

**Dockets UE-170033 and UG-170034 (consolidated) and Dockets UE-072300 and
UG-072301 (consolidated)**

**Puget Sound Energy
2022 Service Quality Program and Electric Service Reliability Filing**

**Attachment A:
Service Quality and Electric Service Reliability Report**

**Puget Sound Energy
2022
Service Quality and Electric Service Reliability Report**

Filed on March 29, 2023

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CHAPTER 1

INTRODUCTION

Service Quality and Electric Service Reliability Report

This Puget Sound Energy 2022 Service Quality and Electric Service Reliability Report meets PSE’s Service Quality Program reporting requirements¹ and the electric service reliability reporting requirements set forth by the Washington Utilities and Transportation Commission.^{2,3} To facilitate external review of PSE’s service quality performance and electric service reliability performance, the two reporting were combined starting with the 2010 reporting year.⁴

Executive Summary

As Washington State’s oldest and largest energy utility, with a 6,000-square-mile service territory stretching across 10 counties, Puget Sound Energy (“PSE” or the “Company”) serves approximately 1.2 million electric customers and about 900,000 natural gas customers primarily in the Puget Sound region of Western Washington. PSE is committed to providing energy that is clean, safe, reliable, affordable, and equitable. PSE meets the energy needs of its customers

¹ The performance benchmark, calculation and reporting of each of the Service Quality Indices (SQIs) in this Report reflect all modifications regarding SQI mechanics stipulated in the Twelfth Supplemental Order of Dockets UE-011570 and UG-011571; Orders 1 and 2 of UE-031946; Orders 12, 14, 16, 17, 18, 19, 20, 21, 23, and 29 of consolidated Dockets UE-072300 and UG-072301; and Order 8 of Dockets UE-170033 and UG-170034.

² The Electric Service Reliability section of this Report reflects all of PSE’s electric service reliability reporting requirements outlined in Docket UE-110060 and in the following sections of the electric service reliability WAC:

- WAC 480-100-388, Electric service reliability definitions,
- WAC 480-100-393, Electric service reliability monitoring and reporting plan,
- WAC 480-100-398, Electric service reliability reports.

³ Two PSE commitments regarding the preparation of the Electric Service Reliability section, as outlined in Section F, Reporting of Customer Complaint Information, of Appendix D to Order 12 of consolidated Dockets UE-072300 and UG-072301 (Section F), are also satisfied in this annual report. 1) Chapter 3 Customer Electric Reliability Complaints section describes how the customer complaint information is used in PSE’s circuit reliability evaluation. Appendix M details PSE’s actions to resolve these complaints. 2) Prior to the filing of each annual report, PSE used to invite UTC staff and the Public Counsel Section of the Washington State Attorney General’s Office (“Public Counsel”) to discuss the format and content of the Electric Service Reliability section since the adoption of Order 12. However, as agreed to by Public Counsel, UTC staff and PSE at the March 13, 2012 meeting, an annual external review meeting of PSE’s reliability results, prior to the filing, is not required. If, however, an external meeting on the format and content of PSE’s Electric Service Reliability section is called for by an external party or PSE, then Public Counsel should be invited.

⁴The annual reporting of the Service Quality Program and the Electric Service Reliability was due separately before the UTC by February 15 and March 31 of each year, respectively. To facilitate external review, PSE filed a petition in October 2010 to consolidate the two reporting requirements, among other petition requests. The UTC granted PSE’s petition in November 2010 (Order 17 of consolidated Dockets UE-072300 and UG-072301) and the reporting consolidation became effective for the 2010 performance periods and each report thereafter.

through cost-effective energy efficiency measures, procurement of sustainable energy resources, and far-sighted investment in the energy-delivery infrastructure. PSE employees are dedicated to providing quality customer service and to delivering energy that is safe, dependable, efficient, and environmentally responsible.

This Service Quality and Electric Service Reliability Report provides PSE's performance results for the following areas: service quality of PSE and its service providers, Customer Service Guarantee, Restoration Service Guarantees, and electric service reliability. For the 2022 reporting year, PSE's electric and natural gas service providers met all seven of the service provider indices. PSE met seven of its nine Service Quality Indices ("SQI") benchmarks but PSE did not meet the benchmark for the length of non-major-storm power outages, per year, per customer (SQI #3) and the benchmark for the Customer Access Center answering performance (SQI #5). See Table 1a: Service Quality and Electric Service Reliability and Service Provider Performance Metrics for a summary of these performance results.

While the length of power outages per year, per customer decreased in 2022 compared to 2021, weather events in January, November, and December were significant contributors to the annual 2022 performance exceeding the SQI #3 benchmark of 155 minutes. There is no service-quality performance penalty associated with SQI #3, but PSE will provide customers a \$50 account credit when PSE doesn't restore the customer's power within 24-consecutive hours during a non-major-storm power outage.⁵ See the Service Guarantees section for further information.

The key causes of missing the SQI #5 benchmark of 80% of calls answered live within 60 seconds include resource constraints, technology issues, and increased call volumes due to winter weather events and the annual purchased gas rate adjustments. The penalty for not meeting the SQI #5 benchmark is \$742,500. PSE will contribute the entire amount of \$742,500 to its electric and natural gas Schedule 129 energy bill assistance programs as extra funding to the programs.

Background

PSE first implemented its Service Quality Program (the "SQ Program") when the Washington Utilities and Transportation Commission ("UTC", "WUTC", or the "Commission") authorized the merger of Washington Natural Gas Company and Puget Sound Power & Light Company in 1997. The stated purpose of the SQ Program was to "provide a specific mechanism to assure customers that they will not experience deterioration in quality of service" and to "protect customers of PSE from poorly-targeted cost cutting."⁶ The SQ Program has been further extended with various modifications to demonstrate PSE's continuous commitment to customer protection and quality

⁵ The SQI #3 SAIDI penalty mechanics was replaced on July 30, 2016, by PSE's 24-hour Restoration Service Guarantee available under PSE's electric Schedule 131, Restoration Service Guarantees, where a \$50 credit is applied to customers' account if they experienced certain prolonged outages per the terms and conditions prescribed in Schedule 131.

⁶ Under consolidated Dockets UE-951270 and UE-960195.

service.⁷

Service Quality Program

The Service Quality Program includes three components:

- **Service Quality Index (“SQI”)**—PSE reports annually to the UTC on the final performance of these nine SQIs. ⁸ This document explains the SQIs, how they are calculated and PSE’s performance on each of the SQIs for the 2022 reporting year.
- **Customer Service Guarantee (“CSG”)**—The Customer Service Guarantee provides for a \$50 credit when PSE misses an SQI #10 appointment based upon the conditions and terms outlined in PSE’s electric and natural gas Schedules 130 Customer Service Guarantee. This Customer Service Guarantee has been available to all customers since the inception of PSE’s Service Quality Program in 1997.
- **Restoration Service Guarantees (“RSG”)**—The Restoration Service Guarantees provides for a \$50 credit to a qualified PSE electric customer based upon the conditions and exceptions outlined in PSE’s electric Schedule 131 Restoration Service Guarantees. There are two RSGs: the 120-hour restoration service guarantee during any storm event and the 24-hour restoration service guarantee during a non-major storm event. The 120-hour guarantee was established in 2008. The 24-hour guarantee became effective on January 1, 2017.

Service Provider Performance

In addition to these three components, the SQ Program also includes reporting of service quality performance of PSE’s primary service providers. Seven Service Provider Indices (“SPIs”) are tracked and reported in areas of kept appointments, construction standards compliance, reliability and service restoration. See Chapter 1, the Service Provider Performance section of this report for the results of these 2022 SPIs.

Annual UTC Service Quality Program and Electric Service Reliability Filing

The Service Quality and Electric Service Reliability Report is filed as Attachment A to PSE’s Annual UTC Service Quality Program and Electric Service Reliability Filing. Besides the reporting of SQIs, SPIs CSG, and RSG; the SQ Program also requires the filing with the UTC of PSE’s natural gas emergency response plans for outlying areas. These plans are filed concurrently with this report as Attachment B to the annual UTC compliance reporting filing. Also, being filed concurrently as Attachment C to this annual UTC filing is PSE’s 2022 Critical Infrastructure

⁷ Under Dockets UE-011570 and UG-011571 (consolidated), UE-072300 and UG-072301 (consolidated), and Dockets UE-170033 and UG-170034 (consolidated).

⁸ The SQI Semi-Annual Report used to be filed in July of each reporting year; it is discontinued per Order 24/10 of the consolidated Dockets UE-220066, UG-220067, and UG-210918 approved by UTC on December 22, 2022.

Security Annual Report, which contains a discussion of PSE’s cybersecurity and physical security policies and related information for 2022.

Overview of Performance

Table 1a summarizes PSE’s 2022 Service Quality Program and Electric Service Reliability performance, along with relevant service providers’ performance metrics and the three service guarantees: Customer Service Guarantee, 24-hour Restoration Service Guarantee, and 120-hour Restoration Service Guarantee.

PSE met seven of the nine service-quality measurements and improved its performance for three indices 1) SQI #8, field service operations transactions customer satisfaction (2021 at 96% satisfaction and 2022 at 97% satisfaction); 2) SQI #4, System Average Interruption Frequency (2021 at 1.35 interruptions and 2022 at 1.06 interruptions); and 3) SQI #11, Electric safety response time (2021 at 69 minutes and 2022 at 54 minutes). PSE did not meet the two of benchmarks: 1) SQI #3, length of power outages per year, per customer and 2) SQI #5, percent of calls answered live within 60 seconds by our Customer Care Center.

Both the SQI #3 and SQI #5 performance results for 2022 were negatively impacted by the numerous weather events in 2022. While PSE’s SQI #3 performance improved in 2022 compared to 2021 (2021 at 207 minutes and 2022 at 188 minutes), weather events in January, November, and December were significant contributors to the annual 2022 performance exceeding the SQI #3 benchmark of 155 minutes. There is no performance penalty associated with this measurement, but PSE will provide customers a \$50 account credit when PSE doesn’t restore the customer’s power within 24 consecutive hours during a non-major-storm power outage.

Besides the weather events, SQI #5 performance was also adversely affected by resource constraints, technology issues, and increased call volumes due to the 12% increase of purchased gas rate adjustments that became effective on November 1, 2022. The overall 2022 SQI #5 is 69%, short of the benchmark of 80%. The penalty for not meeting the SQI #5 benchmark is \$742,500. Per the SQ Program mechanics approved by the UTC, when the annual penalty dollars are less than the equivalent of \$12 per customer, the annual penalty will be allocated to PSE’s low income energy bill assistance program, the Home Energy Lifeline Program (“HELP”) under the electric and natural gas Schedules 129. PSE’s owners will contribute the entire \$742,500 to the electric and natural gas HELP as an additional funding to these two Schedule 129 HELP. The SQI #5 performance penalty of \$742,500 will not be borne by ratepayers.

Appendix C of this report details the penalty calculation and allotment.

Table 1a: Service Quality and Electric Service Reliability and Service Provider Performance Metrics

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Customer Satisfaction				
WUTC complaint ratio	Service Quality Index #2	No more than 0.40 complaints per 1,000 customers, including all complaints filed with WUTC	0.14	<input checked="" type="checkbox"/>
Customer Access Center transactions customer satisfaction	Service Quality Index #6	At least 90% satisfied (rating of 5 or higher on a 7-point scale)	94%	<input checked="" type="checkbox"/>
Field service operations transactions customer satisfaction	Service Quality Index #8	At least 90% satisfied (rating of 5 or higher on a 7-point scale)	97%	<input checked="" type="checkbox"/>
Customer Service				
Customer Access Center answering performance	Service Quality Index #5	At least 80% of calls answered by a live representative within 60 seconds of request to speak with live operator ⁹	69%	<input type="checkbox"/>
Operations Services—Appointments				
Appointments kept	Service Quality Index #10	At least 92% of appointments kept	99% ¹⁰	<input checked="" type="checkbox"/>
Service provider appointments kept—Quanta Electric	Service Provider Index #3B ¹¹	At least 92% of appointments kept	99%	<input checked="" type="checkbox"/>
Service provider appointments kept—Quanta Gas	Service Provider Index #3C	At least 92% of appointments kept	100% ¹²	<input checked="" type="checkbox"/>
Customer Service Guarantee	Service Guarantee #10	A \$50 credit to customers when PSE fails to meet a scheduled SQI appointment	\$17,400	--

⁹ Benchmark revision per UTC Dockets UE-170033 and UG-170034 Order 08, dated December 5, 2017, for SQI #5 annual performance from 2021 and years after.

¹⁰ Missed appointments by type are detailed in Appendix F: *Customer Service Guarantee Performance Detail*.

¹¹ There were no results for Service Provider Indices (SPI) #1A, #2A, #3A and #4A. These indices were assigned to a service provider, Pilchuck, which no longer works for PSE. PSE transitioned all natural gas construction and maintenance work to Quanta Gas as of April 30, 2011. Service Provider Indices #2B and #2C, Service Provider Customer Satisfaction, Quanta Electric and Quanta Gas, respectively, which were applicable in prior years' reports, have been terminated since the 2013 reporting period.

¹² Consistent with the benchmark measurement display (significant digits) actual performance results were rounded from 99.56%.

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Operations Services—Gas				
Gas safety response time	Service Quality Index #7	Average 55 minutes or less from customer call to arrival of field technician	34 minutes	☑
Secondary safety response time—Quanta Gas	Service Provider Index #4D	Within 60 minutes from first response assessment completion to second response arrival	52 minutes	☑
Service provider standards compliance—Quanta Gas	Service Provider Index #1C ¹³	Level 1 ≤ 8 dev/1000 Level 2 ≤ 15 dev/1000 Level 3 ≤ 12 dev/1000	Level 1 1.05 Level 2 2.51 Level 3 0.62	☑
Operations Services—Electric				
Electric safety response time	Service Quality Index #11	Average 55 minutes or less from customer call to arrival of field technician	54 minutes	☑
Secondary core-hours, non-emergency safety response and restoration Time—Quanta Electric	Service Provider Index #4B	Within 250 minutes from the dispatch time to the restoration of non-emergency outage during core hours	232 minutes	☑
Secondary non-core-hours, non-emergency safety response and restoration time—Quanta Electric	Service Provider Index #4C	Within 316 minutes from the dispatch time to the restoration of non-emergency outage during non-core hours	254 minutes	☑
Service provider standards compliance—Quanta Electric	Service Provider Index #1B ¹⁴	Level 1 ≤ 15 dev/1000 Level 2 ≤ 25 dev/1000 Level 3 ≤ 25 dev/1000	Level 1 4.94 Level 2 6.72 Level 3 8.06	☑
120-consecutive –hour power outage restoration guarantee	Service Guarantee #2	A \$50 credit to eligible customers when experienced power outage is longer than 120 consecutive hours	\$0	--
24-consecutive-hour non-major storm power outage restoration guarantee	Service Guarantee #3	A \$50 credit to eligible customers when experienced power outage is longer than 24 consecutive hours during non-major storms	\$15,150	--

¹³ Level 1: Deviation from PSE Standards and/or current regulatory expectations that provide immediate and significant risk to product quality, safety or system integrity; or a combination/repetition of Level 2 deficiencies that indicate a critical failure of systems.

Level 2: Deviation from PSE Standards and/or current regulatory expectations that provide a potentially significant risk to product quality, safety or system integrity; or could potentially result in significant observations from a regulatory agency; or a combination/repetition of Level 3 deficiencies that indicate a failure of system(s).

Level 3: Observations of a less serious or isolated nature that are not deemed Level 1 or 2, but require correction or suggestions on how to improve systems or procedures that may be compliant but would benefit from improvement.

¹⁴ See Footnote 10.

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Electric Service Reliability—SAIFI & SAIDI				
SAIFI_{Total} Total (all outages current year) Outage Frequency—System Average Interruption Frequency Index (SAIFI)	Reliability	Power interruptions per customer per year, including all types of outage event	1.66 interruptions	--
SAIFI_{Total 5-year Average} Total (all outages five-year average) SAIFI	Reliability	Five years average of the power interruptions per customer per year, including all types of outage event	1.74 interruptions	--
SAIFI_{5%} <5% Non-Major-Storm (<5% customers affected) SAIFI	Service Quality Index #4	No more than 1.30 interruptions per year per customer	1.06 interruptions	<input checked="" type="checkbox"/>
SAIFI_{IEEE} IEEE Non-Major-Storm (T _{MED}) SAIFI	Reliability	Power interruptions per customer per year, excluding days exceeding the T _{MED} threshold	1.09 interruptions	--
SAIDI_{Total} Total (all outages current year) Outage Duration—System Average Interruption Duration Index (SAIDI)	Reliability	Outage minutes per customer per year, including all types of outage event	447 minutes	--
SAIDI_{Total 5-year Average} Total (all outages five-year average) SAIDI	Reliability	Outage minutes per customer per year, including all types of outage event five-year average	539 minutes	--
SAIDI_{5%} <5% Non-Major-Storm (<5% customers affected) SAIDI	Reliability	Outage minutes per customer per year, excluding outage events that affected 5% or more customers	207 minutes	--
SAIDI_{IEEE} IEEE Non-Major-Storm (T _{MED}) SAIDI	Reliability	Outage minutes per customer per year, excluding days exceeding the T _{MED} threshold	196 minutes	--
SAIDI_{SQI} SQI IEEE Non-Major-Storm (T _{MEDADJ}) SAIDI	Service Quality Index #3	No more than 155 minutes per customer per year Outage minutes, excluding days exceeding the T _{MEDADJ} threshold with catastrophic day adjustment	181 minutes	<input type="checkbox"/>

Detailed monthly performance results and supplemental information can be found in the following appendices:

- **Appendix A: Monthly SQI Performance**—This appendix details monthly PSE SQI performance and the relevant performance of PSE’s service providers. The attachments to this appendix provide information on the major outage event and localized electric

emergency event days and the natural gas reportable incidents and control time. This appendix has three attachments:

- **Attachment A to Appendix A**—Major Event and Localized Emergency Event Days (Affected Local Areas Only),
 - **Attachment B to Appendix A**—Major Event and Localized Emergency Event Days (Non Affected Local Areas Only), and
 - **Attachment C to Appendix A**—Gas Reportable Incidents and Control Time.
- **Appendix B: Certification of Survey Results**—The independent survey company, EMC Research, certified that all SQI-related customer surveys were conducted with applicable guidelines and the results are unbiased and valid in accordance with the survey procedures established in consolidated Dockets UE-011570 and UG-011571¹⁵.
 - **Appendix C: Penalty Calculation**—This appendix shows the SQI #5 penalty calculation and allocation of SQI penalties between electric and natural gas HELP funding.
 - **Appendix D: Proposed Customer Notice (Report Card)**—This appendix presents PSE’s proposed 2022 service performance customer notice report card. The report card is designed to inform customers of how well PSE delivers its services in key areas to its customers.
 - **Appendix E: Disconnection Results**—This appendix provides the number of disconnections per 1,000 customers for non-payment of amounts due when the UTC disconnection policy would permit service curtailment.
 - **Appendix F: Customer Service Guarantee Performance Detail**—This appendix details annual and monthly Kept Appointments and Customer Service Guarantee payment results by appointment type.
 - **Appendix G: Customer Awareness of Service Guarantee**—This appendix presents the ways PSE makes customers aware of its Customer Service Guarantee and the results of the survey.

¹⁵ PSE’s compliance filing pursuant to paragraph 13 of Order 21 of Dockets UE-072300 and UG-072301 (consolidated), Granting in Part, and Denying in Part, Puget Sound Energy’s Petition for Waiver and Suspension of Service Quality Index Nos. 6 AND 8 (June 21, 2013)

Detailed Electric system and reliability information is found in the following appendices:

- **Appendix H: Electric Reliability Terms and Definitions**—This appendix presents the terms and definitions found in this report.
- **Appendix I: Electric Reliability Data Collection Process and Calculations**—This appendix details data collection methods and issues. It explains how the various data was collected.
- **Appendix J: 1997-Current Year PSE SAIFI and SAIDI Performance by Different Measurements**—This appendix presents PSE SAIFI and SAIDI performance from 1997 through the current year using different measurements.
- **Appendix K: Current Year Electric Service Outage by Cause by Area**—This appendix details the 2022 Outage Cause by County.
- **Appendix L: Historical SAIDI and SAIFI by Area**—This appendix details the three-year history of SAIDI and SAIFI data by county.
- **Appendix M: Areas of Greatest Concern with Action Plan**— This appendix details the areas of greatest concern with an action plan.
- **Appendix N: Current-Year Commission and Rolling-Two-Year PSE Customer Electric Service Reliability Complaints with Resolutions**—This appendix lists the current-year UTC and rolling two-year PSE customer electric service reliability complaints with resolutions.
- **Appendix O: Current Year Geographic Location of Electric Service Reliability Customer Complaints on Service Territory Map with Number of Next Year’s Proposed Projects and Vegetation-Management Mileage**— This appendix illustrates current-year geographic location of electric service reliability customer complaints on service territory map with the number of 2023 proposed projects and vegetation-management mileage.
- **Appendix P: Reliability Program Category Descriptions**— This appendix provides descriptions for the reliability program work.

Customer Notice of SQI Performance

Appendix D: Proposed Customer Notice (Report Card) is the proposed draft customer notice of PSE’s 2022 SQI performance. After consultation with the UTC staff and Public Counsel, PSE will begin distributing the final SQI report card by June 27, 2023, as part of the customer billing package. The report card will be distributed to customers only after adequate consultation with Staff and Public Counsel, but no later than 90 days after PSE files its annual report. For the 2022 report card, PSE will start the distribution by June 27, 2023, based upon the filing date of this report on March 29, 2023.

Data and Reporting Issues

In August 2022, PSE noticed a data and reporting issue associated with SQI #7 that about 1% of natural gas emergencies responded data had been omitted in its 2020 and 2021 SQI #7 reporting. Certain emergency incidents responded by PSE Gas First Responders (“GFR”) in the field didn’t get forwarded to PSE’s main work management system, SAP, due to an interface glitch between SAP and the application used by GFR. The inclusion of these missing data do not change the annual SQI #7 performance results, which remain at 32 minutes for both 2020 and 2021 whereas the SQI #7 benchmark is 55 minutes.

Unusual Event - COVID-19 Pandemic

The COVID-19 pandemic continued to be one of the biggest stories of 2022 and during 2022, Washington State was still under various COVID-19 emergency orders and a state of emergency, which remained effective until October 31, 2022.¹⁶ As a provider of an essential service, PSE has been working continuously to support employees, customers and communities as the COVID-19 pandemic impacted them. This section discusses measures that PSE had taken to mitigate the unusual event as the state moved toward reopening throughout the year.¹⁷

PSE’s COVID-19 Safety Protocols and Measures

PSE implemented the following measures up to the 4th quarter of 2022. Once the State of Washington ended the COVID-19 emergency orders, PSE went back to operating under pre-COVID-19 conditions.

- The Corporate Crisis Management Team continued to monitor safety issues. The team consisted of PSE representatives from various departments: Business Continuity, Central Stores, Corporate Communications, Facility Services, Human Resources, Information Technology, Safety, Operations, and Performance Excellence.
- Continued to limit access to facilities that provide emergency/critical operations. Recommended that employees return to general office space as soon as they felt comfortable doing so.

¹⁶ The National Academy for State Health Policy, “States’ COVID-19 Public Health Emergency Declarations”: <https://nashp.org/states-covid-19-public-health-emergency-declarations-and-mask-requirements/>.

¹⁷ COVID-19 Resources and Information - Governor Jay Inslee, Links to state and local government information about the coronavirus (COVID-19) outbreak in Washington state: <https://www.governor.wa.gov/issues/issues/covid-19-resources>

- Continued to coordinate facility closures in response to possible COVID-19 exposures to reduce risk of transmission to employees, and performed contact tracing and directed exposed employees to self-isolate.
- Continued to provide sanitation services at public spaces within PSE facilities.

In addition to the above measures, PSE modified its day-to-day operations and emergency response procedures for the safety of customers and employees.

Emergency Response

PSE continued to adapt to the evolving guidelines from the federal Centers for Disease Control and Prevention and various Washington state agencies. COVID-19 specific safety protocols have been implemented to provide for the highest degree of safety for employees and the public. Safety protocols include the following:

- Continued to limit access to facilities that provide emergency/critical operations.
- Continued to require employees to use N95 masks when inside customers' homes and businesses, if requested by the customer.
- Continued to require employees to report a potential or confirmed case of COVID-19 exposure.
- Continued to perform contact tracing when an employee reported a potential/confirmed case of COVID-19 exposure.
- Continued to utilize mass notification capabilities to inform all employees that certain facilities were closed for cleaning purposes.

Construction Services

Construction of an essential facility, as defined by Washington Governor Inslee, continued forward during the COVID-19 pandemic. However, construction site activities of new line and service connections to homes and businesses, which were deemed as non-essential services, had been on hold in 2021 in response to Washington Governor Inslee's March 23, 2020 proclamation "Stay Home – Stay Healthy". In 2022, as the region reopened, PSE construction activities returned to normal within the applicable health protocols of the state, counties, and jurisdictions PSE serves. As of March 12, 2022, PSE has lifted any restrictions on reporting of its employees to its facilities or the field. It is now standard protocol to perform pre-shift health checks, maintain social distancing where possible, and wash/sanitize hands often. Face coverings are optional and are worn at customer's request prior to start of any field services.

PSE's Bill Assistance Programs Launched in Responding to COVID-19

The COVID-19 pandemic has had a significant impact on PSE's residential and business customers, particularly those individuals who either lost employment or saw reduced wages, and those small businesses in industries where COVID-19 mitigation efforts necessitated closures or restrictions in operations. Since the start of the COVID-19 pandemic in March 2020, PSE had implemented three separate bill assistance programs: 1) the Crisis-Affected Customer Program

“CACAP”), 2) COVID-19 Bill Assistance Program, and 3) Supplemental CACAP. All three programs were designed to get assistance to customers quickly and easily by removing as many barriers as possible with a streamlined application process or completely automatic enrollment.

As of December 31, 2022, the PSE funded CACAP programs have resulted in paying 96,587 applications with \$58 million dollars of assistance to pay their PSE bills.

- CACAP – PSE distributed \$9.1 million to 15,851 customers in 2020.
- COVID-19 Bill Assistance Program - As of October 1, 2022, for the entirety of the program, PSE distributed \$22,622,547 to customers through 33,237 program applications. A customer could receive more than one bill assistance under the COVID-19 Bill Assistance Program.
- Supplemental CACAP – As of October 4, 2022, for the entirety of the program, \$26,720,617 were distributed to customers through 47,499 program applications.

Furthermore, the Washington State Department of Commerce also provided additional funding to residences who need energy bill assistance through PSE. As of December 31, 2022, PSE distributed \$25,118,651 of the state-funding to 56,705 PSE customers.

Customer Service

During the course of the COVID-19 pandemic, PSE halted non-payment disconnections, beginning in March of 2020 and has likewise offered customer bill assistance through various CACAP and state funded bill payment assistance programs. The disconnection moratorium ended September 30, 2021, and PSE began performing disconnects in May of 2022 on a limited basis, completing 1,546 disconnections through December 2022 (approximately 5% of those who reached the disconnection queue.) The COVID-19 specific safety protocols have also been implemented to provide for the highest degree of safety for employees and the public, and continued to adapt to the evolving guidelines from the CDC and state agencies.

Technology and Business Process Changes to Mitigate the Impact of the COVID-19 Pandemic

PSE continued to utilize the platforms implemented by its long-term initiative Get to Zero (“GTZ”), which include Energy Portal, PSE.com, PSE app, the Sendgrid communications platform and Platform of Insights that were completed in 2021 to meet customer needs. For all of 2022, PSE:

- Maintained suspension of:
 - Collection of reconnection and late payment fees in the billing system
 - Deposit requirement for customers creating new accounts
 - PSE.com and PSE App display of dunning/disconnect activities
- Extended payment arrangement durations from 3 months to 18 months which required a change in how auto-pay customers are processed
- Eliminated remote or manual disconnect fees and reconnect fees during the COVID-19 pandemic, and for an additional six months after the moratorium ends, so the two-tiered fee structure put into place would be overridden
- Created and maintained customer-facing COVID-19 informational pages on PSE.com and the PSE app in 6 languages (English, Chinese, Spanish, Hindi, Russian and Vietnamese)
- Created and distributed required notices to customers regarding the end of the disconnect moratorium

Service Quality Program Changes

There were no SQ Program changes for 2022. However, two changes are coming in 2023 per Order 24/10 of the consolidated Dockets UE-220066, UG-220067, and UG-210918 dated December 22, 2022 (“2022 GRC”) where the UTC approved the Settlement Stipulation and Agreement on Revenue Requirement and all Other Issues Except Tacoma LNG and PSE’s Green Direct Program (“Revenue Requirement Settlement”).¹⁸

The two SQ Program changes starting from the 2023 reporting year are:

- SQI semi-annual UTC reporting that used to be due by July 30th of each year will be discontinued going forward.¹⁹
- SQI #4 SAIFI will be computed using only the latest IEEE-1366 methodology for removing major event day outages with additional adjustment for catastrophic events. This approach is consistent with the current SQI #3 SAIDI performance calculation. The SQI #4 benchmark will be at no more than 1.2 interruptions per year per customer.²⁰

¹⁸ The two SQI changes were discussed in PSE’s 2022 GRC prefilled direct testimonies of its witnesses Mark Newton Lowry in Exh. MNL-1T, Catherine A. Koch in Exh. CAK-1T, and Jon A. Piliaris in Exh. JAP-1T. The Revenue Requirement Settlement incorporated the change in the SQ Program semi-annual reporting change at paragraph 56 and the SQI #4 change at paragraph 60.

¹⁹ Piliaris, Exh. JAP-1T, page 62, lines 18-19

²⁰ Koch, Exh. Cak-1T, page 51, line 11



CHAPTER 2

SERVICE QUALITY BY CUSTOMER SERVICES, CUSTOMER SATISFACTION, AND OPERATIONS SERVICES

PSE has been meeting the Puget Sound region's energy needs for 150 years. PSE proudly embraces the responsibility of providing customers with safe, reliable, and reasonably-priced energy service.

This section summarizes the 2022 results of PSE's seven SQIs related to customer service, customer satisfaction, and operations services:

- WUTC Complaint Ratio (SQI #2)
- Customer Access Center Answering Performance (SQI #5)
- Customer Access Center Transactions Customer Satisfaction (SQI #6)
- Gas Safety Response Time (SQI #7)
- Field Service Operations Transactions Customer Satisfaction (SQI #8)
- Appointments Kept (SQI #10)
- Electric Safety Response Time (SQI #11)
- Service Provider Performance
- Service Guarantees

WUTC Complaint Ratio (SQI #2)

Table 2a: WUTC Complaint Ratio for 2022

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Customer Satisfaction				
WUTC complaint ratio	Service Quality Index #2	No more than 0.40 complaints per 1,000 customers, including all complaints filed with WUTC	0.14	<input checked="" type="checkbox"/>

Overview

Each year the WUTC receives complaints from PSE customers on a variety of topics. In 2022, there were 285 complaints, up from 213 in 2021. The 2021 SQI #2 complaint ratio was 0.10, while the 2022 complaint ratio was also 0.14.

About the Benchmark

The WUTC complaint ratio is calculated by dividing the sum of all natural gas and electric complaints reported to the WUTC by the average monthly number of PSE customers. The quotient is then multiplied by 1,000. The formula follows:

$$WUTC \text{ complaint ratio} = \frac{\text{electric and natural gas complaints recorded by WUTC}}{\text{average monthly number of electric and natural gas customers}} \times 1,000$$

The average monthly customer count is the average of the total number of PSE customers, per month, during the reporting period.

Going Forward

PSE will continue identifying potential issues that could trigger customer complaints. The focus is on prevention of the cause of these issues through timely and accurate support for each customer. Areas of focus for 2022 include:

- Continue to focus on the WUTC “Consumer Upheld” complaint dispositions to identify root cause, to establish preventive and corrective actions, and follow-up to determine the effectiveness of the actions.
- Continue to improve PSE’s company-wide customer experience by using knowledge gained in managing escalated complaints for training and education of others in PSE.
- Continue to work with the WUTC staff to make complaint response and resolution processes more efficient for the WUTC and PSE.

Customer Access Center Answering Performance (SQI #5)

Table 2b: Customer Access Center Answering Performance for 2022

Key Measurement	Benchmark	2022 Performance Results	Achieved
Customer Service			
Customer Access Center answering performance (SQI #5)	At least 80% of calls answered by a live representative within 60 seconds of request to speak with live operator	69%	<input checked="" type="checkbox"/>

Overview

PSE’s Customer Care Center (i.e. Customer Access Center) receives all of PSE’s customer general inquiries and typically represents PSE to customers. Customers calling PSE have the option of going into an Interactive Voice Response (“IVR”) system where they are able to perform self-serve transactions or to speak with a representative. PSE’s customer service representatives (“CSRs”) answer calls promptly providing customers with the information or assistance they require, including natural gas and electric emergencies. In 2022, the CSRs answered 69 percent of the calls within 60 seconds of customer requests, which didn’t meet the benchmark of 80%. Key causes of missing the SQI #5 benchmark include resource constraints, technology issues, and increased call volumes due to winter weather events and the annual purchased gas rate adjustments. The penalty for not meeting the benchmark of this measurement is \$742,500. PSE will contribute the entire amount of \$742,500 to its electric and natural gas Schedule 129 energy bill assistance programs as extra funding to the programs. \$432,092 will be allocated to the electric Schedule 129 program and \$310,408 will be allocated to natural gas.

