Exhibit No.:	_____
Issue(s):	Response to KCPL's MEEIA application/ Equitable Energy Efficiency Baseline/ WattTime: Automated Emissions Reduction ("AER")/ Pay As You Save ("PAYS®")/ Urban Heat Island Mitigation
Witness/Type of Exhibit:	Marke/Rebuttal
Sponsoring Party:	Public Counsel
Case No.:	EO-2019-0132

REBUTTAL TESTIMONY

OF

GEOFF MARKE

Submitted on Behalf of
The Office of the Public Counsel

KANSAS CITY POWER & LIGHT COMPANY

KCP&L GREATER MISSOURI OPERATIONS COMPANY

CASE NO. EO-2019-0132

** **

Denotes Confidential Information that has been Redacted

August 19, 2019

Non-Proprietary Version

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Kansas City Power & Light Company's Notice of Intent to File an Application for Authority to Establish a Demand-Side Programs Investment Mechanism	))))	File No. EO-2019-0132

AFFIDAVIT OF GEOFF MARKE

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Geoff Marke, of lawful age and being first duly sworn, deposes and states:

1. My name is Geoff Marke. I am a Regulatory Economist for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my rebuttal testimony.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Geoff Marke
Chief Economist

Subscribed and sworn to me this 19th day of August 2019.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

JERENE A. BUCKMAN
My Commission Expires
August 23, 2021
Cole County
Commission #13754037

Jerene A. Buckman
Notary Public

My commission expires August 23, 2021.

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REBUTTAL TESTIMONY

OF

GEOFF MARKE

KANSAS CITY POWER & LIGHT COMPANY
KCP&L GREATER MISSOURI OPERATIONS COMPANY
CASE NO. EO-2019-0132

I. INTRODUCTION

Q. Please state your name, title and business address.

A. Geoffrey Marke, PhD, Chief Economist, Office of the Public Counsel ("OPC"), P.O. Box 2230, Jefferson City, Missouri 65102.

Q. What are your qualifications and experience?

A. I have been in my present position with OPC since 2014 where I am responsible for economic analysis and policy research in electric, gas and water utility operations.

Q. Have you testified previously before the Missouri Public Service Commission?

A. Yes. A listing of the cases in which I have previously filed testimony and/or comments before the Commission is attached in Schedule GM-1.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of this testimony is to respond to Kansas City Power & Light Company ("KCPL-MO") and KCP&L Greater Missouri Operations Company ("KCPL-GMO," or collectively "KCPL" or the "Companies") "Missouri Energy Efficiency Investment Act" ("MEEIA") Cycle III application. This testimony will focus on the following sections within KCPL's Missouri's application including:

- KCPL's Proposed MEEIA in Context
    - Avoided Capacity Costs: "We'd start with zero."
    - Redistribution: Winners & Losers
- Program Modifications
    - Energy Efficiency Programs
    - Demand Response Programs

- Low-Income Programs
- Company proposed Research and Pilot
- Evaluation, Measurement and Verification ("EM&V")

- Alternative Recommendations
  - Default MEEIA Level
  - Urban Heat Island Mitigation
  - Pay As You Save ("PAYS®")
  - WattTime: Automated Emissions Reduction ("AER")
  - Equitable Energy Efficiency Modeling

My silence in regard to any issue should not be construed as an endorsement of KCPL's position.

Q. Could you explain why you are referring to KCPL and GMO as one entity ("KCPL" or the "Companies") for this filing?

A. The short answer is because case No: EO-2019-0133("GMO's MEEIA application") was closed and consolidated into Case No: EO-2019-0132 ("KCPL's MEEIA application"). Effectively, KCPL and GMO are being treated as one MEEIA application in an attempt to make the combined MEEIA applications "better" and to recognize that the Southwest Power Pool ("SPP") looks at KCPL and GMO as one entity for resource planning purposes as of 2018.

It is worth noting that OPC specifically argued in favor of undertaking a consolidation cost study and proposal for consolidation of both KCPL and GMO in their next respective filed rate case. To be clear, we argued that the Company be consistent with its Integrated Resource Plan ("IRP") modeling and SPP reporting. Since that time, the recommendation has only been further substantiated by the Company's actions, notably the consolidation of its MEEIA applications and its justified rationale for prematurely stranding the Sibley 3 power plant twenty-two years before the end of its useful life as argued in case No. EC-2019-0200.

Q. What was the Company's response to OPC's consolidation request?

A. In Case Nos: ER-2018-0145 and ER-2018-0146 Company witness Darrin R. Ives stated:

> While KCP&L and GMO operate on a consolidated basis in many respects, there are numerous instances where KCP&L and GMO are operated and administered separately from one another. Examples include but are not limited to: the Fuel Adjustment Clause ("FAC"), **Missouri Energy Efficiency Investment Act ("MEEIA") programs,** and the Renewable Energy Standard Rate Adjustment Mechanism ("RESRAM", which is in place only for GMO at this time). Consolidation of these cost recovery mechanisms and programs, while possible, needs to be done carefully in order to preserve equity between the KCP&L and GMO customer groups and it is unlikely that consolidating everything could occur in one fell swoop. **The KCP&L and GMO generating fleets remain separate and are identified separately on the books and records of KCP&L and GMO, respectively**. (emphasis added).[1]

Q. Was this issue addressed in a stipulation and agreement from that rate case?

A. Yes. On September 19, 2018 a non-unanimous partial stipulation and agreement settling the revenue requirement, in which OPC was not a signatory but did not oppose was filed with the Commission stating as condition #16.

> CONSOLIDATION STUDY
>
> The Company will perform a study investigating the consolidation of KCP&L and GMO rates and will make a recommendation regarding consolidation of rates in these dockets within two years of the date of approval of this Stipulation. KCP&L and GMO will provide quarterly stakeholder updates concerning the study.[2]

[1] ER-2018-0145 and ER-2018-0146 Rebuttal (Rate Design) Testimony of Darrin R. Ives. pp. 2, 3-13.
[2] ER-2018-0145 and ER-2018-0146 Non-unanimous partial stipulation and agreement p. 9.

Q. It has been eleven months since that stipulation was filed. Has OPC received any quarterly updates concerning the study?

A. No.

Q. Has OPC been contacted by KCPL/GMO for input on the study?

A. No.

Q. In light of that information, do you have any recommendations as it pertains to that topic in this MEEIA application?

A. Regarding the inaction of KCPL/GMO on its agreed to consolidation study, further inquiry is warranted on our part above and beyond this case.

As it pertains to this MEEIA application, I recommend that any future MEEIA approval predicated on treating KCPL and GMO as one entity be conditioned on KCPL and GMO filing a request for consolidation in its next general rate case. Furthermore, the Company should be required to submit quarterly updates (including stakeholder presentation and clear calendar deliverables) in this (or future) MEEIA docket expressly conveying to the Commission that it is adhering to Commission orders.

In the last KCPL and GMO general rate case a similar stipulated study and proposal was at issue—Time-of-Use ("TOU") rates - but failed to fully materialize as stakeholders expected. OPC does not want to see a similar narrative of inaction play out yet again.[3]

Q. Please state your opinion on the direct filing of this case.

A. My primary recommendation is for the Commission to reject KCPL's MEEIA Cycle III application as filed. The application is inappropriate given the low avoided costs, long capacity and other pertinent variables that negate a traditional MEEIA application.

However, as a secondary recommendation, I strongly encourage KCPL to refile an amended application that takes into account an annual "default MEEIA level" which maintains a degree

[3] For further detail on this issue, please see Case Nos: ER-2018-0145 and ER-2018-0146 Rebuttal Testimony of Geoff Marke (Rate Design) pp. 5-15.

of programs and spending at a reasonable level that recognizes both historic sunk costs, the potential need to increase MEEIA funding in the future, and explores alternative deliverables in which a MEEIA could provide equitable benefits to all ratepayers.

The rest of this testimony will provide context for my primary recommendation to reject the application as filed, specific concerns I have regarding proposed program and portfolio design, and will then expand on the secondary recommendation including a "default MEEIA level" and possible alternatives to enhance MEEIA opportunities where none currently exist.

II. KCPL'S PROPOSED MEEIA IN CONTEXT

Avoided Capacity Costs: "We would start with zero."

Q. Why don't you support KCPL's MEEIA filing?

A. Because there is no need for it based on KCPL's current and forecasted operations and based on its planned capital expenditures. The November 15, 2018, Commission Agenda Discussion with the Commission Staff ("Staff") provides a good starting point for understanding the current predicament stakeholders find themselves. The 11/15/2018 Commission Agenda discussing the joint filing of parties involved in the KCPL and KCPL-GMO Triennial Integrated Resource Plan ("IRP") filings (Case Nos: EO-2018-0268 and EO-2018-0269) has been transcribed as follows (beginning at the 34:12 mark of the archived agenda):

> Commissioner Daniel Hall: I do have a question about one of the alleged Staff deficiencies and I guess I will look to Mr. Rogers for that. Its Staff deficiency #2 where KCPL's use of the $116 per kW year drastically overstates KCPL's avoided capacity costs. Could you explain to me Staff's position on that?
>
> John Rogers: Yes. The $116 per kW year.
>
> Commissioner Hall: (points to chair at table) and perhaps you should come to the table so the other commissioners can have the benefit of your wisdom.
>
> Chairman Ryan Silvey: Yeah, that would be helpful.

Mr. Rogers: All right. The $116 per kW year represents the fully levelized cost of a CT. Plus estimates of a…

Commissioner Hall: I'm sorry. Of a CT? What is a CT?

Mr. Rogers: A combustion turbine.

Commissioner Hall: OK

Mr. Rogers. So, this is capacity. This represents the cost of capacity per kW year.

Commissioner Hall: Capacity as opposed to energy?

Mr. Rogers: Yes.

Commissioner Hall: Ok

Mr. Rogers: And it also includes some other forms of capacity. Such as transmission and distribution. What Staff is struggling with is the fact that, Kansas City Power and Light is long on capacity for their entire twenty years of their planning forecast.

Commissioner Hall: Even with the coal retirements?

Mr. Rogers: Yes. In other words, there are no new supply side resources until after the 20 year planning horizon. So, Staff is struggling with using this high avoided costs in year 1 when there are no avoided costs.

Commissioner Hall: When you say "using" the avoided costs, what do you mean?

Mr. Rogers: Well, they are using the avoided costs to value capacity savings, or demand savings from the energy efficiency and demand response programs.

Commissioner Hall: So this is a concern in how this would play out in MEEIA cases?

Mr. Rogers: Yes.

Commissioner Hall: Ok.

Mr. Rogers: The other issue here is that SPP has no capacity market. There is no other form of benefits that the utility and ratepayers would receive from avoided capacity. The utility has all of the capacity it needs for more than

twenty years. There is no capacity market to sell the excess capacity into. And that is our concern.

Commissioner Hall: But there is the ability to sell excess energy.

Mr. Rogers: Yes.

Commissioner Hall: Even on the MISO side, the capacity market does not yield significant dollars. So it is the energy sales that could be significant.

Mr. Rogers: Primarily energy. But when you are valuing demand side resources you value them based on the avoided costs of energy, the avoided costs of capacity and benefits the customers receive from the programs.

Commissioner Hall: What did Staff think the appropriate avoided capacity costs was?

Mr. Rogers: Well, **we would start with zero**.

Commissioner Hall: That is a pretty big discrepancy. Ok. But you don't believe it is significant enough to warrant the Commission requiring KCPL to go back and to do additional work on that?

Mr. Rogers: It is my understanding that they are doing additional work on that in anticipation of the MEEIA Cycle III filing.

