Exhibit No.:	
Issue(s):	*Evaluation, Measurement And Verification (EM&V) Savings Shapes, Program Evaluation*
Witness:	*Justin Tevie*
Sponsoring Party:	*MoPSC Staff*
Type of Exhibit:	*Rebuttal Testimony*
Case No.:	*EO-2023-0136*
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MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

TARIFF AND RATE DESIGN DEPARTMENT

REBUTTAL TESTIMONY

OF

JUSTIN TEVIE

UNION ELECTRIC COMPANY,
d/b/a AMEREN MISSOURI

CASE NO. EO-2023-0136

Jefferson City, Missouri
April, 2024

REBUTTAL TESTIMONY

OF

JUSTIN TEVIE

UNION ELECTRIC COMPANY,
d/b/a AMEREN MISSOURI

CASE NO. EO-2023-0136

Q. Please state your name and business address.

A. Justin Tevie, 200 Madison Street, Jefferson City, MO 65102.

Q. Are you the same Justin Tevie that provided direct testimony in this case?

A. Yes.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my testimony is to briefly discuss issues relating to the principal-agent problem, load/savings shapes, Evaluation, Measurement & Verification, ("EM&V"), interactive savings effects and program evaluation.

EXECUTIVE SUMMARY

Q. Please summarize your testimony.

A. The principal-agent problem arises because rate payers (Principal) cannot directly observe the actions of Ameren Missouri (Agent) so the latter must be incentivized to take actions in the interest of the former. This arises because of misaligned interests between Ameren Missouri and rate payers. The Technical Resource Manual ("TRM") assumes a fixed level of energy savings for each measure, regardless of when the measure is installed. A reliable TRM must ensure the accuracy of: (1) the initial energy and demand savings; (2) the savings shapes; (3) the deemed savings; and (4) the baseline measure assumptions.

All this hinges upon the assumption that the TRM is correctly formulated; an incorrect TRM will naturally result in misleading information. Interactive savings effects must be adequately addressed by Ameren Missouri in order to avoid overstating the benefits of the Missouri Energy Efficienty Investment Act ("MEEIA"). Ameren Missouri must develop an algorithm that adjusts downwards the savings of secondary measures once the primary measure is established. Ameren Missouri must be cognizant of plans for EM&V when designing programs. The MEEIA portfolio should concentrate on programs or measures whose savings are easy to quantify and provide benefits to all customers in the class, regardless of program participation. Program evaluation must be well-designed in advance and must include the following phases: planning the evaluation; choosing the evaluation methods; and dissemination and feedback. It must be undertaken as continuous improvement process and not as a static process.

THE PRINCIPAL-AGENT PROBLEM: AMEREN MISSOURI

Q. Is the principal-agent problem present in the MEEIA application submitted by Ameren Missouri?

A. Yes. The principal-agent problem occurs when one of the parties to a contract, the Principal (rate payers), cannot directly observe the the actions or effort of the other party, the Agent (Ameren Missouri), but can only observe the outcome of the Agent's actions. One particular area where this principal-agent problem is manifested is in the very nature of the business that Ameren Missouri is engaged in. The traditional business of Ameren Missouri is to sell more electricity to customers for higher profits through its rates. The concept of energy efficiency does not align with its objectives. Simply put, Ameren Missouri will make more profits if customers use more electricity and vice versa. Promoting energy efficiency will not

be in its best interest so there is a misalignment of interests between Ameren Missouri and rate payers. Since the actions of the Agent cannot be observed the Principal cannot coerce the Agent to pursue the optimal action. The real issue at stake here is that rate payers cannot see the intent of Ameren Missouri because it is intangible and hence cannot tell if Ameren is acting in its own self interest or in the interest of rate payers.

Another area where this problem exists is with respect to the EM&V analysis. It is cost-prohibitive to evaluate all aspects of a demand-side program; there are too many measures and too many people adopting measures to review, so EM&V will prioritize certain aspects over others. Under current MEEIA rules, Ameren Missouri develops and issues the Request for Proposal ("RFP") which sets out what an evaluator will evaluate. Additionally, although the evaluator is a third party, the evaluator is selected and paid by Ameren Missouri. This is quite concerning as it brings to light the impartiality of these evaluations. Will the evaluations performed by the evaluators, in a manner prescribed by Ameren Missouri, be favorable to them? Also Ameren Missouri has an incentive to see an EM&V with high estimated savings.Ameren Missouri's Earning Opportunity is directly tied to the performance as measured by the EM&V. Additionally, future cycles use these estimates to deem measure savings in their TRMs. Since Ameren Missouri still maintains it's traditional rates to sell more electricity to customers for higher profits, Ameren Missouri has the perverse incentive to have evaluated savings be overestimated.