About the Benchmark

The Customer Care Center call answering performance is measured from the time the customer initiated a request to speak with a CSR until a CSR arrived on the line. The annual performance is determined by the average of the 12 monthly call answering performance percentages. The calculation of the monthly answering performance is demonstrated through the following formula:

$$\text{Monthly call answering performance} = \frac{\text{aggregate number of calls answered by a company rep within 60 seconds}}{\text{aggregate number of calls received}}$$

Busy Calls and Call Abandonment

PSE's phone system is configured with a backup system to handle overflow customer calls to 1-888-CALL-PSE. Overflow calls from PSE's main IVR system are routed to a separate IVR system provided by PSE's phone service vendor that enables customers to contact PSE through a different channel. PSE received about 2,010,000 customer calls via 1-888-CALL-PSE during 2022, 4% of the calls were abandoned by customers. All these 1-888-CALL-PSE calls went through either the main phone system or the overflow phone backup system and did not get the busy call signal.

Going Forward

PSE is engaged in initiatives to further the Customer Care Center's answering performance and ensure that the SQI #5 benchmark of 80% of calls being answered within 60 seconds will be achieved. In 2023, PSE will:

- Continue to deliver on-going agent training to improve proficiency and elevate the customer experience
- Continue to personalize the customer experience on PSE's website, presenting relevant self-service options and actionable information
- Continue to improve PSE's self-service options using customer data, allowing customers to complete various transactions online, 24 hours a day
- Continue to improve processes to optimize efficiency and leverage the information systems and technology
- Continue to improve the quality of each customer contact through the ongoing collaboration within the Customer Care Center

Customer Access Center Transactions Customer Satisfaction (SQI #6)

Table 2c: Customer Access Center Transactions Customer Satisfaction for 2022

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Customer Satisfaction				
Customer Access Center transactions customer satisfaction	Service Quality Index #6	At least 90% satisfied (rating of 5 or higher on a 7-point scale)	94%	<input checked="" type="checkbox"/>

Overview

Most of the telephone calls to PSE’s general customer help phone number 1-888-CALL-PSE are handled by PSE’s Customer Care Center (*i.e.* Customer Access Center). EMC Research, an independent research company for PSE’s Service Quality Program²¹, conducted telephone surveys with PSE customers and prepared monthly and semi-annual reports on customer satisfaction regarding Customer Access Center transactions during the 2022 SQ Program reporting year. The independent survey-results found that 94% of customers surveyed were satisfied with the Customer Access Center’s overall transaction performance (SQI #6). This is a decrease of 1% from 2021.

About the Benchmark

An independent research company conducts phone surveys to customers who have made calls to PSE and asks the following questions:

“Overall, how would you rate your satisfaction with this call to Puget Sound Energy? Would you say 7-completely satisfied, 1-not at all satisfied or some number in between?”

A customer is considered satisfied if they responded 5, 6 or 7. The annual performance is determined by the weighted monthly average percent of satisfied customers. The formula for the monthly percentage follows:

$$\text{Monthly percentage of satisfied customers} = \frac{\text{aggregate number of survey responses of 5, 6 or 7}}{\text{aggregate number of survey responses of 1, 2, 3, 4, 5, 6 or 7}}$$

²¹ Per Order 21 in Dockets UE-072300 and UG-072301 (consolidated) issued by WUTC on April 8, 2013, EMC Research Inc. has been the exclusive survey company conducting and preparing the survey results for SQI #6 and #8. The methodology and procedures used by EMC Research Inc. was validated by Dr. MacLachlan of University of Washington as “being of high validity and reliability” as indicated in the Attachment A to PSE’s compliance filing under Order 21 on June 21, 2013.

Going Forward

PSE recognizes that continuous improvements are required to maintain customer satisfaction. PSE will continue to focus on improvement in customer satisfaction through quality assurance processes and technology enhancements, as well as on-going training and customer initiatives.

Gas Safety Response Time (SQI #7)

Table 2d: Gas Safety Response Time for 2022

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Operations Services				
Gas Safety Response Time	Service Quality Index #7	Average 55 minutes or less from customer call to arrival of field technician	34 minutes	<input checked="" type="checkbox"/>

Overview

The primary responsibility of PSE’s Gas First Response (“GFR”) team is to respond to natural gas emergencies. In 2022, PSE responded to more than 20,000 emergency calls concerning natural gas safety with an average response time of 34 minutes. PSE responded to 94% of these gas emergencies within sixty minutes. These emergencies include reports of odors, third-party damage to PSE’s system, and leaks and carbon monoxide concerns. The GFR team also supports local and state first-response organizations, such as fire departments. PSE has GFR personnel located throughout its service territory. These responders are available on a 24/7/365 basis.

In addition to responding to natural gas emergencies, the GFR team performs new customer meter service activation, including meter turn-ons and appliance light-ups; various natural gas system maintenance and inspection activities; adjusts and performs minor repairs on customer equipment; and monitors third-party construction excavation when it occurs near certain underground facilities.

The *Data and Reporting Issues* section describes the change in the collection and reporting of SQI #7 Gas safety response time.

About the Benchmark

The natural gas safety response time is calculated by logging the time each customer service call is created and the time the natural gas field technician arrives on site. The calculated response time for each service call is averaged for all emergency calls during the performance year to determine the overall annual performance.

$$\text{Gas safety response time annual performance} = \frac{\text{sum of all natural gas emergency response times}}{\text{annual number of natural gas emergency calls received}}$$

Going Forward

PSE's natural gas emergency response process is continually assessed and improved where possible. Overall scheduling optimization that supports SQI #7 continues post-IWM implementation. The implementation of the after-hours emergency response call-out plan has improved dispatch cycle times and created a better distribution of work across the workforce.

Field Service Operations Transactions Customer Satisfaction (SQI #8)

Table 2e: Field Service Operations Transactions Customer Satisfaction for 2022

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Customer Satisfaction				
Field Service Operations transactions customer satisfaction	Service Quality Index #8	At least 90% satisfied (rating of 5 or higher on a 7-point scale)	97%	<input checked="" type="checkbox"/>

Overview

EMC Research²², an independent research company, conducts telephone surveys with PSE customers who have requested and received natural gas field service. In 2022, these surveys found that 97% of customers were satisfied with PSE’s field service operations transaction performance.

About the Benchmark

Every week, EMC Research contacts randomly-selected customers who have called PSE the previous week and received natural gas field service. The firm prepares monthly and semi-annual reports on PSE’s field service operations transaction performance.

Customers are asked a number of questions including the following question for the purpose of SQI #8:

“Thinking about the entire service, from the time you first made the call until the work was completed, how would you rate your satisfaction with Puget Sound Energy? Would you say 7- completely satisfied, 1- not at all satisfied or some number in between?”

A customer is considered “satisfied” if they responded 5, 6 or 7.

The annual performance is determined by the weighted monthly average of percent of satisfied customers. The formula for the monthly percentage follows:

$$\text{Monthly percent of satisfied customers} = \frac{\text{aggregate number of survey responses of 5, 6 or 7}}{\text{aggregate number of survey responses of 1, 2, 3, 4, 5, 6 or 7}}$$

²² SQI-related customer surveys were conducted with applicable guidelines and the results are unbiased and valid in accordance with the survey procedures established in consolidated Dockets UE-011570 and UG-011571. EMC Research and the survey procedures used by EMC Research met these guidelines as detailed in PSE’s compliance filing pursuant to the paragraph 13 of Order 21 of Dockets UE-072300 and UG-072301 (consolidated), Granting in Part, and Denying in Part, Puget Sound Energy, Inc’s Petition for Waiver and Suspension of Service Quality Index Nos. 6 AND 8 (June 21, 2013).

Going Forward

PSE will be working to upgrade its current work management system in 2023-2024 to further improve service to its customers. Great customer service is a focal point for PSE field employees who strives to exceed customer expectations.

Appointments Kept (SQI #10)

Table 2f: Appointments Kept for 2022

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Operations Services				
Appointments kept	Service Quality Index #10	At least 92% of appointments kept	99%	<input checked="" type="checkbox"/>

Overview

PSE provides its customers with a variety of scheduled service appointments including:

- **Permanent service**—Permanent natural gas service from an existing main or permanent electric secondary voltage service from existing secondary lines
- **Reconnection of existing service**—Reconnection following move-out, move-in or disconnection for non-payment
- **Natural gas diagnostic service request**—For water heater, furnace checkup, furnace not operating, other diagnostic or repair or follow-up appointments

Service appointments that involve safety do not require scheduling and are performed on a 24/7/365 basis. These non-scheduled services include restoring electric service or responding to a reported gas odor.

When a natural gas or electric customer requests a scheduled field service, PSE provides the customer with either a guaranteed appointment date and time-frame or a guaranteed commitment to provide service on or before a specified date.

In 2022, PSE achieved a result of 99% for this appointments kept SQI. Data on the 1% of the missed appointments and other appointment information by service type is detailed in Appendix F: *Customer Service Guarantee Performance Detail*.

About the Benchmark

The appointments kept SQI is calculated by dividing the number of appointments kept by the total number of appointments made. The formula follows:

$$\text{Appointments kept} = \frac{\text{annual appointments kept}}{\text{annual appointments missed} + \text{annual appointments kept}}$$

Appointments are considered missed when PSE does not arrive during the time period or on the agreed upon date except when the appointments have been missed due to the following reasons:

- The customer fails to keep the appointment
- The customer calls PSE to specifically request the appointment be rescheduled
- PSE reschedules the appointment because conditions at the customer site make it impractical to perform the service
- The appointment falls during an SQI Major Event²³ period

These types of appointments are not considered missed appointments but “excused” appointments. Appointments that were canceled by the customer, regardless of the customer’s reason, will be considered “canceled” appointments. Excused and canceled appointments are not counted as either kept or missed appointments. Additional appointments to complete repairs are considered new appointments.

Going Forward

PSE will continue to review the reasons for missed appointments and work to find solutions so that PSE can meet all its customer commitments

²³ Major Events occur when 5% or more electric customers are without power during a 24 hour period and associated carry-forward days that it will take to restore electric service to these customers, which are excluded from the performance calculations of SQI #4- SAIPI and SQI #11- Electric safety response time.

Electric Safety Response Time (SQI #11)

Table 2g: Electric Safety Response Time for 2022

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Operations Services				
Electric Safety Response Time	Service Quality Index #11	Average 55 minutes or less from customer call to arrival of field technician	54 minutes	<input checked="" type="checkbox"/>

Overview

PSE responded to about 13,000 SQI #11 electric incidents in 2022 with an average response time of 54 minutes. PSE's EFR team has the primary responsibility of responding to electric outages and electric emergencies. Examples of the types of outages and emergency events that PSE responds to include: downed wires, equipment failures, car-pole accidents, bird and animal-related outages, trees or limbs on lines, third-party dig-ins, etc.

EFR personnel are located throughout PSE's service territory and are available to respond on a 24/7/365 basis. EFR's priority is to ensure public and worker safety and then to restore service to customers. After addressing safety concerns, service restoration is made through temporary or permanent repairs or reconfiguration of the electric system. If the repair is beyond the capability of EFR personnel, construction crews are called in to make permanent repairs.

Electric emergency response time is comprised of two components: dispatch time and on-site time. The time to dispatch an emergency is based on the required time to identify and secure a qualified electrical employee. On-site times are a measure of the drive time needed to get a qualified resource to the location of the electric emergency. However, this can be impacted by resource availability and starting location, the primary factors that affect this measure are traffic levels and traffic profiles. EFR drive times are also impacted by the weather itself- flooding, snow, fallen trees- reducing access and/or requiring rerouting to sites.

About the Benchmark

The electric safety response time for emergency incidents is calculated by logging the time of each customer service call and the time the EFR personnel arrives on site. The annual performance is determined by the average number of minutes from the time a customer calls to the arrival of the EFR personnel for electric safety incidents occurring during the performance year. The formula follows:

$$\text{Annual electric safety response time} = \frac{\text{sum of all response times}}{\text{annual number of electric safety incidents}}$$

Certain incidents are excluded from the measurement if they occurred during the following days:

- SQI major events when 5% or more electric customers are without power during a 24-hour period and associated carry-forward days that it will take to restore electric service to these customers (“Major Events”).
- Localized emergency event days when all available EFR in a local area are dispatched to respond to service outages or safety incidents.

Going Forward

- PSE will continue to evaluate staffing levels to ensure adequate support of both planned and unplanned workloads for the Electric First Response organization.
- PSE is investing in operational efficiency technology that will automate EFR callouts for all unplanned, emergency incidents across PSE’s service territory. The callout tool will streamline unplanned callouts for EFR and decrease the incident “dispatch” time. Upon stabilization, the callout tool is expected to reduce the annual average dispatch time.
- As grid modernization technology continues to evolve and expand in PSE’s electrical system, PSE is beginning to analyze the positive impacts that may occur in support of SQI #11 response times. For example, when distribution automation technology automatically detects, de-energizes and isolates damaged areas of the electrical system, it is recognized that specific first response objectives were accomplished using technology.

Service Provider Performance

Table 2h: Service Provider Performance for 2022

Key Measurement	Type of Metric	Benchmark/Description	2022 Performance Results	Achieved
Customer Services and Satisfaction and Operations Services				
Service provider standards compliance—Quanta Electric	Service Provider Index #1B ²⁴	Level 1 ≤ 15 dev/1000 Level 2 ≤ 25 dev/1000 Level 3 ≤ 25 dev/1000	Level 1 4.94 Level 2 6.72 Level 3 8.06	☑
Service provider standards compliance—Quanta Gas	Service Provider Index #1C ²⁵	Level 1 ≤ 8 dev/1000 Level 2 ≤ 15 dev/1000 Level 3 ≤ 12 dev/1000	Level 1 1.05 Level 2 2.51 Level 3 0.62	☑
Service provider appointments kept—Quanta Electric	Service Provider Index #3B ²⁶	At least 92% of appointments kept	99%	☑
Service provider appointments kept—Quanta Gas	Service Provider Index #3C	At least 92% of appointments kept	100% ²⁷	☑
Secondary safety response time—Quanta Gas	Service Provider Index #4D	Within 60 minutes from first response assessment completion to second response arrival	52 minutes	☑
Secondary core-hours, non-emergency safety response and restoration time—Quanta Electric	Service Provider Index #4B	Within 250 minutes from the dispatch time to the restoration of non-emergency outage during core hours	232 minutes	☑
Secondary non-core-hours, non-emergency safety response and restoration time—Quanta Electric	Service Provider Index #4C	Within 316 minutes from the dispatch time to the restoration of non-emergency outage during non-core hours	254 minutes	☑

²⁴ Level 1: Deviation from PSE Standards and/or current regulatory expectations that provide immediate and significant risk to product quality, safety or system integrity; or a combination/repetition of Level 2 deficiencies that indicate a critical failure of systems.

Level 2: Deviation from PSE Standards and/or current regulatory expectations that provide a potentially significant risk to product quality, safety or system integrity; or could potentially result in significant observations from a regulatory agency; or a combination/repetition of Level 3 deficiencies that indicate a failure of system(s).

Level 3: Observations of a less serious or isolated nature that are not deemed Level 1 or 2, but require correction or suggestions on how to improve systems or procedures that may be compliant but would benefit from improvement.

²⁵ See Footnote 17.

²⁶ There were no results for Service Provider Indices (SPI) #1A, #2A, #3A and #4A. These indices were assigned to a service provider, Pilchuck, which no longer works for PSE. PSE transitioned all natural gas construction and maintenance work to Quanta Gas as of April 30, 2011. Service Provider Indices #2B and #2C, Service Provider Customer Satisfaction, Quanta Electric and Quanta Gas, respectively, which were applicable in prior years' reports, have been terminated since the 2013 reporting period.

²⁷ Actual performance results were rounded from 99.6%.

Overview

This section details the service provider metrics relevant to PSE's SQ Program. PSE monitors and assesses the performance of its primary natural gas and electric service providers (Quanta Gas and Quanta Electric). The metrics address PSE standards compliance, new construction service appointments, and safety response and restoration time. Each measure is designed to monitor and improve PSE's service.

About the Benchmark

Service Provider Standards Compliance (SPI #1)—Service providers must achieve a level of conformance to PSE Standards, where the metric is segregated across three relative risk levels assigned to the construction inspection items to support the establishment of continuous improvement activities according to risk.

At Level 1, the deviation from PSE Standards and/or current regulatory expectations that provide immediate and significant risk to product quality, safety or system integrity; or a combination/repetition of Level 2 deficiencies that indicate a critical failure of systems. At Level 2, the deviation from PSE Standards and/or current regulatory expectations that provide a potentially significant risk to product quality, safety or system integrity; or could potentially result in significant observations from a regulatory agency; or a combination/repetition of Level 3 deficiencies that indicate a failure of system(s). Level 3 includes the observations of a less serious or isolated nature that are not deemed Level 1 or 2, but require correction or suggestions on how to improve systems or procedures that may be compliant but would benefit from improvement.

The benchmarks for the three levels are as follows:

Quanta Gas

- For Level 1 inspection items: ≤ 8 deviations/1000 items inspected
- For Level 2 inspection items: ≤ 15 deviations/1000 items inspected
- For Level 3 inspection items: ≤ 12 deviations/1000 items inspected

Quanta Electric

- For Level 1 inspection items: ≤ 15 deviations/1000 items inspected
- For Level 2 inspection items: ≤ 25 deviations/1000 items inspected
- For Level 3 inspection items: ≤ 25 deviations/1000 items inspected

Service Provider New Customer Construction Appointments Kept (SPI #3)—Quanta Gas and Quanta Electric must keep at least 92% of their new customer construction appointments.

Secondary Safety Response Time (SPI #4)—This SPI consists of three sub-indices:

- **Service Provider Indices #4B and #4C**—Quanta Electric's secondary safety response and restoration time during core and non-core hours, respectively. Quanta Electric must

respond and complete power restoration in less than 250 minutes on average during core hours (SPI #4B) and less than 316 minutes on average during non-core hours (SPI #4C). Core hours are 7:00 a.m.–3:30 p.m., Monday through Friday, except holidays. Restoration time is measured from the time a Quanta Electric crew is dispatched to the time the problem causing the interruption has been resolved and the line has been re-energized. Both the core-hours and non-core-hours measurements exclude emergency events and significant storm events.

- **Service Provider Index #4D**—Secondary safety response time—Quanta Gas. Quanta Gas must respond within 60 minutes on average from PSE’s Gas First Response assessment completion to the service provider’s secondary response arrival.

Service Provider Appointments and Related Penalties

Table 2i shows the number of new customer construction appointments completed by PSE service providers and the amount of penalties paid due to missed appointments.

Table 2i: Service Provider Appointments and Missed Appointment Penalties for 2022

Service Provider Appointments ²⁸				Missed Appointment Penalties		
Service Provider	Electric	Natural Gas	Total	Electric	Natural Gas	Total
Quanta Gas	N/A	5,966	5,966	N/A	\$2,000	\$2,000
Quanta Electric	7,287	N/A	7,287	\$1,450	N/A	\$1,450
Total	7,287	5,966	13,253	\$1,450	\$2,000	\$3,450

Going Forward

- Identify areas of improvement to meet core-hour benchmark of 250 minutes
- Identify and implement improvements to customer scheduling for new construction

²⁸ 98 Excused appointments (82 electric and 16 natural gas) are not included in the totals shown in Table 2i. Missed appointments exclude appointments that are “excused” per APPENDIX 2 to Exhibit J (consolidated Dockets UE-011570 and UG-011571) as updated in the compliance filing per Order 25 of Consolidated Dockets UE-072300 and UG 072301.

Service Guarantees

Overview

PSE offers two types of service guarantees to its customers: Customer Service Guarantee (Service Guarantee #1) for a scheduled appointment and Restoration Service Guarantees (Service Guarantee #2 and Service Guarantee #3) for electric service restoration.

PSE promotes its Customer Service Guarantee and the Restoration Service Guarantees on pse.com, the back of billing stock, and on the billing/return envelope. It is also highlighted in the customer newsletter²⁹ as part of customer bill inserts. These promoting efforts are detailed in Appendix F: Customer Service Guarantee Performance Detail.

PSE also surveys its customers monthly about the Customer Service Guarantee. Appendix G discusses the ways PSE has made customers aware of its Customer Service Guarantee and the results of the customer awareness survey.

Customer Service Guarantee

The Customer Service Guarantee (“CSG”) is designed to give customers a \$50 missed appointment credit if PSE or its service providers fail to arrive by the mutually agreed upon time and date to provide one of the following types of service:

- **Permanent service**—Permanent natural gas service from an existing main or permanent electric secondary voltage service from existing secondary lines
- **Reconnection**—Reconnection following move-out, move-in or disconnection for non-payment
- **Natural gas diagnostic service request**—For water heater, furnace checkup, furnace not operating, other diagnostic or repair or follow-up appointments

This service appointment guarantee applies in the absence of Major Events, earthquakes, supply interruptions or other adverse events beyond PSE’s control. In these cases, PSE will reschedule service appointments as quickly as possible.

The number of CSG by energy, service type, and month is detailed in Appendix F: *Customer Service Guarantee Performance Detail*. For additional details on the promotion and communication of CSG, see Appendix G: *Customer Awareness of Service Guarantee*.

²⁹ SQI settlement requirement: “A promotion of the customer service guarantee will be included in the customer newsletter at least three times per year.”

Restoration Service Guarantees

PSE has two Restoration Service Guarantees (“RSG”) under the conditions of electric Schedule 131 that provides a \$50 credit to a qualified customer who experiences a prolonged outage during a non-storm event for more than 24 consecutive hours or is out of electric service for at least 120 consecutive hours for any outage. To receive the RSG credit, affected customers must report the outage or request the credit within seven days of their service restoration. The 120-hour Restoration Service Guarantee has been effective since November 1, 2008. The 24-hour Restoration Service Guarantee became effective on January 1, 2017, which was established to replace the SQI #3 SAIDI performance penalty mechanism.

Both Restoration Service Guarantees will be suspended if PSE lacks safe access to its facilities to perform the needed repair work. To receive either or both the service guarantee payments, affected customers must report the outage or apply within seven days after the restoration of their electric service. Outages caused, or restorations impeded, by Customer equipment are not eligible. If PSE cannot safely access its facilities, the 24-hour or 120-hour period begins when safe access is made available for personnel and equipment.

The maximum credit payment to customers for the 120-hour Restoration Service Guarantee is \$1.5 million. There is no limit of PSE’s 24-hour Restoration Service Guarantee credit payment to customers.

The availability of the 120-hour Restoration Service Guarantee is emphasized and messaged in PSE’s phone system when customers call and report their outage during a major outage event, when 5% or more PSE electric customers are without power, or when PSE opens its Emergency Operations Center in response to a significant outage event.

Customer Service Guarantee Credits

In 2022, PSE credited customers a total of \$17,400 for missing 348 of the 31,538 Customer Service Guarantee applicable appointments (i.e., SQI #10 appointments). While there were less applicable appointments, the number of Customer Service Guarantee Credits paid to customers is about the same. In 2019, PSE credited customers a total of \$14,850 for missing 297 of the 91,536 SQI #10 appointments whereas 284 appointments were missed, for a total of \$14,200 credited in 2020. There were 37,773 SQI #10 appointments for 2020. In 2021, PSE credited customers a total of \$15,200 for missing 304 of the 34,356 SQI #10 appointments.

Table 2j provides summary values of Service Guarantee counts and payments to customers in 2022 by service type.

Table 2j: 2022 PSE SQI #10 Appointment Count and Customer Service Guarantee Credits

Service Type	SQI #10 Appointment Counts ³⁰			Customer Service Guarantee Payments to Customers		
	Electric	Natural Gas	Total	Electric	Natural Gas	Total
Permanent Service	7,287	5,966	13,253	\$1,450	\$2,000	\$3,450
Reconnection	2,832	3,804	6,636	\$1,600	\$3,050	\$4,650
Diagnostic	N/A	11,649	11,649	N/A	\$9,300	\$9,300
Total	10,119	21,419	31,538	\$3,050	\$14,350	\$17,400

Appendix F: *Customer Service Guarantee Performance Detail* provides additional detail on missed appointments along with the credits paid by month and appointment service type as of December 31, 2022.

Restoration Service Guarantee Credits

PSE is committed to reviewing all prolonged outages that may trigger the Restoration Service Guarantees and any customer requests for the RSG credit within 30 days of a request. In 2022, some customers experienced an extended outage and received a \$50 RSG credit because PSE field personnel took longer to locate and repair the failed underground service or waited longer for the arrival of needed equipment or delayed the restoration due to poor weather conditions.

The winter was harsh in the mountain regions and snow caused delays. If a crew left due to harsh conditions or needed other materials/equipment to complete the task and needed to go down for rest before returning – these affected customers are eligible for the RSG. With respect to underground facility outages--failing concentric neutrals that hamper locating faults in direct buried primary cable, or unmarked/poorly mapped handholes for secondary connections that hamper restoration efforts-- these affected customers are also eligible for the RSG. Available crews reaching work limits and the outage not being re-assigning to another crew is also a reason to have a credit payment to a customer if beyond 24 hours for restoration.

³⁰ 98 Excused appointments (82 electric and 16 natural gas) are not included in the totals shown in Table 2i. Missed appointments exclude appointments that are “excused” per APPENDIX 2 to Exhibit J (consolidated Dockets UE-011570 and UG-011571) as updated in the compliance filing per Order 25 of Consolidated Dockets UE-072300 and UG 072301.

Table 2k: 2022 PSE Restoration Service Credit Payment Count and Credit Payments

Key Measurement	Type of Metric	Benchmark/Description	No. of Customers	Restoration Service Guarantee Payments to Customers
120-consecutive – hour power outage restoration guarantee	Service Guarantee #2	A \$50 credit to eligible customers when experienced a power outage is longer than 120 consecutive hours	0	\$0
24-consecutive-hour non-major storm power outage restoration guarantee	Service Guarantee #3	A \$50 credit to eligible customers when experienced a power outage is longer than 24 consecutive hours during non-major storms	303	\$15,150
<i>Total</i>			303	\$15,150



CHAPTER 3

ELECTRIC SERVICE RELIABILITY

Executive Summary

As required by WAC 480-100-393 and 480-100-398, this is PSE's Electric Service Reliability Annual Report. Providing safe, reliable and efficient electric service at a reasonable cost is a top priority for PSE. This executive summary provides an overview of performance results. The body of the report contains further analysis and information as required in PSE's Monitoring Plan³¹.

Appendices H – O also satisfy the requirements of the Monitoring Plan and the appendices following Appendix O provide further details referenced throughout the rest of the report.

To improve electric service for our customers, PSE is modernizing the grid through an interconnected set of plans and actions that provide energy that is reliable, resilient, clean, smart and flexible. **Figure 3a** on the following page illustrates PSE's grid modernization approach as a triangle of the identified service characteristics. While this report focuses on reliability performance, plans discussed within also drive the multiple values of the adjacent characteristics.

³¹ Docket UE-110060

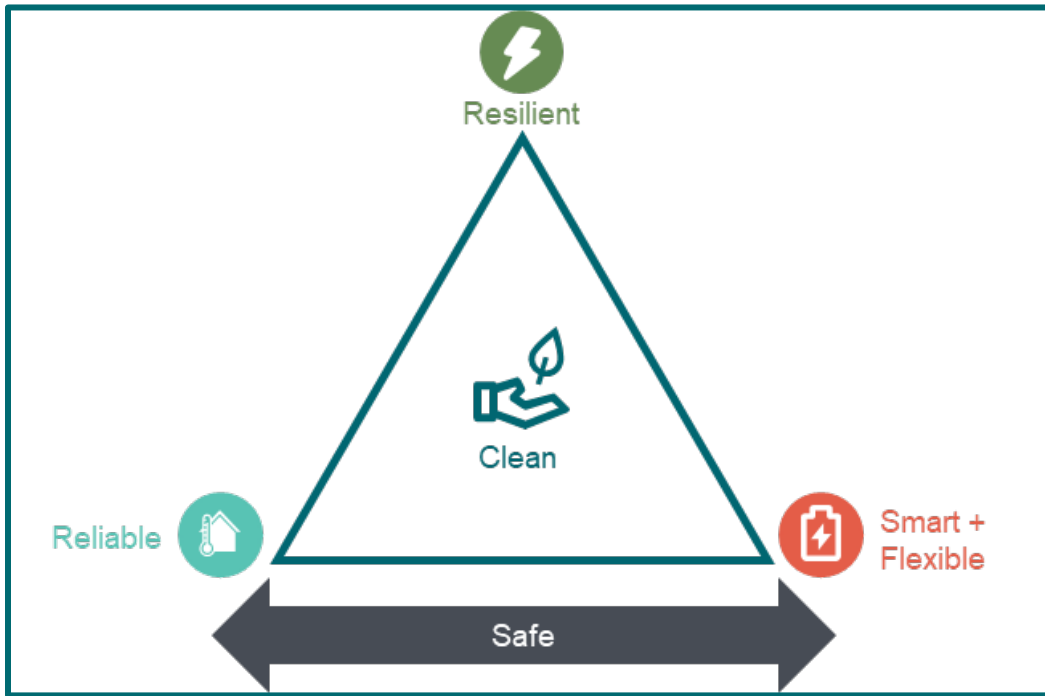


Figure 3a: PSE's grid modernization vision

The two most common industry methods for measuring reliability performance, and the metrics designated in this report as SQI #3 and #4, are System Average Interruption Duration Index (“SAIDI”) and System Average Interruption Frequency Index (“SAIFI”). These metrics, along with Customers Experiencing Multiple Interruptions (“CEMI”) and Customer Complaint metrics help PSE understand the different ways customers experience reliability and changes in reliability. Though imperfect, reviewing these metrics over a period of years, indicates trends and progress PSE is making to improve the electric system reliability.

Both SAIDI and SAIFI generally vary greatly from year to year due to a number of factors, primarily differences in weather. A prediction model, trained using weather data and PSE’s electric distribution circuit details, which is focused on predicting the number of interruptions in a given year estimates the majority of variation in outages is explained by variations in weather characteristics such as temperature, barometric pressure and precipitation. The model is in the beginning stages of development and does not predict SAIDI or SAIFI, however preliminary results align with other analyses that suggest weather events have a large impact on yearly variation in reliability metric results. PSE’s system reliability improved in 2022 compared to 2021 as SQI #3 SAIDI decreased from 207 to 181 minutes and SQI #4 SAIFI decreased from 1.35 to 1.06 interruptions.

Summary of Current SQI #3 SAIDI Performance

In 2022, PSE’s SQI #3, Non-Major Event Day SAIDI, was 181 minutes compared to a target for SQI #3 of 155 minutes. **Figure 3b** shows PSE’s SQI #3 SAIDI results from 2014.

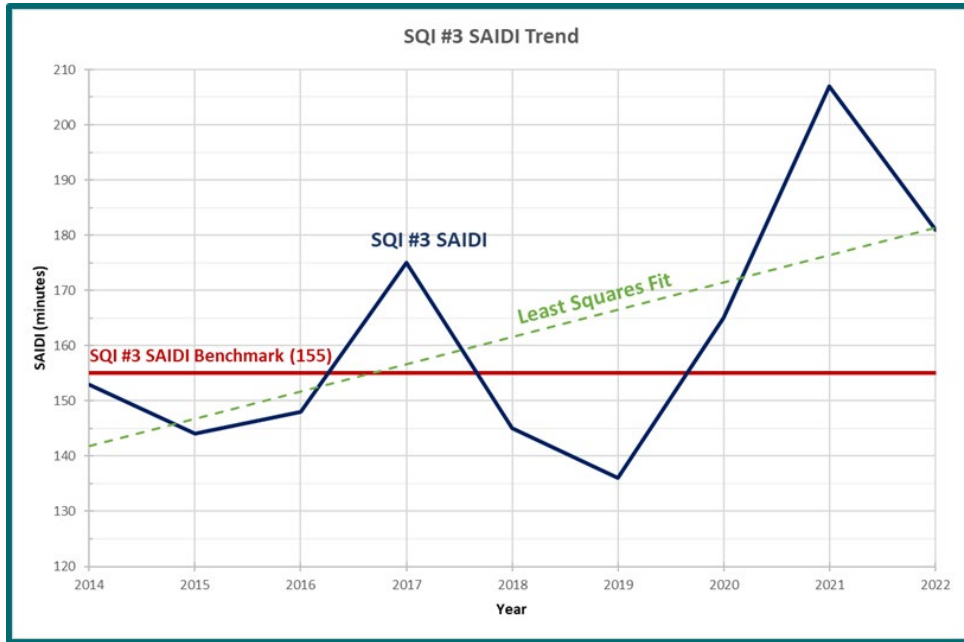


Figure 3b: Trend in SQI #3 SAIDI

Figure 3b shows the volatility in SQI #3 SAIDI results that often occurs from year to year. The majority of this volatility is typically due to the number and severity of weather events that are not excluded from the metric because they do not qualify as Major Event Days (“MED”) but have a significant impact nonetheless. This was true for 2022 where, in January, strong winds and heavy precipitation, lasting multiple days, caused extraordinarily long outage durations in mountainous regions of PSE’s territory due to both the extent of the damage and access issues that delayed restoration. In November and December multiple wind and precipitation weather events occurred more broadly across the territory resulting in a large number of storm days, only some of which met the daily Tmed and were excluded from the SQI #3 SAIDI calculation. The reason for these storm day inclusions in the 2022 SQI #3 SAIDI metric is in part due to multiple storms occurring in rapid succession such that damage from a subsequent storm occurred before all customers from the previous storm could be fully restored.

