Portland General Electric

# 2023 Wildfire Mitigation Plan

**Revision Version: 1.0**
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PGE

This Wildfire Mitigation Plan (WMP) contains statements that relate to future plans, objectives, expectations, performance, and events. These forward-looking statements represent PGE's estimates and assumptions as of December 1, 2022; because PGE is continually updating its wildfire data, information included in the WMP reflects the data available at the time of publication. Furthermore, the estimated costs and schedules contained herein are subject to certain uncertainties including delays in supply chain and increased supply costs, nonperformance of counterparties and employee work factors. PGE assumes no obligation to update or revise any forward-looking statement as a result of new information, future events, or other factors.

These forward-looking statements are not a guarantee of future performance, and any such forward-looking statements are subject to risks and uncertainties which may be difficult to predict or are beyond PGE's control. As a result, actual results may differ materially from those projected in the forward-looking statements.

# 1. Executive Summary

PGE's Wildfire Mitigation & Resiliency (WM&R) organization plans and implements the Wildfire Mitigation Program (Program), developing and coordinating wildfire mitigation activities across the company. The company's approach to wildfire mitigation continues to evolve in response to both global climate change, which is fueling landscape-altering wildfire events worldwide, and to the wildfire rules recently issued by the Oregon Public Utility Commission (OPUC). PGE's goal is to improve regional safety by reducing the risk that PGE's electric utility infrastructure could cause a wildfire, while limiting the impacts of Public Safety Power Shutoff (PSPS) events and other mitigation activities on customers and increasing the resiliency of PGE assets to wildfire damage.

In compliance with OPUC rules governing wildfire protection plans, the Wildfire Mitigation Plan (WMP) describes PGE's approach to wildfire risk mitigation and guides the company's Program.

The WMP presents PGE's approach to risk modeling, which is the foundation of the Program. The risk model, referred to as the "Wildfire Risk Mitigation Assessment," provides guidance for the major Program focus areas: operating protocols, PSPS events, asset management and inspections, vegetation management, Public Safety Partner and community engagement, public awareness and outreach, and research and development.

For 2023, the updated Wildfire Risk Mitigation Assessment resulted in PGE maintaining its 10 existing High Fire Risk Zones (HFRZs) with some minor refinements. HFRZs are areas within PGE's service territory where vegetation, terrain, meteorological patterns, and wildland-urban interface considerations increase the risks associated with wildfire. PGE implements specific inspection and maintenance, vegetation management, and operational actions within these HFRZs during and in preparation for PGE's declared Fire Season for improved ignition prevention and safety.

In addition, PGE continues to expand its situational awareness capabilities, including measures such as installing new remote automated weather stations and artificial intelligence (AI)-enhanced ultra-high-definition cameras (Pano AI cameras) to automatically notify PGE and its Public Safety Partners when they detect a fire, in real time. PGE will continue to invest in mitigations to reduce wildfire risk throughout our system.

However, factors beyond PGE's control, including rising costs and other supply chain issues, changing weather patterns driven by climate change, and competition for limited contract resources for vegetation management and inspections, will continue to impact delivery of PGE's Program in 2023. Investor-owned utilities, the OPUC, and other stakeholders must strive to achieve a reasonable balance between affordable electricity rates and meaningful wildfire risk reduction.

At PGE, wildfire-related planning, mitigation, and research are year-round endeavors. PGE may update this WMP and the Program throughout the year to address new findings, data, and analysis. PGE will continue to work collaboratively with Public Safety Partners, Tribes, local communities, and other key stakeholders to prioritize the safety of people, property, and public spaces.

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# Glossary and Acronyms

**AAR**: After-Action Review

**AGOL**: ArcGIS Online

**ANSI**: American National Standards Institute

**APPA**: American Public Power Association

**AWRR**: Advanced Wildfire Risk Reduction

**Blue-Sky/Grey-Sky Events**: During Blue-Sky events, a utility executes normal daily operations with no natural disasters or other disruptive events. A Grey-Sky event refers to an operating day or days in which a utility faces severe weather or other incident which causes reliability concerns, and all hands are on deck to respond to the incident.

**BPA**: Bonneville Power Administration

**CBO**: Community-Based Organization

**CEOP**: Corporate Emergency Operations Plan

**CIMT**: Corporate Emergency Management Team

**CPC**: Climate Prediction Center

**CRC**: Community Resource Center

**DEI**: Diversity, Equity & Inclusion

**EAC**: Equivalent Annual Cost

**ECC**: Emergency Coordination Center

**EEI**: Edison Energy Institute

**EEMT**: Energy Emergency Management Team

**EFD**: Early Fault Detection

**EOC**: Emergency Operations Center

**EPRI**: Electric Power Research Institute

**ESCC**: Electricity Subsector Coordinating Council

**ESF-12**: Refers to Emergency Support Function-12 and indicates the Public Utility Commission of Oregon's role in supporting the State Office of Emergency Management for energy utilities' issues during an emergency, per OAR 860-300-0002(1).

**FAQ**: Frequently Asked Question

**FDRA**: Fire Danger Rating Area

**Fire Season**: Period(s) of the year during which wildland fires are most likely to occur, spread, and affect resources sufficiently to warrant organized fire management activities

**Fire Weather**: Weather conditions that influence fire ignition, behavior, and suppression

**FITNES**: Facilities Inspection & Treatment to National Electrical Safety Code

**GIS**: Geographic Information System

**High Fire Risk Zone (HFRZ)**: Geographic areas at elevated risk of wildfire ignition identified by PGE in its risk-based WMP

**HSEEP**: Homeland Security Exercise & Evaluation Program

**IAM**: Institute of Asset Management

**IAP**: Incident Action Plan

**ICP**: Incident Command Post

**IMT**: Incident management Team

**IRWIN**: Integrated Reporting of Wildland Fire Information

**IWRMC**: International Wildfire Risk Mitigation Consortium

**ISO**: International Organization for Standardization

**LCES**: Lookouts, Communications, Escape Routes, and Safety Zones

**LiDAR**: Light Detection & Ranging

**Local Community**: Any community of people living, or having rights or interests, in a distinct geographical area, per OAR 860-300-0002(2)

**Local Emergency Management**: Refers to city, county, and Tribal emergency management entities, per OAR 860-300-0002(3)

**NICC**: National Interagency Coordination Center

**NIFC**: National Interagency Fire Center

**NIMS**: National Incident Management System

**No-Test Policy**: PGE will disable auto-reclosing and not manually close-in a faulted circuit

**NRECA**: National Rural Electric Cooperative Association

**NWCC**: Northwest Coordination Center

**NWS**: National Weather Service

**OAR**: Oregon Administrative Rule

**ODF**: Oregon Department of Forestry

**ODHS**: Oregon Department of Human Services

**ODOT**: Oregon Department of Transportation

**OH**: Overhead (transmission or distribution circuit)

**OJUA**: Oregon Joint Use Association

**O&M**: Operations and Maintenance

**OPUC**: Public Utility Commission of Oregon

**P1**: Hazard/danger tree

**P2**: A tree that poses a grow-in or fall-in threat and displays arboricultural defect that poses risk to PGE facilities

**PGE**: Portland General Electric

**PMO**: PGE's Project Management Office

**PSA**: Predictive Service Area

**PSPS**: Public Safety Power Shutoff

**Public Safety Partners**: Includes the ESF-12, Local Emergency Management, and Oregon Department of Human Services (ODHS), per OAR 860-300-0002(6)

**QA/QC**: Quality Assurance/Quality Control

**RAWS**: Remote Automated Weather Station

**Red Flag Warning**: A term used by the National Weather Service to alert forecast users of an ongoing or imminent critical fire weather pattern. Red Flag Warnings will be issued whenever a geographical area has been in a dry spell for a week or two, or for a shorter period, if before spring green-up or after fall color, the National Fire Danger Rating System (NFDRS) is high to extreme, and all of the following weather parameters are forecasted to be met:

- Ten-hour fuels (moisture content of small vegetation that take only about 10 hours to respond to changes in moisture conditions) of 8 percent or less
- A sustained wind average 15 mph or greater.
- Relative humidity less than or equal to 25%.
- A temperature of greater than 75 degrees Fahrenheit.

In some states, dry lightning and unstable air are criteria. A Fire Weather Watch may be issued prior to the Red Flag Warning.

**ROW**: Right-of-way

**RSE**: Risk-Spend Efficiency

**RVM**: Routine Vegetation Management

**SB**: Senate Bill

**SCADA**: Supervisory Data Control & Acquisition

**SEL**: Schweitzer Engineering Laboratories

**SME**: Subject Matter Expert

**Supervisory Control and Data Acquisition (SCADA)**: The control system architecture comprising computers, networked data communications and graphical user interfaces (GUI) for high-level process supervisory management, while also comprising other peripheral devices like programmable logic controllers (PLC) and discrete proportional-integral-derivative (PID) controllers to interface with process plant or machinery.

**Striking Distance**: A term used to describe a tree that has the potential to impact PGE powerlines and other equipment.

**T&D**: Transmission and Distribution

**Tier 1 Risk**: Describes an area where there is not an elevated or extreme risk of wildfires.

**Tier 2 (Elevated) Risk**: Describes an area where there is an elevated risk (including likelihood and potential impacts on people and property) of utility-associated wildfires.

**Tier 3 (Extreme) Risk**: Describes an area where there is an extreme risk (including likelihood and potential impacts on people and property) of utility-associated wildfires.

**Tribes**: this term is used collectively to describe PGE's Tribal partners, including the Confederated Tribes of the Grande Ronde, Confederated Tribes of Warm Springs, *Confederated* Tribes of the Umatilla Indian Reservation, and Confederated Tribes of Siletz Indians.

**UAM**: PGE's Utility Asset Management program

**USDOE**: United States Department of Energy

**USFS**: United States Forest Service

**Utility-Identified Critical Facilities**: the facilities identified by PGE within its service territory that have the potential to threaten life safety or disrupt essential socioeconomic activities if their services are interrupted. Communications facilities and infrastructure are considered Critical Facilities.

**Wildfire Risk Mitigation Assessment**: a PGE program that models and assesses a wide range of potential wildfire-related risk factors to inform PGE's operational and financial decision-making.

**WMP**: Wildfire Mitigation Plan

**WM&R**: PGE's Wildfire Mitigation & Resiliency organization

# 2. Introduction

This WMP describes PGE's wildfire prevention and mitigation efforts and PGE's planned activities to prevent utility-caused wildfire ignition events. The WMP incorporates internal and external lessons learned from the 2022 Fire Season and describes PGE's wildfire preparedness and response activities for 2023.

The success of the Program relies on the active participation of a broad spectrum of internal and external stakeholders under the direction of PGE's WM&R organization. The foundation of the Program is PGE's Wildfire Risk Mitigation Assessment and Risk Spend Efficiency calculations, used to develop and guide Program activities and wildfire mitigation investments. Based on industry benchmarking and findings from its Wildfire Risk Mitigation Assessment, PGE believes that the frequency of utility-caused ignition events can be reduced through:

- Inspection and maintenance of poles and equipment
- Engineering of reliable systems that experience fewer events that result in spark failure modes (potential ignitions)
- System hardening
- Effective vegetation management
- Situational awareness and operational readiness
- Operational changes during Fire Season, including the use of system protection devices such as electronic reclosers
- Effective use of PSPS to prevent utility-caused ignitions during Red Flag Warning meteorological events.

PGE will review its Fire Season operations and wildfire mitigation preparedness and response actions on an annual basis and update the WMP as needed. PGE will also update the WMP as required to comply with applicable regulatory requirements or changes in laws or regulations. If PGE substantively updates the plan outside of the annual submission cycle, PGE will refile the WMP with the OPUC and post the most current version of the WMP on PGE's website.

Some of the most important changes made for the 2023 WMP include the ongoing evolution of PGE's Wildfire Risk Mitigation Assessment in partnership with PGE's Public Safety Partners (please refer to Section 6.2, Updates to 2023 Wildfire Risk Mitigation Assessment, for additional details). PGE also expanded its situational awareness capabilities by adding 22 Pano AI fire detection cameras covering all 10 of PGE's HFRZs. Over 30 fire agencies have direct access to this technology, potentially improving response time to fires in the areas they serve. In addition, PGE's weather station network now consists of 52 stations providing weather data at a micro level, allowing for more precisely informed PSPS decision-making. PGE continues to move forward with non-expulsion fuse installation and other ignition prevention investments, such as tree wire and undergrounding projects. Other capital improvements include the expanded use of intelligent reclosers to reduce the number of customers impacted by PSPS events.

Lastly, in September 2022, PGE executed a PSPS event in all 10 of PGE's pre-designated HFRZs. This decision was not taken lightly, as it directly impacted customers across the PGE service territory. PGE observed damage to PGE assets from limbs and trees, indicating that the PSPS likely prevented wildfire ignitions within the PGE HFRZs during a period of extreme fire potential conditions, with Red Flag Warnings in effect from the Cascade Range to the Coast Range. Please refer to Appendix 8 (Summary of Input from Public Safety Partners and Lessons Learned Captured During the 2022 Fire Season) for lessons learned and recommendations from the PSPS event, tabletop exercises, and collaboration with PGE's Public Safety Partners.

# 3. Purpose and Scope

PGE's WMP is designed to provide strategic direction for the programs and activities that seek to mitigate the potential for PGE equipment, facilities, or activities to become wildfire ignition sources, and to guide PGE's compliance with all applicable laws and regulations, including the OPUC's wildfire rules. In constructing the WMP, PGE observed the following key principles:

- Prioritize public and employee safety

- Act to reduce the risk of wildfire ignitions from PGE assets

- Provide effective guidance to inform PGE's Fire Season operations

- Guide PGE's system hardening activities, increasing resistance to wildfire impacts through a systematic, risk-based approach to identifying and prioritizing system hardening and resiliency activities

- Communicate and collaborate with industry peers and Public Safety Partners, Emergency Support Function 12 (ESF-12), local emergency managers, Oregon Department of Human Services, local communities and community-based organizations, counties, Federal, Tribal, State and local governments, operators of PGE-identified critical facilities, and customers

- Maintain reliable electric service, and

- Implement PSPS events with efficiency, when necessary, and with broad public awareness.

# 4. Operating Environment and Service Territory

## 4.1    Operating Environment

Global climate change continues to alter the Pacific Northwest climate in ways that are difficult to model and predict. This reality will drive continuous evaluation and modification of PGE's WMP for the foreseeable future. In addition, the effects of climate change on California and resulting wildfires have increasingly pulled West Coast wildfire mitigation resources to the south, intensifying competition for available fire suppression, inspection, and vegetation management resources in the Pacific Northwest.

## 4.2    PGE Service Territory – Overview

PGE's service territory is distributed over 4,000 square miles in a combination of forested, mountainous, urban, and suburban environments. Much of the eastern and western portions of PGE's service area are forested, particularly in the Mt. Hood corridor along Highway 26, in the foothills of the Coast Range, and south toward Estacada. While the majority of PGE's service territory is located within the most densely populated area of the state, PGE's managed right-of-way (ROW) contains more than 2.2 million trees, with millions more off-ROW trees. In managing off-ROW conditions, PGE must coordinate with multiple neighboring utilities that interconnect to our system, including the Bonneville Power Administration (BPA), PacifiCorp, West Oregon Electric Cooperative, Wasco Electric Cooperative, Consumers Power, Inc., Forest Grove Light & Power, and McMinnville Water and Light.

**Figure 1: PGE Service Territory**
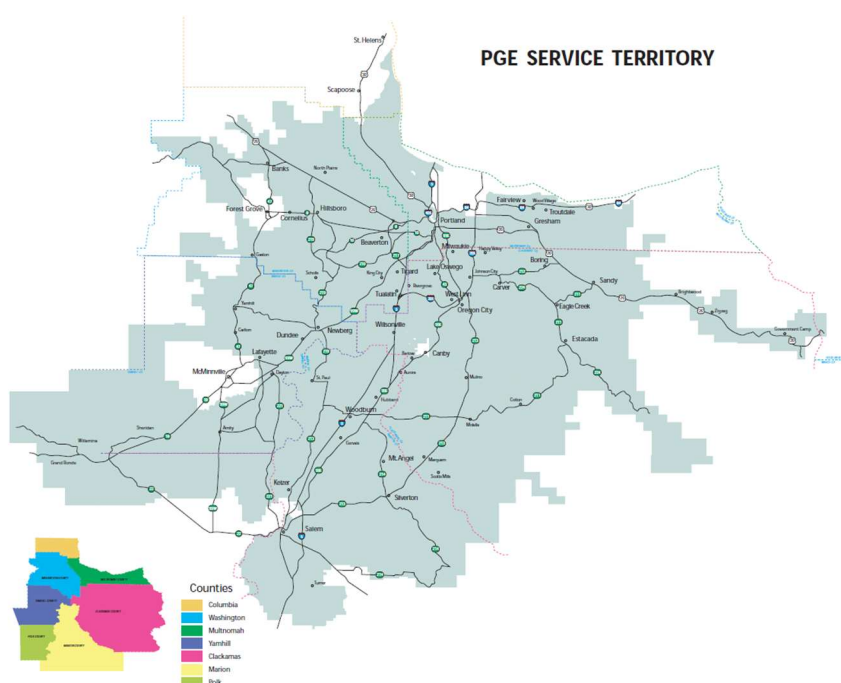
# 5. Wildfire Risk Mitigation Program Overview

PGE's primary wildfire risk mitigation objective is to reduce the risk of ignition from PGE assets, while limiting the impacts of specific mitigation activities, such as PSPS events, on customers. The Program can be broken down into the following four risk mitigation approaches and associated objectives:

- **PSPS:** Identify areas of heightened wildfire threat (HFRZs) within the PGE service territory and mitigate the risk of PGE-caused wildfire ignition in those areas through planned de-energizations (PSPS events) during periods of extreme fire risk.
- **Operational Practices:** Implement operational system settings, including protection systems (e.g., reclosers), line and vegetation maintenance, and using a risk-informed protection strategy to reduce risk of ignitions.
- **Situational Awareness:** Improve PGE's wildfire-related risk management and situational awareness capabilities.
- **System Hardening:** Implement a systematic, risk-informed approach to identify and prioritize system hardening, and resiliency measures to reduce the likelihood of ignitions caused by utility assets and protect PGE assets from damage.

