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J. Luebbert Testimony
Surrebuttal
File No. EO-2023-0136

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MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

TARIFF/RATE DESIGN DEPARTMENT

SURREBUTTAL TESTIMONY

OF

J LUEBBERT

UNION ELECTRIC COMPANY,
d/b/a Ameren Missouri

CASE NO. EO-2023-0136

Jefferson City, Missouri
May 30, 2024

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SURREBUTTAL TESTIMONY

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CASE NO. EO-2023-0136

Q. Please state your name and business address.

A. My name is J Luebbert, and my business address is Missouri Public Service Commission, P. O. Box 360, Jefferson City, Missouri 65102.

Q. Are you the same J Luebbert that filed direct and rebuttal testimony in this case?

A. Yes.

EXECUTIVE SUMMARY

Q. Please summarize your surrebuttal testimony.

A. My surrebuttal testimony addresses parts of the rebuttal testimonies of Ameren Missouri witnesses Antonio M. Lozano, Matt Michels, and Steven M. Wills. I will also address a calculation error in my direct testimony raised by Office of the Public Counsel witness Lena M. Mantle.

Specifically, my testimony will address:

1. Ameren Missouri's incomplete references to the Commission's Report and Order in Case No. EO-2019-0132 and provides necessary context for those references;
2. Ameren Missouri's inconsistency with the study provided in support of its avoided cost calculations;
3. Ameren Missouri's projected future resource needs based on its preferred resource plan; and

4. The inconsistency of Ameren Missouri's claims regarding reliability and affordability with the Missouri Energy Efficiency Investment Act ("MEEIA") 4 Plan.

Staff's rebuttal testimony in this case substantively addresses many of the issues raised in Ameren Missouri's rebuttal testimony. Silence on a particular issue raised by Ameren Missouri in rebuttal testimony, especially those that were addressed within Staff's rebuttal testimony or Ameren Missouri witness conjecture regarding future Staff positions, should not be construed as acceptance of Ameren Missouri's position in this case.

CORRECTIONS TO DIRECT TESTIMONY TABLES

Q. Do you have any corrections to your direct testimony in this case?

A. Yes. Office of the Public Counsel's witness Lena M. Mantle correctly identified an error in the calculations of the hypothetical Fuel Adjustment Clause (FAC) impacts. I have attached an errata sheet to this testimony.[1]

Q. Do the corrections that you describe in the errata sheet alter Staff's position that the FAC's operation cannot be ignored in attempting to quantify the avoided costs associated with a given MEEIA program?

A. Not at all. The effects of the calculation error are minor and do not undermine the premise of the issue. That being said, I appreciate Ms. Mantle pointing out my error.

EVERGY MEEIA REPORT AND ORDER

Q. In his rebuttal testimony, Ameren Missouri's witness Antonio M. Lozano quotes and discusses[2] the Commission's Report and Order for Evergy Missouri West and

[1] See Schedule JL-s1.

[2] Pages 17 through 19 and pages 27 and 28 of Mr. Lozano's rebuttal testimony in this case.

Evergy Missouri Metro's third MEEIA cycles ("Evergy MEEIA 3 Report and Order").[3] Is there any context that you think is especially relevant for this Commission's consideration given your direct involvement in that case?

A. Yes. The impetus for Staff to push for the ability to file direct testimony in the most recent MEEIA cases stems, in part, from the Evergy MEEIA 3 Report and Order. In that case, Evergy altered its position on avoided costs and other key issues in surrebuttal, affording Staff limited opportunities to provide the Commission with factual evidence that would provide a more complete record to rely upon in its determination. In this case, Staff's direct testimony provides the Commission with a much more accurate and complete record of the interplay of MEEIA programs with other rate mechanisms, how benefits may or may not actually be realized by ratepayers and distributed amongst rate classes, the expected magnitude of costs, and how costs will be realized by ratepayers. I will attempt to provide necessary context to several of the Evergy MEEIA 3 Report and Order quotes relied upon by Mr. Lozano. The quotes included in Mr. Lozano's rebuttal testimony generally fall into three categories: avoided costs, ratepayer benefits, and integrated resource plans.

Avoided Costs

Q. On Page 17 of his rebuttal testimony, Mr. Lozano provides the following quote form the Evergy MEEIA 3 Report and Order.

> 29. Staff's use of zero for avoided costs is inappropriate because the MEEIA statute does not limit avoided costs to those associated with the deferral of capacity or require deferral of capacity.[4]

Is the aforementioned quote relevant in this case?

[3] Case Nos. EO-2019-0132 and EO-2019-0133.

[4] Amended Report and Order, Issued March 11, 2020 page 12.

A. No. It appears that Mr. Lozano may have misunderstood my direct testimony in this case. Staff recognizes that benefits may be created via demand reductions from demand-side resources.[5] However, how those benefits are realized by ratepayers is paramount to determining whether programs in a MEEIA application will be "beneficial to all customers in the customer class in which the programs are proposed, regardless of whether the programs are utilized by all customers."

Q. Did Mr. Lozano omit relevant citations from the Evergy MEEIA 3 Report and Order?

A. Yes. The Evergy MEEIA 3 Report and Order also provided that "Using the levelized cost of a hypothetical CT to value avoided costs in this instance is not appropriate because Evergy is not actually avoiding the cost of building a CT" and that use of the hypothetical cost of a simple-cycle Combustion Turbine ("CT") "overstate the benefits."[6]

Q. Mr. Lozano also included the following quote from the Evergy MEEIA 3 Report and Order.

> K. Avoided costs or avoided utility costs means the cost savings obtained by substituting demand-side programs for existing and new supply-side resources. Avoided costs are the foundation of whether a MEEIA program is cost-effective under the TRC test. Avoided costs include avoided utility costs resulting from demand-side programs' energy savings and demand savings associated with generation, transmission, and distribution facilities. Nowhere does the MEEIA statute say that a supply-side resource must be avoided or deferred.[7]

Does Staff's testimony in this case recognize the existence of avoided costs other than those that would occur through supply-side resource avoidance or deferral?

A. Yes. My direct testimony explains several types of cost avoidance, including variable avoided costs that result from Ameren Missouri's MISO participation.

[5] It is important to note Ameren Missouri's participation in MISO and the MISO PRA also increases the likelihood of benefits actually flowing to ratepayers.

[6] Pages 11 and 12 of the Amended Report and Order in Case No. EO-2019-0132, Issued March 11, 2020.

[7] Page 22 of the Amended Report and Order in Case No. EO-2019-0132, Issued March 11, 2020.

Staff's testimony on this subject explains that reliance on variable avoided costs that may be realized through MISO participation is uncertain and further complicates statutory requirements for program approval.[8,9,10] As discussed in Ms. Lange's direct testimony, "If the benefits of a given MEEIA cycle are primarily avoided energy costs, then the Commission can only authorize recovery of a Demand-Side Management (DSM) program under MEEIA to the extent that adequate benefits remain for non-participants in a given class to offset the cost of the programs and other costs of MEEIA."[11] The uncertainty and flow of these potential benefits are paramount to the evaluation of the application and Ameren has not provided evidence in this case that accounts for these details in the analysis of benefits for customers in the rate classes which will pay the program costs.

Q. Is deferral or avoidance of a supply-side resource still an important aspect of a well-designed MEEIA portfolio and the subsequent review of an application?

A. Yes. Deferral or avoidance of a supply-side resource improves the probability of MEEIA programs providing adequate benefits to non-participants. Identification of the specific costs targeted for avoidance or deferral through energy and demand savings should be the starting point for any MEEIA portfolio.[12]

Q. Mr. Lozano provides a final quote from the Evergy MEEIA 3 Report and Order as follows:

[8] Page 5 Luebbert direct testimony states, "Avoided variable costs (or enabled revenues) are possible for energy, capacity, and transmission expenses." This sentence includes a footnote explaining the importance of accounting for the interaction with the FAC when determining benefits for specific rate classes.

[9] On page 12 Luebbert direct testimony I explained that variable avoided costs do not result in avoided earnings opportunities.

[10] On page 31 of my direct testimony I explained that revenue from capacity sales through the PRA are uncertain.

[11] Pages 10 and 11 of the direct testimony of Sarah L.K. Lange in this case.

[12] Page 5 of Luebbert direct testimony in this case.

> 33. Demand-side programs that produce capacity savings have an avoided cost greater than zero even if the subject utility is long on capacity. Valuing avoided costs at zero, as Staff suggests, would unreasonably block the implementation of otherwise cost-effective demand-side programs. This would reduce the number of cost-effective programs offered by companies that have excess capacity.

Could you provide additional context as this quote relates to this case?

A. Hopefully my direct testimony in this case provides a clearer picture of the types of costs that can be avoided through demand-side programs. Staff is not suggesting that zero avoided costs exist in this case; however, the implementation of Ameren Missouri's MEEIA 4 Plan will not avoid the MISO Cost of New Entry (i.e. the annualized capital cost of a combustion turbine) for summer demand reductions that result from the programs.[13] Ameren Missouri's MEEIA 4 Plan[14] drastically overstates the avoided costs related to its expected demand reductions.

Ameren Missouri's analysis in this case does not include demand reduction totals for programs in the Fall, Winter, or Spring MISO Planning Resource Auction ("PRA") pricing periods.

