MINNESOTA
PUBLIC UTILITIES COMMISSION

Staff Briefing Papers: Volume 1

Meeting Date	Thursday, November 5, 2020	Agenda Item **5
Company	Xcel Energy, Minnesota Power, Otter Tail Power	
Docket No.	**E002/M-20-406 In the Matter of Xcel Energy's annual report on safety, reliability, and service quality for 2019; and petition for approval of electric reliability standards for 2020** **E017/M-20-401 In the Matter of Otter Tail Power Company's 2019 Annual Safety, Reliability and Service Quality Report and Proposed SAIFI, SAIDI, and CAIDI Reliability Standards for 2020** **E015/M-20-404 In the Matter of Minnesota Power's 2020 Safety, Reliability and Service Quality Standards Report**	
Issues	1. Should the Commission accept the utilities' annual Safety, Reliability, and Service Quality reports for 2019? 2. At what level should the Commission set Xcel Energy's, Otter Tail Power's, and Minnesota Power's reliability standards for 2020? 3. Should the Commission take any other action on the Annual Reports or associated matters?	
Staff	Hanna Terwilliger hanna.terwilliger@state.mn.us	651-201-2243

Relevant Documents	**Date**
Xcel Energy (20-406)	
Initial Filing – 2019 Annual Safety, Reliability and Service Quality Report	April 2, 2020
Xcel Energy – Other - 2019 QSP Errata and Request for Late Filing	April 3, 2020
Xcel Energy – Other – Quarterly Update Southeast Work Center	May 5, 2020
Xcel Energy – Compliance Filing Quarterly Update Southeast Work Center	August 3, 2020
Xcel Energy – Comments	August 17, 2020
Department of Commerce – Comments	August 19, 2020
Xcel Energy – Reply Comments	September 2, 2020
Department of Commerce – Reply Comments	September 2, 2020
Department – Supplemental Comments submitted outside the comment period	October 6, 2020

Otter Tail Power (20-401)

Initial Filing - 2019 Annual Safety, Reliability and Service Quality Report	April 1, 2020
Department of Commerce – Comments	August 12, 2020
Otter Tail Power – Comments	August 12, 2020
Otter Tail Power – Reply Comments	August 26, 2020

Minnesota Power (20-404)

Initial Filing – Safety, Reliability and Service Quality Standards Report and Appendices A-D	April 1, 2020
Department of Commerce – Comments	August 12, 2020
Minnesota Power – Comments	August 12, 2020
Minnesota Power – Reply Comments	August 26, 2020

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The attached materials are work papers of the Commission Staff. They are intended for use by the Public Utilities Commission and are based upon information already in the record unless noted otherwise.

Contents

Introduction

Each year Minnesota's Investor Owned Utilities (IOUs) submit Safety, Reliability, and Service Quality (SQSR) Reports. For the past several years, Commission staff split the reports into two sections. The Service Quality portion will be summarized in the separate Volume 2 of the briefing papers, while Volume 1 includes the Safety and Reliability metrics as laid out in Minnesota Rules, Chapter 7826, Electric Utility Standards, with specific attention to the reporting requirements outlined by Minn. Rules 7826.0400 to 7826.0600 and order points from the Commission's March 19, 2019 Order. This year, Staff also wrote a Volume 3, which addresses locational and equity considerations for the formation of reliability and service quality metrics from Xcel's Performance Metrics Docket (17-401). Below, Staff summarizes the utility reports and Department comments, and makes a series of recommendations for future reports.

As in previous years, the Department has acknowledged utility compliance with the Commission's rules. The Commission included a number of additional reporting requirements in other Orders, which utilities have by and large provided information on. Appendix A includes a compliance matrix with the Commission's rules and order points. Staff notes that while the Department noted compliance with Minnesota Rules and order points for each specific reporting option in Otter Tail Power and Xcel Energy's reports, it only acknowledged overall compliance with Minnesota Rules in the case of Minnesota Power's report.

Staff has provided a single set of decision options and recommendations for all three volumes of the briefing papers; the decision options are replicated in all documents for easy reference.

Acronyms

AMI	Advanced Metering Infrastructure
ASAI	Average Service Availability Index
CAIDI	Customer Average Interruption Duration Index
CELI	Customers Experiencing Lengthy Interruptions
CEMI	Customer Experiencing Multiple Interruptions
EEI	Edison Electric Institute
ERT	Estimated Restoration Time
FLISR	Fault Location, Isolation, and Service Restoration
IEEE	Institute of Electrical and Electronics Engineers
IMS	Interruption Monitoring System
MAIFI	Momentary Average Interruption Frequency Index
MED	Major Event Day
OMS	Outage Management System
QSP	Quality of Service Plan
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SQSR	Service Quality, Safety, and Reliability

Reliability

Utilities must report reliability results under Minn. Rules 7826.0500. This includes outage tracking metrics like SAIDI, SAIFI, and CAIDI, along with indices like staffing levels and bulk power supply interruptions. The Commission has also asked for various additional information in various orders.

SAIDI, SAIFI, and CAIDI

Utilities report normalized[1] SAIDI, SAIFI, and CAIDI by work center and for the state. In its March 19, 2019 Order the Commission required all utilities to use the IEEE 1366 standard (also known as the 2.5 Beta method) for normalizing Major Event Days. They also propose numerical, individual reliability standards[2] for each work center. The Commission then sets reliability performance standards annually for the utilities, which "remain in effect until final action is taken on a filing proposing new standards or changes them in another proceeding."[3]

Historically the Commission has directed utilities to use a rolling five-year average of SAIDI, SAIFI, and CAIDI metric for each work center in a utility's service territory. However, the

[1] Per Minn. Rules 7826.0200, Subp. 9. "Storm-normalized data" means data that has been adjusted to neutralize the effects of outages due to major storms. Minn. Rules 7826.0500 Subd. D require "an explanation of how the utility normalizes its reliability data to account for major storms."
[2] Minn. Rules 7826.0600, Subp. 1
[3] Minn. Rules 7826.0600, Subp. 2

Commission has 'frozen' standards for utilities at prior year's levels if there is not sufficient progress. Otter Tail's standards have been frozen at 2013 levels and Minnesota Power's at 2016 levels. Xcel had standards for the Southeast work center held at 2017 levels in last year's report. Utilities are also required to provide "an action plan for remedying any failure to comply with the standard" or "why non-compliance was unavoidable under the circumstances."[4]

The Commission also required utilities to file data on the causes of sustained outages by work center in its January 28, 2020 Order. Staff notes that while Minnesota Power and Xcel made the required compliance filing with historical data, both missed submitting 2019 data in the same format with their reports. Staff recommends they both do so in a compliance filing (**Decision Option 2**)

The following sections summarize individual utility performance for 2019. Instances where standards were not met are indicated in red.

Minnesota Power

Table 1: Minnesota Power 2019 Results and 2019 Proposed Standards

Metric	SAIDI	SAIFI	CAIDI
2019 Standard	98.19	1.02	96.26
2019 Performance Results (Normalized)	**144.02**	**1.35**	**106.32**
2019 Performance Results (Non-Normalized)	164.54	1.53	107.45
2020 Proposal A: 2016 Standard	98.19	1.02	96.26
2020 Proposal B: IEEE 2nd Quartile Average	124.8	1.12	109.80

The Commission froze MP's reliability standards at 2016 levels after the Company failed to meet its SAIDI and SAIFI targets for 2015 and 2016. Minnesota Power did not meet any of its standards again in 2019. Minnesota Power offered two options for its 2020 standards: the frozen 2016 standards, or a five-year average of the IEEE benchmarking 2nd quartile for medium utilities. Minnesota Power indicated it prefers to use the IEEE benchmark over the frozen 2016 standards. The Company noted while "there is value in continuing to provide utility-specific rolling five-year average data from an individual longitudinal performance perspective, this is more appropriate a trending data point as opposed to a proper goal-setting metric."[5]

The Company gave weather and equipment failure as the primary reasons for not meeting its reliability goals, including a higher prevalence of windstorms in April and September of 2019. Leading causes of outages were similar to 2018, however there was an increase of around 7% of overhead equipment failure.[6]

Figure 1 and Figure 2 compare the contributing factors to MP's SAIDI and SAIFI values for 2017-2019, created by Commission Staff. Both figures include all outages (non-normalized).

[4] Minn. Rules 7826.0500, Subp. 1E
[5] MP, Reply, Docket 20-404, p. 3
[6] MP, Initial Filing, Docket 20-404, p. 21

Figure 1: Comparison of SAIDI causes, 2017 to 2019[7]

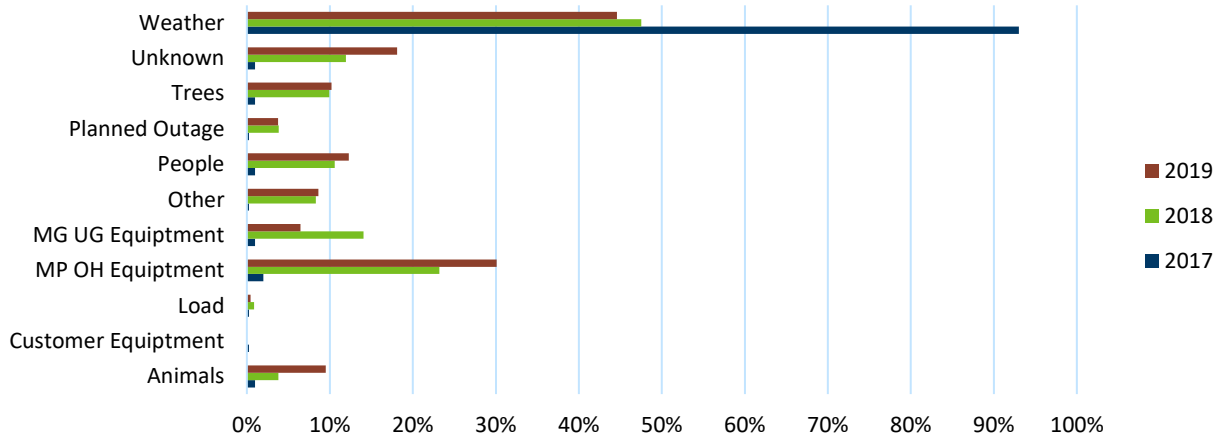
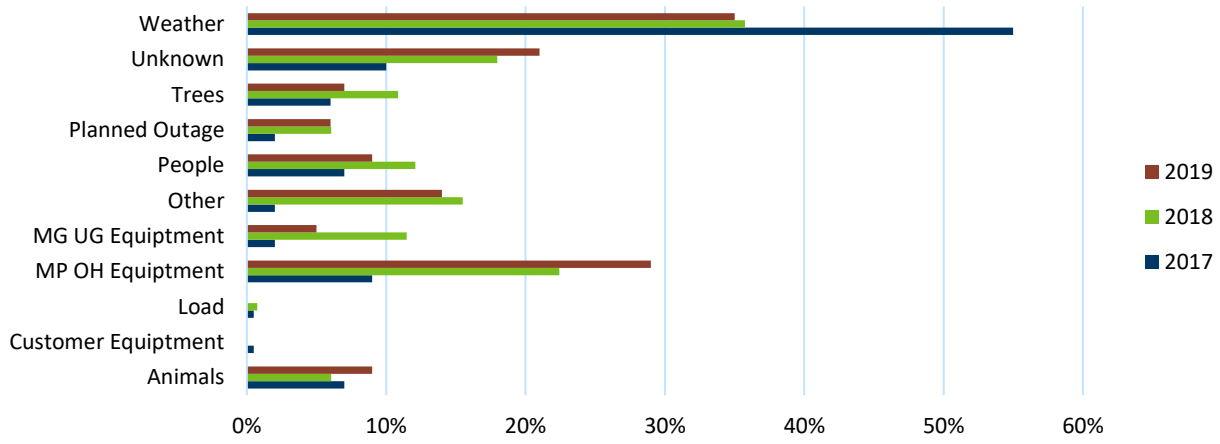


Figure 2: Comparison of SAIFI causes, 2017-2019[8]



The Department recommended leaving Minnesota Power's standards at 2016 levels for 2020 instead of the IEEE benchmarking option (discussed in a subsequent section). The Department indicated the Commission may wish to investigate whether Minnesota Power can provide a breakdown between Duluth and the rest of its service territory for reliability tracking.[9] The Department also provided Figures 3 through 5 showing MP's reliability actuals and goals, along with trend lines, over the past 10 years (recreated by staff below).

