Exhibit: _____
Issues: Avoided cost, load shapes, cost
Witness: effectiveness
Type of Exhibit: Timothy M. Nelson
Sponsoring Party: Surrebuttal Testimony
Evergy Missouri Metro and
Case No. Evergy Missouri West
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September 13, 2021

MISSOURI PUBLIC SERVICE COMMISSION

CASE NOS.: ET-2021-0151 / ET-2021-0269

SURREBUTTAL TESTIMONY

OF

TIMOTHY M. NELSON

ON BEHALF OF

EVERGY METRO, INC. D/B/A EVERGY MISSOURI METRO AND EVERGY MISSOURI WEST, INC. D/B/A EVERGY MISSOURI WEST

Kansas City, Missouri
September 2021

SURREBUTTAL TESTIMONY

OF

TIMOTHY M. NELSON

Case No. ET-2021-0151/0269

Q: Please state your name and business address.

A: My name is Timothy M. Nelson. My business address is 1200 Main, Kansas City, Missouri 64105.

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

A: I am employed by Evergy Metro, Inc. I serve as Senior Manager Analytics, Energy Solutions for Evergy, Inc., Evergy Metro, Inc. d/b/a Evergy Missouri Metro ("Evergy Missouri Metro") and Evergy Kansas Metro ("Evergy Kansas Metro"); Evergy Missouri West, Inc. d/b/a Evergy Missouri West ("Evergy Missouri West"); and Evergy Kansas Central, Inc. d/b/a/ Evergy Kansas Central ("Evergy Kansas Central").

Q: On whose behalf are you testifying?

A**:** I am testifying on behalf of Evergy Missouri Metro and Evergy Missouri West (collectively, "Evergy" or "Company").

Q: What are your responsibilities?

A: I oversee the design and filing of customer programs, performing cost effectiveness calculations, program reporting and other program support. These include electrification and demand-side programs. I also supervise the preparation of the demand-side energy and demand forecasts used for load forecasting, corporate budgeting, and Integrated Resource Planning.

Q: Please describe your education, experience and employment history.

A: I graduated from Iowa State University with a Bachelor of Science in Mechanical Engineering. I completed a Master of Science in Finance from the University of Missouri – Kansas City. I have worked for Evergy since 1994 through multiple mergers and company names. I have held positions as a Production Engineer at the Lake Road Power Plant, Resource Planning Analyst responsible for production cost modeling, Operations Analyst responsible for analyzing market data for the Southwest Power Pool, until moving to my current position in 2014.

Q: Have you previously testified in a proceeding at the Missouri Public Service Commission ("Commission" or "PSC") or before any other utility regulatory agency?

A: Yes, I have testified before both the PSC and State Corporation Commission for the State of Kansas ("KCC").

Q: What is the purpose of your rebuttal testimony?

A: The purpose of my testimony is to address Staff's mischaracterization of the avoided capacity costs used in Evergy's proposal, electric vehicle charging loadshapes, and cost effectiveness.

Q: Please provide a brief overview of your rebuttal testimony.

A: My testimony focuses on avoided capacity costs and cost effectiveness:

- With respect to the appropriate values for avoided capacity cost, I demonstrate that the Company's approach is consistent with the Commission's Order with the recent Missouri Energy Efficiency

Investment Act ("MEEIA") filing[1] and that Staff consistently chooses an avoided capacity cost that has the greatest negative impact on the programs.

- With respect to electric vehicle charging loadshapes I explain why the Company's charging loadshapes developed by Electric Power Research Institute ("EPRI") should be used rather than Staff's unsupported projections.
- With respect to cost effectiveness I discuss the Evergy's conservative estimates of the costs and benefits.

I. AVOIDED CAPACITY COST

Q: First, please explain what is an avoided capacity cost?