Q. Would Staff's avoided cost approach in this case "unreasonably block" demand-side programs?

A. No. However, Ameren Missouri's requested approval of the avoided cost values in Appendix C of the MEEIA 4 Plan will expose ratepayers to the costs of programs[15] that are unlikely to provide benefits near the magnitude suggested by Ameren Missouri.

[13] "Avoided capacity costs" section of Luebbert rebuttal testimony in this case.

[14] Those listed in Appendix C of the Ameren Missouri MEEIA 4 Plan.

[15] This would also include costs associated with earnings opportunities, throughput disincentive, Evaluation, Measurement & Verification (EM&V), and additional administrative costs.

Benefits

Q. On pages 17 and 18 Mr. Lozano provides the following quote from the Evergy MEEIA 3 Report and Order regarding benefits to all customers.

> 42. Valuing avoided generation as the means to show benefits to all customers overlooks the purpose of MEEIA, which is to encourage energy efficiency. Utilities should be endeavoring to increase customer participation in energy efficiency programs. While participating customers save money on their bills and experience direct benefits, non-participating customers will benefit from Evergy's MEEIA Cycle 3 because the programs will be cost-effective. Non participating customers benefit from cost-effective programs, because cost-effective programs save more money than they cost. Simply put, all customers benefit, but participating customers benefit more.[16]

Can you provide some additional context for this case?

A. Yes. First, in the Evergy MEEIA 3 case the Commission relied upon what Evergy portrayed as a "market-based approach" for valuing avoided capacity costs. Unfortunately, Staff was not able to explain the assumption flaws in Evergy's representation of the capacity cost values. Evergy's approach of averaging the received capacity bids, by its nature overstates the actual value by factoring in prices that were not selected as the "market price" which should be based upon the marginal cost of capacity which would be based on the lowest price offer to cover the requirement. While I will not get into the specifics of the of Evergy's capacity purchases or revenues for purposes of this case, Staff has reason to believe that the claimed benefits of MEEIA demand reductions referenced by Evergy have not materialized to date for Evergy ratepayers.

Next, while it may seem intuitive that "Non participating customers benefit from cost-effective programs, because cost-effective programs save more money than they cost," that

[16] Page 15 of the Amended Report and Order in Case No. EO-2019-0132, Issued March 11, 2020.

is not always the case due to the interaction of various rate mechanisms. Furthermore, this conclusion necessarily relies on the accuracy of the benefits and costs used to determine whether a program ultimately will be cost-effective.[17] Staff's direct testimony in this case provides important context for the flow of benefits that may result from variable avoided costs through the FAC. Staff did not provide this level of detail in the Evergy MEEIA 3 case, but the interaction of MEEIA programs with the FAC mechanism are an important consideration for the Commission to assess ratepayer benefits.

In this case, due in part to Ameren Missouri's participation in the MISO PRA, Staff recommends relying on a market-based approach to valuing avoided costs associated with demand reductions because supply-side resource investments are not expected to be avoided or deferred. Reliance on a market-based approach requires the ability to determine accurate demand reductions in each season and appropriately accounting for the interaction of the FAC on flow of ratepayer benefits in order to determine if the programs meet statutory requirements for benefits. Ameren Missouri has not provided evidence in this case that enable such an analysis to be done with reasonable accuracy.

Integrated Resource Plan

Q. Mr. Lozano's rebuttal testimony goes on to refence the Evergy MEEIA 3 Report and Order regarding integrated resource planning.

> 17. The Commission's IRP rule requires that Evergy analyze combinations of demand-side management programs and supply side resources to look for the lowest net present value of revenue requirement.[18]

[17] Staff's rebuttal testimony in this case highlights several assumption flaws for the calculation of energy savings, demand savings, and calculation of benefits associated with Ameren Missouri's MEEIA 4 Plan.

[18] Page 15 of the Amended Report and Order in Case No. EO-2019-0132, Issued March 11, 2020.

Despite Mr. Lozano's inference to the contrary, is Staff's position in this case entirely consistent with Commission Rule 20 CSR 4240-22.050?

A. Yes. I am not aware of any Commission rule requirement that prohibits the utility from modeling combinations of demand-side management programs at varying levels throughout a planning horizon to optimize ratepayer benefit.[19] Such an approach might analyze the costs of implementing various MEEIA cycles individually and consider ramping demand-side programs up to maximize the ability to address supply-side needs while minimizing ineffectual ratepayer costs. As I described in my rebuttal testimony in this case, the Ameren MEEIA 4 Plan will not defer a supply-side resource in Ameren Missouri's Preferred Resource Plan, but implementation of demand-side programs in the early 2030s has the potential to do so based on Ameren's current assumptions.

Q. Mr. Lozano's final quote from the Evergy MEEIA 3 Report and Order regarding Integrated Resource Plan (IRP) analysis states:

> L. A Missouri regulated electric utility seeking to utilize demand-side programs and demand-side programs investment mechanisms is required to use the IRP and risk analysis used in its most recently adopted preferred resource plan to calculate its avoided costs, unless the Commission grants it a variance from the request for good cause shown.

Is Ameren Missouri's approach in the MEEIA 4 Plan consistent with the "IRP and risk analysis used in its most recently adopted preferred resource plan to calculate its avoided costs"?

A. No. Ameren Missouri witness Matt Michels' rebuttal testimony addresses this point by explaining that the avoided costs utilized in Ameren Missouri's application for approval of the MEEIA 4 Plan are inconsistent with those utilized in the IRP analysis for

[19] Additional context regarding IRP optimization is provided later in this testimony.

supply-side resources,[20] but Ameren Missouri did not request a variance from the rule requirement. Again, Ameren Missouri is not relying on the "market-based approach" to valuing demand reductions within the MEEIA 4 Plan application, but relies on the levelized cost of CT beginning in year one, escalated for inflation for the next 20 years. The Evergy MEEIA 3 Report and Order states:

> 24. Using the levelized cost of a hypothetical CT to value avoided costs in this instance is not appropriate because Evergy is not actually avoiding the cost of building a CT.
>
> and
>
> The Commission determines that a market-based approach is the most appropriate way to calculate avoided costs for this MEEIA application and that a market-based approach best values demand-side investments equal to traditional investments in supply and delivery infrastructure.[21]

Q. On page 8 of his testimony, Mr. Lozano states, "[t]his is not a new process, and neither is the approach for avoided costs." Is Ameren Missouri's approach to avoided capacity costs consistent with the approach from Ameren Missouri's Cycle 3 analysis?

A. No. The avoided capacity costs included in Appendix C of the Ameren MEEIA 4 Plan differs from the estimation method utilized for its third MEEIA cycle. Ameren Missouri's new approach is nearly identical to Evergy's approach that the Commission recognized as inappropriate in the Evergy MEEIA 3 Report and Order.

Q. Please provide a brief synopsis of Ameren Missouri's quotes from the Evergy MEEIA 3 Report and Order.

[20] On page 19 of Mr. Michels' rebuttal testimony he states, "Having designed these two alternative resource plans, we move to the integration and risk analysis in the IRP. For both plans, we value the capacity provided by all of the resources in each plan at the market price of capacity. This is the revenue that is realized by these resources (A, B and C in Figure 1), with both supply-side and demand-side valued equally, in the MISO market. At the same time, we assess the cost of serving load in the MISO market, again at the assumed market price of capacity."

[21] Page 26 of the Amended Report and Order in Case No. EO-2019-0132, Issued March 11, 2020.

A. Mr. Lozano seemingly cherry-picked the quotes from the Evergy 3 Report and Order that benefit Ameren Missouri's position in this case. His testimony mischaracterized Staff's position in this case regarding avoided costs. His criticism of Staff's position on avoided costs and the quotes from the Evergy MEEIA 3 Report and Order actually refute Ameren Missouri's treatment of avoided capacity costs in the MEEIA 4 Plan. The Commission undoubtedly would have benefited from a more complete record while deliberating the Evergy MEEIA 3 Report and Order, and Staff's testimony in this case is an attempt to provide the necessary context for making a decision on Ameren's MEEIA 4 Plan that may cost ratepayers roughly $600 million on top of rate increases in the near future.

Q. On page 8 of his rebuttal testimony, Mr. Lozano states:

> The main thing in this case is, should Ameren Missouri's PRP[22] include utility DSM programs through MEEIA?
>
> The answer is a resounding yes.

Do you agree with Mr. Lozano's characterization of "the main thing in this case"?

A. No. Mr. Lozano's question and the subsequent answer are a distraction from the real issues at hand in this case. The primary purpose of this case is not to determine whether Ameren Missouri should include DSM programs in its PRP.[23] A primary purpose of this case is to determine if Ameren Missouri should collect over half a billion dollars from ratepayers to implement MEEIA 4. Ameren Missouri filed an application for a specific set of programs and requested broad approval for various documents and assumptions. The support for the application and the requested approvals and authority is unreasonable, as discussed in the

[22] Preferred Resource Plan (PRP).
[23] My rebuttal testimony indicated that implementing MEEIA programs in later years of the 20-year planning horizon could defer a supply side resource that the MEEIA 4 Plan is unlikely to impact.

testimony offered by Staff in this case. Staff recommends rejection of the specific application and requests for approval set forth by Ameren Missouri in this case.[24]

RESPONSE TO MATT MICHELS TESTIMONY

Avoided Transmission and Distribution Costs

Q. Does Figure 2 included on page 23 of Mr. Michels' rebuttal testimony match the calculation of avoided transmission costs included in Appendix C of the Ameren Missouri MEEIA 4 Plan application?