[7] *Id.*
[8] *Id.*
[9] Department, Initial, Docket 20-404, p. 14

Figure 3: Minnesota Power SAIDI 2010-2019

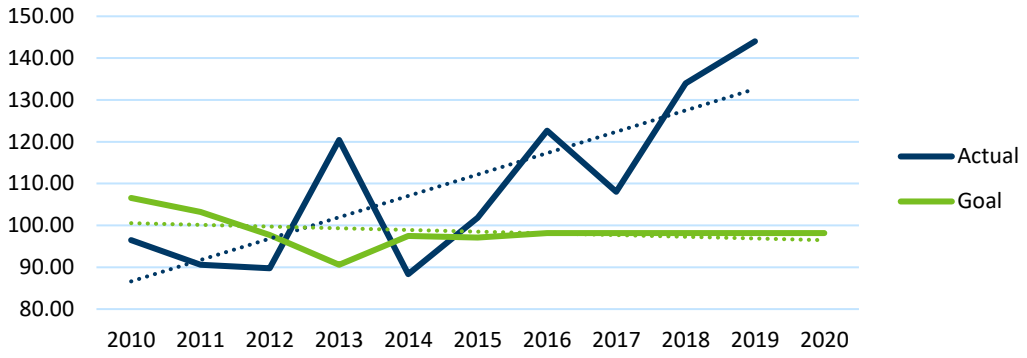


Figure 4: Minnesota Power SAIFI 2009-2019

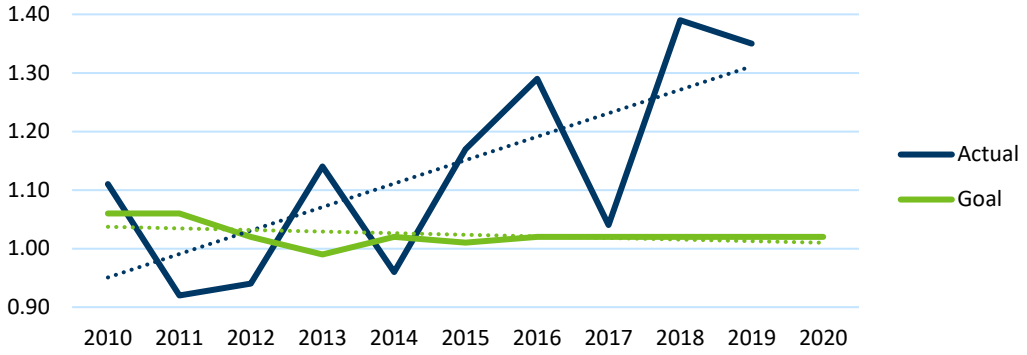
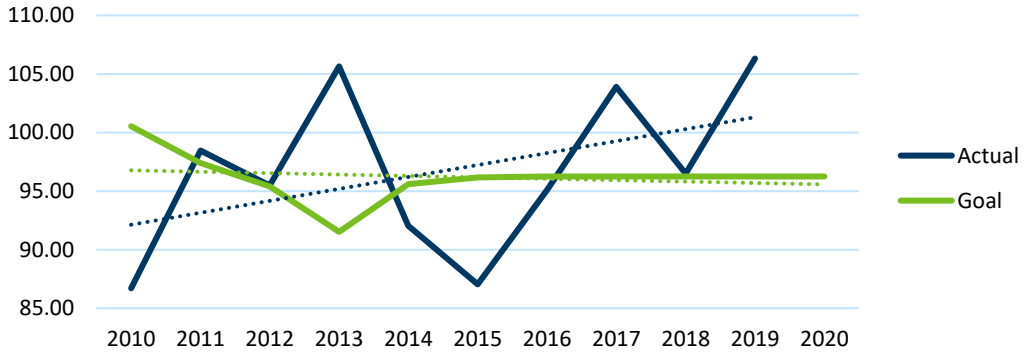


Figure 5: Minnesota Power CAIDI 2009-2019



Staff Analysis

If the Commission does not adopt the benchmarking proposal discussed below, Staff concurs with the Department's recommendation to keep Minnesota Power's standards frozen at 2016 levels. Staff also recommends regardless of what overall standards the Commission decides on, it also requires Minnesota Power to discuss having more granular geographic reliability metrics in next year's report.

Otter Tail Power

Table 2: Otter Tail Power 2018 Results and 2019 Proposed Standards

Region	Metric	2019 Standard	2019 Performance Results[10]	2020 Proposed Standard
Minnesota	SAIDI	64.95	**93.51**	94.00
	SAIFI	1.13	**1.33**	1.00
	CAIDI	57.48	**70.28**	94.00
Bemidji	SAIDI	70.64	**127.33**	
	SAIFI	1.26	**1.52**	
	CAIDI	56.06	**83.85**	
Crookston	SAIDI	69.33	**128.55**	
	SAIFI	1.19	**1.86**	
	CAIDI	58.26	**69.11**	
Fergus Falls	SAIDI	66.97	**95.12**	
	SAIFI	1.11	**1.31**	
	CAIDI	60.33	**72.79**	
Milbank	SAIDI	75.49	**244.74**	
	SAIFI	1.82	**3.35**	
	CAIDI	41.48	**73.12**	
Morris	SAIDI	55.78	51.13	
	SAIFI	1.01	**1.15**	
	CAIDI	55.23	44.36	
Wahpeton	SAIDI	57.24	33.93	
	SAIFI	1.13	0.19	
	CAIDI	50.65	180.71	

As part of its response to the Commission's inquiry about shifting to a benchmarking standard instead of the rolling five year average, Otter Tail proposed moving from reliability goals for its six service centers a single work center encompassing its entire service territory. [11] In its reports, Otter Tail explained the implementation of its new Interruption Monitoring System (IMS), which captures a larger volume of customer outages due to monitoring on all three-phases. Otter Tail also explained several of its customer service centers have experienced reorganization, rendering historically data incompatible for comparison.[12] Due to these changes, the Company explained its reliability targets, which had been held at 2013 levels, are now statistically irrelevant.[13]

The Department noted Otter Tail's proposed statewide goals are higher for SAIDI and CAIDI (and therefore easier to meet), but lower for SAIFI than the 2013 numbers. The Department examined Otter Tail's historic reliability performance, but concluded its performance had not improved enough to warrant changing its goals. The Department did not provide a response to

[10] Otter Tail had no major event days in 2019, resulting in normalized/non-normalized values being equal.
[11] OTP, Initial Filing, Docket 20-401, p. 3
[12] OTP, Initial Filing, Docket 20-401, pp. 32-33
[13] OTP, Initial Filing, Docket 20-401, p. 14

Otter Tail's discussion of upgraded monitoring systems or changes to its customer service centers.

Figures 6 through 8 depict OTP's SAIDI, SAIFI, and CAIDI trends over the past decade. As a whole, Otter Tail has seen mainly flat or slightly increasing reliability indices over the past 10 years, aside from the Milbank and Wahpeton work centers, which Staff understands are service centers with very few feeders, leading to much higher fluctuations from year to year.

Figure 6: Otter Tail Power SAIDI Trends, 2010-2019

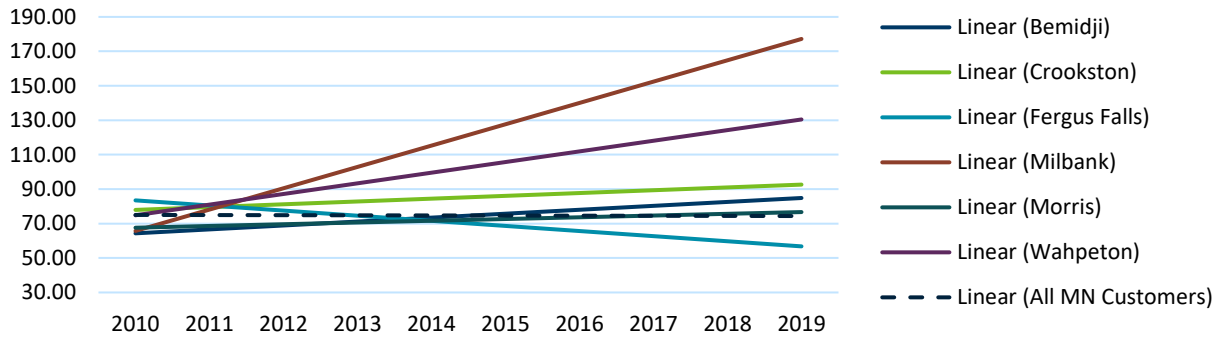


Figure 7: Otter Tail Power, SAIFI Trends, 2010-2019

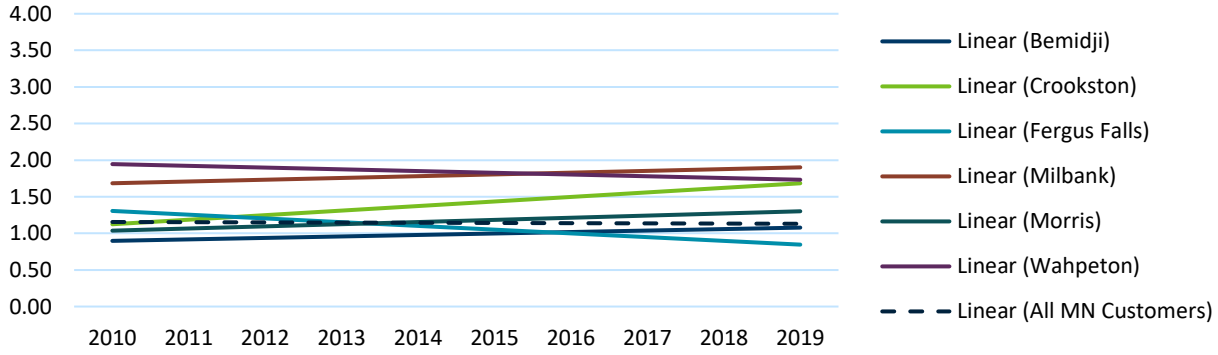
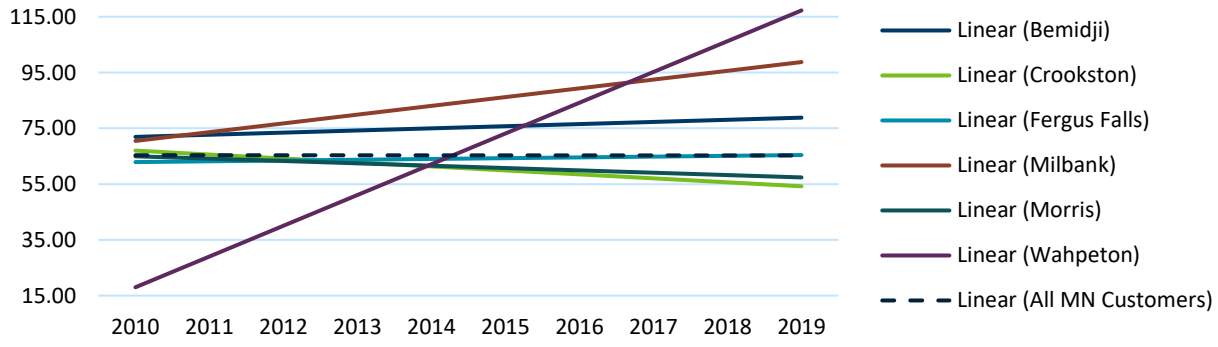


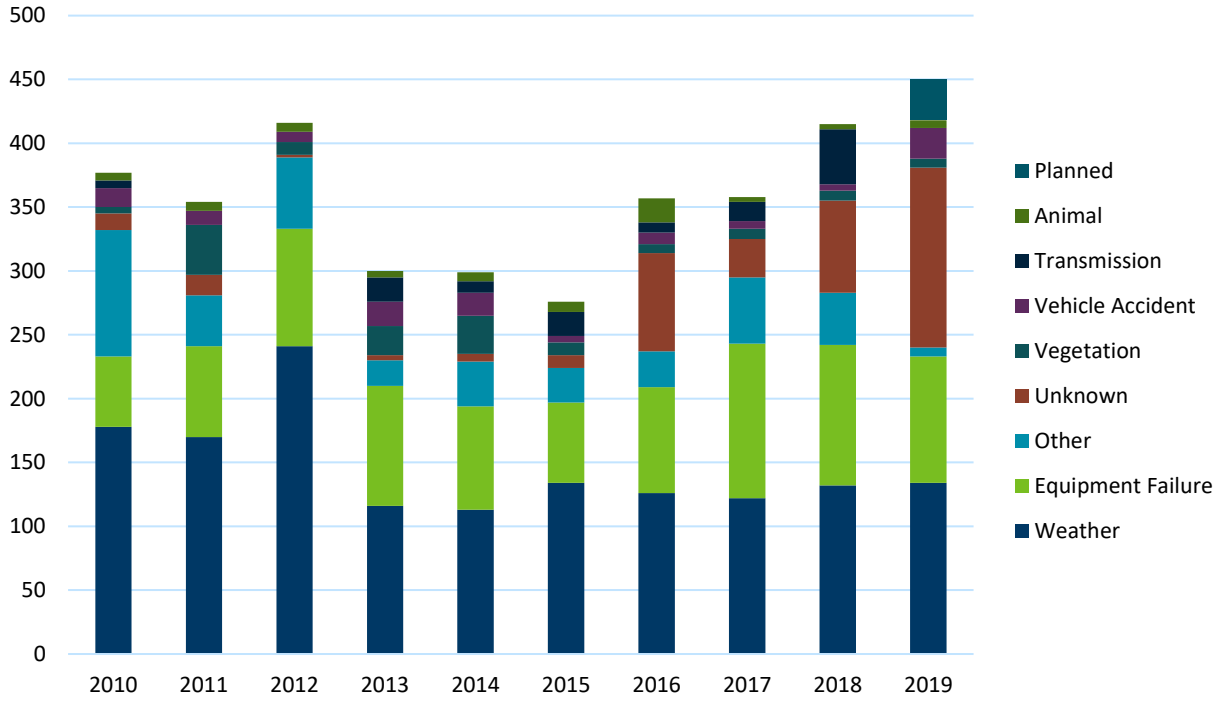
Figure 8: Otter Tail Power, CAIDI Trends, 2010-2019



OTP uses the IEEE 1366 Standard for storm normalization, however no days qualified as a Major Event Days in 2019, meaning normalized and non-normalized values are identical.[14]

As in previous years, Otter Tail provided a table of outage causes by work center for its service area. Staff has compiled Figure 9 showing causes over the past decade.[15] Weather and equipment failure are the most common causes of outages for OTP.

