

Exhibit No.:
Issue(s): *System Energy Losses*
Jurisdictional
Allocation Factors,
Loss Study-FAC Voltage
Adjustment Factors,
Highway Right-of-Way
Usage Policy Revision

Witness: *Alan J. Bax*
Sponsoring Party: *MoPSC Staff*
Type of Exhibit: *Direct Testimony*
Case Nos.: *ER-2024-0189*
Date Testimony Prepared: *June 27, 2024*

MISSOURI PUBLIC SERVICE COMMISSION
INDUSTRY ANALYSIS DIVISION
ENGINEERING ANALYSIS DEPARTMENT

DIRECT TESTIMONY

OF

ALAN J. BAX

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

CASE NO. ER-2024-0189

Jefferson City, Missouri
June 2024

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DIRECT TESTIMONY OF
ALAN J. BAX
EVERGY MISSOURI WEST, INC.
d/b/a Evergy Missouri West
CASE NO. ER-2024-0189**

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- 1 • System energy line loss factor,
- 2 • Jurisdictional allocation factors for demand and energy,
- 3 • Loss Study and its application to Evergy Missouri West's ("EMW") Fuel
- 4 Adjustment Clause ("FAC"), and
- 5 • Voltage Adjustment Factors ("VAFs").

6 I will also briefly discuss a recent policy revision made by EMW regarding its desire to no
7 longer necessarily utilize highway right-of-ways ("ROW") in its routing/installations of
8 transmission and distribution facilities, alternatively preferring to seek and acquire additional
9 private property.

10 Q. Throughout this testimony, do you describe the development of workproduct
11 that you provided to other Staff witnesses for the development of issues?

12 A. Yes. I provided my system energy loss factor to Staff witness Michael L.
13 Stahlman for his development of hourly loads that are subsequently considered in Staff's fuel
14 model. I provided jurisdictional demand and energy allocation factors to Staff witness Matthew
15 Young for use in Staff's Exhibit Modeling System ("EMS") run, which is utilized in allocating
16 related demand and energy revenues and expenses to the Missouri retail and wholesale
17 jurisdictions. Finally, I provided the calculated VAFs to Staff witness Teresa Denney, who
18 utilized these VAFs in conjunction with the determination of Fuel Adjustment Rates ("FAR")
19 that are reflected in the FAC of EMW.

20 Q. Please summarize the results of your analyses.

21 A. A summary of the results of my calculations are included in Schedule AJB-d2.

1 **SYSTEM ENERGY LOSSES**

2 Q. What are system energy losses?

3 A. System energy losses are inherent in the production, transmission and
4 distribution of electricity, largely occurring in the electrical equipment (e.g., transmission and
5 distribution lines, transformers, etc.) between a utility's generating sources and their respective
6 customers' meters. For example, the losses associated with the heat produced in transmitting
7 and distributing electricity along associated conductors. In addition, small fractional amounts
8 of energy, either stolen (diversion) or not metered, are included in my calculation of system
9 energy losses.

10 Q. How are system energy losses determined?

11 A. The basis for calculating system energy losses is that the Net System
12 Input ("NSI") equals the sum of Retail Sales, Wholesale Sales, Company Use, and System
13 Energy Losses. This can be expressed mathematically as:

14
$$\text{NSI} = \text{Retail Sales} + \text{Wholesale Sales} + \text{Company Use} + \text{System Energy Losses}.$$

15 NSI, Company Use, Retail Sales and Wholesale Sales are known quantities; therefore, system
16 energy losses may be calculated as follows:

17
$$\text{System Energy Losses} = \text{NSI} - \text{Retail Sales} - \text{Wholesale Sales} - \text{Company Use}.$$

18 The system energy loss factor is the ratio of system energy losses to NSI:

19
$$\text{System Energy Loss Factor} = (\text{System Energy Losses} \div \text{NSI})$$

20 Q. How is NSI determined?

21 A. In addition to the relationship expressed in the equation above, NSI is also equal
22 to the sum of net generation and the net interchange. Net generation is the total energy output
23 of each generating station minus the energy consumed internally to enable its production of

1 electricity at each plant. The output of each generation plant is continuously monitored and
2 metered. Net interchange is the difference resulting from netting off-system purchases and
3 off-system sales, and is also similarly monitored.

