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COMPANY NAME: PORTLAND GENERAL ELECTRIC COMPANY

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PGE Annual Reliability Report

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Portland General Electric
121 SW Salmon Street • Portland, OR 97204
portlandgeneral.com

May 1, 2023

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street SE
P.O. Box 1088
Salem, OR 97308-1088

RE: RE 113 PGE 2022 Annual Reliability Report

Pursuant to OAR 860-023-0151, PGE hereby submits the Company's 2022 Annual Reliability Report (ARR).

PGE has worked with Staff to develop the new layout for the 2022 report. The background for the new layout stems from the 2014 – 2021 ARRs where Sections III and VIII of PGE's ARR were confidential given the concern that if publicly available, the information on feeders and number of customers served could be used by someone with ill intentions to disrupt and damage the system. This concern was identified around the same time that the Commission was asking for briefings on seismic resilience and physical security from the electric companies. Information deemed confidential and redacted was submitted to Staff on a CD marked confidential or provided in password protected PDFs.

Staff, PGE, and other utilities came to an agreement that customers should be able to see and understand the performance of the feeder that serves them and provide useful information to customers while balancing and protecting information that could be used by bad actors.

Attached are two ARRs 1) a Non-Confidential ARR that is customer friendly while keeping PGE's safety concerns in mind. The non-confidential version includes redaction and should be made available on the OPUC website for public viewing. 2) the Confidential version provides a full report and is submitted pursuant to OAR 860-001-0070. Because two versions are provided, the entire non-redacted document is marked confidential, although it includes both confidential and non-confidential information. We believe this is consistent with the rule and provides for appropriate public disclosure of the non-confidential ARR information. PGE will send a separate email with a password to open the confidential file.

Should you have any questions regarding this filing, please contact Mary Widman at mary.widman@pgn.com Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pgn.com

Sincerely,

\s\ Robert Macfarlane

Robert Macfarlane
Manager, Pricing and Tariffs

Enclosures

Portland General Electric

2022 Annual Reliability Report

Information in this document is accurate at the time of publication but is subject to change without notice.

Portland General Electric Company
Integrated Resource Planning
121 SW Salmon Street
Portland, Oregon 97204

Contents

Tables

Report Summary

Portland General Electric (PGE) looks to power our growing community with clean, reliable, and affordable energy. The Annual Reliability Report provides distribution system performance information based on service interruptions to PGE customers in accordance with Oregon Administration Rule (OAR) 860-023-0151. The report provides the reader with an overview of PGE's electric distribution system's reliability performance and helps identify areas of improvement and excellence. Calculations for reliability indices are based on the Institute of Electrical and Electronic Engineers (IEEE) Standard 1366.[1] This report provides a narrative along with tables, figures, a map, and additional related reports.

[1] Institute of Electrical Electronic Engineers (IEEE) Standard 1366 entitled "IEEE Guide for Electric Power Distribution Reliability Indices" (the 2012 edition), approved on May 14, 2012, by IEEE-SA Standards Board. The guide developed distribution service reliability indices to aid in consistent reporting practices among utilities. The definitions in IEEE 1366 were adopted in 2012 in the Electric Service Reliability Rules, OAR 860-023-0081 through OAR 860-023-0161, which governs the Annual Reliability Report.

Definitions and Acronyms

ADMS – Advanced Distribution Management System; A software platform allowing PGE to model, monitor, control, predict, and safely operate our distribution network in real-time.

AMI – Advanced Metering Infrastructure; a two-way communication system to collect detailed metering data that is integrated into communications networks and data management systems.

CAIDI – Customer Average Interruption Duration Index; the average duration a customer experienced per sustained interruption (greater than 5 minutes).

Customer - A metered electrical service point for which an active bill account is established at a specific location.

FITNES – Facility Inspection and Treatment to the National Electrical Safety Code; Systematically inspects all power poles over a 10-year inspection cycle, looking for violations of the National Electrical Safety Code, and remediating or replacing poles based on inspections.

FLISR – Fault Location, isolation, and service restoration; consists of automatable, SCADA-integrated switching devices on distribution mainlines that ADMS can command and control remotely.

IEEE – Institute of Electrical and Electronics Engineers; a technical professional organization dedicated to advancing technology for the benefit of humanity.

IOC – Integrated Operations Center; PGE centralized facility for managing functions vital to operating the smart grid and improved visibility and control of distribution resources for improved reliability and interruption response

$MAIFI_E$ – Momentary Average Interruption Event Frequency Index; the average number of momentary interruption events per customer (less than or equal to 5 minutes).

MED - Major Event Day; A day in which the daily System Average Interruption Duration Index (SAIDI) exceeds a Major Event Day threshold value.

Momentary Interruption - The brief loss of power delivery to one or more customers caused by the opening and closing operation of an interrupting device resulting in an interruption that lasts less than 5 minutes.

OAR - Oregon Administrative Rule; created by state agencies and some boards and commissions to implement and interpret their statutory authority.

OMS – Outage Management System; platform used to collect, monitor, and manage outage information.

Operating Area – Geographic subdivision of PGE's service territory. PGE's customers and distribution infrastructure are split into three operating areas: 1) Eastern, 2) Western, and 3) Southern.

OPUC – Oregon Public Utility Commission; state agency responsible for rate regulation and enforcing electric safety standards.

Planned Interruption - The loss of electric power to one or more customers that results from a planned interruption event. PGE requires a customer to be given at least 24 hours advanced notice for an interruption event to be classified as a planned interruption.

PSPS – Public Safety Power Shutoff; a temporary, pre-planned de-energization of a portion of a utility's infrastructure during periods of extreme fire danger to prevent the electrical system from becoming the source of an ignition that could endanger communities, residents, and the power grid.

Reliability Reporting Area – PGE's entire service territory, which encompasses the Eastern, Western, and Southern Operating Areas. Also, the area where PGE's annual T_{MED} threshold is calculated for performance.

Reporting Period – the 12-month period, based on a calendar year, for reporting reliability performance.

SAIDI – System Average Interruption Duration Index; the average duration from all sustained interruptions a customer experienced per year (greater than 5 minutes).

SAIFI – System Average Interruption Frequency Index; the average frequency of sustained interruptions a customer experienced per year (greater than 5 minutes).

SCADA – Supervisory Control and Data Acquisition; computer-based system for gathering and analyzing real-time data to monitor and control equipment.

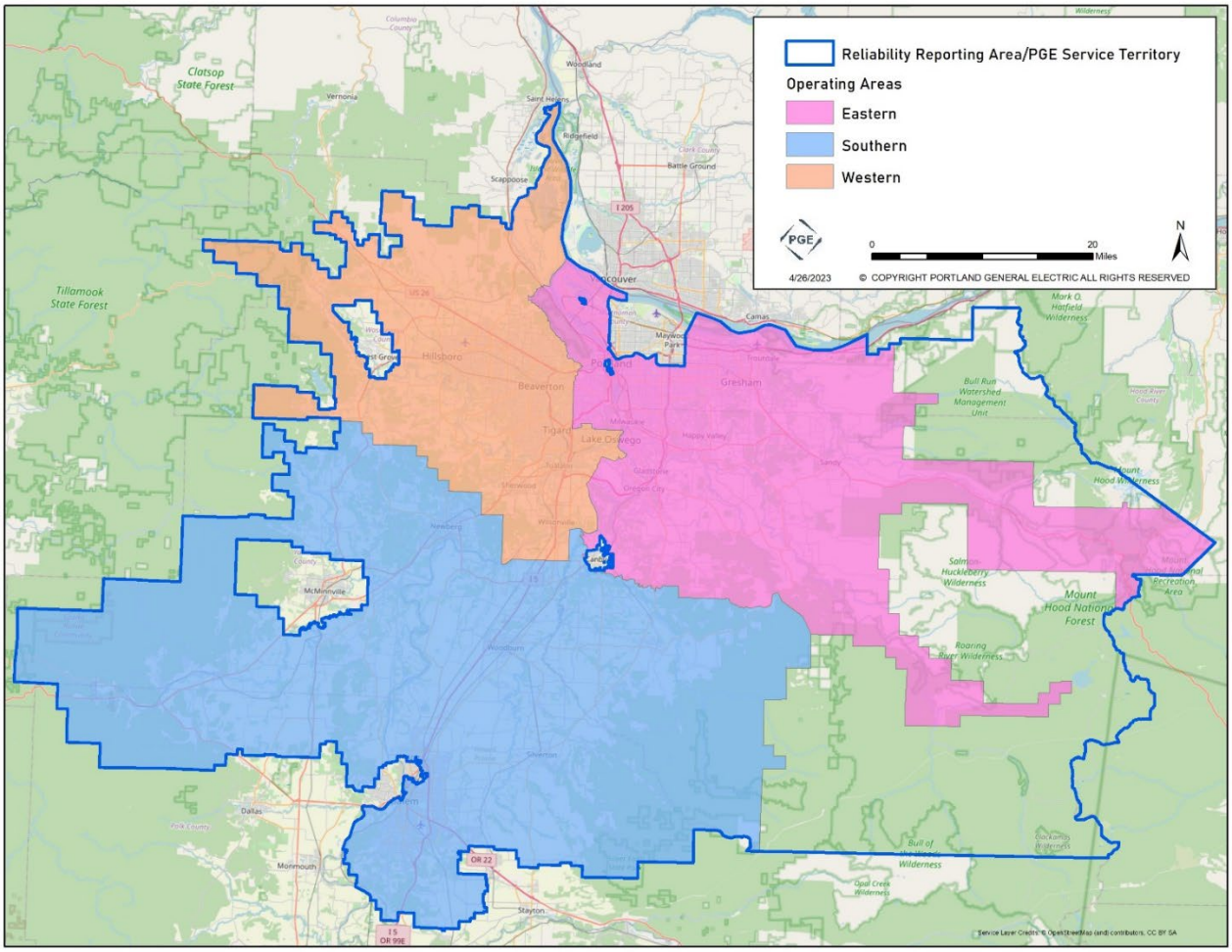
Sustained Interruption - Any interruption not classified as a part of a momentary event. That is, any interruption that lasts more than 5 minutes.

T_{MED} – A major event day threshold value.

1 System Overview

PGE has a service area population of nearly 2 million Oregonians in 51 cities, representing more than 900,000 customers over 4,000 square miles. Figure 1 captures PGE's service territory and the Reliability Reporting Area for the performance metrics captured in this report. This figure also captures the three Operating Areas PGE has established to best service customer needs and growth in the service territory: 1) Eastern, comprised of 50% of customers and 30% of the territory; 2) Southern, comprised of 30% of customers and 50% of the territory, and 3) Western, comprised of 20% of customers and 20% of the territory. Considerations for PGE's Operating Areas include the number of customers, response time for events, geography, and system characteristics. PGE's Operating Areas are modified occasionally to ensure we continue to meet customer needs and growth in PGE's service territory.

Figure 1: PGE's service territory with operating areas highlighted. Much of PGE's service territory on the eastern boundary (unshaded portion) contains US Forest Service land with no service meters or electrical grid infrastructure.



PGE maintains and operates tens of thousands of miles of circuits to serve our customers and communities. Table 1 captures information related to the hundreds of thousands of assets required to operate the circuits that make up PGE's system.

Table 1: PGE Circuits and Assets

Description	Quantity
Substations (transmission and distribution)	172
Substation transformers	439
Circuit breakers (transmission and distribution)	1,962
Poles and structures (transmission and distribution)	225,736
Circuit miles of transmission lines	1,255
Distribution circuits	697
Circuit miles of primary overhead distribution lines	8,161
Circuit miles of primary underground distribution lines	8,285
Overhead transformers	119,065
Underground transformers	74,531
Reclosers and sectionalizers	532

Definitions and additional information for Table 1 can be found in Appendix B.

Table 2 shows PGE's customer base has experienced growth over the last 5 years. As we serve more customers, we continue to invest in our infrastructure to ensure we reliably serve the customers and communities in our service territory.

Table 2: Customer Base by Operating Areas and Reporting Area

	Customer Count				
	2018	**2019**	**2020**	**2021**	**2022**
Eastern	413,627	418,917	428,102	436,247	440,972
Southern	172,602	173,978	176,261	178,151	181,015
Western	288,995	291,795	296,393	299,403	304,014
Total Reporting Area	**875,224**	**884,690**	**900,756**	**913,801**	**926,001**

2 Reporting Methodology

2.1 Customer Interruption Data and Reliability Calculations

PGE gathers customer interruption data via field personnel, dispatchers, customer calls, Supervisory Control and Data Acquisition (SCADA)-enabled devices, and Advanced Metering Infrastructure (AMI). The data from these various sources are integrated and maintained in PGE's outage management and reporting systems.

PGE captures interruption data utilized for reliability calculations through Oracle's Network Management System software for our Outage Management System (OMS) to track interruptions, facilitate interruption restoration, and collect and analyze interruption data. In addition, PGE utilizes databases where interruption, customer, and circuit data is maintained, and reliability metrics are calculated. Interruption details such as start time, restore time, substation involved, circuits, the number of customers affected, the cause of the interruption, the protective device that made the interruption, and elements involved are maintained in these data sources. Interruption events are confirmed via a multi-step evaluation process. For reliability metrics, customer counts are captured on January 1 of the reporting year. The results of the calculations are evaluated daily and confirmed via a standardized review process.

Following the guidance of IEEE Standard 1366, PGE primarily uses the System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), Momentary Average Interruption Frequency Index ($MAIFI_E$), and Customer Average Interruption Duration Index (CAIDI). The equations used to calculate SAIFI, SAIDI, $MAIFI_E$, and CAIDI are provided in Appendix A. Planned interruptions are incorporated in the calculation of the reliability indices in this report unless otherwise stated. PGE has also implemented a cause code for Public Safety Power Shutoff (PSPS) under the planned interruption cause category. For specific PSPS interruption analysis and reporting (see Section 5.2).

Reliability indices, counts, durations, and data throughout the report are presented, both including and excluding Major Event Days (MED). A MED is a day in which the daily system SAIDI exceeds a threshold value, T_{MED}. PGE subscribes to the 2.5 Beta Methodology outlined in the IEEE 1366 Standard to determine T_{MED} for each reporting year. This value is used for a given year's reporting period and applied to the reliability reporting area to identify days in which SAIDI exceeds the daily threshold. Days classified as MED are separately analyzed and reported. Table 20 in Section 5.1 presents PGE's 2022 MED. The detailed steps and calculation for T_{MED} can be found in Appendix A.

To calculate momentary interruption indices, PGE has a process to review and identify momentary interruptions for substation circuit breakers. These momentary interruptions are used for analysis and reporting across PGE's system and distribution circuits. PGE is working to enhance the accuracy of momentary interruption data. The company is in the discovery phase of leveraging AMI to support this work. PGE recognizes that these efforts may impact momentary interruption indices and year over year comparisons.

2.2 Changes to Data Collection and Reporting

In 2022, PGE began including planned interruption data in calculating system reliability indices. This is important to note when performing year over year comparisons to Annual Reliability Reports developed prior to 2022. PGE will continue to include planned interruption data in system reliability indices for all future Annual Reliability Reports. As captured in the Definitions and Acronyms section, PGE requires at least 24 hours advanced notice to customers for an interruption event to be classified as a planned interruption.

PGE established the Outage Communication Specialist team in 2022 in an effort to improve interruption data quality. One of the team's core functions is to ensure the accuracy of customer interruption data via auditing and correction of planned and unplanned interruptions in the OMS. PGE has observed improvements in accuracy of interruption data thus far. The team is also responsible for managing communications related to estimated restoration times for planned and unplanned interruption events, thus improving the experience for customers during an interruption.

Additionally, an initiative was undertaken in 2022 to re-configure and set new rule sets in the OMS. These changes were made to model and reflect interruption events in the system more accurately and are anticipated to improve reliability data.

3 Distribution System Reliability

This chapter captures reliability performance and interruption cause information for PGE's Reliability Reporting Area. The information presents the current and previous reporting years and reflects the exclusion and inclusion of Major Event Days (MED).[2]

3.1 Distribution System Metrics

The following indices represent the overall performance of PGE's Reliability Reporting Area and Operating Areas:

Table 3: PGE Multi-year Distribution System Metrics – Excluding Major Events

	Major Events Excluded														
	SAIDI					SAIFI					$MAIFI_E$				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Eastern	110	95	131	118	132	0.71	0.66	0.81	0.65	0.77	1.74	1.77	1.59	1.57	1.27
Southern	105	151	111	165	151	0.60	0.81	0.51	0.77	0.72	0.77	0.55	0.85	0.73	0.47
Western	73	97	67	110	108	0.51	0.63	0.46	0.61	0.58	0.87	0.76	0.74	0.49	0.45
Reporting Area	**97**	**107**	**106**	**125**	**128**	**0.62**	**0.68**	**0.64**	**0.66**	**0.70**	**1.26**	**1.19**	**1.16**	**1.05**	**0.84**

Table 4: PGE Multi-year Distribution System Metrics – Including Major Events

	Major Events Included														
	SAIDI					SAIFI					$MAIFI_E$				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Eastern	110	127	427	2,739	508	0.71	0.77	1.05	1.82	1.38	1.74	1.92	2.01	2.81	2.00
Southern	105	186	342	5,897	393	0.60	0.90	0.70	2.29	1.12	0.77	0.62	0.89	1.58	0.70
Western	73	120	153	833	367	0.51	0.71	0.68	1.19	1.01	0.87	0.79	0.92	0.86	0.84
Reporting Area	**97**	**136**	**320**	**2,730**	**439**	**0.62**	**0.78**	**0.86**	**1.71**	**1.21**	**1.26**	**1.28**	**1.42**	**1.92**	**1.36**

[2] As captured in the Reporting Methodology section, PGE began the inclusion of planned interruption data included in the calculation of system reliability indices in 2022.

3.2 System Interruption Events

Table 5 through Table 14 captures the number and duration of sustained interruption events as characterized by the cause categories as defined by OAR 860-023-0151(2)(b). Interruption events can impact one to many customers based on where the event occurs on PGE's system.

2022

Table 5: 2022 Interruption Causes - Major Events Excluded

OAR Cause	Customer Count	2022					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	926,001	9	0%	1,489	1,208,304	1%	12,476
B Loss of Supply - Substation	926,001	53	0%	7,724	9,905,238	8%	70,342
C Distribution - Equipment	926,001	3,333	18%	846,287	24,803,695	21%	126,711
D Distribution - Lightning	926,001	9	0%	1,612	7,708	0%	38
E Distribution - Planned	926,001	10,197	56%	1,528,057	10,170,588	9%	59,903
F Distribution - Public	926,001	673	4%	211,189	16,376,320	14%	76,375
G Distribution - Vegetation	926,001	1,532	8%	430,594	32,683,159	28%	181,658
H Distribution - Weather	926,001	1,172	6%	534,200	11,583,536	10%	42,913
I Distribution - Wildlife	926,001	651	4%	68,472	3,654,636	3%	36,804
J Distribution - Unknown	926,001	294	2%	88,784	3,956,771	3%	23,258
K Distribution - Other	926,001	262	1%	45,175	3,863,086	3%	17,511
Grand Total	926,001	**18,185**	**100%**	**3,763,582**	**118,213,043**	**100%**	**647,989**

Table 6: 2022 Interruption Causes - Major Events Included

OAR Cause	Customer Count	2022					
		Major Events Included					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	926,001	42	0%	39,047	10,736,960	3%	32,129
B Loss of Supply - Substation	926,001	61	0%	11,531	14,022,103	3%	82,682
C Distribution - Equipment	926,001	3,555	15%	1,007,649	35,712,572	9%	157,571
D Distribution - Lightning	926,001	9	0%	1,612	7,708	0%	38
E Distribution - Planned	926,001	11,360	47%	4,080,200	83,517,858	21%	91,509
F Distribution - Public	926,001	694	3%	220,743	19,679,710	5%	81,129
G Distribution - Vegetation	926,001	2,245	9%	990,216	72,476,006	18%	291,907
H Distribution - Weather	926,001	4,655	19%	3,523,530	149,683,520	37%	291,075
I Distribution - Wildlife	926,001	655	3%	68,845	3,656,349	1%	36,829
J Distribution - Unknown	926,001	388	2%	194,385	7,708,690	2%	32,308
K Distribution - Other	926,001	318	1%	194,255	9,593,833	2%	22,815
Grand Total	926,001	**23,982**	**100%**	**10,332,013**	**406,795,310**	**100%**	**1,119,992**

2021

Table 7: 2021 Interruption Causes - Major Events Excluded

OAR Cause	Customer Count	2021					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	913,801	12	0%	1,878	988,602	1%	17,877
B Loss of Supply - Substation	913,801	16	0%	2,121	3,256,874	3%	27,267
C Distribution - Equipment	913,801	3,749	27%	1,283,549	26,703,327	23%	140,015

OAR Cause	Customer Count	2021					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
D Distribution - Lightning	913,801	-	0%	-	-	0%	-
E Distribution - Planned	913,801	4,724	33%	811,463	5,069,335	4%	29,344
F Distribution - Public	913,801	655	5%	300,362	19,282,569	17%	83,165
G Distribution - Vegetation	913,801	2,026	14%	691,434	33,542,791	29%	184,435
H Distribution - Weather	913,801	1,033	7%	722,909	10,207,172	9%	40,801
I Distribution - Wildlife	913,801	853	6%	98,085	4,137,825	4%	31,401
J Distribution - Unknown	913,801	897	6%	936,846	8,584,670	8%	32,374
K Distribution - Other	913,801	165	1%	25,935	1,998,127	2%	16,763
Grand Total	913,801	**14,130**	**100%**	**4,874,582**	**113,771,293**	**100%**	**603,442**

Table 8: 2021 Interruption Causes - Major Events Included

OAR Cause	Customer Count	2021					
		Major Events Included					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	913,801	146	0%	326,019	186,796,272	7%	122,400
B Loss of Supply - Substation	913,801	253	1%	505,908	16,710,097	1%	48,278
C Distribution - Equipment	913,801	4,090	12%	1,698,477	55,455,942	2%	172,845
D Distribution - Lightning	913,801	-	0%	-	-	0%	-
E Distribution - Planned	913,801	4,768	14%	823,264	5,308,417	0%	33,593
F Distribution - Public	913,801	674	2%	313,836	20,169,695	1%	86,695
G Distribution - Vegetation	913,801	3,033	9%	1,978,748	192,497,444	8%	378,413
H Distribution - Weather	913,801	7,874	22%	24,314,466	1,050,851,188	42%	438,184

OAR Cause	Customer Count	2021					
		Major Events Included					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
I Distribution - Wildlife	913,801	858	2%	99,366	4,146,568	0%	31,462
J Distribution - Unknown	913,801	13,209	38%	76,079,771	960,526,473	39%	229,052
K Distribution - Other	913,801	182	1%	41,174	2,103,861	0%	17,360
Grand Total	913,801	**35,087**	**100%**	**106,181,028**	**2,494,565,958**	**100%**	**1,558,282**