Commissioner Hall: Ok. (emphasis added)[4]

To be clear, Staff listed multiple deficiencies associated with demand-side management valuation. These included:

- KCPL's base-case load forecast is based on a cutoff date of June 2017 for all implemented MEEIA Cycle 2 program and does not include the load impacts of implemented MEEIA Cycle 2 demand-side programs ("DSM") through March 2019, the end of MEEIA Cycle 2. This is in violation of 4 CSR 240-22.030(7);

- **KCPL's use of $116 per kW year (2015 dollars) drastically overstates KCPL's avoided capacity cost of generation, transmission, and distribution facilities,**

[4] Missouri Public Service Commission Archived Agenda 11/15/2018, 34:12 to 39:00. https://psc.mo.gov/Archive.aspx

adjusted to reflect reliability reserve margins and capacity losses on the transmission and distribution systems, because Plan KAAHA (No DSM) includes no new non-renewable supply-side resources during the entire 20-years of the planning horizon. KCPL's use of $116 per kW year (2015 dollars) to value avoided capacity cost benefits is in violation of rule 4 CSR 240-20.092(1)(C);

- Because KCPL considered and analyzed alternative resource plans with demand-side resources when it is not in need of any new non-renewable supply-side resources for the entire 20-year planning horizon and **did not consider nor analyze alternative resource plans with new low cost supply-side resources to compete with the new demand-side resources on an equivalent basis**, KCPL did not comply with 4 CSR 240-22.060(1)and 4 CSR 240-22.010(2) (A);

- **Because KCPL has used drastically overstated avoided capacity cost benefits when calculating the total resource cost test (TRC) results** for its demand side programs and portfolio, the programs may not comply with 393.1075.3, RSMo.;

- Because **KCP&L's demand-side programs do not defer any non-renewable supply-side resources during the 20-year planning horizon, it is expected that there will be little, if any, benefits for customers who do not participate in the programs**, resulting in programs which may be in violation of Section 393.1075.3 and .4, RSMo.;

- Because KCPL did not include any analysis required by 4 CSR 240-20.094(4)(C)4 in its 2018 IRP, **Staff is concerned that the earning opportunity component of a DSIM included in the IRP and in the anticipated KCPL MEEIA Cycle 3 application may not be as well informed as it should be**; and

- **KCPL's decision makers may have selected an adopted preferred resource plan which includes a MEEIA RAP portfolio of demand side programs which does not comply with the legal mandate in 393.1075. 4**., because the RAP programs may not provide benefits to all customers, including those customers who do not participate in the programs. (emphasis added)[5]

Q. Please summarize Staff's alleged deficiencies and their relevance to this filing.

A. KCPL and GMO's (2015 dollar) avoided cost assumptions no longer reflect reality. Consequently, KCPL and GMO's triennial IRP was deficient in 2018 and those same faulty assumptions are even more inaccurate if applied to a portfolio expected to begin in 2020.

Q. Did OPC file comments in the KCPL and GMO triennial IRP filings?

A. Yes. OPC filed comments on August 30th, 2018 in Case No. EO-2018-0269, GMO triennial's case alone.[6] The substance of my comments centered largely on the self-imposed premature retirement of the Sibley 3 power plant twenty-two years before the end of its useful life. That being said, I strongly agreed with Staff's concerns then and would note that the concerns articulated above are only more pronounced today.

Q. What is the status on the 2019 annual IRP update?

A. There will be no 2019 IRP for KCPL or GMO. The Companies are effectively going to "skip" 2019.

Q. Please explain.

A. KCPL and GMO were required to conduct an annual update workshop with stakeholders regarding their IRP planning on or about April 1, with an updated filing no less than 20 days prior to that meeting. Those dates were extended to August 31 pending further MEEIA 3 settlement negotiations. Because settlement talks have failed to materialize an agreed-to

[5] Case Nos: EO-2018-0268 & EO-2018-0269 Joint Filing KCPL and GMO 2018 Triennial Resource Plan. p. 2-5. See also GM-2.
[6] See GM-3.

MEEIA program, both KCPL and GMO have requested and received variance from having to conduct a 2019 IRP entirely and will instead file a 2020 IRP next spring.

Simply put, if KCPL had updated its 2019 IRP, its 2018 MEEIA filing would no longer be accurate. So if no 2019 IRP exists, than KCPL can still argue for its 2018 MEEIA filing.

Unfortunately, there was no sound empirical basis to approve a MEEIA over a year ago and that data has only become more inaccurate with time. Consider for a moment that the 2016 market potential study, which provides the foundation for the cost-effectiveness scores and savings targets in this application, is coming up on being four years old now. For our part, I am confident that a 2016 market potential study should not be the basis for program activity in 2023 let alone in 2020. To be clear, that is only one fault with the current application. The much larger concern centers on the low avoided costs and the lack of benefits for nonparticipants.

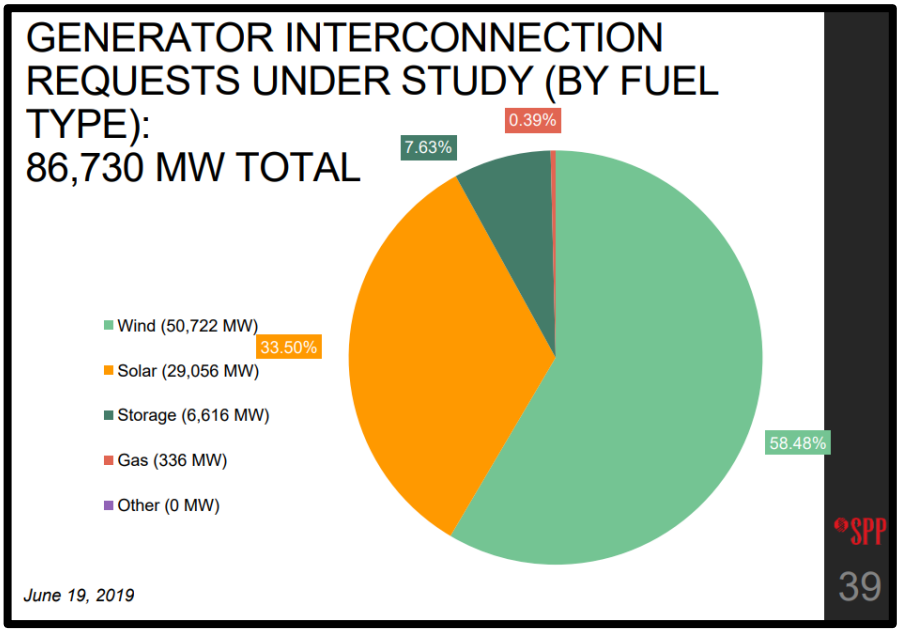
Q. Will any supply-side generation investment be deferred within the 20-year planning period?

A. No.

Q. Will avoided energy costs alone be able to justify a MEEIA investment today?

A. Absolutely not. SPP is flush with energy with more than 86 GW of generation interconnection requests under study as seen in Figure 1.

Figure 1: SPP Generator Interconnection Requests as of June 19, 2019 [7]



According to SPP, today, that would include 9 GW of unbuilt wind with signed interconnection agreements today.[8,9] The 9 GW of signed interconnection agreement wind does not include the most recent Missouri approved 600 MW of Empire wind being sold as a ratepayer-backed merchant generation asset and the 300 MW of state mandated Renewable Energy Standard ("RES") compliance from the Outlaw Wind Farm Ameren Missouri plans on bidding into the SPP market. Neither Empire nor Ameren Missouri's Outlaw projects have obtained SPP interconnection agreements as of this writing but will presumably have those agreements at some point in the future.

Q. Will avoided capacity costs be able to justify a MEEIA investment today?

A. No. Again, there is no deferral of any supply-side generation.

[7] Introduction to SPP p. 39 https://www.spp.org/documents/31587/intro%20to%20spp.pdf
[8] Ibid, p. 123.
[9] I believe this number will likely prove to be understated moving forward. Consider that the Empire "Customer Savings Plan" modeled a "worst-case" scenario of 6.5 GW of wind in the near term. If we assume all 9 GW of wind that already has signed interconnection agreements gets built and the Empire and Ameren projects are introduced into the SPP market, then wind energy alone, in the near-term, would represent 150% of Empire's "high-wind" or "worst-case" scenario.

There is also no capacity market to derive benefits from.

Finally, the 2018 avoided cost assumptions associated with transmission and distribution ("T&D") are also overstated and will need to be adjusted further down to account for the recently announced (and not modeled) planned capital expenditures in T&D related to SB 564's Plant-In-Service-Accounting ("PISA").

As the Commission is well aware, PISA incentivizes the utility to spend money on T&D. GMO for its part, plans on spending $490 million on T&D from 2019-2023 (See Case No: EO-2019-0045) and KCPL-MO (See Case No: EO-2019-0047) plans on spending $416 million across the same period.

Additionally, on August 8, 2019, at Evergy's 2nd Quarter Earnings Call to investors, Evergy CEO Terry Bassham announced further planned capital investment allocations from Kansas to Missouri on top of the aforementioned figures. During the earnings call Mr. Bassham stated:

> Although, we've not completed our work, our team has identified about $150 million of CapEx that we will look to shift from Kansas to Missouri through the 2022 time frame.[10]

Decreasing avoided costs, increasing technology advancement, and PISA legislation undermine the argument for an aggressive MEEIA today. Commission approval of this application will needlessly raise bills on captive customers and increase economic inefficiencies. Because of KCPL's current generation, load profile, and SPP market, the Cycle III application merely functions as a wealth transfer from nonparticipants to participants and the utility. KCPL and the Commission should be mindful of the concept of opportunity costs and consider any and all opportunities to minimize excessive costs and be sure to direct limited resources (capital) to the most optimal outcomes.

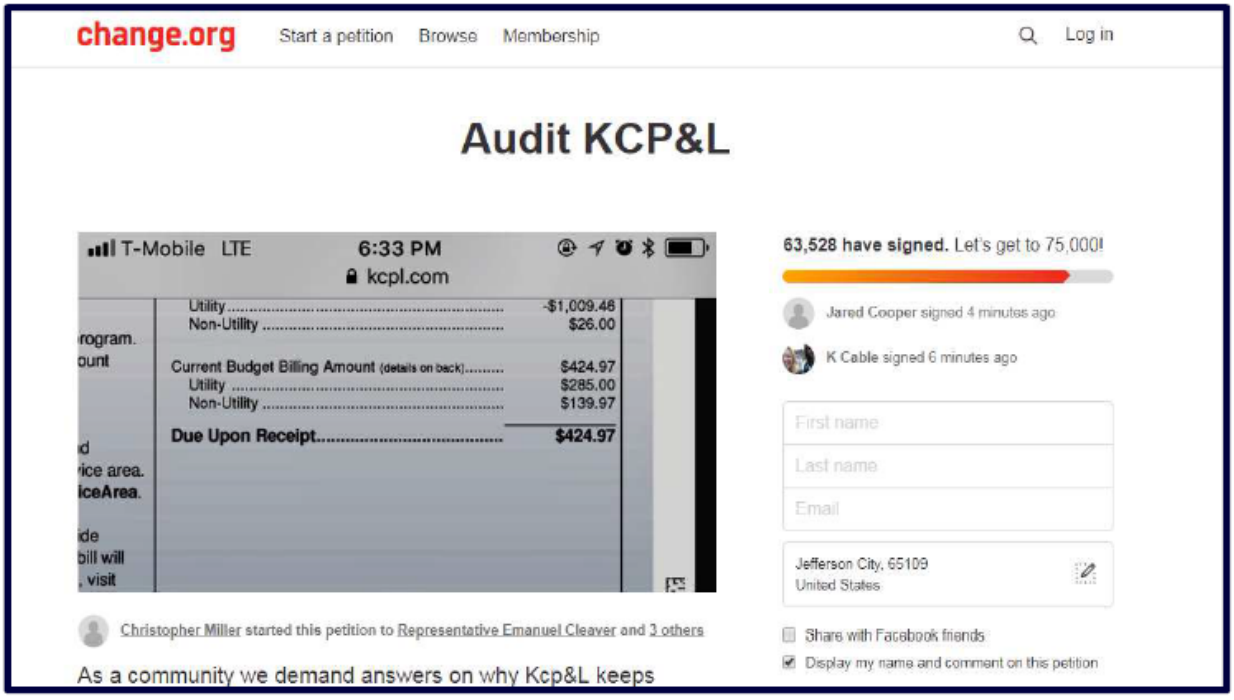
[10] Seeking Alpha. Evergy, Inc. (EVRG) CEO Terry Bassham on Q2 2019 Results—Earnings Call Transcript. https://seekingalpha.com/article/4284701-evergy-inc-evrg-ceo-terry-bassham-q2-2019-results-earnings-call-transcript?part=single

One of the dominant narratives surrounding the recently passed Senate Bill 564 centered on "consumer-friendly rate caps." To be clear, those caps are both temporary and not applicable to the MEEIA surcharge. Customer's bills will be far from consumer-friendly, especially small commercial and residential customer's bills if we pay no heed to upcoming increases in the future.

