

Exhibit No.:
Issue(s): *Quality of Service-
Reliability*
Witness: *Saeid R. Dindarloo, PhD*
Sponsoring Party: *MoPSC Staff*
Type of Exhibit: *Rebuttal Testimony*
Case No.: *ER-2021-0312*
Date Testimony Prepared: *December 20, 2021*

MISSOURI PUBLIC SERVICE COMMISSION

FINANCIAL & BUSINESS ANALYSIS DIVISION

AUDITING DEPARTMENT

REBUTTAL TESTIMONY

OF

SAEID R. DINDARLOO, PhD

**THE EMPIRE DISTRICT ELECTRIC COMPANY,
d/b/a Liberty**

CASE NO. ER-2021-0312

*Jefferson City, Missouri
December 2021*

1 Q. Why did Empire present a reliability benchmark study?

2 A. The reliability of Empire's service was an issue in ER-2019-0374, which
3 was resolved by the unopposed paragraph 10 in the Global Stipulation and Agreement
4 ("Agreement") filed on April 15, 2020. Although the Commission did not approve the Agreement
5 in ER-2019-0374, the Commission noted in its Amended Report and Order issued July 23, 2020,
6 that the unopposed issue of reliable service should be resolved consistent with the terms of the
7 Agreement¹ Per the Global Stipulation and Agreement in ER-2019-0374, Empire agreed to
8 provide a benchmark study to analyze the reliability performance of investor-owned electric
9 utilities in Missouri, Oklahoma, Kansas, and Arkansas, using the publicly available System
10 Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index
11 (SAIDI) data.²

12 Q. What is SAIFI?

13 A. SAIFI is a gauge for outage frequency. It reflects the average frequency of service
14 interruptions in number of occurrences per customer and is defined as the total number of customer
15 interruptions for the period covered divided by the total number of customers served.

16 Q. What is SAIDI?

17 A. SAIDI is a gauge for outage duration. It reflects the average interruption in hours
18 or minutes per customer served for the period covered and is defined as the sum of all customer
19 interruption durations divided by the total number of customers served.

¹ Page 22(footnote #45): "Reliable Service has been resolved by the parties pursuant to paragraph 10 of the Agreement. In the parties' May 11, 2020, Response to Commission Order, the undisputed Reliable Service issue is designated as Issue 22b, referencing the parties April 8, 2020, Joint List of Issues, which sets forth the parties original list of contested issues for Commission determination."

Page 24: "Having reviewed the related filings in the record and determined the unopposed terms in the Agreement to be reasonable resolutions of the undisputed issues identified in the May 11, 2020 Response to Commission Order, the Commission finds the undisputed issues should be resolved consistent with the terms of the Agreement unless otherwise specified in this order."

² Case No. ER-2019-0374- Exhibit No. 750: Global Stipulation and Agreement. P.6.

1 Q. Are the electric utilities required to report to the Commission certain
2 reliability indices?

3 A. Yes. Commission rule 20 CSR 4240-23.010 requires reporting of four major
4 indices including SAIFI and SAIDI. The other major reliability metrics are Customer Average
5 Interruption Duration Index (CAIDI) and Customer Average Interruption Frequency Index
6 (CAIFI). My testimony will focus on the metrics included in Empire's benchmark study, SAIFI,
7 and SAIDI.

8 Q. Please summarize Empire witness Jeffrey Westfall's direct testimony regarding the
9 benchmark study and the Company's reliability improvement programs and investments.

10 A. On page 16 of his direct testimony, Mr. Westfall asserted that the "Comparison of
11 the including and excluding major events performance indicates Empire customers are benefiting
12 from a more resilient infrastructure and enhanced restoration capabilities...". Mr. Westfall also
13 stated that Empire's reliability indices improved significantly in 2020 compared to the benchmark
14 study that included the period of 2014-2019.

15 To improve the reliability of its transmission and distribution assets, Empire has
16 implemented a reliability improvement program called "Operation Toughen-Up" since 2010,
17 which aims to upgrade and replace aging equipment and components.³ In addition to the mentioned
18 program, Empire continuously invests in other reliability improvement projects as summarized in
19 Schedule JW-1 of direct testimony of the Company's witness Jeffrey Westfall.

20 Q. Please summarize the results of the reliability benchmark study performed by
21 Empire?

³ Direct testimony of the Company's witness, Jeffrey Westfall, P. 4.