Figure 9: Otter Tail Power Outage Origins



*Other includes: Bird, Bulk Power Loss, Flood, Fuse, Human error, Investigated and Unknown, Other, Overload, Underground, Vandalism

Staff Analysis

Otter Tail's goals have been frozen since 2013. Staff believes it is important to acknowledge Otter Tail upgraded its monitoring systems, and aside from the discussion around benchmarking, recalculation of Otter Tail's standards is likely warranted. If the Commission declines to adopt Otter Tail's proposal for a single work center, Staff believes it is appropriate to set new standards for Otter Tail's individual service centers. As discussed more in a subsequent section, if the Department's goal is to have insight into more granular levels of reliability than a service territory level provides, there are other options to track locational reliability than performance by work center.

Staff emphasizes that despite not meeting the Commission set goals, Otter Tail's overall reliability results are on average better than Xcel or MP. It is important to consider what good reliability performance looks like- using an average to set increasingly tough standards will

[14] OTP, Initial Filing, Docket 20-401, p. 10

[15] OTP, Initial Filing, Docket 20-401, pp. 14-15 In 2019 Otter Tail began reporting sources of outages with new categorizations in line with its new IMS. Staff has aligned new and old categories for comparison purposes.

eventually result in standards that the utility does not achieve the majority of the time. When gauging reliability performance it is perhaps more important to understand if a utility is performing within a standard range, and the overall trends comparted to peer utilities.

Xcel Energy

Xcel met 5 of its 12 reliability goals for 2019, all in the Metro East or Metro West regions, for a success rate of 42%. While an improvement from 2018's 17% of goals met, it is still a decline from priority years, when Xcel achieved 83% (2017), 50% (2016) and 67% (2015) of its reliability goals.

Table 3: Xcel Energy 2019 Results and 2020 Proposed Standards[16]

Region	Metric	2019 Standard	2019 Performance Results (normalized)	2019 Performance Results (non-normalized)	2020 Proposed Standard (MN Rules)	202 Proposed Standard (IEEE Benchmark)
Minnesota	SAIDI		81.02	124.5		109
	SAIFI		0.75	0.86		0.99
	CAIDI		108.92	145.3		111
Metro East	SAIDI	89.78	80.56	104.57	89.95	109
	SAIFI	0.86	0.75	0.85	0.84	0.99
	CAIDI	103.94	**107.36**	122.52	106.91	111
Metro West	SAIDI	82.08	69.5	79.92	79.37	109
	SAIFI	0.82	0.70	0.74	0.79	0.99
	CAIDI	100.37	99.15	107.38	100.55	111
Northwest	SAIDI	85.86	**89.07**	150.82	87.11	109
	SAIFI	0.76	**0.78**	0.94	0.75	0.99
	CAIDI	113.01	**113.48**	160.71	115.72	111
Southeast	SAIDI	94.82	**129.1**	374.19	94.82	109
	SAIFI	0.76	**0.93**	1.32	0.76	0.99
	CAIDI	122.04	**138.99**	283.4	122.04	111

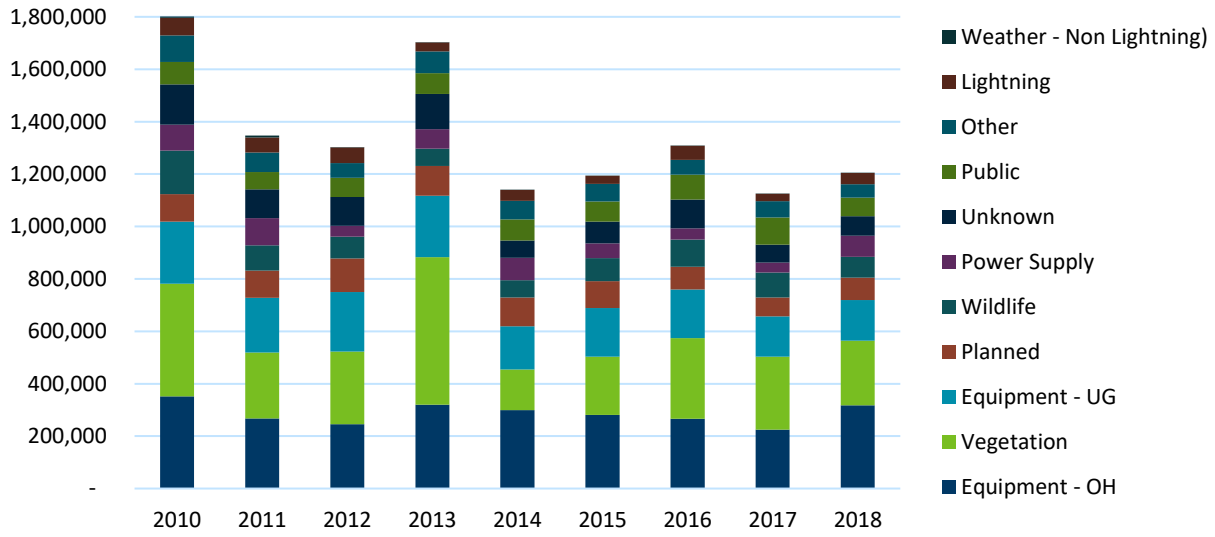
The Department questioned by some of Xcel's proposed goals under the historical calculation method increased.[17] Xcel replied that due to using a five-year average, numbers can fluctuate as the numbers used to calculate them do, and such slight rises and falls from year to year are not uncommon.[18] In response, the Department indicated if the Commission wishes to see continued improvement in goal numbers, it should freeze any standards that increased from the previous year. The Department did not support a move to benchmarking, and recommended using the traditional method of calculating goals.[19]

The Department also noted that Xcel's reasoning for non-compliance with the Commission's goals focused on weather events that are outside of the utility's control, and instead it should focus on improvements that are within its control.[20]

[16] Xcel, Initial Filing, Docket 20-406, p. 6
[17] Department, Initial, Docket 20-406, p. 16
[18] Xcel, Reply, Docket 20-406, p. 5
[19] Department, Response to Reply Comments, Docket 20-406, pp. 4-5
[20] Department, Initial, Docket 20-406, p. 24

In its January 28, 2020 Order, the Commission required utilities to file a compliance filing with sustained outage causes by work center, and also to continue filing the same data on an annual basis. While it filed the compliance filing, Xcel appears to have missed including 2019 numbers on sustained outages by work center, as outlined in Attachment B of the Commission's January 28, 2020 Order. Staff recommends Xcel make a compliance filing with the information and provide it on an ongoing basis in future reports. Staff provides Figure 10 showing sustained outage trends for 2010-2018 for all outages.

Figure 10: Causes of Xcel Sustained Outages



Southeast Work Center

In its January 28, 2020 Order, the Commission directed Xcel to file the following information about its Southeast work center, which had seen worsening reliability over the past few reports:

i. steps taken to increase FTEs at the Southeast work center in 2020,
ii. the number of contractors versus employees at the Southeast work center, and
iii. steps taken to improve reliability standards that are lagging at the Southeast work center.

Xcel also committed to providing quarterly updates on efforts to improve reliability for the Southeast work center, which it has done throughout 2020. Xcel provided an update in Attachment C of its SQSR report.

The Department summarized Xcel's update on the Southeast work center:

> Xcel's report on the Southeast center indicates that the geographical area spans almost across southern Minnesota, "spanning from nearly the border with South Dakota on the west to the border with Wisconsin on the east." Xcel indicated that one of the controllable causes of the poorer reliability performance was not keeping up to date on vegetation management.

> As a result, Xcel stated that the Company will add six new employees, who "will be dispersed across the wide geographic area of the Southeast Work Center based on historical trends of requests for new service and maintenance needs." Xcel also committed to providing quarterly reports to the Commission on the reliability metrics for the Southeast Work Center until the Commission meets to talk about this docket.
>
> The Department acknowledges Xcel's fulfillment of the requirements of Minnesota Rules, part 7826.0500, subp. 1.E. The Department concludes that Xcel's action plan is a step in the right direction and looks forward to seeing the changes in metrics for this area. The Department also requests that Xcel provide an update in its Reply Comments on its progress in hiring new employees for the Southeast Work Center.[21]

Xcel pointed to its most recent quarterly update, and indicated it now has 53 line workers in the Southeast region, an increase of 4 since 2019.[22]

Staff Analysis

Staff concurs with the Department that Xcel (and other utilities) should spend less time discussing weather events that contributed to outages, and focus instead on factors that fall within the utility's control – such as equipment failure. For example, in its filings, Xcel identifies "near miss" storm days fall close to the threshold used to exclude major event days from normalized calculations. Instead of identifying weather events that contributed the most customer minutes out, Staff would find it more helpful if Xcel discussed the top outages causes within the utility's control that contributed to not meeting the standards each year.

Xcel has seen overall improvements in its SAIDI and SAIFI numbers across the majority of its reporting work centers, as indicated by the trendlines in Figures 11 through 13. However, the Southeast work center continues to see worsening SAIDI and SAIFI numbers. The Commission froze Xcel's SAIDI and SAIFI goals for the Southeast work center at 2017 levels in the past two year's reports, and Staff recommends the Commission does the same here, as proposed by Xcel, if it adopts work center specific targets. Staff does acknowledge that reliability improvements may take some time to appear, thus, recommends the Commission continue to receive quarterly updates from Xcel for an additional year, and evaluate in next year's reports. (**Decision Option 3**)

Additionally, some proposed goals under the traditional goal setting method would increase in 2020, making them easier to meet. Utility goals sometimes rise slightly from year to year, making it important to look at the overall trend lines of goals and actual performance. Staff provides the following figures of SAIDI, SAIFI, and CAIDI actuals and goals. The first three graphs show *trends* of actual SAIDI, SAIFI, and CAIDI over time for Xcel's various service areas, not actual numbers.

Figure 11: SAIDI Trends (actual), 2010-2019

[21] Department, Initial, Docket 20-406, p. 13
[22] Xcel, Reply, Docket 20-406, p. 4