Figure 3c on the following page shows how cumulative 2022 SQI #3 SAIDI exceeded PSE’s cumulative 5 year average SAIDI, with weather events in January, November and December being the primary drivers of higher than average SAIDI results. The first and last 2 weeks of the year alone accounted for 21% of SQI #3 SAIDI. Had those weeks been average weeks, 2022 SQI #3 SAIDI would have been 166.

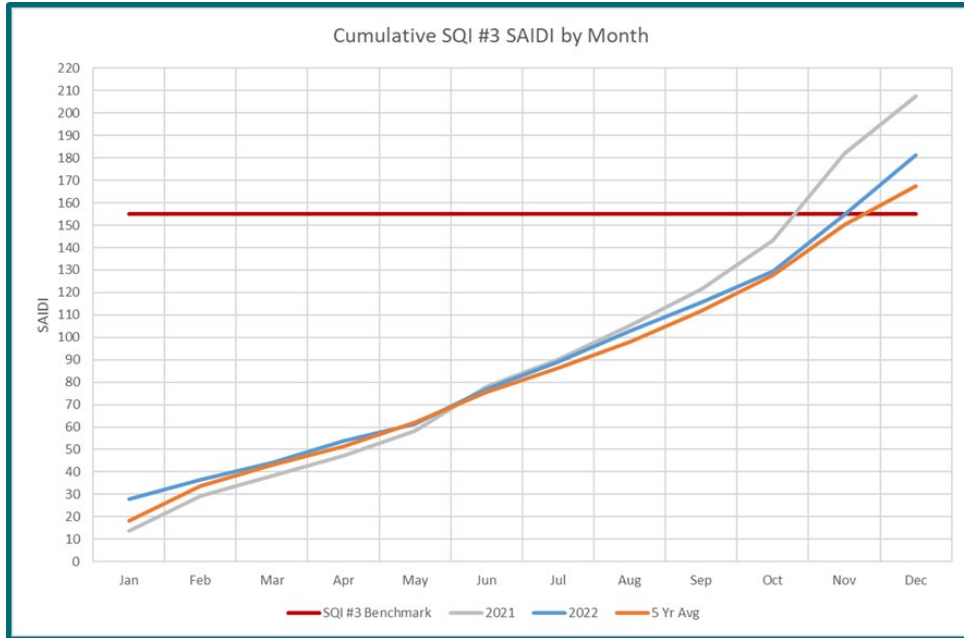


Figure 3c: 2022 cumulative SQI #3 SAIDI compared with 5 year average

Figure 3d on the following page shows the most significant increases and decreases in 2022 SQI #3 SAIDI minutes associated with outage cause categories as compared to the 5 year average. Vegetation and equipment failures, primarily affected by weather events, were responsible for the majority of the increase between 2022 SQI #3 SAIDI and the average. Customer interruptions caused by unknown factors, which saw the largest decrease compared to the 5 year average, has been declining steadily over the past few years, possibly as a result of improvements to determining and categorizing cause types.

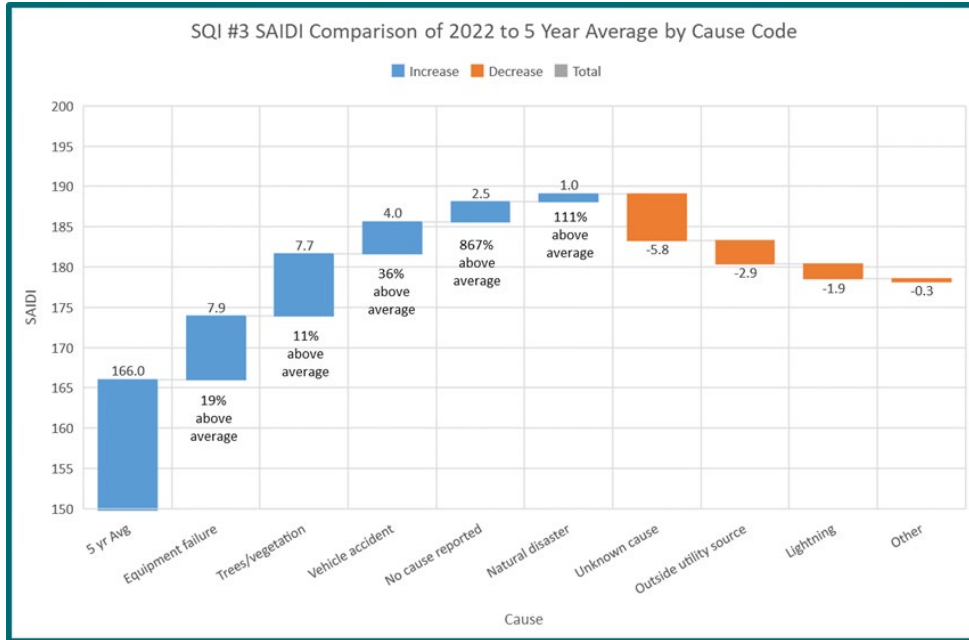


Figure 3d: 2022 SQI #3 SAIDI contribution by cause compared to the 5 year average

Summary of Current SQI #4 SAIFI Performance

In 2022, PSE’s SQI #4 SAIFI was 1.06 interruptions compared to a target for SQI #4 of 1.30 interruptions. **Figure 3e** on the following page shows PSE’s SQI #4 SAIFI results in comparison to historical values.

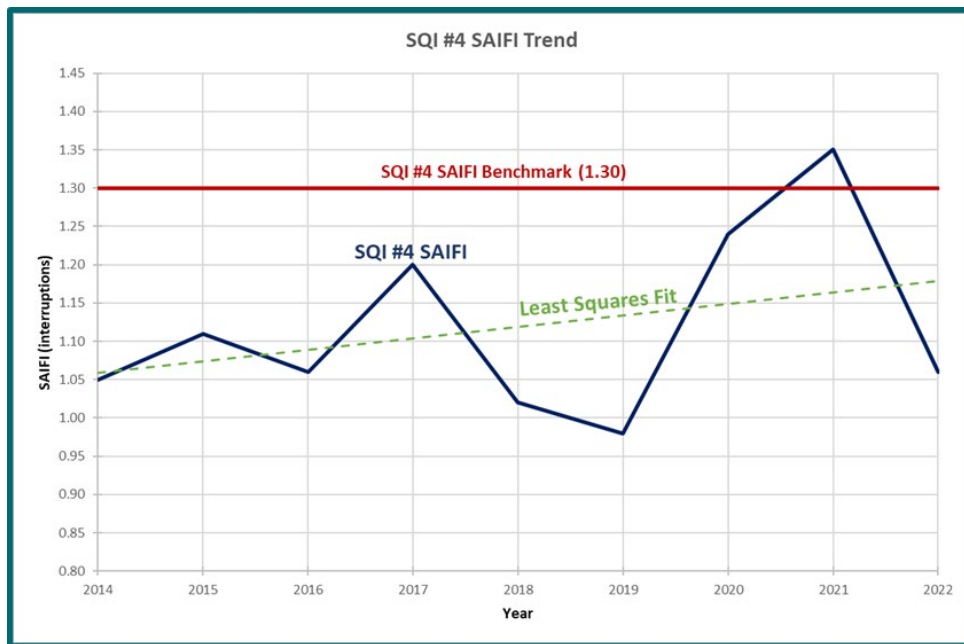


Figure 3e: Trend in SQI #4 SAIFI

Figure 3e shows SQI #4 SAIFI decreased in 2022 compared with 2021. SAIDI and SAIFI are
Puget Sound Energy 2022 Service Quality and Electric Service Reliability Report

strongly correlated and typically follow the same trend because many of the issues that affect SAIDI also affect SAIFI. The decline in SQI #4 SAIFI in 2022 was greater than for SQI #3 SAIDI because an increase in average interruption durations had a large impact on SAIDI but did not affect SAIFI. This difference can be mostly attributed to significant outage durations in mountainous regions of PSE's territory due to both significant extent of damage and access issues that delayed restoration.

Figure 3f shows cumulative 2022 SQI #4 SAIFI by month compared to the 5 year average SQI #4 SAIFI. The weather events in January were significant but did not impact enough customers to be excluded from the metric, resulting in SQI #4 SAIFI starting out above average in January, as can be seen in the chart. The remainder of the year had fewer SQI #4 interruptions, than the 5 year average, which drove year-end results below the 5 year average.

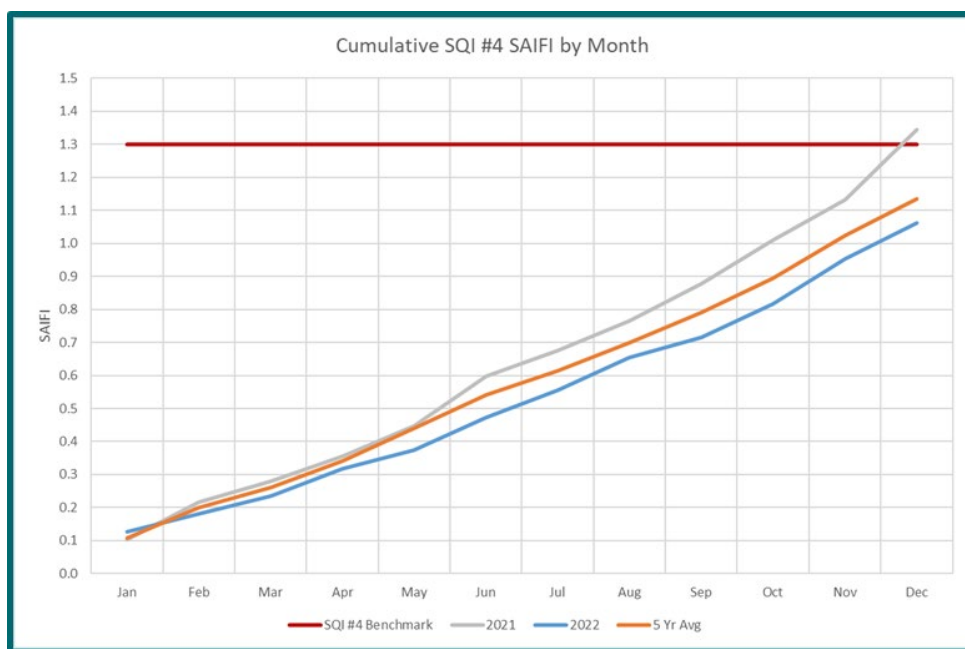


Figure 3f: 2022 cumulative SQI #4 SAIFI compared with 5 year average

Figure 3g on the following page shows the most significant increases and decreases in 2022 SQI #4 SAIFI minutes associated with outage cause categories as compared to the 5 year average. Vehicle accidents, unknown cause and tree/vegetation interruptions were the most notable changes relative to the average. Vehicle accident caused interruptions have been steadily increasing over the past few years, though no cause for the trend has been identified. Customer interruptions caused by unknown factors has been declining steadily over the past few years, possibly as a result of improvements to categorizing cause types. Changes to trees and vegetation caused customer interruptions are primarily impacted by variations in weather.

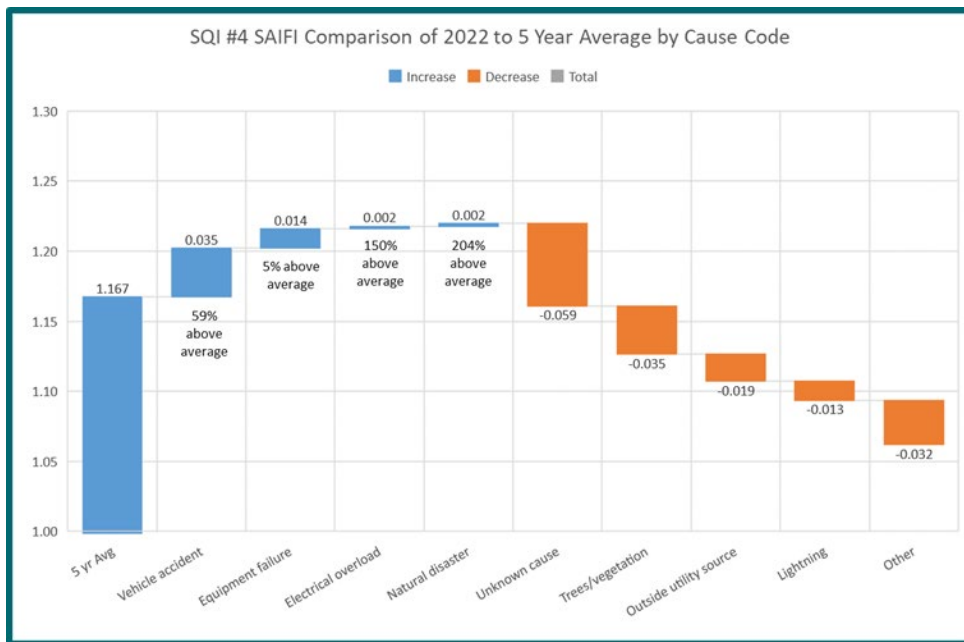


Figure 3g: 2022 SQI #4 SAIFI contribution by cause compared to the 5 year average

Summary of Current CEMI Performance

As agreed to in Dockets UE-072300 and UG-072301 Order 29, PSE began tracking and reporting on CEMI in 2018. **Figure 3h** shows PSE’s Non-MED CEMI results from the inception of this metric.

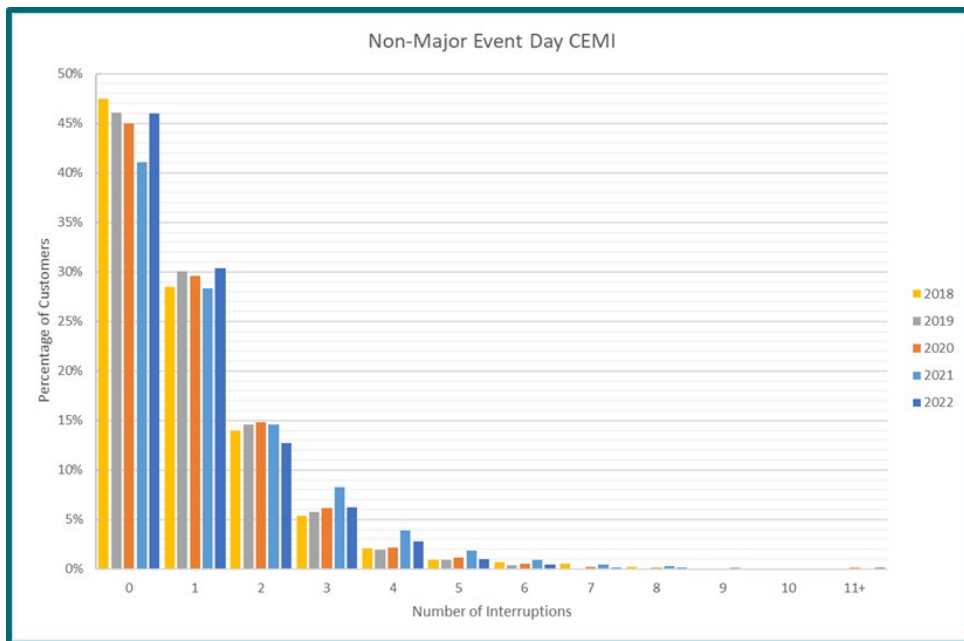


Figure 3h: Trend in Non-Major Event Day CEMI

The results of 2022 show that 76 percent of customers experienced one or less outages, a positive increase from 2021 when 69 percent of customers experience one or less outages. Unlike SAIDI which is largely dependent on the extent of damage, number of customers associated with a particular outage, and restoration duration, CEMI offers another perspective on the customer experience with respect to reliability. In general, PSE aims to reduce the percentage of customers experiencing a high frequency of interruptions. This metric is primarily used by PSE to identify specific pockets of customers experiencing poor reliability that might not surface at system-wide or circuit level metrics, but also can more directly reflect how customers experience reliability.

Summary of Customer Complaints

In 2022, PSE received a total of 104 reliability complaints: 57 received through the Washington Utilities and Transportation Commission (WUTC) and 47 came directly to PSE. **Figure 3i** shows the customer complaint trend from 2014 to present.³² Note that customers may have submitted a complaint with both PSE and the WUTC.

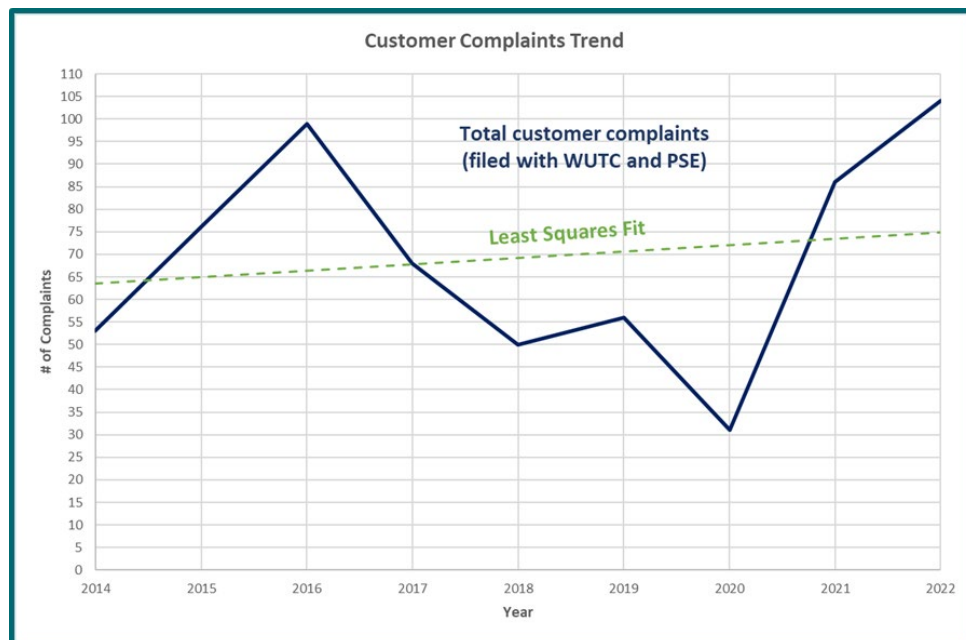


Figure 3i: Trend in Customer Complaints

³² The increase in complaints in 2016 was due to organized neighborhood groups calling PSE to complain about electric reliability in their area, specifically customers in Kenmore. The main driver for the increase in UTC complaints in 2022 was 21 complaints from a Lake Tapps neighborhood in Pierce County.

While the number of complaints increased in 2022, the number of complaints is very small compared to the overall number of PSE customers (0.009%). With the number of complaints so small relative to the customer base, and because relatively large changes in the number of complaints can be influenced by where and when storms occur, changes in complaints over time are not well correlated to trends in SAIDI or SAIFI. However, this metric is useful for PSE in identifying localized customer concerns that might not surface at system-wide or circuit-level metrics.

Summary of Plan Moving Forward

While metrics such as SQI #3 SAIDI, SQI #4 SAIFI and CEMI are the industry standards for measuring reliability performance, they are not perfect. Year-to-year comparisons can sometimes be a better measure of changes in environmental factors than a measure of a utility's efforts. Understanding and mitigating a rapidly changing operating environment such as with increases in the number and type of extreme weather events and vehicle accidents takes time and requires tools beyond standard system-wide metrics. PSE uses several methods to help with this.

One such tool is a project validation process internally referred to as backcasting, which measures reliability performance. The results typically show that reliability is improved in a project's vicinity. However impacts to reliability on the rest of the system may be larger than the sum of location-specific project benefits for a given year, resulting in an increase in system-wide metrics. This may imply that the quantity of reliability issues are beginning to outpace reliability improvement investments or that the characteristic of reliability issues, or environmental conditions, have changed and new or different solutions are needed. PSE also employs a root cause analysis program to dig deeper into the causes of large events and identify potential future risks and opportunities for improvement. These programs provide feedback mechanisms that allow PSE to adjust solutions and investments to changing circumstances.

PSE's long range plan is to continue to implement well-established electric system improvements such as cable replacement, overhead upgrades, and distribution automation to drive improvements in reliability. PSE will also continue to analyze other reliability improving technologies and programs such as distributed energy resources (DERs) to serve isolated sections of customers during an outage. Through PSE's portfolio planning optimization process, reliability projects will continue to be chosen for implementation in a way that maximizes value and advances equity in serving our customers.

SAIDI (SQI #3)³³

Overview³⁴

SAIDI measures the average number of interruption minutes per customer per year. Most electric utilities use this measurement in reviewing the reliability of their electrical system, excluding interruptions that occur simultaneously to a significant portion of their customer base during extreme weather or other unusual events.

SAIDI is similar to SAIFI, but SAIDI measures the average duration of customer interruptions while SAIFI measures the average number, or frequency, of customer interruptions. See **Appendix H: Electric Reliability Terms and Definitions** for the SAIDI definition.

2022 results based on the recorded outages are reported in **Table 3a**.

Table 3a: 2022 SAIDI Results

	Key Measurement	Benchmark	Baseline	Current Year Results	Achieved
SAIDI _{Total}	Total (all outages current year) Outage Duration–System Average Interruption Duration Index (SAIDI)	n/a	532	447	--
SAIDI _{Total 5-year Average}	Total (all outages five-year average) SAIDI	n/a	326	539	--
SAIDI _{5%}	<5% Non-Major-Storm (<5% customers affected) SAIDI	n/a	132	207	--
SAIDI _{IEEE}	IEEE Non-Major-Storm (T _{MED}) SAIDI	n/a	107	196	--
SAIDI _{SQI-3}	IEEE Non-Major Storm (T _{MEDADJ}) SAIDI	No more than 155 minutes per customer per year	n/a	181	☐

Appendix J: 1997-Current Year PSE SAIFI and SAIDI Performance by Different Measurements reports the historical results of the four measurements from 1997 through the current reporting year. See **Appendix I: Electric Reliability Data Collection Process and Calculations** and the section on electric service reliability measurements and baseline statistics for details on the established baseline used for comparison.

³³ This section meets a requirement of Attachment B of Docket UE-110060.

³⁴ This section meets a requirement of Attachment B of Docket UE-110060.

What Influences SAIDI³⁵

PSE tracks outages by cause codes and groups. **Figure 3j** illustrates the impact of tree-related outages, accounting for the majority of customer minutes, across the SAIDI_{Total} and SAIDI_{SQI-3} measurements.

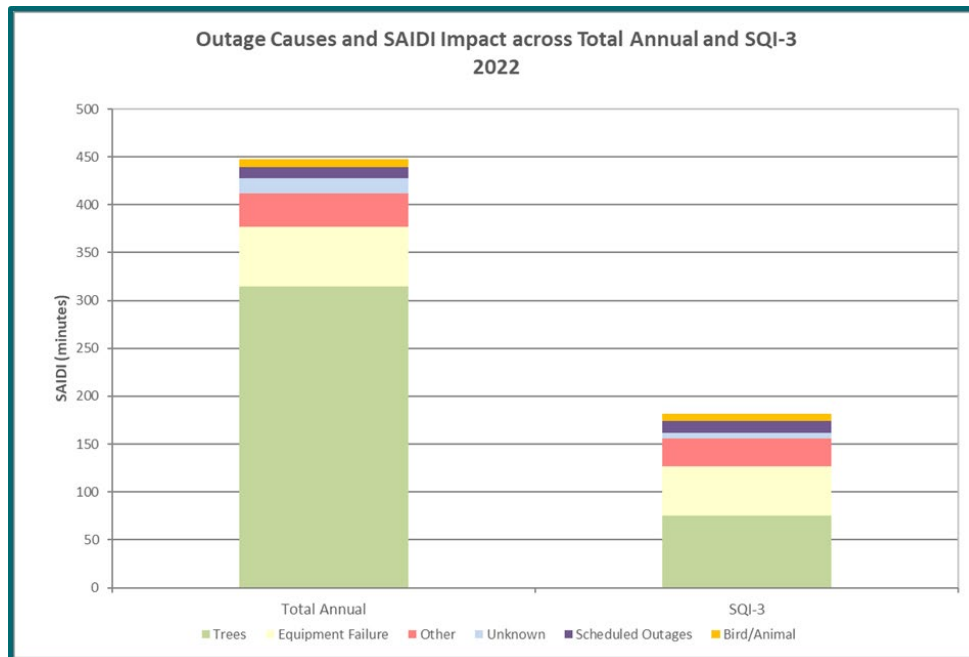


Figure 3j: Outage Causes and SAIDI Impact across Total Annual and SQI-3 in 2022

Despite PSE’s efforts to minimize tree-related outages, this outage type greatly impacts SAIDI performance. Falling trees can damage the infrastructure and require a specialized tree removal crew to remove the tree before field personnel can begin restoration efforts, producing prolonged interruptions. A fallen tree or large limb will damage the line and may also tear down supporting structures, cross arms and poles.

Other cause categories with a large impact on SAIDI include equipment failure, bird/animal along with unknown and the other cause categories. The equipment failures category is used when a device is suspected of failing for reasons not related to external causes and the unknown category covers those outages when electric first response (EFR) personnel were unable to determine the cause of the outage. The Other category includes 20 cause codes that PSE tracks, such as underground dig-ups, vehicle-related outages (vehicle impacting a pole, pad mounted switch, guy wire, etc.) and errors in operating the electric system.

³⁵ This section meets a requirement of Attachment B of Docket UE-110060.

Historical Trends for SAIDI

Table 3b shows the SQI SAIDI from 2018 to 2022.

Table 3b: SQI SAIDI from 2018 to 2022

	2018	2019	2020	2021	2022
SAIDI (SQI #3)	145	136	165	207	181
Benchmark	155 minutes per customer per year, Non-Major Event Days				

SQI #3 SAIDI results vary widely from year to year. While SQI #3 SAIDI decreased in 2022 compared to 2021, weather events in January, November and December resulted in the yearly SQI #3 SAIDI exceeding the 5 year average. **Figure 3k** shows 2022 SQI #3 monthly performance against the 5 previous year average.

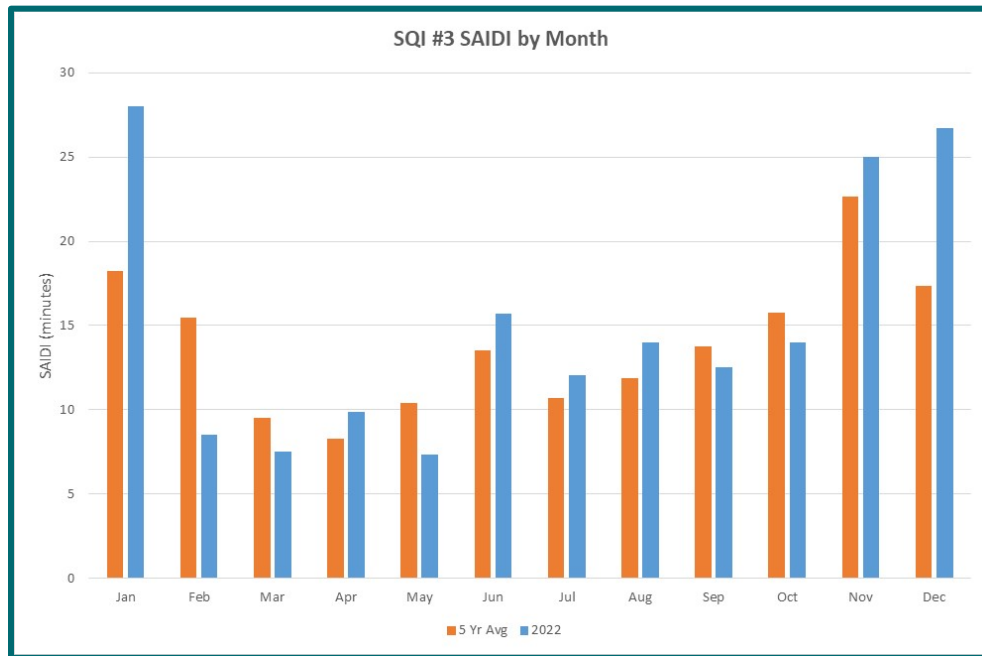


Figure 3k: 2022 SQI-3 comparison to 5 year average by month

For more detail see **Appendices J: 1997-Current Year PSE SAIFI and SAIDI Performance by Different Measurements, K: Current Year Electric Service Outage by Cause by Area** and **L: Historical SAIDI and SAIFI by Area**.

SAIFI (SQI #4) ³⁶

Overview³⁷

SAIFI measures the number of interruptions per customer per year. Most electric utilities use this measurement in reviewing the reliability of their electrical system, excluding major events that cause interruptions to a significant portion of their customer base.

SAIFI is similar to SAIDI, but SAIFI measures the average number of customer interruptions while SAIDI measures the average duration of customer interruptions. See **Appendix H: Electric Reliability Terms and Definitions** for the SAIFI definition.

The 2022 results based on the recorded interruptions are reported in **Table 3c**.

Table 3c: 2022 SAIFI Results

	Key Measurement	Benchmark	Baseline	Current Year Results	Achieved
SAIFI_{Total Annual}	Total (all outages current year) Outage Frequency -- System Average Interruption Frequency Index (SAIFI)	n/a	1.24	1.66	--
SAIFI_{Total 5-year Average}	Total (all outages five-year average) SAIFI	n/a	1.37	1.74	--
SAIFI_{5%}	<5% Non-Major-Storm (<5% customers affected) SAIFI	1.30³⁸	0.80	1.06	<input checked="" type="checkbox"/>
SAIFI_{IEEE}	IEEE Non-Major-Storm (TMED) SAIFI	n/a	0.71	1.09	--

Appendix J: 1997-Current Year PSE SAIFI and SAIDI Performance by Different Measurements reports the historical results of the four measurements from 1997 through the current reporting year. See **Appendix I: Electric Reliability Data Collection Process and Calculations** and the section

³⁶ This section meets a requirement of Attachment B of Docket UE-110060.

³⁷ This section meets a requirement of Attachment B of Docket UE-110060.

³⁸ Beginning in the 2023 reporting year, the benchmark and calculation methodology will change. PSE will report SQI-4 using the SQI-3 methodology and adjust the benchmark to 1.20 as agreed to in the settlement and final order of PSE's general rate case filing under dockets UE-220066 and UG-220067.

on electric service reliability measurements and baseline statistics for details on the established baseline used for comparison.

What Influences SAIFI³⁹

PSE tracks outages by cause codes and groups. As with SAIDI, system interruptions caused by trees and vegetation impacted SAIFI the most in 2022, which is consistent with previous years. This is followed by equipment failure, other and unknown causes having the next greatest impacts on SAIFI. See the previous section on SAIDI for more details on these cause categories.

Figure 3I shows the common causes for the recorded outages in 2022 SAIFI_{Total} and SAIFI_{5%} measurements.

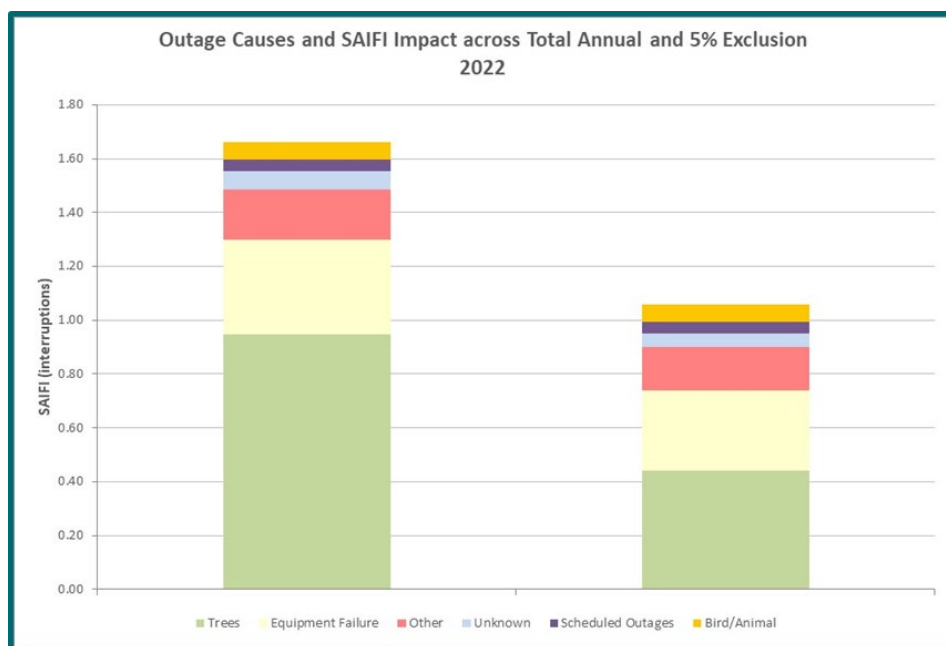


Figure 3I: Common Outage Causes and SAIFI Impact across Total Annual and 5% Exclusion in 2022

³⁹ This section meets a requirement of Attachment B of Docket UE-110060.

Historical Trends for SAIFI⁴⁰

Table 3d shows SQI SAIFI from 2018 to 2022.

Table 3d: SQI SAIFI from 2018 to 2022 (excluding 5% Major Events)

	2018	2019	2020	2021	2022
SAIFI _{5%} (SQI #4)	1.02	0.98	1.24	1.35	1.06
Benchmark	1.30 interruptions per year per customer				

Though weather events in January had a large negative impact on SQI #4 SAIFI, better than average months such as February, May and September had a larger overall effect resulting in a lower than average year-end SQI #4 SAIFI. **Figure 3m** shows 2022 SQI #4 monthly performance against the 5 previous year average.

