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Sponsoring Party: Public Counsel
Case No.: EO-2018-0211

REBUTTAL TESTIMONY

OF

GEOFF MARKE

Submitted on Behalf of
the Office of the Public Counsel

UNION ELECTRIC COMPANY D/B/A AMEREN MISSOURI

CASE NO. EO-2018-0211

August 30, 2018

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's 3rd Filing to Implement Regulatory Changes in Furtherance of Energy Efficiency as Allowed by MEEIA	)))))	File No. EO-2018-0211

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 30th day of August 2018.

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

UNION ELECTRIC COMPANY
d/b/a Ameren Missouri
CASE NO. EO-2018-0211

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 direct testimony?

A. The purpose of this testimony is to respond to Ameren Missouri's "Missouri Energy Efficiency Investment Act" ("MEEIA") Cycle III application. This testimony will focus on the following sections within Ameren Missouri's application including:

- Ameren's MEEIA in Context
    - Redistribution: Winners & Losers
    - Historic & Forecasted Load
    - Historic MEEIA
    - Supply Side Investment Costs
    - Efficient Electrification Load Building
    - Senate Bill 564

- Specific Aspects of the Application
  - Six-year Portfolio & the IRP Process
  - Excessive & Contemporaneous Earnings Opportunity Recovery
  - Evaluation, Measurement & Verification
- Portfolio of Programs
  - Energy Efficiency Programs
  - Demand Response Programs
  - Low-Income Programs

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

Q. Please state OPC's position on the direct filing of this case?

A. OPC's primary recommendation is for the Commission to reject Ameren Missouri's MEEIA Cycle III application as filed. The application is inappropriate given the low avoided costs, long capacity, the loss of Noranda, the inclusion of 750 MW or more of wind generation to meet RES compliance and specific corporate customer's requests, as well as other pertinent variables. The rest of this testimony will provide context for OPC's primary position. However, as a secondary recommendation, OPC strongly encourages Ameren Missouri to refile an amended application that takes into account an annual "default MEEIA level" which maintains programs and spending at a reasonable level that recognizes both historic sunk costs and the potential need to increase MEEIA funding in the future. The "default MEEIA level" is broken down as follows:

Categories	Annual Costs	Class Allocation
• Residential Programs	$5,000,000	Residential
• Business Programs	$5,000,000	Business
• Low-Income Programs	$8,333,000	Residential & Business
• Marketing & Administration	$667,000	Residential & Business
• Earnings Opportunity	$2,000,000	Residential & Business

OPC's proposed Earnings Opportunity is based on approximately 10.5% of the total annual program expenditures and can be rewarded in full by meeting one of two possible scenarios: 1) 75% of the annual program expenditures in each of the residential and commercial categories ($3,750,000 for each) and 50% of the low-income programs ($4,166,500) are spent; or 2) 100% of the annual low-income program expenditure is met within the year ($8,333,000). OPC recommends that all Evaluation, Measurement and Verification ("EM&V") be suspended in light of the OPC's proposed earnings opportunity mechanism (which is based on annual achieved expenditure thresholds).

Finally, OPC recommends that the annual "default MEEIA level" be established on a three-year period, until the utility's avoided costs are increased and/or federal or state-level regulatory or market changes occur warranting an increase in MEEIA program costs and utility earnings opportunity.

Q. What is the basis for this proposed budget?

A. The $10 million annual allocation for residential and business programs is slightly more 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	Budget Amount	Cost per year per account
Empire	172,774[1]	$1,250,000[2]	$7.23
Ameren Missouri	1,219,333[3]	$10,000,000	$8.20

OPC then elected to allocate the $10 million evenly between residential and business customers. The breakdown in costs per year, per customer account can be seen in Table 2.

[1] BMAR-2018-1695 The Empire District Electric Company Annual Report (MO PSC) for 2017
[2] ER-2016-0023 Stipulation and Agreement p. 5
[3] BMAR-2018-1471 Union Electric Company Annual Report for 2017

Table 2: Ameren Missouri's annual cost per account, per number of accounts in customer class

Customer Class	Total Customer Accounts per class	Budget Amount	Cost per year, per account
Residential	1,056,451	$5,000,000	$4.73
Business	162,882	$5,000,000	$30.70

Q. Has OPC included other costs in the proposed budget?

A. Yes. OPC has included Ameren Missouri's targeted low-income amount scaled on an annual basis and $667,000 in annual marketing and administrative costs both of which would be allocated evenly between residential and business customers. Finally, OPC has allocated up to $2,000,000 in annual earnings opportunity if the aforementioned expenditure thresholds are met and, were again, allocated evenly. The overall yearly impact to residential and business customers can be seen in Table 3 and 4 respectively under the assumption that Ameren Missouri spends exactly the budgeted amount allocated and that all customer accounts were billed the MEEIA surcharge.

Table 3: Breakdown in annual costs assuming total residential customer accounts

Program Category	Total Customer Accounts	Allocated Amount	Cost per year, per category
Residential	1,056,451	$5,000,000	$4.73
Low-Income	//	$4,166,500	$3.94
Marketing & Admin	//	$333,5000	$0.63
Earnings Opportunity	//	$1,000,000	$0.95
Total	//	**$10,500,000**	**$9.94**

Table 4: Breakdown in annual costs assuming total business customer accounts

Program Category	Total Customer Accounts	Allocated Amount	Cost per year, per category
Business	162,882	$5,000,000	$30.70
Low-Income	//	$4,166,500	$3.94
Marketing & Admin	//	$333,5000	$2.05
Earnings Opportunity	//	$1,000,000	$6.14
Total	//	**$10,500,000**	**$64.46**

These cost breakdowns are meant to provide a rough approximation of the annual bill impact. There are a certain number of low-income and large business customers that are either exempt or have "opted-out" from having to pay the MEEIA surcharge. As such, the cost per year, per customer will vary accordingly.

Q. Would lost revenues from the throughput be recoverable?

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

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

A. Yes. All of them, with the exception of KCPL and GMO whose MEEIA applications will no doubt be reexamined in the near future. Importantly, OPC's alternative MEEIA default option includes both an earnings opportunity and a throughput disincentive recovery mechanism.

Q. Why can't OPC support Ameren Missouri's MEEIA filing?

A. There is no need for it based on Ameren Missouri's current and forecasted operations. Decreasing avoided costs, depressed load forecasts and increasing technology advancement undermine the argument for an aggressive MEEIA today. Commission approval of this application will raise bills on captive customers and spur more financially stable customers to rooftop solar and away from having to pay fixed costs. Because of Ameren Missouri's current generation and load profile, the Cycle II application merely functions as a wealth transfer from nonparticipants to participants and the utility. Ameren Missouri 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.

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 have no applicability to the many surcharges that appear on Ameren Missouri's customer's bills, particularly the MEEIA surcharge. Customer's bills will be far from consumer-friendly,

especially small commercial customer's bills. Affordability, once a standard for Ameren Missouri was only referenced three times in the Company's Missouri's entire triennial IRP. Ameren Missouri's current business strategy appears to be focused on short-term returns at the expense of long-term cost-sustainability. Section II of this testimony will provide greater context for why OPC is taking this position.

II. AMEREN'S MEEIA IN CONTEXT

Redistribution: Winners & Losers

Q. 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.

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).[4] 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. 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) by international trade.

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

A. Nonparticipants[5] lose as MEEIA program costs and earnings opportunities are increased relative to a baseline forecast (which has some naturally occurring energy efficiency adoption). The nonparticipant loses 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.

[4] 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 leads 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.

[5] 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.

Q. What if there was widespread 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. Absolutely not. OPC has 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.[6] Given Ameren Missouri's current long capacity position, low load forecasts, proposed load-building application, increased supply-side generation investments, and near-term costs associated with recently passed legislation, OPC does not believe the aggregate economy-wide benefits exist to justify approval of this application today.

Stated differently, the argument for MEEIA is as follows:

> Phase 1: Pass a MEEIA law that encourages energy efficiency adoption but also makes the utility whole.

[6] And even in at least one case where that premise was not entirely evident. See also ER-2016-0023 regarding filings regarding the PAYS Study.

Phase 2: Don't build the supply-side investment.

Phase 3: Utility profits and ratepayer's save money by deferring costs on large-scale supply-side investments.

Ameren Missouri's current MEEIA application would be described as follows:

Phase 1: Propose a MEEIA application to encourage energy efficiency adoption and make Ameren Missouri whole.

Phase 2: ???

Phase 3: Profit for Ameren Missouri

It is not clear what exactly ratepayers are getting out of Phase 2 in Ameren Missouri's application because there is no reasonable 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 Ameren Missouri, 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., RES compliance costs, "smart gird" investments, etc…). 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.

Historic & Forecasted Load

Q. Is Ameren Missouri currently long, short, or even, on generating capacity to serve its load?

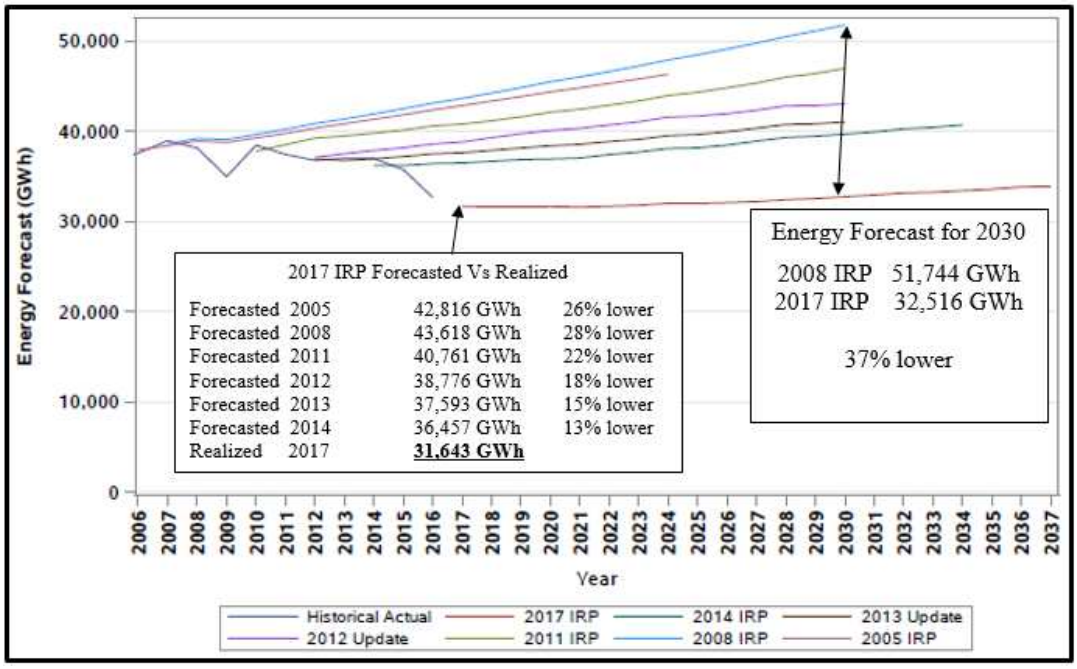
A. It is long on capacity.

Q. What has been Ameren Missouri's recent and forecasted load growth?

A. Ameren Missouri's load growth has been flat or declined for several years, and it is not expected to grow within its planning period. According to Ameren Missouri's 2017 Integrated Resource Plan ("IRP"), Chapter 3—Load Analysis and Forecasting:

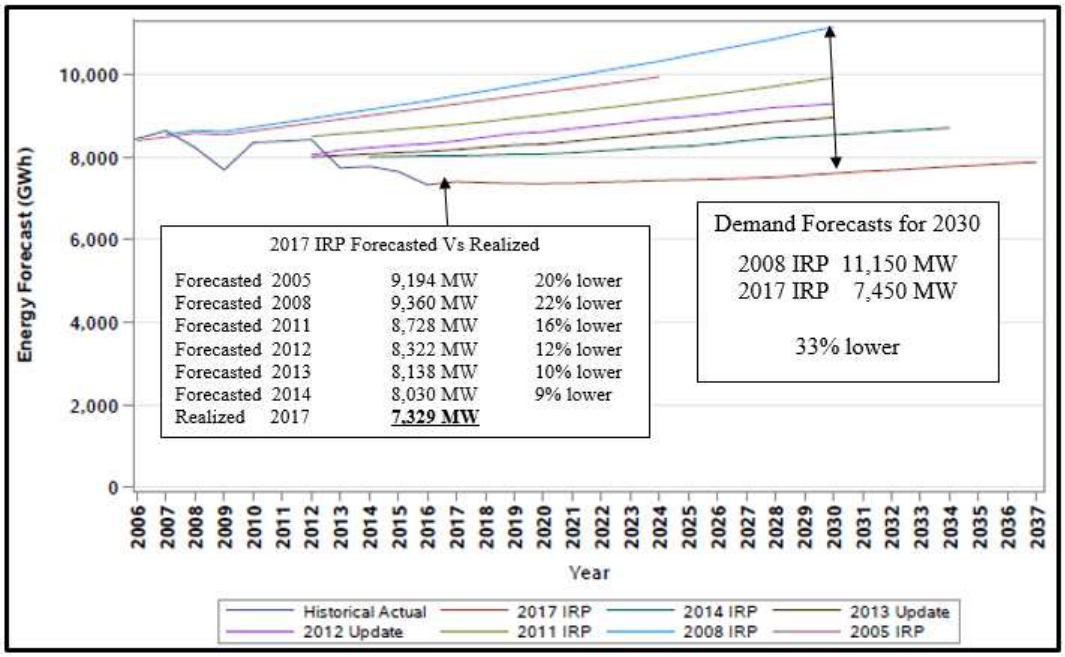
Compared to Ameren Missouri's last IRP, filed in 2014, both the level and the growth rate of the forecasts are lower. The 0.30% growth rate in retail sales in this filing (between 2018 and 2037) is also lower than the 0.6% retail sales growth rate expected for the study period in the 2014 IRP forecast largely due to a combination of factors.[7] Figure's 1 and 2 provide a visual of Ameren Missouri's historical energy and demand IRP forecasts relative to its most recent 2017 forecast and clearly shows lower expected load forecasts than in all of the previous iterations. Figure's 1 & 2 also emphasize the large degree of forecasting error inherent in predicting the future. A point that underscores the inappropriateness of locking in ratepayers to a "six-year" proposed portfolio of programs as requested by Ameren Missouri and to be discussed in greater detail later in this testimony.