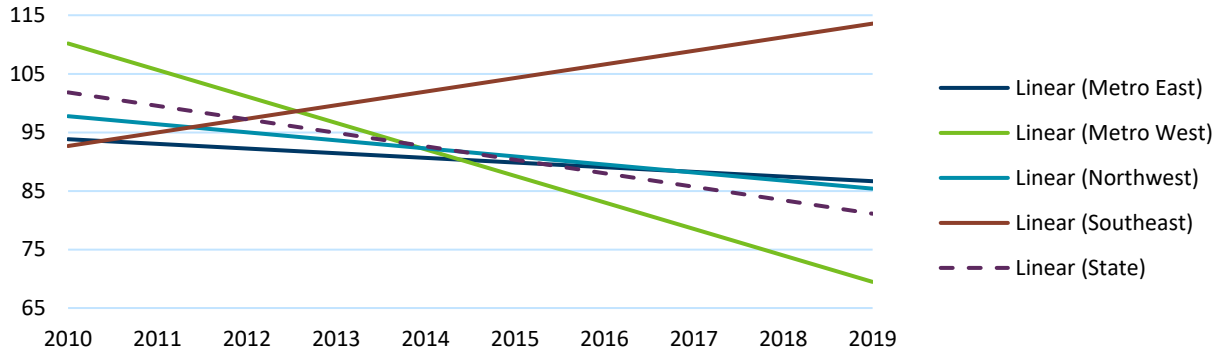


Figure 12: SAIFI Trends (actual), 2010-2019

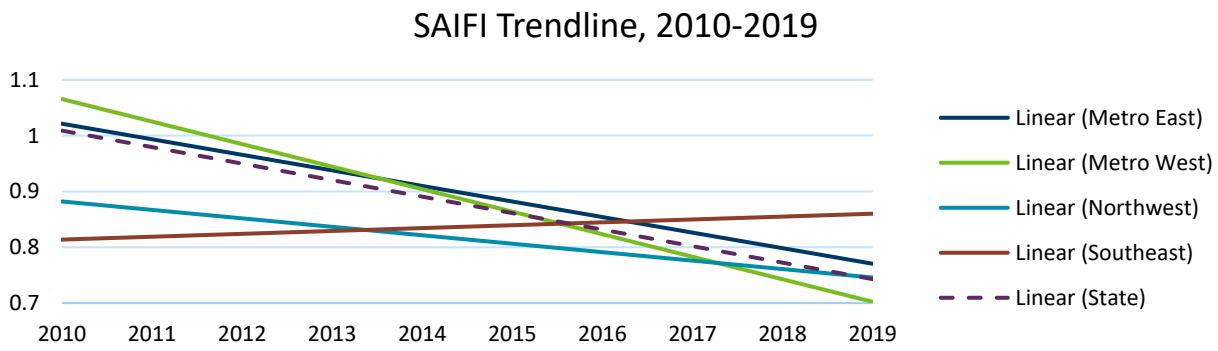
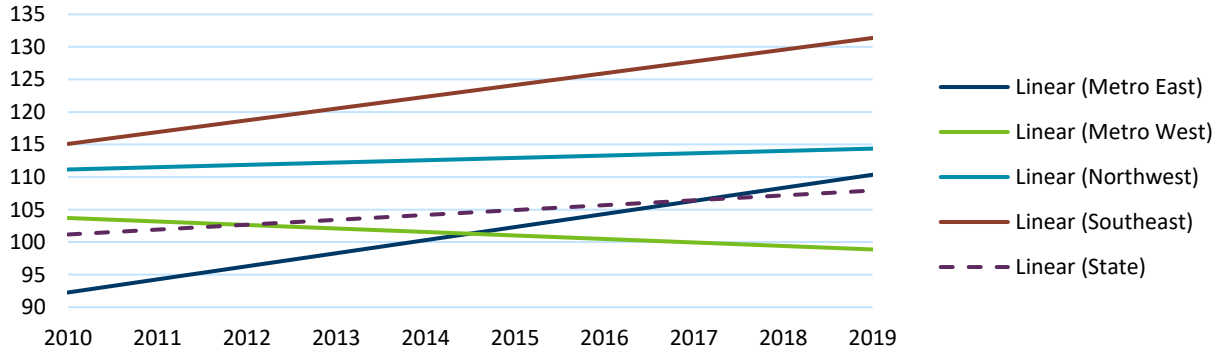


Figure 103: CAIDI Trends (actual), 2010-2019



In terms of goals, the first two charts indicate that while SAIDI and SAIFI goals can see periodic increases, they do not typically occur for more than one or two years in a row, aside from the Southeast Region, for which the Commission froze standards in 2018 and 2019 at 2017 levels. However, CAIDI goals have either stagnated, or started to creep slowly upwards. In the 2017 report, the Department provided analysis around the increase in CAIDI numbers, summarized on pages 13 to 15 of that year's Staff briefing papers.

If the Commission decides to keep the historical method of calculating goals, Staff does not recommend freezing additional standards beyond the Southeast work center at this time. Fluctuations are common in year to year standards, and without continued steady increases in reporting goals, Staff believes freezing individual standards will only create confusion. However, this further supports the proposed transition to benchmarking goals instead of relying on a five-

year average that the Department increasingly is moving away from as it recommends freezing standards year after year.

Figure 14: SAIDI Goals, 2015-2020

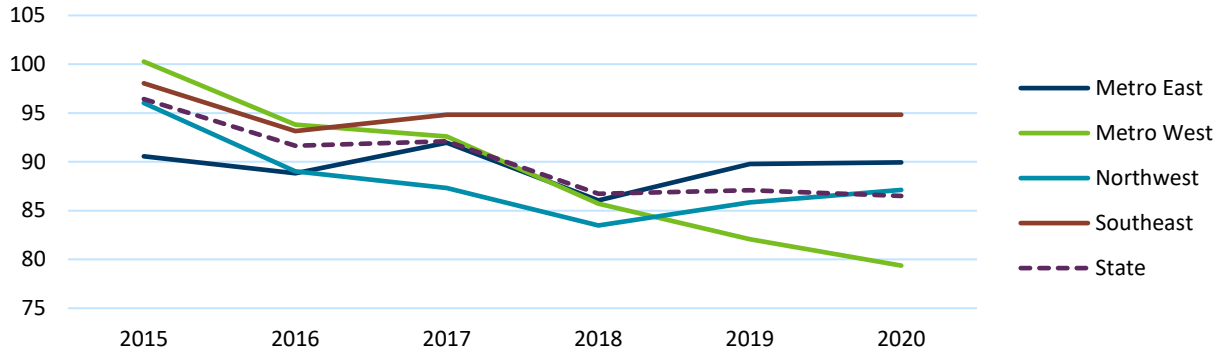


Figure 15: SAIFI Goals, 2015-2020

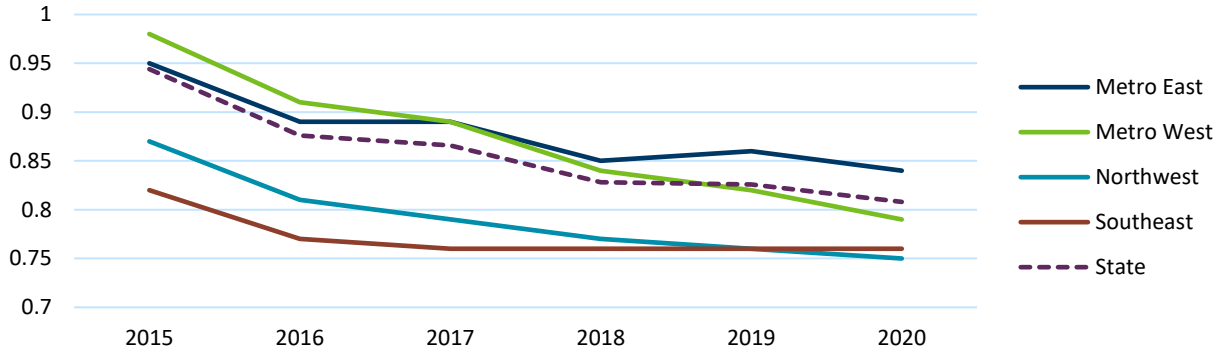
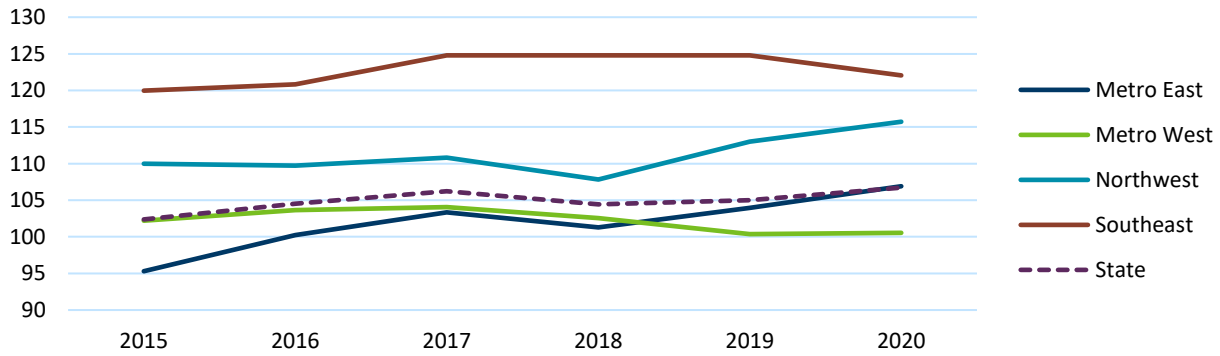


Figure 16: CAIDI Goals, 2015-2020



Transition to Benchmarking

In its March 19, 2019 Orders accepting the utility reports, the Commission required the utilities to benchmark their performance to the IEEE reliability standards. Xcel and Minnesota Power participate in the IEEE reliability benchmarking study; however, Otter Tail Power only participates in the Edison Electric Institute (EEI) benchmarking group.

In its January 28, 2020 Order, the Commission recognized some metrics, including the method by which it currently sets reliability goals, may need to be modified. Therefore, the Commission

required utilities to "discuss transitioning from a five year rolling average method of proposing SAIDI, SAIFI, and CAIDI standards, to standards that are similar to the second quartile rank of similarly sized investor-owned utilities under either the IEEE benchmarking study or using United States Energy Information Administration (EIA) reliability data."

In their 2019 reports, all three utilities supported moving to benchmarking performance instead of the rolling five-year average.

Xcel pointed out the IEEE and EIA reliability data are not usually available until the third quarter of a calendar year, while the Commission's rules require annual reliability reports to be filed on April 1 of each year. It provided several possible solutions: using a 5-year rolling average of the IEEE benchmark, submitting a supplemental filing of the current year results 30 days after the IEEE study results are published, or moving the date of the SQSR reports back. Xcel also noted under a benchmarking approach, various work centers will see more variability as there are inherently more fluctuations in annual numbers with greater granularity.[23]

Minnesota Power provided a comparison of what its goals would have been under the current commission method, and under benchmarking to IEEE second quartile results, noting very similar numbers.[24]

Otter Tail noted its goals have been frozen since 2013, and with the installation of its new and more accurate interruption monitoring system (IMS) in 2019, those standards are no longer relevant. In Reply Comments, Otter Tail agreed to a supplemental filing within 20 days of the IEEE survey results[25]

The Department opposed the move to benchmarking utility performance to national peers, stating the Commission would lose the "longitudinal" view of utility performance. However, the Department also recommended freezing every utility's standards for 2020, in essence forgoing the current method using the five-year rolling average. The Department did support continuing IEEE benchmarking information in a separate filing after IEEE publishes the annual data.

Staff Analysis

As indicated in last year's briefing papers, Staff supports a move to benchmarking for gauging utility's reliability. Benchmarking provides a better way to understand how utilities are performing in relation to peer utilities. This will be key in coming years for several reasons: 1.) monitoring technologies will improve, making comparisons to historic numbers more difficult; 2.) grid modernization improvements will allow utilities better control over their systems, potentially shortening many outages; and 3.) increasing severe weather events as a result of climate change will impact outage frequency and severity. For these reasons, historic averages of utility reliability standards will become increasingly irrelevant. While not every utility in a benchmarking study will implement grid modernization technologies at the same rate, or experience the same severe weather events, benchmarking encompasses a better range of circumstances then looking at a utility in insolation Therefore, benchmarking may better help the Commission understand whether the trends Minnesota utilities are seeing are isolated, or

[23] Xcel, Initial Filing, Docket 20-406, pp. 68-69
[24] MP, Initial Filing, Docket 20-404, p. 12
[25] Otter Tail, Reply, Docket 20-401, p. 2

similar among all utilities, especially when coupled with additional metrics like the proposed metric on grid modernization discussed below.

Work Centers

Staff notes there seem to be different definitions of "work centers" among utilities. Under Minn. Rules 7826, "Work Center" is defined as "a portion of a utility's assigned service area that it treats as an administrative subdivision for purposes of maintaining and repairing its distribution system." Xcel appears to have divided its work centers geographically, and has separate "service centers."[26] Otter Tail appears to have actual service centers associated with different geographic regions. Minnesota Power classifies its entire service territory as a "work center" for reliability metric setting, but in more granular data filings has various regional outposts where linemen and other staff are based. Staff recommends the Commission gather more information from utilities on "work centers" and "service centers," focusing on where distribution linemen are located.

The Commission may also wish to consider whether using "work centers" is the best way to view geographic variations in reliability. The Commission is already examining locational reliability metrics for Xcel Energy in this docket which are based solely upon geographic location. Using a similar approach for Minnesota Power and Otter Tail, even if not to the same extent initially as proposed for Xcel, may help alleviate the Department's concerns about losing granularity with a move to a benchmarking approach.

Time Lag

For the past 3 years the Commission has not considered the utilities SQSR until the middle of Q4. Therefore, submitting a compliance filing with benchmarking data and having a short, supplemental comment period may not delay Commission consideration of the SQSR reports.

Recommendation

Staff proposes an alternative to the Department and utilities proposals; for 2020, the Commission could take a hybrid approach to setting standards: for service territory wide, using the IEEE 2020 2nd quartile results for similarly sized utilities, but maintain the historic 5-year rolling average (or frozen standards) at the "work center" level. Utilities should submit their reports on April 1, 2021 as usual, but prepare a brief supplemental filing after the IEEE benchmarking results are released indicating whether they met the goals, and if not, the reasons why. This approach will avoid needing a rule variance for this year, as well as give time to have a discussion on the definition of "work center" and how better to have metrics for geographic subdivisions for Minnesota Power and Otter Tail. Staff suggests that the Commission could use a second metric where it expects utilities to meet the 2nd quartile benchmark a certain percentage of the time over the past 5 years. This would help adjust for years that have particularly severe weather impacts. Staff recommends further development of such a metric.