A: The avoided capacity cost is an estimate of the incremental cost attributable to an incremental increase in peak demand. The cost is "avoided" if the increase in peak demand is avoided. This metric is used to evaluate alternatives to supply-side resources such as demand-side programs. While electrification programs may have an off-setting or inverse impact compared to demand-side programs it still appropriately represents the cost that may be incurred or avoided.

Q: Staff raises the point that Evergy has proposed different avoided capacity costs in other proceedings. Please comment.

A: Staff should be aware of the context involving the avoided capacity costs in the other proceedings since the same Staff member was the witness in the proceedings noted by Staff. It appears that Staff is attempting to suggest that Evergy is being inconsistent in its use of different avoided capacity values in different proceedings[2]. However, the record will

[1] EO-2019-0132/0133.
[2] Staff Rebuttal Report ET-2021-0151, Witness J Luebbert, pg. 14, lns. 4-6

show that Evergy's proposals are supported, logical, and consistent across the cases and that Staff's position is inconsistent and unsupported.

Q: Please explain how Evergy arrived at its avoided capacity costs for this case?

A: It is really very simple. Evergy adopted the avoided capacity costs approved by the Commission in the MEEIA Cycle 3 case (Docket No. EO-2019-0132).

Q: What does Staff propose for avoided capacity costs?

A: Staff does not actually propose any avoided capacity cost values in this case. Staff only criticizes Evergy's avoided costs and implies that it is too low. First, by stating that additional costs should have been included to reflect SPP transmission fees[3]. Second, by stating that *if* "… Evergy assumed a higher avoided cost of capacity, the benefits would be reduced…", therefore "Evergy is overstating the benefits"[4]. But Staff fails to provide or support any other alternative avoided capacity value other than to say that the avoided costs approved by the Commission in the MEEIA Cycle 3 case are too low.

Q: What was Staff's recommendation for avoided costs in the MEEIA Cycle 3 case?

A: Zero. Staff stated:

> Therefore, KCPL/GMO should have assumed an avoided capacity cost equal to zero dollars in years 2019 through 2031, the estimated market cost of capacity to serve the capacity deficit in 2032, and zero dollars from that point on for the MEEIA Cycle 3 program evaluation.[5]

Q: What about potential avoided SPP transmission fees? Did Evergy forget to include in the avoided costs those fees that were ordered in the MEEIA Cycle 3 case?

A: No. These costs were not included in the Commission order of avoided costs for the MEEIA Cycle 3 case. Evergy is using precisely the same avoided costs in this case as was

[3] Staff Rebuttal Report ET-2021-0151, Witness J Luebbert, pg. 13, lns. 5-9.
[4] Staff Rebuttal Report ET-2021-0151, Witness J Luebbert, pg. 14, lns. 6-9.
[5] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 20, ln. 30; pg. 21, ln. 3.

ordered by the Commission. In the MEEIA case, Staff stated that "… the inclusion of these interconnection costs as an avoided transmission cost is inappropriate…"[6] and that "Staff has not included any avoided transmission costs in its analysis of the KCPL/GMO Cycle 3 programs."[7] Even though Staff recognized that transmission costs could be avoided, Staff's recommendation for avoided transmission costs in the MEEIA Cycle 3 case was also zero.

Q: Is Staff's position that Evergy's avoided capacity costs are too low consistent with Staff's position on avoided costs in the MEEIA Cycle 3 case?

A: No. In the MEEIA Cycle 3 case, Staff said the avoided costs proposed by the Company were too *high*. In fact, it is Staff that has a position that is inconsistent in the two cases. As already discussed, in the MEEIA Cycle 3 case, Staff recommended an avoided capacity cost of zero, but in this case says that the much higher costs approved by the Commission are too low for this filing.

Q: How does Staff explain this inconsistency?