Figure 1: Ameren Missouri forecasted vs realized energy load in previous IRP energy forecasts[8]



[7] EO-2018-0038 Chapter 3 Load Analysis and Forecasting, p. 2.
[8] Ibid. p. 5

Figure 2: Ameren Missouri forecasted vs realized peak demand in previous IRP demand forecasts[9]



Ameren Missouri was "off" 13% and 9% for its energy and demand forecast since the last triennial IRP three years ago. This is relevant because Ameren Missouri's application has put forward a future in which $629 million benefits would be realized in 2044. These espoused benefits would only be realized if all forecasting assumptions were correct *and* remained static for *twenty-six-years*. Consider for a moment that IRP's can vary considerably year-to-year let alone every three-years. That is why an annual and triennial planning process is in place. OPC has no certainty in the veracity of "benefits" to ratepayers twenty-six years into the future based on

Q. What happened during those IRPs that produced such pronounced forecasting errors?

A. Many things. Chief among them includes the housing crisis in 2008 and the loss of its largest customer, Noranda Aluminum Smelter, in 2016.

Q. Does Ameren Missouri's forecasts include future energy efficiency savings?

A. No. According to Ameren Missouri:

[9] Ibid. p. 6

> It should be noted that in the development of this forecast, expectation of improving energy efficiency of end use equipment and appliances is reflected only to the extent that it is due to market conditions, federal standards, or the first three year cycle of energy efficiency programs Ameren Missouri is currently implementing under the MEEIA. The second cycle of MEEIA programs is included in the load forecast because it is already planned and approved and in the process of being implemented by the company.[10]

Q. To be clear, those low load forecasts on figures 1 and 2 do not account for any future ratepayer-funded MEEIA programs?

A. That is correct.

Historic MEEIA

Q. Has Ameren Missouri's previous MEEIA portfolio's affected load?

A. Yes. The promotion of demand-side management techniques and naturally occurring efficiency adoption have likely impacted historic load and will continue to temper future load growth. However, context is important, the terms the parties entered into for both of Ameren Missouri's MEEIA applications were predicated on a future where Noranda was fully operational, and, therefore, the forecasted loads were much greater. On February 5, 2016, parties to Case No. EO-2015-0055 (MEEIA Cycle II) filed a non-unanimous stipulation and agreement, in which the earnings opportunity award was based on a supply side valuation of "a 600 MW combined cycle gas generating plant to begin operation in the year 2023, at a capital cost of $948 million in 2023 dollars."[11]

Per the S&A:

> Ameren Missouri represents that pursuant to its internal modeling, achieving approximately 183 MW (including reserve margin and losses) of coincident-demand savings in the year 2022 pursuant to this MEEIA Cycle, approximately 191 MW

[10] EO-2018-0038 Chapter 3 Load Analysis & Forecasting, p. 5
[11] Non-Unanimous Stipulation and Agreement EO-2015-0055 p. 12. 13 A.

(including reserve margin and losses) of coincident-demand savings in the year 2022 pursuant to a MEEIA Cycle 3, and approximately 61 MW (including reserve margin and losses) of coincident-demand savings in the year 2022 to a MEEIA Cycle 4 results in the deferral of that combined cycle pursuant generating unit to a point in the future that varies based on the assumptions of the number of MEEIA cycles and the level of persistent demand savings associated with each MEEIA cycle.[12]

In its MEEIA Cycle II application Ameren Missouri had to assume that it had cycle III and IV portfolios in place and approved to justify Commission approval of its MEEIA Cycle II settlement. However, exactly three days later, Noranda filed for bankruptcy.[13] Stated differently, if the signatories to Ameren Missouri's MEEIA Cycle II settlement had waited just 72 hours before filing the S&A, it is very likely that the settlement terms would have been very different. As a result, Ameren Missouri ratepayers were locked into a suboptimal outcome for the next three years as Ameren Missouri continues to be rewarded for the profit equivalence of an expensive combined cycle gas plant it never needed to begin with.

Supply Side Investments

Q. Is Ameren Missouri planning on retiring its fossil fuel generating units earlier?

A. No. Ameren Missouri's planned fossil fuel retirement dates have mostly either remained the same or have been pushed out further. This can be seen by comparing Ameren Missouri's two most recent triennial IRP filings as shown in Table 5.

[12] Ibid. p. 12. 13 B.
[13] Barker, J. (2016) New Madrid smelter to shut down next month after Noranda files for bankruptcy. *St. Louis Post-Dispatch*. http://www.stltoday.com/business/local/new-madrid-smelter-to-shut-down-next-month-after-noranda/article_b386f8cc-73a9-590e-8f1b-ebfcff6c6003.html

Table 5: Ameren Missouri fossil fuel retirement changes between triennial IRP's[14,15]

Site	Fuel Type	Retirement Date 2014 IRP	Retirement Date 2017 IRP	Retirement Change
Labadie	Coal	2042	2042	No
Meramec	Coal	2022	2022	No
Rush Island	Coal	2046	2045	Yes (-1 year)
Sioux	Coal	2033	2033	No
Kirksville	Natural Gas	2017	2021	Yes (+4 years)
Howard Bend	Oil	2015	Retired	No
Fairgrounds	Oil	2015	2021	Yes (+6 years)
Meramec CTG-1	Oil	2017	2021	Yes (+4 years)
Meramec CTG-2	Natural Gas	2020	2021	Yes (+1 year)
Mexico	Oil	2020	2023	Yes (+3 years)
Moberly	Oil	2020	2023	Yes (+3 years)
Moreau	Oil	2020	2023	Yes (+3 years)

The lone outlier is Ameren Missouri's one-year accelerated planned retirement date of its Rush Island Energy Center; it moved the date 2046 to 2045. To be clear, that is 27 years into the future. Why Rush Island Energy Center dates were accelerated from 28 years to 27 years is unclear and will require further discovery. Regardless, this adjustment will have no material impact on the topic at hand.

[14] EO-2018-0038 Chapter 4 Existing Supply-Side Resources, p. 11-12. & EO-2015-0084 Chapter 4: Existing Supply-Side Resources, p. 12-13.
[15] This is not an exhaustive list of Ameren Missouri's supply side generation units. Furthermore, there may be more than one unit at a particular site; however, the Company has not indicated individual unit retirements for general sites.

Q. Are you surprised that Ameren Missouri has extended the retirement dates of its natural gas and oil plants in its 2017 IRP filing from those it had in its 2014 filing?

A. Somewhat. Although OPC has not fully explored why the retirement dates were extended, with the exception of Howard Bend, which was retired and was the oldest of the "peaker" plants listed, each of those plants are likely financially solvent and providing a net positive return to ratepayers.

Q. Is Ameren Missouri upgrading or acquiring any more supply side investment?

A. Yes. According to Ameren Missouri's recently filed triennial IRP in Chapter 4: Supply-Side Investment there are the following "portfolio upgrades:"

> Keokuk Energy Center completed upgrades to Units 6 and 14 in December 2016. The net output is expected to increase by 2 MW each with a total capital cost of approximately $24 million. In addition, upgrades at Keokuk Energy Center for Units 5 and 15 are scheduled to be completed in 2019. The net output Keokuk will increase by 2 MW each with a total capital cost of approximately $25 million (for the turbine component upgrades only) budgeted in 2017, 2018 and 2019.
>
> Ameren Missouri is considering adding a fourth CTG unit a MHREC [Maryland Heights Renewable Energy Center] that will be in service in 2025. The fourth unit will provide an additional 3-4 MW of summer net capacity with a total capital cost of $16-18 million in 2024-2025 and will provide additional renewable energy needed for meeting the requirements of Missouri's Renewable Energy Standard (RES).[16]

However, these upgrades are small relative to the announced acquisitions articulated in the Company's press release on September 25, 2017 which stated Ameren Missouri's intent to

> [A]dd at least 700 megawatts of wind generation by 2020, representing an investment of $1 billion. The potential exists to add even more wind generation in the coming years

[16] EO-2018-0038 Chapter 4 Existing Supply-Side Resources, p. 10.

as a result of improving technology and economics, as well as renewable energy customers.

The company also plans to add 100 megawatts of solar generation over the next 10 years, with 50 megawatts expected to come online by 2025.[17]

Since that press release, Ameren Missouri has also secured the opportunity to potentially own up to 200 MW of additional program-related wind generation capacity as a result of its Green Tariff in Case No: ET-2018-0063 and 1 MW of Community-Solar in Case No: EA-2016-0207.[18]

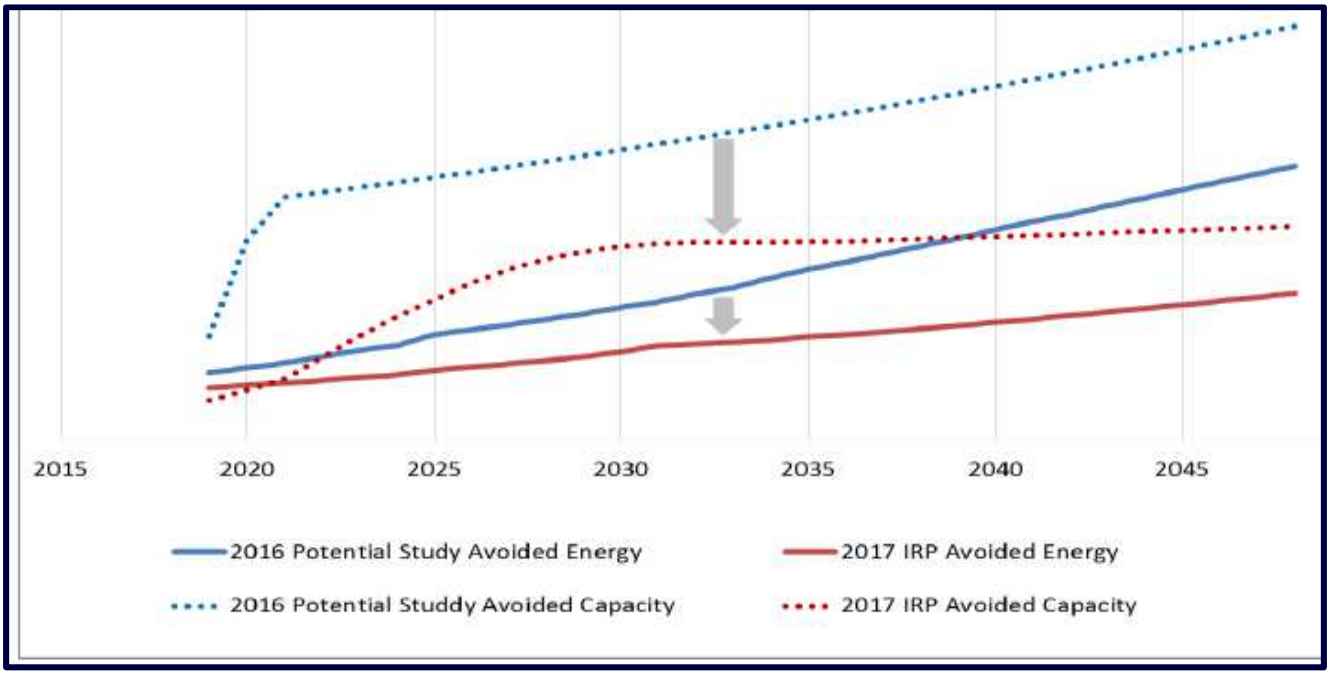
Q. What has been the result of all of this additional generation?

