

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

**Puget Sound Energy
2020 Service Quality Program and Electric Service Reliability Filing**

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

**Puget Sound Energy
2020
Service Quality and Electric Service Reliability Report**

Filed on March 25, 2021

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CHAPTER 1

INTRODUCTION

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) serves more than 1.1 million electric customers and over 800,000 natural gas customers primarily in the Puget Sound region of Western Washington. PSE meets the energy needs of its customer base 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.

Since early 2020, the COVID-19 pandemic has impacted how PSE ensures its service quality performance and service reliability. COVID-19 has changed some of the ways that PSE does business for the safety of customers and employees, and has resulted in the creation of the Crisis Affected Customer Assistance Program ("CACAP")¹ to assist customers who have lost their jobs or are underemployed due to the pandemic. While changes, impacts, and mitigation for the COVID-19 pandemic and related governmental restrictions are listed throughout the report, detailed discussions about this detrimental unusual event has been included in the *Unusual Event* section.

The report provides PSE's 2020 performance and results for the following areas: Customer Service Guarantee, Restoration Service Guarantees, service quality of PSE and its service providers, and electric service reliability.

For the 2020 Service Quality Reporting year, PSE met 8 of 9 benchmarks for the Service Quality Indices (SQI). Chapter 3 of this report on PSE's electric service reliability provides in-depth details about the System Average Interruption Duration Index (SAIDI) SQI performance results that were not met. The large increase in SAIDI minutes in 2020 was caused primarily by numerous and non-

¹ Dockets UE-200331 and UG-200332, electric and natural gas Schedules 129, Low Income Program

stop weather events in the first weeks of the year. While restoration had been slowed by inaccessible roads, additional damage would occur from subsequent wind and snow as damage was repaired. However, there is no SQI penalty associated with this index.²

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.”³ The SQ Program has been further extended⁴ with various modifications to demonstrate PSE’s continuous commitment to customer protection and quality service.

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. This document explains the SQIs, how they are calculated and PSE’s performance on each of the SQIs for the 2020 reporting year. PSE also provides preliminary SQI results to the UTC, semi-annually.
- **Customer Service Guarantee (CSG)**—The Customer Service Guarantee provides for a \$50 credit when PSE misses an SQI #10 appointment. This appointment 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 guarantee during any storm event and the 24-hour 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.

In addition to these three components, the SQ Program also prescribes reporting requirements for PSE’s primary service providers. Several Service Provider Indices (SPIs) benchmark

² The SQI # 3 SAIDI penalty mechanics has been replaced since 7/30/2016 by PSE’s 24-Hour Restoration Service Guarantee available under PSE’s Schedule 131, Restoration Service Guarantees, where a \$50 credit is applied to customers’ account if they experienced certain prolong outages as prescribed in Schedule 131.

³ Under consolidated Dockets UE-951270 and UE-960195.

⁴ Under Dockets UE-011570 and UG-011571 (consolidated), UE-072300 and UG-072301 (consolidated), and Dockets UE-170033 and UG-170034 (consolidated).

performances in areas of construction standards compliance, reliability/service restoration and kept appointments.

The SQ Program also includes PSE's natural gas emergency response plans for outlying areas, which are filed concurrently with this Report as Attachment B to the annual UTC SQ and Electric Service Reliability filing.

Attachment C to the 2020 annual UTC SQ and Electric Service Reliability Report filing is PSE's 2020 Critical Infrastructure Security Annual Report, which contains a discussion of PSE's cybersecurity and physical security policies and related information for 2020.

SQI and Electric Service Reliability Report

This *Puget Sound Energy 2020 SQ and Electric Service Reliability Report* meets PSE's SQ Program reporting requirements⁵ and the electric service reliability reporting requirements set forth by the UTC.^{6,7} To facilitate external review of PSE's SQ and Electric Service Reliability performance, the two reports were combined starting with the 2010 reporting year.⁸

Overview of Performance

Table 1a summarizes PSE's 2020 SQ and Electric Service Reliability performance, along with relevant service providers' performance metrics and the three service guarantees. PSE met all Service Quality Indices under PSE's Service Quality Program except SQI #3 System Average Interruption Duration Index, SAIDI. However, there is no performance penalty associated with this index. Chapter 3 of this report on PSE's electric service reliability provides further details about SQI SAIDI, other performance results, PSE initiatives and actions to maintain or enhance electric service reliability.

⁵ 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.

⁶ 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.

⁷ Two PSE commitments regarding the preparation of the Electric Service Reliability section, as outlined in Section F, Reporting of Customer Compliant 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.

⁸The 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.

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

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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 | 0.10 | ☑ |
| 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% | ☑ |
| Field service operations transactions customer satisfaction | Service Quality Index #8 | At least 90% satisfied (rating of 5 or higher on a 7-point scale) | 96% | ☑ |
| 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 | 84% | ☑ |
| Operations Services—Appointments | | | | |
| Appointments kept | Service Quality Index #10 | At least 92% of appointments kept | 99% ¹⁰ | ☑ |
| Service provider appointments kept—Quanta Electric | Service Provider Index #3B ¹¹ | At least 92% of appointments kept | 99% | ☑ |
| Service provider appointments kept—Quanta Gas | Service Provider Index #3C | At least 92% of appointments kept | 99% | ☑ |
| Customer Service Guarantee | Service Guarantee #10 | A \$50 credit to customers when PSE fails to meet a scheduled SQI appointment | \$14,200 | -- |

⁹ Benchmark revision per UTC Dockets UE-170033 and UG-170034 Order 08, dated December 5, 2017, for SQI #5 annual performance from 2020 and years after.

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

¹¹ There was no result for Service Provider Indices #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 for Quanta Electric and Quanta Gas, respectively, were applicable in the prior years' reporting had been ended since the 2013 reporting period.

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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 | 32 minutes | <input checked="" type="checkbox"/> |
| Secondary safety response time—Quanta Gas | Service Provider Index #4D | Within 60 minutes from first response assessment completion to second response arrival | 50 | <input checked="" type="checkbox"/> |
| Service provider standards compliance—Quanta Gas | Service Provider Index #1C ¹² | Level 1 ≤ 8 dev/1000 Level 2 ≤ 15 dev/1000 Level 3 ≤ 12 dev/1000 | Level 1 0.70 Level 2 9.94 Level 3 3.32 | <input checked="" type="checkbox"/> |
| Operations Services—Electric | | | | |
| Electric safety response time | Service Quality Index #11 | Average 55 minutes or less from customer call to arrival of field technician | 50 minutes | <input checked="" type="checkbox"/> |
| 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 | 234 minutes | <input checked="" type="checkbox"/> |
| 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 | 253 minutes | <input checked="" type="checkbox"/> |
| Service provider standards compliance—Quanta Electric | Service Provider Index #1B ¹³ | Level 1 ≤ 15 dev/1000 Level 2 ≤ 25 dev/1000 Level 3 ≤ 25 dev/1000 | Level 1 4.30 Level 2 7.11 Level 3 8.88 | <input checked="" type="checkbox"/> |
| 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 | \$450 | -- |
| 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 | \$13,950 | -- |

¹² 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.

¹³ See Footnote 10.

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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 | 1.70 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 | 1.67 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 | 1.24 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 | 1.06 interruptions | -- |
| SAIDI_{Total} Total (all outages current year) Outage Frequency—System Average Interruption Duration Index (SAIDI) | Reliability | Outage minutes per customer per year, including all types of outage event | 414 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 | 454 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 | 220 minutes | -- |
| SAIDI_{IEEE} IEEE Non-Major-Storm (T _{MED}) SAIDI | Reliability | Outage minutes per customer per year, excluding days exceeding the T _{MED} threshold | 171 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 | 165 minutes | <input checked="" type="checkbox"/> |

Detailed SQI 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, certify 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-011571¹⁴.
 - **Appendix C: Penalty Calculation**—This appendix shows penalty calculations and allocation if PSE incurs any SQI penalty. For the 2020 reporting year, PSE met all the performance benchmarks with potential penalty assessment, therefore PSE did not incur any penalty associated with its service quality index performance.
 - **Appendix D: Proposed Customer Notice (Report Card)**—This appendix presents PSE’s proposed 2020 customer service performance report. The Customer Service Performance 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.

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.

¹⁴ 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)

- **Appendix K: Current Year Electric Service Outage by Cause by Area**—This appendix details the 2020 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 2020 proposed projects and vegetation-management mileage.
- **Appendix P: Reliability Program Category Descriptions**— This appendix provides reliability program work completed in 2020 and planned for 2021 by category along with descriptions for each category.

Customer Notice of SQI Performance

Appendix D: Proposed Customer Notice (Report Card) is the proposed draft customer notice of PSE’s 2020 SQI performance. After consultation with the UTC staff and Public Counsel, PSE will begin distributing the final SQI report card by June 23, 2021, as part of the customer billing package.

Data and Reporting Issues

There was no data gathering or reporting difficulty in 2020 that impacted the SQI performance categories, or their results. PSE has altered its data gathering procedures and reporting source resulting from a transition to a mobile workforce platform (see further details in the *Continuing to Improve Customer Experience* section below). The transition for PSE Gas First Responders (GFR) took place on July 13, 2020. New reporting processes have been established and validated to ensure that data is captured correctly, and consistently, with legacy procedures. Data and reporting source changes have no effect on the performance results for SQI #7 Gas safety response time and to the GFR’s ability to meet requirements of SQI #10 Kept appointments.

Unusual Event

As a provider of an essential service, PSE has been working to support employees, customers and communities as the COVID-19 pandemic and related governmental restrictions¹⁵ impact the region (Unusual Event). The following are new measures that were put in place in 2020:

- PSE has worked with customers by providing options such as payment plans and choosing a new bill due date.
- PSE has not disconnected customers for non-payment during the pandemic.
- PSE received approval from the UTC for a waiver that allows for suspension of late fees.
- PSE has an energy assistance portal to facilitate access to funds available to income qualified customers.
- PSE received approval from the UTC to implement the Crisis Affected Customer Assistance Program to assist customers who have lost their jobs or are underemployed due to the COVID-19 pandemic. PSE was able to assist more than 15,000 customers, providing over \$8.7M in bill assistance through the CACAP.

To limit exposure and help our community get through the coronavirus situation safely, following are the measures PSE has taken specifically for its employees and facilities:

- PSE has limited access to facilities that provide emergency/critical operations.
- PSE has asked employees to postpone all non-essential domestic and international airline business travel.
- Non-essential events and meetings, both within PSE and in the public, have been postponed.
- PSE is requiring all staff, who can work from home, to do so until further notice.
- PSE has increased sanitation services at public spaces within its facilities.

In addition to the above measures, during 2020, PSE has also adopted its day-to-day operations and emergency response procedures for the safety of customers and employees. The following sections describe the impact of this Unusual Event for the COVID-19 pandemic and related governmental restrictions on PSE's operations for emergency response, construction services, and customer service.

Emergency Response

During the course of this Unusual Event, PSE has continued its traditional essential services, and responds to electric and natural gas emergencies promptly and safely. PSE continues to adapt to the evolving guidelines from the CDC and 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:

- Require pre-shift screenings
- Maintain social distancing

¹⁵ Proclamations by Washington State Governor Inslee: 20-05, 20-25, 20-25.1, 20-25.2, 20-25.3, and 20-25.4

- Require use of N95 masks when inside customers' homes
- Require washing/sanitizing of hands often

These procedures take extra time for emergency responders before and after every job. During the pandemic, PSE has to frequently and quickly move emergency responders to meet the needs of other areas where responders were in quarantine due to a possible exposure. Resource availability has been uncertain as a result of potential infections. Safety protocols, such as daily health screening prior to shifts, were implemented to prevent outbreaks that would inhibit PSE's ability to have the necessary qualified resources to respond to emergencies.

Emergency response time is comprised of two components; dispatch time and on-site time. The time to dispatch an emergency was unaffected by the COVID-19 pandemic and related governmental restrictions. On-site times are predominately a result of the drive time needed to get a qualified resource to the location of the emergency. Though this can be impacted by resource levels, i.e. longer drive distances, it is also affected by traffic levels. The "Stay Home – Stay Healthy" proclamation, governmental restrictions, a shift to work-from-home, and remote learning had a positive effect on traffic levels; therefore, the resulting drive time was less than typical for much of 2020. This positive effect is expected to diminish as the state and the county recovers from the COVID-19 pandemic.

Construction Services

Construction of an essential facility, as defined by Washington Governor Inslee, continues forward during the Unusual Event. However, construction site activities of new line and service connections to homes and businesses, which are deemed as non-essential services were on hold in response to Washington Governor Inslee's March 23, 2020 proclamation "Stay Home – Stay Healthy". Prior to resuming these non-essential construction services on May 4, 2020, PSE employees worked from home to advance construction projects, but did not conduct site visits or construction efforts until the end of the proclamation period.

For construction, PSE has observed the following protocols:

- Practicing social distancing in the field by deploying sandwich boards on work sites.
- Encouraging the public to keep their distance from crews and increased distance between field staff.
- Adjusting our practices for planned outages to minimize impact to residential customers and neighborhoods, as customers are now working from home and students are continuing their education virtually.
- Increased sanitization of work vehicles and facilities that field staff utilize.

Customer Service

During the course of this Unusual Event, PSE has halted credit disconnections, beginning in March of 2020, due to the pandemic, and has likewise offered customer assistance through CACAP funding. Both of these points had an impact on call volumes and talk times within customer care. 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.

Since the start of this Unusual Event, PSE has been experiencing delays due to the impact of the pandemic and related restrictions on our supply chain and workforce. Overall, PSE has constructed less new services.

Through PSE's Get to Zero initiative, PSE has implemented many technology and business process changes to mitigate the impact of this Unusual Event.

Continuing to Improve Customer Experience

Get to Zero

PSE is nearing completion of a long-term initiative called Get to Zero. PSE's goal for the technology and business processes, advanced by the Get to Zero initiative, is to anticipate customer needs and provide solutions to address them. The Get to Zero initiative targets further improvement in customer experience with PSE by providing more self-service options that customers have requested. PSE has developed new ways to proactively communicate with customers and create seamless, integrated operations to tie business processes together. Key highlights completed within 2020 include:

- **Web and Mobile App 3.0** — This functionality included the following changes:
 - added push notifications to PSE app (currently includes functionalities for bills due and power out and power restored)
 - improved account security, by replacing security questions with email verification
 - enhanced paperless billing enrollment status information to include bill consolidators
 - expanded budget billing enrollment options
 - improved usability of start/stop/move self-service and confirmation messaging
 - optimized display of payment and account information
 - added option for a digital welcome packet if customers prefer not to receive paper
 - improved website homepage navigation for residential and business customers
 - improved account selector for customers with multiple contract accounts, so that closed accounts are no longer displayed and customers have the option to pay “all accounts”
 - enhanced the Customer Notification Portal used by PSE Customer Care agents to display based on a time-stamp
 - enabled PSE.com campaign management and session unification to improve customer communications and website analytics
- **Meter Analytics Solution** — The Meter Analytics Solution (MAS) provides an in-house solution that makes meter data accessible for analytics through the Platform of Insights. MAS supports examining meter usage trends, and helps PSE identify meter failures and energy theft through algorithms that run daily. It also creates a foundation for future meter analytics use cases.
- **Meter Upgrade Enhancement** — Remote Connect/Disconnect (RCD) Phase 2 capability allows for remote connect/disconnect for customers due to non-payment for residential electric AML meters. This includes updates to days/times/volumes of disconnects that are

allowed per the UTC AMI ruling¹⁶, as well as a two-tiered fee structure so that remote commands have a fee of \$0. The project also implemented additional dunning notices to customers to ensure a clear understanding of the RCD process flows for non-payment. The 'Storm Mode' functionality was enhanced so that PSE can quickly disable all remote commands in times of inclement weather or other emergency situations. These enhancements allow PSE to more efficiently take care of customers in dunning and automate processes to ensure a near real time reconnect when a payment is made.

- **Payment Platform Replacement** — PSE implemented a new payment platform which offers customers new ways to pay, and posts all payments to the accounts in real time. Real time payment posting ensures that customers who are in the dunning process can pay anytime online and their payment is reflected in their PSE account immediately, as opposed to waiting 1-3 business days. Moreover, the customer experience has been enhanced for making payment through the web, a mobile device, or PSE's 1-888-Call-PSE IVR, V-IVR¹⁷ and agent. Key improvements include auto-pay with credit/debit card and recurring Warm Home Fund donation capability. New ways to pay include PayPal, and in the future, Venmo. Customers can pay as a registered user or a guest on all channels. This functionality reduces the need for customer calls related to payments and increases efficiency in managing the overall payment experience.
- **Transitioning to a Mobile Workforce** – Gas First Response, Industrial Meter Operations and Energy Measurement were transitioned to new mobile tools, allowing them to consolidate existing tools, and move from paper processes to digital forms. This increases the efficiency of field employees and reduces the need for paperwork to be completed within the office.
- **Operational Efficiencies for Workforce Optimization, Scheduling and Customer Appointments** – PSE implemented new work management functionality in order to optimize Gas First Response, Industrial Meter Operations and Energy Measurement field employee schedules for tighter customer appointment timeframes, work priority, and drive time reduction.

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

- PSE completed the follow additional technical development work in 2020 to meet customer needs:
 - Suspended collection of reconnection and late payment fees in the billing system
 - Suspended deposit requirement for customers creating new accounts
 - Extended payment arrangement durations from 6 months to 12 months
 - Created and maintained customer-facing COVID-19 informational pages on PSE.com and the PSE app
 - Suspended PSE.com and PSE App display of dunning/disconnect activities

¹⁶ Advanced Meter Infrastructure Rulemaking, Docket U-180525

¹⁷ Interactive Voice Response (IVR) system and visual Interactive Voice Response (V-IVR) system

- Suspended disconnect activities for non-payment in March of 2020, and disabled the functionality for the remainder of the year
- Set all remote or manual disconnect fees and reconnect fees to \$0 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
- Extended payment arrangements for 12 months in 2020, which required a change in how auto-pay customers are processed

Service Quality Program Changes

There were no SQ Program changes for 2020.



CHAPTER 2

CUSTOMER SERVICES, CUSTOMER SATISFACTION, AND OPERATIONS SERVICES

PSE has been meeting the Puget Sound region’s energy needs for more than 145 years. PSE proudly embraces the responsibility of providing customers with safe, reliable, and reasonably-priced energy service.

This section summarizes the 2020 results of PSE’s seven service quality indices (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 2020

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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 | 0.10 | <input checked="" type="checkbox"/> |

Overview

Each year the WUTC receives complaints from PSE customers on a variety of topics. In 2020, there were a total of 207 complaints, down from 326 in 2019. The 2019 SQI #2 complaint ratio was 0.16, while the 2020 complaint ratio is 0.10.

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 2020 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.

Impact of Unusual Event on SQI #2

Due to the impact of the COVID-19 pandemic, the WUTC placed a moratorium on disconnects, late payment fees and deposits¹⁸. As a result, PSE received fewer disconnect and deposit complaints in 2020. Please see the *Unusual Event* section for further details.

¹⁸ 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 at least until after April 30, 2021.

Customer Access Center Answering Performance (SQI #5)

Table 2b: Customer Access Center Answering Performance for 2020

| Key Measurement | Benchmark | 2020 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 | 84% | <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 2020, the CSRs answered 84 percent of the calls within 60 seconds of customer requests.

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. Among the 2.2 million calls PSE received during 2020, 2% of the calls were abandoned by customers. All the 2.2 million 1-888-Call-PSE calls received went through either the main phone system or the overflow phone backup system except 60 busy calls. These calls occurred on November 3, 2020 and were caused by a toll free number failure of PSE’s telecommunication vendor, CenturyLink. PSE’s phone system used in the Customer Care Center did not experience

any issues and the call volumes on November 3, 2020 were below the capacity that PSE's phone system can handle at the time of the calls.

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 2021, PSE will continue to build on the technology platforms enabled by PSE's Get to Zero initiative:

- Personalizing the customer experience on our website presenting relevant self-service options and actionable information
- Continue to improve our 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
- Continue to build new functionality on top of the Platform of Insights and in our Meter Analytics Solution, including: leveraging AMI interval data for load disaggregation and system planning
- Models were added to the Platform of Insights to identify customers in need of financial support, and who are likely to participate in renewables and energy efficiency programs

Impact of Unusual Event on SQI #5

As discussed in the Unusual Event section, during much of last year, PSE limited field work to emergency calls only, and while there were less calls due to disconnections, there were calls driven to the PSE call center for clarity around the CACAP funding.

Customer Access Center Transactions Customer Satisfaction (SQI #6)

Table 2c: Customer Access Center Transactions Customer Satisfaction for 2020

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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 Program¹⁹, conducted telephone surveys with PSE customers and prepared monthly and semi-annual reports on customer satisfaction regarding Customer Access Center transactions during the 2020 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 an increase of 2% from 2019.

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 to be 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:

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

¹⁹ 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.

Impact of Unusual Event on SQI #6

- As discussed in the *Unusual Event* section, during much of last year, PSE limited field work to emergency calls only, and then set safety protocols for emergency response. As the COVID-19 pandemic concerns lightened up, PSE began increasing work to include customer light-ups and turn-ons. In late fall, PSE began taking customer service calls. These actions did not seem to have an impact upon our level of customer satisfaction, as our survey increased from 92% to 94% overall satisfaction.

Gas Safety Response Time (SQI #7)

Table 2d: Gas Safety Response Time for 2020

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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 | 32 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 2020, PSE responded to more than 21,000 emergency calls concerning natural gas safety. 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 various natural gas system maintenance and inspection activities, adjusts and performs minor repairs on customer equipment and monitors 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. The *Unusual Event* section explains the impact of the COVID-19 pandemic and related governmental restrictions on PSE’s emergency operations. The *Impact of Unusual Event on SQI #8* section below elucidates the specific impact on SQI #8.

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. With the implementation of Integrated Work Management (IWM) for Gas First Response in July of 2020, the focus is to gain proficiency of our new tools to support greater efficiency and improved customer experience. The continued emphasis is on greater integration and streamlining across the work lifecycle, optimization of work scheduling, and facilitating real time updates to and from the field through mobile workforce tools.

Impact of Unusual Event on SQI #7

As discussed in the *Unusual Event* section, during much of last year, PSE limited field work to emergency calls only. Natural gas first responders, whose tasks often involved a visit inside a customer's house to relight/inspect/repair natural gas equipment, have taken on additional risk of COVID-19 transmission while customers face the same risk. The procedures took extra time for first responders before and after every job. There were no significant impacts to SQI #7 performance as a result of the pandemic.

Field Service Operations Transactions Customer Satisfaction (SQI #8)

Table 2e: Field Service Operations Transactions Customer Satisfaction for 2020

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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) | 96% | <input checked="" type="checkbox"/> |

Overview

EMC Research²⁰, an independent research company, conducts telephone surveys with PSE customers who have requested and received natural gas field service. In 2020, these surveys found that 96% 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 to be “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:

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

²⁰ 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

- As noted last year, Integrated Work Management System (IWM) replaced the old system for scheduling daily work in spring of 2020. It is an automated system that optimizes workflow, creating a more streamlined method for assigning work. This program will increase customer satisfaction through transparency in the status of customer service calls such as information on arrival time, guaranteed appointment windows, and almost real-time feedback. PSE will continue to work with the system in 2021 to increase efficiencies for customers.

Impact of Unusual Event on SQI #8

- As discussed in the *Unusual Event* section, during much of last year, PSE limited field work to emergency calls only. Natural gas first responders, whose tasks often involved a visit inside a customer's house to relight/inspect/repair natural gas equipment, have taken on additional risk of COVID-19 transmission while customers face the same risk. The procedures took extra time for first responders before and after every job. There were no significant impacts to SQI #8 performance as a result of the pandemic.

Appointments Kept (SQI #10)

Table 2f: Appointments Kept for 2020

| Key Measurement | Type of Metric | Benchmark/Description | 2020 Performance Results | Achieved |
|---------------------|---------------------------|-----------------------------------|--------------------------|-------------------------------------|
| Operations Services | | | | |
| Appointments kept | Service Quality Index #10 | At least 92% of appointments kept | 99% ²¹ | <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 2020, PSE achieved a result of 99% for this appointments kept metric. 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*.