IMPORTANCE OF ACCURATE ENERGY AND DEMAND SAVINGS ESTIMATES

Q. Does Ameren have a definition for baseline energy usage (baseline)?

A. Yes. It is the energy consumption of the existing inefficient equipment.[1] Put differently, it is the energy consumption displaced by the energy efficiency unit. The baseline can have multiple meanings depending on the program delivery type, but the above definition is applicable to most programs. With respect to early replacement delivery type, the baseline has a dual meaning; it begins as the assumed existing equipment and shifts to the new baseline equipment after the expected life of the existing equipment expires.

Q. Are all of the baselines included in the Ameren TRM appropriately determined and documented?

A. No. Ameren Missouri does not mention how it would treat measures that do not have a federal minimum standard. Some of the measures included in the TRM assume that the baseline energy is based on federal minimum standards[2] that are in effect during that program year. However, the TRM and Deemed Savings Tables account for separate baseline assumptions for "early replacement" of equipment that does not align with federal minimum standards. Projections of savings based on the baseline into the near future can be tricky, especially when the federal minimum standards change in the middle of a projection period. In the event this happens, the projected savings values are incorrect and must be adjusted. It is important to have an accurate measure of the baseline energy because the baseline energy consumption is used to calculate the magnitude of energy savings and its associated shape. Second, the estimated savings are used as an input in the calculation of ratepayer benefits. Overstated energy savings estimates skew results of analyses that rely on the estimated benefits, i.e. rate impact analysis, cost-effectiveness tests, etc. For example, if energy

[1] Appendix G - TRM – Vol. 1: Overview and User Guide
[2] Appendix G - TRM – Vol. 1: Overview and User Guide

savings are overstated, a rate impact analysis would conclude that bills are much lower than they would otherwise have been. This is misleading and gives the impression that the benefits to all customers exceeds the costs.

Q. How reliable are the deemed savings calculated by Ameren Missouri?

A. Deemed savings can only be as accurate as the assumptions used to calculated them. Deemed savings calculated by Ameren are based on the algorithms derived in the TRM. If the sources used by the TRM are not traceable, then it will cast doubt on the deemed savings value derived from the algorithms. An incorrect documentation will result in a mis-specified algorithm and for that matter incorrect savings values.

Q. Can you find an example in the MEEIA application where the baseline definition is misapplied?

Y. Yes, it occurs in the Heating, Ventilation and Air Conditioning ("HVAC") early replacement program. Early Replacement ("ER") is a program that replaces existing equipment before the end of its useful life. Here the baseline is not fixed and starts as the existing equipment, but shifts to the baseline of the new equipment after the expected life of the existing equipment is over. In the deemed savings table, Appendix F (HVAC Deemed Table), page 4, information on several measures are presented. The existing baseline for early replacement (ER1), which represents the first 6 years of early replacement, is misrepresented as a cooling measure. Ameren Missouri used a seasonal energy efficiency ratio ("SEER") rating of 8.3, which was required in the 1990s, instead of the federal minimum rating of 14, which was required starting in 2015.[3] Thus, the energy savings calculated by the algorithm inflates its value. This raises some concerns because any EM&V based on these savings value will be

[3] SEER 13 was the federal minimum in 2006.

misleading and misinform policy.[4] It is worth pointing out that one of the consulting companies, Evergreen Economics, recently recommended that a SEER rating of 13 should be standard for early replacement. Based on this recommendation, savings values provided by Ameren for future periods are very misleading.

Q. Does the TRM need to ensure that initial energy and demand savings estimates are accurate?

A. Yes. The deemed savings calculations are based on the derivations in the TRM. For the cumulative deemed savings to be accurate, it must be based on the energy savings calculations obtained from an accurate TRM. If the assumptions of the TRM are flawed then the deemed savings, used as inputs in the throughput disincentive calculations, will also be misleading or inaccurate. This results in an incorrect estimate of the lost revenues attributable to MEEIA. The application for a MEEIA portfolio is premised on a certain level of energy and demand savings/reductions that the program is expected to achieve. These savings are largely based on assumptions and calculations performed in the TRM that assumes a fixed level of energy savings for each measure regardless of when the measure was installed.