A. The sum combination of Ameren Missouri's additional generation, flat load growth, influx of wind generation in the MISO market and the low price for natural gas has meant lower and lower levels of avoided costs as seen in Figure 3 from Ameren Missouri's most recent IRP.

[17] EO-2018-0038. Filing letter with press release

[18] Per the terms of the second non-unanimous stipulation and agreement in Case No. ET-2018-0063, OPC has reserved the right to challenge the prudency on the investment if it deems necessary in future proceedings.

Figure 3: Avoided cost comparison – 2016 DSM Potential Study vs 2017 IRP[19]



Efficient Electrification Load Building

Q. Does Ameren Missouri have a load-building application in front of the Commission?

A. Yes. Case No. ET-2018-0132, Ameren Missouri's Efficient Electrification Program includes the proposal for two new programs: the Electric Vehicle ("EV") Charging Infrastructure Incentive Program and the Business Solutions program. Together, the two are referred to as the "Charge Ahead" programs.

Q. What is Ameren Missouri's argument for a load-building program?

A. There are several arguments, but chief among them is the fact that an increase in electric load will lead to a decrease in costs to all ratepayers (in the form of fixed cost recovery).

Q. What is OPC's concern with that application in regards to this application?

A. That approval of both applications would seemingly be at odds with one another. OPC questions the appropriateness of supporting both a load building and a load reduction program,

[19] EO-2018-0038 Chapter 8 Demand-Side Resources, p. 4.

all the while more load is being built based on a load forecast that does not see the need for any new load to begin with.

Senate Bill 564

Q. Can ratepayers expect additional costs in the near future?

A. Yes. As a result of the passage of Senate Bill ("SB") 564 Ameren Missouri will have the opportunity to file a five-year capital investment plan that can allow the Ameren Missouri to defer certain depreciation expenses and return associated with certain plant-in-service accounting ("PISA") to a regulatory asset for future recovery. The overall cost impact is yet unknown, nor is it entirely clear what investments are supposed to be made, but it would appear reasonable to assume that Ameren Missouri will elect to receive PISA treatment and in turn ratepayers should expect yearly rate increases for at least the next five years (and likely larger increases thereafter).

Q. Please summarize the various arguments that you have articulated?

A. Ameren Missouri:

- Is not deferring any reasonably calculated supply-side investment with the energy efficiency investments that would be incentivized in its proposed application;
- Is long on capacity;
- Has historically over-forecasted future load growth;
- Is forecasting its lowest load growth to date;
- Is completing a Cycle II MEEIA portfolio predicated, in part, on world in which its formerly largest customer, Noranda, was still on-line;
- Is adding more generation capacity in the form of large-scale wind and solar investments as well as certain upgrades to existing supply-side investments;
- Has extended the useful life of many of its supply-side investments in the past couple of years;
- Has proposed a load-building program to increase electric use; and

- Will likely seek PISA treatment on future large capital distribution and supply-side investments over the next five years.

As such, for these reason, and those to be articulated later in this testimony, OPC recommends that Ameren Missouri's application be rejected and encourage Ameren Missouri to refile its application in line with the terms articulated in the introduction.

III. SPECIFIC ASPECTS OF THE APPLICATION

Six-Year Portfolio & The IRP Process

Q. Putting aside OPC's objection to the proposed application, is a six-year MEEIA portfolio appropriate?

A. No. Six-years is entirely too long given the historic and expected volatility occurring in the utility regulatory landscape and would represent an extreme outlier in terms of industry norm.[20] This is especially true for a state that does not have a mandated Energy Efficiency Resource Standard ("EERS"). MEEIA, more than any other utility cost recovery "mechanism" has found itself in a constant state of regulatory flux. And rightly so, because much of MEEIA is predicated on counter-factual assumptions, evolving technology and changing social norms, the emphasis placed in each application has varied. Consider for a moment how much the Commission's MEEIA rules changed in the most recent revision. Stakeholders have learned and adapted and so have how these programs have functioned. The mechanism is place under MEEIA I was different for each of the three utilities and each of those MEEIA portfolios was different in the utilities MEEIA Cycle II portfolios.

Alternatively, consider how many assumptions change in any given year let alone every three-years within the IRP planning process. Or the sheer volume and diversity in filings every year through the Special Contemporary Topics for future IRP consideration. Six-year cycles lock-in assumptions that are subject to much change. For example, Ameren Missouri's application is based, in part, on market potential study that was finalized in 2016. If the Commission were

[20] See also Ameren Missouri's response to OPC-DR 2005 in GM-2.

to adopt this proposal, stakeholders would be operating under 2016 market assumptions (best case scenario) in 2024.

As evidenced by this testimony, OPC is not opposed to the idea of a "default MEEIA level" that maintains the structural integrity of the DSM programs and allows for increased emphasis if prudent, but if anything is clear from OPC's experience in the last two MEEIA cycles ratepayers have a right to be apprehensive about locking-in assumptions and regulatory conditions in an increasingly dynamic world (examples include, compact fluorescent light bulbs, avoided cost assumptions, market effects, agreed-to targets, etc…).

Excessive & Contemporaneous Earnings Opportunity Recovery

Q. Is Ameren Missouri's earnings opportunity amount reasonable?

A. No. History has shown that the Commission and other stakeholders should dismiss out-of-hand the 100% target Ameren Missouri references as its baseline assumption and instead assume Ameren Missouri will meet each of its categories and achieve the "max" amount possible in earnings opportunity.

Q. What would that amount be?

A. If Ameren Missouri achieved its max earnings reward it would receive $167,485,043 in profit in just five years. Stated differently, it would earn, as pure profit, 30.5% for every ratepayer dollar it spends ($550,000,000). Imagine for a second if the Commission rewarded Ameren Missouri an ROE of 30.5. Although the comparison is not entirely fair, it should not be entirely dismissed either. Such a request cannot be taken seriously.

Q. Is Ameren Missouri's request to be rewarded its earnings opportunity amount every year appropriate?

A. No. Ameren Missouri already receives timely earnings recovery through its past two MEEIA applications. The EM&V process is long and complicated because of both the sheer amount of reward the Company can earn and because the process is an inexact science. That being said, OPC would not object to Ameren Missouri receiving its earnings opportunity on a yearly

basis if Ameren Missouri elects to adopt and fulfill the expenditure thresholds outlined in OPC's proposed "default MEEIA level." This is because OPC's proposal does not recommend an EM&V contractor and the financial amounts (for program costs and earnings opportunity) are both reasonable and fair given the current operating environment.

Evaluation, Measurement & Verification

Q. What is Ameren Missouri proposing in regards to its Evaluation, Measurement, and Verification ("EM&V") process?

A. A similar arrangement in terms of previous EM&V's with the addition of a demand response component. The proposed net-to-gross ("NTG") ratio that includes many sub-ratios within it. The NTG ratio and the sub-ratios within it are as follows:

$$\text{NTG ratio} = 1 - \text{Freeridership ratio} + \text{Spillover ratio}$$

(Denominator in each of the above ratios is the gross savings)

Free-ridership:
- Total Free-riders
- Partial free-riders
- Deferred free-riders

Spillover:
- Participant Spillover
  - Inside Spillover
  - Outside Spillover
  - Like Spillover
  - Unlike Spillover
- Nonparticipant Spillover

OPC would direct interested parties to pages 43 – 44 of Ameren Missouri's application for a short definition of each of the two components and subsequent **nine separate scoring categories** meant to determine whether or not an Ameren Missouri promotion for efficient lighting (in part or in its entirety) motivated someone to replace their inefficient lightbulb with an efficient one.

Q. This is very confusing. Does OPC agree with this methodology?

A. No. Ameren Missouri's proposal is a pseudo-academic exercise in madness and a needless waste of time and resources. Regarding EM&V ratios, OPC's position is that the net-to-gross ratio should consist of free ridership and spillover, nothing more, nothing less. No additional components are necessary or appropriate. Any additional subcomponents are merely an attempt to "game" a process that is largely subjective to begin with. OPC has opined on this position at length in previous filings and has included our most recent objection in GM-3 as well as a national article that referenced OPC's first objection in MEEIA Cycle I in GM-4.

Q. Has OPC taken issue with Ameren Missouri's EM&V methodology in the past?

A. "Taken issue with" would be an understatement. To be clear, OPC's issue has been with Ameren Missouri's residential EM&V contractor, Cadmus. The past two MEEIA dockets are filled with literally hundreds of pages of disagreements over "market effects," flawed survey designs, and inadequate sampling. In stark contrast, OPC would point out that it has filed literally zero objections to KCPL and GMO's contractor, Navigant, over its evaluations in the entire history of its MEEIA evaluations.

Q. Does OPC have a recommendation for Ameren Missouri and the Commission to consider when programs are increased at a level to necessitate full EM&V?

A. Yes. The simplest, easiest answer would be for Ameren Missouri to select a new evaluator for its residential programs. The goodwill that would be gained between OPC and Ameren Missouri in taking this proactive step cannot be emphasized enough. OPC's preferred course-of-action would be to allow OPC and Staff to both participate and vote in the RFP process involved in selecting a new residential EM&V contractor.

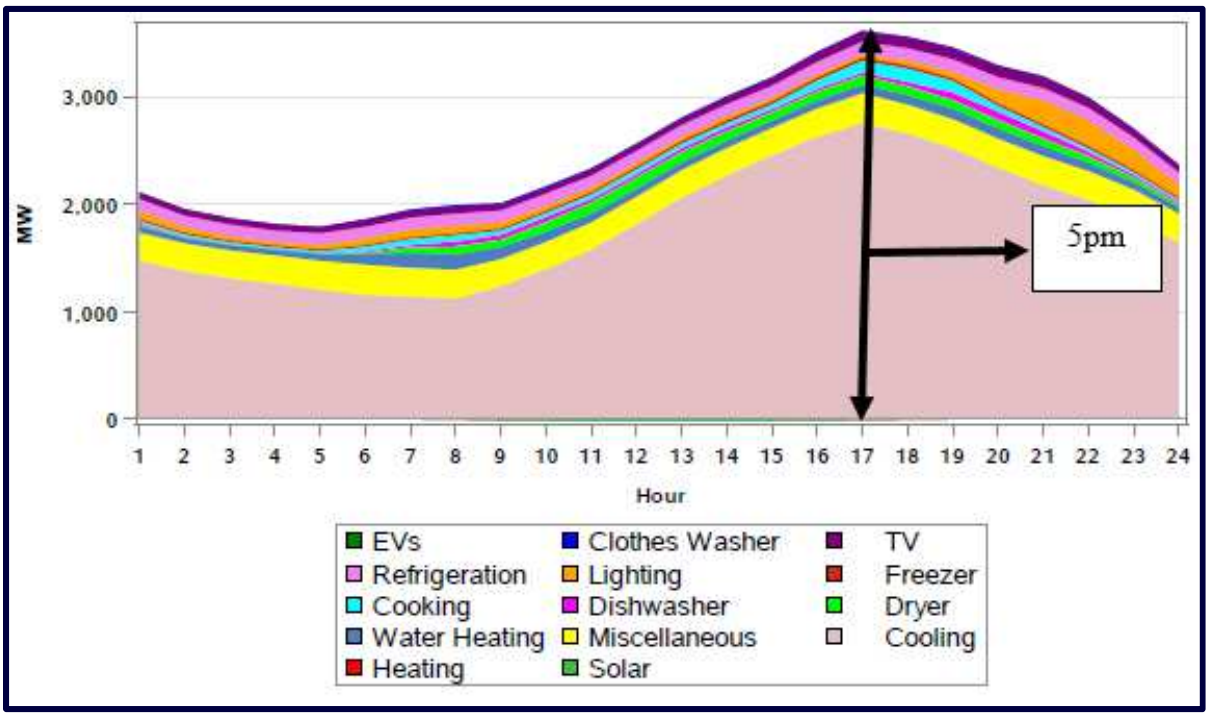
III. PORTFOLIO OF PROGRAMS

Energy Efficiency Programs

Q. Does OPC have any specific recommendations regarding the suite of measures Ameren Missouri has included in its portfolio?