Q. Are KCPL and GMO customers concerned about increased costs?

A. Yes. Last fall, I testified in Case No: ER-2018-0145 and ER-2018-0146, KCPL-MO and KCPL-GMO rate cases, and pointed to over 68,000 people who had signed a Change.org petition titled "Audit KCP&L" in light of both Companies continued increases in rates and recent budget billing failure as seen in figure 2.

Figure 2: Change.org "Audit KCP&L" [11]



[11] Miller, C. (2018) Audit KCP&L. Change.org https://www.change.org/p/audit-kcp-l

KCP&L-specific data was also included in the aforementioned rate cases that included the results of KCP&L's most recent (at that time) JD Power Survey in which **

**

A copy of the survey in its entirety is included in Schedule GM-4.

Redistribution: Winners & Losers

Q. Won't an increase in spending on energy efficiency help with customer bills?

A. Under today's conditions, it will only benefit ratepayers that participate at the expense of non-participants, in particular low-income tenants. The absence of any supply-side deferral and low avoided costs mean that MEEIA will only serve as a wealth transfer, primarily to higher income households and to utility shareholders. Benefits will not be realized by nonparticipants and will

disproportionately impact those least able to bare the increased costs. To properly understand why this is the case, it is important to realize that energy efficiency can be seen as a form of income redistribution. If it is not managed well or if one just casually assumes it will automatically result in an optimal outcome then the redistribution will largely be regressive in nature.

Q. Ok, so what is the argument for aggressively promoting energy efficiency?

A. It is argued that it is cheaper not to produce electricity (often referred to as a "negawatt") than to produce electricity. That is, the cost per kilowatt hour (kWh) avoided due to the adoption of energy efficiency measures is less than the costs that the utility avoids by not having to produce the next kWh. This is typically calculated as the "avoided costs" of generation or fuel costs (or marginal cost for a utility to produce one more unit of power).

Generation investment tends to be large capital projects whose costs have to be spread out over extended time periods (i.e., "lumpy" investments). Presently, in Missouri, generation capacity is already in place at the margin and thus energy efficiency investments represent a redistribution of fixed costs between participants and non-participants. As time progresses, large-scale adoption of energy efficiency may delay new generation and thus some of the "avoided costs" could include capital costs delayed to a future time.

Q. That is a lot to understand. Could you provide an analogous example?

A. The argument for energy efficiency is similar to the argument for free trade in that they both potentially lead to aggregate economy-wide benefits. However, achieving these net benefits requires some welfare redistribution leading to both winners and losers.

In free trade, at a world price below the domestic (no-trade) price, domestic consumers benefit while domestic producers suffer. The reasoning is fairly straightforward, consumers get to consume more of product at a lower price, while producers with higher production costs end up producing less and receiving a lower price for what they produce.

Aggressive adoption of subsidized energy efficiency produces clear winners and losers as well. The winners are the consumers who adopt the efficient measures. The losers are the utility and the nonparticipants.

The utility (like the inefficient domestic producer in the free trade example) loses because it has lost revenues that would otherwise occur under the non-MEEIA baseline (e.g., incandescent lightbulb uses more energy than a LED lightbulb).[12] To address the utility "loser" issue and encourage energy efficiency adoption, Missouri lawmakers passed the Missouri Energy Efficiency Investment Act ("MEEIA") enabling utilities to have an opportunity to be "winners" by compensating them for both lost revenues and affording an "earnings opportunity" for achieving self-selected targets. The earnings opportunity represents an agreed-to profit that is, in part, equivalent to what, theoretically, would be earned though a needed supply-side investment.[13] In the free trade example, a MEEIA arrangement would be the equivalent of compensating the domestic producer so that they were unharmed *and* even profited with an earnings compensation by international trade.

Q. MEEIA makes utilities and participants' winners. Who loses?

A. Nonparticipants[14] lose as MEEIA program costs and earnings opportunities are increased relative to a baseline forecast (which has some naturally occurring energy efficiency adoption). The nonparticipants lose because they face a higher price for service by subsidizing the paying for the participant's rebates. However, participants can also lose if the utility increasingly continues to seek higher customer charges or proposes new, novel fixed charge recovery.

[12] There is an exception to this argument. For example, the electric utility could be a winner in this scenario if the promotion of that energy efficiency end-use induces a customer to fuel switch. For example, the adoption of an efficient geothermal heat pump enables the house to fuel their heat with electricity as opposed to natural gas or propane. In that scenario the total kWh gains of obtaining a new customer would far outweigh the individual loss in kWh's produced from the geothermal heat pump.

[13] Historically, stakeholders have used a combustion turbine as the default "deferral" in place of earnings investment. Given the historic drop in renewable costs, especially wind, a combustion turbine may no longer be an appropriate earnings opportunity proxy.

[14] Nonparticipants are customers who pay a MEEIA surcharge but do not invest their personal finances in ratepayer subsidized end-use measures. They should not be confused with "opt out" customers. Which are certain commercial and industrial customers who do not have to pay any MEEIA surcharge but do get to receive the benefits.

Increases in fixed cost recovery has been sought by literally every utility in a rate case (with the exception of Spire gas in its most recent rate case) since MEEIA legislation was approved.[15]

Q. What if there was widespread sweeping adoption of energy efficiency?

A. If most ratepayers adopted energy efficiency measures then numerous factors would occur that would erode the original participant's benefits relative to a case where the majority of customers do not participate. Thus, in net terms, each participant would be better off in the case where the aggregate number of participants was low. That is, in a situation where the participant can be subsidized by nonparticipants but does not have to subsidize numerous other participants and/or the utility. If most everyone is a participant than the financial savings or "pay back" of the efficient end-use investment would be would be much smaller and take much longer.

As an aside, *the* most cost effective way to ensure future efficiency would be through the enforcement of strong building codes and standards. That is, build it correctly the first time without the ratepayer subsidies. However, that is a subject largely beyond the scope of this testimony.

Q. Is OPC just against promoting energy efficiency?

A. Based on my recommendations later in this testimony I would hope it is obvious that we are not against promoting sound demand side management strategies. OPC and I have historically supported energy efficiency programs under the premise that the aggregate economy-wide net benefits are worth the redistribution of welfare *if* the adoption of programs leads to meaningful deferral of supply-side investments.[16] Given KCPL's current long capacity position, the current make-up of the SPP market and planned Company capital investments associated with

[15] Seeking increases to fixed cost recovery is not the only means by which a utility can undermine a participant's capital investment in energy efficiency. For example, the City of Kansas City invested millions of dollars in lighting only to have KCPL propose categorical shift in cost recovery from energy to demand for its customer class. In this example, the costs savings associated with lighting were reduced because the energy charge was decreased and demand savings (during non-lighting periods) were increased.

[16] And even in at least one case where that premise was not entirely evident. See also Case No: ER-2016-0023 regarding filings associated with the Empire District Electric PAYS Study.

recently passed legislation, the aggregate economy-wide benefits do not exist to justify approval of this application today.

Stated differently, the rationale for approving a MEEIA is show in Figure 6 which contrasts with KCPL's current application as seen in Figure 7 below:

Figure 6: The intended MEEIA business plan

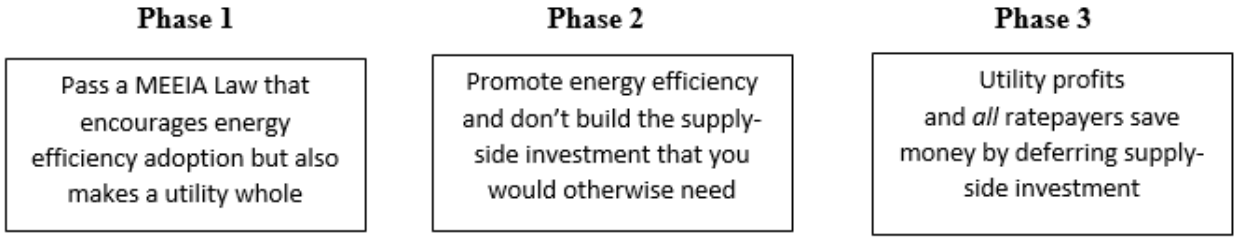
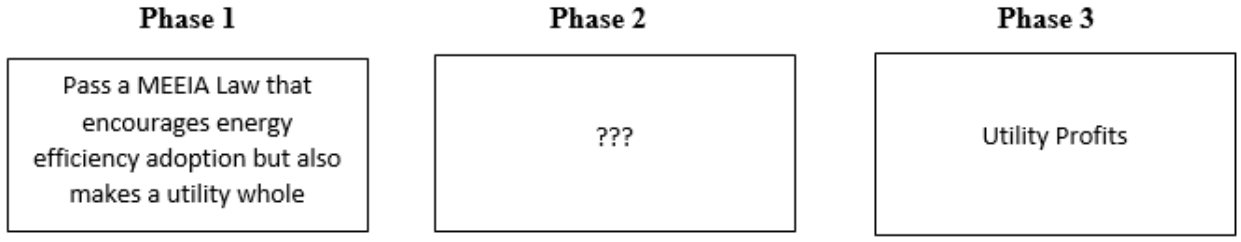


Figure 7: The KCPL MEEIA Cycle III business plan



It is not clear what exactly nonparticipant ratepayers are getting out of Phase 2 in KCPL's application because there is no supply-side investment to defer. That is not to say the benefits of supporting an aggressive MEEIA program will never exist. Rather, the aggressive promotion of energy efficiency and all of its attendant costs will not meaningfully impact the planning period currently in place for KCPL, and will only serve to raise customer bills at a time when costs are already set to be raised through other planned investments (e.g., $1 billion in T&D planned capital expenditures). Increased off-system sales alone cannot justify nor offset the costs that ratepayers will be burdened with. Especially when there are other meaningful investments to be made.

III. PROGRAM MODIFICAITONS

Q. Do you have any comments to make regarding individual programs or measures within KCPL's application?

A. Yes. Putting aside the larger question of whether or not a MEEIA application should be approved, it is important to understand that a MEEIA application is dependent on multiple program offerings in several categories that can be generalized as: energy efficiency, demand response, low-income, EM&V and/or research and pilots. As presently drafted I have many recommended modifications.