1 A. Based on the results of the benchmark study performed by the Company⁴, Empire
2 is ranked 3rd for SAIDI index among 26 electric utilities in Missouri, Kansas, Oklahoma, and
3 Arkansas over the period of 2014-2019. For SAIDI (excluding major events), SAIFI, and SAIFI
4 (excluding major events), Empire has ranked, respectively, 10th, 8th, and 13th among all studied
5 utilities, which includes IOUs, co-ops, and publicly-owned electric utilities.

6 Q. According to the benchmark study, what is the status of Empire’s reliability indices
7 compared to other Missouri utilities?

8 A. Table 1 shows Empire’s rank compared to the other Missouri IOUs, which
9 demonstrates that there is a considerable potential for Empire to improve its SAIFI and SAIDI
10 reliability indices, particularly when excluding major events. Although Empire has significantly
11 improved its reliability indices in 2020 compared to its 2014-2019 average performance in the
12 benchmark study, Empire’s rank among Missouri IOUs remained unchanged (see Table 2). These
13 indices are affected by customer density, tree density, geography, observed weather, and other
14 factors that may be beyond the control of the utilities.

15 TABLE 1. Missouri IOUs reliability ranking based on the Empire’s benchmark study (2014-2019)
16

	SAIFI Rank	SAIFI excluding major events Rank	SAIDI Rank	SAIDI excluding major events Rank
Empire	8	13	3	10
Evergy Metro	10	5	18	4
Evergy West	12	7	11	6
Ameren	3	3	7	5

17

⁴ Case No. EO-2021-0383- Empire's 2020 Annual Reliability Report, PP 19-23.

1 Table 2. Comparison of Empire’s 2020 reliability indices with other Missouri IOUs’ 2014-2019
2 indices
3

Period	Company	SAIFI	SAIFI excluding major events	SAIDI	SAIDI excluding major events
2014-2019	Empire	1.289	1.212	144.47	116.27
	Evergy Metro	1.299	0.924	357.31	84.58
	Evergy West	1.369	1.046	214.49	101.62
	Ameren	0.99	0.768	184.33	92.17
2020 ⁵	Empire	0.936	0.936	103.39	103.39

4
5 Q. Do you agree with Mr. Westfall’s statement, on page 16 of his direct testimony,
6 regarding the status of Empire’s performance in terms of reliability indices?

7 A. Partially. Based on the results of the benchmark study, Empire has improved its
8 reliability as measured by SAIFI and SAIDI during the analysis period. Also, according to the
9 Company’s annual reliability indices report for the year 2020, the Company has further improved
10 these reliability indices compared to the benchmark time period. However, as it is further discussed
11 below in my testimony, Empire’s reliability performance is below other investor-owned utilities
12 in Missouri.

13 Q. Are all customers of Empire experiencing the same level of reliability?

14 A. No. Pursuant to 20 CSR 4240-23.010, Empire has filed its 2020 annual reliability
15 report, which includes the top 5% worst performing circuits based on SAIFI and the Company’s
16 plans to improve them. ** [REDACTED]

17 [REDACTED]⁶ **

18 Q. Do all Companies in the benchmark study use the same definition and procedures
19 for describing and calculating their reliability indices?

⁵ Case No. EO-2021-0383- Empire's 2020 Annual Reliability Report.

³ Case No. EO-2021-0383- Empire's 2020 Annual Reliability Report, P.7.

1 A. No. The IEEE 1366 standard has been used for the companies that use
2 it for reporting reliability indices. However, it should be noted that Empire
3 excludes maintenance/planned outages when reporting its annual reliability indices (i.e., SAIDI,
4 SAIFI, CAIDI, and CAIFI). However, other Missouri investor-owned utilities include such
5 outages in their reliability index calculations.^{7,8} Depending on the frequency and duration of the
6 excluded planned outages, Empire's reported reliability indices might be significantly
7 underreported, which can further exacerbate Empire's rank compared to other Missouri and
8 neighboring states' investor-owned electric utilities, according to the benchmark study conducted
9 by Empire.⁹

10 Q. Do major storm events skew the reliability indices?

11 A. Yes. However, Missouri electric utilities are required to report their reliability
12 indices with and without major events (e.g., severe storms, tornados, earthquakes) to account for
13 the effect of severe, but less frequent, events on reliability indices. The exclusion of major events
14 provides a better look at day-to-day reliability.