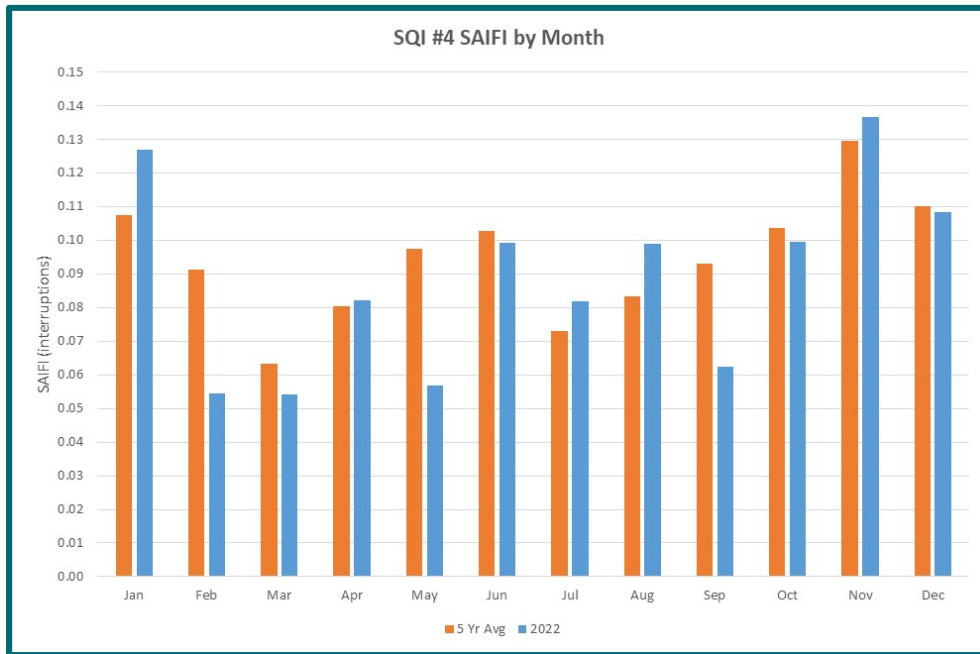


Figure 3m: 2022 SQI-4 comparison to 5 year average by month

For more details see **Appendices J: 1997-Current Year PSE SAIFI and SAIDI Performance by Different Measurements**, **K: Current Year Electric Service Outage by Cause by Area** and **L: Historical SAIDI and SAIFI by Area**.

⁴⁰ This section meets a requirement of Attachment B of Docket UE-110060.

Customers Experiencing Multiple Interruptions

Overview

Starting in 2018, PSE agreed to report on Customers Experiencing Multiple Interruptions (CEMI) as part of Dockets UE-072300 and UG-072301 Order 29. Whereas SAIDI and SAIFI are an average measure of customer experience, CEMI provides the range of customer experiences related to interruption frequency. Metrics like SAIDI and SAIFI are useful for tracking system-wide progress but may hide customer level reliability concerns. CEMI fills this gap, however, instead of describing it as a unique specific measure, it is expressed here as a range. This gives an overall profile of multiple interruptions experienced by PSE customers.

CEMI measures the percentage of customers who have experienced zero to multiple sustained interruptions. It is calculated by totaling the number of non-major event day interruptions experienced by each customer. Then the number of customers who had the set number of interruptions is totaled and divided by the average annual number of electric customers.

Results

Figure3n shows the percentage of PSE customers experiencing varying numbers of interruptions. For example, 46% of customers experienced no sustained interruptions while 30% of customers experienced one sustained interruption.

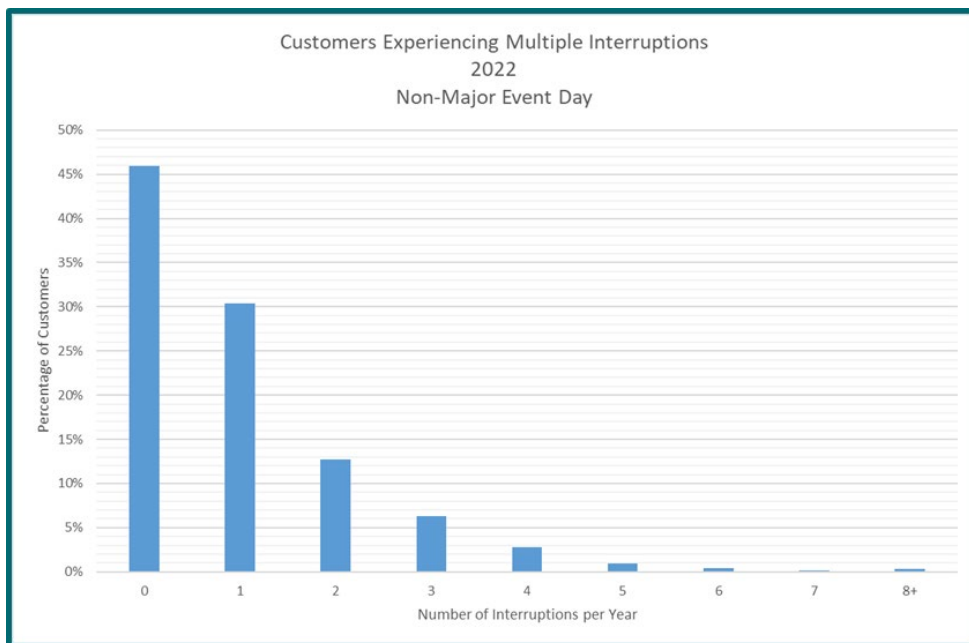


Figure 3n: Customers Experiencing Multiple Interruptions in 2022

About Electric Service Reliability Measurements and Baseline Statistics⁴¹

Overview

As required by PSE's Electric Service Reliability Plan (UE-110060), PSE reports the SAIFI and SAIDI performance results in many key measurements. Each measurement is based on specific criteria, as noted in the respective SAIDI (SQI #3) and SAIFI (SQI #4) sections. Standard formulas are used to calculate each of the measurements. The multiple measurements showcase elements of electric service reliability performance with and without the impacts of extreme weather or other unusual events. The formula for each measurement is defined in **Appendix H: *Electric Reliability Terms and Definitions***.

Baseline Year

To meet UTC requirements, PSE established 2003 as its baseline year⁴². As data collection methods have changed, comparisons between current performance and a 20-year old baseline are no longer meaningful. PSE believes a multi-year trend using data collected with similar methods provides a more accurate representation of the direction of reliability performance. While the result tables given in the SAIDI and SAIFI sections above provide the 2003 baseline numbers for comparison to current results, the charts in the executive summary showing SAIDI and SAIFI trends over multiple years, along with the associated interpretations, represent a more meaningful assessment of current reliability performance.

Major Events

PSE has multiple major event definitions that apply to SAIFI (also referred to as 5% SQI Exclusion) or SAIDI metrics. For SAIFI, major events are defined as days when 5% or more of the electric customer base in a 24-hour period experiences power interruption and the days following (carried-forward days), until all those customers have service restored. The days that meet that criterion are excluded from that metric.

For the purpose of measuring SQI SAIDI, days that exceed the annual adjusted Major Event Day Threshold are excluded from the performance calculation. Starting in the 2016 reporting year, PSE's SQI SAIDI calculation is based on the industry standard IEEE 2.5 Beta methodology and PSE is allowed to adjust catastrophic days. A catastrophic day is defined as any day that exceeds the 4.5 Beta threshold. In addition, PSE also calculates SAIDI using the IEEE 1366 2.5 Beta methodology without adjusting for catastrophic days, referred to IEEE SAIDI.

⁴¹ This section meets a requirement of Attachment B of Docket UE-110060.

⁴² Beginning in the 2023 reporting year, the baseline year will change. PSE establishes 2014 as its baseline year as agreed to in the settlement and final order of PSE's general rate case filing under dockets UE-220066 and UG-220067.

Table 3e details the dates, causes, affected areas and exclusion criteria for the SQI SAIDI, IEEE Standard 1366 exclusion, and 5% exclusion events in 2022. Typically, an event that meets the 5% Exclusion Major Event Day criteria will also exceed the SQI SAIDI T_{MEDADJ} and IEEE T_{MED} criteria. Since the initial reporting of the IEEE methodology in 2003, all 5% Exclusion Major Event Days have met the IEEE T_{MED} . With the addition of reporting SQI SAIDI events in 2016, all 5% Exclusion Major Event Days have met the SQI SAIDI T_{MEDADJ} as well.

IEEE T_{MED} and SQI SAIDI are based on the customer minutes rather than the number of customers impacted. Therefore, if PSE experiences a storm event that is isolated to a small geographic area or a less populated county, it is possible the event exceeds the IEEE T_{MED} and SQI SAIDI but not meet the 5% exclusion criteria. In 2022, three of the IEEE T_{MED} and SQI SAIDI events did not meet the 5% Exclusion Major Event Day criteria.

Table 3e: 2022 SQI SAIDI, IEEE T_{MED} and SQI SAIFI Exclusion Events⁴³

SQI SAIDI Exclusion Date	IEEE T_{MED} Exclusion Dates	Daily SAIDI	Exceed T_{CAT}	5% Customers Out Exclusion	Cause	Span of 5% Customers Out Exclusion Dates	Affected Areas
1/2/2022	n/a	7.10		n/a	Wind	n/a	Kitsap and Thurston Counties
1/3/2022	1/3/2022	8.24		n/a	Wind, Heavy Snow	n/a	Kitsap County and Vashon Island
4/4/2022	4/4/2022	28.07		12.1%	Wind, Rain, Snow	04/04/2022 2 AM - 04/06/2022 7:41 PM	System Wide
5/18/2022	n/a	7.47		5.9%	Wind	5/18/2022 10 AM – 5/20/2022 12 AM	North King County
11/4/2022	11/4/2022	105.94		14.1%	Wind	11/4/2022 6 PM – 11/9/2022 10 PM	System Wide
11/5/2022	11/5/2022	8.49					
11/29/2022	11/29/2022	21.34		10.0%	Wind, Snow, Ice	11/29/2022 6:30 PM – 12/2/2022 11 PM	Kitsap, North King, Thurston Counties
11/30/2022	11/30/2022	10.13					
12/3/2022	12/3/2022	9.69		n/a	Wind, Snow	n/a	Kitsap County, Vashon Island, and Skykomish
12/23/2022	12/23/2022	16.11		9.2%	Ice, Freezing Rain, Snow	12/23/2022 3 PM – 12/29/2022 5 PM	Island, Kitsap, King, Skagit, Thurston, Whatcom Counties, Vashon Island
12/26/2022	12/26/2022	20.85					
12/27/2022	12/27/2022	22.46					

⁴³ The 2022 T_{MEDADJ} is 6.94 minutes. The 2022 T_{MED} is 7.80 minutes. The 2022 T_{CAT} is 111.57 minutes.

Areas of Greatest Concern⁴⁴

PSE's system planning personnel (Planners) investigate multiple "areas-of-concern" and propose projects that will improve the reliability for customers being served by those circuits. As noted in Docket UE-110060, PSE "areas of greatest concern" are the Top 50 distribution circuits over the past five years that consistently contributed the most customer-minute interruptions (CMI). Each circuit is ranked by the total CMI seen by the circuit for each of the previous five years and those with the highest ranking are considered the Top 50 Worst Performing Circuits.

Based upon reviewing the interruption history, number of customers impacted, outage location and other factors, Planners propose projects that are designed to improve reliability on these circuits.

Appendix M: Areas of Greatest Concern with Action Plan details the Year End 2022 Top 50 list along with PSE's completed or future plan for system improvements on each circuit. It is a multi-year process as it will take a number of years to plan, approve, design and build the necessary improvements.

The Planners also monitor performance on circuits that do not meet the areas of greatest concern criteria to ensure the reliability performance does not falter in other parts of the system. The Planners review interruption history, number of customers impacted, interruption location and customer complaints, as well as receiving feedback from field personnel to identify and propose reliability improvement projects. Collectively, the information gathered is used to establish a project benefit which is compared to the overall cost of the improvement resulting in a benefit-to-cost ("B/C") ratio.

As more customer level reliability reporting is developed, which will include an equity component, smaller pockets of customers with reliability issues are identified and evaluated for improvements. This complements the areas of greatest concern analysis to provide a comprehensive approach to reviewing reliability performance for all customers. As system management tools improve and new technologies, such as Advanced Metering Infrastructure ("AMI"), are implemented, the accuracy of this reporting will improve and allow for even more efficient targeting of reliability improvement projects.

⁴⁴ This section meets a requirement of Attachment B of Docket UE-110060.

Customer Electric Reliability Complaints⁴⁵

Customer complaints and jurisdictional concerns about electric reliability and power quality are additional metrics that measure PSE’s success in delivering safe and reliable electric service.

PSE Complaints

PSE responds to customer inquiries concerning outage frequency or duration and/or power quality. Most of the first inquiries are adequately addressed in the initial response and the customer does not contact PSE again. However, when two or more customer inquiries on outage frequency or duration and/or power quality have been recorded from the same customer, during the current and prior reporting year, PSE considers this combination as a complaint.

Figure 3o illustrates the 2017 – 2022 number of recorded PSE complaints. During the rolling two-year period of 2021–2022, PSE received complaints from 47 customers relating to reliability and power quality concerns as compared to 43 complaints recorded in the rolling two year period of 2020-2021. This number represents less than 0.004% of PSE’s customers

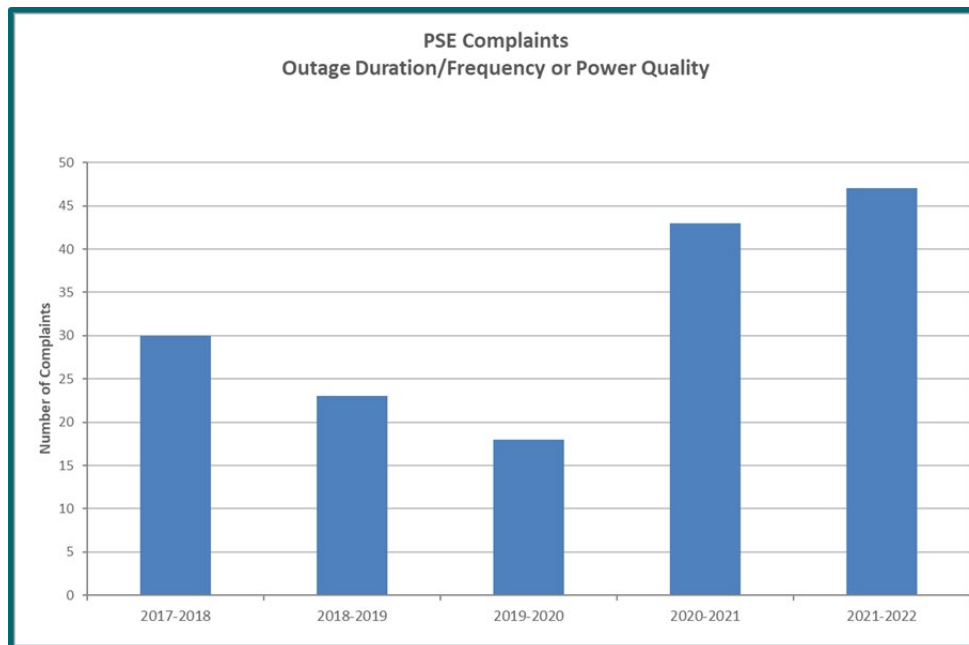


Figure 3o: Five Year History of PSE Complaints

PSE’s complaint process and the change in data collection are described in **Appendix I: Electric Reliability Data Collection Process and Calculations**. The 2020-2022 complaints are shown in tabular form in **Table N2 of Appendix N: Current-Year Commission and Rolling-Two-Year PSE Customer Electric Service Reliability Complaints with Resolutions**.

⁴⁵ This section meets a requirement of Attachment B of Docket No. UE-110060.

UTC Complaints

The number of electric service quality complaints received by the UTC in regards to interruption duration or frequency and/or power quality is another important indicator to measure PSE’s electric service reliability success. **Figure 3p** illustrates 2018 – 2022 number of UTC electric service quality complaints in regard to interruption duration or frequency and/or power quality. In 2022, the UTC received 57 complaints relating to PSE’s electric service quality as compared to 43 in 2021.⁴⁶ The 2022 complaints are shown in **Table N1** of **Appendix N: Current-Year Commission and Rolling-Two-Year PSE Customer Electric Service Reliability Complaints with Resolutions**.

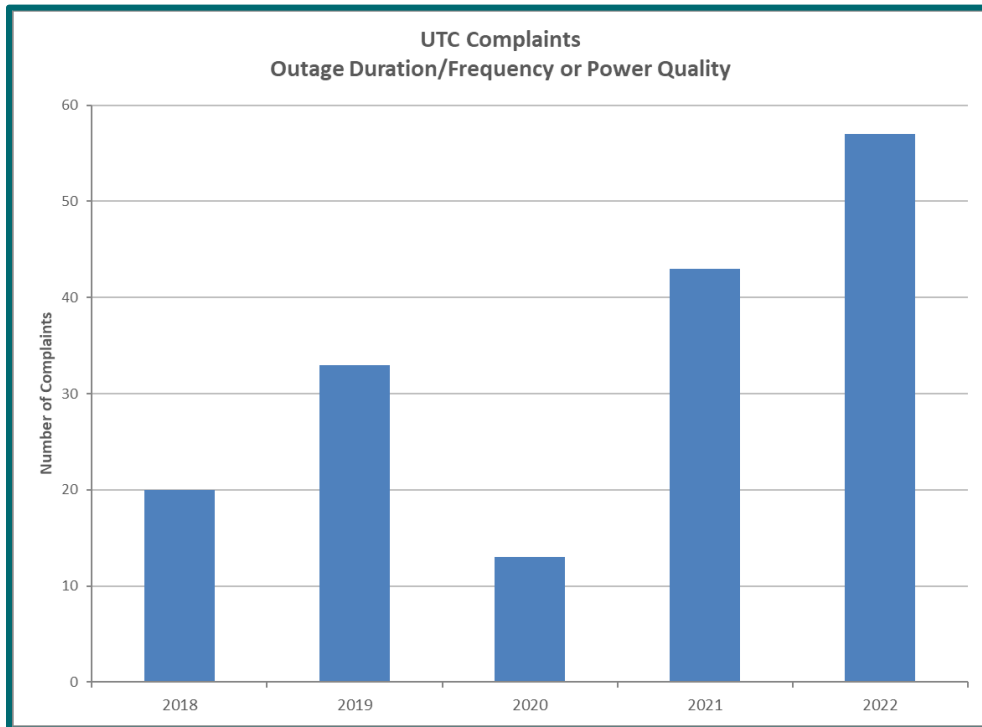


Figure 3p: Five Year History of UTC Complaints

In addition to the customer inquiries and UTC complaints, jurisdictions also have concerns about electric service reliability. Oftentimes, this is a result of constituents initiating contact with their local government entity to act as a unified voice to PSE. PSE works with these jurisdictions to address the reliability concerns.

PSE investigates these customer inquiries, UTC complaints and jurisdictional concerns, and tracks service issues. Customers receive follow-up correspondence from PSE that address their specific concern, as well as PSE’s plan for resolution. The interruption surrounding each of these customer

⁴⁶ The main driver for the increase in UTC complaints in 2022 was a master complaint from one neighborhood in Pierce County.

inquiries and complaint is reviewed for the overall circuit reliability and then an appropriate plan for resolution is prepared and communicated.

Depending on the nature of the circuit reliability, the plan for resolution could be continued monitoring of the circuit or a Planner may propose projects which will improve the circuit reliability. The map in **Appendix O: Current Year Geographic Location of Electric Service Reliability Customer Complaints on Service Territory Map with Number of Next Year's Proposed Projects and Vegetation-Management Mileage** summarizes the number of complaints by county for 2022.

Working to Uphold Reliability⁴⁷

PSE continues to implement well-established programs and processes to improve the reliability of the electric system. This section discusses PSE’s processes for identifying issues, developing solutions and validating that solutions provide the intended benefits.

Using metrics such as SAIDI and SAIFI, in addition to other inputs such as customer complaints and equipment condition, PSE first analyzes the electric system for potential problem areas. Next, project solutions and alternatives are developed for areas that may need improvement. PSE has multiple strategies and methodologies to resolve reliability issues, such as, rebuilding/re-routing existing infrastructure, installing tree-wire conductors, converting overhead conductors to underground, adding new sectionalizing devices, replacing old equipment or adding automation to the system. The descriptions of these reliability programs can be found in **Appendix P: Reliability Program Category Descriptions**. **Table 3f** shows the number of projects of each type that were completed in 2021 and 2022 as well as the projected 2021 SAIDI savings associated with projects completed in 2021.

Table 3f: Reliability program completed work and future plans

Program Category	Outage Cause Each Program Addresses						Estimated SAIDI Savings from 2021 projects	2021 Completed	2022 Completed	2023 Plan
	Trees	BA	EF	SO	UN	Other				
Vegetation Management										
Cyclical Tree Trimming	✓						n/a	2,796 miles	2,418 miles	2,574 miles
TreeWatch	✓						n/a	1,857 trees	771 trees	750- trees
Tree Replanting	✓						n/a	On-going	On-going	On-going
Substation Landscape Renovation	✓						n/a	50 trees	50 trees	50 trees
Targeted Reliability Improvements										
Worst Performing Circuits	✓	✓	✓			✓	3 minutes	12 projects	12 projects	23 projects
Reclosers	✓	✓	✓	✓		✓	<1 minute	26 projects	27 projects	40 projects
FuseSavers	✓	✓	✓			✓	<1 minute	42 projects	38 projects	117 projects
Targeted Reliability	✓	✓	✓			✓	<1 minute	12 projects	16 projects	41 projects
Distribution Automation	✓	✓	✓	✓	✓	✓	5 minutes	3 projects	12 projects	14 projects
Substation SCADA	✓	✓	✓		✓	✓	2 minutes	10 projects	9 projects	12 projects

Table continues on next page

⁴⁷ This section meets a requirement of Attachment B of Docket UE-110060.

Program Category	Outage Cause Each Program Addresses						Estimated SAIDI Savings from 2021 projects	2021 Completed	2022 Completed	2023 Plan
	Trees	BA	EF	SO	UN	Other				
Transmission Automation	✓	✓	✓			✓	<1 minute	2 projects	3 projects	4 projects
Aging Infrastructure										
Cable Remediation			✓			✓	<1 minute	67 projects	23 projects	53 projects
Copper Conductor	✓		✓				n/a	n/a	n/a	6 projects
Wildfire	✓		✓			✓	TBD	1 project		1 project
Pole Inspection and Remediation			✓				TBD	38,147 poles	40,763 poles	35,478 poles
Substation Reliability			✓				<1 minute	17 projects	19 projects	28 projects
Substation Maintenance			✓				n/a	2,733 projects	2,500 projects	3,270 projects

In addition to these improvement projects, PSE also works to maintain performance of the system by patrolling poor performing circuits, using health diagnostic programs to identify failing equipment and adhering to vegetation management best practices. It can be difficult to see the impact of these programs in overall reliability metric results, but without them, customers would experience more frequent and longer duration interruptions.

Following implementation of solutions, PSE performs a reliability improvement verification analysis on a subset of projects to determine whether projects provided the predicted benefit. In order to collect a sufficient amount of data for an analysis, projects are typically reviewed 3 or more years after implementation with a focus on programs that are ongoing. The reliability improvement verification analysis information can be used to adjust predicted benefits for future projects and can help to identify where there might be issues with benefit assumptions, project implementations, system operation or data accuracy. Note that this is not a measure of the value of a project or program, but whether or not it met a reliability benefit expectations. A high benefit project can achieve less than 100% of its reliability benefit expectation and still be the most valuable investment alternative for a given year. The analysis of projects implemented in 2018 resulted in projects achieving more than 100% of predicted reliability benefits.

PSE also performs a detailed root cause analysis on a sample of large interruptions each year to determine whether processes and system components are operating as intended. In 2022, PSE performed 21 RCAs, which accounted for 3% of SAIDI_{SQI-3}. The root cause analysis and reliability improvement verification analysis practices form a feedback loop that allows PSE to continually improve the process of identifying reliability issues and opportunities and making adjustments to optimize the design, construction and operation of the electric system. The analysis of benefits bubble in Figure 3q on the following page shows where this feedback fits into the process for identifying issues and developing solutions.

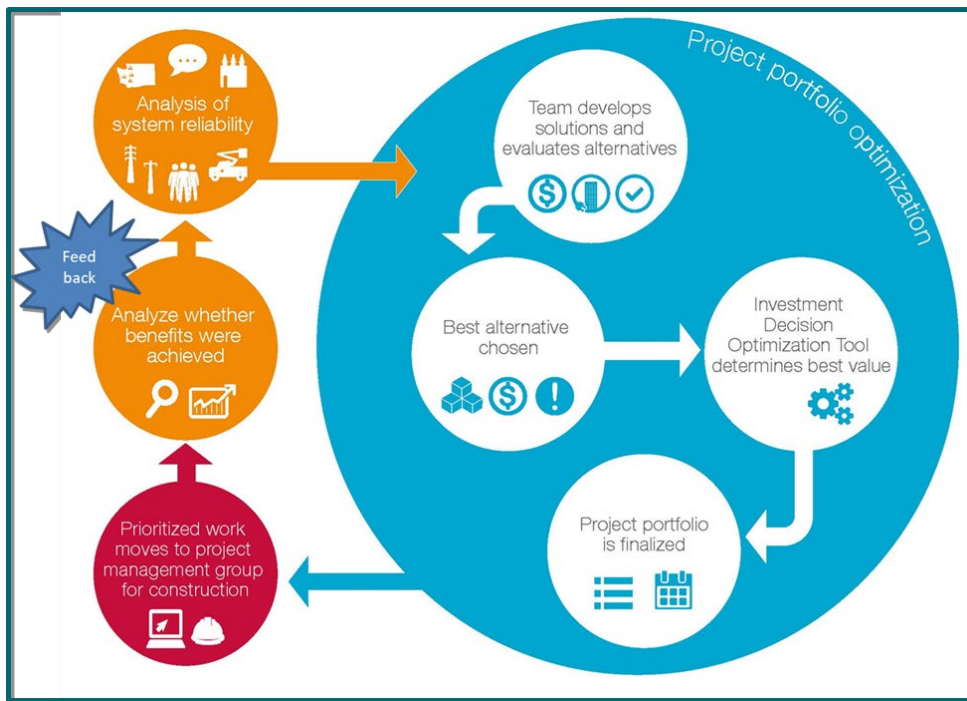


Figure 3q: Benefit analysis feedback in the system planning process

Going Forward⁴⁸

Program benefit validation from the reliability improvement verification analysis indicates that continuing to implement electric system improvements will continue to benefit customers through improved reliability. An analysis using data from the IEEE reliability benchmarking study, the econometric benchmarking study initiated by the UTC staff in 2017 and results from the Interruption Cost Estimate (ICE) Calculator, developed by Lawrence Berkeley National Laboratory and Nexant Inc, suggests that achieving a SQI #3 SAIDI of 110 – 125 minutes and SQI #4 SAIFI below 1.00 interruptions should be PSE’s long term goal. This increase in reliability will also position PSE’s electric system to maximize the benefits from new technologies such as electric vehicles and distributed energy resources.

To achieve these long term goals, PSE evaluates new technologies and process improvements in addition to applying existing reliability solutions to areas with reliability issues. These reliability solutions are described in **Appendix P: Reliability Program Category Descriptions**. Future technologies that may improve reliability will come from PSE’s implementation of an Advanced Distribution Management System (“ADMS”) and advanced fault locating technologies. Once established, these new technologies will broaden the options for addressing reliability concerns and further improve the reliability of the system. Finally, to achieve long term goals, reliability planning and performance considerations are being enhanced by the integration of equity into

⁴⁸ This section meets a requirement of Attachment B of Docket UE-110060.

PSE's planning process.

Solutions being applied to current areas of concern can be found in **Appendix M: Areas of Greatest Concern with Action Plan** and a summary of planned reliability projects for 2023 can be found in **Table 3f**.

Appendices

This section contains the following appendices:

- A: Monthly SQI Performance
 - Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)
 - Attachment B to Appendix A—Major Event and Localized Emergency Event Days (Non Affected Local Areas Only)
 - Attachment C to Appendix A—Natural Gas Reportable Incidents and Control Time
- B: Certification of Survey Results
- C: Penalty Calculation
- D: Proposed Customer Notice (Report Card)
- E: Disconnection Results
- F: Customer Service Guarantee Performance Detail
- G: Customer Awareness of Customer Service Guarantee
- H: Electric Reliability Terms and Definitions
- I: Electric Reliability Data Collection Process and Calculations
- J: 1997-Current Year PSE SAIFI and SAIDI Performance by Different Measurements
- K: Current Year Electric Service Outage by Cause by Area
- L: Historical SAIDI and SAIFI by Area
- M: Areas of Greatest Concern with Action Plan
- N: Current-Year Commission and Rolling Two Year PSE Customer Electric Service Reliability Complaints with Resolutions
- O: Current Year Geographic Location of Electric Service Reliability Customer Complaints on Service Territory Map with Number of Next Year’s Proposed Projects and Vegetation Management Mileage
- P: Reliability Program Category Descriptions

A Monthly SQI Performance

Appendix A consists of Tables A1 and A2 that provide monthly details on the nine service quality indices.

It also contains the following attachments:

Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)

Attachment B to Appendix A—Major Event and Localized Emergency Event Days (Non-Affected Local Areas Only)

Attachment C to Appendix A—Natural Gas Reportable Incident and Control Time

Table A1: PSE Monthly SQI Performance

Category of Service	SQI No.	Description	Annual Benchmark	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022
Customer Satisfaction	2	WUTC Complaint Ratio	0.40 complaints per 1000 customers, including all complaints filed with WUTC	0.010	0.010	0.011	0.010	0.010	0.012	0.021	0.013	0.010	0.008	0.010	0.013
	6	Telephone Center Transactions Customer Satisfaction	90% satisfied (rating of 5 or higher on a 7-point scale)	93%	96%	95%	91%	95%	95%	95%	96%	95%	95%	96%	93%
	8	Field Service Operations Transactions Customer Satisfaction	90% satisfied (rating of 5 or higher on a 7-point scale)	97%	97%	96%	98%	96%	97%	98%	99%	97%	96%	97%	93%
Customer Services	5	Customer Access Center Answering Performance	80% of calls answered by a live representative within 60 seconds of request to speak with live operator	76%	71%	78%	71%	73%	74%	82%	86%	76%	65%	41%	40%
Operations Services	4	SAIFI	1.30 interruptions per year per customer	0.930	0.050	0.050	0.080	0.060	0.100	0.080	0.100	0.060	0.100	0.130	0.110
	3	SAIDI	155 minutes per customer per year	28	9	8	10	7	16	12	14	13	14	25	27
	7	Gas Safety Response Time	Average of 55 minutes from customer call to arrival of field technician	33	34	33	34	34	32	33	32	34	33	35	35
	10	Kept Appointments ^{Note}	92% of appointments kept	98%	99%	100%	99%	99%	99%	99%	99%	99%	99%	99%	98%
	11	Electric Safety Response Time	Average of 55 minutes from customer call to arrival of field technician	55	50	51	52	52	55	59	52	56	53	53	53

Note: Results shown are rounded to the nearest whole percentage per UTC order. However, these 100% monthly performance results do not reflect that PSE and its service providers met all the appointments during the reporting period. Numbers of PSE missed appointments, including the new customer construction appointments carried out the service providers are detailed in Appendix F: Customer Service Guarantee Performance Detail.

Table A2: Service Providers Monthly Service Quality Performance

Category of Service	Index	Service Provider	Annual Benchmark Description	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022
Operations Services	Service Provider New Customer Construction Appointments Kept ^{Note1}	Quanta Electric	At least 92% of appointments kept ^{Note 1}	100%	99%	99%	99%	99%	100%	100%	100%	99%	100%	100%	99%
		Quanta Gas	At least 92% of appointments kept ^{Note 1}	100%	100%	100%	100%	100%	99%	100%	99%	100%	100%	100%	100%
	Service Provider Standards Compliance	Quanta Electric	Achieve a level of QA/QC compliance rate conformance to PSE Standards as follows: Level 1 inspection items: ≤ 15 deviations/1000 items inspected	0.00	4.26	3.21	9.28	0.00	3.24	2.29	7.81	6.20	7.85	7.30	7.81
		Quanta Electric	Level 2 inspection items: ≤ 25 deviations/1000 items inspected ^{Note 2}	5.75	3.95	4.15	5.55	1.59	11.70	4.58	7.94	0.00	7.78	7.95	19.67
		Quanta Electric	Level 3 inspection items: ≤ 205 deviations/1000 items inspected ^{Note 2}	11.53	9.46	4.47	5.50	1.21	10.07	12.39	12.05	8.96	6.57	3.81	10.66
		Quanta Gas	Achieve a level of QA/QC compliance rate conformance to PSE Standards as follows: Level 1 inspection items: ≤ 8 deviations/1000 items inspected ^{Note 2}	1.46	0.00	3.01	0.00	0.00	0.00	1.87	1.35	1.53	0.00	3.37	0.00
		Quanta Gas	Level 2 inspection items: ≤ 15 deviations/1000 items inspected ^{Note 2}	3.05	5.49	3.29	0.00	4.48	4.48	1.20	2.48	1.06	0.99	2.31	1.23
		Quanta Gas	Level 3 inspection items: ≤ 12 deviations/1000 items inspected ^{Note 2}	0.00	1.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.53	3.13

Category of Service	Index	Service Provider	Annual Benchmark Description	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022
	Secondary Safety Response and Restoration Time-Core-Hour	Quanta Electric	Within 250 minutes from the dispatch time to the restoration of non-emergency outage during core hours	248	235	231	228	238	232	229	221	243	223	238	228
	Secondary Safety Response and Restoration Time-Non-Core-Hour	Quanta Electric	Within 316 minutes from the dispatch time to the restoration of non-emergency outage during non-core hours	267	246	260	253	243	279	229	222	248	276	233	296
	Secondary Safety Response Time	Quanta Gas	Within 60 minutes from first response assessment completion to second response arrival	60	54	57	51	48	44	56	53	43	54	48	58

Note 1: Results shown are rounded to the nearest whole percentage per UTC order. However, these 100% monthly performance results do not reflect that the service providers met all the new construction appointments during the reporting period. Numbers of PSE missed appointments, including the new customer construction appointments carried out the service providers are detailed in Appendix F: Customer Service Guarantee Performance Detail.

