Exhibit No.:	
Issue(s):	*Throughput Disincentive, Rebound Effect*
Witness:	*Hari K. Poudel, PhD*
Sponsoring Party:	*MoPSC Staff*
Type of Exhibit:	*Rebuttal Testimony*
Case Nos.:	*EO-2023-0369 and EO-2023-0370*
Date Testimony Prepared:	*July 9, 2024*

MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

TARIFF/RATE DESIGN DEPARTMENT

REBUTTAL TESTIMONY

OF

HARI K. POUDEL, PhD

EVERGY METRO, INC. d/b/a
Evergy Missouri Metro
CASE NO. EO-2023-0369

EVERGY MISSOURI WEST, INC.
d/b/a Evergy Missouri West
CASE NO. EO-2023-0370

Jefferson City, Missouri
July 9 2024

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d/b/a Evergy Missouri West
CASE NO. EO-2023-0370

Q. Please state your name and business address.

A. My name is Hari K. Poudel, and my business address is P.O. Box 360, Jefferson City, Missouri, 65102.

Q. Are you the same Hari K. Poudel that provided direct testimony in this case?

A. Yes.

EXECUTIVE SUMMARY

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to address two distinct issues that are pertinent to Evergy Missouri Metro ("EMM") and Evergy Missouri West ("EMW")'s (collectively, "Evergy") direct testimonies. Initially, my testimony will address Evergy's Net Throughput Disincentive ("NTD"). Lastly, I will address the rebound effect, which Evergy has ignored since the beginning of the first Missouri Energy Efficiency Investment Act ("MEEIA") cycle.

NET THROUGHPUT DISINCENTIVE

Q. Is there a need to change the existing NTD mechanism in the context of the use of time-of-use ("TOU") rate structures?

A. Absolutely.

Q. Why do you believe that the current NTD calculation mechanism has become highly complex?

A. The current NTD mechanism, as implemented in MEEIA Cycles 2 and 3, does not account for the time-dependent impact on energy savings based on rate code, season, and the specific time of day when a particular customer utilizes energy. As customers increasingly choose greater differential rates, there will be a greater demand for more accurate quantification of energy savings. The difference in rates between various time periods can be far larger than the difference between blocked rates. A precise measurement is essential since it directly affects all ratepayers, as the NTD is recovered through the Energy Efficiency Investment Charge. Introducing adjustments to the NTD, Net Marginal Rate ("NMR"), and energy savings estimates to accommodate these variations based on the type of measure and rate code would result in a level of complexity that could make the NTD calculation mechanism unworkable. Hence, it is necessary to employ an alternative method for calculating avoided revenue that takes into consideration the influence of TOU rate differences on the NTD calculation process.

Q. What are the reasons for using an alternative avoided revenue mechanism?

A. A different avoided revenue calculation mechanism is required for residential and Small General Service due to the current mechanism's failure to appropriately consider variations in the timing of expected reductions throughout a day, season, and year, as well as the duration of the reduction within a given day, as explained by Staff Witness Sarah L.K. Lange.[1]

Q. Does Evergy's current NMR analysis specifically isolate the profile of reduced energy sales in order to calculate the NMR based on each measure?

[1] See Staff witness Ms. Lange's direct testimony on page 37, lines 1-20; page 38, lines 1-12; page 39, lines 1-14; page 40, lines 1-4.

A. No. Evergy provides a workpaper that calculates the margin rate, which includes peak and off-peak for different TOU rate codes. However, Staff was unable to locate any comprehensive supporting documents for the net margin rate analysis utilized in this workpaper.[2] Staff didn't receive Data Request ("DR") No. 0045.0[3] response by the specified deadline (July 7, 2024). The DR was expected to include the NMR calculation workpapers along with supporting workpapers for EMW and EMM. The current NMR analysis should take into account the specific time of day when a consumer consumers energy.

Q. Is the precision of the NTD calculation contingent upon the precision of the energy savings estimates?

A. Yes. The current calculation of NTD relies on the energy savings estimates provided by the Technical Resource Manual ("TRM") along with the Net-to-Gross ("NTG") ratio. The accuracy of the NTD is contingent upon the precision and dependability of both the TRM and the evaluation. If the TRM is less accurate, it will negatively impact the accuracy of the NTD calculation mechanism and any resulting evaluations.