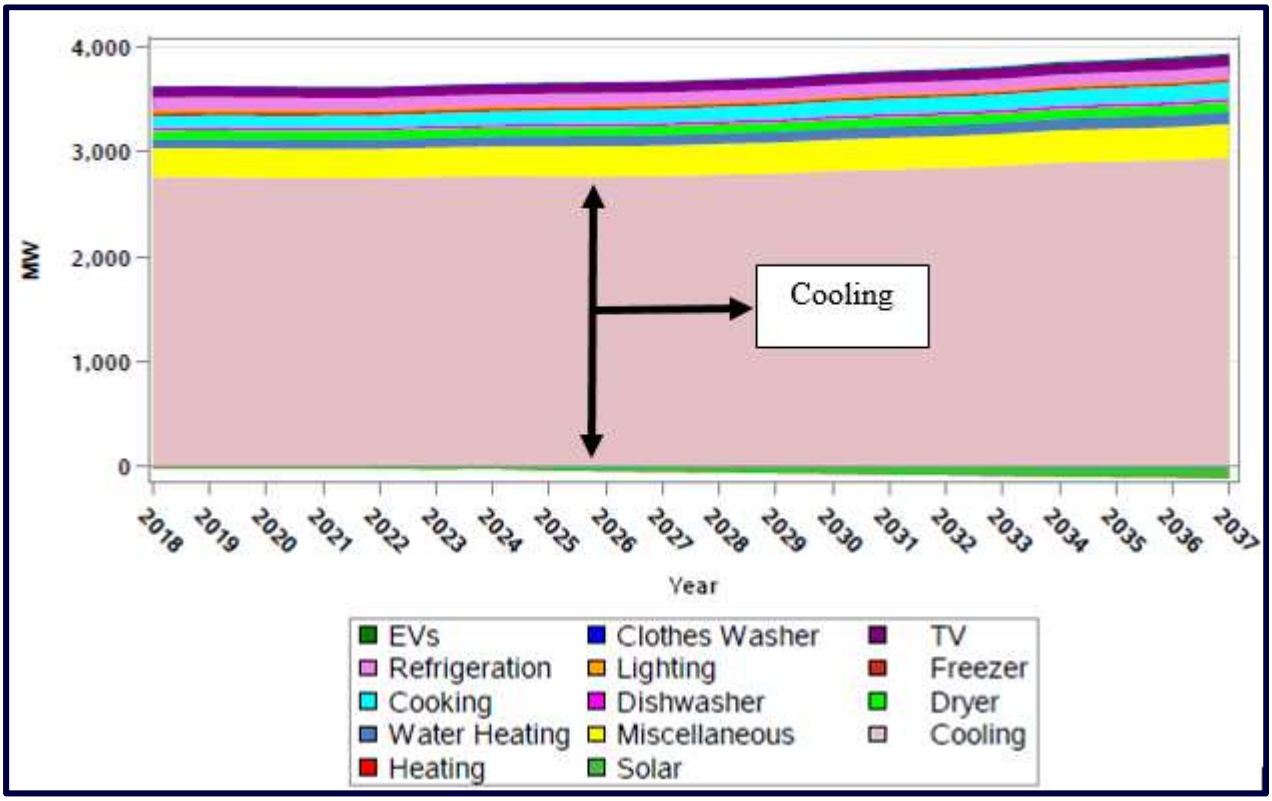
A. Yes. Putting aside OPC's primary and secondary recommendations, OPC believes that Ameren Missouri should focus exclusively on measures that induce the largest peak savings. In short, OPC would recommend that programs emphasize measures that influence an occupants cooling and heating use at specific "peak" hours. In the summer, those peak hours occur roughly at 5 pm and are driven by cooling end-use measures (HVAC). Figures 4 and 5includes Ameren Missouri's forecasted summer 2018 system peak day and summer coincident peak forecast for residential end use.

Figure 4: Summer 2018 System Peak Day: Residential End-Use Profiles (MW) [21]



[21] EO-2018-0038 Chapter 3 Load Analysis and Forecasting, Appendix A p. 353.

Figure 5: Forecast for summer coincident peak for residential end use (MW) [22]



In the winter, those peak hours occur roughly at 8 am and 8 pm and are driven by heating end-use measures (space-heating). Figures 6 and 7 includes Missouri's forecasted winter 2018 system peak day and winter coincident peak forecast for residential end use.

[22] EO-2018-0038 Chapter 3 Load Analysis and Forecasting, Appendix A p. 308.

Figure 6: Forecast for winter coincident peak for residential end use (MW)[23]

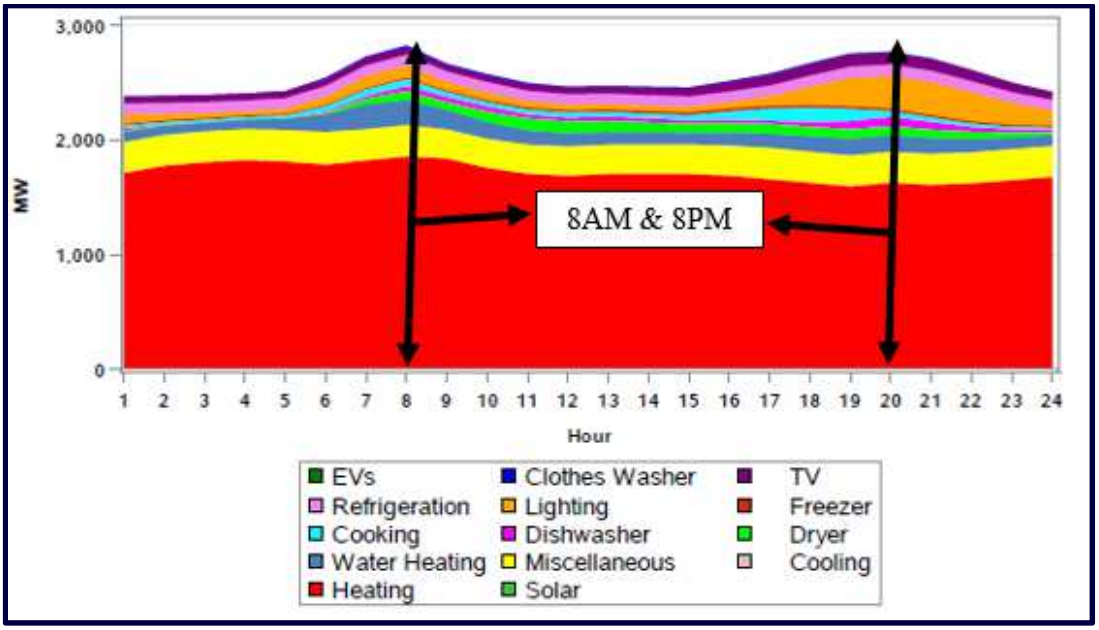
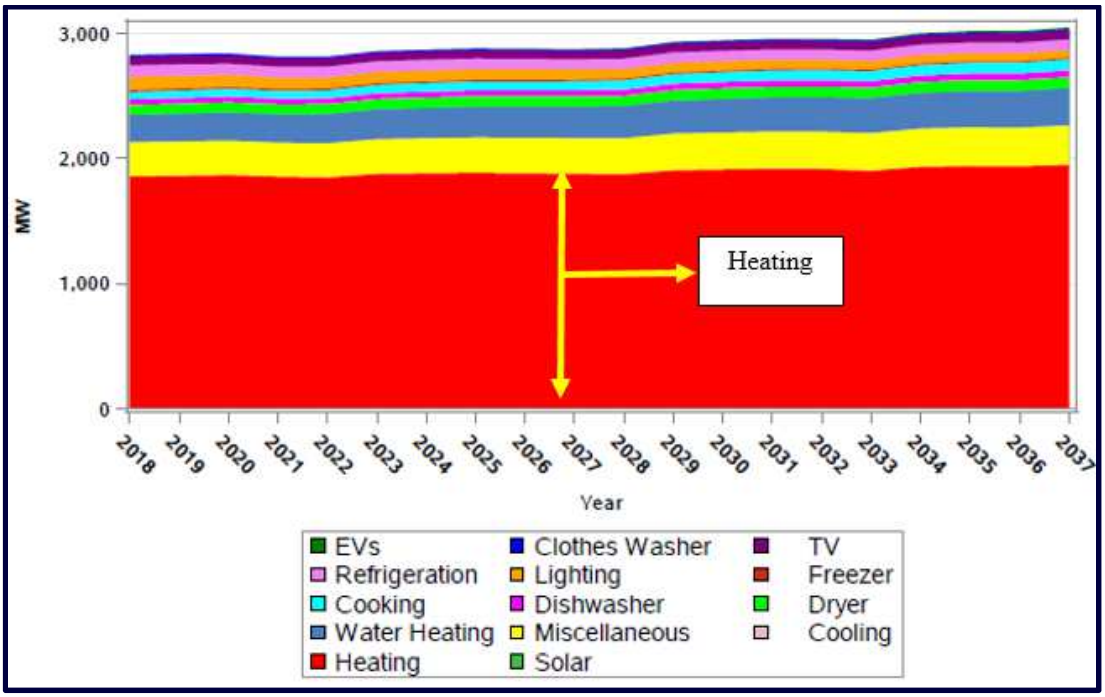


Figure 7: Forecast for winter coincident peak for residential end use (MW)[24]



[23] EO-2018-0038 Chapter 3 Load Analysis and Forecasting, Appendix A p. 361.
[24] EO-2018-0038 Chapter 3 Load Analysis and Forecasting, Appendix A p. 310.

GM-5 and GM-6 contain Ameren Missouri's Load profiles by residential and commercial class respectively. Those load profiles show specific end-use measures usage on system peak days and can serve as a reference for which measures have the most impact on coincident peak demand. With that in mind, greater emphasis should be placed on HVACs, insulation, and heat humps and less on lighting and behavioral reports (largely due to the uncertainty surrounding its impact and the persistency of its impact).

Demand Response Programs

Q. Does OPC have any specific recommendations regarding the Demand Response programs Ameren Missouri has included in its portfolio?

A. Other than to inform the Commission of OPC's DR-2008 and Ameren Missouri's subsequent response which is as follows:

Question:

> Does Ameren Missouri believe that opt-out customers are eligible for any MEEIA programs (including demand response)? Please explain why or why not.

Response:

> Ameren Missouri does not believe that opt-out customers are eligible for any MEEIA programs (including demand response) that are proposed in the MEEIA 2019-24 Plan. Customers that do not contribute financially to the costs of a MEEIA program generally should not have their participation subsidized by other customers, unless specifically allowed by statute (i.e., low-income customers).
>
> Further, Ameren Missouri does not consider its programs (specifically, its demand response programs) to be either an interruptible or curtailable rate, since those are typically offered for a variety of reasons (e.g., reliability concerns) and are not strictly tied to energy efficiency. Per the MEEIA statute and rule (Section

393.1075 RSMo and 4 CSR 240-20.094(7)(M), respectively), opt-out customers could still participate in a non-MEEIA interruptible or curtailable rate option.[25]

Q. Does OPC agree with this position?

A. Yes. OPC is of the opinion that the opt-out provision in MEEIA is categorically unfair to customers who do not have that option. Opt-out customers already benefit from MEEIA without bearing any of the costs. It would disingenuous to allow opt-out customer the ability to further benefit from MEEIA with no associated "skin in the game." OPC fully supports Ameren Missouri's equitable position on this matter.

Low Income Programs

Q. Does OPC have any specific recommendations regarding the Low Income programs Ameren Missouri has included in its portfolio?

A. Other than to inform the Commission of OPC's DR-2006 and Ameren Missouri's subsequent response which is as follows:

Question:

Considering that the PAYS Feasibility Study was concluded after Ameren Missouri submitted its formal application. Does Ameren Missouri intend to address PAYS and/or on-bill financing in direct testimony? If no, please explain why.

Response:

No, not in direct testimony. The Company received no bids for on-bill financing or PAYS in response to its public Request for Proposals for the MEEIA 3 portfolio.

The Company is willing to work with parties regarding the barriers identified in the PAYS feasibility study and discuss potential future implementation paths. Regardless, those issues could not be addressed and an implementation contractor selected with sufficient time for on-bill financing or PAYS to be launched on

[25] See also GM-7.

3/1/2019 nor with enough time to determine appropriate budgets for those activities for Commission approval as part of the initial MEEIA 3 approval.[26]

Q. What is OPC's response?

A. OPC is surprised to hear that there were no bids for the on-bill financing or PAYS Request for Proposals. Further inquiry is warranted on this issue as OPC was under the impression that there are contractors that have expressed interest in deploying these options. OPC is encouraged that Ameren Missouri is willing to work with parties over this issue as it has no doubt been an expressed priority for this office, other parties and an issue that the Commission has shown interest in.

Q. Would PAYS be a low income program?

A. Not necessarily, but it would be a mechanism to enable working families better access to energy efficient products.

Q. Does OPC have any comments Ameren Missouri's proposed low income programs?

A. OPC supports them and has included the budgeted annual equivalent in its alternative "default MEEIA level" to recognize this underserved market.

Q. Does this conclude your testimony?

A. Yes.

[26] See also GM-8.

CASE PARTICPATION OF
GEOFF MARKE, PH.D.