15 Q. Please provide Staff's recommendations to the Commission regarding the
16 improvement of the Company's reliability performance.

17 A. Staff has two recommendations.
18 First, Staff recommends that Empire continue to invest in its reliability improvement programs, to
19 further improve its reliability performance to further reduce the gap between its reliability and
20 other IOUs in the region as described in Tables 1 and 2 above.

⁷ Ameren's response to Staff's DR No. 0002- Case No. EO-2021-0380.

⁸ Evergy's response to Staff's DR No. 0003- Case No. BRIP-2021-1779, and DR No. 0003- Case No. BRIP-2021-1780.

⁹ Direct testimony of the Company's witness, Jeffrey Westfall- Schedule JW-3.

1 Second, Staff recommends that the Commission order Empire to provide an annual report to
2 update the status of its reliability improvement projects and expenditures in a format similar, but
3 not limited, to Schedule JW-1 of the direct testimony of Mr. Westfall, and to identify and justify
4 future reliability improvement opportunities. Currently, pursuant to 20 CSR 4240-23.010(9),
5 Empire files its annual reliability improvement program that summarizes the Company's
6 scheduled programs to maintain or improve its reliability in the next year. In its 2020 report,¹⁰
7 Empire mentioned that the Toughen-Up program will end in 2021; however, the Company plans
8 to spend \$53,826,000 in 2021 on similar projects. Empire does not provide details of such projects
9 in its annual report. A detailed reporting of the justification, necessity, cost-benefit analysis,
10 expected contribution to reliability improvement, budget, progress, and future plans for such
11 projects, under or in-lieu of the Toughen-Up program, is recommended to be submitted by Empire
12 on an annual basis. It is recommended that Empire invests only in reliability projects that are
13 reasonably deemed effective in improving the reliability of its distribution systems, when
14 measured using reliability indices.

15 Q. Does this conclude your Rebuttal Testimony?

16 A. Yes it does.

¹⁰ EFIS Tracking No. BRIP-2021-0278- Empire's Reliability Improvement Program. P. 7.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

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)

Case No. ER-2021-0312

AFFIDAVIT OF SAEID R. DINDARLOO, PhD

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW SAEID R. DINDARLOO, PhD, and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Rebuttal Testimony of Saeid R. Dindarloo, PhD, PE*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

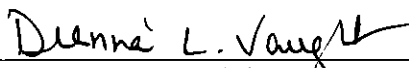


SAEID R. DINDARLOO, PhD

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 20th day of December, 2021.

DIANNA L. VAUGHT Notary Public - Notary Seal State of Missouri Commissioned for Cole County My Commission Expires: July 18, 2023 Commission Number: 15207377



Notary Public

Saeid Dindarloo

I am employed by the Missouri Public Service Commission as an Associate Engineer in the Engineering Analysis Department of the Industry Analysis Division. I mainly review and provide recommendations for electric and gas rate cases (and other cases) as subject matter expert (SME).

Educational Background and Work Experience

I obtained Bachelor of Science and Master of Science degrees, both in Mining Engineering, in 2006 and 2008, respectively. I also received a PhD degree in Mining Engineering from Missouri University of Science and Technology in 2012. I was employed by Missouri University of Science and Technology from 2012 to 2017; Missouri Department of Social Services from 2017 to 2018; Missouri Department of Natural Resources from 2018 to 2020; and Missouri Public Service Commission since 2020.

Case Participation

No.	Case/Tracking	Utility Type	Type Of Case	Designation
	EA-2020-0371	Electric	CCN	Staff
	EO-2021-0308	Electric	Other	SME
	EO-2021-0327	Electric	Other	SME
	EO-2021-0330	Electric	Other	SME
	EO-2021-0344	Electric	Other	Staff
	EO-2021-0345	Electric	Other	Staff
	EO-2021-0346	Electric	Other	Staff
	EO-2021-0347	Electric	Other	Staff
	EO-2021-0348	Electric	Other	Staff
	EO-2021-0352	Electric	Other	SME
	EO-2021-0380	Electric	Other	SME
	EO-2021-0383	Electric	Other	SME
	EO-2021-0404	Electric	Other	SME
	EO-2021-0405	Electric	Other	SME
	ER-2021-0312	Electric	Rate Case	Staff
	EW-2021-0267	Electric	Working Group	Staff
	GR-2021-0108	Gas	Rate Case	SME