The following figure provides a visual representation of PGE's multi-layered approach to wildfire risk mitigation:

**Figure 2: PGE's Wildfire Risk Mitigation Hierarchy**
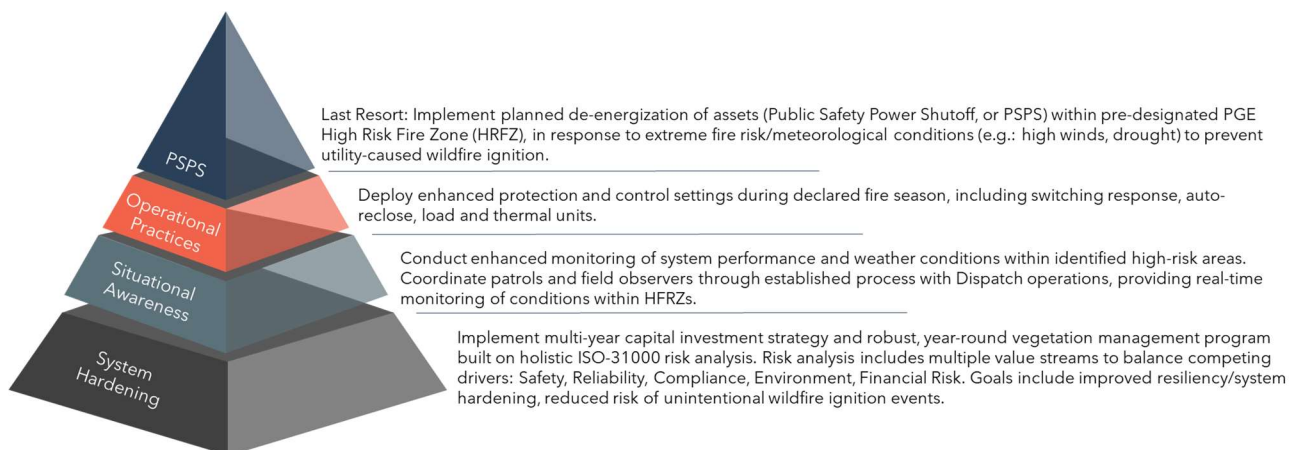


PGE strives to find cost-effective ways to maximize wildfire risk reduction by applying risk assessment modeling to guide mitigation strategies. The purpose of this work is to deliver highest risk reduction per dollar spent on mitigation. Wildfire Risk Mitigation Assessment methodologies and mitigation measures are discussed in more detail in Section 6 of the WMP.

# 6. Wildfire Risk Assessment and Mitigation Activities

## 6.1    Risk Assessment Overview

PGE uses a multi-phase wildfire risk assessment program to:

- Annually identify and refine the boundaries of the HFRZs within the PGE service territory
- Quantify the likelihood that individual PGE assets could contribute to ignition of large wildfires (>100 hectares for fires in timber; >400 hectares for fires in grass or rangeland), map their location, and apply a consequences model to determine where a potential wildfire ignition would be most significant.

The annually updated HFRZ assessment enables PGE to identify the highest-risk areas within its service territory (HFRZs are discussed in Section 7, below) and prioritize wildfire mitigation actions. The model results are a key input to the development of PGE's 2023 WMP. In addition, PGE evaluates wildfire risk across PGE transmission and generation assets outside of our service territory (refer to Appendix 9, PGE Wildfire Risk Assessment Overview & Process, for additional details).

Assessment results allow PGE to evaluate susceptibility to the natural and human factors that could contribute to electric asset-caused wildfire ignitions and provide data-driven guidance for PGE's Program. A technical overview of PGE's fire behavior modeling, a component of the wildfire risk approach, is provided in Appendix 9.

## 6.2    Updates to 2023 Wildfire Risk Mitigation Assessment

PGE aims to improve its Wildfire Risk Mitigation Assessment methodologies through engagement with external experts, as well as through internal controls and feedback loops across the organization.

PGE engages external agencies in the validation of existing variables and development of new variables and inputs for consideration in the risk assessment process. In 2022, this engagement included workshops and field site visits with Oregon Department of Forestry (ODF), U.S. Forest Service (USFS), and local fire agencies to look at fire agency response times to ignition events and assess how vegetation and access conditions influence fire growth potential. In addition, PGE hosted virtual technical working sessions with local fire districts (Clackamas Fire District, Tualatin Valley Fire District, Multnomah County Fire District) and ODF to learn about anticipated fire response times, watershed boundaries, and detection probabilities. These engagements and variables directly informed PGE's 2023 reassessment of the HFRZ geographical boundaries as described in Section 7 of the WMP.

Through an internal post-Fire Season lessons learned process, PGE refined its Wildfire Risk Mitigation Assessment methodologies by introducing new variables layered onto the existing assessment framework. For 2023, these additional variables include:

- Access/egress road density
- Detection probability

- Social vulnerability (including poverty, vehicle access, English as a second language considerations)
- Fire response time/proximity to emergency response (modelled at 10 and 15 minutes).

PGE continues to investigate improvements to data sets and analytical techniques to evolve its Wildfire Risk Mitigation Assessment methodologies and integrate fire risk into PGE's overall asset and risk management portfolios. Over the past two years, PGE has made the following changes to its baseline Wildfire Risk Mitigation Assessment:

- Began the development of a four-year wildfire risk mitigation roadmap, laying out planned mitigation activities through fiscal year 2025
- Increased the number of individual weather scenarios used to model baseline and seasonal wildfire risk (see the Wildfire Simulation Section of Appendix 9 for further details) to 216 scenarios, increasing model confidence
- Introduced new spatial variables to PGE's GIS-based wildfire risk mapping through virtual technical work sessions with local fire districts and the OPUC, including fire detection probability and estimated response time.

**Figure 3: Geographic Differences Between PGE's 2022 and 2023 HFRZs**
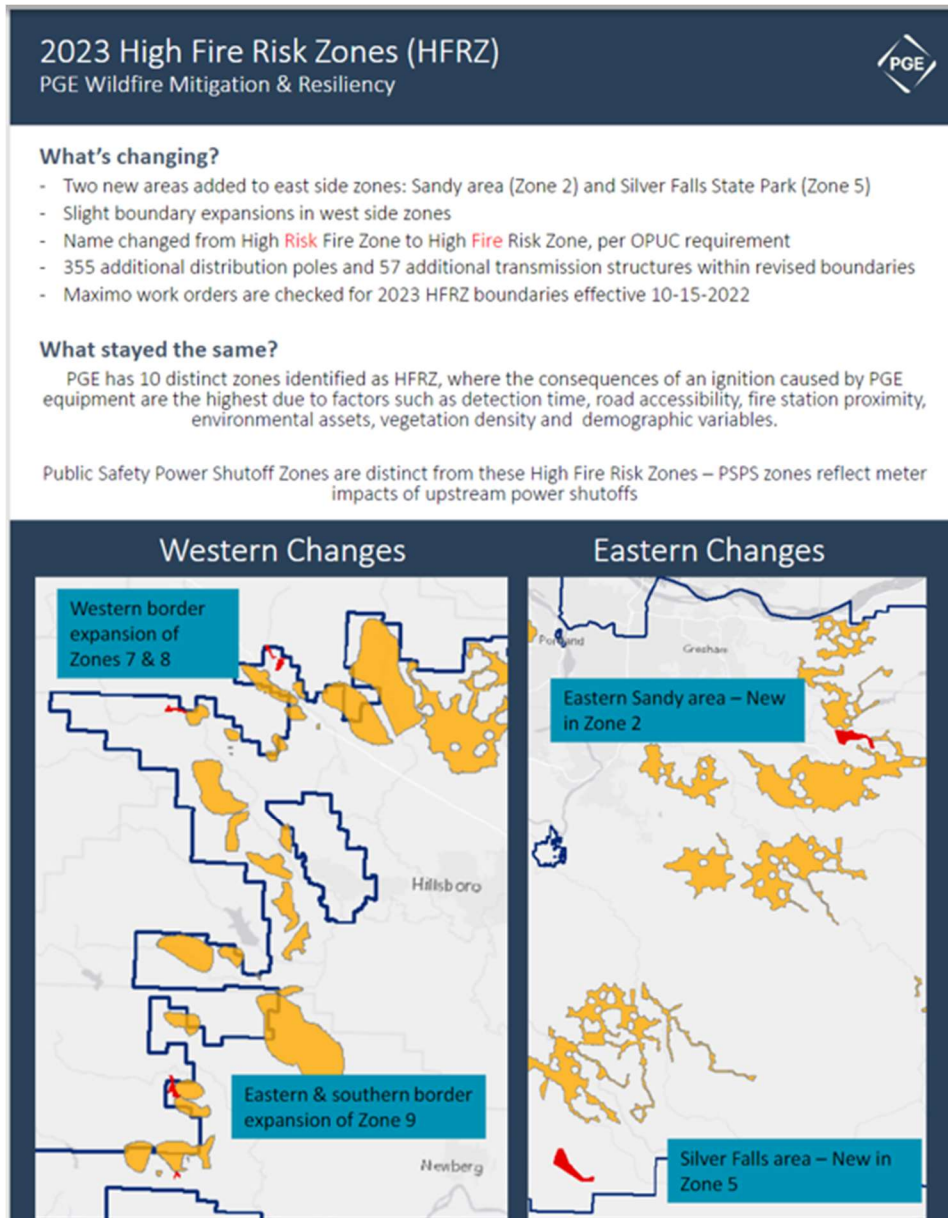


## 6.3 Wildfire Risk Categories

PGE's Wildfire Risk Mitigation Assessment methodologies consider baseline and seasonal wildfire risk, risk to residential areas served by PGE, and risks to generation facilities, substations, and powerlines owned by PGE. PGE uses these assessments to inform wildfire mitigation strategies that provide location-specific reliability and resiliency benefits. This holistic risk assessment approach helps PGE align specific mitigations to risk reduction areas, and to benefit a broad spectrum of regional stakeholders.

PGE seeks to align mitigation measures to risk across PGE's Program, from design and operational standards to construction practices, vegetation management, training, utility asset management, and capital investment.

### 6.3.1  Baseline Wildfire Risk

PGE calculates baseline equipment risk in terms of ignition probability (the annual likelihood that a given piece of equipment could cause a wildfire ignition given its type, age, condition, and location) and the consequences of ignition. These consequences evaluate how a wildfire ignited at a specific location may burn, as well as the potential magnitude of the damage it may cause. In most cases, probability values vary with age and condition of the asset, increasing as equipment ages.

### 6.3.2  Seasonal Wildfire Risk

Seasonal risk is integral to PGE's Wildfire Risk Mitigation Assessment. PGE's assessment of seasonal wildfire risk leverages the consequences modelled from the 216 fire weather scenarios referenced in Appendix 9. PGE also accounts for climate change variability in seasons by leveraging fuel ecology and wildfire studies for the Willamette Valley and Oregon[1]. For additional details regarding how PGE models seasonal wildfire risk, please refer to Appendix 9.

### 6.3.3  Risk to Residential Areas

PGE understands that ignition potential is not limited by HFRZ boundaries and models ignition points as a grid across the entire PGE footprint. PGE assesses risk to residential areas in the fire behavior models described in Appendix 9. PGE's modeling includes high-density locations as well as adjusted burn probabilities. A key factor in risk-informed decision-making is the recognition that detection probability and fire response time as a function of roads/access varies with population density.

### 6.3.4  Risk to PGE Equipment

PGE protects equipment and facilities within its HFRZs with established wildfire design and construction standards (e.g., replacement of wood poles with ductile iron as poles located in HFRZs that are damaged, replaced as part of non-wildfire projects, or reach end-of-life). In future iterations of PGE's Wildfire Risk Mitigation Assessment methodology, risk to PGE equipment will also be considered, as PGE adds the capability to assess which items of equipment are most likely to be damaged if a fire occurs in a given area. PGE is developing the tools required to factor information of this granularity into its Wildfire Risk Mitigation Assessment process.

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[1] Studies included in PGE's Wildfire Risk Mitigation Assessment include Climate Change Increases Risk of Extreme Rainfall Following Wildfire in the Western United States (Touma, Stevenson et al 2022); Changing Wildfire, Changing Forests: the Effects of Climate Change on Fire Regimes and Vegetation in the Pacific Northwest, USA (Halofsky, Peterson and Harvey, 2020); Impacts of Climate Change on Fire Regimes and Carbon Stocks of the U.S. Pacific Northwest (Rogers et al 2011).

### 6.3.5 Georisk

In addition to the risk categories above, PGE models geographic wildfire risk (georisk). Georisk represents wildfire risk due to vegetation encroachment on the conductor, and/or animal contact impacting the components of the structure. Georisk is distinct from asset risk, which is defined as risk due to failed equipment. This information has been integrated into PGE's Strategic Asset Management Structures Model (Structures Model), a component of PGE's Wildfire Risk Mitigation Assessment methodology that allows PGE to evaluate wildfire risk at a more precise level.

PGE inputs asset and georisk data in to the Pyrologix[2] fire physics engine to create simulated probabilistic models that assess fire risk by location, for both long-term planning and real-time decision support. As discussed in Section 6.2, PGE continues to refine variables in coordination with external agencies. This collaboration has led PGE to add new variables for consideration in its ongoing risk analysis processes. These variables include remote sensing both LiDAR and high-definition imagery, wildfire spread distributions and situational awareness variables.

The following table details the data sources for the various inputs PGE uses to assess georisk, as well as the proposed cadence of updates to these data sources.

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[2] Pyrologix is a Missoula-based wildfire threat assessment research firm that provides utility wildfire risk assessment, hazard and risk assessment, stochastic wildfire simulation, fuel treatment prioritization, fuel inventory and management, and exposure analysis modeling and analysis services.

**Table 1: Georisk Modeling Data Sources and Cadence of Updates**

| Data Sources | Inputs | Cadence of Updates |
|---|---|---|
| **Wildfire Modeling** | Fire Propagation and Fire Behavior | Annual review<br>• Affirm/update Subject Matter Expert (SME) assumptions/updated failure data<br>• Landfire (geospatial layering program) calibration through Pyrologix proprietary adjustments<br>• Flame Height<br>• Energy Release Component (ERC) (real-time through 72 hours out)<br>• Fuel Moisture (measured at 1hr/10hr/100hr) (real time through 72 hours out)<br>• Live Fuel Moisture Hourly/real time<br>• Fire Response Time<br>• Flame Intensity<br>• Detection Probability |
| | Elevation Data | Annual/semi-annual review<br>• Affirm/update SME assumptions/updated failure data<br>• National Survey Data<br>• USGS<br>• LiDAR |
| | Meteorological Data | Annual/semi-annual review<br>• National weather data<br>• PGE weather stations (Real Time) |
| | Burn Probability | Annual review<br>• Affirm/Update SME assumptions/updated failure data<br>• Landfire calibration through Pyrologix proprietary adjustments |

## 6.4    Risk Assessment Methodologies: Data Quality & Review Frequency

PGE Wildfire Risk Mitigation Assessment methodologies include multiple statistical models that use a variety of data sources to identify the areas of highest wildfire risk within PGE's service territory. PGE's methodology is consistent with the ISO-31000 Monitoring & Review structure, which provides internal controls to enhance confidence while still considering the dynamic nature of risk.

PGE's quality assurance and quality control (QA/QC) process for finalized Asset Risk models identifies the cadence of updates and required review tasks. Required QA/QC tasks include review and affirmation of existing or updated data, subject matter expert (SME) assumptions, review of mathematical formulas, and variance testing of updates to confirm that updates are reasonable.

The following table describes the cadence of updates for the inputs used in PGE's annual wildfire risk assessment process:

**Table 2: Update Cadence for Key Modeling Inputs**

| Data Sources | Inputs | Cadence of Updates |
|---|---|---|
| **Annual Probability of Asset Failure** | Weibull failure curve parameters | Annual review <br> • Affirm/update SME assumptions/updated failure data |
| | Health indexing | Annual review <br> • Incorporate condition data (as available) |
| | Demographics from database | Periodic updates as data becomes available-GIS/Maximo |
| | GIS data for components on structures | Annual update to address reconfiguration/replacement |
| **Annual Probability of Asset-Caused Ignition** | Probability of equipment related outage is source of ignition | Annual review <br> • Affirm/update SME assumptions |
| | Probability of equipment in violation of PGE patrol/inspection guidelines | Annual review <br> • Incorporate inspection data (as available) <br> • Incorporate updated SME assumptions |
| | Equipment multipliers | Annual review <br> • Affirm/update SME assumptions |
| **Ignition Data** | Tracking PGE caused ignitions by failure mode/driver | Weekly review <br> • Propagates into all wildfire risk processes |

| Data Sources | Inputs | Cadence of Updates |
|---|---|---|
| **Intervention Costs** | Capital cost estimates for wildfire mitigation | Annual review <br> • Affirm/update SME assumptions |
| **Consequence of Wildfire** | The wildfire consequence model developed by Pyrologix identifies structures in burnable locations and estimates the expected consequence of a large fire (i.e., min 400 hectare) started at each location. | Periodic updates as required |
| **Predictive Outage Model** | Weather data & outages to understand outage correlation with storms/wind | Annual review <br><br> Machine learning model will be continuously learning with annual updates |

## 6.5    Wildfire Risk-Based Decision-Making

Climate change will continue to increase wildfire threats, requiring continual adaptation of asset management and other routine business practices. This challenging reality, combined with PGE's responsibility to maintain reliable electric service, requires a careful balance between often-competing interests and system requirements. As the complexity of this analysis increases with each passing year, PGE continues to be guided by the industry best practice of risk-informed decision-making (selecting mitigation projects based on estimated risk reduction value). As defined by Institute of Asset Management (IAM) criteria encompassed in International Organization for Standardization (ISO) 55000 standards, value is a function of lifecycle costs, performance and, ultimately, risk; Figure 4 illustrates this relationship.

**Figure 4: The Value Equation**



PGE factors in changing environmental conditions, impacts to the public and the environment, QA/QC on data quality, and new data sources to iterate and develop its wildfire risk mitigation strategy. PGE follows the ISO-31000 risk framework in evolving its Wildfire Risk Mitigation Assessment methodologies, and leverages both IAM and ISO concepts in value quantification to calculate Risk Spend Efficiency (RSE) across PGE's Program. This concept allows PGE to factor risk, lifecycle costs, and performance into a single process to provide guidance to understand and possibly estimate the effectiveness of mitigation measures. Lifecycle costs are represented in the equivalent annual cost (EAC) denominator.

**Figure 5: The Risk Spend Efficiency Equation**



Performance included in mitigation option, either consequence or relative probability

$$RSE: \frac{(Risk\ of\ Problem - Risk\ after\ Mitigation)}{EAC\ of\ Mitigation}$$

**NOTE: RSE** = Risk Spend Efficiency, **EAC** = Equivalent Annual Cost

PGE applies RSE concepts in assessing mitigation alternatives across a wide range of PGE programs, including PSPS, vegetation management, system hardening/capital investment, and operations. PGE is continually improving its RSE assessment approach for use in both long-term and real-time planning and analysis. The following example analyses illustrate how PGE uses RSE to inform the direction of its mitigation strategies.

The illustrative examples below show the mitigation alternatives assessment for a hypothetical feeder located within a PGE HFRZ, with specified wildfire risk characteristics (heat intensity, flame height, burn probability, detection probability, response time, egress limitations, etc.) not shown.

The assessments compare the RSE outcomes for one hypothetical mitigation measure (undergrounding) vs. another (reconductoring and installation of fire-safe fuses).

**Figure 6: Illustrative Risk Spend Efficiency Assessment: Undergrounding**



As this hypothetical example illustrates, in this case, undergrounding the line would yield an RSE coefficient of 90 (a 90:1 risk reduction per dollar of investment).

The following figure shows the RSE assessment for a second potential mitigation measure: reconductoring and installing fire-safe fuses.