Company Name	Employed Agency	Case Number	Issues
Union Electric Company d/b/a Ameren Missouri	Office of the Public Counsel (OPC)	EA-2018-0202	**Rebuttal:** Renewable Energy Standard Rate Adjustment Mechanism / Conservation
Rule Making	OPC	EW-2018-0078	**Memorandum**: Cogeneration and Net Metering
Rule Making	OPC	EW-2018-0002	**Memorandum**: Solar Rebates
Kansas City Power & Light & KCP&L Greater Missouri Operations Company	OPC	ER-2018-0145 ER-2018-0146	**Direct:** Smart Grid Data Privacy Protections **Rebuttal:** Clean Charge Network / Community Solar / Green Tariff / Economic Development Rider / Customer Information System **Rebuttal:** Rate Design: TOU, EV, IBR
Union Electric Company d/b/a Ameren Missouri	OPC	ET-2018-0063	**Rebuttal:** Green Tariff
Liberty Utilities	OPC	GR-2018-0013	**Surrebuttal:** Decoupling
Empire District Electric Company	OPC	EO-2018-0092	**Rebuttal:** Overview of proposal/ MO PSC regulatory activity / Federal Regulatory Activity / SPP Activity and Modeling / Ancillary Considerations **Surrebuttal** Response to parties **Affidavit** in opposition to the non-unanimous stipulation and agreement
Great Plains Energy Incorporated, Kansas City Power & Light Company, KCP&L Greater Missouri Operations Company, and Westar Energy, Inc.	OPC	EM-2018-0012	**Rebuttal:** Merger Commitments and Conditions / Outstanding Concerns
Missouri American Water	OPC	WR-2017-0285	**Direct:** Future Test Year/ Cost Allocation Manual and Affiliate Transaction Rules for Large Water Utilities / Lead Line Replacement **Direct:** Rate Design / Cost Allocation of Lead Line Replacement **Rebuttal**: Lead Line Replacement / Future Test Year/ Decoupling /

			Residential Usage / Public-Private Coordination **Rebuttal**: Rate Design **Surrebuttal**: affiliate Transaction Rules / Decoupling / Inclining Block Rates / Future Test Year / Single Tariff Pricing / Lead Line Replacement
Missouri Gas Energy / Laclede Gas Company	OPC	GR-2017-0216 GR-2017-0215	**Rebuttal:** Decoupling / Rate Design / Customer Confidentiality / Line Extension in Unserved and Underserved Areas / Economic Development Rider & Special Contracts **Surrebuttal:** Pay for Performance / Alagasco & EnergySouth Savings / Decoupling / Rate Design / Energy Efficiency / Economic Development Rider: Combined Heat & Power
Indian Hills Utility	OPC	WR-2017-0259	**Direct:** Rate Design
Empire District Electric Company	OPC	EO-2018-0048	Integrated Resource Planning: Special Contemporary Topics Comments
Kansas City Power & Light	OPC	EO-2018-0046	Integrated Resource Planning: Special Contemporary Topics Comments
KCP&L Greater Missouri Operations Company	OPC	EO-2018-0045	Integrated Resource Planning: Special Contemporary Topics Comments
Missouri American Water	OPC	WU-2017-0296	**Direct:** Lead line replacement pilot program **Rebuttal:** Lead line replacement pilot program **Surrebuttal:** Lead line replacement pilot program
KCP&L Greater Missouri Operations Company	OPC	EO-2017-0230	**Memorandum**: Integrated Resource Plan, preferred plan update
Working Case: Emerging Issues in Utility Regulation	OPC	EW-2017-0245	**Memorandum**: Emerging Issues in Utility Regulation / **Presentation:** Inclining Block Rate Design Considerations **Presentation:** Missouri Integrated Resource Planning: And the search for the “preferred plan.” / Comments on DER modeling
Rule Making	OPC	EX-2016-0334	**Memorandum**: Missouri Energy Efficiency Investment Act Rule Revisions

Great Plains Energy Incorporated, Kansas City Power & Light Company, KCP&L Greater Missouri Operations Company, and Westar Energy, Inc.	OPC	EE-2017-0113 / EM-2017-0226	**Direct**: Employment within Missouri / Independent Third Party Management Audits / Corporate Social Responsibility
Union Electric Company d/b/a Ameren Missouri	OPC	ET-2016-0246	**Rebuttal**: EV Charging Station Policy **Surrebuttal**: EV Charging Station Policy
Kansas City Power & Light		ER-2016-0156	**Direct:** Consumer Disclaimer **Direct:** Response to Commission Directed Questions **Rebuttal:** Customer Experience / Greenwood Solar Facility / Dues and Donations / Electric Vehicle Charging Stations **Rebuttal:** Class Cost of Service / Rate Design **Surrebuttal:** Clean Charge Network / Economic Relief Pilot Program / EEI Dues / EPRI Dues
Union Electric Company d/b/a Ameren Missouri	OPC	ER-2016-0179	**Direct:** Consumer Disclaimer / Transparent Billing Practices / MEEIA Low-Income Exemption **Direct**: Rate Design **Rebuttal:** Low-Income Programs / Advertising / EEI Dues **Rebuttal:** Grid-Access Charge / Inclining Block Rates /Economic Development Riders
KCP&L Greater Missouri Operations Company	OPC	ER-2016-0156	**Direct:** Consumer Disclaimer **Rebuttal:** Regulatory Policy / Customer Experience / Historical & Projected Customer Usage / Rate Design / Low-Income Programs **Surrebuttal:** Rate Design / MEEIA Annualization / Customer Disclaimer / Greenwood Solar Facility / RESRAM / Low-Income Programs
Empire District Electric Company, Empire District Gas Company, Liberty Utilities (Central) Company, Liberty Sub-Corp.	OPC	EM-2016-0213	**Rebuttal:** Response to Merger Impact **Surrebuttal:** Resource Portfolio / Transition Plan

Working Case: Polices to Improve Electric Regulation	OPC	EW-2016-0313	**Memorandum**: Performance-Based and Formula Rate Design
Working Case: Electric Vehicle Charging Facilities	OPC	EW-2016-0123	**Memorandum**: Policy Considerations of EV stations in rate base
Empire District Electric Company	OPC	ER-2016-0023	**Rebuttal:** Rate Design, Demand-Side Management, Low-Income Weatherization **Surrebuttal:** Demand-Side Management, Low-Income Weatherization, Monthly Bill Average
Missouri American Water	OPC	WR-2015-0301	**Direct:** Consolidated Tariff Pricing / Rate Design Study **Rebuttal:** District Consolidation/Rate Design/Residential Usage/Decoupling **Rebuttal**: Demand-Side Management (DSM)/ Supply-Side Management (SSM) **Surrebuttal:** District Consolidation/Decoupling Mechanism/Residential Usage/SSM/DSM/Special Contracts
Working Case: Decoupling Mechanism	OPC	AW-2015-0282	**Memorandum:** Response to Comments
Rule Making	OPC	EW-2015-0105	**Memorandum**: Missouri Energy Efficiency Investment Act Rule Revisions, Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0084	Triennial Integrated Resource Planning Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0055	**Rebuttal**: Demand-Side Investment Mechanism / MEEIA Cycle II Application **Surrebuttal**: Potential Study / Overearnings / Program Design **Supplemental Direct:** Third-party mediator (Delphi Panel) / Performance Incentive **Supplemental Rebuttal:** Select Differences between Stipulations **Change Request:** EM&V **Rebuttal:** Pre-Pay Billing
The Empire District Electric Company	OPC	EO-2015-0042	Integrated Resource Planning: Special Contemporary Topics Comments

KCP&L Greater Missouri Operations Company	OPC	EO-2015-0041	Integrated Resource Planning: Special Contemporary Topics Comments
Kansas City Power & Light	OPC	EO-2015-0040	Integrated Resource Planning: Special Contemporary Topics Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0039	Integrated Resource Planning: Special Contemporary Topics Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0029	Ameren MEEIA Cycle I Prudence Review Comments
Kansas City Power & Light	OPC	ER-2014-0370	**Direct** (Revenue Requirement): Solar Rebates **Rebuttal:** Rate Design / Low-Income Weatherization / Solar Rebates **Surrebuttal:** Economic Considerations / Rate Design / Cyber Security Tracker
Rule Making	OPC	EX-2014-0352	Net Metering and Renewable Energy Standard Rule Revisions, Comments
The Empire District Electric Company	OPC	ER-2014-0351	**Rebuttal:** Rate Design/Energy Efficiency and Low-Income Considerations
Rule Making	OPC	AW-2014-0329	**Memorandum**: Utility Pay Stations and Loan Companies, Rule Drafting
Union Electric Company d/b/a Ameren Missouri	OPC	ER-2014-0258	**Direct:** Rate Design/Cost of Service Study/Economic Development Rider **Rebuttal:** Rate Design/ Cost of Service/ Low Income Considerations **Surrebuttal:** Rate Design/ Cost-of-Service/ Economic Development Rider
KCP&L Greater Missouri Operations Company	OPC	EO-2014-0189	**Rebuttal:** Sufficiency of Filing **Surrebuttal:** Sufficiency of Filing
KCP&L Greater Missouri Operations Company	OPC	EO-2014-0151	Renewable Energy Standard Rate Adjustment Mechanism (RESRAM) Comments
Liberty Natural Gas	OPC	GR-2014-0152	**Surrebuttal:** Energy Efficiency
Summit Natural Gas	OPC	GR-2014-0086	**Rebuttal:** Energy Efficiency **Surrebuttal:** Energy Efficiency
Union Electric Company d/b/a Ameren Missouri	OPC	ER-2012-0142	**Direct:** PY2013 EM&V results / Rebound Effect **Rebuttal:** PY2013 EM&V results **Surrebuttal:** PY2013 EM&V results **Direct:** Cycle I Performance Incentive

			Rebuttal: Cycle I Performance Incentive
Kansas City Power & Light	Missouri Public Service Commission Staff	EO-2014-0095	**Rebuttal:** MEEIA Cycle I Application testimony adopted
KCP&L Greater Missouri Operations Company	Missouri Division of Energy (DE)	EO-2014-0065	Integrated Resource Planning: Special Contemporary Topics Comments
Kansas City Power & Light	DE	EO-2014-0064	Integrated Resource Planning: Special Contemporary Topics Comments
The Empire District Electric Company	DE	EO-2014-0063	Integrated Resource Planning: Special Contemporary Topics Comments
Union Electric Company d/b/a Ameren Missouri	DE	EO-2014-0062	Integrated Resource Planning: Special Contemporary Topics Comments
The Empire District Electric Company	DE	EO-2013-0547	Triennial Integrated Resource Planning Comments
Working Case: State-Wide Advisory Collaborative	OPC	EW-2013-0519	**Presentation:** Does Better Information Lead to Better Choices? Evidence from Energy-Efficiency Labels
Independence-Missouri	OPC	Indy Energy Forum 2014	**Presentation:** Energy Efficiency
Independence-Missouri	OPC	Indy Energy Forum2015	**Presentation:** Rate Design
NARUC – 2017 Winter	OPC	Committee on Consumer Affairs	NARUC – 2017 Winter Presentation: PAYS Tariff On-Bill Financing
NASUCA – 2017 Summer	OPC	Committee on Water Regulation	NASUCA – 2017 Summer Presentation: Regulatory Issues Related to Lead-Line Replacement of Water Systems
NASUCA – 2017 winter	OPC	Committee on Utility Accounting	NASUCA – 2017 Winter Presentation: Lead Line Replacement Accounting and Cost Allocation

Ameren Missouri's
Response to MPSC Data Request
EO-2018-0211
Ameren Missouri's 3rd Filing to Implement Regulatory Changes in Energy Efficiency by MEEIA

Data Request No.: OPC 2005

Can Ameren Missouri identify any utilities that have adopted six year energy efficiency portfolios? Please identify said utility(s).

RESPONSE

Prepared By: Timothy Via

Title: Program manager Energy efficiency & Demand Response

Date: 7/20/18

Based on data research from ESource, there are 17 Utilities with DSM cycles of 5 years or greater. See Table below.

State. Province	Utility	Cycle years
MI	DTE Energy	6
IA	Alliant Energy - Iowa	5
	Black Hills Energy - IA	5
VA	Dominion	5
PA	Duquesne Light	5
	FirstEnergy - Met-Ed	5
	FirstEnergy - Penelec	5
	FirstEnergy - Penn Power	5
	FirstEnergy - West Penn Power	5
BC	FortisBC	5
CA	Los Angeles Department of Water & Power	5
IA	MidAmerican Energy	5
IL	MidAmerican Energy - IL	5
FL	Orlando Utilities Commission	5

PA	PECO	5
CA	PG&E	5
PA	PPL Electric Utilities	5

MEMORANDUM

To: Missouri Public Service Commission Official Case File,
Case No. EO-2015-0055

From: Geoff Marke, Chief Economist
Office of the Public Counsel

Subject: OPC Change Request to Ameren Missouri MEEIA Cycle II Year 1 Residential Savings Estimates

Date: August 14, 2017

Overview:

OPC supports all of the recommendations outlined in Staff's Independent Auditor report with two notable exceptions.

