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Witness: *Michael L. Stahlman*
Sponsoring Party: *MoPSC Staff*
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Case No.: *ER-2024-0189*
Date Testimony Prepared: *June 27, 2024*

MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

TARIFF/RATE DESIGN DEPARTMENT

DIRECT TESTIMONY

OF

MICHAEL L. STAHLMAN

EVERGY MISSOURI WEST, INC.,

d/b/a Evergy Missouri West

CASE NO. ER-2024-0189

Jefferson City, Missouri
June 27, 2024

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MICHAEL L. STAHLMAN

EVERGY MISSOURI WEST, INC.,
d/b/a Every Missouri West

CASE NO. ER-2024-0189

Q. Please state your name and business address.

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

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

A. I am employed by the Missouri Public Service Commission ("Commission") as a Regulatory Economist in the Tariff/Rate Design Department in the Industrial Analysis Division.

Q. Please describe your educational and work background.

A. Please see Schedule MLS - d1.

EXECUTIVE SUMMARY

Q. What is the purpose of your testimony?

A. The purpose of my direct testimony is presenting the results of Staff's weather normalization analysis for Evergy Missouri West ("EMW").

Q. Please summarize your testimony.

A. I calculated the Staff's Weather Normalization and 365 Day Adjustments. These calculations relied on the weather data provided by Staff witness Francisco Del Pozo, loss data from Staff and data provided by EMW through data requests. I also used these results

to calculate the expected usage for the Time of Use blocks for the residential customer class. These results, including the Weather Normalization and 365 Day Adjustments, were given to Staff witness Kim Cox for use in her revenue calculation.

I also calculated the Load Requirement at Transmission. This calculation relied on loss factors provided by Staff witness Alan Bax, weather data provided by Staff witness Francisco Del Pozo, data provided by EMW through data requests and 3.190 reports, and normalized sales provided by Staff witness Kim Cox. The results were provided to Staff witness Brodrick Niemeier for use in the fuel model.

WEATHER NORMALIZATION

Q. What is weather normalization?

A. In many of the classes of service, electricity consumption is highly responsive to the weather, specifically temperature. As the temperature reaches higher levels, the demand for cooling, air conditioning, and fans increases the customers' consumption of electricity. As the weather becomes colder, the demand for additional heating, via electric space heating, also forces an increase in electricity consumption. Electric air conditioning and space heating is prevalent in EMW's service territory; therefore, it follows that the respective electric loads of EMW are linked with and responsive to temperature. Weather normalization is the process of measuring the impact of weather on energy consumption and removing abnormal weather influence from the test period in order to provide a more accurate representation of "normal" electric usage.

Q. Where did the weather data come from for this analysis?

A. Weather data was provided by Staff witness Francisco Del Pozo. Mr. Del Pozo further describes the weather data in his testimony, including a description of "normal" weather.

Q. What time period did Staff weather normalize?

A. Staff weather normalized the update period for this case, the twelve months ending December 31, 2023.

Q. Why did Staff weather normalize for the update period, when EMW weather normalized for the test year?

A. The Commission ordered that there be an update period for this case for the 12 months ending December 31, 2023.[1] In an attempt to capture a more likely forward-looking indictor of non-weather electricity usage per customer, Staff weather normalized the update period as it includes the most current information available for analysis and will more closely align to revenue estimates and costs as an outcome of this rate case.

Q. Briefly describe the weather normalization process.

A. Staff used MetrixND to run regression analysis to determine a class's response to weather and other variables. The method and model used by Staff is similar to those used by EMW. Staff's model and method contained elements important in the class-level weather normalization process: use of daily load research data to determine non-linear, class-specific responses to changes in temperature with the incorporation of different base usage parameters to account for different days of the week, months of the year and holidays. Staff then used the model to simulate energy consumption by substituting normal daily weather data with the actual daily weather data. The results of Staff's analysis were provided to Staff witness Kim Cox to be used in the normalization of revenues for weather sensitive classes, Residential ("RES"),

[1] Commission's Order Granting Applications to Intervene and Order Setting Procedural Schedule issued on 3/8/2024

Small General Service ("SGS"), and Large General Service ("LGS"), and to Staff witness Alan Bax for the Sale for Resale ("SFR").

Q. Did Staff weather normalize Large Power?

A. No. Staff reviewed the data for individual large power customers and found that only a minority of the customers had a usage pattern consistent with being weather sensitive. A larger portion appeared seasonal, and others were weather insensitive.