[26] During the Commission hearing on the 2018 Service quality reports, Xcel explained that it has different definitions of work centers and service centers.

Therefore, staff recommends adopting **Decision Option 6** for Minnesota Power, **Decision Options 9 and 11** for Otter Tail, and **Decision Options 12 and 14** for Xcel Energy. Starting with the calendar year 2021 reports (reported in 2022), Staff recommends moving completely to a benchmarking approach for setting reliability goals, while still maintaining reporting at a work center level.

Staff also recommends convening an informal meeting with utility and Department staff (along with any other interested stakeholders) before the next service quality reports are filed to continue the discussion about a transition to benchmarking and hopefully resolve the time lag data issue along with the Department's concerns about more granular reliability data.

IEEE Benchmarking Results

IEEE 2019 Benchmarking results were not available when utilities submitted their reports, however they have since become available, as such Staff presents a comparison here in Tables 4 – 6. Utilities all submitted comparisons to the 2018 benchmarking results as those were the most recently available. Items in red indicate where a utility did not meet the second quartile, green indicates the utility did meet the second quartile. A star indicated first quartile performance. Otter Tail and Xcel both had first quartile performances for several metrics.

Table 4: Minnesota Power 2019 Benchmarking Results (2nd Quartile – Medium Utilities)

	Minnesota Power All Events	IEEE All Events	Minnesota Power Normalized	IEEE 1366
SAIDI	164.54	250	144.02	140
SAIFI	1.53	1.48	1.35	1.17
CAIDI	106.32	181	107.45	124

Table 5: Otter Tail 2019 Benchmarking Results (2nd Quartile – Medium Utilities)

	Otter Tail All Events	IEEE All Events	Otter Tail Normalized	IEEE 1366
SAIDI	93.51*	250	93.51*	140
SAIFI	1.33	1.48	1.33	1.17
CAIDI	70.28*	181	70.28*	124

Table 6: Xcel 2019 Benchmarking Results (2nd Quartile – Small Utilities)

	Xcel Energy All Events	IEEE All Events	Xcel Normalized	IEEE 1366
SAIDI	124.5*	238	81.02*	107
SAIFI	0.86*	1.25	0.75*	1.01
CAIDI	143.3	190	108.92	110

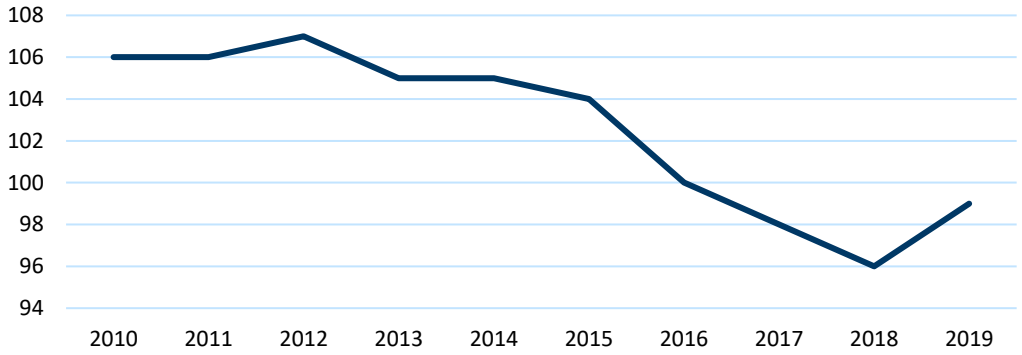
Work Center Staffing Levels

Minn. Rules 7826.0500 Subp. 1K requires utilities to report "data on staffing levels at each work center, including the number of full-time equivalent positions held by field employees responsible for responding to trouble and for the operation and maintenance of distribution lines." The Department acknowledged compliance with Minnesota rules by all three utilities.

Minnesota Power

Minnesota Power reported 99 line worker positions, along with 13.68 full time equivalent contractor positions.[27] 2019 marks a rebound in Minnesota Power's line worker positions from a low of 96 in 2018. Figure 117 depicts the overall level of line worker positions.

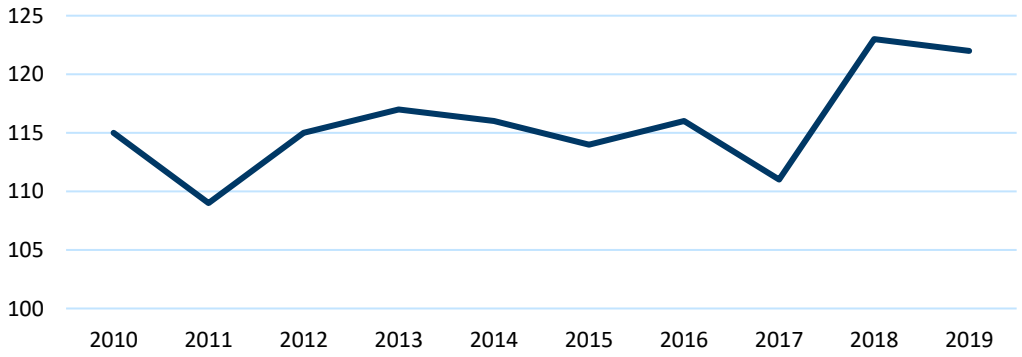
Figure 117: MP Line Workers (FTE), 2010-2019



Otter Tail Power

Otter Tail increased the number of line workers significantly since 2017, depicted in Figure 8.[28] Otter Tail also provided the number of office staff that support its line workers for each service center, along with its customer care and relations team, which has increased overall since 2009.

Figure 18: OTP Line Workers (FTE), 2010-2019



Xcel Energy

In its compliance filing to its 2018 report, and in its 2019 report, Xcel provided updated staffing levels at its work centers broken down by linemen and support staff. With the updated

[27] MP, Initial Filing, Docket 20-404, p. 18
[28] OTP, Initial Filing, Docket 20-401, p. 27

information, Xcel's staffing levels are largely static across its service territory, with minor fluctuations. The Southeast Work Center has regained a number of staff since a low in 2017.

Table 7: Xcel Energy Linemen Staffing Levels, 2010-2019[29]

	Metro East	Metro West	Northwest	Southeast	Other*	Total
2010	131	170	32	52	38	423
2011	135	174	31	52	37	429
2012	131	169	32	51	37	420
2013	128	173	32	53	41	427
2014	126	176	33	53	46	434
2015	128	176	33	53	46	436
2016	124	184	30	47	46	431
2017	119	176	31	46	46	418
2018	124	180	32	49	47	432
2019	123	177	30	49	45	424
Historical Average	127	176	32	51	43	427
% change from 2010	-3%	3%	-1%	-3%	11%	1%

Table 8: Xcel Energy Work Center Support (with Contractors) Staffing Levels, 2010-2019[30]

	Metro East	Metro West	Northwest	Southeast	Other*	Total
2010	69	68	22	36	31	226
2011	68	74	22	29	29	222
2012	64	68	22	31	25	210
2013	62	67	21	31	37	218
2014	61	65	21	31	36	214
2015	60	63	22	34	35	214
2016	60	64	25	33	35	217
2017	64	75	21	34	35	229
2018	62	74	22	32	35	225
2019	59	79	22	31	35	226
Historical Average	63	70	22	32	33	220
% change from 2010	-10%	2%	0%	-12%	7%	-3%

* Xcel Energy employees associated with the Fargo and Sioux Falls Service Centers respond to trouble in western Minnesota and the Dakotas.

Reliability by Class

In its March 19, 2019 Order, the Commission required the utilities to provide information on how different customer classes are impacted by outages.

[29] Xcel, Initial, Docket 20-406, p. 33
[30] Xcel, Initial, Docket 20-406, p. 33

Minnesota Power

Minnesota Power calculated averages of the time customers were served by taking outage numbers from each class and determining their overall reliability by time served, depicted in below. This metric is also known as the Average Service Availability Index, or ASAI, and represents the percentage of time that power was available. Numbers were similar to 2018 values.

Table 9: Minnesota Power Reliability by Customer Class (ASAI)[31]

Customer Class	Residential	Commercial	Industrial
2018	99.97500%	99.99558%	99.99992%
2019	99.97387%	99.99527%	99.99987%

Otter Tail Power

In its 2018 report, OTP indicated that it does not have the ability to differentiate reliability by customer class due to the retirement of its old Interruption Monitoring System (IMS), but its new IMS system would be able to provide reliability details by customer class starting in reporting year 2019.[32] However, in its 2019 report, the Company indicated it did not have the ability to do so until it implements an outage management system or advanced metering infrastructure.[33]

Xcel Energy

Xcel indicated that it does not currently track customer reliability by class on a feeder level basis, and repeated its justification from last year's report:

> We did attempt to segregate feeders that were predominately residential compared to feeders that were predominately commercial. In 2017, we found that feeders primarily serving commercial customers in general had a SAIDI value that was significantly better than the feeders serving primarily residential customers. The 2018 data showed a similar result. Although not studied, this is likely due to several items including: less vegetation in industrial and commercial areas, shorter feeders due to higher load density resulting in less exposure to the environment, and higher percentage of customers with underground service. We do not expect this general performance to vary much from year to year.[34]

Staff Analysis

Staff expects, at a minimum, Xcel will be able to report reliability by class when it implements its new AMI system and other associated grid modernization improvements which should give it the ability to parse more granular data.

[31] MP, Initial Filing, Docket 20-404 p. 20
[32] OTP, Initial Filing, Docket 19-260, p. 33
[33] OTP, Reply, Docket 20-401, p. 2
[34] Xcel, Initial Filing, Docket 20-406, p. 14

MAIFI

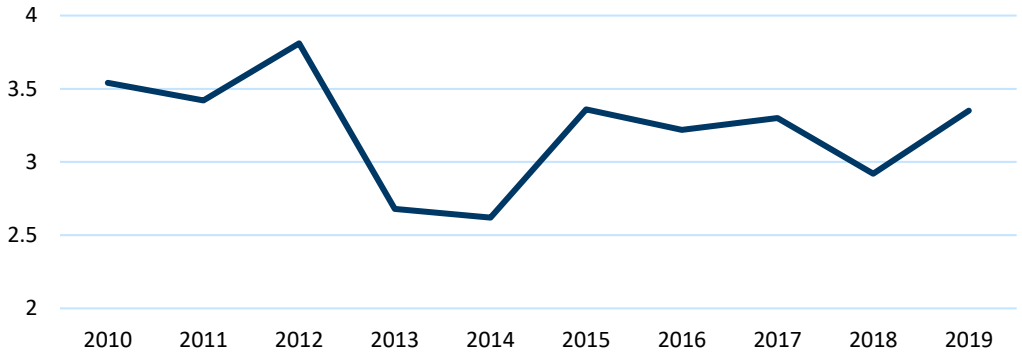
MAIFI (Momentary Average Interruption Frequency Index) in consists of interruptions lasting less than five minutes, which are excluded from SAIDI, SAIFI, and CAIDI calculations. These types of interruptions tend to have a more disproportionate impact on commercial and industrial customers for whom even a 30 second lapse in power can cause hours of lost productivity as machinery restarts.

Minnesota Power

MP indicated that while it has tracked MAIFI for the past decade, it acknowledged that its data collection will be incomplete without a significant investment in further sensing technology. Approximately 30 percent of MP's data is collected by its SCADA system with the rest collected manually, either via customer calls or when device maintenance is done.[35]

Figure 129 from MP's report indicates its storm excluded MAIFI results over the past 10 years.

Figure 12: Minnesota Power MAIFI 2010 – 2019

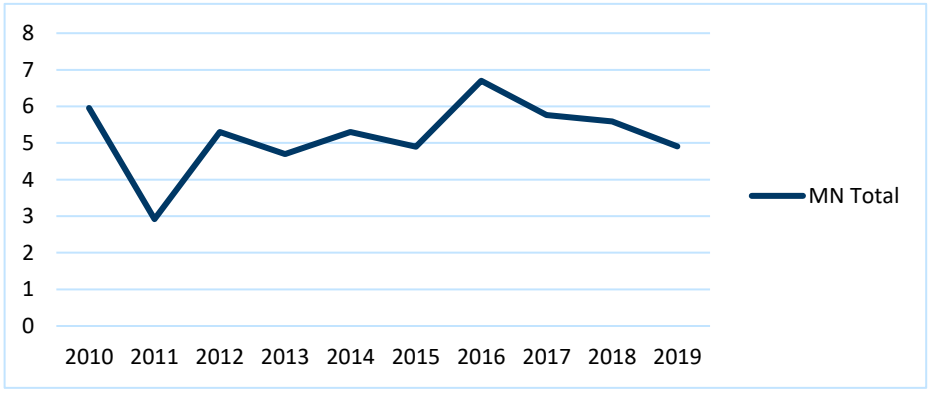


Otter Tail Power

OTP indicated that it uses MAIFI as a predictor of future SAIDI values, and analyzes line sections with high MAIFI for additional vegetation management or infrastructure investments. Table 10 depicts OTP's 2019 and historic MAIFI values.