- Note 2:**
- Level 1 Deviation from PSE Standards and/or current regulatory expectations that provide immediate and significant risk to product quality, safety or system integrity; or a combination/repetition of Level 2 deficiencies that indicate a critical failure of systems.
 - Level 2 Deviation from PSE Standards and/or current regulatory expectations that provide a potentially significant risk to product quality, safety or system integrity; or could potentially result in significant observations from a regulatory agency; or a combination/repetition of Level 3 deficiencies that indicate a failure of system(s).
 - Level 3 Observations of a less serious or isolated nature that are not deemed Level 1 or 2, but require correction or suggestions on how to improve systems or procedures that may be compliant but would benefit from improvement.

Table A3: Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)

This Attachment A to Appendix A provides detail on Major Event and localized emergency event days (Affected local areas only).


 SQI #11 Supplemental Reporting Major Event And Localized Emergency Event Days Affected Local Areas Only										
Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments ⁴⁹
1/1/2022	Wind	Northern	1	5,955	212,102	2.81%	17	9 of 16	No	9 Event Duty, 1 PTO, 6 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/2/2022	Wind	Northern	1	1,939	212,102	0.91%	27	13 of 16	No	13 Event Duty, 3 PTO, 8 Line Crews, 8 Tree Crews
1/2/2022	Wind	Southern	1	6,751	265,130	2.55%	15	7 of 15	No	7 Event Duty, 1 PTO, 7 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/2/2022	Wind	Western	1	7,526	133,265	5.65%	55	7 of 14	No	7 Event Duty, 1 PTO, 6 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/3/2022	Wind	North King	1	6,489	338,812	1.92%	39	17 of 22	No	17 Event Duty, 3 PTO, 2 STFP, 10 Line Crews, 10 Tree Crews
1/3/2022	Wind	South King	1	1,720	256,704	0.67%	23	8 of 13	No	8 Event Duty, 3 PTO, 2 Reg Day Off, 11 Line Crews, 11 Tree Crews
1/3/2022	Wind	Western	1	1,469	133,265	1.10%	37	11 of 14	No	11 Event Duty, 1 STD, 2 Reg Day Off, 10 Line Crews, 10 Tree Crews
1/4/2022	Wind	Northern	1	392	212,102	0.18%	18	14 of 16	No	14 Event Duty, 2 PTO, 8 Line Crews, 8 Tree Crews
1/4/2022	Wind	Western	1	1,070	133,265	0.80%	14	12 of 14	No	12 Event Duty, 1 STD, 1 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/5/2022	Wind	South King	1	5,352	256,704	2.08%	8	10 of 12	No	10 Event Duty, 2 PTO, 8 Line Crews, 8 Tree Crews
1/5/2022	Wind	Western	1	2,464	133,265	1.85%	6	12 of 13	No	12 Event Duty, 1 PTO, 12 Line Crews, 12 Tree Crews

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⁴⁹ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability, **STFP**—Short-Term Family Paid Leave

Table A3: Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)

This Attachment A to Appendix A provides detail on Major Event and localized emergency event days (Affected local areas only).

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments ⁵⁰
1/6/2022	Wind	Western	1	4,512	133,265	3.39%	15	12 of 14	No	12 Event Duty, 1 STD, 1 PTO, 10 Line Crews, 10 Tree Crews
1/7/2022	Wind	Northern	1	3,084	212,102	1.45%	32	12 of 16	No	12 Event Duty, 3 PTO, 1 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/7/2022	Wind	Southern	1	553	265,130	0.21%	23	13 of 16	No	13 Event Duty, 1 PTO, 2 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/8/2022	Wind	Northern	1	14	212,102	0.01%	5	12 of 16	No	12 Event Duty, 4 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/8/2022	Wind	North King	1	496	333,812	0.15%	19	7 of 17	No	7 Event Duty, 1 PTO, 9 Reg Day Off, 11 Line Crews, 11 Tree Crews
1/8/2022	Wind	Southern	1	22	265,130	0.01%	3	6 of 16	No	6 Event Duty, 10 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/8/2022	Wind	Western	1	1	133,265	0.00%	1	6 of 13	No	6 Event Duty, 7 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/9/2022	Wind	North King	1	195	333,812	0.06%	6	6 of 19	No	6 Event Duty, 13 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/9/2022	Wind	Southern	1	89	265,130	0.03%	5	8 of 16	No	8 Event Duty, 8 Reg Day Off, 8 Line Crews, 8 Tree Crews
1/9/2022	Wind	Western	1	385	133,265	0.29%	2	4 of 13	No	4 Event Duty, 9 Reg day-off, 8 Line Crews, 8 Tree Crews
1/10/2022	Wind	Southern	1	1,801	265,130	0.68%	14	12 of 16	No	12 Event Duty, 1 PTO, 3 Reg Day Off, 9 Line Crews, 9 Tree Crews
2/21/2022	Wind	Northern	1	6,638	212,161	3.13%	79	14 of 17	No	14 Event Duty, 1 PTO, 2 Reg Day Off, 10 Line Crews, 10 Tree Crews

Table continues on next page.

⁵⁰ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability

Table A3: Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments ⁵¹
2/22/2022	Wind	Northern	1	526	212,161	0.25%	18	16 of 17	No	16 Event Duty, 1 PTO, 9 Line Crews, 9 Tree Crews
4/3/2022	Wind/Rain	Northern	1	4,509	212,779	2.12%	20	7 of 17	No	7 Event Duty, 10 Reg Day Off, 8 Line Crews, 8 Tree Crews
4/4/2022	Wind/Rain	Northern	3	31,187	212,779	14.66%	75	16 of 23	Yes	16 Event Duty, 7 Line Crews, 7 Tree Crews
4/4/2022	Wind/Rain	North King	3	26,377	335,078	7.87%	69	19 of 22	Yes	19 Event Duty, 4 Line Crews, 4 Tree Crews
4/4/2022	Wind/Rain	South King	3	22,575	257,202	8.78%	76	13 of 13	Yes	13 Event Duty, 11 Line Crews, 11 Tree Crews
4/4/2022	Wind/Rain	Southern	3	38,539	265,832	14.50%	161	16 of 63	Yes	16 Event Duty, 19 Line Crews, 19 Tree Crews
4/4/2022	Wind/Rain	Western	3	34,669	133,525	25.96%	148	13 of 13	Yes	13 Event Duty, 7 Line Crews, 7 Tree Crews
4/8/2022	Wind/Rain	Western	1	5,319	133,525	3.98%	19	13 of 13	No	13 Event Duty, 8 Line Crews, 8 Tree Crews
4/11/2022	Wind/Rain	Western	1	1,097	133,525	0.82%	18	13 of 13	No	13 Event Duty, 8 Line Crews, 8 Tree Crews
5/18/2022	Wind	North King	2	48,378	335,878	14.40%	79	16 of 16	Yes	16 Event Duty, 10 Line Crews, 10 Tree Crews
5/18/2022	Wind	Northern	2	6,595	213,031	3.10%	57	19 of 19	No	19 Event Duty, 7 Line Crews, 7 Tree Crews
5/18/2022	Wind	South King	2	6,097	257,569	2.37%	25	13 of 13	No	13 Event Duty, 10 Line Crews, 10 Tree Crews

Table continues on next page.

⁵¹ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability

Table A3: Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments ⁵²
5/18/2022	Wind	Southern	2	523	266,299	0.20%	14	16 of 16	No	16 Event Duty, 8 Line Crews, 8 Tree Crews
5/18/2022	Wind	Western	2	12,894	133,656	9.65%	29	13 of 13	Yes	13 Event Duty, 8 Line Crews, 8 Tree Crews
8/10/2022	Lightning	Western	1	7,089	134,203	5.28%	17	13 of 13	Yes	13 Event Duty, 8 Line Crews, 8 Tree Crews
9/10/2022	Heat/Wildfires	South King	1	1,682	258,371	0.65%	22	14 of 14	No	9 Event Duty, 5 Reg Day Off, 7 Line Crews, 7 Tree Crews
10/22/2022	Wind/Rain	North King	1	2,971	337,602	0.88%	20	10 of 21	No	10 Event Duty, 1 PTO, 10 Reg Day Off, 10 Line Crews, 10 Tree Crews
10/24/2022	Wind/Rain	Northern	1	1,045	214,484	0.49%	33	11 of 17	No	11 Event Duty, 4 PTO, 2 Reg Day Off, 9 Line Crews, 9 Tree Crews
10/27/2022	Wind/Rain	Northern	1	4,237	214,484	1.98%	51	17 of 17	No	17 Event Duty, 10 Line Crews, 10 Tree Crews
10/30/2022	Wind/Rain	Northern	1	12,589	214,484	5.87%	25	13 of 17	Yes	13 Event Duty, 4 Reg Day Off, 10 Line Crews, 10 Tree Crews
10/30/2022	Wind/Rain	Western	1	1,314	134,915	0.97%	15	11 of 14	No	11 Event Duty, 3 Reg Day Off, 6 Line Crews, 6 Tree Crews
11/3/2022	Wind/Rain	Western	1	6,015	135,102	4.45%	64	12 of 14	No	12 Event Duty, 2 PTO, 8 Line Crews, 8 Tree Crews
11/4/2022	Wind/Rain	North King	6	76,283	337,780	22.58%	226	23 of 23	Yes	23 Event Duty, 12 Line Crews, 12 Tree Crews
11/4/2022	Wind/Rain	Northern	6	73,462	214,766	34.21%	452	17 of 17	Yes	17 Event Duty, 23 Line Crews, 23 Tree Crews

Table continues on next page.

⁵² **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability

Table A3: Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments ⁵³
11/4/2022	Wind/Rain	South King	6	32,603	258,853	12.60%	146	14 of 14	Yes	14 Event Duty, 7 Line Crews, 7 Tree Crews
11/4/2022	Wind/Rain	Southern	6	37,776	268,722	14.06%	188	16 of 16	Yes	16 Event Duty, 17 Line Crews, 17 Tree Crews
11/4/2022	Wind/Rain	Western	6	28,067	135,102	20.77%	149	14 of 14	Yes	14 Event Duty, 8 Line Crews, 8 Tree Crews
11/17/2022	Wind/Rain	South King	2	23,953	258,853	9.25%	115	13 of 13	Yes	13 Event Duty, 1 PTO, 11 Line Crews, 11 Tree Crews
11/27/2022	Snow/Ice	Northern	1	1,476	214,766	0.69%	25	9 of 16	No	9 Event Duty, 8 Reg Day Off, 14 Line Crews, 14 Tree Crews
11/29/2022	Snow/Ice	North King	4	58,376	337,780	17.28%	219	23 of 23	Yes	23 Event Duty, 11 Line Crews, 11 Tree Crews
11/29/2022	Snow/Ice	Northern	4	11,990	214,766	5.58%	63	17 of 17	Yes	17 Event Duty, 10 Line Crews, 10 Tree Crews
11/29/2022	Snow/Ice	South King	4	5,185	258,853	2.00%	64	14 of 14	No	14 Event Duty, 8 Line Crews, 8 Tree Crews
11/29/2022	Snow/Ice	Southern	4	56,689	268,722	21.10%	180	16 of 16	Yes	16 Event Duty, 6 Line Crews, 6 Tree Crews
11/29/2022	Snow/Ice	Western	4	35,805	135,102	26.50%	132	14 of 14	Yes	14 Event Duty, 10 Line Crews, 10 Tree Crews
12/3/2022	Snow	North King	1	3,282	337,874	0.97%	27	15 of 15	No	15 Event Duty, 1 PTO, 6 Reg Day Off, 14 Line Crews, 14 Tree Crews
12/3/2022	Snow	Western	1	31,458	135,234	23.26%	119	13 of 13	Yes	13 Event Duty, 1 STD, 12 Line Crews, 12 Tree Crews

Table continues on next page.

⁵³ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability

Table A3: Attachment A to Appendix A—Major Event and Localized Emergency Event Days (Affected Local Areas Only)

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments ⁵⁴
12/4/2022	Wind	Western	1	64	135,234	0.05%	11	11 of 11	No	11 Event Duty, 13 Line Crews, 7 Tree Crews
12/9/2022	Wind	North King	1	1,591	337,874	0.47%	20	12 of 13	No	12 Event Duty, 1 STD, 10 Line Crews, 1 Tree Crew
12/20/2022	Snow/Ice	Western	1	2,845	135,234	2.10%	30	12 of 15	No	12 Event Duty, 3 PTO, 8 Line Crews, 4 Tree Crews
12/22/2022	Ice	South King	1	4,264	258,914	1.65%	35	12 of 13	No	12 Event Duty, 1 PTO, 10 Line Crews, 3 Tree Crews
12/23/2022	Ice/Wind/Rain	North King	7	50,306	337,874	14.89%	252	12 of 13	Yes	12 Event Duty, 1 STD, 14 Line Crews, 7 Tree Crews
12/23/2022	Ice/Wind/Rain	Northern	7	39,932	214,921	18.58%	266	10 of 13	Yes	10 Event Duty, 1 PTO, 1 STD, 1 Covering Safety meeting, 10 Line Crews, 1 Tree Crew
12/23/2022	Ice/Wind/Rain	South King	7	24,571	258,914	9.49%	135	9 of 13	Yes	9 Event Duty, 2 PTO, 1 STD, 1 Reg Day Off, 10 Line Crews, 6 Tree Crews
12/23/2022	Ice/Wind/Rain	Southern	7	42,524	268,979	15.81%	151	15 of 15	Yes	15 Event Duty, 26 Line Crews, 4 Tree Crews
12/23/2022	Ice/Wind/Rain	Western	7	59,691	135,234	44.14%	221	22 of 22	Yes	22 Event Duty, 6 Line Crews, 4 Tree Crews

⁵⁴ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability

**Table A4: Attachment B to Appendix A—Major Event and Localized Emergency Event Days
(Non-Affected Local Areas Only)**

This Attachment B to Appendix A provides detail on Major Event and localized emergency event days (Non-affected local areas only).

PSE <i>PUGET SOUND ENERGY</i>		SQI #11 Supplemental Reporting Major Event And Localized Emergency Event Days Non-Affected Local Areas Only								
Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event)	Comments
1/1/2022	Wind	North King	1	414	338,812	0.12%	10		N/A	
1/1/2022	Wind	South King	1	1,819	256,704	0.71%	4		N/A	
1/1/2022	Wind	Southern	1	272	265,130	0.10%	5		N/A	
1/1/2022	Wind	Western	1	994	133,265	0.75%	6		N/A	
1/2/2022	Wind	North King	1	2,498	338,812	0.74%	16		N/A	
1/2/2022	Wind	South King	1	162	256,704	0.06%	4		N/A	
1/3/2022	Wind	Northern	1	2,734	212,102	1.29%	27		N/A	
1/3/2022	Wind	Southern	1	11,902	265,130	4.49%	10		N/A	
1/4/2022	Wind	North King	1	7,075	338,812	2.09%	23		N/A	
1/4/2022	Wind	South King	1	2,341	256,704	0.91%	16		N/A	
1/4/2022	Wind	Southern	1	4,516	265,130	1.70%	10		N/A	
1/5/2022	Wind	Northern	1	704	212,102	0.33%	8		N/A	

Table continues on next page.

**Table A4: Attachment B to Appendix A—Major Event and Localized Emergency Event Days
(Non-Affected Local Areas Only)**

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event)	Comments
1/5/2022	Wind	North King	1	1,451	338,812	0.43%	15		N/A	
1/5/2022	Wind	Southern	1	5,360	265,130	2.02%	10		N/A	
1/6/2022	Wind	Northern	1	470	212,102	0.22%	24		N/A	
1/6/2022	Wind	North King	1	5,503	338,812	1.62%	23		N/A	
1/6/2022	Wind	South King	1	509	256,704	0.20%	8		N/A	
1/6/2022	Wind	Southern	1	887	265,130	0.33%	14		N/A	
1/7/2022	Wind	North King	1	4,561	338,812	1.35%	26		N/A	
1/7/2022	Wind	South King	1	7,280	256,704	2.84%	24		N/A	
1/7/2022	Wind	Western	1	2,344	133,265	1.76%	12		N/A	
1/8/2022	Wind	South King	1	9	256,704	0.00%	5		N/A	
1/9/2022	Wind	Northern	1	1	212,102	0.00%	1		N/A	
1/9/2022	Wind	South King	1	667	265,704	0.25%	3		N/A	
1/10/2022	Wind	Northern	1	108	212,102	0.05%	1		N/A	
1/10/2022	Wind	North King	1	1,104	338,812	0.33%	1		N/A	

Table continues on next page

**Table A4: Attachment B to Appendix A—Major Event and Localized Emergency Event Days
(Non-Affected Local Areas Only)**

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments
1/10/2022	Wind	South King	1	9	256,704	0.00%	1		N/A	
1/10/2022	Wind	Western	1	2	133,265	0.00%	1		N/A	
2/21/2022	Wind	North King	1	2,222	334,061	0.67%	2		N/A	
2/21/2022	Wind	South King	1	1,478	256,760	0.58%	4		N/A	
2/21/2022	Wind	Southern	1	683	265,236	0.26%	2		N/A	
2/21/2022	Wind	Western	1	1,592	133,309	1.19%	9		N/A	
2/22/2022	Wind	North King	1	259	334,061	0.08%	4		N/A	
2/22/2022	Wind	South King	1	40	256,760	0.02%	6		N/A	
2/22/2022	Wind	Southern	1	465	265,236	0.18%	5		N/A	
2/22/2022	Wind	Western	1	96	133,309	0.07%	5		N/A	
4/3/2022	Wind/Rain	North King	1	29	335,078	0.01%	4		N/A	
4/3/2022	Wind/Rain	South King	1	1,641	257,202	0.64%	1		N/A	
4/3/2022	Wind/Rain	Southern	1	143	265,832	0.05%	5		N/A	
4/3/2022	Wind/Rain	Western	1	28	133,525	0.02%	4		N/A	

Table continues on next page

**Table A4: Attachment B to Appendix A—Major Event and Localized Emergency Event Days
(Non-Affected Local Areas Only)**

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments
4/8/2022	Wind/Rain	Northern	1	338	212,779	0.16%	11		N/A	
4/8/2022	Wind/Rain	North King	1	375	335,078	0.11%	7		N/A	
4/8/2022	Wind/Rain	South King	1	397	257,202	0.15%	13		N/A	
4/8/2022	Wind/Rain	Southern	1	147	265,832	0.06%	9		N/A	
4/11/2022	Wind/Rain	Northern	1	3,751	212,779	1.76%	4		N/A	
4/11/2022	Wind/Rain	North King	1	6,973	335,078	2.08%	11		N/A	
4/11/2022	Wind/Rain	South King	1	1,431	257,202	0.56%	4		N/A	
4/11/2022	Wind/Rain	Southern	1	485	265,832	0.18%	23		N/A	
8/10/2022	Lightning	Northern	1	785	213,840	0.37%	13		N/A	
8/10/2022	Lightning	North King	1	5,177	336,983	1.54%	10		N/A	
8/10/2022	Lightning	South King	1	136	258,151	0.05%	11		N/A	
8/10/2022	Lightning	Southern	1	181	267,350	0.07%	7		N/A	
9/10/2022	Heat/Wildfires	Northern	1	47	214,183	0.02%	6		N/A	
9/10/2022	Heat/Wildfires	North King	1	1,033	337,331	0.31%	10		N/A	

Table continues on next page

**Table A4: Attachment B to Appendix A—Major Event and Localized Emergency Event Days
(Non-Affected Local Areas Only)**

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments
10/24/2022	Wind/Rain	North King	1	798	337,602	0.24%	11		N/A	
10/24/2022	Wind/Rain	South King	1	593	258,652	0.23%	8		N/A	
10/24/2022	Wind/Rain	Southern	1	297	268,307	0.11%	9		N/A	
10/24/2022	Wind/Rain	Western	1	1,146	134,915	0.85%	14		N/A	
10/27/2022	Wind/Rain	North King	1	332	337,602	0.10%	16		N/A	
10/27/2022	Wind/Rain	South King	1	1,416	258,652	0.55%	7		N/A	
10/27/2022	Wind/Rain	Southern	1	629	268,307	0.23%	13		N/A	
10/27/2022	Wind/Rain	Western	1	1,445	134,915	1.07%	26		N/A	
10/30/2022	Wind/Rain	North King	1	10,074	337,602	2.98%	16		N/A	
10/30/2022	Wind/Rain	South King	1	151	258,652	0.06%	6		N/A	
10/30/2022	Wind/Rain	Southern	1	335	268,307	0.12%	8		N/A	
11/3/2022	Wind/Rain	Northern	1	10,035	214,766	4.67%	18		N/A	
11/3/2022	Wind/Rain	North King	1	417	337,780	0.12%	14		N/A	
11/3/2022	Wind/Rain	South King	1	20	258,853	0.01%	6		N/A	

Table continues on next page

**Table A4: Attachment B to Appendix A—Major Event and Localized Emergency Event Days
(Non-Affected Local Areas Only)**

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments
11/3/2022	Wind/Rain	Southern	1	743	268,722	0.28%	13		N/A	
11/17/2022	Wind/Rain	Northern	2	3,790	214,766	1.76%	25		N/A	
11/17/2022	Wind/Rain	North King	2	4,112	337,780	1.22%	18		N/A	
11/17/2022	Wind/Rain	Southern	2	5,008	268,722	1.86%	18		N/A	
11/17/2022	Wind/Rain	Western	2	227	135,102	0.17%	5		N/A	
11/27/2022	Snow/Ice	North King	1	3,280	337,780	0.97%	10		N/A	
11/27/2022	Snow/Ice	South King	1	301	258,853	0.12%	6		N/A	
11/27/2022	Snow/Ice	Southern	1	373	268,722	0.14%	6		N/A	
11/27/2022	Snow/Ice	Western	1	161	135,102	0.12%	6		N/A	
12/3/2022	Snow	Northern	1	16	214,921	0.01%	4		N/A	
12/3/2022	Snow	South King	1	1,506	258,914	0.58%	15		N/A	
12/3/2022	Snow	Southern	1	3,496	268,979	1.30%	18		N/A	
12/4/2022	Wind	Northern	1	613	214,921	0.29%	6		N/A	
12/4/2022	Wind	North King	1	22	337,874	0.01%	6		N/A	

Table continues on next page

**Table A4: Attachment B to Appendix A—Major Event and Localized Emergency Event Days
(Non-Affected Local Areas Only)**

Date	Type of Event	Local Area	Duration (Days)	No. of Customers Affected	No. of Customers in Area	% of Customers Affected	No. of Outage Events	Resource Utilization (for the event, EFR Count only)	>5% Customer Affected or SAIDI Tmed Event	Comments
12/4/2022	Wind	South King	1	227	258,914	0.09%	8		N/A	
12/4/2022	Wind	Southern	1	80	268,979	0.03%	4		N/A	
12/9/2022	Wind	Northern	1	2,426	214,921	1.13%	14		N/A	
12/9/2022	Wind	South King	1	394	258,914	0.15%	6		N/A	
12/9/2022	Wind	Southern	1	79	268,979	0.03%	5		N/A	
12/9/2022	Wind	Western	1	52	135,234	0.04%	4		N/A	
12/20/2022	Snow/Ice	Northern	1	115	214,921	0.05%	7		N/A	
12/20/2022	Snow/Ice	North King	1	4,641	337,874	1.37%	11		N/A	
12/20/2022	Snow/Ice	South King	1	404	258,914	0.16%	4		N/A	
12/20/2022	Snow/Ice	Southern	1	85	268,979	0.03%	5		N/A	
12/22/2022	Ice	Northern	1	1,262	214,921	0.59%	18		N/A	
12/22/2022	Ice	North King	1	2,821	337,874	0.83%	28		N/A	
12/22/2022	Ice	Southern	1	423	268,979	0.16%	16		N/A	
12/22/2022	Ice	Western	1	1,331	135,234	0.98%	5		N/A	

Table A5: Attachment C to Appendix A—Natural Gas Reportable Incidents and Control Time

This Attachment C to Appendix A provides detail on each natural gas reportable incident and response times.⁵⁵

Natural Gas Reportable Incidents and Control Time (in Hours : Minutes)						
Date	City	Address	1st Notice to PSE	First PSE Arrival	Emergency Controlled	Emergency Control Time
1/6/2022	Cle Elum	4245 Bullfrog Rd.	14:41	15:30	16:05	0:49
1/15/2022	Seattle	60 E. Lynn St	17:30	18:26	22:55	0:56
1/17/2022	Bellevue	5008 139th Pl SE	4:53	5:30	9:38	0:37
2/1/2022	Redmond	19805 NE Novelty Hill Rd.	14:15	14:29	17:28	0:14
2/7/2022	Tacoma	4317 S. Union Ave	9:35	9:41	10:32	0:06
2/15/2022	Seattle	808 45TH AVE SW	11:22	11:49	12:00	0:27
3/3/2022	Bellevue	805 168th Pl NE	9:28	9:38	11:39	0:10
3/31/2022	Sammamish	24022 SE 46th Pl	13:57	14:21	14:35	0:24
4/12/2022	Olympia	8001 Boxelder Dr SW	16:55	17:23	20:09	0:28
4/13/2022	Everett	1615 Edgemoor Ln	12:07	12:38	14:40	0:31
4/15/2022	Sammamish	24407 NE 18th St	13:00	13:10	14:09	0:10
5/8/2022	Sammamish	25727 SE 36th Pl	19:09	19:37	21:37	0:28
6/15/2022	Kirkland	8821 NE 118th Pl	8:45	9:13	10:32	0:28
Table continues on next page.						

⁵⁵ Report of the time duration from first arrival to control of gas emergencies, for incidents subject to reporting under the 2003 edition of WAC 480-93-200 and WAC 480-93-210, Order R-374, Docket UG-911261.

Natural Gas Reportable Incidents and Control Time (in Hours : Minutes)						
Date	City	Address	1st Notice to PSE	First PSE Arrival	Emergency Controlled	Emergency Control Time
6/16/2022	Woodinville	17610 140TH AVE NE	12:02	12:22	12:33	0:20
6/17/2022	Puyallup	822 3rd St NE	8:49	9:02	9:36	0:13
6/22/2022	Black Diamond	29745 224TH AVE SE	15:17	15:51	16:41	0:34
6/30/2022	Seattle	2520 Airport Way S	14:26	14:39	14:45	0:13
7/2/2022	Covington	18631 SE 277th Pl	16:48	17:15	17:36	0:27
7/4/2022	Seattle	4733 5th Ave NE	14:40	14:52	16:59	0:12
7/5/2022	Seattle	2026 E. Madison St.	13:45	13:57	14:07	0:12
7/11/2022	Duvall	27806 NE 156th Pl	11:10	11:50	11:58	0:40
7/20/2022	Lacey	4318 15th Ave NE	15:13	15:28	21:27	0:15
7/20/2022	Seattle	2509 S. Orcas St	12:18	12:18	13:16	0:00
7/23/2022	University Place	8722 33rd St W	10:04	10:13	10:19	0:09
7/28/2022	Lacey	4527 13th Ave SE	23:19	23:50	23:50	0:31
7/29/2022	Steilacoom	630 Shannon St.	16:11	16:41	17:20	0:30
8/2/2022	Woodinville	16426 NE 180th Pl.	14:58	15:26	15:39	0:28
8/14/2022	Sammamish	4635 240th Ave SE	9:21	9:40	9:58	0:19
8/18/2022	Seattle	8111 1st Ave S	17:50	19:00	19:30	1:10
8/20/2022	Seattle	2400 S Jackson St.	15:42	16:15	16:46	0:33
8/23/2022	Renton	14410 SE Petrovitsky RD, HSE	8:59	9:22	9:32	0:23

Table continues on next page.

Natural Gas Reportable Incidents and Control Time (in Hours : Minutes)						
Date	City	Address	1st Notice to PSE	First PSE Arrival	Emergency Controlled	Emergency Control Time
8/29/2022	Seattle	8856 24th Ave SW	9:11	9:27	10:25	0:16
8/30/2022	Kent	18612 80TH AVE S	9:45	10:04	10:36	0:19
9/7/2022	North Bend	142 MAIN AVE N	11:56	12:56	13:39	1:00
9/15/2022	Bellevue	288 106th Ave NE	11:24	11:34	12:41	0:10
9/20/2022	Auburn	29309 61st Ave S.	19:20	19:45	20:09	0:25
9/23/2022	Issaquah	2186 NW Spring Fork Ln.	13:42	13:49	14:16	0:07
10/1/2022	Lynnwood	20125 28th Ave W.	10:35	10:55	11:08	0:20
10/3/2022	Everett	1821 MCDOUGALL AVE	22:06	22:38	22:46	0:32
10/5/2022	Kent	4224 S 272nd St.	13:10	13:23	13:25	0:13
10/13/2022	Sammamish	2921 204th Ln NE	7:19	7:58	7:58	0:39
10/14/2022	Tacoma	5104 6th Ave.	9:06	9:17	10:25	0:11
10/15/2022	Seattle	6215 NE Princeton Way	10:04	10:28	10:58	0:24
10/15/2022	Renton	15211 SE 176th St.	13:26	14:00	14:17	0:34
10/20/2022	Sammamish	22711 SE 23rd Pl.	11:43	12:07	12:15	0:24
10/21/2022	North Bend	42321 SE 171st St	19:54	20:31	20:39	0:37
10/28/2022	Sumner	1003 Main St	2:53	3:59	6:06	1:06
11/2/2022	Bellevue	15325 SE 27th St	10:33	10:43	11:07	0:10
Table continues on next page.						

Natural Gas Reportable Incidents and Control Time (in Hours : Minutes)						
Date	City	Address	1st Notice to PSE	First PSE Arrival	Emergency Controlled	Emergency Control Time
11/2/2022	Kent	21929 132ND AVE SE	12:27	12:47	13:05	0:20
11/8/2022	Puyallup	19000 Canyon Rd E	13:35	14:07	16:38	0:32
11/15/2022	Kirkland	13107 NE 132nd St.	10:05	10:27	11:14	0:22
11/29/2022	Snohomish	12626 182nd Ave SE	9:26	9:58	10:39	0:32
11/29/2022	Edmonds	8021 181st PL SW	19:40	20:01	20:01	0:21
12/5/2022	Seattle	301 SHILSHOLE AVE NW	20:44	21:07	22:09	0:23
12/7/2022	Marysville	10718 57th Dr NE	23:17	23:42	23:47	0:25
12/8/2022	Redmond	8411 169th Pl NE	22:44	23:58	0:06	1:14
12/9/2022	Edmonds	521 HEMLOCK WAY	13:17	13:56	14:08	0:39
12/16/2022	Kenmore	7363 NE 145TH PL	14:30	15:44	15:47	1:14
12/28/2022	Edmonds	6024 133rd Pl. SE	16:57	17:41	18:59	0:44
Average Natural Gas Reportable Incidents Control Time for 2022						0:55

B Certification of Survey Results



TO: Eric Haechrel, Puget Sound Energy
FR: Andrew Thibault, EMC Research, Inc.
DT: March 2, 2023
RE: PSE Service Quality Index Research

This memo constitutes certification by EMC Research, Inc. that the tabulations and underlying surveys were conducted and prepared in accordance with the procedures established in Docket Nos. UE-011570 and UG-011571.

These procedures, data collection methods, and quality controls are consistent with industry practices and, we believe, ensure that the data collected and information produced in the surveys is unbiased and valid.

We are glad to answer any questions about the research methodology and provide any additional information you may need.

Sincerely,

A handwritten signature in black ink, appearing to be "AT", written over a light blue horizontal line.

Andrew Thibault, Principal
EMC Research Inc.

C Penalty Calculation

For the 2022 reporting year, PSE met 7 of 9 benchmarks for the Service Quality Program but missed the benchmark for the average and length of non-major-storm power outages, per year, per customer (SQI #3 SAIDI) and the Customer Access Center answering performance (SQI #5). There is no SQI penalty associated with SQI #3. The SQI #3 penalty mechanics have been replaced since July 30, 2016, by PSE's 24-Hour Restoration Service Guarantee available under PSE's Schedule 131, Restoration Service Guarantees, where a \$50 credit is applied to the customer's account if they experienced certain prolonged outages as prescribed in Schedule 131. The penalty for SQI #5 is \$742,500\$0.67 per electric customers.