**Figure 7: Illustrative Risk Spend Efficiency Assessment: Reconductoring and Fire-Safe Fuses**
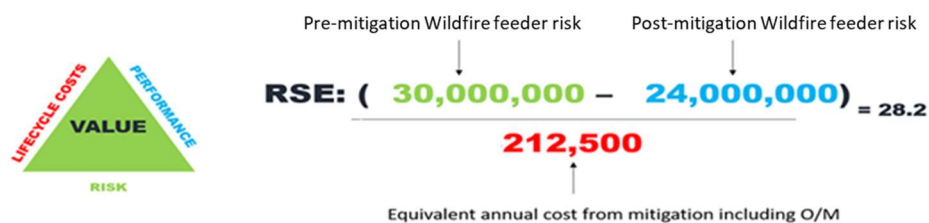


In this hypothetical example, undergrounding the line (Example 1) would yield a higher RSE value—risk reduction per dollar of investment—than Example 2 (reconductoring the line and installing fire-safe fuses): an RSE value of 90:1 vs. 28:1.

RSEs directionally inform selection of wildfire mitigation options for inclusion in the mitigation strategies within the HFRZs. PGE's goal is to achieve the highest estimated risk reduction value per dollar invested. This RSE assessment approach is flexible enough to allow PGE to adjust the analytical variables to account for factors such as climate change, and to incorporate findings from its ODF, USFS, and local fire agency partnerships.

PGE uses data from internal as well as external benchmarking sources. For example, a statistical understanding of how failure modes and ignition drivers for covered conductor affect risk is critical to effectively evaluating the appropriate locations to install covered conductor. Through its participation in the International Wildfire Risk Mitigation Consortium (IWRMC), PGE has leveraged the experiences of industry peers to inform its fire detection probability analysis as well as decision-making around the most effective locations for use of covered wire.

The following sections provide detail about the ways in which PGE uses risk-based decision-making in specific areas of its Program:

### 6.5.1 Risk-Informed Decision Making for PSPS Events

PGE uses meteorological, outage data and predictive analytics to make risk-informed decisions regarding PSPS events, as well as curtailment decisions. Before and during Fire Season, PGE reviews regional NWS forecasts, fire activity briefings, fire potential forecasts, and data from PGE weather stations[3] strategically located throughout the service territory. PGE makes its weather station data publicly available via MesoWest, for anyone needing data to improve regional forecasting and the analysis of extreme weather events.

In 2023, PGE plans to improve its risk-informed decision-making through improved situational awareness capabilities. PGE plans to install 30 new remote automated weather stations (RAWS) and deploy its four mobile weather stations, as needed, within HFRZs. As RAWS are installed they will be incorporated into PGE situational awareness intake. Site selection for RAWS will take utility, meteorology, and stakeholder requirements into consideration to ensure optimal placement, as discussed in more detail in the Research and Development section of the WMP, in late 2022 PGE operationalized a prototype of a Storm Predictive Tool that will incorporate weather data from across PGE's service territory to better inform PGE's PSPS execution decision analysis. As additional RAWS come online, the data they record is intended to further refine the Predictive Outage model.

Please refer to Section 9.2, below, for addition detail regarding PGE's PSPS decision-making process.

### 6.5.2 Risk-Informed Decision Making and Mitigation Actions for Vegetation Management

PGE's vegetation management strategy includes both cyclical, routine inspections, and maintenance of the entire PGE distribution system. Additionally, PGE performs Advanced Wildfire Risk Reduction (AWRR) vegetation management activities in the HFRZs within PGE's service territory. Annual AWRR activities are guided by the designated boundaries of PGE's HFRZs, data from PGE's Remote Sensing Project (which uses LiDAR and hyperspectral imagery to monitor vegetation density and proximity to PGE assets), and annual vegetation surveys. AWRR crews follow program trim specifications, which include increased removal rates and enhanced vegetation control techniques, discussed in more detail in Section 11, Vegetation Management.

The evolution of PGE's Vegetation Management program also illustrates the influence of the Wildfire Risk Mitigation Assessment methodologies on PGE's wildfire-related investment decision-making. Originally dedicated to enhancing electrical reliability through compliance with OPUC safety and clearance requirements, PGE Vegetation Management has transitioned to a dual-track program, focused on increasing system reliability and decreasing the chance of infrastructure-caused ignitions.

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[3] In 2022, PGE deployed 24 additional permanent weather stations and one temporary station to increase situational and conditional awareness and provide visibility within its HFRZs, bringing the number of permanent weather stations deployed within its service territory to 52.

Use of risk-based decision-making protocols has allowed PGE's Vegetation Management program to prioritize resources.

In much the same way, cross-organizational access to data from PGE's Remote Sensing Project data allows working groups across the company to plan and implement mitigation activities using a consistent set of data and analysis, with benefits shared across PGE workflows, including design and vegetation maintenance. PGE's GIS, Strategic Assessment Management, WM&R and Vegetation Management organizations all use LiDAR data, both independently and cooperatively, to benefit operational efficiency.

### 6.5.3 Risk-Informed Decision Making and Mitigation Actions for System Hardening

PGE continues to leverage its SAM Structures Model and Fire-Safe Construction Standard to harden the transmission and distribution (T&D) system within its HFRZs. PGE's system hardening activities are designed to accomplish three goals:

- Reduce the risk of potential wildfire ignition caused by PGE facilities through the use of ductile iron poles, fiberglass crossarms, covered wire, transformers, and conductor undergrounding
- Reduce the impacts of a wildfire on PGE's assets by installing system hardening technologies (fire mesh, ductile iron poles, fiberglass crossarms, conductor undergrounding)
- Protect utility infrastructure during potentially disruptive natural and human-caused disasters, strengthening PGE's ability to maintain and quickly restore reliable electrical service to support disaster relief and public safety.

In working towards these goals, PGE will deploy additional reliability and wildfire risk mitigation improvements within the HFRZs. PGE is guided by its annually updated Fire-Safe Construction Standard in executing equipment replacements in HFRZs. As specified in the Fire-Safe Construction Standard, the company will evaluate the following assets for replacement, installation, or implementation, when warranted:

- Avian-safe framing and phase covers
- Replacement of wood structures with nonflammable structures (e.g.: ductile iron poles, fiberglass crossarms)
- Polymer cutouts and cutout covers
- Aging conductors in HFRZs
- Tree wire, an insulated overhead conductor designed to reduce service interruptions, which also reduces the potential for the conductor to become an ignition source
- Overhead to underground conversions on specific feeders with key wildfire response variables including fire response/detection probability and egress
- Fuse replacement with fire-safe fuses and/or ELF (non-expulsion) fuses to eliminate a potential ignition source
- Reclosers and switching devices to increase operational flexibility and minimize customer impacts through the application of wildfire operational settings

### 6.5.4 Risk-Informed Decision Making and Mitigation Actions for Capital Investments

PGE uses the SAM Structural Model and the RSE methodology discussed in Section 6.5, Wildfire Risk-Based Decision-Making, in assessing project alternatives and prioritization of wildfire risk mitigation investments. Based on the outcomes of this analysis, PGE's multi-year wildfire capital investment strategy ranks system hardening and situational awareness projects as the highest-value risk mitigation per dollar of investment to inform prioritization of PGE's capital budget. Please refer to Section 12, Wildfire Program Costs, for detailed information regarding year-to-year actual and planned WM&R O&M and capital expenditures.

For example, undergrounding and reconductoring feeders and distribution lines is one of the most effective ways to shield PGE equipment from vegetation and animal contacts that could lead to wildfire ignition. Table 3, below, shows the planned undergrounding and reconductoring investments currently included in PGE's 2023 wildfire capital investment strategy.

PGE is revising its 2023–2026 wildfire capital investment strategy, which distributes planned capital spending among multiple asset and mitigation classes in alignment with the Wildfire Risk Mitigation Assessment of wildfire risk change over time. The goal of this effort is to create an optimized multi-year investment framework to implement separate but interrelated mitigation strategies, based on a risk profile that incorporates a broad spectrum of wildfire risk drivers.

PGE is consistently evaluating its long-term investment strategy in response to R&D findings, risk modeling and industry experience, and will continue to optimize its investment strategy for wildfire risk mitigation based on the best available information and analysis. Tables 3 and 4, below, reflect PGE's best estimates of planned investments and timelines at the time this document was submitted; however, PGE recognizes that factors outside of the company's control or to customer advantage may require adjustments to this schedule of activities. Planned line-miles per year are targets or estimates, which may be adjusted based on a wide variety of factors aimed to reduce wildfire risk and increase system resiliency.

PGE's portfolio of planned capital investment projects offers co-benefits in addition to their wildfire mitigation value; for example, many of the PGE feeders with the highest Customers Experiencing Multiple Interruptions (CEMI) values[4] (feeders that experience multiple outages per year) are designated for hardening under this strategy. By aligning its strategy to prioritize both wildfire mitigation and CEMI, PGE is investing in outcomes that offer regional benefit beyond wildfire hardening. System hardening projects on Tribal lands, and within culturally or environmentally sensitive areas, provide the co-benefits of improved cultural resource and environmental protection.

Ultimately, upon successful completion of the measures referenced above, these system hardening investments will reduce PGE's wildfire risk while shrinking the geographic boundaries of three existing PGE HFRZs—as line-miles of PGE infrastructure are hardened over the next several years, PGE will no longer need to de-energize those circuits to prevent potential ignitions during PSPS events. PGE plans

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[4] CEMI is an industry-standard metric of system reliability

to estimate these risk reduction values with a combination of volumetric mileage in a mitigated state as well as number of customer meters impacted by PSPS events.

PGE will also estimate non-wildfire-related resiliency benefits from these investments—for example, increased protection from wind/ice storm damage—using traditional asset management expected risk and net economic benefit ratios. The following tables show PGE's planned undergrounding/reconductoring projects and situational awareness/programmatic investments, by region, for 2023:

**Table 3: Planned Wildfire Undergrounding/Reconductoring Investments (in Line-Miles), 2023**

| UG/RECON | 2023 |
|---|---|
| Grande Ronde-Agency (UG) | 9.75 |
| Scoggins-Cherry Grove (UG) | 8.39 |
| Yamhill-Yamhill 13 (UG) | 0.6 |
| North Plains (RC) | 8.0 |
| Leland-Carus (RC) | 14.56 |
| Willamina-Buell (UG) | 11.09 |
| **TOTAL** | **44.39** |

**Table 4: Planned Situational Awareness/Programmatic Investments, 2023**

| Programmatic | 2023 |
|---|---|
| **AI-Equipped UHD Cameras** | 6 |
| **Weather Stations** | 30 |
| **Reclosers** | 50 |
| **Fire-Safe Fuses** | 600 |
| **Early Fault Detection (EFD)[5]** | 1 feeder |

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[5] Early Fault Detection is a technology that uses sensors to detect anomalies on the feeder in real time, allowing PGE to intervene (replace or repair) the affected component(s) prior to a failure that could cause an ignition.

**Figure 8: Planned PGE Wildfire Mitigation Investments 2023**
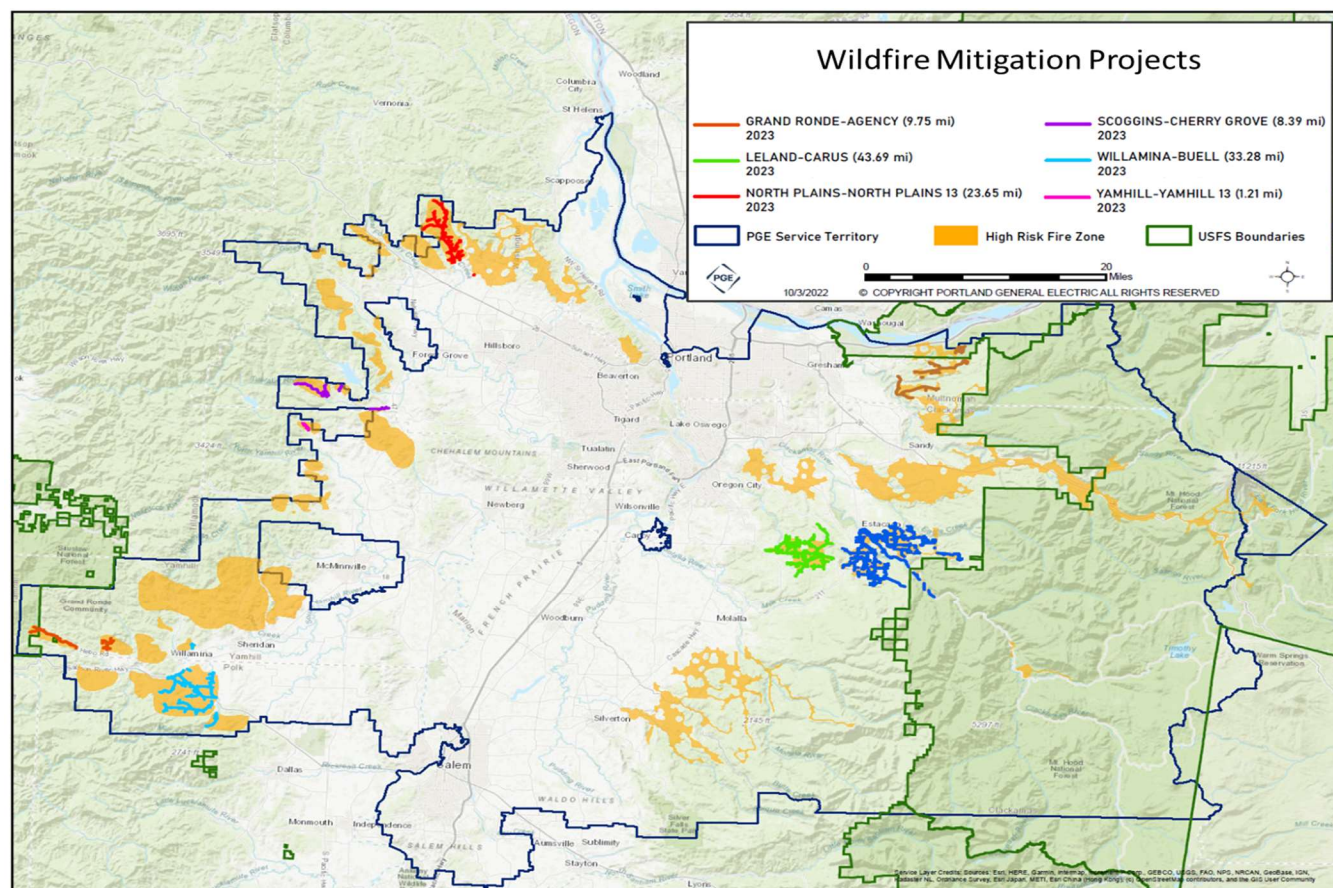
### 6.5.5 Risk-Informed Decision-Making and Mitigation Actions for Operations

PGE relies on a wide variety of weather and fuel models, as well as human analysis, to obtain the granularity of information required to accurately forecast and model hazardous fire weather conditions. The goal is to use these models to forecast potential hazardous fire weather conditions 7-10 days in advance. These models can provide decision-makers with a detailed understanding of the uncertainties and range of outcomes possible for a given weather pattern. Operational procedures within the HFRZs during the Fire Season are discussed in further detail in Section 8.2, System Operations During Fire Season.

In 2023, PGE will conduct further model testing and validation to assess the Storm Predictive Tool's ability to incorporate more granular and sophisticated inputs to better inform PGE's PSPS execution decision analysis and improve system alarming. For additional details regarding the Storm Predictive Tool, please refer to Section 15.4, below.

This tool should improve PGE's ability to predict potential equipment outages based on forecasted and real-time meteorological data. Once integrated with other PGE capabilities, the Storm Predictive Tool is intended to offer co-benefits to PGE's Utility Asset Management program, including increased spare equipment ordering efficiency, as well as improved spare equipment mobilization and operational standards and practices.

### 6.5.6 Risk-Informed Decision Making for Prioritized Opportunistic Interventions

Generally, when repairs are needed on an asset and the cost of the repair is higher than the value of the asset, the asset will be evaluated for replacement. Once crews are mobilized, there may also be reliability and economic benefits to proactive asset replacement, particularly within HFRZs. Whenever possible, PGE assesses the cost/benefit of proactive asset replacement during planned improvement/maintenance activities on other nearby assets. This approach helps PGE maintain reliable electric service and increase cost efficiency.

PGE prioritizes capital investments and maintenance activities that provide highest benefits to the system including reduced outage duration, improved asset survival and other impacts to infrastructure beyond wildfire mitigation. This multi-dimensional view allows PGE to achieve the best value risk reduction per dollar of investment.

# 7. High Fire Risk Zones (HFRZs)

PGE has identified areas of its service territory where vegetation, terrain, meteorology, population density and the wildland-urban interface (WUI) increase the risks associated with utility-caused wildfire ignition. For the purposes of this WMP, PGE refers to these areas as High Fire Risk Zones (HFRZs). PGE may choose to implement a proactive PSPS within a given HFRZ during periods of extreme weather wildfire threat. For 2023, PGE has identified the same 10 HFRZs as in 2022, with minor refinements, modifying the geographic boundaries of some zones and adding a total of 355 distribution poles and 57 transmission structures to the areas potentially impacted by PSPS events (see Figure 10 below for details):

**HFRZ 1**: Mt. Hood Corridor/Foothills
**HFRZ 2**: Columbia River Gorge
**HFRZ 3**: Oregon City
**HFRZ 4**: Estacada
**HFRZ 5**: Scott's Mills
**HFRZ 6**: Portland West Hills
**HFRZ 7**: Tualatin Mountains
**HFRZ 8**: North West Hills
**HFRZ 9**: Central West Hills
**HFRZ 10**: Southern West Hills

PGE relied on the ISO-31000 wildfire risk analysis framework for the 2023 HFRZ Assessment. For this assessment PGE incorporated new variables and refined boundary conditions to improve its understanding of:

- Wildfire risk
- Location based wildfire intensity and behavior
- Climate change impact projections
- Fire behavior and consequences

PGE's Wildfire Risk Assessment factors in the likelihood that a given PGE asset could become an ignition source, as well as the likelihood that such an ignition could spread into a large, uncontrolled fire. Additional analytical factors include vegetation density, fuels dryness, the potential for extreme weather conditions, probability of mechanical control, fire response time, detection probability and the presence of structures and other infrastructure.

In conducting the risk assessment, PGE ran thousands of scenarios in a Monte Carlo simulation to identify the areas of the PGE service territory where the risks associated with a utility-caused ignition are highest. The results of this modeling provided the basis for PGE's 2023 HFRZ analysis.

## 7.1    Enhanced Monitoring and Technology in HFRZs

In a partnership with the Electric Power Research Institute (EPRI), PGE installed a network of connected, intelligent fire detection cameras equipped with artificial intelligence (AI) within its HFRZs. These ultra-high-definition camera systems give PGE a 360-degree fire detection triangulation capability across its service territory, accurate to within +/- 100 yards. The Pano AI platform's machine learning algorithms automate fire detection, awareness, and notifications, helping PGE expand and improve regional fire detection resources. Under its 2023 Wildfire Capital Investment Strategy, PGE is planning to install six additional AI-equipped UHD cameras within the HFRZs (refer to Figure 9 for details regarding camera locations). For additional details on PGE's Wildfire Capital Investment Strategy, please refer to Section 12, Wildfire Program Costs.

