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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, 2024

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

RE: RE 113 PGE 2023 Annual Reliability Report

Pursuant to OAR 860-023-0151, PGE hereby submits the Company's 2023 Annual Reliability Report (ARR).

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. 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

2023 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) is powering our growing community with increasingly clean, safe, reliable, and affordable energy. The Annual Reliability Report provides distribution system performance information based on service interruptions to PGE customers in accordance with Oregon Administrative Rule (OAR) 860-023-0151. The report provides the reader with an overview of PGE's electric distribution system 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, map, and additional related information.

[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 as required by Oregon Administrative Rule 860-024-011.

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.

Interruption, Momentary - 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.

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

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

$MAIFI_E$ – Momentary Average Interruption Event Frequency Index; the average number of momentary interruption events per customer. This index does not include the events immediately preceding a sustained interruption.

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 Event - An interruption of duration limited to the period of time required to restore service. One or more momentary interruptions that occur within five minutes of the first operation are considered one momentary interruption event.

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.

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).

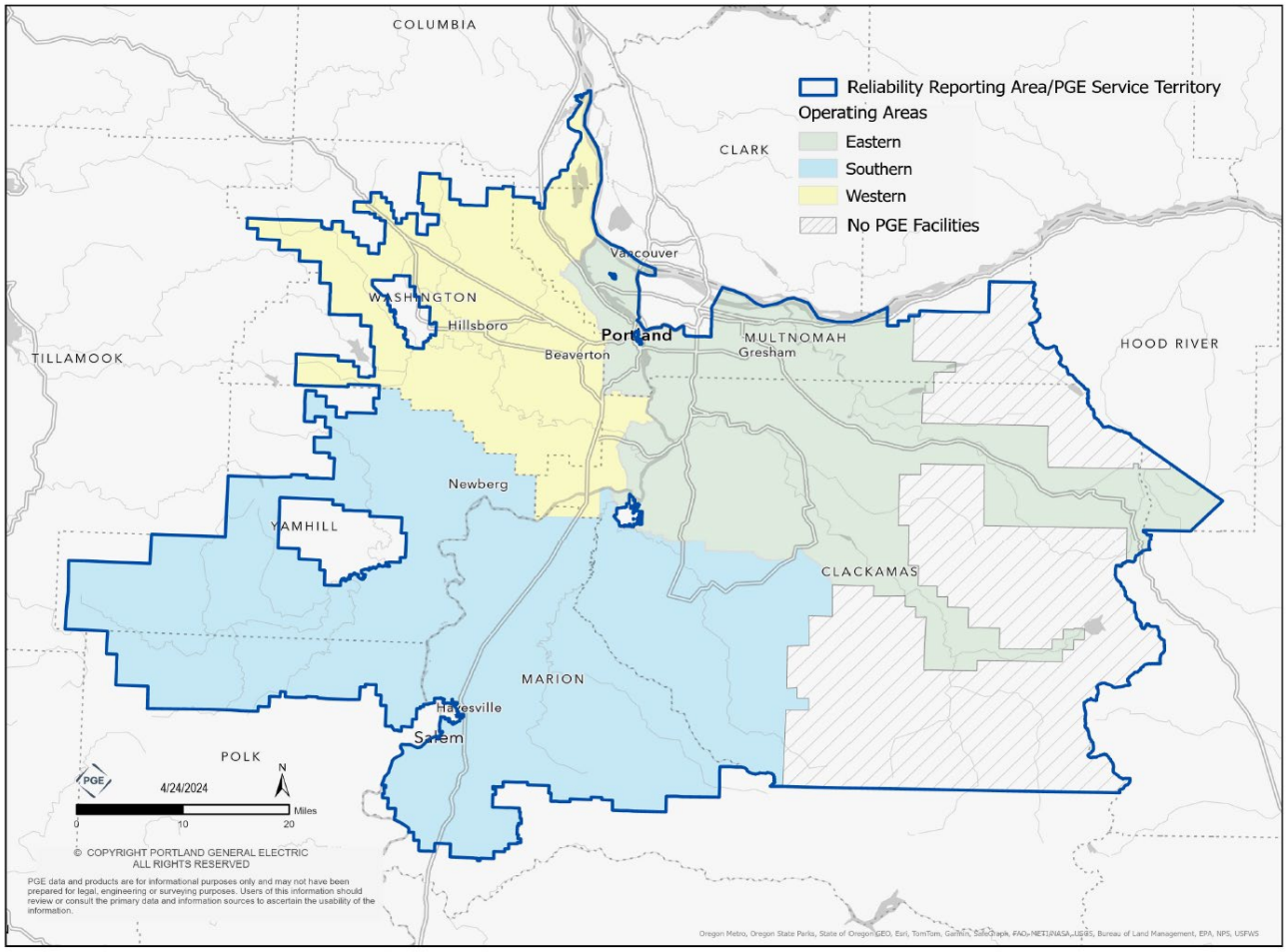
SCADA – Supervisory Control and Data Acquisition; computer-based system for gathering and analyzing real-time data to monitor and control equipment.

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

1 System Overview

PGE has a service area population of over 1.9 million Oregonians in 51 cities, representing more than 930,000 customers over 4,000 square miles. Figure 1 shows 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 interruptions, 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



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)	167
Substation transformers	432
Circuit breakers (transmission and distribution)	2,010
Poles and structures (transmission and distribution)	225,698
Circuit miles of transmission lines	1,254
Distribution circuits	700
Circuit miles of primary overhead distribution lines	8,149
Circuit miles of primary underground distribution lines	8,415
Overhead transformers	118,020
Underground transformers	73,945
Reclosers and sectionalizers	585

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				
	2019	**2020**	**2021**	**2022**	**2023**
Eastern	418,917	428,102	436,247	440,972	443,843
Southern	173,978	176,261	178,151	181,015	182,125
Western	291,795	296,393	299,403	304,014	305,569
Total Reporting Area	**884,690**	**900,756**	**913,801**	**926,001**	**931,537**

2 Reporting Methodology

2.1 Customer Interruption Data and Reliability Calculations

PGE gathers customer interruption data via field personnel, dispatchers, customer calls, web entries, 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 are 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. Interruptions 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 2023 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 SCADA operated reclosers and 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, as required, for all future Annual Reliability Reports. 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 to improve interruption data quality. Throughout 2023, the team continued to develop, grow, train, and define processes to improve data auditing and correction of planned and unplanned interruptions in the OMS. PGE also developed tools and automated reports to reduce the manual review efforts of the data. PGE will continue to iteratively incorporate new technology and modern techniques to improve the accuracy of interruption records.

Additionally, an upgrade to the OMS will take place in 2024. This initiative will allow OMS to leverage a more current version of the toolset to maintain interruption data. This will also increase the stability and resiliency of the system to assure availability through high usage times like storm response. PGE is targeting a re-architecture of the OMS and any related interruption data inputs and outputs. This work will improve clarity on real-time interruption data across PGE and post-event reporting.

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).

3.1 Distribution System Metrics

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

NOTE: The 2023 values in Table 3 and Table 4 capture the same data as no Major Event Days were experienced in 2023.

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

	Major Events Excluded														
	SAIDI					SAIFI					$MAIFI_E$				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Eastern	95	131	118	132	109	0.66	0.81	0.65	0.77	0.70	1.77	1.59	1.57	1.27	1.35
Southern	151	111	165	151	132	0.81	0.51	0.77	0.72	0.74	0.55	0.85	0.73	0.47	0.52
Western	97	67	110	108	94	0.63	0.46	0.61	0.58	0.54	0.76	0.74	0.49	0.45	0.54
Reporting Area	107	106	125	128	109	0.68	0.64	0.66	0.70	0.65	1.19	1.16	1.05	0.84	0.92

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

	Major Events Included														
	SAIDI					SAIFI					$MAIFI_E$				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Eastern	127	427	2,739	508	109	0.77	1.05	1.82	1.38	0.70	1.92	2.01	2.81	2.00	1.35
Southern	186	342	5,897	393	132	0.90	0.70	2.29	1.12	0.74	0.62	0.89	1.58	0.70	0.52
Western	120	153	833	367	94	0.71	0.68	1.19	1.01	0.54	0.79	0.92	0.86	0.84	0.54
Reporting Area	136	320	2,730	439	109	0.78	0.86	1.71	1.21	0.65	1.28	1.42	1.92	1.36	0.92

3.2 System Interruptions

Table 5 through Table 14 capture the number and duration of sustained interruptions characterized by the cause categories as defined by OAR 860-023-0151(2)(b). Interruptions can impact one to many customers.

NOTE: Table 5 and Table 6 capture the same data as no Major Event Days were experienced in 2023.

2023

Table 5: 2023 Interruption Causes – Major Events Excluded

		2023							
		Major Events Excluded							
OAR Cause	Customer Count	Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	931,537	19	0%	4,176	0%	2,524,883	2%	21,256	3%
B Loss of Supply - Substation	931,537	30	0%	3,794	0%	6,762,940	7%	53,450	9%
C Distribution - Equipment	931,537	3,319	16%	784,030	22%	23,279,793	23%	141,210	23%
D Distribution - Lightning	931,537	65	0%	22,870	1%	671,956	1%	2,467	0%
E Distribution - Planned	931,537	13,560	66%	1,951,578	55%	10,866,944	11%	75,406	12%
F Distribution - Public	931,537	653	3%	186,295	5%	14,628,884	14%	70,888	12%
G Distribution - Vegetation	931,537	1,321	6%	313,844	9%	26,353,610	26%	140,894	23%
H Distribution - Weather	931,537	394	2%	125,681	4%	8,070,363	8%	32,337	5%
I Distribution - Wildlife	931,537	625	3%	63,455	2%	1,927,131	2%	19,573	3%
J Distribution - Unknown	931,537	272	1%	55,891	2%	3,977,133	4%	25,447	4%
K Distribution - Other	931,537	299	1%	31,365	1%	2,087,908	2%	26,566	4%
Grand Total		**20,557**	**100%**	**3,542,978**	**100%**	**101,151,545**	**100%**	**609,494**	**100%**

Table 6: 2023 Interruption Causes – Major Events Included

OAR Cause	Customer Count	2023							
		Major Events Included							
		Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	931,537	19	0%	4,176	0%	2,524,883	2%	21,256	3%
B Loss of Supply - Substation	931,537	30	0%	3,794	0%	6,762,940	7%	53,450	9%
C Distribution - Equipment	931,537	3,319	16%	784,030	22%	23,279,793	23%	141,210	23%
D Distribution - Lightning	931,537	65	0%	22,870	1%	671,956	1%	2,467	0%
E Distribution - Planned	931,537	13,560	66%	1,951,578	55%	10,866,944	11%	75,406	12%
F Distribution - Public	931,537	653	3%	186,295	5%	14,628,884	14%	70,888	12%
G Distribution - Vegetation	931,537	1,321	6%	313,844	9%	26,353,610	26%	140,894	23%
H Distribution - Weather	931,537	394	2%	125,681	4%	8,070,363	8%	32,337	5%
I Distribution - Wildlife	931,537	625	3%	63,455	2%	1,927,131	2%	19,573	3%
J Distribution - Unknown	931,537	272	1%	55,891	2%	3,977,133	4%	25,447	4%
K Distribution - Other	931,537	299	1%	31,365	1%	2,087,908	2%	26,566	4%
Grand Total		**20,557**	**100%**	**3,542,978**	**100%**	**101,151,545**	**100%**	**609,494**	**100%**

2022

Table 7: 2022 Interruption Causes – Major Events Excluded

OAR Cause	Customer Count	2022 Major Events Excluded: Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	926,001	9	0%	1,489	0%	1,208,304	1%	12,476	2%
B Loss of Supply - Substation	926,001	53	0%	7,724	0%	9,905,238	8%	70,342	11%
C Distribution - Equipment	926,001	3,333	18%	846,287	22%	24,803,695	21%	126,711	20%
D Distribution - Lightning	926,001	9	0%	1,612	0%	7,708	0%	38	0%
E Distribution - Planned	926,001	10,197	56%	1,528,057	41%	10,170,588	9%	59,903	9%
F Distribution - Public	926,001	673	4%	211,189	6%	16,376,320	14%	76,375	12%
G Distribution - Vegetation	926,001	1,532	8%	430,594	11%	32,683,159	28%	181,658	28%
H Distribution - Weather	926,001	1,172	6%	534,200	14%	11,583,536	10%	42,913	7%
I Distribution - Wildlife	926,001	651	4%	68,472	2%	3,654,636	3%	36,804	6%
J Distribution - Unknown	926,001	294	2%	88,784	2%	3,956,771	3%	23,258	4%
K Distribution - Other	926,001	262	1%	45,175	1%	3,863,086	3%	17,511	3%
Grand Total		**18,185**	**100%**	**3,763,582**	**100%**	**118,213,043**	**100%**	**647,989**	**100%**

Table 8: 2022 Interruption Causes – Major Events Included

OAR Cause	Customer Count	2022 Major Events Included: Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	926,001	42	0%	39,047	0%	10,736,960	3%	32,129	3%
B Loss of Supply - Substation	926,001	61	0%	11,531	0%	14,022,103	3%	82,682	7%
C Distribution - Equipment	926,001	3,555	15%	1,007,649	10%	35,712,572	9%	157,571	14%
D Distribution - Lightning	926,001	9	0%	1,612	0%	7,708	0%	38	0%
E Distribution - Planned	926,001	11,360	47%	4,080,200	39%	83,517,858	21%	91,509	8%
F Distribution - Public	926,001	694	3%	220,743	2%	19,679,710	5%	81,129	7%
G Distribution - Vegetation	926,001	2,245	9%	990,216	10%	72,476,006	18%	291,907	26%
H Distribution - Weather	926,001	4,655	19%	3,523,530	34%	149,683,520	37%	291,075	26%
I Distribution - Wildlife	926,001	655	3%	68,845	1%	3,656,349	1%	36,829	3%
J Distribution - Unknown	926,001	388	2%	194,385	2%	7,708,690	2%	32,308	3%
K Distribution - Other	926,001	318	1%	194,255	2%	9,593,833	2%	22,815	2%
Grand Total		**23,982**	**100%**	**10,332,013**	**100%**	**406,795,310**	**100%**	**1,119,992**	**100%**

2021

Table 9: 2021 Interruption Causes – Major Events Excluded

OAR Cause	Customer Count	2021 Major Events Excluded: Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	913,801	12	0%	1,878	0%	988,602	1%	17,877	3%
B Loss of Supply - Substation	913,801	16	0%	2,121	0%	3,256,874	3%	27,267	5%
C Distribution - Equipment	913,801	3,749	27%	1,283,549	26%	26,703,327	23%	140,015	23%
D Distribution - Lightning	913,801	-	0%	-	0%	-	0%	-	0%
E Distribution - Planned	913,801	4,724	33%	811,463	17%	5,069,335	4%	29,344	5%
F Distribution - Public	913,801	655	5%	300,362	6%	19,282,569	17%	83,165	14%
G Distribution - Vegetation	913,801	2,026	14%	691,434	14%	33,542,791	29%	184,435	31%
H Distribution - Weather	913,801	1,033	7%	722,909	15%	10,207,172	9%	40,801	7%
I Distribution - Wildlife	913,801	853	6%	98,085	2%	4,137,825	4%	31,401	5%
J Distribution - Unknown	913,801	897	6%	936,846	19%	8,584,670	8%	32,374	5%
K Distribution - Other	913,801	165	1%	25,935	1%	1,998,127	2%	16,763	3%
Grand Total		**14,130**	**100%**	**4,874,582**	**100%**	**113,771,293**	**100%**	**603,442**	**100%**

Table 10: 2021 Interruption Causes – Major Events Included

OAR Cause	Customer Count	2021							
		Major Events Included							
		Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	913,801	146	0%	326,019	0%	186,796,272	7%	122,400	8%
B Loss of Supply - Substation	913,801	253	1%	505,908	0%	16,710,097	1%	48,278	3%
C Distribution - Equipment	913,801	4,090	12%	1,698,477	2%	55,455,942	2%	172,845	11%
D Distribution - Lightning	913,801	-	0%	-	0%	-	0%	-	0%
E Distribution - Planned	913,801	4,768	14%	823,264	1%	5,308,417	0%	33,593	2%
F Distribution - Public	913,801	674	2%	313,836	0%	20,169,695	1%	86,695	6%
G Distribution - Vegetation	913,801	3,033	9%	1,978,748	2%	192,497,444	8%	378,413	24%
H Distribution - Weather	913,801	7,874	22%	24,314,466	23%	1,050,851,188	42%	438,184	28%
I Distribution - Wildlife	913,801	858	2%	99,366	0%	4,146,568	0%	31,462	2%
J Distribution - Unknown	913,801	13,209	38%	76,079,771	72%	960,526,473	39%	229,052	15%
K Distribution - Other	913,801	182	1%	41,174	0%	2,103,861	0%	17,360	1%
Grand Total		**35,087**	**100%**	**106,181,028**	**100%**	**2,494,565,958**	**100%**	**1,558,282**	**100%**

2020

Table 11: 2020 Interruption Causes – Major Events Excluded

OAR Cause	Customer Count	2020 Major Events Excluded: Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	900,756	18	0%	3,285	0%	3,304,322	3%	21,338	4%
B Loss of Supply - Substation	900,756	47	0%	6,916	0%	6,485,928	7%	47,877	8%
C Distribution - Equipment	900,756	3,345	22%	769,009	24%	17,736,162	18%	102,884	18%
D Distribution - Lightning	900,756	80	1%	37,324	1%	1,227,893	1%	4,517	1%
E Distribution - Planned	900,756	7,102	47%	1,193,745	38%	6,085,204	6%	36,273	6%
F Distribution - Public	900,756	628	4%	162,825	5%	10,901,856	11%	54,431	10%
G Distribution - Vegetation	900,756	2,198	15%	616,103	19%	38,549,256	40%	212,405	37%
H Distribution - Weather	900,756	439	3%	215,775	7%	4,005,473	4%	15,603	3%
I Distribution - Wildlife	900,756	826	5%	88,037	3%	3,388,877	4%	35,556	6%
J Distribution - Unknown	900,756	204	1%	45,993	1%	3,098,120	3%	24,872	4%
K Distribution - Other	900,756	188	1%	29,904	1%	1,097,462	1%	17,146	3%
Grand Total		**15,075**	**100%**	**3,168,917**	**100%**	**95,880,554**	**100%**	**572,902**	**100%**

Table 12: 2020 Interruption Causes – Major Events Included

OAR Cause	Customer Count	2020							
		Major Events Included							
		Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	900,756	22	0%	5,611	0%	3,801,007	1%	23,225	3%
B Loss of Supply - Substation	900,756	49	0%	7,492	0%	6,653,191	2%	49,561	6%
C Distribution - Equipment	900,756	3,500	20%	1,098,936	12%	26,670,823	9%	113,956	15%
D Distribution - Lightning	900,756	81	0%	41,757	0%	1,236,759	0%	4,519	1%
E Distribution - Planned	900,756	7,287	41%	1,228,120	13%	7,095,720	2%	41,881	5%
F Distribution - Public	900,756	650	4%	202,322	2%	21,066,948	7%	59,791	8%
G Distribution - Vegetation	900,756	2,701	15%	1,833,181	20%	83,153,207	29%	262,989	34%
H Distribution - Weather	900,756	2,200	12%	4,304,068	47%	118,290,364	41%	128,469	17%
I Distribution - Wildlife	900,756	837	5%	97,389	1%	3,634,221	1%	35,873	5%
J Distribution - Unknown	900,756	265	1%	234,953	3%	9,864,307	3%	33,897	4%
K Distribution - Other	900,756	201	1%	89,843	1%	6,597,757	2%	17,962	2%
Grand Total		**17,793**	**100%**	**9,143,673**	**100%**	**288,064,306**	**100%**	**772,123**	**100%**