Q. Considering the implementation of TOU rate structures, what are your reasons for believing that the assumptions made in historical NMR analysis are inappropriate?

A. Evergy's current NMR analysis has relied on the relationship between monthly customer usage and the block where the usage falls in a given month. In time-based rate structures, the price of the last Kilowatt hour ("kWh") consumed depends on the type of rate and the time period where energy reductions occur, rather than the monthly usage reduction alone. Evergy's current time-based rate structure includes both a low-differential

[2] EO-2023-0369 Evergy's workpaper "TOU Wtd Avg Margin Rate 04012024"
[3] DR0045.0 (Please provide the net margin rates and net margin rate calculations with supporting workpapers for EMW and EMM, as described in the testimony of Ms. Leigh Anne Jones at pages 4-5 of her testimony, "In recognition of Evergy's adoption of TOU based rate schedules for its residential customers, the Company proposes to segment the calculation of TD related to residential program energy savings by Evergy's TOU pricing periods and end use measure categories (heating, ventilation and air conditioning ("HVAC") and other)." Please include the hourly avoided energy assumed for each of 8,760 hours for each end use measure category, and provide any workpapers supporting each calculation.)

and a high-differential design in which the energy charge will vary by the time of the day that the energy is used (On-Peak or Off-Peak), and the season (Summer or Winter). On-peak prices are higher and off-peak prices are lower than they would be for a flat rate, based on season, day of week, and time of day. High differential TOU adoption (between 15-20%) has undoubtedly posed challenges in the NMR calculation. In addition, the remaining 80-85%[4] of residential customers that are in the default reclassification of a peak adjustment rate schedule have some difference in rates during peak periods. Therefore, the utilization of historical NMR analysis assumptions is inappropriate for the current TOU rate structures.

Q. Do other utility companies provide information regarding the NMR analysis in their filings?

A. Yes. Other Missouri utilities provides NMR analysis along with comprehensive supporting documents and workpapers to the Commission in their MEEIA applications and in their direct testimonies in general rate cases as well.

Q. What is your recommendation based on the current TOU rate structures?

A. With a TOU rate structure, the rate differential no longer occurs based primarily upon the total energy usage in a given month by rate class but rather the time of day that an individual customer uses energy. Utilizing historical NMR in NTD calculation raises the probability of either overcharging customers or undervaluing the lost revenues of a utility. Thus, the current MEEIA application necessitates separate NMRs based on rate code, by season, and the specific time of day when a consumer reduces energy consumption due to their energy efficiency measures.

[4] EO-2023-0369/0370 Direct Testimony of Leigh Anne Jones Page 5, lines 10-12.

REBOUND EFFECT

Q. In your direct testimony, you discussed the rebound effect that occurs when energy efficiency measures are implemented. Does Evergy's MEEIA application consider the rebound effect when estimating energy or demand savings?

A. No.

Q. What is the rebound effect?

A. The rebound effect is generally understood as a response to improved energy efficiency, in which potential energy savings from efficiency improvements are partially offset by increased consumption of energy services.[5]

Q. Does current literature support including the rebound effect in energy efficiency effectiveness studies?

A. Yes. The direct testimony[6] I provided discuss the specific information in the rebound effect that is available in the current literature.

Q. Do you agree with the Office of the Public Counsel ("OPC") witness's Dr. Geoff Marke position on the rebound effect?

A. Yes. OPC's witness Dr. Marke believes that

> The rebound effect is a very real phenomenon. It is also something that has not been properly factored into any EM&V study in Missouri to date.[7]

Therefore, real-world data on these issues would be useful.

Q. Do you agree with OPC's witness Dr. Marke's proposal or recommendation to the Commission on this rebound effect?

[5] Azevedo, I.M. (2014) Consumer end-use energy efficiency and rebound effects. Annual Review of Environment and Resources, 39, 393–418.
[6] See Staff Witness, Poudel's direct testimony, page 6, lines 6-23; page 7, lines 1-16.
[7] See OPC Witness, Marke's direct testimony, page 21, lines 10-12.