Energy Efficiency Programs

Online Home and Business Energy Audit

Q. What is the online home and business energy audit tool?

A. It is effectively a software application that would be added to KCPL's "My Account" portal and allows customers to self-audit their home for energy savings online.

Q. What is your recommendation on KCPL's proposed online energy audit tool?

A. I recommend the Commission reject it. This represents "a low hanging fruit" item that is easily removed from the portfolio to make a future MEEIA application more beneficial. The online home and business energy audit tool is redundant, has been ineffective with other utilities, and is not a prudent expense. Removing it from the MEEIA programs will save ratepayers $800,000.

Q. Why is it redundant?

A. Similar online tools are already available on the internet for free. Moreover, as a result of the over $100 million dollar investment in AMI hardware and AMI billing software, customers should already be getting the best personalized customer experience in the state. Consequently, this additional "education" item suffers from diminishing returns.

Q. There are no energy or demand savings associated with this measure. Why is that?

A. It's an "educational" item. Albeit a passive one on the Company's part.

Q. What has been your experience with online energy audit tools?

A. Customers do not use them or have enough information about their building's make-up to accurately estimate potential savings. Additionally, the savings estimates are highly dependent on a variety of factors (price, weather, occupancy, interactive-effects with natural gas, etc…), all of which can be misleading if not properly accounted for.

Q. Do you support maintaining an online audit tool just for business?

A. No. The same issues exist. For business customers, KCPL should be utilizing whole-building benchmarking data in the U.S. Department of Energy ("DOE") ENERGY STAR Portfolio Manager. Ratepayers should not have to pay additional money for yet another tool. Rather, KCPL should make data available for building managers and owners with the DOE tool.

Home Energy Reports

Q. What is the Home Energy Report?

A. The Home Energy Report is a behavioral modification measure. KCPL utilizes the OPower home energy reports to a large portion of its customers. The basis behind a home energy report is centered on the concept of "shaming."[17] That is, a customer gets a mail insert that not only gives the customer their energy average energy usage but compares their usage against "similar" households. Behavioral research suggests that a person will be more likely to change their behavior based on the power of other people's actions than, say, saving money or helping the environment.[18]

Q. What is your opinion on KCPL's proposed Home Energy Report?

A. I recommend that the Commission reject it. This program represents approximately $4.5 million in program costs. Similar to the online energy audit, the reports have been made redundant as a result of the over $100 million dollar investment in AMI hardware and AMI

[17] Nikiforuk, A. (2011) What saves energy? Shame. *The Tyee*. https://thetyee.ca/Opinion/2011/07/14/EnergyShaming/

[18] This work is based on the research by Robert Cialdini over hotel towels. A more detailed explanation of experiment can be found at Goldstein, N. (2008) Changing Minds and Changing Towels. *Psychology Today*. https://www.psychologytoday.com/us/blog/yes/200808/changing-minds-and-changing-towels

billing software. Customers should already be getting the best personalized customer experience negating much of the value of the Home Energy Report.

The reports also suffer from the issue of "persistence." That is, unlike an LED light bulb that literally uses less electricity than an incandescent across the same life-span, behavioral response programs are only good for a limited amount of time and thus are not a "long-life measure."

To date, stakeholders have approved behavioral modification reports and "deemed" the energy savings associated with them. That is, we have not attempted to apply a net-to-gross ratio, rather the Company gets to claim savings and earnings for merely mailing the item.

Given the KCPL's current resource planning status and the hundred million dollar investment in customer experience, this measure can easily be removed without any material impact on savings. OPC has been an active participant in the pending "roll-out" of TOU pilot rates and online customer experience over the past year. The work KCPL has done appears very promising. The customer portal and tailored customer experience is both superior to the home energy report and is already an enormous sunk cost. There is little to no value in the Home Energy Report at this point.

Heating, Cooling and Weatherization

Q. What is the Heating, Cooling and Weatherization program?

A. It is a residential program designed to reduce heating and cooling consumption holistically through audits and rebates (e.g., for efficient HVACs, insulation, etc…).

Q. What is your opinion on the Heating, Cooling and Weatherization program?

A. I strongly support a targeted effort of this program on the real estate market. For several years now, I has advocated for aligning home energy audits with real estate inspections and transactions. For most people, the only time they seriously consider the large scale investment on a heating or cooling system is either upon failure or when they are about to purchase an

existing system—that is, when they purchase a house. The home buying transaction is the perfect time for KCPL to introduce an energy audit and push large capital investment measures.

I recommend that future MEEIA filings provide a more detailed business plan on targeting the real estate segment of its customers.

Q. Are there any other recommendations on this program?

A. Yes. I strongly support introducing a PAYS option with this program. I will discuss that recommendation in greater detail later in this testimony.

Business Process Efficiency

Q. What is the Business Process Efficiency program?

A. It is essentially a ratepayer-funded energy management professional. KCPL contracts with an implementer that serves as an energy management professional for select customers to "hand-hold" them through various energy savings opportunities and assessments.

Q. What is your opinion on the Business Process Efficiency program?

A. Given the KCPL's current resource planning status, I suggest this program be removed. The role of an energy management professional can be met internally by commercial and industrial businesses or can be procured through third-party businesses or organizations (see also the Association of Energy Engineers—Kansas City, Energy Management Association, Kansas Municipal Energy Agency, etc…). Restated, this subsidy can be removed and those energy professionals and the respective groups will still operate in this market.

Demand Response Programs

Business Demand Response

Q. What is the Business Demand Response program?

A. A load curtailment program for select commercial and/or industrial customers that allows them to receive a financial reward by stopping or reducing a significant amount of their energy usage during a "called" peak demand period.

Q. What is your opinion on the Business Demand Response program?

A. Since 2015, KCPL/GMO have called between one and two events a year. That's it.

These events were essentially called to make sure the curtailment program was still operational if it needed to be called. That is, the events have basically functioned as "test runs."

A considerable amount of testimony was filed in the last KCPL and GMO general rate case and my opinion remains the same. I am not opposed to demand response or emergency curtailment options. In fact, I have been vocal in the IRP process about wanting to have a good grasp of the demand response potential that could be called, if the wholesale energy markets ever significantly changed. That being said, to date, events have not been called. There are a variety of reasons why, but it is clear that there has been very little realized energy/demand savings value from the various programs to date.

Moving forward, I strongly oppose opt-out MEEIA customers from participating in MEEIA events. Opt-out MEEIA customers have opted-out and should not be entitled to additional MEEIA benefits or eligible for participation in MEIA programs (including demand response). As it stands, my primary reason for taking this position is my belief that the opt-out provision is categorically unfair to captive ratepayers who cannot opt-out. I am fully conscious that the MEEIA statute can be interpreted to provide this inequity but I believe that if a customer elects to "opt-out" of paying the costs of MEEIA then that customer cannot simultaneously "opt in" to receive the participant benefits. Failure to recognize and rectify this process moving forward will only serve to cannibalize the remaining MEEIA participants by inducing further opt-outs, and lead, at best, to suboptimal MEEIA programs in the future.

Both Companies' current tariffs are designed to allow a curtailable rate separate and aside from MEEIA. I recommend removing the business demand response program from MEEIA unless KCPL can guarantee that events will be called beyond "test runs" and when there is are economic benefits to be realized from an event being called. Otherwise, I recommend that this program remain outside of MEEIA and be used in emergency situations as it has historically operated.

Residential and Small Business Demand Response

Q. What is the Residential and Small Business Demand Response program?

A. A program that provides free smart thermostats (and potentially other control technologies) and financial payments to customers to allow KCPL/GMO to control the device and lower the temperature for an event that could last up to four hours.

Q. What is your opinion on the Business Demand Response program?

A. In 2016 there were eight events called. In 2017 there were three events called. In 2018 there were two events called. I am not aware of any events that have been called during 2019's "extended" Cycle II season. While called events decreased every year, the number of free thermostats increased every year. In short, each year of this program has produced fewer benefits at greater costs.

It should not be lost on the Commission that customers also have the option to "override" a called event and control the temperature of their house if they desire with no penalty.

If no events, or very few events are actually called, there are no additional benefits from subsidizing the full costs of a smart thermostat. It is my understanding that there are now thousands of Company-controlled smart thermostats currently in its service territory. Moving forward, I would recommend that this program be amended to only calling events with existing subsidized smart thermostats. There is no sound reason to continue subsidizing homes with more smart thermostats if events are not being called. At this point, I believe it is incumbent upon KCPL to show value in the existing investment made from Cycle II before further roll-out is warranted. Additionally, KCPL should be required to call a minimum amount of events to satisfy this investment.

Smart Thermostats and Privacy

Q. Do you have any additional concerns regarding smart thermostats?

A. Yes. On September 19, 2019 a non-unanimous partial stipulation and agreement settling the revenue requirement, in which OPC was not a signatory but did not oppose was filed with the Commission stating as condition #18.

> CUSTOMER PRIVACY
>
> The Company will adopt the Green Button platform no later than the second half of 2020. The Company commits to producing a privacy policy statement and frequently asked questions ("FAQ") website section for customers regarding use of customer data. The Company will receive input from OPC, Staff, and DE on the privacy policy statement and FAQs. The Company will hold annual meetings with Staff, OPC, and DE regarding the results of the third party privacy impact assessments. The meetings and any material discussed at the meetings may be designated as confidential by the Company.[19]

Q. It has been eleven months since that stipulation was filed. Has OPC been notified of any action regarding adoption of the Green Button platform?

A. No.

Q. Has OPC been contacted by KCPL/GMO for input on its privacy policy statement or FAQ?

A. No.

Q. Has OPC been contacted by KCPL/GMO for its annual meeting to discuss the results of its third party privacy impact assessment?

A. No.

[19] ER-2018-0145 and ER-2018-0146 Non-unanimous partial stipulation and agreement p. 9.

Q. In light of that information, do you have any recommendations as it pertains to that topic in this MEEIA application?

A. Putting aside yet another example of KCPL and GMO's inability to adhere to the terms of its stipulation and agreement ordered by the Commission for a moment, I continue to have serious concerns about the level of privacy and lack of guidance from the Commission on this issue. Working docket AW-2018-0393 is now over a year old. A July 29th order from the Commission has Staff filing draft rules by September 16th, 2019. However, even under the most optimistic of scenarios, codified rules on the issue of customer data will likely not occur before this issue comes before the Commission in a MEEIA docket.

In Case No. ER-2018-0145 and ER-2018-0146 I testified to the very real threat inherent in third party data access and smart thermostat in particular. My testimony on that is included here:

> **Q. Does OPC have a response to Mr. Johnson's position that other utilities need to opine on KCPL/GMO specific recommendations?**
>
> A. No other utility in Missouri has AMI and supporting software in place. KCPL/GMO is singularly unique in that regard but this is a reality that KCPL/GMO should have fully been aware of when they elected to be first movers on AMI.
>
> **Q. Please provide Mr. Johnson's full quote regarding customer protection criteria with third parties?**
>
> A. Mr. Johnson stated:
>
> > Mr. Marke is correct that it is incumbent on the utility to protect the customers' data. To ensure that happens, customer protection criteria must be specified for third parties to adhere to prior to gaining access to customer data. The utilities will have no control

over treatment of the customer's data once the third party has access.[20]

Q. What is OPC's response?

A. This is a curious comment to make. On the one hand, Mr. Johnson agrees with OPC that customer protection criteria must be in place to ensure third parties do not take advantage of customers, but on the other hand, Mr. Johnson does not follow-up that declarative statement with an affirmation that KCPL/GMO has that essential criteria in place. It's a throw away comment that unexpectedly challenged OPC to consider if there were any potential examples in which KCPL/GMO entered into contracts with third parties in which customer data was obtained by third parties (and by extension, other parties) without full KCPL/GMO ratepayer consent or knowledge.