A. No. The method describing the calculation of avoided transmission costs included as Figure 2 of his rebuttal testimony does not seem to align with the method described in Ameren Missouri's most recent IRP.

Q. Did Ameren Missouri provide supporting documentation for the assumptions included in Figure 2?

A. Not in this case. Ameren Missouri's trend of providing workpapers with hardcoded numbers and vague or missing citations continued for the workpaper provided in support of Figures 2 and 3[25] in Mr. Michels' rebuttal testimony.

Q. Are there other concerns with the analysis included in Figure 2 of Mr. Michels' testimony?

A. Yes, most notably the analysis appears to be based upon assumptions from 2020. The hardcoded values and a vague reference to "From Analysis" is also a major concern.

[24] See page 14 of my rebuttal testimony in this case which states: The rejection of a given application is not an attack on the benefits of ratepayers utilizing electricity more efficiently, but rather an indication that the programs offered by a utility in a given application are not reasonable, are not well supported, and/or did not meet the various requirements that must be achieved prior to approval and cost recovery from all ratepayers. In this case, Ameren's Amended Application fails to address any of these three concerns.

[25] Page 25 of Mr. Michels rebuttal testimony.

Q. Mr. Michels mentions the Avoided Energy Supply Components in New England: 2024 Report ("AESC 2024")[26] in support of Ameren Missouri's approach to quantifying avoided transmission and distribution costs. Are there relevant distinctions between Ameren Missouri and utilities that operate in the New England states?

A. Yes, I will highlight a few distinctions between Ameren Missouri and utilities in the states described by the report. The AESC 2024 report discusses states that operate within ISO New England which undoubtedly has many distinctions from Ameren Missouri's participation in MISO. Utilities in Missouri are not currently required to offer demand-side programs under MEEIA. Most of the states discussed in the AESC 2024 report appear to have statewide energy efficiency standards requiring a specified level of energy usage reductions. Stakeholders in states with mandated savings targets may be incented to skew modeled benefits of demand-side programs high, in order to avoid further program and administrative costs. Missouri does not have a required energy efficiency standard, but does have distinct requirements for approval and recovery of MEEIA programs.[27] Most of the states discussed within the report have deregulated electricity markets. In contrast, Ameren Missouri is a vertically integrated electric utility meaning that it owns its generation, transmission, and distribution assets and that ratepayers in its service territory do not have a choice of the supplier of energy. Ameren Missouri does not have to compete with other entities in order to provide electric service to ratepayers in its service territory. The age, composition, and investment strategies for transmission and distribution infrastructure for the utilities in New England obviously differ from Ameren Missouri as well.

[26] Attached as Schedule MM-R1 to Mr. Michels rebuttal testimony.
[27] As discussed throughout Staff's testimony in this case.

Q. Mr. Michels explains that "Ameren Missouri has based its avoided distribution costs on the totality of system level costs relative to load."[28] Is Ameren Missouri's approach to estimating avoided distribution system costs consistent with the approach discussed in the AESC 2024 report as alluded by Mr. Michels?[29]

A. No. The AESC 2024 report describes a review of investments that are directly tied to load-growth, recognizes that timing and location of load reductions play a role in investment costs, accounting for the coincidence of load reductions with equipment peaks, and notes that electrification measures should be assumed to create costs at the same rate as load reductions.[30]

Q. The narrative surrounding Ameren Missouri's Smart Energy Plan has largely focused on replacement of aging infrastructure and improved reliability as opposed to investments driven primarily to account for load growth. Would including all of the costs associated with Ameren Missouri's Smart Energy Plan be consistent with the approach discussed in the AESC 2024?

A. No. The AESC 2024 report states:

> [t]he investment should include all identifiable load-related costs, but no more.
>
> and
>
> Some T&D investments simply replace old equipment. Other investments relocate facilities due to road widening, loss of easements, and similar factors. Neither type of investment is load-related.[31]

[28] Page 24 of Matt Michels' rebuttal testimony in this case.
[29] Page 23 of Matt Michels' rebuttal testimony in this case.
[30] Page 272-279 of the AESC 2024 Report.
[31] Page 277 of the AESC 2024 Report.

Avoided Capacity Costs

Q What approach is utilized to develop avoided capacity costs in the AESC 2024 report?

A. "The avoided capacity costs are driven by actual and forecasted clearing prices in ISO New England's FCM [Forward Capacity Market]."[32]

Q. Is Ameren Missouri's approach to avoided capacity cost estimation included in Appendix C of its MEEIA 4 Plan in this case consistent with the aforementioned approach?

A. No. Furthermore, the AESC 2024 draws distinctions in the value of cleared measures (i.e. measures that participate in the capacity market) and uncleared measures (i.e. measures that do not participate in the capacity market) and notes the importance of the hour of load reduction for resources.[33]

"Sharpshooting" future resource needs

Q. Mr. Michels' rebuttal testimony characterizes Staff's position in this case as a suggestion to "sharpshoot" the implementation of demand-side programs.[34] Do you agree with that characterization?

A. No. First, Mr. Michels is mischaracterizing a quote from my direct testimony in this case. The actual quote from my direct testimony is consistent with the approach that was suggested to Staff by Lawrence Berkley National Lab's ("LBNL") Electricity Markets and Policy Department regarding a relatively recent IRP case.[35]

[32] Pages 133 and 166 of the AESC 2024 Report.

[33] Ibid.

[34] This discussion begins on page 12 of Mr. Michels' rebuttal testimony.

[35] The memo to Staff from LBNL which is dated August 5, 2022 is attached to this testimony as Schedule JL-s2. Pages 1-3 and pages 9-10 discuss IRP model optimization.

Staff is not suggesting that Ameren Missouri "sharpshoot" the exact amount of demand-side resources to meet a future capacity need. Instead, Staff is suggesting that the planned funding of demand-side programs account for Ameren Missouri's expectation of the magnitude and timing of resource needs. Allowing a capacity expansion modeling software to optimize the size and timing of supply-side resources, as well as demand-side resources, would place the two resource categories on more equal footing in the evaluation process. Ameren Missouri's PRP is not developed using such an approach. Determining a MEEIA funding level and including that "resource" for the entirety of the IRP planning horizon regardless of resource needs is unnecessarily opaque and provides undue preference to demand-side resources.

Q. Does Ameren Missouri identify time periods to consider additions of supply-side resources in its alternative resource plans?

A. Yes. The timing and magnitude of demand-side resources should account for the magnitude and timing of identified resource needs.

Q. Mr. Michels states that Ameren Missouri is "evaluating demand-side resources against conventional, dispatchable supply-side resources, primarily because they are more appropriately viewed as capacity resources."[36] Will Ameren Missouri's MEEIA 4 Plan substitute any such resources in Ameren Missouri's preferred resource plan?

A. No. Implementation of demand-side resources later in the 20-year IRP planning horizon is much more likely to substitute or replace the need to build additional capacity resources.

Q. In his rebuttal testimony, Mr. Michels states:

> Implementation of MEEIA programs cannot be viewed through the lens of short-term paybacks under a specific set of assumptions at a given

[36] Page 21 of Matt Michels rebuttal testimony in this case.

> moment. Rather, it must be viewed as a commitment to capturing cost effective savings for customers and load reductions that reduce the need for future generation resources whenever that need might be.[37]

Are you surprised that Ameren Missouri would take that position given the lack of shareholder risk associated with Ameren Missouri's MEEIA 4 Plan?

A. No. Ameren Missouri shareholders have nearly no risk associated with its MEEIA 4 Plan but stand to gain millions if awarded the requested earnings opportunity amounts. Furthermore, the MEEIA 4 Plan appears to have no impact on Ameren Missouri's plans for future generation, transmission, and distribution investments and the cost of the MEEIA 4 Plan does not affect the rate cap limitations in place to due to Ameren Missouri's election to utilize "Plant in Service Accounting".

Q. Does that same perspective hold true for Ameren Missouri's ratepayers?

A. No. The costs associated with Ameren Missouri's MEEIA 4 plan are much more certain than any benefits that may be realized. Inflated benefit estimates give the appearance of cost-effective programs, but if the benefits are unlikely to ever be realized by ratepayers, the estimates should be rejected. Overestimated "benefits," as included in Ameren Missouri's MEEIA 4 Plan, increase the likelihood that programs are implemented in a manner that are not cost-effective, and are ultimately detrimental to ratepayers, especially non-participants.

Q. How could overestimated benefits in a MEEIA application harm ratepayers?

A. Ratepayers are unlikely to ever realize benefits that match those that were assumed to occur prior to authorization of program implementation. This increases the likelihood that ratepayers fully fund MEEIA programs with costs that outweigh the realized ratepayer benefits.

[37] Page 14 of Matt Michels rebuttal testimony in this case.

Q. How could ratepayers be harmed if a MEEIA application is approved based upon a faulty assumption that future supply-side resources will be avoided or deferred?

A. Ratepayers are harmed in at least two distinct ways. First, ratepayers are harmed because they are paying higher rates today through the Energy Efficiency Investment Charge (EEIC) to fully fund Ameren's MEEIA program, which may not result in realized benefits in excess of the costs, and might include providing Ameren Missouri Shareholders an earnings opportunity on "foregone" supply-side resources that are not actually "foregone." Second, ratepayers are harmed in the future when those theoretical "foregone" additional resources become actual resources and the ratepayers have to pay for them.