Per the SQ Program mechanics approved by the UTC, when the annual penalty dollars are less than the equivalent of \$12 per customer, the annual penalty will be allocated to PSE's low income bill assistance program, the Home Energy Lifeline Program ("HELP"). If the annual penalty amount exceeds \$12 per customer, the Company will place an SQI credit on each customer's bill, rather than allocating the penalty dollars to HELP.

The following tables show the calculation of the SQI #4 and SQI #11 penalties and the allocation of penalty between electric and natural gas HELP funding. There is no allotment to natural gas HELP as both SQI #4 and #7 pertaining to electric service only.

Table C1--Calculated SQI #5 Penalty

SQI #	Benchmark	Overall Performance	Difference from Benchmark	Penalty	Calculation
5 Customer Access Center Answering Performance	80% of calls answered live by company rep within 60 seconds of request to speak to live operator	69%	-11%	\$742,500	$\$742,500 = ((80-69) / 80) * 100 * \$54,000$

Average Annual Customer	
Gas	869,532
Electric	1,210,401
Total	2,079,933

Refund Calculation

SQI #	Total	Gas	Electric
5 Customer Access Center Answering Performance	\$742,500	\$310,408 = $742,500 * (869,532 / 2,079,933)$	\$432,092 = $742,500 * (1,210,401 / 2,079,933)$
Total	\$742,500	\$310,408	\$432,092

Per Customer	Gas	Electric
	\$0.36	\$0.36

D

Proposed Customer Notice (Report Card)

2022 Service Quality Report Card

The Customer Service Performance Report Card is designed to inform customers of how well PSE delivers its services in key areas to its customers. The Report Card will be distributed to customers only after adequate consultation with the UTC staff and the Public Counsel Unit of the Attorney General's Office, but no later than 90 days after PSE files its annual SQ and Electric Service Reliability Report. For the 2022 report card, PSE will start the distribution by June 27, 2023, based upon the filing date of this report on March 29, 2023.

Figure D1 shows PSE's proposed Customer Service Performance Report Card.

Figure D1: Draft 2022 Service Quality Report Card

2022 Service Quality Report Card

Each year Puget Sound Energy measures service-quality benchmarks established in cooperation with the Washington Utilities and Transportation Commission (UTC), the Public Counsel Unit of the Attorney General's Office, and other parties. These benchmarks ensure we are satisfying customer expectations, providing reliable service, and keeping customers safe. Failure to achieve these service-quality measurements would put us at risk of a penalty of up to \$12 million.

Key Measurement	Benchmark	2022 Performance	Achieved
Customer Satisfaction			
Percent of customers satisfied with our Customer Care Center services, based on survey	At least 90 percent	94 percent	✓
Percent of customers satisfied with field services, based on survey	At least 90 percent	97 percent	✓
Number of complaints to the UTC per 1,000 customers, per year	Less than 0.40	0.14	✓
Customer Services			
Percent of calls answered live within 60 seconds by our Customer Care Center	At least 80 percent	69 percent	
Operations Services			
Frequency of non-major-storm power outages, per year, per customer	Less than 1.30 outages	1.06 outages	✓
Length of power outages per year, per customer	Less than 2 hours, 35 minutes	3 hours, 1 minute	
Time from customer call to arrival of field technicians in response to electric system emergencies	No more than 55 minutes	54 minutes	✓
Time from customer call to arrival of field technicians in response to natural gas emergencies	No more than 55 minutes	34 minutes	✓
Percent of service appointments kept	At least 92 percent	99 percent	✓

2022 Performance Highlights

We met seven of the nine service-quality measurements (see chart above) and improved our performance for 1) percent of customers satisfied with field services, based on survey; 2) frequency of non-major-storm power outages, per year, per customer; and 3) time from customer call to arrival of field technicians in response to electric system emergencies. We did not meet the benchmarks for 1) percent of calls answered live within 60 seconds by our Customer Care Center, 2) length of power outages per year, per customer.

The key causes of missing the benchmark for the percentage of calls answered live within 60 seconds include resource constraints, technology issues, and increased call volumes due to winter weather events and the annual purchased gas rate adjustments. The penalty for not meeting the benchmark is \$742,500. PSE will contribute the entire \$742,500 to its electric and natural gas Schedule 129 energy bill assistance programs as additional funding to the programs.

While the length of power outages per year, per customer decreased in 2022 compared to 2021, weather events in January, November and December of 2022 were significant contributors to the annual performance that exceeded the benchmark. There is no performance penalty associated with the measurement, but we give customers a \$50 account credit when we don't restore the customer's power within 24 consecutive hours during a non-major-storm power outage.

In addition to committing to the nine service-quality measurements, we have three service guarantees to our customers:

- Keeping scheduled service appointments.
- If your power is out for 120 consecutive hours or longer during any power outage.
- If your power is out for 24 consecutive hours or longer during a non-major-storm power outage.

If we fail to meet any of these guarantees, we credit your bill \$50, conditions apply, and customer action required. Learn more at <https://www.pse.com/pages/customer-service-guarantees> or 1-888-225-5773.

In 2022, PSE paid \$17,400 for missing 348 of the total 31,538 service guaranteed appointments. We provided 303 customers with a \$50 credit for not restoring electric service within 24 consecutive hours during certain non-major-storm power outages and there were no customer claims issued on restoring electric service within 120 consecutive hours during any power outage.

Everyday our employees aim to provide safe, dependable, and efficient service to meet your expectations.

Copies of information on rules, rates, power supply fuel mix, regulations, customer rights and responsibilities, as well as an annual report, are available by calling 1-888-225-5773 and at pse.com.

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E Disconnection Results

Tables E1 and E2 provide the annual and monthly number of disconnections per 1,000 customers for non-payment of amounts due when the UTC disconnection policy would permit service curtailment. There is no disconnection for non-payment of amounts due for the year of 2021. On February 29, 2020, Washington Governor Jay Inslee declared a state of emergency in response to the COVID-19 pandemic. On April 17, 2020, Governor Inslee issued Proclamation 20-23.2, which prohibits all energy, water, and telecommunications providers from disconnecting residential service due to nonpayment, (2) refusing to reconnect residential customers who were disconnected due to nonpayment, and (3) charging late fees or reconnection fees. Prior to the April 17 2020 Proclamation, PSE had suspended all service disconnections and late payment fees. On October 20, 2020, the Commission issued Order 01 in Docket U-200281 to extend the suspension of the disconnection of energy services for nonpayment initially until after April 30, 2021, but further extended to September 30, 2021. Although PSE was allowed to resume the non-payment disconnection 180 days after the moratorium was lifted. PSE did not begin performing disconnects on a limited basis until in May of 2022. For 2022, PSE completing 1,546 disconnections through December 2022 (approximately 5% of those who reached the disconnection queue.) .

Table E1: Annual Disconnection Results from 2018 to 2022 per 1,000 Customers

2018	2019	2020	2021	2022
48	42	8	0	2

Table E2: Monthly Disconnection Results per 1,000 Customers for 2022

Month	Disconnections per 1,000 Customers
January	0.0
February	0.0
March	0.0
April	0.0
May	0.0
June	0.1
July	0.1

Table continues on next page.

**Table E2: Monthly Disconnection Results per 1,000 Customers for 2022
(Continued)**

Month	Disconnections per 1,000 Customers
August	0.2
September	0.3
October	0.3
November	0.3
December	0.2

F

Customer Service Guarantee Performance Detail

This appendix provides detail on SQI #10, Appointments Kept, performance and customer service guarantee payment by service type and month.

Definition of the Categories:

Canceled—Appointments canceled by either customers or PSE

Excused—Appointments missed due to customer reasons or due to SQI Major Events

Manual Kept—Adjusted missed appointments resulting from review by the PSE personnel

Missed Approved—Appointments missed due to PSE reasons and customers are paid the \$50 Customer Service Guarantee payment

Missed Open—Appointments not yet reviewed by PSE for the \$50 Service Guarantee payment

Customer Service Guarantee Payment—Total for the \$50 Customer Service Guarantee payments made to customers for each missed approved appointment

System Kept—Appointments in which PSE arrived at the customer site as promised

Total Appointments (Excludes Canceled and Excused)—Sum of Total Missed and Total Kept

Total Kept—Total number of Manual Kept and System Kept

Total Missed—Total number of Missed Approved, Missed Denied, and Missed Open

Table F1: SQI #10 and Customer Service Guarantee Payment Annual Summary for 2022

	Total Appointments (Exclude Canceled and Excused)	Missed Approved	Missed Open	Total Missed	Manual Kept	System Kept	Total Kept	Canceled	Excused	Customer Service Guarantee Payment	Percent Kept (Exclude Canceled and Excused) *
Electric											
Permanent Service	7,287	29	0	29	57	7,201	7,258	0	63	\$1,450	100%
Reconnection	2,832	32	0	32	858	1,942	2,800	0	0	\$1,600	99%
Subtotal	10,119	61	0	61	915	9,143	10,058	0	63	\$3,050	99%
Natural Gas											
Diagnostic	11,649	186	0	186	296	11,167	11,463	0	0	\$9,300	99%
Permanent Service	5,966	40	0	40	176	5,750	5,926	0	16	\$2,000	99%
Reconnection	3,804	61	0	61	82	3,661	3,743	0	0	\$3,050	98%
Subtotal	21,419	287	0	287	554	20,578	21,132	0	16	\$14,350	99%
Grand Total	31,538	348	0	348	1,469	29,721	31,190	0	79	\$17,400	99%

*SQI Results shown in the table and in this document are rounded to the nearest whole percentage per UTC order for performance calculation and comparison to the benchmark.

Table F2: SQI #10 and Customer Service Guarantee Payment Annual Details for 2022 (Continued)

Month	Fuel	Type	Total Appointments (Exclude Canceled and Excused)	Missed Approved	Missed Open	Total Missed	Manual Kept	System Kept	Total Kept	Canceled	Excused	Customer Service Guarantee Payment
Jan-22	Electric	Permanent Service	571	5	0	5	4	562	566	0	21	\$250
Jan-22	Electric	Reconnection	309	4	0	4	94	211	305	0	0	\$200
Jan-22	Gas	Diagnostic	1,192	19	0	19	26	1,147	1,173	0	0	\$950
Jan-22	Gas	Permanent Service	556	17	0	17	28	511	539	0	6	\$850
Jan-22	Gas	Reconnection	450	6	0	6	9	435	444	0	0	\$300
Jan-22 Total			3,078	51	0	51	161	2,866	3,027	0	27	\$2,550
Feb-22	Electric	Permanent Service	549	0	0	0	4	545	549	0	0	\$0
Feb-22	Electric	Reconnection	316	1	0	1	115	200	315	0	0	\$50
Feb-22	Gas	Diagnostic	926	14	0	14	18	894	912	0	0	\$700
Feb-22	Gas	Permanent Service	525	13	0	13	16	496	512	0	0	\$650
Feb-22	Gas	Reconnection	323	6	0	6	7	310	317	0	0	\$300
Feb-22 Total			2,639	34	0	34	160	2,445	2,605	0	0	\$1,700
Mar-22	Electric	Permanent Service	729	1	0	1	2	726	728	0	0	\$50
Mar-22	Electric	Reconnection	303	1	0	1	89	213	302	0	0	\$50
Mar-22	Gas	Diagnostic	848	4	0	4	15	829	844	0	0	\$200
Mar-22	Gas	Permanent Service	644	1	0	1	16	627	643	0	0	\$50
Mar-22	Gas	Reconnection	339	7	0	7	9	323	332	0	0	\$350
Mar-22 Total			2,863	14	0	14	131	2,718	2,849	0	0	\$700

Table continues on next page.

Table F2: SQI #10 and Customer Service Guarantee Payment Annual Details for 2022 (Continued)

Month	Fuel	Type	Total Appointments (Exclude Canceled and Excused)	Missed Approved	Missed Open	Total Missed	Manual Kept	System Kept	Total Kept	Canceled	Excused	Customer Service Guarantee Payment
Apr-22	Electric	Permanent Service	584	1	0	1	0	583	583	0	9	\$50
Apr-22	Electric	Reconnection	195	5	0	5	59	131	190	0	0	\$250
Apr-22	Gas	Diagnostic	715	16	0	16	22	677	699	0	0	\$800
Apr-22	Gas	Permanent Service	558	2	0	2	21	535	556	0	0	\$100
Apr-22	Gas	Reconnection	318	7	0	7	9	302	311	0	0	\$350
Apr-22 Total			2,370	31	0	31	111	2,228	2,339	0	9	\$1,550
May-22	Electric	Permanent Service	708	1	0	1	197	510	707	0	0	\$50
May-22	Electric	Reconnection	364	3	0	3	8	353	361	0	0	\$150
May-22	Gas	Diagnostic	508	1	0	1	9	498	507	0	0	\$50
May-22	Gas	Permanent Service	755	1	0	1	285	469	754	0	0	\$50
May-22	Gas	Reconnection	212	2	0	2	6	204	210	0	0	\$100
May-22 Total			2,286	18	0	18	102	2,166	2,268	0	0	\$900
Jun-22	Electric	Permanent Service	691	2	0	2	6	683	689	0	0	\$100
Jun-22	Electric	Reconnection	207	2	0	2	64	141	205	0	0	\$100
Jun-22	Gas	Diagnostic	498	11	0	11	14	473	487	0	0	\$550
Jun-22	Gas	Permanent Service	590	0	0	0	10	580	590	0	0	\$0
Jun-22	Gas	Reconnection	188	2	0	2	8	178	186	0	0	\$100
Jun-22 Total			2,174	17	0	17	102	2,055	2,157	0	0	\$850

Table continues on next page.

Table F2: SQI #10 and Customer Service Guarantee Payment Annual Details for 2022 (Continued)

	Fuel	Type	Total Appointments (Exclude Canceled and Excused)	Missed Approved	Missed Open	Total Missed	Manual Kept	System Kept	Total Kept	Canceled	Excused	Customer Service Guarantee Payment
Jul-22	Electric	Permanent	593	1	0	1	8	584	592	0	0	\$50
Jul-22	Electric	Reconnection	165	2	0	2	58	105	163	0	0	\$100
Jul-22	Gas	Diagnostic	370	4	0	4	5	361	366	0	0	\$200
Jul-22	Gas	Permanent	496	0	0	0	7	489	496	0	0	\$0
Jul-22	Gas	Reconnection	196	6	0	6	4	186	190	0	0	\$300
Jul-22 Total			1,820	13	0	13	82	1,725	1,807	0	0	\$650
Aug-22	Electric	Permanent	719	3	0	3	0	716	716	0	1	\$150
Aug-22	Electric	Reconnection	235	2	0	2	81	152	233	0	0	\$100
Aug-22	Gas	Diagnostic	371	3	0	3	7	361	368	0	0	\$150
Aug-22	Gas	Permanent	587	3	0	3	12	572	584	0	0	\$150
Aug-22	Gas	Reconnection	282	2	0	2	3	277	280	0	0	\$100
Aug-22 Total			2,194	13	0	13	103	2,078	2,181	0	1	\$650
Sep-22	Electric	Permanent	635	5	0	5	12	618	630	0	2	\$250
Sep-22	Electric	Reconnection	163	4	0	4	69	90	159	0	0	\$200
Sep-22	Gas	Diagnostic	770	14	0	14	25	731	756	0	0	\$700
Sep-22	Gas	Permanent	444	0	0	0	18	426	444	0	0	\$0
Sep-22	Gas	Reconnection	221	6	0	6	2	213	215	0	0	\$300
Sep-22 Total			2,233	29	0	29	126	2,078	2,204	0	2	\$1,450

Table continues on next page.

Table F2: SQI #10 and Customer Service Guarantee Payment Annual Details for 2022 (Continued)

	Fuel	Type	Total Appointments (Exclude Canceled and Excused)	Missed Approved	Missed open	Total Missed	Manual Kept	System Kept	Total Kept	Canceled	Excused	Customer Service Guarantee Payment
Oct-22	Electric	Permanent	668	2	0	2	2	664	666	0	0	\$100
Oct-22	Electric	Reconnection	261	4	0	4	79	178	257	0	0	\$200
Oct-22	Gas	Diagnostic	1,578	22	0	22	35	1,521	1,556	0	0	\$1,100
Oct-22	Gas	Permanent	466	1	0	1	23	442	465	0	0	\$50
Oct-22	Gas	Reconnection	370	6	0	6	7	357	364	0	0	\$300
Oct-22 Total			3,343	35	0	35	146	3,162	3,308	0	0	\$1,750
Nov-22	Electric	Permanent	479	4	0	4	2	473	475	0	21	\$200
Nov-22	Electric	Reconnection	270	0	0	0	44	226	270	0	0	\$0
Nov-22	Gas	Diagnostic	1,966	35	0	35	58	1,873	1,931	0	0	\$1,750
Nov-22	Gas	Permanent	354	1	0	1	8	345	353	0	2	\$50
Nov-22	Gas	Reconnection	495	3	0	3	8	484	492	0	0	\$150
Nov-22 Total			3,564	43	0	43	120	3,401	3,521	0	23	\$2,150
Dec-22	Electric	Permanent	380	2	0	2	15	363	378	0	9	\$100
Dec-22	Electric	Reconnection	197	4	0	4	46	147	193	0	0	\$200
Dec-22	Gas	Diagnostic	1,816	37	0	37	52	1,727	1,779	0	0	\$1,850
Dec-22	Gas	Permanent	201	0	0	0	3	198	201	0	8	\$0
Dec-22	Gas	Reconnection	380	7	0	7	9	364	373	0	0	\$350
Dec-22 Total			2,974	50	0	50	125	2,799	2,924	0	17	\$2,500
Grand Total			31,538	348	0	348	1,469	29,721	31,190	0	79	\$17,400

G

Customer Awareness of Service Guarantees

In 2022, Puget Sound Energy made customers aware of its three service guarantees through the following efforts:

1. PSE Customer Care Center and customer service representatives received training about the Customer Service Guarantee and the following script:
If we miss your customer service appointment under normal operating conditions, we will automatically credit your energy account with \$50 guaranteed.
2. An online job aid that explains the circumstances for notifying customers about the Customer Service Guarantee is available to all representatives and field employees.
3. Every customer new to PSE service receives the *Your customer rights and responsibilities* brochure, which is also posted year-round on pse.com.

These samples below illustrate some of the communications used to raise awareness about PSE's three Service Guarantees.

1. **January:** Messaged in customer newsletter, PSE.com landing page and mailing envelopes

Customer Service Guaranteed

We stand behind our service to you. We constantly track our performance and use your feedback to make improvements. We'll credit your bill if we fail to meet our service guarantees.

- Appointment service guarantee
- 24-consecutive-hour non-major storm power outage restoration guarantee
- 120-consecutive-hour power outage restoration guarantee. Conditions apply.

More at pse.com/guarantees.



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Customer service — guaranteed.

We commit to keeping scheduled appointments and to restoring power outages as soon as we can. For more information, visit pse.com/guarantees.



2. **April:** Messaged in customer newsletter and PSE.com landing page

Service Guarantees

We stand behind our service to you. We constantly track our performance and use your feedback to make improvements. We'll credit your bill if we fail to meet our service guarantees.

- Appointment service guarantee
- 24-consecutive-hour non-major storm power outage restoration guarantee
- 120-consecutive-hour power outage restoration guarantee

Conditions apply. More at pse.com/guarantees.

3. **June:** Messaged in customer newsletter and PSE.com landing page

Customer service guarantee

We stand behind our service to you. We constantly track our performance and use your feedback to make improvements. We'll credit your bill if we fail to meet our service guarantees.

- Appointment service guarantee
- 24-consecutive-hour non-major storm power outage restoration guarantee
- 120-consecutive-hour power outage restoration guarantee

Conditions apply. More at pse.com/guarantees.

4. **July:** Messaged in customer bills

July 2022 bill print messages Summary page

Customer service guaranteed

Each year Puget Sound Energy measures how well we deliver our services to you in three key areas. Look for our 2021 Service Quality Report Card included in your bill.

pse.com/guarantees

5. **August:** Messaged in customer newsletter

Customer service guaranteed

We stand behind our service to you. We constantly track our performance and use your feedback to make improvements. We'll credit your bill if we fail to meet our service guarantees.

- Appointment service guarantee
- 24-consecutive-hour non-major storm power outage restoration guarantee
- 120-consecutive-hour power outage restoration guarantee. Conditions apply.

More at pse.com/guarantees.

6. **October:** Messaged in customer newsletter and customer bills

Customer Service Guarantees

We stand behind our service to you. We constantly track our performance and use your feedback to make improvements. We'll credit your bill if we fail to meet our service guarantees.

- Appointment service guarantee
- 24-consecutive-hour non-major storm power outage restoration guarantee
- 120-consecutive-hour power outage restoration guarantee. Conditions apply.

More at pse.com/guarantees

7.

October 2022 bill print messages
Summary page

Customer service, guaranteed

We stand behind our service, from keeping scheduled appointments to restoring power outages as soon as we can. We'll credit your bill if we fail to meet our service guarantees.

pse.com/guarantees

8. December: Messaged in customer newsletters and PSE.com landing page

Customer Service Guaranteed

We stand behind our service to you. We constantly track our performance and use your feedback to make improvements. We'll credit your bill if we fail to meet our service guarantees.

- Appointment service guarantee
- 24-consecutive-hour non-major storm power outage restoration guarantee
- 120-consecutive-hour power outage restoration guarantee

Conditions apply. [pse.com/guarantees](https://www.pse.com/guarantees).

PSE.com, posted year-round

<https://www.pse.com/pages/customer-service-guarantees>



Customer service guarantees

We stand behind our service to you. We're continually tracking how we're doing and using your feedback to improve. And we'll credit your bill if we fail to meet our service guarantees.

Appointment service guarantee

We'll credit your bill \$50 if we don't keep an appointment to install new service, reconnect existing service or inspect natural gas equipment.

Certain maintenance work, including exchanges related to the Meter Upgrade project, are not eligible. Please see links below for qualifications and exclusions.

- [Electric appointment service guarantee](#)
- [Natural gas appointment service guarantee](#)

24 hour power outage restoration guarantee

You may be eligible for a \$50 credit if your power is out for longer than 24 hours, barring a major storm or other event. Conditions apply and you must either report your outage to PSE or request the credit within seven (7) calendar days following restoration.

Guarantee effective as of Jan. 1, 2017

- The consecutive 24-hour period begins when PSE is first notified of the outage. In the event PSE cannot safely access its facilities, the consecutive 24-hour period begins when safe access is made available for the company's personnel and standard equipment
- The guarantee is not applicable in the following circumstances:
 - The outage is associated with a major storm or event, which includes subsequent days;
 - Restoration is prevented by an action or default by someone outside PSE's control (other than a company employee or agent);
 - PSE does not have safe access to its facilities in order to perform the needed repair;
 - PSE verifies that there was no outage as reported by the customer;
 - The customer's equipment has caused the outage; or
 - The customer's system has not received the proper electrical inspections and certifications.

- [All qualifications and conditions](#)

120 hour power outage restoration guarantee

You may be eligible for a \$50 credit if your power is out for 120 consecutive hours or longer. Qualifications apply and you must either report your outage to PSE or request the credit within seven (7) calendar days following restoration.

- [All qualifications and conditions](#)

Your customer rights and responsibilities

Puget Sound Energy wants to make sure you know your rights and responsibilities regarding your electric and/or natural gas service.

- [Rights and responsibilities](#)

Tracking our performance

Every year we set goals for improving our service. These performance report cards show how we're doing in areas such as customer satisfaction, appointment scheduling, response time, field services and more. We also track the effectiveness of our energy efficiency programs.

[2018 Service Quality report card](#)

[2017 Service Quality report card](#)

[2016-17 Electric energy efficiency report card](#)

[2016-17 Natural gas energy efficiency report card](#)

Previous years

Service Quality: [2016](#), [2015](#), [2014](#), [2013](#)

Energy Efficiency: [2014-15](#)

Table G1: Customer Awareness of Customer Service Guarantee

		Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022
Field Service Operations Transactions Customer Satisfaction Survey													
Q26A. When you called to make the appointment for a service technician to come out, did the customer service representative tell you about PSE \$50 Service Guarantee?	Yes	69	55	48	61	47	41	47	42	39	63	63	71
	No	125	107	105	137	105	120	131	131	116	140	100	121
	Don't Know	46	47	47	50	44	38	62	35	37	47	37	46
	Refused Response	1	0	0	2	4	1	10	0	0	0	0	0
	Total Customers Surveyed	241	209	200	250	200	200	250	208	192	250	200	238
Q26C. Which of the following best fits your understanding of how the service guarantee works if a scheduled appointment has to be changed by PSE.	Whenever Puget Sound Energy changes an appointment, you are given the \$50, OR	30	30	17	28	25	15	20	18	23	38	22	32
	You are given the \$50 service guarantee if the rescheduled time causes you inconvenience.	24	11	18	30	23	15	26	14	9	23	21	32
	You have no understanding or expectations about this part of the service guarantee plan.	148	123	130	151	114	131	168	156	153	176	145	159
	Don't Know	31	39	27	29	32	35	26	20	7	13	12	13
	Refused Response	8	6	8	12	6	4	10	0	0	0	0	2
	Total Customers Surveyed	241	209	200	250	200	200	250	208	192	250	200	238

Table continues on next page.

Table G1: Customer Awareness of Customer Service Guarantee (continues)

		Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022
Field Service Operations Transactions Customer Satisfaction Survey													
Q26D. Did your appointment have to be rescheduled or did it occur as planned?	It was rescheduled	3	4	9	11	6	2	5	3	7	10	4	9
	Technician arrived but was late	2	0	1	1	0	0	0	2	1	5	4	0
	It occurred as planned	226	203	187	223	181	196	233	200	179	231	188	225
	Don't know	7	1	1	10	8	2	2	2	5	3	4	4
	Refused	3	1	2	5	5	0	10	1	0	1	0	0
	Total Customers Surveyed	241	209	200	250	200	200	250	208	192	250	200	238
Q26E. Who initiated rescheduling your appointment?	Puget Sound Energy (PSE) initiated	1	3	4	5	0	1	0	0	1	2	2	5
	Myself (customer initiated)	2	1	5	6	5	1	5	2	5	8	2	4
	Don't know	0	0	0	0	1	0	0	1	1	0	0	0
	Refused	0	0	0	0	0	0	0	0	0	0	0	0
	Total Customers Surveyed	3	4	9	11	6	2	5	3	7	10	4	9

H

Electric Reliability Terms and Definitions

Terms and Definitions

Area of Greatest Concern— Top 50 worst-performing distribution circuits over the past five years that consistently contributed the most customer-minute interruptions. An area targeted for specific actions to improve the level of service reliability or quality.

Blue-sky Days—Days when the energy-delivery system operates as normal.

Catastrophic Event Days —Days when the daily SAIDI is greater than the annual catastrophic event day threshold (T_{CAT}).

Cause Codes—Codes used to identify PSE’s best estimation of what caused a Sustained Interruption to occur. The codes are listed below:

Code	Description	Code	Description
AO	Accident Other, with Fires	FI	Faulty Installation
BA	Bird or Animal	LI	Lightning
CP	Car Pole Accident	SO	Scheduled Outage (was WR – Work Required)
CR	Customer Request	TF	Tree – Off Right-of-Way
DU	Dig Up Underground	TO	Tree – On Right-of-Way
EF	Equipment Failure	TV	Trees/Vegetation
EO	Electrical Overload	UN	Unknown Cause (unknown equipment involved only)
EQ	Earthquake	VA	Vandalism

CEMI_n—Customers Experiencing Multiple Interruptions—This index indicates the ratio of individual customers experiencing n or more sustained interruptions to the total number of customers served. The performance result is calculated based on the below formula:

$$CEMI_n = \frac{\text{Total Number of Customers that experienced more than } n \text{ sustained interruptions}}{\text{Average Annual Electric Customer Count}}$$

Commission Complaint—Any single-customer electric-service reliability complaint filed by a customer with the Washington Utilities and Transportation Commission (UTC).

Customer Complaint—Repeated customer inquiries relating to dissatisfaction with the resolution or explanation of a concern related to a Sustained Interruption or

Power Quality. This is indicated by two or more recorded contacts in PSE’s customer information system during current and prior year.

Customer Count—The number of electric customers per the outage reporting system that is a part of SAP, PSE’s work management, customer information and financial information system.

Customer Inquiry—An event whereby a customer contacts the Customer Care Center to report a Sustained Interruption or Power Quality concern.

Duration of Sustained Interruption—The period beginning when PSE is first informed that service to a customer has been interrupted, and ending when the problem which caused the interruption has been resolved and the line has been re-energized (measured in minutes, hours or days).

Equipment Codes

Code	Description	Code	Description
OCN	Overhead Secondary Connector	OTF	Overhead Transformer Fuse
OCO	Overhead Conductor	OTR	Overhead Transformer
OFC	Overhead Cut – Out	UEL	Underground Elbow
OFU	Overhead Line Fuse / Fuse Link	UFJ	Underground J – Box
OJU	Overhead Jumper Wire	UPC	Underground Primary Cable
OPO	Distribution Pole	UPT	Padmount Transformer
OSV	Overhead Service	USV	Underground Service

IDOT— Investment Decision Optimization Tool—An analysis tool that helps to identify a set of projects that will create maximum value by comparing the relative costs and benefits of each project.

IEEE 1366—IEEE Standard 1366-2003, a guide approved and published by the Institute of Electrical and Electronics Engineers that defines electric power reliability indices and factors that affect their calculations.

Interruption— The total loss of electric power on one or more normally energized conductors to one or more customers connected to the distribution or transmission portion of the system. This does not include any of the power quality issues such as: sags, swells, impulses, or harmonics.

Major Event—An event, such as a storm, that causes serious reliability problems. PSE utilizes three Major Event criteria to evaluate its reliability performance: SAIDI_{SQI} Exclusion Major Event Days and SAIFI_{SQI} Exclusion Major Event Days and IEEE 1366 T_{MED} Exclusion Major Event Days.

Major Event Days—Days when outage events can be excluded from the reliability performance calculation. The three types of Major Event Days are:

SAIDI_{SQI} Major Event Days—Any day in which the daily system SAIDI exceeds the threshold value, T_{MEDADJ} .

5% Exclusion Major Event Days—Days that five percent or more of electric customers are experiencing an electric outage during a 24-hour period and subsequent days when the service to those customers is being restored.

IEEE 1366 T_{MED} Exclusion Major Event Days—Any days in which the daily system SAIDI exceeds the threshold value, T_{MED} .

Momentary Interruption: The brief loss of power delivery to one or more customers caused by the opening and closing of an interrupting device.

SAIDI_{SQI} – any interruption five minutes or shorter

SAIFI_{SQI} – any interruption one minute or shorter

Outage—The state of a system component when it is not available to perform its intended function, due to some event directly associated with that component. For the most part, a component's unavailability is considered an outage when it causes a Sustained Interruption of service to customers. The system component can be transmission, distribution or customer owned if it causes a Sustained Interruption to other customers.

Power Quality—Industry standards are not broad enough to define power quality or how and when to measure it. For purposes of this plan, power quality includes all other physical characteristics of electrical service except for Sustained Interruptions, including momentary outages, voltage sags, voltage flicker, harmonics and voltage spikes.

SAIDI—System Average Interruption Duration Index— This index indicates the total duration of interruption for the average customer during a predefined period of time. It is commonly measured in minutes or hours of interruption. The measurements used in PSE's Plan and reporting include Total methodology (SAIDI_{Total}), Total with five-year-rolling average methodology (SAIDI_{Total 5-year Average}), 5% exclusion methodology (SAIDI_{5%}), IEEE methodology (SAIDI_{IEEE}) and SQI methodology (SAIDI_{SQI}). The performance result for each of the measurements is calculated based on the below formula:

$$\text{SAIDI} = \frac{\Sigma \text{Customer Minute Interruptions}}{\text{Average Annual Electric Customer Count}}$$

SAIDI_{Total}: the numerator includes all customer minute interruptions on outages five minutes or longer.

SAIDI_{Total 5-year Average}: Rolling five-year average of current year Annual SAIDI_{Total} and prior four years Annual SAIDI_{Total} results, excluding any exclusion that has been approved by the UTC. Exclusions for an entire year will be replaced by the preceding Annual SAIDI_{Total} performance results until there are five years included in the calculation of current year SAIDI_{Total 5-year Average}. Exclusions for an event will not be included in the Annual SAIDI_{Total} performance results.

SAIDI_{5%}: the numerator includes customer minute interruptions during non-5% Exclusion Major Event Days. Outages one minute and longer are included in this metric.

SAIDI_{IEEE}= the numerator includes customer minute interruptions during non-IEEE 1366 T_{MED} Exclusion Major Event Days. Outages that are longer than 5 minutes are included in this metric.

SAIDI_{SQL-3}: the numerator includes customer minute interruptions during non-SQI SAIDI T_{MEDADJ} Exclusion Major Event Days. Outages that are longer than 5 minutes are included in this metric.

SAIFI—System Average Interruption Frequency Index—This index is designed to give information about the average frequency of Sustained Interruptions per customers (CI). The measurements used in PSE’s Plan and reporting include Total methodology, SQI-4 methodology and IEEE SAIFI methodology. The performance results for each of the measurement will be calculated according to the following:

$$\text{SAIFI} = \frac{\sum \text{Number of Customer Interruptions}}{\text{Average Annual Electric Customer Count}}$$

SAIFI_{Total}: the numerator includes all customer interruptions on outages five minutes or longer.

