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November 3, 2025



Ms. Sasha Bergman
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

**RE: In the Matter of Otter Tail Power Company 2024 Annual Safety,
Reliability and Service Quality Report and Proposed SAIFI, SAIDI and
CAIDI Reliability Standards for 2025
Docket No. E017/M-25-30
IEEE Supplemental Filing**

Dear Ms. Bergman:

Otter Tail Power Company (Otter Tail Power) submits this IEEE Supplemental filing in the above-referenced matter in compliance with ordering paragraph 4, 5 and 9 of the Minnesota Public Utilities Commission's Order dated January 13, 2025, in Docket No. E017/M-24-30 (In the matter of Otter Tail Power Company's 2024 Annual Safety, Reliability and Service Quality Report and Proposed SAIFI, SAIDI and CAIDI Reliability Standards for 2024 and future standards).

4. *Otter Tail Power's 2024 statewide Reliability Standard is set at the IEEE benchmarking second Quartile for medium utilities. Otter Tail's work center reliability standards are set at the IEEE benchmarking second quartile for medium utilities. Set Otter Tail Power's 2023 statewide Reliability Standard at the IEEE benchmarking 2nd Quartile for medium utilities. Set Otter Tail's work center reliability standards at the IEEE benchmarking 2nd quartile for medium utilities. Required Otter Tail to file a supplement to its 2024 SQSR report 30 days after IEEE publishes the 2024 benchmarking results, with an explanation for any standards the utility did not meet.*
5. *Otter Tail Power's must file a supplement to its 2024 safety, reliability, and service quality report 30 days after IEEE publishes the 2024 benchmarking results, with an explanation for any standards the utility did not meet.*
9. *Minnesota Power and Otter Tail Power must include a discussion on the IEEE reporting sample size and data exclusion challenges from this year*

The attached IEEE 2025 (for 2024) Benchmark Reliability Survey results were completed August 15, 2025. Note that the 2024 IEEE Benchmark Results include all utilities, small, medium and large, thus the results shown below include all utilities and no breakdown by size was included.

Table 1 shows Otter Tail Power’s 2024 normalized SAIFI, CAIDI and SAIDI results based on the IEEE 2.5 Beta Method philosophy for the entire Minnesota system and work centers, compared with the IEEE benchmarking second quartile for all responding utilities. Otter Tail’s **2024 results were gathered by our new Outage Management System which captures customer minutes and sustained customer interruptions at the customer level compared to previous (all years) reporting which gathered data at the feeder level.** As expected, we have seen impacts on our metrics with the application at a more granular level.

Table 1

	SAIDI IEEE	SAIFI IEEE	CAIDI IEEE
2024 IEEE Benchmark Median for all utilities	137	1.06	124
Bemidji	114.77	1.05	109.75
Crookston	108.2	0.81	133.73
Fergus Falls	220.37	1.57	140.44
Morris	108.74	0.8	135.72
MN Total	141.55	1.16	122.22

Fergus Falls CSC 2024 SAIDI, SAIFI, and CAIDI results exceeded all IEEE benchmark median results. MN Total System exceed SAIDI and SAIFI goals largely due to results within the Fergus Falls CSC. As mentioned previously, we have migrated to a more granular interruption data system for 2024 reporting (OMS implemented in December 2022) and away from our former reporting method (Interruption Monitoring System, IMS) in the 2023 and prior timeframe.

Among the most significant events influencing Fergus Falls CSC reliability metrics in 2024 were several summer storms with widespread impacts, as well as a notable equipment failure:

- A Mid-July Summer Storm (Wind/Trees/Lightning) occurred from July 13 to July 14, 2024. This event resulted in a total of 1,047,374 customer minutes. Affected were 2,881 customers, with an average outage duration of 315 minutes. Nineteen feeders were impacted, with outages concentrated around Ottertail city, Perham, Rush Lake, Parkers Prairie, and Elizabeth/Carlisle.

- **Material Failure (Overhead Splice):** On December 18, 2024, from 4:00 PM to 6:55 PM, an overhead splice failure led to a complete outage at the Fergus Falls Buse St. Substation. This incident lasted 175 minutes and affected a total of 2,172 customers, adding 380,100 customer minutes to the annual interruption totals.
- **Late July Summer Weather (Trees/Wind):** On July 31, 2024, wind gusts of 91 MPH caused 218,445 customer minutes impacting 2,219 customers with an average duration was 91 minutes. Eighteen feeders were impacted, most notably the Fergus Falls Buse NW Feeder, which experienced a full outage when a tree fell on the line—affecting 1,337 customers for 70 minutes and accounting for 82,000 customer minutes. Additional feeders impacted included All Freazee (North, South, Rural), Wendell, Elbow Lake, Elizabeth/Carlisle, and Perham.

These events, particularly the July storms and the December equipment failure, contributed substantially to the elevated SAIDI, SAIFI, and CAIDI figures for Fergus Falls CSC and, by extension, the Minnesota Total System in 2024.

Regarding the request to include discussions on “*the IEEE reporting sample size and data exclusion challenges from this year,*” Otter Tail Power responds with the following:

According to the US Energy Information Administration (EIA) there are 166 investor-owned utilities in the United States. The IEEE survey sample size of 73 respondents may or may not be statistically significant. EEI’s Reliability Survey, in which OTP participates, has a sample size of 10% more utilities with much more data, i.e. outage cause types by percentage, customer minutes associated, and statistics, etc. Survey accuracy would be dependent on desired confidence level, margin of error, and the variability within the population. Otter Tail Power, a rural focused electrical utility, serves 422 communities with an average population of approximately 400, in a service territory the size of the state of North Dakota. If the utility respondent population “type” does not have the customer rural demographic Ottertail has, with much exposure, results could vary greatly.

Also, the exclusion of utility size breakdown is contrary to the original intentions of the compliance orders.

Otter Tail has electronically filed this document with the Minnesota Public Utilities Commission and on all persons on the official service list for the above-referenced docket. A Certificate of Service is also enclosed.

Sasha Bergman
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November 3, 2025

Please contact me at (218) 739-8552 or rjensen@otpc.com, should you have any questions.

Sincerely,

/s/ ROD D. JENSEN
Rod D. Jensen PE
Senior Reliability Engineer

amn
Enclosures
By electronic filing
c: Service List



IEEE Benchmark Year 2025 Results for 2024 Data

2025 Distribution Reliability Working Group Meeting

Updated August 15, 2025 Austin, TX



History of the Study

Background

- 1. Initiated in 2003, conducted annually*
- 2. Participants are anonymous with key identifier to retain anonymity*
- 3. Participation list is not revealed to anyone*
- 4. Each participant can choose to share their results*
- 5. No inference is made about good or bad reliability*
- 6. Intended to provide information for users to assess their performance relative to peers*
- 7. Called the 2025 Study (for 2024 Results)*



Benchmarking

Using annual key metrics (SAIDI, SAIFI and CAIDI) to assess performance of a system may be useful, however, needs to be tempered with judgment

DRWG Study attempts to identify various aspects that could cause a difference in reported metrics

Data may not be directly comparable, since

- Data collection & system differences exist
- Certain exclusion differences can occur, although we strive to have the differences minimized
- No exclusions for performance beyond catastrophic event day levels which could influence trend in subsequent years and then roll off

IEEE 1366-2003/2012/2022

- addresses data issues by clearly defining the rules (i.e. what data should be excluded)
- It **DOES NOT** address the data collection issues
- Companies may not report all forms of outages, due to data collection issues or other reasons