²¹ Results shown are rounded from 99.7% to the nearest whole percentage per UTC order. However, the 100% 2020 annual performance result does not reflect that PSE and its service providers met all the appointments during the reporting period. Numbers of missed appointments by appointment type are 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 Event²² 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

- Continue to review the reasons for missed appointments and work to find solutions so that PSE can meet all its customer commitments
- Continue to evaluate tools and technologies that would enable a higher level of customer service and convenience through PSE’s Get to Zero initiative by offering better ways for self-service options, including scheduling of field services

²² 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, which are excluded from the performance calculations of SQI #4-SAIFI and SQI #11- Electric safety response time.

Impact of Unusual Event on SQI #10

Overall, the total number of SQI #10 appointments decreased drastically in 2020: There were 91,536 SQI #10 appointments in 2019 but only 37,773 in 2020. As discussed in the Unusual Event section, PSE limited field work for essential services for part of the year. Therefore, there were less natural gas equipment related appointments as well as new permanent construction service appointments. In addition, PSE has halted disconnections due to non-payment per the WUTC moratorium on disconnects. As a result, PSE received fewer electric and natural reconnect requests. These reductions did not seem to affect the SQI #10 Kept appointments results.

Electric Safety Response Time (SQI #11)

Table 2g: Electric Safety Response Time for 2020

| Key Measurement | Type of Metric | Benchmark/Description | 2020 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 | 51 minutes | <input checked="" type="checkbox"/> |

Overview

PSE responded to more than 13,000 electric incidents in 2020. PSE’s Electric First Response (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.

The *Unusual Event* section explains the impact of the COVID-19 pandemic and related governmental restrictions on PSE’s emergency operations.

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:

- 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.
- 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 and response.
- The ongoing deployment of PSE's 'Advanced Metering Infrastructure' over the next several years will improve customer outage confirmation capability.

Impact of Unusual Event on SQI #11

PSE responded quickly to the COVID-19 pandemic to ensure electric first response capabilities. As a result, EFR had very low COVID-19 incident cases (potential and confirmed exposures) in 2020. EFR availability has been uncertain due to safety protocols to prevent potential infections. As discussed in the *Unusual Event* section, PSE has noticed a reduction in the traffic time component of the SQI #11 response time, however it did not seem to have a big effect on the overall SQI #11 performance.

Service Provider Performance

Table 2h: Service Provider Performance for 2020

| Key Measurement | Type of Metric | Benchmark/Description | 2020 Performance Results | Achieved |
|--|--|--|--|-------------------------------------|
| Customer Services and Satisfaction and Operations Services | | | | |
| Service provider standards compliance—Quanta Electric | Service Provider Index #1B ²³ | Level 1 ≤ 15 dev/1000 Level 2 ≤ 20 dev/1000 Level 3 ≤ 20 dev/1000 | Level 1 4.30 Level 2 7.11 Level 3 8.88 | <input checked="" type="checkbox"/> |
| Service provider standards compliance—Quanta Gas | Service Provider Index #1C ²⁴ | Level 1 ≤ 8 dev/1000 Level 2 ≤ 15 dev/1000 Level 3 ≤ 12 dev/1000 | Level 1 0.70 Level 2 9.94 Level 3 2.21 | <input checked="" type="checkbox"/> |
| Service provider appointments kept—Quanta Electric | Service Provider Index #3B ²⁵ | 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 | 99% | <input checked="" type="checkbox"/> |
| Secondary safety response time—Quanta Gas | Service Provider Index #4D | Within 60 minutes from first response assessment completion to second response arrival | 50 minutes | <input checked="" type="checkbox"/> |
| 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 | 234 minutes | <input checked="" type="checkbox"/> |
| 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 | 253 minutes | <input checked="" type="checkbox"/> |

²³ 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.

²⁴ See Footnote 17.

²⁵ There were no results for Service Provider Indices (SPI) #1A, #2A, #3A and #4A. These indices were assigned to a service provider, Pilchuck that 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.

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.

The *Unusual Event* section explains the impact of the COVID-19 pandemic and related governmental restrictions on PSE's construction services. The *Impact of Unusual Event on Service Provider Performance* section below indicates the specific impact on service provider performance.

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.

These 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 2020

| Service Provider Appointments²⁶ | | | | Missed Appointment Penalties | | |
|---|-----------------|--------------------|---------------|-------------------------------------|--------------------|----------------|
| Service Provider | Electric | Natural Gas | Total | Electric | Natural Gas | Total |
| Quanta Gas | N/A | 8,022 | 8,022 | N/A | \$3,150 | \$3,150 |
| Quanta Electric | 7,854 | N/A | 7,854 | \$5,050 | N/A | \$5,050 |
| Total | 7,854 | 8,022 | 15,876 | \$5,050 | \$5,050 | \$8,200 |

Going Forward

- Identify areas of improvement to meet core-hour benchmark of 250 minutes
- Partner with large municipalities to improve the permitting process
- Identify and implement improvements to customer scheduling for new construction

Impact of Unusual Event on Service Provider Performance

PSE engaged early with the builder community and its service providers to keep them informed about the changing processes to mitigate the impact of COVID-19 pandemic and related

²⁶ 416 Excused appointments (176 electric and 240 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.

governmental restrictions. PSE shared its COVID-19 safety plans for service providers and PSE employees in the field with the builder community on May 4, 2020. The safety measures and the Unusual Event did not seem to have any significant impact on service provider performance.

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 newsletter²⁷ 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 Storms, 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*.

²⁷ SQI settlement requirement: "A promotion of the customer service guarantee will be included in the customer newsletter, "EnergyWise," 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 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.

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.

2020 Service Guarantee Credits

Customer Service Guarantee Credits

In 2020, PSE credited customers a total of \$14,200 for missing 297 of the 37,773 Customer Service Guarantee applicable appointments (i.e., SQI #10 appointments). While there were less applicable appointments but the number of Customer Service Guarantee Credits paid to customers is about the same. In 2019 PSE SE credited customers a total of \$14,850 for missing 297 of the 91,536 SQI #10 appointments.

Table 2j provides summary values of Service Guarantee counts and payments to customers in 2020 by service type.

Table 2j: 2020 PSE SQI #10 Appointment Count and Customer Service Guarantee Credits

| Service Type | SQI #10 Appointment Counts ²⁸ | | | Customer Service Guarantee Payments to Customers | | |
|-------------------|--|---------------|---------------|--|----------------|-----------------|
| | Electric | Natural Gas | Total | Electric | Natural Gas | Total |
| Permanent Service | 7,854 | 8,022 | 15,876 | \$5,050 | \$3,150 | \$8,200 |
| Reconnection | 8,917 | 5,272 | 14,189 | \$1,300 | \$2,300 | \$3,600 |
| Diagnostic | N/A | 7,708 | 7,708 | N/A | \$2,400 | \$2,400 |
| Total | 16,771 | 21,002 | 37,773 | \$6,350 | \$7,850 | \$14,200 |

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, 2020.

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. The following table summarizes payments to customers in 2020.

| 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 | 9 | \$450 |
| 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 | 279 | \$13,950 |
| Total | | | 288 | \$14,400 |

²⁸ 416 Excused appointments (176 electric and 240 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.



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. To continually improve and provide reliable electric service and modernize the electric grid throughout its service area, PSE uses a three prong balanced approach to deliver a Reliable, Resilient, Smart and Flexible grid. This report focuses on the reliability component of PSE's grid modernization vision of the future. The lower left corner of the triangle in **Figure 3a** identifies how the information in this report fits into that vision.

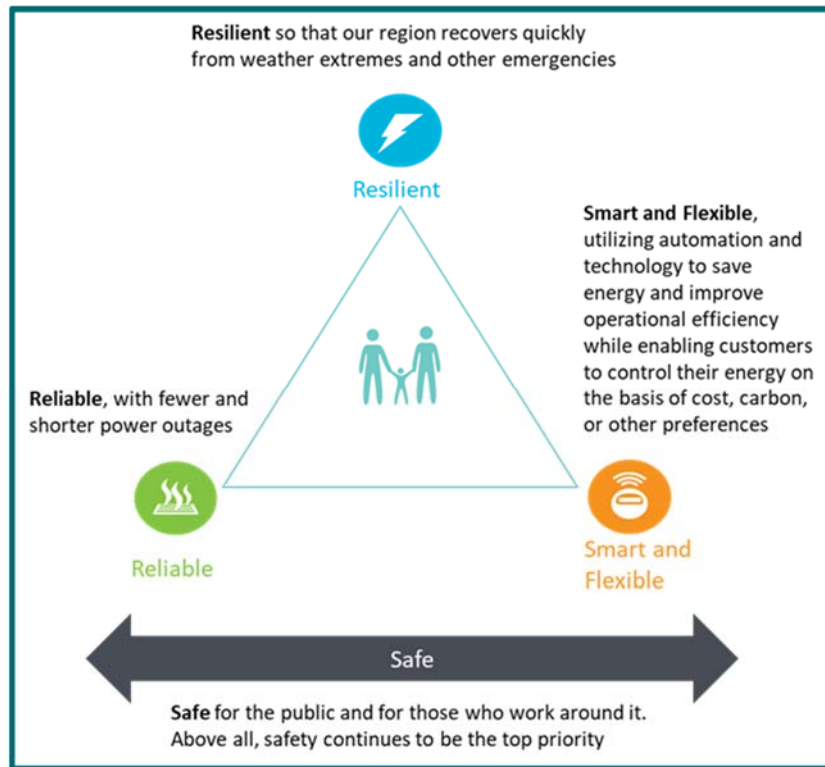


Figure 3a: PSE's grid modernization vision

This executive summary provides an overview of the analysis in the report while the following sections reflect the organization of information as outlined in PSE's Monitoring Plan²⁹. **Appendices H – O** satisfy the requirements of the Monitoring Plan, while additional appendices following Appendix O provide further details referenced throughout the rest of the report.

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). Those, along with Customers Experiencing Multiple Interruptions (CEMI) and customer complaints are used to measure changes in reliability at PSE and are described in this report. Though imperfect, these metrics can show the progress of PSE's electric system reliability over a period of years.

Both SAIDI and SAIFI generally vary greatly from year to year due to a number of factors, primarily differences in weather. The reliability of the electric system in 2020 saw large increases in SAIDI and SAIFI primarily due to the weather in early January. The result was an increase in SAIDI to 165 and in SAIFI to 1.24.

²⁹ Docket UE-110060

Summary of Current SQI #3 SAIDI Performance

In 2020, SAIDI for PSE was 165 minutes compared to a target for SAIDI of 155 minutes. **Figure 3b** shows the SAIDI results starting from 2014 when PSE’s Outage Management System (OMS) went operational.³⁰

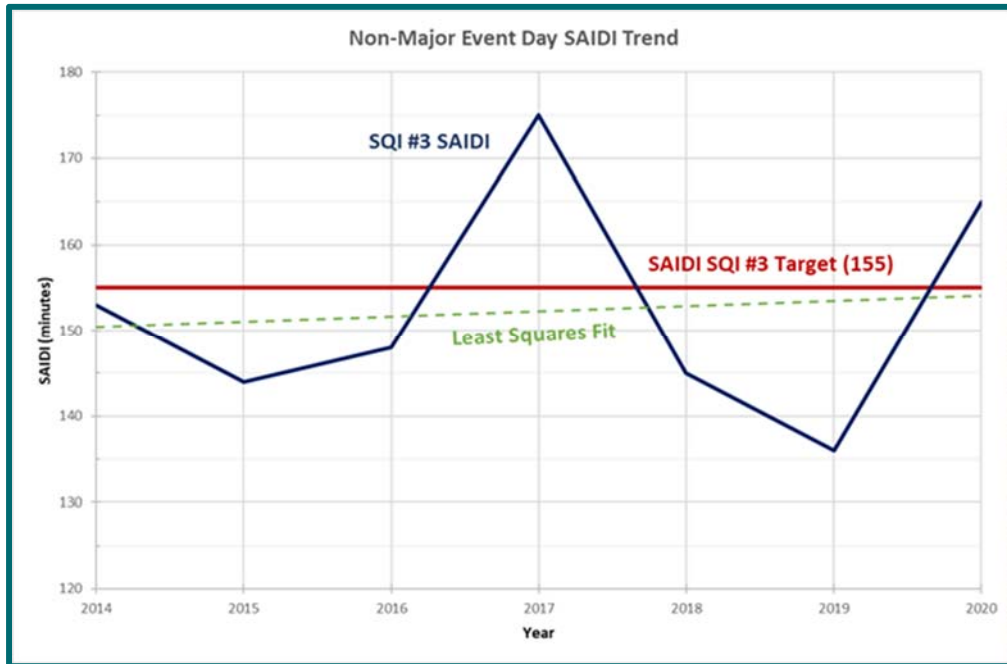


Figure 3b: Trend in Non-Major Event Day SAIDI

Figure 3b shows the great volatility in results from year to year and 2020 had the greatest change from the previous year in recent history. The majority of this volatility is typically due to the number and severity of weather events (wind, heavy snow...etc.) that do not qualify as Major Event Days (MED) but have a significant impact nonetheless. The weather in early January of 2020 was an extreme example of this as strong winds and heavy snow caused wide-spread interruptions over multiple days. Restoration was slowed by inaccessible roads and, in one case, closure of Highway 2 for several days blocking any access to repair damage in the Skykomish area. As damage was repaired, additional damage would occur from subsequent wind and snow resulting in the first 14 days of the year causing 16% of the year’s total non-MED SAIDI. Had the days in this 2 week span been the same as any previous year going back to 2014, the SAIDI for 2020 would have been below the benchmark and the least squares fit trend line would show decreasing SAIDI over time.

³⁰ The primary driver for the decline in SAIDI performance for 2017 was the higher than average tree related outages impacting customers in Whatcom, Skagit and Island Counties.

Figure 3c shows the outsized influence the weather in January had on SAIDI relative to the rest of the year.

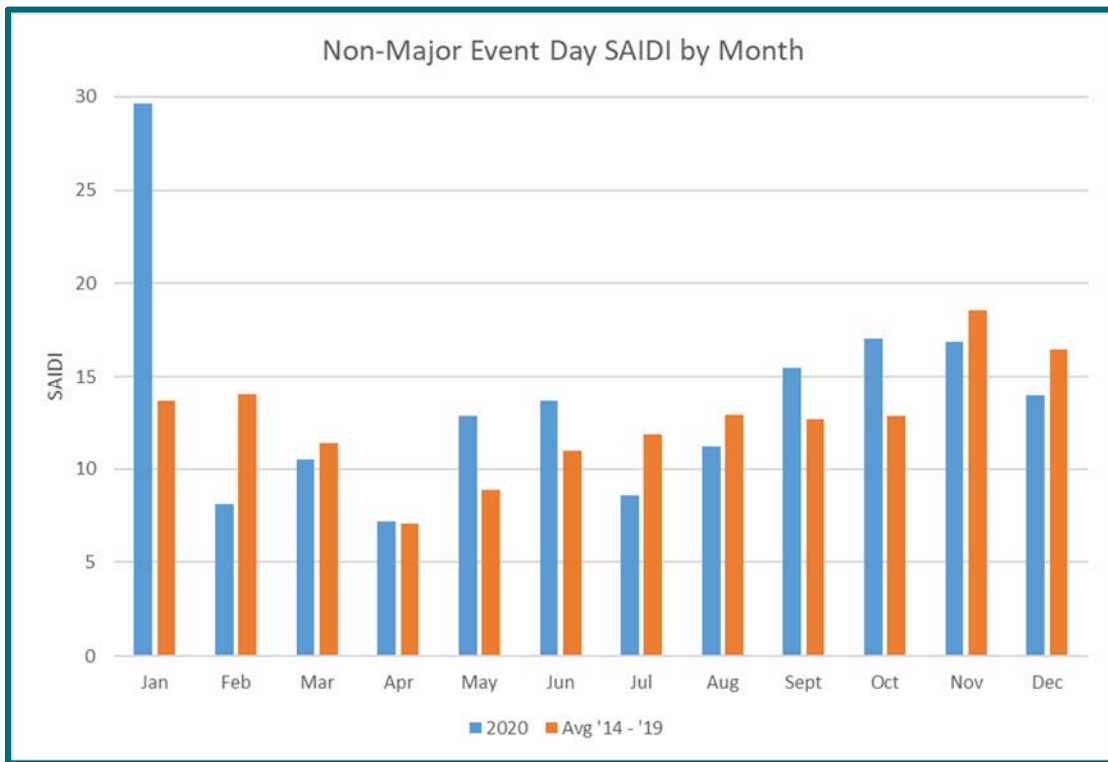


Figure 3c: Impact of early January weather on 2020 SAIDI results

Summary of Current SQI #4 SAIFI Performance

In 2020, SAIFI was 1.24 interruptions compared to a target for SAIFI of 1.30 interruptions. **Figure 3d** shows how the results from 2020 compare with historical values.³¹

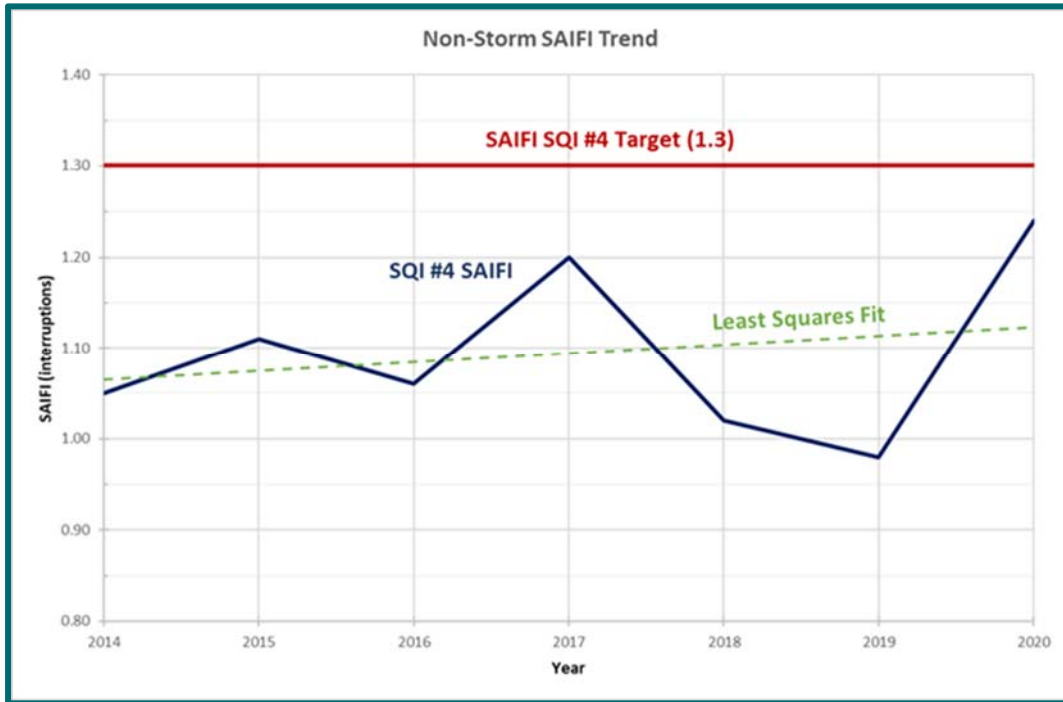


Figure 3d: Trend in Non-Storm SAIFI

Figure 3d shows that, as was the case for SAIDI, SAIFI increased in 2020 compared to previous years. While not perfectly correlated, SAIDI and SAIFI typically follow the same trend. The issues that caused an increase in SAIDI in 2020 also caused an increase in SAIFI. Though 2020 saw the greatest increase in SAIFI in the last six years, it remained below the 1.30 target.

³¹ The primary driver for the decline in SAIFI performance for 2017 was the higher than average tree related outages impacting customers in Whatcom, Skagit and Island Counties.

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 3e** shows results for years 2018 through 2020.

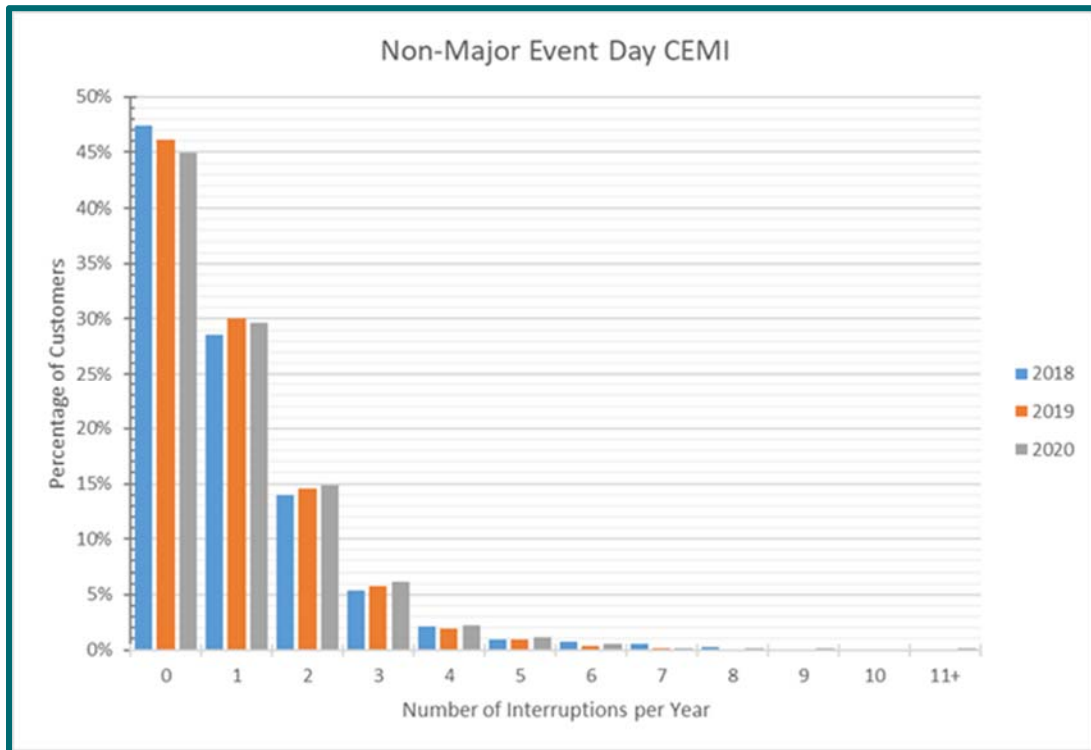


Figure 3e: 2018 through 2020 Non-Major Event Day CEMI results

Drawing conclusions about reliability performance is difficult using CEMI. In general, PSE wants to reduce the percentage of customers experiencing a high frequency of interruptions although that will result in an increase in the percentage of customers experiencing a lower frequency of interruptions as customers are moved from a higher frequency category to a lower one. The results for 2020 show a slight shift toward a higher percentage of customers in the higher frequency categories compared to 2019, as would be expected given that SAIDI and SAIFI increased. However, this information is more useful for PSE in identifying specific customers experiencing poor reliability that might not be seen in system-wide or circuit level metrics than it is in comparing system-wide results between specific years.

Summary of Customer Complaints

In 2020 PSE counted a total of 31 reliability complaints; 13 via the Washington Utilities and Transportation Commission (WUTC) and 18 via directly contacting PSE. **Figure 3f** shows how the results from 2020 compare to previous years.³² Note that customers may have submitted a complaint with both PSE and the WUTC.



Figure 3f: Trend in Customer Complaints

Though SAIDI and SAIFI saw large increases in 2020, the number of customer complaints decreased. This continues the multi-year trend in decreasing customer complaints related to reliability shown in **Figure 3f**. Note that the number of complaints is very small compared to the number of PSE customers (0.003%). Because the number of complaints is so small and because relatively large changes in the number of complaints can occur depending on where and when storms occur, changes in complaints are not well correlated to SAIDI or SAIFI. As with CEMI, this information is most useful for PSE as a tool to identify customers with reliability concerns that might not be seen in a system-wide or circuit level metric analysis.

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.

Summary of Plan Moving Forward

Relative to previous years, 2020 was an anomaly with respect to SAIDI and SAIFI. Due to stormy weather in early January, the trend of improving reliability appears to have slowed. However, the proven cost effective processes and policies PSE has implemented over time, combined with the feedback mechanisms PSE has developed and implemented to continuously monitor and improve reliability, will continue to drive improvement in long term reliability performance.

