Exhibit No. 118

Staff – Exhibit 118
Sarah Lange
Rebuttal Testimony
File No. ER-2021-0312

Exhibit No.:	
Issue(s):	*Rate Design and Class Cost of Service Studies*
Witness:	*Sarah L.K. Lange*
Sponsoring Party:	*MoPSC Staff*
Type of Exhibit:	*Rebuttal Testimony*
Case No.:	*ER-2021-0312*
Date Testimony Prepared:	*December 20, 2021*

MISSOURI PUBLIC SERVICE COMMISSION

COMMISSION STAFF

INDUSTRY ANALYSIS DIVISION

TARIFF/RATE DESIGN DEPARTMENT

REBUTTAL TESTIMONY

OF

SARAH L.K. LANGE

THE EMPIRE DISTRICT ELECTRIC COMPANY, d/b/a Liberty

CASE NO. ER-2021-0312

Jefferson City, Missouri
December 2021

TABLE OF CONTENTS OF

REBUTTAL TESTIMONY OF

SARAH L.K. LANGE

THE EMPIRE DISTRICT ELECTRIC COMPANY,
d/b/a Liberty

CASE NO. ER-2021-0312

REBUTTAL TESTIMONY

OF

SARAH L.K. LANGE

THE EMPIRE DISTRICT ELECTRIC COMPANY,
d/b/a Liberty

CASE NO. ER-2021-0312

Q. Please state your name and business address.

A. My name is Sarah L.K. Lange. My business address is P. O. Box 360, Jefferson City, MO 65102.

Q. Are you the same Sarah L.K. Lange that contributed to Staff's Class Cost of Service (CCOS) and Rate Design Report filed on November 17, 2021 in this case?

A. Yes.

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

A. The purpose of my rebuttal testimony is to respond to The Empire District Electric Company, d/b/a Liberty ("Empire" or "Company") witnesses and Midwest Energy Consumers Group (MECG) witness Kavita Maini concerning Rate Design and Class Cost of Service issues.

Executive Summary

Q. Has Empire taken steps to modernize its rate schedules in this case?

A. Empire has not taken appreciable steps towards consolidating its end-use rate schedules with the generally applicable various rate schedules.[1] Empire has requested to

[1] At pages 17 and 18 of his direct testimony Empire's witness Mr. Gregory W. Tillman discusses some of the commitments made by Empire in its last rate case to explore modernization of its rate structures. At pages 37 – 42 of his direct testimony Empire's witness Timothy S. Lyons discusses the rate structure consolidation studies the Company performed in this case in partial furtherance with its commitments made in the Global Stipulation and Agreement in File No. ER-2019-0374 "14. The Company will submit a rate impact analysis for the alignment of GP/TEB rates in its next rate case. 15. The Company will submit a rate impact analysis for the alignment of CB/SH rates in its next rate case. 16. The Company will propose the elimination of the Feed & Grain rate in its next general rate case." That agreement was not ultimately approved by the Commission.

discontinue Time of Use (ToU) options for customers on the GP, TEB, SH, and PFM rate schedules, and requests to in continue charging the vast majority of its customers on rate structures that do not recognize the impact of time of day on energy pricing or system resources. Instead, Empire requests to introduce a highly-differentiated option to a few hundred of its customers who may choose to participate if they expect bill savings.

Q. How do Staff's ToU and rate structure recommendations differ from Empire's approach?

A. Staff recommends that all customers begin to be billed in a manner that recognizes - at least to some extent - the impact of time of day on energy pricing or system resources. In essence, Liberty hopes that a small number of customers will take actions to make a big difference by opting into a different rate structure and changing their usage to make big savings on their bill. Staff recommends that all customers be charged rates that better align revenue recovery with cost causation, and that will provide customers with information to make choices about when to use energy that will incur lower system costs, or to bear some responsibility for when they use energy that incurs system costs.

Staff recommends combining the GP and TEB schedules to eliminate the end-use distinction that is a relic of historic load-building efforts.[2] Currently, and as requested by Empire, bills of customers served on schedules GP or TEB who take service at Primary voltage are subject to a metering adjustment. This arrangement has presented complications to revenues calculations and Class Cost of Service studies.

[2] Staff recommends creating separate schedules for customers served at Primary voltage versus customer served at Secondary voltage as there is a distinction in the cost to serve these customers based on the level of distribution infrastructure at which they are served and in the level of losses from system voltage to the voltage at which the usage is metered.

The current rate structures, Empire's proposed rate structures, and Staff's recommended rate structures are outlined in the table below:

		Current Rate Structure		Liberty-Requested Rate Structure		Staff Recommended Rate Structure
		Generally Applicable Rate Structure	Is Time Variant Option Available?	Generally Applicable Rate Structure	Is Time Variant Option Available?	Generally Applicable Rate Structure
Residential	**Res.**	Flat Summer with Declining Block Non-Summer, first Non-Summer block equal to Summer rate	Yes, Rider ToU	No Change	Yes, Highly-Differentiated Proposed Schedule RGT	Low-Differential Time Variant
Commercial Building	**CB**	Flat Summer with Declining Block Non-Summer, first Non-Summer block equal to Summer rate	Yes, Rider ToU	No Change	Yes, Highly-Differentiated Proposed Schedule CBT	Low-Differential Time Variant
Small Heating	**SH**	Flat Summer with Declining Block Non-Summer, first Non-Summer block equal to Summer rate	Yes, Rider ToU	No Change	No	
General Power	**GP**	Hours Use with Monthly Demand Charge and Annual Facilities Demand Charge	Yes, Rider ToU	No Change	No	Low-Differential Time Variant
Total Electric Building	**TEB**	Hours Use with Monthly Demand Charge and Annual Facilities Demand Charge	Yes, Rider ToU	No Change	No	
Large Power	**LP**	Hours Use with Monthly Demand Charge and Annual Facilities Demand Charge	Yes, Rider ToU	No Change	Yes, Highly-Differentiated Proposed Schedule LPT	Low-Differential Time Variant

Q. Does Staff recommend reliance on the Empire CCOS as filed by Empire or as modified by any intervener to establish class revenue requirements in this case?