Q. Did anything come to mind?

A. Yes. In 2017 the *Kansas City Star* published a technology article titled "Digital Life: Real tech payoff that comes with a (remote) risk." The article discusses why the KCPL/GMO Nest thermostat program is both attractive (e.g., hi-tech "learning" thermostat valued at $200 with an additional $50 inducement payment) and successful (more than 16,000 given away at the time of the articles print date). It then discusses the risks:

> Back to that catch. First, you're sharing data about your lifestyle with Nest, meaning Google. Marketer's armed with the patterns of your comings and goings could someday use it as fresh ammunition to tempt you towards their products—likely in ways that you'll be blind to.

[20] ER-2018-0145 & ER-2018-0146 Rebuttal Testimony of Gary Johnson p. 5, 22-23 & p. 6, 1-2.

> Then there's hacker risk. Nest founder Tony Fadell has said the Nest is built with "bank level security" and that the business will fail "if people don't trust it." Yet researchers have said the thing can be cracked by someone who has access to it during delivery or in your home (cough, ex-boyfriend, cough).
>
> Once exploited, scientists from the University of Central Florida said, "what was once a learnings thermostat has been transformed into a spy" able to get into your Wi-Fi network and everything that connects to it.
>
> Such is the dilemma of virtually everything about the digital era and cool things that come from internet connections. Privacy traded for convenience.[21] [22]

The mere fact that the *Kansas City Star* felt compelled to report and opine on this dilemma suggests that many KCPL/GMO customers may not fully be aware of what they consented to when they agreed to "participate" and receive a free smart thermostat (valued at $200.00) and the additional $50.00 incentive.

Q. Has anyone attempted to determine the volume of data created and shared through a Nest thermostat?

A. Yes. Researchers out of the University of Amsterdam produced a report last year on those very questions. A list of the individualized data points collected by the Nest thermostat is included in Figure 1:

[21] Canon, S. (2017) Digital Life: Real tech payoff that comes with a (remote) risk" *Kansas City Star* July 10. https://www.kansascity.com/news/business/technology/article160430799.html see also GM-5.
[22] Hernandez, G. et al (2017) Smart Nest Thermostat: A smart spy in your home. https://www.blackhat.com/docs/us-14/materials/us-14-Jin-Smart-Nest-Thermostat-A-Smart-Spy-In-Your-Home-WP.pdf

Figure 1: Individualized data points collected by a Nest thermostat

Wi-Fi network name (SSID)	Home address (plus ZIP code)
Wi-Fi Password to connect to the Internet	Heating and Cooling (HVAC) system capabilities
IP address	Current temperature
Account associated email Addresses	Humidity
Name	Ambient light in the room
Profile photo	Room movement
Mobile location data	Device setting changes
Bluetooth data	Heating and cooling usage information
Log entries (eg. IP address)	Device model
Technical information (eg browser type and version)	Software version
Thermostat location	Battery charge level
Location information (home or business)	Serial number

The report found 89 unique third-party applications connected to the Nest thermostat that can, in turn, be connected with other applications, devices, and consequently, different companies.[23]

Q. Who would want that kind of information?

A. Many companies would. In fact, "Big Data" has been commonly compared to the equivalent of "Big Oil" for the twenty-first century. [24, 25] However, technology writer, Michael Haupt persuasively argues that the metaphor is both inappropriate and potentially dangerous. Haupt states:

> Yes, big data might be the new oil, but let's remember what data really is**: a natural resource created by, for and because of sovereign human beings.** Let's not allow a new breed of corporations to extract wealth from us, like we've allowed in the past. If we allow privatization of data, as we've permitted with other

[23] Dirkzwger, A. et al (2017) Where does your data go? Mapping the data flow of Nest. Masters of Media, New Media & Digital Culture, University of Amsterdam. https://mastersofmedia.hum.uva.nl/blog/2017/10/25/where-does-your-data-go-mapping-the-data-flow-of-nest/ See also GM-6

[24] The Economists (2017) The world's most valuable resource is no longer oil, but data. *The Economists*. https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data

[25] Haupt, M. (2016) "Data is the new oil"—A ludicrous proposition. *Medium*: Project 2030. https://medium.com/project-2030/data-is-the-new-oil-a-ludicrous-proposition-1d91bba4f294

natural resources in the past, we only have ourselves to blame. (emphasis added)[26]

Q. Does this mean that OPC objects to the Nest thermostat program now?

A. Maybe. But that is an issue beyond the scope of this testimony.

Q. Does OPC have any concluding statements on the issue of One CIS: privacy?

A. There needs to be a robust, honest conversation on the topic of privacy, customer consent and liability. The fact that KCPL/GMO's present position is that they are the sole owner of their customer data is troubling. OPC disagrees with this statement and seeks Commission guidance on minimizing future risk to ratepayers. OPC will provide further recommendations regarding the accounting treatment of One CIS in the conclusion of this testimony.[27]

To date KCPL and GMO have not engaged OPC in a meaningful conversation on the topic of privacy, customer consent and liability. I do not know whether they have engaged Staff or the Division of Energy ("DE"). As it stands, KCPL and GMO's last publically stated position on this topic is that

"customer information remains the sole property of the covered utility."[28]

I disagree.

Until the Company can provide some level of commitment and explicit safeguards ensuring that their captive customer information is not being used or is otherwise susceptible to non-consensual third-party access, or, at a minimum, explicitly states how said data is being used,

[26] Ibid.
[27] ER-2018-0145 & ER-2018-0146 Surrebuttal Testimony of Geoff Marke p. 23, 1 to 25, 13.
[28] AW-2018-0393 Kansas City Power & Light Company's & KCP&L Greater Missouri Operations Company's Comments on proposed new rules regarding treatment of customer information. P. 1. August 24, 2018.

I cannot recommend subsidizing smart thermostats that have proven to be both easily compromised and sources of copious amounts of data collection.

Low-Income Programs

Q. Do you have any recommendations or concerns regarding the proposed low-income programs in KCPL's filed application?

A. Yes. I recommend that KCPL and GMO propose a Business Social Services program similar to the Ameren Missouri MEEIA program. This program specifically targets non-profits and social service facilities. For example, specific targets and extended rebates for soup kitchens, homeless shelters, battered spouse facilities, etc… This is often overlooked market that should be considered moving forward.

Company Proposed Research and Pilot

Q. Do you have any recommendations or concerns regarding the proposed Research and Pilot considerations in KCPL's filed application?

A. I categorically do not support KCPL's Electric Vehicle Charging option. The Company has a two paragraph write-up in its application suggesting exploring the use of demand response options with home and public chargers. To be clear, as seen above, KCPL has not effectively shown they are utilizing demand response with the programs it was approved to implement in Cycle II. EV chargers are not cost effective MEEIA options because they are load building items. It is as simple as that. For whatever benefits EV charging may purportedly have, it simply is not energy efficiency.

I have additional comments to make regarding KCPL's PAYS and/or residential financing pilot option later in this testimony.

Evaluation, Measurement and Verification ("EM&V")

Q. Do you have any recommendations or concerns regarding the proposed EM&V in KCPL's filed application?

A. I do not support the use of non-participant spillover as a net-to-gross ("NTG") ratio factor. The NTG should account for free ridership and spillover. No further breakdown is necessary (e.g., NTG ratio = 1 – Free ridership rate + spillover rate). Furthermore, I do not support KCPL's proposed baseline shift exemption. If the federal government mandates a measure to adhere to certain standards, those are the standards. It is inappropriate to calculate gross and net kWh and kW savings as though those standards did not exist. I would also disagree on maintaining a 0.85 NTG factor for the throughput disincentive net to gross adjustment and instead propose 0.70 NTG to more accurately reflect free ridership. Additionally, the Company's earnings opportunity should be rewarded at the end of the three-year verification of targets, not on an annual basis.

I also strongly suggest that KCPL's future MEEIA application include a discussion with the Company's EM&V consultant prior to submitting its application. Despite the almost one year lapse in when the application was filed and where stakeholders are at today. There was not one technical conference or discussion about EM&V prior to this filing. As such, my recommendations and concerns are certainly understated in regard to what has been filed.

IV. ALTERNATIVE RECOMMENDATIONS

Default MEEIA Level

Q. Do you see merit in having some level of funding and program activity in place?

A. Yes. To be clear, my primary recommendation is to reject what has been filed. That being said, my secondary recommendation would be to approve a default annual MEEIA spending level that could serve as a bridge to a future scenario where demand-side management programs could be ratcheted up if warranted. A default level MEEIA would maintain a degree of program activity and reasonable spending level that would recognize the historic sunk costs,

the potential need to increase MEEIA funding in the future, and explore alternative deliverables in which a MEEIA could provide equitable benefits to all ratepayers.

Q. What would a default MEEIA level look like?

A. A "default MEEIA level" is broken down as follows:

Categories	Annual Costs Range	Class Allocation
• Residential Programs	$791,667 - $875,000	Residential
• Business Programs	$791,667 - $875,000	Business
• Low-Income Programs	$950,000 - $1,050,000	Residential & Business
• Earnings Opportunity	$333,333.33	Residential & Business

I recommend that all Evaluation, Measurement and Verification ("EM&V") be suspended in light of my proposed earnings opportunity mechanism (which is based on annual achieved expenditure thresholds) and that deemed savings be utilized to inform savings assumptions related to the throughput disincentive. Earnings opportunities would be solely dependent on prudently incurred annual spend limited within the proposed cost range. That is, an earnings opportunity would not be realized if annual expenditures for low-income programs were only $500,000. Likewise, the Company would need to seek Commission approval for annual budgets that exceeded any of the program cost ranges.

Additionally, I recommend that the annual "default MEEIA level" be in place until either a new MEEIA application is approved or until the Company(s) next filed rate case. For purposes of cost allocation between utilities, I suggest a 50/50 split between KCPL and GMO for administrative ease.

Q. Is this budget comparable to any other energy efficiency programs by other utilities?

A. Yes. The proposed budget accounts solely for residential, business and low-income annual spend is slightly less than the overall budget currently in place for Empire Missouri scaled up to account for more total customer accounts as seen in Table 1.

Table 1: Comparison between Commission-approved Empire DSM programs and OPC's residential and business budgeted proposal

Utility	Total Customer Accounts	Program Budget Amount	Program cost per year per account[29]
Empire	173,981[30]	$1,250,000[31]	$7.18
KCPL+GMO	615,926[32,33]	$2,700,000	$4.38

Q. What programs/measures would be included or excluded?

A. I recommend removing most of the programs (e.g., OPower, online audit tool, energy savings products, rebating new smart thermostats, etc…). Focus would be placed primarily on heating, cooling and weatherization-like measures for residential customers and a non-lighting Business Standard offerings for commercial and industrial customers. In short, the emphasis would be placed solely on demand-reducing measures.

Q. Are there any additional ratepayer costs you propose?

A. Yes. I propose an additional $2 million in targeted annual research and development ("R&D") costs to inform alternative MEEIA valuation opportunities. A description of the R&D framework and specific valuation opportunities will be discussed in greater length later in this testimony. However, for cost comparative purposes, the additional $2 million in R&D annual spend breakdown has been included in table 2 along with the per year, per account impact comparison with Empire District Electric.