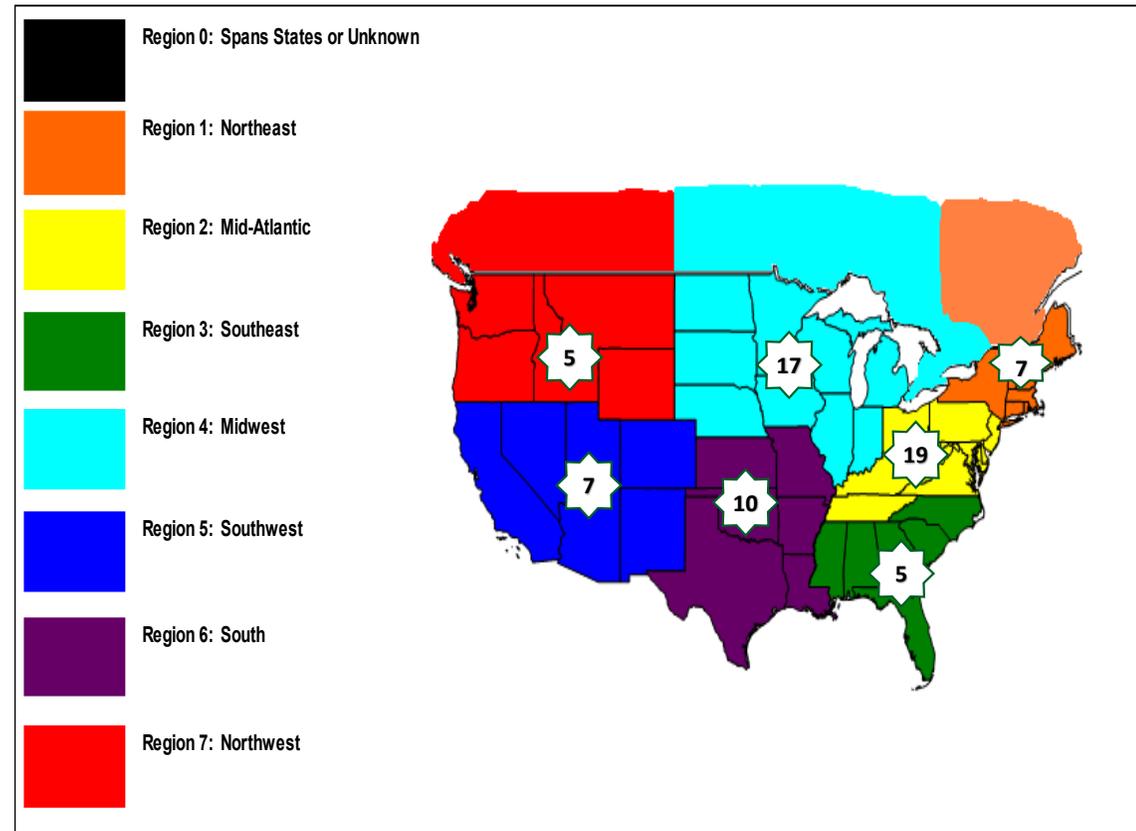


2025 Benchmark Results

For calendar data 2024



Regions represented by the participants 2025 Benchmark Study





Respondents in 2025: 73

ALL	73	SAIDI ALL	SAIDI IEEE	SAIDI WOF	SAIDI WOP	SAIFI ALL	SAIFI IEEE	SAIFI WOF	SAIFI WOP	CAIDI ALL	CAIDI IEEE	CAIDI WOF	CAIDI WOP
	MIN	58	30	30	27	0.59	0.33	0.33	0.31	61	47	50	50
	Q1	207	95	91	86	1.13	0.86	0.77	0.70	168	108	110	106
	MEDIAN	329	137	126	111	1.45	1.06	0.94	0.86	208	124	131	131
	Q3	560	213	199	182	2.17	1.51	1.45	1.26	342	149	157	157
	MAX	3063	474	452	424	4.11	3.30	2.75	2.47	1388	232	240	247
	Study-Wide Weighted Results	616	168	138	119	1.74	1.31	1.07	0.95	354	128	129	126

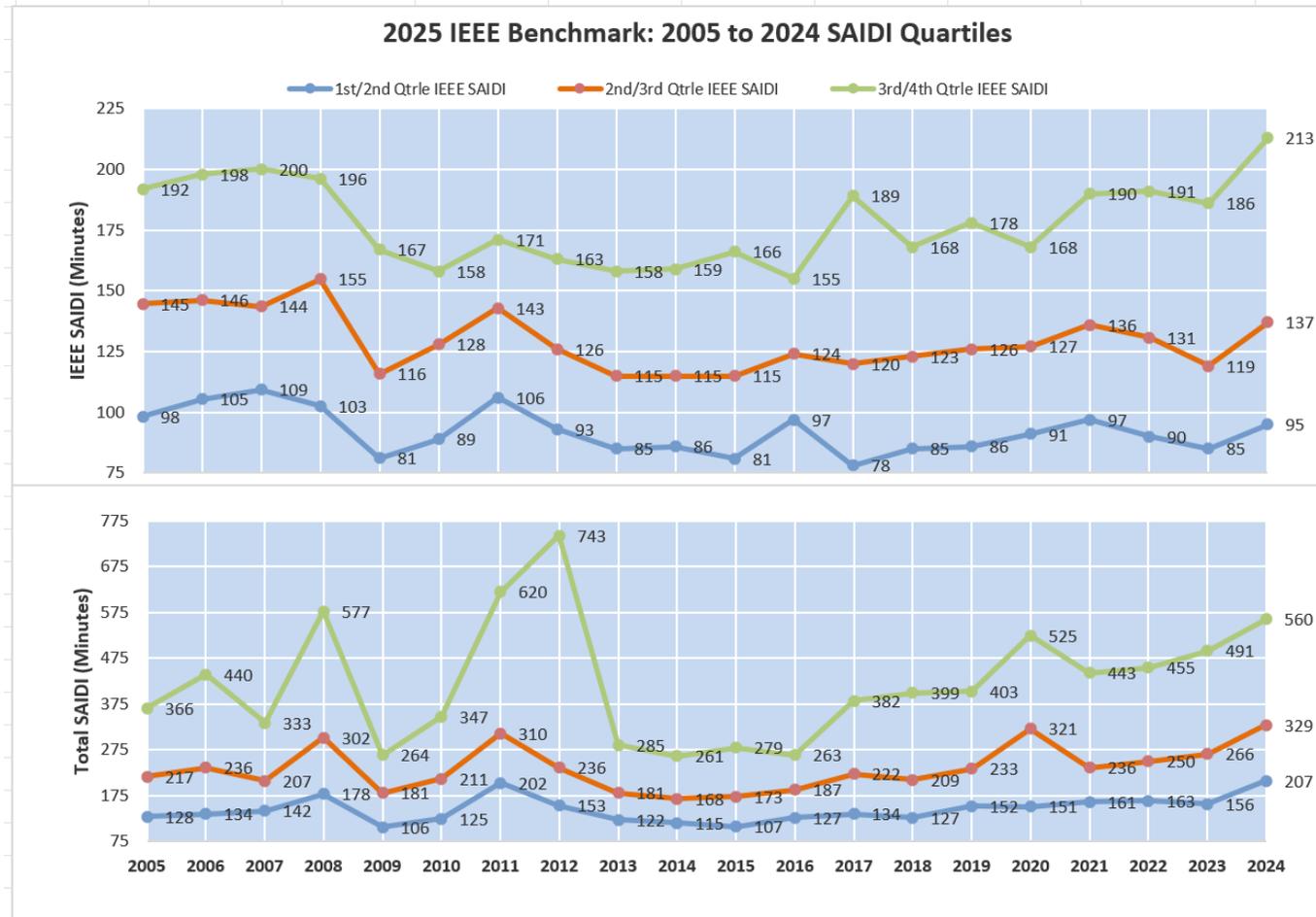
Updated Values: Respondents in 2024: 73

ALL	73	SAIDI ALL	SAIDI IEEE	SAIDI WOF	SAIDI WOP	SAIFI ALL	SAIFI IEEE	SAIFI WOF	SAIFI WOP	CAIDI ALL	CAIDI IEEE	CAIDI WOF	CAIDI WOP
	MIN	37	24	24	24	0.06	0.06	0.06	0.06	69	61	61	58
	Q1	156	85	81	75	1.01	0.74	0.65	0.59	160	110	113	111
	MEDIAN	266	119	110	94	1.27	0.98	0.86	0.78	192	136	140	140
	Q3	491	186	182	156	1.64	1.27	1.22	1.08	306	154	158	157
	MAX	2822	401	401	349	5.07	3.45	2.84	2.64	1032	589	562	562

ALL	73	SAIDI ALL	SAIDI IEEE	SAIDI WOF	SAIDI WOP	SAIFI ALL	SAIFI IEEE	SAIFI WOF	SAIFI WOP	CAIDI ALL	CAIDI IEEE	CAIDI WOF	CAIDI WOP
	MIN	37	24	24	24	0.06	0.06	0.06	0.06	69	61	61	58
	Q1	150	84	80	74	0.95	0.70	0.65	0.58	156	109	112	108
	MEDIAN	266	119	110	94	1.27	0.98	0.86	0.78	192	136	140	140
	Q3	491	186	182	156	1.64	1.27	1.22	1.08	306	154	158	157
	MAX	2822	401	401	349	5.07	3.45	2.84	2.64	1032	589	562	562