Table 10: Otter Tail Power MAIFI (non-normalized)[36]

Customer Service Center	MAIFI
Bemidji	5.32
Crookston	7.38
Fergus Falls	4.39
Milbank	10.28
Morris	4.99
Wahpeton	1.23
MN Total	4.91



[35] MP, Initial Filing, Docket 20-404, p. 16-17
[36] OTP, Initial Filing, Docket 20-401, p. 6

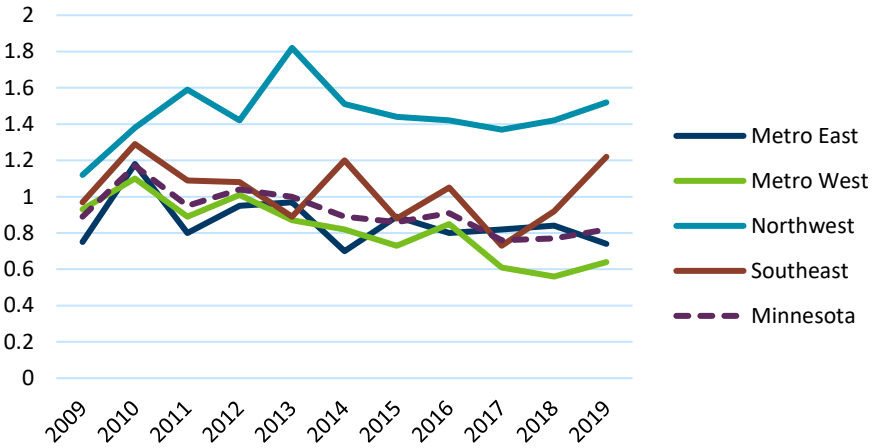
Xcel Energy

Xcel provided three MAIFI calculations for its feeders that are SCADA enabled using the IEEE Momentary Interruption Event Definition. Xcel noted that "momentary outage information is available at the Feeder-level and above, by Feeder circuit, and only on Feeders that are located in substations with Supervisory Control and Data Acquisition (SCADA) capability. With current distribution infrastructure, we are able to report MAIFI at the distribution Feeder level for approximately 92 percent of our retail customers."[37]

These calculations depended on which method the Company used: non-normalized, IEEE, or QSP method.[38] Table 11 depicts Xcel's non-normalized 2019 results.

Table 11: Xcel MAIFI (non-normalized)[39]

Region	MAIFI
Minnesota	0.82
Metro East	0.74
Metro West	0.64
Northwest	1.52
Southeast	1.22



The Department questioned by the Southeast and Northwest MAIFI numbers had not improved over the past decade.[40] In reply, Xcel explained that unlike the metro region, the Northwest and Southeast are more susceptible to transmission events that cause momentary outages due to a higher prevalence of radial lines on the distribution system. The Company noted some transmission projects in its COVID-19 Recovery proposal would address transmission level reliability.[41]

CEMI and CELI

CEMI (Customers Experiencing Multiple Interruptions) and CELI (Customers Experiencing Lengthy Interruptions) are additional ways of measuring how customers are impacted by outages. Unlike CAIDI, these metrics focus on customers who deal with repeated or longer than average outages. The Commission required utilities to report on CEMI and CELI in its March 19, 2019 Order accepting the 2017 reports. The percentages represent the number of customers

[37] Xcel, Initial Filing, Docket 20-406, p. 34
[38] Xcel, Initial Filing, Docket 20-406, p. 35
[39] Xcel, Initial Filing, Docket 20-406, p. 36
[40] Department, Initial, Docket 20-406, p. 21
[41] Xcel, Reply, Docket 20-406, p. 6

who experience multiple or lengthy outages during the reporting year. The Commission required reporting at the following intervals:

> CEMI – normalized and non-normalized, percent of customers experiencing more than 4, 5, or 6 outages in a year.
>
> CELI –percent of customers experiencing outages lasting longer than 6 hours, 12 hours, and 24 hours.

In is January 28, 2020 order accepting the 2018 reports, the Commission also required utilities to report the longest interruption and the most interruptions experienced by any one customer (or feeder, if customer level not available).

Minnesota Power

Figure 20 shows Minnesota Power's non-normalized CEMI performance over the past ten years for customers experiencing 4, 5, or 6+ outages in a year. Figure 21 depicts CELI over the same time period, for interruptions of various lengths. Minnesota Power did not report the longest interruption experienced by a customer, or the customer who experienced the most interruptions. Staff recommends they do so in a compliance filing (**Decision Option 2**)

Figure 20: Minnesota Power Non-normalized CEMI

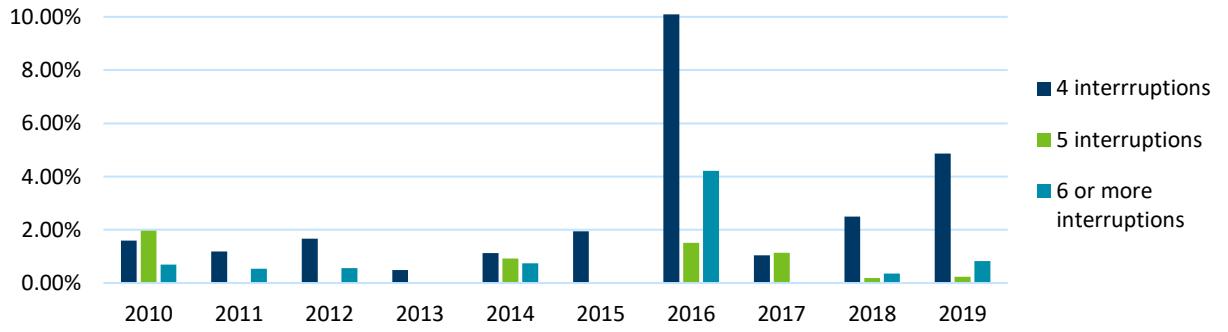
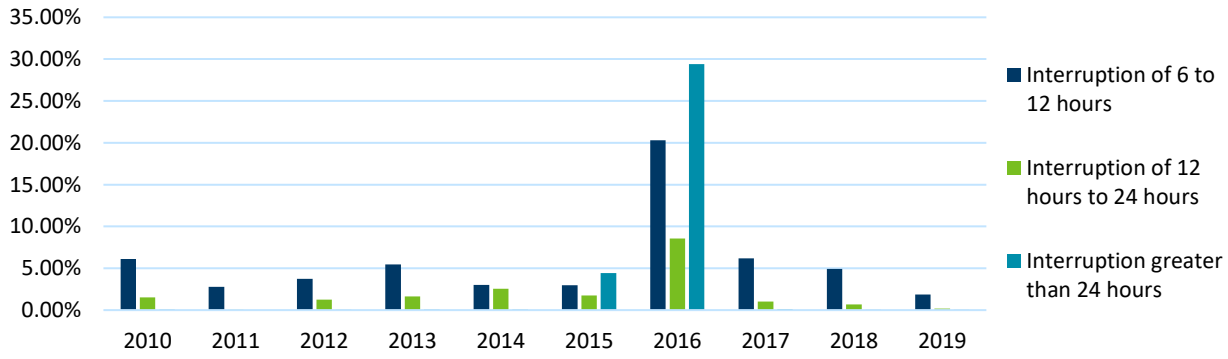


Figure 131: Minnesota Power Non-normalized CELI



Otter Tail Power

Figure 22 shows Otter Tail's non-normalized CEMI performance over the past ten years for customers experiencing 4, 5, or 6+ outages in a year. Otter Tail reported the most outages at the feeder level, with 2 interruptions and 24 momentary interruptions.[42]

Figure 22: Otter Tail Non-normalized CEMI

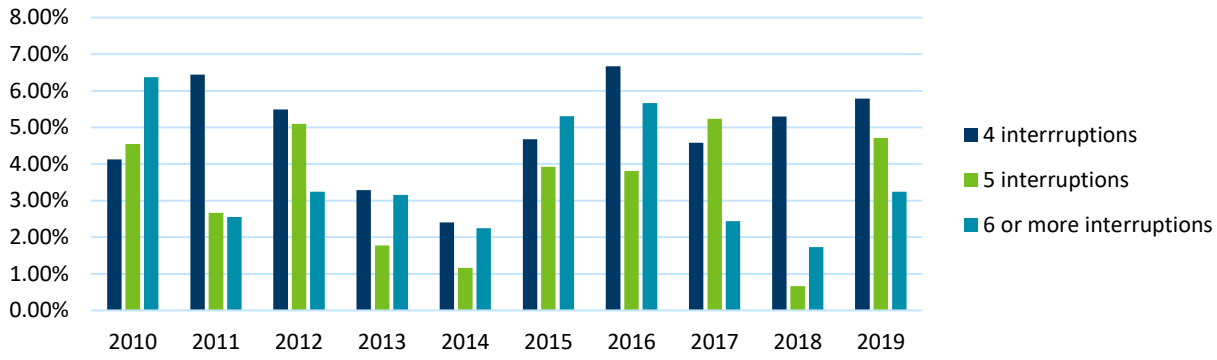
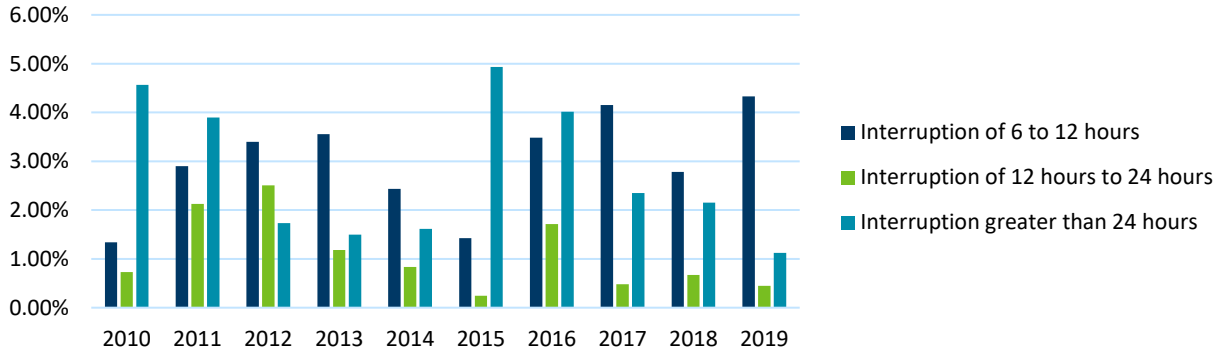


Figure 23 indicates the percentage of customers experiencing outages of 6, 12, or 24 hours or longer for 2010-2019. Otter Tail's longest feeder level interruption was 17 hours and 31 minutes.[43]

Figure 23: Otter Tail Non-normalized CELI



Xcel Energy

Figure 144 shows Xcel's non-normalized CEMI performance over the past ten years for customers experiencing 4, 5, or 6+ outages in a year. Xcel noted it participates in an EEI CEMI benchmarking group, but the results are only available to study participants. The most outages experienced by a customer was 14, mainly due to vegetation issues, although 3 were intentional to trim trees and replace bad cable.[44]

[42] OTP, Initial Filing, Docket 20-401, p. 35
[43] OTP, Initial Filing, Docket 20-401, p. 35
[44] Xcel, Initial Filing, Docket 20-406, p. 39

Figure 144: Xcel CEMI (4+ Interruptions, non-normalized)[45]

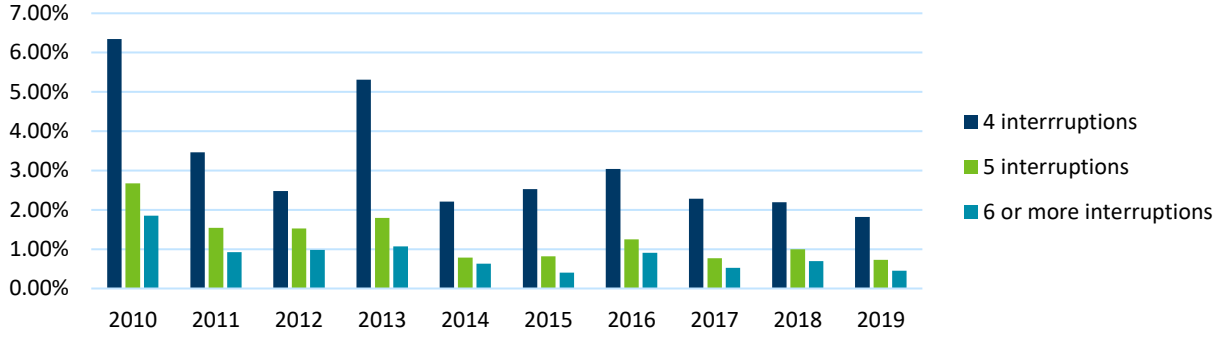
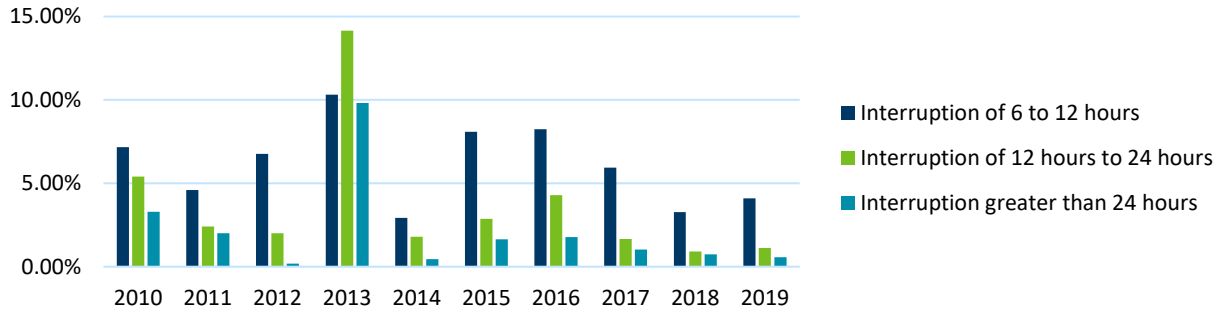


Figure indicates the percentage of customers experiencing outages of 6, 12, or 24 hours or longer for 2010-2019. In 2019 the longest outage experienced by a customer was 95 hours, 8 minutes, a result of a severe winter storm.