2019

Table 13: 2019 Interruption Causes – Major Events Excluded

OAR Cause	Customer Count	2019 Major Events Excluded: Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	884,690	10	0%	1,794	0%	1,994,722	2%	14,625	2%
B Loss of Supply - Substation	884,690	44	0%	4,663	0%	8,711,936	9%	73,786	12%
C Distribution - Equipment	884,690	3,098	18%	720,374	23%	16,269,896	17%	102,937	17%
D Distribution - Lightning	884,690	123	1%	38,823	1%	502,711	1%	1,817	0%
E Distribution - Planned	884,690	9,549	55%	1,266,329	41%	7,558,105	8%	57,638	10%
F Distribution - Public	884,690	626	4%	187,512	6%	17,054,908	18%	70,182	12%
G Distribution - Vegetation	884,690	1,928	11%	516,330	17%	33,348,813	35%	206,511	34%
H Distribution - Weather	884,690	472	3%	152,230	5%	3,081,251	3%	13,481	2%
I Distribution - Wildlife	884,690	908	5%	109,111	4%	2,746,056	3%	29,959	5%
J Distribution - Unknown	884,690	287	2%	56,279	2%	2,279,435	2%	18,906	3%
K Distribution - Other	884,690	167	1%	29,969	1%	969,841	1%	10,924	2%
Grand Total		**17,212**	**100%**	**3,083,416**	**100%**	**94,517,674**	**100%**	**600,766**	**100%**

Table 14: 2019 Interruption Causes – Major Events Included

OAR Cause	Customer Count	2019							
		Major Events Included							
		Sustained Interruption Count	% of Interruption Count	Total Interruption Duration	% of Total Interruption Duration	Customer Minutes of Interruption	% of Customer Minutes	Customers Interrupted	% of Customers Interrupted
A Loss of Supply - Transmission	884,690	10	0%	1,794	0%	1,994,722	2%	14,625	2%
B Loss of Supply - Substation	884,690	44	0%	4,663	0%	8,711,936	7%	73,786	11%
C Distribution - Equipment	884,690	3,140	18%	745,108	22%	17,099,398	14%	104,990	15%
D Distribution - Lightning	884,690	207	1%	68,125	2%	1,950,174	2%	8,069	1%
E Distribution - Planned	884,690	9,599	54%	1,270,997	37%	7,622,257	6%	58,333	9%
F Distribution - Public	884,690	630	4%	188,390	5%	17,181,166	14%	70,507	10%
G Distribution - Vegetation	884,690	2,086	12%	623,140	18%	44,583,281	37%	245,853	36%
H Distribution - Weather	884,690	745	4%	353,702	10%	13,647,587	11%	44,981	7%
I Distribution - Wildlife	884,690	911	5%	109,613	3%	3,389,860	3%	31,702	5%
J Distribution - Unknown	884,690	303	2%	63,004	2%	3,596,442	3%	22,155	3%
K Distribution - Other	884,690	168	1%	30,166	1%	970,038	1%	10,925	2%
Grand Total		**17,843**	**100%**	**3,458,702**	**100%**	**120,746,861**	**100%**	**685,926**	**100%**

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.

NOTE: The 2023 column in Table 15 through Table 18 capture the same data as no Major Event Days were experienced in 2023.

Table 15: Individual Customer Interruptions Excluding Major Event Days

Sustained Interruptions	2019	2020	2021	2022	2023
0	494,816	516,678	526,894	532,677	556,647
1	249,305	250,653	242,334	244,619	235,081
2	91,123	88,830	93,611	90,136	86,723
3	32,199	25,743	30,680	34,900	31,363
4	9,482	10,935	10,950	10,759	10,589
5	3,466	4,426	3,687	6,116	5,459
6	2,371	1,489	2,951	3,826	2,689
7	1,052	939	1,074	1,395	1,850
8	583	429	549	623	819
9	193	234	293	490	200
10	58	137	231	174	89
>10	42	263	547	286	28

Table 16: Individual Customer Interruptions Including Major Event Days

Sustained Interruptions	2019	2020	2021	2022	2023
0	468,551	436,964	264,766	379,296	556,647
1	246,055	267,551	229,686	279,883	235,081
2	110,248	117,877	172,642	147,109	86,723
3	35,780	42,801	105,996	51,850	31,363
4	11,515	20,714	64,675	25,923	10,589
5	6,177	8,267	38,050	14,713	5,459
6	3,075	2,792	16,916	9,500	2,689
7	1,721	1,583	8,980	6,030	1,850
8	863	953	5,015	4,165	819
9	472	549	2,785	2,653	200
10	177	231	1,663	1,473	89
>10	56	474	2,627	3,406	28

Table 17: Individual Customer Interruption Hours Excluding Major Event Days

Sustained Interruption Hours	2019	2020	2021	2022	2023
0	494,816	516,678	526,894	532,677	556,647
0-2	153,312	152,182	167,672	155,450	146,183
2-4	104,279	99,161	84,539	95,179	98,855
4-6	50,305	50,926	41,795	46,857	46,818
6-8	28,627	27,143	25,508	28,144	26,235
8-10	21,460	18,918	16,427	19,822	15,710
10-12	9,504	11,297	12,369	10,864	8,483
12-14	6,126	6,782	11,826	11,848	10,164
14-16	3,994	5,033	5,832	4,877	5,121
16-18	3,072	3,705	3,387	4,126	5,119
18-20	2,919	1,781	3,563	2,261	2,512
>20	6,276	7,150	13,989	13,896	9,690

Table 18: Individual Customer Interruption Hours Including Major Event Days

Sustained Interruption Hours	2019	2020	2021	2022	2023
0	468,551	436,964	264,766	379,296	556,647
0-2	143,560	130,852	93,965	145,724	146,183
2-4	111,301	100,177	60,665	103,168	98,855
4-6	54,817	60,345	32,126	67,702	46,818
6-8	31,965	33,873	24,126	43,641	26,235
8-10	25,317	36,961	18,799	32,714	15,710
10-12	13,137	17,548	14,895	26,265	8,483
12-14	8,261	11,887	12,862	19,910	10,164
14-16	5,339	9,843	9,630	8,020	5,121
16-18	6,069	6,451	11,296	8,708	5,119
18-20	3,678	6,202	15,894	6,492	2,512
>20	12,695	49,653	354,777	84,361	9,690

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 (2021-2023)		Total Hours of Sustained Interruption Target	Customers Exceeding Target Hours of Total Interruption Duration in Each of the Last Three Years (2021-2023)	
		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	444	2,262	18	1,352	6,984

5 Major Events

5.1 Major Event Days Summary

No Major Event Days were identified in 2023. PGE determines major events following IEEE Standard 1366.

For 2023, PGE applied a T_{MED} of 7.01 minutes across the Reliability Reporting Area. Additional information on MED exclusion reports is located in Appendix C.

Table 20: PGE T_{MED} Values

Year	T_{MED}
2024	7.34
2023	7.01
2022	6.50
2021	4.80
2020	4.78
2019	5.31

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.[2] 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 did not execute a PSPS event in 2023.

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

6 Worst Performing Circuits

This section identifies the top 10 circuits as worst performing from an interruption frequency and/or duration perspective. This information is presented for 2022 and 2023 and is also categorized by exclusion or inclusion of Major Events.

PGE completed over 700 compliance, safety, and/or reliability focused work orders in 2023 on the identified worst performing circuits. Analysis of poor performance and actions taken for improvement are captured in the following tables.

NOTE: When identifying worst performing circuits, PGE targets those circuits that have the most opportunity for reliability improvement. Also, 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 interruptions to customers that should be evaluated for mitigation.

NOTE: The 2023 columns in Table 21 through Table 24 capture the same data as no Major Event Days were experienced in 2023.

Table 21: 2023 Worst SAIDI - Major Events Excluded

	2023 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
OAK GROVE-LAKE HARRIET	481	305	348	1,383	1,907	1.10	0.38	0.80	1.03	2.10	8.00	1.00	6.00	3.00	4.00	Interruption drivers: Transmission outage (vegetation) and equipment. Improvement efforts: Completed 2 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
WILLAMINA-BUELL	470	61	162	379	1,647	0.87	0.37	0.36	1.71	6.13	-	1.00	-	-	-	Interruption drivers: Transmission outage (public), vegetation, and equipment. Improvement efforts: Completed 7 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed recloser in 2023.
BRIGHTWOOD-NORTH BANK	176	374	197	705	1,115	0.52	2.64	0.91	4.48	7.40	5.00	6.00	4.00	6.00	12.00	Interruption drivers: Vegetation and weather. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Installed new switch in 2023. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
CANYON-23RD	24	120	576	102	1,010	0.09	1.29	1.29	0.47	1.39	-	1.00	1.00	1.00	-	Interruption drivers: Vegetation, weather, and equipment. Improvement efforts: Completed 20 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on sections of this circuit in 2023.

	2023 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
GALES CREEK-GALES CREEK13	573	1,003	1,782	942	956	1.56	3.34	6.60	4.51	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage (vegetation), vegetation, and weather. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.
EAGLE CREEK-RIVER MILL	52	1,108	567	1,840	840	0.56	5.74	2.08	5.99	5.89	6.00	17.00	-	3.00	1.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
HARMONY-MILWAUKIE	48	3	88	381	806	0.15	0.01	1.17	1.07	3.24	8.00	2.00	1.00	-	1.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 14 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed new switch in 2023.
AMITY-BELLEVUE	487	257	172	332	746	1.52	1.16	0.52	0.88	2.32	-	-	-	1.00	2.00	Interruption drivers: Vegetation, equipment, and public. Improvement efforts: Completed 43 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed new recloser and replaced recloser in 2023.

	2023 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
GARDEN HOME-METZGER	472	54	27	20	738	3.19	0.18	0.15	0.08	2.41	3.00	1.00	1.00	-	1.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 39 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed reclosers/circuit ties as part of distribution automation scheme in 2023.
HARBORTON-BURLINGTON	381	475	299	404	657	2.02	2.42	0.77	1.57	3.42	1.00	2.00	1.00	-	4.00	Interruption drivers: Public, vegetation, and weather. Improvement efforts: Completed 48 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed spacers on portion of circuit in 2023.

Table 22: 2023 Worst SAIDI - Major Events Included

	2023 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
OAK GROVE-LAKE HARRIET	481	305	348	1,383	1,907	1.10	0.38	0.80	1.03	2.10	8.00	3.00	12.00	3.00	4.00	Interruption drivers: Transmission outage (vegetation) and equipment. Improvement efforts: Completed 2 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.

	2023 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
WILLAMINA-BUELL	470	292	16,547	381	1,647	0.87	1.37	3.02	1.72	6.13	-	1.00	-	-	-	Interruption drivers: Transmission outage (public), vegetation, and equipment. Improvement efforts: Completed 7 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed recloser in 2023.
BRIGHTWOOD-NORTH BANK	176	7,419	5,142	4,985	1,115	0.52	3.46	3.83	9.43	7.40	5.00	7.00	6.00	19.00	12.00	Interruption drivers: Vegetation and weather. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Installed new switch in 2023. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
CANYON-23RD	65	222	1,404	845	1,010	0.10	1.33	4.34	1.93	1.39	-	1.00	1.00	2.00	-	Interruption drivers: Vegetation, weather, and equipment. Improvement efforts: Completed 20 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on sections of this circuit in 2023.
GALES CREEK-GALES CREEK13	580	1,675	2,736	2,783	956	1.57	4.56	7.38	5.94	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage (vegetation), vegetation, and weather. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.

	2023 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
EAGLE CREEK-RIVER MILL	63	3,434	8,139	3,360	840	0.57	7.52	5.70	9.34	5.89	6.00	17.00	-	5.00	1.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
HARMONY-MILWAUKIE	48	54	12,527	1,226	806	0.15	0.02	3.92	2.35	3.24	8.00	4.00	2.00	-	1.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 14 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed new switch in 2023.
AMITY-BELLEVUE	487	257	8,954	875	746	1.52	1.16	2.55	2.82	2.32	-	-	2.00	1.00	2.00	Interruption drivers: Vegetation, equipment, and public. Improvement efforts: Completed 43 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed new recloser and replaced recloser in 2023.

	2023 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
GARDEN HOME-METZGER	839	113	146	157	738	4.66	0.22	0.26	0.18	2.41	3.00	1.00	1.00	1.00	1.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 39 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed reclosers/circuit ties as part of distribution automation scheme in 2023.
HARBORTON-BURLINGTON	415	1,464	3,411	1,157	657	2.08	3.51	4.09	2.26	3.42	1.00	3.00	3.00	-	4.00	Interruption drivers: Public, vegetation, and weather. Improvement efforts: Completed 48 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed spacers on portion of circuit in 2023.

Table 23: 2023 Worst SAIFI - Major Events Excluded

	2023 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
BRIGHTWOOD-NORTH BANK	176	374	197	705	1,115	0.52	2.64	0.91	4.48	7.40	5.00	6.00	4.00	6.00	12.00	Interruption drivers: Vegetation, transmission outage (vegetation), and equipment. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Installed new switch in 2023. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.

	2023 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
WILLAMINA-BUELL	470	61	162	379	1,647	0.87	0.37	0.36	1.71	6.13	-	1.00	-	-	-	Interruption drivers: Transmission outage (public), vegetation, and equipment. Improvement efforts: Completed 7 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed recloser in 2023.
EAGLE CREEK-RIVER MILL	52	1,108	567	1,840	840	0.56	5.74	2.08	5.99	5.89	6.00	17.00	-	3.00	1.00	Interruption drivers: Vegetation, public, and equipment. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
SPRINGBROOK-ST PAUL	415	226	84	333	631	2.39	0.92	0.25	1.19	5.84	1.00	3.00	1.00	4.00	3.00	Interruption drivers: Vegetation, substation outage, and equipment. Improvement efforts: Completed 32 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK13	573	1,003	1,782	942	956	1.56	3.34	6.60	4.51	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage (vegetation), vegetation, and weather. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.

	2023 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
HILLSBORO-LAUREL	100	63	316	173	420	0.36	0.18	2.35	1.17	3.51	2.00	-	-	2.00	2.00	Interruption drivers: Substation outage, public, and equipment. Improvement efforts: Completed 17 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
HARBORTON-BURLINGTON	381	475	299	404	657	2.02	2.42	0.77	1.57	3.42	1.00	2.00	1.00	-	4.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 48 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed spacers on portion of circuit in 2023.
COLTON-GRAYS HILL	588	103	59	1,822	338	2.07	1.32	0.28	1.38	3.37	2.00	-	1.00	-	2.00	Interruption drivers: Weather, vegetation, and equipment. Improvement efforts: Completed 59 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced primary underground circuit and installed recloser in 2020. Installed recloser in 2019. Monitoring and evaluating potential action items.
REDLAND-REDLAND13	134	252	887	95	264	0.87	1.41	4.94	0.64	3.26	-	-	2.00	-	-	Interruption drivers: Vegetation, transmission outage (public), and public. Improvement efforts: Completed 29 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting circuit reconfiguration in future years. Replaced primary underground circuit and installed recloser in 2021. Replaced primary underground circuit in 2020.
HARMONY-MILWAUKIE	48	3	88	381	806	0.15	0.01	1.17	1.07	3.24	8.00	2.00	1.00	-	1.00	Interruption drivers: Vegetation, public, and equipment. Improvement efforts: Completed 14 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed new switch in 2023.

Table 24: 2023 Worst SAIFI - Major Events Included

	2023 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					Analysis & Steps Taken
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	
BRIGHTWOOD-NORTH BANK	176	7,419	5,142	4,985	1,115	0.52	3.46	3.83	9.43	7.40	5.00	7.00	6.00	19.00	12.00	Interruption drivers: Vegetation, transmission outage (vegetation), and equipment. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Installed new switch in 2023. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
WILLAMINA-BUELL	470	292	16,547	381	1,647	0.87	1.37	3.02	1.72	6.13	-	1.00	-	-	-	Interruption drivers: Transmission outage (public), vegetation, and equipment. Improvement efforts: Completed 7 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed recloser in 2023.
EAGLE CREEK-RIVER MILL	63	3,434	8,139	3,360	840	0.57	7.52	5.70	9.34	5.89	6.00	17.00	-	5.00	1.00	Interruption drivers: Vegetation, public, and equipment. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
SPRINGBROOK-ST PAUL	415	1,679	4,931	461	631	2.39	2.10	0.96	1.24	5.84	1.00	3.00	1.00	4.00	3.00	Interruption drivers: Vegetation, substation outage, and equipment. Improvement efforts: Completed 32 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.

	2023 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
GALES CREEK-GALES CREEK13	580	1,675	2,736	2,783	956	1.57	4.56	7.38	5.94	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage (vegetation), vegetation, and weather. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.
HILLSBORO-LAUREL	121	405	1,312	1,522	420	0.38	1.47	3.00	2.58	3.51	2.00	-	-	2.00	2.00	Interruption drivers: substation outage, public, and equipment. Improvement efforts: Completed 17 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
HARBORTON-BURLINGTON	415	1,464	3,411	1,157	657	2.08	3.51	4.09	2.26	3.42	1.00	3.00	3.00	-	4.00	Interruption drivers: Public, vegetation, and equipment. Improvement efforts: Completed 48 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed spacers on portion of circuit in 2023.
COLTON-GRAYS HILL	899	4,283	8,238	2,658	338	2.49	2.86	4.50	2.03	3.37	2.00	-	4.00	1.00	2.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 59 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced primary underground circuit and installed recloser in 2020. Installed recloser in 2019. Monitoring and evaluating potential action items.
REDLAND-REDLAND13	340	3,825	14,165	1,521	264	1.38	2.92	6.95	3.62	3.26	-	-	3.00	-	-	Interruption drivers: Vegetation, transmission outage (public), and public. Improvement efforts: Completed 29 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting circuit reconfiguration in future years. Replaced primary underground circuit and installed recloser in 2021. Replaced primary underground circuit in 2020.

	2023 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
HARMONY-MILWAUKIE	48	54	12,527	1,226	806	0.15	0.02	3.92	2.35	3.24	8.00	4.00	2.00	-	1.00	Interruption drivers: Vegetation, public, and equipment. Improvement efforts: Completed 14 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed new switch in 2023.

Table 25: 2022 Worst SAIDI - Major Events Excluded

	2022 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
EAGLE CREEK-RIVER MILL	52	1,108	567	1,840	840	0.56	5.74	2.08	5.99	5.89	6.00	17.00	-	3.00	1.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
COLTON-GRAYS HILL	588	103	59	1,822	338	2.07	1.32	0.28	1.38	3.37	2.00	-	1.00	-	2.00	Interruption drivers: Vegetation, weather, and public. Improvement efforts: Completed 59 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced primary underground circuit and installed recloser in 2020. Installed recloser in 2019. Monitoring and evaluating potential action items.
ORIENT-OXBOW	381	696	997	1,671	385	1.44	2.60	4.01	5.94	1.59	6.00	4.00	1.00	3.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Monitoring and evaluating potential action items.

	2022 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
OAK GROVE-LAKE HARRIET	481	305	348	1,383	1,907	1.10	0.38	0.80	1.03	2.10	8.00	1.00	6.00	3.00	4.00	Interruption drivers: Vegetation, equipment, and transmission outage. Improvement efforts: Completed 2 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
SANDY-SANDY13	317	291	150	1,200	230	3.36	1.15	0.90	3.47	2.28	1.00	5.00	-	4.00	-	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 98 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024.
SCOGGINS-CHERRY GROVE	726	207	1,039	1,094	612	1.95	2.38	2.80	6.25	1.67	1.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 51 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed new reclosers in 2023.
ROCK CREEK-NEWBERRY	-	412	756	994	350	-	2.33	3.01	1.39	2.97	-	1.00	1.00	-	-	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 24 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK13	573	1,003	1,782	942	956	1.56	3.34	6.60	4.51	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.