In addition to continuing to implement well-established electric system improvements such as cable replacement, treewire and distribution automation, PSE will continue to identify and evaluate new reliability improving technologies such as transmission line automatic switching, single phase reclosers and fault locating technologies. Through PSE's budget optimization process, specific reliability projects will continue to be chosen for implementation that maximize value for customers.

PSE's processes for evaluating, designing and implementing reliability improvements are intended to reduce SAIDI over the next 10 years. With increasing electric vehicle and distributed energy resource adoption, along with more people working from home, PSE expects customers to likely demand better reliability over time. Continuing to invest in grid modernization will help to meet future customer expectations for reliability as well as maximize customer benefit from wider adoption of these technologies as they mature.

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 events that cause interruptions to a significant portion of their customer base due to extreme weather or unusual events.

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

The 2020 results based on the recorded outages are reported in **Table 3a**.

Table 3a: 2020 SAIDI Results

| | Key Measurement | Benchmark | Baseline | Current Year Results | Achieved |
|---------------------------------------|--|--|----------|----------------------|-------------------------------------|
| SAIDI _{Total} | Total (all outages current year) Outage Frequency–System Average Interruption Duration Index (SAIDI) | n/a | 532 | 414 | -- |
| SAIDI _{Total 5-year Average} | Total (all outages five-year average) SAIDI | n/a | 326 | 454 | -- |
| SAIDI _{5%} | <5% Non-Major-Storm (<5% customers affected) SAIDI | n/a | 132 | 220 | -- |
| SAIDI _{IEEE} | IEEE Non-Major-Storm (T _{MED}) SAIDI | n/a | 107 | 171 | -- |
| SAIDI _{SQI-3} | IEEE Non-Major Storm (T _{MEDADJ}) SAIDI | No more than 155 minutes per customer per year | n/a | 165 | <input checked="" type="checkbox"/> |

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 3g** illustrates the impact of tree-related outages, accounting for the majority of customer minutes, across the SAIDI_{Total} and SAIDI_{SQI-3} measurements.

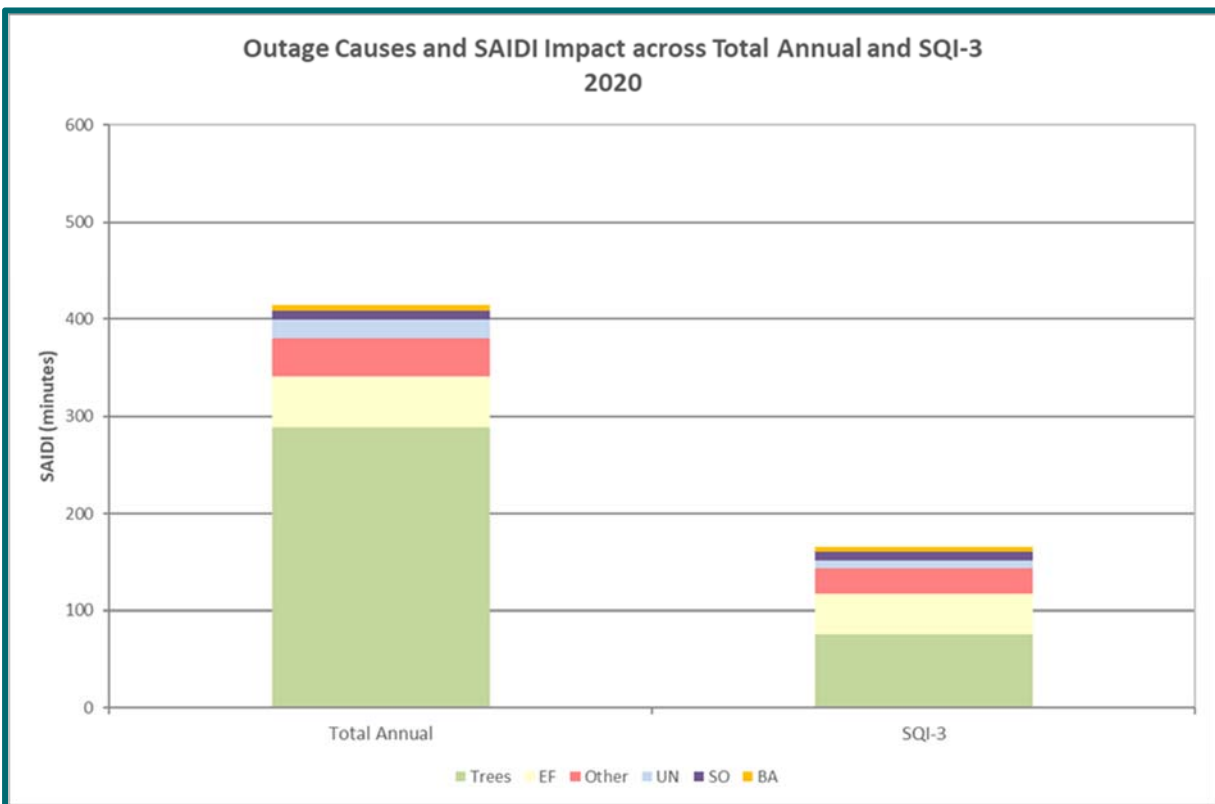


Figure 3g: Outage Causes and SAIDI Impact across Total Annual and SQI-3 in 2020

Despite PSE’s best efforts to minimize tree-related outages, these outages can greatly influence SAIDI performance. Falling trees can damage the infrastructure and require a specialized tree removal crew to remove fallen trees 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 (EF), unknown (UN) and the other (Other) cause category. 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

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

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 pole, padmounted switch, guy wire, etc.) and errors in operating the electric system.

Historical Trends for SAIDI

Table 3b shows the SQI SAIDI from 2016 to 2020.

Table 3b: SQI SAIDI from 2016 to 2020

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----------------------|--|------------|------------|------------|------------|
| SAIDI (SQI #3) | 148 | 175 | 145 | 136 | 165 |
| Benchmark | 155 minutes per customer per year, Non-Major Event Days | | | | |

SAIDI results vary widely from year to year. The large increase in SAIDI in 2020, primarily caused by stormy weather in early January, distorts the multi-year trend somewhat. However, while the SAIDI benchmark was missed in 2020, the 5 year SAIDI least squares fit trend shows a slight downward slope indicating that SAIDI is generally trending below the benchmark.

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**.

Impact of Unusual Event on SQI SAIDI

The impacts of the COVID-19 pandemic on reliability are not clear. Disruptions to working environments from distancing and quarantine requirements and recommendations as well as delays from permitting agencies may have had some effect, but their impact on reliability cannot be measured.

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 interruption 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 2020 results based on the recorded interruptions are reported in **Table 3c**.

Table 3c: 2020 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 | 1.70 | -- |
| SAIFI_{Total 5-year Average} | Total (all outages five-year average) SAIFI | n/a | 1.37 | 1.67 | -- |
| SAIFI_{5%} | <5% Non-Major-Storm (<5% customers affected) SAIFI | 1.30 | 0.80 | 1.24 | <input checked="" type="checkbox"/> |
| SAIFI_{IEEE} | IEEE Non-Major-Storm (TMED) SAIFI | n/a | 0.71 | 1.06 | -- |

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.

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.

What Influences SAIFI³⁸

PSE tracks outages by cause codes and groups. As with SAIDI, system damage caused by trees and vegetation continue to impact the most customers in 2020, which is consistent with previous years. This is followed by equipment failure (EF), other (Other) and unknown (UN) having the greatest impact on SAIFI. See section on SAIDI for more details on these cause categories.

Figure 3h shows the common causes for the recorded outages in 2020 and their impact on customers across SAIFI_{Total} and SAIFI_{5%} measurements.

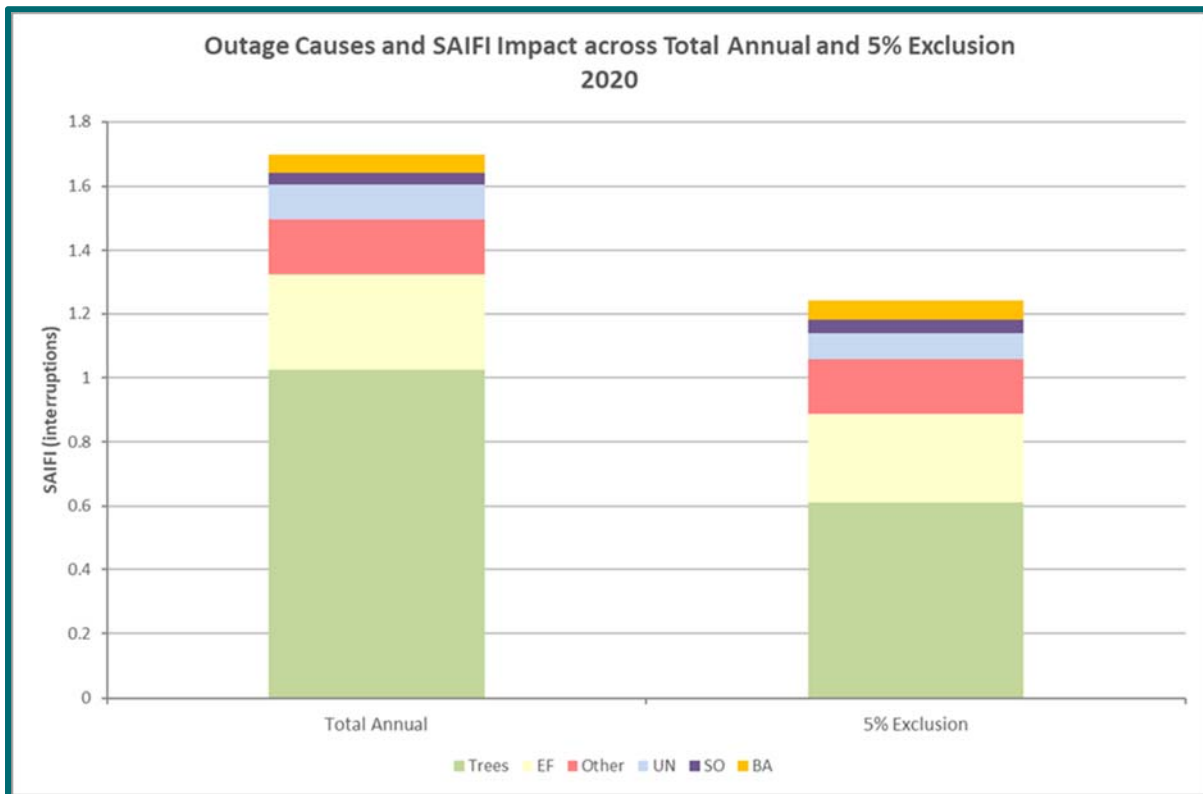


Figure 3h. Common Outage Causes and SAIFI Impact across Total Annual and 5% Exclusion in 2020

³⁸ This section meets a requirement of Attachment B of Docket UE-110060.

Historical Trends for SAIFI³⁹

Table 3d shows SQI SAIFI from 2016 to 2020.

Table 3d: SQI SAIFI from 2016 to 2020 (excluding 5% Major Events)

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------------------|--|------|------|------|------|
| SAIFI _{5%} (SQI #4) | 1.06 | 1.20 | 1.02 | 0.98 | 1.24 |
| Benchmark | 1.30 interruptions per year per customer | | | | |

As with SAIDI, SAIFI results can vary widely from year to year. The issues that caused a large increase in SAIDI in 2020 also caused the large increase in SAIFI. Despite this, the result was below the benchmark and has been below the benchmark for 5 years as shown in **Table 3d**. 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**.

Impact of Unusual Event on SQI SAIFI

The impacts of the COVID-19 pandemic on reliability are not clear. Disruptions to working environments from distancing and quarantine requirements and recommendations as well as delays from permitting agencies may have had some effect, but their impact on reliability cannot be measured. .

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

Customer 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

Figure 3i shows the percentage of PSE customers experiencing varying numbers of interruptions. For example, 45% of customers experienced no sustained interruptions while 30% of customers experienced one sustained interruption.

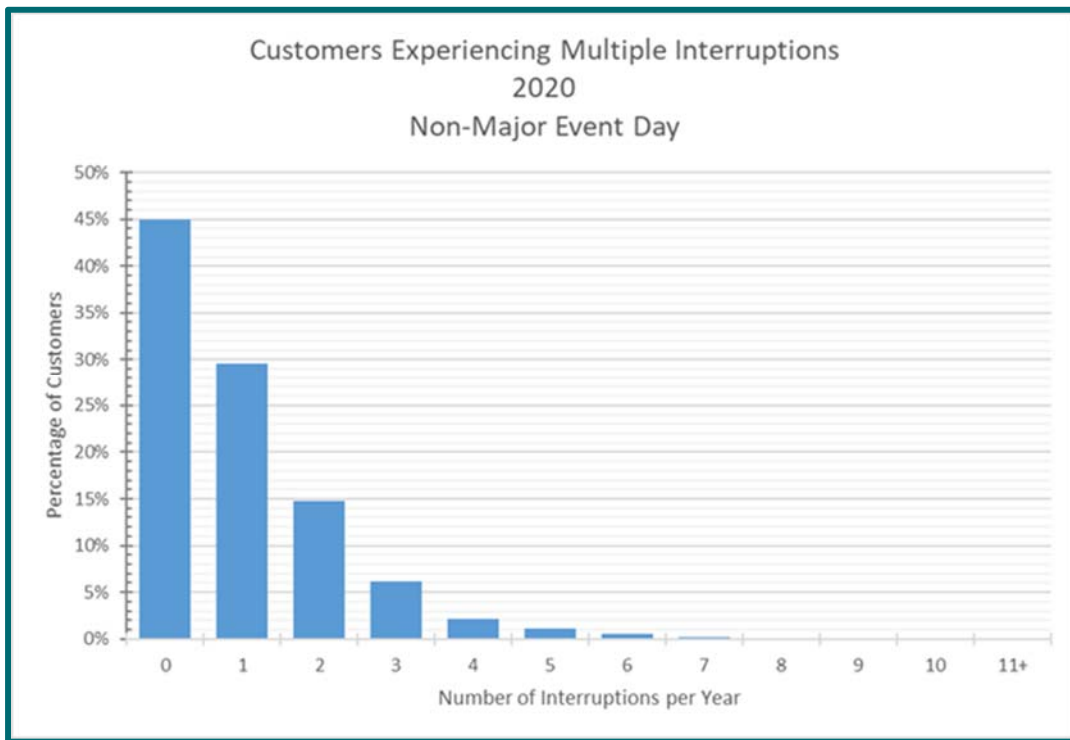


Figure 3i: Customers Experiencing Multiple Interruptions in 2020

About Electric Service Reliability Measurements and Baseline Statistics⁴⁰

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 SAIFI (SQI #4) and SAIDI (SQI #3) sections. Standard formulas are used to calculate each of the measurements but with one critical difference that showcases a particular area of electric service reliability performance. 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 year. As data collection methods have changed, comparisons between current performance and an 18-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.

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

Table 3e details the dates, causes, affected areas and exclusion criteria for the SQI SAIDI, IEEE Standard 1366 exclusion, and 5% exclusion events in 2020. 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 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 that events exceed the IEEE T_{MED} and SQI SAIDI but not meet the 5% exclusion criteria. In 2020, four of the IEEE T_{MED} and SQI SAIDI events did not meet the 5% Exclusion Major Event Day criteria.

Table 3e: 2020 SQI SAIDI, IEEE T_{MED} and SQI SAIFI Exclusion Events⁴¹

| 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 |
|--------------------------|--------------------------------|-------------|------------------|----------------------------|------------------|--|---|
| 1/13/2020 | 1/13/2020 | 11.35 | -- | 5.40% | Snow | 1/13/2020 2:45 AM - 1/18/2020 3:00 PM | Kitsap County, eastern portion of King County |
| 1/15/2020 | 1/15/2020 | 9.46 | -- | | | | |
| 1/31/2020 | 1/31/2020 | 22.31 | -- | 5.62% | Wind, Flooding | 1/31/2020 3:30 PM - 2/2/2020 3:00 PM | Whatcom, Skagit, Island, Kitsap Counties, Vashon Island |
| 2/1/2020 | n/a | 5.54 | -- | | | | |
| 2/7/2020 | 2/7/2020 | 9.80 | -- | n/a | Snow | n/a | Kitsap County, eastern portion of King County |
| 2/23/2020 | 2/23/2020 | 8.40 | -- | n/a | Wind | n/a | King County |
| 9/7/2020 | 9/7/2020 | 73.45 | -- | 14.32% | Wind, Wildfire | 9/7/2020 3:00 PM - 9/10/2020 12:00 PM | Kitsap and Pierce Counties, the southern portion of King County and Vashon Island |
| 9/8/2020 | 9/8/2020 | 31.21 | -- | | | | |
| 10/13/2020 | 10/13/2020 | 44.09 | -- | 17.48% | Wind | 10/13/2020 9:00 AM - 10/16/2020 5:00 AM | Entire service territory |
| 11/13/2020 | 11/13/2020 | 25.61 | -- | n/a | Wind | n/a | Island County |
| 12/21/2020 | 12/21/2020 | 7.20 | -- | n/a | Rain, Snow, Wind | n/a | Whatcom, Skagit, Island, Thurston Counties |

⁴¹ The 2020 T_{MEDADJ} is 55.43 minutes. The 2020 T_{MED} is 6.31 minutes. The 2020 T_{CAT} is 81.17 minutes.

Areas of Greatest Concern⁴²

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. The collective Top 50 circuits saw a 2% improvement in SAIDI from 2019 to 2020. **Appendix M: Areas of Greatest Concern with Action Plan** details the Year End 2020 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, such as CEMI, is developed, 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.

⁴² This section meets a requirement of Attachment B of Docket UE-110060.

Customer Electric Reliability Complaints⁴³

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 3j illustrates the 2015 – 2020 number of recorded PSE complaints.⁴⁴ During the rolling two-year period of 2019–2020, PSE received complaints from 18 customers relating to reliability and power quality concerns as compared to 23 complaints recorded in the rolling two year period of 2018-2019. This number represents less than 0.002% of PSE’s customers and the trend shows PSE complaints to be steadily decreasing since 2015-2016.

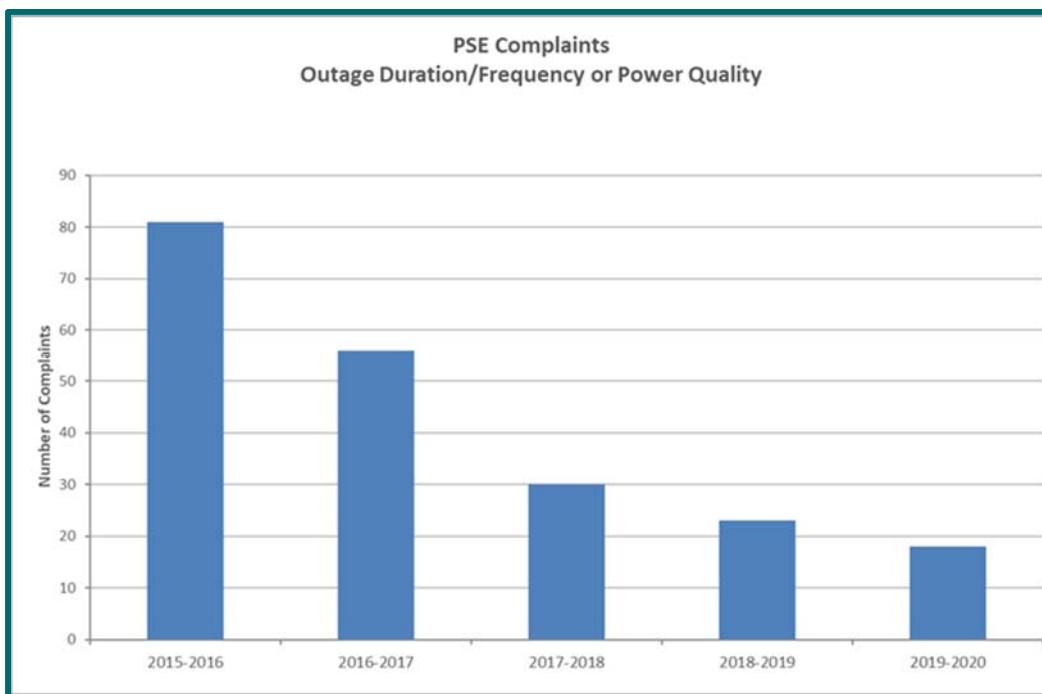


Figure 3j: Five Year History of PSE Complaints

⁴³ This section meets a requirement of Attachment B of Docket No. UE-110060.

⁴⁴ 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.

PSE’s complaint process and the change in data collection are described in **Appendix I: Electric Reliability Data Collection Process and Calculations**. The 2019-2020 complaints are shown in tabular form in **Table N1 of Appendix N: Current-Year Commission and Rolling-Two-Year PSE Customer Electric Service Reliability Complaints with Resolutions**.

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 3k** illustrates 2016 – 2020 number of UTC electric service quality complaints in regards to interruption duration or frequency and/or power quality. In 2020, the UTC received 13 complaints relating to PSE’s electric service quality as compared to 33 in 2019.⁴⁵ The 2020 complaints are shown in **Table N2 of Appendix N: Current-Year Commission and Rolling-Two-Year PSE Customer Electric Service Reliability Complaints with Resolutions**.

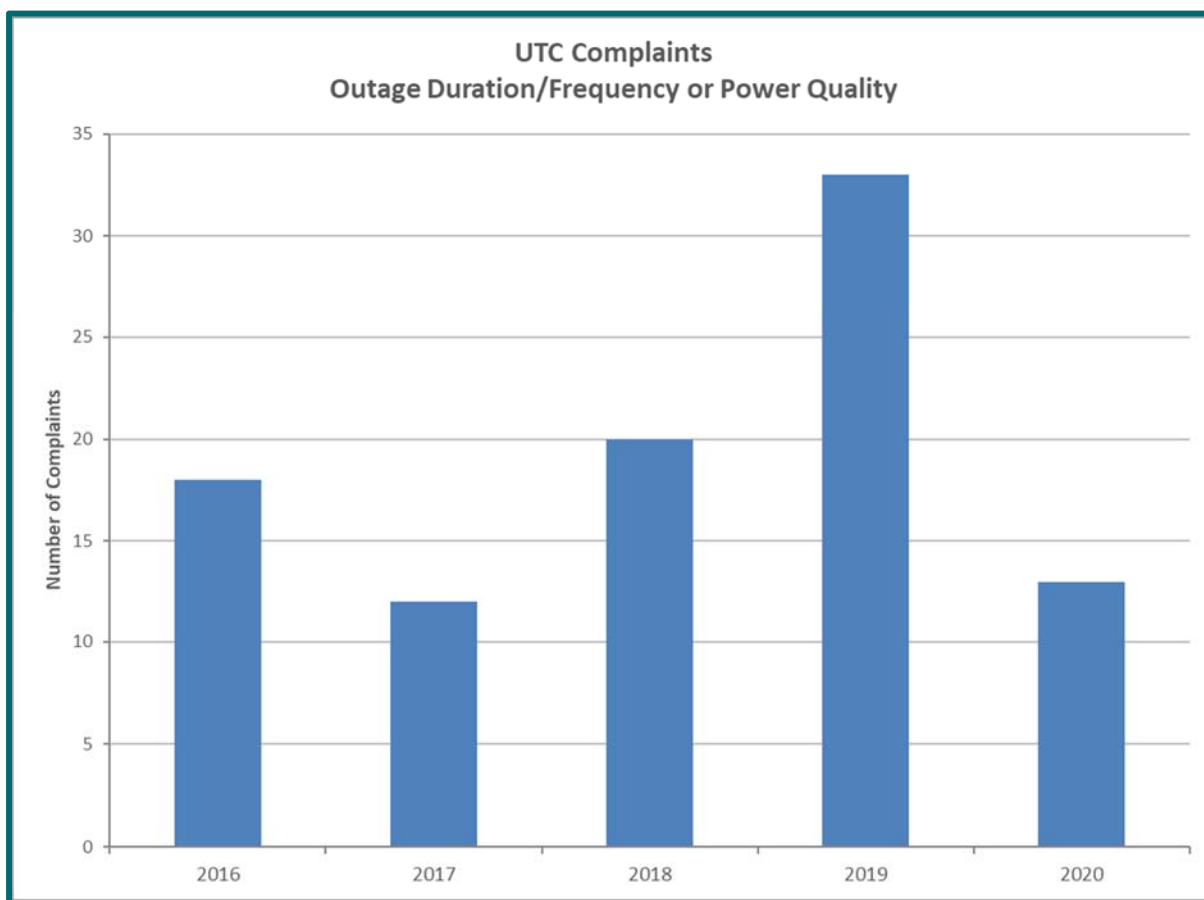


Figure 3k: Five Year History of UTC Complaints

⁴⁵ The main driver for the increase in UTC complaints in 2020 was a master complaint from one neighborhood in Whatcom County.