A. No. As discussed below, Staff has concerns with some of the data used to derive allocators in this case, and with the allocators selected for some revenues, expenses, and investment costs. Further, the Empire CCOS Study is based on the Empire Cost of Service as it existed at the time of direct filing, which reflected – among other things - Empire's requested return on equity, cost of debt, capital structure, income taxes, property taxes, fuel expense, purchased power expense, and market energy revenues. These revenue requirement components are not allocated to the classes equally, and it is not a simple matter to adjust a concluded CCOS Study to align to a differently-constituted revenue requirement. Instead, the Commission should take this opportunity to consolidate the end-use rate schedules and broadly implement time-variant rate structures.

Q. Are Empire's requested ToU tracker and FAC modification appropriate?

A. No. While broadly-implemented highly-differentiated time-variant rate structures likely impart revenue and bill volatility, these issues are not of concern in the context of this rate case given the subtlety of the Staff-recommended designs, and the limited applicability of the Empire-requested designs.

Empire's requested time of use rate design and related provisions

Q. What rate design is requested by Empire for Residential and small non-residential customers?

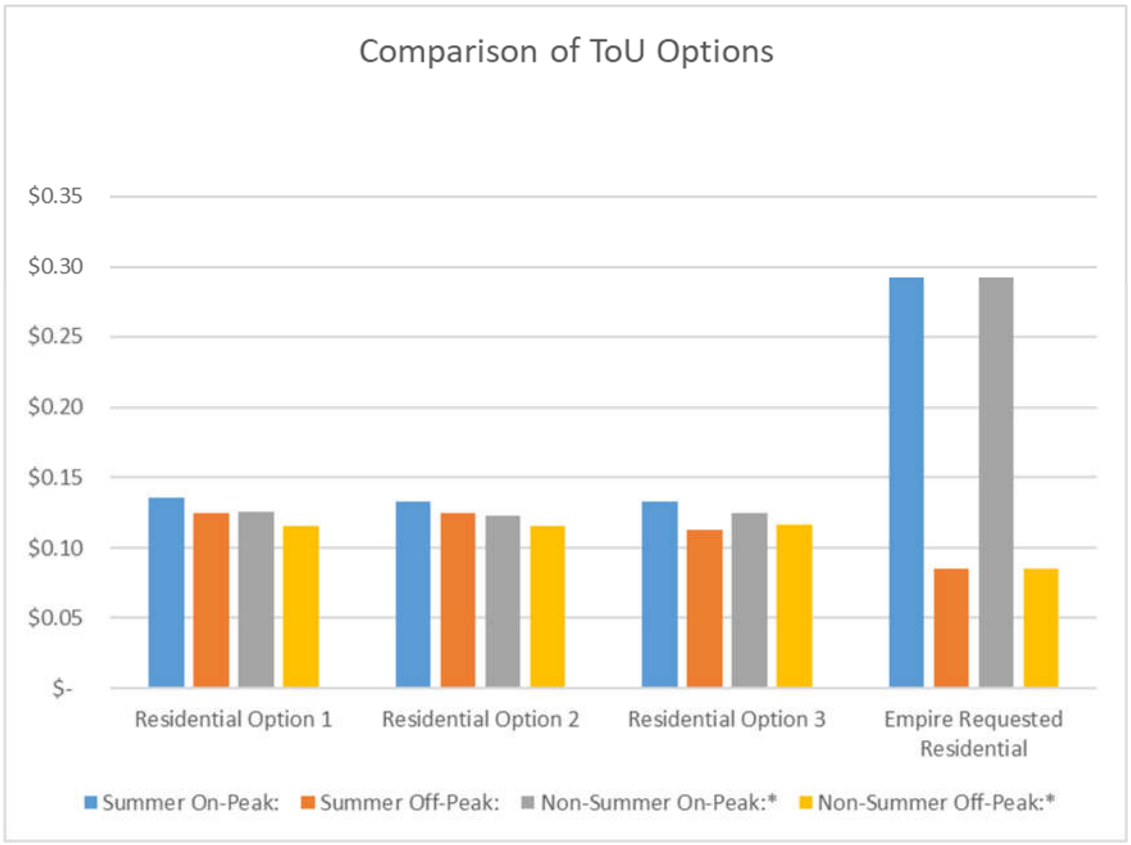
A. The rates requested by Empire for the Residential and CB rate schedules are provided below:

Residential (RG) Class - TOU Rates			Company-Requested General Rate		
Season	Period	TOU Energy Rate ($/kWh)	Season	Block	Energy Rates ($/kWh)
Summer	Mon-Fri, excluding holidays – 2pm to 7pm	$ 0.29288	Summer	1st Block kWh	$ 0.13577
Summer	All Other Hours	$ 0.08490	Summer	2nd Block kWh	$ 0.13577
Winter	Mon-Fri, excluding holidays – 6am to 9am, and 6pm to 9pm	$ 0.29288	Winter	1st Block kWh	$ 0.13577
Winter	All Other Hours	$ 0.08490	Winter	2nd Block kWh	$ 0.10932

Commercial (CB) Class - TOU Rates			Company-Requested General Rate		
Season	Period	TOU Energy Rate ($/kWh)	Season	Block	Energy Rates ($/kWh)
Summer	Mon-Fri, excluding holidays – 2pm to 7pm	$ 0.33894	Summer	1st Block kWh	$ 0.14330
Summer	All Other Hours	$ 0.08865	Summer	2nd Block kWh	$ 0.14330
Winter	Mon-Fri, excluding holidays – 6am to 9am, and 6pm to 9pm	$ 0.33894	Winter	1st Block kWh	$ 0.14330
Winter	All Other Hours	$ 0.08865	Winter	2nd Block kWh	$ 0.12825

Empire's ToU designs are aggressively differentiated. A comparison of the Empire residential rate design to the Staff recommended rate design options[3] are provided in the graph below:

[3] Note, Staff's recommendation is for implementation of a single time-variant rate schedule for each rate class, the "options" reflect options for Commission review in the context of this case, not optional rate schedules for customers going forward.



*Prorated for declining block on Staff Options 1 & 2.