365-DAYS ADJUSTMENT TO USAGE

Q. Why does Staff make a 365-day adjustment?

A. Calendar months and revenue months differ from one another because of the periods they cover and the differing beginning and ending times. Calendar months coincide with the calendar, beginning on the first day of the month and ending on the last day of the month. EMW's respective customers' usage is measured and rate revenues are collected over a period known as a revenue month, which is the interval over which EMW reads customers' meters and issues bills. A bill rendered for a given revenue month may charge for usage in parts of two calendar months. Revenue months usually take their names from the calendar month in which the customer's bill is rendered. For example, assume a customer's meter was read and usage determined on June 8, and then again on July 8, and that bill was sent to the customer on July 15. The revenue month for this bill is July even though 22 days of the usage measured for this bill occurred from June 9 through June 30 and it contained only eight days of usage in July.

The length of a revenue month is dependent upon the interval between meter readings and does not necessarily have the same number of days that occur in a given calendar month of the same name; that is, a revenue month may have more or less than the number of days for the same-named calendar month. For the example given above, the usage is for 30 days

(June 9 through July 8), even though the revenue month is July, which has 31 days. When revenue month usage is totaled over the year, the resulting revenue year will include usage from the immediately prior calendar year and assign usage to the next calendar year, meaning a revenue year may contain more than or less than 365 days' usage. Therefore, since the costs and expenses are accounted over a calendar year, Staff calculates an annualization adjustment to bring the revenue year kWh into a 365-days interval. This adjustment is stated in kWh and is referred to as the 365-Days Adjustment. Staff calculated the 365-Days Adjustment by adjusting individual bill cycles that had more than or less than 365 days' usage from the first date in that cycle's revenue test year to the last meter read date in that cycle's revenue test year. The overall average usage per day of that cycle was then multiplied by the days over/under 365 days to determine the kWh adjustment.

The 365-Days Adjustment for RES, SGS, and LGS were provided to Staff witness Kim Cox, who used the 365-Days Adjustment to adjust the revenues of the class revenue months to the twelve months ending December 31, 2023.

LOAD REQUIREMENT AT TRANSMISSION

Q. What is the load requirement at transmission?

A. Hourly load requirement at transmission is the hourly electric supply necessary to meet the energy demands of both the company's customers and the company's own needs. This is calculated at the transmission level to account for losses in the transmission and distribution system.

Q. Where did Staff obtain the load and weather data?

A. The hourly loads used in the analysis of the period of January 2023 through December 2023 were obtained from EMW's data provided in accordance with

20 CSR 4240-3.190 (1)(C). Staff witness Francisco Del Pozo provided actual and normal daily temperatures used in this analysis.

Q. Why does Staff weather normalize the load requirement at transmission?

A. Due to the high saturation of air conditioning, and the presence of significant electric space heating in EMW's service territory, the magnitude and shape of EMW's load requirement are directly related to daily temperatures. The actual daily temperatures for the update period differed from normal conditions. Therefore, to reflect normal weather, daily peak and average load requirement are adjusted independently, but using the same method.

Q. Why does Staff weather normalize the average load separately from the peak load?

A. Independent adjustments are necessary because average loads and peak loads respond differently to weather. Daily average load is calculated as the daily energy divided by twenty-four hours and the daily peak is the maximum hourly load for the day. Separate regression models estimate both a base component, which is allowed to fluctuate across time, and a weather sensitive component, which measures the response to daily fluctuations in weather for daily average loads and peak loads. The regression parameters, along with the difference between normal and actual cooling and heating measures, are used to calculate weather adjustments to both the average and peak loads for each day. The adjustments for each day are added respectively to the actual average and peak loads for each day.

Q. How does Staff calculate the load requirement at transmission?

A. The starting point for allocating both the weather-normalized daily peak and the weather- normalized average loads to the hours is the actual hourly loads. A unitized load curve is calculated for each day as a function of the actual peak and average loads for that day.

The corresponding weather-normalized daily peak and average loads, along with the unitized load curves, are used to calculate weather-normalized hourly loads.

Once Staff's normalized, annualized test year usage for EMW's retail customer classes is completed, weather-normalized wholesale usage is added. Then, the non-sale for resale classes annual usage was increased by the average annual loss factor supplied by Staff witness Alan J. Bax. A weather normalized SFR class's annualized usage was added to the non-transmission-level classes annual usage to produce an annual sum of the hourly load requirement that equals the adjusted test year usage and is consistent with Staff's normalized revenues.

A factor was applied to each hour of the weather-normalized loads to produce an annual sum of the hourly load requirement that equals the adjusted test year usage, plus losses, and is consistent with normalized revenues. Once completed, the test-year hourly normalized system loads were given to Staff witness Brodrick Niemeier to be used in developing the test year fuel and purchased-power expense.