A: The only statement given to justify this is the claim that "… incremental capacity costs from increased load from EV charging are more likely than actual cost avoidance from MEEIA Cycle 3 implementation." Staff makes another similarly unsupported statement earlier that "Each MW reduced by DSM implementation does not necessarily result in realized cost avoidance but substantial increases in load are much more likely to cause additional costs attributable to the incremental load in the form of a capacity." This is an accusation without merit that implies that demand savings from MEEIA Cycle 3 programs aren't real (but increases from EVs are), despite the Evaluation, Measurement and Valuation ("EM&V") of the MEEIA programs that demonstrates otherwise. Staff

[6] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 24, lns. 10-11.
[7] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 24, lns. 21-22.

participates in the EM&V process and has ample opportunity to provide input. Staff also hires their own auditor, to audit the work of the Company's EM&V consultant. Thus, Staff is aware that the demand saving are in fact real. Staff does not provide any substantiation or support for their accusation that MEEIA Cycle 3 programs are not likely to result in "cost avoidance".

Q: How does the avoided capacity cost affect cost effectiveness? Are MEEIA programs and electrification programs affected in the same way?

A: No, avoided costs have opposite effects on these programs. For MEEIA programs (i.e. programs that *reduce* load), a high avoided cost makes them *more* cost effective and a low avoided cost makes them *less* cost effective. For electrification programs (i.e. programs that *increase* load) a high avoided cost makes them *less* cost effective and a low avoided cost makes them *more* cost effective. Thus, by choosing a high avoided capacity cost for electrification programs and the lowest possible avoided capacity cost for MEEIA programs, zero, Staff is consistently choosing an avoided capacity cost that has the greatest negative impact on the programs. This is an illogical position. Imagine a theoretical scenario where the two programs offset each other, one with a 1 MW increase and one with a 1 MW decrease. There would then be no net increase or decrease in the capacity position. By using vastly different avoided costs for a 1 MW increase versus the 1MW decrease, Staff's position ignores the demand savings from DSM programs. The rational approach, considering that the Company has both types of programs that would offset each other to a degree because they overlap, is to use the same avoided capacity cost for each under the current circumstances.

Q: Staff references on p. 14 of its Rebuttal Report the avoided costs used in the Company's DSM potential study for the 2021 triennial IRP (EO-2021-0035) and argues that Evergy is overstating the benefits of its electrification programs by not using those avoided cost values. How do you respond?

A: While this case and the triennial IRP were filed near the same time, the IRP was not filed and therefore the avoided costs, preferred plan, and capacity position were not on the record at the time of preparation of the electrification case. It is to be expected that the appropriate avoided capacity cost may change over time, but in this case it is most appropriate to use the same avoided capacity cost recently ordered by the Commission in the MEEIA case. That being the case, while avoided cost is typically used to measure the cost effectiveness of specific programs, the Company modeled the ratepayer, societal and participant costs and benefits that may result from EV adoption in Evergy's territory as explained later in this testimony. Thus, Staff's implication that the Company was selective in its presentation of avoided cost information is not appropriate.

II. COST EFFECTIVENESS

Q: Please explain the methodology used in the cost effectiveness model that informed Evergy's proposal.

A: ICF's analysis does not attempt to model the cost effectiveness of each proposed program, or the proposed portfolio of programs, because it is very difficult to definitively link EV adoption and EV programs, regardless of the funding source or administrator.

Instead, ICF's methodology considers the costs and benefits of market-wide EV adoption *as a whole* rather than attempting to isolate the costs and benefits associated with Evergy's proposed programs. More specifically, the analysis compares the estimated

revenues of a future population of EVs with the estimated costs of energy, capacity, and supporting charging infrastructure to determine whether EVs are a net benefit or cost to all utility customers, EV drivers (participants), and society.