4 Q. What are Retail Sales, Wholesale Sales and Company Use and how are these
5 values determined?

6 A. The Commission sets cost of service based rates for a respective utility's
7 Missouri retail customers. However, not all sales are necessarily associated with a utility's
8 provision of service to its Missouri retail customers. EMW has customers in two jurisdictions:
9 a retail jurisdiction and a wholesale jurisdiction. Retail sales in Missouri consist of sales to
10 EMW's residential and business customers. Wholesale sales are sales that are under the
11 jurisdiction of the Federal Energy Regulatory Commission ("FERC"), and are primarily to
12 certain municipal electric systems. Retail and Wholesale sales are thus described as sales
13 occurring in two separate jurisdictions. Retail Sales and Wholesale Sales represent the
14 jurisdictional energy metered within a particular utility's system. Company Use is the
15 electricity consumed at Evergy Missouri West's non-generation facilities, such as its corporate
16 office building.

17 Q. What is the resultant system energy loss factor for EMW?

18 A. The system energy line loss factor for EMW is:

19 EMW - 0.0609 of NSI

20 Q. Which Staff witness used your calculated system energy loss factors?

21 A. I provided my calculated system energy loss factors to Staff witness
22 Michael L. Stahlman.

1 **JURISDICTIONAL ALLOCATIONS**

2 Q. Please describe the jurisdictions applicable to this case.

3 A. The Commission sets cost of service based rates for a utility's Missouri retail
4 customers; however, not all the costs incurred by a utility are necessarily associated with its
5 provision of service to its Missouri retail customers. As previously mentioned, Evergy Missouri
6 West has both retail and wholesale customers in separate jurisdictions.

7 Q. Please define the phrase "jurisdictional allocation."

8 A. Some costs incurred in serving customers in a particular jurisdiction may be
9 directly assigned to that jurisdiction. The costs that are not directly assigned to a particular
10 jurisdiction are allocated among the various applicable jurisdictions. Jurisdictional allocation
11 refers to the process by which demand-related and energy-related costs are allocated to the
12 applicable jurisdictions of the utility.

13 Q. Please describe the term "demand-related" costs.

14 A. Costs that do not vary significantly over the course of a year, or that do not vary
15 with the amount of energy generated or consumed, such as the capital costs associated with
16 generation and transmission plant, are typically allocated on the basis of demand (i.e.,
17 "demand related").

18 Q. Please describe the term "energy-related" costs.

19 A. Variable costs, such as fuel and purchased power, are typically allocated on the
20 basis of energy consumption (i.e., "energy related").

21 Q. How are these demand-related and energy-related costs incorporated into
22 corresponding Staff analyses?

1 A. Demand-related and energy-related costs are divided between applicable retail
2 and wholesale operations. The application of a particular allocation factor is dependent upon
3 the types of costs being allocated among the associated jurisdictions.

4 **DEMAND ALLOCATION FACTOR**

5 Q. What is the definition of demand?

6 A. Demand refers to the rate of electric energy that is delivered to a system to meet
7 the requirements of its customers, generally expressed in kilowatts or megawatts, either at an
8 instant in time or averaged over any designated interval of time.

9 Q. What is the system peak demand?

10 A. System peak demand is the largest electric requirement that occurs on a utility's
11 system within a specified period of time (e.g. hour, day, month, season, or year). In my
12 analyses, I used hourly demands.

13 Q. Please explain the term coincident peak.

14 A. A coincident peak ("CP") is the hourly contribution of each of EMW's two
15 jurisdictions (Missouri Retail and Wholesale Operations), that occurs simultaneous to the
16 respective system peak demand, i.e., each individual jurisdiction contributing demand at the
17 time of the corresponding system peak.