A. Yes. In energy efficiency literature, some analysts raise questions about the rebound effect, arguing that it is a major factor that needs to be accounted for when analyzing energy efficiency programs. Mr. Nadel states that:

> there are both direct and indirect rebound 1 effects, but these tend to be modest. Direct rebound effects are generally 10% or less. Indirect rebound effects are less well understood, but the best available estimate is somewhere around 11%. These two types of rebound can be combined to estimate the total rebound at about 20%.[8]

Lutzenhiser et al. (2010)[9] notes that current modeling techniques are insufficient in explaining real world energy use, in part because they generally fail to take behavior [rebound] into account.

Q. What are the most plausible estimates of the size of the direct rebound effect?

A. The rebound effect literature attempts to estimate the direct rebound effect for specific energy efficiency programs and policies. Many of these are evaluations of individual programs. The existing literature indicates that direct rebound effects will generally be about 10% or less.

Q. Does Staff agree with OPC's witness, Dr. Marke?

A. Staff agrees with OPC's witness Dr. Marke that:

> an across-the-board 10% reduction in energy savings be applied to any future EM&V filings to account for the rebound effect or that future EM&V studies specifically analyze the rebound effect for households participating in the EM&V report.[10]

Q. What effect does exclusion of consideration of rebound effect have on Evergy's application?

A. Reducing energy consumption due to energy efficiency has been discussed in the existing literature in the form of the rebound effect. The literature demonstrates that the

[8] Nadel, S. (2012). The Rebound Effect: Large or Small? An ACEEE White Paper. https://www.aceee.org/files/pdf/white-paper/rebound-large-and-small.pdf.
[9] Lutzenhiser, L., Moezzi, M., Hungerford, D., & Friedmann, R. (2010). Sticky points in modeling household energy consumption.
[10] See OPC Witness, Marke's direct testimony, page 21, lines 12-14.

failure to take account of rebound effects could contribute to shortfalls in the assessment of the contribution that energy efficiency can realistically make. To put it another way, the exclusion of the rebound effect could lead to overstating the energy efficiency savings' estimation in the existing MEEIA application. Empirically, the exclusion of the rebound will result in a substantial overestimation of the net benefits and lost margins.

Q. How should the rebound effect be addressed in the existing MEEIA application?

A. Since the rebound effect is typically measured as a percentage of the potential energy savings, Staff recommends using 10% reduction in energy savings estimations in the TRM.

CONCLUSION

Q. What are your recommendations?

A. Staff witnesses recommend the Commission not approve the current MEEIA application. The Commission should not approve the multimillion-dollar application without taking into account the following recommendations:

(1) Net Throughput Disincentive: Rate schedules with rate differentials that occur during the course of a single day (and that vary by the day of the week) will affect the actual avoided marginal revenues more than those assumed in the traditional block structure. The mechanism currently in use requires dozens of margin rate calculations which might by more complex and tedious. Therefore, I strongly support Staff witness Sarah L. K. Lange's mechanism to use different avoided revenue mechanism, as she discussed in detail in her direct testimony. Staff witness Ms. Lange explains that a different mechanism should be used, in part because the NTD mechanism used in MEEIA Cycles 2 and 3 is unworkable today.

(2) Rebound Effect: Evergy should consider the rebound effect's impact on energy savings in the current MEEIA application and moving forward. The significance is that excluding rebound can result in substantially overestimated net benefits and lost margins. Therefore, Staff recommends using 10% reduction in energy savings estimations in the TRM.

Q. Does this conclude your testimony?

A. Yes. It does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Evergy Metro, Inc. d/b/a Evergy Missouri Metro's Notice of Intent to File an Application for Authority to Establish a Demand-Side Programs Investment Mechanism	)))))	Case No. EO-2023-0369
n the Matter of Evergy Missouri West, Inc. d/b/a Evergy Missouri West's Notice of Intent to File an Application for Authority to Establish a Demand-Side Programs Investment Mechanism	)))))	Case No. EO-2023-0370

AFFIDAVIT OF HARI K. POUDEL, PhD

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW HARI K. POUDEL, PhD and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Rebuttal Testimony of Hari K. Poudel, PhD*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

HARI K. POUDEL, PhD

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 8th day of July 2024.

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

Notary Public