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 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 2020.

Working to Uphold Reliability⁴⁶

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**. The number of projects of each type that were completed in 2020 can be found in the same appendix in **Table P1**.

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. Furthermore, PSE has actively worked in recent years to improve operation of the system by implementing initiatives to reduce the impact of planned outages and reduce the occurrence and extent of abnormal system configurations. Though the system is designed to be flexible, it operates at greatest efficiency when it is in its normal configuration. Reducing abnormal conditions results in fewer customers impacted and faster restoration times when interruptions occur. It can be difficult to see the impact of these

⁴⁶ This section meets a requirement of Attachment B of Docket UE-110060.

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 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 results for the analysis of projects implemented in 2016 are shown in **Table 3f**. For each program the percentage of actual performance compared to predicted performance is reported for SAIDI and SAIFI, thus 100% means that the project achieved all of the intended benefits. Note that due to changes to the system over time, not all projects have 3 or more years of consistent data to analyze.

Table 1f. Reliability improvement verification analysis of project benefits actual vs predicted

| Program | Total Projects completed in 2016 | Number of projects reviewed | SAIDI | SAIFI |
|-------------------------------|----------------------------------|-----------------------------|-------------------|-------------------|
| #6 Copper Replacement | 3 | 3 | 100% | 100% |
| Cable Remediation | 258 | 30 | 100% | 100% |
| Distribution Pole Replacement | 6 | 6 | 100% | 100% |
| Overhead Rebuild | 4 | 4 | 100% | 100% |
| Overhead Upgrade | 2 | 2 | 100% | 100% |
| Recloser | 22 | 22 | 68% ⁴⁷ | 64% |
| TripSaver | 48 | 31 | 100% | 47% ⁴⁸ |
| Tree Wire | 28 | 28 | 99% | 100% |
| Underground Conversion | 2 | 2 | 100% | 100% |
| Underground Upgrade | 2 | 2 | 100% | 100% |
| Totals | 375 | 130 | | |

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. PSE also performs detailed root cause analysis on a sample of large interruptions each year to determine whether processes and system components are operating as intended. In 2020, PSE performed this analysis on 32 separate interruption events, which together accounted for nearly 8% of SAIDI_{SQI-3}. The root cause analysis and reliability improvement verification analysis practices form a feedback

⁴⁷ The SAIDI and SAIFI benefits for reclosers have been shown to increase as more years of data are evaluated. Recloser projects completed in 2015 showed an increase from 83% to 100% SAIDI benefit when increasing the number of years evaluated from 3 to 4. It is expected that projects completed in 2016 will show a similar result.

⁴⁸ Currently there are only 3 years of post-implementation data available for TripSavers. TripSavers are likely to show improved SAIFI performance as more years of data can be analyzed.

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 31** shows where this feedback fits into the process for identifying issues and developing solutions.

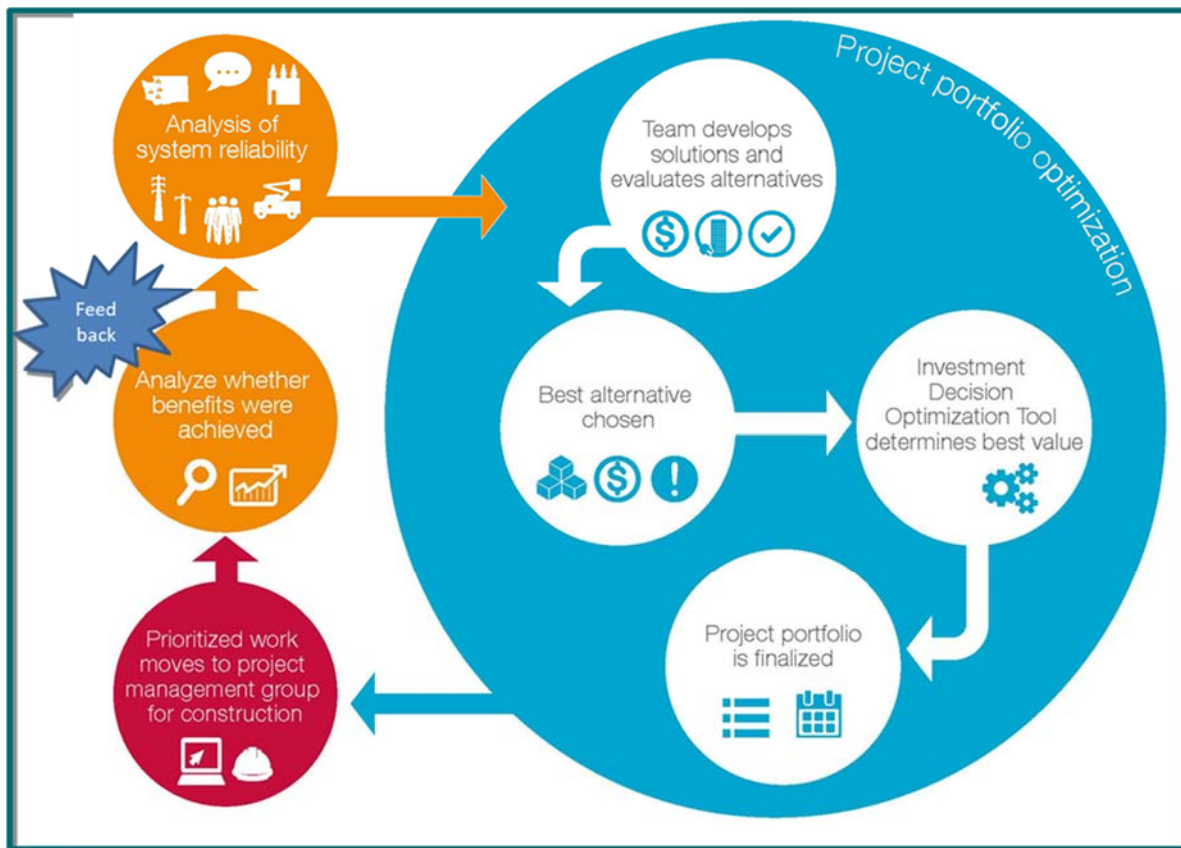


Figure 31: Benefit analysis feedback in the system planning process

Going Forward⁴⁹

Multi-year SAIDI and SAIFI results as well as program benefit validation from the reliability improvement verification analysis indicate that continuing to implement electric system improvements will continue to result in improved reliability. An analysis using data from the IEEE reliability benchmarking study, the econometric benchmarking study initiated by the UTC staff and results from the Interruption Cost Estimate (ICE) Calculator, developed by Lawrence Berkeley National Laboratory and Nexant Inc, suggests that achieving a SAIDI of 110 – 125 minutes and maintaining SAIFI at or 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

⁴⁹ This section meets a requirement of Attachment B of Docket UE-110060.

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. An example of a new technology being leveraged for reliability is the use of the Advanced Metering Infrastructure (AMI) network for distribution automation telecommunications. Examples of new technologies currently being piloted include single phase reclosing and transmission line automatic switching. These are described in **Appendix P: Reliability Program Category Descriptions**. Future technologies that may improve reliability but are not yet being piloted for reliability improvements include 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.

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 2021 can be found in **Table P1** in **Appendix P: Reliability Program Category Descriptions**. These projects are expected to provide a 13 SAIDI minutes/year benefit.

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 2020 | Feb 2020 | Mar 2020 | Apr 2020 | May 2020 | Jun 2020 | Jul 2020 | Aug 2020 | Sep 2020 | Oct 2020 | Nov 2020 | Dec 2020 |
|-----------------------|---------|---|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Customer Satisfaction | 2 | WUTC Complaint Ratio | 0.40 complaints per 1000 customers, including all complaints filed with WUTC | 0.012 | 0.011 | 0.008 | 0.009 | 0.009 | 0.009 | 0.005 | 0.008 | 0.005 | 0.007 | 0.009 | 0.009 |
| | 6 | Telephone Center Transactions Customer Satisfaction | 90% satisfied (rating of 5 or higher on a 7-point scale) | 94% | 93% | 94% | 93% | 93% | 94% | 96% | 97% | 95% | 95% | 96% | 96% |
| | 8 | Field Service Operations Transactions Customer Satisfaction | 90% satisfied (rating of 5 or higher on a 7-point scale) | 96% | 96% | 96% | 96% | 96% | 98% | 98% | 96% | 93% | 97% | 96% | 94% |
| 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 | 72% | 67% | 85% | 95% | 97% | 96% | 96% | 97% | 92% | 84% | 72% | 56% |
| Operations Services | 4 | SAIFI | 1.30 interruptions per year per customer | 0.940 | 0.141 | 0.040 | 0.061 | 0.097 | 0.104 | 0.058 | 0.087 | 0.119 | 0.107 | 0.162 | 0.127 |
| | 3 | SAIDI | 155 minutes per customer per year | 26 | 12 | 11 | 7 | 13 | 14 | 9 | 11 | 15 | 17 | 17 | 13 |
| | 7 | Gas Safety Response Time | Average of 55 minutes from customer call to arrival of field technician | 31 | 31 | 29 | 30 | 31 | 31 | 33 | 33 | 33 | 34 | 32 | 32 |
| | 10 | Kept Appointments ^{Note} | 92% of appointments kept | 100% | 99% | 99% | 95% | 99% | 99% | 99% | 99% | 99% | 99% | 99% | 99% |
| | 11 | Electric Safety Response Time | Average of 55 minutes from customer call to arrival of field technician | 51 | 51 | 51 | 48 | 48 | 48 | 49 | 49 | 50 | 50 | 50 | 51 |

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 2020 | Feb 2020 | Mar 2020 | Apr 2020 | May 2020 | Jun 2020 | Jul 2020 | Aug 2020 | Sep 2020 | Oct 2020 | Nov 2020 | Dec 2020 |
|--------------------------------|---|--|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Operations Services | Service Provider New Customer Construction Appointments Kept ^{Note1} | Quanta Electric | At least 92% of appointments kept ^{Note 1} | 97% | 98% | 99% | 100% | 99% | 100% | 100% | 99% | 99% | 99% | 100% | 99% |
| | | Quanta Gas | At least 92% of appointments kept ^{Note 1} | 98% | 96% | 99% | 100% | 99% | 100% | 99% | 100% | 99% | 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 | 9.57 | 4.61 | 5.90 | 2.36 | 1.85 | 3.49 | 5.03 | 1.36 | 1.30 | 1.60 | 6.04 | 8.56 |
| | | Quanta Electric | Level 2 inspection items: ≤ 20 deviations/1000 items inspected ^{Note 2} | 16.83 | 13.97 | 2.81 | 8.41 | 6.51 | 4.14 | 10.03 | 1.12 | 8.66 | 6.68 | 1.60 | 4.56 |
| | | Quanta Electric | Level 3 inspection items: ≤ 20 deviations/1000 items inspected ^{Note 2} | 17.60 | 15.91 | 7.06 | 7.25 | 3.56 | 7.06 | 11.46 | 6.15 | 10.95 | 5.46 | 9.62 | 4.45 |
| | | 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} | 1.30 | 0.00 | 0.00 | 0.00 | 0.00 | 2.90 | 0.00 | 2.25 | 0.00 | 1.95 | 0.00 | 0.00 |
| | | Quanta Gas | Level 2 inspection items: ≤ 15 deviations/1000 items inspected ^{Note 2} | 13.84 | 14.41 | 8.10 | 11.24 | 7.53 | 1.28 | 1.28 | 14.80 | 13.13 | 17.41 | 2.90 | 12.17 |
| | | Quanta Gas | Level 3 inspection items: ≤ 12 deviations/1000 items inspected ^{Note 2} | 3.16 | 7.63 | 0.00 | 4.12 | 3.66 | 5.65 | 0.00 | 3.23 | 2.97 | 2.26 | 0.00 | 7.21 |
| | Secondary Safety Response and Restoration Time-CoreHour | Quanta Electric | Within 250 minutes from the dispatch time to the restoration of non-emergency outage during core hours | 256 | 271 | 240 | 240 | 207 | 228 | 229 | 240 | 244 | 224 | 242 | 246 |
| | Secondary Safety Response and Restoration Time-NonCore-Hour | Quanta Electric | Within 316 minutes from the dispatch time to the restoration of non-emergency outage during non-core hours | 276 | 274 | 246 | 246 | 244 | 254 | 241 | 243 | 241 | 240 | 275 | 273 |
| Secondary Safety Response Time | Quanta Gas | Within 60 minutes from first response assessment completion to second response arrival | 46 | 44 | 35 | 43 | 39 | 42 | 59 | 55 | 54 | 52 | 53 | 62 | |

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 ⁵⁰ |
| 1/1/2020 | Wind/Snow | South King | 1 | 3,966 | 248,135 | 1.6% | 17 | 10 of 12 | No | 10 EFRs, 2 PTO, 6 Line Crews, 1 Tree Crew |
| 1/3/2020 | Wind/Snow | Northern | 1 | 18,405 | 207,491 | 8.9% | 95 | 13 of 15 | No | 13 EFRs, 1 PLV, 1 Reg Day Off, 9 Line Crews, 4 Tree Crews |
| 01/4/2020 | Wind/Snow | Northern | 1 | 2,947 | 207,491 | 1.4% | 38 | 12 of 15 | No | 12 EFRs, 3 Reg Day Off, 9 Line Crews, 5 Tree Crews |
| 01/7/2020 | Wind/Snow | Western | 1 | 3,412 | 130,850 | 2.6% | 26 | 11 of 11 | No | 11 EFRs, 8 Line Crews, 2 Tree Crews |
| 1/10/2020 | Wind/Snow | Southern | 1 | 8,223 | 261,283 | 3.1% | 24 | 12 of 14 | No | 12 EFRs, 1 PTO, 1 Reg Day Off, 6 Line Crews, 1 Tree Crew |
| 1/11/2020 | Wind/Snow | Southern | 1 | 6,632 | 261,283 | 2.5% | 26 | 10 of 13 | No | 10 EFRs, 3 Reg Day Off, 6 Line Crews, 2 Tree Crews |
| 1/12/2020 | Wind/Snow | Northern | 1 | 5,215 | 207,491 | 2.5% | 30 | 13 of 15 | No | 13 EFRs, 2 Reg Day Off, 9 Line Crews, 2 Tree Crews |
| 1/12/2020 | Wind/Snow | South King | 1 | 6,692 | 248,135 | 2.7% | 12 | 7 of 12 | No | 7 EFRs, 1 PTO, 4 Reg Day Off, 6 Line Crews, 1 Tree Crew |
| 1/12/2020 | Wind/Snow | Southern | 1 | 11,346 | 261,283 | 4.3% | 23 | 10 of 15 | No | 10 EFRs, 5 Reg Day Off, 6 Line Crews, 1 Tree Crew |
| 1/13/2020 | Wind/Snow | Northern | 6 | 31,148 | 207,491 | 15.0% | 162 | 15 of 15 | Yes | 15 Event Duty, 9 Line Crews, 5 Tree Crews |
| 1/13/2020 | Wind/Snow | North King | 6 | 37,345 | 328,501 | 11.4% | 170 | 23 of 23 | Yes | 23 Event Duty, 7 Line Crews, 13 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, **SP**—Service Provider

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 |
|-----------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|---|
| 1/13/2020 | Wind/Snow | South King | 6 | 4,779 | 248,135 | 1.9% | 41 | 12 of 12 | Yes | 12 Event Duty, 6 Line Crews, 1 Tree Crew |
| 1/13/2020 | Wind/Snow | Southern | 6 | 14,491 | 261,283 | 5.5% | 63 | 15 of 15 | Yes | 15 Event Duty, 6 Line Crews, 3 Tree Crews |
| 1/13/2020 | Wind/Snow | Western | 6 | 38,529 | 130,850 | 29.4% | 164 | 11 of 11 | Yes | 11 Event Duty, 8 Line Crews, 7 Tree Crews |
| 1/31/2020 | Wind/Snow | Northern | 3 | 40,026 | 207,491 | 19.3% | 181 | 15 of 15 | Yes | 15 Event Duty, 9 Line Crews, 5 Tree Crew |
| 1/31/2020 | Wind/Snow | North King | 3 | 8,830 | 328,501 | 2.7% | 60 | 23 of 23 | Yes | 23 Event Duty, 7 Line Crews |
| 1/31/2020 | Wind/Snow | South King | 3 | 12,451 | 248,135 | 5.0% | 55 | 12 of 12 | Yes | 12 Event Duty, 6 Line Crews, 1 Tree Crew |
| 1/31/2020 | Wind/Snow | Southern | 3 | 9,564 | 261,283 | 3.7% | 64 | 15 of 15 | Yes | 15 Event Duty, 6 Line Crews, 2 Tree Crews |
| 1/31/2020 | Wind/Snow | Western | 3 | 12,308 | 130,850 | 9.4% | 112 | 11 of 11 | Yes | 11 Event Duty, 8 Line Crews, 7 Tree Crews |
| 2/5/2020 | Wind/Snow | Northern | 1 | 2,027 | 207,567 | 1.0% | 18 | 15 of 15 | No | 15 EFRs, 8 Line Crews, 2 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, **SP**—Service Provider

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 |
|-----------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|---|
| 2/7/2020 | Wind/Snow | Northern | 1 | 9,339 | 207,567 | 4.5% | 44 | 13 of 15 | No | 13 EFRs, 2 Reg Day Off, 8 Line Crews, 2 Tree Crews |
| 2/7/2020 | Wind/Snow | Southern | 1 | 11,281 | 261,425 | 4.3% | 58 | 12 of 14 | No | 12 EFRs, 2 PTO, 1 Reg Day Off, 6 Line Crews, 1 Tree Crew |
| 2/8/2020 | Wind/Snow | Southern | 1 | 3,056 | 261,425 | 1.2% | 26 | 9 of 15 | No | 9 EFRs, 6 Reg Day Off, 6 Line Crews |
| 2/8/2020 | Wind/Snow | Western | 1 | 343 | 130,896 | 0.3% | 17 | 9 of 11 | No | 9 EFRs, 2 Reg Day Off, 7 Line Crews |
| 2/23/2020 | Wind | Northern | 1 | 765 | 207,567 | 0.4% | 19 | 9 of 15 | No | 9 EFRs, 6 Reg Day Off, 8 Line Crews, 1 Tree Crew |
| 2/23/2020 | Wind | South King | 1 | 15,286 | 248,329 | 6.2% | 70 | 10 of 11 | No | 10 EFRs, 1 PTO, 1 Reg Day Off, 6 Line Crews, 3 Tree Crews |
| 2/23/2020 | Wind | Southern | 1 | 9,277 | 261,425 | 3.5% | 39 | 14 of 15 | No | 14 EFRs, 1 Reg Day Off, 6 Line Crews, 3 Tree Crews |
| 2/23/2020 | Wind | Western | 1 | 11,720 | 130,896 | 9.0% | 40 | 7 of 11 | No | 7 EFRs, 4 Reg Day Off, 7 Line Crews |
| 2/24/2020 | Wind | South King | 1 | 259 | 248,329 | 0.1% | 18 | 9 of 12 | No | 9 EFRs, 2 PTO, 1 Reg Day Off, 6 Line Crews, 1 Tree Crew |

Table continues on next page.

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

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 |
|-----------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|---|
| 3/14/2020 | Wind | Northern | 1 | 7,400 | 207,746 | 3.6% | 75 | 15 of 22 | No | 15 EFRs, 2 PTO, 5 Reg Day Off, 8 Line Crews, 1 Tree Crew |
| 3/14/2020 | Wind | Western | 1 | 2,416 | 130,992 | 1.8% | 18 | 9 of 11 | No | 9 EFRs, 2 Reg Day Off, 6 Line Crews, 1 Tree Crew |
| 3/15/2020 | Wind | Northern | 1 | 601 | 207,746 | 0.3% | 21 | 12 of 15 | No | 12 EFRs, 1 PTO, 2 Reg Day Off, 8 Line Crews, 2 Tree Crews |
| 5/9/2020 | Wind | South King | 1 | 697 | 248,855 | 0.3% | 14 | 7 of 11 | No | 7 EFRs, 2 PTO, 2 Reg Day Off, 6 Line Crews, 1 Tree Crew |
| 5/30/2020 | Wind | Western | 1 | 9,042 | 131,198 | 6.9% | 21 | 9 of 12 | No | 9 EFRs, 3 Reg Day Off, 5 Line Crews |
| 8/21/2020 | Wind | Northern | 1 | 2,410 | 208,426 | 1.2% | 16 | 11 of 15 | No | 11 EFRs, 3 PTO, 1 Reg Day Off, 9 Line Crews, 2 Tree Crews |
| 9/7/2020 | Wind/Fire | Northern | 4 | 24,678 | 208,684 | 11.8% | 75 | 15 of 15 | Yes | 15 Event Duty, 2 Line Crews, 4 Tree Crews |
| 9/7/2020 | Wind/Fire | North King | 4 | 10,680 | 330,226 | 3.2% | 71 | 22 of 22 | Yes | 22 Event Duty, 1 Line Crew, 2 Tree Crews |
| 9/7/2020 | Wind/Fire | South King | 4 | 75,914 | 248,940 | 30.5% | 225 | 12 of 12 | Yes | 12 Event Duty, 20 Line Crews, 6 Tree Crews |
| 9/7/2020 | Wind/Fire | Southern | 4 | 79,044 | 262,884 | 30.1% | 189 | 15 of 15 | Yes | 15 Event Duty, 27 Line Crews, 4 Tree Crews |
| 9/7/2020 | Wind/Fire | Western | 4 | 16,460 | 131,477 | 12.5% | 101 | 12 of 12 | Yes | 12 Event Duty, 6 Line Crews, 9 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, **LTD**—Long-Term Disability, **SP**—Service Provider

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 |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|---|
| 9/23/2020 | Wind/Rain | Northern | 1 | 10,364 | 208,684 | 5.0% | 81 | 14 of 15 | No | 14 EFRs, 1 PTO, 9 Line Crews, 3 Tree Crews |
| 9/23/2020 | Wind/Rain | Western | 1 | 5,131 | 131,477 | 3.9% | 31 | 12 of 12 | No | 12 EFRs, 5 Line Crews |
| 9/24/2020 | Wind/Rain | Western | 1 | 9,259 | 131,477 | 7.0% | 17 | 11 of 12 | No | 11 EFRs, 1 PTO, 5 Line Crews |
| 9/25/2020 | Wind/Rain | Western | 1 | 3,938 | 131,477 | 3.0% | 22 | 9 of 12 | No | 9 EFRs, 3 PTO, 5 Line Crews, 2 Tree Crews |
| 10/10/2020 | Wind | Northern | 1 | 2,109 | 208,903 | 1.0% | 17 | 7 of 15 | No | 7 EFRs, 1 PTO, 7 Reg Day Off, 9 Line Crews |
| 10/11/2020 | Wind | North King | 1 | 940 | 330,266 | 0.3% | 18 | 14 of 24 | No | 14 EFRs, 3 PTO, 7 Reg Day Off, 9 Line Crews, 2 Tree Crews |
| 10/11/2020 | Wind | Western | 1 | 7,117 | 131,486 | 5.4% | 24 | 10 of 12 | No | 10 EFRs, 2 Reg Day Off, 5 Line Crews, 1 Tree Crew |
| 10/12/2020 | Wind | Southern | 1 | 170 | 263,028 | 0.1% | 25 | 13 of 15 | No | 13 EFRs, 2 PTO, 8 Line Crews, 4 Tree Crews |
| 10/13/2020 | Wind/Rain | Northern | 4 | 25,252 | 208,903 | 12.1% | 169 | 15 of 15 | Yes | 15 Event Duty, 10 Line Crews, 9 Tree Crews |

Table continues on next page.