18 Q. What types of costs are allocated on the basis of demand?

19 A. Capital costs associated with generation and transmission plant, as well as
20 certain operational and maintenance ("O&M") expenses, are allocated on this basis. This is
21 appropriate because generation and transmission are planned, designed and constructed to meet
22 a utility's anticipated demand.

1 Q. Why use peak demand as the basis for allocations?

2 A. Peak demand is the largest electric requirement occurring within a specified
3 period of time (e.g., day, month, season, or year) on a utility's system. In addition, for planning
4 purposes, an amount must be included for meeting required contingency reserves. Since
5 generation units and transmission lines are planned, designed, and constructed to meet a utility's
6 anticipated system peak demands plus required reserves, the contribution of each individual
7 jurisdiction to these peak demands is the appropriate basis on which to allocate the costs of
8 these facilities.

9 Q. What methodology did you use to determine the demand allocators?

10 A. I used what is known as the Four Coincident Peak ("4 CP") methodology.
11 A 4 CP method is appropriate for a utility that experiences dominant seasonal demands in the
12 four summer months (June to September) relative to the demands in the other eight months of
13 a calendar year. A utility that experiences similar hourly peaks in both winter and summer
14 months might consider using a 12 CP method. Comparatively, a utility that does not experience
15 similar peaks in both winter and summer months, but instead experiences a peak demand in one
16 particular month within a calendar year may consider utilizing a 1 CP. The monthly demands
17 reported for the months in calendar years 2022 and 2023, which include the test year and the
18 update period for the current case, are consistent with the monthly demands in the reporting
19 periods associated with the last several rate cases involving EMW or its predecessors.

20 Q. Please describe the procedure for calculating the jurisdictional demand
21 allocation factors using the 4 CP methodology.

22 A. The allocation factor for each applicable jurisdiction respectively for EMW's
23 operating systems was determined using the following process:

1 a. Identify the peak hourly load on EMW's operating system respectively
2 in each month for the four - month period June 2023 through September
3 2023 and sum these hourly peak loads.

4 b. Identify the corresponding load in each of the applicable jurisdictions
5 (Retail and Wholesale) identified earlier on EMW's system that
6 contributed to the respective overall system monthly peaks identified in
7 "a" above and sum these loads for each particular jurisdiction.

8 c. Divide b. above by a. above.

9 The resultant ratios are the allocation factors for each applicable jurisdiction for the EMW
10 electric system as follows:

11 Missouri Retail Jurisdiction:	0.9981
12 Wholesale Jurisdiction:	0.0019
13 Total:	1.0000

14 Q. Which Staff witness used your jurisdictional demand allocation factors?

15 A. I provided these jurisdictional demand allocation factors to Staff witness
16 Matthew Young.

17 **ENERGY ALLOCATION FACTOR**

18 Q. What types of costs are allocated on the basis of energy?

19 A. Variable expenses, such as fuel and purchased power, along with certain O&M
20 expenses, are allocated to the applicable jurisdictions of EMW based on energy consumption.

21 Q. How did you calculate the energy allocation factor?

22 A. The energy allocation factor for an individual jurisdiction in EMW is the ratio
23 of the normalized annual kilowatt-hour ("kWh") usage in the particular jurisdiction, during
24 calendar year 2023, to EMW's total system kWh usage. Staff also applied adjustments to these
25 normalized kWhs accounting for losses, anticipated growth, and certain customer

1 annualizations. Normalized weather adjustments were provided by Staff witness Michael L.
2 Stahlman. The adjustments for growth and certain annualizations were provided by Staff
3 witness Kim Cox.

4 Q. What are the energy allocation factors you determined in this case?

5 A. Staff has calculated the following energy allocation factors for the
6 aforementioned applicable jurisdictions of EMW, based on kWh usage data in calendar
7 year 2023, including the aforementioned adjustments:

8 Missouri Retail Jurisdiction	0.9979
9 Wholesale Jurisdiction:	0.0021
10 Total:	1.0000

11 These jurisdictional energy allocation factors were provided to Staff witness Matthew Young
12 to allocate related costs to the respective applicable jurisdictions for EMW.