2020

Table 9: 2020 Interruption Causes - Major Events Excluded

OAR Cause	Customer Count	2020					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	900,756	18	0%	3,285	3,304,322	3%	21,338
B Loss of Supply - Substation	900,756	47	0%	6,916	6,485,928	7%	47,877
C Distribution - Equipment	900,756	3,345	22%	769,009	17,736,162	18%	102,884
D Distribution - Lightning	900,756	80	1%	37,324	1,227,893	1%	4,517
E Distribution - Planned	900,756	7,102	47%	1,193,745	6,085,204	6%	36,273
F Distribution - Public	900,756	628	4%	162,825	10,901,856	11%	54,431
G Distribution - Vegetation	900,756	2,198	15%	616,103	38,549,256	40%	212,405
H Distribution - Weather	900,756	439	3%	215,775	4,005,473	4%	15,603
I Distribution - Wildlife	900,756	826	5%	88,037	3,388,877	4%	35,556

OAR Cause	Customer Count	2020					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
J Distribution - Unknown	900,756	204	1%	45,993	3,098,120	3%	24,872
K Distribution - Other	900,756	188	1%	29,904	1,097,462	1%	17,146
Grand Total	900,756	**15,075**	**100%**	**3,168,917**	**95,880,554**	**100%**	**572,902**

Table 10: 2020 Interruption Causes - Major Events Included

OAR Cause	Customer Count	2020					
		Major Events Included					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	900,756	22	0%	5,611	3,801,007	1%	23,225
B Loss of Supply - Substation	900,756	49	0%	7,492	6,653,191	2%	49,561
C Distribution - Equipment	900,756	3,500	20%	1,098,936	26,670,823	9%	113,956
D Distribution - Lightning	900,756	81	0%	41,757	1,236,759	0%	4,519
E Distribution - Planned	900,756	7,287	41%	1,228,120	7,095,720	2%	41,881
F Distribution - Public	900,756	650	4%	202,322	21,066,948	7%	59,791
G Distribution - Vegetation	900,756	2,701	15%	1,833,181	83,153,207	29%	262,989
H Distribution - Weather	900,756	2,200	12%	4,304,068	118,290,364	41%	128,469
I Distribution - Wildlife	900,756	837	5%	97,389	3,634,221	1%	35,873
J Distribution - Unknown	900,756	265	1%	234,953	9,864,307	3%	33,897
K Distribution - Other	900,756	201	1%	89,843	6,597,757	2%	17,962
Grand Total	900,756	**17,793**	**100%**	**9,143,673**	**288,064,306**	**100%**	**772,123**

2019

Table 11: 2019 Interruption Causes - Major Events Excluded

OAR Cause	Customer Count	2019					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	884,690	10	0%	1,794	1,994,722	2%	14,625
B Loss of Supply - Substation	884,690	44	0%	4,663	8,711,936	9%	73,786
C Distribution - Equipment	884,690	3,098	18%	720,374	16,269,896	17%	102,937
D Distribution - Lightning	884,690	123	1%	38,823	502,711	1%	1,817
E Distribution - Planned	884,690	9,549	55%	1,266,329	7,558,105	8%	57,638
F Distribution - Public	884,690	626	4%	187,512	17,054,908	18%	70,182
G Distribution - Vegetation	884,690	1,928	11%	516,330	33,348,813	35%	206,511
H Distribution - Weather	884,690	472	3%	152,230	3,081,251	3%	13,481
I Distribution - Wildlife	884,690	908	5%	109,111	2,746,056	3%	29,959
J Distribution - Unknown	884,690	287	2%	56,279	2,279,435	2%	18,906
K Distribution - Other	884,690	167	1%	29,969	969,841	1%	10,924
Grand Total	884,690	**17,212**	**100%**	**3,083,416**	**94,517,674**	**100%**	**600,766**

Table 12: 2019 Interruption Causes - Major Events Included

OAR Cause	Customer Count	2019					
		Major Events Included					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	884,690	10	0%	1,794	1,994,722	2%	14,625
B Loss of Supply - Substation	884,690	44	0%	4,663	8,711,936	7%	73,786
C Distribution - Equipment	884,690	3,140	18%	745,108	17,099,398	14%	104,990

OAR Cause	Customer Count	2019					
		Major Events Included					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
D Distribution - Lightning	884,690	207	1%	68,125	1,950,174	2%	8,069
E Distribution - Planned	884,690	9,599	54%	1,270,997	7,622,257	6%	58,333
F Distribution - Public	884,690	630	4%	188,390	17,181,166	14%	70,507
G Distribution - Vegetation	884,690	2,086	12%	623,140	44,583,281	37%	245,853
H Distribution - Weather	884,690	745	4%	353,702	13,647,587	11%	44,981
I Distribution - Wildlife	884,690	911	5%	109,613	3,389,860	3%	31,702
J Distribution - Unknown	884,690	303	2%	63,004	3,596,442	3%	22,155
K Distribution - Other	884,690	168	1%	30,166	970,038	1%	10,925
Grand Total	884,690	**17,843**	**100%**	**3,458,702**	**120,746,861**	**100%**	**685,926**

2018

Table 13: 2018 Interruption Causes - Major Events Excluded

OAR Cause	Customer Count	2018					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	875,224	9	0%	3,240	3,740,530	4%	10,516
B Loss of Supply - Substation	875,224	23	0%	2,334	3,014,158	4%	25,921
C Distribution - Equipment	875,224	3,082	20%	722,473	15,518,548	18%	86,967
D Distribution - Lightning	875,224	53	0%	17,665	761,925	1%	4,872
E Distribution - Planned	875,224	8,522	55%	758,957	7,256,976	9%	91,746
F Distribution - Public	875,224	669	4%	178,273	12,570,129	15%	72,642
G Distribution - Vegetation	875,224	1,653	11%	412,006	29,053,261	34%	159,017

OAR Cause	Customer Count	2018					
		Major Events Excluded					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
H Distribution - Weather	875,224	252	2%	84,826	5,703,283	7%	21,820
I Distribution - Wildlife	875,224	781	5%	94,799	3,715,910	4%	32,832
J Distribution - Unknown	875,224	240	2%	48,310	1,942,658	2%	13,861
K Distribution - Other	875,224	122	1%	18,635	1,411,643	2%	22,486
Grand Total	875,224	**15,406**	**100%**	**2,341,518**	**84,689,021**	**100%**	**542,680**

Table 14: 2018 Interruption Causes - Major Events Included

OAR Cause	Customer Count	2018					
		Major Events Included					
		Sustained Event Count	Percentage of Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Percentage of Customer Minutes	Customers Interrupted
A Loss of Supply - Transmission	875,224	9	0%	3,240	3,740,530	4%	10,516
B Loss of Supply - Substation	875,224	23	0%	2,334	3,014,158	4%	25,921
C Distribution - Equipment	875,224	3,082	20%	722,473	15,518,548	18%	86,967
D Distribution - Lightning	875,224	53	0%	17,665	761,925	1%	4,872
E Distribution - Planned	875,224	8,522	55%	758,957	7,256,976	9%	91,746
F Distribution - Public	875,224	669	4%	178,273	12,570,129	15%	72,642
G Distribution - Vegetation	875,224	1,653	11%	412,006	29,053,261	34%	159,017
H Distribution - Weather	875,224	252	2%	84,826	5,703,283	7%	21,820
I Distribution - Wildlife	875,224	781	5%	94,799	3,715,910	4%	32,832
J Distribution - Unknown	875,224	240	2%	48,310	1,942,658	2%	13,861
K Distribution - Other	875,224	122	1%	18,635	1,411,643	2%	22,486
Grand Total	875,224	**15,406**	**100%**	**2,341,518**	**84,689,021**	**100%**	**542,680**

4 Customer Reliability

This section presents reliability information at the individual customer level. PGE captures and evaluates reliability at the customer level to identify areas of performance not seen at the system level. The information presented captures sustained interruptions for the current and previous reporting years and reflects the exclusion and inclusion of Major Event Days (MED). These indices include planned interruption events but exclude momentary interruptions.

4.1 Individual Customer Interruptions and Durations

Table 15 and Table 16 reflect the number of customers that have experienced a number of interruptions, and Table 17 and Table 18 reflect the total interruption durations.

Table 15: Individual Customer Interruptions Excluding Major Event Days

Sustained Interruptions	2018	2019	2020	2021	2022
0	524,870	494,816	516,678	526,894	532,677
1	222,743	249,305	250,653	242,334	244,619
2	79,385	91,123	88,830	93,611	90,136
3	26,953	32,199	25,743	30,680	34,900
4	12,782	9,482	10,935	10,950	10,759
5	4,350	3,466	4,426	3,687	6,116
6	2,463	2,371	1,489	2,951	3,826
7	1,128	1,052	939	1,074	1,395
8	256	583	429	549	623
9	155	193	234	293	490
10	125	58	137	231	174
>10	14	42	263	547	286

Table 16: Individual Customer Interruptions Including Major Event Days

Sustained Interruptions	2018	2019	2020	2021	2022
0	524,870	468,551	436,964	264,766	379,296
1	222,743	246,055	267,551	229,686	279,883
2	79,385	110,248	117,877	172,642	147,109
3	26,953	35,780	42,801	105,996	51,850
4	12,782	11,515	20,714	64,675	25,923
5	4,350	6,177	8,267	38,050	14,713
6	2,463	3,075	2,792	16,916	9,500

Sustained Interruptions	2018	2019	2020	2021	2022
7	1,128	1,721	1,583	8,980	6,030
8	256	863	953	5,015	4,165
9	155	472	549	2,785	2,653
10	125	177	231	1,663	1,473
>10	14	56	474	2,627	3,406

Table 17: Individual Customer Interruption Hours Excluding Major Event Days

Sustained Interruption Hours	2018	2019	2020	2021	2022
0	524,870	494,816	516,678	526,894	532,677
0-2	141,703	153,312	152,182	167,672	155,450
2-4	84,280	104,279	99,161	84,539	95,179
4-6	44,683	50,305	50,926	41,795	46,857
6-8	29,767	28,627	27,143	25,508	28,144
8-10	19,831	21,460	18,918	16,427	19,822
10-12	11,004	9,504	11,297	12,369	10,864
12-14	4,756	6,126	6,782	11,826	11,848
14-16	5,523	3,994	5,033	5,832	4,877
16-18	2,198	3,072	3,705	3,387	4,126
18-20	2,102	2,919	1,781	3,563	2,261
>20	4,507	6,276	7,150	13,989	13,896

Table 18: Individual Customer Interruption Hours Including Major Event Days

Sustained Interruption Hours	2018	2019	2020	2021	2022
0	524,870	468,551	436,964	264,766	379,296
0-2	141,703	143,560	130,852	93,965	145,724
2-4	84,280	111,301	100,177	60,665	103,168
4-6	44,683	54,817	60,345	32,126	67,702
6-8	29,769	31,965	33,873	24,126	43,641
8-10	19,829	25,317	36,961	18,799	32,714
10-12	11,004	13,137	17,548	14,895	26,265
12-14	4,756	8,261	11,887	12,862	19,910
14-16	5,523	5,339	9,843	9,630	8,020

Sustained Interruption Hours	2018	2019	2020	2021	2022
16-18	2,198	6,069	6,451	11,296	8,708
18-20	2,102	3,678	6,202	15,894	6,492
>20	4,507	12,695	49,653	354,777	84,361

4.2 Consecutive Years Customer Reliability

Table 19 captures customers who have exceeded a target number of sustained interruptions or total interruption durations for each of the last 3 years. The thresholds are OPUC staff proposed over the period.

Table 19: Customer Reliability Targets

Immediate Primary Source of Service Operation Voltage	# of Sustained Interruptions Target	Customers Exceeding Target Interruptions in Each of the Last Three Consecutive Years (2020-2022)		Total Hours of Sustained Interruption Target	Customers Exceeding Target Hours of Total Interruption Duration in Each of the Last Three Years (2020-2022)	
		Major Events Excluded	Major Events Included		Major Events Excluded	Major Events Included
Above 57 kV	3	0	0	9	0	0
Between 13 kV and 57 kV	4	0	0	12	0	0
Below 13 kV	6	501	1,390	18	2,974	22,298

5 Major Events

5.1 Major Event Days Summary

Table 20 is a high-level summary of the MEDs experienced in 2022. PGE determines major events following IEEE Standard 1366.

For 2022, PGE applied a T_{MED} of 6.5 minutes across the Reliability Reporting Area. Additional information on MED exclusion reports is located in Appendix C.

Table 20: 2022 Major Event Days

Event Date(s)	Duration (Days)	Interruption Causes	SAIDI				SAIFI				CAIDI			
			Operating Area			Reporting Area	Operating Area			Reporting Area	Operating Area			Reporting Area
			Eastern	Southern	Western		Eastern	Southern	Western		Eastern	Southern	Western	
January 7th	1	High Winds	5.17	3.70	0.09	8.97	0.021	0.010	0.004	0.034	251	385	24	263
April 4th	1	Snow/High Winds	4.08	1.14	3.46	8.69	0.021	0.008	0.019	0.048	192	139	186	181
April 11th	1	Snow/High Winds	17.00	1.59	10.61	29.20	0.038	0.004	0.010	0.052	448	423	1,058	565
September 9th	1	PSPS/High Winds	51.45	19.22	17.84	88.50	0.023	0.012	0.012	0.046	2,285	1,597	1,521	1,913
November 4th-5th	2	High Winds/ Precipitation	23.49	1.69	1.35	26.54	0.060	0.004	0.009	0.073	392	379	155	363
November 7th	1	Equipment	6.38	0.31	0.05	6.74	0.014	0.001	0.000	0.015	461	254	171	440
December 22	1	High Winds/ Freezing Rain	9.36	1.01	7.40	17.78	0.024	0.005	0.020	0.050	385	190	362	355
December 27	1	High Winds/ Precipitation	62.03	18.63	44.62	125.28	0.093	0.032	0.067	0.191	670	586	670	656
Total PGE MED	**9**		**178.96**	**47.29**	**85.42**	**311.7**	**0.294**	**0.076**	**0.141**	**0.509**	**609**	**622**	**606**	**612**

Table 21 captures PGE's historical, current, and forthcoming T_{MED} values used for MED determination.

Table 21: PGE T_{MED} Values

Year	T_{MED}
2023	7.01
2022	6.50
2021	4.80
2020	4.78
2019	5.31
2018	5.49

5.2 Public Safety Power Shutoff Events

PGE's top priority is the safety of the customers and communities in our service territory. In the event of extreme conditions, PGE may call a Public Safety Power Shutoff (PSPS) to help protect lives, property, and public spaces.[3] PGE executes a PSPS as a last resort when severe fire potential and meteorological conditions increase the risk of utility-caused ignitions and wildfire. PGE understands that turning off power causes significant challenges and hardships for customers and communities and takes this decision seriously.

PGE executed only one Public Safety Power Shutoff (PSPS) event during the 2022 Wildfire Season.[4] Beginning on September 6 through September 12, 2022, PGE conducted a PSPS event in response to the National Weather Service (NWS) Red Flag Warnings and hazardous fire potential conditions across its service territory.

Table 22 captures reliability performance impacts specifically related to the 2022 PSPS event. These values are captured as part of the planned interruption cause category in Section 1 and Section 2.

Table 22: PSPS Summary

Cause Category	2022								
	Customer Count	Major Event Excluded				Major Event Included			
		Sustained Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Customers Interrupted	Sustained Interruption Count	Total Interruption Duration	Customer Minutes Interrupted	Customers Interrupted
PSPS	926,001	121	38,146	117,123	345	1,159	2,570,151	73,375,297	31,433

[3] For more information related to PGE's Wildfire Safety program, go to https://portlandgeneral.com/outages-safety/safety/wildfire-safety

[4] For more information related to PGE's 2022 PSPS event, go to https://assets.ctfassets.net/416ywc1laqmd/2ORY2Yct3bE0KrkVbYDXz1/a5ef8c140031e270cdae3cec2323af3c/2022-12-28_PGE_PSPS_Annual_Report_FINAL.pdf

6 Worst Performing Circuits

This section identifies the top 10 circuits that are worst performing from an interruption frequency and/or duration perspective. This information is presented for 2021 and 2022 and is also categorized by exclusion or inclusion of Major Events.

Analysis of poor performance and actions taken for improvement are captured in the following tables.

NOTE: The data and analysis for this section excludes planned interruptions and PSPS events. Planned interruptions often result from improvements to PGE's system. PSPS-related analysis and improvements are conducted as part of PGE's Wildfire Mitigation Plan. Worst performing circuit analysis focuses on drivers of unplanned interruption events to customers that should be evaluated for mitigation.

Table 23: 2022 Worst SAIDI - Major Events Excluded

	2022 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
EAGLE CREEK-RIVER MILL	459	52	1108	567	1,840	2.65	0.56	5.74	2.08	5.99	6.00	6.00	17.00	0.00	3.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 9 work orders on this circuit in 2022. System reconfiguration project underway. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
COLTON-GRAYS HILL	309	588	103	59	1,822	2.43	2.07	1.32	0.28	1.38	2.00	2.00	0.00	1.00	0.00	Interruption drivers: vegetation, weather, and public. Improvement efforts: Completed 33 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary underground circuit and installed recloser in 2020. Installed recloser in 2019.
ORIENT-OXBOW	0	381	696	997	1,671	0.00	1.44	2.60	4.01	5.94	0.00	6.00	4.00	1.00	3.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
OAK GROVE-LAKE HARRIET	1065	481	305	348	1,383	4.10	1.10	0.38	0.80	1.03	0.00	8.00	1.00	6.00	3.00	Interruption drivers: equipment, vegetation, and transmission outage. Improvement efforts: Completed 10 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
SANDY-SANDY 13	161	317	291	150	1,200	1.83	3.36	1.15	0.90	3.47	0.00	1.00	5.00	0.00	4.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 21 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

	2022 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
SCOGGINS-CHERRY GROVE	47	726	207	1,039	1,094	0.17	1.95	2.38	2.80	6.25	3.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 3 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
ROCK CREEK-NEWBERRY	0	0	412	756	994	0.00	0.00	2.33	3.01	1.39	0.00	0.00	1.00	1.00	0.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 9 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK 13	305	573	1,003	1,782	942	1.64	1.56	3.34	6.60	4.51	1.00	0.00	0.00	3.00	2.00	Interruption drivers: transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 12 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary circuit and transformer in 2021.
PENINSULA PARK-OCKLEY GREEN	30	304	1	0	878	0.30	1.07	0.00	0.01	2.39	1.00	3.00	0.00	2.00	1.00	Interruption drivers: substation outage, vegetation, and equipment. Improvement efforts: Completed 3 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
ST LOUIS-NORTH	195	488	310	843	805	0.71	1.83	2.68	0.30	3.13	9.00	7.00	6.00	1.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 9 work orders on this circuit in 2022. Currently rebuilding substation and replacing primary circuit. Primary underground and overhead circuit replaced 2019.

Table 24: 2022 Worst SAIDI - Major Events Included

	2022 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
BRIGHTWOOD-NORTH BANK	430	176	7,419	5,142	4,985	1.86	0.52	3.46	3.83	9.43	17.00	5.00	7.00	6.00	19.00	Interruption drivers: weather, transmission outage, and equipment. Improvement efforts: Completed 7 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
WELCHES-ZIG ZAG	963	457	2,717	6,725	3,758	4.27	1.38	3.14	5.71	6.11	1.00	4.00	2.00	3.00	7.00	Interruption drivers: weather, vegetation, and substation outage. Improvement efforts: Completed 23 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Early Fault Detector sensors installed in 2021. Reclosure replaced in 2020. Primary underground circuit and pole replaced in 2019.
ROCK CREEK-NEWBERRY	0	0	1,129	1,636	3,478	0.00	0.00	3.07	5.51	2.46	0.00	0.00	1.00	3.00	0.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 9 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
DURHAM-BONITA	21	0	86	11	3,363	0.03	0.00	0.20	0.01	4.21	0.00	1.00	1.00	1.00	0.00	Interruption drivers: weather, public, and equipment. Improvement efforts: Monitoring and evaluating potential action items.
EAGLE CREEK-RIVER MILL	459	63	3,434	8,139	3,360	2.65	0.57	7.52	5.70	9.34	6.00	6.00	17.00	0.00	5.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 9 work orders on this circuit in 2022. System reconfiguration project underway. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.

	2022 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
ORIENT-OXBOW	0	1,071	1,540	3,571	3,189	0.00	2.77	3.01	4.76	8.89	0.00	8.00	6.00	2.00	5.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
SCOGGINS-CHERRY GROVE	47	726	712	1,044	3,073	0.17	1.95	2.57	2.80	7.71	3.00	1.00	1.00	2.00	4.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 3 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
RIVERGATE SOUTH-11011	174	4	542	4	2,907	0.21	0.04	2.04	0.04	7.50	0.00	1.00	1.00	0.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 1 work order on this circuit in 2022. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK 13	305	580	1,675	2,736	2,783	1.64	1.57	4.56	7.38	5.94	1.00	0.00	0.00	3.00	2.00	Interruption drivers: transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 12 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary circuit and transformer in 2021.
CANBY-13644	32	375	592	15,121	2,723	0.07	1.95	0.99	2.66	2.79	1.00	3.00	1.00	0.00	4.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 2 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

Table 25: 2022 Worst SAIFI - Major Events Excluded

	2022 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
SCOGGINS-CHERRY GROVE	47	726	207	1,039	1,094	0.17	1.95	2.38	2.80	6.25	3.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 3 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
EAGLE CREEK-RIVER MILL	459	52	1,108	567	1,840	2.65	0.56	5.74	2.08	5.99	6.00	6.00	17.00	0.00	3.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 9 work orders on this circuit in 2022. System reconfiguration project underway. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
CURTIS-11077	107	36	5	1	537	1.04	0.40	0.02	0.00	5.96	0.00	0.00	0.00	0.00	0.00	Interruption drivers: public, weather, and equipment. Improvement efforts: Completed 6 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
ORIENT-OXBOW	0	381	696	997	1,671	0.00	1.44	2.60	4.01	5.94	0.00	6.00	4.00	1.00	3.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
MARKET-ENGLEWOOD	131	185	98	16	570	1.04	1.24	1.23	0.16	5.11	1.00	0.00	2.00	0.00	1.00	Interruption drivers: equipment, public, and wildlife. Improvement efforts: Completed 4 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK 13	305	573	1,003	1,782	942	1.64	1.56	3.34	6.60	4.51	1.00	0.00	0.00	3.00	2.00	Interruption drivers: transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 12 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary circuit and transformer in 2021.