Q. Are reasonable benefit estimations important to determine if programs are cost effective?

A. Yes. It is paramount that benefits are reasonable, estimated, and realizable by ratepayers. If the benefits do not materialize, ratepayers will have paid for programs that are not cost-effective. As Staff has explained in testimony throughout this case, Ameren Missouri's benefit estimates are not reasonable nor reliable.

RELIABILITY AND AFFORDABILITY

Q. Mr. Michels, Mr. Wills, and Mr. Lozano all cite to comparisons of alternative resource plans from the Company's most recent IRP[38] claiming that these comparisons of plans demonstrate massive ratepayer benefits. Should the Commission rely upon those comparisons?

A. No. The comparison of alternative resource plans does not provide a realistic view of ratepayer benefits that may result from Ameren Missouri's MEEIA 4 Plan. Ameren

[38] Pages 7-11 of Mr. Lozano's rebuttal testimony, pages 6-15 of Mr. Michels' rebuttal testimony, and pages 5-6, 21, and 33 of Mr. Wills' rebuttal testimony in this case.

Missouri's preferred resource plan to invest billions of dollars in generation, transmission, and distribution resources over the next decade cannot be ignored when evaluating potential benefits of a MEEIA application. Similarly, the interaction of rate mechanisms on the flow of any realized benefits to ratepayers cannot be ignored when determining if a MEEIA application meets statutory requirements. Mr. Brad J. Fortson's rebuttal testimony explains several additional flaws in comparing alternative resource Plan I to Ameren Missouri's Preferred Resource Plan.

Q. Mr. Michels states that suspending MEEIA programs would require a major shift in Ameren Missouri's resource planning to ensure resources are available to meet customer needs and ensure reliability in the near term and long term.[39] Do you agree with this sentiment?

A. No. As discussed in my rebuttal testimony, the generation investments that Ameren Missouri plans to add over the next several years are not driven by the inclusion or exclusion of the MEEIA 4 Plan. Demand-side programs in the later years of the 20-year IRP planning horizon could have a material impact on the need to build additional resources. However, the demand impacts from a MEEIA cycle implemented today would have minimal impacts on such a resource and many factors are likely to change prior to that point.

Q. Mr. Michels, Mr. Wills, and Mr. Lozano all mention reliability and affordability in their respective rebuttal testimonies in this case.[40] Should the Commission be concerned that rejection of Ameren Missouri's MEEIA 4 Plan will put either of these objectives at risk?

A. Absolutely not. First, all three witnesses are relying on the flawed comparison of alternative resource plans from the IRP. Next, neither of these plans account for the ability

[39] Page 11 of Mr. Michels rebuttal testimony in this case.

[40] Page 5 of Mr. Lozano's rebuttal testimony, pages 10-14 of Mr. Michels' rebuttal testimony, and pages 3,5, and 20 of Mr. Wills' rebuttal testimony in this case.

for Ameren Missouri to alter energy efficiency program funding based on time. As Staff has discussed in its testimony in this case, timing plays a key role in the benefits that may be realized from any resource, supply-side or demand-side. From a capacity perspective, Ameren Missouri's MEEIA 4 Plan focuses almost entirely on summer demand reductions. Figure 5 of my rebuttal testimony indicates that Ameren Missouri's preferred resource plan projects to have more than adequate supply side resources in the summer for the entirety of the 20-year IRP planning horizon without any demand-side programs. Ameren Missouri has not provided demand impacts for the winter, spring, or fall seasons that may result from the MEEIA 4 Plan in this case.

Q. Would it be appropriate for Ameren Missouri to provide information regarding MEEIA 4 Plan demand impacts in non-summer seasons in surrebuttal or prior to the scheduled hearing in this case?

A. No.[41] The MEEIA programs described by Ameren Missouri in this case do not appear to be primarily designed to achieve demand reductions in those periods. Furthermore, Ameren Missouri's workpapers provided in support of direct testimony in this case focus on summer demand reduction estimates. If demand reductions in the non-summer months were a focus of the programs and reliability within those months is a concern that Ameren Missouri's MEEIA 4 Plan can mitigate, the information would have been appropriately addressed in the application and direct testimony. Providing that information at the last minute will not provide the Commission with a complete record to reliably make its determination.

[41] See page 15 of my rebuttal testimony in this case.

Q. Mr. Wills states that, "Staff continues to cling to a "do nothing" philosophy…"[42] based on positions in recent Ameren Missouri cases. Is this a fair assessment of Staff's "philosophy"?

A. Absolutely not. Staff's "philosophy" is to examine the options available to solve a problem, and provide the Commission an independent analysis so that the Commission does not have to rely solely on a solution the utility happens to offer in the immediate filing as the way to avert an implied disaster. Accordingly, Staff's testimony in recent cases has highlighted the importance of identifying the problem being solved prior to offering a solution. Staff's direct recommended approach to MEEIA development offers a targeted and systematic approach to balancing supply-side and demand-side resource planning. To the extent that Ameren Missouri has systematically targeted programs and measures that would address future resource planning needs, little to no reliable evidence of that action is presented in its direct testimony or workpapers for the MEEIA 4 Plan.[43]

Q. Is Mr. Wills' summarization of "Staff's overarching rationale for its recommendation"[44] an accurate portrayal of Staff's position in this case?

A. No. However, based on Ameren Missouri's preferred resource plan, the MEEIA 4 Plan will not avoid or defer supply-side resources.

CONCLUSION

Q. Did the rebuttal testimony of Ameren Missouri's witnesses substantively address the concerns raised by Staff in direct testimony?

[42] Page 4 or Ameren Missouri witness Steven M. Wills in this case.
[43] To the extent that such evidence exists, it would be inappropriate to introduce at this point in this case.
[44] Page 6 of Mr. Wills' testimony in this case.

A. No. The rebuttal testimony of Ameren Missouri's witnesses continues to fail to address many of the substantive issues in this case, instead reverting to incomplete citations of a Commission Report and Order for a prior MEEIA case without appropriate context, references to Ameren Missouri's IRP,[45] references to an avoided cost study from another jurisdiction, and misrepresentations of Staff's position in an apparent attempt to distract from the obvious conclusions that should be made regarding Ameren Missouri's MEEIA 4 Plan:

1. The application lacks reasonable support for the claimed benefits which are overstated;
2. The MEEIA 4 Plan is not reasonably expected to meet the requirements of a MEEIA portfolio, especially those pertaining to ratepayer benefits;
3. Ameren Missouri's requested approval is overly broad;
4. Ameren Missouri's requested approval would allow the company to maximize shareholder earnings today without reducing the expectation for future shareholder investments; and
5. Ameren Missouri's application in this case and the MEEIA 4 Plan should be rejected.

Staff maintains its recommendations for the Commission in this case as discussed in direct and rebuttal testimony.

Q. Does this conclude your surrebuttal testimony?

A. Yes, it does.

[45] As discussed in Mr. Fortson's surrebuttal testimony, the IRP comparisons referenced by Ameren Missouri's witnesses are not an appropriate view of ratepayer benefits attributable to the Ameren Missouri MEEIA 4 Plan.

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 J LUEBBERT

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW J LUEBBERT and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Surrebuttal Testimony of J Luebbert*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

J LUEBBERT

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 23rd day of May 2024.

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: July 18, 2027
Commission Number: 15207377

Notary Public

Q. Please identify corrections to your direct testimony that are necessary based on the change in the calculation.

A. The list below contains the corrections to my direct testimony based on the calculation error identified by Office of the Public Counsel witness Lena M. Mantle.

1. On page 22 line 17 should be replaced with "filing, the net of these amounts is compared to the "base energy cost" for the actual load during the same time period."
2. The table at line 1 of page 23 should be replaced with the table below.

	Base Factor		Actuals
Fuel Cost	$ 1.50		$ 1.20
Purchased Power Costs	$ 2.00		$ 1.90
Purchased Power Revenue	$ (1.65)		$ (1.26)
Total/Net	$ 1.85		$ 1.84
Energy Sales	100		95
		Base Energy Cost:	$ 1.75750
		Difference from Actual and Base Energy Cost:	$ 0.08250
		New FAC Rate:	$ 0.00078

3. On page 23, line 4 should be replaced with "cost and the base energy cost is then billed as the new FAC rate.[13]"
4. The table at line 1 of page 25 should be replaced with the table below.

Fuel Cost	$ 1.50		$ 1.50
Purchased Power Costs	$ 2.00	$ (0.03)	$ 1.97
Purchased Power Revenue	$ (1.65)		$ (1.65)
Total/Net	$ 1.85		$ 1.82
Energy Sales	100	(1)	99
		Base Energy Cost:	$ 1.83150
		Difference from Actual and Base Energy Cost:	$(0.01150)
		New FAC Rate:	$(0.00011)

5. The table at line 11 of page 25 should be replaced with the table below.

Fuel Cost	$ 1.50		$ 1.50
Purchased Power Costs	$ 2.00	$ (0.01)	$ 1.99
Purchased Power Revenue	$ (1.65)		$ (1.65)
Total/Net	$ 1.85		$ 1.84
Energy Sales	100	(1)	99
		Base Energy Cost:	$ 1.83150
		Difference from Actual and Base Energy Cost:	$ 0.00850
		New FAC Rate:	$ 0.00008

6. The table at line 20 of page 27 should be replaced with the table below.

	$/kWh	kWh	$
Customer benefit	$ 0.00011	99	0.01082

7. The table at line 1 of page 28 should be replaced with the table below.

	Pre-program kWh	Program Costs	Post-program kWh	Customer Benefits	Benefits : Costs
All Customers	100	$ 0.01	99	$ 0.01082	1.081575

8. The table at line 9 of page 28 should be replaced with the table below.

	Pre-program kWh	Program Costs	Post-program kWh	Customer Benefits	Benefits : Costs within Class
Class A	10	$ 0.01	9	$ 0.00098	0.098325
Class B	90	$ -	90	$ 0.00983	#DIV/0!