**Figure 9: 2023 PGE Pano AI Camera Locations**
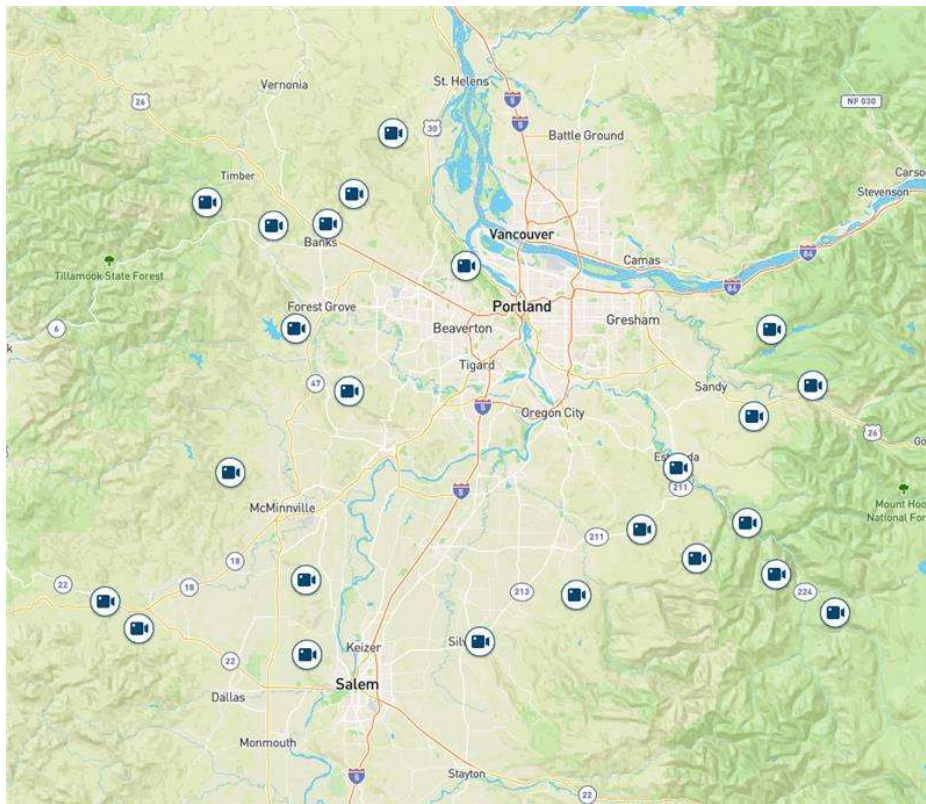


These camera systems are part of a larger situational awareness strategy in which PGE coordinates with federal, state, Tribal, and local fire agencies, fire management officers, and district foresters, as well as private landowners. In 2023, PGE will continue to seek ways to share access to this information with its Public Safety Partners, 30 of which currently have access to the camera network and notifications:

- Canby Fire District
- Forest Grove Fire & Rescue
- Gresham Fire & Emergency Services
- Lake Oswego Fire Department
- City of Portland Fire & Rescue
- City of Portland Water Bureau
- Clackamas Fire District #1
- Clackamas County Fire Defense Board
- The Confederated Tribes of Grande Ronde Emergency Services
- Estacada Rural Fire Protection District
- Gaston Fire District
- Hillsboro Fire & Rescue
- Hoodland Fire District
- Life Flight Network
- Marion County Fire Defense Board
- Marion Area Multi Agency Emergency Telecommunications (METCOM)
- Mt. Angel Fire District
- Multnomah County Fire Defense Board
- Oregon Department of Forestry
- Oregon State Police
- Polk County Fire Defense Board
- Sandy Fire District
- State of Oregon
- T-Mobile
- Tualatin Valley Fire & Rescue
- USFS – Mt. Hood District
- Washington County Fire Defense Board
- Washington County Consolidated Communications Agency (WCCCA)
- Yamhill County Fire Defense Board
- Yamhill Communications Agency (YCOM)

To illustrate the potential value of this technology, at 1525 on July 14, PGE's Bald Peak Pano AI camera notified users that it had detected smoke in a rural area in the western part of PGE's service territory. At 1625, PGE's High Compromise camera issued a second "detected smoke" notification and triangulated the smoke's location 6.8 miles away. The Pano AI system's initial detection and notification was 104 minutes before the regional fire reporting service issued a potential wildland fire alert, and 140 minutes before emergency services personnel were dispatched to the fire. ODF and other federal, Tribal, state, and local fire departments as well as land management agencies have provided feedback that the early detection information and triangulation accuracy obtained through PGE's Pano AI camera network is making a difference in crew deployment optimization and initial attack speed.

The following figures show PGE's 2023 HFRZs, and changes in HFRZ boundaries from 2022 to 2023.

**Figure 10: PGE HFRZs 2023 vs. 2022**
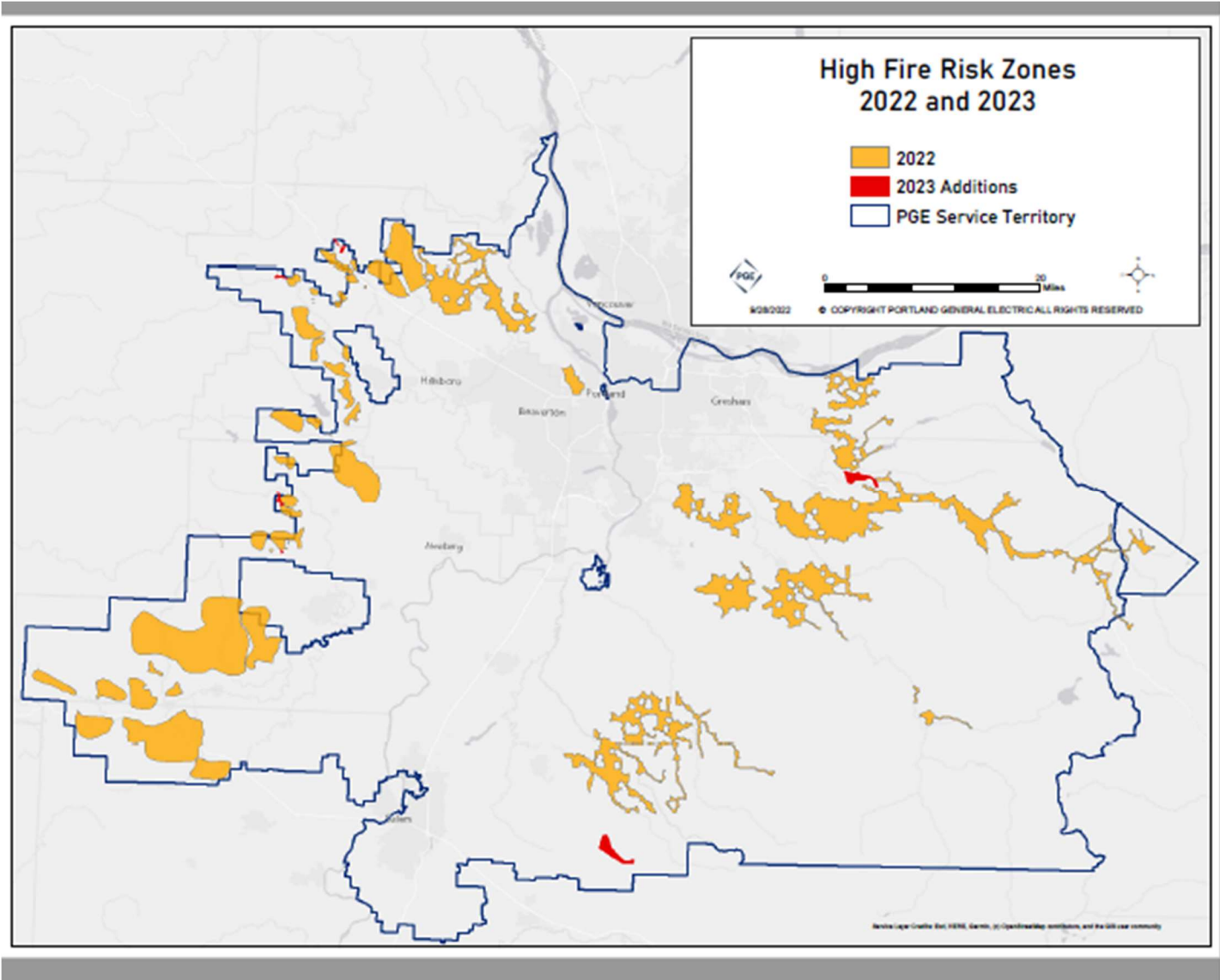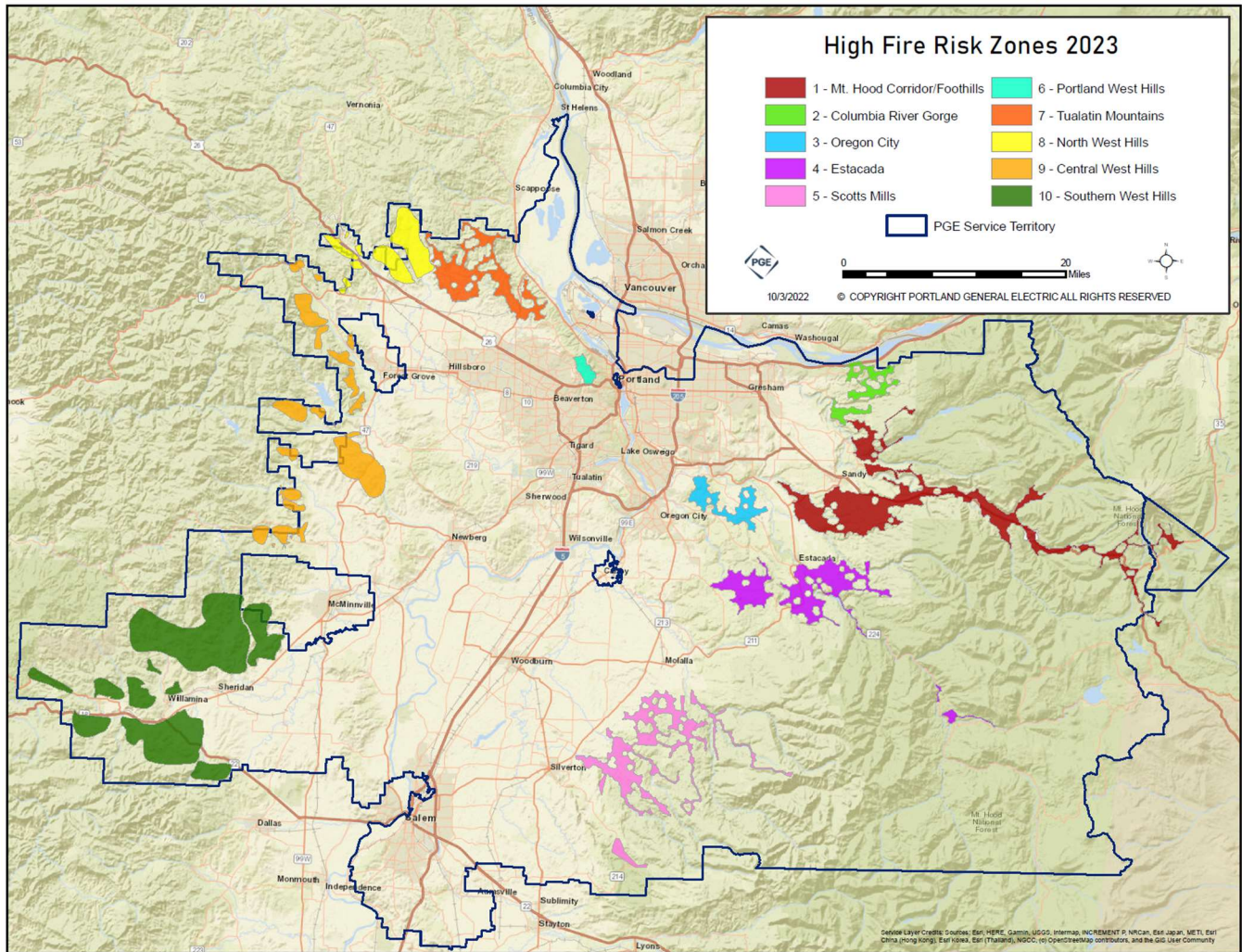
**Table 5: Changes in Distribution Line-Miles Within PGE's HFRZs, 2022 vs 2023**

| | DISTRIBUTION LINE MILES | | T&D POLES | | CUSTOMERS (METERS) | |
|---|---|---|---|---|---|---|
| HFRZ | 2022 | 2023 (NET CHANGE) | 2022 | 2023 (NET CHANGE) | 2022 | 2023 (NET CHANGE) |
| Zone 1 | 244.8 | 249.7 (+4.9) | 7,780 | 7,930 (+110) | 9,464 | 9.513 (+49) |
| Zone 2 | 24.7 | 24.7 (0.0) | 710 | 710 (0) | 456 | 456 (0) |
| Zone 3 | 47.4 | 47.4 (0.0) | 1,268 | 1,268 (0) | 1,743 | 1,743 (0) |
| Zone 4 | 138.5 | 138.5 (0.0) | 3,727 | 3,726 (-1) | 2,655 | 2,652 (-3) |
| Zone 5 | 142.7 | 150.7 (+8.0) | 3,274 | 3,442 (+168) | 1,927 | 2,000 (+73) |
| Zone 6 | 15.0 | 15.0 (0.0) | 702 | 702 (0) | 961 | 960 (-1) |
| Zone 7 | 91.6 | 91.6 (0.0) | 2,182 | 2,182 (0) | 1,525 | 1,524 (-1) |
| Zone 8 | 41.4 | 43.1 (+1.7) | 1,025 | 1,068 (+43) | 731 | 762 (+31) |
| Zone 9 | 75.4 | 78.4 (+3.0) | 1,742 | 1,820 (+78) | 1,005 | 1,049 (+44) |
| Zone 10 | 134.9 | 133.9 (-1.0) | 3,091 | 3,085 (-6) | 1,711 | 1,710 (-1) |

# 8. Operating Protocols

## 8.1    Fire Season

PGE declares its own Fire Season based on a variety of factors, such as current and forecasted weather, drought status/timing and intensity, fuel availability and flammability, agency posture, and regional fire activity. PGE bases its decisions on data and information from multiple sources and considers State and Tribal Fire Season declarations within its service territory. The annual Fire Season declaration initiates a series of PGE operational changes.

PGE's Fire Season declaration:

- Changes how the company operates the PGE system, initiating fire-season-specific settings within parts of the grid, including disabling reclosing/testing capabilities, where applicable
- Initiates Fire Season operational work practices in the field
- Activates internal 24x7 Wildfire Threat Alert Notifications (Threat Alerts). Threat Alerts are a GIS-triggered, near-real-time analytical tool that alerts PGE when:
  - Any fire incident has been confirmed by the Integrated Reporting of Wildland-Fire Information (IRWIN) service within one mile of a PGE facility in the last hour (five miles for PGE Parks)
  - A Red Flag Warning has been issued covering an area within one mile of a PGE facility within the last 24 hours (five miles for PGE Parks), and
  - A confirmed fire perimeter is updated by the National Interagency Fire Center (NIFC) within one mile of a PGE facility in the last hour (five miles for PGE Parks) in the event of an expanding wildfire.

## 8.2    System Operations During Fire Season

Once it declares the start of Fire Season, PGE implements operational changes to reduce the risk that PGE infrastructure and operations could become ignition sources. For non-Supervisory Control and Data Acquisition (SCADA) distribution reclosing devices in PGE's HFRZs, these system changes include manually blocking the automatic test-energization of circuits following temporary faults, such as momentary tree branch contacts and lightning strikes with no damage. SCADA distribution reclosing devices are operated as shown in Table 6. Prior to re-energizing, PGE will patrol the downstream circuit to verify that the cause of the fault has been cleared.

PGE may also change settings outside of Fire Season, when the risk of wildfire danger is elevated, or when a Red Flag Warning is in effect. In these instances, PGE will proactively block automatic reclosing on SCADA-controlled devices within PGE's HFRZs.

PGE annually reviews and updates settings for protection and control devices located within PGE HFRZs. In 2023, PGE will continue to implement circuit breaker and recloser protection to minimize fault energy and reduce the risk of utility-caused ignitions during Fire Season.

Additionally, the distribution feeder breakers servicing PGE's HFRZs (those equipped with relays and SCADA) can be set one of three modes: Normal, Fire Season, or Red Flag. Those 13 kV feeders that do not have relays utilize the electronic reclosers' necessary protection settings: Normal, Wildfire, and Red Flag mode.

The tables below show the distribution system operations inside and outside of Fire Season that provide the necessary protection settings for Normal, Fire Season, and Red Flag modes.

**Table 6: Distribution System Operations In and Out of Fire Season**

| Mode | Description | Reason |
|------|-------------|--------|
| Normal | The feeder breaker will have two attempts of reclosing (an automatic test energization of the circuit following a fault event) and instantaneous (relay trips instantly when a fault occurs, with no preprogrammed delay) | Maximize reliability |
| Fire Season | The feeder breaker or electronic recloser will have one attempt of reclosing and trip on definite time instantaneous (a programmed delay before the relay trips). | Minimize risk of ignition |
| Red Flag Warning (during Fire Season) | The feeder breaker or electronic recloser trips on definite time instantaneous and reclosing is blocked. | Minimize risk of ignition |

**NOTE**: Transmission lines located east of the Cascades that traverse PGE's HFRZs do not have specialized wildfire protective modes. As a result, they are placed in the most conservative mode of operation during PGE's declared Fire Season. Transmission lines that are not equipped with SCADA-enabled reclosing will be blocked from reclosing throughout Fire Season. Transmission lines that are equipped with SCADA-enabled reclosing will remain in automatic mode when PGE declares Fire Season. If one of these lines relays and recloses, reclosing will be blocked via SCADA and the line will be patrolled.

**Table 7: Pelton & Round Butte Transmission System Operations In and Out of Fire Season**

| Mode | Description | Reason |
|---|---|---|
| Normal | Two recloses at Pelton, one reclosure at Round Butte | Maximize reliability |
| Fire Season & Red Flag Warning | Reclosing is blocked—reclosers open and lock out without testing the circuit by auto-reclosing. | Minimize risk of ignition |

## 8.3 Preparedness and Training

Prior to Fire Season, PGE provides annual wildfire training to keep employees who will be working in the field during Fire Season safe. This includes non-field personnel that may go into the field on an as-needed basis. Participants receive training, either through computer-based training or a hands-on curriculum covering the use of required fire suppression tools and equipment during field deployments. Contractors who perform work in the field on behalf of PGE must also satisfy this training requirement and carry fire suppression tools and equipment. Training topics for 2023 focus on employee and contractor safety and include (but are not limited to):

- How fuels, weather, and topography impact the ignition and spread of wildfires
- What a fire weather zone forecast is, and how to interpret key factors and validate them in the field
- The suppression tools and equipment PGE, and those acting on behalf of PGE, are required to carry
- Basic suppression tactics for low-intensity ground and surface fires, and
- How to identify lookouts, communications, escape routes, and safety zones (LCES), and how this critical life safety acronym applies to all PGE Fire Season operations.