	2022 Worst SAIDI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
PENINSULA PARK-OCKLEY GREEN	304	1	0	878	6	1.07	0.00	0.01	2.39	0.06	3.00	-	2.00	1.00	3.00	Interruption drivers: substation outage, vegetation, and equipment. Improvement efforts: Completed 34 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit and installed reclosers/circuit ties as part of distribution automation scheme in 2023.
ST LOUIS-NORTH	488	310	843	805	274	1.83	2.68	0.30	3.13	1.92	7.00	6.00	1.00	1.00	-	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 51 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Replaced conductor on portion of circuit in 2023.

Table 26: 2022 Worst SAIDI - Major Events Included

	2022 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
BRIGHTWOOD-NORTH BANK	176	7,419	5,142	4,985	1,115	0.52	3.46	3.83	9.43	7.40	5.00	7.00	6.00	19.00	12.00	Interruption drivers: weather, transmission outage, and equipment. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Installed new switch in 2023. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.

	2022 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
WELCHES-ZIG ZAG	457	2,717	6,725	3,758	562	1.38	3.14	5.71	6.11	3.02	4.00	2.00	3.00	7.00	-	Interruption drivers: weather, vegetation, substation outage. Improvement efforts: Completed 66 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced conductor on portion of circuit and replaced open-wire secondary in 2023. Early Fault Detector sensors installed in 2021. Recloser replaced in 2020. Primary underground circuit and pole replaced in 2019.
ROCK CREEK-NEWBERRY	-	1,129	1,636	3,478	350	-	3.07	5.51	2.46	2.97	-	1.00	3.00	-	-	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 24 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
DURHAM-BONITA	0	86	11	3,363	2	0.00	0.20	0.01	4.21	0.01	1.00	1.00	1.00	-	1.00	Interruption drivers: weather, public, and equipment. Improvement efforts: Monitoring and evaluating potential action items.
EAGLE CREEK-RIVER MILL	63	3,434	8,139	3,360	840	0.57	7.52	5.70	9.34	5.89	6.00	17.00	-	5.00	1.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
ORIENT-OXBOW	1,071	1,540	3,571	3,189	385	2.77	3.01	4.76	8.89	1.59	8.00	6.00	2.00	5.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Monitoring and evaluating potential action items.

	2022 Worst SAIDI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
SCOGGINS-CHERRY GROVE	726	712	1,044	3,073	612	1.95	2.57	2.80	7.71	1.67	1.00	1.00	2.00	4.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 51 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed new reclosers in 2023.
RIVERGATE SOUTH-11011	4	542	4	2,907	3	0.04	2.04	0.04	7.50	0.03	1.00	1.00	-	1.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 3 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK13	580	1,675	2,736	2,783	956	1.57	4.56	7.38	5.94	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.
CANBY-13644	375	592	15,121	2,723	468	1.95	0.99	2.66	2.79	1.00	3.00	1.00	-	4.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Monitoring and evaluating potential action items.

Table 27: 2022 Worst SAIFI - Major Events Excluded

	2022 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
SCOGGINS-CHERRY GROVE	726	207	1,039	1,094	612	1.95	2.38	2.80	6.25	1.67	1.00	1.00	1.00	1.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 51 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed new reclosers in 2023.

	2022 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
EAGLE CREEK-RIVER MILL	52	1,108	567	1,840	840	0.56	5.74	2.08	5.99	5.89	6.00	17.00	-	3.00	1.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
CURTIS-11077	36	5	1	537	1	0.40	0.02	0.00	5.96	0.01	-	-	-	-	2.00	Interruption drivers: Public, weather, and equipment. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
ORIENT-OXBOW	381	696	997	1,671	385	1.44	2.60	4.01	5.94	1.59	6.00	4.00	1.00	3.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Monitoring and evaluating potential action items.
MARKET-ENGLEWOOD	185	98	16	570	73	1.24	1.23	0.16	5.11	0.43	-	2.00	-	1.00	-	Interruption drivers: equipment, public, and wildlife. Improvement efforts: Completed 3 safety, compliance, and/or reliability focused work orders on this circuit in 2023. The circuits underground getaway cable from the substation was replaced in 2023.
GALES CREEK-GALES CREEK13	573	1,003	1,782	942	956	1.56	3.34	6.60	4.51	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.

	2022 Worst SAIFI Major Events Excluded															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
BRIGHTWOOD-NORTH BANK	176	374	197	705	1,115	0.52	2.64	0.91	4.48	7.40	5.00	6.00	4.00	6.00	12.00	Interruption drivers: weather, transmission outage, and equipment. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Installed new switch in 2023. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
MT PLEASANT-MT VIEW	2	23	96	276	13	0.01	0.07	1.23	4.48	0.04	2.00	3.00	1.00	2.00	-	Interruption drivers: equipment, transmission outage, and substation outage. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
ABERNETHY-OREGON CITY	84	23	103	187	46	1.32	1.12	0.35	4.40	0.18	5.00	-	2.00	3.00	-	Interruption drivers: equipment, vegetation, and wildlife. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023.
SANDY-WILDCAT	112	418	259	487	284	0.60	2.13	1.81	4.27	1.35	-	2.00	-	2.00	-	Interruption drivers: Vegetation, substation outage, and equipment. Improvement efforts: Completed 27 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed new recloser in 2023.

Table 28: 2022 Worst SAIFI - Major Events Included

	2022 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
BRIGHTWOOD-NORTH BANK	176	7,419	5,142	4,985	1,115	0.52	3.46	3.83	9.43	7.40	5.00	7.00	6.00	19.00	12.00	Interruption drivers: weather, transmission outage, and vegetation. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Installed new switch in 2023. Primary circuit replacement and Early Fault Detection devices installed in 2021. Underground primary circuit replacement in 2020.
EAGLE CREEK-RIVER MILL	63	3,434	8,139	3,360	840	0.57	7.52	5.70	9.34	5.89	6.00	17.00	-	5.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 8 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Primary overhead to underground conversion on this circuit in 2023. System reconfiguration project in 2024. Tree wire installed on primary overhead circuit in 2022. Replaced primary underground circuit in 2021. Installed recloser in 2020.
ORIENT-OXBOW	1,071	1,540	3,571	3,189	385	2.77	3.01	4.76	8.89	1.59	8.00	6.00	2.00	5.00	1.00	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Monitoring and evaluating potential action items.
SCOGGINS-CHERRY GROVE	726	712	1,044	3,073	612	1.95	2.57	2.80	7.71	1.67	1.00	1.00	2.00	4.00	1.00	Interruption drivers: substation outage, vegetation, and weather. Improvement efforts: Completed 51 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed new reclosers in 2023.

	2022 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
RIVERGATE SOUTH-11011	4	542	4	2,907	3	0.04	2.04	0.04	7.50	0.03	1.00	1.00	-	1.00	1.00	Interruption drivers: weather, substation outage, and equipment. Improvement efforts: Completed 3 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
SANDY-SANDY13	351	2,358	1,011	2,431	230	3.46	2.26	1.82	6.95	2.28	1.00	5.00	4.00	4.00	-	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 98 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024.
WELCHES-ZIG ZAG	457	2,717	6,725	3,758	562	1.38	3.14	5.71	6.11	3.02	4.00	2.00	3.00	7.00	-	Interruption drivers: weather, vegetation, and substation outage. Improvement efforts: Completed 66 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced conductor on portion of circuit and replaced open-wire secondary in 2023. Early Fault Detector sensors installed in 2021. Recloser replaced in 2020. Primary underground circuit and pole replaced in 2019.
CURTIS-11077	36	5	236	619	1	0.40	0.02	0.03	6.04	0.01	-	-	-	-	2.00	Interruption drivers: Public, weather, and equipment. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Monitoring and evaluating potential action items.
GALES CREEK-GALES CREEK13	580	1,675	2,736	2,783	956	1.57	4.56	7.38	5.94	3.80	-	-	3.00	2.00	2.00	Interruption drivers: Transmission outage, vegetation, public, and substation outage. Improvement efforts: Completed 6 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Targeting FLISR deployment in 2024. Replaced primary circuit and transformer in 2021.

	2022 Worst SAIFI Major Events Included															
	SAIDI					SAIFI					$MAIFI_E$					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	Analysis & Steps Taken
MERIDIAN-MERIDIAN13	461	346	4,742	981	39	1.74	1.57	5.19	5.80	0.13	1.00	2.00	1.00	-	-	Interruption drivers: weather, vegetation, and equipment. Improvement efforts: Completed 13 safety, compliance, and/or reliability focused work orders on this circuit in 2023. Installed reclosers/circuit ties as part of distribution automation scheme in 2023.

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.[3] 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 12% of its circuits and activated the first 17 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.

- **Wildfire Mitigation Projects:** PGE has identified approximately 145 miles of system hardening improvements including overhead to underground conversion and conductor replacement projects. These investments are all in PGE's High Fire Risk Zones (HFRZ) in which the key driver is wildfire mitigation to protect public safety and the environment. These investments are described in PGE's published 2024 Wildfire Mitigation Plan. PGE believes these investments will bring multiple benefits beyond wildfire risk mitigation including storm resiliency and reliability improvements.

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

[3] 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 the identified projects are displaced by other projects of higher priority.

In 2023, PGE installed new or replaced over 8,400 distribution poles via the Distribution Overhead Facility Inspection and Treatment to the National Electrical Safety Code (FITNES) program.

PGE's 2024 goal is to complete approximately 6,800 work orders targeting pole replacements, clearance pole installations, and crossarm replacements.

7.2 Major Transmission Projects

- **Orenco Substation Project:** This project was completed in 2023. The substation was reconfigured, and the substation's transformers, breakers, and switchgear were replaced. Transmission circuit reconductoring was also 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 maintain and/or support improved customer reliability, given anticipated load growth in the area.

- **South Milliken Project:** This multi-year 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.

- **Monitor Substation Project:** This future project will rebuild Monitor substation with 230 kV, 115 kV, and 57 kV ring buses and will accommodate future 57 kV to 115 kV conversion. A new 230/115 kV bulk power transformer will be installed, along with a new 115/57 kV transformer. A 115 kV capacitor bank will be installed for voltage support.

  This project is part of a multi-phase effort known as the Willamette Valley Resiliency Project, which involves substation, transmission, and distribution system reconfiguration and asset replacements. The scope of the project includes multiple transmission lines and substations across northwestern Marion County. The design and construction of the Willamette Valley Resiliency Project will occur over the next five years and will maintain and/or support improved customer reliability, resiliency, and load growth in the area.

8 Distribution Circuit Information

Table 29, Table 30, and Table 31 provide details and reliability performance information by operating areas regarding PGE's 700 distribution circuits.

NOTE: The Major Event Excluded and Major Events Included columns in Table 29 through Table 31 capture the same data as no Major Event Days were experienced in 2023.

Eastern Operating Area

Table 29: Reliability Performance for PGE's Eastern Operating Area

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	$MAIFI_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	$MAIFI_E$
ABERNETHY	6105013	ABERNETHY-CLACKAMAS HEIGHTS	7.2/12.5 kV Grounded Y	[redacted]	74	6,913	12.92	0.138	-	74	6,913	12.92	0.138	-
ABERNETHY	6105023	ABERNETHY-OREGON CITY	7.2/12.5 kV Grounded Y	[redacted]	423	106,044	47.81	0.191	-	423	106,044	47.81	0.191	-
ABERNETHY	6105033	ABERNETHY-TRANSIT	7.2/12.5 kV Grounded Y	[redacted]	384	50,919	35.19	0.265	-	384	50,919	35.19	0.265	-
ABERNETHY	6105043	ABERNETHY-WASHINGTON	7.2/12.5 kV Grounded Y	[redacted]	173	20,658	11.98	0.100	1	173	20,658	11.98	0.100	1
ALDER	1118013	ALDER-ANKENY	7.2/12.5 kV Grounded Y	[redacted]	845	191,222	55.08	0.243	-	845	191,222	55.08	0.243	-
ALDER	1118053	ALDER-IRVING	7.2/12.5 kV Grounded Y	[redacted]	6,786	806,440	198.19	1.668	1	6,786	806,440	198.19	1.668	1
ALDER	1118043	ALDER-LINCOLN	7.2/12.5 kV Grounded Y	[redacted]	431	67,807	44.12	0.280	4	431	67,807	44.12	0.280	4
ALDER	1118033	ALDER-STARK	7.2/12.5 kV Grounded Y	[redacted]	644	90,278	34.30	0.245	3	644	90,278	34.30	0.245	3
ALDER	1118063	ALDER-TAYLOR	7.2/12.5 kV Grounded Y	[redacted]	130	12,520	2.38	0.025	5	130	12,520	2.38	0.025	5
ALDER	1118073	ALDER-YAMHILL	7.2/12.5 kV Grounded Y	[redacted]	713	126,629	131.77	0.742	-	713	126,629	131.77	0.742	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
ARLETA	1125013	ARLETA-52ND	7.2/12.5 kV Grounded Y	[redacted]	358	37,424	11.49	0.110	1	358	37,424	11.49	0.110	1
ARLETA	1125033	ARLETA-FOSTER	7.2/12.5 kV Grounded Y	[redacted]	249	21,425	10.19	0.118	3	249	21,425	10.19	0.118	3
ARLETA	1125023	ARLETA-HAROLD	7.2/12.5 kV Grounded Y	[redacted]	757	142,291	40.98	0.218	1	757	142,291	40.98	0.218	1
ARLETA	1125043	ARLETA-POWELL	7.2/12.5 kV Grounded Y	[redacted]	3,605	630,277	186.25	1.065	4	3,605	630,277	186.25	1.065	4
ARLETA	1125053	ARLETA-STEELE	7.2/12.5 kV Grounded Y	[redacted]	1,674	235,731	64.46	0.458	4	1,674	235,731	64.46	0.458	4
BELL	1155073	BELL-BATTIN	7.2/12.5 kV Grounded Y	[redacted]	383	35,294	27.77	0.301	2	383	35,294	27.77	0.301	2
BELL	1155083	BELL-BRENTWOOD	7.2/12.5 kV Grounded Y	[redacted]	64	11,696	30.78	0.168	-	64	11,696	30.78	0.168	-
BELL	1155023	BELL-FLAVEL	7.2/12.5 kV Grounded Y	[redacted]	647	100,741	37.41	0.240	1	647	100,741	37.41	0.240	1
BELL	1155013	BELL-JOHNSON CREEK	7.2/12.5 kV Grounded Y	[redacted]	11	2,448	174.88	0.786	-	11	2,448	174.88	0.786	-
BELL	1155053	BELL-KENDALL	7.2/12.5 kV Grounded Y	[redacted]	209	74,439	46.76	0.131	-	209	74,439	46.76	0.131	-
BELL	1155063	BELL-KING	7.2/12.5 kV Grounded Y	[redacted]	731	132,039	59.42	0.329	-	731	132,039	59.42	0.329	-
BELL	1155043	BELL-SOUTHGATE	7.2/12.5 kV Grounded Y	[redacted]	424	35,306	14.49	0.174	2	424	35,306	14.49	0.174	2
BELL	1155033	BELL-WICHITA	7.2/12.5 kV Grounded Y	[redacted]	131	14,739	7.02	0.062	-	131	14,739	7.02	0.062	-
BLUE LAKE	5156013	BLUE LAKE-BLUE LAKE 13	7.2/12.5 kV Grounded Y	[redacted]	362	48,246	20.72	0.155	2	362	48,246	20.72	0.155	2
BLUE LAKE	5156033	BLUE LAKE-SUNDIAL	7.2/12.5 kV Grounded Y	[redacted]	9	1,653	3.21	0.017	1	9	1,653	3.21	0.017	1
BLUE LAKE	5156023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
BORING	5177033	BORING-282ND	7.2/12.5 kV Grounded Y	[redacted]	2,873	292,814	118.74	1.165	-	2,873	292,814	118.74	1.165	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
BORING	5177023	BORING-CITY	7.2/12.5 kV Grounded Y	[redacted]	608	53,759	34.64	0.392	-	608	53,759	34.64	0.392	-
BORING	5177013	BORING-TELFORD	7.2/12.5 kV Grounded Y	[redacted]	724	189,817	172.56	0.658	-	724	189,817	172.56	0.658	-
BRIGHTWOOD	5174013	BRIGHTWOOD-BRIGHTWOOD 13	7.2/12.5 kV Grounded Y	[redacted]	2,907	425,653	417.72	2.853	8	2,907	425,653	417.72	2.853	8
BRIGHTWOOD	5174023	BRIGHTWOOD-NORTH BANK	7.2/12.5 kV Grounded Y	[redacted]	6,318	951,063	1,130.87	7.512	12	6,318	951,063	1,130.87	7.512	12
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]	8	5,619	160.54	0.229	-	8	5,619	160.54	0.229	-
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]	-	-	-	-	-	-	-	-	-	-
CANYON	1196163	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
CANYON	1196043	CANYON-13120	7.2/12.5 kV Grounded Y	[redacted]	2,534	455,166	241.08	1.342	-	2,534	455,166	241.08	1.342	-
CANYON	1196453	CANYON-13121	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
CANYON	1196063	CANYON-13122 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	322	38,623	120.32	1.003	-	322	38,623	120.32	1.003	-
CANYON	1196073	CANYON-13123 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	343	41,160	117.60	0.980	-	343	41,160	117.60	0.980	-
CANYON	1196083	CANYON-13124 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	204	24,480	119.41	0.995	-	204	24,480	119.41	0.995	-
CANYON	1196093	CANYON-13125 NETWORK #2	7.2/12.5 kV Grounded Y	[redacted]	340	43,409	133.57	1.046	-	340	43,409	133.57	1.046	-
CANYON	1196173	CANYON-13133 NETWORK #3	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
CANYON	1196183	CANYON-13134 NETWORK #3	7.2/12.5 kV Grounded Y	[redacted]	11	4,345	71.23	0.180	-	11	4,345	71.23	0.180	-
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]	-	-	-	-	-	-	-	-	-	-
CANYON	1196023	CANYON-21ST	7.2/12.5 kV Grounded Y	[redacted]	1,337	265,897	90.75	0.456	-	1,337	265,897	90.75	0.456	-
CANYON	1196103	CANYON-23RD	7.2/12.5 kV Grounded Y	[redacted]	4,553	3,206,253	,020.45	1.449	-	4,553	3,206,253	,020.45	1.449	-
CANYON	1196033	CANYON-BURNSIDE	7.2/12.5 kV Grounded Y	[redacted]	8,085	762,193	215.37	2.285	-	8,085	762,193	215.37	2.285	-
CANYON	1196013	CANYON-CANYON 13	7.2/12.5 kV Grounded Y	[redacted]	392	116,586	69.98	0.235	-	392	116,586	69.98	0.235	-
CARVER	5198033	CARVER-ALMOND	7.2/12.5 kV Grounded Y	[redacted]	26	1,623	0.81	0.013	1	26	1,623	0.81	0.013	1
CARVER	5198013	CARVER-CARVER 13	7.2/12.5 kV Grounded Y	[redacted]	4,165	351,901	168.37	1.993	1	4,165	351,901	168.37	1.993	1
CARVER	5198053	CARVER-NORTH	7.2/12.5 kV Grounded Y	[redacted]	114	21,285	9.91	0.053	1	114	21,285	9.91	0.053	1
CARVER	5198023	CARVER-RIVERBEND	7.2/12.5 kV Grounded Y	[redacted]	5	1,389	15.44	0.056	1	5	1,389	15.44	0.056	1
CARVER	5198063	CARVER-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	3	186	1.19	0.019	1	3	186	1.19	0.019	1
CARVER	5198043	CARVER-WOODS	7.2/12.5 kV Grounded Y	[redacted]	1,184	146,053	43.39	0.352	3	1,184	146,053	43.39	0.352	3
CENTENNIAL	5202053	CENTENNIAL-BARKER	7.2/12.5 kV Grounded Y	[redacted]	756	117,843	40.15	0.258	-	756	117,843	40.15	0.258	-
CENTENNIAL	5202043	CENTENNIAL-BRAECROFT	7.2/12.5 kV Grounded Y	[redacted]	199	39,781	19.37	0.097	-	199	39,781	19.37	0.097	-
CENTENNIAL	5202033	CENTENNIAL-CENTENNIAL 13	7.2/12.5 kV Grounded Y	[redacted]	300	32,572	11.84	0.109	-	300	32,572	11.84	0.109	-
CENTENNIAL	5202063	CENTENNIAL-TREELAND	7.2/12.5 kV Grounded Y	[redacted]	3,685	350,870	115.08	1.209	-	3,685	350,870	115.08	1.209	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
CLACKAMAS	6205023	CLACKAMAS-EVELYN	7.2/12.5 kV Grounded Y	[redacted]	56	9,065	35.97	0.222	7	56	9,065	35.97	0.222	7
CLACKAMAS	6205013	CLACKAMAS-GLADSTONE	7.2/12.5 kV Grounded Y	[redacted]	1,611	225,751	100.83	0.720	-	1,611	225,751	100.83	0.720	-
CLACKAMAS	6205033	CLACKAMAS-JENNIFER	7.2/12.5 kV Grounded Y	[redacted]	77	21,717	32.61	0.116	-	77	21,717	32.61	0.116	-
CLACKAMAS	6205043	CLACKAMAS-TOLBERT	7.2/12.5 kV Grounded Y	[redacted]	43	4,652	3.08	0.028	1	43	4,652	3.08	0.028	1
CURTIS	1212012	CURTIS-11077	6.48/11.1 kV Grounded Y	[redacted]	9	1,507	5.98	0.036	2	9	1,507	5.98	0.036	2
CURTIS	1212013	CURTIS-CURTIS 13	7.2/12.5 kV Grounded Y	[redacted]	479	65,773	49.94	0.364	1	479	65,773	49.94	0.364	1
DELAWARE	1221013	DELAWARE-DENVER	7.2/12.5 kV Grounded Y	[redacted]	1,405	195,199	56.35	0.406	5	1,405	195,199	56.35	0.406	5
DELAWARE	1221023	DELAWARE-INTERSTATE	7.2/12.5 kV Grounded Y	[redacted]	4,480	567,194	391.17	3.090	1	4,480	567,194	391.17	3.090	1
DELAWARE	1221033	DELAWARE-LOMBARD	7.2/12.5 kV Grounded Y	[redacted]	4,274	300,195	85.77	1.221	1	4,274	300,195	85.77	1.221	1
DUNNS CORNER	5218013	DUNNS CORNER-DUNNS CORNER 13	7.2/12.5 kV Grounded Y	[redacted]	2,418	602,046	396.08	1.591	2	2,418	602,046	396.08	1.591	2
DUNNS CORNER	5218023	DUNNS CORNER-KELSO	7.2/12.5 kV Grounded Y	[redacted]	9	453	1.31	0.026	2	9	453	1.31	0.026	2
E	1225012	E-11021	6.48/11.1 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
E	1225022	E-11039	6.48/11.1 kV Grounded Y	[redacted]	1	149	149.08	1.000	-	1	149	149.08	1.000	-
E	1225032	E-11040	6.48/11.1 kV Grounded Y	[redacted]	166	29,297	140.17	0.794	2	166	29,297	140.17	0.794	2
E	1225042	E-11041	6.48/11.1 kV Grounded Y	[redacted]	18	4,383	24.90	0.102	-	18	4,383	24.90	0.102	-
E	1225052	E-11042	6.48/11.1 kV Grounded Y	[redacted]	2	300	150.00	1.000	-	2	300	150.00	1.000	-
E	1225062	E-11043	6.48/11.1 kV Grounded Y	[redacted]	1	210	3.96	0.019	-	1	210	3.96	0.019	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
E	1225112	E-11047	6.48/11.1 kV Grounded Y	[redacted]	13	2,586	17.24	0.087	1	13	2,586	17.24	0.087	1
E	1225122	E-11064	6.48/11.1 kV Grounded Y	[redacted]	3	119	6.26	0.158	1	3	119	6.26	0.158	1
E	1225013	E-13139	7.2/12.5 kV Grounded Y	[redacted]	1,765	465,679	270.90	1.027	-	1,765	465,679	270.90	1.027	-
E	1225023	E-13140	7.2/12.5 kV Grounded Y	[redacted]	3,744	887,871	303.13	1.278	-	3,744	887,871	303.13	1.278	-
E	1225033	E-13141	7.2/12.5 kV Grounded Y	[redacted]	283	13,167	5.07	0.109	-	283	13,167	5.07	0.109	-
E	1225093	E-13142	7.2/12.5 kV Grounded Y	[redacted]	3,382	802,743	251.09	1.058	-	3,382	802,743	251.09	1.058	-
E	1225083	E-13144	7.2/12.5 kV Grounded Y	[redacted]	877	178,718	64.08	0.314	2	877	178,718	64.08	0.314	2
E	1225043	E-13145	7.2/12.5 kV Grounded Y	[redacted]	1,102	285,326	261.05	1.008	-	1,102	285,326	261.05	1.008	-
E	1225053	E-13148	7.2/12.5 kV Grounded Y	[redacted]	9	2,211	1.14	0.005	-	9	2,211	1.14	0.005	-
E	1225063	E-13149	7.2/12.5 kV Grounded Y	[redacted]	1,925	473,312	246.00	1.001	-	1,925	473,312	246.00	1.001	-
E	1225073	E-13150	7.2/12.5 kV Grounded Y	[redacted]	27	2,395	1.25	0.014	-	27	2,395	1.25	0.014	-
EAGLE CREEK	5230013	EAGLE CREEK-BARTON	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
EAGLE CREEK	5230023	EAGLE CREEK-RIVER MILL	7.2/12.5 kV Grounded Y	[redacted]	6,029	860,913	868.73	6.084	1	6,029	860,913	868.73	6.084	1
EASTPORT	1231023	EASTPORT-76TH	7.2/12.5 kV Grounded Y	[redacted]	434	38,963	11.63	0.130	5	434	38,963	11.63	0.130	5
EASTPORT	1231013	EASTPORT-PLAZA	7.2/12.5 kV Grounded Y	[redacted]	392	32,308	19.05	0.231	5	392	32,308	19.05	0.231	5
ESTACADA	5237023	ESTACADA-ESTACADA 13	7.2/12.5 kV Grounded Y	[redacted]	1,307	268,670	185.67	0.903	-	1,307	268,670	185.67	0.903	-
ESTACADA	5237013	ESTACADA-FARADAY	7.2/12.5 kV Grounded Y	[redacted]	3,702	1,268,545	432.95	1.263	1	3,702	1,268,545	432.95	1.263	1