Electricity Markets and Policy Department

August 5, 2022

To: Brad Fortson, Missouri Public Service Commission

From: Tom Eckman and Natalie Mims Frick

Re: Review of Evergy Metro and Evergy West Integrated Resource Plan (IRP) 2022 Annual Update

This memo is pursuant to a request by staff of the Missouri Public Service Commission for technical assistance on economic valuation of electricity resources in the context of Integrated Resource Planning (IRP). Berkeley Lab is providing this assistance under the Economic Valuation of Energy Resources project funded by the U.S. Department of Energy.

Berkeley Lab, at the request of the Missouri Public Service Commission staff reviewed Evergy Metro and Evergy West's ("the Company") IRP 2022 Annual Updates ("2022 Update"). Our review was focused on how the Company used Plexos, their capacity expansion model, to select resources in the Company IRPs. We also identified other opportunities for improved analysis and transparency in our review. This memo is organized into seven sections:

1. Capacity expansion model optimization
2. Risk assessment
3. Load forecasting
4. Energy efficiency and other DERs
5. Capacity by resource type
6. Preferred plan
7. Other topics

Each section provides an overview, specific comments on the 2022 Updates (*with quoted text in italics*), and recommendations for staff to consider.

1. Capacity Expansion Model Optimization

It is not clear from our review of Evergy Metro and Evergy West's 2022 Update how the Company is using the Plexos capacity expansion model to evaluate its discrete alternative resource plans (ARPs). The tables and discussion in the 2022 Update do not provide enough information to determine if the capacity additions in the ARPs tested were pre-determined resource plans or represent resource plans selected by Plexos through its optimization process.

Pre-determined resource plans specify the type, timing and amount of resource development as inputs to a capacity expansion model. In contrast, capacity expansion models like Plexos can also be provided with an inventory of resource options (both specific resources and "proxy" or generic resources) that are

then selected by the model through its optimization process based on their relative cost and operating characteristics. Resource plans derived in this manner are model outputs, rather than inputs.

Explanation of using Plexos (p 5 Evergy Metro and Evergy West). Use of Plexos for capacity expansion modeling: Through the implementation of Plexos, Evergy is now able to complete capacity expansion modeling. In capacity expansion modeling, the model (Plexos) is able to generate an "optimized" (lowest cost) resource plan given a certain market scenario and a set of constraints and resource options. This new capability has created additional flexibility in Evergy's modeling processes and was used in this 2022 Annual Update process to supplement individual Alternative Resource Plans which were used to test discrete decisions (similar to past IRPs). Capacity Expansion modeling was not performed using MIDAS in the past.

This statement appears to indicate that Plexos was used to generate optimized capacity expansion plans. However, it is not clear from the narrative whether the type, amount and schedule of development for the ARPs considered by the Company were inputs to the model or outputs from the model. Plexos can be used to "test discrete decisions" by estimating the net present value revenue requirement (NPVRR) of a pre-determined set of resource plans (i.e., type, amount and schedule) under a range of inputs (e.g., CO_2 prices) and constraints (e.g., plant retirement assumptions). Alternatively, it can be used to develop resource plans under range of inputs using the model's optimization logic to select the type, amount and schedule of resource development.

***Recommendation 1A*:** Staff can considering asking the Company to clarify how the Plexos capacity expansion model is being used to both develop and test ARPs. At a minimum, it will be useful for the Company to identify which ARPs represent pre-determined capacity additions and which ARPs were derived either wholly (or in-part) through Plexos capacity expansion optimization process. Staff can request that the company provide its rationale for using the approach employed in this update and whether it intends to use the same method in its next IRP.

Section 6.2 Alternative Resource Plan Development (p 46 Evergy Metro, p 33 Evergy West).
Our understanding of section 6.2 is that ARPs being considered are "prescriptive" resource plans that are fed into Plexos for testing. This means that the ARPs are inputs to the model, and not derived from the model's optimization process. Therefore, this section more accurately describes the input assumptions (e.g., refiring vs. retirement of the Lawrence Unit 5 coal plant, adding pre-determined quantities of wind and solar capacity in specific years) for each portfolio that was run through Plexos.

***Recommendation 1B*:** Staff can request that the Company allow the capacity expansion model to develop an "optimized" resource plan by selecting from an inventory of resource options, including both supply side and demand side resources. An optimized plan can serve as a basis of comparison of alternative plans that have other potentially desirable attributes (e.g., lower CO^2 emissions).[1]

Table 21: Overview of Joint-Planning Resource Plans (p 51-52 Evergy Metro, p 38-39 Evergy West).
It is not clear whether the renewable and generation resource additions in Table 21 are inputs to Plexos or are derived from Plexos optimizations.

[1] For more information on how other planners have performed this analysis, see the Northwest Power and Conservation Council's 8th Power Plan at https://www.nwcouncil.org/2021-northwest-power-plan/.

***Recommendation 1C*:** Staff can ask the Company to clarify if renewable and generation resource additions are inputs (or if the renewables resources are inputs and the generation is derived by Plexos) to Plexos. If applicable, staff can ask the Company if Plexos optimizations were done without the prescribed resource builds (and therefore only reflect pre-determined retirements).

2. Risk Assessment

Risk is a measure of the expected severity of bad outcomes. In the case of resource planning, bad outcomes are resource plans that are more expensive. Evergy Metro and West use standard deviation as a statistical measure of risk in their 2022 Update because it demonstrates variability in a resource plan cost across different modeled scenarios. Unfortunately, standard deviation simply measures the distribution of outcomes. It is primarily a measure of predictability rather than risk.

Financial risk managers generally prefer to use coherent risk measures.[2] These are risk measures which satisfy the four mathematical properties of monotonicity, sub-additivity, homogeneity, and translational invariance. These four properties make a risk measure useful for properly ranking choices. The property of monotonicity guarantees that if all of the outcomes for a given plan are better, then that plan will not have greater risk. The property of subadditivity guarantees that portfolio diversity reduces risk. Positive homogeneity implies the risk of a portfolio is proportional to its size. In general terms, if the cost of one portfolio is double that of another portfolio, then its risk is also approximately double. Translation invariance implies that the increasing the capital cost of a portfolio cannot increase risk and may reduce it. That is, buying more insurance reduces your risk.

Standard deviation is not a coherent risk measure because it does not satisfy the monotonicity property. For example, some resource plans can have large standard deviations but a low probability of bad outcomes, making them less risky than plans with smaller standard deviations, but more bad (i.e., a higher probability of more expensive) outcomes. Improving predictability by selecting plans based on their smaller standard deviation may eliminate plans with mostly good outcomes, but a few really bad outcomes.

An example of coherent risk metric that can be used to compare the relative risk of resource plans is the tail value at risk (TVaR), also known as tail conditional expectation (TCE) or conditional tail expectation (CTE). TVaR is a risk measure associated with the more general value at risk. It quantifies the expected value of the loss given that an event outside a given probability level has occurred. For example, in the context of resource planning, TailVar90 represents the average NPVRR of the 90th percentile outcomes across all of the future conditions tested (i.e., the average NPVRR of the 10% most expensive end point NPVRRs).

Results of IRP Customer Risk Analysis (p 109 Evergy Metro, p 100 Evergy West). Standard deviation is used as a statistical measure of risk in this case because it demonstrates variability in resource plan cost across different modeled scenarios.

The work papers Commission staff provided to Berkeley Lab indicate that each of the 27 combinations of load growth, gas and carbon prices represent a single future for which Plexos computes a NPVRR. Then, each of these 27 NPVRR was assigned a weight based on the "end point" probability of that combination

[2] See for example, The Fifth Northwest Electric Power and Conservation Plan, Appendix P – Treatment of Uncertainty and Risk (https://www.nwcouncil.org/sites/default/files/AppendixP_1.pdf)

of load growth, gas and carbon prices (Figure 5, Evergy Metro and Evergy West). An alternative approach to assessing the risk of each ARP is run Plexos in a stochastic mode, letting the model draw randomly from the more continuous distributions for load growth, gas and carbon prices. In this approach, Plexos can be used to test far more futures (hundreds) rather than 27 end point probabilities of load growth, gas and carbon price as inputs.

***Recommendation 2A*:** Staff can request that the Company provide a more detailed explanation of how the probabilities, along with standard deviation were used to assess risk. Reviewing the distribution NPVRR for each of ARP across all of the 27 combinations of future conditions in addition to its expected value can be used to ascertain whether some ARPs are riskier (i.e., have skewed distributions of NPVRRs). As an example, we used the work papers from the Evergy Metro's 2022 Update to plot a frequency distribution of NPVRRs for three ARPs. The results are shown in Figure 1.

