BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the Matter of the Application of Evergy Kansas Metro, Inc., Evergy Kansas South, Inc. and Evergy Kansas Central, Inc. for Approval of its Demand-Side Management Portfolio Pursuant to the Energy Efficiency Investment Act (KEEIA), K.S.A. 66-1283.	)))))))	Docket No. 22-EKME-254-TAR

CROSS-ANSWERING TESTIMONY OF
ALICE NAPOLEON

ON BEHALF OF
THE CITIZENS' UTILITY RATEPAYER BOARD

June 24, 2022

1. PURPOSE

Q. What is the purpose of your cross-answering testimony?

A. The purpose of this cross-answering testimony is to address statements by Mr. Paul Raab, testifying on behalf of Kansas Gas Service, regarding the likely impacts of Evergy's proposed programs on fuel switching and on overall fossil fuel consumption. I also review and discuss the Kansas Corporation Commission (KCC) Staff's recommendations regarding the Throughput Disincentive (TD), as addressed in the testimony of Mr. Douglas Hall, and regarding the budget for the Hard-to-Reach Homes program, as discussed in the testimony of Dr. Lana Ellis.

2. IMPACTS ON FUEL SWITCHING

Q. Please describe Mr. Raab's position.

A. Mr. Raab states that the Kansas Energy Efficiency Investment Act (KEEIA) does not "consider a fully 'holistic' approach to energy efficiency that considers all available energy sources."[1] He asserts that Evergy's proposed programs, specifically the Business Comfort and New Construction components of the Whole Business Efficiency program, and the Enhanced New Construction component of the Commercial Hard-to-Reach Business Program, will distort the fuel selection process and thereby promote fuel switching.[2] He argues that this could lead to "increased usage of electricity, natural gas, and total energy consumed," which is "clearly in conflict with the State's goal and policy as stated in the

[1] Direct Testimony of Paul H. Raab on behalf of Kansas Gas Service, Docket No. 22-EKME-254-TAR, p. 5. ("Raab Direct Testimony").

[2] Id., at p. 9.

KEEIA and the Commission's energy efficiency objectives."[3] Furthermore, he expresses concern that the business programs do not incorporate a "like for like" component similar to the residential programs.[4]

Mr. Raab is concerned that the current methodology to quantify energy savings may not properly quantify the actual changes in energy use.[5] Furthermore, Mr. Raab is concerned that Evergy may restrict access to the program tracking database that documents project and program data.[6]

Q. What does Mr. Raab recommend?

A. First, he recommends that the Commission incorporate a "like for like" component for business Demand-Side Management (DSM) programs.[7]

Second, he recommends that "the Commission deny Evergy's request to approve the New Construction component of the Whole Business Efficiency Program and the Enhanced New Construction component of the HTR Business Program, or in the alternative exclude heating, ventilation, and air conditioning equipment from these programs."[8]

Third, he recommends that "the Commission require greater transparency with respect to how Evergy's incentives have been spent and their impact. This requires that all parties (including the Gas Utilities) have full access to Evergy's energy efficiency database that

[3] Raab Direct Testimony at p. 24-25.
[4] Id., at p. 8-9.
[5] Id., at p. 16.
[6] Id., at p. 23.
[7] Id., at p. 25.
[8] Id., at p. 25.

documents, at a minimum, the recipient of all ratepayer funded incentives, the amount of the incentive paid, and the purpose for which the incentive was paid." [9]

Q. What support does Mr. Raab present for these recommendations?

A. Mr. Raab states that "Distortions of the fuel selection decision caused by the Evergy incentives can result in increased usage of electricity, natural gas, and total energy consumed."[10] He bases this conclusion on two supposedly "indisputable facts:"[11] specifically "increased consumption of electricity necessarily implies increased usage of the fossil fuel needed to produce that electricity" and "more fossil fuel energy is required to provide a Btu of electrical energy at the point of usage (a home, for example) than to provide a Btu of the fossil fuel energy at the same point of usage."

Q. Will the incentives proposed in the programs selected by Mr. Raab lead to increased usage of electricity, natural gas, and total energy consumption?