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
ESTACADA	5237033	ESTACADA-NORTH FORK	7.2/12.5 kV Grounded Y	[redacted]	3,764	775,929	458.32	2.223	-	3,764	775,929	458.32	2.223	-
FAIRVIEW	5251033	FAIRVIEW-CLEAR CREEK	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
FAIRVIEW	5251053	FAIRVIEW-FAIRVIEW 13	7.2/12.5 kV Grounded Y	[redacted]	591	48,861	27.81	0.336	1	591	48,861	27.81	0.336	1
FAIRVIEW	5251013	FAIRVIEW-KENNEL CLUB	7.2/12.5 kV Grounded Y	[redacted]	77	14,937	12.80	0.066	-	77	14,937	12.80	0.066	-
FAIRVIEW	5251043	FAIRVIEW-TROUTDALE	7.2/12.5 kV Grounded Y	[redacted]	2,089	264,532	86.31	0.682	-	2,089	264,532	86.31	0.682	-
FAIRVIEW	5251023	FAIRVIEW-WOOD VILLAGE	7.2/12.5 kV Grounded Y	[redacted]	908	35,510	39.37	1.007	-	908	35,510	39.37	1.007	-
GLENCOE	1277013	GLENCOE-GLISAN	7.2/12.5 kV Grounded Y	[redacted]	312	49,300	14.51	0.092	-	312	49,300	14.51	0.092	-
GLENCOE	1277023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	12	108	0.30	0.034	-	12	108	0.30	0.034	-
GLENCOE	1277033	GLENCOE-SUNNYSIDE	7.2/12.5 kV Grounded Y	[redacted]	2,023	118,788	39.14	0.667	1	2,023	118,788	39.14	0.667	1
GLENCULLEN	1278013	GLENCULLEN-BRIDLEMILE	7.2/12.5 kV Grounded Y	[redacted]	3,695	479,063	197.15	1.521	5	3,695	479,063	197.15	1.521	5
GLENCULLEN	1278023	GLENCULLEN-SUNSET	7.2/12.5 kV Grounded Y	[redacted]	2,839	643,250	272.79	1.204	3	2,839	643,250	272.79	1.204	3
GLENDOVEER	5280013	GLENDOVEER-13596	7.2/12.5 kV Grounded Y	[redacted]	378	34,165	38.17	0.422	-	378	34,165	38.17	0.422	-
GLENDOVEER	5280023	GLENDOVEER-13597	7.2/12.5 kV Grounded Y	[redacted]	440	42,729	28.32	0.292	-	440	42,729	28.32	0.292	-
GLENDOVEER	5280033	GLENDOVEER-13598	7.2/12.5 kV Grounded Y	[redacted]	215	59,640	23.89	0.086	-	215	59,640	23.89	0.086	-
GLENDOVEER	5280043	GLENDOVEER-13599	7.2/12.5 kV Grounded Y	[redacted]	545	46,849	21.20	0.247	-	545	46,849	21.20	0.247	-
GLENDOVEER	5280053	GLENDOVEER-CLIFFGATE	7.2/12.5 kV Grounded Y	[redacted]	276	33,485	16.15	0.133	-	276	33,485	16.15	0.133	-
GLENDOVEER	5280063	GLENDOVEER-NORTHEAST	7.2/12.5 kV Grounded Y	[redacted]	312	42,103	26.10	0.193	-	312	42,103	26.10	0.193	-

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[redacted]	5260013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
[redacted]	5260063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
[redacted]	5260093	[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]	4,887	936,770	670.08	3.496	4	4,887	936,770	670.08	3.496	4
HARBORTON	1310013	HARBORTON-HARBORTON 13	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
HARBORTON	1310033	HARBORTON-LINNTON	7.2/12.5 kV Grounded Y	[redacted]	323	48,959	122.09	0.805	1	323	48,959	122.09	0.805	1
HARMONY	1313013	HARMONY-HARMONY 13	7.2/12.5 kV Grounded Y	[redacted]	155	13,351	8.54	0.099	-	155	13,351	8.54	0.099	-
HARMONY	1313053	HARMONY-INTERNATIONAL	7.2/12.5 kV Grounded Y	[redacted]	611	239,457	235.69	0.601	-	611	239,457	235.69	0.601	-
HARMONY	6313033	HARMONY-LAKE	7.2/12.5 kV Grounded Y	[redacted]	723	85,987	127.58	1.073	2	723	85,987	127.58	1.073	2
HARMONY	1313033	HARMONY-LINWOOD	7.2/12.5 kV Grounded Y	[redacted]	200	32,656	14.29	0.087	3	200	32,656	14.29	0.087	3
HARMONY	1313023	HARMONY-MILWAUKIE	7.2/12.5 kV Grounded Y	[redacted]	6,096	1,495,615	822.67	3.353	1	6,096	1,495,615	822.67	3.353	1
HARMONY	1313043	HARMONY-THIESSEN	7.2/12.5 kV Grounded Y	[redacted]	144	46,214	47.79	0.149	4	144	46,214	47.79	0.149	4

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HARRISON	1312043	HARRISON-DAVIS	7.2/12.5 kV Grounded Y	[redacted]	125	13,476	6.41	0.059	-	125	13,476	6.41	0.059	-
HARRISON	1312053	HARRISON-HARRISON 13	7.2/12.5 kV Grounded Y	[redacted]	362	18,790	8.44	0.163	3	362	18,790	8.44	0.163	3
HARRISON	1312013	HARRISON-IVON	7.2/12.5 kV Grounded Y	[redacted]	62	9,738	8.70	0.055	-	62	9,738	8.70	0.055	-
HARRISON	8003112	TEMP H-NEPTUNE	6.48/11.1 kV Grounded Y	[redacted]	18	4,892	5.16	0.019	-	18	4,892	5.16	0.019	-
HARRISON	8003122	TEMP H-SATURN	6.48/11.1 kV Grounded Y	[redacted]	1	61	0.77	0.013	-	1	61	0.77	0.013	-
HAYDEN ISLAND	1316033	HAYDEN ISLAND-MAINLAND	7.2/12.5 kV Grounded Y	[redacted]	69	17,611	106.73	0.418	-	69	17,611	106.73	0.418	-
HAYDEN ISLAND	1316013	HAYDEN ISLAND-NORTH SHORE	7.2/12.5 kV Grounded Y	[redacted]	8,081	1,292,945	510.84	3.193	4	8,081	1,292,945	510.84	3.193	4
HAYDEN ISLAND	1316023	HAYDEN ISLAND-SOUTH SHORE	7.2/12.5 kV Grounded Y	[redacted]	838	105,228	202.36	1.612	-	838	105,228	202.36	1.612	-
HEMLOCK	5317023	HEMLOCK-FREMONT	7.2/12.5 kV Grounded Y	[redacted]	472	105,081	70.62	0.317	-	472	105,081	70.62	0.317	-
HEMLOCK	5317013	HEMLOCK-HEMLOCK 13	7.2/12.5 kV Grounded Y	[redacted]	125	27,390	13.47	0.061	-	125	27,390	13.47	0.061	-
HEMLOCK	5317033	HEMLOCK-MASON	7.2/12.5 kV Grounded Y	[redacted]	144	20,066	29.17	0.209	-	144	20,066	29.17	0.209	-
HOGAN NORTH	5323023	HOGAN NORTH-BRIGADOON	7.2/12.5 kV Grounded Y	[redacted]	2,393	288,352	101.57	0.843	2	2,393	288,352	101.57	0.843	2
HOGAN NORTH	5323043	HOGAN NORTH-HOGAN NORTH 13	7.2/12.5 kV Grounded Y	[redacted]	3,975	346,271	119.36	1.370	-	3,975	346,271	119.36	1.370	-
HOGAN NORTH	5323033	HOGAN NORTH-LINKS	7.2/12.5 kV Grounded Y	[redacted]	5,099	931,470	270.85	1.483	2	5,099	931,470	270.85	1.483	2
HOGAN NORTH	5323013	HOGAN NORTH-SALQUIST	7.2/12.5 kV Grounded Y	[redacted]	3,392	391,488	133.98	1.161	2	3,392	391,488	133.98	1.161	2
HOGAN SOUTH	5324013	HOGAN SOUTH-CLEVELAND	7.2/12.5 kV Grounded Y	[redacted]	356	78,951	35.56	0.160	1	356	78,951	35.56	0.160	1
HOGAN SOUTH	5324023	HOGAN SOUTH-LAWRENCE	7.2/12.5 kV Grounded Y	[redacted]	662	74,679	18.28	0.162	2	662	74,679	18.28	0.162	2

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HOGAN SOUTH	5324033	HOGAN SOUTH-MAIN	7.2/12.5 kV Grounded Y	[redacted]	111	28,733	19.44	0.075	-	111	28,733	19.44	0.075	-
HOGAN SOUTH	5324043	HOGAN SOUTH-PAROPA	7.2/12.5 kV Grounded Y	[redacted]	178	27,913	9.29	0.059	1	178	27,913	9.29	0.059	1
HOGAN SOUTH	5324053	HOGAN SOUTH-WALLULA	7.2/12.5 kV Grounded Y	[redacted]	466	58,092	19.17	0.154	1	466	58,092	19.17	0.154	1
HOLGATE	1325043	HOLGATE-BYBEE	7.2/12.5 kV Grounded Y	[redacted]	2,146	210,186	81.56	0.833	4	2,146	210,186	81.56	0.833	4
HOLGATE	1325013	HOLGATE-GIDEON	7.2/12.5 kV Grounded Y	[redacted]	53	6,580	5.62	0.045	1	53	6,580	5.62	0.045	1
HOLGATE	1325033	HOLGATE-HOLGATE 13	7.2/12.5 kV Grounded Y	[redacted]	139	14,504	4.13	0.040	3	139	14,504	4.13	0.040	3
HOLGATE	1325053	HOLGATE-KENILWORTH	7.2/12.5 kV Grounded Y	[redacted]	739	102,003	47.05	0.341	4	739	102,003	47.05	0.341	4
HOLGATE	1325023	HOLGATE-RHONE	7.2/12.5 kV Grounded Y	[redacted]	545	60,466	29.28	0.264	3	545	60,466	29.28	0.264	3
ISLAND	1345033	ISLAND-13180	7.2/12.5 kV Grounded Y	[redacted]	339	67,827	32.64	0.163	-	339	67,827	32.64	0.163	-
ISLAND	1345023	ISLAND-13187	7.2/12.5 kV Grounded Y	[redacted]	5,627	866,813	280.34	1.820	-	5,627	866,813	280.34	1.820	-
ISLAND	1345013	ISLAND-13188	7.2/12.5 kV Grounded Y	[redacted]	730	177,429	64.92	0.267	1	730	177,429	64.92	0.267	1
ISLAND	1345043	ISLAND-ISLAND 13	7.2/12.5 kV Grounded Y	[redacted]	1,638	386,332	247.97	1.051	1	1,638	386,332	247.97	1.051	1
JENNINGS LODGE	6365053	JENNINGS LODGE-ADDIE	7.2/12.5 kV Grounded Y	[redacted]	3,461	203,525	121.58	2.068	-	3,461	203,525	121.58	2.068	-
JENNINGS LODGE	6365023	JENNINGS LODGE-JENNINGS 13	7.2/12.5 kV Grounded Y	[redacted]	2,960	383,513	148.94	1.150	1	2,960	383,513	148.94	1.150	1
JENNINGS LODGE	6365033	JENNINGS LODGE-MELDRUM	7.2/12.5 kV Grounded Y	[redacted]	3,465	512,370	223.16	1.509	3	3,465	512,370	223.16	1.509	3
JENNINGS LODGE	6365013	JENNINGS LODGE-OAK GROVE	7.2/12.5 kV Grounded Y	[redacted]	657	61,488	43.86	0.469	1	657	61,488	43.86	0.469	1
JENNINGS LODGE	6365043	JENNINGS LODGE-WEBSTER	7.2/12.5 kV Grounded Y	[redacted]	609	81,278	40.48	0.303	1	609	81,278	40.48	0.303	1