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

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 ⁵⁵ |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|---|
| 10/13/2020 | Wind/Rain | North King | 4 | 90,209 | 330,266 | 27.3% | 215 | 24 of 24 | Yes | 24 Event Duty, 14 Line Crews, 7 Tree Crews |
| 10/13/2020 | Wind/Rain | South King | 4 | 31,354 | 248,997 | 12.6% | 154 | 12 of 12 | Yes | 12 Event Duty, 10 Line Crews, 5 Tree Crews |
| 10/13/2020 | Wind/Rain | Southern | 4 | 38,201 | 263,028 | 14.5% | 159 | 15 of 15 | Yes | 15 Event Duty, 20 Line Crews, 5 Tree Crews |
| 10/13/2020 | Wind/Rain | Western | 4 | 50,332 | 131,486 | 38.3% | 152 | 12 of 12 | Yes | 12 Event Duty, 13 Line Crews, 9 Tree Crews |
| 10/23/2020 | Wind | Western | 1 | 2,783 | 131,486 | 2.1% | 22 | 10 of 12 | No | 10 EFRs, 2 PTO, 5 Line Crews |
| 10/24/2020 | Wind | Northern | 1 | 930 | 208,903 | 0.4% | 20 | 6 of 15 | No | 6 EFRs, 3 PTO, 6 Reg Day Off, 9 Line Crews, 1 Tree Crew |
| 10/24/2020 | Wind | Western | 1 | 14,425 | 131,486 | 11.0% | 54 | 9 of 12 | No | 9 EFRs, 2 PTO, 1 Reg Day Off, 9 Line Crews, 4 Tree Crew |
| 11/3/2020 | Wind/Rain | Western | 1 | 660 | 131,459 | 0.50% | 15 | 11 of 12 | No | 11 EFRs, 1 PTO, 5 Line Crews |
| 11/4/2020 | Wind/Rain | Northern | 1 | 2,836 | 208,878 | 1.4% | 42 | 14 of 15 | No | 14 EFRs, 1 Reg Day Off, 9 Line Crews, 4 Tree Crews |

Table continues on next page.

⁵⁵ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability, **LTD**—Long-Term Disability, **SP**—Service Provider

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 ⁵⁶ |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|---|
| 11/4/2020 | Wind/Rain | Western | 1 | 4,171 | 131,459 | 3.17% | 35 | 11 of 12 | No | 11 EFRs, 1 PTO, 5 Line Crews, 2 Tree Crews |
| 11/5/2020 | Wind/Rain | Western | 1 | 155 | 131,459 | 0.12% | 15 | 11 of 12 | No | 11 EFRs, 1 PTO, 5 Line Crews, 2 Tree Crews |
| 11/7/2020 | Wind/Rain | Western | 1 | 624 | 131,459 | 0.47% | 13 | 8 of 12 | No | 8 EFRs, 4 Reg Day Off, 5 Line Crews, 1 Tree Crew |
| 11/8/2020 | Wind/Rain | Northern | 1 | 9,566 | 208,878 | 4.6% | 29 | 11 of 14 | No | 11 EFRs, 1 PTO, 2 Reg Day Off, 9 Line Crews, 3 Tree Crews |
| 11/8/2020 | Wind/Rain | Western | 1 | 13,252 | 131,459 | 10.08% | 44 | 7 of 12 | No | 7 EFRs, 5 Reg Day Off, 5 Line Crews, 3 Tree Crews |
| 11/13/2020 | Wind/Rain | Northern | 1 | 43,024 | 208,878 | 20.6% | 90 | 12 of 14 | No | 12 EFRs, 2 PTO, 9 Line Crews, 5 Tree Crews |
| 11/13/2020 | Wind/Rain | Southern | 1 | 8,751 | 262,989 | 3.33% | 77 | 12 of 15 | No | 12 EFRs, 3 PTO, 8 Line Crews, 3 Tree Crews |
| 11/13/2020 | Wind/Rain | Western | 1 | 1,954 | 131,459 | 1.49% | 17 | 10 of 12 | No | 10 EFRs, 2 PTO, 5 Line Crews, 5 Line Crews |
| 11/14/2020 | Wind/Rain | Northern | 1 | 2,093 | 208,878 | 1.0% | 31 | 10 of 14 | No | 10 EFRs, 1 PTO, 3 Reg Day Off, 9 Line Crews, 4 Tree Crews |

Table continues on next page.

⁵⁶ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability, **LTD**—Long-Term Disability, **SP**—Service Provider

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 ⁵⁷ |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|---|
| 11/17/2020 | Wind/Rain | Northern | 1 | 4,120 | 208,878 | 2.0% | 59 | 12 of 14 | No | 12 EFRs, 2 PTO, 17 Line Crews, 9 Tree Crews |
| 11/17/2020 | Wind/Rain | South King | 1 | 950 | 249,030 | 0.38% | 15 | 12 of 12 | No | 12 EFRs, 8 Line Crews |
| 11/17/2020 | Wind/Rain | Southern | 1 | 6,272 | 262,989 | 2.38% | 53 | 10 of 15 | No | 10 EFRs, 5 PTO, 7 Line Crews, 2 Tree Crews |
| 11/17/2020 | Wind/Rain | Western | 1 | 3,358 | 131,459 | 2.55% | 19 | 9 of 12 | No | 9 EFRs, 3 PTO, 5 Line Crews |
| 11/30/2020 | Wind | Northern | 1 | 1,152 | 208,878 | 0.6% | 29 | 12 of 14 | No | 12 EFRs, 1 PTO, 1 Reg Day Off, 9 Line Crews, 2 Tree Crews |
| 12/19/2020 | Wind | Southern | 1 | 2,266 | 263,369 | 0.9% | 19 | 7 of 15 | No | 7 EFRs, 8 Reg Day Off, 8 Line Crews |
| 12/21/2020 | Wind | Northern | 1 | 8,650 | 209,094 | 4.1% | 71 | 10 of 12 | No | 10 EFRs, 2 PTO, 2 Reg Day Off, 9 Line Crews, 3 Tree Crews |
| 12/21/2020 | Wind | Southern | 1 | 9,488 | 263,369 | 3.60% | 52 | 12 of 15 | No | 12 EFRs, 3 PTO, 8 Line Crews, 4 Tree Crews |
| 12/22/2020 | Wind | Northern | 1 | 10,621 | 209,094 | 5.1% | 38 | 11 of 14 | No | 11 EFRs, 3 PTO, 9 Line Crews, 5 Tree Crews |
| 12/30/2020 | Wind | Southern | 1 | 9,412 | 263,369 | 3.57% | 43 | 13 of 15 | No | 13 EFRs, 2 PTO, 10 Line Crews, 4 Tree Crews |

⁵⁷ **EFR**—Electric First Responder, **PTO**—Paid Time Off, **Reg day-off**—Regular day-off, **STD**—Short-Term Disability, **LTD**—Long-Term Disability, **SP**—Service Provider

**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).


|  | | 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 |
| 1/1/2020 | Wind/Snow | Northern | 1 | 3,650 | 207,491 | 1.76% | 19 | Local | No | |
| 1/1/2020 | Wind/Snow | North King | 1 | 560 | 328,501 | 0.17% | 14 | Local | No | |
| 1/1/2020 | Wind/Snow | Southern | 1 | 114 | 261,283 | 0.04% | 8 | Local | No | |
| 1/1/2020 | Wind/Snow | Western | 1 | 4,544 | 130,850 | 3.47% | 9 | Local | No | |
| 1/3/2020 | Wind/Snow | North King | 1 | 1,078 | 328,501 | 0.33% | 9 | Local | No | |
| 1/3/2020 | Wind/Snow | South King | 1 | 36 | 248,135 | 0.01% | 8 | Local | No | |
| 1/3/2020 | Wind/Snow | Southern | 1 | 496 | 261,283 | 0.19% | 17 | Local | No | |
| 1/3/2020 | Wind/Snow | Western | 1 | 1,356 | 130,850 | 1.04% | 4 | Local | No | |
| 1/4/2020 | Wind/Snow | North King | 1 | 1,177 | 328,501 | 0.36% | 12 | Local | No | |
| 1/4/2020 | Wind/Snow | South King | 1 | 129 | 248,135 | 0.05% | 6 | Local | No | |
| 1/4/2020 | Wind/Snow | Southern | 1 | 158 | 261,283 | 0.06% | 7 | Local | No | |

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 |
|-----------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|--|----------|
| 1/4/2020 | Wind/Snow | Western | 1 | 7 | 130,850 | 0.01% | 1 | Local | No | |
| 1/7/2020 | Wind/Snow | Northern | 1 | 4,579 | 207,491 | 2.21% | 12 | Local | No | |
| 1/7/2020 | Wind/Snow | North King | 1 | 1,287 | 328,501 | 0.39% | 13 | Local | No | |
| 1/7/2020 | Wind/Snow | South King | 1 | 200 | 248,135 | 0.08% | 13 | Local | No | |
| 1/7/2020 | Wind/Snow | Southern | 1 | 2,244 | 261,283 | 0.86% | 8 | Local | No | |
| 1/10/2020 | Wind/Snow | Northern | 1 | 1,901 | 207,491 | 0.92% | 17 | Local | No | |
| 1/10/2020 | Wind/Snow | North King | 1 | 3,088 | 328,501 | 0.94% | 12 | Local | No | |
| 1/10/2020 | Wind/Snow | South King | 1 | 17 | 248,135 | 0.01% | 7 | Local | No | |
| 1/10/2020 | Wind/Snow | Western | 1 | 1,156 | 130,850 | 0.88% | 9 | Local | No | |
| 1/11/2020 | Wind/Snow | Northern | 1 | 143 | 207,491 | 0.07% | 9 | Local | No | |
| 1/11/2020 | Wind/Snow | North King | 1 | 474 | 328,501 | 0.14% | 12 | Local | No | |
| 1/11/2020 | Wind/Snow | South King | 1 | 352 | 248,135 | 0.14% | 8 | Local | No | |
| 1/11/2020 | Wind/Snow | Western | 1 | 4 | 130,850 | 0.00% | 3 | Local | No | |
| 1/12/2020 | Wind/Snow | North King | 1 | 3,024 | 328,501 | 0.92% | 20 | Local | No | |

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 |
|-----------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 1/12/2020 | Wind/Snow | Western | 1 | 275 | 130,850 | 0.21% | 7 | Local | No | |
| 2/5/2020 | Wind/Snow | North King | 1 | 3,110 | 328,883 | 0.95% | 10 | Local | No | |
| 2/5/2020 | Wind/Snow | South King | 1 | 1,488 | 248,329 | 0.60% | 16 | Local | No | |
| 2/5/2020 | Wind/Snow | Southern | 1 | 113 | 261,425 | 0.04% | 6 | Local | No | |
| 2/5/2020 | Wind/Snow | Western | 1 | 1 | 130,896 | 0.00% | 1 | Local | No | |
| 2/7/2020 | Wind/Snow | North King | 1 | 6,598 | 328,883 | 2.0% | 44 | Local | No | |
| 2/7/2020 | Wind/Snow | South King | 1 | 11,513 | 248,329 | 4.6% | 28 | Local | No | |
| 2/7/2020 | Wind/Snow | Western | 1 | 10,312 | 130,896 | 7.9% | 42 | Local | No | |
| 2/8/2020 | Wind/Snow | Northern | 1 | 1,737 | 207,567 | 0.84% | 14 | Local | No | |
| 2/8/2020 | Wind/Snow | North King | 1 | 153 | 328,883 | 0.05% | 14 | Local | No | |
| 2/8/2020 | Wind/Snow | South King | 1 | 1,516 | 248,329 | 0.6% | 10 | Local | No | |
| 2/23/2020 | Wind | North King | 1 | 15,726 | 328,883 | 4.8% | 50 | Local | No | |
| 2/24/2020 | Wind | Northern | 1 | 356 | 207,567 | 0.17% | 10 | Local | No | |
| 2/24/2020 | Wind | North King | 1 | 367 | 328,883 | 0.11% | 15 | Local | No | |

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 |
|-----------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 2/24/2020 | Wind | Southern | 1 | 15 | 261,425 | 0.01% | 6 | Local | No | |
| 2/24/2020 | Wind | Western | 1 | 160 | 130,896 | 0.12% | 7 | Local | No | |
| 3/14/2020 | Wind | North King | 1 | 4 | 329,664 | 0.00% | 4 | Local | No | |
| 3/14/2020 | Wind | South King | 1 | 2,531 | 248,760 | 1.02% | 5 | Local | No | |
| 3/14/2020 | Wind | Southern | 1 | 22 | 261,800 | 0.01% | 2 | Local | No | |
| 3/15/2020 | Wind | North King | 1 | 12 | 329,664 | 0.00% | 3 | Local | No | |
| 3/15/2020 | Wind | South King | 1 | 314 | 248,760 | 0.13% | 7 | Local | No | |
| 3/15/2020 | Wind | Southern | 1 | 275 | 261,800 | 0.11% | 7 | Local | No | |
| 3/15/2020 | Wind | Western | 1 | 393 | 130,992 | 0.30% | 6 | Local | No | |
| 5/9/2020 | Wind | Northern | 1 | 45 | 208,016 | 0.02% | 4 | Local | No | |
| 5/9/2020 | Wind | North King | 1 | 21,386 | 329,797 | 6.48% | 12 | Local | No | |
| 5/9/2020 | Wind | Southern | 1 | 696 | 262,234 | 0.27% | 7 | Local | No | |
| 5/9/2020 | Wind | Western | 1 | 713 | 131,198 | 0.54% | 7 | Local | No | |
| 5/30/2020 | Wind | Northern | 1 | 5,843 | 208,016 | 2.81% | 11 | Local | No | |

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 |
|-----------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 5/30/2020 | Wind | North King | 1 | 775 | 329,797 | 0.23% | 16 | Local | No | |
| 5/30/2020 | Wind | South King | 1 | 1,786 | 248,855 | 0.72% | 9 | Local | No | |
| 5/30/2020 | Wind | Southern | 1 | 4,766 | 262,234 | 1.82% | 35 | Local | No | |
| 8/21/2020 | Wind | North King | 1 | 675 | 330,182 | 0.20% | 14 | Local | No | |
| 8/21/2020 | Wind | South King | 1 | 124 | 248,931 | 0.05% | 6 | Local | No | |
| 8/21/2020 | Wind | Southern | 1 | 108 | 262,619 | 0.04% | 15 | Local | No | |
| 8/21/2020 | Wind | Western | 1 | 604 | 131,417 | 0.46% | 9 | Local | No | |
| 9/23/2020 | Wind/Rain | North King | 1 | 1,569 | 330,226 | 0.48% | 32 | Local | No | |
| 9/23/2020 | Wind/Rain | South King | 1 | 274 | 248,940 | 0.11% | 18 | Local | No | |
| 9/23/2020 | Wind/Rain | Southern | 1 | 4,872 | 262,884 | 1.85% | 37 | Local | No | |
| 9/24/2020 | Wind/Rain | Northern | 1 | 2,880 | 208,684 | 1.4% | 26 | Local | No | |
| 9/24/2020 | Wind/Rain | North King | 1 | 628 | 330,226 | 0.19% | 17 | Local | No | |
| 9/24/2020 | Wind/Rain | South King | 1 | 1,410 | 248,940 | 0.57% | 3 | Local | No | |
| 9/24/2020 | Wind/Rain | Southern | 1 | 0 | 262,884 | 0.00% | 0 | Local | No | |

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 |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 9/25/2020 | Wind/Rain | Northern | 1 | 4,443 | 208,684 | 2.1% | 52 | Local | No | |
| 9/25/2020 | Wind/Rain | North King | 1 | 494 | 330,226 | 0.15% | 21 | Local | No | |
| 9/25/2020 | Wind/Rain | South King | 1 | 391 | 248,940 | 0.16% | 12 | Local | No | |
| 9/25/2020 | Wind/Rain | Southern | 1 | 4,767 | 262,884 | 1.81% | 37 | Local | No | |
| 10/10/2020 | Wind/Rain | North King | 1 | 4,265 | 330,266 | 1.3% | 20 | Local | No | |
| 10/10/2020 | Wind/Rain | South King | 1 | 469 | 248,997 | 0.19% | 12 | Local | No | |
| 10/10/2020 | Wind/Rain | Southern | 1 | 389 | 263,028 | 0.15% | 12 | Local | No | |
| 10/10/2020 | Wind/Rain | Western | 1 | 157 | 131,486 | 0.12% | 11 | Local | No | |
| 10/11/2020 | Wind/Rain | Northern | 1 | 1,313 | 208,903 | 0.6% | 9 | Local | No | |
| 10/11/2020 | Wind/Rain | South King | 1 | 386 | 248,997 | 0.16% | 11 | Local | No | |
| 10/11/2020 | Wind/Rain | Southern | 1 | 5,218 | 263,028 | 1.98% | 36 | Local | No | |
| 10/12/2020 | Wind/Rain | Northern | 1 | 423 | 208,903 | 0.2% | 13 | Local | No | |
| 10/12/2020 | Wind/Rain | North King | 1 | 4,938 | 330,266 | 1.50% | 19 | Local | No | |
| 10/12/2020 | Wind/Rain | South King | 1 | 154 | 248,997 | 0.06% | 8 | Local | No | |

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 |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 10/12/2020 | Wind/Rain | Western | 1 | 212 | 131,486 | 0.16% | 8 | Local | No | |
| 10/23/2020 | Wind/Rain | Northern | 1 | 366 | 208,903 | 0.2% | 18 | Local | No | |
| 10/23/2020 | Wind/Rain | North King | 1 | 49 | 330,266 | 0.01% | 8 | Local | No | |
| 10/23/2020 | Wind/Rain | South King | 1 | 84 | 248,997 | 0.03% | 10 | Local | No | |
| 10/23/2020 | Wind/Rain | Southern | 1 | 6,792 | 263,028 | 2.58% | 15 | Local | No | |
| 10/24/2020 | Wind/Rain | North King | 1 | 459 | 330,266 | 0.1% | 10 | Local | No | |
| 10/24/2020 | Wind/Rain | South King | 1 | 1,800 | 248,997 | 0.72% | 15 | Local | No | |
| 10/24/2020 | Wind/Rain | Southern | 1 | 188 | 263,028 | 0.07% | 8 | Local | No | |
| 11/3/2020 | Wind/Rain | Northern | 1 | 220 | 208,878 | 0.1% | 9 | Local | No | |
| 11/3/2020 | Wind/Rain | North King | 1 | 7,063 | 330,248 | 2.14% | 20 | Local | No | |
| 11/3/2020 | Wind/Rain | South King | 1 | 429 | 249,030 | 0.17% | 9 | Local | No | |
| 11/3/2020 | Wind/Rain | Southern | 1 | 36 | 262,989 | 0.01% | 4 | Local | No | |
| 11/4/2020 | Wind/Rain | North King | 1 | 4,342 | 330,248 | 1.31% | 19 | Local | No | |
| 11/4/2020 | Wind/Rain | South King | 1 | 1,622 | 249,030 | 0.65% | 22 | Local | No | |

Table continues on next page

Appendix A: Monthly SQI Performance

**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 |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 11/4/2020 | Wind/Rain | Southern | 1 | 359 | 262,989 | 0.14% | 15 | Local | No | |
| 11/5/2020 | Wind/Rain | Northern | 1 | 724 | 208,878 | 0.3% | 13 | Local | No | |
| 11/5/2020 | Wind/Rain | North King | 1 | 1,454 | 330,248 | 0.44% | 15 | Local | No | |
| 11/5/2020 | Wind/Rain | South King | 1 | 121 | 249,030 | 0.05% | 9 | Local | No | |
| 11/5/2020 | Wind/Rain | Southern | 1 | 2,944 | 262,989 | 1.12% | 14 | Local | No | |
| 11/7/2020 | Wind/Rain | Northern | 1 | 111 | 208,878 | 0.1% | 9 | Local | No | |
| 11/7/2020 | Wind/Rain | North King | 1 | 354 | 330,248 | 0.11% | 8 | Local | No | |
| 11/7/2020 | Wind/Rain | South King | 1 | 2 | 249,030 | 0.00% | 2 | Local | No | |
| 11/7/2020 | Wind/Rain | Southern | 1 | 63 | 262,989 | 0.02% | 4 | Local | No | |
| 11/8/2020 | Wind/Rain | North King | 1 | 2 | 330,248 | 0.00% | 2 | Local | No | |
| 11/8/2020 | Wind/Rain | South King | 1 | 546 | 249,030 | 0.22% | 3 | Local | No | |
| 11/8/2020 | Wind/Rain | Southern | 1 | 2,099 | 262,989 | 0.80% | 8 | Local | No | |
| 11/13/2020 | Wind/Rain | North King | 1 | 7,366 | 330,248 | 2.23% | 24 | Local | No | |
| 11/13/2020 | Wind/Rain | South King | 1 | 267 | 249,030 | 0.11% | 14 | Local | No | |

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 |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 11/14/2020 | Wind/Rain | North King | 1 | 87 | 330,248 | 0.03% | 7 | Local | No | |
| 11/14/2020 | Wind/Rain | South King | 1 | 25 | 249,030 | 0.01% | 7 | Local | No | |
| 11/14/2020 | Wind/Rain | Southern | 1 | 119 | 262,989 | 0.05% | 9 | Local | No | |
| 11/14/2020 | Wind/Rain | Western | 1 | 13 | 131,459 | 0.01% | 5 | Local | No | |
| 11/17/2020 | Wind/Rain | North King | 1 | 1,301 | 330,248 | 0.39% | 26 | Local | No | |
| 11/30/2020 | Wind | North King | 1 | 1,126 | 330,248 | 0.34% | 13 | Local | No | |
| 11/30/2020 | Wind | South King | 1 | 574 | 249,030 | 0.23% | 7 | Local | No | |
| 11/30/2020 | Wind | Southern | 1 | 250 | 262,989 | 0.10% | 10 | Local | No | |
| 11/30/2020 | Wind | Western | 1 | 574 | 131,459 | 0.44% | 11 | Local | No | |
| 12/19/2020 | Wind | Northern | 1 | 502 | 209,094 | 0.24% | 16 | Local | No | |
| 12/19/2020 | Wind | North King | 1 | 289 | 330,483 | 0.09% | 11 | Local | No | |
| 12/19/2020 | Wind | South King | 1 | 10 | 249,187 | 0.00% | 5 | Local | No | |
| 12/19/2020 | Wind | Western | 1 | 3 | 131,613 | 0.00% | 3 | Local | No | |
| 12/21/2020 | Wind | North King | 1 | 13,343 | 330,483 | 4.04% | 34 | Local | No | |

Table continues on next page

Appendix A: Monthly SQI Performance

**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 |
|------------|---------------|------------|-----------------|---------------------------|--------------------------|-------------------------|----------------------|--|---|----------|
| 12/21/2020 | Wind | South King | 1 | 7,644 | 249,187 | 3.07% | 21 | Local | No | |
| 12/21/2020 | Wind | Western | 1 | 7,524 | 131,613 | 5.72% | 21 | Local | No | |
| 12/22/2020 | Wind | North King | 1 | 3,780 | 330,483 | 1.14% | 12 | Local | No | |
| 12/22/2020 | Wind | South King | 1 | 296 | 249,187 | 0.12% | 5 | Local | No | |
| 12/22/2020 | Wind | Southern | 1 | 1,103 | 263,369 | 0.42% | 15 | Local | No | |
| 12/22/2020 | Wind | Western | 1 | 155 | 131,613 | 0.12% | 7 | Local | No | |
| 12/30/2020 | Wind | Northern | 1 | 2,338 | 209,094 | 1.12% | 24 | Local | No | |
| 12/30/2020 | Wind | North King | 1 | 13,424 | 330,483 | 4.06% | 14 | Local | No | |
| 12/30/2020 | Wind | South King | 1 | 21 | 249,187 | 0.01% | 6 | Local | No | |
| 12/30/2020 | Wind | Western | 1 | 232 | 131,613 | 0.18% | 6 | Local | No | |

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.⁵⁸

| 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 |
| 1/1/2020 | Seattle | 5265 S Brandon St | 10:46 | 11:10 | 11:30 | 0:24 |
| 1/24/2020 | Des Moines | 605 S 223rd ST | 11:47 | 12:09 | 12:29 | 0:22 |
| 1/30/2020 | Spanaway | 1407 201st St E | 17:02 | 17:41 | 19:29 | 0:39 |
| 1/31/2020 | Everett | 8220 Beverly Blvd | 9:46 | 10:00 | 11:55 | 0:14 |
| 2/1/2020 | Lynnwood | 6005 178th St SW | 7:41 | 8:10 | 11:58 | 0:29 |
| 2/14/2020 | Seattle | 324 N 77th St | 10:55 | 11:20 | 13:26 | 0:25 |
| 2/24/2020 | Lakewood | 3901 Southgate Ave SW | 8:49 | 9:01 | 9:07 | 0:12 |
| 2/25/2020 | Redmond | 6406 238th Ave NE | 14:04 | 14:19 | 17:44 | 0:15 |
| 2/29/2020 | Tacoma | 8845 Tacoma Ave S | 15:26 | 15:31 | 15:55 | 0:05 |
| 3/5/2020 | Everett | 3007 Rucker Ave | 10:40 | 10:52 | 11:04 | 0:12 |
| 3/23/2020 | Olympia | 3432 13th Ave SW | 10:48 | 11:08 | 12:10 | 0:20 |
| 3/27/2020 | Olympia | 2215 Village St NE | 12:39 | 12:39 | 13:35 | 0:00 |
| 4/8/2020 | Seattle | 6714 21st Ave NW | 17:12 | 17:31 | 17:49 | 0:19 |

Table continues on next page.