A. I find that Mr. Raab's statements are not only *disputable*; they are also *unlikely*.

As Mr. Raab describes, fuel is used more efficiently on site than when burned at the generator. Mr. Raab calls to attention the Energy Star Portfolio Manager figure which presents a source-site ratio for electricity (Grid Purchase) of 2.80. He also points out more geographically specific data from the Source Energy and Emissions Analysis Tool ("SEEAT"), which suggests a ratio of 3.81.[12]

[9] Raab Direct Testimony at p. 26.
[10] Id., at pg. 4.
[11] Id., at p. 18-19.
[12] Id., at p. 19-20.

It is critical to note that the source-site ratio that Mr. Raab cites does not consider the efficiency of end-use equipment. For example, heat pumps used for space heating are generally very efficient. In the *Air Source Heat Pump Buying Guide*, the Northeast Energy Efficiency Partnership (NEEP) explains that heat pumps can heat homes at efficiencies of "400 percent in cool weather," and that on average, in cold climates, heat pumps maintain an average efficiency in the 200–250 percent range."[13] Similarly, a study from the U.S. Department of Energy noted that, at temperatures above 20 degrees, cold-weather heat pumps can consistently operate at efficiencies of 300 percent or better (assuming a Coefficient of Performance, or COP, of 3.0).[14,15] Conversely, fossil fuel space heating can never reach 100 percent efficiency, as some heat will always escape.

In Topeka, the average daily low temperature in January is 20 ºF.[16] Assuming Mr. Raab's cited source-site ratio for electricity of 2.8 and a relatively normal COP of 3.0 for a cold weather heat pump, the overall efficiency of heating with the heat pump would be 107 percent.[17] On the gas side, using Mr. Raab's cited source-site ratio for natural gas of 1.05 and an efficiency of 97 percent consistent with a high efficiency furnace, the overall

[13] Northeast Energy Efficiency Partnership. *Air Source Heat Pump Buying Guide*. Available at: https://neep.org/sites/default/files/resources/ASHP_buyingguide_5.pdf.

[14] Per Energy Star, the "COP is a measure of efficiency in the heating mode that represents the ratio of total heating capacity (Btu) to electrical input (also in Btu)." More information is available at: https://www.energystar.gov/ia/partners/product_specs/eligibility/lchvac_elig.pdf.

[15] United States Department of Energy. *High Efficiency Cold Climate Heat Pump 2016 Building Technologies Office Peer Review*. Available at: https://www.energy.gov/sites/prod/files/2016/04/f30/32212_Shen_040616-1135.pdf,

[16] US Climate Data. "Climate Topeka – Kansas." Available at: https://www.usclimatedata.com/climate/topeka/kansas/united-states/usks0571.

[17] The formula to calculate overall efficiency is:

$$\frac{1}{\text{Source}-\text{Site ratio}} \times \text{Equipment Efficiency} = \text{Overall Efficiency}.$$

For example, overall efficiency for a heat pump is:

$$\frac{1}{2.8} \times 3.0\ (COP) = 1.07 \text{ or } 107 \text{ percent}.$$

efficiency of heating with the gas furnace would be around 92 percent. In this example, less energy would be used to heat with the heat pump on an average January day in Topeka than would be needed to heat with a natural gas furnace.