	2022 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
BRIGHTWOOD-NORTH BANK	430	176	374	197	705	1.86	0.52	2.64	0.91	4.48	17.00	5.00	6.00	4.00	6.00	Interruption drivers: weather, transmission outage, and equipment. Improvement efforts: Completed 7 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
MT PLEASANT-MT VIEW	38	2	23	96	276	0.52	0.01	0.07	1.23	4.48	1.00	2.00	3.00	1.00	2.00	Interruption drivers: equipment, transmission outage, and substation outage. Improvement efforts: Completed 5 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
ABERNETHY-OREGON CITY	271	84	23	103	187	0.86	1.32	1.12	0.35	4.40	22.00	5.00	0.00	2.00	3.00	Interruption drivers: equipment, vegetation, and wildlife. Improvement efforts: Completed 10 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
SANDY-WILDCAT	177	112	418	259	487	1.52	0.60	2.13	1.81	4.27	1.00	0.00	2.00	0.00	2.00	Interruption drivers: vegetation, substation outage, and equipment. Improvement efforts: Completed 26 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

Table 26: 2022 Worst SAIFI - Major Events Included

	2022 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
BRIGHTWOOD-NORTH BANK	430	176	7,419	5,142	4,985	1.86	0.52	3.46	3.83	9.43	17.00	5.00	7.00	6.00	19.00	Interruption drivers: weather, transmission outage, and equipment. Improvement efforts: Completed 7 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
EAGLE CREEK-RIVER MILL	459	63	3,434	8,139	3,360	2.65	0.57	7.52	5.70	9.34	6.00	6.00	17.00	0.00	5.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
ORIENT-OXBOW	0	1,071	1,540	3,571	3,189	0.00	2.77	3.01	4.76	8.89	0.00	8.00	6.00	2.00	5.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 1 work order on this circuit in 2022. Monitoring and evaluating potential action items.
SCOGGINS-CHERRY GROVE	47	726	712	1,044	3,073	0.17	1.95	2.57	2.80	7.71	3.00	1.00	1.00	2.00	4.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 9 work orders on this circuit in 2022. System reconfiguration project underway. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
RIVERGATE SOUTH-11011	174	4	542	4	2,907	0.21	0.04	2.04	0.04	7.50	0.00	1.00	1.00	0.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 3 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

	2022 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
SANDY-SANDY 13	161	351	2,358	1,011	2,431	1.83	3.46	2.26	1.82	6.95	0.00	1.00	5.00	4.00	4.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 21 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
WELCHES-ZIG ZAG	963	457	2,717	6,725	3,758	4.27	1.38	3.14	5.71	6.11	1.00	4.00	2.00	3.00	7.00	Interruption drivers: weather, vegetation, and substation outage. Improvement efforts: Completed 23 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Early Fault Detector sensors installed in 2021. Reclosure replaced in 2020. Primary underground circuit and pole replaced in 2019.
CURTIS-11077	107	36	5	236	619	1.04	0.40	0.02	0.03	6.04	0.00	0.00	0.00	0.00	0.00	Interruption drivers: public, weather, and equipment. Improvement efforts: Completed 6 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK 13	305	580	1,675	2,736	2,783	1.64	1.57	4.56	7.38	5.94	1.00	0.00	0.00	3.00	2.00	Interruption drivers: transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 12 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary circuit and transformer in 2021.
MERIDIAN-MERIDIAN 13	358	461	346	4,742	981	1.30	1.74	1.57	5.19	5.80	1.00	1.00	2.00	1.00	0.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 4 work orders on this circuit in 2022. Ongoing recloser installations in 2023.

Table 27: 2021 Worst SAIDI - Major Events Excluded

	2021 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
GALES CREEK-GALES CREEK 13	305	573	1,003	1,782	942	1.64	1.56	3.34	6.60	4.51	1.00	0.00	0.00	3.00	2.00	Interruption drivers: transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 12 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary circuit and transformer in 2021.
ABERNETHY-CLACKAMAS HEIGHTS	25	77	32	1,614	318	0.24	0.42	0.43	1.01	1.38	4.00	1.00	0.00	0.00	2.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 1 work order on this circuit in 2022. Monitoring and evaluating potential action items.
SCOGGINS-CHERRY GROVE	47	726	207	1,039	1,094	0.17	1.95	2.38	2.80	6.25	3.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 3 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
WELCHES-ZIG ZAG	963	455	1,442	1,019	586	4.27	1.37	2.98	3.49	2.96	1.00	4.00	2.00	2.00	4.00	Interruption drivers: weather, vegetation, and substation outage. Improvement efforts: Completed 23 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Early Fault Detector sensors installed in 2021. Reclosure replaced in 2020. Primary underground circuit and pole replaced in 2019.
SCOTTS MILLS-SCOTTS MILLS 13	174	347	565	1,006	112	0.62	1.68	0.95	3.42	0.34	2.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, vegetation, public, and equipment. Improvement efforts: Completed 22 work orders on this circuit in 2022. Recloser to be installed 2023. Reclosers installed in 2021.
ORIENT-OXBOW	0	381	696	997	1,671	0.00	1.44	2.60	4.01	5.94	0.00	6.00	4.00	1.00	3.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

	2021 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
NEWBERG-CHEHALEM	116	129	130	969	519	0.36	0.68	0.59	3.34	1.12	0.00	0.00	1.00	0.00	1.00	Interruption drivers: weather, vegetation, and public. Improvement efforts: Completed 33 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
ALDER-STARK	4	5	38	958	335	0.04	0.02	1.12	1.26	1.00	2.00	1.00	1.00	5.00	1.00	Interruption drivers: public, vegetation, and wildlife. Improvement efforts: Completed 5 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
REDLAND-REDLAND 13	193	134	252	887	95	0.93	0.87	1.41	4.94	0.64	0.00	0.00	0.00	2.00	0.00	Interruption drivers: vegetation, substation outage, weather, and public. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary underground circuit and installed recloser in 2021. Replaced primary underground circuit in 2020.
ST LOUIS-NORTH	195	488	310	843	805	0.71	1.83	2.68	0.30	3.13	9.00	7.00	6.00	1.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 9 work orders on this circuit in 2022. Currently rebuilding substation and replacing primary circuit. Primary underground and overhead circuit replaced 2019.

Table 28: 2021 Worst SAIDI - Major Events Included

	2021 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
WOODBURN-EAST	324	412	215	27,330	1,024	2.33	0.89	0.85	5.62	1.12	1.00	2.00	3.00	2.00	0.00	Interruption drivers: transmission outage, public, vegetation, and weather. Improvement efforts: Completed 2 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
LELAND-CARUS	580	1,326	3,898	19,734	2,051	2.08	3.96	2.19	5.86	4.48	0.00	5.00	7.00	10.00	6.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 24 work orders on this circuit in 2022. Part of tree wire program installing tree wire on primary overhead circuits from 2018 through 2022. Replaced primary circuit and switch in 2021. Replaced primary circuit and transformer in 2020.
SCOTTS MILLS-SCOTTS MILLS 13	174	403	2,829	19,589	198	0.62	1.73	1.27	6.15	0.47	2.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, vegetation, public, and equipment. Improvement efforts: Completed 22 work orders on this circuit in 2022. Recloser to be installed 2023. Reclosers installed in 2021.
TWILIGHT-BREMER	193	205	289	19,445	311	1.03	0.79	1.98	3.74	0.81	1.00	6.00	3.00	2.00	3.00	Interruption drivers: weather, transmission, and vegetation. Improvement efforts: Completed 9 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
JENNINGS LODGE-WEBSTER	36	185	12	18,379	378	0.20	1.84	0.10	3.00	1.98	5.00	3.00	1.00	5.00	2.00	Interruption drivers: weather, transmission, and equipment. Improvement efforts: Completed 7 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
CANBY-BUTTEVILLE	317	13	34	17,352	590	1.05	0.04	0.17	2.45	2.11	5.00	6.00	1.00	0.00	4.00	Interruption drivers: transmission outage, weather, and vegetation. Improvement efforts: Completed 2 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

	2021 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
BELL-KING	10	163	168	17,010	1,292	0.12	1.20	0.21	0.98	2.22	8.00	5.00	4.00	0.00	2.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Monitoring and evaluating potential action items.
SULLIVAN-WILLAMETTE	23	82	409	16,810	768	0.19	0.16	1.41	2.54	1.10	2.00	1.00	1.00	2.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 11 work orders on this circuit in 2022. Asset replacements and tree wire installed on overhead primary circuit in 2022.
WILLAMINA-BUELL	499	470	292	16,547	381	1.74	0.87	1.37	3.02	1.72	0.00	0.00	1.00	0.00	0.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 6 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
BARNES-BOONE	22	476	2	16,407	252	0.14	2.92	0.04	3.88	1.25	0.00	2.00	1.00	0.00	0.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 6 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

Table 29: 2021 Worst SAIFI - Major Events Excluded

	2021 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
GALES CREEK-GALES CREEK 13	305	573	1,003	1,782	942	1.64	1.56	3.34	6.60	4.51	1.00	0.00	0.00	3.00	2.00	Interruption drivers: transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 12 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary circuit and transformer in 2021.
REDLAND-REDLAND 13	193	134	252	887	95	0.93	0.87	1.41	4.94	0.64	0.00	0.00	0.00	2.00	0.00	Interruption drivers: vegetation, substation outage, weather, and public. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary underground circuit and installed recloser in 2021. Replaced primary underground circuit in 2020.
ORIENT-OXBOW	0	381	696	997	1,671	0.00	1.44	2.60	4.01	5.94	0.00	6.00	4.00	1.00	3.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
CLAXTAR-CLAXTAR 13	0	84	1	57	2	0.00	1.27	0.00	3.89	0.02	0.00	0.00	0.00	0.00	0.00	Interruption drivers: weather, vegetation, public, and equipment. Improvement efforts: Completed 1 work order on this circuit in 2022. Monitoring and evaluating potential action items.
CLAXTAR-HAYESVILLE	38	121	27	61	204	0.17	1.16	0.24	3.70	1.07	1.00	0.00	0.00	0.00	0.00	Interruption drivers: transmission outage, equipment, and wildlife. Improvement efforts: Completed 2 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

	2021 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
WELCHES-ZIG ZAG	963	455	1,442	1,019	586	4.27	1.37	2.98	3.49	2.96	1.00	4.00	2.00	2.00	4.00	Interruption drivers: weather, vegetation, and substation outage. Improvement efforts: Completed 23 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Early Fault Detector sensors installed in 2021. Reclosure replaced in 2020. Primary underground circuit and pole replaced in 2019.
SCOTTS MILLS-SCOTTS MILLS 13	174	347	565	1,006	112	0.62	1.68	0.95	3.42	0.34	2.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, vegetation, public, and equipment. Improvement efforts: Completed 22 work orders on this circuit in 2022. Recloser to be installed 2023. Reclosers installed in 2021.
NEWBERG-CHEHALEM	116	129	130	969	519	0.36	0.68	0.59	3.34	1.12	0.00	0.00	1.00	0.00	1.00	Interruption drivers: weather, vegetation, and public. Improvement efforts: Completed 33 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
HARBORTON-LINNTON	691	118	471	737	139	3.11	1.05	2.38	3.19	0.32	3.00	1.00	0.00	1.00	0.00	Interruption drivers: vegetation, wildlife, and equipment. Improvement efforts: Completed 5 work orders on this circuit in 2022. Monitoring and evaluating potential action items.
DUNNS CORNER-DUNNS CORNER 13	583	389	607	817	495	1.70	1.97	3.16	3.08	2.38	8.00	4.00	7.00	6.00	0.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 58 work orders on this circuit in 2022. Tree wire installed on primary overhead circuit in 2023. Replaced primary underground circuit in 2021. Installed reclosers in 2020.

Table 30: 2021 Worst SAIFI - Major Events Included

	2021 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
GALES CREEK-GALES CREEK 13	305	580	1,675	2,736	2,783	1.64	1.57	4.56	7.38	5.94	1.00	0.00	0.00	3.00	2.00	Interruption drivers: transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 12 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary circuit and transformer in 2021.
REDLAND-REDLAND 13	193	340	3,825	14,165	1,521	0.93	1.38	2.92	6.95	3.62	0.00	0.00	0.00	3.00	0.00	Interruption drivers: vegetation, substation outage, weather, and public. Improvement efforts: Completed 25 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced primary underground circuit and installed recloser in 2021. Replaced primary underground circuit in 2020.
SCOTTS MILLS-SCOTTS MILLS 13	174	403	2,829	19,589	198	0.62	1.73	1.27	6.15	0.47	2.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, vegetation, public, and equipment. Improvement efforts: Completed 22 work orders on this circuit in 2022. Recloser to be installed 2023. Reclosers installed in 2021.
ESTACADA-NORTH FORK	459	313	6,639	9,594	1,100	1.77	1.89	5.32	5.98	4.00	2.00	0.00	2.00	6.00	0.00	Interruption drivers: vegetation, transmission outage, and weather. Improvement efforts: Completed 65 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Replaced multiple spans of primary underground circuit in 2020.
EAGLE CREEK-BARTON	481	593	2,973	5,757	402	2.57	2.12	2.89	5.98	2.88	5.00	5.00	6.00	0.00	5.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 11 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

	2021 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	Analysis & Steps Taken
LELAND-CARUS	580	1,326	3,898	19,734	2,051	2.08	3.96	2.19	5.86	4.48	0.00	5.00	7.00	10.00	6.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 24 work orders on this circuit in 2022. Part of tree wire program installing tree wire on primary overhead circuits from 2018 through 2022. Replaced primary circuit and switch in 2021. Replaced primary circuit and transformer in 2020.
DUNNS CORNER-DUNNS CORNER 13	583	565	3,145	4,616	1,517	1.70	3.01	4.56	5.77	4.20	8.00	6.00	7.00	10.00	0.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 58 work orders on this circuit in 2022. Tree wire installed on primary overhead circuit in 2023. Replaced primary underground circuit in 2021. Installed reclosers in 2020.
WELCHES-ZIG ZAG	963	457	2,717	6,725	3,758	4.27	1.38	3.14	5.71	6.11	1.00	4.00	2.00	3.00	7.00	Interruption drivers: weather, vegetation, and substation outage. Improvement efforts: Completed 23 work orders on this circuit in 2022. Monitoring and evaluating potential action items. Early Fault Detector sensors installed in 2021. Reclosure replaced in 2020. Primary underground circuit and pole replaced in 2019.
EAGLE CREEK-RIVER MILL	459	63	3,434	8,139	3,360	2.65	0.57	7.52	5.70	9.34	6.00	6.00	17.00	0.00	5.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 9 work orders on this circuit in 2022. System reconfiguration project underway. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
WOODBURN-EAST	324	412	215	27,330	1,024	2.33	0.89	0.85	5.62	1.12	1.00	2.00	3.00	2.00	0.00	Interruption drivers: transmission outage, public, vegetation, and weather. Improvement efforts: Completed 2 work orders on this circuit in 2022. Monitoring and evaluating potential action items.

7 Improvement Projects and Programs

This section summarizes a few of the major reliability improvement efforts PGE is currently conducting or planning to complete within the 5-year horizon.[5] Information is grouped by distribution or transmission based on which system the majority of the project/program scope will be applied. The following projects and programs are all multimillion-dollar efforts aimed at maintaining and/or improving reliability for PGE's customers.

7.1 Major Distribution Projects/Programs

- **Distribution Automation:** In 2019, PGE began modernizing the distribution system to improve customer reliability through significant technology upgrades. One key modernization area was through Fault Location, Isolation, and Service Restoration (FLISR) deployments. FLISR implementation consists of installing automatable, SCADA-integrated switching devices on PGE's distribution circuits, a foundational reliability component of the grid of the future. When integrated with our advanced distribution management system (ADMS), the advanced FLISR application will monitor system conditions and autonomously perform switching operations in the event of a sustained fault.

  Working together, ADMS and FLISR will reduce sustained interruption frequency and duration for PGE customers. This capability is especially valuable during large-scale events that can disrupt power across a large service area. During major events, operators can quickly become overwhelmed by the volume of switching operations, leading to longer interruption event response times. ADMS and FLISR will measurably improve PGE's event response time, improving electrical grid resiliency.

  To date, PGE has deployed modern switching devices across more than 10% of its circuits and plans to activate its first set of circuits in a new ADMS-FLISR advanced application in 2023. By 2025, PGE plans to expand modern switching device deployments to over 15% of its circuits while continuing to enable FLISR implementations within the ADMS, when feasible.

- **Proactive Underground Cable Replacement:** The Unjacketed Cable Replacement Program executes projects to replace unjacketed underground cable across all of PGE's service territory. The aging nature and resulting failure rate for this type of underground cable drives the need for proactive replacement at a large scale.

[5] PGE's budgets are fixed each year and many factors could cause a reprioritization of work identified, often on a year-to-year basis. The projects captured represent part of a body of work that PGE has identified for the coming years. Changes in our local environment will dictate the timing and duration over which that work is completed and whether or not the identified projects are displaced by other projects of higher priority.

As unjacketed underground cable is removed from PGE's system, the key tangible benefit to customers is improved reliability via mitigation of unplanned interruption events due to cable failures.

The program currently targets 35 – 50 miles of unjacketed cable replacement annually over the 5-year planning horizon.

- **Distribution Overhead FITNES:** This program ensures compliance with OPUC regulatory requirements and supports customer safety and reliability.

  In 2022, PGE replaced 4,831 distribution poles via the Distribution Overhead Facility Inspection and Treatment to the National Electrical Safety Code (FITNES) program.

  PGE's goal for 2023 is to complete approximately 6,000 work orders targeting bad order pole replacements, clearance pole installations, and crossarm replacements.

7.2 Major Transmission Projects

- **Orenco Substation Project:** This project rebuilds the Orenco substation's configuration and replaces substation transformers, breakers, and switchgear. Transmission circuit reconductoring is also being performed as part of the project.

  This project is part of a multi-phase effort known as the Hillsboro Reliability Project, which involves substation, transmission, and distribution additions and improvements centered around Hillsboro, Oregon. The design and construction of the Hillsboro Reliability Project will occur over the next five years and will support maintained and/or improved customer reliability, given anticipated load growth in the area.

- **South Milliken Project:** This project targets the replacement of 18 miles of existing, aged lattice transmission towers between PGE's Faraday and Boring substations as well as between Boring substation and Hogan Road in East Multnomah County. The project also inspects existing lattice structures and replacements as needed between Hogan Road and PGE's Stephens substation.

  The condition of the existing, aged lattice structures presents both reliability and safety concerns, and looks to proactively replace these structures before failure. The rebuild of the 18-mile section of the circuit will ensure maintained reliability and allow for a future upgrade from 57kV to 115kV without any additional changes to the replaced sections of the circuit.

- **Transmission Inspection Programs:** PGE conducts a variety of programs focused on replacements and improvements of transmission structures. This includes the Overhead Transmission FITNES, Full Pole Inspection, and Transmission Line Clearance Mitigation. All these programs support compliance with OPUC and Federal regulatory requirements and support customer safety and reliability.

  In 2022, PGE replaced 189 transmission poles via the various transmission inspection programs and forecasts to complete approximately 250 work orders in 2023.

8 Distribution Circuit Information

Table 31, Table 32, and Table 33 provide details and reliability performance information by operating areas regarding PGE's 697 distribution circuits.