[29] I am including these estimates merely for comparative purposes. The estimates omit deemed throughput disincentive and the earnings opportunity. Additionally, the actual costs per year per account will also vary based on customer account type and ultimate spend. That is a non-residential or business customer will pay a greater monthly amount than a residential customer due to differences in overall customer account totals and differences between the two utilities. This additional level of complexity has been introduced by the Company (KCPL and GMO) as its MEEIA filing is a joint-filing. OPC is amendable to treating each utility separately in its entirety. Again, for administrative ease, I would propose a 50/50 split in what is articulated above.

[30] BMAR-2019-1971 The Empire District Electric Company Annual Report (MO PSC) for 2018

[31] ER-2016-0023 Stipulation and Agreement p. 5

[32] BMAR-2019-1967 Kansas City Power & Light Company Annual Report for 2018

[33] BMAR-2019-1969 KCP&L Greater Missouri Operations Company Annual Report for 2018

Table 2: Comparison between Commission-approved Empire DSM programs and OPC's residential, business and R&D budgeted proposal

Utility	Total Customer Accounts	Program + R&D Budget Amount	Program + R&D cost per year per account
Empire	173,981	$1,250,000	$7.18
KCPL+GMO	615,926	$4,700,000	$7.63

Q. Would lost revenues associated with the throughput disincentive be recoverable?

A. Yes. However, I am unable to provide an annual bill impact associated with that amount as it would be dependent on the measures rebated.

Q. Is your annual "default MEEIA level" proposal more generous than energy efficiency mechanisms in place for other utilities in Missouri?

A. Yes. It is more generous than all Commission-approved, ratepayer-funded demand side management programs, with the exception of Ameren Missouri. Importantly, my alternative MEEIA default option includes both an earnings opportunity, a throughput disincentive recovery mechanism and an explicit roadmap to explore alternative opportunities to support an amended MEEIA application in light of the lack of supply side deferral opportunities.

Equitable Energy Efficiency Baseline Study

Q. Do you have any further recommendations regarding KCPL's MEEIA application as it pertains to low-income customers?

A. Yes. Similar to what Ameren Missouri agreed to in its MEEIA Cycle III application, I propose that KCPL collect demographic data showing estimated energy use intensity, energy efficiency equitable baseline investment, and energy savings in the KCPL and GMO service territory across various parameters. The goal of this data collection would be to explore residential energy efficiency in order to evaluate the equitable distribution of investments and benefits among customers.

This data should be made available to all parties and the general public in order to better inform future energy efficiency discussions and to aid the Commission's decision-making in this area of regulatory policy. Making this data available would allow researchers to analyze the impact of current MEEIA efforts, and it could assist in preparation for its subsequent MEEIA plan application to the Commission.

KCPL and GMO should also be required to collaborate with an independent academic researcher to provide an analysis of the data regarding energy efficiency utilization by customer income level and by other factors.

Said research should be concluded prior to any future MEEIA application and should include an on-the-record presentation to the Commission prior to any future MEEIA filing.

Q. What specific data should be required?

A. Data provided by KCPL should include, at a minimum, the following:

1. A compilation of annual reconciliation reports (includes annual spending, savings on all residential and income qualified residential programs) from 2012 to 2017, and for ongoing program years;
2. Any data on energy efficiency program utilization by zip code (i.e., dollars, measures, applications); and
3. Aggregate residential consumption data at a spatial level that could be correlated with Census spatial levels (i.e., zip code+4). This includes:
    - Average monthly residential usage for each zip code in the service territory; and
    - A random sample of 2% of household monthly sum usage in each zip code.

Q. What research deliverables would you expect to be provided by an independent academic research authority?

A. The data provided by KCPL would allow the following research deliverables to be performed for the parties and the Commission:

1. Estimate and assess the spatial distribution of mean/median energy use intensity (EUI) in kBTU/ft^2 across the KCPL service territories. The EUI model and maps

may be used for exploring residential energy efficiency disparities across the service territories and for program targeting. This model could be based on 1) data from the Energy Information Administration Residential Energy Consumption Survey or 2) aggregated consumption data from KCPL with additional parcel data from county tax offices to calculate mean/median square footage;

2. Assess program investments between income-qualified and non-income qualified energy efficiency programs and customers. Establish an Equitable Energy Efficiency baseline (E3b) to quantify the gap between equitable, based on territory population demographics (e.g., the proportion of low-income households), and actual annual investments as reported in annual utility filings with the Missouri Public Service Commission; and
3. Assess the equitable distribution of household energy savings between low income and non-low-income customers in the service territory based on utility reported data as filed with the Commission for relative comparisons.

Q. Are you aware of an example of an independent academic analysis performed on the equity of residential energy efficiency utilization?

A. Yes. GM-7 contains 2016 academic article from *Energy Policy* titled "Targeting energy justice: Exploring spatial, racial/ethnic and socioeconomic disparities in urban residential heating energy efficiency" by Dr. Tony Reames of the University of Michigan. The abstract states:

> Fuel poverty, the inability of households to afford adequate energy services, such as heating, is a major energy justice concern. Increasing residential energy efficiency is a strategic fuel poverty intervention. However, the absence of easily accessible household energy data impedes effective targeting of energy efficiency programs. This paper uses publicly available data, bottom-up modeling and small-area estimation techniques to predict the means census block group residential heating energy intensity (EUI), an energy efficiency proxy, in Kansas City, Missouri. Results mapped using geographic information

> systems (GIS) and statistical analysis, show disparities in the relationship between heating EUI and spatial, racial/ethnic, and socioeconomic block group characteristics. Block groups with lower median incomes, a greater percentage of households with poverty, a greater percentage of racial/ethnic minority headed-households, and a larger percentage of adults with less than a high school education were, on average, less energy efficient (higher EUIs). Results also imply that racial segregation, which continues to influence urban housing choices, exposes Black and Hispanic households to increased fuel poverty vulnerability. Lastly, the spatial concentration and demographics of vulnerable block groups suggest proactive, area-and community-based targeting of energy efficiency assistance programs may be more effective than existing self-referral approaches.[34]

Stakeholders are in the unique position of comparing Dr. Reames' pre-MEEIA baseline against the hundreds of millions of dollars of investments from at least two cycles of programs.

Q. Do you want to condition this recommendation on Dr. Reames' involvement?

A. That would be ideal, but I am willing to listen to suggestions on this issue as we have no idea whether or not Dr. Reames would even be interested in conducting the work. Regardless, whether or not Dr. Reames or somebody under his supervision conducts this work is less of a concern for us than making sure an independent research was replicating the 2016 study to see whether or the MEEIA investment to date has been effective and how this information could inform future MEEIA programs. So, at a minimum, the researcher would utilize Dr. Reames' work as the basis for study.

[34] Reames, T.G. (2016) Targeting energy justice: Exploring spatial, racial/ethnic and socioeconomic disparities in urban residential heating energy efficiency. *Energy Policy*. 77: 549-558. See GM-7.

Q. Do you have any privacy concerns over this recommendation in light of your early comments about customer data?

A. No. To be clear, I am not opposed to aggregated data for utility purposes. The intent behind this recommendation is to not use customer usage information for non-utility purposes or as a nonregulated revenue stream.

WattTime: Automated Emissions Reduction ("AER")

Q. Do you have any further recommendations regarding future demand response or customer education programs?

A. Yes. Assuming KCPL adopts and enforces robust customer data protection measures, OPC would recommend that KCPL strongly consider including WattTime's (or a similar software application) Automated Emission Reductions ("AER") technology as a complementary feature for future smart energy efficient devices and/or demand response programs.[35]

[35] See also: DeWitt, Z. & M. Roeschke (2015) Optimal refrigeration control for soda vending machines. *Energy Systems and Control*. U. of California, Berkley https://www.watttime.org/app/uploads/2019/03/Optimal-Refrigeration-Control-For-Soda-Vending-Machines_May_2015.pdf;

Tran, J. et al. (2015) Automated demand response refrigerator project. *Energy Engineering*. U. of California, Berkeley. https://www.watttime.org/app/uploads/2019/03/Automated-Demand-Response-Refrigerator-Project_October-2015.pdf;

Callaway, D., M. Fowlie & G. McCormick (2018) Location, location, location: The variable value of renewable energy and demand-side efficiency resources. U. of Chicago. *Journal of the Association of Environmental and Resource Economists* 5(1): 39-75. https://www.watttime.org/app/uploads/2019/03/Location-location-location-The-variable-value-of-renewable-energy-and-demand-side-efficiency-resources_September-2015.pdf;

Graff Zivin, J.S., M. Kotchen and E. Masur (2014) Spatial and temporal heterogeneity of marginal emissions: Implications for electric cars and other electricity-shifting policies. *Journal of Economic Behavior & Organization.* 107: 248-268. https://www.watttime.org/app/uploads/2019/03/Spatial-and-temporal-heterogeneity-of-marginal-emissions-Implications-for-electric-cars-and-other-electricity-shifting-policies_March-2014.pdf;

Siler-Evans, K., I. Azevedo & M.G. Morgan (2012) Marginal emissions factors for the U.S. electricity system. Environmental Science & Technology. https://www.watttime.org/app/uploads/2019/03/Marginal-Emissions-Factors-for-the-US-Electricity-System_April-2012.pdf; and

Mandel, J. & M. Dyson (2019) WattTime validation and technology primer. Rocky Mountain Institute. https://www.watttime.org/app/uploads/2019/03/Automated-Emissions-Reduction-Primer_RMI-Validation_June2017.pdf

Q. What is an AER?

A. According to the WattTime website the AER technology is:

> Based on real-time grid data, cutting-edge algorithms, and machine learning—provides first-of-its-kind insight into the electricity grid's marginal emissions rate. We're able to "see" when, where, and how the grid is breathing. WattTime's AER technology uses that insight to make smart devices even smarter. Powered by our software, smart devices that control flexible electricity loads use the cloud-based AER signal to automatically, effortlessly, and seamlessly sync their energy use with moments of cleaner energy while avoiding moments of dirtier energy. Most importantly, this happens without sacrificing cost and user experience.[36] . . .
>
> WattTime's AER software pulls information from different power plants and grid operator data to calculate which moments have lower marginal emission rates. It then "talks" via the cloud to individual smart devices that are signed up for AER. The software system lets these devices know when to use electricity—and when not to—reduce emissions, automatically. We simply "move" flexible energy consumption to better times. And we do this seamlessly, without impacting the end use.[37]

Stated differently, in the SPP footprint there should be a strong correlation between increased emissions and peak usage. Using WattTime's grid emission algorithm should help minimize grid intensity, cut emissions and reduce peak usage.[38]

OPC is very interested in exploring this technology not only in MEEIA but also with KCPL's TOU pilot program roll-out. No doubt, there needs to be further dialogue on its applicability with specific devices but the possibilities are promising and worth pursuing. The Commission should note, that Ameren Missouri has recently agreed to explore

[36] WattTime (2019) What is AER? https://www.watttime.org/aer/what-is-aer/
[37] WattTime (2019) AER 101. https://www.watttime.org/aer/how-aer-works/
[38] See GM-8.

WattTime's AER application in its recently filed stipulation and agreement for its EV fast charge rebates.

Pay As You Save ("PAYS®")

Q. Do you have any further recommendations regarding how KCPL can increase its market share of nonparticipants to justify a future MEEIA application?

A. I recommend that KCPL offer a PAYS program.

Q. Did KCPL's independent third party evaluator of PAYS see a market need and recommend pursuing the program?

A. Yes. The recommendation was not an unequivocal endorsement but was predicated on regulatory approval and targeted marketing.