SAIFI_{Total 5-year Average}: Rolling five-year average of current year Annual SAIFI_{Total} and prior four years Annual SAIFI_{Total} results, excluding any exclusion that has been approved by the UTC. Exclusions for an entire year will be replaced by the preceding Annual SAIFI_{Total} performance results until there are five years included in the calculation of current year SAIFI_{Total 5-year Average}. Exclusions for an event will not be included in the Annual SAIFI_{Total} performance results.

SAIFI_{5%}: the numerator includes customer interruptions during non-5% Exclusion Major Event Days. Outages one minute and longer are included in this metric.

SAIFI_{IEEE}= the numerator includes customer interruptions during non-IEEE 1366 T_{MED} Exclusion Major Event Days. Outages that are longer than 5 minutes are included in this metric.

SQ—PSE’s Service Quality Program was first established per conditions of the Puget Power and Washington Natural Gas merger in 1997 under Docket UE-960195. The SQ Program has been since extended and modified in Dockets UE-011570 and UG-011571 (consolidated), Docket UE-031946, and Dockets UE-072300 and UG-072301 (consolidated).

Step Restoration—The restoration of service to blocks of customers in an area until the entire area or feeder is restored.

Sustained Interruption—Any interruption not classified as momentary.

SAIDI_{SQI} - Any interruption longer than five minutes

SAIFI_{SQI} - Any interruption longer than one minute

T_{CAT}—The Catastrophic Event Day identification threshold value that is calculated at the end of each reporting year for use during the next reporting year. It is determined by reviewing the past five years of daily system SAIDI, and using a 4.5 beta methodology of the IEEE Standard 1366 in calculating the catastrophic threshold value. Any days having a daily system SAIDI greater than T_{CAT} are days on which the energy-delivery system experienced catastrophic stresses, which are classified as Catastrophic Event Days.

$T_{CAT} = e^{(\alpha + 4.5\beta)}$ where α is the log-average of the data set and β is the log-standard deviation of the data set

T_{MED}—The Major Event Day identification threshold value that is calculated at the end of each reporting year for use during the next reporting year. It is determined by reviewing the past five years of daily system SAIDI, and using the IEEE 1366 2.5 beta methodology in calculating the threshold value. Any days having a daily system SAIDI greater than T_{MED} are days on which the energy-delivery system experienced stresses beyond those normally expected, which are classified as Major Event Days.

$T_{MED} = e^{(\alpha + 2.5\beta)}$ where α is the log-average of the data set and β is the log-standard deviation of the data set.

T_{MEDADJ}—The SQI-3 SAIDI Major Event Day identification threshold value that is calculated at the end of each reporting year for use during the next reporting year. It is determined by reviewing the past five years of daily system SAIDI. Any catastrophic event day (T_{CAT}) daily SAIDI is replaced with the previous five year monthly average daily SAIDI. A T_{MEDADJ} is then calculated using the IEEE 1366 2.5 beta methodology to determine threshold value. Any days having a daily system SAIDI greater than T_{MEDADJ} are days on which the energy-delivery system experienced stresses beyond those normally expected, which are classified as SQI-3 Major Event Days.

$T_{MEDADJ} = e^{(\alpha + 2.5\beta)}$ where α is the log-average of the data set and β is the log-standard deviation of the data set.

I **Electric Reliability Data Collection Process and Calculations**

Data Collection – Methods and Issues

This appendix discusses data collection methods and issues. It explains how the various data were collected. Changes in methods from prior reporting periods are highlighted and the impact of the new method on data accuracy is discussed.

In April 2013, PSE implemented the new OMS and CIS replacing a legacy system. With the legacy system, the Automated Meter Reading (AMR) System had provided some of the data to indicate when a Sustained Interruption began or ended but this functionality was not implemented in the OMS. Today, the AMR System is integrated to OMS for the purpose of validating outage status through meter pings. In 2017, PSE performed an analysis to determine if the outage data integrity from the AMR was robust enough to enhance PSE's current processes for identifying the start and end times of an interruption. The study results indicated that AMR data was not robust enough and PSE did not pursue additional integration of the AMR System with OMS.

Methods for Identifying when a Sustained Interruption Begins

The following methods are used to determine the beginning point of an interruption:

- A customer calls to PSE's Customer Care Center, either through the automated voice response unit or talking with a customer representative.
- A customer calls to a PSE employee rather than through the Customer Care Center.
- A customer logging into their online PSE account and reporting an outage.
- A sectionalizing device operation that is reflected in the OMS based on a SCADA interface.

Possible Causes of Data Inconsistencies:

- If service to a customer affected by a service interruption remains out after the interruption has been corrected, a follow-up call from the customer may be reported as a new incident.
- Data entry mistakes can create inconsistencies.
- During a major storm event, the focus is on ensuring a safe environment for the responders and restoring customers as quickly as possible. While outage information is recorded, given the magnitude of the event and number of outages, the records may not accurately report the extent of the outage or if customers were systematically restored.

Methods to Specify When the Duration of a Sustained Interruption Ends

The following methods are used to determine the ending point of an interruption:

- PSE Service personnel will log the time when customers are restored.
- SCADA provides a signal to the OMS that a sectionalizing device has been restored.

Possible Causes of Data Inconsistencies:

- Multiple layers of issues may be contributing to a Sustained Interruption for a specific customer as described in the definition of Duration of Sustained Interruption.
- Data entry errors can affect the accuracy of the information.
- Getting consistent feedback from the field personnel responding to the outage.
- During a major storm event, the focus is on ensuring a safe environment for the responders and restoring customers as quickly as possible. While outage information is recorded, given the magnitude of the event and number of outages, the records may not accurately report the extent of the outage or if customers were systematically restored.

Recording Cause Codes

Outage cause codes are reported by the PSE service personnel responding to the outage location.

Possible Causes of Data Inconsistencies:

- During a major storm event, the focus is on ensuring a safe environment for the responders and restoring customers as quickly as possible. While outage information is recorded, given the magnitude of the event and number of outages, the records may not accurately report the extent of the outage or if customers were systematically restored.
- Restoration efforts take precedence over pinpointing the exact cause and location of the outage, especially in cross-country terrain or in darkness.

Recording and Tracking Customer Complaints

The CSR in PSE's Customer Care Center handling the call listens for key words and then categorizes the customer comments accordingly.

- The CSR creates a Service Miscellaneous request for the appropriate PSE personnel to contact the customer and discuss their concerns.
- All contact is tracked as an interaction record in PSE's Customer Information System and Service Miscellaneous Notification in PSE's work

management system, SAP, and counted as a customer inquiry for electric reliability reporting purposes.

- When two or more customer inquiries on outage frequency or duration and/or power quality have been recorded in SAP from a customer during current and prior reporting year, these customer inquiries together will be considered as a PSE “Customer Complaint.”

Possible Causes of Data Inconsistencies:

- Data entry errors from the initial inquiry or during the feedback loop can affect the accuracy of the information.
- High volumes of customer inquiries, during storms for example, may increase likelihood of data entry errors.

Change in Definitions and Calculations

This section describes the methodology used in defining and calculating reliability metrics, which are then used to evaluate performance. The UTC in WAC 480-100-398 (2) requires a utility to report changes made in this methodology including data collection and calculation of reliability information after the initial baselines are set. The utility must explain why the changes occurred and how the change is expected to affect comparisons of the newer and older information.

Change to Include the IEEE Methodology

In the 2004 Annual Electric Service Reliability Report, PSE indicated that starting in 2005, reliability metrics using the IEEE Standard 1366 methodology as a guideline would be included. This change and other modifications for monitoring and reporting electric service reliability information were adopted by PSE in UE-060391. The purpose for moving to the IEEE Standard 1366 methodology is to:

- Provide uniformity in reliability indices
- Identify factors which affect these indices
- Aid in consistent reporting practices among utilities

T_{MED} (Major Event Day Threshold) is the reliability index that facilitates this consistency. A detailed equation for calculating T_{MED} is provided in **Appendix H: *Electric Reliability Terms and Definitions***.

While the IEEE guidelines provide a standard for the industry, companies can create a variety of definitions of an outage or sustained outage.

- PSE defines sustained outages as those lasting longer than one minute for SQI SAIFI
- PSE utilizes the IEEE definition of a sustained outage to be longer than five minutes for SQI SAIDI

Changes for 2010 and Subsequent Years Reporting

In 2010, PSE met with the UTC staff to enhance the format of the Electric Service Reliability report and the reliability statistics information provided. Specific enhancements included clarification of baseline statistics and detailed comparison of and expanded set of reliability metrics. This annual report reflects all these reporting enhancements and the SQI SAIDI performance and benchmark calculation changes approved by the UTC.

Baseline Data Reliability Statistics

Pursuant to the WAC Electric Service Reliability requirements, PSE establishes 2003 as its baseline year as the performance from the year was about average for each of the reliability measurements. However, PSE would rather develop a baseline using multiple years to mitigate the fluctuation of weather conditions and other external factors. PSE feels there is limited usefulness in designating one specific year's information as a "baseline" and cautions against the use of a single year's data to assess year-to-year system reliability trends.

Timing of Annual Report Filings

PSE will be reporting data and information on a calendar year basis. PSE's annual Electric Service Reliability report will be filed as part of the annual SQ and Electric Service Reliability report with the UTC no later than the end of March of each year.⁵⁶

Tree-related Outage Codes

PSE conducted a review of tree-related outages and the use of the tree on-right-of-way (TO) and tree off-right-of-way (TF) cause codes on outage notifications. However, it was found that during an outage it was difficult for field personnel to accurately assess the correct use of TF and TO cause codes.

As a result, PSE created a new outage cause code, Trees/Vegetation (TV) and revised the tree-related outage coding process. The TO/TF designation is still used in some cases where a certified arborist field-verifies if the tree was on or off right-of-way, but its use is limited. All other tree-related outages are coded as TV. A more useful and stable process for categorizing vegetation caused interruptions is in development.

PSE complaints

The business process for recording customer inquiries changed with the new CIS implementation in March 2013. Starting in the 2014 reporting, PSE used the service notification records pertaining to outage duration/frequency or power quality for reporting the number of PSE complaints for the last two calendar years. PSE feels that using this new method of data collection provides a more complete assessment

⁵⁶ Order 17 of consolidated Dockets UE-072300 and UG-072301, page 10, section 26.

of customer inquiries pertaining to reliability and power quality concern.

Changes for 2017 and Subsequent Years Reporting

SQI SAIDI Benchmark and Calculation Methodology

PSE, the Washington State Public Counsel Unit personnel, and the UTC staff met throughout 2015 and 2016 to determine a new SQI SAIDI benchmark and calculation methodology. On June 17, 2016, in Order 29 of consolidated Dockets UE-072300 and UG-072301 (Order 29), the UTC adopted the changes on how PSE will calculate SQI SAIDI results using the IEEE Standard 1366 for 2016 and subsequent reporting years. The new SQI SAIDI benchmark is 155 minutes. Also a part of the Order 29, PSE will not be penalized if the SQI SAIDI benchmark is missed but PSE has new non-major event 24-hour Restoration Service Guarantee.

The Electric Reliability Terms and Definitions appendix was expanded to include the new terms and definitions as a result of the SQI SAIDI changes per Order 29. In addition, the SAIDI and SAIFI definitions and formulas were streamlined for ease of reading.

Changes for 2021 and Subsequent Years Reporting

Tree-related Outage Codes

PSE conducted a review of tree-related outages and the use of the tree on-right-of-way (TO) and tree off-right-of-way (TF) cause codes on outage notifications. However, it was found that during an outage it was difficult for field personnel to accurately assess the correct use of TF and TO cause codes.

As a result in September of 2021, PSE implemented new outage cause codes and revised the tree-related outage coding process. The additional tree-related outage codes are Tree Grow In (GI), Tree Limb (TL), Tree Trunk Failure (TT), Tree Uprooted (TU).

Areas of Greatest Concern

This section of the annual reporting includes information on specific areas PSE is targeting for specific actions to enhance the level of service reliability. For the 2022 Electric Service Reliability Report, PSE continues to designate the Areas of Greatest Concern as the Top 50 worst-performing circuits⁵⁷ over the previous five years that rank worst in terms of customer interruption minutes.

⁵⁷ This definition of Areas of Concern became effective in 2012 considering the trend in system performance based on circuits that exceed the SQI, number of customers affected by those circuits and the number of complaints.

- Each circuit is first ranked by the annual total customer interruption minutes seen by the circuit for each of the previous five years.
- The yearly ranking results are then averaged to determine the overall Top 50 worst-performing circuits over the past five years.

The following information will be reported on each of these areas:

- Identification of each Area of Greatest Concern.
- Explanation of the specific actions PSE plans to take in each Area of Greatest Concern to improve the service in each area during the coming year.

Exclusion Events

Per Dockets UE-072300 and UG-072300 (consolidated), from 2010 through 2015 PSE petitioned to exclude certain annual results or outage minutes from the performance calculation for the current year and years following that will be affected. PSE demonstrated that event was unusual or extraordinary and that PSE's level of preparedness and response was reasonable. The UTC granted the following events to be considered extraordinary:

- Total SAIDI results for 2006
- January 2012 storm event
- August 2015 storm event
- November 2015 storm event

In June 2016, Order 29 sets forth an objective approach in identifying catastrophic events. Catastrophic days are identified based on the 4.5 Beta of the IEEE Standard 1366. Any days having a daily system SAIDI greater than T_{CAT} is considered a catastrophic event for purposes of the SQI SAIDI mechanics. While these catastrophic days are excluded from the annual SQI SAIDI results, these days negatively impact the standard 2.5 beta threshold value in the next year and the following four years. Per Order 29, the daily system SAIDI value for that day is replaced with the five year average of that month's previous daily SAIDI. The major event day threshold value is then calculated using the adjusted data (T_{MEDADJ}). The following days are considered catastrophic:

- March 13, 2016
- February 6, 2017
- December 20, 2018
- January 6, 2019
- January 13, 2021
- November 15, 2021

J **1997-current year PSE SAIDI and SAIFI Performance by Different Measurements⁵⁸**

This appendix presents PSE SAIDI and SAIFI performance from 1997 through the current year using different measurements.

⁵⁸ This section meets a requirement of Attachment B of Docket UE-110060.

1997-2022 PSE SAIDI Performance in Different Measurements (Average number of outage minutes per customer per year)						
Calendar Year	(a) Annual SAIDI Excluding Any Days That 5% or More Customers Are w/o Power	(b) Annual IEEE SAIDI Excluding Daily Results over T_{MED}	(c) Annual Total SAIDI Results: No Exclusions	(d) Annual Total SAIDI Results with Exclusions	(e) Total SAIDI 5-Year Rolling Annual Average with Exclusions	(f) Annual SQI SAIDI excluding Daily Results over $T_{MED,ADJ}$ (SQI-3)
1997	105	109	202	202		
1998	117	119	383	383		
1999	131	118	388	388		
2000	103	111	253	253		
2001	147	110	240	240	293	
2002	106	99	215	215	296	
2003	132	106	532	532	326	
2004	114	115	302	302	308	
2005	128	124	192	192	296	
2006	213	163	2,636			
2007	167	143	312	312	311	
2008	163	155	202	202	308	
2009	190	145	215	215	245	
2010	129	124	512	512	287	
2011	144	144	163	163	281	
2012	134	120	1,400	134 ¹	245	
2013	122	125	209	209	247	
2014	173	154	540	540	312	
2015	180	163	760	313 ²	272	
2016	148	154	391	391	317	148
2017	222	175	477	477	386	175
2018	148	145	434	434	431	145
2019	132	136	550	550	433	136
2020	220	171	414	414	453	165
2021	245	207	849	849	545	207
2022	206	196	447	447	539	181

¹ Per UTC approval, excludes the January 2012 Storm Event
² Per UTC approval, excludes the August 2015 and November 2015 storm events

Figure J1: 1997–2022 SAIDI Performance by Different Measurement

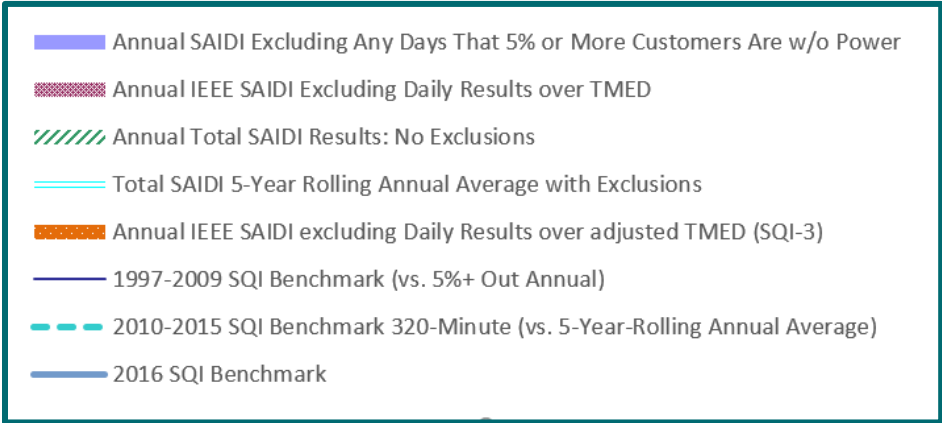


Figure J2: Legend for Figure J3

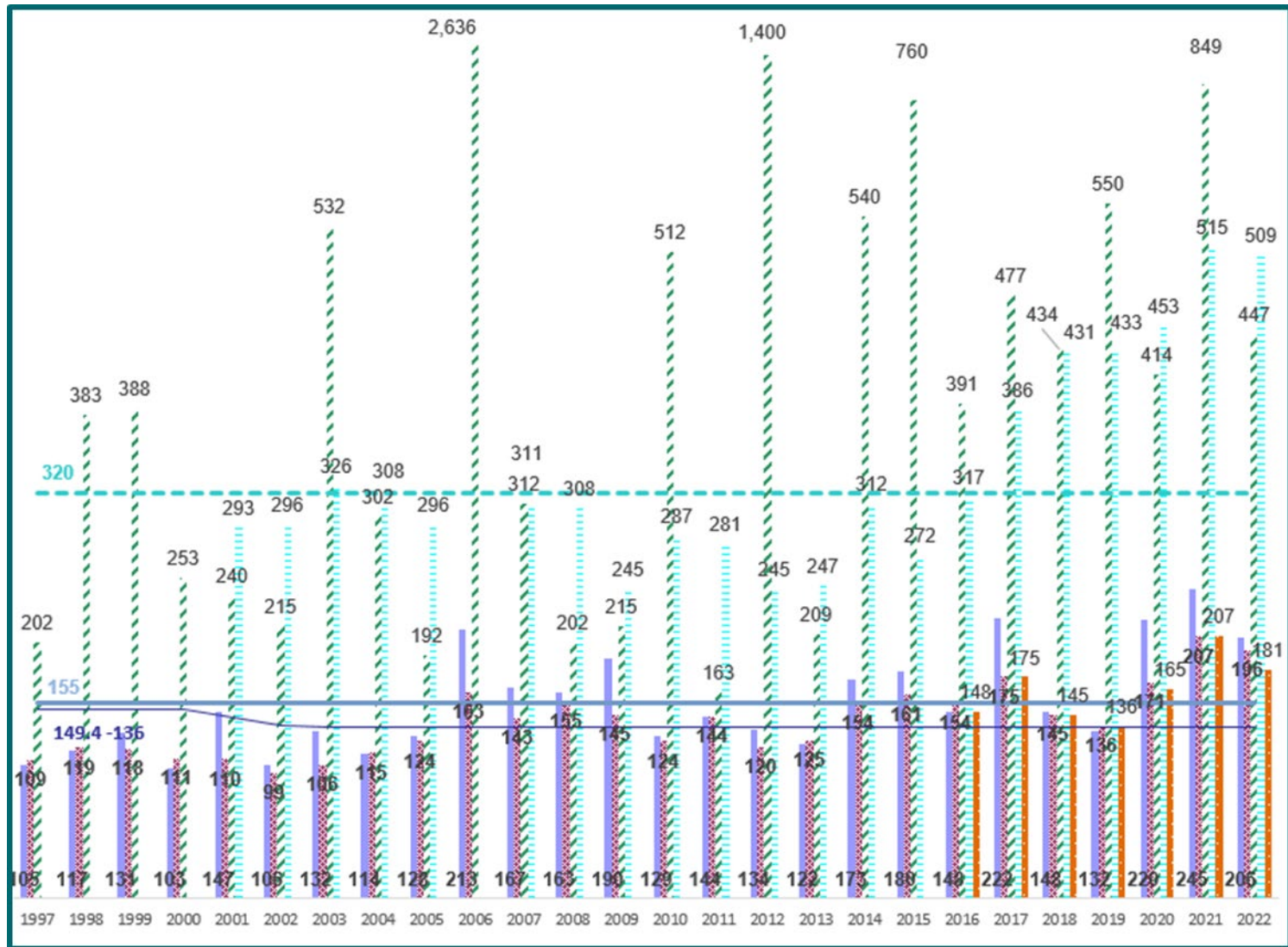


Figure J2: 1997–2022 SAIDI Performance by Different Measurements

1997-2022 PSE SAIFI Performance in Different Measurements (Average number of interruptions per year per customer)					
Calendar Year	(a) Annual SAIFI Excluding Any Days That 5% or More Customers Are w/o Power	(b) Annual IEEE SAIFI Excluding Daily Results over T_{MED}	(c) Annual Total SAIFI Results: No Exclusions	(d) Annual Total SAIFI Results with Exclusions	(e) Total SAIFI 5-Year Rolling Annual Average with Exclusions
1997	1.04	1.11	1.53	1.53	
1998	0.85	0.92	1.42	1.42	
1999	0.98	0.96	1.88	1.88	
2000	0.85	0.91	1.32	1.32	
2001	0.98	0.79	1.34	1.34	1.50
2002	0.83	0.80	1.07	1.07	1.41
2003	0.80	0.71	1.24	1.24	1.37
2004	0.77	0.77	1.09	1.09	1.21
2005	0.94	0.93	1.18	1.18	1.18
2006	1.23	1.05	2.52		
2007	0.98	0.91	1.42	1.42	1.20
2008	1.01	0.98	1.12	1.12	1.21
2009	1.09	0.94	1.24	1.24	1.22
2010	0.86	0.87	1.59	1.59	1.31
2011	1.02	1.02	1.07	1.07	1.29
2012	0.92	0.83	1.62	0.92	1.19
2013	0.86	0.86	1.13	1.13	1.19
2014	1.05	1.00	1.89	1.89	1.32
2015	1.11	1.04	2.18	2.18	1.44
2016	1.06	1.02	1.70	1.70	1.56
2017	1.20	1.12	1.80	1.80	1.74
2018	1.02	0.99	1.52	1.52	1.82
2019	0.98	0.96	1.57	1.57	1.75
2020	1.24	1.06	1.70	1.70	1.66
2021	1.35	1.26	2.27	2.27	1.77
2022	1.06	1.09	1.66	1.66	1.74

Figure J3: 1997–2022 SAIFI Performance by Different Measurements

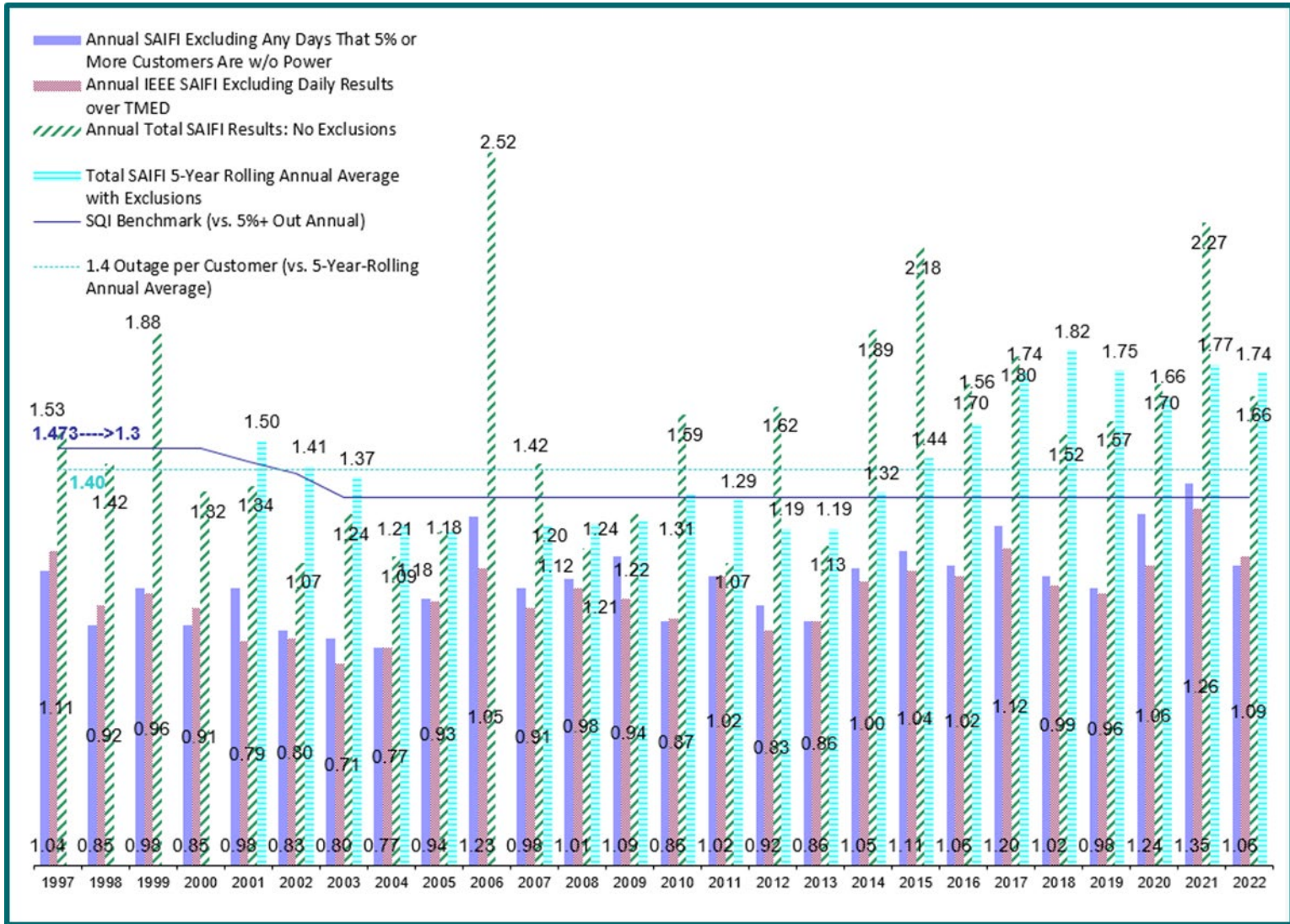


Figure J4: 1997–2022 SAIFI Performance by Different Measurements

K Current Year Electric Service Outage by Cause by Area⁵⁹

This appendix details the 2022 Outage Cause by County. In Tables K1 through K3 color codes indicate which major outage category the outage cause is grouped into. The Cause Code definitions can be found in **Appendix H: Electric Reliability Terms and Definitions**.

Table K1: Color Code Legend

Color Code Legend
Preventable
Third Party (Non-Tree)
Tree-related

Table K2: Total Outages by Cause

	Northern			King/Kittitas		Southern/Western			Total
	Whatcom	Skagit	Island	King	Kittitas	Pierce	Thurston	Kitsap	
AO	28	25	9	72	11	25	26	15	211
BA	167	111	57	689	34	122	134	199	1,513
CP	74	52	11	152	8	34	62	31	424
CR	1	5	3	2	0	1	0	0	12
DU	15	10	12	78	7	18	14	16	170
EF	717	406	295	2,281	194	505	690	529	5,617
EO	0	0	0	3	0	0	1	0	4
EQ	0	0	0	0	0	0	0	0	0
FI	4	5	1	14	0	3	10	4	41
LI	5	0	6	7	2	0	0	8	28
SO	219	179	65	728	41	175	225	339	1,971
TV⁶⁰	536	377	408	1,994	70	247	671	1,290	5,593
UN	23	27	15	157	6	6	9	36	279
VA	3	2	0	18	1	11	7	6	48
Misc.⁶¹	19	19	14	101	13	12	13	20	211
Total	1,811	1,218	896	6,296	387	1,159	1,862	2,493	16,122

⁵⁹ This section meets a requirement of Attachment B of Docket UE-110060.

⁶⁰ 1,407 of the outages were caused by Tree Grow In (GI), Tree Off Right of way (TF), Tree On Right of way (TO), Tree Trunk Failure (TT), Tree Uprooted (TU), or Tree Limb (TL).

⁶¹ Miscellaneous causes are included in both Preventable and Third Party (Non-Tree) categories

Table K3: SQI #3 SAIDI Outages by Cause

	Northern			King/Kittitas		Southern/Western			Total
	Whatcom	Skagit	Island	King	Kittitas	Pierce	Thurston	Kitsap	
AO	28	25	9	71	10	23	26	15	207
BA	161	109	57	681	32	122	134	199	1,495
CP	72	51	11	146	8	34	60	30	412
CR	1	5	3	2	0	1	0	0	12
DU	15	10	12	78	7	18	14	15	169
EF	655	378	278	2,177	175	474	616	487	5,240
EO	0	0	0	2	0	0	1	0	3
EQ	0	0	0	0	0	0	0	0	0
FI	4	5	1	13	0	3	10	4	40
LI	5	0	6	7	2	0	0	8	28
SO	216	176	64	720	40	172	220	326	1,934
TV⁶²	315	242	272	1,044	44	153	344	642	3,056
UN	22	21	12	133	6	6	7	31	238
VA	3	1	0	17	1	11	7	6	46
Misc.⁶³	16	17	9	95	12	10	11	17	187
Total	1,513	1,040	734	5,186	337	1,027	1,450	1,780	13,067

⁶² 776 of the outages were caused by Tree Grow In (GI), Tree Off Right of way (TF), Tree On Right of way (TO), Tree Trunk Failure (TT), Tree Uprooted (TU), or Tree Limb (TL).

⁶³ Miscellaneous causes are included in both Preventable and Third Party (Non-Tree) categories

L

Historical SAIDI and SAIFI by Area⁶⁴

This appendix details in Table L1, the three year history of SAIDI and SAIFI data by county.

Table L1: SAIDI and SAIFI Data for the Past Three Years by County⁶⁵

Region/County	Year	Total SAIFI	SAIFI 5%	Total SAIDI	SQI SAIDI
Northern					
Whatcom	2022	1.81	1.19	357	200
	2021	2.05	1.50	652	224
	2020	2.12	1.70	382	237
Skagit	2022	1.64	1.41	324	216
	2021	3.25	2.18	1295	296
	2020	1.68	1.43	403	234
Island	2022	2.54	1.03	2133	284
	2021	5.34	2.55	3448	384
	2020	3.01	2.47	1108	195
King/Kittitas					
King	2022	1.42	0.90	406	176
	2021	1.95	1.06	740	179
	2020	1.37	0.96	311	140
Kittitas	2022	1.55	1.20	414	262
	2021	2.58	2.08	456	312
	2020	2.57	2.00	574	263

Table continues on next page

⁶⁴ This section meets a requirement of Attachment B of Docket UE-110060.

⁶⁵ Reported figures are based on most current SAP outage data, as of January 2023.

Region/County	Year	Total SAIFI	SAIFI 5%	Total SAIDI	SQI SAIDI
Southern/Western					
Pierce	2022	1.45	0.90	212	165
	2021	2.13	1.03	1007	195
	2020	1.69	0.98	800	125
Thurston	2022	1.70	1.02	343	154
	2021	2.31	1.57	660	179
	2020	1.41	1.12	236	145
Kitsap	2022	2.58	1.68	623	179
	2021	2.63	1.76	610	253
	2020	2.69	1.95	501	225

County Trends from 2021 to 2022:

With the exception of Kitsap County, all counties improved in all four measures.

- Whatcom County.
 - Total SAIDI, Total SAIFI, and SQI SAIDI performance improvement driven by fewer customers impacted by fewer tree related outages and equipment failures.
 - SAIFI 5% improvement due to fewer customers impacted by fewer equipment failures.
- Skagit and Island Counties improved across all four measures. Both counties saw a fewer tree related outages that impacted less customers.
- King County.
 - Total SAIDI, Total SAIFI, and SQI SAIFI performance driven by a decrease in tree related outages and equipment failures that impacted fewer customers.
 - SQI SAIDI performance driven by a decrease in outages related to equipment failures.
- Kittitas County.
 - Total SAIFI and SAIFI 5% improved due to fewer customers impacted by accidents, bird/animal, and tree related outages
 - Total SAIDI and SQI SAIDI improved due to fewer customers impacted by accidents, bird/animal

- Pierce County.
 - Total SAIDI, Total SAIFI, SQI SAIDI, and SAIFI 5% performance driven by an improvement in fewer tree related outages that impacted fewer customers, and a shorter duration of those tree outages.
- Thurston County.
 - Total SAIDI, Total SAIFI, SQI SAIDI, and SAIFI 5% performance driven by fewer and shorter duration bird/animal and tree related outages that impacted fewer customers.
- Kitsap County saw an improvement in three measures and a decline in one measure.
 - Total SAIFI, improved due to fewer outage related to accidents that impacted few customers.
 - SQI SAIDI improved due fewer customers impacted by equipment failures and tree related outages.
 - SAIFI 5% improved due to a decrease in the number of equipment failure outages that affected fewer customers.
 - Total SAIDI declined due to more customers impacted by tree related outages.