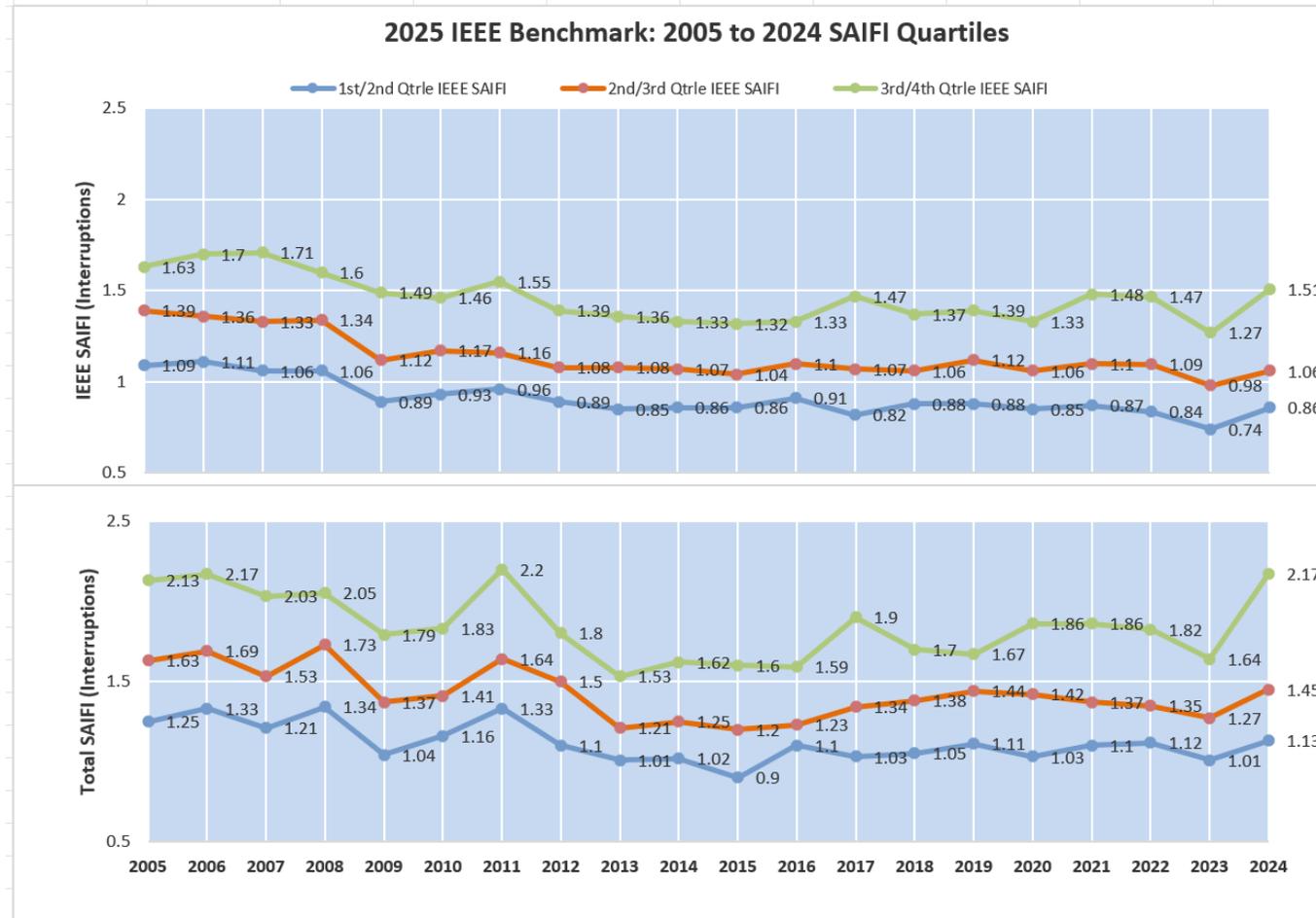


Historic SAIDI Quartiles



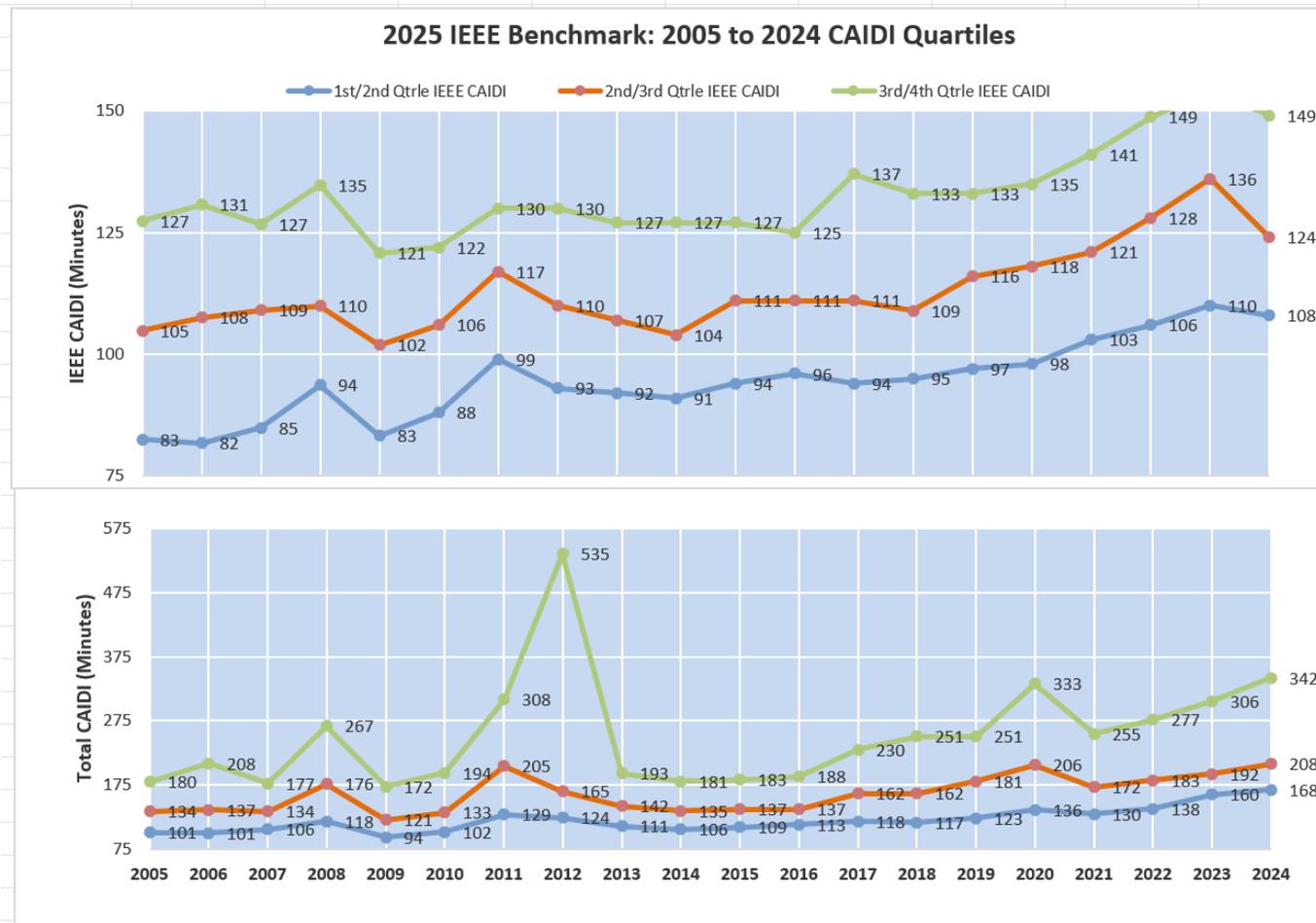


Historic SAIFI Quartiles



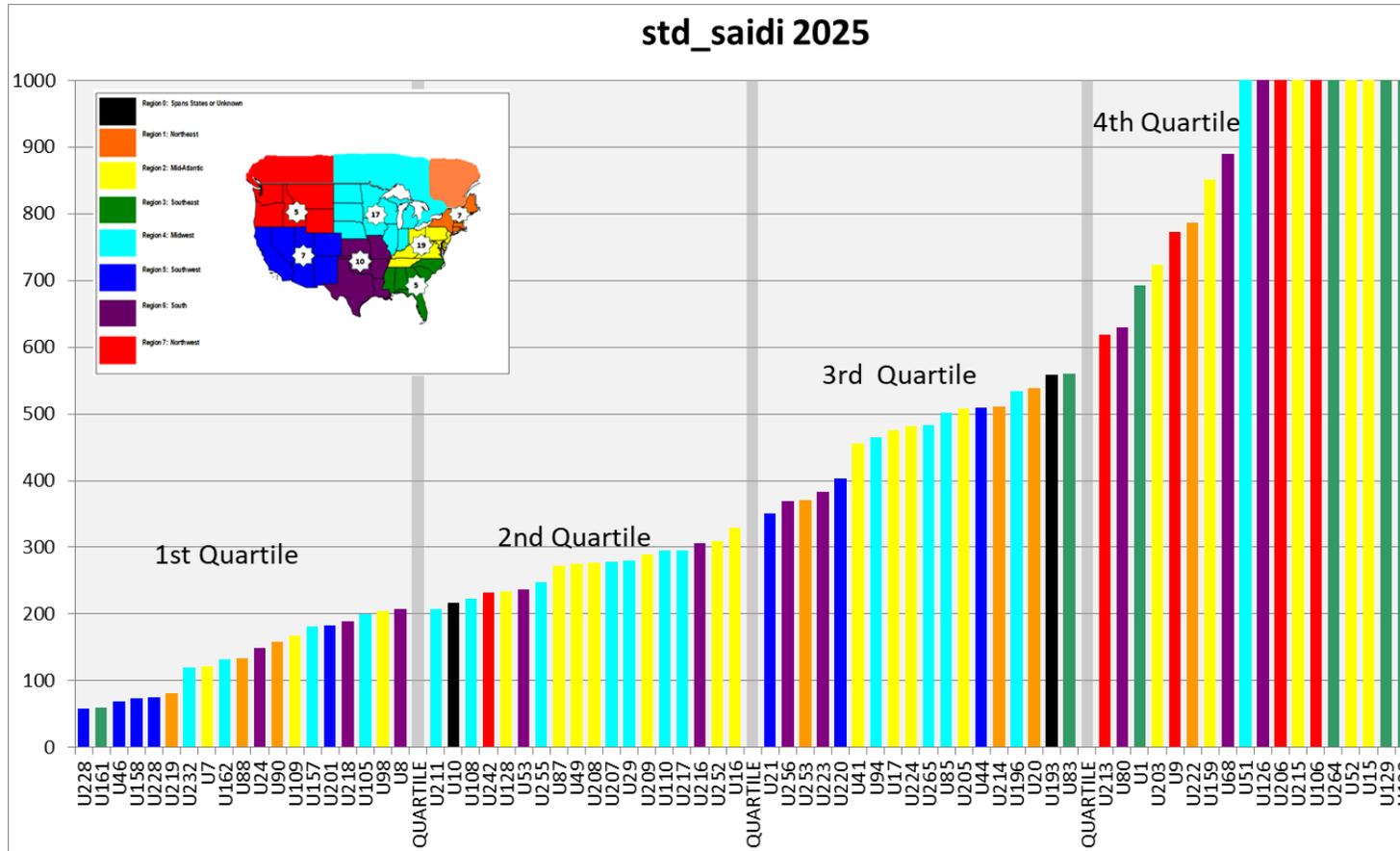


Historic CAIDI Quartiles



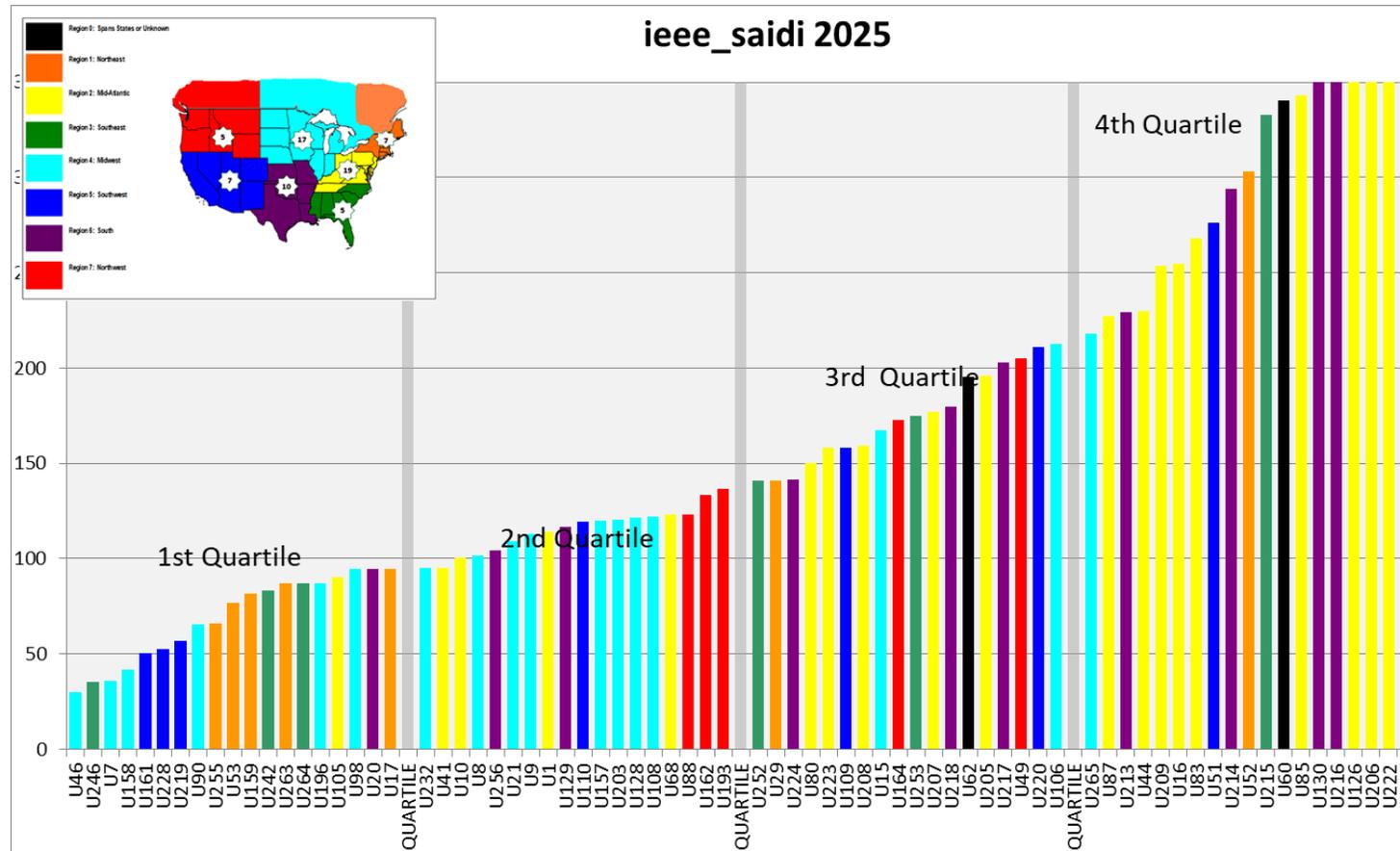