13 **LOSS STUDY AS IT APPLIES TO THE FUEL ADJUSTMENT CLAUSE**

14 Q. Did EMW provide a System Energy Loss Study in this Case?

15 A. No.

16 Q. Please provide a brief description and purpose for developing and filing a
17 System Energy Loss Study.

18 A. A System Energy Loss Study includes an analysis of sales and usage data
19 pertaining to the operations of EMW. EMW has previously initiated and maintained a FAC.
20 In order to remain in compliance with Commission regulation 20 CSR 4240-20.090(13),¹ in

¹ 20 CSR 4240-20.090(13) Rate Design of the RAM. The design of the RAM rates shall reflect differences in losses incurred in the delivery of electricity at different voltage levels for the electric utility's different rate classes as determined by periodically conducting Missouri jurisdictional system loss studies. ...When the electric utility seeks to continue or modify its RAM, the end of the twelve- (12-) month period of actual data collected that is used in its Missouri jurisdictional system loss study must be no earlier than four (4) years before the date the utility files the general rate proceeding seeking to continue or modify its RAM.

1 conjunction with its request to continue utilizing a Rate Adjustment Mechanism (“RAM”) such
2 as its FAC, it is necessary for EMW to submit a current loss study.

3 Q. Why did EMW not submit a System Energy Loss Study in this Case?

4 A. In the Direct Testimony of Company witness Linda J. Nunn, Ms. Nunn asserts
5 that EMW had submitted a System Energy Loss Study that was filed with its last general rate
6 increase request case in 2022 (Case No. ER-2022-0130). Ms. Nunn contends that since this
7 System Energy Loss Study was based on data experienced on the EMW system in calendar year
8 2020, it continues to be compliant with applicable Commission regulations, which states:

9 ...When the electric utility seeks to continue or modify its RAM,
10 the end of the twelve- (12-) month period of actual data collected
11 that is used in its Missouri jurisdictional system loss study must be
12 no earlier than four (4) years before the date the utility files the
13 general rate proceeding seeking to continue or modify its RAM....

14 Q. Does Staff concur with this assertion made by Ms. Nunn regarding this
15 previously submitted System Energy Loss Study?

16 A. Yes, it does.

17 Q. What information are you relying on in this particular System Energy
18 Loss Study?

19 A. This document includes an analysis of line losses reported overall for EMW’s
20 operating system and also derived loss factors for each of the corresponding operating voltage
21 levels (transmission, substation, primary and secondary) in which EMW serves its customers.

22 Q. What are these voltage adjustment factors for each operating voltage level of
23 EMW’s system?

1 A. VAFs are determined to account for the energy losses experienced in the
2 delivery of electricity from the generation level to the customer. Staff determined the VAFs
3 applicable to the transmission, substation, primary, and secondary operating voltage levels for
4 EMW that are currently reflected in the FAC per the terms of the Stipulation and Agreement
5 reached in the last EMW general rate case (Case No. ER-2022-0130). Given that Staff agrees
6 with EMW that a new loss study is not required in this current general rate increase case, I
7 recommend that these current VAFs continue to be utilized:

8 VAF_{Transmission} – 1.0300

9 VAF_{Substation} – 1.0388

10 VAF_{Primary} – 1.0503

11 VAF_{Secondary} – 1.0766

12 Q. What Staff members are using these VAFs?

13 A. These VAFs were provided to Staff witness Teresa Denney for utilization in the
14 calculations of Fuel Adjustment Rates reflected in EMW’s FAC. These FARs will be applied
15 to the individual voltage service classification of a particular customer in the EMW’s FAC
16 tariff, should the Commission authorize EMW to continue utilizing its FAC and
17 associated tariffs.