Q. Does Staff recommend Empire's ToU rates be ordered on a mandatory basis for all customers?

A. No.

Q. Are Empire's requested ToU designs appropriate for the design of mandatory rate schedules at this time?

A. No. Empire has not requested that these designs be implemented as mandatory ToU rates, and the billing determinants relied upon by Empire to design the rates are not reliable for purposes of a generally applicable rate. These designs, if mandatory, would cause significant bill risk and volatility to customers, and would not reasonably recover non-avoidable

costs from all customers. Further, these designs, if mandatory, would present a significant risk of under recovery and opportunity for financial windfall to Empire.

Q. Does Staff recommend Empire's ToU rates be ordered available to customers on an opt-in basis, with participation capped as requested by Empire, and with the attendant rate tracker requested by Empire?

A. No. As discussed below, Staff has concerns that these rates if offered on an opt-in basis will be heavily subjected to free-ridership and that few, if any, incremental system benefits will materialize. Staff does not support the rate tracker requested by Empire that would come at a cost to non-participating ratepayers. However, Staff does not object at this time Empire offering the Empire-designed ToU rates on an opt-in basis, with or without its requested caps, so long as the rate tracker is not included.

Q. At pages 9-10 of his direct Mr. Tillman includes the following exchange,

> Q. What are the primary goals associated with the introduction of TOU rates?
>
> A. The over-arching goal is to provide a tool for customers to have more control of their electricity bill. For example, if a customer shifts load from the higher priced on-peak period to the lower-priced off-peak period, she will create a direct reduction to her electric bill. Additionally, another primary goal is supported because she is using system resources more efficiently and reducing the overall cost of providing service to all customers.

Do you agree?

A. No. From the perspective of Staff in providing recommendations to the Commission to establish just and reasonable rates, the primary goal of ToU rates is improved alignment of actual or allocated cost causation and revenue responsibility. I do agree that a goal is more efficient system utilization and reduction of overall required system resources, which would reduce the overall cost of providing services to all customers.

Q. Why is this distinction significant in this case?

A. Empire's requested ToU designs are aggressive. They enable participating customers to avoid costs that are not avoidable to the system, and concurrently, Empire requests that other customers indemnify Empire for the revenue responsibility avoided by the participating customers, through Empire's requested tracker and modification to the fuel adjustment clause.

Q. Is Staff aware of a means to effectively mitigate these risks at this time under the current statutory framework that includes the existence of Empire's fuel adjustment clause?

A. No.

Q. Are the hourly class loads Empire relied upon precise enough to accurately develop highly-differentiated ToU rate designs?

A. No. At this time, Empire's average-mean multijurisdictional approach with single-variable scaling for ToU determinants is inappropriate for development of highly-differentiated ToU rates.[4] However, for lower-differential ToU rates, as recommended by Staff, the determinants appear to be sufficient.

Q. How could Empire's determinants be appropriate for developing Staff's recommended ToU design, but not Empire's requested ToU design?

A. Misplacing one hour's load in the Empire design displaces revenues by a net of $0.21-0.25, while under the Staff design that net difference is a fraction of that amount. That one hour under Empire's design could be worth roughly $125 per customer per year. Empire's requested caps on participation do limit the exposure of the company to either losses

[4] Additional discussion concerning Empire's determinant derivation is provided in the section "Empire's peak information and class makeup."

or windfalls, but do not protect participating customers from potential bill impacts of higher-than-average on-peak usage.

Q. Is it reasonable to exclude holidays and weekends?

A Based on Staff's observations at Empire and other utilities, peaks can and do occur on holidays and weekends. Labor Day, July Fourth, and Christmas day, as well as adjacent weekend days, and summer weekends in general, have provided peak or near-peak loads at Missouri utilities and at Midcontinent Independent System Operator ("MISO") and the Southwest Power Pool ("SPP"). Staff suggests that if the Empire design is authorized, that any initial authorization should include weekends and holidays.

Q. At page 13 of his direct testimony Mr. Tillman explains that:

> The proposed TOU rates were designed based on the underlying embedded costs associated with the respective classes for which the TOU rates are being developed. In other words, the TOU rates are revenue neutral to the standard rate classes. This means that, on average, customers in the class would pay the same for their consumption regardless of the rate they choose. If an average customer switches from the standard rate to the TOU rate and does not modify his usage pattern, his bill for the TOU rate will be the same as if he were billed on the standard rate.

At page 14, he continues,

> If a customer shifts consumption from the on-peak period to the off-peak period relative to average consumption, the base rate revenue related to that consumption will be decreased. Similarly, if the customer's consumption shifts from the off-peak period to the on-peak period, the base rate revenue will increase. These changes in revenue include shifts in both the base fuel portion of the customer bill and the non-fuel base rate portion of the customer bill.

Do these statements cause potential misunderstandings concerning the meaning of an "average" customer?

A. These statements are accurate with regards to a fictitious "average" customer, but this fictitious average customer is in no way a typical customer. While this clarification is necessary in any case when there are questions of "average" customer impact, the shortcomings of simple averages are very pronounced when ToU rate structures are introduced. Mr. Tillman's "average" customer uses 250 kWh on peak each summer month, 772 kWh off peak each summer month, 196 kWh on peak each non-summer month, and 826 kWh off peak each non-summer month. I would be shocked if a single customer fit these usage metrics, and I don't believe Mr. Tillman is implying that a customer – much less all customers – does fit these metrics. What Mr. Tillman has done is to use the multi-jurisdictional hourly load shape, scaled to Missouri-jurisdictional usage, to estimate the billing determinants for the residential rate schedule as a whole. However, customers who opt-in to these rates are unlikely to match the class average consumption pattern. Customers who opt-in to these rates are likely to already have usage patterns that are predominately off-peak, or that can easily be shifted to off-peak, or that have plans to significantly grow their on-peak load.

Q. For customers with predominantly off-peak existing usage, what is the advantage to opting into these rates?

A. If those customers can maintain that usage pattern, those customers will avoid paying revenue they would under the existing generally applicable rate designs, in other words, that customer will save money.

Q. For customers with usage that can easily be shifted to off-peak, what is the advantage of opting into these rates, versus the mandatory ToU design recommended by Staff?