Eastern Operating Area

Table 31: Reliability Performance for PGE's Eastern Operating Area

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
ABERNETHY	6105013	ABERNETHY-CLACKAMAS HEIGHTS	7.2/12.5 kV Grounded Y	[redacted]	746	171,256	317.73	1.384	1,059	626,178	1,161.74	1.965
ABERNETHY	6105023	ABERNETHY-OREGON CITY	7.2/12.5 kV Grounded Y	[redacted]	9,890	435,698	197.24	4.477	12,507	1,298,933	588.02	5.662
ABERNETHY	6105033	ABERNETHY-TRANSIT	7.2/12.5 kV Grounded Y	[redacted]	1,535	168,285	115.74	1.056	4,470	338,365	232.71	3.074
ABERNETHY	6105043	ABERNETHY-WASHINGTON	7.2/12.5 kV Grounded Y	[redacted]	4,318	218,242	126.66	2.506	4,676	365,032	211.86	2.714
ALDER	1118013	ALDER-ANKENY	7.2/12.5 kV Grounded Y	[redacted]	803	173,648	49.99	0.231	2,656	663,483	190.99	0.765
ALDER	1118053	ALDER-IRVING	7.2/12.5 kV Grounded Y	[redacted]	1,786	221,151	54.27	0.438	1,798	225,970	55.45	0.441
ALDER	1118043	ALDER-LINCOLN	7.2/12.5 kV Grounded Y	[redacted]	354	45,646	29.24	0.227	355	46,018	29.48	0.227
ALDER	1118033	ALDER-STARK	7.2/12.5 kV Grounded Y	[redacted]	2,838	895,891	337.94	1.071	2,844	916,110	345.57	1.073
ALDER	1118063	ALDER-TAYLOR	7.2/12.5 kV Grounded Y	[redacted]	5,476	1,330,465	255.61	1.052	5,481	1,333,182	256.13	1.053
ALDER	1118073	ALDER-YAMHILL	7.2/12.5 kV Grounded Y	[redacted]	648	91,527	95.44	0.676	649	91,540	95.45	0.677

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
ARLETA	1125013	ARLETA-52ND	7.2/12.5 kV Grounded Y	[redacted]	3,159	402,560	122.10	0.958	4,685	1,154,457	350.15	1.421
ARLETA	1125033	ARLETA-FOSTER	7.2/12.5 kV Grounded Y	[redacted]	144	10,500	4.98	0.068	161	11,635	5.52	0.076
ARLETA	1125023	ARLETA-HAROLD	7.2/12.5 kV Grounded Y	[redacted]	456	61,501	17.79	0.132	462	63,483	18.36	0.134
ARLETA	1125043	ARLETA-POWELL	7.2/12.5 kV Grounded Y	[redacted]	43	2,773	0.82	0.013	9,627	7,588,276	2,248.38	2.852
ARLETA	1125053	ARLETA-STEELE	7.2/12.5 kV Grounded Y	[redacted]	539	40,012	10.81	0.146	670	116,296	31.43	0.181
BELL	1155073	BELL-BATTIN	7.2/12.5 kV Grounded Y	[redacted]	2,302	185,348	188.55	2.342	2,303	185,616	188.83	2.343
BELL	1155083	BELL-BRENTWOOD	7.2/12.5 kV Grounded Y	[redacted]	57	6,348	17.44	0.157	58	6,354	17.46	0.159
BELL	1155023	BELL-FLAVEL	7.2/12.5 kV Grounded Y	[redacted]	397	66,210	25.41	0.152	3,020	287,872	110.46	1.159
BELL	1155013	BELL-JOHNSON CREEK	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
BELL	1155053	BELL-KENDALL	7.2/12.5 kV Grounded Y	[redacted]	3,196	287,819	180.56	2.005	4,846	535,123	335.71	3.040
BELL	1155063	BELL-KING	7.2/12.5 kV Grounded Y	[redacted]	456	72,948	32.70	0.204	5,109	2,902,967	1,301.20	2.290
BELL	1155043	BELL-SOUTHGATE	7.2/12.5 kV Grounded Y	[redacted]	305	50,182	20.55	0.125	425	73,616	30.15	0.174
BELL	1155033	BELL-WICHITA	7.2/12.5 kV Grounded Y	[redacted]	232	23,304	11.04	0.110	3,040	2,267,867	1,074.31	1.440
BLUE LAKE	5156013	BLUE LAKE-BLUE LAKE13	7.2/12.5 kV Grounded Y	[redacted]	259	37,694	16.21	0.111	268	44,031	18.94	0.115
BLUE LAKE	5156033	BLUE LAKE-SUNDIAL	7.2/12.5 kV Grounded Y	[redacted]	527	104,168	202.27	1.023	537	112,444	218.34	1.043
BLUE LAKE	5156023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	20	5,706	300.33	1.053	20	5,706	300.33	1.053

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Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
BORING	5177033	BORING-282ND	7.2/12.5 kV Grounded Y	[redacted]	173	21,308	8.71	0.071	330	73,181	29.92	0.135
BORING	5177023	BORING-CITY	7.2/12.5 kV Grounded Y	[redacted]	3,493	723,382	270.83	1.308	8,125	1,630,102	610.30	3.042
BORING	5177013	BORING-TELFORD	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
BRIGHTWOOD	5174013	BRIGHTWOOD-BRIGHTWOOD13	7.2/12.5 kV Grounded Y	[redacted]	2,821	589,302	574.93	2.752	6,302	6,882,639	6,714.77	6.148
BRIGHTWOOD	5174023	BRIGHTWOOD-NORTH BANK	7.2/12.5 kV Grounded Y	[redacted]	3,996	612,053	731.25	4.774	8,972	7,000,476	8,363.77	10.719
CANYON	1196113	CANYON-13114 NETWORK #1	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196123	CANYON-13115 NETWORK #1	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196133	CANYON-13116 NETWORK #1	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196143	CANYON-13117 NETWORK #1	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196153	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	2	532	1.10	0.004	2	532	1.10	0.004
CANYON	1196163	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196043	CANYON-13120	7.2/12.5 kV Grounded Y	[redacted]	3	926	0.49	0.002	4	1,134	0.60	0.002
CANYON	1196453	CANYON-13121	7.2/12.5 kV Grounded Y	[redacted]	1	211	16.25	0.077	1	211	16.25	0.077
CANYON	1196063	CANYON-13122 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196073	CANYON-13123 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196083	CANYON-13124 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
CANYON	1196093	CANYON-13125 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196173	CANYON-13133 NETWORK #3	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196183	CANYON-13134 NETWORK #3	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196193	CANYON-13135 NETWORK #3	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANYON	1196203	CANYON-13136 NETWORK #3	7.2/12.5 kV Grounded Y	[redacted]	13	8,316	69.30	0.108	13	8,316	69.30	0.108
CANYON	1196023	CANYON-21ST	7.2/12.5 kV Grounded Y	[redacted]	457	295,816	100.79	0.156	457	295,816	100.79	0.156
CANYON	1196103	CANYON-23RD	7.2/12.5 kV Grounded Y	[redacted]	1,613	341,922	108.10	0.510	6,216	2,691,318	850.88	1.965
CANYON	1196033	CANYON-BURNSIDE	7.2/12.5 kV Grounded Y	[redacted]	623	89,884	27.92	0.194	624	90,849	28.22	0.194
CANYON	1196013	CANYON-CANYON13	7.2/12.5 kV Grounded Y	[redacted]	953	201,062	124.04	0.588	3,476	980,515	604.88	2.144
CARVER	5198033	CARVER-ALMOND	7.2/12.5 kV Grounded Y	[redacted]	149	54,683	27.38	0.075	4,166	394,059	197.33	2.086
CARVER	5198013	CARVER-CARVER13	7.2/12.5 kV Grounded Y	[redacted]	289	59,050	28.11	0.138	431	123,497	58.78	0.205
CARVER	5198053	CARVER-NORTH	7.2/12.5 kV Grounded Y	[redacted]	325	32,905	15.33	0.151	2,481	565,522	263.40	1.156
CARVER	5198023	CARVER-RIVERBEND	7.2/12.5 kV Grounded Y	[redacted]	28	4,185	46.50	0.311	28	4,185	46.50	0.311
CARVER	5198063	CARVER-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	160	16,508	107.89	1.046	160	16,508	107.89	1.046
CARVER	5198043	CARVER-WOODS	7.2/12.5 kV Grounded Y	[redacted]	246	46,422	13.78	0.073	703	387,093	114.90	0.209
CENTENNIAL	5202053	CENTENNIAL-BARKER	7.2/12.5 kV Grounded Y	[redacted]	3,741	353,726	120.89	1.279	3,774	380,506	130.04	1.290

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Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
CENTENNIAL	5202043	CENTENNIAL-BRAECROFT	7.2/12.5 kV Grounded Y	[redacted]	767	125,158	61.44	0.377	2,975	488,883	240.00	1.460
CENTENNIAL	5202033	CENTENNIAL-CENTENNIAL13	7.2/12.5 kV Grounded Y	[redacted]	329	52,788	19.73	0.123	976	769,702	287.63	0.365
CENTENNIAL	5202063	CENTENNIAL-TREELAND	7.2/12.5 kV Grounded Y	[redacted]	3,420	467,267	153.20	1.121	6,785	798,896	261.93	2.225
CLACKAMAS	6205023	CLACKAMAS-EVELYN	7.2/12.5 kV Grounded Y	[redacted]	64	12,357	47.53	0.246	64	12,357	47.53	0.246
CLACKAMAS	6205013	CLACKAMAS-GLADSTONE	7.2/12.5 kV Grounded Y	[redacted]	294	52,251	23.41	0.132	546	496,894	222.62	0.245
CLACKAMAS	6205033	CLACKAMAS-JENNIFER	7.2/12.5 kV Grounded Y	[redacted]	227	83,439	124.91	0.340	894	240,028	359.32	1.338
CLACKAMAS	6205043	CLACKAMAS-TOLBERT	7.2/12.5 kV Grounded Y	[redacted]	226	49,524	32.84	0.150	1,747	196,274	130.16	1.158
CURTIS	1212012	CURTIS-11077	6.48/11.1 kV Grounded Y	[redacted]	1,636	147,665	553.05	6.127	1,657	169,739	635.72	6.206
CURTIS	1212013	CURTIS-CURTIS13	7.2/12.5 kV Grounded Y	[redacted]	284	74,908	56.53	0.214	287	77,560	58.54	0.217
DELAWARE	1221013	DELAWARE-DENVER	7.2/12.5 kV Grounded Y	[redacted]	736	90,818	22.81	0.185	746	105,834	26.58	0.187
DELAWARE	1221023	DELAWARE-INTERSTATE	7.2/12.5 kV Grounded Y	[redacted]	3,186	279,153	196.73	2.245	3,246	347,025	244.56	2.288
DELAWARE	1221033	DELAWARE-LOMBARD	7.2/12.5 kV Grounded Y	[redacted]	1,088	167,211	47.60	0.310	1,836	354,266	100.84	0.523
DUNNS CORNER	5218013	DUNNS CORNER-DUNNS CORNER13	7.2/12.5 kV Grounded Y	[redacted]	3,832	790,411	520.01	2.521	7,157	3,769,145	2,479.70	4.709
DUNNS CORNER	5218023	DUNNS CORNER-KELSO	7.2/12.5 kV Grounded Y	[redacted]	714	105,981	308.98	2.082	785	174,815	509.66	2.289
E	1225012	E-11021	6.48/11.1 kV Grounded Y	[redacted]	29	5,066	211.10	1.208	29	5,066	211.10	1.208

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E	1225022	E-11039	6.48/11.1 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
E	1225032	E-11040	6.48/11.1 kV Grounded Y	[redacted]	3	501	2.53	0.015	3	501	2.53	0.015
E	1225042	E-11041	6.48/11.1 kV Grounded Y	[redacted]	2	19	0.11	0.011	3	143	0.81	0.017
E	1225052	E-11042	6.48/11.1 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
E	1225062	E-11043	6.48/11.1 kV Grounded Y	[redacted]	6	480	9.06	0.113	7	2,336	44.08	0.132
E	1225112	E-11047	6.48/11.1 kV Grounded Y	[redacted]	154	45,660	302.38	1.020	154	45,660	302.38	1.020
E	1225122	E-11064	6.48/11.1 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
E	1225013	E-13139	7.2/12.5 kV Grounded Y	[redacted]	16	2,559	1.49	0.009	104	172,155	99.92	0.060
E	1225023	E-13140	7.2/12.5 kV Grounded Y	[redacted]	1,335	229,435	78.76	0.458	1,335	229,435	78.76	0.458
E	1225033	E-13141	7.2/12.5 kV Grounded Y	[redacted]	1	5	0.00	0.000	1	5	0.00	0.000
E	1225093	E-13142	7.2/12.5 kV Grounded Y	[redacted]	2	20	0.01	0.001	2	20	0.01	0.001
E	1225083	E-13144	7.2/12.5 kV Grounded Y	[redacted]	251	35,439	12.69	0.090	500	188,224	67.39	0.179
E	1225043	E-13145	7.2/12.5 kV Grounded Y	[redacted]	5	507	0.70	0.007	5	507	0.70	0.007
E	1225053	E-13148	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
E	1225063	E-13149	7.2/12.5 kV Grounded Y	[redacted]	459	38,242	19.88	0.239	460	38,871	20.20	0.239
E	1225073	E-13150	7.2/12.5 kV Grounded Y	[redacted]	60	3,304	1.72	0.031	60	3,304	1.72	0.031

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EAGLE CREEK	5230013	EAGLE CREEK-BARTON	7.2/12.5 kV Grounded Y	[redacted]	2,263	303,718	359.00	2.675	4,053	4,688,446	5,541.90	4.791
EAGLE CREEK	5230023	EAGLE CREEK-RIVER MILL	7.2/12.5 kV Grounded Y	[redacted]	6,110	1,866,713	1,855.58	6.074	9,480	3,395,432	3,375.18	9.423
EASTPORT	1231023	EASTPORT-76TH	7.2/12.5 kV Grounded Y	[redacted]	345	91,184	27.24	0.103	351	95,271	28.46	0.105
EASTPORT	1231013	EASTPORT-PLAZA	7.2/12.5 kV Grounded Y	[redacted]	124	14,457	8.50	0.073	185	126,993	74.70	0.109
ESTACADA	5237023	ESTACADA-ESTACADA13	7.2/12.5 kV Grounded Y	[redacted]	2,961	751,741	362.28	1.427	6,189	2,176,895	1,049.11	2.983
ESTACADA	5237013	ESTACADA-FARADAY	7.2/12.5 kV Grounded Y	[redacted]	2,581	433,154	202.03	1.204	7,589	2,138,660	997.51	3.540
ESTACADA	5237033	ESTACADA-NORTH FORK	7.2/12.5 kV Grounded Y	[redacted]	2,342	385,600	222.89	1.354	8,692	5,387,391	3,114.10	5.024
FAIRVIEW	5251033	FAIRVIEW-CLEAR CREEK	7.2/12.5 kV Grounded Y	[redacted]	1	13	0.04	0.003	1	13	0.04	0.003
FAIRVIEW	5251053	FAIRVIEW-FAIRVIEW13	7.2/12.5 kV Grounded Y	[redacted]	109	17,668	10.52	0.065	329	162,092	96.54	0.196
FAIRVIEW	5251013	FAIRVIEW-KENNEL CLUB	7.2/12.5 kV Grounded Y	[redacted]	44	15,766	13.64	0.038	1,192	97,259	84.13	1.031
FAIRVIEW	5251043	FAIRVIEW-TROUTDALE	7.2/12.5 kV Grounded Y	[redacted]	2,104	197,879	66.47	0.707	2,149	264,024	88.69	0.722
FAIRVIEW	5251023	FAIRVIEW-WOOD VILLAGE	7.2/12.5 kV Grounded Y	[redacted]	127	31,926	35.35	0.141	130	33,463	37.06	0.144
GLENCOE	1277013	GLENCOE-GLISAN	7.2/12.5 kV Grounded Y	[redacted]	763	247,634	72.96	0.225	1,068	573,601	169.00	0.315
GLENCOE	1277023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	57	11,923	35.38	0.169	164	84,476	250.67	0.487
GLENCOE	1277033	GLENCOE-SUNNYSIDE	7.2/12.5 kV Grounded Y	[redacted]	4,838	1,328,007	435.13	1.585	10,752	4,442,117	1,455.48	3.523
GLENCULLEN	1278013	GLENCULLEN-BRIDLEMILE	7.2/12.5 kV Grounded Y	[redacted]	2,693	890,525	365.57	1.106	7,450	3,820,270	1,568.26	3.058

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GLENCULLEN	1278023	GLENCULLEN-SUNSET	7.2/12.5 kV Grounded Y	[redacted]	969	204,143	86.57	0.411	3,891	2,133,102	904.62	1.650
GLENDOVEER	5280013	GLENDOVEER-13596	7.2/12.5 kV Grounded Y	[redacted]	114	16,480	18.45	0.128	226	68,242	76.42	0.253
GLENDOVEER	5280023	GLENDOVEER-13597	7.2/12.5 kV Grounded Y	[redacted]	629	113,390	75.14	0.417	706	132,390	87.73	0.468
GLENDOVEER	5280033	GLENDOVEER-13598	7.2/12.5 kV Grounded Y	[redacted]	400	74,220	29.56	0.159	3,135	424,918	169.22	1.249
GLENDOVEER	5280043	GLENDOVEER-13599	7.2/12.5 kV Grounded Y	[redacted]	474	66,211	31.14	0.223	784	261,402	122.95	0.369
GLENDOVEER	5280053	GLENDOVEER-CLIFFGATE	7.2/12.5 kV Grounded Y	[redacted]	966	144,721	69.71	0.465	1,282	458,787	221.00	0.618
GLENDOVEER	5280063	GLENDOVEER-NORTHEAST	7.2/12.5 kV Grounded Y	[redacted]	351	51,946	31.75	0.215	3,611	984,526	601.79	2.207
[redacted]	5260013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	5260063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	5260043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	5260033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	5260083	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	5260023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	5260073	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HARBORTON	1310023	HARBORTON-BURLINGTON	7.2/12.5 kV Grounded Y	[redacted]	2,295	581,352	411.43	1.624	3,262	1,645,462	1,164.52	2.309
HARBORTON	1310013	HARBORTON-HARBORTON13	7.2/12.5 kV Grounded Y	[redacted]	1	342	31.08	0.091	12	5,031	457.33	1.091

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HARBORTON	1310033	HARBORTON-LINNTON	7.2/12.5 kV Grounded Y	[redacted]	159	60,517	149.79	0.394	759	349,486	865.06	1.879
HARMONY	1313013	HARMONY-HARMONY13	7.2/12.5 kV Grounded Y	[redacted]	397	86,154	55.19	0.254	1,143	929,513	595.46	0.732
HARMONY	1313053	HARMONY-INTERNATIONAL	7.2/12.5 kV Grounded Y	[redacted]	76	20,234	19.82	0.074	1,232	331,830	325.01	1.207
HARMONY	6313033	HARMONY-LAKE	7.2/12.5 kV Grounded Y	[redacted]	41	22,445	33.15	0.061	43	24,514	36.21	0.064
HARMONY	1313033	HARMONY-LINWOOD	7.2/12.5 kV Grounded Y	[redacted]	423	56,368	24.60	0.185	2,711	881,154	384.62	1.183
HARMONY	1313023	HARMONY-MILWAUKIE	7.2/12.5 kV Grounded Y	[redacted]	2,020	724,429	399.80	1.115	4,335	2,255,291	1,244.64	2.392
HARMONY	1313043	HARMONY-THIESSEN	7.2/12.5 kV Grounded Y	[redacted]	29	1,723	1.77	0.030	62	32,138	32.93	0.064
HARRISON	1312043	HARRISON-DAVIS	7.2/12.5 kV Grounded Y	[redacted]	2,903	680,416	349.29	1.490	2,904	680,520	349.34	1.491
HARRISON	1312053	HARRISON-HARRISON13	7.2/12.5 kV Grounded Y	[redacted]	2,328	420,691	187.56	1.038	2,330	422,431	188.33	1.039
HARRISON	1312013	HARRISON-IVON	7.2/12.5 kV Grounded Y	[redacted]	31	1,999	1.81	0.028	31	1,999	1.81	0.028
HARRISON	8003112	TEMP H-NEPTUNE	6.48/11.1 kV Grounded Y	[redacted]	211	46,412	48.70	0.221	318	76,191	79.95	0.334
HARRISON	8003122	TEMP H-SATURN	6.48/11.1 kV Grounded Y	[redacted]	80	5,713	69.67	0.976	80	5,713	69.67	0.976
HAYDEN ISLAND	1316033	HAYDEN ISLAND-MAINLAND	7.2/12.5 kV Grounded Y	[redacted]	206	29,014	175.84	1.248	206	29,014	175.84	1.248
HAYDEN ISLAND	1316013	HAYDEN ISLAND-NORTH SHORE	7.2/12.5 kV Grounded Y	[redacted]	2,473	498,077	196.64	0.976	2,474	498,612	196.85	0.977

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HAYDEN ISLAND	1316023	HAYDEN ISLAND-SOUTH SHORE	7.2/12.5 kV Grounded Y	[redacted]	45	5,378	10.19	0.085	46	5,829	11.04	0.087
HELVETIA	8003093	TEMP G-MERCURY	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HELVETIA	8003103	TEMP G-VENUS	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HEMLOCK	5317023	HEMLOCK-FREMONT	7.2/12.5 kV Grounded Y	[redacted]	2,977	383,202	257.87	2.003	2,989	391,582	263.51	2.011
HEMLOCK	5317013	HEMLOCK-HEMLOCK13	7.2/12.5 kV Grounded Y	[redacted]	531	51,893	25.88	0.265	532	52,111	25.99	0.265
HEMLOCK	5317033	HEMLOCK-MASON	7.2/12.5 kV Grounded Y	[redacted]	146	40,082	56.53	0.206	569	455,461	642.40	0.803
HOGAN NORTH	5323023	HOGAN NORTH-BRIGADOON	7.2/12.5 kV Grounded Y	[redacted]	87	15,734	5.54	0.031	170	24,071	8.48	0.060
HOGAN NORTH	5323043	HOGAN NORTH-HOGAN NORTH13	7.2/12.5 kV Grounded Y	[redacted]	4,323	403,211	139.13	1.492	5,287	827,733	285.62	1.824
HOGAN NORTH	5323033	HOGAN NORTH-LINKS	7.2/12.5 kV Grounded Y	[redacted]	9,039	2,318,185	673.30	2.625	13,150	6,566,739	1,907.27	3.819
HOGAN NORTH	5323013	HOGAN NORTH-SALQUIST	7.2/12.5 kV Grounded Y	[redacted]	544	53,961	18.36	0.185	4,324	903,988	307.58	1.471
HOGAN SOUTH	5324013	HOGAN SOUTH-CLEVELAND	7.2/12.5 kV Grounded Y	[redacted]	257	57,624	25.79	0.115	280	68,421	30.63	0.125
HOGAN SOUTH	5324023	HOGAN SOUTH-LAWRENCE	7.2/12.5 kV Grounded Y	[redacted]	3,158	639,839	159.40	0.787	4,708	1,413,423	352.12	1.173
HOGAN SOUTH	5324033	HOGAN SOUTH-MAIN	7.2/12.5 kV Grounded Y	[redacted]	52	6,321	4.27	0.035	54	8,771	5.93	0.037
HOGAN SOUTH	5324043	HOGAN SOUTH-PAROPA	7.2/12.5 kV Grounded Y	[redacted]	362	52,654	17.54	0.121	3,438	444,179	147.96	1.145
HOGAN SOUTH	5324053	HOGAN SOUTH-WALLULA	7.2/12.5 kV Grounded Y	[redacted]	348	49,163	16.20	0.115	355	53,700	17.69	0.117

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HOLGATE	1325043	HOLGATE-BYBEE	7.2/12.5 kV Grounded Y	[redacted]	1,007	627,521	248.52	0.399	1,028	648,126	256.68	0.407
HOLGATE	1325013	HOLGATE-GIDEON	7.2/12.5 kV Grounded Y	[redacted]	68	8,621	7.34	0.058	68	8,621	7.34	0.058
HOLGATE	1325033	HOLGATE-HOLGATE13	7.2/12.5 kV Grounded Y	[redacted]	303	25,405	7.27	0.087	335	31,989	9.15	0.096
HOLGATE	1325053	HOLGATE-KENILWORTH	7.2/12.5 kV Grounded Y	[redacted]	712	203,077	93.80	0.329	745	207,555	95.87	0.344
HOLGATE	1325023	HOLGATE-RHONE	7.2/12.5 kV Grounded Y	[redacted]	271	50,973	24.65	0.131	3,297	4,909,168	2,373.87	1.594
ISLAND	1345033	ISLAND-13180	7.2/12.5 kV Grounded Y	[redacted]	257	30,127	14.46	0.123	328	229,781	110.31	0.157
ISLAND	1345023	ISLAND-13187	7.2/12.5 kV Grounded Y	[redacted]	1,009	93,358	30.03	0.325	2,268	337,991	108.71	0.729
ISLAND	1345013	ISLAND-13188	7.2/12.5 kV Grounded Y	[redacted]	2,054	365,980	134.01	0.752	3,647	611,931	224.07	1.335
ISLAND	1345043	ISLAND-ISLAND13	7.2/12.5 kV Grounded Y	[redacted]	271	22,546	14.46	0.174	271	22,546	14.46	0.174
JENNINGS LODGE	6365053	JENNINGS LODGE-ADDIE	7.2/12.5 kV Grounded Y	[redacted]	1,217	84,718	50.70	0.728	1,334	439,900	263.26	0.798
JENNINGS LODGE	6365023	JENNINGS LODGE-JENNINGS13	7.2/12.5 kV Grounded Y	[redacted]	279	42,764	16.57	0.108	974	476,049	184.44	0.377
JENNINGS LODGE	6365033	JENNINGS LODGE-MELDRUM	7.2/12.5 kV Grounded Y	[redacted]	317	34,675	15.09	0.138	461	159,101	69.23	0.201
JENNINGS LODGE	6365013	JENNINGS LODGE-OAK GROVE	7.2/12.5 kV Grounded Y	[redacted]	281	30,765	21.91	0.200	758	408,868	291.22	0.540
JENNINGS LODGE	6365043	JENNINGS LODGE-WEBSTER	7.2/12.5 kV Grounded Y	[redacted]	3,882	300,494	149.42	1.930	4,055	769,448	382.62	2.016