18 **HIGHWAY RIGHT-OF-WAY USAGE POLICY REVISION**

19 Q. Please briefly describe EMW’s revised policy regarding utilizing highway
20 right-of-way in routing its transmission lines.

21 A. In its Response to Staff Data Request No. 296 in this case, EMW provided its
22 revised “Transmission Engineering Policy Road Right-Of-Way” policy, dated December 21,
23 2022. Paragraph 1.2 of this policy states:

Direct Testimony of
Alan J. Bax

1 ** [REDACTED]
2 [REDACTED]
3 [REDACTED]
4 [REDACTED] **2,3

5 Q. What are your reservations regarding this newly revised EMW policy?

6 A. Historically, utilities have intentionally utilized the highway ROW in routing its
7 transmission facilities, which resulted in limiting the acquisition of additional private property
8 in its installation of such facilities. However, in a recent Complaint case filed with the
9 Commission, Staff was made aware of EMW seeking to acquire additional private property in
10 conjunction with a proposed improvement project of an existing transmission line currently
11 routed within the associated highway ROW.

12 Q. What are possible implications regarding enacting such a policy?

13 A. More complaints from property owners, increasing expenses for EMW and
14 potentially increasing rate base. Seeking additional private property in such circumstances,
15 without establishing a specific, unambiguous operating need/necessity for additional ROW
16 footage is liable to cause frustration among landowners, as alleged in the current Complaint
17 case. It has been typical historical practice for utilities, including EMW, to utilize highway
18 ROW, a practice that should seemingly continue unless there are specific identifiable needs to
19 do otherwise that would necessitate seeking additional private property.

20 Q. Does this conclude your Direct Testimony?

21 A. Yes, it does.

² Staff requested to receive a copy of this revised policy via a Data Request in the current Complaint Case (EC-2024-0015), which was filed in July 2023. However, EMW’s Response to this Data Request indicated that the policy was not available, despite the revised policy provided in this Rate Case being dated December 2022.

³ EMW’s Response to Staff Data Request 296 is attached to this Direct Testimony as Schedule AJB-d3

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) Case No. ER-2024-0189
Authority to Implement A General Rate)
Increase for Electric Service)

AFFIDAVIT OF ALAN J. BAX

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW ALAN J. BAX and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Direct Testimony of Alan J. Bax*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

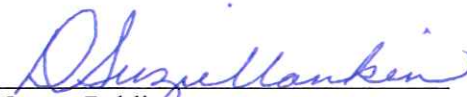


ALAN J. BAX

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 18th day of June 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

ALAN J. BAX

I graduated from the University of Missouri - Columbia with a Bachelor of Science degree in Electrical Engineering in December 1995. Concurrent with my studies, I was employed as an Engineering Assistant in the Energy Management Department of the University of Missouri – Columbia from the Fall of 1992 through the Fall of 1995. Prior to this, I completed a tour of duty in the United States Navy, completing a course of study at the Navy Nuclear Power School and a Navy Nuclear Propulsion Plant. Following my graduation from the University of Missouri - Columbia, I was employed by The Empire District Electric Company as a Staff Engineer until August 1999, at which time I began my employment with the Staff of the Missouri Public Service Commission. My current position is an Engineer in the Engineering Analysis Department, within the Industry Analysis Division. I presented in a Peer Review of Power Quality Regulations in the National Association of Regulatory Utility Commissioners (“NARUC”) outreach program with the Public Utilities Commission of Sri Lanka (“PUCSL”), supported by the Bureau of Energy Resources (“ENR”) at the United States Department of State. I am a member of the Institute of Electrical/Electronic Engineers (“IEEE”).