RESIDENTIAL TIME-OF-USE BLOCKS[2]

Q. Did you also provide Staff witness Kim Cox with estimates of energy use for different time-of-use blocks?

A. Yes. Staff used the peak and average regression analysis for the residential class and utilized the same method used in calculating the hourly load requirement at transmission to estimate the percentages of energy used between certain hours of the day.

[2] The use of "Time-of-Use Blocks" in this section is not to be confused the blocks for the residential energy charges. Rather it is meant to be descriptive of the different periods of time in a given day that different prices.

Q. Why did Staff use this method instead of applying the residential weather normalization adjustment factor to all hours equally?

A. Essentially for the same reasons that Staff uses this method in estimating the hourly load requirement at transmission; electricity consumption is highly responsive to the weather due to factors like air conditioning. Typically, air conditioner load is highest during the hottest hours of the day, the peak usage times, rather than during the cooler periods or at night.

Q. Were these estimates performed for each residential rate code?

A. No. EMW has only been able to provide Staff data for the residential class as a whole rather than individual residential rate codes, so even though Staff calculated different percentages to match the different time-of-use blocks, the estimates are constructed on a typical residential customer.

CONCLUSION

Q. Please summarize your testimony.

A. I calculated Staff's weather normalization adjustment, 365-days adjustment, and load requirement at transmission using inputs from other Staff witnesses and Evergy Missouri West's responses to data requests and reports. I also estimated the percentages of energy used for different time-of-use blocks. The results of my calculations were then provided to other Staff witnesses.

Q. Does this conclude your direct testimony?

A. Yes it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Evergy Missouri West, Inc. d/b/a Evergy Missouri West's Request for Authority to Implement A General Rate Increase for Electric Service	))))	Case No. ER-2024-0189

AFFIDAVIT OF MICHAEL L. STAHLMAN

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW MICHAEL L. STAHLMAN and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Direct Testimony of Michael L. Stahlman*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

MICHAEL L. STAHLMAN

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 24th day of June 2024.

Notary Public

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

Michael Stahlman

Education

2009	M. S., Agricultural Economics, University of Missouri, Columbia.
2007	B.A., Economics, Summa Cum Laude, Westminster College, Fulton, MO.

Professional Experience

2010 -	Regulatory Economist, Missouri Public Service Commission
2007 – 2009	Graduate Research Assistant, University of Missouri
2008	Graduate Teaching Assistant, University of Missouri
2007	American Institute for Economic Research (AIER) Summer Fellowship Program
2006	Price Analysis Intern, Food and Agricultural Policy Research Institute (FAPRI), Columbia, MO
2006	Legislative Intern for State Representative Munzlinger
2005 – 2006	Certified Tutor in Macroeconomics, Westminster College, Fulton, MO
1998 – 2004	Engineering Watch Supervisor, United States Navy

Expert Witness Testimony

Union Electric Company d/b/a AmerenUE GR-2010-0363
In the Matter of Union Electric Company d/b/a AmerenUE for Authority to File Tariffs Increasing Rates for Natural Gas Service Provided to Customers in the Company's Missouri Service Area

Union Electric Company d/b/a Ameren Missouri GT-2011-0410
In the Matter of the Union Electric Company's (d/b/a Ameren Missouri) Gas Service Tariffs Removing Certain Provisions for Rebates from Its Missouri Energy Efficient Natural Gas Equipment and Building Shell Measure Rebate Program

KCP&L Great Missouri Operations Company EO-2012-0009
In the Matter of KCP&L Greater Missouri Operations Company's Notice of Intent to File an Application for Authority to Establish a Demand-Side Programs Investment Mechanism

Union Electric Company d/b/a Ameren Missouri EO-2012-0142
In the Matter of Union Electric Company d/b/a Ameren Missouri's Filing to Implement Regulatory Changes Furtherance of Energy Efficiency as Allowed by MEEIA

Kansas City Power & Light Company EO-2012-0323
In the Matter of the Resource Plan of Kansas City Power & Light Company

KCP&L Great Missouri Operations Company EO-2012-0324
In the Matter of the Resource Plan of KCP&L Greater Missouri Operations Company

Kansas City Power & Light Company EO-2012-0135
KCP&L Great Missouri Operations Company EO-2012-0136
In the Matter of the Application of Kansas City Power & Light Company [KCP&L Great Missouri Operations Company] for Authority to Extend the Transfer of Functional Control of Certain Transmission Assets to the Southwest Power Pool, Inc.