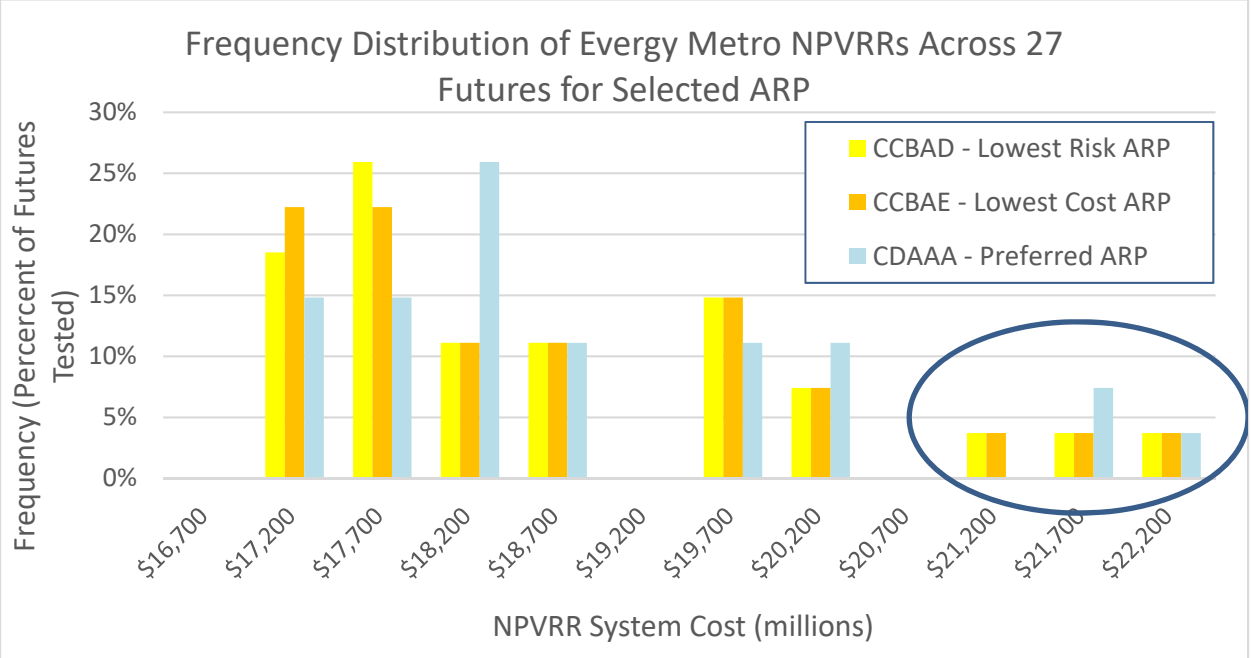

Figure 1 – Frequency Distribution of Evergy Metro's NPVRR Across 27 Futures for Selected ARPs

An inspection of Figure 1 shows that Metro's Preferred Plan (CDAAA) as well as the ARP with the lowest cost (CCBAE) and lowest risk as measured by TailVar90 (CCBAD) exhibit a concentration of NPVRR in the $17.2 to $18.7 billion frequency bins. All three ARPs have standard deviations that vary by less than two percent. However, the preferred ARP also exhibits higher frequency of "bad" (i.e., more expensive) outcomes (circled area on graph) than do the two ARPs which have both lower cost and lower risk (as measured by TailVaR90). Figure 1 is an example of how using standard deviation as a risk measure may not screen out ARPs with a higher probability of risk.

Figure 5: Scenario Weighted Endpoint Probabilities (p 59 Evergy Metro, p 46 Evergy West).
According to Figure 5 in the 2022 Update, the Company created 27 different futures to test the risk of their resource plans against their preferred portfolio. It appears from the work papers provided to us by Commission staff that Evergy tested each of its ARPs in the Plexos model against all 27 of the future conditions specified as Critical Uncertain Factors to derive their expected value and standard deviation NPVRRs (Figures 12 and 13, Evergy Metro and Evergy West). However, the risk assessment section of

the 2022 Update only provides quantitative results for two ARPs, the preferred resource plan and the RES Requirements Plan across all of these 27 futures.

Figure 13. NPVRR Comparison by Endpoint ($M) (p 110 Evergy Metro, p 101 Evergy West). Figure 13 shows how two ARP compare when subjected to the identical future conditions. It does not provide a visual sense of how the ARPs will perform across all 27 future conditions based on each endpoint's probability (Figure 5).

Overall Conclusions and Evergy's Preferred Resource Plan (p 99 Evergy Metro, p 89 Evergy West) However, for the purpose of this risk analysis, Evergy will compare this Preferred Plan to a new Alternative Resource Plan which adds renewables only when needed to meet Missouri RES requirements (based on renewable forecasts for MO Metro and MO West) and capacity (of any type) only when needed to meet Resource Adequacy requirements as its benchmark for adding resources only when "required".

The Company included an analysis comparing a "RES Requirements" ARP with their preferred plan in their 2022 Update. The RES Requirements ARP is first mentioned in the risk analysis portion of the 2022 Update. It does not appear that the RES Requirements ARP is discussed with the other ARPs (e.g., section 6.2), nor does it appear to have been analyzed in Plexos along with the other ARPs.

Recommendation 2B: Staff can request that the Company's quantitative risk analysis discuss all of the ARPs it considers in its IRP, and that the Company provide a frequency distribution graph (i.e., histogram) similar to Figure 1 in this memo to show the distribution of NPVRRs across all 27 future conditions.

Figure 2 plots the Expected Value NPVRR and TailVaR90 for each ARP evaluated by Evergy Metro's system across the 27 of the future conditions shown in Figure 5, page 59 of their update. This graph can be used to compare the relative cost and risk of the 2022 Update ARPs. The TailVAR90 of each ARP is the y-axis (risk) input[3] and the weighted average NPVRR of each ARP across all 27 future conditions is the x-axis (cost) input. Figure 1 allows for the comparison of the expected cost of all resources plan and risk, using a coherent measure of risk. Resource plans that are both lower cost and lower risk will appear nearest the graph's origin, higher risk plans towards the top of the graph and higher cost plans towards the right side of the graph.

[3] Determining the "TailVar90" of each ARPs and the RES Requirement Plan requires calculating the average NPVRR of the three most expensive "end points" across all 27 potential futures for each of these resource plans.

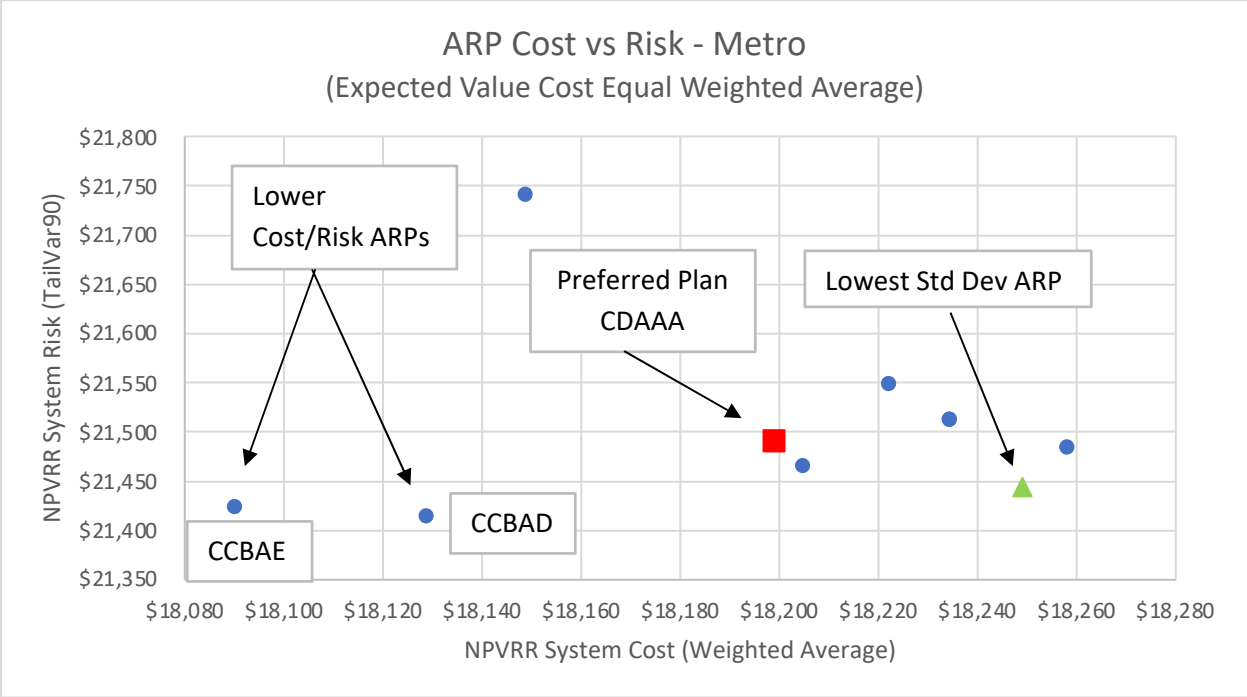

Figure 2. Relative Cost and Risk of Alternative Resource Plans based on Evergy Metro's 2022 Annual Update

A review of Figure 2 shows that the ARP with the lowest Standard Deviation, is neither the lowest cost ARP nor the lowest risk ARP (as measured by TailVAr90). Moreover, the Preferred Plan selected by Evergy Metro (CDAAA, shown as the red square) does not appear to be either the lowest cost or lowest risk or the APR with the smallest standard deviation.