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KELLEY POINT	1367013	KELLEY POINT-KELLEY POINT13	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
KELLEY POINT	1367043	KELLEY POINT-LEDBETTER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
KELLEY POINT	1367023	KELLEY POINT-MARINE	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
KELLEY POINT	1367033	KELLEY POINT-SIMMONS	7.2/12.5 kV Grounded Y	[redacted]	4	952	19.83	0.083	4	952	19.83	0.083
KELLEY POINT	1367053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
KELLEY POINT	1367063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
KELLY BUTTE	1370023	KELLY BUTTE-BINNSMEAD	7.2/12.5 kV Grounded Y	[redacted]	495	43,049	12.45	0.143	515	47,754	13.81	0.149
KELLY BUTTE	1370033	KELLY BUTTE-FAIRLAWN	7.2/12.5 kV Grounded Y	[redacted]	76	10,408	10.09	0.074	2,010	1,174,292	1,138.98	1.950
KELLY BUTTE	1370043	KELLY BUTTE-MALL205	7.2/12.5 kV Grounded Y	[redacted]	411	59,439	19.37	0.134	467	158,046	51.50	0.152
KELLY BUTTE	1370013	KELLY BUTTE-MCGREW	7.2/12.5 kV Grounded Y	[redacted]	685	82,293	25.82	0.215	1,389	377,227	118.36	0.436
LELAND	6402013	LELAND-BEAVERCREEK	7.2/12.5 kV Grounded Y	[redacted]	529	79,237	25.31	0.169	757	158,773	50.71	0.242
LELAND	6402023	LELAND-CARUS	7.2/12.5 kV Grounded Y	[redacted]	2,864	435,940	180.66	1.187	11,451	6,824,767	2,828.33	4.746
LELAND	6402033	LELAND-KELM	7.2/12.5 kV Grounded Y	[redacted]	91	9,983	5.32	0.049	344	729,506	389.07	0.183
LENTS	1405013	LENTS-13101	7.2/12.5 kV Grounded Y	[redacted]	1,357	442,738	171.47	0.526	1,368	454,778	176.13	0.530
LENTS	1405043	LENTS-HAPPY VALLEY	7.2/12.5 kV Grounded Y	[redacted]	540	109,793	29.45	0.145	5,426	2,877,076	771.75	1.455
LENTS	1405023	LENTS-MT SCOTT	7.2/12.5 kV Grounded Y	[redacted]	3	520	4.91	0.028	3	520	4.91	0.028

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LENTS	1405033	LENTS-NORTH	7.2/12.5 kV Grounded Y	[redacted]	290	29,215	16.42	0.163	323	45,320	25.47	0.182
MARQUAM	1430133	MARQUAM-MCCALL #10 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MARQUAM	1430083	MARQUAM-MCCALL #11 NETWORK	12.8 kV Grounded Y	[redacted]	12	664	2.28	0.041	12	664	2.28	0.041
MARQUAM	1430033	MARQUAM-MCCALL #12 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MARQUAM	1430183	MARQUAM-MCCALL #9 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MARQUAM	1430213	MARQUAM-MEADE	7.2/12.5 kV Grounded Y	[redacted]	2,515	411,353	308.36	1.885	3,204	1,074,948	805.81	2.402
MARQUAM	1430253	MARQUAM-ORANGE	7.2/12.5 kV Grounded Y	[redacted]	810	192,920	459.33	1.929	810	192,920	459.33	1.929
MARQUAM	1430263	MARQUAM-PORTER	7.2/12.5 kV Grounded Y	[redacted]	5	2,001	4.77	0.012	5	2,001	4.77	0.012
MARQUAM	1430163	MARQUAM-SPIRIT #1 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MARQUAM	1430113	MARQUAM-SPIRIT #2 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MARQUAM	1430063	MARQUAM-SPIRIT #3 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MARQUAM	1430013	MARQUAM-SPIRIT #4 NETWORK	12.8 kV Grounded Y	[redacted]	66	24,852	248.52	0.660	66	24,852	248.52	0.660

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MARQUAM	1430303	MARQUAM-TILIKUM	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MCGILL	5440123	MCGILL-HORSETAIL	7.2/12.5 kV Grounded Y	[redacted]	414	162,055	114.85	0.293	1,852	276,769	196.15	1.313
MCGILL	5440113	MCGILL-LATOURELL	7.2/12.5 kV Grounded Y	[redacted]	907	84,750	38.24	0.409	3,250	608,023	274.38	1.467
MCGILL	5440023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MCGILL	5440073	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MCGILL	5440013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MCGILL	5440063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MCGILL	5440133	MCGILL-TOKETEE	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MIDWAY	5455013	MIDWAY-DIVISION	7.2/12.5 kV Grounded Y	[redacted]	241	37,284	15.99	0.103	1,161	419,931	180.07	0.498
MIDWAY	5455023	MIDWAY-DOUGLAS	7.2/12.5 kV Grounded Y	[redacted]	852	141,541	49.82	0.300	4,468	1,030,228	362.63	1.573
MIDWAY	5455033	MIDWAY-LYNCH	7.2/12.5 kV Grounded Y	[redacted]	4,206	824,784	347.86	1.774	10,169	1,373,579	579.32	4.289
MIDWAY	5455043	MIDWAY-POWELLHURST	7.2/12.5 kV Grounded Y	[redacted]	706	150,712	47.59	0.223	1,058	368,049	116.21	0.334
MT PLEASANT	6475023	MT PLEASANT-CLAIRMONT	7.2/12.5 kV Grounded Y	[redacted]	3,911	240,707	73.72	1.198	3,912	240,713	73.73	1.198
MT PLEASANT	6475043	MT PLEASANT-MT VIEW	7.2/12.5 kV Grounded Y	[redacted]	9,140	563,210	276.76	4.491	9,166	590,934	290.39	4.504
MT PLEASANT	6475053	MT PLEASANT-RIVERCREST	7.2/12.5 kV Grounded Y	[redacted]	1,325	77,276	60.47	1.037	1,342	123,086	96.31	1.050
MT PLEASANT	6475033	MT PLEASANT-SOUTH END	7.2/12.5 kV Grounded Y	[redacted]	3,908	325,805	92.51	1.110	4,086	504,538	143.25	1.160

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MULTNOMAH	1480023	MULTNOMAH-13176	7.2/12.5 kV Grounded Y	[redacted]	1,562	202,803	70.61	0.544	1,890	422,142	146.99	0.658
MULTNOMAH	1480033	MULTNOMAH-13177	7.2/12.5 kV Grounded Y	[redacted]	642	213,334	58.10	0.175	1,238	393,397	107.13	0.337
MULTNOMAH	1480013	MULTNOMAH-13181	7.2/12.5 kV Grounded Y	[redacted]	617	101,189	42.61	0.260	1,229	805,486	339.15	0.517
MULTNOMAH	1480063	MULTNOMAH-MULTNOMAH13	7.2/12.5 kV Grounded Y	[redacted]	1,127	323,247	110.02	0.384	1,438	670,726	228.29	0.489
NORTHERN	1495032	NORTHERN-11009	11.4kV Grounded Y	[redacted]	23	748	0.43	0.013	23	748	0.43	0.013
NORTHERN	1495042	NORTHERN-11016	11.1 kV Grounded Y	[redacted]	407	17,966	44.92	1.018	407	17,966	44.92	1.018
NORTHERN	1495062	NORTHERN-11071	11.4kV Grounded Y	[redacted]	4,686	329,254	148.51	2.114	4,687	332,147	149.82	2.114
OAK GROVE	5515033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
OAK GROVE	5515013	OAK GROVE-LAKE HARRIET	7.2/12.5 kV Grounded Y	[redacted]	818	607,779	6,139.19	8.263	908	949,951	9,595.46	9.172
OAK GROVE	5515023	OAK GROVE-WHITE WATER	7.2/12.5 kV Grounded Y	[redacted]	3	4,436	211.23	0.143	6	15,292	728.20	0.286
[redacted]	1514913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ORIENT	5517023	ORIENT-BARLOW	7.2/12.5 kV Grounded Y	[redacted]	622	112,919	115.22	0.635	5,351	1,562,604	1,594.49	5.460
ORIENT	5517013	ORIENT-ORIENT13	7.2/12.5 kV Grounded Y	[redacted]	902	235,332	285.25	1.093	1,676	1,042,687	1,263.86	2.032
ORIENT	5517033	ORIENT-OXBOW	7.2/12.5 kV Grounded Y	[redacted]	4,828	1,338,443	1,685.70	6.081	7,497	3,556,642	4,479.40	9.442
PELTON	9999990	PELTON-ROUND BUTTE	7.2/12.5 kV Grounded Y	[redacted]	8	2,915	728.82	2.000	8	2,915	728.82	2.000

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PENINSULA PARK	1545021	PENINSULA PARK-OCKLEY GREEN	7.2/12.5 kV Grounded Y	[redacted]	6,737	2,449,258	884.85	2.434	6,744	2,453,856	886.51	2.436
PENINSULA PARK	1545011	PENINSULA PARK-PENINSULA PARK	7.2/12.5 kV Grounded Y	[redacted]	2,097	198,541	137.11	1.448	2,097	198,541	137.11	1.448
PLEASANT VALLEY	5553023	PLEASANT VALLEY-BAXTER	7.2/12.5 kV Grounded Y	[redacted]	102	35,300	17.21	0.050	341	388,989	189.66	0.166
PLEASANT VALLEY	5553053	PLEASANT VALLEY-CLATSOP	7.2/12.5 kV Grounded Y	[redacted]	879	261,064	113.90	0.384	4,762	779,719	340.19	2.078
PLEASANT VALLEY	5553033	PLEASANT VALLEY-MOON	7.2/12.5 kV Grounded Y	[redacted]	6,485	1,577,567	503.53	2.070	6,499	1,600,766	510.94	2.074
PLEASANT VALLEY	5553013	PLEASANT VALLEY-PLEASANT13	7.2/12.5 kV Grounded Y	[redacted]	633	60,685	34.32	0.358	1,016	211,247	119.48	0.575
PLEASANT VALLEY	5553043	PLEASANT VALLEY-SUN	7.2/12.5 kV Grounded Y	[redacted]	500	229,696	61.11	0.133	701	449,259	119.52	0.186
[redacted]	1557911	[redacted]	4.16 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
PORTSMOUTH	1558013	PORTSMOUTH-CARBIDE	7.2/12.5 kV Grounded Y	[redacted]	10,031	1,129,817	291.79	2.591	10,054	1,173,352	303.04	2.597
PORTSMOUTH	1558053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	18	7,475	934.41	2.250	18	7,475	934.41	2.250
PORTSMOUTH	1558033	PORTSMOUTH-WILLIS	7.2/12.5 kV Grounded Y	[redacted]	5,147	652,669	275.50	2.173	5,384	760,811	321.15	2.273
RAMAPO	5575023	RAMAPO-EMERALD	7.2/12.5 kV Grounded Y	[redacted]	857	359,503	157.13	0.375	2,175	951,819	416.00	0.951
RAMAPO	5575013	RAMAPO-GILBERT	7.2/12.5 kV Grounded Y	[redacted]	295	58,712	26.34	0.132	4,277	1,190,422	534.06	1.919
RAMAPO	5575033	RAMAPO-RAMAPO13	7.2/12.5 kV Grounded Y	[redacted]	3,262	592,567	193.65	1.066	3,969	1,011,939	330.70	1.297

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
REDLAND	6581023	REDLAND-HENRICI	7.2/12.5 kV Grounded Y	[redacted]	3,136	927,486	488.41	1.651	6,742	2,599,361	1,368.81	3.550
REDLAND	6581013	REDLAND-REDLAND13	7.2/12.5 kV Grounded Y	[redacted]	1,709	251,815	102.87	0.698	10,562	6,747,915	2,756.50	4.315
RIVERGATE SOUTH	1598012	RIVERGATE SOUTH-11010	6.66/11.4 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
RIVERGATE SOUTH	1598022	RIVERGATE SOUTH-11011	6.66/11.4 kV Grounded Y	[redacted]	4,058	396,302	310.58	3.180	9,582	3,710,440	2,907.87	7.509
RIVERGATE SOUTH	1598023	RIVERGATE SOUTH-PEARCY	7.2/12.5 kV Grounded Y	[redacted]	48	7,847	156.94	0.960	48	7,847	156.94	0.960
RIVERGATE SOUTH	1598013	RIVERGATE SOUTH-SWIFT	7.2/12.5 kV Grounded Y	[redacted]	2	339	6.52	0.038	2	339	6.52	0.038
RIVERVIEW	1600033	RIVERVIEW-FULTON	7.2/12.5 kV Grounded Y	[redacted]	3,039	379,177	150.71	1.208	4,438	979,834	389.44	1.764
RIVERVIEW	1600023	RIVERVIEW-MACADAM	7.2/12.5 kV Grounded Y	[redacted]	195	12,499	9.04	0.141	1,810	164,067	118.63	1.309
RIVERVIEW	1600013	RIVERVIEW-TERWILLIGER	7.2/12.5 kV Grounded Y	[redacted]	336	62,026	56.64	0.307	690	446,928	408.15	0.630
ROCKWOOD	5602053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ROCKWOOD	5602063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ROCKWOOD	5602023	ROCKWOOD-INDUSTRIAL	7.2/12.5 kV Grounded Y	[redacted]	29	5,489	25.65	0.136	29	5,489	25.65	0.136
ROCKWOOD	5602033	ROCKWOOD-REYNOLDS	7.2/12.5 kV Grounded Y	[redacted]	789	152,162	88.47	0.459	1,258	422,860	245.85	0.731
ROCKWOOD	5602013	ROCKWOOD-ROCKWOOD13	7.2/12.5 kV Grounded Y	[redacted]	1,485	159,385	45.73	0.426	2,115	565,900	162.38	0.607
ROCKWOOD	5602043	ROCKWOOD-WILKES	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ROSEMONT	4604123	ROSEMONT-HIDDEN SPRINGS	7.2/12.5 kV Grounded Y	[redacted]	931	260,531	125.68	0.449	932	260,736	125.78	0.450

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
ROSEMONT	4604113	ROSEMONT-MOSSY BRAE	7.2/12.5 kV Grounded Y	[redacted]	1,841	116,328	120.30	1.904	2,944	517,149	534.80	3.044
ROSEMONT	4604133	ROSEMONT-OVERLOOK	7.2/12.5 kV Grounded Y	[redacted]	1,653	478,830	303.63	1.048	1,766	545,117	345.67	1.120
[redacted]	9999923	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	9999913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
RUBY	5620113	RUBY-CAR LINE	7.2/12.5 kV Grounded Y	[redacted]	645	73,948	25.69	0.224	665	90,133	31.31	0.231
RUBY	5620123	RUBY-JUNCTION	7.2/12.5 kV Grounded Y	[redacted]	4,500	438,215	117.14	1.203	4,663	487,452	130.30	1.246
SANDY	5640043	SANDY-362ND	7.2/12.5 kV Grounded Y	[redacted]	5,961	675,723	408.54	3.604	9,510	2,038,551	1,232.50	5.750
SANDY	5640013	SANDY-BLUFF	7.2/12.5 kV Grounded Y	[redacted]	3,816	469,335	287.05	2.334	3,900	542,160	331.60	2.385
SANDY	5640033	SANDY-SANDY13	7.2/12.5 kV Grounded Y	[redacted]	8,620	2,955,203	1,212.64	3.537	17,372	6,926,667	2,842.29	7.128
SANDY	5640023	SANDY-WILDCAT	7.2/12.5 kV Grounded Y	[redacted]	13,373	1,529,827	491.43	4.296	16,231	5,739,040	1,843.57	5.214
SELLWOOD	1655013	SELLWOOD-KELLOGG PARK	7.2/12.5 kV Grounded Y	[redacted]	1,989	152,711	86.67	1.129	2,039	231,712	131.51	1.157
SELLWOOD	1655033	SELLWOOD-SELLWOOD13	7.2/12.5 kV Grounded Y	[redacted]	515	70,491	14.82	0.108	5,339	913,698	192.03	1.122
SELLWOOD	1655023	SELLWOOD-WAVERLY	7.2/12.5 kV Grounded Y	[redacted]	2,691	312,304	255.99	2.206	3,905	2,112,888	1,731.88	3.201
SULLIVAN	6675013	SULLIVAN-ROBINWOOD	7.2/12.5 kV Grounded Y	[redacted]	2,374	222,329	107.15	1.144	2,420	258,456	124.56	1.166
SULLIVAN	6675053	SULLIVAN-SALAMO	7.2/12.5 kV Grounded Y	[redacted]	34	12,724	6.52	0.017	72	113,065	57.92	0.037
SULLIVAN	6675033	SULLIVAN-SUSSEX	7.2/12.5 kV Grounded Y	[redacted]	41	11,237	10.52	0.038	41	11,237	10.52	0.038

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
SULLIVAN	6675023	SULLIVAN-TANNER	7.2/12.5 kV Grounded Y	[redacted]	126	12,405	5.58	0.057	131	13,180	5.93	0.059
SULLIVAN	6675043	SULLIVAN-WILLAMETTE	7.2/12.5 kV Grounded Y	[redacted]	239	37,339	22.98	0.147	1,904	1,264,322	778.04	1.172
[redacted]	1676913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	1676914	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUMMIT	5677023	SUMMIT-GOVERNMENT CAMP	7.2/12.5 kV Grounded Y	[redacted]	1,481	196,375	398.33	3.004	2,475	2,256,644	4,577.37	5.020
SUMMIT	5677013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	124	18,323	458.06	3.100	204	184,545	4,613.63	5.100
SUMMIT	5677033	SUMMIT-SUMMIT13	7.2/12.5 kV Grounded Y	[redacted]	954	195,517	700.78	3.419	1,588	1,567,138	5,616.98	5.692
SWAN ISLAND	1680073	SWAN ISLAND-BASIN	7.2/12.5 kV Grounded Y	[redacted]	2	486	3.80	0.016	2	486	3.80	0.016
SWAN ISLAND	1680123	SWAN ISLAND-DOLPHIN	7.2/12.5 kV Grounded Y	[redacted]	12	1,618	19.49	0.145	12	1,618	19.49	0.145
SWAN ISLAND	1680153	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	1	343	12.26	0.036	1	343	12.26	0.036
SWAN ISLAND	1680133	SWAN ISLAND-GOING	7.2/12.5 kV Grounded Y	[redacted]	4	1,345	25.38	0.075	4	1,345	25.38	0.075
SWAN ISLAND	1680143	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	4	316	9.02	0.114	5	507	14.48	0.143
TABOR	1690013	TABOR-82ND	7.2/12.5 kV Grounded Y	[redacted]	426	128,594	55.84	0.185	5,819	2,056,708	893.06	2.527
TABOR	1690033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	134	29,827	27.98	0.126	1,372	560,867	526.14	1.287
TABOR	1690023	TABOR-TABOR13	7.2/12.5 kV Grounded Y	[redacted]	290	25,791	6.57	0.074	4,272	1,128,902	287.69	1.089

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
TEMP B	1707103	TEMP B-NORTH	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
TEMP B	1707113	TEMP B-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	11	941	78.42	0.917	11	941	78.42	0.917
TEMP C	8003023	TEMP C-R3006	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
TOWN CENTER	6696023	TOWN CENTER-LAWNFIELD	7.2/12.5 kV Grounded Y	[redacted]	2,088	195,238	108.71	1.163	4,134	1,492,824	831.19	2.302
TOWN CENTER	6696053	TOWN CENTER-MONTEREY	7.2/12.5 kV Grounded Y	[redacted]	4,407	355,308	107.80	1.337	4,539	502,772	152.54	1.377
TOWN CENTER	6696073	TOWN CENTER-NORTH	7.2/12.5 kV Grounded Y	[redacted]	10	765	76.45	1.000	10	765	76.45	1.000
TOWN CENTER	6696043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	5	314	104.69	1.667	5	314	104.69	1.667
TOWN CENTER	6696013	TOWN CENTER-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	19	2,215	123.06	1.056	19	2,215	123.06	1.056
TOWN CENTER	6696063	TOWN CENTER-SUNNYBROOK	7.2/12.5 kV Grounded Y	[redacted]	1,135	106,675	99.05	1.054	1,187	119,273	110.75	1.102
TOWN CENTER	6696033	TOWN CENTER-VALLEY VIEW	7.2/12.5 kV Grounded Y	[redacted]	228	17,556	76.00	0.987	229	17,585	76.13	0.991
TWILIGHT	6699033	TWILIGHT-BREMER	7.2/12.5 kV Grounded Y	[redacted]	931	245,897	169.35	0.641	1,227	457,346	314.98	0.845
URBAN	1707053	URBAN-BARBUR	7.2/12.5 kV Grounded Y	[redacted]	44	3,853	15.85	0.181	44	3,853	15.85	0.181
URBAN	1707083	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
URBAN	1707013	URBAN-CORBETT	7.2/12.5 kV Grounded Y	[redacted]	3,518	641,734	460.02	2.522	4,483	1,429,951	1,025.05	3.214
URBAN	1707063	URBAN-GAINES	7.2/12.5 kV Grounded Y	[redacted]	77	30,421	24.09	0.061	368	276,121	218.62	0.291
URBAN	1707043	URBAN-GIBBS	7.2/12.5 kV Grounded Y	[redacted]	14	1,337	2.76	0.029	14	1,337	2.76	0.029

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
URBAN	1707073	URBAN-KELLY	7.2/12.5 kV Grounded Y	[redacted]	213	2,780	3.12	0.239	214	2,888	3.24	0.240
URBAN	1707023	URBAN-LANDING	7.2/12.5 kV Grounded Y	[redacted]	2	13	0.01	0.001	2	13	0.01	0.001
URBAN	1707033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
URBAN	1707093	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	1,351	157,150	52,383.36	450.333	1,351	157,150	52,383.36	450.333
WACKER	1743013	WACKER-WACKER1	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WACKER	1743023	WACKER-WACKER2	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WELCHES	5727013	WELCHES-WELCHES13	7.2/12.5 kV Grounded Y	[redacted]	5,546	1,073,165	583.24	3.014	10,628	9,859,626	5,358.49	5.776
WELCHES	5727023	WELCHES-ZIG ZAG	7.2/12.5 kV Grounded Y	[redacted]	4,769	918,335	612.63	3.181	10,984	11,427,278	7,623.27	7.328
[redacted]	6666912	[redacted]	6.48/11.1 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WILLBRIDGE	8003033	TEMP A-ALFA	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WILLBRIDGE	8003043	TEMP A-BRAVO	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WILLBRIDGE	1741052	WILLBRIDGE-SALMONBERRY	6.66/11.4 kV Grounded Y	[redacted]	1	139	1.21	0.009	2	528	4.59	0.017
WILLBRIDGE	1741062	WILLBRIDGE-WILDWOOD	6.66/11.4 kV Grounded Y	[redacted]	5	1,002	11.79	0.059	5	1,002	11.79	0.059