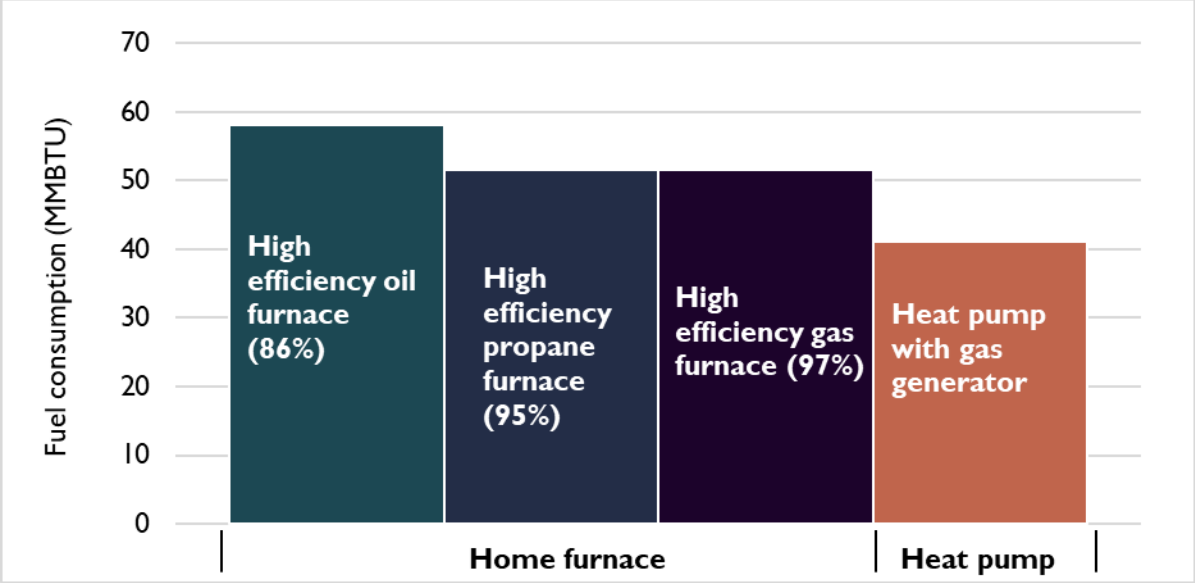
The SEEAT model cited by Mr. Raab suggests a higher source-site ratio of 3.81. This figure assumes that 73.9 percent of electric generation from non-baseload plants comes from coal fired generation. Under these circumstances, the overall source-to-use energy efficiency of the heat pump would only be 79 percent, compared to a final total energy efficiency of 89 percent for the gas furnace. However, this is an unlikely scenario. Indeed, as Mr. Raab points out, "the fuel used to generate electricity "on the margin" is natural gas."[18] Thus, if we were to change the inputs of the SEEAT model, such that natural gas makes up anything greater than about 65 percent of electric generation, then we would find that the heat pump performed equally, if not more efficiently, than a highly efficient gas furnace. As more renewable and clean energy resources move to the margin, the source-site ratio will continue to improve. Furthermore, it is important to note that most gas furnaces installed will not achieve the assumed 97 percent efficiency, and that heat pumps can achieve efficiencies above 300 percent.

Heat pumps also tend to be more efficient than other space cooling equipment during the summer. NEEP reports that cold climate heat pumps are twice as efficient as window air conditioning (AC) units and about 25 percent more efficient than a new central AC system.[19]

[18] Direct Testimony of Paul H. Raab on behalf of Kansas Gas Service, Docket No. 22-EKME-254-TAR, p. 21.
[19] Id.

Figure 1 presents projected MMBtu input for a customer with an annual natural gas load of 50 MMBtu and for a heat pump with a COP of 3.0. According to a Department of Energy Analysis, cold climate air source heat pumps are likely to maintain a coefficient of performance of 3.0 or higher when the temperature is above 20 degrees.[20] With an average daily low temperature in January of 20 degrees in Topeka, a COP of 3.0 is a reasonable assumption.[21] I assume that all load is served by natural gas generators.[22]

Figure 1. MMBtu input by Space Heating Type



As shown in Figure 1, using conservative assumptions, a heat pump for space heating will lead to roughly 20 percent lower energy consumption than a high efficiency natural gas furnace. As more clean and renewable energy is added to the grid, this gap will continue to increase. If wind, or any other renewable or clean energy is on the margin, then the

[20] U.S. Department of Energy. *High Efficiency Cold Climate Heat Pump 2016 Building Technologies Office Peer Review*. Available at: https://www.energy.gov/sites/prod/files/2016/04/f30/32212_Shen_040616-1135.pdf.

[21] U.S. Climate Data. "Climate Topeka – Kansas." Available at: https://www.usclimatedata.com/climate/topeka/kansas/united-states/usks0571

[22] U.S. Energy Information Administration. 2018. https://www.eia.gov/tools/faqs/faq.php?id=73&t=11.

increased usage of electricity would not imply the increased usage of fossil fuels. As renewables continue to penetrate the grid, the margin will more frequently be made up of electricity from non-fossil sources.

In summary, I find that cold weather heat pumps are very likely to use less energy than a highly efficient gas furnace. Suggesting otherwise is misleading to the Commission and should not be considered during the development of an order related to KEEIA, particularly as coal continues to be phased out of the electric system.