Total SAIDI



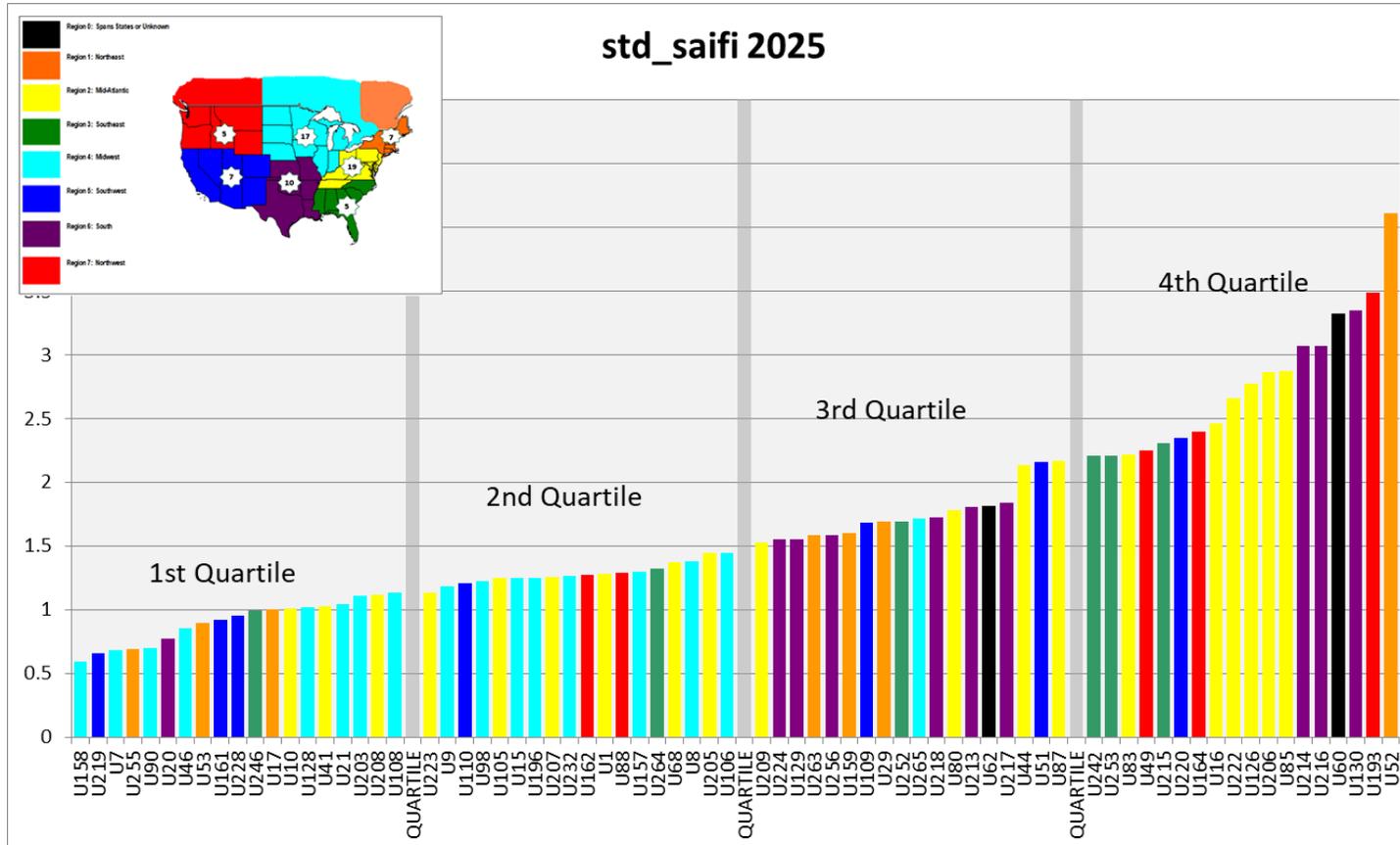


IEEE SAIDI



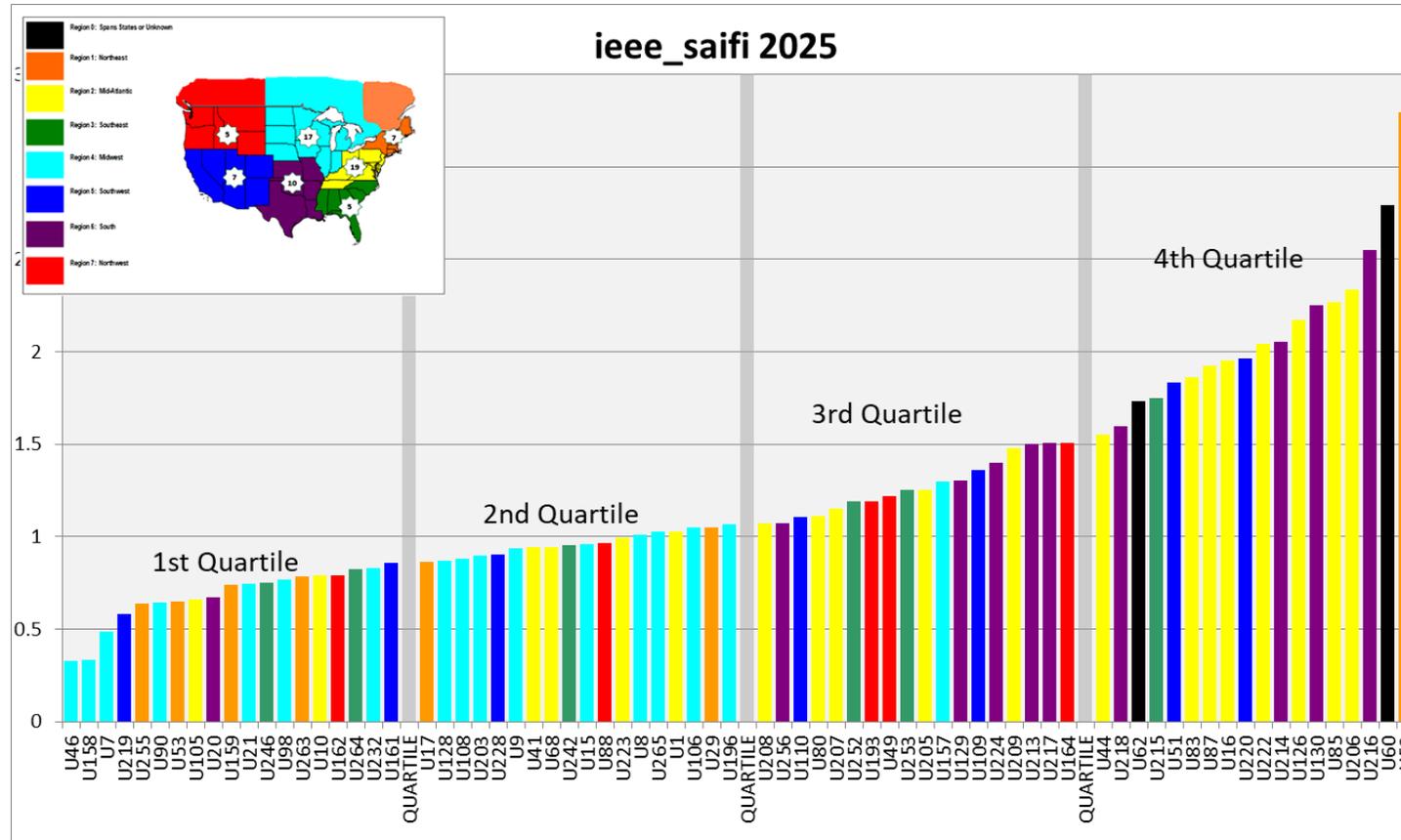


Total SAIFI



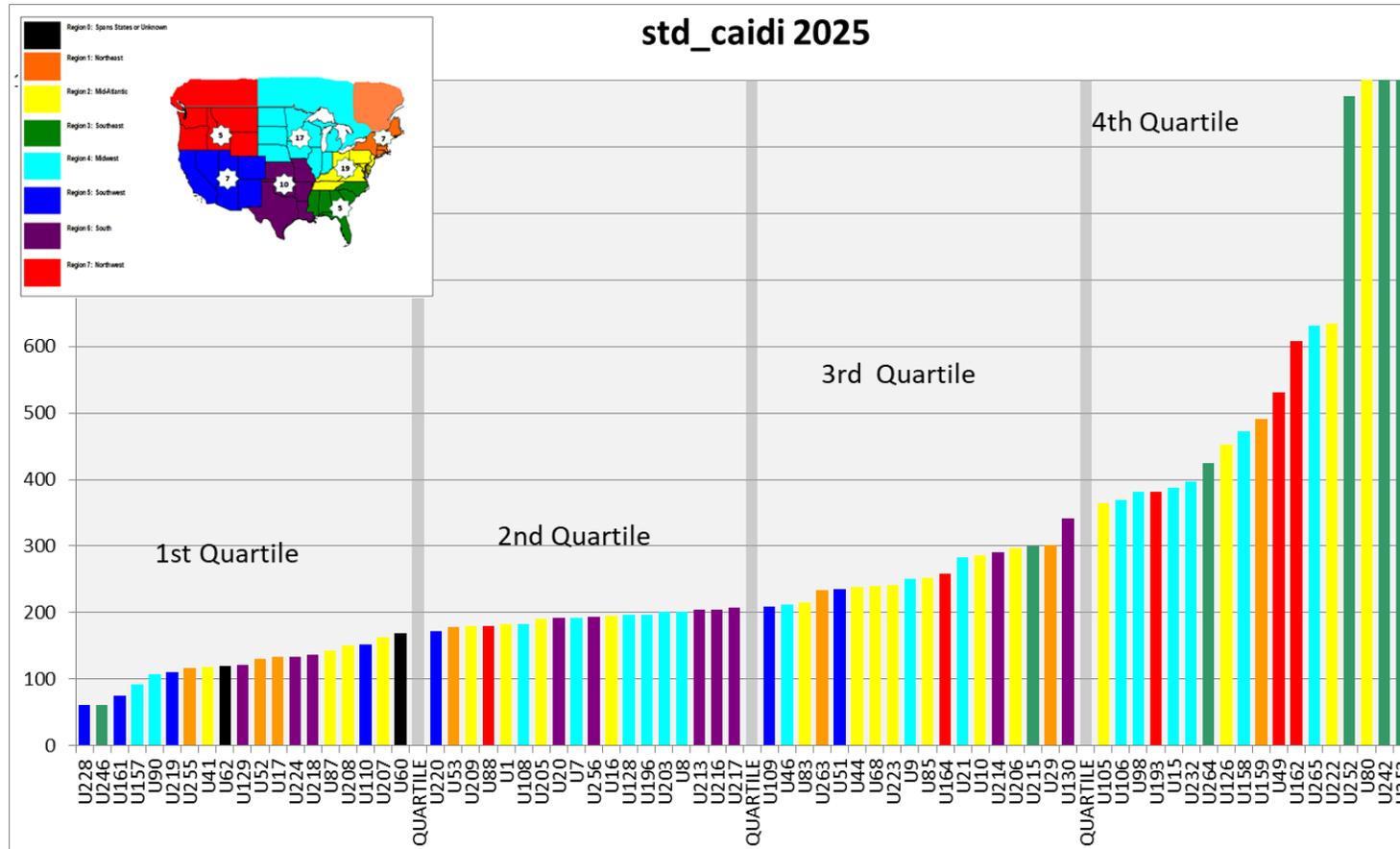


IEEE SAIFI





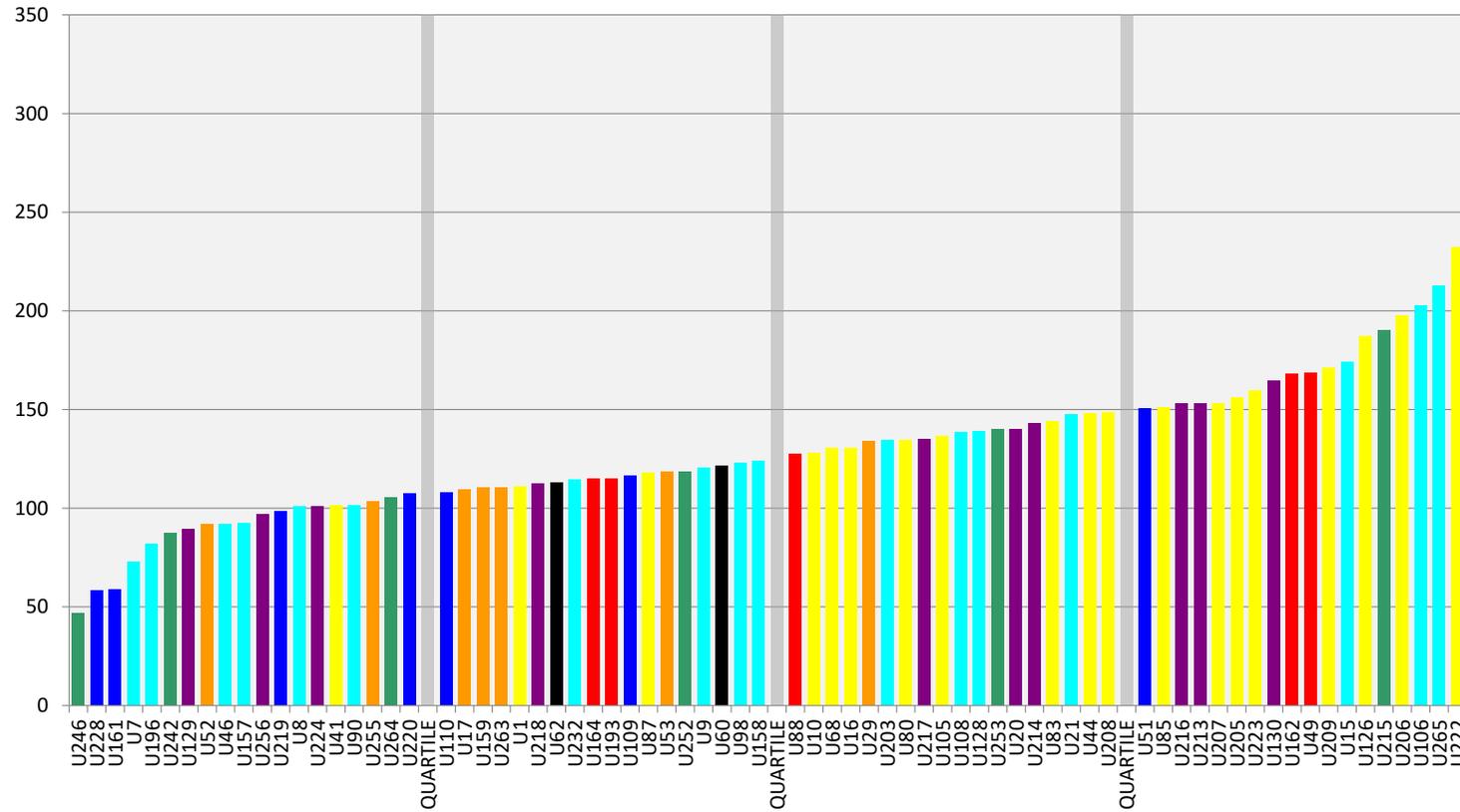
Total CAIDI