⁵⁸ 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 |
| 4/10/2020 | Tacoma | 8401 S Hosmer Street | 18:47 | 19:00 | 20:24 | 0:13 |
| 5/4/2020 | Medina | 2231 78th Ave NE | 9:54 | 10:21 | 13:34 | 0:27 |
| 5/6/2020 | Auburn | 3604 S 293rd Pl | 1:15 | 13:31 | 13:46 | 12:16 |
| 5/7/2020 | Renton | 3801 Oaksdale Ave SW | 14:16 | 14:46 | 17:19 | 0:30 |
| 5/8/2020 | Puyallup | 717 2nd St SW | 18:23 | 18:49 | 18:56 | 0:26 |
| 5/12/2020 | Seattle | 12354 15th Ave NE | 20:17 | 20:39 | 21:49 | 0:22 |
| 5/13/2020 | Olympia | 501 Lilly Rd SE | 9:17 | 9:49 | 10:25 | 0:32 |
| 5/13/2020 | Snohomish | 21520 E Lost Lake Rd | 9:19 | 9:50 | 10:01 | 0:31 |
| 5/27/2020 | Auburn | 1205 24th St SE | 14:07 | 14:24 | 16:28 | 0:17 |
| 5/28/2020 | Renton | 4524 SE 4th Pl | 13:14 | 13:39 | 13:47 | 0:25 |
| 5/29/2020 | Renton | 15418 SE 177th Pl | 15:22 | 15:35 | 15:49 | 0:13 |
| 6/3/2020 | Seattle | 3801 SW Alaska St | 11:50 | 12:13 | 13:40 | 0:23 |
| 6/5/2020 | Gig Harbor | 2203 36th St NW | 14:00 | 14:06 | 16:16 | 0:06 |
| 6/6/2020 | Des Moines | 925 S 261st Pl | 10:57 | 11:31 | 11:55 | 0:34 |
| 6/7/2020 | Medina | 2005 Evergreen Point Rd. | 16:09 | 16:36 | 17:01 | 0:27 |
| 6/16/2020 | Olympia | 309 Washington St NE | 11:48 | 11:59 | 12:32 | 0:11 |
| 6/19/2020 | Seattle | 2413 N 41st St | 18:44 | 18:52 | 19:02 | 0:08 |
| 6/24/2020 | Seattle | 1153 NW 51st St | 10:19 | 10:29 | 11:53 | 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 |
| 6/26/2020 | Everett | 3214 Broadway | 12:41 | 12:59 | 15:03 | 0:18 |
| 6/27/2020 | Seatac | 18740 International Blvd | 11:36 | 12:00 | 14:15 | 0:24 |
| 6/30/2020 | Puyallup | 210 S Meridian | 2:05 | 2:40 | 11:10 | 0:35 |
| 7/7/2020 | Everett | 1515 Rainier Ave | 19:43 | 20:13 | 20:34 | 0:30 |
| 7/9/2020 | Kent | 10121 SE 226th Pl | 12:45 | 13:10 | 13:24 | 0:25 |
| 7/10/2020 | Seattle | 4022 Delridge Way | 8:15 | 8:47 | 10:53 | 0:32 |
| 7/10/2020 | Kent | 17600 Se Covington sawyer RD | 16:38 | 17:50 | 18:49 | 1:12 |
| 7/10/2020 | Maple Valley | 25228 235th Way SE | 11:37 | 12:12 | 12:33 | 0:35 |
| 7/11/2020 | Ellensburg | 531 Allegro Way | 14:07 | 14:39 | 16:58 | 0:32 |
| 7/28/2020 | Seattle | 59 East Lynn Street | 11:03 | 11:25 | 11:36 | 0:22 |
| 7/29/2020 | Lake Forest Park | 4524 NE 204th Pl | 10:47 | 11:06 | 11:18 | 0:19 |
| 7/29/2020 | Snohomish | 21417 W Lost Lake Rd | 12:07 | 12:34 | 12:44 | 0:27 |
| 8/4/2020 | Seattle | 2230 32nd Ave S | 12:43 | 13:04 | 13:22 | 0:21 |
| 8/10/2020 | Seattle | 7714 6th Ave NW | 12:48 | 13:11 | 13:19 | 0:23 |
| 8/15/2020 | Seattle | 404 S 96th St | 8:35 | 8:54 | 9:36 | 0:19 |
| 8/16/2020 | Ruston | 5433 N 49th St | 14:50 | 15:17 | 15:49 | 0:27 |
| 8/17/2020 | Tumwater | 477 Z Street SE | 19:03 | 19:24 | 19:36 | 0:21 |
| 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 |
| 8/21/2020 | Seattle | 4153 41st Ave S | 9:16 | 9:16 | 9:28 | 0:00 |
| 8/21/2020 | Seattle | 7719 Mary Ave NW | 9:44 | 9:51 | 9:56 | 0:07 |
| 8/31/2020 | Dupont | 210 BARKSDALE AVE Dupont 98327 | 13:46 | 14:08 | 14:31 | 0:22 |
| 9/3/2020 | Chehalis | 102 McBride Ct | 9:27 | 9:39 | 10:25 | 0:12 |
| 9/4/2020 | Lake Forest Park | 18953 Forest Park Dr NE | 11:21 | 11:37 | 11:42 | 0:16 |
| 9/8/2020 | Sumner | 8414 170th Ave E | 19:53 | 20:10 | 22:58 | 0:17 |
| 9/9/2020 | Kent | 11624 Kent Kenley Rd | 14:34 | 14:41 | 15:06 | 0:07 |
| 9/14/2020 | Gig Harbor | 1809 Clorindi Cir NW | 10:27 | 10:55 | 11:02 | 0:28 |
| 9/24/2020 | Seattle | 5717 Rainier Ave S | 11:44 | 12:10 | 12:20 | 0:26 |
| 9/27/2020 | Federal Way | 30440 28th Ave S | 23:52 | 0:42 | 0:42 | 0:50 |
| 9/27/2020 | Kirkland | 13260 108th Ave NE | 16:16 | 16:44 | 18:30 | 0:28 |
| 9/28/2020 | JBLM Tacoma | 2013 Evergreen Way SW | 12:40 | 13:18 | 13:38 | 0:38 |
| 9/30/2020 | Bellevue | 11100 Main St | 10:11 | 10:20 | 11:22 | 0:09 |
| 10/1/2020 | Seattle | 4835 Delridge Way SW | 10:53 | 10:58 | 11:42 | 0:05 |
| 10/15/2020 | Federal Way | 32015 Pacific Hwy S | 12:48 | 13:05 | 14:03 | 0:17 |
| 10/15/2020 | Seattle | 8457 36th Ave SW | 14:57 | 15:25 | 17:20 | 0:28 |
| 10/19/2020 | Gig Harbor | 9510 Beachwood Dr NW | 14:38 | 15:09 | 15:17 | 0:31 |
| 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 |
| 10/21/2020 | Renton | 16211 SE 137th Pl | 10:55 | 11:32 | 21:41 | 0:37 |
| 11/2/2020 | Seattle | 2858 NW 70th St | 11:42 | 12:09 | 12:25 | 0:27 |
| 11/5/2020 | Seattle | 111 S Jackson ST | 8:08 | 8:23 | 8:24 | 0:15 |
| 11/10/2020 | Woodinville | 19316 183rd Ave NE | 16:10 | 16:24 | 16:33 | 0:14 |
| 11/11/2020 | Maple Valley | 25521 223rd Ct SE | 11:02 | 11:42 | 11:55 | 0:40 |
| 11/15/2020 | Tacoma | 4016 E C St | 12:02 | 12:15 | 12:27 | 0:13 |
| 11/19/2020 | Seattle | 3760 Lawton St | 15:18 | 15:32 | 16:00 | 0:14 |
| 11/28/2020 | Maple Valley | 25306 SE 221st ST | 11:05 | 11:50 | 12:20 | 0:45 |
| 12/4/2020 | Newcastle | 7806 113th Ave SE | 12:12 | 12:33 | 13:15 | 0:21 |
| 12/5/2020 | Vashon | 11908 Sylvan Beach Walk SW | 13:57 | 15:26 | 15:30 | 1:29 |
| 12/15/2020 | Tacoma | 6021 Garcia Blvd | 9:59 | 10:02 | 10:14 | 0:03 |
| 12/20/2020 | Covington | 18810 SE 270th St | 10:12 | 10:41 | 10:59 | 0:29 |
| 12/24/2020 | Seattle | 8321 37th Ave S | 19:42 | 20:03 | 20:03 | 0:21 |
| Average Control Time for 2020 | | | | | | 1:08 |

B Certification of Survey Results



TO: Eric Haechrel, Puget Sound Energy
FR: Andrew Thibault, EMC Research, Inc.
DT: February 2021
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 2020 reporting year, PSE met 8 of 9 benchmarks for the Service Quality Program but missed the benchmark for SQI #3, System Average Interruption Duration Index (SAIDI). However, there is no SQ Program penalty associated with this index. The SQI #3 SAIDI penalty mechanics were 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.

D

Proposed Customer Notice (Report Card)

2020 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 Staff and Public Counsel, but no later than 90 days after PSE files its annual SQ and Electric Service Reliability Report.

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

Figure D1: Draft 2020 Service Quality Report Card

2020 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's expectations, providing reliable service, and keeping customers safe. Failure to achieve all these service-quality measurements in a reporting year would put us at risk of a penalty of up to \$12 million.

| Key Measurement | Benchmark | 2020 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 | 96 percent | ✓ |
| Number of complaints to the UTC per 1,000 customers, per year | Less than 0.40 | 0.10 | ✓ |
| Customer Services | | | |
| Percent of calls answered live within 60 seconds by our Customer Care Center | At least 80 percent | 84 percent | ✓ |
| Operations Services | | | |
| Frequency of non-major-storm power outages, per year, per customer | Less than 1.30 outages | 1.24 outages | ✓ |
| Length of power outages per year, per customer* | Less than 2 hours, 35 minutes | 2 hours, 45 minutes | |
| Time from customer call to arrival of field technicians in response to electric system emergencies | No more than 55 minutes | 51 minutes | ✓ |
| Time from customer call to arrival of field technicians in response to natural gas emergencies | No more than 55 minutes | 32 minutes | ✓ |
| Percent of service appointments kept | At least 92 percent | 99 percent | ✓ |

*There is no annual performance penalty associated with this 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. Please see the information about service guarantees below.

2020 Performance Highlights

2020 was a year of unprecedented challenges brought on by the COVID-19 pandemic. We have continued to adapt to the CDC and state agencies' evolving guidelines to ensure our employee's and the public's safety and provide reliable energy service.

We met eight of the nine service metrics (see chart above), improving in all areas of Customer Satisfaction and Services. We also improved response time for electric and gas emergencies from 2019. The missed benchmark for the length of power outages per year was caused primarily by

numerous and non-stop weather events in the first weeks of 2020. While restoration had been slowed by inaccessible roads, additional damage would occur from subsequent wind and snow as damage was repaired.

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

- Keeping scheduled 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>.

For 2020, PSE paid \$14,200 for missing 284 of the total 37,773 service guaranteed appointments. We provided 279 customers with a \$50 credit for not restoring electric service within 24 consecutive hours during certain non-major-storm power outages and nine customers with a \$50 credit for not restoring electric service within 120 consecutive hours during any power outage.

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

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.

Table E1: Annual Disconnection Results from 2016 to 2020 per 1,000 Customers

| 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|
| 42 | 53 | 48 | 42 | 8 |

Table E2: Monthly Disconnection Results per 1,000 Customers for 2020

| Month ⁵⁹ | Disconnections per 1,000 Customers |
|---------------------|------------------------------------|
| January | 3 |
| February | 3 |
| March | 1 |
| April | 0 |
| May | 0 |
| June | 0 |
| July | 0 |
| August | 0 |
| September | 0 |
| October | 0 |
| November | 0 |
| December | 0 |

⁵⁹ 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 at least until after April 30, 2021.

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 2020

| | 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 | 7,854 | 101 | 0 | 101 | 37 | 7,716 | 7,753 | 0 | 176 | \$5,050 | 99% |
| Reconnection | 8,917 | 26 | 0 | 26 | 69 | 8,822 | 8,891 | 0 | 0 | \$1,300 | 100%* |
| Subtotal | 16,771 | 127 | 0 | 127 | 106 | 16,538 | 16,644 | 0 | 176 | \$6,350 | 99% |
| Natural Gas | | | | | | | | | | | |
| Diagnostic | 7,708 | 48 | 0 | 48 | 408 | 7,252 | 7,660 | 0 | 0 | \$2,400 | 99% |
| Permanent Service | 8,022 | 63 | 0 | 63 | 201 | 7,758 | 7,959 | 0 | 240 | \$3,150 | 99% |
| Reconnection | 5,272 | 46 | 0 | 46 | 139 | 5,087 | 5,226 | 0 | 0 | \$2,300 | 99% |
| Subtotal | 21,002 | 157 | 0 | 157 | 748 | 20,097 | 20,845 | 0 | 240 | \$7,850 | 99% |
| Grand Total | 37,773 | 284 | 0 | 284 | 854 | 36,635 | 37,489 | 0 | 416 | \$14,200 | 99% |

*99.7% before rounding. 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. However, a 100% performance result does not reflect that PSE met all its appointments during the reporting period. There were 26 missed SQI #10 electric reconnection appointments in 2020 as indicated in the "Total Missed" column.

Table F2: SQI #10 and Customer Service Guarantee Payment Annual Details for 2020

| 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-20 | Electric | Permanent Service | 619 | 4 | - | 4 | 5 | 610 | 615 | 0 | 18 | \$200 |
| Jan-20 | Electric | Reconnection | 2,760 | 7 | - | 7 | 12 | 2,741 | 2,753 | 0 | 0 | \$350 |
| Jan-20 | Gas | Diagnostic | 2,304 | 5 | 0 | 5 | 91 | 2,208 | 2,299 | 0 | 0 | \$250 |
| Jan-20 | Gas | Permanent Service | 638 | 18 | 0 | 18 | 37 | 583 | 620 | 0 | 33 | \$900 |
| Jan-20 | Gas | Reconnection | 1,335 | 2 | 0 | 2 | 15 | 1,318 | 1,333 | 0 | 0 | \$100 |
| Jan-20 Total | | | 7,656 | 36 | 0 | 36 | 160 | 7,460 | 7,620 | 0 | 51 | \$1,800 |
| Feb-20 | Electric | Permanent Service | 645 | 16 | 0 | 16 | 2 | 627 | 629 | 0 | 0 | \$800 |
| Feb-20 | Electric | Reconnection | 2,574 | 5 | 0 | 5 | 11 | 2,558 | 2,569 | 0 | 0 | \$250 |
| Feb-20 | Gas | Diagnostic | 1,889 | 5 | 0 | 5 | 82 | 1,802 | 1,884 | 0 | 0 | \$250 |
| Feb-20 | Gas | Permanent Service | 707 | 18 | 0 | 18 | 14 | 675 | 689 | 0 | 3 | \$900 |
| Feb-20 | Gas | Reconnection | 1,049 | 1 | 0 | 1 | 8 | 1,040 | 1,048 | 0 | 0 | \$50 |
| Feb-20 Total | | | 6,864 | 45 | 0 | 45 | 117 | 6,702 | 6,819 | 0 | 3 | \$2,250 |
| Mar-20 | Electric | Permanent Service | 659 | 10 | 0 | 10 | 1 | 648 | 649 | 0 | 0 | \$500 |
| Mar-20 | Electric | Reconnection | 1,251 | 3 | 0 | 3 | 9 | 1,239 | 1,248 | 0 | 0 | \$150 |
| Mar-20 | Gas | Diagnostic | 976 | 2 | 0 | 2 | 41 | 933 | 974 | 0 | 0 | \$100 |
| Mar-20 | Gas | Permanent Service | 661 | 12 | 0 | 12 | 18 | 631 | 649 | 0 | 0 | \$600 |
| Mar-20 | Gas | Reconnection | 441 | 2 | 0 | 2 | 4 | 435 | 439 | 0 | 0 | \$100 |
| Mar-20 Total | | | 3,988 | 29 | 0 | 29 | 73 | 3,886 | 3,959 | 0 | 0 | \$1,450 |

Table continues on next page.

Table F2: SQI #10 and Customer Service Guarantee Payment Annual Details for 2020

| 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-20 | Electric | Permanent Service | 120 | 23 | 0 | 23 | 1 | 96 | 97 | 0 | 35 | \$1,150 |
| Apr-20 | Electric | Reconnection | 142 | 0 | 0 | 0 | 4 | 138 | 142 | 0 | 0 | \$0 |
| Apr-20 | Gas | Diagnostic | 76 | 0 | 0 | 0 | 3 | 73 | 76 | 0 | 0 | \$0 |
| Apr-20 | Gas | Permanent Service | 24 | 0 | 0 | 0 | 9 | 15 | 24 | 0 | 0 | \$0 |
| Apr-20 | Gas | Reconnection | 130 | 0 | 0 | 0 | 0 | 130 | 130 | 0 | 0 | \$0 |
| Apr-20 Total | | | 492 | 23 | 0 | 23 | 17 | 452 | 469 | 0 | 35 | \$1,150 |
| May-20 | Electric | Permanent Service | 551 | 12 | 0 | 12 | 1 | 538 | 539 | 0 | 34 | \$600 |
| May-20 | Electric | Reconnection | 110 | 0 | 0 | 0 | 6 | 104 | 110 | 0 | 0 | \$0 |
| May-20 | Gas | Diagnostic | 213 | 0 | 0 | 0 | 14 | 199 | 213 | 0 | 0 | \$0 |
| May-20 | Gas | Permanent Service | 582 | 1 | 0 | 1 | 14 | 567 | 581 | 0 | 204 | \$50 |
| May-20 | Gas | Reconnection | 102 | 0 | 0 | 0 | 2 | 100 | 102 | 0 | 0 | \$0 |
| May-20 Total | | | 1,558 | 13 | 0 | 13 | 37 | 1,508 | 1,545 | 0 | 238 | \$650 |
| Jun-20 | Electric | Permanent Service | 825 | 4 | 0 | 4 | 5 | 816 | 821 | 0 | 0 | \$200 |
| Jun-20 | Electric | Reconnection | 111 | 2 | 0 | 2 | 2 | 107 | 109 | 0 | 0 | \$100 |
| Jun-20 | Gas | Diagnostic | 289 | 0 | 0 | 0 | 15 | 274 | 289 | 0 | 0 | \$0 |
| Jun-20 | Gas | Permanent Service | 814 | 7 | 0 | 7 | 8 | 799 | 807 | 0 | 0 | \$350 |
| Jun-20 | Gas | Reconnection | 81 | 0 | 0 | 0 | 0 | 81 | 81 | 0 | 0 | \$0 |
| Jun-20 Total | | | 2,120 | 13 | 0 | 13 | 30 | 2,077 | 2,107 | 0 | 0 | \$650 |

Table continues on next page.

| | Fuel | Type | Total Appointments (Exclude Canceled and | Missed Approved | Missed Open | Total Missed | Manual Kept | System Kept | Total Kept | Canceled | Excused | Customer Service Guarantee Payment |
|---------------------|----------|--------------|---|-----------------|-------------|--------------|-------------|--------------|--------------|----------|-----------|------------------------------------|
| Jul-20 | Electric | Permanent | 750 | 3 | 0 | 3 | 7 | 740 | 747 | 0 | 0 | \$150 |
| Jul-20 | Electric | Reconnection | 131 | 3 | 0 | 3 | 1 | 127 | 128 | 0 | 0 | \$150 |
| Jul-20 | Gas | Diagnostic | 137 | 6 | 0 | 6 | 13 | 118 | 131 | 0 | 0 | \$300 |
| Jul-20 | Gas | Permanent | 791 | 1 | 0 | 1 | 16 | 774 | 790 | 0 | 0 | \$50 |
| Jul-20 | Gas | Reconnection | 104 | 6 | 0 | 6 | 14 | 84 | 98 | 0 | 0 | \$300 |
| Jul-20 Total | | | 1,913 | 19 | 0 | 19 | 51 | 1,843 | 1,894 | 0 | 0 | \$950 |
| Aug-20 | Electric | Permanent | 795 | 6 | 0 | 6 | 3 | 786 | 789 | 0 | 0 | \$300 |
| Aug-20 | Electric | Reconnection | 424 | 2 | 0 | 2 | 5 | 417 | 422 | 0 | 0 | \$100 |
| Aug-20 | Gas | Diagnostic | 152 | 4 | 0 | 4 | 13 | 135 | 148 | 0 | 0 | \$200 |
| Aug-20 | Gas | Permanent | 819 | 3 | 0 | 3 | 19 | 797 | 816 | 0 | 0 | \$150 |
| Aug-20 | Gas | Reconnection | 128 | 3 | 0 | 3 | 18 | 107 | 125 | 0 | 0 | \$150 |
| Aug-20 Total | | | 2,318 | 18 | 0 | 18 | 58 | 2,242 | 2,300 | 0 | 0 | \$900 |
| Sep-20 | Electric | Permanent | 666 | 4 | 0 | 4 | 4 | 658 | 662 | 0 | 52 | \$200 |
| Sep-20 | Electric | Reconnection | 353 | 0 | 0 | 0 | 6 | 347 | 353 | 0 | 0 | \$0 |
| Sep-20 | Gas | Diagnostic | 207 | 2 | 0 | 2 | 17 | 188 | 205 | 0 | 0 | \$100 |
| Sep-20 | Gas | Permanent | 741 | 3 | 0 | 3 | 19 | 719 | 738 | 0 | 0 | \$150 |
| Sep-20 | Gas | Reconnection | 261 | 5 | 0 | 5 | 11 | 245 | 256 | 0 | 0 | \$250 |
| Sep-20 Total | | | 2,228 | 14 | 0 | 14 | 57 | 2,157 | 2,214 | 0 | 52 | \$700 |

Table continues on next page.