Southern Operating Area

Table 32: Reliability Performance for PGE's Southern Operating Area

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
AMITY	2120013	AMITY-AMITY 13	7.2/12.5 kV Grounded Y	[redacted]	2,132	259,301	183.51	1.509	4,003	982,240	695.15	2.833
AMITY	2120023	AMITY-BELLEVUE	7.2/12.5 kV Grounded Y	[redacted]	1,076	382,371	349.20	0.983	3,378	1,234,476	1,127.37	3.085
BARNES	2140043	BARNES-BATTLE CREEK	7.2/12.5 kV Grounded Y	[redacted]	2,017	207,296	97.87	0.952	2,218	231,014	109.07	1.047
BARNES	2140013	BARNES-BOONE	7.2/12.5 kV Grounded Y	[redacted]	2,239	447,378	252.33	1.263	2,239	447,378	252.33	1.263
BARNES	2140023	BARNES-COMMERCIAL	7.2/12.5 kV Grounded Y	[redacted]	693	108,570	27.62	0.176	716	135,260	34.41	0.182
BARNES	2140033	BARNES-SUNNYSIDE	7.2/12.5 kV Grounded Y	[redacted]	723	98,164	27.72	0.204	737	99,506	28.10	0.208
BETHEL	2151023	BETHEL-FRUITLAND	7.2/12.5 kV Grounded Y	[redacted]	1,232	355,389	131.29	0.455	1,307	391,796	144.73	0.483
BETHEL	2151033	BETHEL-GEER	7.2/12.5 kV Grounded Y	[redacted]	412	71,643	46.67	0.268	1,075	262,973	171.32	0.700
BETHEL	2151013	BETHEL-MACLEAY	7.2/12.5 kV Grounded Y	[redacted]	3,462	359,484	183.41	1.766	3,463	360,089	183.72	1.767
CANBY	6190013	CANBY-13643	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANBY	6190023	CANBY-13644	7.2/12.5 kV Grounded Y	[redacted]	299	47,389	103.02	0.650	1,295	1,255,677	2,729.73	2.815
CANBY	6190043	CANBY-BUTTEVILLE	7.2/12.5 kV Grounded Y	[redacted]	64	8,814	7.47	0.054	2,512	698,562	592.00	2.129
CANBY	6190033	CANBY-FILBERT	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CANBY	6190053	CANBY-ZIMMERMAN	7.2/12.5 kV Grounded Y	[redacted]	1,600	870,687	590.70	1.085	1,876	1,355,250	919.44	1.273

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
CLAXTAR	2207013	CLAXTAR-CLAXTAR 13	7.2/12.5 kV Grounded Y	[redacted]	14	1,577	3.49	0.031	14	1,577	3.49	0.031
CLAXTAR	2207023	CLAXTAR-HAYESVILLE	7.2/12.5 kV Grounded Y	[redacted]	2,489	469,474	204.03	1.082	2,490	469,481	204.03	1.082
CLAXTAR	2207033	CLAXTAR-RIDGE	7.2/12.5 kV Grounded Y	[redacted]	516	93,252	49.03	0.271	551	136,018	71.51	0.290
COLTON	6208013	COLTON-DHOOGHE	7.2/12.5 kV Grounded Y	[redacted]	698	429,927	721.35	1.171	1,507	1,515,747	2,543.20	2.529
COLTON	6208023	COLTON-GRAYS HILL	7.2/12.5 kV Grounded Y	[redacted]	1,660	2,043,140	1,835.71	1.491	2,380	2,973,317	2,671.44	2.138
CULVER	2211143	CULVER-CULVER 13	7.2/12.5 kV Grounded Y	[redacted]	4	185	1.33	0.029	4	185	1.33	0.029
CULVER	2211113	CULVER-GAFFIN	7.2/12.5 kV Grounded Y	[redacted]	8	465	1.84	0.032	8	465	1.84	0.032
CULVER	2211123	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
CULVER	2211133	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
DAYTON	4220013	DAYTON-EAST	7.2/12.5 kV Grounded Y	[redacted]	1,877	434,973	277.58	1.198	2,065	719,311	459.04	1.318
DAYTON	4220033	DAYTON-LAFAYETTE	7.2/12.5 kV Grounded Y	[redacted]	467	117,360	59.03	0.235	788	169,267	85.14	0.396
DAYTON	4220023	DAYTON-SOUTHWEST	7.2/12.5 kV Grounded Y	[redacted]	183	77,995	173.32	0.407	184	78,642	174.76	0.409
ELMA	2233013	ELMA-ELMA 13	7.2/12.5 kV Grounded Y	[redacted]	107	12,635	9.58	0.081	107	12,635	9.58	0.081
ELMA	2233023	ELMA-FOUR CORNERS	7.2/12.5 kV Grounded Y	[redacted]	916	292,484	110.54	0.346	1,177	397,354	150.17	0.445
ELMA	2233043	ELMA-HUDSON	7.2/12.5 kV Grounded Y	[redacted]	563	96,011	42.67	0.250	563	96,011	42.67	0.250
ELMA	2233033	ELMA-STATE	12.5 kV Grounded Y	[redacted]	7	853	2.49	0.020	7	853	2.49	0.020

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
FAIRMOUNT	2250013	FAIRMOUNT-CANDALARIA	7.2/12.5 kV Grounded Y	[redacted]	623	81,893	29.02	0.221	623	81,893	29.02	0.221
FAIRMOUNT	2250023	FAIRMOUNT-MISSION	7.2/12.5 kV Grounded Y	[redacted]	5,718	625,317	245.99	2.249	5,736	644,022	253.35	2.256
FARGO	2253013	FARGO-FARGO 13	7.2/12.5 kV Grounded Y	[redacted]	339	48,504	27.83	0.194	650	342,553	196.53	0.373
[redacted]	2900013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	77	9,082	162.17	1.375	133	24,963	445.77	2.375
GRAND RONDE	2285033	GRAND RONDE-AGENCY	7.2/12.5 kV Grounded Y	[redacted]	233	77,030	134.90	0.408	852	1,018,847	1,784.32	1.492
GRAND RONDE	2285023	GRAND RONDE-FORTHILL	7.2/12.5 kV Grounded Y	[redacted]	716	235,870	339.87	1.032	1,612	1,769,675	2,549.96	2.323
HILLCREST	2318033	HILLCREST-CASCADIA	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HILLCREST	2318023	HILLCREST-HILLCREST 13	7.2/12.5 kV Grounded Y	[redacted]	3	861	2.92	0.010	48	88,267	299.21	0.163
HILLCREST	2318043	HILLCREST-REED	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HILLCREST	2318013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HILLCREST	2318223	HILLCREST-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	1	450	10.99	0.024	1	450	10.99	0.024
[redacted]	2188013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
INDIAN	2340023	INDIAN-KEIZER	7.2/12.5 kV Grounded Y	[redacted]	2,213	281,757	139.07	1.092	2,682	319,746	157.82	1.324
INDIAN	2340013	INDIAN-LABISH	7.2/12.5 kV Grounded Y	[redacted]	1,043	201,321	88.96	0.461	4,540	875,163	386.73	2.006
INDIAN	2340043	INDIAN-NORTH	7.2/12.5 kV Grounded Y	[redacted]	2,004	329,803	101.42	0.616	2,006	330,431	101.61	0.617
INDIAN	2340033	INDIAN-STATION	7.2/12.5 kV Grounded Y	[redacted]	558	126,084	79.20	0.351	558	126,084	79.20	0.351

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
INDIAN	2340053	INDIAN-WEST	7.2/12.5 kV Grounded Y	[redacted]	2,089	291,674	83.81	0.600	2,109	303,094	87.10	0.606
[redacted]	2400911	[redacted]	4.16 kV Grounded Y	[redacted]	1	97	97.00	1.000	1	97	97.00	1.000
LIBERAL	6464013	LIBERAL-LIBERAL 13	7.2/12.5 kV Grounded Y	[redacted]	525	189,854	179.45	0.496	1,884	767,988	725.89	1.781
LIBERAL	6464023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
LIBERTY	2410013	LIBERTY-BROWNING	7.2/12.5 kV Grounded Y	[redacted]	133	22,594	36.27	0.213	133	22,594	36.27	0.213
LIBERTY	2410043	LIBERTY-LONE OAK	7.2/12.5 kV Grounded Y	[redacted]	134	14,579	5.76	0.053	135	14,663	5.80	0.053
LIBERTY	2410053	LIBERTY-MORNINGSIDE	7.2/12.5 kV Grounded Y	[redacted]	2,844	202,114	87.69	1.234	2,903	211,803	91.89	1.259
LIBERTY	2410023	LIBERTY-ROSEDALE	7.2/12.5 kV Grounded Y	[redacted]	732	188,969	70.67	0.274	1,110	417,301	156.06	0.415
LIBERTY	2410063	LIBERTY-SKYLINE	7.2/12.5 kV Grounded Y	[redacted]	753	173,237	50.88	0.221	1,059	266,463	78.26	0.311
LIBERTY	2410033	LIBERTY-VISTA	7.2/12.5 kV Grounded Y	[redacted]	397	47,057	23.97	0.202	692	134,465	68.50	0.353
MARKET	2425013	MARKET-ENGLEWOOD	7.2/12.5 kV Grounded Y	[redacted]	7,184	800,845	579.48	5.198	7,204	801,758	580.14	5.213
MARKET	2425033	MARKET-FAIRGROUNDS	7.2/12.5 kV Grounded Y	[redacted]	2,079	94,306	46.36	1.022	2,079	94,306	46.36	1.022
MARKET	2425023	MARKET-HAWTHORNE	7.2/12.5 kV Grounded Y	[redacted]	92	8,900	7.39	0.076	92	8,900	7.39	0.076
MARKET	2425043	MARKET-PARK	7.2/12.5 kV Grounded Y	[redacted]	369	40,993	36.18	0.326	369	40,993	36.18	0.326
MCCLAIN	2435033	MCCLAIN-COTTAGE	7.2/12.5 kV Grounded Y	[redacted]	144	11,502	7.38	0.092	144	11,502	7.38	0.092
MCCLAIN	2435013	MCCLAIN-FRONT	7.2/12.5 kV Grounded Y	[redacted]	45	2,158	2.16	0.045	45	2,158	2.16	0.045

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
MCCLAIN	2435043	MCCLAIN-HOLLYWOOD	7.2/12.5 kV Grounded Y	[redacted]	316	20,830	15.95	0.242	339	49,653	38.02	0.260
MIDDLE GROVE	2450023	MIDDLE GROVE-BROWN	7.2/12.5 kV Grounded Y	[redacted]	248	31,598	15.28	0.120	248	31,598	15.28	0.120
MIDDLE GROVE	2450043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	3,398	541,004	479.19	3.010	3,398	541,004	479.19	3.010
MIDDLE GROVE	2450033	MIDDLE GROVE-CORDON	7.2/12.5 kV Grounded Y	[redacted]	1,516	160,158	49.07	0.464	2,114	523,022	160.24	0.648
MIDDLE GROVE	2450013	MIDDLE GROVE-SWEGLE	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MIDDLE GROVE	2450053	MIDDLE GROVE-WEST	7.2/12.5 kV Grounded Y	[redacted]	3,915	331,542	94.62	1.117	3,916	331,614	94.64	1.118
MILL CREEK	2540013	MILL CREEK-EASTLAND	7.2/12.5 kV Grounded Y	[redacted]	794	59,154	64.58	0.867	1,476	287,018	313.34	1.611
MILL CREEK	2540023	MILL CREEK-KUEBLER	7.2/12.5 kV Grounded Y	[redacted]	497	128,614	216.16	0.835	497	128,614	216.16	0.835
MILL CREEK	2540033	MILL CREEK-MILL CREEK 13	7.2/12.5 kV Grounded Y	[redacted]	1	55	0.11	0.002	30	8,567	17.17	0.060
MOLALLA	6466023	MOLALLA-BUCKAROO	7.2/12.5 kV Grounded Y	[redacted]	277	62,094	20.90	0.093	279	62,698	21.10	0.094
MOLALLA	6466043	MOLALLA-FOREST	7.2/12.5 kV Grounded Y	[redacted]	668	278,697	165.89	0.398	2,623	2,954,794	1,758.81	1.561
MOLALLA	6466013	MOLALLA-MARQUAM	7.2/12.5 kV Grounded Y	[redacted]	2,450	501,429	339.26	1.658	7,654	4,157,631	2,813.01	5.179
MOLALLA	6466033	MOLALLA-YODER	7.2/12.5 kV Grounded Y	[redacted]	2,434	436,184	279.25	1.558	2,899	651,183	416.89	1.856
MT ANGEL	2470013	MT ANGEL-EAST	7.2/12.5 kV Grounded Y	[redacted]	87	8,292	12.62	0.132	88	9,278	14.12	0.134
MT ANGEL	2470023	MT ANGEL-WEST	7.2/12.5 kV Grounded Y	[redacted]	1,065	510,727	296.59	0.618	2,905	1,041,201	604.65	1.687
MULINO	6478013	MULINO-NORTH	7.2/12.5 kV Grounded Y	[redacted]	85	29,320	73.67	0.214	147	176,695	443.96	0.369

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
MULINO	6478023	MULINO-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	1,730	332,283	361.18	1.880	3,554	1,240,028	1,347.86	3.863
NEWBERG	4485033	NEWBERG-CHEHALEM	7.2/12.5 kV Grounded Y	[redacted]	2,778	1,211,120	543.35	1.246	4,355	2,618,076	1,174.55	1.954
NEWBERG	4485023	NEWBERG-DUNDEE	7.2/12.5 kV Grounded Y	[redacted]	2,004	286,930	112.83	0.788	2,457	344,403	135.43	0.966
NEWBERG	4485053	NEWBERG-HOOVER PARK	7.2/12.5 kV Grounded Y	[redacted]	790	19,119	7.90	0.326	791	19,124	7.90	0.327
NEWBERG	4485043	NEWBERG-NORTH COLLEGE	7.2/12.5 kV Grounded Y	[redacted]	543	112,795	34.07	0.164	632	270,925	81.83	0.191
NORTH MARION	2505043	NORTH MARION-CROSBY	7.2/12.5 kV Grounded Y	[redacted]	2,793	491,243	224.82	1.278	4,974	1,000,325	457.81	2.276
NORTH MARION	2505033	NORTH MARION-FRONT	7.2/12.5 kV Grounded Y	[redacted]	561	56,742	101.69	1.005	1,115	94,451	169.27	1.998
NORTH MARION	2505013	NORTH MARION-HUBBARD	7.2/12.5 kV Grounded Y	[redacted]	205	73,877	46.43	0.129	1,939	727,323	457.15	1.219
NORTH MARION	2505023	NORTH MARION-MCLAREN	7.2/12.5 kV Grounded Y	[redacted]	373	134,838	124.16	0.343	787	401,992	370.16	0.725
OXFORD	2523013	OXFORD-FAIRVIEW	7.2/12.5 kV Grounded Y	[redacted]	596	97,928	36.72	0.223	3,581	329,354	123.49	1.343
OXFORD	2523063	OXFORD-LEE	7.2/12.5 kV Grounded Y	[redacted]	1,038	142,755	168.94	1.228	1,038	142,755	168.94	1.228
OXFORD	2523033	OXFORD-MADRONA	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
OXFORD	2523043	OXFORD-OXFORD 13	7.2/12.5 kV Grounded Y	[redacted]	73	7,883	7.98	0.074	1,455	650,704	658.61	1.473
OXFORD	2523053	OXFORD-RURAL	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
OXFORD	2523023	OXFORD-SHELTON	7.2/12.5 kV Grounded Y	[redacted]	183	48,970	65.38	0.244	239	68,823	91.89	0.319

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
SALEM	2637013	SALEM-13260	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SALEM	2637023	SALEM-13261	7.2/12.5 kV Grounded Y	[redacted]	14	1,740	6.45	0.052	14	1,740	6.45	0.052
SALEM	2637033	SALEM-13262	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SALEM	2637043	SALEM-13263	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SALEM	2637063	SALEM-13264	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SALEM	2637053	SALEM-UNION	7.2/12.5 kV Grounded Y	[redacted]	143	32,386	154.96	0.684	143	32,386	154.96	0.684
SCOTTS MILLS	2652013	SCOTTS MILLS-SCOTTS MILLS 13	7.2/12.5 kV Grounded Y	[redacted]	939	334,301	180.70	0.508	2,078	2,344,072	1,267.07	1.123
SHERIDAN	2660023	SHERIDAN-EAST	7.2/12.5 kV Grounded Y	[redacted]	1,070	159,407	123.19	0.827	1,807	1,185,737	916.33	1.396
SHERIDAN	2660013	SHERIDAN-KADELL	7.2/12.5 kV Grounded Y	[redacted]	243	50,230	29.43	0.142	1,965	2,508,490	1,469.53	1.151
SILVERTON	2665013	SILVERTON-NORTH	7.2/12.5 kV Grounded Y	[redacted]	499	77,050	24.15	0.156	4,388	1,041,644	326.53	1.376
SILVERTON	2665023	SILVERTON-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	6,774	1,234,342	509.22	2.795	11,905	3,619,991	1,493.40	4.911
SILVERTON	2665033	SILVERTON-WEST	7.2/12.5 kV Grounded Y	[redacted]	1,490	414,283	211.69	0.761	5,114	1,459,051	745.55	2.613
[redacted]	4671913	[redacted]	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SPRINGBROOK	4672043	SPRINGBROOK-FERNWOOD	7.2/12.5 kV Grounded Y	[redacted]	4,777	631,465	325.33	2.461	4,867	761,474	392.31	2.507
SPRINGBROOK	4672023	SPRINGBROOK-ST PAUL	7.2/12.5 kV Grounded Y	[redacted]	1,228	332,367	341.59	1.262	1,270	457,034	469.72	1.305

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
SPRINGBROOK	4672013	SPRINGBROOK-VILLA	7.2/12.5 kV Grounded Y	[redacted]	551	162,762	78.33	0.265	551	162,762	78.33	0.265
SPRINGBROOK	4672063	SPRINGBROOK-ZIMRI	7.2/12.5 kV Grounded Y	[redacted]	1,258	503,413	346.94	0.867	2,122	1,025,168	706.53	1.462
ST LOUIS	2630013	ST LOUIS-EAST	7.2/12.5 kV Grounded Y	[redacted]	774	133,034	66.02	0.384	775	133,055	66.03	0.385
ST LOUIS	2630033	ST LOUIS-NORTH	7.2/12.5 kV Grounded Y	[redacted]	2,625	671,283	820.64	3.209	2,977	736,464	900.32	3.639
ST LOUIS	2630023	ST LOUIS-WEST	7.2/12.5 kV Grounded Y	[redacted]	968	221,273	244.50	1.070	1,119	366,760	405.26	1.236
TURNER	2698023	TURNER-CASCADE	7.2/12.5 kV Grounded Y	[redacted]	1,499	213,435	239.01	1.679	2,000	329,315	368.77	2.240
TURNER	2698013	TURNER-TURNER 13	7.2/12.5 kV Grounded Y	[redacted]	741	358,930	216.35	0.447	773	383,646	231.25	0.466
UNIONVALE	4700013	UNIONVALE-UNIONVALE 13	7.2/12.5 kV Grounded Y	[redacted]	1,454	797,299	724.16	1.321	2,674	1,091,910	991.74	2.429
UNIVERSITY	2705013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	142	14,633	36.49	0.354	142	14,633	36.49	0.354
UNIVERSITY	2705023	UNIVERSITY-TRADE	7.2/12.5 kV Grounded Y	[redacted]	124	12,180	4.75	0.048	126	12,733	4.97	0.049
WACONDA	2720033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	2	707	70.73	0.200	2	707	70.73	0.200
WACONDA	2720023	WACONDA-RIVER	7.2/12.5 kV Grounded Y	[redacted]	593	194,644	377.95	1.151	766	318,318	618.09	1.487
WACONDA	2720013	WACONDA-WACONDA 13	7.2/12.5 kV Grounded Y	[redacted]	1,052	155,106	77.01	0.522	1,118	169,396	84.11	0.555
WALLACE	2725013	WALLACE-WALLACE 13	7.2/12.5 kV Grounded Y	[redacted]	2,000	250,180	167.68	1.340	2,400	426,137	285.61	1.609
WALLACE	2725023	WALLACE-WILLOW LAKE	7.2/12.5 kV Grounded Y	[redacted]	68	25,227	20.23	0.055	69	26,757	21.46	0.055
WILLAMINA	2740033	WILLAMINA-BRIDGE	7.2/12.5 kV Grounded Y	[redacted]	5,303	1,022,895	741.23	3.843	8,482	3,881,477	2,812.66	6.146

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
WILLAMINA	2740023	WILLAMINA-BUELL	7.2/12.5 kV Grounded Y	[redacted]	1,469	287,314	428.83	2.193	2,135	1,448,120	2,161.37	3.187
WILLAMINA	2740013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	3	2,898	579.67	0.600	3	2,898	579.67	0.600
WOODBURN	2753033	WOODBURN-CANNERY	7.2/12.5 kV Grounded Y	[redacted]	185	27,070	15.58	0.107	364	91,079	52.43	0.210
WOODBURN	2753013	WOODBURN-EAST	7.2/12.5 kV Grounded Y	[redacted]	70	31,117	78.78	0.177	462	407,621	1,031.95	1.170
WOODBURN	2753023	WOODBURN-TOMLIN	7.2/12.5 kV Grounded Y	[redacted]	710	199,507	115.52	0.411	713	202,348	117.17	0.413
WOODBURN	2753043	WOODBURN-WEST	7.2/12.5 kV Grounded Y	[redacted]	702	122,634	54.00	0.309	711	128,145	56.43	0.313
YAMHILL	4760023	YAMHILL-CARLTON	7.2/12.5 kV Grounded Y	[redacted]	1,657	741,721	346.44	0.774	2,661	2,131,228	995.44	1.243
YAMHILL	4760013	YAMHILL-YAMHILL 13	7.2/12.5 kV Grounded Y	[redacted]	2,142	409,510	218.99	1.145	3,684	2,630,312	1,406.58	1.970