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KELLEY POINT	1367013	KELLEY POINT-KELLEY POINT 13	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
KELLEY POINT	1367043	KELLEY POINT-LEDBETTER	7.2/12.5 kV Grounded Y	[redacted]	1	38	1.31	0.034	-	1	38	1.31	0.034	-
KELLEY POINT	1367023	KELLEY POINT-MARINE	7.2/12.5 kV Grounded Y	[redacted]	2	88	3.52	0.080	-	2	88	3.52	0.080	-
KELLEY POINT	1367033	KELLEY POINT-SIMMONS	7.2/12.5 kV Grounded Y	[redacted]	43	15,568	331.24	0.915	-	43	15,568	331.24	0.915	-
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]	9,783	772,737	223.14	2.825	3	9,783	772,737	223.14	2.825	3
KELLY BUTTE	1370033	KELLY BUTTE-FAIRLAWN	7.2/12.5 kV Grounded Y	[redacted]	554	24,062	23.25	0.535	-	554	24,062	23.25	0.535	-
KELLY BUTTE	1370043	KELLY BUTTE-MALL 205	7.2/12.5 kV Grounded Y	[redacted]	655	103,786	32.15	0.203	1	655	103,786	32.15	0.203	1
KELLY BUTTE	1370013	KELLY BUTTE-MCGREW	7.2/12.5 kV Grounded Y	[redacted]	804	73,302	23.04	0.253	4	804	73,302	23.04	0.253	4
LELAND	6402013	LELAND-BEAVERCREEK	7.2/12.5 kV Grounded Y	[redacted]	6,050	445,667	138.66	1.882	1	6,050	445,667	138.66	1.882	1
LELAND	6402023	LELAND-CARUS	7.2/12.5 kV Grounded Y	[redacted]	4,404	553,892	229.54	1.825	2	4,404	553,892	229.54	1.825	2
LELAND	6402033	LELAND-KELM	7.2/12.5 kV Grounded Y	[redacted]	415	21,342	11.32	0.220	1	415	21,342	11.32	0.220	1
LENTS	1405013	LENTS-13101	7.2/12.5 kV Grounded Y	[redacted]	739	87,636	34.18	0.288	1	739	87,636	34.18	0.288	1
LENTS	1405043	LENTS-HAPPY VALLEY	7.2/12.5 kV Grounded Y	[redacted]	592	51,265	13.74	0.159	-	592	51,265	13.74	0.159	-
LENTS	1405023	LENTS-MT SCOTT	7.2/12.5 kV Grounded Y	[redacted]	1	1,152	11.08	0.010	-	1	1,152	11.08	0.010	-
LENTS	1405033	LENTS-NORTH	7.2/12.5 kV Grounded Y	[redacted]	267	22,465	12.66	0.151	-	267	22,465	12.66	0.151	-

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MARQUAM	1430133	MARQUAM-MCCALL #10 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
MARQUAM	1430083	MARQUAM-MCCALL #11 NETWORK	12.8 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
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]	597	192,754	150.47	0.466	-	597	192,754	150.47	0.466	-
MARQUAM	1430253	MARQUAM-ORANGE	7.2/12.5 kV Grounded Y	[redacted]	2	26	0.06	0.005	-	2	26	0.06	0.005	-
MARQUAM	1430263	MARQUAM-PORTER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
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]	-	-	-	-	-	-	-	-	-	-
MARQUAM	1430303	MARQUAM-TILIKUM	7.2/12.5 kV Grounded Y	[redacted]	2	154	0.29	0.004	-	2	154	0.29	0.004	-
MCGILL	5440123	MCGILL-HORSETAIL	7.2/12.5 kV Grounded Y	[redacted]	305	90,390	64.02	0.216	3	305	90,390	64.02	0.216	3
MCGILL	5440113	MCGILL-LATOURELL	7.2/12.5 kV Grounded Y	[redacted]	2,356	226,615	102.36	1.064	-	2,356	226,615	102.36	1.064	-
MCGILL	5440023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
MCGILL	5440073	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-

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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]	899	87,099	37.33	0.385	2	899	87,099	37.33	0.385	2
MIDWAY	5455023	MIDWAY-DOUGLAS	7.2/12.5 kV Grounded Y	[redacted]	761	117,484	41.31	0.268	5	761	117,484	41.31	0.268	5
MIDWAY	5455033	MIDWAY-LYNCH	7.2/12.5 kV Grounded Y	[redacted]	1,825	333,211	140.48	0.769	-	1,825	333,211	140.48	0.769	-
MIDWAY	5455043	MIDWAY-POWELLHURST	7.2/12.5 kV Grounded Y	[redacted]	1,470	144,868	45.77	0.464	-	1,470	144,868	45.77	0.464	-
MT PLEASANT	6475023	MT PLEASANT-CLAIRMONT	7.2/12.5 kV Grounded Y	[redacted]	3,581	368,285	112.01	1.089	-	3,581	368,285	112.01	1.089	-
MT PLEASANT	6475043	MT PLEASANT-MT VIEW	7.2/12.5 kV Grounded Y	[redacted]	243	46,992	23.22	0.120	-	243	46,992	23.22	0.120	-
MT PLEASANT	6475053	MT PLEASANT-RIVERCREST	7.2/12.5 kV Grounded Y	[redacted]	251	34,182	26.83	0.197	1	251	34,182	26.83	0.197	1
MT PLEASANT	6475033	MT PLEASANT-SOUTH END	7.2/12.5 kV Grounded Y	[redacted]	198	25,853	7.30	0.056	-	198	25,853	7.30	0.056	-
MULTNOMAH	1480023	MULTNOMAH-13176	7.2/12.5 kV Grounded Y	[redacted]	3,466	221,664	77.15	1.206	3	3,466	221,664	77.15	1.206	3
MULTNOMAH	1480033	MULTNOMAH-13177	7.2/12.5 kV Grounded Y	[redacted]	1,498	217,325	59.14	0.408	2	1,498	217,325	59.14	0.408	2
MULTNOMAH	1480013	MULTNOMAH-13181	7.2/12.5 kV Grounded Y	[redacted]	543	55,700	23.49	0.229	1	543	55,700	23.49	0.229	1
MULTNOMAH	1480063	MULTNOMAH-MULTNOMAH 13	7.2/12.5 kV Grounded Y	[redacted]	529	63,839	21.80	0.181	1	529	63,839	21.80	0.181	1
NORTHERN	1495143	NORTHERN-11009	11.4kV Grounded Y	[redacted]	74	19,492	10.60	0.040	-	74	19,492	10.60	0.040	-
NORTHERN	1493163	NORTHERN-11016	11.1 kV Grounded Y	[redacted]	231	42,942	109.55	0.589	-	231	42,942	109.55	0.589	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
NORTHERN	1495153	NORTHERN-11071	11.4kV Grounded Y	[redacted]	574	72,728	32.53	0.257	-	574	72,728	32.53	0.257	-
OAK GROVE	5515033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
OAK GROVE	5515013	OAK GROVE-LAKE HARRIET	7.2/12.5 kV Grounded Y	[redacted]	289	219,946	2,365.01	3.108	4	289	219,946	2,365.01	3.108	4
OAK GROVE	5515023	OAK GROVE-WHITE WATER	7.2/12.5 kV Grounded Y	[redacted]	2	646	646.37	2.000	1	2	646	646.37	2.000	1
[redacted]	1514913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
ORIENT	5517023	ORIENT-BARLOW	7.2/12.5 kV Grounded Y	[redacted]	768	227,393	233.70	0.789	2	768	227,393	233.70	0.789	2
ORIENT	5517013	ORIENT-ORIENT 13	7.2/12.5 kV Grounded Y	[redacted]	963	177,822	217.92	1.180	3	963	177,822	217.92	1.180	3
ORIENT	5517033	ORIENT-OXBOW	7.2/12.5 kV Grounded Y	[redacted]	1,442	343,956	433.74	1.818	1	1,442	343,956	433.74	1.818	1
PELTON	9999990	PELTON-ROUND BUTTE	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
PENINSULA PARK	1545021	PENINSULA PARK-OCKLEY GREEN	7.2/12.5 kV Grounded Y	[redacted]	1,267	144,553	43.38	0.380	3	1,267	144,553	43.38	0.380	3
PENINSULA PARK	1545011	PENINSULA PARK-PENINSULA PARK 13	7.2/12.5 kV Grounded Y	[redacted]	891	113,736	76.95	0.603	3	891	113,736	76.95	0.603	3
PLEASANT VALLEY	5553023	PLEASANT VALLEY-BAXTER	7.2/12.5 kV Grounded Y	[redacted]	118	17,328	8.30	0.057	2	118	17,328	8.30	0.057	2
PLEASANT VALLEY	5553053	PLEASANT VALLEY-CLATSOP	7.2/12.5 kV Grounded Y	[redacted]	12	3,560	1.53	0.005	1	12	3,560	1.53	0.005	1
PLEASANT VALLEY	5553033	PLEASANT VALLEY-MOON	7.2/12.5 kV Grounded Y	[redacted]	803	211,877	63.57	0.241	9	803	211,877	63.57	0.241	9
PLEASANT VALLEY	5553013	PLEASANT VALLEY-PLEASANT 13	7.2/12.5 kV Grounded Y	[redacted]	14	2,536	1.44	0.008	2	14	2,536	1.44	0.008	2
PLEASANT VALLEY	5553043	PLEASANT VALLEY-SUN	7.2/12.5 kV Grounded Y	[redacted]	4,519	409,153	101.00	1.116	2	4,519	409,153	101.00	1.116	2
[redacted]	1557911	[redacted]	4.16 kV Grounded Y	[redacted]	1	11	3.63	0.333	-	1	11	3.63	0.333	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
PORTSMOUTH	1558013	PORTSMOUTH-CARBIDE	7.2/12.5 kV Grounded Y	[redacted]	897	129,484	33.61	0.233	-	897	129,484	33.61	0.233	-
PORTSMOUTH	1558053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	1	136	15.12	0.111	-	1	136	15.12	0.111	-
PORTSMOUTH	1558033	PORTSMOUTH-WILLIS	7.2/12.5 kV Grounded Y	[redacted]	4,094	631,070	267.40	1.735	-	4,094	631,070	267.40	1.735	-
RAMAPO	5575023	RAMAPO-EMERALD	7.2/12.5 kV Grounded Y	[redacted]	978	222,049	97.26	0.428	-	978	222,049	97.26	0.428	-
RAMAPO	5575013	RAMAPO-GILBERT	7.2/12.5 kV Grounded Y	[redacted]	471	121,346	54.54	0.212	-	471	121,346	54.54	0.212	-
RAMAPO	5575033	RAMAPO-RAMAPO 13	7.2/12.5 kV Grounded Y	[redacted]	320	95,657	31.34	0.105	-	320	95,657	31.34	0.105	-
REDLAND	6581023	REDLAND-HENRICI	7.2/12.5 kV Grounded Y	[redacted]	3,863	224,761	118.30	2.033	-	3,863	224,761	118.30	2.033	-
REDLAND	6581013	REDLAND-REDLAND 13	7.2/12.5 kV Grounded Y	[redacted]	8,204	682,931	278.52	3.346	-	8,204	682,931	278.52	3.346	-
RIVERGATE SOUTH	1598012	RIVERGATE SOUTH-11010	6.66/11.4 kV Grounded Y	[redacted]	1	596	27.11	0.045	-	1	596	27.11	0.045	-
RIVERGATE SOUTH	1598022	RIVERGATE SOUTH-11011	6.66/11.4 kV Grounded Y	[redacted]	46	5,437	4.26	0.036	1	46	5,437	4.26	0.036	1
RIVERGATE SOUTH	1598023	RIVERGATE SOUTH-PEARCY	7.2/12.5 kV Grounded Y	[redacted]	51	7,843	163.40	1.063	-	51	7,843	163.40	1.063	-
RIVERGATE SOUTH	1598013	RIVERGATE SOUTH-SWIFT	7.2/12.5 kV Grounded Y	[redacted]	511	67,155	1,243.61	9.463	2	511	67,155	1,243.61	9.463	2
RIVERVIEW	1600033	RIVERVIEW-FULTON	7.2/12.5 kV Grounded Y	[redacted]	5,631	975,486	388.49	2.243	1	5,631	975,486	388.49	2.243	1
RIVERVIEW	1600023	RIVERVIEW-MACADAM	7.2/12.5 kV Grounded Y	[redacted]	201	4,543	2.81	0.124	1	201	4,543	2.81	0.124	1
RIVERVIEW	1600013	RIVERVIEW-TERWILLIGER	7.2/12.5 kV Grounded Y	[redacted]	89	10,668	9.72	0.081	1	89	10,668	9.72	0.081	1
ROCKWOOD	5602053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
ROCKWOOD	5602063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
ROCKWOOD	5602023	ROCKWOOD-INDUSTRIAL	7.2/12.5 kV Grounded Y	[redacted]	4	1,128	5.32	0.019	-	4	1,128	5.32	0.019	-
ROCKWOOD	5602033	ROCKWOOD-REYNOLDS	7.2/12.5 kV Grounded Y	[redacted]	264	60,503	35.24	0.154	-	264	60,503	35.24	0.154	-
ROCKWOOD	5602013	ROCKWOOD-ROCKWOOD 13	7.2/12.5 kV Grounded Y	[redacted]	615	113,842	32.81	0.177	-	615	113,842	32.81	0.177	-
ROCKWOOD	5602043	ROCKWOOD-WILKES	7.2/12.5 kV Grounded Y	[redacted]	5	478	12.59	0.132	-	5	478	12.59	0.132	-
ROSEMONT	4604123	ROSEMONT-HIDDEN SPRINGS	7.2/12.5 kV Grounded Y	[redacted]	1,928	454,503	219.25	0.930	-	1,928	454,503	219.25	0.930	-
ROSEMONT	4604113	ROSEMONT-MOSSY BRAE	7.2/12.5 kV Grounded Y	[redacted]	255	38,312	39.50	0.263	-	255	38,312	39.50	0.263	-
ROSEMONT	4604133	ROSEMONT-OVERLOOK	7.2/12.5 kV Grounded Y	[redacted]	748	130,499	83.65	0.479	-	748	130,499	83.65	0.479	-
ROUND BUTTE	9999923	ROUND BUTTE-SPILLWAY	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
ROUND BUTTE	9999913	ROUND BUTTE-SWITCHING STATION	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
RUBY	5620113	RUBY-CAR LINE	7.2/12.5 kV Grounded Y	[redacted]	457	66,833	23.24	0.159	2	457	66,833	23.24	0.159	2
RUBY	5620123	RUBY-JUNCTION	7.2/12.5 kV Grounded Y	[redacted]	621	140,384	35.32	0.156	2	621	140,384	35.32	0.156	2
SANDY	5640043	SANDY-362ND	7.2/12.5 kV Grounded Y	[redacted]	1,937	155,978	94.76	1.177	-	1,937	155,978	94.76	1.177	-
SANDY	5640013	SANDY-BLUFF	7.2/12.5 kV Grounded Y	[redacted]	6	626	0.38	0.004	-	6	626	0.38	0.004	-
SANDY	5640033	SANDY-SANDY 13	7.2/12.5 kV Grounded Y	[redacted]	5,931	617,608	255.32	2.452	-	5,931	617,608	255.32	2.452	-
SANDY	5640023	SANDY-WILDCAT	7.2/12.5 kV Grounded Y	[redacted]	4,478	923,081	290.83	1.411	-	4,478	923,081	290.83	1.411	-
SELLWOOD	1655013	SELLWOOD-KELLOGG PARK	7.2/12.5 kV Grounded Y	[redacted]	322	71,941	40.99	0.183	8	322	71,941	40.99	0.183	8
SELLWOOD	1655033	SELLWOOD-SELLWOOD 13	7.2/12.5 kV Grounded Y	[redacted]	5,589	1,114,438	231.55	1.161	1	5,589	1,114,438	231.55	1.161	1

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
SELLWOOD	1655023	SELLWOOD-WAVERLY	7.2/12.5 kV Grounded Y	[redacted]	1	7	0.01	0.001	-	1	7	0.01	0.001	-
SULLIVAN	6675013	SULLIVAN-ROBINWOOD	7.2/12.5 kV Grounded Y	[redacted]	225	57,432	27.75	0.109	1	225	57,432	27.75	0.109	1
SULLIVAN	6675053	SULLIVAN-SALAMO	7.2/12.5 kV Grounded Y	[redacted]	200	26,516	13.61	0.103	-	200	26,516	13.61	0.103	-
SULLIVAN	6675033	SULLIVAN-SUSSEX	7.2/12.5 kV Grounded Y	[redacted]	80	17,591	16.49	0.075	-	80	17,591	16.49	0.075	-
SULLIVAN	6675023	SULLIVAN-TANNER	7.2/12.5 kV Grounded Y	[redacted]	162	53,663	23.95	0.072	-	162	53,663	23.95	0.072	-
SULLIVAN	6675043	SULLIVAN-WILLAMETTE	7.2/12.5 kV Grounded Y	[redacted]	3,522	678,234	420.22	2.182	2	3,522	678,234	420.22	2.182	2
[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]	539	43,710	89.02	1.098	2	539	43,710	89.02	1.098	2
SUMMIT	5677013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	76	11,497	287.43	1.900	2	76	11,497	287.43	1.900	2
SUMMIT	5677033	SUMMIT-SUMMIT 13	7.2/12.5 kV Grounded Y	[redacted]	480	86,695	305.26	1.690	3	480	86,695	305.26	1.690	3
SWAN ISLAND	1680073	SWAN ISLAND-BASIN	7.2/12.5 kV Grounded Y	[redacted]	1	34	0.27	0.008	-	1	34	0.27	0.008	-
SWAN ISLAND	1680123	SWAN ISLAND-DOLPHIN	7.2/12.5 kV Grounded Y	[redacted]	11	322	3.88	0.133	-	11	322	3.88	0.133	-
SWAN ISLAND	1680153	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	40	5,662	202.21	1.429	-	40	5,662	202.21	1.429	-
SWAN ISLAND	1680133	SWAN ISLAND-GOING	7.2/12.5 kV Grounded Y	[redacted]	39	4,713	87.28	0.722	-	39	4,713	87.28	0.722	-
SWAN ISLAND	1680143	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	3	510	14.58	0.086	-	3	510	14.58	0.086	-
TABOR	1690013	TABOR-82ND	7.2/12.5 kV Grounded Y	[redacted]	1,073	252,458	109.86	0.467	1	1,073	252,458	109.86	0.467	1

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
TABOR	1690033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	172	16,370	15.28	0.161	-	172	16,370	15.28	0.161	-
TABOR	1690023	TABOR-TABOR 13	7.2/12.5 kV Grounded Y	[redacted]	600	84,515	21.59	0.153	-	600	84,515	21.59	0.153	-
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]	-	-	-	-	-	-	-	-	-	-
TOWN CENTER	6696023	TOWN CENTER-LAWNFIELD	7.2/12.5 kV Grounded Y	[redacted]	29	3,963	2.21	0.016	-	29	3,963	2.21	0.016	-
TOWN CENTER	6696053	TOWN CENTER-MONTEREY	7.2/12.5 kV Grounded Y	[redacted]	3,408	102,970	31.23	1.034	2	3,408	102,970	31.23	1.034	2
TOWN CENTER	6696073	TOWN CENTER-NORTH	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
TOWN CENTER	6696043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
TOWN CENTER	6696013	TOWN CENTER-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	11	3,282	182.31	0.611	-	11	3,282	182.31	0.611	-
TOWN CENTER	6696063	TOWN CENTER-SUNNYBROOK	7.2/12.5 kV Grounded Y	[redacted]	1,094	75,117	69.62	1.014	-	1,094	75,117	69.62	1.014	-
TOWN CENTER	6696033	TOWN CENTER-VALLEY VIEW	7.2/12.5 kV Grounded Y	[redacted]	1	159	0.70	0.004	-	1	159	0.70	0.004	-
TWILIGHT	6699033	TWILIGHT-BREMER	7.2/12.5 kV Grounded Y	[redacted]	611	270,475	188.48	0.426	3	611	270,475	188.48	0.426	3
URBAN	1707053	URBAN-BARBUR	7.2/12.5 kV Grounded Y	[redacted]	17	6,571	29.20	0.076	-	17	6,571	29.20	0.076	-
URBAN	1707083	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	1	170	170.32	1.000	-	1	170	170.32	1.000	-
URBAN	1707013	URBAN-CORBETT	7.2/12.5 kV Grounded Y	[redacted]	20	1,576	1.13	0.014	1	20	1,576	1.13	0.014	1
URBAN	1707063	URBAN-GAINES	7.2/12.5 kV Grounded Y	[redacted]	51	8,549	6.82	0.041	-	51	8,549	6.82	0.041	-
URBAN	1707043	URBAN-GIBBS	7.2/12.5 kV Grounded Y	[redacted]	8	1,500	3.11	0.017	-	8	1,500	3.11	0.017	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
URBAN	1707073	URBAN-KELLY	7.2/12.5 kV Grounded Y	[redacted]	895	128,460	143.53	1.000	-	895	128,460	143.53	1.000	-
URBAN	1707023	URBAN-LANDING	7.2/12.5 kV Grounded Y	[redacted]	1	7	0.00	0.001	-	1	7	0.00	0.001	-
URBAN	1707033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	2	181	90.45	1.000	-	2	181	90.45	1.000	-
URBAN	1707093	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	3	262	87.42	1.000	-	3	262	87.42	1.000	-
[redacted]	1743013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
[redacted]	1743023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
WELCHES	5727013	WELCHES-WELCHES 13	7.2/12.5 kV Grounded Y	[redacted]	2,867	433,574	236.28	1.562	-	2,867	433,574	236.28	1.562	-
WELCHES	5727023	WELCHES-ZIG ZAG	7.2/12.5 kV Grounded Y	[redacted]	7,369	1,209,002	809.78	4.936	-	7,369	1,209,002	809.78	4.936	-
[redacted]	6666912	[redacted]	6.48/11.1 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
WILLBRIDGE	1741052	WILLBRIDGE-SALMONBERRY	6.66/11.4 kV Grounded Y	[redacted]	238	21,493	186.90	2.070	-	238	21,493	186.90	2.070	-
WILLBRIDGE	1741062	WILLBRIDGE-WILDWOOD	6.66/11.4 kV Grounded Y	[redacted]	90	13,071	155.61	1.071	-	90	13,071	155.61	1.071	-