A. It is a question of how easily usage can be shifted. For customers who typically run the dryer, the dishwasher, turn on the air fryer, and stand in front of an open refrigerator

pondering cooking options when they get home at 6:00, a few behavioral changes could shift at least a portion of that load to an off-peak time. Perhaps at the Staff recommended rate they will delay running the dryer and dishwasher, but will continue their other behaviors. Perhaps at nearly thirty cents per kWh, they will forego cooking a few nights a week and get take out instead.

Q. If that more substantial on-peak energy consumption avoidance does occur, doesn't that mean that system costs are avoided or reduced?

A. It depends which costs are discussed, and over which term. Using this cooking example, reducing the amount of energy that Empire purchases from the SPP IM in high-cost hours will, all else being equal, reduce the net energy cost that flows back through the FAC. However, unless that customer happens to elect to forego cooking on what happens to be a peak day for capacity-determination purposes, that decision will not enable a capacity sale. And unless that customer happens to forego cooking on each peak day for decades, that decision will not result in the early retirement of a generation station, or the reduction in the size of distribution or transmission equipment in that customer's vicinity.

Q. Is it reasonable to rely on embedded generation costs for designing a highly-differentiated ToU rate as proposed by Empire?

A. No. Mr. Tillman allocates the entire "excess" portion of the Average and Excess Production cost allocation to the on-peak rate. While this facially seems logical, it is important to think through how the cost causation aligns with cost recovery and revenue responsibility. Foremost, approximately 1/3 of the production revenue requirement is related to non-dispatchable generation that cannot rationally be allocated under an A&E production allocator, and is unlikely to be operating at the time of summer on-peak energy sales.

More concretely though, consider the following hypothetical: if all Empire customers with even-numbered street addresses invited all Empire customers with odd-numbered street addresses over on hot summer afternoons, and all Empire customers with odd-numbered street addresses invited all Empire customers with even-numbered street addresses over on cold winter mornings and evenings, one half of the revenue responsibility of the residential rate schedule for the excess component of production capacity could be avoided. Empire's plants would still exist, even if the retirement dates of some units may be accelerated. Empire's investors would still expect return on and of investment in those plants, but the revenue responsibility would be halved, and the cost recovery would be halved. Empire's proactive solution to this absurd result is to request a tracker to protect that revenue that the customers avoided contributing per the design of the ToU rate Empire has requested.

Q. Is this hypothetical a realistic outcome of this case?

A. No, it is simply illustrative of the problem of treating costs that are not avoidable in the short term as avoidable in the short term for purposes of designing ToU rates. In addition to the intense coordination on the part of Empire customers that this exercise would require, it would also not be possible given Empire's requested cap on the number of participants in ToU rate design, and would assume that the majority of participants are not free-riders to the rate design.

Q. Rather than significant amounts of the stable generation revenue requirement, are their alternative cost-based justifications for a ToU design that is less moderated than that proposed by Staff, and more moderated than that proposed by Empire?

A. Yes. A reasonable cost-based means of shifting revenue recovery to on-peak sales that is consistent with the regulatory compact would be to shift the some portion of the

revenue requirement associated with the return on equity and related income tax expense to recovery from on-peak sales. This arrangement essentially ensures that a positive return is generated by the utility, but retains the risk of higher and lower than expected sales.

Q. Under Empire's proposal, Rider ToU is eliminated and new rate-schedule specific ToU options are created for Residential, CB, and LP customers. What options would exist for customers currently served on the GP, TEB, SH, and PFM rate schedules?

A. It is my understanding that no ToU option would exist, for this reason, Staff recommends retention of Rider ToU.

ToU Best-Bill Guarantee and ToU Tracker Request

Q. At page 12 of his direct testimony, Mr. Tillman describes the operation of a "best-bill guarantee" for customers that opt into the ToU rates as:

> . . . if, after 12-months of receiving service on the TOU rate, the customer has paid more under the TOU rate than they would have under the standard tariff rate, the Company will calculate the difference and refund that amount to the customer in the form of a bill credit. Following the customer's first year on the TOU rate, the customer may switch back to the standard rate or remain on the TOU rate without the benefit of the best-bill guarantee.

Is this proposal appropriate?

A. No. As an opt-in rate, customers should bear the risk that they will not financially benefit from participation in the rate. However, Empire should fully educate customers prior to enrollment in the rate, and take reasonable steps to ensure that customers understand the rate. Given the limited enrolment, a mid-month check in, especially during high-usage months, may be a useful tool to ensure that customers for whom the rate is not a good fit have an opportunity to exit the rate. If it can be accommodated by Empire's billing system, Staff would not object to a one-month grace period under which a customer could revert

to the default rate for that customer going forward, and for a one month lookback. For example, if a customer enrolled on the opt-in schedule in April and stays on that schedule until July, but is overwhelmed by the July bill, Staff suggests a reasonable outcome would be to rebill the customer on the default schedule and allow the customer to return to the default schedule for service going forward.

Q. At page 16 of his direct testimony, Mr. Tillman requests on behalf of Empire, Commission authority to "calculate a non-fuel revenue impact and track the revenue impact through a newly established retail purchased power tracker," related to the Company's understanding of revenue erosion associated with customer migration to the ToU rates. He continues "The Company will calculate the non-fuel portion of the base rate for each customer's monthly consumption at the standard rate and at the TOU rate and determine the difference in the revenue. These differences will be accumulated in a retail purchased power tracker." Is this request reasonable?

A. No, this request is unreasonable for several reasons. In addition to concerns discussed by Staff witness Kimberly K. Bolin, this request is unreasonable and unnecessary because, (1) The dollars at stake do not warrant this level of revenue protection scheme in a regulatory environment in which rate regulated utilities are assumed to bear some level of revenue risk; (2) the requested best bill guarantee would potentially result in a mix-match of bills that are truly billed on ToU or not, which would complicate calculation of the tracker balance or render its intention moot, and (3) the load-building and load-shifting that a ToU rate may induce represent new revenue, for which there is no justification to make Empire "whole."