Figure 25: Xcel CELI (>6, 12, 24 Hours, non-normalized)[46]



Staff Analysis

Staff notes utilities appear to report CEMI and CELI slightly differently, and in some cases include graphs that have misleading data breakdowns underneath. Staff clarified CEMI and CELI numbers with utilities, and recreated the above graphs, which show distinct categories for each CEMI or CELI metric. Staff recommends utilities report CEMI and CELI using the following format for future reports to avoid confusion. Staff also recommends utilities provide numbers that are independent of charts, as sometimes the formatting on charts leads to incorrect values associated with the graphics.

- CEMI 4 – Customers that experience exactly 4 interruptions
- CEMI 5 – Customer that experience exactly 5 interruptions
- CEMI 6 – Customers that experience 6 or more interruptions
- CELI 6 – customers who experience outages of 6 to 12 hours in length
- CELI 12 – customers who experience outages of 12 -24 hours in length
- CELI 24 – customers who experience outages of 24 hours or greater

[45] Xcel, Initial Filing, Docket 20-406, p. 41
[46] Xcel, Initial Filing, Docket 20-406, p. 43

Estimated Restoration Times

In its March 2019 Order, the Commission required utilities to report on the accuracy of their estimates for when power will be restored to customers who have lost service.

Minnesota Power

Minnesota Power provided data indicating over 97% of estimated restoration times were meet or exceeded, with only 2.74% underestimating the amount of time to restore power. This is the first year Minnesota Power has tracked the information.[47]

Otter Tail Power

Otter Tail indicated it is unable to estimate restoration times, due to the lack of a system with which to do so.[48]

Xcel Energy

Xcel uses a window of 90 minutes before the estimated restoration time up until the actual time (-90 to 0). Xcel explained customer satisfaction drastically drops off once the restoration time exceeds the estimate, hence its use of the -90 to 0 window. The Company continues to refine its algorithm to enhance its accuracy. Xcel's restoration accuracy estimates for Minnesota improved by over six percentage points in 2019, to 49.9% of customers resorted power either before, or up to the event. In its 2019 Order, the Commission requested Xcel provide the percent of outages resorted 0 to 30 minutes after the estimated time, 10.4 % in 2019.[49]

Worst Performing Feeder

Minn. Rules 7826.0500 Subp. 1H requires utilities to file, "to the extent technically feasible, circuit interruption data, including identifying the worst performing circuit in each work center, stating the criteria the utility used to identify the worst performing circuit, stating the circuit's SAIDI, SAIFI, and CAIDI, explaining the reasons that the circuit's performance is in last place, and describing any operational changes the utility has made, is considering, or intends to make to improve its performance."

The Department acknowledged all 3 utilities fulfilled the reporting requirement.

Minnesota Power

The Company identified its four worst performing feeders, two urban and two rural.[50] The Department noted none of the feeders on Minnesota Power's list have been worst performing over the past 10 years, however two of the feeders did exceed the 6 year tree trimming cycle.[51] In its 2018 comments, the Department identified concerns about the Colbyville 240 feeder, as it had appeared on the list of poor performing circuits four out of the past ten years. Minnesota Power provided an update describing the work done to improve the circuit, including greatly

[47] MP, Initial Filing, Docket 20-404, p. 27
[48] OTP, Initial Filing, Docket 20-401, p. 35
[49] Xcel, Initial Filing, Docket 20-406, p. 29-30
[50] MP, Initial Filing, Docket 20-404, Appendix A, p. 17
[51] Department, Initial, Docket 20-404, p. 9

improved reliability numbers for 2019.[52] The Department was satisfied with Minnesota Power's response and recommended discontinuing additional reporting for future reports.[53]

Otter Tail Power

The Company explained it changed its internal methods for determining its worst performing feeders in 2019, shifting to include MAIFI in its calculations, instead of just sustained outage metrics. It identified its worst performing feeders in each work center.[54] The Department provide the following analysis of OTP's historical worst feeder performance.

> The Department notes that, according to OTP's annual reports over the years, there is no apparent trend in terms of outage causes or continuing poor performance for any particular feeder. The Department uses historical data to identify potential areas of concerns regarding any feeders that appear multiple times as a worst performing feeder. After reviewing 14 years of historical data, the Department concludes that there is no concern with any specific feeder at this time.[55]

Xcel Energy

Xcel identified the four to five worst performing feeders for each of its four work centers, and the efforts taken to improve them. Xcel also includes a longer list of 25 feeders for each work center that have the poorest performing SAIDI numbers. In 2019. Xcel identified four feeders that were repeats from 2018, and detailed additional efforts to remedy problems.[56] The Department acknowledged Xcel met the reporting requirements under Minnesota Rules.[57]

Major Service Interruptions

Minn. Rules 7826.0500 Subp. 1G requires utilities to file copies of reports submitted to the Commission's Consumer Affairs Office under 7826.0700. Utilities must provide the following information on major service interruptions:

A. the location and cause of the interruption;
B. the number of customers affected;
C. the expected duration of the interruption; and
D. the utility's best estimate of when service will be restored, by geographical area.

All three utilities provided the required reports, and the Department acknowledged fulfillment of the reporting requirement.

Variance to Minn. Rules 7826.0500 Subpart 1.G.

Utilities submit contemporaneous reports of major outages to the Commission's consumer affairs office. They are required to submit a compilation of these reports under the service quality rules with their SQSR report. Xcel requested a variance from the portion of the rule that

[52] MP, Initial Filing, Docket 20-404, p. 14
[53] Department, Initial, Docket 20-404, p. 9
[54] OTP, Initial Filing, Docket 20-401, p. 18
[55] Department, Initial, Docket 20-401, p. 8
[56] Xcel, Initial Filing, Docket 20-406, pp. 23-24
[57] Department

requires it to file copies of the reports sent to CAO in eDockets. Xcel provided the following analysis for granting a rule variance:

1. **Enforcement of the rule would impose an excessive burden upon the applicant or others affected by the rule.**
   Last year, Attachment D was a 1,162-page attachment in which nearly every page had the specific substation and/or feeder redacted, and some pages contained redacted information about major customers who were impacted by the outage. Preparing this attachment for filing (i.e., collecting and combining all of the e-mails into one large .pdf, performing the redactions, and then verifying the redactions) is time consuming for the Company. The Company believes this effort is an excessive burden in light of the fact it is compiling e-mails that the Commission and the Department has already received from the Company.
2. **Granting the variance would not adversely affect the public interest.**
   Granting this rule variance would not adversely affect the public interest because it requires the Company to provide e-mails that were previously sent to both the Commission Consumer Affairs Office (CAO) and the Department. The Company regularly includes with its filing a summary list showing the date and work center of all major outages, whether the Company provided notice to the CAO and Department. The Company plans to continue providing this chart so that all interested stakeholders can see the extent of the Company's compliance with Minn. R. 7826.0700, Subpart 1, the Company also addresses its compliance with this rule in narrative form in the Annual Report.
3. **Granting the variance would not conflict with standards imposed by law.**
   The Company does not believe that granting this variance would conflict with any standards imposed by law.[58]

The Department concurred with Xcel that the variance met the thee part test, and should be granted.[59]

Both Xcel and the Department discussed additional reporting on the leading causes of outages in lieu of the reports, however Staff notes this is already required under last year's Order.

Staff Analysis

Staff recommends the Commission vary this rule for all three utilities, as Minnesota Power and Otter Tail provide the same filing annually. However, Minnesota Power and Otter Tail Power do not currently provide a summary table like Xcel does, so Staff recommends they be required to provide such a table in lieu of the copies of the reports.

Decision Option 4 varies the rule and requires a summary table of reports

Xcel Energy

Xcel reported 214 major service interruptions for 2019. Of these, 5 were not contemporaneously reported to the Commission's Consumer Affairs Office, around 2% of total

[58] Xcel, Initial Filing, Docket 20-406, pp. 6-7
[59] Department, Initial, Docket 20-406, p. 9

events.[60] According to the Department's analysis, Xcel has had similar levels of unreported outages in prior years, most resulting on days with especially heavy storm activity.[61]

Bulk Power Interruptions

Minn. Rules 7826.0500 Subp. 1F requires, "to the extent feasible, a report on each interruption of a bulk power supply facility during the calendar year, including the reasons for interruption, duration of interruption, and any remedial steps that have been taken or will be taken to prevent future interruption."

OTP had two bulk power supply interruptions for 2019, one caused by ice and wind (7.5-minute interruption), and the second due to a broken cross arm (22.5-minute interruption).[62]

Minnesota Power seems to have mis-reported bulk power supply interruptions in 2019, instead describing a list of feeder level outages.[63] Staff recommends a compliance filing with the correct information (**Decision Option 2a**)

Xcel did not have any generation outages for 2019. It listed 63 transmission outages during 2019, and indicated "since the incidents shown were reactionary due to storms, public damage, or other activities associated with random and unforeseen events, no plans have been developed to address the specific issues encountered."[64] 19 of the outages occurred from equipment failure, 7 from external factors, 4 unknown, and the remaining 32 from storms or debris in the line, including one instance of a balloon as the source of the outage.[65]

The Department acknowledged Xcel and OTP fulfilled the reporting requirement.

Voltage Violations

Minn. Rules 7826.0500 Subp. 1I requires utilities to submit "data on all known instances in which nominal electric service voltages on the utility's side of the meter did not meet the standards of the American National Standards Institute for nominal system voltages greater or less than voltage range B."

The Department acknowledged that all three utilities fulfilled the reporting requirement.

Minnesota Power

Minnesota Power reported eight ANSI Voltage Range B violations in 2019.[66]

Otter Tail Power

The Department provided the following analysis on OTP's voltage violations in 2019:

> OTP provided a table listing the feeders and number of known occurrences where the voltage fell outside the American National Standards Institute (ANSI) voltage range B in

[60] Xcel, Initial Filing, Docket 20-406, p. 26-27
[61] Department, Initial, Docket 20-406, p. 15
[62] OTP, Initial Filing, Docket 20-401, p. 17
[63] MP, Initial Filing, Docket 20-401, Appendix A, pp. 9-10
[64] Xcel, Initial Filing, Docket 20-406, p. 25
[65] Xcel, Initial Filing, Docket 20-406, Attachment F
[66] MP, Initial Filing, Docket 20-404, Attachment A, p. 18

> 2019. OTP noted that most of the feeders with numerous occurrences were feeders serving a single large customer with a very large load (mostly pipelines). The Department observes no significant trend regarding this metric.[67]

Xcel Energy

Xcel reported 185 investigations for voltage violations in 2018. Of these, 26 resulted in actual voltages problems, typically due to equipment malfunction. In those instances, the Company replaces or upgrades the necessary equipment.[68]

Grid Modernization Impacts on Reliability Metric

In its March 19, 2019 Order, the Commission requested utilities discuss the impact of grid modernization investments on measures of reliability, along with investments that could improve tracking of outages or power quality issues. After reviewing utility responses in the 2018 reports, the Commission asked for input on a potential new metric relating to grid modernization:

> Provide a comparison of the reliability (SAIDI, SAIFI, CAIDI, MAIFI, normalized/non-normalized) of feeders with grid modernization investments such as Advanced Metering Infrastructure (AMI) or Fault Location Isolation and Service Restoration (FLISR), to the historic 5-year average reliability for the same feeders before grid modernization investments.