## 8.4 Event Response & Management

PGE closely monitors active wildfires in or near its distribution service territory and generation asset areas in Oregon and Washington. As an incident expands in size and complexity, PGE will contact the appropriate agency Incident Management Team (IMT) and may offer to embed PGE representatives at the incident command post. PGE representatives are delegated authority to make decisions that align with Corporate Incident Management Team (CIMT) and company leadership direction on PGE's behalf. The goal of this strategy is to enhance interoperability, share information, and promote collaboration with utility peers, Public Safety Partners, and state, Tribal, and local emergency managers to achieve shared objectives to serve the community and affected customers.

During a PSPS event, PGE's CIMT will follow established procedures and protocols to manage the event—see Section 9, Operations During PSPS Events, for more details. Under certain circumstances, the CIMT may execute additional de-energizations known as Preventative Outage Areas (POAs)to protect against risk of ignition or to protect life and safety.  POAs are executed as needed based upon critical circumstances such as emerging meteorological events, system topology conditions, and/or interactions with PGE's Public Safety Partners during PSPS events.  POAs are outside of PGE-defined PSPS Areas and do not receive pre-fire season communications.  CRCs will also not be deployed for POA events.

POAs are executed under PGE's protocols for emergent de-energizations, which can occur during and outside of Fire Season.  PGE personnel on-site also have authority to de-energize portions of the distribution system without requesting permission from or notifying PGE management (for example: to de-energize a downed power line). In addition, first responders may request an emergent de-energization from PGE via 911.

# 9. Operations During PSPS Events

As discussed in Section 6.5.1, Risk-Based Decision-Making for PSPS Events, PGE uses meteorological and outage data and predictive analytics to decide whether to execute a PSPS event. This section provides a high-level overview of the escalating levels of a PSPS event, and the actions taken within each level. PGE maintains detailed, annually updated operational plans and protocols for PSPS events in internal documentation libraries.

The PSPS Process bell curve (Figure 12, below) correlates the various incident levels defined in internal PGE emergency operations plans to illustrate typical operations during the various phases of a PSPS event. It is intended to provide a point of reference only, as PGE may adjust operations during a PSPS event based on real-time conditions.

During an event, information including location, de-energization estimates, and estimated restoration times (ERTs) for each impacted PSPS Area can be found on PGE'S Wildfire Outages and PSPS webpage. PGE's website has the bandwidth capable of handling web traffic surges expected during PSPS events, and all web-based PSPS information will be easily readable and accessible on mobile devices.

During the 2023 Fire Season, PGE will provide multiple options to allow Public Safety Partners to access real-time GIS information pertaining to PSPS outages. These options include a link to PGE's public PSPS web layer service and an ArcGIS Online (AGOL) web map containing PSPS information as required by OAR 860-300-0060. Both the PSPS web layer service and AGOL web maps are updated simultaneously with the PSPS Area map found on PGE'S Wildfire Outages & PSPS page. PGE will continue to evaluate the customer experience with these tools and look for ways to improve that overall experience in the 2023 Fire Season.

Figure 12: PSPS Process Bell Curve
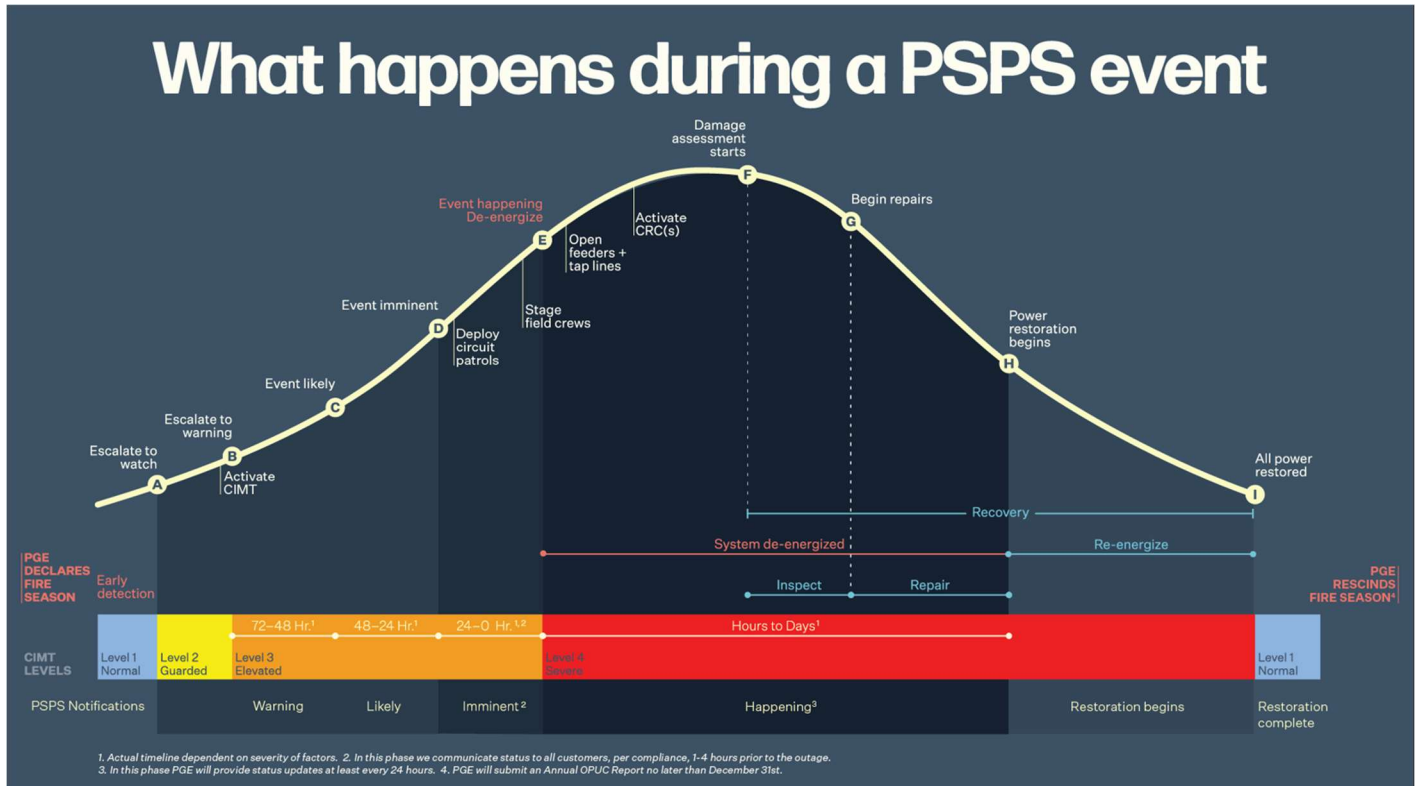
## 9.1 Protocols for De-Energization of Power Lines and Power System Operations During PSPS Events

As a last-resort safety measure to protect people, property, and public areas, PGE will proactively turn off power within one or more PSPS Areas when conditions threaten the ability to safely operate the grid. When PSPS events are declared, PGE takes steps to keep customers and stakeholders well-informed and strives to mitigate customer impacts by limiting the duration of the outage, as much as conditions allow.

## 9.2 Levels of a PSPS Event

If PGE makes the decision to execute a PSPS event, the order of operation generally follows the PSPS Process Bell Curve (Figure 12, above). PGE will adapt actual PSPS event operations as required to address evolving, dynamic, and unpredictable circumstances.



### Level 1: Normal

Once Fire Season has been declared, under **Level 1: Normal** conditions, PGE closely monitors and communicates regional weather and wildfire situation/status to operational leadership. Through real-

time situational awareness monitoring, PGE can tailor operational and system changes during Fire Season, thereby increasing safety and operational efficiency.

Year-round, PGE conducts a Daily (M-F) Operations Call. Should weather or other related events warrant communications outside the normal schedule, PGE may decide to convene the Daily Operations Call on weekends or holidays. During Fire Season, this daily briefing includes, but is not limited to:

- Fire weather forecasts and fire potential specific to PGE's service territory
- Reporting of National Weather Service (NWS)-issued Fire Weather Watches and/or Red Flag Warnings
- Summary of current regional fire activity

Additionally, PGE closely monitors changing or deteriorating conditions, regularly communicating critical updates to affected business units. To assist with this, PGE maintains working relationships with fire agencies, fire management officers, district foresters and dispatch centers at the federal, state, Tribal and local levels, including the Portland office of the NWS. These partnerships provide PGE with specific, granular situational awareness, assistance with forecast modeling validation, fire suppression resource pre-positioning, and activity/growth updates for fires in proximity to PGE assets.

## Level 2: Guarded

If PGE determines that current or predicted fire risk conditions warrant an escalation in planning and coordination, PGE shifts from **Level 1: Normal** to **Level 2: Guarded**, which represents a PSPS Watch posture. When this occurs, PGE will activate the PSPS Assessment Team (PAT) to monitor conditions and prepare the company to initiate the next phase of PSPS plans and procedures, if necessary. PGE also issues a preliminary notification to internal stakeholders and ESF-12 OPUC Safety Staff that PGE has moved to **Level 2: Guarded** status. Following the decision to issue a **Level 2: Guarded** notification, PGE will place the company's full CIMT on standby and build out its duty roster.

## Level 3: Elevated

PGE's decision to escalate from **Level 2: Guarded** to **Level 3: Elevated** status is predicated on conditions on the ground, pace of onset of weather conditions and risk tolerance at the time. Once the decision is made to proceed to **Level 3: Elevated**, PGE will fully activate the CIMT.

**Level 3: Elevated** is divided into three sequential, time-boxed phases, each representing an escalated state of readiness. To the extent practicable, PGE will adhere to the following notification timeline in advance of a PSPS event:

- **PSPS Warning**:      72-48 hours prior to de-energization
- **PSPS Likely**:      48-24 hours prior to de-energization
- **PSPS Imminent**:      4-1 hours prior to de-energization

*Preparation for De-Energization*

During the **Level 3: Elevated** phase of the potential PSPS event, PGE closely monitors fire potential indicators, situation, and status. The CIMT develops Incident Action Plans (IAPs) for each operational period (or as directed by the CIMT's IC), including situation-specific tactics and detailed instructions for field and support personnel—for example, pre-positioning of Pre-PSPS Circuit Patrol personnel and Community Resource Centers (CRCs) in applicable PSPS Areas. Immediately prior to de-energization, PGE resources in the field move into their "Get Set" positions or designated staging areas until execution of de-energization begins.

PGE will continue to monitor fire weather conditions throughout the **Level 3: Elevated** phase. When threshold conditions indicate that a PSPS is imminent and the CIMT's Situational Unit and IC have determined that escalating to **Level 4: Severe** (Event Happening stage) is appropriate, they will request de-energization approval for the appropriate PSPS areas(s) from the Officer-In-Charge (OIC).

## Level 4: Severe: (Event Happening)

Transitioning from **Level 3: Elevated** to **Level 4: Severe**, is triggered by the decision to de-energize the PSPS Area(s). Immediately thereafter, field resources are given the "Go" signal to open feeder and tap line breakers and activate CRCs. PGE will communicate the start of the de-energization, as indicated in Table 8, below.

*Community Resource Centers (CRCs)*

During PSPS events, PGE may establish CRCs in selected areas to provide critical restoration information, including updates and real-time information, to customers impacted by the outage(s). The CRCs also provide customers with electronic and/or medical device charging, internet access, and clean water and ice, to offset some of the impacts associated with PSPS de-energization.

PGE has identified multiple potential locations for CRCs within or near each PSPS Area, to provide the flexibility to select the location that best suits customers' needs based on event specifics. PGE may or may not activate CRCs at all pre-designated locations during a particular PSPS event—depending on the nature of the event, some CRC locations may not be needed, or it may also be possible to serve multiple PSPS-impacted areas from a common CRC location. Pre-identifying multiple CRC locations within each PSPS Area also gives PGE options if mandatory evacuations require the relocation of a CRC. PGE's goal is to locate CRCs as near as possible to the areas impacted by the de-energization, although specific circumstances may make this impractical.

PGE's decision-making process for the potential deployment of CRCs begins during the **Level 3: Elevated** PSPS Likely phase. At this phase, PGE selects the specific CRC location(s) and sets hours of operation. Whenever possible, PGE will work with community partners to make CRC resources available to impacted customers; in some instances (for example, when resources are being provided by a County, Red Cross, or other entity, when multiple PSPS Areas are served by a single CRC, or when safety concerns preclude PGE's ability to site a particular CRC), PGE may not establish a CRC in an impacted PSPS Area. PGE will notify Public Safety Partners and Adjacent Public Safety partners as soon as CRC location and activation schedules have been confirmed. PGE will make efforts to have CRCs

operational within 24 hours of de-energization, and to keep these locations operational as long as they are of benefit to customers.

**Figure 13: September 2022 PGE CRC Volunteers**



## 9.3    Communications Requirements During PSPS Events

Beginning at the **Level 3: Elevated** phase, to the extent practicable, PGE will initiate a methodical sequence of pre-event PSPS notifications and subsequent updates, delivered in 24-hour intervals, that progress from each of the three **Level 3: Elevated** phases (Warning, Likely, Imminent) through the **Level 4: Severe** Restoration Complete phase. During a PSPS event, PGE will communicate with Public Safety Partners, operators of utility-identified Critical Facilities (including Communications facilities), customers, and other stakeholders at the intervals identified in Table 8. PGE will provide priority notifications to Public Safety Partners, Adjacent Public Safety Partners, and operators of utility-identified critical facilities beginning 72-48 hour prior to de-energization, if possible.

In addition, prior to and during PSPS events, PGE makes current PSPS status information, information including location, de-energization estimates, and estimated restoration times (ERTs) for each impacted PSPS area, available on www.portlandgeneral.com's wildfire and PSPS outage webpage. All PSPS information on portlandgeneral.com will be easily readable and accessible on mobile devices.

**Table 8: PSPS Notification Cadence**

| Notification Cadence | Audience | | |
|---|---|---|---|
| | Public Safety Partners, Adjacent Public Safety Partners, Stakeholders | Utility-identified critical facilities[1] | Customers |
| PSPS Warning<br>72-48 hours prior to de-energization | ✓ | ✓ | |
| PSPS Likely<br>48-24 hours prior to de-energization | ✓ | ✓ | ✓ |
| PSPS Imminent<br>4-1 hours prior to de-energization | ✓ | ✓ | ✓ |
| PSPS Happening<br>At de-energization | ✓ | ✓ | ✓ |
| Restoration Begins | ✓ | ✓ | ✓ |
| Restoration Complete | ✓ | ✓ | ✓ |
| At a minimum, status updates at 24-hour intervals until service has been restored[2] | ✓ | ✓ | ✓ |

**Notes**

[1] Including Communications facilities

[2] These notifications may be required any time after initial notifications during **Level 3: Elevated** through restoration, as dictated by the event

PGE will use multiple media channels, including owned, earned and sponsored channels, to inform impacted customers, communities and stakeholders throughout the PGE service area in accordance with OAR 860-300-0050, with special attention to those within the affected PSPS Area(s). PGE will deliver notifications in multiple formats across multiple channels that may include, but are not limited to, phone calls, text messages, prepared public safety notifications distributed through Public Safety Partners, social media posts, media advisories, emails, and messages to agencies that serve diverse community populations. For PSPS outreach to customers and stakeholders, PGE aims to address the geographic and cultural demographics of the PSPS Area, including languages spoken, access to broadband, and accessibility for those who are visually or hearing impaired, through the following strategies:

- All of PGE's PSPS-related written communications are provided in English and Spanish.
- PGE Customer Service offers a Language Hotline that can answer customer questions in 200 languages.

- PGE works closely with Public Safety Partners and the broadcast and print media to provide regular PSPS-related SMS (text) messages and news reports to help customers who may not have in-home broadband access stay informed throughout the PSPS event.

- All of the PSPS-related content on the portlandgeneral.com website is designed to be ADA-A-compliant[6]; for vision- or hearing-impaired customers, PGE provides both audible and written messaging options, as well as closed-captioning on all videos posted to the website.

- Throughout the event, PGE disseminates its PSPS-related messaging via as many platforms and formats as possible to facilitate the widest possible reach—text messaging, online content, traditional media, paid advertising, written materials and customer service in multiple languages, closed captioning—and works with community-based organizations and Public Safety Partners to reach as many impacted customers as possible.

PGE recognizes the criticality of effective communication to stakeholders before, during, and after a PSPS event; to the extent practicable, the following figure provides a visual summary of PGE's PSPS notifications process.

**Figure 14: PSPS Notifications Strategy**
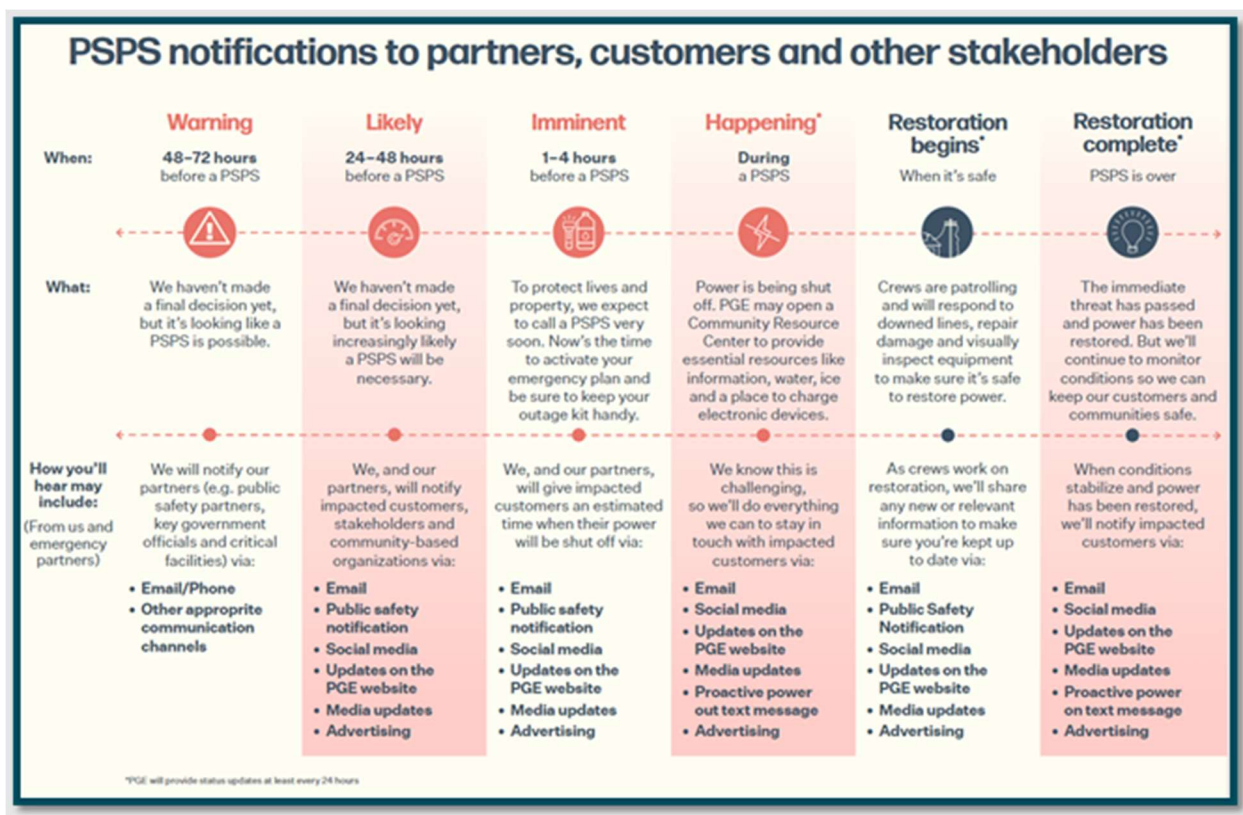


Throughout the PSPS event, PGE will provide the elements of notification information required by OAR 860-300-0050 to Public Safety Partners, Adjacent Public Safety Partners, operators of Utility-

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[6] Reference to Web Content Accessibility Guidelines: https://www.w3.org/WAI/WCAG21/quickref/

identified Critical Facilities (including communications facilities), and customers as summarized in Table 9.