Q. How is load building a concern related to the tracker request?

A. Assume the "average" customer that is the basis for the Empire rate design acquires an electric vehicle. That customer will likely increase their electric consumption significantly, and much of the usage will presumably be off-peak. That new load is new load, period. There is no justification to make Empire whole where the load was not considered in establishing rates in this case. This rationale also applies to load-shifting, in addition to load-building. For example, if customers pre-cool or pre-heat homes either manually, or using smart thermostats or thermal energy storage, that additional load is new revenue to the extent that more energy is required to heat or cool air or mass ahead of time than is required to heat or cool air just in time.

FAC base factor

Q. At page 30 of his direct testimony, Aaron J. Doll states:

> The current FAC tariff calculates a single Net Base Energy Cost ("NBEC") by multiplying the Net System Input ("NSI") by the Base Factor ("BF"). The Company's proposal in the TOU tariff is to establish an On-Peak BF and an Off-Peak BF. To accommodate this structure into the FAC, an adjustment needs to be made to the NBEC to reflect the different BF for TOU customers.

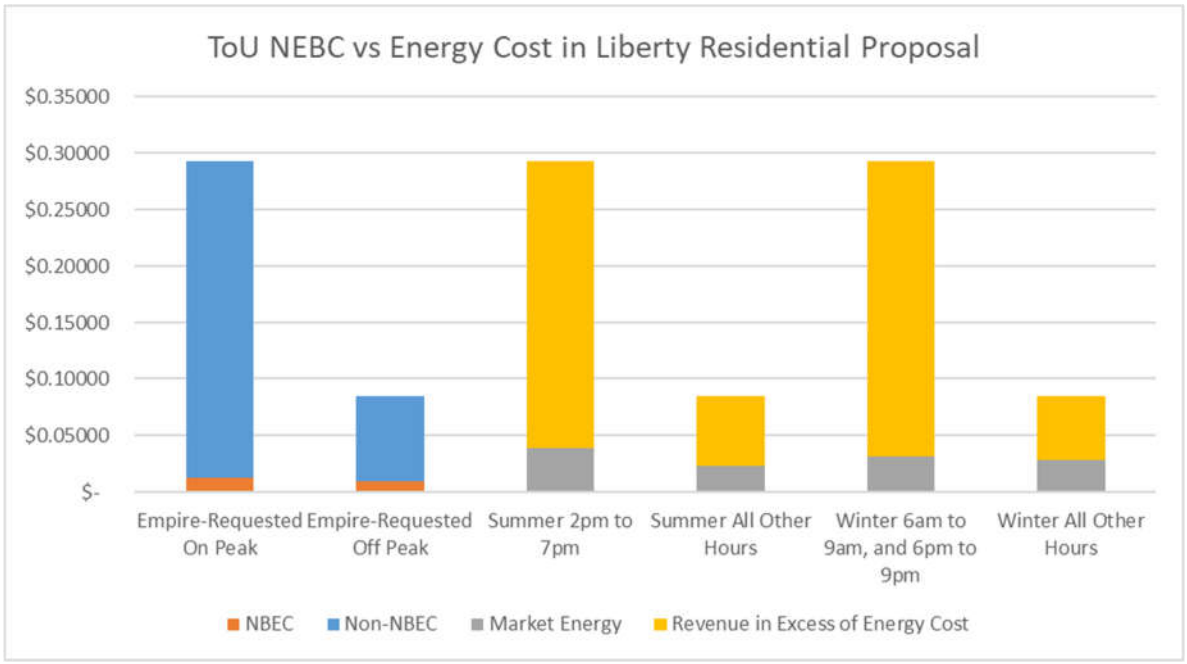
He continues:

> The NBEC is defined in 20.CSR 4240-20.090 1.U. as the fuel and purchased power costs net of fuel-related revenues billed during the accumulation period in base rates. Since TOU customers have a different base rate, in part due to base fuel revenue, it is appropriate to calculate the NBEC accurately to reflect the different level of the fuel component in base rates. If the Company would continue to calculate NBEC as NSI*BF, a mismatch would be created that would cause the Company to under-recover or over-recover fuel, which would have an impact on all customers.

Do you agree that a mismatch will occur in recovery of fuel?

A. No. While a strict mismatch may result from the perspective of customers participating in a ToU rate, no mismatch occurs within the NBEC from the perspective of the Company. Further, as it relates to either the ToU rate designs requested by Empire in this case or the designs recommended by Staff in this case, it is important to understand that given the relative magnitude of Empire's requested NBEC at secondary voltage, the Empire's requested ToU rate elements, the cost of market energy, and the other revenues in the NBEC that offset the cost of market energy, even if a mismatch did exist it is not of a magnitude to necessitate regulatory remedies.

The hourly average LMPs by month associated with Empire's load range from roughly $0.0119/kWh to $0.05/ kWh. Using the LMPs used in Staff's fuel run, adjusted to secondary voltage, the average cost of energy for each Empire ToU time period is $0.0413, $0.0247, $0.0340, and $0.0301, for summer on and off peak, and non-summer on and off peak, respectively. Empire's workpapers find a cost of energy for native load of $0.02715, which is generally consistent with these ranges, however, to create the NBEC, the cost of energy is netted by other energy revenues and included with other energy-related costs to result in a simple NBEC of $0.01080 for the non-ToU NEBC. So while the wholesale cost of energy could cost-justify summer ToU differentials of approximately a cent and a half in the summer and half a cent in the non-summer using the Empire-selected time periods, only three-tenths of a cent of differential is captured in the Empire ToU NEBC design.



Q. While one way that ToU rates can be derived is through differences in the average costs of fuel, does that mean that the bills collected pursuant to that rate are collecting those literal costs of fuel?

A. No. Once a revenue requirement has been established it is simply a revenue requirement and under accepted regulatory practices those collected dollars are purely fungible unless specifically ordered otherwise. So while a mismatch as noted by Mr. Doll would occur from the perspective of ToU customers if the Commission ordered Empire to track the energy costs allocated to each customer class and each rate element, such a mismatch is not a foregone conclusion and does not result from the perspective of the Company. The rates designed by Mr. Tillman are differentiated not only by the average net energy cost of each time period, but also by the inclusion and exclusion of the "excess" portion of capacity.