Q. Did OPC take issue with KCPL's independent third party evaluation of PAYS?

A. Yes. Despite the report's general positive conclusions and recommendations, there were some fundamental flaws and misunderstandings in how the evaluators characterized the PAYS tool. Those response comments, authored by the PAYS creators, were filed in this case and are included in GM-9 for reference. In addition to the filed comments, OPC arranged a technical conference in conjunction with this filing to field any questions, concerns, or misunderstanding about PAYS with stakeholders. The stakeholder submitted questions and PAYS responses are included in GM-10 for reference.

Q. What do you propose regarding a PAYS program?

A. My primary recommendation is for KCPL to roll out a full PAYS program with the next MEEIA application; however, I would be amendable to a one-year, proof-of-concept PAYS pilot program with the following seven conditions out of an abundance of caution:

1. <u>One-Year Pilot-Program Goal.</u> The goal should be that within one year of the date of the first completed installation, approximately 1% of the utility's customers (i.e., 5,000 for KCP&L) will complete installation of PAYS projects in their units. Assuming an offer

acceptance rate of 78.1%, this will require at least 6,400 Easy Plans (i.e., offers based on location-specific assessments).

2. Target Market. At least two-thirds of participants must live in neighborhoods designated by the parties as predominantly low- or moderate-income customers or be renters in multifamily housing (5 or more units) where the renter is a customer responsible for paying their energy bills. Owners of multifamily units in participating buildings may also use the PAYS tariff to install upgrades in common areas (e.g., building and parking lighting), but will be allowed to install their own upgrades, and/or use the PAYS charge or their own capital.
3. Earnings Opportunity. A utility's earning opportunity should be tied to the success of its program to ensure the utility's support (e.g., a commitment to 5,000 completed projects and provide customer usage data to target high users, demographic information to target low-moderate income neighborhoods, and identify customers living in multi-family buildings of 5 or more units). For example, there should be a zero-earnings opportunity for a utility that reaches fewer than 50% of the targeted number of customers. For each percent over 50% the utility should receive 2% of the specified earnings opportunity.
4. Program Operator. Since the pilot is a proof of concept, the utility should use the only successful PAYS program operator serving multiple states, EEtility, Inc. and its version of the PAYS system. EEtility's proven model and its license to use the Energy Efficiency Institute, Inc.'s intellectual property will eliminate the need for design and licensing fees.
5. Capital Budget. The program should have a budget for capital of $5,500 per completed project or a total of $27.5 million (see attached spreadsheet), however the utility will not be penalized if the demand for cost effective projects results in the need for additional capital. The utility's earnings opportunity should be tied to its ability to obtain access to capital without carrying costs and an interest rate of no more than 5%. The utility must be assured that if it uses its customary protocols for uncollectables, it will be assured of any uncollectables over its current rate for non-payment.

6. Operational Budget. The operational budget, for planning purposes should be $4.1 million (see attached spreadsheet), however the utility should not be penalized if additional start-up costs associated with the first PAYS pilot results in the need for additions to the operational budget, providing the total operational budget is less than $5 million.
7. Startup Budget. To initiate a program, no less than one month before the first customer contacts, the Program Operator will need to secure and train staff, arrange for leased equipment (e.g., the vehicles, blower doors, other testing equipment and computers), and offices. The estimated start-up costs for a one-year pilot is approximately $180,000. The start-up costs will be one-time costs, providing that the Program Operator receives 90 days-notice prior to termination, extension or expansion of the on-year pilot. EEI did not include a separate startup budget in its response to KCP&L's Cadmus study since startup costs could be amortized over the life of a program.

Q. What is the driving force behind your support for PAYS?

A. PAYS enables deeper, energy efficiency and demand savings to customers that do not have thousands of dollars of disposable income to make energy-related investments, which includes most of the residential customers across KCPL's service territory if key economic indicators are to be believed. If stakeholders are really serious about energy efficiency, they should support a PAYS program.

There have now been three independent third-party studies conducted across each of the major electric utilities. Each one has come back with similar conclusions for the need/potential and recommendations for exploration. Most recently, Ameren Missouri has verbally agreed with stakeholders to send out an RFP for a PAYS pilot program this fall with the hope of operation in 2020.

I can find no compelling reason why KCPL would not make a good faith effort to explore a one-year pilot program. At the conclusion of the one-year, either the PAYS program will be successful and the program can be ramped up or it will not and stakeholders can move on.

Q. Do you have any final comments to make regarding PAYS?

A. I look forward to reading and responding to the rebuttal comments from other stakeholders on this issue in surrebuttal testimony.

Urban Heat Island Mitigation

Q. Do you have any further recommendations regarding alternative means to value future MEEIA applications?

A. Yes. I recommend that KCPL begin investigating how MEEIA could be tailored to address the urban heat island phenomenon in Kansas City.

Q. What are urban heat islands?

A. Many urban and suburban areas experience elevated temperatures compared to their outlying rural surroundings; this difference in temperature is what constitutes an urban heat island.

On a hot, sunny summer day, the sun can heat dry, exposed urban surfaces, like roofs and pavement, to temperatures 50 to 90°F (27 to 50°C) hotter than the air,[39] while shaded or moist surfaces—often in more rural surroundings—remain close to air temperatures. Surface urban heat islands are typically present day and night, but tend to be strongest during the day when the sun is shining.

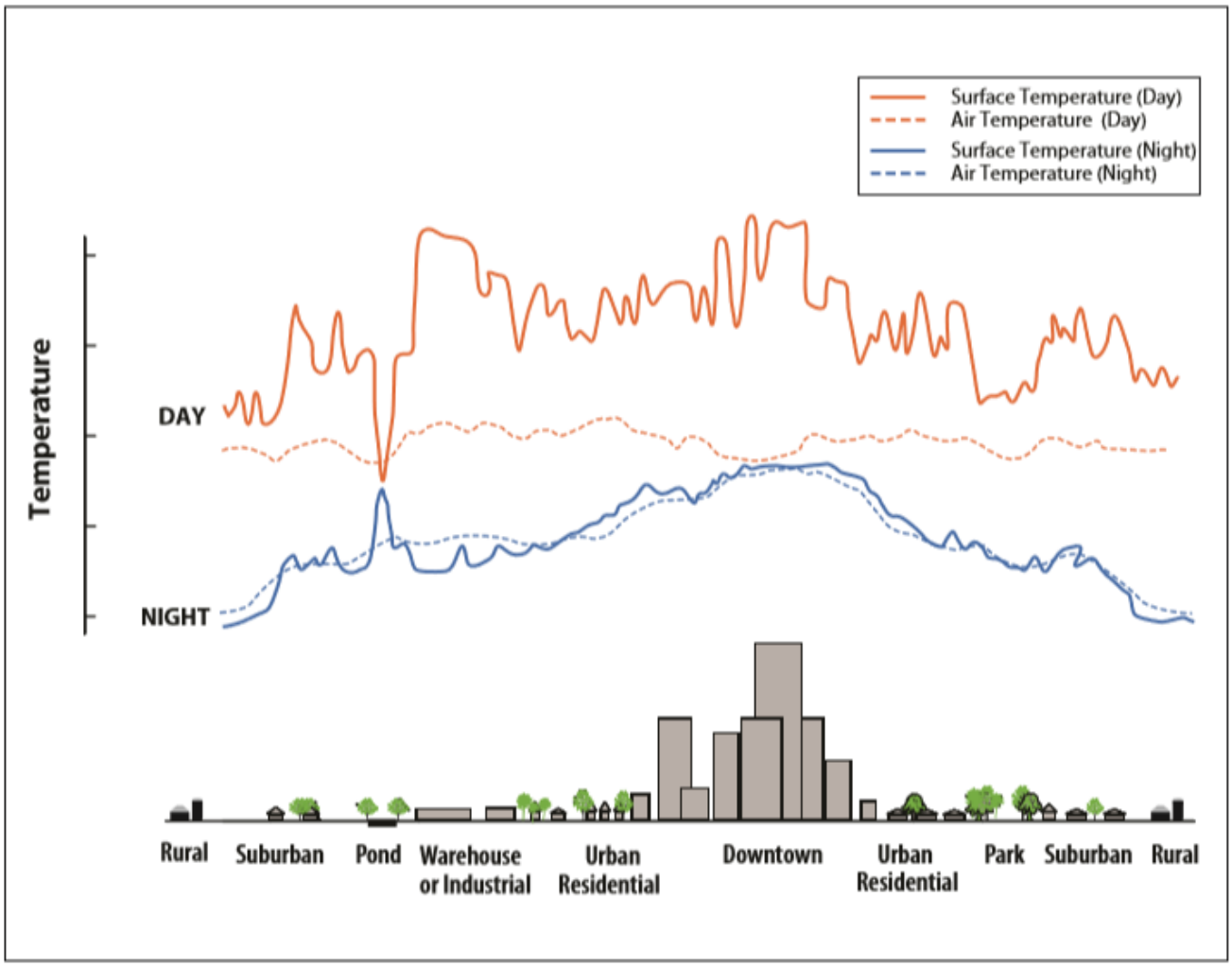
Think about a parking lot in the hot sun—most of us know that if we're walking barefoot, we should stick to the white lines and avoid the black pavement. Now scale that up across a city. The darker the surface, the less vegetation there is, and the more developed the area (e.g., conventional black roofs, sidewalks, roads and parking lots) will result in higher surface and consequently increasers the air temperature.

Surface temperatures have an indirect, but significant, influence on air temperatures. For example, parks and vegetated areas, which typically have cooler surface temperatures, contribute to cooler air temperatures. Dense, built-up areas, on the other hand, typically lead to warmer air temperatures. Because air mixes within the atmosphere, though, the relationship

[39] Berdahl P. and S. Brez. (1997) Preliminary survey of the solar reflectance of cool roofing materials. *Energy and Buildings* 25:149-158.

between surface and air temperatures is not constant, and air temperatures typically vary less than surface temperatures across an area as seen in Figure 8

Figure 8: Variations of surface and atmospheric temperatures



Q. Does the city of Kansas City's urban profile produce an urban heat island?

A. Yes. Kansas City has one of the worst heat islands in the United States and is forecasted to produce more pronounced results into the future if left alone.[40]

[40] The Weather Channel's "climate disruption index" projects Kansas City to be the fifth most impacted city in the future with only New York, Las Vegas, Minneapolis and New Orleans exceeding it. http://stories.weather.com/disruptionindex

Q. Could you provide some basis for the Urban Heat Island problem in regards to Kansas City?

A. Yes. In late 2014, the Kansas City region was named a Climate Action Champion by the White House and the Department of Energy. Area partners, included 119 local governments in the bi-state (Missouri and Kansas) area including over 4,423 square miles committed to developing a regional climate resilience strategy that would assess climate change trends for the Kansas City region, identify potential risks and vulnerabilities, and include alternative mitigation, adaptation and resilience options. A Climate Resilience Workshop series was created that was designed to help decision makers and community partners more intentionally link cross-cutting strategies across multiple sectors, including air quality, ecosystem management, energy, hazard mitigation and emergency planning, environmental justice, land use, public health, transportation and water.