ICF's cost effectiveness evaluation concludes that—for the range of assumptions and scenarios analyzed—there is a net benefit to all customers when the revenues from EV adoption over the next 10 years are weighed against the projected costs to serve these EVs in terms of energy, capacity, and charging infrastructure. When interpreting this result, it is critical to understand that ICF's modeling assumes ratepayers bear 100% of commercial charging infrastructure capital costs during the 10-year analysis period. In other words, the model assumes every non-residential charging station needed to support EV growth over the next ten years is ratepayer funded. We know this will not actually be the case, however, because 1) Evergy's Commercial Rebate Program does not fully cover developer's costs for a given station, 2) Evergy's Commercial Rebate Program expires halfway through the analysis period, and 3) Evergy's modest buildout of the CCN represents a small fraction of the projected charging port needs over the next ten years. This methodology is valid because all customers benefit from EV adoption even when ratepayers bear the full expense associated with charging infrastructure beyond what an individual EV driver might install at home. Consequently, ICF's modeling results are meaningful because they enable Evergy to assert that the programs supporting increased EV adoption are cost effective (including the proposed Commercial Rebate Program and CCN Expansion).

This approach and methodology, which focuses on overall EV adoption, are similar in methodology to cost-benefit studies conducted in multiple states and for several other utilities. Specific examples of these studies include those conducted by Energy &

Environmental Economics (E3)[8] for Xcel Energy in Colorado and M.J. Bradley & Associates[9] for the state of Arizona.

After discussion with stakeholders in the technical conferences, Evergy later filed a supplemental Report on July 16, 2021 with the standard program cost effectiveness results for the residential rebate program which Evergy had developed during the program design phase.

Q: Do you agree with Staff's analysis that the Company's proposed Commercial Rebate Program would be detrimental to non-participating Evergy Metro ratepayers until around the year 2030 when rate case timing is taken into consideration?

A: No. As explained in Mr. Ives' testimony, Staff's analysis represented by Highly Confidential Figure 4[10] provides little more than a conceptual demonstration of regulatory lag. Our interpretation of Staff's analysis is that they passed-through Evergy's assumption that ratepayers would bear the capital costs of all charging stations required during the 10-year analysis period, which is inappropriately one-sided without proper consideration of the estimated benefits associated with the EVs enabled by that infrastructure. Further, Staff's analysis appears to pass through residential charging infrastructure costs, while ICF's modeling does not consider that a cost to the ratepayer. In addition, Staff's energy costs are based on the model workpaper included with Evergy's original filing on February 24, 2021. Evergy subsequently corrected the energy cost calculation on this workpaper and refiled on May 7, 2021.

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[8] E3, "Benefit-Cost Analysis of Transportation Electrification in the Xcel Energy Colorado Service Territory," May 2020. Available at: https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/Regulatory%20Filings/CO%20Recent%20Filings/04_Attachment%20SWW-7.pdf.

[9] M.J. Bradley & Associates, "EV Cost-Benefit Analyses: Arizona," December 2018. Available at: http://www.swenergy.org/pubs/azevstudy.

[10] Staff Rebuttal Report EO-2019-0132/0133, Witness Sarah L. K. Lange, pg. 19.

Q: What cost categories were considered in the cost effectiveness evaluation ICF conducted for Evergy?

A: ICF's market-wide analysis includes costs generally falling into three categories: energy, vehicle and charging infrastructure. Energy costs include those associated with energy and capacity supply, as well as retail electric rates. Vehicle costs include the incremental cost of EVs (compared to internal combustion engine vehicles), available vehicle incentives or tax credits, vehicle operations and maintenance, and gasoline, including applicable state and federal taxes. Charging infrastructure costs include residential (Level 2) and commercial (Level 2 and direct current fast charging) applications.

Q: Staff witness Lange asserts in her testimony that Evergy has not considered distribution facilities and related distribution costs that may result from additional charging infrastructure. Are these statements accurate?

A: No, they are not. Evergy's analysis did incorporate utility-side investments. As noted in the Report, specifically Appendix C, "the estimated infrastructure costs include the EV charging equipment, make-ready (both customer-side and utility-side facilities), and equipment installation. It is important to note that actual infrastructure costs can vary significantly based on the project and site. Utility-side facilities may not be required in all applications." For example, in Evergy's experience with Clean Charge Network stations to date, single DCFCs are rarely installed without other stations co-located, whether that is another DCFC or Level 2 EV charging. This typically results in overall infrastructure cost reductions – both customer-side and utility-side – for a single project/location. During technical conferences, Evergy provided parties with insight into the projected cost for non-

residential charging station installations, pointing to the range of line extension costs and the portion that is likely to be borne by the site host or third-party developer[11].