Q. Are there other aspects of Mr. Raab's analysis that concern you?

A. Yes. As stated in my direct testimony, new construction is an important part of the buildings sector to address with efficiency measures. Given the long lifetimes of buildings and of certain equipment, such as HVAC, building efficiency should be addressed when it is built. Promoting efficiency in new construction will be especially important if a state or federal policy that addresses Kansas buildings' emissions is put into place at any time over the next several decades.

I would also highlight that incentivizing electric equipment in new construction does not displace fossil customers. New construction is meant to target customers bringing new electric load on to the system, rather than phasing out existing equipment decisions and energy sources. Therefore, the gas company cannot claim these customers' load.

3. THROUGHPUT DISINCENTIVE

Q. Please describe Staff's position on Evergy's proposal to address lost revenue.

A. In his testimony, Mr. Hall raises concerns that Evergy's TD proposal could potentially result in over-recovery relative to the benefits of the DSM programs, and that Evergy's

proposed net marginal revenue rates are based on the assumption that all of Evergy's costs are fixed costs even though some of the costs are variable and will decrease with the reduction in sales as a result of DSM.[23]

Q. What does Staff propose in this regard?

A. Mr. Hall recommends two changes to Evergy's proposed TD mechanism in order to minimize the cost of DSM on non-participating ratepayers. First, he recommends that lost revenue recovery be capped at the level of Evergy's last-approved revenue requirement. Second, he recommends removing variable costs, as estimated by Staff, from net marginal revenue rates.[24]

Q. What are your thoughts on Mr. Hall's proposal?

A. I greatly appreciate Mr. Hall's discussion and analysis of Evergy's proposed TD. His proposed modifications represent an improvement over the Company's proposal. If the Commission decides to retain some form of a TD, I agree with Mr. Hall's two recommendations.

Still, I remain concerned about several intrinsic characteristics of lost revenue adjustment mechanisms (LRAMs), even with the modifications proposed by Mr. Hall.

First, an LRAM is likely to require periodic, large amounts of time and other resources to verify the energy savings resulting from DSM programs. For example, an LRAM can give rise to disputes about the utility's precise level of influence on savings, such as free ridership, codes and standards, and other factors that are difficult, costly, and impractical

[23] Direct Testimony of Douglas Hall on behalf of the Utilities Division of the Kansas Corporation Commission, Docket No. 22-EKME-254-TAR, p. 2.

[24] Id., at p. 2.

to estimate with the high level of accuracy needed for reimbursing Evergy. Aside from determination of the LRAM, such a high level of accuracy is not needed for standard cost-effectiveness or evaluation, measurement, and verification purposes. This precision is not needed at all for implementation of a decoupling mechanism.

Second, an LRAM would be more difficult to adapt to future new demand-side technologies that impact the utility's sales, such as distributed generation or electric vehicles, than a decoupling mechanism. A decoupling mechanism can be agnostic to these other influences; an LRAM would become more complicated, as interactions between the DSM and the new technologies would need to be sorted out so that reductions in sales can be properly attributed to DSM savings.

Third, as customers adopt new end-use products that are likely to *increase* electricity consumption, such as heat pumps or electric vehicles, decoupling will require the Company to refund to customers the increased revenues associated with those increased sales. In this way, decoupling is not only more comprehensive and simpler than a TD, it is also more balanced.

Q. What is your recommendation?

A. My recommendation is that a decoupling mechanism be developed in a separate proceeding. To allow time for the development of the decoupling mechanism while DSM is rolled out, an LRAM as proposed by Mr. Hall could be instituted for a limited period of time (e.g., one year).

4. RECOVERY OF PROGRAM EXPENSES FOR HARD-TO-REACH HOMES

Q. Did Staff submit testimony on the Hard-to-Reach Homes program?

A. Yes. Lana J. Ellis, PhD submitted testimony regarding the overall size and cost-effectiveness of the Hard-to-Reach Homes Program.