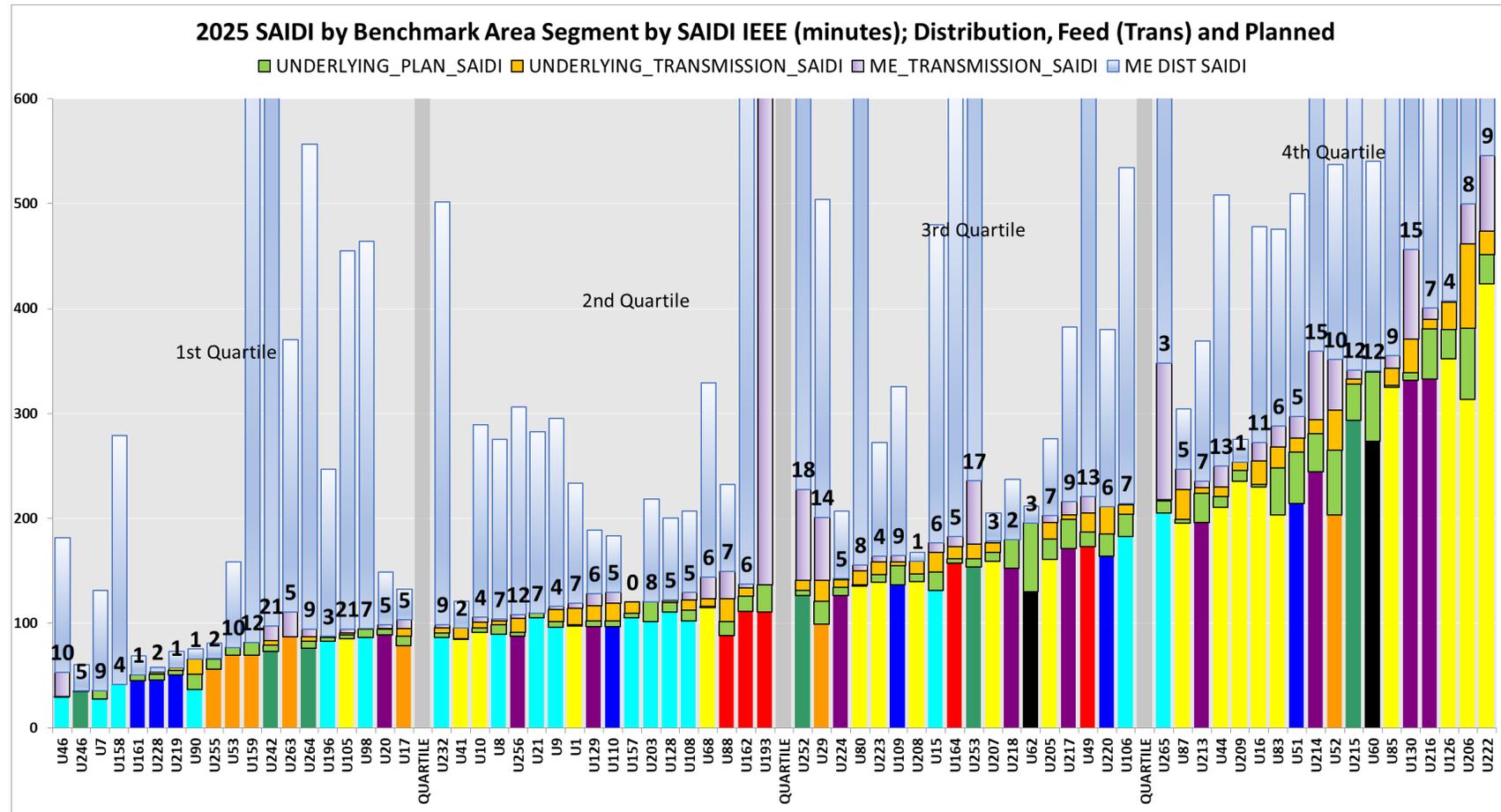
IEEE CAIDI

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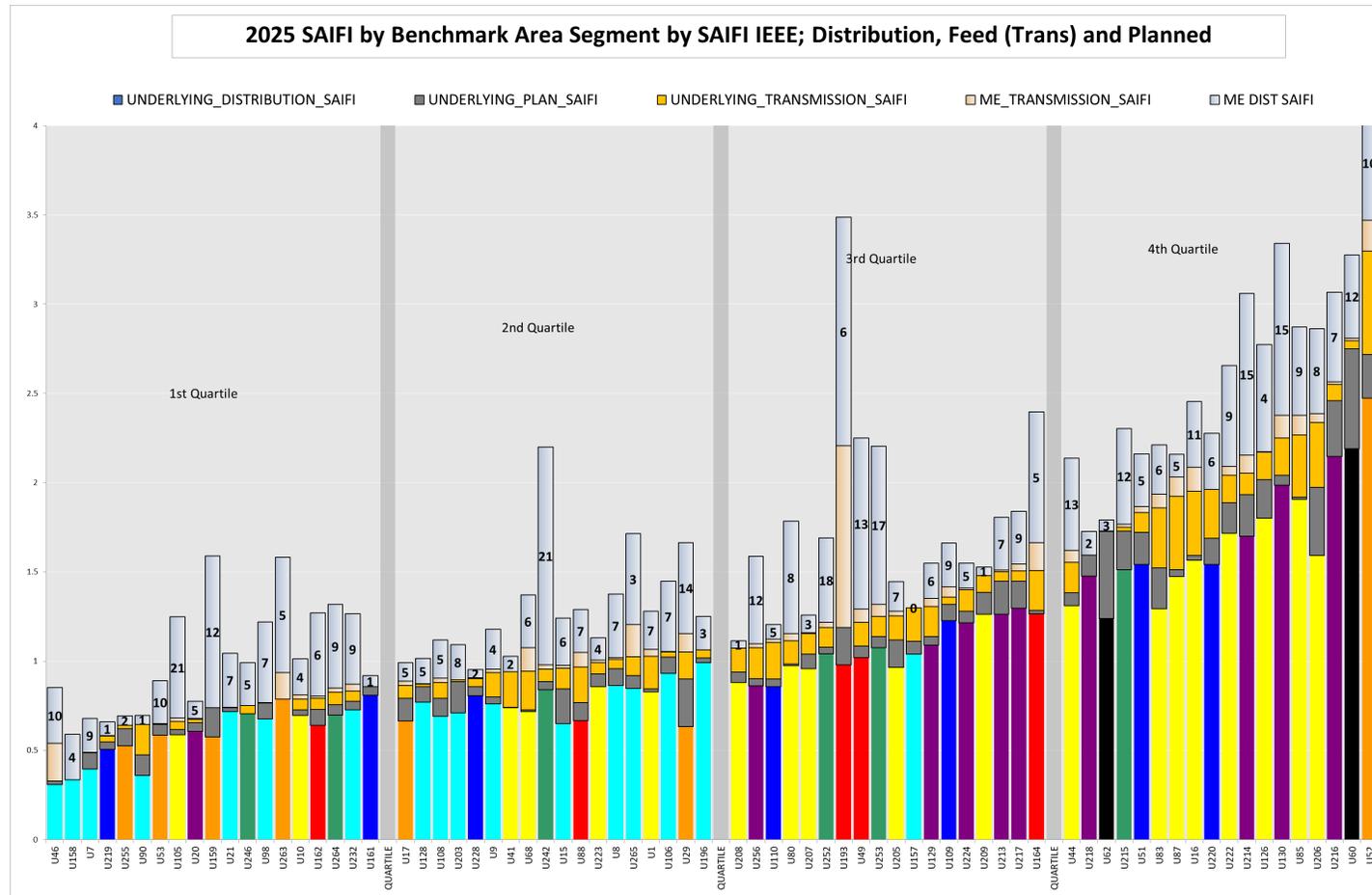


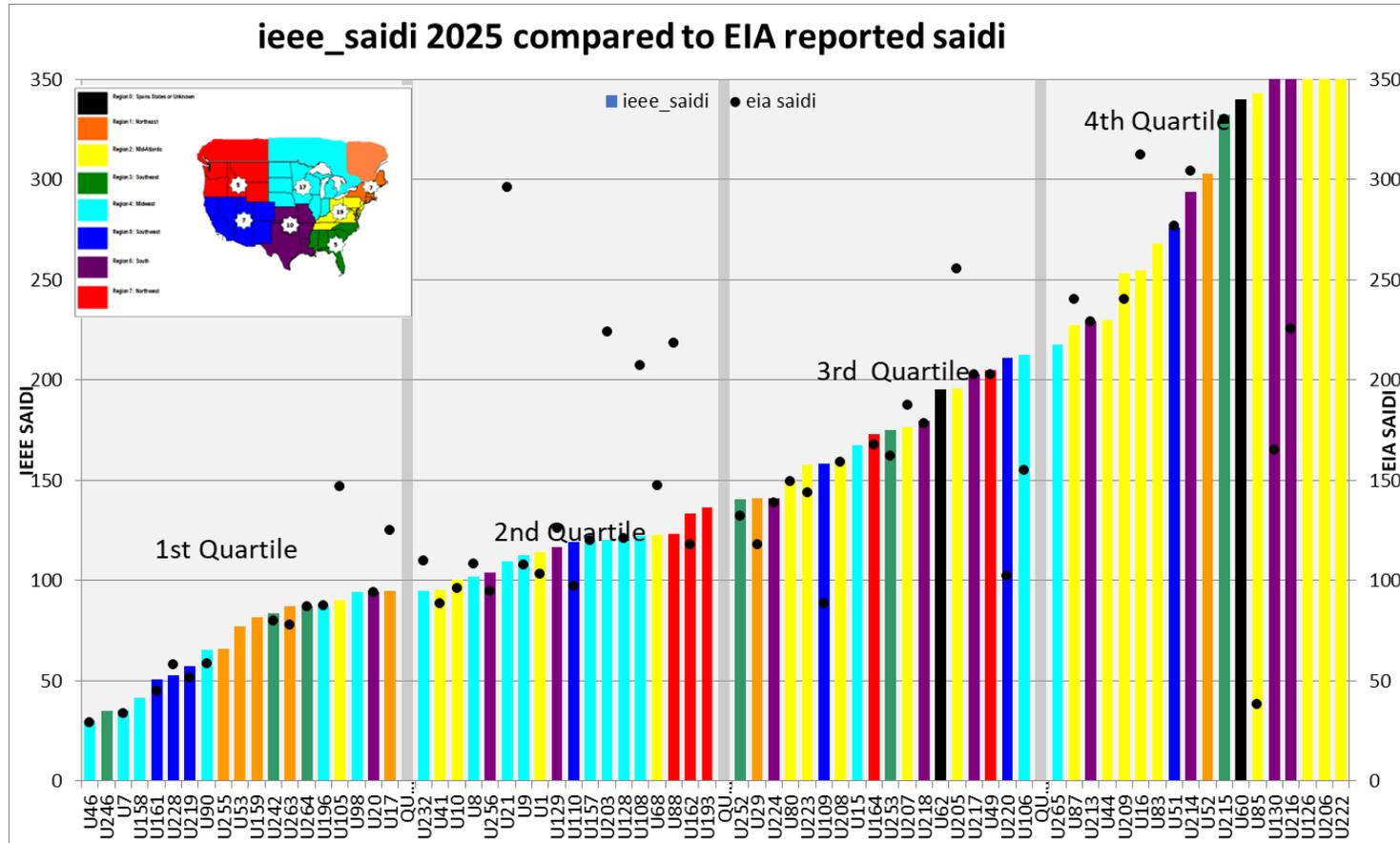
Stacked SAIDI





Stacked SAIFI









IEEE DRWG/PNNL Reliability Analysis Coordination

2025 Distribution Reliability Working Group Meeting

July 29, 2025 Austin, TX



Approach

1. *Compare eagle-I to IEEE DRWG benchmark results*
2. *Attempt to determine how real time versus after-the-fact (scrubbed) data can be used to perform correlations against climate data as well as whether real-time data can be used to develop predictive performance expectations (i.e. situational awareness)*
3. *Define how best to use each dataset*
4. *Move forward with climate versus system performance*