On the other hand, an inspection of Figure 3, which shows the same data as Figure 2, but for Evergy West, reveals that the Preferred ARP (CDAAF) is in fact the lowest cost and lowest risk ARP tested in Plexos. However, as is the case for Evergy Metro, the preferred IRP does not have the lowest standard deviation.

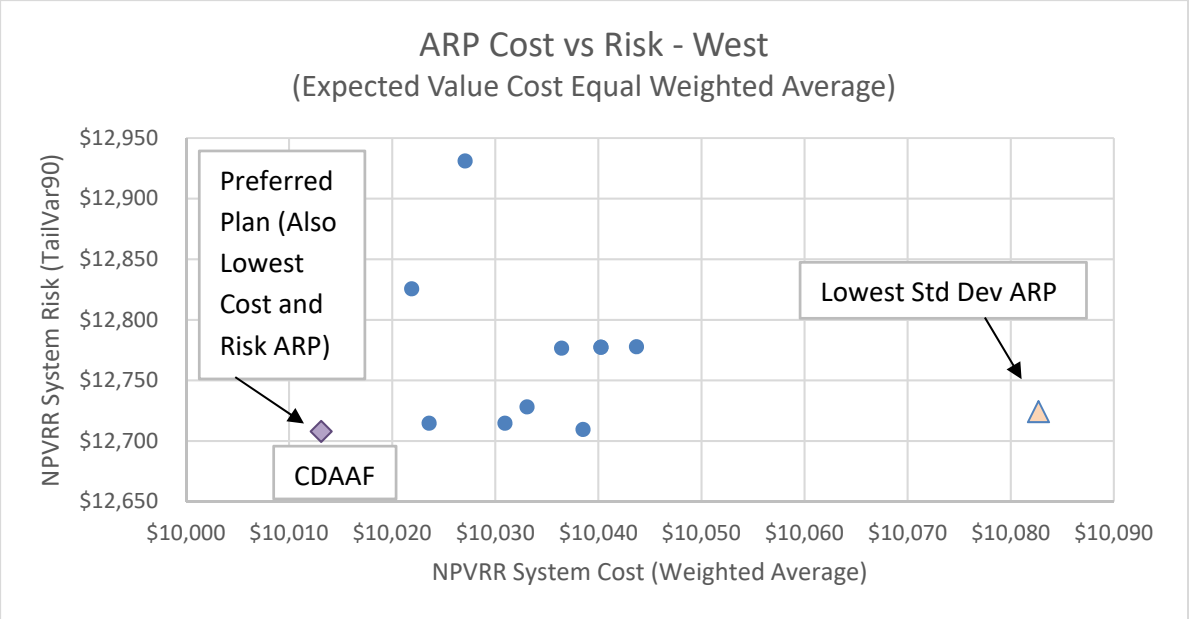

Figure 3. Relative Cost and Risk of Alternative Resource Plans based on Evergy West's IRP Update

***Recommendation 2C*:** Staff can request that the Company provide a more detailed explanation of the how the risk analysis described in Section 6 of their updates was used to inform the selection of their preferred plans. Specifically, staff could ask the Company why they selected standard deviation as their risk metric and, since it appears that the APRs with the lowest standard deviations were not selected as the preferred plan by either Metro or West, what role their risk metric played in the selection of their preferred plans. In addition, staff could ask the Company to describe the basis of the underlying probabilities that they assigned to each critical uncertainty factors (Figure 4, p 58 Evergy Metro and Evergy West) that were used to create 27 futures used to test the ARPs in Plexos.

3. Load Forecast

In the 2022 Update, the Company updated appliance and equipment saturations for the load forecast, but did not update the energy efficiency potential study. Subsequently, the energy efficiency potential study does not reflect the change in baseline and number of units available to adopt an efficient technology during the planning period. This results in an under estimate of energy efficiency potential in the company's high forecast and an overestimation of energy efficiency in the company's low load forecast.

In the short-term the lack of internal consistency between the load forecast and the energy efficiency potential assessment does not likely significantly impact the overall choice of a preferred resource plan However, depending upon the magnitude of the difference in potential, the inconsistency between the load forecast and efficiency potential assessment could affect resource need, and hence resource development schedules, in the intermediate term (5-10 years).

Updated supply-side costs (p 4 Evergy Metro and Evergy West).
The Company's 2022 Update states that supply side costs, including solar and wind resources, and load forecasts were updated. It does not appear that the Company reflected the potential impact that these updated might have on the cost (and availability) of energy efficiency resources. For example, new

codes and standards that were incorporated into the updated load forecast could impact both the remaining energy efficiency potential as well as the cost of those measures effected by the updated codes and standards.

Input changes from the 2021 Triennial IRP (p 14 Evergy Metro and p 3 Evergy West). DOE Forecasts of appliances and equipment saturations and kWh/unit: Annual Energy Outlook (AEO) 2021 vs AEO 2020.

EIA's AEO reflects the impact of known changes in federal efficiency standards (both existing and those with future effective dates). When Evergy updated their appliance and equipment saturations inputs in their load forecast, it impacted their energy efficiency potential. Evergy's energy efficiency potential assessment should be internally consistent with the load forecast's baseline use/efficiency assumptions so estimates of energy savings potential are internally consistent with those assumed in the load forecast. If the load forecast was updated without out updating the energy efficiency potential, they are not in alignment. In addition, Evergy currently uses the same estimates of efficiency potential in all three of its load growth scenarios ("High" "Medium," and "Low"). Because the high load forecast presumably has more housing starts and new commercial buildings than the low load forecast, assuming the same potential across all load growth scenarios overstates potential in the low forecast and understates potential in the high forecast.

Input changes from the 2021 Triennial IRP (p 15 Evergy Metro and p 4 Evergy West). There are some changes from the Moody's Analytics Economic forecasts from 2020 to 2021. Economic forecasts for Population, Households, Employment (both Manufacturing and Non-Manufacturing) and Gross Product (both Manufacturing and Non-Manufacturing) all show lower growth trajectory in the 2021 forecast compared to the 2020 forecast. The lower growth trajectory in the Economic forecast contributes to a lower growth trajectory in the load forecast.

Evergy Metro's 20-year energy forecast drops from 0.65% (2021 IRP) to 0.41% (2022 Update) average annual growth rate (AAGR) and the peak forecast drops from 0.56% (2021 IRP) to 0.39% (2022 Update) AAGR. Similarly, Evergy West's 20-year energy forecast dropped from 0.79% (2021 IRP) to 0.49% (2022 Update) and the peak forecast drops from 0.62% (2021 IRP) to 0.47% (2022 Update).

These are significant reductions in the forecast pace of growth and, assuming that the underlying pace of new construction is lower in the updated forecast, should reduce the energy efficiency potential available in new homes and commercial buildings. As noted earlier, it does not appear that Evergy updated its assessment of EE potential to reflect the lower economic growth forecast.

***Recommendation 3A*:** In future IRPs, staff can request that the Company document how it ensures that the baseline conditions/current practice assumptions used in the load forecast (e.g., new housing and commercial building starts, appliance saturations, employment growth) and in the energy efficiency potential assessment are internally consistent. In the interim, staff can request that the Company document how it ensures that known changes baseline conditions–due to the implementation of revised building codes and updated federal standards or changes in current market practices–assumed in its revised load forecast are reflected in current energy efficiency program offerings.

***Recommendation 3B*:** In future IRPs, staff can encourage or require the Company to establish mechanisms to align its range of load forecast with its assessment of remaining energy efficiency potential. This can be done by separating energy efficiency potential into two measure categories. The first category should include those where the potential is only dependent on the existing building,

appliance and equipment stock, such as the number of existing homes and commercial buildings. The second category should be comprised of those measures whose potential is directly affected by variations in future population, households, business and employment growth. The amount of potential in the second category will vary by the pace of future load growth.

Changes in demand-side resource analysis from the 2021 Triennial IRP (p 42 Evergy Metro, p 30 Evergy West). There are no changes to the DSM Potential Study results for the IRP Annual Update for any scenario.

Given the changes to the load forecast described earlier in the document, some additional explanation may be needed as to why "no changes to the DSM Potential Study" were needed or made. It may be that the near-term annual savings anticipated are such a small fraction of the 20-year potential that changes to the cumulative potential do not significantly impact short term savings targets. However, given that the baseline efficiency and use of some end uses appears to have changed between AEO 2020 and AEO 2021, this could affect both the expected savings and cost of measures in existing programs.

***Recommendation 3C*:** Staff can request that the Company provide documentation and a more detailed explanation as to why no changes were needed in the energy efficiency resources assessment to ensure alignment with their updated load forecasts.

4. Energy efficiency and other Distributed Energy Resources (DERs)

Energy efficiency and demand response are the only DERs considered in the IRP. Behind the meter solar and storage were not included in the IRP, and energy efficiency and demand response were modeled separately (exogenously) from the capacity expansion model. Limiting the resources available for the capacity expansion model to select from reduces the solutions that are available to produce a reliable, least cost plan. Excluding analysis on the impact of behind-the-meter DER adoptions produces an inaccurate baseline and forecast.