**Table 9: Notification Information**

| Notification Information | Audience | | |
|---|---|---|---|
| | Public Safety Partners, Adjacent Public Safety Partners, Stakeholders | Utility-Identified Critical Facilities | Customers |
| Date and time PSPS will be executed | √ | √ | √ |
| Estimated duration of PSPS | √ | √ | √ |
| Notice of when re-energization efforts will begin and when re-energization is expected to be complete | √ | √ | |
| At a minimum, status updates at 24-hour intervals until service has been restored | √ | √ | √ |
| Number of customers impacted by PSPS | √ | | |
| The PSPS zone, which would include Geographic Information System shapefile(s) depicting current boundaries of the area subject to de-energization | √ | √ | |
| When feasible, the Public Utility will support Local Emergency Management efforts to send out emergency alerts | √ | | |
| A statement of impending PSPS execution, including an explanation of what a PSPS is and the risks that the PSPS would be mitigating | | | √ |
| A 24-hour means of contact customers may use to ask questions or seek information | | | √ |
| How to access details about the PSPS via the Public Utility's website, including education and outreach materials disseminated in advance of the annual Wildfire Season | | | √ |

**Note**

[1] Specifically provided to Operators of Communications Facilities located within the area(s) of the anticipated PSPS.

# 10. Ignition Prevention Inspections

PGE conducts annual Ignition Prevention Inspections within its 10 HFRZs, as well as in areas subject to heightened wildfire risk within PGE's right-of-way for generation and transmission assets located outside of PGE's service territory. PGE inspects each supporting structure (pole or tower) within the HFRZs or area subject to heightened risk each year – approximately 26,000 structures in all, scattered across more than 1,000 line-miles located within PGE's service territory and over 100 line-miles located outside of PGE's service territory. The following table quantifies the number of assets inspected:

**Table 10: PGE Structures Surveyed 2022**

| Location | Structure Count | Line Miles |
|---|---|---|
| PGE HFRZs 1-10 | 25,250 | 1,100 |
| PGE Generation and Transmission Assets Outside Service Territory | 750 | 100 |

## 10.1 Ignition Prevention Inspection Procedures

PGE's Ignition Prevention Inspections are performed in-person. Under PGE's Inspect-Correct methodology, crews perform inspection tasks and complete most corrections during the initial visit to the structure, significantly reducing PGE's average correction times, and reducing customer impacts by eliminating the need for multiple site visits.

Within PGE's service territory, crews visually inspect distribution system support structures, lines, and equipment from the ground using binoculars or a spotting scope mounted on a tripod; physically measure vegetation and structural clearances; and sound each wooden supporting structure to detect internal damage or decay. The crew may drill the pole or capture more detailed measurements to assess the extent of damage or decay in more detail. Crews use a standard form (see Appendix 2) to consistently and repeatably record conditions during the field inspections and capture digital photos of each supporting structure using mobile GIS software.

Figure 15 illustrates the data displayed and tracked through PGE's mobile GIS structure tracking application:

**Figure 15: PGE ARCGIS Online Structure Tracking Data**
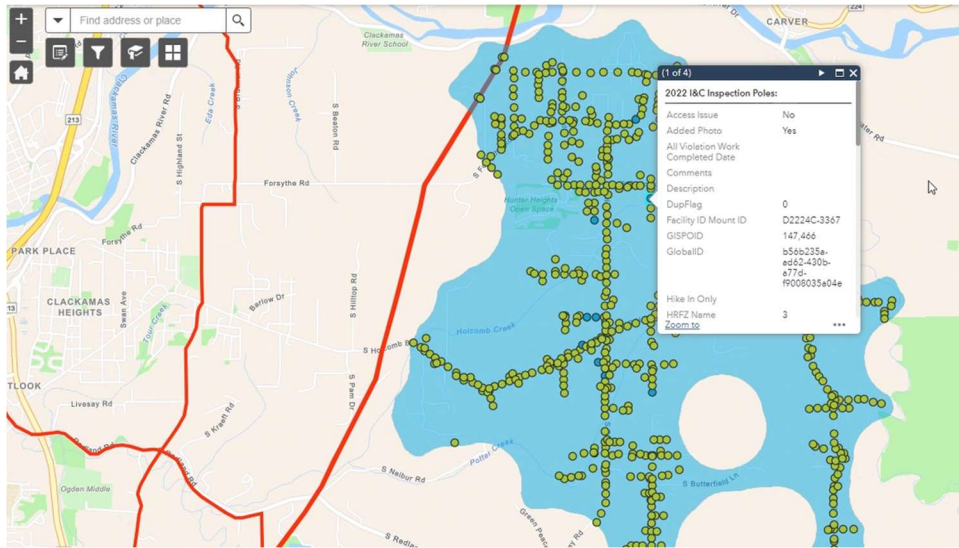


PGE also uses the Inspect-Correct methodology to annually inspect over 170 distribution poles located near its generation facilities in areas of heightened risk outside of the PGE service territory.

Ignition Prevention Inspections conducted outside of PGE's service territory primarily address conditions in the right-of-way (ROW) for PGE 230 kV or 500 kV transmission facilities. These inspections are performed by PGE Transmission Patrolmen with detailed knowledge of how these transmission facilities are constructed, operated, and maintained, including specialized knowledge of supporting structure bonding and grounding configurations. The PGE Transmission Patrolmen visually inspect the supporting structures, lines, and equipment from the ground using binoculars, and use drones to assess conditions in the overhead space. PGE Transmission Patrolmen also use a standard form to consistently and repeatably capture conditions during the inspections.

## 10.2    Ignition Prevention Inspection Standards

PGE's Ignition Prevention Inspection standards build upon several years of PGE experience in administering its Facility Inspection and Treatment to the National Electrical Safety Code (FITNES) Program, which satisfies OAR 860-024-0011 and OAR 860-024-0012. The FITNES Program inspects approximately 28,000 poles annually, or approximately 10 percent of PGE's system, for non-compliance with safety rules governing PGE's and pole occupant facilities.

PGE continues to refine its Ignition Prevention Inspection work practices through active participation in industry discussions and forums. In 2023, based on feedback received from OPUC Safety Staff, PGE will continue to include inspection standards relating to conductor attachments to trees.

PGE's Ignition Prevention Inspection standards direct inspection teams to identify conditions which, left unaddressed, could lead to vegetation or wildlife contact with energized conductors or equipment and, potentially, an ignition event. PGE's Ignition Prevention Inspection standards address the following inspection categories:

- Damaged/broken/missing/loose hardware and equipment

- Damaged conductor

- Conductor clearances

- Bonding

- Damaged/decayed poles

- Broken lashing wire

- Tree attachments

- Other potential sources of ignition

A full list of PGE's Ignition Prevention Inspection standards is found in Appendix 2. PGE will update these standards as required to reflect updated information or OPUC guidance.

PGE 's HFRZ Ignition Prevention Inspections may be combined with other safety or detailed inspections as required by OAR 860-024-0001(6). To avoid multiple inspections of the same pole each year, PGE's ignition prevention inspections may also incorporate the safety patrol standards described in OARs 860-024-0011(2)(c) and 860-024-0018(4). Depending on the facility to be inspected, PGE may also choose to accomplish both the FITNES inspection (OAR 860-024-0011(1)(b)) and ignition prevention inspection during the same site visit.

## 10.3    Ignition Prevention Inspection Program Oversight

PGE's Ignition Prevention Inspection Program management team oversees project management, administration, fieldwork, technical support, and management oversight and reporting.

Each year, prior to the start of the inspection season, the crews responsible for PGE's ignition prevention inspections undergo in-depth training covering the following major topic areas:

- Scope and locations of the inspections
- Inspect/Correct standards, including printed specifications showing which conditions to inspect for and correct, with diagrams and example photos
- Inspect/Correct procedures, including how to conduct the visual inspection, identify pole occupants, obtain measurements, and capture digital photos
- Inspection software, with hands-on training in use of the GIS software
- Required crew configuration, tools and equipment, and materials
- Communications protocols between PGE and the vendor conducting the inspections
- Protocols for communicating with customers prior to accessing private property
- Quality Assurance requirements
- Other requirements associated with vendor performance
- Wildfire awareness and suppression safety training

During the initial one to two weeks of the HFRZ ignition prevention inspection period, each inspection crew is accompanied by a PGE observer who verifies work performed, provides feedback, and answers questions. During the remainder of the inspection period, PGE performs weekly QA/QC of

each crew's work. New crews added during the inspection season are required to complete the same training and initial PGE observer requirements.

Ignition Prevention Inspections conducted outside of PGE's service territory but within the ROW for its 230 kV and 500 kV transmission facilities are accomplished by PGE Transmission Patrolmen and directed through monthly coordination meetings. PGE Lead Working Foremen are responsible for QA/QC of each Transmission Patrolman's work.

The Ignition Prevention Inspections Program is monitored by the assigned PGE project manager, using a GIS dashboard that monitors each supporting structure located in an HFRZ or area of heightened risk. PGE monitors inspection results daily during the inspection season.

### 10.4    Ignition Prevention Inspection Timing

#### Annual HFRZ Notifications

Per OAR 860-024-0011(2)(b), PGE will notify all Owners and Operators of Facilities of any geographic changes to the HFRZ in which their facilities are located no later than 60 days before the start of the 2023 Ignition Prevention Inspections. The number and geographical boundaries of PGE HFRZs are reassessed annually and are subject to change as system hardening projects are completed and new information and analysis becomes available.

#### Timing of Annual Ignition Prevention Inspections

PGE's goal is to begin its annual ignition prevention inspections as early as possible during the calendar year and to complete the inspections no later than July 31, with the majority of inspections completed prior to PGE's declaration of the start of 2023 Fire Season. Accumulated snowfall at higher elevations within the HFRZs and areas of heightened wildfire risk may delay the inspection process in some areas by hindering physical access to supporting structures and obscuring defects on conductors or equipment.

#### HFRZ Inspect-Correct Timeframes

PGE categorizes HFRZ corrections and specifies their mitigation timeframes as follows:

- A condition that poses an imminent danger to life or property must be repaired, disconnected, or isolated by the operator immediately upon discovery
- A condition that correlates to a heightened risk of utility-caused ignition shall be corrected no later than 180 days after discovery unless an occupant receives notification under OAR 860-028-0120(6) that the violation must be corrected in less than 180 days to alleviate a significant safety risk to any operator's employees or a potential risk to the general public
- All other conditions requiring correction shall be corrected consistent with OAR 860-024-0012.

PGE recognizes that OAR 860-024-0018 sets forth several new duties for operators of electric facilities, including requirements to address conditions not associated with PGE facilities and conditions involving supporting structures to which PGE is attached but does not own. With respect to conditions

associated with other pole occupants, PGE will comply with OAR 860-024-0018(8) – 860-024-0018(11) and utilize remediation tools afforded to Operators of electric facilities by the OPUC's High Fire Risk Zone Safety Standards.

## 10.5    Ignition Probability Values and Historic Ignition Tracking

In 2021, in response to new OPUC requirements, PGE created an ignition management tracking database and process. This allows PGE to evaluate the system hardening investments described in the Targeted Interventions to Reduce Wildfire Risk Section, below, in light of the risk drivers that deliver an optimized risk/spend efficiency calculation. For example, if analysis shows that georisk represents a feeder's only risk, but 99 percent of all the ignitions recorded at that site are caused by animal contact, then installing animal protection devices would likely be the appropriate risk mitigation outcome for that location.

As PGE collects risk assessment data and supplements it with lessons learned and industry best practices, it refines its ignition probability values database to create more accurate risk projections. These risk projections, based on quantifiable drivers, allow PGE to map risk velocity (risk forecasted through time) and link it to the various strategies described in Section 6.5, Wildfire Risk-Based Decision-Making, to drive highest-value risk mitigations.

## 10.6    Ignition Reporting Requirements

PGE tracks ignitions potentially caused by PGE equipment, as well as fires that impact PGE facilities. Relevant tracking and reporting include documentation of the initial observation and recording of ignition events in the field, as well as the specific geographic and ROW location of any impacted PGE equipment.

PGE conducts a review of any ignition events reported in the field, and documents relevant data for submission to the OPUC. In addition, PGE tracks and reports the progress of ignition event reports submitted to the OPUC and archives its OPUC ignition event reports for future compliance purposes. Historic ignition event data[7] is used to inform strategic asset management decisions, including system hardening measures, with a more granular understanding of risk. PGE plans to continue to build out this ignition tracking/reporting database as a key component of understanding ignition events by drivers.

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[7] PGE has been tracking historic ignition event data since May 2021

# 11. Vegetation Management

PGE's vegetation management strategy has two major components: PGE's Routine Vegetation Management (RVM) program and the Advanced Wildfire Risk Reduction (AWRR) program. PGE will continue to implement a phased approach to implementation of its AWRR work within the HFRZs. One of the primary goals of PGE's Vegetation Management program is to annually inspect and mitigate identified trees within its HFRZs. PGE establishes internal targets for completion of various work scopes in line with the activities listed below.

## 11.1 Routine Vegetation Management (RVM) Inspection & Maintenance

Under its RVM program, PGE manages approximately 2.2 million trees within its ROW of 12,000 miles of overhead conductor. In recent years, PGE has expanded its vegetation management program to trim with increased clearances and remove more vegetation that is dead, dying, diseased, or displaying growth habits or defects that could impact overhead power lines. PGE performs cyclic patrols and trims vegetation to comply with OAR 860-024-0016 minimum conductor vegetation clearance standards. During routine maintenance inspections, PGE also patrols for and mitigates readily climbable vegetation.[8] PGE documents relevant tree trimming plans and makes them available to the OPUC upon request.

Under its RVM program, PGE inspects about one-third of its overhead distribution assets annually. Routine inspection timing may change as PGE evaluates the effectiveness of its vegetation management cycles to optimize effectiveness and efficiency. Across PGE's overhead system, routine vegetation management activities are ongoing year-round.

PGE inspectors evaluate all vegetation adjacent to PGE facilities, including PGE-owned communications facilities, for proximity, species, growth habits, strength, and overall tree health. When assessing trees along powerlines, PGE considers the following in its vegetation management prescriptions:

- Line voltage
- Location
- Line configuration
- Potential sag under various environmental conditions, and

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[8] OAR 860-024-0016(1) "Readily climbable" means vegetation having both of the following characteristics: (a) Low limbs, accessible from the ground and sufficiently close together so that the vegetation can be climbed by a child or average person without using a ladder or other special equipment and (b) A main stem or major branch that would support a child or average person either within arms' reach of an uninsulated energized electric line or within such proximity to the electric line that the climber could be injured by direct or indirect contact with the line.

- Clearance requirements to avoid off-cycle trimming.

PGE inspectors create project-specific work layout for vegetation contractors to complete while moving through the system performing RVM activities. Line clearance trim specifications are designed to maintain vegetation clearances during routine wind and adverse weather conditions. At a minimum, PGE adheres to the voltage-based clearance requirements specified in OAR 860-024-0016. PGE vegetation contractors trim identified trees to PGE specifications during the three-year standardized maintenance cycle to comply with OAR Division 24 Safety Standards (Division 24), ORS 758.282 and 758.284, and ANSI A300 and OSHA Z133 guidelines.

In addition, RVM work is field-validated by PGE forestry personnel who work closely with the crews to confirm completion. PGE subjects its vegetation management activities to a detailed QA/QC process to verify that vegetation management tasks have been completed to specification. To increase RVM program effectiveness, PGE also coordinates vegetation management activities closely with external stakeholders, including USFS, ODF, Oregon Department of Transportation (ODOT), municipalities, and private landowners.

## 11.2 Advanced Wildfire Risk Reduction (AWRR) Vegetation Management Program for HFRZs

AWRR operations fall outside of PGE's routine maintenance and trimming operations as the AWRR scope, operational practices, inspection schedule, and cadence are all on escalated cycles. AWRR program activities are guided by the results from PGE's Wildfire Risk Assessment modeling program.

For 2023, PGE has continued to refine its vegetation management activities, including the AWRR program, to address current climatic conditions and focus on OPUC requirements. ORS 758.280-758.286 provides PGE's operational framework for AWRR-related activities, as most of this work occurs outside of designated PGE ROW, utility easements, and annual maintenance schedules.

Under the AWRR program, PGE performs annual vegetation inspections on overhead line mileage that falls within HFRZs, mitigates vegetation based upon inspection results, performs QA/QC of vegetation management work completed by crews, documents its vegetation management activities, and coordinates them with county, municipal, and other external agencies, including ODOT, ODF, and USFS.

PGE closely manages AWRR program work to verify that it is completed to PGE specifications, from the establishment of the AWRR work schedule at the beginning of the year through QA/QC of the completed work. AWRR vegetation prescriptions follow program specifications, which include more stringent inspection and maintenance cycles and tree removal guidelines than those required under Division 24.

Tree removal practices associated with AWRR are applicable to any tree within striking distance of PGE electrical infrastructure, regardless of the tree's condition. PGE classifies trees that are an imminent hazard to PGE facilities as "P1" trees. PGE classifies trees that pose a probable hazard to the line or facility as "P2." A P2 designation can refer to any tree condition that could create a hazard to a PGE line or facility–trees that are dead, dying, diseased, or damaged, or that have fungal or insect

infestation or stress, sunscald, overall poor health, mechanical damage, multiple tops, poor site conditions, conks on trunk, excavation or aggradation in the root zone, as well as trees that are located too close to PGE facilities.

In 2023, PGE will conduct as much of the AWRR Program's vegetation and P1 inspections and subsequent trimming and P1 mitigation within designated HFRZs as possible during the first six months of the year, although this work is ongoing throughout the year.