Western Operating Area

Table 33: Reliability Performance for PGE's Western Operating Area

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
BANKS	4135013	BANKS-BANKS 13	7.2/12.5 kV Grounded Y	[redacted]	1,047	261,831	411.04	1.644	2,315	2,243,617	3,522.16	3.634
BANKS	4135023	BANKS-CEDAR CANYON	7.2/12.5 kV Grounded Y	[redacted]	1,903	385,414	215.92	1.066	4,852	4,005,669	2,244.07	2.718
[redacted]	4146013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
BEAVERTON	4150013	BEAVERTON-ALLEN	7.2/12.5 kV Grounded Y	[redacted]	845	115,960	39.59	0.288	1,003	414,576	141.54	0.342
BEAVERTON	4150023	BEAVERTON-JAMIESON	7.2/12.5 kV Grounded Y	[redacted]	446	67,056	94.58	0.629	646	315,399	444.85	0.911
BEAVERTON	4150033	BEAVERTON-NORTHWEST	7.2/12.5 kV Grounded Y	[redacted]	39	3,633	2.10	0.023	39	3,633	2.10	0.023
BEAVERTON	4150053	BEAVERTON-WEST SLOPE	7.2/12.5 kV Grounded Y	[redacted]	226	52,807	24.72	0.106	283	92,334	43.23	0.132
BETHANY	4157043	BETHANY-BURTON	7.2/12.5 kV Grounded Y	[redacted]	2,142	337,511	158.08	1.003	4,282	944,485	442.38	2.006
BETHANY	4157013	BETHANY-GERMANTOWN	7.2/12.5 kV Grounded Y	[redacted]	13	2,248	1.03	0.006	2,193	473,963	217.41	1.006
BETHANY	4157023	BETHANY-KAISER	7.2/12.5 kV Grounded Y	[redacted]	51	7,377	4.74	0.033	1,606	391,729	251.92	1.033
BETHANY	4157053	BETHANY-LAIDLAW	7.2/12.5 kV Grounded Y	[redacted]	153	42,866	18.23	0.065	4,419	2,076,691	882.95	1.879
BETHANY	4157063	BETHANY-SPRINGVILLE	7.2/12.5 kV Grounded Y	[redacted]	1,534	259,213	74.55	0.441	2,116	422,490	121.51	0.609
BETHANY	4157033	BETHANY-THOMPSON	7.2/12.5 kV Grounded Y	[redacted]	113	16,752	14.88	0.100	1,263	367,570	326.44	1.122
[redacted]	4160913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
[redacted]	4160923	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	4160933	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
BOONES FERRY	1170043	BOONES FERRY-GOODALL	7.2/12.5 kV Grounded Y	[redacted]	2,303	332,005	188.42	1.307	2,553	725,469	411.73	1.449
BOONES FERRY	1170013	BOONES FERRY-KRUSE	7.2/12.5 kV Grounded Y	[redacted]	468	193,668	101.40	0.245	469	194,027	101.59	0.246
BOONES FERRY	1170033	BOONES FERRY-LAKE GROVE	7.2/12.5 kV Grounded Y	[redacted]	585	137,196	54.92	0.234	3,585	669,975	268.20	1.435
BOONES FERRY	1170053	BOONES FERRY-MOUNTAIN PARK	7.2/12.5 kV Grounded Y	[redacted]	4,955	594,837	194.26	1.618	4,955	594,837	194.26	1.618
BOONES FERRY	1170023	BOONES FERRY-WEMBLEY PARK	7.2/12.5 kV Grounded Y	[redacted]	199	55,417	34.53	0.124	236	91,157	56.80	0.147
BROOKWOOD	4185353	BROOKWOOD-BORWICK	7.2/12.5 kV Grounded Y	[redacted]	2,653	525,669	200.25	1.011	2,653	525,669	200.25	1.011
BROOKWOOD	4185213	BROOKWOOD-BROOKWOOD 13	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
BROOKWOOD	4185243	BROOKWOOD-CRATER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
BROOKWOOD	4185313	BROOKWOOD-SUNRISE	7.2/12.5 kV Grounded Y	[redacted]	2,252	112,883	52.72	1.052	2,252	112,883	52.72	1.052
BROOKWOOD	4185323	BROOKWOOD-TRILLIUM	7.2/12.5 kV Grounded Y	[redacted]	4	204	0.21	0.004	4	204	0.21	0.004
CEDAR HILLS	4200033	CEDAR HILLS-CEDAR HILLS 13	7.2/12.5 kV Grounded Y	[redacted]	9	12,289	12,289.35	9.000	9	12,289	12,289.35	9.000
CEDAR HILLS	4200063	CEDAR HILLS-LEAHY	7.2/12.5 kV Grounded Y	[redacted]	3,137	1,002,819	361.51	1.131	3,775	1,358,669	489.79	1.361

2022					Major Events Excluded				Major Events Included			
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CEDAR HILLS	4200013	CEDAR HILLS-SHOPPING CENTER	7.2/12.5 kV Grounded Y	[redacted]	2,265	464,410	215.20	1.050	4,842	1,130,508	523.87	2.244
CEDAR HILLS	4200043	CEDAR HILLS-SKYLINE	7.2/12.5 kV Grounded Y	[redacted]	4	125	0.16	0.005	4	125	0.16	0.005
CEDAR HILLS	4200053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	191	33,734	154.04	0.872	193	34,160	155.98	0.881
CEDAR HILLS	4200023	CEDAR HILLS-SYLVAN	7.2/12.5 kV Grounded Y	[redacted]	815	101,960	39.67	0.317	3,361	1,227,604	477.67	1.308
COFFEE CREEK	4209023	COFFEE CREEK-FREEMAN	7.2/12.5 kV Grounded Y	[redacted]	212	27,752	131.52	1.005	212	27,752	131.52	1.005
COFFEE CREEK	4209013	COFFEE CREEK-HOLIDAY	7.2/12.5 kV Grounded Y	[redacted]	11	3,032	8.40	0.030	12	3,623	10.04	0.033
CORNELIUS	4210033	CORNELIUS-ADAIR	7.2/12.5 kV Grounded Y	[redacted]	463	120,259	86.52	0.333	808	379,316	272.89	0.581
CORNELIUS	4210013	CORNELIUS-CORNELIUS 13	7.2/12.5 kV Grounded Y	[redacted]	1,894	478,069	166.63	0.660	3,044	1,889,358	658.54	1.061
CORNELIUS	4210023	CORNELIUS-VERBOORT	7.2/12.5 kV Grounded Y	[redacted]	2,263	406,729	233.35	1.298	2,922	1,339,588	768.55	1.676
CORNELL	4206023	CORNELL-BLUFFS	7.2/12.5 kV Grounded Y	[redacted]	864	111,441	30.00	0.233	5,933	2,236,228	601.95	1.597
CORNELL	4206013	CORNELL-SALTZMAN	7.2/12.5 kV Grounded Y	[redacted]	1,872	145,643	84.14	1.081	3,594	950,908	549.34	2.076
CORNELL	4206033	CORNELL-WESTLAWN	7.2/12.5 kV Grounded Y	[redacted]	1,381	294,838	159.29	0.746	3,350	1,248,866	674.70	1.810
DENNY	4222043	DENNY-EAST	7.2/12.5 kV Grounded Y	[redacted]	335	63,574	38.44	0.203	4,075	1,059,068	640.31	2.464
DENNY	4222013	DENNY-NORTH	7.2/12.5 kV Grounded Y	[redacted]	38	6,615	16.13	0.093	260	101,524	247.62	0.634
DENNY	4222033	DENNY-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	279	66,854	20.92	0.087	279	66,854	20.92	0.087

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DENNY	4222023	DENNY-WEST	7.2/12.5 kV Grounded Y	[redacted]	2,172	378,857	139.59	0.800	2,173	379,693	139.90	0.801
DILLEY	4223023	DILLEY-CARPENTER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
DILLEY	4223013	DILLEY-DILLEY 13	7.2/12.5 kV Grounded Y	[redacted]	1,472	508,576	809.83	2.344	2,411	1,864,410	2,968.81	3.839
DURHAM	4224043	DURHAM-BONITA	7.2/12.5 kV Grounded Y	[redacted]	106	19,824	28.90	0.155	2,885	2,306,855	3,362.76	4.206
DURHAM	4224053	DURHAM-BRIDGEPORT	7.2/12.5 kV Grounded Y	[redacted]	358	45,191	37.22	0.295	358	45,191	37.22	0.295
DURHAM	4224013	DURHAM-DURHAM 13	7.2/12.5 kV Grounded Y	[redacted]	68	28,310	71.49	0.172	464	192,636	486.45	1.172
DURHAM	4224913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
DURHAM	4224023	DURHAM-SATTLER	7.2/12.5 kV Grounded Y	[redacted]	2,756	298,129	125.48	1.160	2,756	298,129	125.48	1.160
DURHAM	4224033	DURHAM-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	2	606	1.07	0.004	5	1,310	2.31	0.009
GALES CREEK	4275013	GALES CREEK-GALES CREEK 13	7.2/12.5 kV Grounded Y	[redacted]	3,626	756,224	957.25	4.590	5,543	3,903,565	4,941.22	7.016
GARDEN HOME	4276023	GARDEN HOME-MCKAY	7.2/12.5 kV Grounded Y	[redacted]	511	82,774	30.52	0.188	3,432	769,212	283.63	1.265
GARDEN HOME	4276013	GARDEN HOME-METZGER	7.2/12.5 kV Grounded Y	[redacted]	582	133,884	43.13	0.188	897	561,203	180.80	0.289
HELVETIA	4335094	HELVETIA-BACHELOR	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HELVETIA	4335104	HELVETIA-SACAJAWEA	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HELVETIA	4335034	HELVETIA-STEENS	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
HELVETIA	4335044	HELVETIA-STRAWBERRY	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

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HILLSBORO	4320013	HILLSBORO-DAIRY CREEK	7.2/12.5 kV Grounded Y	[redacted]	663	387,241	89.06	0.152	2,948	1,852,374	426.03	0.678
HILLSBORO	4320053	HILLSBORO-DENNIS	7.2/12.5 kV Grounded Y	[redacted]	11	1,668	6.39	0.042	11	1,668	6.39	0.042
HILLSBORO	4320033	HILLSBORO-JACKSON	7.2/12.5 kV Grounded Y	[redacted]	462	152,747	55.99	0.169	466	153,362	56.22	0.171
HILLSBORO	4320023	HILLSBORO-LAUREL	7.2/12.5 kV Grounded Y	[redacted]	1,950	302,792	187.26	1.206	4,233	2,483,764	1,536.03	2.618
HILLSBORO	4320043	HILLSBORO-SCHOLLS	7.2/12.5 kV Grounded Y	[redacted]	623	59,717	53.65	0.560	757	96,066	86.31	0.680
HUBER	4330053	HUBER-BANY	7.2/12.5 kV Grounded Y	[redacted]	253	43,504	12.62	0.073	253	43,504	12.62	0.073
HUBER	4330023	HUBER-FARMINGTON	7.2/12.5 kV Grounded Y	[redacted]	1,510	485,765	141.29	0.439	1,874	638,830	185.81	0.545
HUBER	4330013	HUBER-HUBER 13	7.2/12.5 kV Grounded Y	[redacted]	4,456	376,271	90.86	1.076	4,456	376,271	90.86	1.076
HUBER	4330033	HUBER-KINNAMAN	7.2/12.5 kV Grounded Y	[redacted]	2,727	264,052	107.34	1.109	2,727	264,052	107.34	1.109
HUBER	4330043	HUBER-MARYVILLE	7.2/12.5 kV Grounded Y	[redacted]	1,403	486,367	107.06	0.309	1,555	627,899	138.21	0.342
KING CITY	4378023	KING CITY-BULL MOUNTAIN	7.2/12.5 kV Grounded Y	[redacted]	32	3,650	2.60	0.023	32	3,650	2.60	0.023
KING CITY	4378013	KING CITY-FISCHER	7.2/12.5 kV Grounded Y	[redacted]	150	17,001	5.35	0.047	150	17,001	5.35	0.047
KING CITY	4378043	KING CITY-HAZELBROOK	7.2/12.5 kV Grounded Y	[redacted]	36	2,361	1.35	0.021	37	2,524	1.45	0.021
KING CITY	4378053	KING CITY-NORTH	7.2/12.5 kV Grounded Y	[redacted]	133	57,279	26.42	0.061	183	57,577	26.56	0.084
KING CITY	4378063	KING CITY-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
KING CITY	4378033	KING CITY-SUMMERFIELD	7.2/12.5 kV Grounded Y	[redacted]	31	2,127	0.78	0.011	35	6,596	2.43	0.013

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MAIN	4422023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	2,130	192,186	106.71	1.183	2,251	417,874	232.02	1.250
MAIN	4422033	MAIN-BENTLEY	7.2/12.5 kV Grounded Y	[redacted]	126	62,380	28.29	0.057	126	62,380	28.29	0.057
MAIN	4422053	MAIN-EXPRESS	7.2/12.5 kV Grounded Y	[redacted]	7,108	947,491	305.54	2.292	7,233	1,303,564	420.37	2.332
MAIN	4422073	MAIN-GRIFFIN OAKS	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MAIN	4422063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MAIN	4422043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MAIN	4422013	MAIN-RIVER	7.2/12.5 kV Grounded Y	[redacted]	2,715	371,131	141.71	1.037	2,851	417,085	159.25	1.089
[redacted]	4430913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MERIDIAN	4447083	MERIDIAN-65TH	7.2/12.5 kV Grounded Y	[redacted]	87	18,067	17.04	0.082	87	18,067	17.04	0.082
MERIDIAN	4447053	MERIDIAN-BORLAND	7.2/12.5 kV Grounded Y	[redacted]	9	1,185	1.30	0.010	126	45,904	50.39	0.138
MERIDIAN	4447093	MERIDIAN-CHILDS	7.2/12.5 kV Grounded Y	[redacted]	20	2,940	3.45	0.023	20	2,940	3.45	0.023
MERIDIAN	4447063	MERIDIAN-LAKEVIEW	7.2/12.5 kV Grounded Y	[redacted]	48	3,899	10.18	0.125	85	37,829	98.77	0.222
MERIDIAN	4447013	MERIDIAN-MERIDIAN 13	7.2/12.5 kV Grounded Y	[redacted]	3,922	873,436	615.96	2.766	8,340	1,406,541	991.92	5.882
MERIDIAN	4447073	MERIDIAN-NYBERG	7.2/12.5 kV Grounded Y	[redacted]	12	1,985	14.08	0.085	12	1,985	14.08	0.085
MERIDIAN	4447043	MERIDIAN-PILKINGTON	7.2/12.5 kV Grounded Y	[redacted]	400	105,870	44.35	0.168	513	123,612	51.79	0.215
MERIDIAN	4447033	MERIDIAN-SAGERT	7.2/12.5 kV Grounded Y	[redacted]	426	48,797	16.84	0.147	442	52,438	18.09	0.153

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MURRAYHILL	4482033	MURRAYHILL-KINTON	7.2/12.5 kV Grounded Y	[redacted]	7	2,381	0.54	0.002	7	2,381	0.54	0.002
MURRAYHILL	4482013	MURRAYHILL-MURRAYHILL 13	7.2/12.5 kV Grounded Y	[redacted]	236	61,675	14.92	0.057	6,545	3,550,897	858.95	1.583
MURRAYHILL	4482053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
MURRAYHILL	4482043	MURRAYHILL-REUSSER	7.2/12.5 kV Grounded Y	[redacted]	226	20,025	9.30	0.105	226	20,025	9.30	0.105
MURRAYHILL	4482023	MURRAYHILL-TEAL	7.2/12.5 kV Grounded Y	[redacted]	595	74,040	18.79	0.151	595	74,040	18.79	0.151
NORTH PLAINS	4510023	NORTH PLAINS-MASON HILL	7.2/12.5 kV Grounded Y	[redacted]	3,100	1,462,332	677.95	1.437	5,829	5,100,042	2,364.41	2.702
NORTH PLAINS	4510013	NORTH PLAINS-NORTH PLAINS 13	7.2/12.5 kV Grounded Y	[redacted]	1,416	392,201	269.74	0.974	2,888	2,221,651	1,527.96	1.986
OAK HILLS	4516033	OAK HILLS-FIVE OAKS	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
OAK HILLS	4516053	OAK HILLS-GREENBRIER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
OAK HILLS	4516013	OAK HILLS-OAK HILLS 13	7.2/12.5 kV Grounded Y	[redacted]	55	3,095	2.27	0.040	56	3,177	2.33	0.041
OAK HILLS	4516023	OAK HILLS-SOMERSET	7.2/12.5 kV Grounded Y	[redacted]	5	1,390	0.86	0.003	5	1,390	0.86	0.003
OAK HILLS	4516043	OAK HILLS-WALKER	7.2/12.5 kV Grounded Y	[redacted]	409	51,710	22.43	0.177	409	51,710	22.43	0.177
ORENCO	4518053	ORENCO-231ST	7.2/12.5 kV Grounded Y	[redacted]	5,139	291,507	77.78	1.371	5,141	292,587	78.06	1.372
ORENCO	4518043	ORENCO-AMBERGLEN	7.2/12.5 kV Grounded Y	[redacted]	79	19,911	5.64	0.022	79	19,911	5.64	0.022
ORENCO	4518013	ORENCO-BASELINE	7.2/12.5 kV Grounded Y	[redacted]	5,218	251,886	53.90	1.117	5,219	251,994	53.93	1.117

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ORENCO	4518033	ORENCO-ORENCO 13	7.2/12.5 kV Grounded Y	[redacted]	854	62,396	83.42	1.142	856	62,429	83.46	1.144
ORENCO	4518023	ORENCO-PRIMATE	7.2/12.5 kV Grounded Y	[redacted]	238	26,134	10.04	0.091	1,295	3,300,859	1,268.10	0.498
ORENCO	4518063	ORENCO-WILKINS	7.2/12.5 kV Grounded Y	[redacted]	2	11	0.01	0.001	2	11	0.01	0.001
OSWEGO	1520013	OSWEGO-IRON MOUNTAIN	7.2/12.5 kV Grounded Y	[redacted]	260	49,533	41.24	0.216	3,758	163,851	136.43	3.129
OSWEGO	1520033	OSWEGO-MARYLHURST	7.2/12.5 kV Grounded Y	[redacted]	110	20,737	9.70	0.051	261	100,287	46.93	0.122
OSWEGO	1520043	OSWEGO-PALATINE	7.2/12.5 kV Grounded Y	[redacted]	711	152,132	84.33	0.394	820	222,835	123.52	0.455
OSWEGO	1520023	OSWEGO-STAFFORD	7.2/12.5 kV Grounded Y	[redacted]	138	37,935	19.51	0.071	145	42,028	21.62	0.075
PROGRESS	4565053	PROGRESS-GREENBURG	7.2/12.5 kV Grounded Y	[redacted]	1,999	148,979	77.15	1.035	4,829	1,833,184	949.34	2.501
PROGRESS	4565063	PROGRESS-HALL	7.2/12.5 kV Grounded Y	[redacted]	26	3,250	17.47	0.140	26	3,250	17.47	0.140
PROGRESS	4565013	PROGRESS-ROBINSON	7.2/12.5 kV Grounded Y	[redacted]	3,209	403,697	183.33	1.457	3,209	403,697	183.33	1.457
PROGRESS	4565023	PROGRESS-SAWYER	7.2/12.5 kV Grounded Y	[redacted]	898	69,429	87.44	1.131	1,036	106,227	133.79	1.305
PROGRESS	4565033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
PROGRESS	4565043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	27	1,883	69.73	1.000	27	1,883	69.73	1.000
RALEIGH HILLS	4570073	RALEIGH HILLS-DOGWOOD	7.2/12.5 kV Grounded Y	[redacted]	910	159,623	90.54	0.516	1,584	634,307	359.79	0.898
RALEIGH HILLS	4570053	RALEIGH HILLS-MONTCLAIR	7.2/12.5 kV Grounded Y	[redacted]	375	101,927	65.93	0.243	2,380	644,448	416.85	1.539
RALEIGH HILLS	4570063	RALEIGH HILLS-OLESON	7.2/12.5 kV Grounded Y	[redacted]	1,266	285,889	133.97	0.593	1,894	1,489,634	698.05	0.888

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REEDVILLE	4583083	REEDVILLE-AUGUSTA	7.2/12.5 kV Grounded Y	[redacted]	308	41,004	12.27	0.092	308	41,004	12.27	0.092
REEDVILLE	4583033	REEDVILLE-BLANTON	7.2/12.5 kV Grounded Y	[redacted]	745	118,346	37.06	0.233	1,011	211,131	66.12	0.317
REEDVILLE	4583013	REEDVILLE-HAZELDALE	7.2/12.5 kV Grounded Y	[redacted]	2,568	1,100,178	430.43	1.005	5,756	2,037,654	797.20	2.252
REEDVILLE	4583043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
REEDVILLE	4583053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
REEDVILLE	4583063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
REEDVILLE	4583073	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
REEDVILLE	4583093	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
REEDVILLE	4583023	REEDVILLE-TV	7.2/12.5 kV Grounded Y	[redacted]	760	108,116	55.50	0.390	769	112,394	57.70	0.395
ROCK CREEK	4598023	ROCK CREEK-185TH	7.2/12.5 kV Grounded Y	[redacted]	3,055	336,661	118.79	1.078	3,056	336,674	118.80	1.078
ROCK CREEK	4598033	ROCK CREEK-FOREST PARK	7.2/12.5 kV Grounded Y	[redacted]	934	246,675	124.27	0.471	1,196	537,917	270.99	0.603
ROCK CREEK	4598013	ROCK CREEK-NEWBERRY	7.2/12.5 kV Grounded Y	[redacted]	1,499	1,051,305	1,037.81	1.480	3,250	4,588,964	4,530.07	3.208
ROSEWAY	4605033	ROSEWAY-ALEXANDER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ROSEWAY	4605063	ROSEWAY-BUTTERNUT	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ROSEWAY	4605043	ROSEWAY-CENTURY	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ROSEWAY	4605023	ROSEWAY-ESPLANADE	7.2/12.5 kV Grounded Y	[redacted]	145	58,313	26.74	0.066	146	58,447	26.80	0.067