First, Ameren Missouri's MEEIA Cycle II EM&V report should be amended to exclude non-participant spillover savings ("NPSO") in its entirety based on the design and limited sample size used to obtain the results.

Second, Ameren Missouri's Home Energy Report ("HER") earnings opportunity payout should be reduced by 1/3 in total (or $666,666.66) to reflect the poor performance which resulted in only a 4% realization rate (e.g., total annual evaluated savings of 1,323 MWh per year contrasted with the TRM estimated 33,750 MWh per year).

Non-participant Spillover ("NPSO"):

Ameren Missouri's residential evaluator, Cadmus, has projected NPSO savings that constitute 20% of the total residential portfolio. This assertion is based on the results of only 27 surveys. Moreover, Cadmus has allocated almost all of these savings (over 90%) to one program—Ameren Missouri's Heating and Cooling.

The Commission's independent auditor, Evergreen Economics ("Evergreen"), has recalculated the NPSO, and effectively halved the estimated amount. With the remaining NPSO savings, Evergreen has further allocated the savings evenly across each of the programs.

OPC agrees with Evergreen in that future NPSO (if attempted to be claimed) should be allocated evenly across programs. However, it is inappropriate to award any amount of savings estimates at this time based on the lack of substantive support. OPC recommends that NPSO not be included for 2016 due to insufficient support (27 surveys in total) and deficient design as articulated in Evergreen's auditor report including the following excerpt:

Additionally, in response to the question "why was the measure installed" (used for Criterion #5), there were multiple responses that clearly indicated that the measures were adopted for reasons other than saving energy, even though some of these same respondents indicated that Ameren Missouri also had some influence on their decision. Examples of responses that were judged to have met this criterion include:

- "(The measure was installed as) Part of the replacement for the faucet."(faucet
- aerator)
- "The one we had was too small." (efficient room air conditioner)
- "It's just a matter of economy, I've always done it." (thermostat programmed)
- "They just checked it while at my home, I didn't request it." (thermostat setting)
- "It was part of the service agreement, they just check it every year." (AC tune up)
- "'Cause the refrigerator went bad." (refrigerator recycle)

All of these responses were still considered to be NPSO, even though it appears that the motivation for adopting the measure was primarily from something other than Ameren Missouri's program and outreach efforts. These responses are analogous to adoptions that are counted as free riders among participants. (emphasis added) [1]

Table 1 provides a breakdown of the NPSO estimates of Cadmus, Evergreen and OPC.

Table 1: Non-participant spillover breakdown recommended estimates

Ameren Missouri Residential Program	Cadmus (Evaluator) NPSO (MWh/Yr)	Evergreen (Auditor) NPSO (MWh/Yr)	OPC NPSO (MWh/Yr)
Efficient Products	190	1,937	0
Smart Thermostats	130	1,937	0
Energy Efficiency Kits	5	1,937	0
Heating and Cooling	17,977	1,937	0
Lighting	1,144	1,937	0
Total	**+ 19,446**	**+ 9,685**	**0**

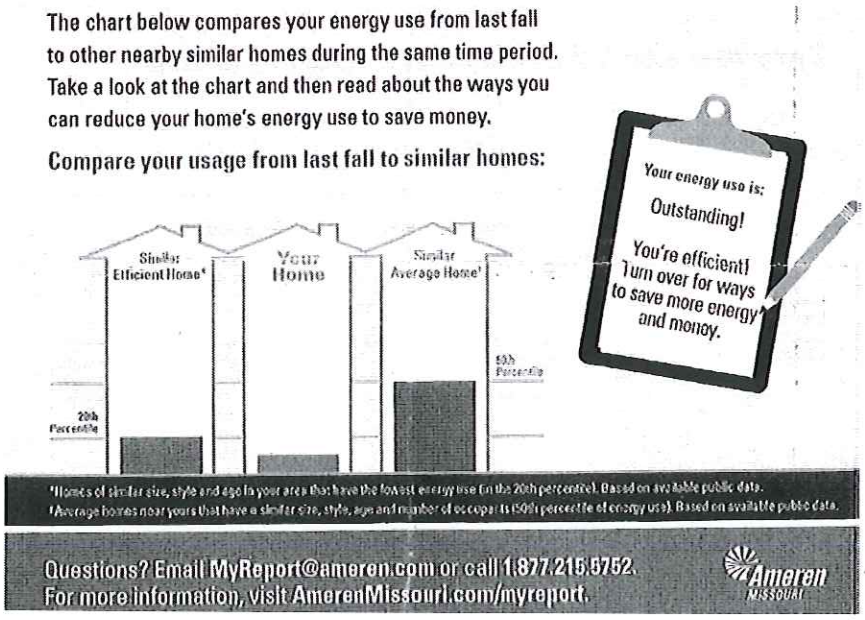
Home Energy Reports ("HER")

Ameren Missouri's HER program is not tied to explicit energy or demand savings, rather the utility is awarded a lump sum "earnings opportunity" reward at the end of three years in the form of $2,000,000. This represents 7.28% of the target earnings opportunity. In effect, the Company needs to make a "good faith" effort to produce a behavioral response inducing product to encourage its customers to conserve and save energy. The performance metric is the "effective prudent spend of [the] budget".

[1] Evergreen Economics. (2017) Independent EM&V Audit of the Ameren Missouri PY2016 Program Evaluations. P. 63.

OPC does not believe the Company's efforts in administering this program have demonstrated an effective or prudent spend as the programs design was ultimately unsuccessful (see Figure 1).

Figure 1: Excerpt from Ameren Missouri's Home Energy Report



OPC noted the following issues with the HER including:

- Evaluated savings of 6.2 kWh per year per customer to the TRM assumption of 150 kWh per year per customer, or similarly the total annual evaluated savings of 1,323 MWh per year to the reported 33,750 MWh per year, the realization rate is 4%.
- The HER reports appear to have induced a negative savings uplift (i.e., the control group saved more energy from other programs than did the treatment group).
- Ameren Missouri HER reports only included two of three "typical" behavioral modification components:
  - Neighbor comparison
  - ~~Customer-specific progress tracker~~ (not included)
  - Energy saving tips (not customer specific)
- HER photos did not always align with the corresponding energy tip.
- Ameren Missouri HER TRM estimates appear to be overstated when compared to the benchmark utilities outcome.
- HER reports did not include a web-based complementary user service.
- Ameren Missouri only saved approximately one-third of the amount compared to the other benchmark utilities in their first six months (see table 2, excerpt of Cadmus HER Table 22 below):

Table 2: Excerpt from Cadmus Report regarding benchmark utilities HER results

Table 22. Average Energy Savings of HER Programs in the Sixth Month

Utility	Customer Cohort Name	Starting Month	Percentage Savings at in Sixth Month*
Ameren MO	-	August 2016	0.44%
Ameren Illinois	PY3	September 2010	1.75%
Consumers Energy	Track 1 - Pilot	June 2011	1.10%
PPL Electric	Legacy 2	May 2011	1.50%

* Cadmus calculated percentage savings for the Ameren Missouri program as the quotient of average per-customer savings, divided by control customers' average per-customer usage during the post-period. We estimated percent savings for other utility programs in the sixth -month based on monthly savings plots in the cited reports.

Overall, the Company's program expenditure for PY2016 was $587,002 for 225,000 ratepayers across three iterations (or $0.76) a report. As it stands, the Company will be awarded $666,666.66 for mailing out a report with virtually no induced realized savings. Based on the results to date, Ameren Missouri's HER program has not been an "effective, prudent spend of the budget" and so the earnings opportunity should be reduced by 1/3 to reflect the poor performance of the first year of a three-year program.

Lies, Damned Lies and Modeling: Energy Efficiency's Problem With Tracking Savings

"Not only can we only scratch the surface of recent results, but we can only scratch the surface of the surface."

https://www.greentechmedia.com/articles/read/overcoming-energy-efficiencys-problem-with-tracking-savings#gs.RHuIfJM

by Stephen Lacey
June 03, 2015

In September of last year, consultants keeping watch over Massachusetts' energy efficiency program issued an update on the state's ability to track savings.

The presentation included data about public awareness, satisfaction levels after retrofits, and draft results for residential and commercial programs. It was all mostly positive.

But the slides also included a revealing statement.

"Not only can we only scratch the surface of recent results, but we can only scratch the surface of the surface," wrote Ralph Prahl, the lead for evaluation, measurement and verification (EM&V) at the Massachusetts Energy Efficiency Advisory Council.

The issue, explained Prahl, was that the state relied heavily on draft results to draw conclusions at the time. In addition, the utilities and consultants on the advisory council still couldn't agree on how some programs were performing -- a first for the state.

The admission worried some onlookers. Massachusetts budgets $500 million a year for efficiency programs and more than $20 million to monitor results. If the top-

ranked state in energy efficiency can't access performance data in a timely way, what does that say about the rest of the country?

"It's as if you had a speedometer in your car that told you how fast you went an hour ago." *Tim Guiterman*

The problem isn't unique to Massachusetts. A growing number of energy-efficiency professionals are speaking out about the overly complex and archaic way that energy efficiency is measured.

"We spend all this money, but our ways to verify if they're saving energy are not working that well," said Tim Guiterman, the director of EM&V solutions at EnergySavvy, which touts itself as a modern alternative to efficiency program management.

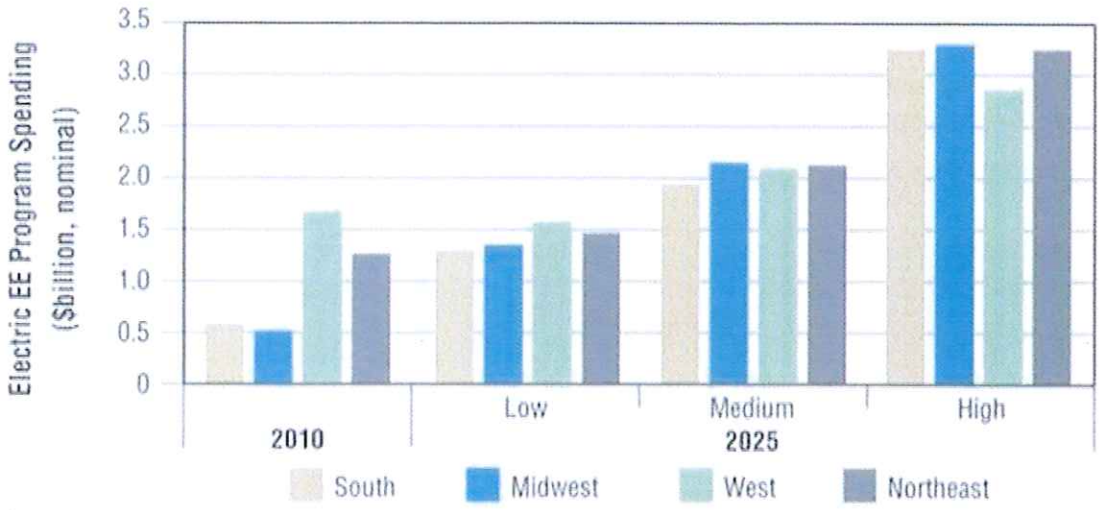
At a time when nearly every product, service and behavior can be tracked in real time, the efficiency industry still relies on complicated models and outdated data to verify energy savings, said Guiterman.

In states like California and New York, results for programs weren't delivered unil three years later. "It's as if you had a speedometer in your car that told you how fast you went an hour ago," he said.

The problem is not limited to any one sector, efficiency company or utility. Rather, say experts, the industry is systematically plagued by an outdated way of measuring performance -- partly because efficiency is hard to track compared to energy generation, and partly because of the industry's inability to modernize.

Utilities in the U.S. now spend more than $7 billion per year on ratepayer-funded energy efficiency programs. Within a decade, ratepayers may be supporting up to $15 billion per year in utility efficiency spending, according to government estimates.

The low cost of delivering energy efficiency cannot be rivaled -- it is by far the cheapest resource. But do utilities actually know how much they're saving? That's debatable.



Source: Lawrence Berkeley National Laboratory

Economists and analysts tussle over the role of efficiency in nationwide carbon emission reductions, the scope of the rebound effect, and how effective building codes are in changing energy use. With different statistical assumptions, wildly different conclusions can be reached about efficiency.

A similar debate is taking place on the utility level, where different approaches to modeling often bring different results.

"Jurisdictions calculate and define savings differently, utilize different deemed savings values and baseline assumptions, tend to not report uncertainty in results, and apply different levels of independent review," wrote a group of experts at the DOE's State Energy Efficiency Action Network back in 2011.