Southern Operating Area

Table 30: Reliability Performance for PGE's Southern Operating Area

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	$MAIFI_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	$MAIFI_E$
AMITY	2120013	AMITY-AMITY 13	7.2/12.5 kV Grounded Y	[redacted]	1,979	557,762	396.70	1.408	2	1,979	557,762	396.70	1.408	2
AMITY	2120023	AMITY-BELLEVUE	7.2/12.5 kV Grounded Y	[redacted]	2,814	851,591	780.56	2.579	2	2,814	851,591	780.56	2.579	2
BARNES	2140043	BARNES-BATTLE CREEK	7.2/12.5 kV Grounded Y	[redacted]	362	55,584	26.26	0.171	-	362	55,584	26.26	0.171	-
BARNES	2140013	BARNES-BOONE	7.2/12.5 kV Grounded Y	[redacted]	182	77,090	43.55	0.103	-	182	77,090	43.55	0.103	-
BARNES	2140023	BARNES-COMMERCIAL	7.2/12.5 kV Grounded Y	[redacted]	518	90,434	23.03	0.132	-	518	90,434	23.03	0.132	-
BARNES	2140033	BARNES-SUNNYSIDE	7.2/12.5 kV Grounded Y	[redacted]	2,076	291,318	81.78	0.583	-	2,076	291,318	81.78	0.583	-
BETHEL	2151023	BETHEL-FRUITLAND	7.2/12.5 kV Grounded Y	[redacted]	188	33,712	12.46	0.069	-	188	33,712	12.46	0.069	-
BETHEL	2151033	BETHEL-GEER	7.2/12.5 kV Grounded Y	[redacted]	2,050	165,857	107.56	1.329	-	2,050	165,857	107.56	1.329	-
BETHEL	2151013	BETHEL-MACLEAY	7.2/12.5 kV Grounded Y	[redacted]	223	23,299	11.93	0.114	-	223	23,299	11.93	0.114	-
CANBY	6190013	CANBY-13643	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
CANBY	6190023	CANBY-13644	7.2/12.5 kV Grounded Y	[redacted]	462	214,251	468.82	1.011	1	462	214,251	468.82	1.011	1
CANBY	6190043	CANBY-BUTTEVILLE	7.2/12.5 kV Grounded Y	[redacted]	196	144,726	124.23	0.168	3	196	144,726	124.23	0.168	3
CANBY	6190033	CANBY-FILBERT	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
CANBY	6190053	CANBY-ZIMMERMAN	7.2/12.5 kV Grounded Y	[redacted]	1,642	437,306	297.89	1.119	1	1,642	437,306	297.89	1.119	1
CLAXTAR	2207013	CLAXTAR-CLAXTAR 13	7.2/12.5 kV Grounded Y	[redacted]	248	13,867	30.82	0.551	-	248	13,867	30.82	0.551	-

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CLAXTAR	2207023	CLAXTAR-HAYESVILLE	7.2/12.5 kV Grounded Y	[redacted]	1,197	199,134	86.66	0.521	4	1,197	199,134	86.66	0.521	4
CLAXTAR	2207033	CLAXTAR-RIDGE	7.2/12.5 kV Grounded Y	[redacted]	198	19,896	10.47	0.104	-	198	19,896	10.47	0.104	-
COLTON	6208013	COLTON-DHOOGHE	7.2/12.5 kV Grounded Y	[redacted]	1,079	316,170	534.07	1.823	2	1,079	316,170	534.07	1.823	2
COLTON	6208023	COLTON-GRAYS HILL	7.2/12.5 kV Grounded Y	[redacted]	3,915	400,434	360.75	3.527	2	3,915	400,434	360.75	3.527	2
CULVER	2211143	CULVER-CULVER 13	7.2/12.5 kV Grounded Y	[redacted]	12	1,475	10.38	0.085	-	12	1,475	10.38	0.085	-
CULVER	2211113	CULVER-GAFFIN	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
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]	1,388	262,996	167.83	0.886	-	1,388	262,996	167.83	0.886	-
DAYTON	4220033	DAYTON-LAFAYETTE	7.2/12.5 kV Grounded Y	[redacted]	2,921	256,599	124.87	1.421	-	2,921	256,599	124.87	1.421	-
DAYTON	4220023	DAYTON-SOUTHWEST	7.2/12.5 kV Grounded Y	[redacted]	167	26,327	59.83	0.380	-	167	26,327	59.83	0.380	-
ELMA	2233013	ELMA-ELMA 13	7.2/12.5 kV Grounded Y	[redacted]	157	21,316	15.61	0.115	-	157	21,316	15.61	0.115	-
ELMA	2233023	ELMA-FOUR CORNERS	7.2/12.5 kV Grounded Y	[redacted]	2,876	236,531	89.83	1.092	-	2,876	236,531	89.83	1.092	-
ELMA	2233043	ELMA-HUDSON	7.2/12.5 kV Grounded Y	[redacted]	349	103,901	44.25	0.149	-	349	103,901	44.25	0.149	-
ELMA	2233033	ELMA-STATE	12.5 kV Grounded Y	[redacted]	3	406	1.19	0.009	1	3	406	1.19	0.009	1
FAIRMOUNT	2250013	FAIRMOUNT-CANDALARIA	7.2/12.5 kV Grounded Y	[redacted]	702	163,840	58.14	0.249	-	702	163,840	58.14	0.249	-
FAIRMOUNT	2250023	FAIRMOUNT-MISSION	7.2/12.5 kV Grounded Y	[redacted]	714	135,829	53.54	0.281	-	714	135,829	53.54	0.281	-

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FARGO	2253013	FARGO-FARGO 13	7.2/12.5 kV Grounded Y	[redacted]	449	125,550	72.24	0.258	2	449	125,550	72.24	0.258	2
[redacted]	2900013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
GRAND RONDE	2285033	GRAND RONDE-AGENCY	7.2/12.5 kV Grounded Y	[redacted]	681	42,115	74.02	1.197	-	681	42,115	74.02	1.197	-
GRAND RONDE	2285023	GRAND RONDE-FORTHILL	7.2/12.5 kV Grounded Y	[redacted]	1,397	243,128	352.36	2.025	-	1,397	243,128	352.36	2.025	-
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]	408	56,795	150.65	1.082	-	408	56,795	150.65	1.082	-
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	9	0.24	0.025	-	1	9	0.24	0.025	-
[redacted]	2188013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
INDIAN	2340023	INDIAN-KEIZER	7.2/12.5 kV Grounded Y	[redacted]	309	49,141	24.38	0.153	1	309	49,141	24.38	0.153	1
INDIAN	2340013	INDIAN-LABISH	7.2/12.5 kV Grounded Y	[redacted]	4,733	331,270	127.41	1.820	-	4,733	331,270	127.41	1.820	-
INDIAN	2340043	INDIAN-NORTH	7.2/12.5 kV Grounded Y	[redacted]	1,591	285,350	88.02	0.491	1	1,591	285,350	88.02	0.491	1
INDIAN	2340033	INDIAN-STATION	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
INDIAN	2340053	INDIAN-WEST	7.2/12.5 kV Grounded Y	[redacted]	10,138	1,518,519	437.49	2.921	-	10,138	1,518,519	437.49	2.921	-
[redacted]	2400911	[redacted]	4.16 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
LIBERAL	6464013	LIBERAL-LIBERAL 13	7.2/12.5 kV Grounded Y	[redacted]	379	58,798	55.52	0.358	2	379	58,798	55.52	0.358	2

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LIBERAL	6464023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	2	253	252.83	2.000	-	2	253	252.83	2.000	-
LIBERTY	2410013	LIBERTY-BROWNING	7.2/12.5 kV Grounded Y	[redacted]	80	6,243	10.02	0.128	-	80	6,243	10.02	0.128	-
LIBERTY	2410043	LIBERTY-LONE OAK	7.2/12.5 kV Grounded Y	[redacted]	270	30,878	12.20	0.107	2	270	30,878	12.20	0.107	2
LIBERTY	2410053	LIBERTY-MORNINGSIDE	7.2/12.5 kV Grounded Y	[redacted]	446	83,474	36.20	0.193	-	446	83,474	36.20	0.193	-
LIBERTY	2410023	LIBERTY-ROSEDALE	7.2/12.5 kV Grounded Y	[redacted]	733	142,696	53.13	0.273	-	733	142,696	53.13	0.273	-
LIBERTY	2410063	LIBERTY-SKYLINE	7.2/12.5 kV Grounded Y	[redacted]	726	191,563	55.72	0.211	1	726	191,563	55.72	0.211	1
LIBERTY	2410033	LIBERTY-VISTA	7.2/12.5 kV Grounded Y	[redacted]	4,396	434,476	221.11	2.237	1	4,396	434,476	221.11	2.237	1
MARKET	2425013	MARKET-ENGLEWOOD	7.2/12.5 kV Grounded Y	[redacted]	649	104,234	75.42	0.470	-	649	104,234	75.42	0.470	-
MARKET	2425033	MARKET-FAIRGROUNDS	7.2/12.5 kV Grounded Y	[redacted]	38	2,280	1.12	0.019	-	38	2,280	1.12	0.019	-
MARKET	2425023	MARKET-HAWTHORNE	7.2/12.5 kV Grounded Y	[redacted]	3,482	291,162	241.23	2.885	-	3,482	291,162	241.23	2.885	-
MARKET	2425043	MARKET-PARK	7.2/12.5 kV Grounded Y	[redacted]	114	19,734	14.05	0.081	-	114	19,734	14.05	0.081	-
MCCLAIN	2435033	MCCLAIN-COTTAGE	7.2/12.5 kV Grounded Y	[redacted]	246	15,517	9.99	0.158	-	246	15,517	9.99	0.158	-
MCCLAIN	2435013	MCCLAIN-FRONT	7.2/12.5 kV Grounded Y	[redacted]	1,176	133,982	137.14	1.204	-	1,176	133,982	137.14	1.204	-
MCCLAIN	2435043	MCCLAIN-HOLLYWOOD	7.2/12.5 kV Grounded Y	[redacted]	470	36,193	27.90	0.362	3	470	36,193	27.90	0.362	3
MIDDLE GROVE	2450023	MIDDLE GROVE-BROWN	7.2/12.5 kV Grounded Y	[redacted]	2,180	250,710	121.47	1.056	-	2,180	250,710	121.47	1.056	-
MIDDLE GROVE	2450043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	193	39,305	34.84	0.171	-	193	39,305	34.84	0.171	-
MIDDLE GROVE	2450033	MIDDLE GROVE-CORDON	7.2/12.5 kV Grounded Y	[redacted]	825	157,578	48.41	0.253	1	825	157,578	48.41	0.253	1

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MIDDLE GROVE	2450013	MIDDLE GROVE-SWEGLE	7.2/12.5 kV Grounded Y	[redacted]	66	16,555	7.64	0.030	2	66	16,555	7.64	0.030	2
MIDDLE GROVE	2450053	MIDDLE GROVE-WEST	7.2/12.5 kV Grounded Y	[redacted]	259	36,831	10.49	0.074	1	259	36,831	10.49	0.074	1
MILL CREEK	2540013	MILL CREEK-EASTLAND	7.2/12.5 kV Grounded Y	[redacted]	1,534	124,127	134.63	1.664	-	1,534	124,127	134.63	1.664	-
MILL CREEK	2540023	MILL CREEK-KUEBLER	7.2/12.5 kV Grounded Y	[redacted]	28	5,233	8.84	0.047	-	28	5,233	8.84	0.047	-
MILL CREEK	2540033	MILL CREEK-MILL CREEK 13	7.2/12.5 kV Grounded Y	[redacted]	6	720	1.45	0.012	1	6	720	1.45	0.012	1
MOLALLA	6466023	MOLALLA-BUCKAROO	7.2/12.5 kV Grounded Y	[redacted]	503	97,586	32.70	0.169	-	503	97,586	32.70	0.169	-
MOLALLA	6466043	MOLALLA-FOREST	7.2/12.5 kV Grounded Y	[redacted]	2,280	517,530	309.90	1.365	1	2,280	517,530	309.90	1.365	1
MOLALLA	6466013	MOLALLA-MARQUAM	7.2/12.5 kV Grounded Y	[redacted]	952	195,834	132.68	0.645	-	952	195,834	132.68	0.645	-
MOLALLA	6466033	MOLALLA-YODER	7.2/12.5 kV Grounded Y	[redacted]	485	131,257	82.34	0.304	-	485	131,257	82.34	0.304	-
MT ANGEL	2470013	MT ANGEL-EAST	7.2/12.5 kV Grounded Y	[redacted]	70	19,019	29.04	0.107	-	70	19,019	29.04	0.107	-
MT ANGEL	2470023	MT ANGEL-WEST	7.2/12.5 kV Grounded Y	[redacted]	276	34,418	20.19	0.162	-	276	34,418	20.19	0.162	-
MULINO	6478013	MULINO-NORTH	7.2/12.5 kV Grounded Y	[redacted]	419	158,360	401.93	1.063	-	419	158,360	401.93	1.063	-
MULINO	6478023	MULINO-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	1,115	353,677	389.08	1.227	9	1,115	353,677	389.08	1.227	9
NEWBERG	4485033	NEWBERG-CHEHALEM	7.2/12.5 kV Grounded Y	[redacted]	1,950	1,076,081	345.56	0.626	-	1,950	1,076,081	345.56	0.626	-
NEWBERG	4485023	NEWBERG-DUNDEE	7.2/12.5 kV Grounded Y	[redacted]	4,001	1,035,533	407.05	1.573	-	4,001	1,035,533	407.05	1.573	-
NEWBERG	4485053	NEWBERG-HOOVER PARK	7.2/12.5 kV Grounded Y	[redacted]	876	62,072	25.39	0.358	3	876	62,072	25.39	0.358	3
NEWBERG	4485043	NEWBERG-NORTH COLLEGE	7.2/12.5 kV Grounded Y	[redacted]	4,071	494,987	203.70	1.675	-	4,071	494,987	203.70	1.675	-

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NORTH MARION	2505043	NORTH MARION-CROSBY	7.2/12.5 kV Grounded Y	[redacted]	411	55,871	25.63	0.189	-	411	55,871	25.63	0.189	-
NORTH MARION	2505033	NORTH MARION-FRONT	7.2/12.5 kV Grounded Y	[redacted]	118	9,430	16.84	0.211	1	118	9,430	16.84	0.211	1
NORTH MARION	2505013	NORTH MARION-HUBBARD	7.2/12.5 kV Grounded Y	[redacted]	769	280,986	177.50	0.486	-	769	280,986	177.50	0.486	-
NORTH MARION	2505023	NORTH MARION-MCLAREN	7.2/12.5 kV Grounded Y	[redacted]	733	164,111	152.10	0.679	-	733	164,111	152.10	0.679	-
OXFORD	2523013	OXFORD-FAIRVIEW	7.2/12.5 kV Grounded Y	[redacted]	327	62,850	23.49	0.122	-	327	62,850	23.49	0.122	-
OXFORD	2523063	OXFORD-LEE	7.2/12.5 kV Grounded Y	[redacted]	152	15,032	17.81	0.180	-	152	15,032	17.81	0.180	-
OXFORD	2523033	OXFORD-MADRONA	7.2/12.5 kV Grounded Y	[redacted]	640	141,018	444.85	2.019	1	640	141,018	444.85	2.019	1
OXFORD	2523043	OXFORD-OXFORD 13	7.2/12.5 kV Grounded Y	[redacted]	88	15,174	15.50	0.090	-	88	15,174	15.50	0.090	-
OXFORD	2523053	OXFORD-RURAL	7.2/12.5 kV Grounded Y	[redacted]	12	1,424	6.09	0.051	-	12	1,424	6.09	0.051	-
OXFORD	2523023	OXFORD-SHELTON	7.2/12.5 kV Grounded Y	[redacted]	241	20,136	27.17	0.325	-	241	20,136	27.17	0.325	-
SALEM	2637013	SALEM-13260	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SALEM	2637023	SALEM-13261	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SALEM	2637033	SALEM-13262	7.2/12.5 kV Grounded Y	[redacted]	4	919	9.57	0.042	-	4	919	9.57	0.042	-
SALEM	2637043	SALEM-13263	7.2/12.5 kV Grounded Y	[redacted]	77	3,981	13.97	0.270	-	77	3,981	13.97	0.270	-
SALEM	2637063	SALEM-13264	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SALEM	2637053	SALEM-UNION	7.2/12.5 kV Grounded Y	[redacted]	44	1,058	5.09	0.212	-	44	1,058	5.09	0.212	-
SCOTTS MILLS	2652013	SCOTTS MILLS-SCOTTS MILLS 13	7.2/12.5 kV Grounded Y	[redacted]	4,094	752,383	406.91	2.214	-	4,094	752,383	406.91	2.214	-