| | 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-20 | Electric | Permanent | 812 | 5 | 0 | 5 | 6 | 801 | 807 | 0 | 37 | \$250 |
| Oct-20 | Electric | Reconnection | 440 | 1 | 0 | 1 | 2 | 437 | 439 | 0 | 0 | \$50 |
| Oct-20 | Gas | Diagnostic | 324 | 4 | 0 | 4 | 33 | 287 | 320 | 0 | 0 | \$200 |
| Oct-20 | Gas | Permanent | 853 | 0 | 0 | 0 | 20 | 833 | 853 | 0 | 0 | \$0 |
| Oct-20 | Gas | Reconnection | 627 | 9 | 0 | 9 | 29 | 589 | 618 | 0 | 0 | \$450 |
| Oct-20 Total | | | 3,056 | 19 | 0 | 19 | 90 | 2,947 | 3,037 | 0 | 37 | \$950 |
| Nov-20 | Electric | Permanent | 685 | 9 | 0 | 9 | 0 | 676 | 676 | 0 | 0 | \$450 |
| Nov-20 | Electric | Reconnection | 318 | 3 | 0 | 3 | 8 | 307 | 315 | 0 | 0 | \$150 |
| Nov-20 | Gas | Diagnostic | 476 | 9 | 0 | 9 | 40 | 427 | 467 | 0 | 0 | \$450 |
| Nov-20 | Gas | Permanent | 692 | 0 | 0 | 0 | 13 | 679 | 692 | 0 | 0 | \$0 |
| Nov-20 | Gas | Reconnection | 581 | 10 | 0 | 10 | 23 | 548 | 571 | 0 | 0 | \$500 |
| Nov-20 Total | | | 2,752 | 31 | 0 | 31 | 84 | 2,637 | 2,721 | 0 | 0 | \$1,550 |
| Dec-20 | Electric | Permanent | 727 | 5 | 0 | 5 | 2 | 720 | 722 | 0 | 0 | \$250 |
| Dec-20 | Electric | Reconnection | 303 | 0 | 0 | 0 | 3 | 300 | 303 | 0 | 0 | \$0 |
| Dec-20 | Gas | Diagnostic | 665 | 11 | 0 | 11 | 46 | 608 | 654 | 0 | 0 | \$550 |
| Dec-20 | Gas | Permanent | 700 | 0 | 0 | 0 | 14 | 686 | 700 | 0 | 0 | \$0 |
| Dec-20 | Gas | Reconnection | 433 | 8 | 0 | 8 | 15 | 410 | 425 | 0 | 0 | \$400 |
| Dec-20 Total | | | 2,828 | 24 | 0 | 24 | 80 | 2,724 | 2,804 | 0 | 0 | \$1,200 |
| Grand Total | | | 37,773 | 284 | 0 | 284 | 854 | 36,635 | 37,489 | 0 | 416 | \$14,200 |

G **Customer Awareness of Service Guarantees**

In 2020, 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 2020 bill-insert newsletter article to all customers, also posted on pse.com:

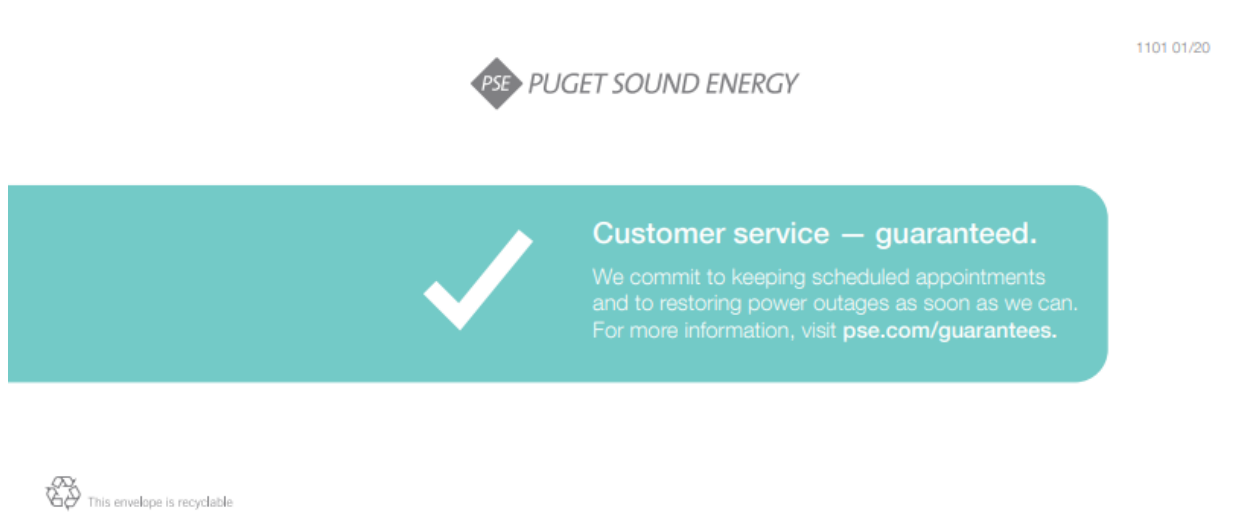
Customer service guaranteed

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 nonmajor storm power outage restoration guarantee
- 120-consecutive-hour power outage restoration guarantee

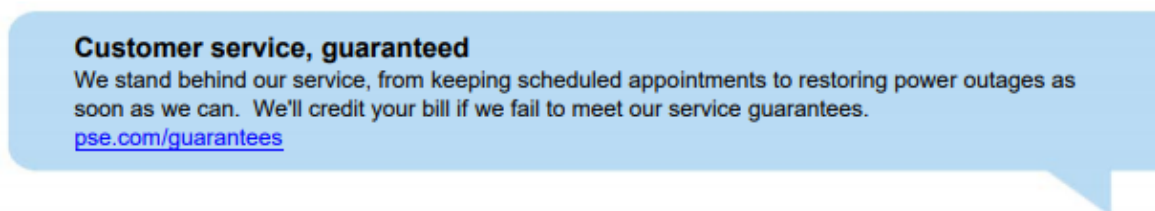
Conditions apply. More at [pse.com/guarantees](https://www.pse.com/guarantees).

2. January 2020 bill envelope, also posted on pse.com:



3. January 2020 bill-print message for all customers with link to Service guarantees page on pse.com:

**January 2020 bill print messages
Summary page**



4. May 2020 bill insert newsletter article to all customers, also posted on pse.com:

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.

5. June 2020 bill-print message for all customers with link to Service Guarantees page on pse.com:

**June 2020 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 2019 Service Quality Report Card included in your bill.
pse.com/guarantees

6. July 2020 bill envelope, also posted on pse.com:

1101 07/20



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.



This envelope is recyclable

7. August 2020 bill insert newsletter article to all customers, also posted on pse.com:

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.

8. October 2020 bill-print message for all customers with link to Service Guarantees page on pse.com:

October 2020 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

October 1st price change – All G&F customers

9. December 2020 bill-print message for all customers with link to Service Guarantees page on pse.com:

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

10. December 2020 bill envelope, also posted on pse.com:



1101 12/20



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.



This envelope is recyclable

4. 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 2020 | Feb 2020 | Mar 2020 | Apr 2020 | May 2020 | Jun 2020 | Jul 2020 | Aug 2020 | Sep 2020 | Oct 2020 | Nov 2020 | Dec 2020 |
|--|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 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 | 89 | 72 | 46 | 29 | 23 | 26 | 25 | 30 | 38 | 59 | 46 | 36 |
| | No | 114 | 90 | 77 | 156 | 164 | 103 | 164 | 120 | 138 | 147 | 120 | 132 |
| | Don't Know | 46 | 37 | 26 | 63 | 55 | 69 | 60 | 51 | 23 | 44 | 32 | 31 |
| | Refused Response | 1 | 1 | 1 | 2 | 8 | 2 | 1 | - | 1 | - | 2 | 1 |
| | Total Customers Surveyed | 250 | 200 | 150 | 250 | 250 | 200 | 250 | 201 | 200 | 250 | 200 | 200 |
| 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. | | | | | | | | | | | | | |
| | You are given the \$50 service guarantee if the rescheduled time causes you inconvenience. | 34 | 39 | 23 | 8 | 8 | 10 | 18 | 17 | 22 | 15 | 18 | 18 |
| | Whenever PSE changes an appointment, you are given the \$50. | 33 | 30 | 13 | 14 | 9 | 14 | 4 | 10 | 11 | 26 | 20 | 14 |
| | You have no understanding or expectations about this part of the service guarantee plan. | 132 | 97 | 92 | 196 | 161 | 112 | 97 | 123 | 115 | 150 | 98 | 100 |
| | Don't Know | 51 | 33 | 21 | 30 | 64 | 63 | 127 | 51 | 51 | 46 | 61 | 62 |
| | Refused Response | - | 1 | 1 | 2 | 8 | 1 | 4 | - | 1 | 13 | 3 | 6 |
| | Total Customers Surveyed | 250 | 200 | 150 | 250 | 250 | 200 | 250 | 201 | 200 | 250 | 200 | 200 |

Table continues on next page.

| | | Jan 2020 | Feb 2020 | Mar 2020 | Apr 2020 | May 2020 | Jun 2020 | Jul 2020 | Aug 2020 | Sep 2020 | Oct 2020 | Nov 2020 | Dec 2020 |
|---|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Field Service Operations Transactions Customer Satisfaction Survey | | | | | | | | | | | | | |
| Q26D. Did your appointment have to be rescheduled or did it occur as planned? | It occurred as planned. | 232 | 192 | 140 | 233 | 236 | 188 | 241 | 185 | 185 | 237 | 176 | 189 |
| | It was rescheduled. | 11 | 3 | 4 | 9 | 4 | 4 | 4 | 8 | 5 | 2 | 8 | 4 |
| | Technician arrived but was late. | 2 | - | - | 1 | 1 | - | - | - | 1 | 2 | 1 | 1 |
| | Don't Know | 4 | 4 | 4 | 2 | 3 | 7 | 3 | 6 | 8 | 6 | 12 | 4 |
| | Refused Response | 1 | 1 | 2 | 5 | 6 | 1 | 2 | 2 | 1 | 3 | 3 | 2 |
| | Total Customers Surveyed | 250 | 200 | 150 | 250 | 250 | 200 | 250 | 201 | 200 | 250 | 200 | 200 |
| | | | | | | | | | | | | | |
| Q26E. Who initiated rescheduling your appointment? | Myself (Customer Initiated) | 7 | 3 | 2 | 6 | 4 | 2 | - | 5 | 3 | 1 | 4 | 2 |
| | Puget Sound Energy Initiated | 3 | - | 2 | 2 | - | 2 | 3 | 3 | 2 | 1 | 4 | 2 |
| | Don't Know | 1 | - | - | 1 | - | - | 1 | - | - | - | - | - |
| | Refused Response | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total Customers Surveyed | 11 | 3 | 4 | 9 | 4 | 4 | 4 | 8 | 5 | 2 | 8 | 4 |

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:

SAIDIS_{QI} 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.

SAIDIS_{QI} – any interruption five minutes or shorter

SAIFIS_{QI} – 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 is commonly referred to as customer-minutes of interruption (CMI) or customer hours, and is designed to provide information about the average time the customers are interrupted. 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 (SAIDIS_{QI}). 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 one minute 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_{SQI-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:

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

SAIFI_{Total}: the numerator includes all customer interruptions on outages one minute 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.⁶⁰

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

⁶⁰ Order 17 of consolidated Dockets UE-072300 and UG-072301, page 10, section 26.

that using this new method of data collection provides a more complete assessment 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.

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 2020 Electric Service Reliability Report, PSE continues to designate the Areas of Greatest Concern as the Top 50 worst-performing circuits⁶¹ over the previous five years that rank worst in terms of customer interruption minutes.

- 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.

⁶¹ 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.

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

J 1997-current year PSE SAIDI and SAIFI Performance by Different Measurements⁶²

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

| 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 | 438 | 438 | 432 | 145 |
| 2019 | 132 | 136 | 550 | 550 | 434 | 136 |
| 2020 | 220 | 171 | 414 | 414 | 454 | 165 |

Figure J1: 1997–2020 SAIDI Performance by Different Measurement

⁶² This section meets a requirement of Attachment B of Docket UE-110060.

| 1997-2020 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 | 1.57 | 1.57 | 1.83 |
| 2019 | 0.98 | 0.96 | 1.57 | 1.57 | 1.76 |
| 2020 | 1.24 | 1.06 | 1.70 | 1.70 | 1.67 |

Figure J3: 1997–2020 SAIFI Performance by Different Measurements

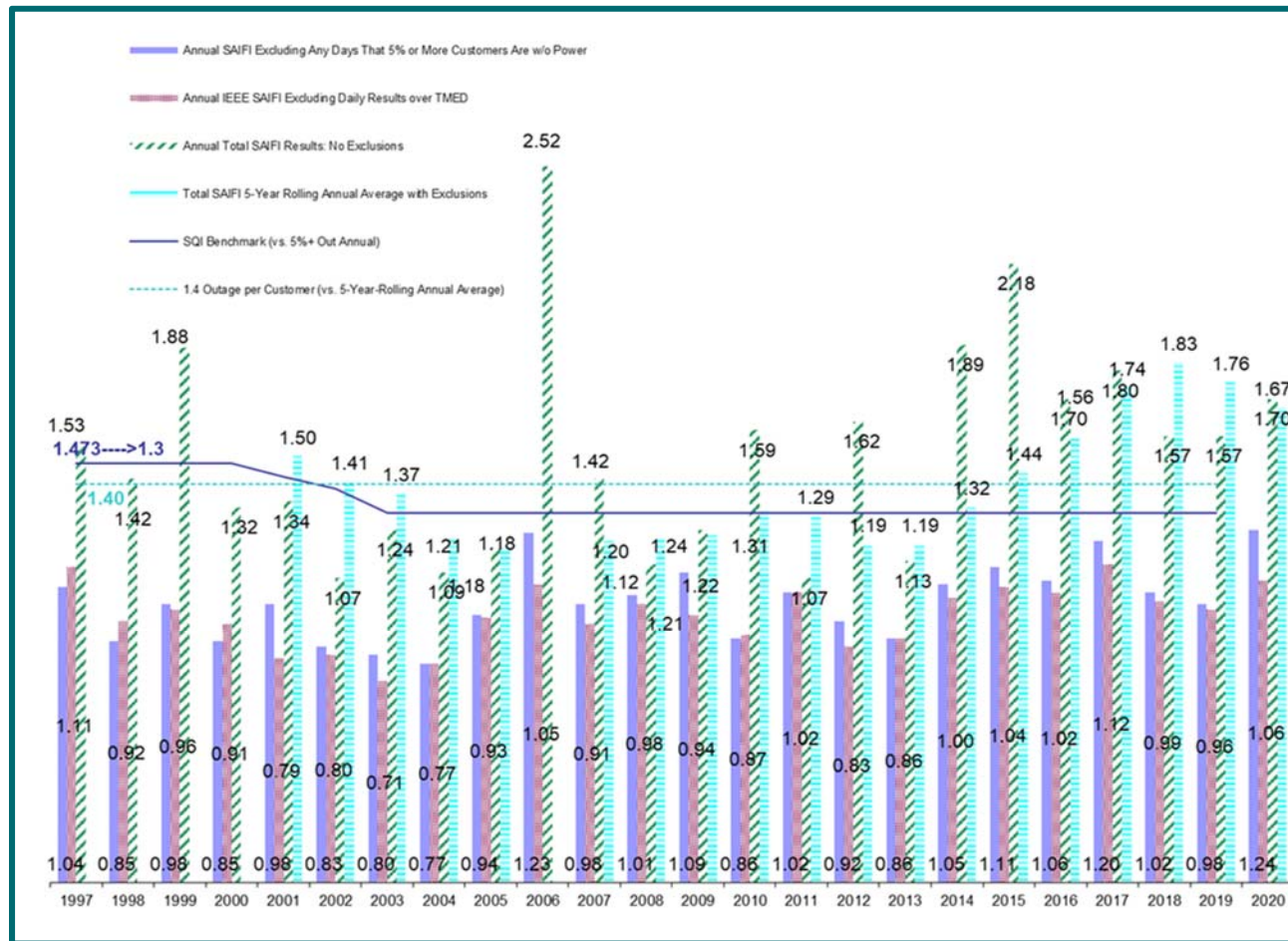


Figure J4: 1997–2020 SIFI Performance by Different Measurements

K Current Year Electric Service Outage by Cause by Area⁶³

This appendix details the 2020 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 | 37 | 21 | 9 | 96 | 5 | 31 | 29 | 13 | 241 |
| BA | 154 | 95 | 62 | 604 | 22 | 122 | 152 | 242 | 1,453 |
| CP | 39 | 30 | 12 | 139 | 6 | 42 | 33 | 40 | 341 |
| CR | 0 | 0 | 0 | 6 | 0 | 3 | 5 | 1 | 15 |
| DU | 17 | 9 | 17 | 80 | 6 | 20 | 18 | 15 | 182 |
| EF | 681 | 389 | 305 | 2,275 | 155 | 483 | 699 | 444 | 5,431 |
| EO | 0 | 1 | 0 | 0 | 0 | 1 | 00 | 1 | 3 |
| EQ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FI | 11 | 5 | 8 | 29 | 2 | 5 | 6 | 7 | 73 |
| LI | 17 | 2 | 0 | 34 | 4 | 12 | 21 | 16 | 106 |
| SO | 249 | 94 | 82 | 842 | 48 | 168 | 189 | 207 | 1,879 |
| TV⁶⁴ | 678 | 483 | 385 | 1,908 | 93 | 413 | 693 | 1,188 | 5,841 |
| UN | 78 | 68 | 12 | 185 | 8 | 26 | 36 | 45 | 458 |
| VA | 0 | 6 | 1 | 20 | 0 | 4 | 1 | 2 | 34 |
| Misc⁶⁵ | 15 | 8 | 20 | 91 | 11 | 24 | 20 | 13 | 202 |
| Total | 1,976 | 1,211 | 913 | 6,309 | 360 | 1,354 | 1,902 | 2,234 | 16,259 |

⁶³ This section meets a requirement of Attachment B of Docket UE-110060.

⁶⁴ The tree on-right-of-way (TO) and tree off-right-of-way (TF) cause codes are limited in their use while a process for better designations is developed. See description in Appendix I. For 2020, there were 160 events labeled TF and 204 events labeled TO.

⁶⁵ Miscellaneous causes are included in both Preventable and Third Party (Non-Tree) categories

Table K3: SQI SAIDI Outages by Cause

| | Northern | | | King/Kittitas | | Southern/Western | | | Total |
|--------------------------|----------|--------|--------|---------------|----------|------------------|----------|--------|--------|
| | Whatcom | Skagit | Island | King | Kittitas | Pierce | Thurston | Kitsap | |
| AO | 33 | 20 | 9 | 91 | 5 | 29 | 27 | 13 | 227 |
| BA | 152 | 93 | 60 | 594 | 22 | 121 | 150 | 240 | 1,432 |
| CP | 39 | 29 | 12 | 137 | 5 | 41 | 31 | 39 | 333 |
| CR | 0 | 0 | 0 | 6 | 0 | 2 | 5 | 1 | 14 |
| DU | 17 | 9 | 16 | 79 | 6 | 20 | 18 | 15 | 180 |
| EF | 641 | 356 | 277 | 2,134 | 145 | 451 | 650 | 420 | 5,074 |
| EO | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| EQ | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FI | 10 | 4 | 8 | 25 | 2 | 4 | 5 | 7 | 65 |
| LI | 17 | 2 | 0 | 31 | 4 | 12 | 21 | 15 | 102 |
| SO | 246 | 90 | 82 | 821 | 46 | 164 | 188 | 204 | 1,841 |
| TV⁶⁶ | 461 | 313 | 262 | 1,086 | 76 | 204 | 442 | 768 | 3,612 |
| UN | 68 | 61 | 7 | 163 | 8 | 21 | 30 | 37 | 395 |
| VA | 0 | 6 | 1 | 20 | 0 | 4 | 1 | 2 | 34 |
| Misc⁶⁷ | 11 | 7 | 18 | 82 | 9 | 19 | 16 | 11 | 173 |
| Total | 1,695 | 990 | 752 | 5,269 | 328 | 1,093 | 1,584 | 1,773 | 13,484 |

⁶⁶ The tree on-right-of-way (TO) and tree off-right-of-way (TF) cause codes are limited in their use while a process for better designations is developed. See description in Appendix I. For 2020, there were 146 events labeled TF and 130 events labeled TO.

⁶⁷ Miscellaneous causes are included in both Preventable and Third Party (Non-Tree) categories

L

Historical SAIDI and SAIFI by Area⁶⁸

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 County⁶⁹

| Region/County | Year | Total SAIFI | SAIFI 5% | Total SAIDI | SQI SAIDI |
|----------------------|-------------|-------------|-------------|-------------|------------|
| Northern | | | | | |
| Whatcom | 2020 | 2.12 | 1.70 | 382 | 237 |
| | 2019 | 1.91 | 1.62 | 309 | 191 |
| | 2018 | 1.44 | 0.87 | 590 | 134 |
| Skagit | 2020 | 1.68 | 1.43 | 403 | 234 |
| | 2019 | 1.02 | 0.92 | 203 | 157 |
| | 2018 | 2.32 | 1.62 | 949 | 333 |
| Island | 2020 | 3.01 | 2.47 | 1108 | 195 |
| | 2019 | 1.20 | 1.06 | 196 | 164 |
| | 2018 | 3.84 | 1.97 | 2541 | 316 |
| King/Kittitas | | | | | |
| King | 2020 | 1.37 | 0.96 | 311 | 140 |
| | 2019 | 1.51 | 0.84 | 593 | 117 |
| | 2018 | 1.15 | 0.86 | 202 | 109 |
| Kittitas | 2020 | 2.57 | 2.00 | 574 | 263 |
| | 2019 | 2.24 | 2.07 | 464 | 358 |
| | 2018 | 1.43 | 1.51 | 260 | 256 |

Table continues on next page

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

⁶⁹ Reported figures are based on most current SAP outage data, as of January 2021.

| Region/County | Year | Total SAIFI | SAIFI 5% | Total SAIDI | SQI SAIDI |
|-------------------------|-------------|-------------|-------------|-------------|------------|
| Southern/Western | | | | | |
| Pierce | 2020 | 1.69 | 0.98 | 800 | 125 |
| | 2019 | 1.12 | 0.61 | 623 | 88 |
| | 2018 | 0.96 | 0.68 | 118 | 89 |
| Thurston | 2020 | 1.41 | 1.12 | 236 | 145 |
| | 2019 | 1.89 | 0.91 | 784 | 159 |
| | 2018 | 1.52 | 1.14 | 303 | 146 |
| Kitsap | 2020 | 2.69 | 1.95 | 501 | 225 |
| | 2019 | 1.93 | 1.38 | 525 | 157 |
| | 2018 | 2.78 | 1.42 | 929 | 216 |

County Trends from 2019 to 2020:

- Whatcom and Island Counties declined across all four measures due to more customers impacted by tree related outages.
- Skagit County declined across all four measures due to more customers impacted by tree related outages and equipment failures
- Pierce County declined across all four measures:
 - Total SAIDI and SAIFI declined due to more customers impacted by tree related outages
 - SQI SAIDI declined to more customers impacted by tree related outages, equipment failures and accidents.
 - SAIFI 5% declined to more customers impacted by tree related outages and scheduled outages
- Kitsap County saw an improvement in one measure and a decline in the other three measures.
 - The Total SAIFI, SAIFI 5% and SQI SAIDI performance declined primarily due to more customers affected by tree related outages.
 - The improvement in Total SAIDI performance was primarily driven by improvements in scheduled outages and accidents
- Thurston County performance improved in three measures and declined in one measure.
 - Total SAIDI and SAIFI improved due to fewer customers impacted by fewer tree related outages.
 - SQI SAIDI improved due to fewer customers impacted by equipment failures, bird/animal and car pole outages.
 - SAIFI 5% declined due to more customers impacted by tree related outages.

- King County saw an improvement in two measures and a decline in two measures.
 - Total SAIDI and SAIFI improvement in fewer customers impacted by tree related outages.
 - SQI SAIDI declined due to more tree related outages and car pole accidents
 - SAIFI 5% declined due to more tree related outages and equipment failures

- Kittitas County saw an improvement in two measures and a decline in two measures.
 - SAIFI 5% and SQI SAIDI improved to due fewer customers affected by lightning
 - Total SAIDI and Total SAIFI declined due to more tree related outages

M **Areas of Greatest Concern with Action Plan⁷⁰**

This appendix details the areas of greatest concern with the 2020 and 2021 action plan.

Table M1 provides the 2020 list of the Top 50 Circuits with the highest minutes interrupted in the PSE territory.

CMI refers to Customer Minutes Interruptions.

⁷⁰ This section meets a requirement of Attachment B of Docket UE-110060.