Xcel expressed concern that the metric as outlined above could take a long time to show results given annual variability in reliability due to severe weather. It explained improvements from grid modernization are expected to be gradual, not immediate. The Company offered an alternative metric that would track estimated reductions due to FLISR.[69]

Otter Tail indicated any metric would not currently be applicable as it does not have FLISR or AMI installed.[70]

The Department supported the Commission's original metric as described above.[71]

Staff Analysis

Staff continues to recommend the metric described above for utilities once they have implemented grid modernization improvements. However, staff is aware of the potential for lengthy data, and proposed for the purposes of the report that utilities provide aggregate comparisons of feeders – ex, the SAIDI of *all* feeders with grid mod investments compared to the historic 5 year average SAIDI for the same set of feeders for the years preceding grid modernization improvements. This would also help assist in the variable nature when looking at feeder level reliability. Staff also recommends utilities only start including feeders in the calculations once they have grid modernization improvements for one full calendar year.

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[67] Department, Initial, Docket 20-401, p. 9
[68] Xcel, Initial Filing, Docket 20-406, p. 31
[69] Xcel, Initial Filing, Docket 20-406, p. 18
[70] OTP, Initial Filing, Docket 20-401, p. 32
[71] Department, Initial, Docket 20-406, p. 24

Additionally, if the Commission moves to collecting more granular reliability information for Xcel energy as described in Volume 3, it could add a column to the data collection that indicates whether particular feeders have grid modernization investments, allowing for comparisons without adding an additional report. Staff recommends revisiting adding in this information in a future report.

Decision Option 5 adopts the grid modernization metric.

Safety

Utilities report two categories in their annual safety reports:

1. Occupational Illness and Injuries: summaries of all reports filed with the United States Occupational Safety and Health Administration and the Occupational Safety and Health Division of the Minnesota Department of Labor and Industry during the calendar year (Minn. Rules 7826.0400, Part A)
2. Property Damage Claims: a description of all incidents during the calendar year in which an injury requiring medical attention or property damage resulting in compensation occurred as a result of downed wires or other electrical system failures and all remedial action taken as a result of any injuries or property damage described. (Minn. Rules 7826.0400, Part B)

The Department acknowledged each utility had fulfilled the necessary reporting requirements.

Minnesota Power

The Department provided the following summary of MP's safety results:

> MP reported 19 injuries in 2019, none of which required medical attention. The injuries resulted in a total of 95 lost work days, or approximately 32 days per injury. The Company has not had a death reported since 2010.
>
> In 2019, MP experienced 13 property damage claims totaling $111,048. While to total amount of claims in 2019 was significantly higher than 2018's $22,374 in claims, a single claim for damage to a rented truck represented 78 percent of the 2019 total.[72]

Otter Tail Power

The Department provided tables showing OTP's historic incident rate, which indicated that 2019 was similar to every category for the past 10 years. Otter Tail had no property damage claims for 2019.[73]

Xcel Energy

The Department provided the following summary of Xcel's safety results:

[72] Department, Initial, Docket 20-404, p. 5
[73] Department, Initial, Docket 20-401, pp. 4-5

> Xcel provided summaries of 2019 data requested by the U.S. Department of Labor. This information reflects safety information on a random selection of the Company's plants and is therefore not necessarily comparable year to year.
>
> Xcel reported three payments in compensation for injuries requiring medical attention resulting from downed wires or other electrical system failures in 2019.
>
> The Department notes that property damage due to overhead conductors was the most common category in 2019 as often is the case. While the number of claims in 2019 didn't vary much from 2018 (81 versus 79), the amount paid in claims in 2019 increased significantly to $1,203,379.30 from $147,754.08 (714% increase). It appears that three unusually large claims cause this increase; removing these claims reduces the amounts paid for 2019 to be within a relatively consistent range.[74]

The Department requested additional information on the three large claims from Xcel. In reply comments, Xcel explained both incidents from earlier years that had been settled through mediation in 2019, and due to a 2018 change in the way it reported damage payouts, it was included in this year's report.[75]

Staff Recommendation

Staff requests that in future report reviews, the Department consider using a compliance matrix like the one Staff created in Attachment A. This will help expedite review if in most cases the Department is simply summarizing a utility report and not adding any additional analysis.

Staff recommends adopting **Decision Options 1 – 5** (accepting reports, compliance filings, the requested rule variance, and grid modernization tracking)

For setting reliability standards, as discussed above Staff recommends a hybrid approach, adopting the following decision options:

Minnesota Power: **Decision Option 6**
Otter Tail Power: **Decision Options 9 and 11**
Xcel Energy: **Decision Options 12 and 14**

[74] Department, Initial, Docket 20-406, pp. 9-10
[75] Xcel, Reply, Docket 20-406, pp. 2-3

Decision Options (Combined from Volumes 1 – 3)

1. Accept Xcel Energy's, Otter Tail Power's, and Minnesota Power's annual Safety, Service Quality, and Reliability reports for 2019. *(Department, OTP, MP, Xcel)*

Volume 1 (Reliability)

2. Require the utilities to make a compliance filing, within 30 days of the order, with data as follows: *(Staff)*
    a. Xcel Energy: causes of sustained customer outages, by service center for 2019, as a spreadsheet, (.xlsx).
    b. Minnesota Power:
        i. interruptions to the bulk power system for 2019
        ii. causes of sustained customer outages, by service center for 2019, as a spreadsheet, (.xlsx);
        iii. The highest number of interruptions experienced by any one customer (or feeder, if customer level is not available).
        iv. The longest experienced interruption by any one customer (or feeder, if customer level is not available).

3. Require Xcel Energy to continue quarterly status reports on efforts to improve reliability in the Southeast Work Center. *(Staff)*

4. Grant a variance to MN Rule 7826.0500 Subpart 1.G. for Minnesota Power, Otter Tail Power, and Xcel Energy. Require utilities to file a summary table that includes the information contained in the reports, similar to Attachment G in Xcel's filing.

5. Require utilities to provide the reliability (SAIDI, SAIFI, CAIDI, MAIFI, normalized/non-normalized) for feeders with grid modernization investments such as Advanced Metering Infrastructure (AMI) or Fault Location Isolation and Service Restoration (FLISR), to the historic 5-year average reliability for the same feeders before grid modernization investments.

<u>Minnesota Power</u>

6. Set Minnesota Power's 2020 Reliability Standard at the IEEE benchmarking 2nd Quartile for medium utilities. Require a supplemental filing to Minnesota Power's 2020 SQSR report 30 days after IEEE publishes the 2020 benchmarking results, with an explanation for any standards the utility did not meet. *(Staff)*

7. Set Minnesota Power's Reliability Standards for 2020 at the levels described below. *(MP)*

	SAIDI	SAIFI	CAIDI
IEEE Benchmarking Average	124.8	1.12	109.80

8. Set Minnesota Power's Reliability Standards for 2020 at the 2016 levels. *(Department)*

	SAIDI	SAIFI	CAIDI
2016 Standard	98.19	1.02	96.26

Otter Tail Power

9. Set Otter Tail Power's 2020 statewide Reliability Standard at the IEEE benchmarking 2nd Quartile for medium utilities. Require a supplemental filing to Otter Tail Power's 2020 SQSR report 30 days after IEEE publishes the 2020 benchmarking results, with an explanation for any standards the utility did not meet. *(Staff)*

10. Set Otter Tail Power's Reliability Standards for 2020 at the following levels. *(OTP)*

	SAIDI	SAIFI	CAIDI
All MN Customers	94.00	1.00	94.00

11. Set Otter Tail Power's Reliability Standards for 2020 at the following levels. *(Department)*

Work Center	SAIDI	SAIFI	CAIDI
Bemidji	70.64	1.26	56.06
Crookston	69.33	1.19	58.26
Fergus Falls	55.97	1.11	60.33
Milbank	75.49	1.82	41.48
Morris	55.78	1.01	55.23
Wahpeton	57.24	1.13	50.65

Xcel Energy

12. Set Xcel Energy's 2020 statewide Reliability Standard at the IEEE benchmarking 2nd Quartile for large utilities. Require a supplemental filing to Minnesota Power's 2020 SQSR report 30 days after IEEE publishes the 2020 benchmarking results, with an explanation for any standards the utility did not meet. *(Staff)*

13. Set Xcel Energy's Reliability Standards for 2020 at the following levels. *(Xcel)*

	SAIDI	SAIFI	CAIDI
Statewide	109	0.99	111

14. Set Xcel Energy's Reliability Standards for 2020 at the following levels. *(Department)*

Work Center	SAIDI	SAIFI	CAIDI
Metro East	89.78	0.84	103.94
Metro West	79.37	0.79	100.37
Northwest	85.86	0.75	113.01
Southeast	94.82	0.76	122.04

Volume 2 (Service Quality)

15. Require Xcel Energy further clarify call center data in their 2020 SQSR Reports. Specifically, discuss the Company's efforts to improve the reliability of its Customer Resource System[76] (*DOC*) and explain why IVR is included in reporting for calls answered within 20 sec threshold. (*Staff*)
16. Direct utilities to report the following in their service quality reports due April 1, 2021:
    a. Yearly total number of website visits;
    b. Yearly total number of emails received;
    c. Categorization of email subject, including categories for emails related to assistance programs and disconnections as part of reporting under rule 7826.1700. (*Staff*)
17. Require a compliance filing within 30 days from the date of the Order from each utility in which engagement plans related to Emergency Medical Account status are explained. (*Staff*)
18. Direct utilities, after consultation with Department and Commission staff, to file revised categories for reporting complaint data. Delegate authority to the executive secretary to approve additional report categories, with the goals of having them in place by the April 1, 2021 report filing. (*Staff*)
19. Delegate authority to the Executive Secretary to approve Xcel's, MP's, and OTP's public facing summaries. As part of this approval, Staff may communicate with utilities and stakeholders to refine the language and content in the summaries. (*Staff*)

Volume 3 (Locational and Equity)

20. Xcel shall file the information listed in the revised Attachment A with its Safety, Service Quality, and Reliability report due April 1, 2021. *(Staff)*
21. Delegate authority to the executive secretary to convene one or more technical workshops to further develop the record, and to issue notices as appropriate. *(Staff, Department, Xcel)*
22. Adopt Fresh Energy's recommendations as outlined in Attachment B *(Fresh Energy)*
23. Take some other action

[76] Department's Response Comments to Xcel Energy p5 (October 6, 2020).

Ruels or Order?	Reporting requirement		Minnesota Power		Otter Tail Power		Xcel Energy	
			Utility Included	Dep	Utility Included	Dep	Utility Included	Dep
Minn. Rules 7826.0400, A	Summaries of reports files with OSHA		Yes	Yes	Yes	Yes	Yes	Yes
Minn. Rules 7826.0400, B	Incidents involving injury requiring medical attention or property damage		Yes	Yes	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, A	SAIDI	normalized	Yes	Yes	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 1		non-normalized	Yes	Yes	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, B	SAIFI	normalized	Yes	Yes	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 1		non-normalized	Yes	Yes	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, C	CAIDI	normalized	Yes	Yes	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 1		non-normalized	Yes	Yes	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 3	MAIFI	normalized	Yes	n/a	Yes	Yes	Yes	Yes
		non-normalized	Yes	n/a	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 4	CEMI	normalized	Yes	Yes	Yes	Yes	Yes	Yes
		non-normalized	Yes	Yes	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 6	CELI	normalized	Yes	Yes	Yes	Yes	Yes	Yes
		non-normalized	Yes	Yes	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 5	The highest number of interruptions experienced by any one customer (or feeder, if customer level is not available).		No	n/a	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 7	The longest experienced interruption by any one customer (or feeder, if customer level is not available).		No	n/a	Yes	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 9	Estimated Restoration Times		Yes	n/a	No*	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 10	IEEE Benchmarking		Yes	Yes	No*	Yes	Yes	Yes
Jan 28, 2020 Order, Attch B, 11	Performance by Customer Class		Yes	n/a	No*	Yes	No*	Yes
Jan 28, 2020 Order, Attch B, 12	Causes of sustaind customer outages, by work center		No	n/a	Yes	Yes	No	n/a
Minn. Rules 7826.0500 Subp. 1, D	Explanation of storm normalization method		Yes	n/a	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, E	Action plan for remedying noncompliance with 7826.0600		Yes	Yes	Yes	n/a	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, F	Bulk power supply interruptions, and remedies		No	n/a	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, G	a copy of each report filed under part 7826.0700;		Yes	n/a	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, H	Worst performing feeder data		Yes	Yes	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, I	Voltage violations		Yes	n/a	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, J	Staffing levels		Yes	n/a	Yes	Yes	Yes	Yes
Minn. Rules 7826.0500 Subp. 1, K	Other information (not required)		-	-	Yes	Yes	-	-
Minn. Rules 7826.0600, Subp. 1	Proposed reliability standard		Yes	Yes	Yes	Yes	Yes	Yes

Key

Yes	Utility supplied the information/Department concluded requirements were met
No*	Utility unable to provide the information, but gave an explanation
n/a	the Department did not discuss the requirement
No	The utility did not provide the information
-	information is not required