Q. Do you expect the deemed savings to equal evaluated or measured savings?

A. If the TRM is inaccurate or not precise, then the savings will be misleading.

Q. Do you expect the deemed savings to equal actual savings?

A. No, the actual savings are determined by factors that are not adequately captured or estimated by the methods employed by Ameren Missouri. Factors such as changes in populations, economic conditions, price, end-use ownership, efficiency trends, and weather

[4] To put things into perspective, the savings from using a SEER 8.3 are approximately 5 times greater than using a SEER 14 based on information provided in the TRM.

conditions affect consumer end-use load shapes and can explain the discrepancy between deemed and actual savings. It is the expectation of Ameren Missouri that its load-forecasting models, SAE[5], that explicitly incorporates or models these factors, will reasonably minimize the discrepancies between the actual and deemed savings. This expectation is flawed because the forecasts of the SAE are as good as the underlying assumptions. If the assumptions are not reasonable or do not adequately capture the dynamics of Ameren Missouri's footprint, they will not be reliable. Put simply, Ameren Missouri's models can only mimic the actual savings. They cannot produce the actual savings derived from a specific population.

Q. Does Ameren Missouri propose or outline why it should design its programs around the hours of highest impact?

A No. After searching through the TRM and related application, I could not find where Ameren Missouri identified specific hours where the greatest savings impact could be achieved. The TRM does not provide such information. It only states a static - not hourly dependent - annual energy savings and coincident factor. This is quite concerning because the whole premise of MEEIA is based on the concept of avoided cost. If Ameren Missouri can identify hours of greatest impact, then it can design program around those hours to achieve maximum savings which are the program benefits that can be used as inputs in calculating avoided costs. For example, suppose weekdays from 6am-11am are identified as the hours of greatest impact. Then Ameren Missouri should design its programs around those hours to achieve maximum savings. As Mr. Luebbert explained in his direct testimony,[6] the identification of specific costs targeted for avoidance or deferral through energy and demand

[5] SAE means Statistically Adjusted End-Use
[6] Direct Testimony of J Luebbert, EO-2023-0136, page 3.

savings should be the starting point for any MEEIA portfolio. He goes on to explain that the avoided costs should then serve as a reference point for budgeting purposes.

INTERACTIVE SAVINGS EFFECTS

Q. What are interactive savings effects?

A. An interactive effect occurs when there is an interplay among several measures so that it is virtually impossible to isolate the impact of one measure, say the primary measure, from the joint impact of all the measures.

Q. Are interactive savings effects a problem in the MEEIA application submitted by Ameren Missouri?

A. Yes. In most instances, when a primary measure is installed, secondary measures are also installed so all measures operate simultaneously to save energy. The problem is that when trying to assign energy and demand savings to the primary and secondary measures, it is often difficult to extricate the impact of the primary measure from the total impact of both primary and secondary measures. However, the energy and demand savings of the combined measures is unlikely to equal the sum of the estimated savings for each measure separately installed. To put things in perspective, suppose a household installs three measures: cooling(primary), building shell, and thermostat. With these three new measures, it is all but impossible to isolate and accurately measure what energy savings can be attributed to which measure.

Interactive effects minimize the impact(s) of other measures that have been installed in addition to a primary measure. For example, if a representative family installs three measures relating to builiding shell, cooling, and thermostat, it is simply wrong to tally the saving attributable to each separately as the aggregate savings. Installation of building shell measures

are likely to affect the time of cooling equipment operation. Thermostats that are expected to derive energy savings by optimizing cooling system runtime will naturally save less energy if the cooling unit is more efficient. These interactions are expected and must be accounted for appropriately to accurately estimate and measure energy savings. It is difficult to extricate the impact of one measure when all three operate simultaneously.

Q. Does Ameren propose or outline how they will address the impacts of the interactive savings effects in the MEEIA application?

A. No. In the market potential study (MPS) and in response to Staff data request (DR) 117, Ameren stated that:

> As savings are introduced from select measures, the per-unit savings from other measures need to be adjusted (downward) to avoid over-counting. The analysis typically prioritizes market opportunity equipment measures (versus retrofit measures that can be installed at any time). For example, the savings from a building shell measures [sic] are adjusted down to reflect the efficiency gains of installing efficient HVAC equipment. The analysis also prioritizes efficiency measures relative to conservation (behavioral) measures. These impacts are accounted for in all phases of estimated potential savings.

Staff submitted data request (DR) 117 to elicit information on how Ameren Missouri intended to perform the interactive savings adjustment in MEEIA using specific examples. I could not find where in the MEEIA application Ameren used a specific formula or algorithm to implement a downward adjustment to interactive savings.

Q. In light of these discussions, what are your recommendations to the Commission on this subject?

A Staff recommends that the Commission should not approve the current MEEIA application. I strongly support this position and this application should not be approved without regard to the the discussion below. Ameren Missouri must provide a transparent plan, with specific details, to adjust downwards the benefits that accrue to all secondary measures

after the primary measure has been identified. There has to be a formula or algorithm for adjusting downwards the savings of the secondary measures. This algorithm must be made explicit by Ameren Missouri and all the underlying assumptions in its derivation must be justified. It is worth noting that this algorithm may be informed by empirical studies based on specific samples sizes. The plan must also have as a point of reference a representative household that uses, for example, cooling, building shell, and thermostats. The primary measure should be identified in advance for the sake of simplicity. It must then susbsequently include a detailed algorithm that includes the percentages or fractions that will be applied to the secondary measures to adjust them downwards after the primary measure has been established. Finally, the plan must explain how Ameren Missouri accounts for the interaction effects of measures within the application for MEEIA Cycle 4, EM&V, the throughput disincentive, and how Ameren Missouri intends to use this to inform future MEEIA cycles.