Q. Is it possible that the FAC could be used as a tool to mitigate revenue risk to the utility and bill risks to customers associated with more highly-differentiated mandatory ToU designs if eventually implemented?

A. Possibly. If language associated with the differences in the average costs of energy were included in relevant Commission orders, yes, I believe so. Note that this approach would not provide relief to the exact customers who over-contributed during severe weather nor seek utility indemnification for the exact customers who under-contributed during mild weather, however, it does merit further study.

Q. Does Staff support the FAC ToU NEBC provision?

A. Not at this time. If the Commission does proceed with incorporation of such a provision the Empire design is inappropriate.

Q. If the ToU NBEC is approved for implementation against Staff's recommendation, what adjustments are necessary?

A. If the ToU NBEC is approved for implementation with Empire's ToU proposal, the amounts would need to be adjusted to correspond with the final NBEC and ToU rates found for the case, and the appropriate adjustment would be to the FAC component charged to ToU customers, not to the NBEC experienced by the Company.

Empire's CCOS Study

Empire's peak information and class makeup

Q. What are Staff's concerns with Empire's use of class peaks within its CCOS?

A. Empire's study, as many traditional CCOS Studies do, relies heavily on peak hour class loads. Empire's peaks are derived from a load research process that relies on an analysis of its load spread across Missouri, Kansas, Arkansas, Oklahoma, and wholesale sales,

with a single factor applied to estimate jurisdictional loads and peaks for the Missouri portion. Whatever the reliability of this process is for creation of total NSI shapes, it is less reliable when reduced to a class-level, particularly with the granularity of Empire's CCOS classes. Further, rate switching is common between Empire's GP and TEB rate schedules and Empire's CB and SH schedules. Also, during the test year, there was net switching from CB to Residential. Studying these rate schedules as separate rate classes for peak purposes increases the likelihood of error, and ignores the likelihood that the Noncoincident Peak ("NCP") of the combined rate schedules is less than the additive NCP of the rate schedules combined. Finally, Staff's normalized and annualized revenues and NSI varied from Empire's, and Staff considers its results more reasonable.

Q. Wouldn't CB/SH and TEB/GP rate switching only impact the results between those rate schedules in the CCOS study results?

A. No. Because of the reliance on peak allocation within the Empire study as the basis for many "external" allocators upon which many "internal" allocators are derived, this issue permeates the study results.

Q. Is the process Empire used to estimate peaks and class loads precise enough to create a market energy allocator as relied upon by Staff in other CCOS Studies?

A. No. At this time, Empire's class data is not precise enough for assignment of market energy costs.[5]

[5] Similarly, this data is not precise enough for the creation of highly-differentiated ToU rate designs.

Unreasonable Allocator Selection in Empire CCOS Study

Q. Were the allocators selected by Empire for the accounts associated with the stable production-related revenue requirement, variable production-related revenue requirement, the cost of market energy, and the proceeds of energy market participation reasonable and reflective of internally consistent logic?

A. No. It is also not reasonable to allocate generation revenue requirement that has been incurred for reasons other than provision of capacity as capacity-related. The Empire study allocators selected for the accounts associated with the stable production-related revenue requirement (capital costs, a portion of operating expenses, a related allocation of property tax) and are based on an assumption that the plant was built primarily for meeting peak capacity requirements. The inequity of this allocator selection is compounded by the fact that a significant portion of the production facilities in the Empire fleet have low or no costs or expenses that vary with the number of kWh generated.

Q. Is it reasonable to allocate the capital costs of low- or no-variable cost generation based on class capacity requirements?

A. Generally, no. It may be possible to conduct a study under which specific generation facilities are allocated entirely or proportionately to a given class and all costs, expenses, and revenues associated with that facility are proportionately allocated to that class, however that is not how Empire treated production facilities in its study.

Q. How much of Empire's generation revenue requirement is related to non-dispatchable resources with low- or no-variable costs of generation?

A. Based on Staff's accounting schedules, approximately 1/3 of the production rate base and depreciation expense is related to non-dispatchable resources such as wind that have

essentially no expenses that vary with the number of kWh generated. The most reasonable and simplest allocation approach to apply within the context of Empire's CCOS would be to allocate non-dispatchable generation on class energy requirements, which produces the same result as levelizing the stable revenue requirement of the facility over the kWh produced by the facility.

Q. Why is it important to consider how both stable and variable generation costs, including fuel, are allocated when allocating the cost of market energy, and the proceeds of energy market participation?

A. Today Empire participates in the SPP integrated market. It is fundamentally unfair to charge one group of customers for the costs of building and maintaining a power plant, but to provide the sales revenue from that power plant to another group of customers. This is acutely true where generation with little to no marginal costs such as fuel are concerned. Specifically, under Empire's allocation, the Residential, CB, SH, and Lighting rate schedules are paying for 58% of the wind but only receiving 49% of the wind revenue. Conversely, the LP, GP, TEB, and Feedmill rate schedules are paying for only 43% of the cost of wind, but receiving 52% of the wind revenue.[6] This is fundamentally unfair, and represents too large a portion of Empire's revenue requirement and net energy revenues to ignore or dismiss.

Q. Is it a simple matter to realign net revenues to align the revenue requirement benefits of capacity with the cost responsibility for that capacity?

A. Unfortunately, no, it is not simple to do this, particularly in the context of an A&E study. The A&E study predates the development and implementation of today's integrated energy markets, such as the SPP IM in which Empire participates. Because hourly loads are not available to assign market energy expenses to the classes by the hour in which

[6] Values are rounded.

those expenses are experienced, there is no reliable way in this case to allocate the value for energy that was obtained. Further there is no way to disaggregate fuel costs for the hours in which Empire's load used energy from the fuel costs from the hours in which Empire's generation exceeded its load.

Q. How did Empire allocate fuel expenses and the revenues from energy sales, Renewable Energy Certificate Sales, and Production tax credits?

A. Empire's approach nets all "energy" related costs and revenues.[7] This approach is not appropriate where a utility's generation does not more or less align to its native load, nor where a utility participates in an integrated energy market. In this case, Empire does both.