TESTIMONY AND REPORTS

BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

BY ALAN J. BAX

<u>COMPANY</u>	<u>CASE NUMBER</u>
Aquila Networks – MPS	ER-2004-0034
Union Electric Company d/b/a AmerenUE	EO-2004-0108
Empire District Electric Company	ER-2002-0424
Kansas City Power and Light Company	EA-2003-0135
Union Electric Company d/b/a AmerenUE	EO-2003-0271
Aquila Networks – MPS	EO-2004-0603
Union Electric Company d/b/a AmerenUE	EC-2002-0117
Three Rivers and Gascoage Electric Coops	EO-2005-0122
Union Electric Company d/b/a AmerenUE	EC-2002-1
Aquila Networks – MPS	EO-2001-0384
Empire District Electric Company	ER-2001-299
Aquila Networks – MPS	EA-2003-0370
Union Electric Company d/b/a AmerenUE	EW-2004-0583
Union Electric Company d/b/a AmerenUE	EO-2005-0369
Trigen Kansas City	HA-2006-0294
Union Electric Company d/b/a AmerenUE	EC-2005-0352
Missouri Public Service	ER-2001-672
Aquila Networks – MPS	EO-2003-0543
Kansas City Power and Light Company	ER-2006-0314
Macon Electric Coop	EO-2005-0076
Aquila Networks – MPS	EO-2006-0244
Union Electric Company d/b/a AmerenUE	EC-2004-0556
Union Electric Company d/b/a AmerenUE	EC-2004-0598
Empire District Electric Company	ER-2004-0570
Union Electric Company d/b/a AmerenUE	EC-2005-0110
Union Electric Company d/b/a AmerenUE	EC-2005-0177
Union Electric Company d/b/a AmerenUE	EC-2005-0313
Empire District Electric Company	EO-2005-0275
Aquila Networks – MPS	EO-2005-0270
Union Electric Company d/b/a AmerenUE	EO-2006-0145
Empire District Electric Company	ER-2006-0315
Aquila Networks – MPS	ER-2005-0436

COMPANY

CASE NUMBER

Union Electric Company d/b/a AmerenUE	EO-2006-0096
West Central Electric Cooperative	EO-2006-0339
Kansas City Power and Light Company	ER-2006-0314
Union Electric Company d/b/a AmerenUE	EO-2008-0031
Union Electric Company d/b/a AmerenUE	EC-2009-0193
Empire District Electric Company	ER-2008-0093
Missouri Rural Electric Cooperative	EO-2008-0332
Grundy Electric Cooperative	EO-2008-0414
Osage Valley Electric Cooperative	EO-2009-0315
Union Electric Company d/b/a AmerenUE	EO-2009-0400
Union Electric Company d/b/a AmerenUE	EO-2008-0310
Aquila Networks – MPS	EA-2008-0279
West Central Electric Cooperative	EO-2008-0339
Empire District Electric Company	EO-2009-0233
Union Electric Company d/b/a/ AmerenUE	EO-2009-0272
Empire District Electric Company	EO-2009-0181
Union Electric Company d/b/a AmerenUE	ER-2008-0318
Kansas City Power and Light Company	ER-2009-0089
Kansas City Power and Light – GMO	ER-2009-0090
Union Electric Company d/b/a AmerenUE	ER-2010-0036
Empire District Electric Company	ER-2010-0130
Laclede Electric Cooperative	EO-2010-0125
Union Electric Company d/b/a AmerenUE	EC-2010-0364
Union Electric Company d/b/a AmerenUE	EO-2011-0052
Kansas City Power and Light Company	ER-2010-0355
Union Electric Company d/b/a AmerenUE	EO-2010-0263
Kansas City Power and Light – GMO	EO-2011-0137
Kansas City Power and Light – GMO	ER-2010-0356
Union Electric Company d/b/a AmerenUE	ER-2011-0028
Kansas City Power and Light – GMO	EO-2012-0119
Kansas City Power and Light Company	EO-2011-0137
Union Electric Company d/b/a AmerenUE	ER-2012-0121
Union Electric Company d/b/a/ Ameren Missouri	EX-2012-0332
Empire District Electric Company	EO-2011-0085
Empire District Electric Company	EO-2012-0192
Empire District Electric Company	EO-2013-0313
Union Electric Company d/b/a AmerenUE	ER-2012-0180
Union Electric Company d/b/a AmerenUE	EO-2013-0418