IMPORTANCE OF EVALUATION, MEASUREMENT AND VERIFICATION

Q. Does the program evaluation presented in the MEEIA application submitted by Ameren Missouri consider all possible impacts in the calculation of benefits?

A Even though the MEEIA application mentions the impacts of both tangible and intangible benefits, I could not find where the latter was addressed in the TRM. The tangible components can easily be quantified in the TRM, assuming the TRM is correct, and replicated in the deemed savings table and must be verified for accuracy. The intangible benefits are more complicated and harder to compute. It involves estimating the impacts of the program above and beyond what would have occurred in the absence of the program that involves a secondary/auxilliary step. This step essentially involves identifying the proportion of

energy-efficient measures installed or purchased that would have been installed or purchased in the absence of the program.

Q. Does Ameren Missouri have a well designed evaluation plan to assess the overall impact of MEEIA?.

A. After searching Ameren's EM & V documentation, I could not find where Ameren Missouri implements a plan to assess the overall impact of MEEIA. This is very concerning because a well-defined and complete evaluation does not only provide feedback on the effectiveness of a program, but will also help to determine the appropriateness of the program for the target population. In addition, it will inform us of any problems with its implementation and support and whether there are any ongoing concerns that need to be addressed as the program is implemented. A plan that is incomplete and inaccurate will be misleading and misinform policy as it has the potential to overstate the benefits and the evaluation results, which can result in overstated bill reductions for customers.

Q. What are your recommendations to the Commission on this issue?

A. Staff recommends that the Commission reject Ameren Missouri's Amended Application. Staff recommends that future applications for MEEIA programs address the following information.

Ameren Missouri must have a complete and accorate program evaluation plan. The program evaluation itself involves three stages-planning the evaluation,choosing the evaluation methods, and dissemination and feedback. The planning phase involves collecting data, defining the objectives of the evaluation, and considering the types of evaluation methods to employ. At this stage, it can be decided to avoid measures or programs that are difficult to evaluate accurately. If they can still be evaluated but the costs are prohibitive, then such

programs should be dropped. The evaluation method usually depends on the objectives of the evaluation and the alloted budget, but it must at a minimum provide both impact and outcome assessments. The dissemination and feedback phase feeds the results of the evaluation back into the planning stage so it becomes a continuous improvement process and not a static one. Ameren Missouri must provide a comprehensive document that details step by step how the program evaluation was carried out to assess the overall impact of MEEIA. It must include the methods for conducting both impacts and outcome evaluations and spell out the advantages and disadvantages of each method. It must also state whether the objectives of the program were met or not and plans to incorporate that information into future program years. It is worth pointing out that the scope of an evaluation will always be hindered by the available resources. However, a well-designed and simple evaluation can be as powerful as more elaborate and costly one.

It is important for Ameren Missouri to be cognizant of plans for EM&V when designing programs. Plans for EM&V can become complex when the measures promoted by Ameren Missouri generate benefits that have free-ridership and spillover components. If these issues cannot be minimized from the start, then an elaborate plan must be in place to capture most of these benefits in the EM&V plan. A decision can be made to avoid measures or programs that are difficult to evaluate accurately. If the costs associated with evaluation are prohibitive, then such programs should be dropped. Generally speaking, some measures are less prone to free-ridership and spillover problems than others so it makes more sense to promote such measures, such as programs that are not subsidized by federal money; this has the potential to reduce free-ridership.

When this is done properly and the savings are accurately estimated, using the most appropriate approach, this can serve as a blueprint to formulate future EM&V studies that address free-ridership and spillover effects.

If the EM&V is poorly implemented, selecting projects/measures not representative of the entire population, wrongly estimated parameters and associated measure savings, then evaluation results will be misleading and will not inform policy.

Q. Does this conclude your rebuttal testimony?

A. Yes it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's 4th Filing to Implement Regulatory Changes in Furtherance of Energy Efficiency as Allowed by MEEIA	))))	Case No. EO-2023-0136

AFFIDAVIT OF JUSTIN TEVIE

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW JUSTIN TEVIE, and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Rebuttal Testimony of Justin Tevie;* and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

JUSTIN TEVIE

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 25th day of April 2024.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: April 04, 2025
Commission Number: 12412070

Notary Public