Table 3. Evergy Joint resource Plan Implementation Period 2022-2025 (p 7 Evergy Metro and Evergy West).

The megawatt (MW) and megawatt-hour (MWh) contribution of demand-side resources is not quantified in Table 3. If demand-side resources are considered as selectable input option for the capacity expansion model (given that rate revenues are used to acquire it) its expected contribution to MW and MWh should be quantified in Tables 3 - 8 as well as similar tables and figures (e.g., Figure 2)

DSM Sensitivity (p 70 Evergy Metro, p 58 Evergy Missouri West)

A more detailed explanation of how this sensitivity test was conducted may be useful. We assume that the load forecast was reduced by two different levels of DSM and then Plexos was run with the preferred ARP. Since the MEEIA goals plan has a higher NPVRR than the preferred plan, we assume it also had a higher cost (at least on average) than the preferred plan and/or it included energy efficiency measures that exceeded the cost of generation in the optimized ARP. This sensitivity test essentially determines the economics of developing different levels of energy efficiency after a preferred supply side resource plan has been selected. An alternative method uses the capacity expansion model's optimization process to determine the economic level of energy efficiency in a resource plan. This method allows the capacity expansion model to select the energy efficiency from an inventory of supply

and demand side resource options based on its cost and resource characteristics (e.g., load shape, annual and cumulative availability). In this method, rather than reduce the load forecast by a level of efficiency that pre-determined to be "cost-effective" the economical amount by load shape and the timing of energy efficiency resource development is selected by the Plexos model.

Distributed Energy Resources (p 77 Evergy Metro, p 66 Evergy West). While Evergy has not yet seen significant penetration of distributed energy resources to the point that it impacts our long-term plan, the continued expansion of electrification, DER aggregation driven by FERC Order 2222, and other policy changes which could influence DER adoption will all continue to be monitored and factored into Evergy's long-term plans as needed.

This is a reactive strategy for addressing DERs. Given "FERC Order 2222 and other policy changes" the utility might be asked to consider whether adoption of a more proactive strategy vis-a-vis DERs would result in less uncertainty. For example, the utility might assess its distribution network to identify feeders where the addition of DERs could improve reliability or defer capacity additions so that it could encourage/incent DER development on those feeders rather than at random locations across its system.

***Recommendation 4*:** Staff can request that the Company treat energy efficiency, demand response and other DERs (specifically behind-the-meter solar and storage) as resource options in its capacity expansion modeling for its next IRP, rather than as adjustments to the load forecast inputs to the capacity expansion modeling.[4] Alternatively, staff can request that the Company prepare a "white paper" outlining the changes it would need to implement to include energy efficiency, demand response and other DERs as resource options that could be selected in its capacity expansion modeling process.[5]

5. Capacity by Resource Type

References to nameplate ratings are relevant for describing the quantity of capacity the Company intends to acquire. However, all resources, but particularly variable output, non-dispatchable resources such and wind and solar have an Effective Load Carrying Capacity (ELCCs) that is not equivalent to their nameplate capacity. Given that the ELCC of each resource type was determined, it seems reasonable to reflect these values in the tables and figures rather than nameplate ratings. The ELCCs of resources are comparable while the nameplates, particularly for solar and wind, are not.

We are unable to determine if the updated resource portfolio has the same overall ELCC (or alternatively Loss of Load Expectation (LOLE)) as the 2021 IRP. Moreover, the megawatt (MW) and megawatt-hour (MWh) contribution of demand-side resources is not quantified in Table 3. If demand-side resources are considered as selectable input option for the capacity expansion model (given that rate revenues are used to acquire it) its expected contribution to MW and MWh should be quantified in tables 3 - 8 , 24/25,[6] 36, 37,[7] and similar figures (e.g., Figure 2).

[4] For more information on how to treat efficiency, demand response and other DERs as resource options see, Methods to Incorporate Energy Efficiency in Electricity System Planning and Markets and presentations to the Missouri Public Service Commission staff on June 2 and June 22, 2022.

[5] For example, see Supply-Side Representation of Energy Efficiency Resources in the Georgia Power IRP Model

[6] Tables 3-8 are identical in Evergy Metro and Evergy West filings. Table 24 is Evergy Metro's MEEIA Resource Plan. Table 25 is Evergy West's MEEIA Resource Plan.

[7] Table 36 is Evergy Metro's Planning Preferred Plan CDAAA and Table 37 is Evergy Metro Preferred Plan Capacity Balance. If the red line in Table 37 represents actual needed capacity ("ELCC capacity equivalent) then stacked bars for all resources should reflect their ELCCs and not their nameplate capacity. If the red line represents the "nameplate" equivalent needed capacity then existing stacked bars are acceptable.

***Recommendation 5*:** Staff can request that the Company, for the figures and tables discussed above and other references to actual system capacity expected from resources, show their ELCC rather than nameplate. It would be more accurate to report ELCCs in this and any other tables/figures depicting the actual system level capacity expected from these resources.

6. Preferred Plan

The Company selected one preferred plans in its IRP (CDAAA). Based on our review of work papers provided by staff, the lowest cost, lowest risk plan for Evergy Metro is CDAAA. Evergy West's lowest cost and lowest risk plan is CDAAF.

Preferred Plan (p 58 Evergy West). However, given the significant variability between the potential drivers of which additional unit should retire in that timeframe, as well as other uncertainties described previously, Evergy is selecting CDAAA as its Preferred Plan at the joint planning level, which is based on the resource additions needed in the medium-term to support such a retirement, but does not include a specific identified retirement.

Preferred Plan (p 70 Evergy Metro, p 58 Evergy West). Although this Preferred Plan ranks relatively low in the tables shown above, this is because it does not include any savings from an assumed retirement at this point, which is expected to be part of the ultimately executed plan.

It is not clear why the Company stated that the Preferred Plan should rank higher because its NPVRR does not yet reflect the savings from assumed retirements. The retirements assumed in CDAAA do not differ from several of the ARPs with lower NPVRR listed (Tables 30-32 Evergy Metro, Tables 32-34). Moreover, in some of those ARPs where there are more retirements, additional resource costs are incurred to provide replacement resources, and these ARPs still have lower NPVRRs.

Preferred Plan (p 73 Evergy Metro). The Company has selected CDAAA as its Preferred Plan at the Evergy level and CDAAA as its Preferred Plan for Evergy Metro. This plan is lower cost than the 2021 IRP Preferred Plan at both the Evergy and Evergy Metro level. It was selected despite being higher cost than many of the accelerated retirement plans which were modeled at both the Evergy and Evergy Metro level due to the exclusion of specific additional accelerated retirements because of the significant uncertainty which exists related to such accelerated retirements (Section 6.2).

In contrast to Every Metro and the Company's joint system preferred plan, Evergy West selected CDAAF as its preferred plan. Plan CDAAF defers retirement of Lake Road 4/6 until 2030 compared while Plan CDAAA retires Lake Road 4/6 in 2024. Plan CDAAF was not evaluated for Evergy Metro or, if it was, the results for this plan for Evergy Metro are not reported in the update or in the Working Papers provided to us by Commission staff.

Evergy Metro states that the expected cost of the preferred plan (CDAAA) is higher than the accelerated retirement plans, but it was chosen due to the uncertainty surrounding accelerated retirement. If this is correct, a logical rationale may be that the preferred plan was selected because it presents lower risk, even though it costs more. However, without some quantification of the relative risk of each plan it is not possible to assess the merits of such a tradeoff. Moreover, it isn't clear that the lower cost plans with accelerated retirements are inherently riskier. The preferred plan faces the same risk as the others with respect to the uncertainty regarding when or which plants to retire first, and all of the lower cost plans avoid the potential cost imposed by future carbon regulations.

***Recommendation 6*:** Staff can ask the Company to clarify how it intends to reconcile the difference in implementation timeframes for retirement of Lake Road 4/6 between its preferred plan for Evergy Metro and its preferred plan for its Evergy West and the Joint system. In addition, staff can ask the Company to provide a more detailed description (and quantification) of the relative costs and risk of plan CDAAA compared to plan CDAAF for Evergy Metro.

7. Other topics

Medium-term Plan (p 8 Evergy Metro and Evergy West). Previously identified solar addition in 2024, which was subsequently delayed to 2026 based on RFP responses, has been replaced with wind based on capacity expansion results, although actual resource selection may vary based on continued procurement activities.

The text quoted appears to state that the original pace of renewable development was determined to be too aggressive (i.e., fast) and the mix shifted more to wind from solar based on the Plexos modeling.

***Recommendation 7A**:* Staff can request that the Company provide an explanation of why the model selected the slower pace (e.g., lower load forecast), especially since the assumed retirement schedule for coal plants did not change between the IRP and the 2022 Update.

Table 12. Natural Gas Forecasts – 2022 Annual Update Vs. 2021 Triennial IRP (p 21 Evergy Metro and p 10 Evergy West).

It appears the 2022 Update's high and low forecast for future natural gas prices are higher than the 2021 forecast, while the "mid" updated forecast is lower than the 2021 "mid" forecast.

***Recommendation 7B**:* Staff can ask the Company for an explanation of their reasoning for the assumption that the mid case gas price decreases while the high and low case increase. Typically, if the entire “range” of potential future prices shifts upward, the expected value does as well.