Kansas City Power & Light Company, KCP&L Great Missouri Operations Company, and Transource Missouri — EA-2013-0098, EO-2012-0367

In the Matter of the Application of Transource Missouri, LLC for a Certificate of Convenience and Necessity Authorizing it to Construct, Finance, Own, Operate, and Maintain the Iatan-Nashua and Sibley-Nebraska City Electric Transmission Projects

Kansas City Power & Light Company
KCP&L Great Missouri Operations Company — EU-2014-0077

In the Matter of the Application of Kansas City Power & Light Company and KCP&L Greater Missouri Operations Company for the Issuance of an Accounting Authority Order relating to their Electrical Operations and for a Contingent Waiver of the Notice Requirement of 4 CSR 240-4.020(2)

Kansas City Power & Light Company — EO-2014-0095

In the Matter of Kansas City Power & Light Company's Notice of Intent to File an Application for Authority To Establish a Demand-Side Programs Investment Mechanism

Veolia Energy Kansas City, Inc — HR-2014-0066

In the Matter of Veolia Energy Kansas City, Inc for Authority to File Tariffs to Increase Rates

Grain Belt Express Clean Line, LLC — EA-2014-0207

In the Matter of the Application of Grain Belt Express Clean Line LLC for a Certificate of Convenience and Necessity Authorizing It to Construct, Own, Operate, Control, Manage, and Maintain a High Voltage, Direct Current Transmission Line and an Associated Converter Station Providing an Interconnection on the Maywood - Montgomery 345 kV Transmission Line

Union Electric Company d/b/a Ameren Missouri — ER-2014-0258

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariff to Increase Its Revenues for Electric Service

Empire District Electric Company — ER-2014-0351

In the Matter of The Empire District Electric Company for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customers in the Company's Missouri Service Area

Kansas City Power & Light Company — ER-2014-0370

In the Matter of Kansas City Power & Light Company's Request for Authority to Implement a General Rate Increase for Electric Service

Kansas City Power & Light Company — EO-2014-0240

In the Matter of Kansas City Power & Light Company's Filing for Approval of Demand-Side Programs and for Authority to Establish a Demand-Side Programs Investment Mechanism

KCP&L Great Missouri Operations Company — EO-2014-0241

In the Matter of KCP&L Greater Missouri Operations Company's Filing for Approval of Demand-Side Programs and for Authority to Establish a Demand-Side Programs Investment Mechanism

Ameren Transmission Company of Illinois EA-2015-0146
In the Matter of the Application of Ameren Transmission Company of Illinois for Other Relief or, in the Alternative, a Certificate of Public Convenience and Necessity Authorizing it to Construct, Install, Own, Operate, Maintain and Otherwise Control and Manage a 345,000-volt Electric Transmission Line from Palmyra, Missouri to the Iowa Border and an Associated Substation Near Kirksville, Missouri

Empire District Electric Company ER-2016-0023
In the Matter of The Empire District Electric Company's Request for Authority to Implement a General Rate Increase for Electric Service

KCP&L Great Missouri Operations Company ER-2016-0156
In the Matter of KCP&L Greater Missouri Operations Company's Request for Authority to Implement a General Rate Increase for Electric Service

Kansas City Power & Light Company ER-2016-0285
In the Matter of Kansas City Power & Light Company's Request for Authority to Implement A General Rate Increase for Electric Service

Union Electric Company d/b/a Ameren Missouri ER-2016-0179
In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariff to Increase Its Revenues for Electric Service

Grain Belt Express Clean Line, LLC EA-2016-0358
In the Matter of the Application of Grain Belt Express Clean Line LLC for a Certificate of Convenience and Necessity Authorizing it to Construct, Own, Operate, Control, Manage and Maintain a High Voltage, Direct Current Transmission Line and an Associated Converter Station Providing an Interconnection on the Maywood-Montgomery 345kV transmission line.

Spire Missouri, Inc. GR-2017-0215 and GR-2017-0216
In the Matter of Spire Missouri, Inc.'s Request to Increase Its Revenues for Gas Service

Liberty Utilities GR-2018-0013
In the Matter of Liberty Utilities (Midstates Natural Gas) Corp. d/b/a Liberty Utilities' Tariff Revisions Designed to Implement a General Rate Increase for Natural Gas Service in the Missouri Service Areas of the Company

Spire Missouri, Inc. GO-2019-0058 and GO-2019-0059
In the Matter of Spire Missouri, Inc. d/b/a Spire's Request to Decrease [Increase] WNAR

Grain Belt Express Clean Line LLC EM-2019-0150
Invenergy Transmission LLC
Invenergy Investment Company LLC
In the Matter of the Joint Application of Invenergy Transmission LLC, Invenergy Investment Company LLC, Grain Belt Express Clean Line LLC and Grain Belt Express Holding LLC for an Order Approving the Acquisition by Invenergy Transmission LLC of Grain Belt Express Clean Line LLC