Q. Do these concerns effect only the revenue requirement driven by production accounts?

A. No. Most of the internally-created allocators in the Empire study rely on the plant allocations within the production accounts.

Empire's distribution classification

Q. Is it reasonable to allocate the costs of Empire's company-use Electric Vehicle ("EV") charging equipment and current publicly available EV charging equipment solely to Empire's customers that are served at secondary?

A. No, these costs are caused by a management decisions that are unrelated to the distribution infrastructure requirements of customers in general, let alone the distribution infrastructure requirements of only those customers served at secondary voltage.

[7] Empire Response to Staff Data Request 0155 "REQUEST: Within the fuel model, how is the revenue that is calculated for North Fork Ridge, Kings Point, and Neosho Ridge affected by Paygo, the Energy Hedge Agreement, revenue from REC sales, and/or PTCs? RESPONSE: PTC and REC sales revenue is added to the market revenue to produce the Total Revenue in the fuel model. There is no revenue for Paygo or the Energy Hedge Agreement in the fuel model."

Q. Are Empire's distribution classifications generally reasonable?

A. The classification of accounts between primary and secondary is an improvement over prior cases and other utilities. Empire did not attempt to classify customer-specific infrastructure associated with service to primary customers as customer-related for allocation among primary customers. Empire is cooperating with the Staff to further improve this process in future cases. Empire's classification of significant amounts of distribution plant as customer-related is against the emerging industry best practices, and should be improved in future cases through application of the "basic customer" approach.

Q. Do these concerns effect only the revenue requirement driven by the distribution accounts?

A. No. Most of the internally-created allocators in the Empire study rely on the plant allocations within the distribution accounts.

Reliability of Empire CCOS Study

Q. Is the Empire CCOS Study reliable for introducing changes to the revenue responsibility of the rate classes in this case?

A. Generally, no. In addition to the discussions above, Staff is concerned that the subscription solar revenue requirement appears to be generally allocated to the rate classes instead of being more directly assigned for recovery from the benefiting customers, and regulatory expense is allocated as related to class-allocations of labor instead of a more reasonable allocator such as revenue or sales.

Q. Why didn't Staff prepare a modification to the Empire study to address these issues?

A. The issues identified as Staff's concerns with Empire's peak information and class makeup so undermine the Empire study that reasonable results are not possible from simply changing which costs and expenses are allocated by the unreliable allocators. For example, within the Empire study, unreasonable classes were selected to develop unreliable class loads, which were used to develop unreliable class peaks, which are then used to allocate non-dispatchable generation and to unreasonable allocate the proceeds of generation. Incorporating an attempt to disaggregate market activities would not cure the underlying problem with the reasonableness of the peaks and class makeup.[8] However, Empire has now fully deployed AMI metering, and the highest-quality load data obtained in the history of the State of Missouri will be the basis of its next rate case. This case presents an excellent opportunity to effectively set aside an attempt to debate detailed results based on broad-brush inputs, and to instead focus on rate design elements that will better recover costs from customers while also educating customers as to the basic drivers of their electric bills.

Responses to MECG

Q. Does Ms. Maini's adjustment to the Empire study address Staff's concerns with the reliability of Empire's study for shifting class revenue responsibilities?

A. No.

Q. Is it reasonable to rely on Edison Electric Institute (EEI) average bill data to understand the bill increases that may or may not be experienced by particular customers as discussed extensively in Ms. Maini's testimony?

[8] These same factors, among others, prevent the reasonable implementation of high-differential ToU rates at this time. Neither the available hourly load information, nor the underlying cost information is precise enough to move beyond the ToU rate designs recommended by Staff in the Rate Design Report.

A. No. EEI data is useful for understanding a utility's revenues, but not for understanding a customer's bills. Changes in customer makeup, for example, rate switching or growth of particular customers or the number of similar customers, within a rate schedule can drive apparent changes in EEI results that are not indicative of the experiences of customers who remain in a rate schedule.

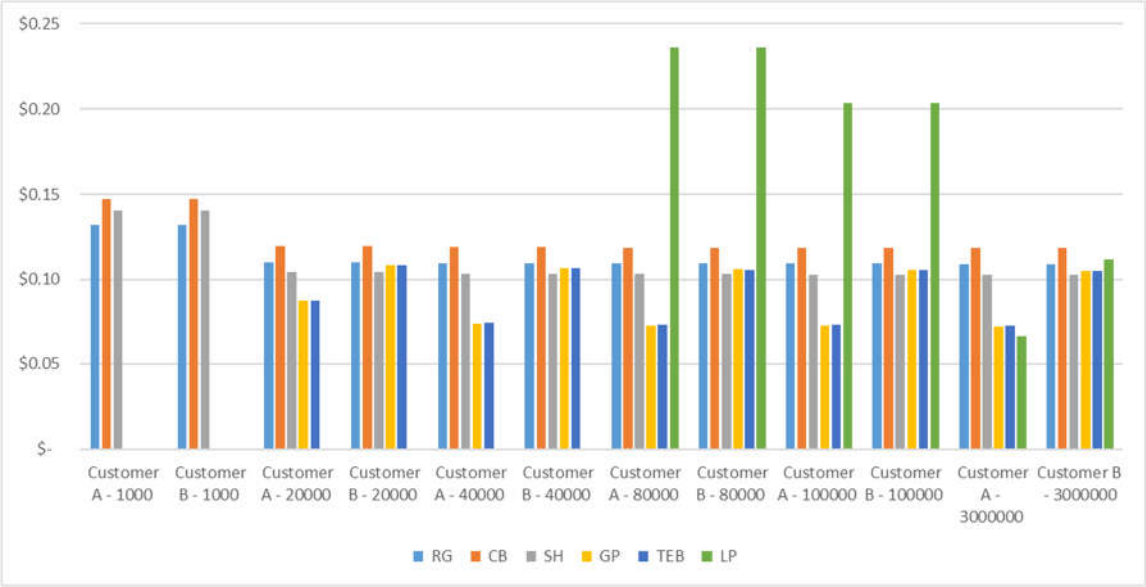
Q. At page 11 of her direct testimony, Ms. Maini states,

> 12 Q. FOR A GIVEN REVENUE REQUIREMENT, WHAT IS THE IMPACT OF CLOSELY ALIGNING RATES WITH EACH CLASS' COST OF SERVICE?
>
> A. Provided that the class cost of service study is properly developed to reflect cost causation, closely aligning rates with each class' cost of service fulfills the important goals of promoting equity among classes and encouraging economic efficiency.