COMPANY

CASE NUMBER

City Utilities of Springfield	EO-2012-0441
Kansas City Power and Light – GMO	EO-2012-0367
Empire District Electric Company	ER-2011-0004
Union Electric Company d/b/a/ Ameren Missouri	ER-2012-0166
Kansas City Power and Light Company	ER-2012-0174
Union Electric Company d/b/a/ Ameren Missouri	ER-2013-0044
Kansas City Power and Light – GMO	ER-2012-0175
Central Missouri Electric Cooperative	EO-2015-0137
Empire District Electric Company	ER-2012-0345
Kansas City Power and Light Company	EO-2012-0367
Boone Electric Cooperative	EO-2015-0012
Transource Missouri, LLC	EA-2013-0098
Black River Electric Cooperative	EO-2015-0096
Union Electric Company d/b/a/ Ameren Missouri	EW-2012-0369
Empire District Electric Company	ER-2014-0351
Union Electric Company d/b/a/ Ameren Missouri	EO-2014-0044
Union Electric Company d/b/a/ Ameren Missouri	EO-2013-0418
Union Electric Company d/b/a/ Ameren Missouri	EE-2013-0511
Union Electric Company d/b/a/ Ameren Missouri	EO-2015-0017
Union Electric Company d/b/a/ Ameren Missouri	EO-2016-0087
Union Electric Company d/b/a/ Ameren Missouri	EO-2014-0009
Kansas City Power and Light Company	EO-2014-0128
Union Electric Company d/b/a/ Ameren Missouri	EO-2017-0358
Empire District Electric Company	EO-2016-0192
Empire District Electric Company	EO-2017-0217
Union Electric Company d/b/a/ Ameren Missouri	EO-2014-0296
Union Electric Company d/b/a/ Ameren Missouri	EO-2015-0328
Union Electric Company d/b/a/ Ameren Missouri	ER-2014-0258
Union Electric Company d/b/a/ Ameren Missouri	EX-2017-0153
Union Electric Company d/b/a/ Ameren Missouri	EO-2019-0391
Empire District Electric Company	EO-2018-0118
Empire District Electric Company	ER-2016-0023
Ozark Electric Cooperative Inc.	EO-2020-0163
Union Electric Company d/b/a/ Ameren Missouri	EC-2016-0235
Union Electric Company d/b/a/ Ameren Missouri	EO-2018-0058
Union Electric Company d/b/a/ Ameren Missouri	EE-2019-0395
Kansas City Power and Light – GMO	ER-2016-0156
Kansas City Power and Light – GMO	EO-2019-0061

COMPANY

CASE NUMBER

Kansas City Power and Light Company	ER-2014-0370
Union Electric Company d/b/a/ Ameren Missouri	EO-2017-0044
Kansas City Power and Light Company	ER-2016-0285
Empire District Electric Company	EO-2019-0381
Union Electric Company d/b/a/ Ameren Missouri	EE-2019-0395
Union Electric Company d/b/a/ Ameren Missouri	ER-2016-0179
Union Electric Company d/b/a/ Ameren Missouri	EO-2018-0278
Union Electric Company d/b/a/ Ameren Missouri	EO-2020-0315
Union Electric Company d/b/a/ Ameren Missouri	EO-2017-0127
Kansas City Power and Light Company	ER-2018-0145
Kansas City Power and Light Company – GMO	ER-2018-0146
Evergy Missouri West LLC	EO-2021-0388
Gridliance High Plains, LLC	EM-2022-0156
Union Electric Company d/b/a/ Ameren Missouri	EO-2021-0305
Union Electric Company d/b/a/ Ameren Missouri	EM-2021-0309
Union Electric Company d/b/a/ Ameren Missouri	ER-2019-0335
Union Electric Company d/b/a/ Ameren Missouri	EE-2019-0383
Osage Valley Electric Cooperative, LLC	EO-2022-0073
Osage Valley Electric Cooperative, LLC	EO-2023-0126
Ozark Border Electric Cooperative, LLC	EO-2022-0264
Evergy Missouri West LLC	EO-2021-0339
Union Electric Company d/b/a/ Ameren Missouri	EE-2021-0086
Union Electric Company d/b/a/ Ameren Missouri	EM-2022-0292
Liberty Utilities-Empire	EO-2021-0389
Laclede Electric Cooperative	EO-2022-0143
Empire District Electric Company	ER-2019-0374
Union Electric Company d/b/a/ Ameren Missouri	ET-2021-0082
Union Electric Company d/b/a/ Ameren Missouri	ER-2021-0240
Union Electric Company d/b/a/ Ameren Missouri	EO-2022-0226
Union Electric Company d/b/a/ Ameren Missouri	EO-2022-0190
Union Electric Company d/b/a/ Ameren Missouri	EO-2022-0332
Union Electric Company d/b/a/ Ameren Missouri	EO-2023-0256
NextEra Energy Transmission Southwest, LLC	EA-2022-0234
Evergy Missouri Metro	ER-2022-0129
Evergy Missouri West LLC	ER-2022-0130
Evergy Missouri West LLC	EO-2022-0320
Missouri Joint Municipal Utility Electric Commission	EM-2022-0156
Liberty Utilities-Empire	EO-2022-0226