**Figure 16: SlashBuster Clearing Right-of-Way**

**Figure 17: 105' Aerial Lift Removing Dead Tree on Border of AWRR Zone**

## 11.3   Inspection & Maintenance Frequencies for AWRR

**Table 11: PGE HFRZ Inspection & Maintenance Strategies**

| AWRR Mitigation | Inspection or Maintenance | Cadence | Description |
|---|---|---|---|
| **Clearance and P1 Inspection** | Inspection | Annual | During this inspection, PGE AWRR inspectors identify vegetation that is within 5' of high-voltage conductors, and newly established vegetation that is not suitable for a given location. Inspectors verify ongoing vegetation clearance compliance and identify any vegetation that has encroached on PGE assets since the previous inspection. AWRR inspections occur annually, outside of the RVM program's 3-year vegetation maintenance cycle. Inspectors also identify any P1 trees. |
| **Clearance and P1 Mitigation** | Maintenance | Annual | Trees/vegetation identified by the AWRR inspectors as too close, and/or wrong tree for the location are trimmed back to proper specification by tree crews. PGE mitigates all P1 hazard trees as quickly as possible, frequently within 24 hours of identification. |
| **Enhanced Vegetation Inspection** | Inspection | Annual, ongoing | PGE performs a comprehensive inspection along designated HFRZ lines for all potential P2 trees. PGE is currently tracking stems of large diameter trees within minimum approach distance that are mature and not susceptible to movement. PGE will be reviewing these trees for safety every year. In addition, AWRR inspectors identify and target specific sections of line that require more intensive clearance work, including increased side-clearance, overhang removal, selective removal of tree parts, expansion of ROW widths, ROW mowing, and whole tree removal. |
| **Enhanced Vegetation Trimming and Mitigation** | Maintenance | Annual, on-going | PGE removes or otherwise mitigates P2 trees on an ongoing basis throughout the year. Once planned, PGE enhanced vegetation trimming and removal projects are executed as seasonal conditions allow.<br>PGE will mitigate any large-diameter trees that show decline from conditions recorded in the AWRR database appropriately. Due to the scale and logistics of P2 mitigation, some projects planned for a given year may carry over for completion in the subsequent year. |

# 12. Expected Wildfire Program Costs

PGE develops an annual budget of implementation and administrative costs, as well as forecasted capital budgets, for the Program. The activities and expenditures generally included in these budgets include:

**Wildfire-Related Operations & Maintenance (O&M):**

For 2023, Program operation and maintenance (O&M) includes, but is not limited to:

- Wildfire Mitigation Program implementation
    - Wildfire training (described in Section 8)
    - Wildfire-related staff
    - Wildfire Analytics and Planning and tool development (described in Sections 5 and 6)
- Vegetation management, wildfire-related (described in Section 11)
- Support Areas
    - Community Resource Centers and costs (described in Sections 9 and 12)
    - Portable battery pilot (described in Section 15)
    - Wildfire-related outreach and education costs (described in Section 13)
    - Engineering (described in Sections 9 and 15)

### Table 12: 2023 PGE Wildfire Mitigation O&M and Capital Costs

| HFRZ 1-10 O&M | |
|---|---|
| **Activity** | **Cost (2023)** |
| Wildfire Mitigation Program | $4.7M |
| Inspections | $3.1M |
| Vegetation Management | $14.8M |
| Support Areas (Includes CRCs, Communications, Engineering, Portable Battery Pilot) | $1M |
| **TOTAL** | **$23.6M[9]** |

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[9] This budget is based on the 2022 General Rate Case decision dated 04/25/2022.

| HFRZ 1-10 Capital | |
|---|---|
| **Cost Area** | **Cost (2023)** |
| Wildfire Mitigation & Resiliency | $9 M-$20.9 M[10] |
| Utility Asset Management (Project Management Office) | $5.3 M |
| Utility Asset Management | $0.8 M |
| **TOTAL** | **$15.1 M - $27.0 M** |

For reference, as of filing this WMP, PGE's $15 million 2022 capital investments for wildfire mitigation included:

- 23 additional weather stations
- 20 AI cameras in HFRZ
- 11 miles of copper replacement (construction started fall 2022)
- 44 Smart Reclosers/TripSavers
- PGE exceeded its 2022 Fuse Replacement Program goal of 480 by installing 979 non-expulsion (fire-safe) fuses.

PGE will continue to refine its Wildfire Risk Mitigation Assessment program in 2023 and beyond and will continue to forecast its WM&R capital and O&M spending needs based on the results of that analysis. PGE's planned programs may be augmented if PGE is successful as it actively pursues State and Federal grant funding for a variety of wildfire risk reduction and resiliency improvement projects. These programs include FEMA BRIC grants and the DOE Bipartisan Infrastructure Bill (BIL) with grant funding opportunities through the Grid Resilience and Innovation Partnerships (GRIP) section. PGE is also exploring additional opportunities through the State of Oregon's formula grants under the BIL.

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[10] Project designs are currently in various stages of completion

# 13. WMP Engagement, Public Outreach and Awareness, and Public Safety Partner Coordination

## 13.1 Engagement, Outreach and Coordination Overview

PGE's employs a three-pronged approach to collecting feedback, educating, and coordinating with customers and stakeholders regarding the WMP. It includes:

- WMP Engagement Strategy
- Community Outreach and Awareness Strategy
- Public Safety Partner Coordination Strategy

PGE's WMP Engagement Strategy is focused on building long-term relationship and equitable engagement with a diverse set of community members, using the guiding principle "Nothing about me without me." PGE actively seeks to understand the needs and wishes of the communities it serves.

The Community Outreach and Awareness Strategy focuses on educating customers and communities about PGE's wildfire mitigation efforts and preparing them for the possibility of wildfire or PSPS events. Outreach and awareness are year-round efforts using multiple mediums and communication channels to reach customers and community stakeholders. PGE values close working relationships with its Public Safety Partners and considers them integral to the success of a well-coordinated Wildfire Mitigation Program. PGE's Public Safety Partner Coordination Strategy outlines the format and cadence of coordination for these efforts.

## 13.2 2022 Public Safety Partner Coordination and Collaboration

PGE collaborated with its Public Safety Partners via multiple channels in 2022 to support development of the 2023 WMP. Those engagement channels included After Action Review (AAR) processes for both the PSPS Tabletop Exercise at PGE's Integrated Operations Center on May 13 and for the September 2022 PSPS event, as well as a PGE-facilitated Pano AI workshop with fire agencies in October.

### PSPS Tabletop Exercise AAR

During the exercise, participants commented that Public Safety Partners would benefit from having input into the refinement of PGE's public notification templates, as there is specific information that external partners and stakeholders will request and need access to during a PSPS event.

Public Safety Partners expressed their appreciation that they were included in the exercise. Participants commented that it would be beneficial to conduct a functional exercise to allow all partners to work through a PSPS event collaboratively, in real time.

### September 2022 PSPS Event

PGE also solicited feedback from its Public Safety Partners during the AAR process following the September 9–12, 2022 PSPS event. Some of the suggestions that PGE is working to incorporate in its 2023 Program include:

- Host a Public Safety Partner workshop to allow external stakeholders to advise and support clarification of cross-jurisdictional coordination responsibilities for alerts and warnings
- Evaluate alongside Public Safety Partners the use of Wireless Emergency Alerts for PSPS events and define policies and agreements to facilitate its successful deployment and reduce "overspray" confusion for notification recipients.
- Build a county partnership model to support Public Safety Partner-hosted locations with water and ice donations
- Hold a work session with Public Safety Partners, including ESF-12, to share information about CRCs, locations, information sharing, and other incident support services for community members
- Develop centralized dashboards, status hubs, and granular data feeds readily accessible to all stakeholders, with emphasis on dashboards targeted to all PGE employees, Public Safety Partners, and customers
- Evaluate a method to further granulate GIS data to identify the current stage of the PSPS event for each PSPS Area.

A more detailed description of PGE's engagement with Public Safety Partners and lessons learned during the September 2022 PSPS event is available in PGE's ***PSPS Annual Report*** to the OPUC.

### Pano AI Partnership

On October 19, 2022, PGE held a workshop with representatives from Pano AI and six Oregon fire agencies to coordinate development opportunities for situational awareness. Participants discussed how the Pano AI wildfire camera technology is improving detection/alerting processes and decision-making, learned more about existing Pano AI capabilities, and discussed potential improvements to the platform's features and tools. For example, workshop participants explored the feasibility of capturing weather data at the camera locations to provide real-time meteorological condition information to responders. The group also discussed the potential for this technology to improve emergency evacuation processes by sharing access and data with law enforcement agencies county to county and even state to state.

### 13.3   2023 WMP Engagement Strategy

PGE's 2023 WMP Engagement Strategy is influenced by the community feedback captured during the 2022 program year (see Appendix 3 for comments received during PGE's 2022 WMP engagement sessions) and will focus on continuing to proactively engage and collaborate with PSPs, local communities, and customers. The annual Wildfire Mitigation planning process provides PGE with the opportunity to solicit feedback on its WMP and strengthen long-term engagement relationships with Public Safety Partners and local community members.

PGE's engagement methods are shaped by OPUC compliance rules and recommendations, as well as the iterative feedback received from Public Safety Partners, community-based organizations (CBOs), local community stakeholders and customers throughout the year. The metrics and criteria PGE uses to evaluate engagement effectiveness include quantitative metrics such as number of

participants/attendees per event and workshop ratings/scores, as well as qualitative feedback received during and after each engagement event. Although the specific schedule for these events has not been established at this time, PGE's 2023 WMP engagement activities may include:

- Anticipate contracting with a qualified communications, outreach, and public involvement consultancy with strong ties to local communities to help PGE host a series of WMP engagement sessions across the PGE service territory.
- Hosting at least one WMP engagement session within each county (or group of adjacent counties within reasonable geographic proximity), with access and functional needs considerations, in its service territory. Participants will be able to attend these public workshops in-person or virtually.
- Holding a pre-planning session with Public Safety Partners to identify any language or functional needs to be accommodated during public engagement sessions.
- Capturing WMP feedback from both in-person and virtual WMP engagement session participants to better understand the needs and concerns of those most impacted by PGE's wildfire mitigation efforts, while meeting OPUC rule requirements.
- Providing additional feedback opportunities through follow-up surveys, to further inform the 2024 WMP.

One of the main goals of PGE's WMP Engagement Strategy is to complete all engagement session planning by the end of the first quarter of 2023, with the aim of delivering these sessions as early as the second quarter of 2023. One of the key takeaways from PGE's 2022 engagement sessions was the importance of the timing of these events. PGE will focus on delivering its 2023 WMP Engagement Strategy events during the peak of Fire Season and/or when wildfire concern and activity is at its highest, rather than too early or late in the year.

PGE's 2023 WPM Engagement Strategy will consider including breakout stations/tables for PGE's Public Safety Partners, engaging American Sign Language and Spanish-speaking interpreters for the virtual or onsite events, and offering a virtual or onsite Spanish-only community engagement event.

### 13.4   Wildfire Community Outreach and Awareness Strategy

The goal of PGE's 2023 Wildfire Community Outreach and Awareness Strategy is to take a comprehensive and cohesive approach in communicating directly with community stakeholders and partners, customers, and the general public about PGE's wildfire mitigation efforts. The purpose of this strategy is to prepare communities for Wildfire Season by providing information about specific preparedness actions they can take, as well as steps PGE may take, including PSPS events. Outreach methods will reflect an umbrella approach that covers multiple partners, stakeholders, and channels to reach customers and communities throughout the PGE service territory. This approach will also incorporate stakeholder, Public Safety Partner, and customer feedback, as well as insights from available data about how customers are engaging with the information PGE provides. PGE is developing a strategy for expanded collaboration with Public Safety Partners and Local Communities during the 2024 WMP development process.

PGE's efforts to connect with the target audiences for its community outreach and awareness program will begin with outreach to regulators, state and emergency response agencies, PSPs and local municipalities to raise awareness about PGE's HFRZs, beginning with the annual submittal of PGE's WMP and continuing through Fire Season. In 2023, PGE will provide these entities with information about steps PGE is taking to reduce the risk of wildfire, and about opportunities to participate in one of the scheduled informational conference calls and tabletop exercises prior to PGE declaring Fire Season. PGE conducts ongoing outreach to state agencies and government officials to share vital information about PGE's wildfire mitigation efforts and potential PSPS events.

### 13.4.1 Wildfire Communication & Awareness Channels and Campaigns

PGE employs a variety of tools and communication channels to broadly disseminate wildfire information and awareness and to ensure equitable information access for all members of the local community. For example, PGE has shared information with over 250 Community-Based Organizations (CBOs), food banks and school districts within PGE's service territory, enlisting their help in communicating with specific communities and customer groups to build awareness about the Wildfire Mitigation Program and potential PSPS events. PGE engages with CBOs by providing a toolkit (Appendix 7) of sample outage preparedness messages for use in social media, email, newsletter, and website messaging, in 15 languages (Arabic, Burmese, Chinese (simplified), Chinese (traditional), English, Farsi, Japanese, Korean, Rohingya, Romanian, Russian, Somali, Spanish, Swahili, and Vietnamese)—the most commonly spoken languages in PGE's service territory according to Oregon Census data. This learning has been validated through PGE's language line, which provides phone interpretation services in over 200 languages.

One of the main communication tools at PGE's disposal is the use of its public-facing website, (portlandgeneral.com) to communicate with all customers regarding wildfire awareness and PSPS preparedness. To provide stakeholders, partners, customers, and the public a central resource for wildfire-related information, PGE annually updates its wildfire outages web content in English and Spanish and provides a more specific set of information in 13 additional languages. The portlandgeneral.com wildfire pages provide information on the following topics:

- What is a Public Safety Power Shutoff?
- An interactive map of PGE's service territory and pre-identified PSPS areas, showing which zone (if any) is currently active. The map allows users to enter a service address to see whether it's located within the active area
- How to prepare a home or business for a PSPS event (which includes information about emergency plans, kits, and checklists)
- A high-level overview of PGE's wildfire preparation/mitigation strategy
- Information regarding how PGE's HFRZs were identified
- Factors considered in evaluating the likelihood of a PSPS event (e.g.: wind speed, temperature, humidity, the dryness of trees and brush, etc.)
- PSPS FAQs

Figures 18 and 19 provide examples of PSPS educational content found on the www.portlandgeneral.com website.

**Figure 18: portlandgeneral.com's Wildfire Outages and PSPS Page (English and Spanish Versions)**
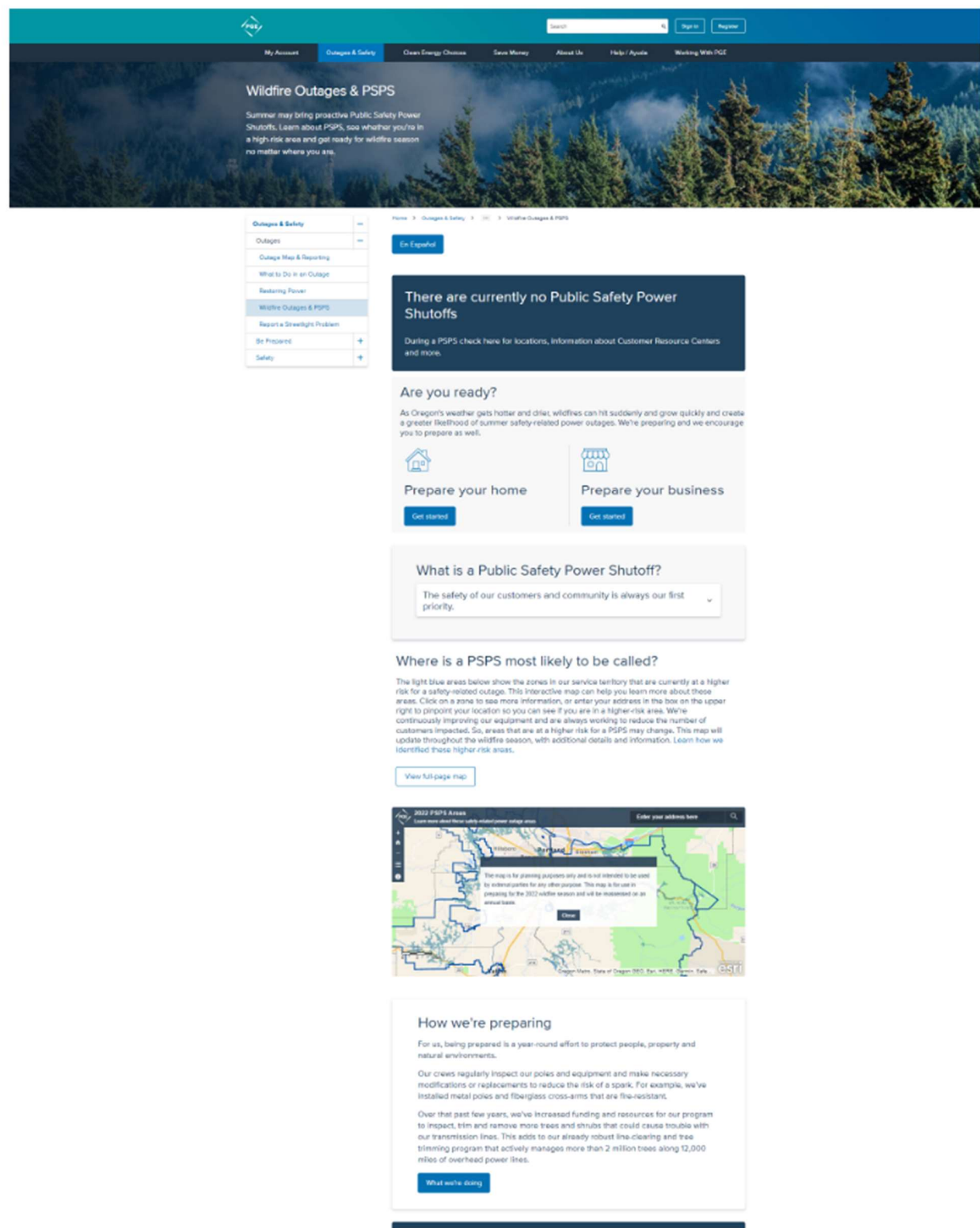
**Apagones por incendios forestales**

El verano podría traer consigo Interrupciones del Suministro Eléctrico por Motivos de Seguridad Pública (PSPS) proactivas. Infórmese sobre las PSPS, vea si se encuentra en un área de alto riesgo y prepárese para la temporada de incendios forestales.

**En Español**

- Obtenga ayuda con su factura
- Ahorre en su factura y ayude al planeta
- Administre su cuenta
- Manténgase seguro y prepárese
  - Prepare su hogar
  - Apagones por incendios forestales
  - Equipos médicos que usan energía eléctrica
  - Seguridad
  - Alerta de fraude

**Actualmente no hay Interrupciones del Suministro Eléctrico por Motivos de Seguridad Pública (o PSPS) activas**

Durante una PSPS, consulte aquí para encontrar las ubicaciones de las PSPS, información sobre los Centros de Recursos Comunitarios de PGE y más.

**¿Está preparado?**

A medida que el clima de Oregón se vuelve más caluroso y seco, los incendios forestales pueden comenzar de repente y crecer rápidamente, lo que aumenta las probabilidades de que se produzcan apagones de verano por motivos de seguridad. Nosotros nos estamos preparando, y le pedimos que se prepare usted también.

**Prepare su hogar**

Prepárese

**Prepare su empresa (en inglés)**

Prepárese

**Interrupción del Suministro Eléctrico por Motivos de Seguridad Pública**

La seguridad de nuestros clientes y la comunidad son siempre la máxima prioridad.

**Áreas con mayor riesgo de PSPS**

Por motivos de un apagón de seguridad las áreas en morada clara son áreas en nuestro territorio de servicio de más alto riesgo. Haga clic en un área del mapa o ingresar su dirección en la caja para precisar su ubicación. Este mapa se actualizará durante la temporada de incendios forestales con detalles e información adicionales.