The result: "EM&V is sometimes seen as expensive, not credible, not timely, not transparent, and as a burden, not a benefit."

With billions of dollars at stake, that uncertainty is inexcusable, said efficiency industry veteran Michael Blasnik. He and others have found that traditional modeling approaches can be off by double digits.

"To me, the real scandal is how much utilities spend on consulting firms to determine cost-effectiveness. They don't use energy data; they use projections, models and widgets," said Blasnik, now a senior building scientist at Nest Labs. (Blasnik spoke to GTM before joining Nest, when he ran his own consultancy focused on evaluating energy efficiency.)

"Millions of dollars get spent doing these studies where no one knows the assumptions. You could end up with statistical analysis that disproves the laws of thermodynamics," said Blasnik.

In addition, most utilities rely on self-reporting to determine net savings. After issuing rebates, a utility may hire a consultancy to call customers and ask if they would have retrofitted their home or facility without financial assistance. The practice is a way of separating legitimate projects from "free riders."

There's plenty of dispute over self-reporting. Last October, the Missouri utility Ameren sparred with regulators after it claimed 70 gigawatt-hours of savings more than what independent auditors measured. Its reported savings were based on self-reported data. [emphasis added]

"When you give people money and ask if the program that gave you money worked, how do you think they'll respond?" said Energy Savvy's Guiterman.

There is no single answer to the industry's EM&V problem. Because energy efficiency cannot be measured in the same way that energy generation can, there are inherent challenges to measuring behavior change. But new approaches to tracking savings are emerging.

California-based Lime Energy thinks it can track savings on a project-by-project basis better than the status quo.

"If you think about efficiency as a commodity and think about programs in terms of resource acquisition, it's way simpler." *Matt Golden*

Lime targets the most difficult customer set: small and medium-sized businesses. The company sets up direct installation programs for utilities, hires local contractors to complete the projects, and then charges the power companies for every kilowatt-hour of efficiency delivered with no administrative fees. The savings are tracked in real time by Lime's software.

"EM&V needs to be continuous and instantaneous. Old methodologies have not gotten us there," said Arjun Saroya, the VP of engineering at Lime.

"Utilities have become tired of lack of results from larger administrators. We've capitalized on that trend."

Seattle-based EnergySavvy is growing its business based a similar premise. The company has built an end-to-end software platform that helps utilities target efficiency opportunities, manage projects and rebates, and track savings through utility bills and meter data.

"With modern cloud computing and data science it's possible to cheaply analyze actual energy savings for every single project, on a rolling basis, and compare with general energy users to remove other effects. What we do is billing analysis on steroids. And that's never been available before," said Guiterman. "It gets them away from the customer self-reported stuff."

These two companies are among dozens in the "intelligent efficiency" sector using better data loggers, sensors, meters and analytics software to fine-tune reporting of energy efficiency. They're all attacking a different part of a major problem: the slow adoption of IT in measuring efficiency program performance.

"M&V practices have yet to evolve to take advantage of the smart grid infrastructure that allows for increased data collection," wrote DOE efficiency experts back in 2011. Four years later, these companies are just starting to change the way utilities track energy savings.

Efficiency entrepreneur and policy advocate Matt Golden, a frequent contributor at GTM, believes utilities are ignoring their most important piece of infrastructure: the smart meter.

"Moving to energy-efficiency procurement that pays for efficiency at the meter will unshackle contractors and the broader energy-efficiency industry from the trap of current incentive programs and the stifling regulation that inevitably goes with them," he wrote in a recent op-ed.

Golden put it much more bluntly in an interview: "I'm looking to fundamentally change the way we think about M&V. If you think about efficiency as a commodity and think about programs in terms of resource acquisition, it's way simpler."

The problem, he said, is that utilities approach efficiency through a coupon-based approach -- sending out rebates and then calculating savings through complicated models and self-reporting in the hopes that the program will be deemed effective months or years later.

As a senior consultant to the Investor Confidence Project, Golden is applying his passion for standards to metering. He's currently working on the Open EE Meter, an open-source tool designed to standardize the way savings are measured.

A group of home-performance professionals, led by Nate Adams and Ted Kidd, have also been advocating for a simpler way to measure savings and deliver rebates in the residential efficiency space. Called "One Knob," their proposed program is structured around reading savings at the meter -- delivering incentives simply based on negawatts, not prescriptive retrofits demanded by a program administrator.

"Is paying for a negawatt too simple? Well, isn't that what utilities and public utility commissions want? Incentivizing saved energy directly is the fastest and simplest path there," wrote Adams in a piece at GTM last fall.

Almost everyone agrees that M&V needs to improve. But some are skeptical about the singular obsession with the meter.

"Reading the meter is helpful, but it doesn't get to all of the factors that you have to account for. That's just the starting point," said Glenn Garland, the CEO of CLEAResult, the country's biggest efficiency program administrator. Deeper analysis is needed to account for seasonal changes, building occupancy shifts and de-tuned equipment, he said.

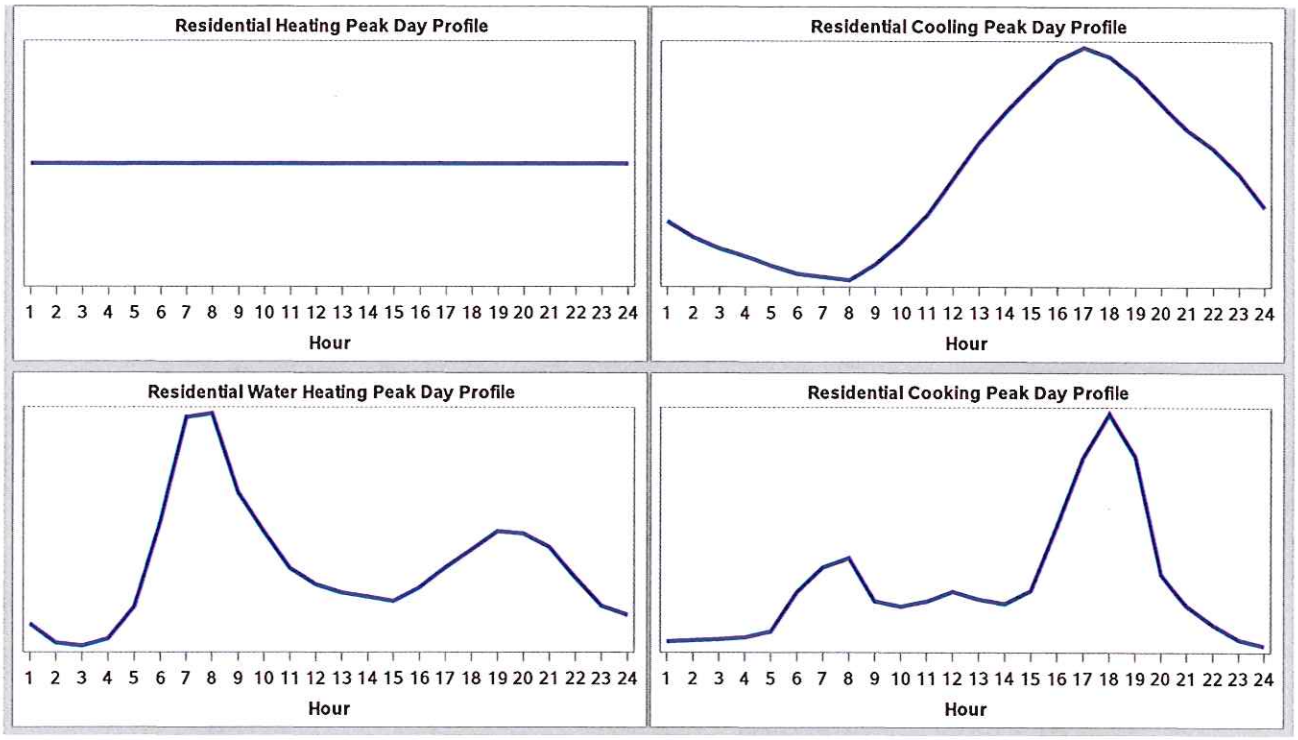
The industry is somewhat divided on the severity of the M&V problem in efficiency. Regulators worried about their reputations and the large consulting firms traditionally responsible for tracking programs are generally hesitant to admit the limitations of modeling. Thus, the most passionate advocates for reform still face a resistance to change.

But rapid changes in technology that make reporting easier may finally break through the inertia.

"The industry is colliding with new technology in a huge way -- and that's going to change it," said Lime Energy's Saroya.

Load Profile by Class and End Uses on System Peak Days[20]