Dr. Ellis states that low-income programs are not required to pass cost-effectiveness tests if they are in the public interest and supported by a reasonable budget, as compared with the overall DSM program budget.[25] She finds that the Hard-to-Reach Homes program is not cost-effective based on Staff's calculation of the RIM test.[26] Further, she finds that Evergy's proposed budget for the Hard-to-Reach Homes program exceeds 5 percent of total budget, the level that the Commission has historically defined as reasonable.[27] She indicates that approval of the program should depend on whether it is found to be in the public interest and supported by a reasonable budget. Dr. Ellis notes that Evergy was allowed to exceed the 5 percent cap if it could show evidence of effectiveness in the previous energy efficiency docket.[28]

Dr. Ellis also notes that Evergy has not provided adequate justification for Evergy's proposed increase in the size of the proposed weatherization component relative to historical spending for the Weatherization Assistance Program.[29]

[25] Direct Testimony of Lana J. Ellis, PhD on behalf of the Utilities Division of the Kansas Corporation Commission, Docket No. 22-EKME-254-TAR, p. 6.

[26] Id., at p. 7-9.

[27] Id., at p. 6 and 12.

[28] Id., at p. 6.

[29] Id., at p. 14-15.

Q. What does Staff recommend?

A. Dr. Ellis recommends that the Commission approve the Hard-to-Reach Homes programs and recovery of program expenses up to 5 percent of total program budget. She also recommends that Evergy be required to demonstrate effectiveness for recovery of any expenditures above 5 percent.[30]

Q. What do you think about Dr. Ellis's recommendations?

A. I appreciate Dr. Ellis's analysis, which points to a potential issue with whether Evergy will be able to ramp up the program as rapidly as it projected, given the historical weatherization spending trends.

I do have some concern with the 5 percent cap, as it is defined relative to a budget that may shift during this proceeding consistent with the parties' various recommendations to reduce or eliminate programs and/or components of programs. Further, a rigid cap could stifle the development of the program.

Q. What do you recommend?

A. I recommend that Evergy provide justification for whether it will be able to ramp up the Hard-to-Reach Homes program, in light of the historical spending on weatherization. If Evergy is not able to demonstrate that its proposed ramp-up of the Hard-to-Reach Homes program is reasonably attainable, the Company should revise the budget consistent with an achievable ramp rate.

[30] Id., at p. 2.

If Evergy is able to show that its proposed ramp-up is attainable, e.g. based on the speed at which similar programs have been developed in other service areas, I recommend that the Hard-to-Reach Homes program be approved as proposed. Rather than capping the budget for this program, however, I suggest focusing on providing Evergy with guidance on how to demonstrate program effectiveness using the types of data that Mr. Colton recommends collecting and reporting in his testimony on behalf of the Sierra Club/Appleseed.[31] Specifically, in addition to measuring annual and lifetime program savings per home, the following data should be collected and tracked for program participants relative to a control group:

1. The dollars of bills for current service by month
2. The dollars of actual receipts by month
3. The number of accounts receiving a bill by month
4. The number of accounts making a payment by month
5. The number of disconnect notices issued by month
6. The number of accounts in arrears
7. The dollars of arrears by month
8. The average arrears of accounts with arrears by month
9. The number of accounts with a $0 balance by month

[31] Direct Testimony of Roger Colton on behalf of Sierra Club and Kansas Appleseed Center for Law and Justice, Inc., Docket No. 22-EKME-254-TAR, p. 103-106.

10. The number of final bills by month

11. Pre-and post-treatment energy burdens[32]

These data can be used to establish and measure the effectiveness of the Hard-to-Reach Homes program at addressing critical problems for low-income customers.

Q. Does this conclude your testimony?

A. Yes.

[32] Id.

VERIFICATION

COMMONWEALTH OF MASSACHUSETTS)
)
COUNTY OF MIDDLESEX) ss:

Alice Napoleon, being duly sworn upon her oath, deposes and states that she is a consultant for the Citizens' Utility Ratepayer Board, that she has read and is familiar with the foregoing *Cross Testimony*, and that the statements made herein are true and correct to the best of her knowledge, information, and belief.

Alice Napoleon

SUBSCRIBED AND SWORN to before me this 24th day of June, 2022.

Notary Public

My Commission expires:

TEJAN BAYOH
Notary Public
Commonwealth of Massachusetts
My Commission Expires
August 17, 2023

CERTIFICATE OF SERVICE

22-EKME-254-TAR

I, the undersigned, hereby certify that a true and correct copy of the above and foregoing document was served by electronic service on this 24th day of June, 2022, to the following:

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