Is this accurate, and does it tell the full story?

A. This is no longer fully accurate in today's regulatory world, in that a modern class cost of service study encompasses significant offsetting revenues, and in that rates can be more closely aligned to determinants across classes given the advent of cost-effective advanced metering. Today, a customer's class is no longer the best tool for pricing a customer's energy. Historically, it was prohibitively expensive to meter and bill exactly how much energy each customer used at all times. Classes were used as a shortcut for setting rates, and class distinctions at Empire were based on annual demand, and on end use. The general premise of a class is a simplifying assumption that customers within a class used energy similarly enough that they could be billed based on either the total usage in a month or the highest usage in an interval in a month, or a simple relationship of those amounts, without regard to the time of day that energy is actually consumed or the time of day at which a customer experienced its peak demand.

To illustrate the relationships between rate schedules (class), demand, energy usage, and a customer's bill, Staff calculated Empire bills for two fictitious customers - a data center, ("Customer A") with a 95% load factor, and a manufacturer ("Customer B") with a 45% load factor. Staff calculated the bills for the same load profiles at various levels of usage, representing the level of variation from some of the smallest consumption customers on the Empire system, up to the size of some of the largest customers on the Empire system. Note that these bills would result regardless of the time of day at which the customers used energy or experienced their peak demand – meaning the 45% load profile bills would apply equally to a customer peaking at 4 pm with all usage between 8 am and 8 pm as it would to a customer peaking at 4 am with all usage between 8 pm and 8 am. To facilitate comparisons, the annual bills for each divided by the annual consumption for each are provided below at varying levels of usage.



Note, in the Res., CB, and SH rate schedules, the customers pay the same average rate on each rate schedule despite their very different usage patterns. Note that on the GP, TEB, and LP rate schedules, at a given level of usage, the average rate disparity for Customer A and

Customer B ranges from $0.021 to $0.0453, with the smaller disparity on the higher average cost rate, and the lower disparity on the higher average cost rate. This result is not facially reasonable. Grouping customers into classes based on more or less the average annual demand is no longer the best tool for aligning a customer's rates with their cost causation, with the advent of cost-effective AMI metering, billing customers by the energy they consume is now capable of providing a more meaningful price signal than billing customers based on the rate schedule under which they are served.

Q. At page 12 Ms. Maini states:

> 4 Q. HOW IS ECONOMIC EFFICIENCY ACHIEVED?
>
> A. If retail rates align with cost of service then they provide accurate pricing signals that drive consumer behavior, which in turn results in more efficient use of the system and minimizes system costs. For example, in instances where the class rates are set above cost, say for the industrial class, the resulting rates would incent customers in this class to reduce production or shift production elsewhere. Such a consequence results in higher costs for all customers since the utility's fixed costs would need to be recovered from lesser billing determinants. On the other hand, for classes where rates are set at artificially low levels, such as Empire's residential class, then the rates are not sending the price signal that those customers should engage in energy efficiency measures.
>
> In instances where the class revenue responsibility is at cost of service but rates are designed such that there is recovery of fixed costs through volumetric charges, then the pricing signals are distorted and have the potential once again of sending inappropriate cost signals. For example, if fixed generation costs are recovered through variable charges then the demand charge is kept artificially low, thus implying that building generation is cheaper than is actually the case. Similarly, if the energy charge is artificially high then there is an implication that energy costs are more expensive than is actually the case. Such a signal could then result in customers choosing to use less energy but contributing more to peak conditions. This has the effect of increasing the need for capacity thereby increasing system costs, which once again, must be recovered from customers through higher rates.

Does this provide an accurate framework for considering achievement of economic efficiency in energy pricing?

A. This view is not accurate in the context of embedded cost rates and within the parameters of Missouri energy regulation and Empire's existing regulatory mechanisms. Most blatantly, this view ignores the impact of the revenues from energy sales, REC sales, and PTCs to reduce the net embedded energy cost. Within its CCOS, Empire has classified these costs as energy-related, however, they are not related to the energy requirements of Empire's load.

Q. Is Ms. Maini's "correction" of Mr. Lyons' load factor/A&E calculation including the treatment of interruptible credit value advocated by MECG internally consistent in terms of the treatment of the net value of capacity & energy-related costs and revenues?

A. This relationship requires further study, but does not appear internally consistent.

Q. MECG relies on the NBEC calculation to determine the level of "energy" costs in energy rates. Is this reasonable?

A. No. This approach is the result of applying the cost of market energy that has been offset by other revenues to rate design. This approach is problematic in the context of class cost of service and the ToU NBEC, as discussed above. It is also inappropriate in the context of rate design. Adjusting the NBEC to remove revenues and reduce fuel by the simple proportion of load to generation results in an NBEC of roughly $0.042 per kWh. The net energy cost value that MECG cites in its discussion includes $14 million in transmission revenues, $221,928 in sales of RECs, and a net of approximately $165 million in off system sales revenues net of excess fuel costs. It is not reasonable to ignore the actual incremental cost of obtaining energy in favor of that cost, minus unrelated revenues.

Q. Does this conclude your rebuttal testimony?

A. Yes.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the Request of The Empire District Electric Company d/b/a Liberty for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customers in its Missouri Service Area	)))))	Case No. ER-2021-0312

AFFIDAVIT OF SARAH L.K. LANGE

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW SARAH L.K. LANGE, and on her oath declares that she is of sound mind and lawful age; that she contributed to the foregoing *Rebuttal Testimony of Sarah L.K. Lange;* and that the same is true and correct according to her best knowledge and belief.

Further the Affiant sayeth not.

Sarah L.K. Lange
SARAH L.K. LANGE

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 20th day of December, 2021.

Dianna L. Vaught
Notary Public

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: July 18, 2023
Commission Number: 15207377