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ROSEWAY	4605013	ROSEWAY-ROSEWAY 13	7.2/12.5 kV Grounded Y	[redacted]	39	3,312	2.27	0.027	39	3,312	2.27	0.027
ROSEWAY	4605053	ROSEWAY-SOHI	7.2/12.5 kV Grounded Y	[redacted]	2,063	512,423	386.73	1.557	2,063	512,423	386.73	1.557
[redacted]	9999013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	16	3,367	177.20	0.842	30	30,254	1,592.30	1.579
SCHOLLS FERRY	4645113	SCHOLLS FERRY-KEMMER	7.2/12.5 kV Grounded Y	[redacted]	2,316	413,188	277.31	1.554	2,423	435,317	292.16	1.626
SCHOLLS FERRY	4645123	SCHOLLS FERRY-RAINBOW	7.2/12.5 kV Grounded Y	[redacted]	586	217,131	146.12	0.394	5,792	3,074,381	2,068.90	3.898
SCHOLLS FERRY	4645133	SCHOLLS FERRY-ROY ROGERS	7.2/12.5 kV Grounded Y	[redacted]	76	33,291	11.83	0.027	7,508	1,191,731	423.65	2.669
SCOGGINS	4650023	SCOGGINS-CHERRY GROVE	7.2/12.5 kV Grounded Y	[redacted]	3,035	533,018	1,129.27	6.430	3,720	1,467,253	3,108.59	7.881
SCOGGINS	4650013	SCOGGINS-LAURELWOOD	7.2/12.5 kV Grounded Y	[redacted]	3,142	474,110	415.52	2.754	7,354	4,613,883	4,043.72	6.445
SHUTE	4660064	SHUTE-BIRCH	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SHUTE	4660074	SHUTE-FERN	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SHUTE	4660044	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SHUTE	4660084	SHUTE-MAPLE	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SHUTE	4660054	SHUTE-PINE	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SHUTE	4660024	[redacted]	34.5 kV Grounded Y	[redacted]	1	180	180.00	1.000	2	360	360.00	2.000
SHUTE	4660014	[redacted]	34.5 kV Grounded Y	[redacted]	1	180	180.00	1.000	1	180	180.00	1.000
SHUTE	4660104	SHUTE-SPRUCE	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
SHUTE	4660094	SHUTE-TULIP	34.5 kV Grounded Y	[redacted]	5	10,001	5,000.53	2.500	5	10,001	5,000.53	2.500
SIX CORNERS	4670013	SIX CORNERS-13359	7.2/12.5 kV Grounded Y	[redacted]	986	250,496	80.26	0.316	4,155	1,718,307	550.56	1.331
SIX CORNERS	4670023	SIX CORNERS-13360	7.2/12.5 kV Grounded Y	[redacted]	1,150	136,132	119.00	1.005	1,399	230,732	201.69	1.223
SIX CORNERS	4670043	SIX CORNERS-BORCHERS	7.2/12.5 kV Grounded Y	[redacted]	1,056	272,424	141.89	0.550	1,911	652,356	339.77	0.995
SIX CORNERS	4670033	SIX CORNERS-CHAPMAN	7.2/12.5 kV Grounded Y	[redacted]	160	33,352	10.62	0.051	290	101,969	32.46	0.092
SIX CORNERS	4670053	SIX CORNERS-SIX CORNERS 13	7.2/12.5 kV Grounded Y	[redacted]	1,924	186,507	107.68	1.111	1,924	186,507	107.68	1.111
[redacted]	4674911	[redacted]	4.16 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ST HELENS	9999023	ST HELENS-HOULTON	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ST MARYS EAST	4635023	ST MARYS EAST-BETHANY	7.2/12.5 kV Grounded Y	[redacted]	124	52,656	79.06	0.186	124	52,656	79.06	0.186
ST MARYS EAST	4635053	ST MARYS EAST-BUTNER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
ST MARYS EAST	4635033	ST MARYS EAST-ELMONICA	7.2/12.5 kV Grounded Y	[redacted]	836	233,883	68.99	0.247	4,261	356,960	105.30	1.257
ST MARYS EAST	4635013	ST MARYS EAST-JENKINS	7.2/12.5 kV Grounded Y	[redacted]	4	595	16.09	0.108	4	595	16.09	0.108
ST MARYS EAST	4635063	ST MARYS EAST-MILLIKAN	7.2/12.5 kV Grounded Y	[redacted]	4,363	497,616	271.18	2.378	4,366	500,547	272.78	2.379
ST MARYS EAST	4635043	ST MARYS EAST-ST MARYS 13	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	4255911	[redacted]	4.16 kV Grounded Y	[redacted]	1	208	69.21	0.333	1	208	69.21	0.333
SUNSET	4679313	SUNSET-BLANCHET	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
SUNSET	4679453	SUNSET-COLFAX	7.2/12.5 kV Grounded Y	[redacted]	854	58,646	2,792.69	40.667	854	58,646	2,792.69	40.667
SUNSET	4679133	SUNSET-CORNELL	7.2/12.5 kV Grounded Y	[redacted]	3	2,861	1,430.74	1.500	3	2,861	1,430.74	1.500
SUNSET	4679124	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679244	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679364	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679343	SUNSET-DAWSON	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679123	SUNSET-DORION	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679153	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679253	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679353	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679553	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679653	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679753	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679853	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679513	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679613	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
SUNSET	4679713	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679813	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679523	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679623	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679723	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679823	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679533	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679633	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679733	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679833	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679114	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679234	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679354	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679143	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679243	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	2	398	397.68	2.000	2	398	397.68	2.000
SUNSET	4679463	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
SUNSET	4679223	SUNSET-LANE	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679284	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679433	SUNSET-MCCALL	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679423	SUNSET-MEEK	7.2/12.5 kV Grounded Y	[redacted]	620	135,299	218.58	1.002	620	135,299	218.58	1.002
SUNSET	4679413	SUNSET-NIXON	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679333	SUNSET-OLCOTT	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679213	SUNSET-PAULING	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SUNSET	4679323	SUNSET-SPALDING	7.2/12.5 kV Grounded Y	[redacted]	2	349	3.97	0.023	2	349	3.97	0.023
SUNSET	4679233	SUNSET-WHITMAN	7.2/12.5 kV Grounded Y	[redacted]	149	6,169	82.26	1.987	149	6,169	82.26	1.987
SUNSET	4679113	SUNSET-YOUNG	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
SYLVAN	1685013	SYLVAN-BARNES	7.2/12.5 kV Grounded Y	[redacted]	1,089	250,431	93.27	0.406	5,456	3,811,103	1,419.41	2.032
SYLVAN	1685023	SYLVAN-PATTON	7.2/12.5 kV Grounded Y	[redacted]	9,731	2,233,669	787.33	3.430	15,489	8,455,764	2,980.53	5.460
[redacted]	4693093	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	4693063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	160	20,408	43.51	0.341	161	20,566	43.85	0.343
[redacted]	4693083	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	3,401	672,013	218.97	1.108	3,609	939,309	306.06	1.176
[redacted]	4693053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
[redacted]	4693033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	2,085	515,851	307.24	1.242	2,310	721,837	429.92	1.376
[redacted]	4693043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	1,560	379,485	110.86	0.456	1,886	417,962	122.10	0.551
[redacted]	4693023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	71	24,591	35.28	0.102	71	24,591	35.28	0.102
[redacted]	4693073	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
[redacted]	4693013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
TIGARD	4695013	TIGARD-13336	7.2/12.5 kV Grounded Y	[redacted]	72	13,623	11.80	0.062	74	13,713	11.88	0.064
TIGARD	4695043	TIGARD-13337	7.2/12.5 kV Grounded Y	[redacted]	43	9,016	6.70	0.032	43	9,016	6.70	0.032
TIGARD	4695023	TIGARD-13361	7.2/12.5 kV Grounded Y	[redacted]	607	217,630	194.66	0.543	827	403,912	361.28	0.740
TIGARD	4695033	TIGARD-13362	7.2/12.5 kV Grounded Y	[redacted]	260	26,513	10.36	0.102	744	253,988	99.25	0.291
TIGARD	4695053	TIGARD-TIGARD 13	7.2/12.5 kV Grounded Y	[redacted]	4,432	406,661	189.76	2.068	4,550	417,047	194.61	2.123
[redacted]	4999013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	3	509	72.73	0.429	3	509	72.73	0.429
[redacted]	4999023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
TUALATIN	4697023	TUALATIN-AVERY	7.2/12.5 kV Grounded Y	[redacted]	484	72,215	33.36	0.224	2,630	299,784	138.47	1.215
TUALATIN	4697063	TUALATIN-CIPOLE	7.2/12.5 kV Grounded Y	[redacted]	40	8,666	24.76	0.114	40	8,666	24.76	0.114
TUALATIN	4697043	TUALATIN-HERMAN	7.2/12.5 kV Grounded Y	[redacted]	281	7,786	38.55	1.391	281	7,786	38.55	1.391
TUALATIN	4697013	TUALATIN-IBACH	7.2/12.5 kV Grounded Y	[redacted]	77	15,483	9.92	0.049	81	16,313	10.45	0.052

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
TUALATIN	4697053	TUALATIN-LEVETON	7.2/12.5 kV Grounded Y	[redacted]	50	1,050	21.00	1.000	50	1,050	21.00	1.000
TUALATIN	4697033	TUALATIN-TUALATIN 13	7.2/12.5 kV Grounded Y	[redacted]	128	3,018	24.15	1.024	129	5,619	44.95	1.032
WEST PORTLAND	4735033	WEST PORTLAND-72ND	7.2/12.5 kV Grounded Y	[redacted]	38	16,028	14.16	0.034	42	20,335	17.96	0.037
WEST PORTLAND	4735043	WEST PORTLAND-NORTH	7.2/12.5 kV Grounded Y	[redacted]	609	119,428	43.26	0.221	978	220,458	79.85	0.354
WEST PORTLAND	4735023	WEST PORTLAND-PACIFIC	7.2/12.5 kV Grounded Y	[redacted]	380	41,080	15.23	0.141	1,151	805,870	298.80	0.427
WEST PORTLAND	4735013	WEST PORTLAND-WEST PORTLAND 13	7.2/12.5 kV Grounded Y	[redacted]	1,681	498,017	458.16	1.546	1,681	498,017	458.16	1.546
WEST UNION	4737033	WEST UNION-ALOCLEK	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WEST UNION	4737013	WEST UNION-CORNELIUS PASS	7.2/12.5 kV Grounded Y	[redacted]	77	15,619	15.71	0.077	2,046	237,017	238.45	2.058
WEST UNION	4737053	WEST UNION-IMBRIE	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WEST UNION	4737043	WEST UNION-JACOBSON	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WEST UNION	4737023	WEST UNION-WEST UNION 13	7.2/12.5 kV Grounded Y	[redacted]	676	153,058	59.77	0.264	676	153,058	59.77	0.264
WILSONVILLE	4745073	WILSONVILLE-BOECKMAN	7.2/12.5 kV Grounded Y	[redacted]	1,497	28,006	20.65	1.104	1,534	28,723	21.18	1.131
WILSONVILLE	4745063	WILSONVILLE-CHARBONNEAU	7.2/12.5 kV Grounded Y	[redacted]	3,129	1,014,953	396.16	1.221	3,254	1,047,399	408.82	1.270

2022					Major Events Excluded				Major Events Included			
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI
WILSONVILLE	4745013	WILSONVILLE-CITY	7.2/12.5 kV Grounded Y	[redacted]	282	32,952	8.26	0.071	282	32,952	8.26	0.071
WILSONVILLE	4745043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-
WILSONVILLE	4745023	WILSONVILLE-PARKWAY	7.2/12.5 kV Grounded Y	[redacted]	195	88,617	105.37	0.232	195	88,617	105.37	0.232
WILSONVILLE	4745033	WILSONVILLE-VILLEBOIS	7.2/12.5 kV Grounded Y	[redacted]	1,692	18,792	6.68	0.601	1,692	18,792	6.68	0.601
WILSONVILLE	4745093	WILSONVILLE-WEST	7.2/12.5 kV Grounded Y	[redacted]	704	220,109	106.28	0.340	844	306,875	148.18	0.408

Appendix A Reliability Index Equations

SAIDI

The system average interruption duration index defined as the sustained interruption duration time (in minutes) an average customer experiences during the year. It is determined by dividing the sum of all customer-sustained interruption durations by the total number of customers served.

$$SAIDI = \frac{Sum\ of\ customer\ sustained\ interruption\ durations}{Total\ number\ of\ customers\ served}$$

SAIFI

The system average sustained interruption frequency index. This index is the number of times an average customer experiences a sustained interruption during a year. It is determined by dividing the sum of the total number of customer-sustained interruptions by the total number of customers served.

$$SAIFI = \frac{Sum\ of\ total\ number\ of\ customer\ sustained\ interruptions}{Total\ number\ of\ customers\ served}$$

$MAIFI_E$

Momentary average interruption frequency index of events for the system. This index is the number of times that an average customer experiences momentary interruption events during a year. It is determined by dividing the sum of the total number of customer momentary interruption events by the total number of customers served. Note that this index does not include the events immediately preceding a sustained interruption.

$$MAIFI_E = \frac{Sum\ of\ total\ number\ of\ customer\ momentary\ interruption\ events}{Total\ number\ of\ customers\ served\ on\ circuits\ with\ MV90\ or\ SCADA}$$

CAIDI

The customer average interruption duration index represents the average time required to restore service. It is determined by dividing the sum of customer minutes interrupted by the total number of customers served.

$$CAIDI = \frac{Sum\ of\ customer\ minutes\ of\ interruption}{Total\ number\ of\ customers\ interrupted}$$

T_{MED}

The SAIDI index is used as the basis of this definition. In calculating the daily system SAIDI, any interruption that spans multiple days is accrued to the day on which the interruption begins. The MED identification T_{MED} value is calculated at the end of each reporting period (typically one year) for use during the next reporting period, as follows:

1. Collect values of daily SAIDI for 5 sequential years, ending on the last day of the last complete reporting period. If fewer than 5 years of historical data are available, use all available historical data until 5 years of historical data are available.
2. Only those days that have a SAIDI/Day value will be used to calculate T_{MED} (do not include days that did not have any interruptions).
3. Take the natural logarithm (ln) of each daily SAIDI value in the data set.
4. Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.
5. Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.
6. Compute the MED threshold, T_{MED}, using:

$$T_{MED} = e^{(\alpha + 2.5\beta)}$$

7. Any day with daily SAIDI greater than the threshold value T_{MED} that occurs during the subsequent reporting period is classified as a MED.

Activities that occur on days classified as MEDs should be separately analyzed and reported.

Appendix B Asset Class Definitions

Substations: Sites containing critical equipment to transform electricity between the transmission and distribution systems. Electricity voltages are either stepped-up for the transmission system or down for the distribution system to transport electricity.

Substation transformers: These assets change the relationship between the incoming voltage and current and the outgoing voltage and current. They are rated on their primary and secondary voltage relationship and their power-carrying capacity.

Circuit breakers: Each one of these assets is the combination of a thermostat and a switch. It has a bimetal strip that heats and bends during a circuit overload. When the strip bends, it trips the breaker and opens the switch, thus breaking the circuit.

Poles and structures: Poles are used to support electric circuits and are typically made of wood. Structures are generally used for transmission circuits. They can consist of single or multiple sets and are typically made of wood, steel, or lattice towers.

Transmission circuit: Transmission circuits transports high voltage (e.g., 115kV) electricity from large generation sources to substations for the transmission of electricity to the distribution system.

Distribution circuit: Distribution circuits deliver electricity from a substation to local areas where the voltage is transformed via overhead or underground transformers to levels that customers can use. The majority of PGE's distribution circuits are operated at nominal voltage level of 13kV.

Overhead transformers: One of a set of 1 to 3 pole-mounted distribution transformers. Overhead transformers step down the distribution voltage to levels that customers can use.

Underground transformers: Underground transformers – also called "pad-mounted" transformers – are electrically the same as pole mounted units, but packed in a box-like, oil-filled metal enclosure and installed on a ground-level concrete foundation, or "pad." These transformers step down the distribution voltage to levels that customers can use.

Sectionalizers and reclosers: Sectionalizers and reclosers are protective devices on the distribution system. The sectionalizer automatically isolates a faulted section on the circuit, while a recloser interrupts the current on the faulted section.

Appendix C MED Report Filings with OPUC

The following MED reports in Table 34 were filed for Major Storm/Event Exclusion with the OPUC in accordance with OAR 860-023-0161.

Since 2012, PGE has calculated T_{MED} and reported MED's at the service-territory level, defined in this report as the Reliability Reporting Area. Prior to 2012, MED's were evaluated at the Operating Area and each area was a Reliability Reporting Area. However, after 2012, the MED Reports filed inaccurately referenced Reliability Reporting Areas in lieu of Operating Areas. Future MED Report filings will use the Operating and Reliability Reporting Area definitions as outlined in this Annual Reliability Report.

Table 34: MED Reports Filed

Event Date(s)	Description	Available at:
January 7th	Major Event Exclusion for January 7th, 2022	apps.puc.state.or.us/edockets
April 4th	Major Event Exclusion for April 4th, 2022	apps.puc.state.or.us/edockets
April 11th	Major Event Exclusion for April 11th, 2022	apps.puc.state.or.us/edockets
September 9th	Major Event Exclusion for September 9th, 2022	apps.puc.state.or.us/edockets
November 4th-5th	Major Event Exclusion for November 4th-5th, 2022	apps.puc.state.or.us/edockets
November 7th	Major Event Exclusion for November 7th, 2022	apps.puc.state.or.us/edockets
December 22	Major Event Exclusion for December 22, 2022	apps.puc.state.or.us/edockets
December 27	Major Event Exclusion for December 27, 2022	apps.puc.state.or.us/edockets

Appendix D Outage Management System Cause Code Mapping

Table 35 provides an overview of how PGE maps the detailed OMS cause codes to the high-level reporting interruption causes as required in OAR 860-023-0151(2)(b). It also provides a mapping to the cause codes provided to customers via outage maps and outage notifications. The customer-facing cause codes provide a brief reason for the interruption.

Table 35: Cause Code Mapping

OAR Cause	OMS Cause Code	PGE Outage Map/Text Cause Code
A Loss of Supply - Transmission	*Multiple*[1]	*Multiple*[1]
B Loss of Supply - Substation	Other - Substation Equipment Failure	Equipment Issue
B Loss of Supply - Substation	Protection System	Equipment Issue
B Loss of Supply - Substation	Terminal Equipment	Equipment Issue
C Distribution - Equipment	Anchor / Guying	Equipment Issue
C Distribution - Equipment	Arrestor	Equipment Issue
C Distribution - Equipment	Capacitor	Equipment Issue
C Distribution - Equipment	Cross Arm	Equipment Issue
C Distribution - Equipment	Elbow	Equipment Issue
C Distribution - Equipment	Fuse / Cutout	Equipment Issue
C Distribution - Equipment	Insulator	Equipment Issue
C Distribution - Equipment	Lateral	Equipment Issue
C Distribution - Equipment	Meter	Equipment Issue
C Distribution - Equipment	Network Protector	Equipment Issue
C Distribution - Equipment	OH Connector / Clamp / Jumper	Equipment Issue
C Distribution - Equipment	Other - Pole Hardware Failure	Equipment Issue
C Distribution - Equipment	Other - Underground Hardware Failure	Equipment Issue
C Distribution - Equipment	Overhead Transformer	Equipment Issue
C Distribution - Equipment	Overloaded Service	Equipment Overload
C Distribution - Equipment	Padmount Transformer	Equipment Issue
C Distribution - Equipment	Pole / Structure	Equipment Issue
C Distribution - Equipment	Primary Cable	Equipment Issue
C Distribution - Equipment	Primary Conductor	Equipment Issue
C Distribution - Equipment	Primary Splice	Equipment Issue
C Distribution - Equipment	Recloser / Sectionalizer	Equipment Issue
C Distribution - Equipment	Regulator	Equipment Issue

OAR Cause	OMS Cause Code	PGE Outage Map/Text Cause Code
C Distribution - Equipment	Secondary Cable	Equipment Issue
C Distribution - Equipment	Secondary Conductor	Equipment Issue
C Distribution - Equipment	Secondary Dead-end	Equipment Issue
C Distribution - Equipment	Secondary Splice	Equipment Issue
C Distribution - Equipment	Sleeve	Equipment Issue
C Distribution - Equipment	Stress Cone	Equipment Issue
C Distribution - Equipment	Submersible Transformer	Equipment Issue
C Distribution - Equipment	Switch	Equipment Issue
C Distribution - Equipment	UG Connector / Clamp / Jumper	Equipment Issue
D Distribution - Lightning	Lightning	Lightning
E Distribution - Planned	Planned Outage	Maintenance / System Upgrade
E Distribution - Planned	Public Safety Power Shutoff	Public Safety Power Shutoff
E Distribution - Planned	Rotating Outage	Rotating Outage
F Distribution - Public	Cable	Construction accident
F Distribution - Public	Car Hit Equipment	Traffic Accident
F Distribution - Public	Electrical Contact	Public accident
F Distribution - Public	Felled Tree / Limb	Tree on Line
F Distribution - Public	Non-Residential Fire	Fire
F Distribution - Public	Object Contact	Public accident
F Distribution - Public	Other - Public	Public accident
F Distribution - Public	Residential Fire	House Fire
F Distribution - Public	Underground Dig In	Construction accident
F Distribution - Public	Vandalism / Theft	Vandalism
G Distribution - Vegetation	Limb on Line	Tree on Line
G Distribution - Vegetation	Tree / Limb Burning	Tree on Line
G Distribution - Vegetation	Tree Uprooted	Tree on Line
H Distribution - Weather	Earthquake	Earthquake
H Distribution - Weather	Flooding	Flooding
H Distribution - Weather	Forest Fire	Forest Fire
H Distribution - Weather	High Winds	High winds
H Distribution - Weather	Severe Heat	Hot Weather
H Distribution - Weather	Snow / Ice	Heavy Snow/Ice
I Distribution - Wildlife	Other - Animal	Animal Contact
I Distribution - Wildlife	Reportable Bird	Animal Contact
I Distribution - Wildlife	Squirrel	Animal Contact
J Distribution - Unknown	Other - Environment / Weather	Weather
J Distribution - Unknown	Pole Fire	Equipment Issue

OAR Cause	OMS Cause Code	PGE Outage Map/Text Cause Code
J Distribution - Unknown	Substation Fire	Equipment Issue
K Distribution - Other	Design Error	Equipment Issue
K Distribution - Other	Installation Error - Improper Install	Equipment Issue
K Distribution - Other	Installation Error - Wrong Equipment	Equipment Issue
K Distribution - Other	Operational Error	Equipment Issue
K Distribution - Other	Other - PGE Intentional Outage	System Upgrades
K Distribution - Other	Unplanned - Safety	Safety Shutdown
K Distribution - Other	Utility Made Contact	Equipment Issue

[1] Any outage event in which the system field is captured as 'Transmission' will be assigned to the Loss of Supply - Transmission cause category. The appropriate cause code will also be assigned.

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