M

Areas of Greatest Concern with Action Plan⁶⁶

This appendix details the areas of greatest concern with the 2022, 2023, and 2024 action plan.

Table M1 provides the 2022 list of the Top 50 Circuits with the highest minutes interrupted in the PSE territory.

The table spans 5 pages.

CMI refers to Customer Minutes Interruptions.

⁶⁶ This section meets a requirement of Attachment B of Docket UE-110060.

Table M1: 2021 Areas of Greatest Concern

Circuit	County	2022 Year End 5 Year Avg Rank	2022 Year End 5 Year Average Total CMI	2021 Year End 5 Year Avg Rank	2021 Year End 5 Year Average Total CMI	Action by PSE	5 Yr CMI Trend
Baker River Switch-24	Skagit	1	5,566,481	1	5,287,730	One underground conversion project planned for 2023. One underground conversion project proposed for 2024.	▲
Chico-12	Kitsap	2	4,354,700	2	3,241,917	One recloser replacement project completed in 2022.	▲
Langley-16	Island	3	5,241,781	8	3,495,256	One treewire and one underground conversion project planned for 2023.	▲
Sherwood-18	King	4	3,204,967	3	3,346,246	One fusesaver project completed in 2022. One fusesaver and one treewire project proposed for 2023.	▼
Cottage Brook-13	King	5	2,603,858	5	2,937,005	One fusesaver project completed in 2022. One treewire project scheduled for 2024.	▼
Vashon-12	King	6	2,402,475	6	3,242,864	One feeder tie project completed in 2022. One distribution automation project planned for 2023. One treewire project proposed for 2024.	▼
Nugents Corner-26	Whatcom	7	2,515,474	7	3,097,818	Two underground conversion projects planned for 2023.	▼
Brooks Hill-15	Island	8	5,060,615	16	3,646,934	One fusesaver project proposed for 2024	▲
Kendall-12	Whatcom	9	3,385,870	4	4,130,768	One underground conversion project planned for 2023 and one fusesaver project proposed for 2024.	▼
Freeland-12	Island	10	4,387,716	13	3,878,007	One fusesaver project completed in 2022. Three fusesaver projects planned for 2023. One treewire project and one underground conversion project scheduled for 2024.	▲
Baker River Switch-13	Skagit	11	2,866,685	Not on 2021 list		One fusesaver project proposed for 2024.	▲

Circuit	County	2022 Year End 5 Year Avg Rank	2022 Year End 5 Year Average Total CMI	2021 Year End 5 Year Avg Rank	2021 Year End 5 Year Average Total CMI	Action by PSE	5 Yr CMI Trend
Tolt-15	King	12	3,455,281	14	3,225,651	One underground conversion project completed in 2022. One fusesaver project, one overhead system improvement project and one treewire project planned for 2023.	▲
Slater-16	Whatcom	13	2,113,677	11	2,132,929	One treewire project completed in 2022. One fusesaver project planned for 2023.	▼
Big Rock-15	Skagit	14	2,415,778	9	2,689,096	One feeder tie project completed in 2022. One underground conversion project planned for 2023 and one proposed for 2024	▼
Glacier-12	Whatcom	15	3,357,711	12	3,670,516	One treewire project proposed for 2023.	▼
Four Corners-12	King	16	1,795,519	18	1,678,563	One treewire project completed in 2022. Two fusesaver projects planned for 2023 and three fusesaver projects proposed for 2024.	▲
Cle Elum-11	Kittitas	17	1,673,928	Not on 2021 list		Planning is continuing to monitor for improvements.	▲
Shaw-15	Pierce	18	1,949,207	42	1,841,952	One fusesaver project planned for 2023. One fusesaver project proposed for 2024.	▲
Maxwelton-12	Island	19	3,556,607	40	2,878,981	One fusesaver project completed in 2022. One fusesaver project proposed for 2024.	▲
Duvall-12	King	20	2,389,934	23	2,254,572	One underground conversion project and one recloser project planned for 2023. One overhead upgrade project scheduled for 2025	▲
Freeland-15	Island	21	4,970,439	Not on 2021 list		One treewire project proposed for 2024 and 3 fusesaver projects proposed for 2024.	▲
Fernwood-17	Kitsap	22	2,157,882	17	3,007,017	One fusesaver project proposed for 2024.	▼

Circuit	County	2022 Year End 5 Year Avg Rank	2022 Year End 5 Year Average Total CMI	2021 Year End 5 Year Avg Rank	2021 Year End 5 Year Average Total CMI	Action by PSE	5 Yr CMI Trend
Skykomish-25	King	23	4,561,747	37	2,464,239	One underground conversion project scheduled for 2025 and one fusesaver project proposed for 2024.	▲
Duvall-15	King	24	1,727,428	15	2,057,346	One feeder tie project is proposed for 2024.	▼
Griffin-13	Thurston	25	2,266,728	28	2,237,459	One recloser project planned for 2023. One underground conversion project proposed for 2024.	▲
Langley-12	Island	26	4,571,107	38	3,403,556	One underground conversion project planned for 2023. One underground conversion project and one treewire project proposed for 2024.	▲
Cottage Brook-15	King	27	1,432,434	20	1,695,859	One treewire project completed in 2022. One treewire project planned for 2023.	▼
Fragaria-12	Kitsap	28	1,534,249	25	1,605,334	One treewire project planned for 2023 and one fusesaver project proposed for 2024.	▼
Griffin-16	Thurston	29	1,931,512	Not on 2021 list		One fusesaver project proposed for 2024.	▲
Freeland-13	Island	30	3,440,236	Not on 2021 list		One fusesaver project planned for 2023 and one fusesaver project proposed for 2024.	▲
Clover Valley-16	Island	31	2,747,374	24	2,820,172	One treewire project and one fusesaver project planned for 2023.	▼
Greenwater-16	King	32	2,491,276	33	2,325,712	Two recloser projects planned for 2023.	▲
Black Diamond-13	King	33	1,405,822	46	1,360,364	One feeder extension and one underground conversion project planned for 2023.	▲
Vashon-23	King	34	1,362,741	21	1,574,018	One distribution automation planned for 2023.	▼

Circuit	County	2022 Year End 5 Year Avg Rank	2022 Year End 5 Year Average Total CMI	2021 Year End 5 Year Avg Rank	2021 Year End 5 Year Average Total CMI	Action by PSE	5 Yr CMI Trend
Greenwater-13	King	35	2,519,131	Not on 2021 list		Planning is continuing to monitor for improvements.	▲
Mount Si-24	King	36	1,946,600	Not on 2021 list		One distribution automation and three fusesaver projects planned for 2023.	▲
Prine-23	Thurston	37	1,366,581	48	1,239,612	One overhead rebuild proposed for 2024 and one fusesaver project proposed for 2024.	▲
Fragaria-15	Kitsap	38	1,556,793	36	1,949,811	Planning is continuing to monitor for improvements.	▼
Fragaria-15	Pierce	38	1,556,793	36	1,949,811	Planning is continuing to monitor for improvements.	▼
Lake Tapps-18	King	39	2,512,903	Not on 2021 list		Planning is continuing to monitor for improvements.	▲
Rose Hill-21	Kitsap	40	1,905,637	Not on 2021 list		Planning is continuing to monitor for improvements.	▲
Silverdale-15	King	41	1,849,629	Not on 2021 list		Planning is continuing to monitor for improvements.	▲
Vashon-13	King	42	1,494,248	30	2,173,816	One distribution automation planned for 2023. One fusesaver project proposed for 2024.	▼
Fernwood-16	Kitsap	43	2,867,661	10	3,078,399	Three fusesaver projects proposed for 2024.	▼
Coupeville-15	Island	44	2,546,052	Not on 2021 list		One fusesaver project planned for 2023 and one fusesaver project proposed for 2024.	▲
Miller Bay-23	Kitsap	45	1,710,495	32	1,766,571	One fusesaver project and one recloser project planned for 2023. One treewire and one underground conversion project proposed for 2024.	▼

Circuit	County	2022 Year End 5 Year Avg Rank	2022 Year End 5 Year Average Total CMI	2021 Year End 5 Year Avg Rank	2021 Year End 5 Year Average Total CMI	Action by PSE	5 Yr CMI Trend
Fragaria-16	Kitsap	46	1,359,828	34	1,994,002	Planning is continuing to monitor for improvements.	▼
Hamilton-15	Skagit	47	3,483,183	31	3,811,579	One treewire and one fusesaver project completed in 2022. One feeder tie project proposed for 2023 and one fusesaver project proposed for 2024.	▼
Buckley-16	Pierce	48	1,654,965	27	1,737,780	One fusesaver project planned for 2023. One treewire project proposed for 2024.	▼
Winslow-12	Kitsap	49	1,914,742	29	1,979,427	One fusesaver project proposed for 2024.	▼
Alger-15	Skagit	50	3,031,371	35	3,220,803	One underground conversion project and three fusesaver projects proposed for 2024.	▼

N

Current-Year Commission and Rolling-Two Year PSE Customer Electric Service Reliability Complaints with Resolutions⁶⁷

This appendix lists in Tables N1 and N2, the current year UTC and rolling two-year PSE customer electric service reliability complaints with resolutions.

Table N1 listing the 57 complaints spans 3 pages.

Table N1: Current Year Commission Complaints

No.	Complaint Type	Date of Complaint	Location	Closing Date	Case Resolution
1	Reliability and Power Quality	3/24/2022	La Conner	03/31/2022	Company upheld
2	Reliability and Power Quality	7/12/2022	Rochester	07/19/2022	Company upheld
3	Reliability	1/4/2022	Easton	01/27/2022	Company upheld
4	Reliability	1/5/2022	Easton	01/11/2022	Company upheld
5	Reliability	1/5/2022	Olympia	01/14/2022	Company upheld
6	Reliability	1/10/2022	Fall City	01/26/2022	Company upheld
7	Reliability	1/24/2022	Enumclaw	02/14/2022	Company upheld
8	Reliability	2/10/2022	Poulsbo	03/03/2022	Company upheld
9	Reliability	3/14/2022	Easton	03/24/2022	Company upheld
10	Reliability	4/14/2022	Bellevue	04/21/2022	Company upheld
11	Reliability	6/7/2022	Sammamish	06/17/2022	Company upheld
12	Reliability	6/24/2022	Olympia	07/11/2022	Company upheld
13	Reliability	6/28/2022	Redmond	07/19/2022	Company upheld
14	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
15	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
16	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
17	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
18	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld

⁶⁷ This section meets a requirement of Attachment B of Docket UE-110060.

No.	Complaint Type	Date of Complaint	Location	Closing Date	Case Resolution
19	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
20	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
21	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
22	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
23	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
24	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
25	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
26	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
27	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
28	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
29	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
30	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
31	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
32	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
33	Reliability	7/13/2022	Lake Tapps	07/28/2022	Company upheld
34	Reliability	7/15/2022	Lake Tapps	07/28/2022	Company upheld
35	Reliability	7/25/2022	Sammamish	08/10/2022	Company upheld
36	Reliability	7/27/2022	Federal Way	08/24/2022	Company upheld with arrangements
37	Reliability	8/10/2022	Bellevue	08/24/2022	Company upheld
38	Reliability	8/11/2022	Snoqualmie Pass	08/24/2022	Company upheld
39	Reliability	9/19/2022	Snoqualmie Pass	09/28/2022	Company upheld
36	Reliability	7/27/2022	Federal Way	08/24/2022	Company upheld with arrangements
37	Reliability	8/10/2022	Bellevue	08/24/2022	Company upheld
38	Reliability	8/11/2022	Snoqualmie Pass	08/24/2022	Company upheld
39	Reliability	9/19/2022	Snoqualmie Pass	09/28/2022	Company upheld
40	Reliability	7/27/2022	Federal Way	08/24/2022	Company upheld with arrangements
41	Reliability	8/10/2022	Bellevue	08/24/2022	Company upheld
42	Reliability	8/11/2022	Snoqualmie Pass	08/24/2022	Company upheld
43	Reliability	9/19/2022	Snoqualmie Pass	09/28/2022	Company upheld

No.	Complaint Type	Date of Complaint	Location	Closing Date	Case Resolution
44	Reliability	11/10/2022	Bainbridge Island	11/23/2022	Company upheld
45	Reliability	12/1/2022	North Bend	12/12/2022	Company upheld
46	Reliability	12/2/2022	Baring	12/23/2022	Company upheld
47	Reliability	12/2/2022	Bellingham	12/20/2022	Company upheld
48	Reliability	12/8/2022	Bellingham	12/21/2022	Company upheld
49	Reliability	12/29/2022	Bellingham	3/1/2023	Company upheld
50	Reliability	12/29/2022	Bellingham	3/1/2023	Company upheld
51	Reliability	12/29/2022	Bellingham	3/1/2023	Company upheld
52	Reliability	12/29/2022	Bellingham	3/1/2023	Company upheld
53	Reliability	12/29/2022	Mercer Island	1/18/2023	Company upheld
54	Reliability	12/29/2022	Silverdale	1/18/2023	Company upheld
55	Power Quality	4/25/2022	Bellevue	05/25/2022	Company upheld
56	Power Quality	5/4/2022	Kirkland	05/18/2022	Company upheld
57	Power Quality	11/16/2022	Bellevue	1/20/2023	Company upheld

Table N2: Rolling Two-Year PSE Customer Electric Service Reliability Complaints with Resolutions (Sorted by County)

Table N2 listing the 47 complaints spans 5 pages.

No.	County	Date of Complaint	Location	Complaint Type	Circuit	Response
1	Island	Sep-21 Apr-21	Greenbank	Reliability	Greenbank-13	Contacted Customer to address concerns
2	Island	Nov-21 Oct-22	Oak Harbor	Reliability	Crescent Harbor-15	Contacted Customer to address concerns
3	King	Nov-21 Mar-22	Auburn	Reliability	Ellingson-16	Contacted Customer to address concerns
4	King	Jan-21 Jan-21 Oct-21	Auburn	Reliability	Sherwood-17	Reported in 2021. No new inquiries in 2022
5	King	Jul-21 Oct-21	Bellevue	Reliability	Kenilworth-25	Reported in 2021. No new inquiries in 2022
6	King	Oct-21 Mar-22	Bellevue	Reliability Power Quality	Kenilworth-25	Contacted Customer to address concerns
7	King	Jul-21 Aug-21	Bellevue	Power Quality	Somerset-13	Reported in 2021. No new inquiries in 2022
8	King	Feb-21 May-22	Bellevue	Reliability	Somerset-17	Contacted Customer to address concerns
9	King	Aug-21 Sep-21	Duvall	Reliability	Duvall-15	Reported in 2021. No new inquiries in 2022

No.	County	Date of Complaint	Location	Complaint Type	Circuit	Response
10	King	Oct-21 Nov-21	Duvall	Reliability	Tolt-15	Reported in 2021. No new inquiries in 2022
11	King	Jan-21 Jan-21	Fall City	Reliability	Fall City-13	Reported in 2021. No new inquiries in 2022
12	King	Dec-20 Jan-21	Fall City	Power Quality	Klahanie-15	Reported in 2021. No new inquiries in 2022
13	King	Oct-21 Jan-22	Issaquah	Reliability	West Issaquah-14	Contacted Customer to address concerns
14	King	Aug-21 Nov-21	Kirkland	Reliability	Crestwood-22	Reported in 2021. No new inquiries in 2022
15	King	Apr-21 May-22	Kirkland	Reliability	Totem-23	Contacted Customer to address concerns
16	King	Agu-21 Aug-22	Kirkland	Reliability	Wayne-16	Contacted Customer to address concerns
17	King	Nov-21 Apr-22	Newcastle	Reliability	Hazelwood-12	Contacted Customer to address concerns
18	King	Jun-21 Dec-22	North Bend	Power Quality	North Bend-12	Contacted Customer to address concerns
19	King	Nov-21 Jan-22	North Bend	Reliability	North Bend-15	Contacted Customer to address concerns
20	King	Feb-21 Jul-21	Redmond	Reliability	Hollywood-22	Reported in 2021. No new inquiries in 2022

No.	County	Date of Complaint	Location	Complaint Type	Circuit	Response
21	King	Feb-21 Jul-21	Redmond	Reliability	Hollywood-22	Reported in 2021. No new inquiries in 2022
22	King	Oct-21 Dec-21	Renton	Reliability	Hazelwood-15	Reported in 2021. No new inquiries in 2022
23	King	Sep-21 Oct-21	Sammamish	Reliability	Pine Lake-23	Reported in 2021. No new inquiries in 2022
24	King	Jan-21 Feb-21	Sammamish	Power Quality	Pine Lake-27	Reported in 2021. No new inquiries in 2022
25	King	Jun-22 Sep-22	Vashon	Reliability	Vashon-12	Contacted Customer to address concerns
26	King	Mar-21 Sep-22	Woodinville	Reliability	Cottage Brook-13	Contacted Customer to address concerns
27	King	Mar-21 Apr-21	Woodinville	Power Quality	Cottage Brook-15	Reported in 2021. No new inquiries in 2022
28	King	May-22 Nov-22	Woodinville	Reliability	Lake Leota-16	Contacted Customer to address concerns
29	Kitsap	Oct-21 Oct-21	Port Orchard	Reliability	Fernwood-17	Reported in 2021. No new inquiries in 2022
30	Kitsap	Oct-21 Jul-22	Poulsbo	Reliability Power Quality	Poulsbo-16	Contacted Customer to address concerns
31	Kittitas	Jan-22 Nov-22	Easton	Reliability	Hyak-13	Contacted Customer to address concerns

No.	County	Date of Complaint	Location	Complaint Type	Circuit	Response
32	Kittitas	Feb-21 Jun-21	Ellensburg	Reliability	Kittitas-25	Reported in 2021. No new inquiries in 2022
33	Kittitas	Dec-22 Dec-22	Ronald	Reliability	Cascade-16	Contacted Customer to address concerns
34	Pierce	Jul-22 Dec-22	Bonney Lake	Reliability	Lake Tapps-18	Contacted Customer to address concerns
35	Pierce	Jun-21 Sep-21	Graham	Reliability	Kapowsin-15	Reported in 2021. No new inquiries in 2022
36	Pierce	Jul-21 Apr-22	Lake Tapps	Power Quality	Dieringer-15	Contacted Customer to address concerns
37	Pierce	Aug-21 Sep-21	Puyallup	Power Quality	Shaw-13	Reported in 2021. No new inquiries in 2022
38	Pierce	May-21 Jun-22 Aug-22	Sumner	Power Quality Reliability	Dieringer-17	Contacted Customer to address concerns
39	Thurston	Dec-21 Dec-21 Jan-22	Olympia	Power Quality	Friendly Grove-25	Contacted Customer to address concerns
40	Thurston	Apr-22 May-22	Olympia	Reliability	Griffin-15	Contacted Customer to address concerns
41	Thurston	Sep-21 Oct-21	Yelm	Power Quality	Yelm-25	Reported in 2021. No new inquiries in 2022
42	Whatcom	Oct-21 Oct-21	Bellingham	Reliability	Britton-14	Reported in 2021. No new inquiries in 2022

No.	County	Date of Complaint	Location	Complaint Type	Circuit	Response
43	Whatcom	Oct-21 Oct-22	Bellingham	Reliability	Britton-17	Contacted Customer to address concerns
44	Whatcom	Sep-22 Oct-22	Bellingham	Power Quality	Carolina-16	Contacted Customer to address concerns
45	Whatcom	Oct-21 Dec-21	Bellingham	Power Quality	Woburn-27	Reported in 2021. No new inquiries in 2022
46	Whatcom	Dec-21 Dec-21	Deming	Reliability	Glacier-12	Reported in 2021. No new inquiries in 2022
47	Whatcom	Mar-22 Jul-22	Lynden	Reliability	Berthusen-11	Contacted Customer to address concerns

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Current Year Geographic Location of Electric Service Reliability Customer Complaints on Service Territory Map with Number of Next Year’s Proposed Projects and Vegetation-Management Mileage⁶⁸

This appendix illustrates current-year geographic location of the 2022 electric service reliability customer complaints on service territory map with the number of 2023 proposed projects and vegetation-management mileage.

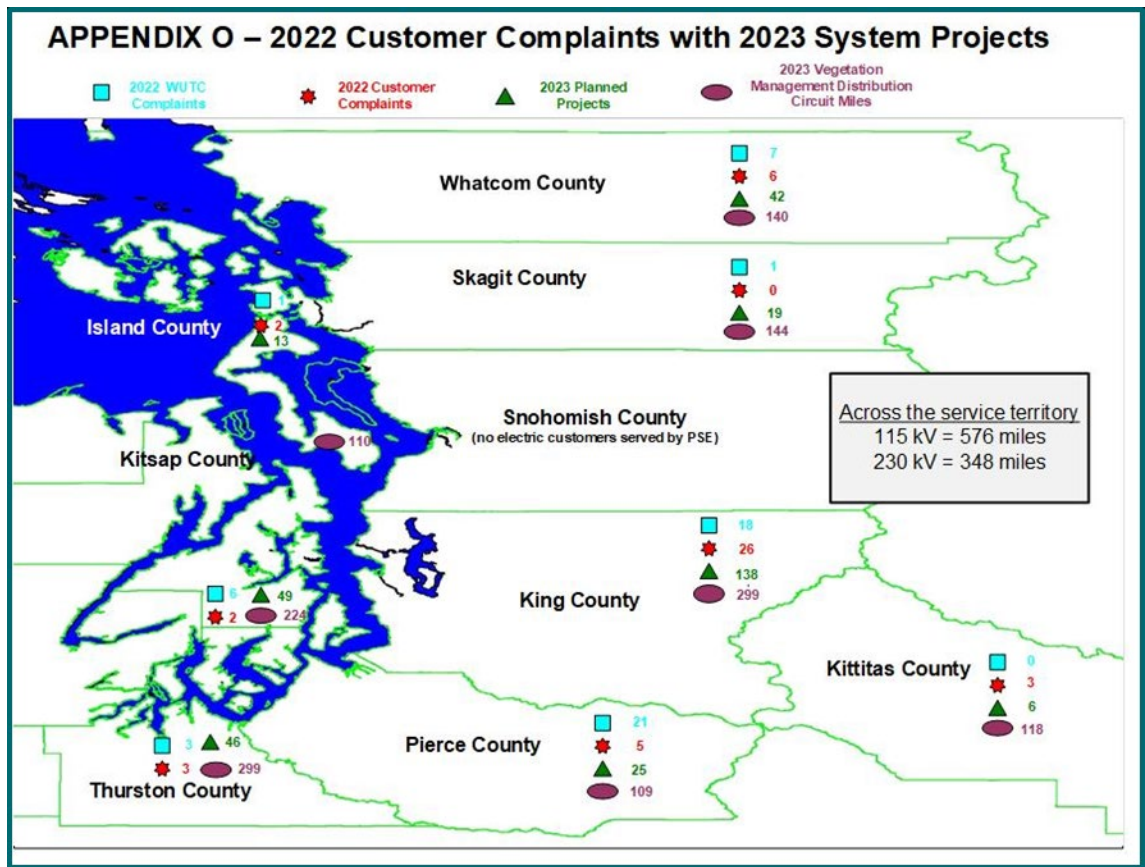


Figure O1: 2022 Customer Complaints with 2023 System Projects

⁶⁸ This section meets a requirement of Attachment B of Docket UE-110060.

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Reliability Program Category Descriptions

This appendix provides reliability program work category descriptions for work outlined in **Table 3f**.

Vegetation Management

Outages related to trees and vegetation continues to be a major factor in the SAIDI and SAIFI performance. Trees remain a vital element of the region's quality of life, but they are also a major cause of customer interruptions. To mitigate trees and limbs growing into electric power lines, PSE performs vegetation maintenance based on a cyclical schedule. The maintenance programs focus on achieving a safe and reliable electric system. Vegetation management involves a variety of practices and techniques designed to keep trees and limbs from coming in contact with power lines and causing outages. Less than 10% of tree-related outages are caused by tree growth, illustrating an effective vegetation management program.

Cyclical Tree Trimming

PSE has a cyclical vegetation management program to reduce outages in its overhead electric distribution, high-voltage distribution and transmission systems.

- **Overhead distribution system**—Usually trees are trimmed every four years for distribution lines in urban areas and every six years for lines in rural areas. Danger trees, trees that are an imminent threat of falling into power lines, are removed in these rights-of-way or within 12 feet of the system at the same time that trees are trimmed.
- **55/115kV transmission corridor system**—Trees are trimmed every three years on PSE's 55/115kV transmission rights-of-way. Spray and mowing activities are performed and danger trees are removed along the edge of these corridors, typically within 12 feet of the system at the same time trees are trimmed.
- **230kV transmission corridor system**—Trees are trimmed annually in transmission corridor system over 200kV. Spray and mowing activities are performed and danger trees are removed along the edge of these corridors, typically within 16 feet of the system at the same time trees are trimmed. These maintenance activities are compliance driven per the North American Electric Reliability Corporation ("NERC") clearing requirements.
- **Hotspotting**—occurs yearly on the overhead distribution and 55/115kV transmission systems. Hotspotting, or unscheduled trimming or removal, is driven by PSE field technicians or customer requests.

TreeWatch

PSE also manages vegetation impacts from beyond the 12 foot right of way with its TreeWatch program. Within this program, certified arborists work with communities and property owners to identify and remove “at-risk” trees on private property that are more than 12 feet away from power lines located beyond the limits of normal cyclical vegetation management standards. The trim and removal numbers vary year to year due to the size and complexity of the trees targeted to be trimmed and removed.

Tree Replanting

PSE replants trees in PSE’s service area to prevent future reliability concerns from developing. In addition, PSE developed and makes available to customers a vegetation planning handbook called *Energy Landscaping*. The handbook helps customers evaluate landscaping opportunities and is a how-to for planting trees and shrubs and tree-care solutions. It also lists recommended trees and shrubs to plant near power lines.

Substation Landscape Renovation

PSE may renovate the areas around select substations in an effort to reduce the risk of future interruptions. This may include removing trees, removing the tops of trees and replanting vegetation less likely to cause damage resulting in an interruption to customers.

Targeted Reliability Improvements

In addition to vegetation management programs, PSE has implemented other programs to reduce the frequency and duration of outages on the transmission and distribution systems. These programs include the Worst Performing Circuits, replacing existing overhead distribution wire with tree wire or spacer cable to prevent tree limb outages, installing more sectionalizing devices (some which are remotely monitored and control), adding distribution automation and enhancing the transmission and distribution Supervisory Control and Data Acquisition (“SCADA”) devices.

Worst Performing Circuits

PSE’s Planners investigate the Worst Performing Circuits and propose projects that will improve the reliability for customers being served by those circuits. Different reliability strategies are applied to these circuits, including tree wire, spacer cable, underground conversions, overhead rebuilds, adding new feeder ties and distribution automation and more recently considering non wires alternatives, i.e., energy storage solutions.

Reclosers

Installation of reclosers has been an effective tactic to improve reliability. These devices are an improvement over conventional fuses. With a conventional fuse, a temporary fault, typically a branch brushing against the power line, causes the fuse to blow open and de-energize the line. Service is not restored until EFR personnel patrols the line and manually replaces the blown fuse using a bucket truck. In comparison, reclosers sense the fault on the power line and automatically attempt to re-energize the line. If the recloser no longer senses the fault, it will reclose and re-energize the line. If the fault is not temporary, the recloser can isolate the damaged section of the line and customers upstream from the recloser do not experience an outage.

FuseSavers

PSE has been replacing 100T overhead fuses with single phase reclosing devices in some locations. These devices help reduce temporary outages related to tree limbs and animal contact, similar to a recloser, but at a reduced cost.

Targeted Reliability

This category of projects can include copper conductor replacements, overhead system rebuilds, underground system relocations, feeder ties and overhead to underground system conversions. These projects may also include components of other project types such as treewire or SCADA. Because each project is unique and isn't associated with a specific targeted reliability program, these projects are grouped together under the same category.

Distribution Automation

Distribution automation automates outage restoration on the distribution grid by using sensors to locate faults, remotely operate switches to isolate faulted sections and to restore power to the non-faulted sections. A computer control system automates this action by collecting information from grid devices and determining the optimal switching to restore power to the largest number of customers in less than five minutes. The faulted section will still remain without power until crews can repair the damage.

Substation SCADA

Supervisory Control and Data Acquisition (SCADA) is an important aspect of managing the electric transmission and distribution power systems. SCADA is a system used for monitoring and controlling electrical equipment that will provide situational awareness for PSE's operators and enable faster restoration of power to the customers. Approximately 99% of PSE's feeder breakers have loading visibility and indication only, while 57% of PSE's feeder breakers have loading visibility, indication and supervisory control.

Transmission Automation

Currently, PSE has existing automation schemes on PSE's transmission system. These schemes were developed back in the 1970's, and were state-of-the-art technology for that time. Using local sensors, and multiple reclosing at either end of the transmission line, a logic scheme was set up to restore the maximum number of customers and isolate the faulted section of the transmission line. Though the restoration of customers is typically optimized, the existing automatic schemes do not cover every scenario, thus leaving a potential for extended outages to one or more substations on a particular transmission line. The Transmission Line Automated Switching (TLAS) solution solves this issue and automatically restores power to the maximum number of customers in all scenarios.

Cable Remediation

For an underground electric-distribution system, age and moisture make buried cable vulnerable to failures and prolonged outages, particularly the commonly installed high molecular weight ("HMW") bare concentric neutral direct-bury cable installed prior to 1965. The cable remediation program primarily remediates the underground residential distribution system that have a trended probability of failure, of which high-molecular weight (HMW) cable type is the worst offender. Cable replacement has an expected life that exceeds 30 years.

Copper Conductor Replacement

The Copper Replacement program is a safety, reliability and resiliency initiative to replace #6 overhead copper (CU) conductor in PSE's primary distribution system. This conductor is old, losing mechanical strength and at a risk of failure.

Wildfire Mitigation

The Wildfire mitigation plan is a reliability and safety initiative to reduce ignition risks associated with electricity delivery and protect critical infrastructure by developing situational awareness, targeted operational response and system hardening. Specific improvements include insulator replacement, non-wood cross-arms and poles, pole wraps, current limiting expulsion-type fuses, FR3-filled service transformers, covered conductors, line detection and enhanced fault detection on circuits designated as having extreme or high burn potential.

Pole Inspection and Replacement

In an overhead electric system, the failure of a utility pole can cause an outage that could affect thousands of customers. To minimize the risk of a large outage, PSE has a pole inspection, treatment, reinforcement and replacement program for both transmission and distribution wood poles.

PSE assesses each wood pole's condition by excavating around the base to determine the extent of below-ground decay and by boring into the pole to assess decay within the pole. The remaining strength of the pole is calculated based on the measurements of decay. Poles with remaining strength that still meets the National Electric Safety Code (NESC) guidelines are treated with an internal fumigant, which extends its serviceable life. Poles not meeting NESC guidelines are scheduled for replacement or reinforcement.

Industry data shows that the average serviceable life of a wood pole in the Pacific Northwest without remedial treatment is 43 years. Poles which have received routine treatment throughout their life last significantly longer. Industry data suggests the average life could be around 100 years.

In addition to the programmatic investment in pole replacement and reinforcement, PSE also replaces poles identified as near failure during the year and in storm restoration efforts which are not included in these numbers.

Substation Reliability

Substations are the key hubs connecting high-voltage power lines and the electric distribution power lines that serve customers. Substations typically serve between 500 and 5,000 customers and contain major pieces of electric system equipment, technology to monitor and operate the system, and backup systems. Substations are inspected monthly and maintenance programs are in place to ensure performance and efficiently maintain expensive equipment.

As PSE continues adding more infrastructure, reliability measures are incorporated into the design. For example, building a substation requires the installation of the transmission and distribution lines; to enhance reliability and operational flexibility, the power lines typically connect to adjacent substations. New substations enable the operational ability to shift customers to the neighboring substations during an outage.

Upgrades to the substations and equipment are important strategies for reliability and overall asset management. Specific types of equipment are proactively replaced under replacement programs to maintain system reliability, reduce operational costs and offset impacts from aging infrastructure.

Substation Maintenance

In addition to the planned replacements, PSE administers planned diagnostics which determines the condition based maintenance in order to improve performance and increase the asset life. The transmission and distribution substation maintenance program utilizes low cost, non-intrusive diagnostic tasks to identify problems that could result in equipment failure. Several diagnostic tests on substation major equipment which help to determine equipment needs are:

- Infrared scans, performed every other year to identify problem areas on the electrified portion of the station

- Dissolved gas analysis in oil to determine overheating or arcing
- Breaker profiling to evaluate the quality of mechanism operation
- SF6 gas testing to determine insulation integrity
- Monthly inspections for a visual evaluation

Depending on diagnostic testing and time since last maintenance the portfolio of planned maintenance is scheduled each year to more thoroughly evaluate the condition and administer maintenance tasks per the manufacturer recommendation. The current substation maintenance program includes maintenance activities for:

- Large substation equipment (transformer, breaker, regulator, etc.), which includes the equipment required by Western Electric Coordinating Council (WECC), per the Transmission Maintenance and Inspection Plan
- Station batteries
- Protective relays, which includes transmission line & transformer relays (required per NERC compliance) and distribution transformer, feeder and line recloser relays
- Transmission automatic switch controllers