Table M1: 2020 Areas of Greatest Concern

| Circuit | County | 2020 Year End 5 Year Avg Rank | 2020 Year End 5 Year Average Total CMI | 2019 Year End 5 Year Avg Rank | 2019 Year End 5 Year Average Total CMI | Action by PSE | 5 Yr CMI Trend |
|-----------------------|---------|-------------------------------|--|-------------------------------|--|--|----------------|
| Baker River Switch-24 | Skagit | 1 | 4,187,458 | 3 | 3,693,876 | Two underground conversion projects proposed for 2022. | ▲ |
| Chico-12 | Kitsap | 2 | 3,409,149 | 1 | 5,456,595 | A new underground circuit proposed for 2023. | ▼ |
| Cottage Brook-13 | King | 3 | 2,786,844 | 4 | 3,005,323 | One TripSaver, one tree wire and one underground cable replacement project planned for 2021. | ▼ |
| Nugents Corner-26 | Whatcom | 4 | 3,311,791 | 2 | 3,703,653 | Two underground cable replacement projects planned for 2021. Two underground conversion projects proposed for 2022. | ▼ |
| Kendall-12 | Whatcom | 5 | 3,659,975 | 12 | 3,473,489 | One underground conversion project proposed for 2023. | ▲ |
| Sherwood-18 | King | 6 | 2,363,202 | 8 | 2,087,338 | Three TripSaver projects planned for 2021. One tree wire and one Recloser project proposed for 2022. | ▲ |
| Big Rock-15 | Skagit | 7 | 2,658,742 | 6 | 3,191,674 | One underground cable replacement, one overhead feeder tie, and one FuseSaver project planned for 2021. Two underground conversion projects proposed for 2022. | ▼ |
| Fernwood-17 | Kitsap | 8 | 2,974,369 | 5 | 3,297,006 | One FuseSaver and two underground cable replacement projects planned for 2021. | ▼ |

Table continues on next page

| Circuit | County | 2020 Year End 5 Year Avg Rank | 2020 Year End 5 Year Average Total CMI | 2019 Year End 5 Year Avg Rank | 2019 Year End 5 Year Average Total CMI | Action by PSE | 5 Yr CMI Trend |
|------------------|----------|-------------------------------|--|-------------------------------|--|---|----------------|
| Vashon-12 | King | 9 | 2,640,350 | 18 | 2,327,858 | One overhead tree wire feeder tie and one underground cable replacement project planned for 2021. One tree wire project planned for 2022. | ▲ |
| Fernwood-16 | Kitsap | 10 | 2,115,499 | 10 | 2,217,418 | One FuseSaver project planned for 2021. | ▼ |
| Langley-16 | Island | 11 | 2,209,787 | 11 | 2,577,736 | One tree wire project completed in 2020. Two underground cable replacement projects planned for 2021. One tree wire and one underground conversion project proposed for 2022. | ▼ |
| Griffin-13 | Thurston | 12 | 2,220,200 | 25 | 2,198,160 | One underground cable replacement and one underground conversion project planned for 2021. One underground conversion project proposed for 2023. | ▲ |
| Cottage Brook-15 | King | 13 | 1,538,362 | 39 | 1,410,634 | One overhead system improvement project planned for 2021. | ▲ |
| Norway Hill-15 | King | 14 | 1,681,699 | 7 | 2,061,529 | One tree wire project and one underground cable replacement project planned for 2021. | ▼ |
| Vashon-23 | King | 15 | 1,390,824 | 17 | 1,566,067 | One underground cable replacement project completed in 2020. One underground cable replacement and one overhead tree wire feeder tie project planned for 2021. One tree wire project proposed for 2022. | ▼ |

Table continues on next page

| Circuit | County | 2020 Year End 5 Year Avg Rank | 2020 Year End 5 Year Average Total CMI | 2019 Year End 5 Year Avg Rank | 2019 Year End 5 Year Average Total CMI | Action by PSE | 5 Yr CMI Trend |
|----------------|---------|-------------------------------|--|-------------------------------|--|--|----------------|
| Fragaria-16 | Kitsap | 16 | 1,968,273 | 15 | 2,671,361 | Planning is continuing to monitor for improvements. | ▼ |
| Glacier-12 | Whatcom | 17 | 2,082,603 | Not on 2019 list | | One cable replacement project planned for 2021. One tree wire project proposed for 2022. | ▲ |
| Eastgate-12 | King | 18 | 1,554,529 | 33 | 1,515,046 | One Distribution Automation project planned for 2021. | ▲ |
| Freeland-12 | Island | 19 | 2,260,793 | 21 | 2,649,599 | One tree wire project completed in 2020. Two FuseSaver projects planned for 2021. One tree wire and one underground conversion project proposed for 2022. | ▼ |
| Winslow-12 | Kitsap | 20 | 1,859,225 | 38 | 1,706,997 | Planning is continuing to monitor for improvements. | ▲ |
| Brooks Hill-15 | Island | 21 | 2,236,004 | 20 | 3,117,122 | Planning is continuing to monitor for improvements. | ▼ |
| Slater-16 | Whatcom | 22 | 1,328,729 | 16 | 1,909,037 | One Distribution Automation, one Recloser and one underground cable replacement project planned for 2021. One tree wire and one FuseSaver project proposed for 2022. | ▼ |
| Fragaria-15 | Kitsap | 23 | 1,926,829 | 9 | 2,388,265 | One Distribution Automation and one FuseSaver project planned for 2021. | ▼ |
| Fragaria-12 | Kitsap | 24 | 1,442,355 | 36 | 1,312,767 | One underground cable replacement and two FuseSaver projects planned for 2021. One tree wire and one FuseSaver project proposed for 2022. | ▲ |

Table continues on next page

| Circuit | County | 2020 Year End 5 Year Avg Rank | 2020 Year End 5 Year Average Total CMI | 2019 Year End 5 Year Avg Rank | 2019 Year End 5 Year Average Total CMI | Action by PSE | 5 Yr CMI Trend |
|------------------|---------|-------------------------------|--|-------------------------------|--|---|----------------|
| Greenwater-16 | King | 25 | 2,167,224 | 29 | 2,319,102 | One underground conversion project proposed for 2022. | ▼ |
| Duvall-15 | King | 26 | 1,643,362 | 19 | 1,875,402 | Two tree wire projects, two feeder tie projects planned for 2021 | ▼ |
| Vashon-13 | King | 27 | 1,976,873 | 13 | 2,281,378 | Two underground cable replacement and one new overhead tree wire feeder tie project planned for 2021. | ▼ |
| Clover Valley-16 | Island | 28 | 2,119,786 | 48 | 1,989,834 | One underground cable replacement project completed in 2020. One cable replacement and one FuseSaver project planned for 2021. One tree wire and one FuseSaver project proposed for 2022. | ▲ |
| Cottage Brook-16 | King | 29 | 1,195,443 | Not on 2019 list | | One underground conversion project proposed for 2022. | ▲ |
| Miller Bay-23 | Kitsap | 30 | 1,494,736 | 27 | 1,875,817 | One Recloser project planned for 2021. One tree wire, one FuseSaver, and one underground conversion project proposed for 2022. | ▼ |
| Skykomish-25 | King | 31 | 2,285,891 | 40 | 1,700,506 | One underground system improvement project planned for 2021. | ▲ |
| Kendall-13 | Whatcom | 32 | 1,316,754 | 26 | 1,471,924 | One underground cable replacement project planned for 2021. One reconductor project proposed for 2022. | ▼ |

Table continues on next page

| Circuit | County | 2020 Year End 5 Year Avg Rank | 2020 Year End 5 Year Average Total CMI | 2019 Year End 5 Year Avg Rank | 2019 Year End 5 Year Average Total CMI | Action by PSE | 5 Yr CMI Trend |
|-------------------|----------|-------------------------------|--|-------------------------------|--|---|----------------|
| Tolt-15 | King | 33 | 2,054,306 | 49 | 2,076,255 | One overhead reconductor, one tree wire, one underground cable replacement, and one underground conversion project planned for 2021. One FuseSaver proposed for 2022. | ▼ |
| Port Madison-15 | Kitsap | 34 | 1,688,295 | 23 | 2,091,549 | Two underground cable replacement and one FuseSaver project planned for 2021. One underground feeder extension and two overhead tree wire projects proposed for 2022. | ▼ |
| Hobart-15 | King | 35 | 1,615,163 | 28 | 1,897,590 | One tree wire project completed in 2020. One tree wire project proposed for 2022. | ▼ |
| Longmire-25 | Thurston | 36 | 1,200,066 | 22 | 1,489,038 | One tree wire project planned for 2021. | ▼ |
| Somerset-16 | King | 37 | 1,758,261 | Not on 2019 list | | One Recloser planned for 2021. | ▲ |
| Baker River Sw-13 | Skagit | 38 | 1,527,714 | Not on 2019 list | | One feeder tie project proposed for 2022. | ▲ |
| Port Madison-12 | Kitsap | 39 | 2,337,472 | 42 | 2,680,478 | One underground cable replacement project, one feeder tie project, one underground conversion project, and one Distribution Automation project proposed for 2022. | ▼ |
| Lake Youngs-15 | King | 40 | 1,909,685 | Not on 2019 list | | One Recloser project planned for 2021. Three FuseSaver projects proposed for 2022. | ▲ |

Table continues on next page

| Circuit | County | 2020 Year End 5 Year Avg Rank | 2020 Year End 5 Year Average Total CMI | 2019 Year End 5 Year Avg Rank | 2019 Year End 5 Year Average Total CMI | Action by PSE | 5 Yr CMI Trend |
|---------------|--------|-------------------------------|--|-------------------------------|--|--|----------------|
| Hamilton-15 | Skagit | 41 | 2,187,690 | 47 | 2,602,470 | One tree wire and one FuseSaver project planned for 2021. One feeder tie proposed for 2022. | ▼ |
| Silverdale-15 | Kitsap | 42 | 1,611,570 | 35 | 3,197,849 | One underground cable replacement project and one underground conversion project planned for 2021. | ▼ |
| Fernwood-13 | Kitsap | 43 | 1,950,702 | 32 | 2,325,468 | One FuseSaver project planned for 2021. One underground cable replacement project and one tree wire project proposed for 2022. | ▼ |
| Alger-15 | Skagit | 44 | 2,134,729 | Not on 2019 list | | One tree wire project completed 2020. One underground conversion project proposed for 2022. | ▲ |
| Pine Lake-26 | King | 45 | 1,571,727 | Not on 2019 list | | One FuseSaver project planned for 2021. | ▲ |
| Inglewood-13 | King | 46 | 1,693,404 | 14 | 2,801,500 | A Distribution Automation upgrade project planned for 2021 | ▼ |
| Long Lake-23 | Kitsap | 47 | 1,272,393 | 34 | 1,484,946 | One Distribution Automation project planned for 2021. | ▼ |
| Plateau-21 | King | 48 | 1,225,173 | Not on 2019 list | | Planning is continuing to monitor for improvements. | ▲ |

Table continues on next page

| Circuit | County | 2020 Year End 5 Year Avg Rank | 2020 Year End 5 Year Average Total CMI | 2019 Year End 5 Year Avg Rank | 2019 Year End 5 Year Average Total CMI | Action by PSE | 5 Yr CMI Trend |
|------------|--------|-------------------------------|--|-------------------------------|--|--|----------------|
| Langley-12 | Island | 49 | 1,755,437 | 50 | 2,488,867 | One tree wire project to be completed 2021. Two underground conversion and one tree wire projects proposed for 2022. | ▼ |
| Winslow-15 | Kitsap | 50 | 1,371,458 | 30 | 1,629,829 | One underground cable replacement and one FuseSaver project planned for 2021. One Distribution Automation project proposed for 2022. | ▼ |

N Current-Year Commission and Rolling-Two Year PSE Customer Electric Service Reliability Complaints with Resolutions⁷¹

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: Current Year Commission Complaints

| No. | Complaint Type | Date of Complaint | Location | Closing Date | Case Resolution |
|-----|----------------|-------------------|-------------------|--------------|-----------------|
| 1 | Reliability | 2/6/2020 | Poulsbo | 2/14/2020 | Company upheld |
| 2 | Reliability | 5/20/2020 | Carnation | 5/28/2020 | Company upheld |
| 3 | Reliability | 5/22/2020 | Skykomish | 6/25/2020 | Company upheld |
| 4 | Reliability | 9/16/2020 | Gold Bar | 9/29/2020 | Company upheld |
| 5 | Reliability | 10/20/2020 | Sumner | 10/23/2020 | Company upheld |
| 6 | Reliability | 11/6/2020 | Puyallup | 11/20/2020 | Company upheld |
| 7 | Reliability | 11/13/2020 | Mount Vernon | 11/20/2020 | Company upheld |
| 8 | Reliability | 11/18/2020 | Bainbridge Island | 11/25/2020 | Company upheld |
| 9 | Reliability | 12/18/2020 | Lacey | 12/28/2020 | Company upheld |
| 10 | Reliability | 12/18/2020 | Lacey | 12/28/2020 | Company upheld |
| 11 | Reliability | 12/21/2020 | Bellevue | 1/5/2021 | Company upheld |
| 12 | Reliability | 12/23/2020 | Kirkland | 1/11/2021 | Consumer upheld |
| 13 | Power Quality | 6/19/2020 | Orting | 7/1/2020 | Company upheld |

⁷¹ This section meets a requirement of Attachment B of Docket UE-110060.

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

| No. | County | Date of Complaint | Location | Complaint Type | Circuit | Response |
|-----|--------|----------------------------|---------------|------------------------------|---------------------|--|
| 1 | King | Jan-20 Jan-20 | Baring | Reliability | Skykomish-25 | Contacted customer to address concerns |
| 2 | King | Sep-19 Apr-20 | Issaquah | Reliability | Snoqualmie-13 | Contacted customer to address concerns |
| 3 | King | Jan-19 Jun-19 | Kent | Reliability | Boeing Aerospace-13 | Reported in 2019, no new inquiries in 2020 |
| 4 | King | Feb-19 Feb-19 | Kirkland | Reliability | Crestwood-22 | Reported in 2019, no new inquiries in 2020 |
| 5 | King | Apr-20 Jun-20 | Kirkland | Power Quality | Inglewood-15 | Contacted customer to address concerns |
| 6 | King | Jan-20 May-20 | Kirkland | Power Quality Reliability | Rose Hill-21 | Contacted customer to address concerns |
| 7 | King | Sep-19 Jan-20 | Mercer Island | Reliability Power Quality | South Mercer-15 | Contacted customer to address concerns |
| 8 | King | Apr-20 Oct-20 | Redmond | Reliability | Redmond-22 | Contacted customer to address concerns |
| 9 | King | Feb-19 Dec-19 Feb-20 | Renton | Reliability | Fairwood-17 | Contacted customer to address concerns |

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| No. | County | Date of Complaint | Location | Complaint Type | Circuit | Response |
|-----|----------|----------------------------|---------------|------------------------------|------------------|--|
| 10 | King | Apr-20 Jul-20 | Renton | Reliability | Hazelwood-15 | Contacted customer to address concerns |
| 11 | King | Jun-20 Jul-20 Sep-20 | Sammamish | Reliability | Klahanie-17 | Contacted customer to address concerns |
| 12 | Kitsap | Feb-19 Feb-19 | Port Orchard | Reliability | Long Lake-21 | Reported in 2019, no new inquiries in 2020 |
| 13 | Skagit | Jul-20 Jul-20 | Sedro Woolley | Reliability | Alger-15 | Contacted customer to address concerns |
| 14 | Thurston | Jan-19 Sep-19 | Lacey | Reliability | Fall City-13 | Reported in 2019, no new inquiries in 2020 |
| 15 | Thurston | Aug-19 Jan-20 | Lacey | Reliability Power Quality | Hawks Prairie-14 | Contacted customer to address concerns |
| 16 | Thurston | Sep-20 Nov-20 | Lacey | Reliability | Patterson-13 | Contacted customer to address concerns |
| 17 | Thurston | Jan-19 Nov-20 | Lacey | Reliability | Pickering-21 | Contacted customer to address concerns |
| 18 | Thurston | Feb-20 Dec-20 | Rainier | Reliability | Rainier-12 | Contacted customer to address concerns |

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 Mileage⁷²

This appendix illustrates current-year geographic location of the 2020 electric service reliability customer complaints on service territory map with the number of 2020 proposed projects and vegetation-management mileage.

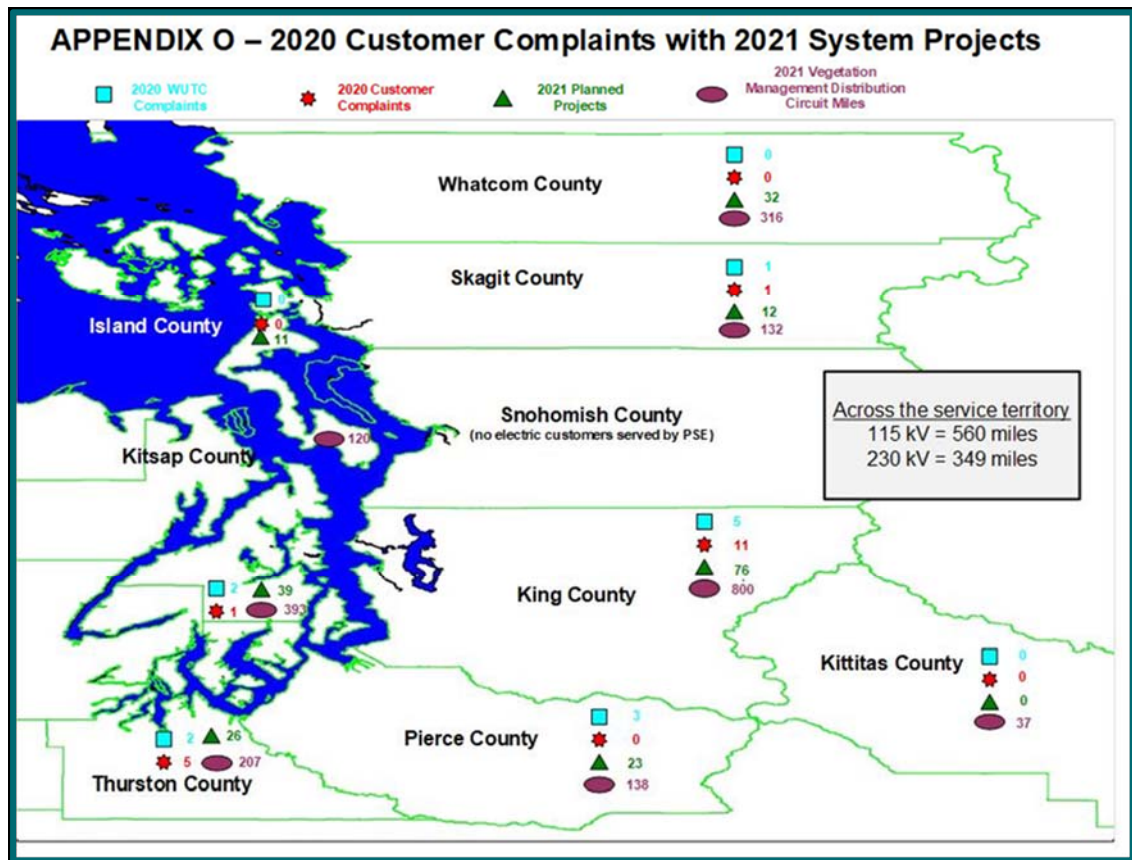


Figure O1: 2020 Customer Complaints with 2021 System Projects

⁷² This section meets a requirement of Attachment B of Docket UE-110060.

P

Reliability Program Category Descriptions

This appendix provides reliability program work completed in 2020 and planned for 2021 by category along with descriptions for each category.

Table P1: Reliability program completed work and future plans

| Program Category | Outage Cause Each Program Addresses | | | | | | 2020 Completed | 2021 Plan |
|--|-------------------------------------|----|----|----|----|-------|----------------|---------------|
| | Trees | BA | EF | SO | UN | Other | | |
| Vegetation Management | | | | | | | | |
| Cyclical Programs | ✓ | | | | | | 2,739 miles | 3,052 miles |
| TreeWatch | ✓ | | | | | | 6,404 trees | 10,000 trees |
| Tree Replanting | ✓ | | | | | | On-going | On-going |
| Substation Landscape Renovation | ✓ | | | | | | Monitor | 2 substations |
| Targeted Reliability Improvements | | | | | | | | |
| Worst Performing Circuits | ✓ | ✓ | ✓ | | | ✓ | 14 projects | 17 projects |
| Tree Wire ⁷³ | ✓ | ✓ | | | | | 6 projects | 0 projects |
| Distribution Sectionalizing Devices | ✓ | ✓ | ✓ | ✓ | | ✓ | 1 projects | 25 projects |
| High Value System Reliability Projects | ✓ | ✓ | ✓ | | | ✓ | 3 projects | 10 projects |
| Distribution Automation | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 4 projects | 8 projects |
| Transmission & Distribution SCADA | ✓ | ✓ | ✓ | | ✓ | ✓ | 11 projects | 10 projects |
| Pilot Projects | | | | | | | | |
| Single Phase Reclosers | ✓ | ✓ | ✓ | | | ✓ | 6 projects | 56 projects |
| Transmission Line Automatic Switching | ✓ | ✓ | ✓ | | | ✓ | 2 projects | 2 projects |

Table continues on next page

⁷³ There were 0 projects in 2021 identified as being only treewire. Other projects in the Worst Performing Circuits and High Value System Reliability Projects categories contain projects that include Tree Wire.

| Program Category | Outage Cause Each Program Addresses | | | | | | 2020 Completed | 2021 Plan |
|---|-------------------------------------|----|----|----|----|-------|----------------|----------------|
| | Trees | BA | EF | SO | UN | Other | | |
| Aging Infrastructure | | | | | | | | |
| Cable Remediation | | | ✓ | | | ✓ | 59 projects | 61 projects |
| Pole Inspection and Treat and Replacement ⁷⁴ | | | ✓ | | | | 42,475 poles | 37,853 poles |
| Substation Equipment Replacement | | | ✓ | | | | 32 projects | 30 projects |
| Substation Maintenance | | | ✓ | | | | 2,952 projects | 2,947 projects |

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 Programs

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

⁷⁴ The 2020 project count contains pole inspection and replacement program work as well as inspection support for major projects. The total project counts can vary greatly from year to year depending on the level of support required from projects not related to the pole program.

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 Program

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 Program

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 interruptions on the 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.

Tree Wire

The vast majority of tree wire, a thick-coated power line, is installed at locations where there has been a previous history of outages related to tree branches and a field assessment confirms that installing tree wire would reduce the likelihood of outages. Tree wire improvements also provide a benefit to reduce the number of bird or animal caused outages. PSE is also looking to use spacer cable which is a more robust coated overhead conductor than tree wire in selected situations to help improve reliability related to tree related outages.

Distribution Sectionalizing Devices

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. Another effective tactic implemented is the installation of gang-operated switches. Gang-operated switches provide the ability to simultaneously disconnect the three-phase lines rather than disconnecting one phase at a time, and to better isolate damaged infrastructure so more customers can continue to be served.

High Value System Reliability Projects

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. The telecommunication for this automation relies on various technologies, the newest of which is the AMI network. The network used for metering data will be the primary network used for automation in all new projects which can provide more control over the performance of the automation system.

Transmission and Distribution 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 45% of PSE's feeder breakers have loading visibility, indication and supervisory control.

Pilot Projects

In addition to these ongoing targeted reliability improvement programs, PSE continues to monitor pilot projects still in the evaluation phase.

Single-Phase Reclosers

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. In 2016-2017, 245 of these devices, called TripSavers, were installed in 106 locations. Analysis of the devices show the assumed reliability benefits were being achieved, however, several design and operational issues were discovered. Due to this, further installations were paused as alternative options were considered. The performance of similar devices, called FuseSavers, from a different vendor have been installed in a few new locations and are currently being evaluated to determine if the same benefit can be achieved without the design and operational issues.

Transmission Line Automatic Switching

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. This pilot project will provide a solution that automatically locates a transmission line fault, isolates the fault, and reconfigures the system to restore the power to the maximum number of customers. The project is currently being evaluated for system-wide use.

Aging Infrastructure

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. Since 1989, PSE has managed a cable remediation program that considers two remediation options: silicone injection or cable replacement.

- Silicone injection extends the life of underground power cable for 20 years by restoring the cable's insulating properties. This alternative is only used on single phase cables which have been pre-tested to verify the condition. Due to cost of testing and implementing on three phase cables there is more value in replacement.
- Cable replacement has an expected life that exceeds 30 years.

Pole Inspection and Treat 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 Equipment Replacement

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