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SHERIDAN	2660023	SHERIDAN-EAST	7.2/12.5 kV Grounded Y	[redacted]	1,726	284,042	217.49	1.322	-	1,726	284,042	217.49	1.322	-
SHERIDAN	2660013	SHERIDAN-KADELL	7.2/12.5 kV Grounded Y	[redacted]	375	121,860	71.56	0.220	-	375	121,860	71.56	0.220	-
SILVERTON	2665013	SILVERTON-NORTH	7.2/12.5 kV Grounded Y	[redacted]	1,278	469,145	147.44	0.402	-	1,278	469,145	147.44	0.402	-
SILVERTON	2665023	SILVERTON-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	804	121,926	50.42	0.333	-	804	121,926	50.42	0.333	-
SILVERTON	2665033	SILVERTON-WEST	7.2/12.5 kV Grounded Y	[redacted]	1,216	530,025	272.09	0.624	-	1,216	530,025	272.09	0.624	-
SPRINGBROOK	4672043	SPRINGBROOK-FERNWOOD	7.2/12.5 kV Grounded Y	[redacted]	2,050	396,627	194.52	1.005	-	2,050	396,627	194.52	1.005	-
SPRINGBROOK	4672023	SPRINGBROOK-ST PAUL	7.2/12.5 kV Grounded Y	[redacted]	5,852	641,153	660.30	6.027	3	5,852	641,153	660.30	6.027	3
SPRINGBROOK	4672013	SPRINGBROOK-VILLA	7.2/12.5 kV Grounded Y	[redacted]	3,031	315,678	152.72	1.466	-	3,031	315,678	152.72	1.466	-
SPRINGBROOK	4672063	SPRINGBROOK-ZIMRI	7.2/12.5 kV Grounded Y	[redacted]	4,154	670,403	444.27	2.753	1	4,154	670,403	444.27	2.753	1
ST LOUIS	2630013	ST LOUIS-EAST	7.2/12.5 kV Grounded Y	[redacted]	501	131,713	59.04	0.225	-	501	131,713	59.04	0.225	-
ST LOUIS	2630033	ST LOUIS-NORTH	7.2/12.5 kV Grounded Y	[redacted]	1,694	233,881	287.68	2.084	-	1,694	233,881	287.68	2.084	-
ST LOUIS	2630023	ST LOUIS-WEST	7.2/12.5 kV Grounded Y	[redacted]	752	91,709	102.01	0.836	-	752	91,709	102.01	0.836	-
TURNER	2698023	TURNER-CASCADE	7.2/12.5 kV Grounded Y	[redacted]	534	142,276	160.22	0.601	-	534	142,276	160.22	0.601	-
TURNER	2698013	TURNER-TURNER 13	7.2/12.5 kV Grounded Y	[redacted]	340	64,169	38.77	0.205	-	340	64,169	38.77	0.205	-
UNIONVALE	4700013	UNIONVALE-UNIONVALE 13	7.2/12.5 kV Grounded Y	[redacted]	1,994	432,153	393.22	1.814	1	1,994	432,153	393.22	1.814	1
UNIVERSITY	2705013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	22	817	2.01	0.054	-	22	817	2.01	0.054	-
UNIVERSITY	2705023	UNIVERSITY-TRADE	7.2/12.5 kV Grounded Y	[redacted]	953	211,424	82.62	0.372	-	953	211,424	82.62	0.372	-

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WACONDA	2720033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
WACONDA	2720023	WACONDA-RIVER	7.2/12.5 kV Grounded Y	[redacted]	461	80,582	157.08	0.899	1	461	80,582	157.08	0.899	1
WACONDA	2720013	WACONDA-WACONDA 13	7.2/12.5 kV Grounded Y	[redacted]	2,443	361,471	175.30	1.185	1	2,443	361,471	175.30	1.185	1
WALLACE	2725013	WALLACE-WALLACE 13	7.2/12.5 kV Grounded Y	[redacted]	1,628	378,213	252.48	1.087	3	1,628	378,213	252.48	1.087	3
WALLACE	2725023	WALLACE-WILLOW LAKE	7.2/12.5 kV Grounded Y	[redacted]	30	7,260	5.74	0.024	2	30	7,260	5.74	0.024	2
WILLAMINA	2740033	WILLAMINA-BRIDGE	7.2/12.5 kV Grounded Y	[redacted]	1,710	800,823	573.24	1.224	-	1,710	800,823	573.24	1.224	-
WILLAMINA	2740023	WILLAMINA-BUELL	7.2/12.5 kV Grounded Y	[redacted]	4,584	1,187,105	1,790.51	6.914	-	4,584	1,187,105	1,790.51	6.914	-
WILLAMINA	2740013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	6	1,421	284.20	1.200	-	6	1,421	284.20	1.200	-
WOODBURN	2753033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	906	43,215	25.07	0.526	-	906	43,215	25.07	0.526	-
WOODBURN	2753013	WOODBURN-EAST	7.2/12.5 kV Grounded Y	[redacted]	26	5,810	14.90	0.067	-	26	5,810	14.90	0.067	-
WOODBURN	2753023	WOODBURN-TOMLIN	7.2/12.5 kV Grounded Y	[redacted]	944	122,117	70.79	0.547	-	944	122,117	70.79	0.547	-
WOODBURN	2753043	WOODBURN-WEST	7.2/12.5 kV Grounded Y	[redacted]	203	37,455	16.73	0.091	-	203	37,455	16.73	0.091	-
YAMHILL	4760023	YAMHILL-CARLTON	7.2/12.5 kV Grounded Y	[redacted]	1,297	173,570	81.87	0.612	-	1,297	173,570	81.87	0.612	-
YAMHILL	4760013	YAMHILL-YAMHILL 13	7.2/12.5 kV Grounded Y	[redacted]	1,215	392,010	210.08	0.651	-	1,215	392,010	210.08	0.651	-

Western Operating Area

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

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	$MAIFI_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	$MAIFI_E$
BANKS	4135013	BANKS-BANKS 13	7.2/12.5 kV Grounded Y	[redacted]	460	76,199	121.14	0.731	3	460	76,199	121.14	0.731	3
BANKS	4135023	BANKS-CEDAR CANYON	7.2/12.5 kV Grounded Y	[redacted]	3,404	932,905	524.40	1.913	-	3,404	932,905	524.40	1.913	-
[redacted]	4146013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
BEAVERTON	4150013	BEAVERTON-ALLEN	7.2/12.5 kV Grounded Y	[redacted]	6,515	331,745	114.43	2.247	-	6,515	331,745	114.43	2.247	-
BEAVERTON	4150023	BEAVERTON-JAMIESON	7.2/12.5 kV Grounded Y	[redacted]	55	11,907	16.87	0.078	-	55	11,907	16.87	0.078	-
BEAVERTON	4150033	BEAVERTON-NORTHWEST	7.2/12.5 kV Grounded Y	[redacted]	250	29,795	17.35	0.146	-	250	29,795	17.35	0.146	-
BEAVERTON	4150053	BEAVERTON-WEST SLOPE	7.2/12.5 kV Grounded Y	[redacted]	734	206,462	97.11	0.345	-	734	206,462	97.11	0.345	-
BETHANY	4157043	BETHANY-BURTON	7.2/12.5 kV Grounded Y	[redacted]	132	13,649	6.38	0.062	-	132	13,649	6.38	0.062	-
BETHANY	4157013	BETHANY-GERMANTOWN	7.2/12.5 kV Grounded Y	[redacted]	12	554	0.25	0.006	-	12	554	0.25	0.006	-
BETHANY	4157023	BETHANY-KAISER	7.2/12.5 kV Grounded Y	[redacted]	26	1,578	1.02	0.017	-	26	1,578	1.02	0.017	-
BETHANY	4157053	BETHANY-LAIDLAW	7.2/12.5 kV Grounded Y	[redacted]	203	23,646	9.92	0.085	-	203	23,646	9.92	0.085	-
BETHANY	4157063	BETHANY-SPRINGVILLE	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
BETHANY	4157033	BETHANY-THOMPSON	7.2/12.5 kV Grounded Y	[redacted]	141	20,591	18.24	0.125	-	141	20,591	18.24	0.125	-
[redacted]	4160913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
[redacted]	4160923	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
[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]	2,204	497,635	282.59	1.252	-	2,204	497,635	282.59	1.252	-
BOONES FERRY	1170013	BOONES FERRY-KRUSE	7.2/12.5 kV Grounded Y	[redacted]	616	313,822	164.13	0.322	-	616	313,822	164.13	0.322	-
BOONES FERRY	1170033	BOONES FERRY-LAKE GROVE	7.2/12.5 kV Grounded Y	[redacted]	3,797	230,693	93.74	1.543	-	3,797	230,693	93.74	1.543	-
BOONES FERRY	1170053	BOONES FERRY-MOUNTAIN PARK	7.2/12.5 kV Grounded Y	[redacted]	2,336	221,566	72.36	0.763	-	2,336	221,566	72.36	0.763	-
BOONES FERRY	1170023	BOONES FERRY-WEMBLEY PARK	7.2/12.5 kV Grounded Y	[redacted]	505	215,818	137.55	0.322	-	505	215,818	137.55	0.322	-
BROOKWOOD	4185353	BROOKWOOD-BORWICK	7.2/12.5 kV Grounded Y	[redacted]	1	255	0.10	0.000	-	1	255	0.10	0.000	-
BROOKWOOD	4185213	BROOKWOOD-BROOKWOOD 13	7.2/12.5 kV Grounded Y	[redacted]	34	5,858	18.25	0.106	-	34	5,858	18.25	0.106	-
BROOKWOOD	4185243	BROOKWOOD-CRATER	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
BROOKWOOD	4185313	BROOKWOOD-SUNRISE	7.2/12.5 kV Grounded Y	[redacted]	515	111,960	52.34	0.241	-	515	111,960	52.34	0.241	-
BROOKWOOD	4185323	BROOKWOOD-TRILLIUM	7.2/12.5 kV Grounded Y	[redacted]	139	4,706	1.45	0.043	-	139	4,706	1.45	0.043	-
CEDAR HILLS	4200033	CEDAR HILLS-CEDAR HILLS 13	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
CEDAR HILLS	4200063	CEDAR HILLS-LEAHY	7.2/12.5 kV Grounded Y	[redacted]	5,060	1,260,120	455.41	1.829	2	5,060	1,260,120	455.41	1.829	2
CEDAR HILLS	4200013	CEDAR HILLS-SHOPPING CENTER	7.2/12.5 kV Grounded Y	[redacted]	3,676	630,187	291.89	1.703	-	3,676	630,187	291.89	1.703	-
CEDAR HILLS	4200043	CEDAR HILLS-SKYLINE	7.2/12.5 kV Grounded Y	[redacted]	4	512	0.67	0.005	-	4	512	0.67	0.005	-
CEDAR HILLS	4200053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	1	-	-	-	-	1
CEDAR HILLS	4200023	CEDAR HILLS-SYLVAN	7.2/12.5 kV Grounded Y	[redacted]	981	197,158	76.72	0.382	-	981	197,158	76.72	0.382	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
COFFEE CREEK	4209023	COFFEE CREEK-FREEMAN	7.2/12.5 kV Grounded Y	[redacted]	33	12,593	62.34	0.163	-	33	12,593	62.34	0.163	-
COFFEE CREEK	4209013	COFFEE CREEK-HOLIDAY	7.2/12.5 kV Grounded Y	[redacted]	5	614	1.74	0.014	-	5	614	1.74	0.014	-
CORNELIUS	4210033	CORNELIUS-ADAIR	7.2/12.5 kV Grounded Y	[redacted]	305	67,049	42.54	0.194	2	305	67,049	42.54	0.194	2
CORNELIUS	4210013	CORNELIUS-CORNELIUS 13	7.2/12.5 kV Grounded Y	[redacted]	737	334,533	116.72	0.257	1	737	334,533	116.72	0.257	1
CORNELIUS	4210023	CORNELIUS-VERBOORT	7.2/12.5 kV Grounded Y	[redacted]	362	44,888	25.56	0.206	3	362	44,888	25.56	0.206	3
CORNELL	4206023	CORNELL-BLUFFS	7.2/12.5 kV Grounded Y	[redacted]	752	59,394	15.88	0.201	1	752	59,394	15.88	0.201	1
CORNELL	4206013	CORNELL-SALTZMAN	7.2/12.5 kV Grounded Y	[redacted]	128	26,498	15.39	0.074	-	128	26,498	15.39	0.074	-
CORNELL	4206033	CORNELL-WESTLAWN	7.2/12.5 kV Grounded Y	[redacted]	491	114,082	62.04	0.267	-	491	114,082	62.04	0.267	-
DENNY	4222043	DENNY-EAST	7.2/12.5 kV Grounded Y	[redacted]	1,031	209,893	128.22	0.630	1	1,031	209,893	128.22	0.630	1
DENNY	4222013	DENNY-NORTH	7.2/12.5 kV Grounded Y	[redacted]	150	23,523	55.48	0.354	-	150	23,523	55.48	0.354	-
DENNY	4222033	DENNY-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	555	82,271	25.75	0.174	-	555	82,271	25.75	0.174	-
DENNY	4222023	DENNY-WEST	7.2/12.5 kV Grounded Y	[redacted]	1,437	250,210	92.33	0.530	2	1,437	250,210	92.33	0.530	2
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]	935	167,148	266.16	1.489	-	935	167,148	266.16	1.489	-
DURHAM	4224043	DURHAM-BONITA	7.2/12.5 kV Grounded Y	[redacted]	13	2,177	3.17	0.019	1	13	2,177	3.17	0.019	1
DURHAM	4224053	DURHAM-BRIDGEPORT	7.2/12.5 kV Grounded Y	[redacted]	72	14,031	11.32	0.058	-	72	14,031	11.32	0.058	-
DURHAM	4224013	DURHAM-DURHAM 13	7.2/12.5 kV Grounded Y	[redacted]	56	3,634	9.20	0.142	-	56	3,634	9.20	0.142	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
DURHAM	4224913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
DURHAM	4224023	DURHAM-SATTLER	7.2/12.5 kV Grounded Y	[redacted]	2,603	179,819	75.43	1.092	-	2,603	179,819	75.43	1.092	-
DURHAM	4224033	DURHAM-SOUTH	7.2/12.5 kV Grounded Y	[redacted]	9	316	0.56	0.016	-	9	316	0.56	0.016	-
GALES CREEK	4275013	GALES CREEK-GALES CREEK 13	7.2/12.5 kV Grounded Y	[redacted]	3,135	772,727	980.62	3.978	2	3,135	772,727	980.62	3.978	2
GARDEN HOME	4276023	GARDEN HOME-MCKAY	7.2/12.5 kV Grounded Y	[redacted]	833	118,842	43.44	0.304	2	833	118,842	43.44	0.304	2
GARDEN HOME	4276013	GARDEN HOME-METZGER	7.2/12.5 kV Grounded Y	[redacted]	8,102	2,436,015	789.89	2.627	1	8,102	2,436,015	789.89	2.627	1
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]	-	-	-	-	-	-	-	-	-	-
HILLSBORO	4320013	HILLSBORO-DAIRY CREEK	7.2/12.5 kV Grounded Y	[redacted]	684	50,032	11.62	0.159	2	684	50,032	11.62	0.159	2
HILLSBORO	4320053	HILLSBORO-DENNIS	7.2/12.5 kV Grounded Y	[redacted]	13	1,879	7.25	0.050	2	13	1,879	7.25	0.050	2
HILLSBORO	4320033	HILLSBORO-JACKSON	7.2/12.5 kV Grounded Y	[redacted]	320	42,981	15.68	0.117	2	320	42,981	15.68	0.117	2
HILLSBORO	4320023	HILLSBORO-LAUREL	7.2/12.5 kV Grounded Y	[redacted]	5,722	686,111	423.53	3.532	2	5,722	686,111	423.53	3.532	2
HILLSBORO	4320043	HILLSBORO-SCHOLLS	7.2/12.5 kV Grounded Y	[redacted]	275	41,297	36.71	0.244	2	275	41,297	36.71	0.244	2
HUBER	4330053	HUBER-BANY	7.2/12.5 kV Grounded Y	[redacted]	161	18,242	6.47	0.057	-	161	18,242	6.47	0.057	-
HUBER	4330023	HUBER-FARMINGTON	7.2/12.5 kV Grounded Y	[redacted]	1,215	127,861	37.21	0.354	-	1,215	127,861	37.21	0.354	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
HUBER	4330013	HUBER-HUBER 13	7.2/12.5 kV Grounded Y	[redacted]	4,826	716,258	172.59	1.163	1	4,826	716,258	172.59	1.163	1
HUBER	4330033	HUBER-KINNAMAN	7.2/12.5 kV Grounded Y	[redacted]	3,083	473,862	192.31	1.251	-	3,083	473,862	192.31	1.251	-
HUBER	4330043	HUBER-MARYVILLE	7.2/12.5 kV Grounded Y	[redacted]	1,001	248,934	54.84	0.221	-	1,001	248,934	54.84	0.221	-
KING CITY	4378023	KING CITY-BULL MOUNTAIN	7.2/12.5 kV Grounded Y	[redacted]	522	132,532	94.80	0.373	-	522	132,532	94.80	0.373	-
KING CITY	4378013	KING CITY-FISCHER	7.2/12.5 kV Grounded Y	[redacted]	200	23,280	7.33	0.063	-	200	23,280	7.33	0.063	-
KING CITY	4378043	KING CITY-HAZELBROOK	7.2/12.5 kV Grounded Y	[redacted]	129	38,964	22.34	0.074	-	129	38,964	22.34	0.074	-
KING CITY	4378053	KING CITY-NORTH	7.2/12.5 kV Grounded Y	[redacted]	99	14,966	6.89	0.046	-	99	14,966	6.89	0.046	-
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]	60	7,285	2.68	0.022	-	60	7,285	2.68	0.022	-
MAIN	4422023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	408	91,536	50.80	0.226	-	408	91,536	50.80	0.226	-
MAIN	4422033	MAIN-BENTLEY	7.2/12.5 kV Grounded Y	[redacted]	281	45,471	20.73	0.128	-	281	45,471	20.73	0.128	-
MAIN	4422053	MAIN-EXPRESS	7.2/12.5 kV Grounded Y	[redacted]	509	173,787	56.02	0.164	-	509	173,787	56.02	0.164	-
MAIN	4422073	MAIN-GRIFFIN OAKS	7.2/12.5 kV Grounded Y	[redacted]	147	10,733	10,732.8	147.000	-	147	10,733	10,732.8	147.000	-
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]	3,830	277,127	106.10	1.466	2	3,830	277,127	106.10	1.466	2
[redacted]	4430913	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
MERIDIAN	4447083	MERIDIAN-65TH	7.2/12.5 kV Grounded Y	[redacted]	4	833	0.79	0.004	-	4	833	0.79	0.004	-
MERIDIAN	4447053	MERIDIAN-BORLAND	7.2/12.5 kV Grounded Y	[redacted]	10	3,222	3.56	0.011	-	10	3,222	3.56	0.011	-
MERIDIAN	4447093	MERIDIAN-CHILDS	7.2/12.5 kV Grounded Y	[redacted]	3	649	0.76	0.004	-	3	649	0.76	0.004	-
MERIDIAN	4447063	MERIDIAN-LAKEVIEW	7.2/12.5 kV Grounded Y	[redacted]	29	2,431	6.43	0.077	-	29	2,431	6.43	0.077	-
MERIDIAN	4447013	MERIDIAN-MERIDIAN 13	7.2/12.5 kV Grounded Y	[redacted]	235	59,035	41.90	0.167	-	235	59,035	41.90	0.167	-
MERIDIAN	4447073	MERIDIAN-NYBERG	7.2/12.5 kV Grounded Y	[redacted]	19	2,617	18.69	0.136	-	19	2,617	18.69	0.136	-
MERIDIAN	4447043	MERIDIAN-PILKINGTON	7.2/12.5 kV Grounded Y	[redacted]	4,588	625,156	264.56	1.942	-	4,588	625,156	264.56	1.942	-
MERIDIAN	4447033	MERIDIAN-SAGERT	7.2/12.5 kV Grounded Y	[redacted]	66	19,254	6.64	0.023	-	66	19,254	6.64	0.023	-
MURRAYHILL	4482033	MURRAYHILL-KINTON	7.2/12.5 kV Grounded Y	[redacted]	56	5,889	1.32	0.013	-	56	5,889	1.32	0.013	-
MURRAYHILL	4482013	MURRAYHILL-MURRAYHILL 13	7.2/12.5 kV Grounded Y	[redacted]	723	103,354	25.00	0.175	-	723	103,354	25.00	0.175	-
MURRAYHILL	4482053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
MURRAYHILL	4482043	MURRAYHILL-REUSSER	7.2/12.5 kV Grounded Y	[redacted]	134	17,259	8.02	0.062	-	134	17,259	8.02	0.062	-
MURRAYHILL	4482023	MURRAYHILL-TEAL	7.2/12.5 kV Grounded Y	[redacted]	722	165,975	42.14	0.183	-	722	165,975	42.14	0.183	-
NORTH PLAINS	4510023	NORTH PLAINS-MASON HILL	7.2/12.5 kV Grounded Y	[redacted]	3,435	1,027,832	476.51	1.592	-	3,435	1,027,832	476.51	1.592	-
NORTH PLAINS	4510013	NORTH PLAINS-NORTH PLAINS 13	7.2/12.5 kV Grounded Y	[redacted]	4,042	751,938	497.64	2.675	-	4,042	751,938	497.64	2.675	-
OAK HILLS	4516033	OAK HILLS-FIVE OAKS	7.2/12.5 kV Grounded Y	[redacted]	2,094	202,946	103.76	1.071	1	2,094	202,946	103.76	1.071	1
OAK HILLS	4516053	OAK HILLS-GREENBRIER	7.2/12.5 kV Grounded Y	[redacted]	3	1,157	2.36	0.006	-	3	1,157	2.36	0.006	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
OAK HILLS	4516013	OAK HILLS-OAK HILLS 13	7.2/12.5 kV Grounded Y	[redacted]	13	368	0.27	0.009	-	13	368	0.27	0.009	-
OAK HILLS	4516023	OAK HILLS-SOMERSET	7.2/12.5 kV Grounded Y	[redacted]	122	19,124	11.85	0.076	-	122	19,124	11.85	0.076	-
OAK HILLS	4516043	OAK HILLS-WALKER	7.2/12.5 kV Grounded Y	[redacted]	2	296	0.13	0.001	-	2	296	0.13	0.001	-
ORENCO	4518433	ORENCO-231ST	7.2/12.5 kV Grounded Y	[redacted]	71	12,199	4.63	0.027	-	71	12,199	4.63	0.027	-
ORENCO	4518543	ORENCO-AMBERGLEN	7.2/12.5 kV Grounded Y	[redacted]	3,943	617,010	174.74	1.117	-	3,943	617,010	174.74	1.117	-
ORENCO	4518523	ORENCO-BASELINE	7.2/12.5 kV Grounded Y	[redacted]	704	177,581	50.21	0.199	-	704	177,581	50.21	0.199	-
ORENCO	4518313	ORENCO-ORENCO 13	7.2/12.5 kV Grounded Y	[redacted]	4	527	0.70	0.005	-	4	527	0.70	0.005	-
ORENCO	4518323	ORENCO-PRIMATE	7.2/12.5 kV Grounded Y	[redacted]	2,615	244,290	93.96	1.006	-	2,615	244,290	93.96	1.006	-
ORENCO	4518443	ORENCO-WILKINS	7.2/12.5 kV Grounded Y	[redacted]	130	46,573	23.46	0.065	-	130	46,573	23.46	0.065	-
OSWEGO	1520013	OSWEGO-IRON MOUNTAIN	7.2/12.5 kV Grounded Y	[redacted]	1,440	167,380	141.37	1.216	1	1,440	167,380	141.37	1.216	1
OSWEGO	1520033	OSWEGO-MARYLHURST	7.2/12.5 kV Grounded Y	[redacted]	538	144,818	68.05	0.253	1	538	144,818	68.05	0.253	1
OSWEGO	1520043	OSWEGO-PALATINE	7.2/12.5 kV Grounded Y	[redacted]	764	333,509	188.85	0.433	2	764	333,509	188.85	0.433	2
OSWEGO	1520023	OSWEGO-STAFFORD	7.2/12.5 kV Grounded Y	[redacted]	2,102	144,175	74.55	1.087	-	2,102	144,175	74.55	1.087	-
PROGRESS	4565053	PROGRESS-GREENBURG	7.2/12.5 kV Grounded Y	[redacted]	934	138,935	72.06	0.484	-	934	138,935	72.06	0.484	-
PROGRESS	4565063	PROGRESS-HALL	7.2/12.5 kV Grounded Y	[redacted]	17	4,809	25.85	0.091	-	17	4,809	25.85	0.091	-
PROGRESS	4565013	PROGRESS-ROBINSON	7.2/12.5 kV Grounded Y	[redacted]	280	44,494	20.22	0.127	1	280	44,494	20.22	0.127	1
PROGRESS	4565023	PROGRESS-SAWYER	7.2/12.5 kV Grounded Y	[redacted]	13	6,248	7.77	0.016	-	13	6,248	7.77	0.016	-