COMPANY

CASE NUMBER

Liberty Utilities-Empire	EC-2022-0291
Union Electric Company d/b/a/ Ameren Missouri	EO-2021-0401
Union Electric Company d/b/a/ Ameren Missouri	EM-2022-0094
Union Electric Company d/b/a/ Ameren Missouri	EO-2022-0102
Union Electric Company d/b/a/ Ameren Missouri	ER-2022-0337
Liberty Utilities-Empire	EO-2022-0132
Liberty Utilities-Empire	ER-2021-0312
Union Electric Company d/b/a/ Ameren Missouri	EO-2024-0116
Liberty Utilities-Empire	EO-2024-0098
Union Electric Company d/b/a/ Ameren Missouri	EO-2024-0144
Evergy Missouri West LLC	EC-2024-0015
Osage Valley Electric Cooperative, LLC	EO-2023-0439
Howard Electric Cooperative	EO-2024-0247
Union Electric Company d/b/a/ Ameren Missouri	EO-2024-0208
Union Electric Company d/b/a/ Ameren Missouri	EX-2023-0254
Liberty Utilities-Empire	EO-2023-0266
Liberty Utilities-Empire	EO-2024-0165
Grain Belt Express LLC	EA-2023-0017
Liberty Utilities-Empire	EO-2023-0108
Liberty Utilities-Empire	EO-2024-0194
Evergy Missouri West LLC	EC-2024-0168

SUMMARY

RESULTS OF CALCULATIONS

SYSTEM ENERGY LINE LOSS FACTORS

Eversource Missouri West - 0.0609 of Net System Input

DEMAND ALLOCATION FACTORS¹

Eversource Missouri West

Missouri Retail - 0.9981

Missouri Wholesale - 0.0019

ENERGY2 ALLOCATION FACTORS²

Eversource Missouri West

Missouri Retail - 0.9979

Missouri Wholesale - 0.0021

VOLTAGE ADJUSTMENT FACTORS³

Eversource Missouri West

$VAF_{\text{Transmission}} = 1.0300$

$VAF_{\text{Substation}} = 1.0388$

$VAF_{\text{Primary}} = 1.0503$

$VAF_{\text{Secondary}} = 1.0766$

¹ Jurisdictional Demand Allocation Factors were determined utilizing the Four Coincident Peak Methodology (“4CP”).

² The Energy Allocation Factors considered modifications of customer growth, weather normalizations, customer annualizations and energy line loss adjustments.

³ As reflected in the Stipulation and Agreement approved in Case No. ER-2022-0130.

Case No. ER-2024-0189

SCHEDULE AJB-d3

HAS BEEN DEEMED

CONFIDENTIAL

IN ITS ENTIRETY