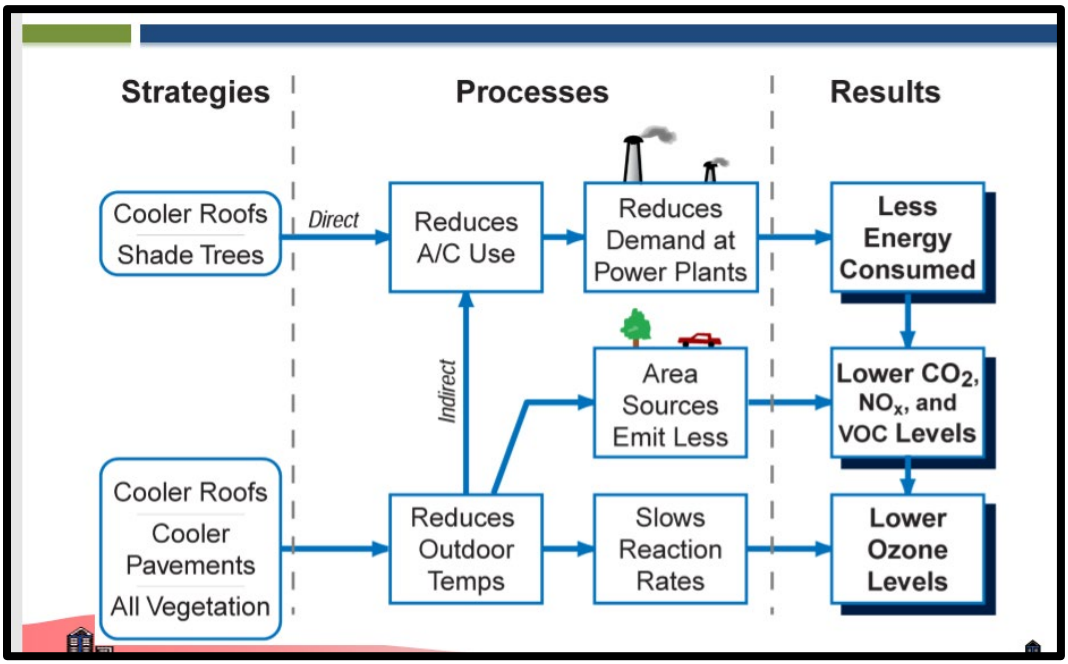
Championed and coordinated by the Mid-American Regional Council ("MARC") two separate independent research studies were conducted on the urban heat island phenomenon for the Kansas City area. The first study was conducted by a third-party research firm, Leidos, and completed in September of 2015. Titled, "Energy Savings of Heat-Island Reduction Strategies for the Kansas City Area" focused solely on the city of Kansas City. A second study was undertaken by Lawrence Berkeley National Laboratory for the greater Kansas City Region (both Missouri and Kansas). I have included the Leidos study in GM-11 and the Berkeley PowerPoint in GM-12. The Berkeley Study is expected to be released publically this fall. Additional work has on this topic that was conducted independently from MARC includes research from the University of Missouri, Kansas City ("UMKC") graduate student Kyle Reed and Climatologist Dr. Sun Fengpeng.[41]

[41] I have included a copy of Kyle Reed and Dr. Sun Fengpeng's findings in a presentation given to KCPL and other stakeholders in GM-13. GM-14 contains the presentation given by the Executive Director of the Global Cool Cities Alliance, Kurt Shickman's also on June 25, 2019 at KCPL's headquarters.

Q. Why is this relevant to this MEEIA application?

A. Presently there is no supply-side deferral in the 20-year planning period for KCPL. Consequently, KCPL cannot claim to be producing benefits for all customers that outweigh the projected costs and therefore the application does not conform to MEEIA's statutory requirements for approval. What the urban heat island does is recognize a problem that has historically been overlooked and is forecasted to get much worse if no mitigation efforts are taken. In short, the Kansas City Urban Heat Island presents a problem in which a MEEIA-like tailored effort could help solve; thus producing benefits for all ratepayers. Figure 9, provides a high-level flow-chart of the strategies, process and resulting benefits in mitigating the urban heat island that could be exercised with a coordinated effort:

Figure 9: Strategies, Process and Results



Q. When did OPC get involved in the urban heat island discussion?

A. Shortly after KCPL's MEEIA filing it was evident that a traditional MEEIA could not be justified. In an attempt to find an alternative defense for an approved MEEIA portfolio I read

an article on the benefits of implementing cool roofs.[42] Further research on that topic and its applicability to the Kansas City area led me to the aforementioned work on the urban heat island in Kansas City. I then reached out to representatives from the greater Kansas City area as well as national (and international) experts on the topic. Finally, a dialogue on the potential was broached with the Staff, DE, Renew Missouri and the Company.

Q. Beyond the stakeholders who have intervened in this case, what outside parties have participated in this topic?

A. The following groups in figure 10 have attended and/or actively presented their work to KCPL in the fact-finding, problem-solving collaborative:

Figure 10: Participants in the KCPL Urban Heat Island Mitigation Collaborative to date

- US Environmental Protection Agency
- American Council for Energy Efficient Economy
- Bridging the Gap (environmental non-profit)
- US Green Building Council
- University of Missouri, Kansas City
- Mid America Regional Council
- City of Kansas City
- Global Cool City Alliance
- Lawrence Berkeley National Laboratory
- U.S. Department of Energy
- Sobolt (for-profit, the Netherlands)
- Kansas City Water
- Metropolitan Energy Center

Q. What was the feedback from the MEEIA interveners?

A. I will let those parties speak for themselves in testimony.

Q. Would KCPL be able to mitigate the urban heat island with its present MEEIA application?

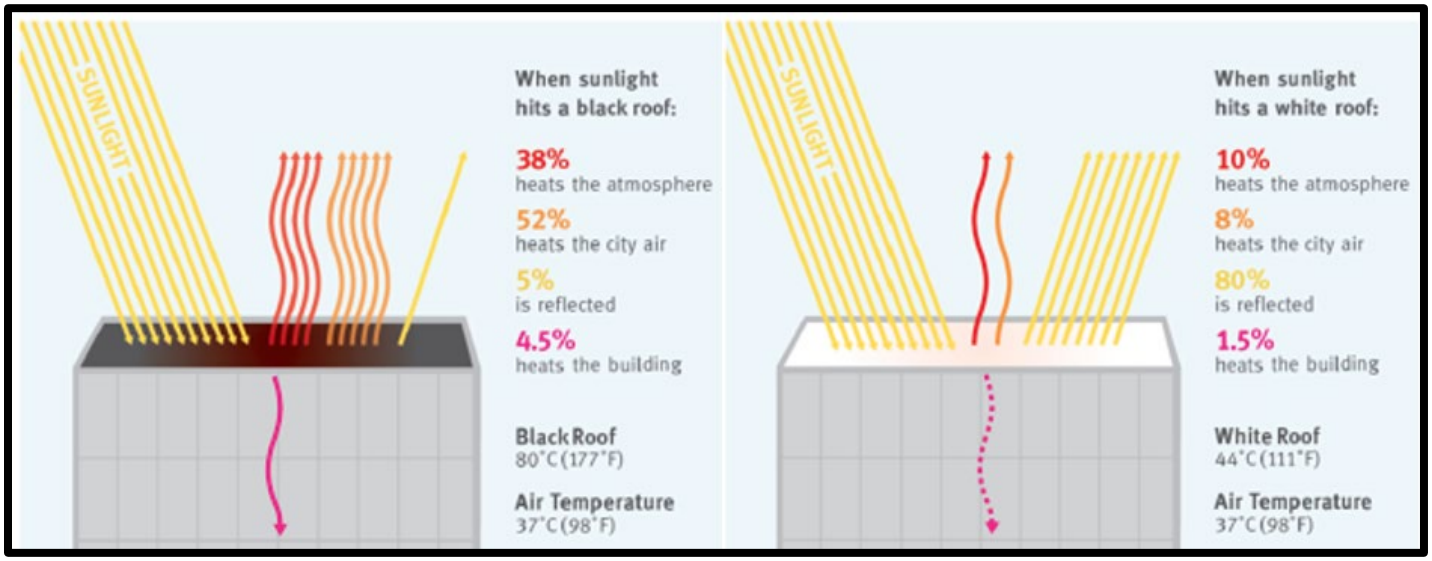
A. No. For a variety of reasons, rebating light bulbs and sending out home energy reports will have no material impact on the urban heat island.

Q. What would be an example of an action that could mitigate the urban heat island?

A. One example is to convert traditional flat rooftops to cool rooftops. Figure 11 provides an illustrative graphic of sunlight on a black and white roof.

[42] Wolfram, C. (2018) How should we use our roofs? Energy Institute at Haas. https://energyathaas.wordpress.com/2018/10/22/how-should-we-use-our-roofs/

Figure 11: How solar energy interacts with dark and highly-reflective urban surfaces



GM-15 contains a write-up titled "Highly Solar Reflective "Cool 'Roofs in Kansas City authored specifically for the KCPL collaborative by Kurt Shickman the Executive Director of the Global Cool Cities Alliance.[43]

Q. Beyond cool roofs, are there other measures?

A. Increased vegetation and increased highly-reflective urban surfaces would all move towards further mitigation.

Q. Will you be able to opine on all of the work that has been done on this topic in this testimony?

A. No. However, much of the information is included as various attachments. This topic is well established and much of the empirical foundation has already been developed by independent researchers. I believe it is a clear problem that KCPL can help mitigate through MEEIA. GM-17 is an academic peer-reviewed article titled "Capturing the true value of trees, cool roofs and other urban heat island mitigation strategies for utilities" and effectively functions as a how-to of various action items that could be utilized. The upcoming Lawrence Berkeley Study will

[43] GM-16 contains a copy of Shickman K. et al (2016) The potential impact of cool roof technologies upon heat wave meteorology and human health in Boston and Chicago. ASTM International Ninth Symposium on Roofing Research and Standards Development.

perhaps be the most useful research item moving forward and will be filed in this docket when it becomes available.

Q. What would be your recommendation regarding this topic moving forward?

A. The urban heat island problem is not an easy fix but will require a lot of coordination and various public-private partnerships. Much of the research needed to justify action has already been conducted. But additional work remains.

I recommend allocating up to $2 million dollars on research and development with funds directed at two deliverables including:

1.) Further empirical justification and coordination with relevant local stakeholders to be incorporated in a future MEEIA; and

2.) The creation of a corporate social responsibility team that actively engages local, state and national actors for funding and help on the urban heat island phenomenon.

Q. Please explain your second deliverable more.

A. As it stands, I do not believe the urban heat island can be mitigated under the traditional MEEIA framework. What I would propose is a specific time period (no more than 18 months) where KCPL would actively seek out alternative funding streams and donations to address Kansas City's Urban Heat Island problem. Ratepayers would fund that R&D and future earnings opportunities could be tied to the amount of money/donations generated from the solicitations. For example, I think it would be more than generous to provide a 10% return on any dollar generated after a certain threshold was met. So, if KCPL were to generate $100 million in grant money to implement cool roofs across Kansas City, then the Company could earn a $10 million earnings opportunity.

Stated differently, the first deliverable is focused on identifying relevant stakeholders and articulating clear and reasonable goals. The second deliverable is focused on allowing the utility and relevant stakeholders the opportunity to present the most cost-effective way to achieve those clear and reasonable goals.

Q. Would mitigating the urban heat island in Kansas City produce benefits for all customers?

A. Yes. I am confident that if left unattended Kansas City's core temperature will increase and translate to increased energy and demand costs for all customers. The proposal on the table in this case is merely a $2 million R&D investment, or literally less than half the amount of money the Company was willing to spend on a home energy report delivered three times a year in the mail for a subset of households. If the R&D investment pays off, that is, if it leads to actionable items and coordinated efforts from local leaders then all ratepayers will be better off and the Company will be in compliance with the MEEIA statute.

Q. Does this conclude your testimony?

A. Yes.