Q: Is Evergy overstating the benefits of its electrification programs as Staff alleges[12]?

A: No. Evergy's cost effectiveness evaluation assumptions are reasonable and, in some respects, conservative. As noted in the Report, the market-wide "analysis does not seek to model the potential impacts of a single program, but rather the costs and benefits that may result from increased EV adoption. It is very difficult to attribute direct program impacts on the EV market as there are numerous complex factors that go into car buying and charging decisions. ICF's methodology is similar to the analyses other utilities have applied to model the impacts of TE, with a focus on the customer benefit."[13] Company Witness Ives describes how the cost benefit analysis utilized by Staff that focuses on an individual charger basis inappropriately ignores revenues from EV drivers that aren't captured in such a cost benefit analysis.

The analysis conservatively assumes that Evergy customers (ratepayers) would bear the costs associated with *all* non-residential charging infrastructure needed to support EV adoption in the territory. This cost allocation results in inflated infrastructure costs to the ratepayer while, in actuality, some of these costs will be borne by EV charging providers, site hosts, and other third parties. In addition, Evergy's line extension allowance for EV charging infrastructure is designed to cover a typical installation and may not always cover the entire upfront cost associated with charging station installation and would then require a customer contribution.[14]

[11] Slide 11 from Technical Conference #4 is included on pg. 87 of the Staff Rebuttal Report ET-2021-0151.
[12] Staff Rebuttal Report ET-2021-0151, Witness J Luebbert, pg. 14, lns. 8-9.
[13] Evergy Transportation Electrification Filing Report, Section 3.4.2.
[14] Evergy Transportation Electrification Filing Report, Section 3.4.2.

Also, as explained in the Report,

> Another conservative facet of the cost effectiveness evaluation is that it does not include the potential benefits of improved utility load factor and avoided distribution costs through improved asset management associated with managed charging and other efforts to shift EV charging activity to off-peak periods. Even modest benefits from improved utility load factor and distribution asset management will likely offset any cost increases. Actively managing charging may also help decrease net societal costs by reducing the increased demand through better utilization of charging infrastructure. It is important to note that this cost effectiveness evaluation does not include certain non-monetized benefits that are sometimes considered in the societal cost test, such as emission reductions."[15]

With these conservative assumptions applied, the analysis still results a customer NPV net benefit of $42.5M (Missouri Metro) and $22.6M (Missouri West) in a medium EV adoption scenario.[16] Additional costs, such as higher avoided capacity costs, transmission costs associated with increased EV charging infrastructure, or program administrative costs, would have to exceed the estimated customer net benefit amounts to result in unfavorable cost effectiveness.

III. ELECTRIC VEHICLE CHARGING LOADSHAPES

Q: Did Staff develop some alternative EV charging loadshapes that they relied upon to evaluate the residential programs?

A: Yes. Staff developed three EV charging loadshapes: Projected Weekday A, Projected Weekday B, and Projected Weekday C. In Projected Weekday A, Staff assumed that *all* charging occurs at home on weekdays in a single hour between 5 – 6 pm. The Projected Weekday B scenario is similar, except that a slower charging rate is assumed so that the

[15] Evergy Transportation Electrification Filing Report, Section 3.4.2.
[16] Evergy Transportation Electrification Filing Report, Appendix C. pg. 103 and pg.118.

charging spans two hours from 5 – 7 pm. Finally, the Projected Weekday C shifts the start time of the Projected B scenario to begin at 8 pm.

Q: How did Staff develop these scenarios?