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Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
PROGRESS	4565033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
PROGRESS	4565043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
RALEIGH HILLS	4570073	RALEIGH HILLS-DOGWOOD	7.2/12.5 kV Grounded Y	[redacted]	558	81,196	46.16	0.317	1	558	81,196	46.16	0.317	1
RALEIGH HILLS	4570053	RALEIGH HILLS-MONTCLAIR	7.2/12.5 kV Grounded Y	[redacted]	1,380	243,725	158.99	0.900	1	1,380	243,725	158.99	0.900	1
RALEIGH HILLS	4570063	RALEIGH HILLS-OLESON	7.2/12.5 kV Grounded Y	[redacted]	2,544	187,479	87.89	1.193	1	2,544	187,479	87.89	1.193	1
REEDVILLE	4583083	REEDVILLE-AUGUSTA	7.2/12.5 kV Grounded Y	[redacted]	3,930	516,464	150.97	1.149	1	3,930	516,464	150.97	1.149	1
REEDVILLE	4583033	REEDVILLE-BLANTON	7.2/12.5 kV Grounded Y	[redacted]	4,294	83,427	28.39	1.461	1	4,294	83,427	28.39	1.461	1
REEDVILLE	4583013	REEDVILLE-HAZELDALE	7.2/12.5 kV Grounded Y	[redacted]	318	80,800	33.50	0.132	-	318	80,800	33.50	0.132	-
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]	28	8,665	787.70	2.545	-	28	8,665	787.70	2.545	-
REEDVILLE	4583023	REEDVILLE-TV	7.2/12.5 kV Grounded Y	[redacted]	55	9,821	5.45	0.031	-	55	9,821	5.45	0.031	-
ROCK CREEK	4598023	ROCK CREEK-185TH	7.2/12.5 kV Grounded Y	[redacted]	3,097	289,860	102.39	1.094	2	3,097	289,860	102.39	1.094	2
ROCK CREEK	4598033	ROCK CREEK-FOREST PARK	7.2/12.5 kV Grounded Y	[redacted]	256	89,806	43.62	0.124	1	256	89,806	43.62	0.124	1
ROCK CREEK	4598013	ROCK CREEK-NEWBERRY	7.2/12.5 kV Grounded Y	[redacted]	3,078	364,695	364.33	3.075	-	3,078	364,695	364.33	3.075	-

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Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
ROSEWAY	4605033	ROSEWAY-ALEXANDER	7.2/12.5 kV Grounded Y	[redacted]	102	19,936	13.64	0.070	-	102	19,936	13.64	0.070	-
ROSEWAY	4605063	ROSEWAY-BUTTERNUT	7.2/12.5 kV Grounded Y	[redacted]	68	14,791	40.41	0.186	-	68	14,791	40.41	0.186	-
ROSEWAY	4605043	ROSEWAY-CENTURY	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
ROSEWAY	4605023	ROSEWAY-ESPLANADE	7.2/12.5 kV Grounded Y	[redacted]	442	17,647	8.09	0.203	-	442	17,647	8.09	0.203	-
ROSEWAY	4605013	ROSEWAY-ROSEWAY 13	7.2/12.5 kV Grounded Y	[redacted]	156	15,624	8.31	0.083	1	156	15,624	8.31	0.083	1
ROSEWAY	4605053	ROSEWAY-SOHI	7.2/12.5 kV Grounded Y	[redacted]	146	15,614	11.02	0.103	-	146	15,614	11.02	0.103	-
[redacted]	9999013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	18	14,336	754.55	0.947	-	18	14,336	754.55	0.947	-
SCHOLLS FERRY	4645113	SCHOLLS FERRY-KEMMER	7.2/12.5 kV Grounded Y	[redacted]	42	9,619	4.47	0.020	1	42	9,619	4.47	0.020	1
SCHOLLS FERRY	4645123	SCHOLLS FERRY-RAINBOW	7.2/12.5 kV Grounded Y	[redacted]	567	308,579	200.38	0.368	-	567	308,579	200.38	0.368	-
SCHOLLS FERRY	4645133	SCHOLLS FERRY-ROY ROGERS	7.2/12.5 kV Grounded Y	[redacted]	3,993	318,048	109.82	1.379	1	3,993	318,048	109.82	1.379	1
SCOGGINS	4650023	SCOGGINS-CHERRY GROVE	7.2/12.5 kV Grounded Y	[redacted]	852	298,340	630.74	1.801	1	852	298,340	630.74	1.801	1
SCOGGINS	4650013	SCOGGINS-LAURELWOOD	7.2/12.5 kV Grounded Y	[redacted]	777	184,356	162.00	0.683	-	777	184,356	162.00	0.683	-
SHUTE	4660174	SHUTE-AZALEA	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SHUTE	4660064	SHUTE-BIRCH	34.5 kV Grounded Y	[redacted]	1	276	276.27	1.000	-	1	276	276.27	1.000	-
SHUTE	4660184	SHUTE-CARNATION	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SHUTE	4660074	SHUTE-FERN	34.5 kV Grounded Y	[redacted]	1	179	59.74	0.333	-	1	179	59.74	0.333	-
SHUTE	4660194	SHUTE-FREESIA	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-

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SHUTE	4660134	SHUTE-IRIS	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SHUTE	4660144	SHUTE-JASMINE	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SHUTE	4660154	SHUTE-LILAC	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]	1	7,178	7,177.85	1.000	-	1	7,178	7,177.85	1.000	-
SHUTE	4660014	SHUTE-NOBLE	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SHUTE	4660204	SHUTE-ORCHID	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]	3	368	368.20	3.000	-	3	368	368.20	3.000	-
SHUTE	4660164	[redacted]	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SHUTE	4660104	SHUTE-SPRUCE	34.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SHUTE	4660094	SHUTE-TULIP	34.5 kV Grounded Y	[redacted]	1	12	4.06	0.333	-	1	12	4.06	0.333	-
SIX CORNERS	4670013	SIX CORNERS-13359	7.2/12.5 kV Grounded Y	[redacted]	502	74,666	23.98	0.161	3	502	74,666	23.98	0.161	3
SIX CORNERS	4670023	SIX CORNERS-13360	7.2/12.5 kV Grounded Y	[redacted]	14	3,562	3.12	0.012	-	14	3,562	3.12	0.012	-
SIX CORNERS	4670043	SIX CORNERS-BORCHERS	7.2/12.5 kV Grounded Y	[redacted]	657	236,806	123.53	0.343	-	657	236,806	123.53	0.343	-
SIX CORNERS	4670033	SIX CORNERS-CHAPMAN	7.2/12.5 kV Grounded Y	[redacted]	198	52,922	16.52	0.062	-	198	52,922	16.52	0.062	-
SIX CORNERS	4670053	SIX CORNERS-SIX CORNERS 13	7.2/12.5 kV Grounded Y	[redacted]	247	51,788	29.80	0.142	-	247	51,788	29.80	0.142	-

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[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]	-	-	-	-	-	-	-	-	-	-
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]	694	173,906	51.38	0.205	-	694	173,906	51.38	0.205	-
ST MARYS EAST	4635013	ST MARYS EAST-JENKINS	7.2/12.5 kV Grounded Y	[redacted]	3	735	22.27	0.091	-	3	735	22.27	0.091	-
ST MARYS EAST	4635063	ST MARYS EAST-MILLIKAN	7.2/12.5 kV Grounded Y	[redacted]	247	126,598	68.99	0.135	-	247	126,598	68.99	0.135	-
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]	-	-	-	-	-	-	-	-	-	-
SUNSET	4679313	SUNSET-BLANCHET	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SUNSET	4679453	SUNSET-COLFAX	7.2/12.5 kV Grounded Y	[redacted]	38	2,737	136.84	1.900	-	38	2,737	136.84	1.900	-
SUNSET	4679133	SUNSET-CORNELL	7.2/12.5 kV Grounded Y	[redacted]	4	367	183.69	2.000	-	4	367	183.69	2.000	-
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]	2	735	367.68	1.000	-	2	735	367.68	1.000	-
SUNSET	4679123	SUNSET-DORION	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-

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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]	-	-	-	-	-	-	-	-	-	-
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]	-	-	-	-	-	-	-	-	-	-

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Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
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]	1	219	31.32	0.143	-	1	219	31.32	0.143	-
SUNSET	4679243	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
SUNSET	4679463	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
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]	2	1,898	1,898.17	2.000	-	2	1,898	1,898.17	2.000	-
SUNSET	4679423	SUNSET-MEEK	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
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]	-	-	-	-	-	-	-	-	-	-
SUNSET	4679233	SUNSET-WHITMAN	7.2/12.5 kV Grounded Y	[redacted]	6	2,454	34.56	0.085	-	6	2,454	34.56	0.085	-

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SUNSET	4679113	SUNSET-YOUNG	7.2/12.5 kV Grounded Y	[redacted]	3	723	34.43	0.143	-	3	723	34.43	0.143	-
SYLVAN	1685013	SYLVAN-BARNES	7.2/12.5 kV Grounded Y	[redacted]	3,573	1,273,272	473.86	1.330	2	3,573	1,273,272	473.86	1.330	2
SYLVAN	1685023	SYLVAN-PATTON	7.2/12.5 kV Grounded Y	[redacted]	2,612	1,295,158	456.52	0.921	3	2,612	1,295,158	456.52	0.921	3
[redacted]	4693093	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
[redacted]	4693063	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	57	8,040	17.14	0.122	-	57	8,040	17.14	0.122	-
[redacted]	4693083	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	1,659	697,598	227.75	0.542	1	1,659	697,598	227.75	0.542	1
[redacted]	4693053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	3	1,057	70.47	0.200	-	3	1,057	70.47	0.200	-
[redacted]	4693033	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	1,067	224,847	132.65	0.629	-	1,067	224,847	132.65	0.629	-
[redacted]	4693043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	780	302,927	84.78	0.218	-	780	302,927	84.78	0.218	-
[redacted]	4693023	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	103	14,814	21.32	0.148	-	103	14,814	21.32	0.148	-
[redacted]	4693073	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	14	3,661	457.68	1.750	-	14	3,661	457.68	1.750	-
[redacted]	4693013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	4	833	41.64	0.200	-	4	833	41.64	0.200	-
TIGARD	4695013	TIGARD-13336	7.2/12.5 kV Grounded Y	[redacted]	36	2,874	2.49	0.031	-	36	2,874	2.49	0.031	-
TIGARD	4695043	TIGARD-13337	7.2/12.5 kV Grounded Y	[redacted]	52	6,662	4.96	0.039	-	52	6,662	4.96	0.039	-
TIGARD	4695023	TIGARD-13361	7.2/12.5 kV Grounded Y	[redacted]	1,245	69,595	62.08	1.111	1	1,245	69,595	62.08	1.111	1
TIGARD	4695033	TIGARD-13362	7.2/12.5 kV Grounded Y	[redacted]	441	187,114	73.23	0.173	1	441	187,114	73.23	0.173	1
TIGARD	4695053	TIGARD-TIGARD 13	7.2/12.5 kV Grounded Y	[redacted]	467	99,436	46.73	0.219	-	467	99,436	46.73	0.219	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFIE
[redacted]	4999013	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
[redacted]	4999023	[redacted]	12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
TUALATIN	4697023	TUALATIN-AVERY	7.2/12.5 kV Grounded Y	[redacted]	176	42,830	19.79	0.081	-	176	42,830	19.79	0.081	-
TUALATIN	4697063	TUALATIN-CIPOLE	7.2/12.5 kV Grounded Y	[redacted]	489	44,082	123.14	1.366	1	489	44,082	123.14	1.366	1
TUALATIN	4697043	TUALATIN-HERMAN	7.2/12.5 kV Grounded Y	[redacted]	122	17,727	88.63	0.610	1	122	17,727	88.63	0.610	1
TUALATIN	4697013	TUALATIN-IBACH	7.2/12.5 kV Grounded Y	[redacted]	5	1,765	1.13	0.003	-	5	1,765	1.13	0.003	-
TUALATIN	4697053	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	52	1,232	24.16	1.020	-	52	1,232	24.16	1.020	-
TUALATIN	4697033	TUALATIN-TUALATIN 13	7.2/12.5 kV Grounded Y	[redacted]	40	21,693	164.34	0.303	-	40	21,693	164.34	0.303	-
WEST PORTLAND	4735033	WEST PORTLAND-72ND	7.2/12.5 kV Grounded Y	[redacted]	293	55,547	45.27	0.239	2	293	55,547	45.27	0.239	2
WEST PORTLAND	4735043	WEST PORTLAND-NORTH	7.2/12.5 kV Grounded Y	[redacted]	1,024	133,270	48.43	0.372	2	1,024	133,270	48.43	0.372	2
WEST PORTLAND	4735023	WEST PORTLAND-PACIFIC	7.2/12.5 kV Grounded Y	[redacted]	697	127,533	47.30	0.259	2	697	127,533	47.30	0.259	2
WEST PORTLAND	4735013	WEST PORTLAND-WEST PORTLAND 13	7.2/12.5 kV Grounded Y	[redacted]	437	160,302	148.84	0.406	2	437	160,302	148.84	0.406	2
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]	227	48,388	49.17	0.231	-	227	48,388	49.17	0.231	-
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]	2	188	1.36	0.014	-	2	188	1.36	0.014	-
WEST UNION	4737023	WEST UNION-WEST UNION 13	7.2/12.5 kV Grounded Y	[redacted]	798	202,293	78.74	0.311	-	798	202,293	78.74	0.311	-

2023					Major Events Excluded					Major Events Included				
Substation Name	Circuit Id	Circuit Name	Voltage	Circuit Customer Count	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$	Customers Interrupted	Customer Minutes Interrupted	SAIDI	SAIFI	MAIFI$_E$
WILSONVILLE	4745073	WILSONVILLE-BOECKMAN	7.2/12.5 kV Grounded Y	[redacted]	3,005	199,899	144.54	2.173	-	3,005	199,899	144.54	2.173	-
WILSONVILLE	4745063	WILSONVILLE-CHARBONNEAU	7.2/12.5 kV Grounded Y	[redacted]	961	121,253	47.46	0.376	-	961	121,253	47.46	0.376	-
WILSONVILLE	4745013	WILSONVILLE-CITY	7.2/12.5 kV Grounded Y	[redacted]	5,670	425,365	106.63	1.421	-	5,670	425,365	106.63	1.421	-
WILSONVILLE	4745043	[redacted]	7.2/12.5 kV Grounded Y	[redacted]	-	-	-	-	-	-	-	-	-	-
WILSONVILLE	4745023	WILSONVILLE-PARKWAY	7.2/12.5 kV Grounded Y	[redacted]	85	37,323	44.43	0.101	-	85	37,323	44.43	0.101	-
WILSONVILLE	4745033	WILSONVILLE-VILLEBOIS	7.2/12.5 kV Grounded Y	[redacted]	212	30,642	18.72	0.130	-	212	30,642	18.72	0.130	-
WILSONVILLE	4745093	WILSONVILLE-WEST	7.2/12.5 kV Grounded Y	[redacted]	1,646	504,441	155.31	0.507	-	1,646	504,441	155.31	0.507	-

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.

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

$MAIFI_E$

The momentary average interruption event frequency index. 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., 115 kV) 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. Most 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

No Major Event Days were identified in 2023.

Since 2012, PGE has calculated T_{MED} and reported MEDs at the service-territory level, defined in this report as the Reliability Reporting Area. Prior to 2012, MEDs 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.

Appendix D Outage Management System Cause Code Mapping

Table 32 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 32: 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	*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

OAR Cause	OMS Cause Code	PGE Outage Map/Text Cause Code
C Distribution - Equipment	Regulator	Equipment Issue
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	System Upgrades
E Distribution - Planned	Public Safety Power Shutoff	Public Safety Power Shutoff
E Distribution - Planned	Rotating Outage	Rotating Outage
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' or 'Substation' will be assigned to the Loss of Supply – Transmission or Loss of Supply - Substation cause categories, respectively. The appropriate cause code will also be assigned.

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