Profile Shapes for Residential End Uses



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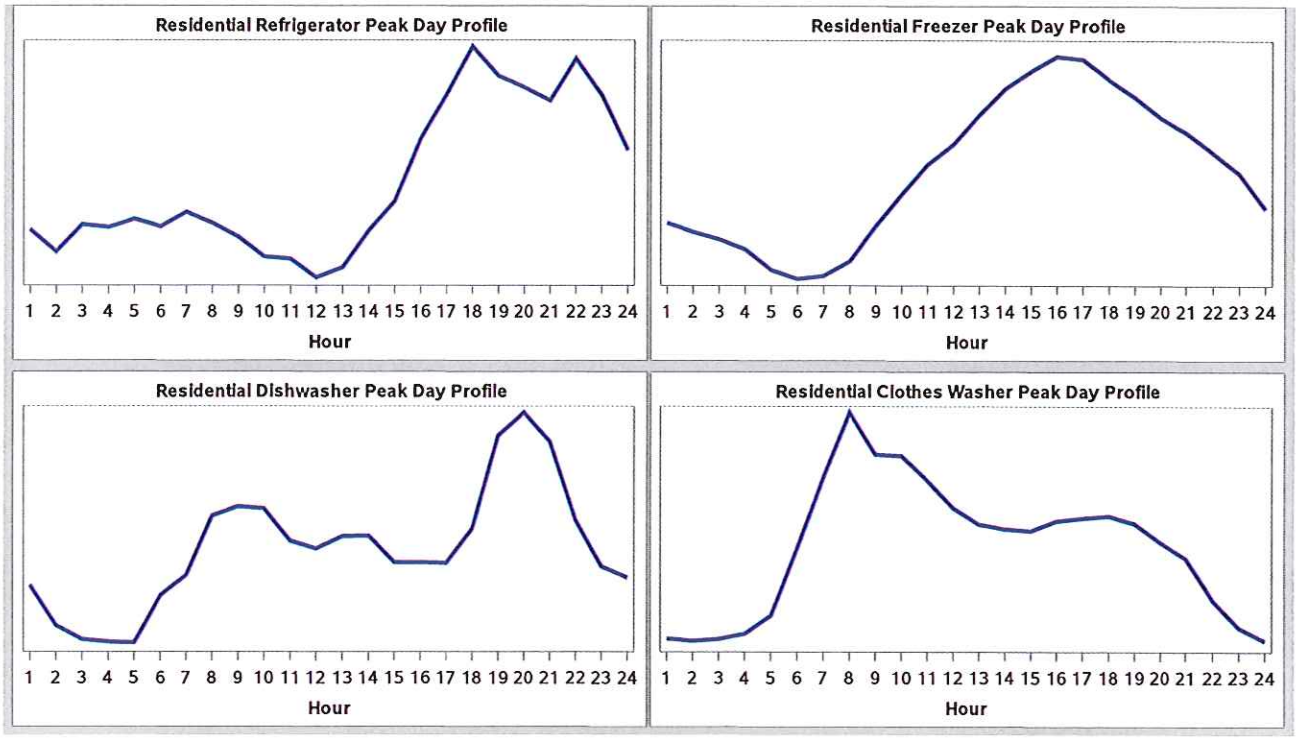
Residential Refrigerator Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Residential Freezer Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Residential Dishwasher Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
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Residential Clothes Washer Peak Day Profile
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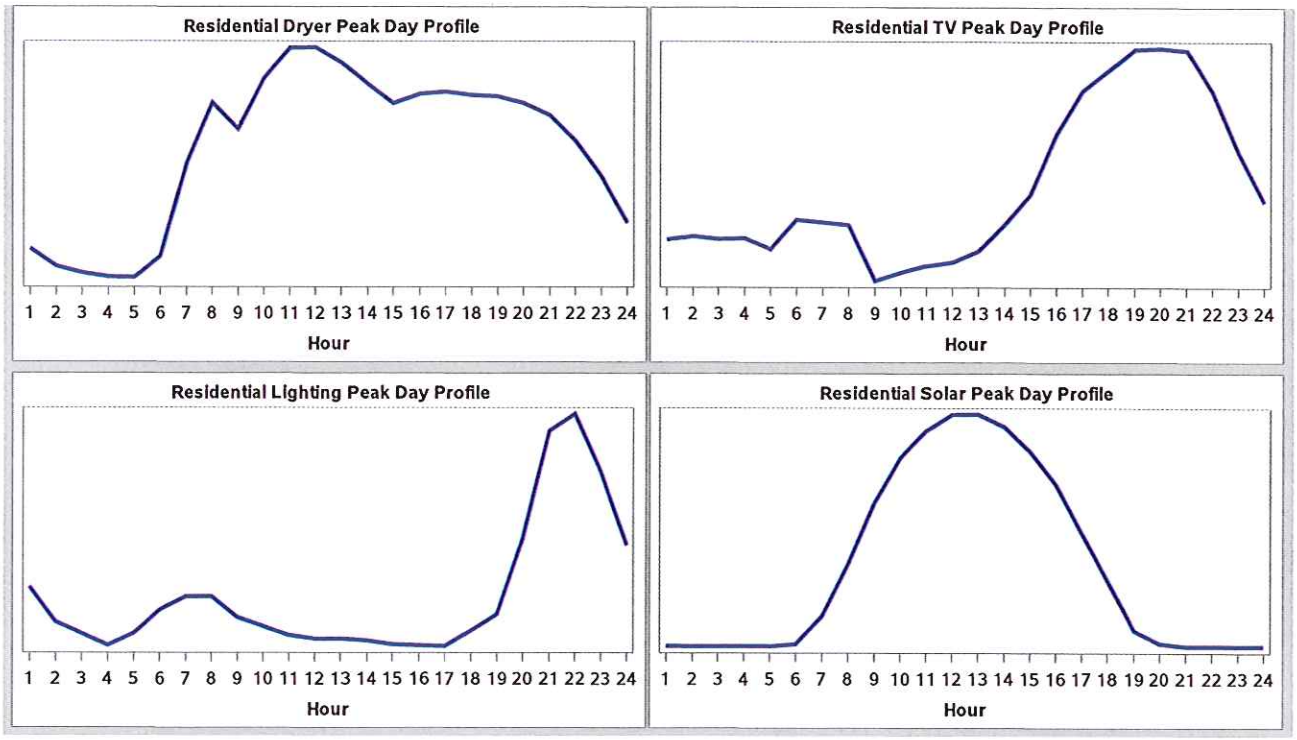
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Residential Lighting Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
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Residential Solar Peak Day Profile
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Residential Miscellaneous Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
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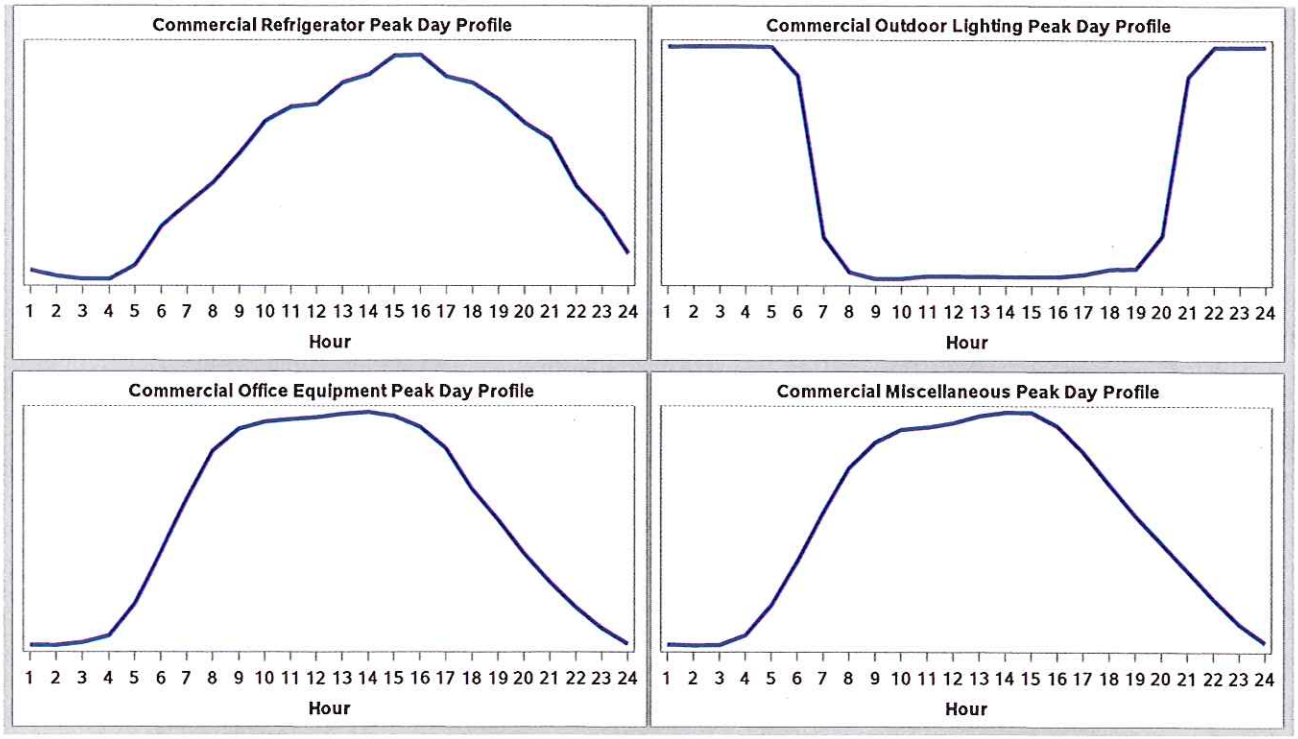
Residential Electric Vehicles Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour

Load Profile by Class and End Uses on System Peak Days[20]

Profile Shapes for Commercial End Uses



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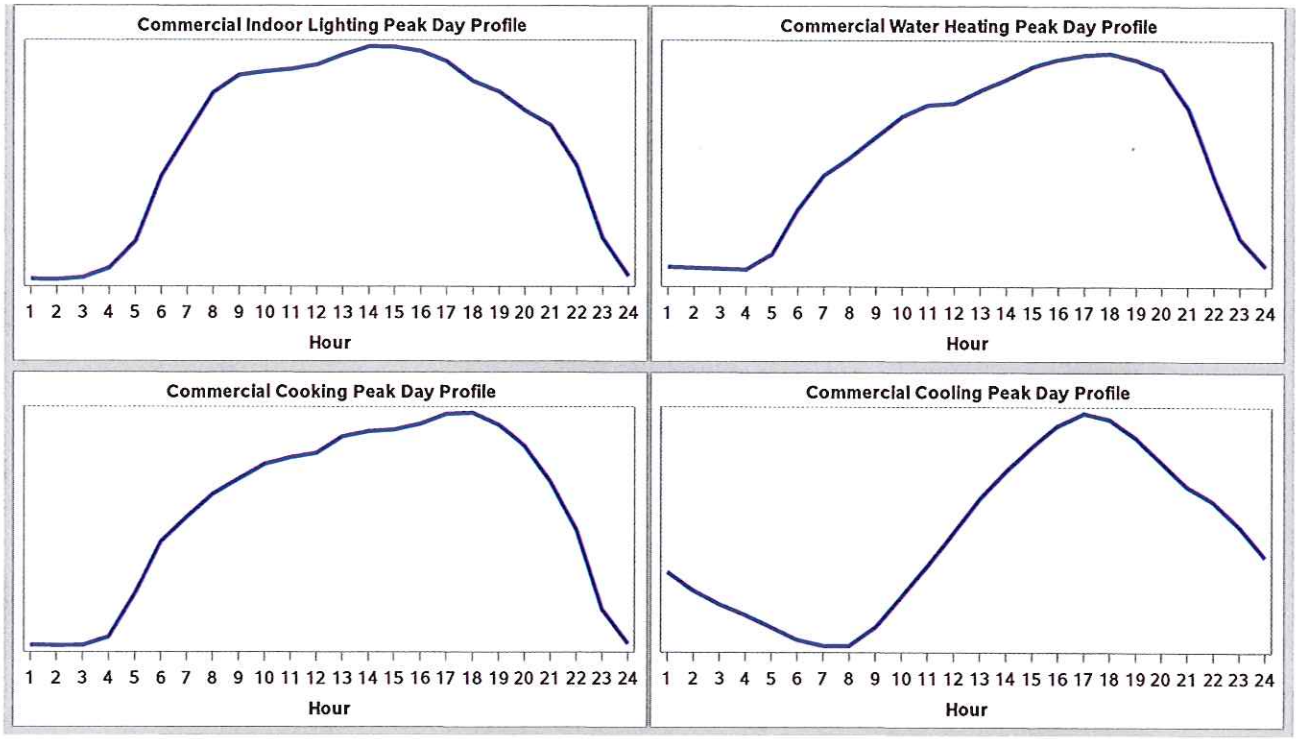
Commercial Indoor Lighting Peak Day Profile
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Commercial Water Heating Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Commercial Cooking Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Commercial Cooling Peak Day Profile
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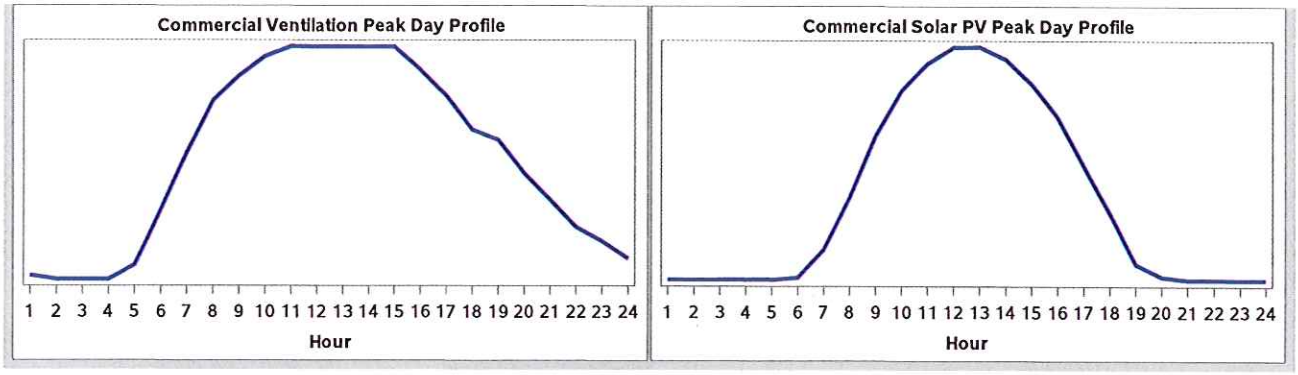
Commercial Ventilation Peak Day Profile
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Hour
Commercial Solar PV Peak Day Profile
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour

Ameren Missouri's
Response to MPSC Data Request
EO-2018-0211
Ameren Missouri's 3rd Filing to Implement Regulatory Changes in Energy Efficiency by MEEIA

Data Request No.: OPC 2008

Does Ameren Missouri believe that opt-out customers are eligible for any MEEIA programs (including demand response)? Please explain why or why not.

RESPONSE

Prepared By: Tom Thompson
Title: General Supervisor
Date: 7/23/18

Ameren Missouri does not believe that opt-out customers are eligible for any MEEIA programs (including demand response) that are proposed in the MEEIA 2019-24 Plan. Customers that do not contribute financially to the costs of a MEEIA program generally should not have their participation subsidized by other customers, unless specifically allowed by statute (i.e., low-income customers).

Further, Ameren Missouri does not consider its programs (specifically, its demand response programs) to be either an interruptible or curtailable rate, since those are typically offered for a variety of reasons (e.g., reliability concerns) and are not strictly tied to energy efficiency. Per the MEEIA statute and rule (Section 393.1075 RSMo and 4 CSR 240-20.094(7)(M), respectively), opt-out customers could still participate in a non-MEEIA interruptible or curtailable rate option.

GM-7

Ameren Missouri's
Response to MPSC Data Request
EO-2018-0211
Ameren Missouri's 3rd Filing to Implement Regulatory Changes in Energy Efficiency by MEEIA

Data Request No.: OPC 2006

Considering that the PAYS Feasibility Study was concluded after Ameren Missouri submitted its formal application. Does Ameren Missouri intend to address PAYS and/or on-bill financing in direct testimony? If no, please explain why.

RESPONSE

Prepared By: Bill Davis
Title: Director, Energy Efficiency and Renewables
Date: 7/13/2018

No, not in direct testimony. The Company received no bids for on-bill financing or PAYS in response to its public Request for Proposals for the MEEIA 3 portfolio.

The Company is willing to work with parties regarding the barriers identified in the PAYS feasibility study and discuss potential future implementation paths. Regardless, those issues could not be addressed and an implementation contractor selected with sufficient time for on-bill financing or PAYS to be launched on 3/1/2019 nor with enough time to determine appropriate budgets for those activities for Commission approval as part of the initial MEEIA 3 approval.