Union Electric Company d/b/a Ameren Missouri GR-2019-0077
In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase its Revenues for Natural Gas Service

Union Electric Company d/b/a Ameren Missouri ER-2019-0335
In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Decrease Its Revenues for Electric Service

Empire District Electric Company ER-2019-0374
In the Matter of The Empire District Electric Company's Request for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customers in its Missouri Service Area

Union Electric Company d/b/a Ameren Missouri EA-2020-0371
In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Permission and Approval and a Certificate of Public Convenience and Necessity Under 20 CSR 4240-3.105

Spire Missouri, Inc. GR-2021-0108
In the Matter of Spire Missouri Inc.'s d/b/a Spire Request for Authority to Implement a General Rate Increase for Natural Gas Service Provided in the Company's Missouri Service Areas

Union Electric Company d/b/a Ameren Missouri ER-2021-0240
In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Adjust Its Revenues for Electric Service

Union Electric Company d/b/a Ameren Missouri GR-2021-0241
In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Adjust Its Revenues for Natural Gas Service

The Empire District Electric Company ER-2021-0312
In the Matter of the Request of The Empire District Electric Company d/b/a Liberty for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customers in its Missouri Service Area

The Empire District Gas Company GR-2021-0320
In the Matter of The Empire District Gas Company's d/b/a Liberty Request to File Tariffs to Change its Rates for Natural Gas Service

Ameren Transmission Company of Illinois EA-2022-0099
In the Matter of the Application of Ameren Transmission Company of Illinois for a Certificate of Convenience and Necessity Under Section 393.170.1, RSMo. Relating to Transmission Investments in Southeast Missouri

Evergy Metro, Inc d/b/a Evergy Missouri Metro ER-2022-0129
In the Matter of Evergy Metro, Inc. d/b/a Evergy Missouri Metro's Request for Authority to Implement A General Rate Increase for Electric Service

Evergy Missouri West, Inc. d/b/a Evergy Missouri West ER-2022-0130
In the Matter of Evergy Missouri West, Inc. d/b/a Evergy Missouri West's Request for Authority to Implement A General Rate Increase for Electric Service

Spire Missouri, Inc. GR-2022-0179
In the Matter of Spire Missouri, Inc. d/b/a Spire's Request for Authority to

Implement a General Rate Increase for Natural Gas Service Provided in the Company's Missouri Service Areas

Union Electric Company d/b/a Ameren Missouri EA-2022-0245
In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Approval of a Subscription-Based Renewable Energy Program

Union Electric Company d/b/a Ameren Missouri ER-2022-0337
In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Adjust Its Revenues for Electric Service

Grain Belt Express Clean Line LLC EA-2023-0017
In the Matter of the Application of Grain Belt Express LLC for an Amendment to its Certificate of Convenience and Necessity Authorizing it to Construct, Own, Operate, Control, Manage, and Maintain a High Voltage, Direct Current Transmission Line and Associated Converter Station

Union Electric Company d/b/a Ameren Missouri EA-2023-0286
In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Permission and Approval and Certificates of Public Convenience and Necessity Authorizing it to Construct Renewable Generation Facilities

Evergy Metro, Inc d/b/a Evergy Missouri Metro EO-2024-0002
Evergy Missouri West, Inc. d/b/a Evergy Missouri West
In the Matter of Requests for Customer Account Data Production from Evergy Metro, Inc. d/b/a Evergy Missouri Metro and Evergy Missouri West, Inc. d/b/a Evergy Missouri West

Selected Manuscripts

Stahlman, Michael and Laura M.J. McCann. "Technology Characteristics, Choice Architecture and Farmer Knowledge: The Case of Phytase." Agriculture and Human Values (2012) 29: 371-379.

Stahlman, Michael. "The Amorality of Signals." Awarded in top 50 authors for SEVEN Fund essay competition, "The Morality of Profit."

Selected Posters

Stahlman, Michael, Laura M.J. McCann, and Haluk Gedikoglou. "Adoption of Phytase by Livestock Farmers." Selected poster at the American Agricultural Economics Association Annual Meeting, Orlando, FL, July 27-29, 2008. Also presented at the USDA/CSREES Annual Meeting in St. Louis, MO in February 2009.

McCann, Laura, Haluk Gedikoglu, Bob Broz, John Lory, Ray Massey, and Michael Stahlman. "Farm Size and Adoption of BMPs by AFOs." Selected poster at the 5th National Small Farm Conference in Springfield, IL in September 2009.