A: Staff did not provide any information to support their three scenarios. A review of Staff's workpapers shows that Staff's Projected A scenario chose to place *all* of the charging for *all* rebate recipients in the highest price hour of the day. Projected B scenario, again, is similar except that it assumes a slightly slower charging rate than Projected A. Projected C scenario at least acknowledges that the TOU rate exists, but also falls short. The Projected C scenario assumes that the customer has heard the Company's "Wait until 8" campaign and depends on the customer to program the EV to start charging at 8 pm.

In their analysis Staff assumes that *every* EV customer will rigidly follow the "Wait until 8" campaign but for some reason will not be motivated to adopt managed charging after midnight when cheaper rates are in effect and when the customer could save *significantly* more money. In fact, the super off-peak charging TOU rate that is offered in both Missouri Metro[17] and Missouri West[18] provides an additional 50% saving compared to off-peak charging.

Staff provides no evidence in testimony or in the workpapers that these three scenarios would be reflective of the average loadshape of EV charging in this program. Nor has Staff pointed to any other industry research on EV loadshapes to use as an

[17] https://www.evergy.com/-/media/documents/billing/missouri/detailed_tariffs_mo/residential-time-of-use-040519.pdf?la=en

[18] https://www.evergy.com/-/media/documents/billing/missouri/detailed_tariffs_mo/gmo/residential-time-of-use-040519.pdf?la=en

alternative to or in addition to the EV charging loadshapes[19] developed through EPRI's industry research utilized by Evergy.

Q: Does Staff rely on these unsupported projections to draw their conclusions?

A: Yes. Staff provided a chart[20] comparing the Projected A and Projected B scenarios to the loadshapes developed through EPRI's industry research. Staff then makes this statement about the chart, "As can be shown from the chart, if EV charging load is not managed it will likely occur during expensive peak hours."[21] But the chart does NOT prove anything, because Staff's underlying assumptions in Projections A and B have no basis. Put another way, Staff assumes that all rebate recipients simultaneously charge during the most expensive hour, then plots this unsubstantiated, hypothetical loadshape alongside Evergy's loadshapes (based on EPRI's industry research), and then points to the chart as proof that all charging simultaneously occurs during the most expensive hours. Again, Staff gives no evidence that this is the case. Therefore, no conclusions can be drawn from Staff's analysis or Figure's 1[22], 2[23], and 3[24] in Staff's report.

Q: Does this conclude your testimony?

A: Yes.

[19] Provided in the Company's workpapers: EPRI Loadshape Analysis for Home Charging Rebate_Public.xlsx
[20] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 8, Figure 1.
[21] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 8, lns. 6-7.
[22] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 8, Figure 1.
[23] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 11, Figure 2.
[24] Staff Rebuttal Report EO-2019-0132/0133, Witness J Luebbert, pg. 11, Figure 3.

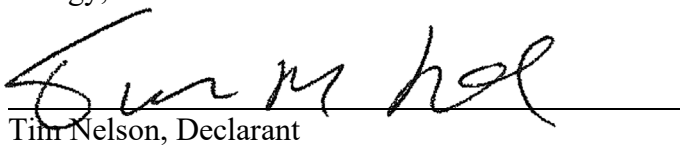
DECLARATION OF TIM NELSON

County of Jackson)
) ss
State of Missouri)

Tim Nelson , being duly sworn, deposes and says that the information accompanying the attached testimony was prepared by his or under his direction and supervision.

Under penalty of perjury, I declare that the foregoing is true and correct to the best of my knowledge and belief.[1]

Evergy, Inc.



Tim Nelson, Declarant

[1] *See* Letter from the Commission, dated March 24, 2020: "[A]ny person may file an affidavit in any matter before the Commission without being notarized so long as the affidavit contains the following declaration: ['']Under penalty of perjury, I declare that the foregoing is true and correct to the best of my knowledge and belief.['] _____ Signature of Declarant[.] This guidance applies both to pleadings filed in cases before the Commission and to required annual reports and statements of income."