Benchmarking

Perform daily comparisons of eagle-I versus ieee daily ci and cmi

Timing challenges occurred

Reviewed various ways of accounting for time issues

Looked at different methods of determining correlations and defining areas where correlations worked

Identify how and when regional values can be used to determine reliability impacts resulting from climate variables

Begin to identify whether there is a “fragility curve” relating to specific climate variables which are statistically significant within areas



Results

Comparisons of correlation coefficient between IEEE and EAGLE-I across NERC regions

	IEEE_CI vs Daily max	IEEE_CI vs Sum diff	IEEE_CI vs Movibg avg	IEEE_moving_avg vs Moving avg
WECC	0.56 (0.56)	0.33 (0.59)	0.38 (0.56)	0.48 (0.68)
FRCC	0.74 (0.61)	0.80 (0.64)	0.76 (0.58)	0.89 (0.77)
MRO	0.41 (0.61)	0.37 (0.62)	0.38 (0.59)	0.48 (0.75)
NPCC	0.54 (0.68)	0.75 (0.69)	0.57 (0.59)	0.82 (0.80)
RFC	0.48 (0.61)	0.44 (0.63)	0.41 (0.58)	0.52 (0.65)
SERC	0.32 (0.56)	0.33 (0.59)	0.32 (0.58)	0.40 (0.68)
SPP	0.66 (0.73)	0.74 (0.75)	0.57 (0.67)	0.81 (0.86)
TRE	0.48 (0.52)	0.59 (0.51)	0.56 (0.46)	0.82 (0.61)
All NERC	0.36 (0.74)	0.33 (0.73)	0.33 (0.72)	0.38 (0.76)

Note: Pearson's correlation coefficient (Spearman's rank correlation coefficient)

- NERC region-specific correlation coefficient value is larger than that based on all NERC regions
- In most NERC regions (except WECC), IEEE 3-day moving window average CI and EAGLE-I 3-day moving window average CI has the highest correlation coefficient:
 - Possibly because WECC is too large?
- NERC regions highlighted in yellow background color has a relatively high correlation coefficient between the two outage datasets
- Spearman's rank correlation coefficient is generally higher than Pearson's correlation coefficients (Exceptions are mainly in FRCC and TRE).



Next Steps

Continue to explore correlations between climate and performance

- 1) Are there statistics which can inform our approaches?
 - a) How could we use these relationships to help real-time performance as well as long-term investment decisions?
 - b) Can we estimate how much that will improve our responses/resilience to various types of climate scenarios?
 - c) How does that relate to the various credible climate expectations?
- 2) Can we estimate how much such various options could improve results for communities and customers using tools like the ICE calculator?
- 3) Can we develop tools which will help the planners make better project choices?



Limitations

Spatial and temporal imprecision is influencing our products

- 1) We've asked for detailed outage data in the past...can we further this request?
- 2) Your system has certain geography associated with your data...can we use a service territory shape file (as a minimum) to help define the impacts and timing for reliability (anonymity will continue to be respected)
- 3) How can we further the analysis of climate versus performance to being to develop a Wizard for making the best hardening decisions for your geography given credible future climate scenarios?



CERTIFICATE OF SERVICE

**RE: In the Matter of Otter Tail Power Company 2024 Annual Safety, Reliability and Service Quality Report and Proposed SAIFI, SAIDI and CAIDI Reliability Standards for 2025
Docket No. E017/M-25-30**

I, Anahita Narimani, hereby certify that I have this day served a copy of the following, or a summary thereof, on Sasha Bergman and Sharon Ferguson by e-filing, and to all other persons on the attached service list by electronic service or by First Class Mail.

**Otter Tail Power Company
IEEE Supplemental Filing**

Dated this 3rd day of **November 2025**.

/s/ ANAHITA NARIMANI
Anahita Narimani
Regulatory Filing Coordinator
Otter Tail Power Company
215 South Cascade Street
Fergus Falls MN 56537
(218) 739-8363

#	First Name	Last Name	Email	Organization	Agency	Address	Delivery Method	Alternate Delivery Method	View Trade Secret	Service List Name
1	Sasha	Bergman	sasha.bergman@state.mn.us		Public Utilities Commission		Electronic Service		No	Official 25-30
2	Mike	Bull	mike.bull@state.mn.us		Public Utilities Commission	121 7th Place East, Suite 350 St. Paul MN, 55101 United States	Electronic Service		Yes	Official 25-30
3	Ray	Choquette	rchoquette@agp.com	Ag Processing Inc.		12700 West Dodge Road PO Box 2047 Omaha NE, 68103-2047 United States	Electronic Service		No	Official 25-30
4	Generic	Commerce Attorneys	commerce.attorneys@ag.state.mn.us		Office of the Attorney General - Department of Commerce	445 Minnesota Street Suite 1400 St. Paul MN, 55101 United States	Electronic Service		Yes	Official 25-30
5	Sharon	Ferguson	sharon.ferguson@state.mn.us		Department of Commerce	85 7th Place E Ste 280 Saint Paul MN, 55101-2198 United States	Electronic Service		No	Official 25-30
6	Jessica	Fyhrie	jfyhrie@otpc.com	Otter Tail Power Company		PO Box 496 Fergus Falls MN, 56538-0496 United States	Electronic Service		No	Official 25-30
7	Adam	Heinen	aheinen@dakotaelectric.com	Dakota Electric Association		4300 220th St W Farmington MN, 55024 United States	Electronic Service		No	Official 25-30
8	Nick	Kaneski	nick.kaneski@enbridge.com	Enbridge Energy Company, Inc.		11 East Superior St Ste 125 Duluth MN, 55802 United States	Electronic Service		No	Official 25-30
9	Collin	Kremeier	ckremeier@otpc.com	Otter Tail Power Company		PO Box 496 Fergus Falls MN, 56538-0496 United States	Electronic Service		No	Official 25-30
10	James D.	Larson	james.larson@avantenergy.com	Avant Energy Services		220 S 6th St Ste 1300 Minneapolis MN, 55402 United States	Electronic Service		No	Official 25-30
11	Kavita	Maini	kmaini@wi.rr.com	KM Energy Consulting, LLC		961 N Lost Woods Rd Oconomowoc WI, 53066 United States	Electronic Service		No	Official 25-30
12	Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP		33 South Sixth St Ste 4200 Minneapolis MN, 55402 United States	Electronic Service		No	Official 25-30
13	Matthew	Olsen	molsen@otpc.com	Otter Tail Power Company		215 South Cascade Street Fergus Falls MN, 56537 United States	Electronic Service		No	Official 25-30

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14	Wendi	Olson	wolson@otpc.com	Otter Tail Power Company		215 South Cascade Fergus Falls MN, 56537 United States	Electronic Service		No	Official 25-30
15	Generic Notice	Regulatory	regulatory_filing_coordinators@otpc.com	Otter Tail Power Company		215 S. Cascade Street Fergus Falls MN, 56537 United States	Electronic Service		No	Official 25-30
16	Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us		Office of the Attorney General - Residential Utilities Division	1400 BRM Tower 445 Minnesota St St. Paul MN, 55101-2131 United States	Electronic Service		Yes	Official 25-30
17	Cary	Stephenson	cstephenson@otpc.com	Otter Tail Power Company		215 South Cascade Street Fergus Falls MN, 56537 United States	Electronic Service		No	Official 25-30
18	Stuart	Tommerdahl	stommerdahl@otpc.com	Otter Tail Power Company		215 S Cascade St PO Box 496 Fergus Falls MN, 56537 United States	Electronic Service		No	Official 25-30