Entérese cómo identificamos estas áreas de mayor riesgo.

Ver mapa en vivo

**Cómo nos estamos preparando**

Nos preparamos durante todo el año para proteger a las personas, las propiedades y los ambientes naturales.

Nuestras cuadrillas revisan periódicamente los postes y los equipos, y realizan las modificaciones o los reemplazos que sean necesarios para reducir el riesgo de chispas. Por ejemplo, hemos instalado postes metálicos y crucetas de fibra de vidrio que son ignífugos.

En los últimos años, hemos aumentado los fondos y los recursos para que nuestro programa revise, pode y quite más árboles y arbustos que puedan causar

Additionally, PGE may attend wildfire preparedness events and town halls hosted by county and fire agencies, for the purpose of sharing information about the potential for wildfire-related power (PSPS) outages. In 2022, PGE attended five such events in Clackamas County and shared information and checklists for making an outage kit and preparing an emergency plan, as well as information about Public Safety Power Shutoffs, including when PGE may call them and why and what factors PGE will consider in making that determination, with reference to resources on portlandgeneral.com.

**Figure 20: Flyer for 2022 PGE Community Wildfire Preparedness Events**



For 2023, PSPS preparedness information provided on the www.portlandgeneral.com website will be available in 15 languages (see Section 13.4.1, above, for the full list). PGE will also provide PSPS preparedness checklists translated into multiple languages, available via the PGE website during Fire Season, as well as PSPS preparedness one-pagers to CBOs, food banks, and schools throughout the PGE service territory. In addition, throughout Wildfire Season, PGE references the Language Line on its website and customer communications. PGE Customer Resource Centers distribute fliers in multiple languages with the following message: "We speak your language. Our customer service advisors can assist you in 200+ languages. Call us at 503-228-6322."

As Wildfire Season approaches, PGE will activate a campaign to raise awareness of wildfire and the potential for PSPS events, including a Wildfire Safety Month press release in May, distributed to 280 media outlets in Oregon via FlashAlert. Additionally, PGE will send out wildfire awareness and PSPS preparedness emails and direct mail to targeted customer segments in English and Spanish.

Throughout Fire Season, PGE will issue additional press releases and/or generate media stories about wildfire preparedness, what a PSPS is, and when a PSPS may be called, using mass communications to reach broad audiences.

Additionally, PGE will share at least one communications toolkit[11] with messaging for use by Public Information Officers for cities, counties, and emergency response agencies in PGE's service area. In late spring and throughout Fire Season, PGE's Twitter and Facebook will regularly share graphics and information driving viewers to portlandgeneral.com for wildfire awareness and PSPS information. PGE has chosen these social media communications tools for breadth of reach.

In 2023, PGE plans to build on its 2022 communications, education, and preparedness campaigns, using these existing communications and educational channels as a baseline and working collaboratively with community leaders and PSPs to refine and update the direction and content as required to keep customers informed. Please refer to Appendix 4 for an inventory of PGE's 2022 efforts and channels utilized.

### 13.4.2   Outreach and Awareness Timing

In 2023, PGE will perform outreach and awareness activities prior to and during the 2023 Fire Season to reach customers, Operators of Critical Facilities, federal, state and local governments and elected officials, agencies, Tribes, and Public Safety Partners. Customer communications will begin in May, with cadence and medium tailored to specific target audiences including residential and business customers, key managed accounts, critical and pole customers, and customers inside and outside of PSPS areas. Communications will continue throughout Wildfire Season in the form of paid advertising (daily) and strategic direct customer outreach (every two to four weeks). Activities will follow the same seasonal timeline employed during in 2022. Refer to Appendix 5 for timeline details.

### 13.4.3   Outcome of 2022 Outreach and Awareness Efforts

Outcomes of 2022 outreach and awareness efforts are provided in Appendix 6, Outcomes of 2022 Outreach & Awareness Efforts.

### 13.5   Assessing Effectiveness of Wildfire Community Outreach and Awareness Efforts

In 2023, PGE, in partnership with its Public Safety Partners, will seek measurably equitable outcomes and metrics for its wildfire community outreach and awareness activities. Goals for PGE's community outreach and awareness activities include raising awareness for customers and other stakeholders regarding PGE's Wildfire Mitigation Program and building collaborative relationships with these groups. PGE will work to provide communications that are inclusive and meet people where they are by using languages they understand. These equitable outcomes and metrics include:

- **Outcome:** Deliver wildfire mitigation information and awareness in an approachable and accessible manner that benefits all community members

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[11] Please see Appendix 7 to view sample 2022 toolkit materials.

- **Outcome:** Empower Public Safety Partners with access to timely and actionable information

PGE will measure the effectiveness of its outreach and awareness efforts through the use of surveys as well as the following metrics:

- **Customer Marketing**:
  - Site visits to our wildfire pages on portlandgeneral.com
  - Wildfire newsletter and email open and click-through rates
  - Click through rates on wildfire digital ads

- **Corporate Communications**:
  - Reach of wildfire press release
  - Breadth of coverage generated
  - Number of social media posts and engagement

Finally, PGE will use 2023 as a baseline year to start measuring customer wildfire awareness with annual surveys.

### 13.6 Public Safety Partner Coordination Strategy

PGE works closely with Public Safety Partners to facilitate information sharing, community outreach and wildfire preparedness and response. PGE defines Public Safety Partners as the OPUC's Emergency Support Function (ESF)-12, Local Emergency Management, Oregon Department of Emergency Management (OEM) and Oregon Department of Human Services (ODHS). PGE's Public Safety Partner Coordination Strategy is divided into three phases: prior to, during, and after Fire Season. By working in partnership with each Public Safety Partner, PGE can maximize the effectiveness of its outreach efforts and the size of the audience receiving these communications and improve operational coordination and information sharing. Meeting frequency and location will be determined in collaboration with our Public Safety Partners.

### 13.6.1 Prior To Fire Season

Before Fire Season, PGE will engage in joint planning processes and deliver presentations to Public Safety Partners at existing information sharing and preparedness coordination forums, as needed. PGE will include wildfire preparedness topics in one of the all-hazards quarterly summits with Public Safety Partners. PGE and ESF-12 coordinate on the location, time, and topics for quarterly summits. PGE will also coordinate with Public Safety Partners to implement the WMP Engagement Strategy.

PGE will also host at least one annual pre-Fire Season tabletop exercise with Public Safety Partners that will focus on PSPS notification procedures and processes. This tabletop will occur before the end of the second quarter of 2023 and will follow the Homeland Security Exercise and Evaluation Program (HSEEP) principles and guidelines. All Public Safety Partners will receive an invite to attend the tabletop exercise and participate in the associated AAR process. When possible, PGE will engage in exercises developed by other Public Safety Partners to improve interoperability during an actual event.

### 13.6.2  During Fire Season

Once PGE declares the start of the Fire Season, the company will inform its various Public Safety Partners regarding in-season operational modifications to the PGE system.

Additionally, during Fire Season, PGE enhances situational awareness monitoring and maintains a state of operational readiness. Should a new fire start or expanding fire threaten PGE infrastructure, a company representative will contact the agency and/or Incident Management Team (IMT)-identified point of contact to coordinate appropriate utility response. For all incidents, PGE acts as a cooperating partner when company infrastructure is at risk or has been impacted by a wildfire.

If an incident requires the activation of the PGE CIMT, PGE will notify impacted stakeholders and initiate in-person and virtual coordination activities. As required, PGE will deploy dedicated utility representatives to jurisdictional Emergency Operations Centers (EOCs), Emergency Coordination Centers (ECCs), or Incident Command Posts (ICPs).

After wildfire incidents, PSPS events or PGE-led tabletop or functional exercises, PGE will conduct an AAR process that is consistent with HSEEP and utility sector best practices, reviewing incident response and identifying continuous improvement action items. A detailed summary of input from our Public Safety Partners and lessons learned captured through exercises and events from 2022 can be found in Appendix 8.

### 13.6.3  After Fire Season

When the annual Fire Season ends, PGE will solicit feedback from Public Safety Partners about implementation of the Wildfire Mitigation Program and any opportunities for improvement. This feedback is solicited through phone calls and meetings.

# 14.  Participation in National and International Forums

In 2023, as in previous years, PGE will be an active participant in a wide array of national and international industry forums addressing wildfire and outage-related issues.

Emergency managers from PGE, PacifiCorp, NW Natural, and BPA collaborate throughout the year as part of an Energy Emergency Management Team (EEMT). Annually, the EEMT exchanges contact information with the Northwest Coordination Center (NWCC) for emergency communications during Fire Season. Dispatch/Control Center numbers provided by the energy companies are for dispatch-to-dispatch communications. Emergency management contacts are provided for both NWCC and fire dispatch center personnel to assist with strategic decision-making and incident coordination.

In addition, PGE annually participates in a variety of industry forums that may discuss wildfire-related topics, including:

- **International Wildfire Risk Mitigation Consortium (IWRMC):** PGE participates with utilities from across the Western U.S., Canada, South America, and Australia to benchmark and share best practices for wildfire mitigation. The IWRMC is comprised of four working groups: Operations & Protocols, Risk Management, Vegetation Management, and Asset Management.

  PGE has leadership positions on the Operations & Protocols and Risk Management working groups. In 2022, PGE used this forum to benchmark its approach to wildfire risk mitigation assessment to industry best practices and accelerate its learning on capital investments while understanding the difference in the environments other industry participants experience. PGE also participated in the group to understand new technologies and their potential applicability to PGE operations, as well as vegetation management approaches from around the globe.

  Through the IWRMC, PGE is able to leverage lessons learned for specific wildfire mitigation strategies already implemented by other utilities: for example, the use of covered conductor to reduce wildfire risk. Utilities that implemented this strategy failed to account for detection, fire response, and failure modes that could result in wire-down events, increasing wildfire risk as covered conductor failed to de-energize, resulting in ignition events that were sometimes undetected for hours. This was a costly lesson learned for peer utilities, which were forced to remove and underground covered conductor in environments where that failure mode would be common. PGE customers benefit from the company's active participation in this forum as the shared data and review of mitigation strategy outcomes help PGE avoid pitfalls and select more cost-effective and successful risk mitigation measures.

- **Electric Power Research Institute (EPRI):** PGE engages with its research partners at EPRI through multiple programs to address wildfire mitigation research and is leveraging EPRI-led programs such as the Incubatenergy Network to gain knowledge of new technologies and start-ups in wildfire-related disciplines. PGE engages with EPRI at multiple leadership levels. The PGE President and CEO serves on the EPRI Board of Directors; a PGE Senior Vice President serves on the EPRI Research Advisory Council; multiple PGE Senior Managers and Directors

serve as Sector Council advisors, and dozens of PGE SMEs engage with EPRI at the program advisory and technical working group levels.

In partnership with EPRI, PGE sponsored the three-day Utility Wildfire Symposium on November 8–10, 2022, in Portland, attended by OPUC Commissioners and staff, representatives from research institutes and industry, and government officials. Attendees viewed demonstrations of wildfire-related technologies, heard presentations on current wildfire-related research, and discussed opportunities for new research projects and collaboration across participating entities.

EPRI was recently commissioned to conduct a study for the California Investor-Owned Utilities to determine which portable battery products are best-suited to back up medical devices during power outages (such as PSPS events). PGE has engaged with its research partners at EPRI to design a Portable Battery Pilot Project, in which PGE will study the feasibility of offering no-cost portable battery devices to PSPS-impacted residential customers also enrolled in PGE's medical certificate program (for additional details, please see Section 15.6, below).

- **Oregon Joint Use Association (OJUA):** PGE is active in the leadership of the OJUA, a non-profit industry workgroup whose mission involves building trust, cooperation, and organizational cohesion between utility pole owners, users, and government entities to promote the safe, efficient use of the ROW. The OJUA has featured educational presentations on the topic of wildfire mitigation at its past two annual meetings. Additionally, by administrative rule, the OJUA is an advisor to the OPUC on the adoption, amendment, or repeal of administrative rules governing utility pole owners and occupants.

- **Other National and Regional Forums:** PGE is actively engaged with industry research partners at the Western Energy Institute, Edison Energy Institute (EEI), and the U.S. Department of Energy. This is evidenced by PGE participation in the leadership of these organizations, as well as its active engagement in the industry technical sessions and conferences.

- **Regional Disaster Preparedness Organization (RDPO):** PGE actively participates in the RDPO, which encompasses the five Portland metro region counties (Multnomah, Washington, Clackamas, Columbia, and Clark), as a utility/energy sector participant and steering committee member. In this role, PGE provides the RDPO with insights and a utility perspective on issues. In addition, participation in this group has enhanced PGE's regional partnerships and provided insights into regional disaster resilience and preparedness initiatives.

- **Oregon Wildfire Detection Camera Interoperability Committee:** PGE participates in this committee, whose primary goals and objectives include developing and maintaining statewide wildfire camera detection system(s) and fostering coordination and collaboration among its members. The committee membership includes the Governor's Office, public safety agencies, fire agencies, emergency managers, USFS, Bureau of Land Management, Statewide Interoperability Coordinator, ODF (co-chair of the committee), the Oregon Hazards Lab at the University of Oregon (co-chair of the committee), Tribal representatives, and Oregon's investor-owned utilities.

PGE is also working with federal partners to support the Wildfire Working Group's interdisciplinary and interagency efforts, representing the utility sector in the President's 2022 wildfire meetings with cabinet secretaries to emphasize the need for continued leadership at the federal level on wildfires and shared responsibility on the matter, among other issues.

In 2022, PGE participated in site visits with the San Diego Gas & Electric and Southern California Edison wildfire mitigation teams. The purpose of this benchmarking trip was to accelerate PGE's learning toward mitigating wildfire risks from PGE assets, as well as how to communicate with and support our customers. The teams discussed risk analysis, incident management approaches, capital investment strategies, fire suppression tools, community resource models, and communication techniques. Some key takeaways from the visits include:

- Opportunities to leverage greater automated notification capabilities around PSPS communications
- Opportunity to develop stronger relationships with local media to broaden and deepen awareness around wildfire preparedness and PSPS communications
- Significant investments being made in reconductoring in areas where undergrounding is not feasible or cost-effective
- Southern California Edison has a robust electronic Customer Care Plan Dashboard on all impacted customers during a PSPS event, allowing them to drill down to the individual customer/meter
- Both utilities were providing grants to assist with wildfire burn opportunities
- Considerable investments were being made to acquire aviation assets (helicopters and drones) available to provide air support to combat wildfires
- The importance of robust and dedicated meteorology and wildfire communications teams.

One finding from PGE's benchmarking peer reviews is that CPUC Decision 21-06-034[12], which requires California IOUs to consider the needs of Medical Baseline and Access and Functional Needs Communities impacted by PSPS events, could have implementation and customer impacts for Northwest utilities. PGE Interviewed representatives from California IOUs to understand the findings and best practices they observed during the rapid deployment of this regulatory mandate, as well as challenges, uptake rates, and implementation best practices. These interviews led PGE to work with EPRI to create the Portable Battery Pilot Project described in Section 15.6.

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[12] https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/safety-and-enforcement-division/documents/decision-phase-3-gl.pdf

# 15. Research & Development

PGE is undertaking a variety of wildfire-related research projects with public and private research institute and industry partners.

## 15.1 Early Fault Detection Pilot Project

As a result of its collaboration with EPRI, PGE deployed the Early Fault Detection (EFD) pilot project in 2021.[13] EFD uses sensors to detect anomalies on the feeder in real time, allowing PGE to intervene (replace or repair) the affected component(s) prior to a failure that could cause an ignition. In 2023, PGE will deploy the first of three planned EFD systems on feeders within its HFRZs and, if possible, will add further EDF systems by leveraging potential federal grant funding opportunities. In addition, in 2023 PGE will evaluate detection/response times for covered conductor equipped with an EFD system to assess the viability of this approach as an alternative to undergrounding within its HFRZs.

**Figure 21: Damaged Conductor Identified by EFD System in 2022 and corrected by PGE**



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[13] Incubatenergy Labs 2020 Pilot Project Report: IND Technology – Early Fault Detection for Power Lines

**Figure 22: Example of An Installed EFD System**
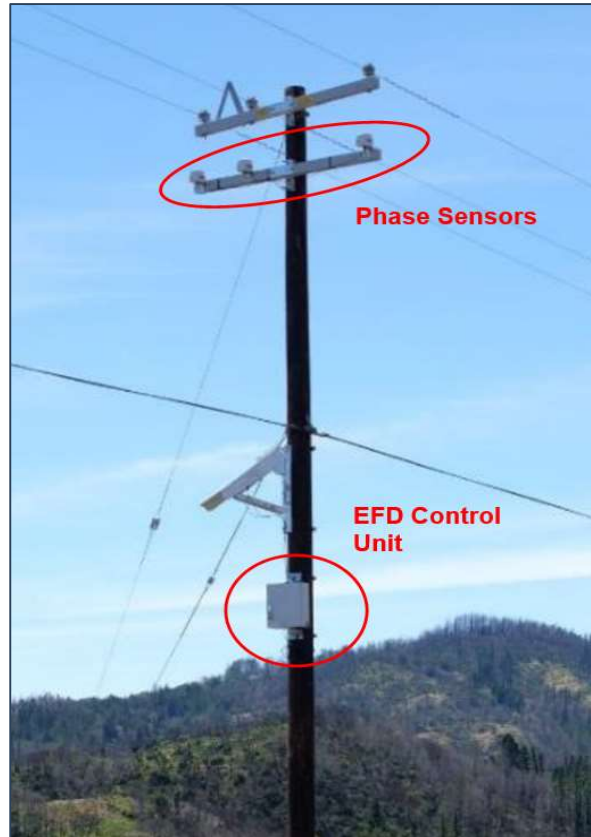


### 15.2    Pano AI: 360-Degree, AI-Based Imaging

In 2021, in partnership with EPRI and the City of Portland, PGE tested an artificial intelligence-enhanced ultra-high-definition (UHD) camera technology, Pano AI (Incubatenergy Labs 2021 Pilot Project Report – Pano AI – 360-Degree, AI-Based Imaging for Wildfire Situational and Locational Awareness). These cameras can detect and identify smoke through ultra-high-definition video imaging, and notify PGE if it detects a fire, in real time. As the PGE-sponsored pilot project showed, this technology has proven benefits in accelerating fire detection and response times. The cameras are now operational within all PGE HFRZs and detected multiple fires (not wildfires) in 2022.

As of 2022, PGE validated the efficacy of this technology and deployed 22 Pano AI cameras across its 10 HFRZs (see Figure 9 for locations) and plans to deploy an additional 15 cameras in 2023. PGE also provided access to these cameras to multiple Public Safety Partners, including the Columbia Cascade Interagency Communications Center (which provides camera access to USFS, ODF, U.S. Fish & Wildlife Service and other agencies), three ODF Forest Protection Districts, and the Confederated Tribes of Grande Ronde, among others. See Section 7.1, Enhanced Monitoring & Technology In HFRZs, for a full list of agencies with access to PGE's Pano AI network.

**Figure 23: Smoke Detected by AI-Equipped UHD Camera**
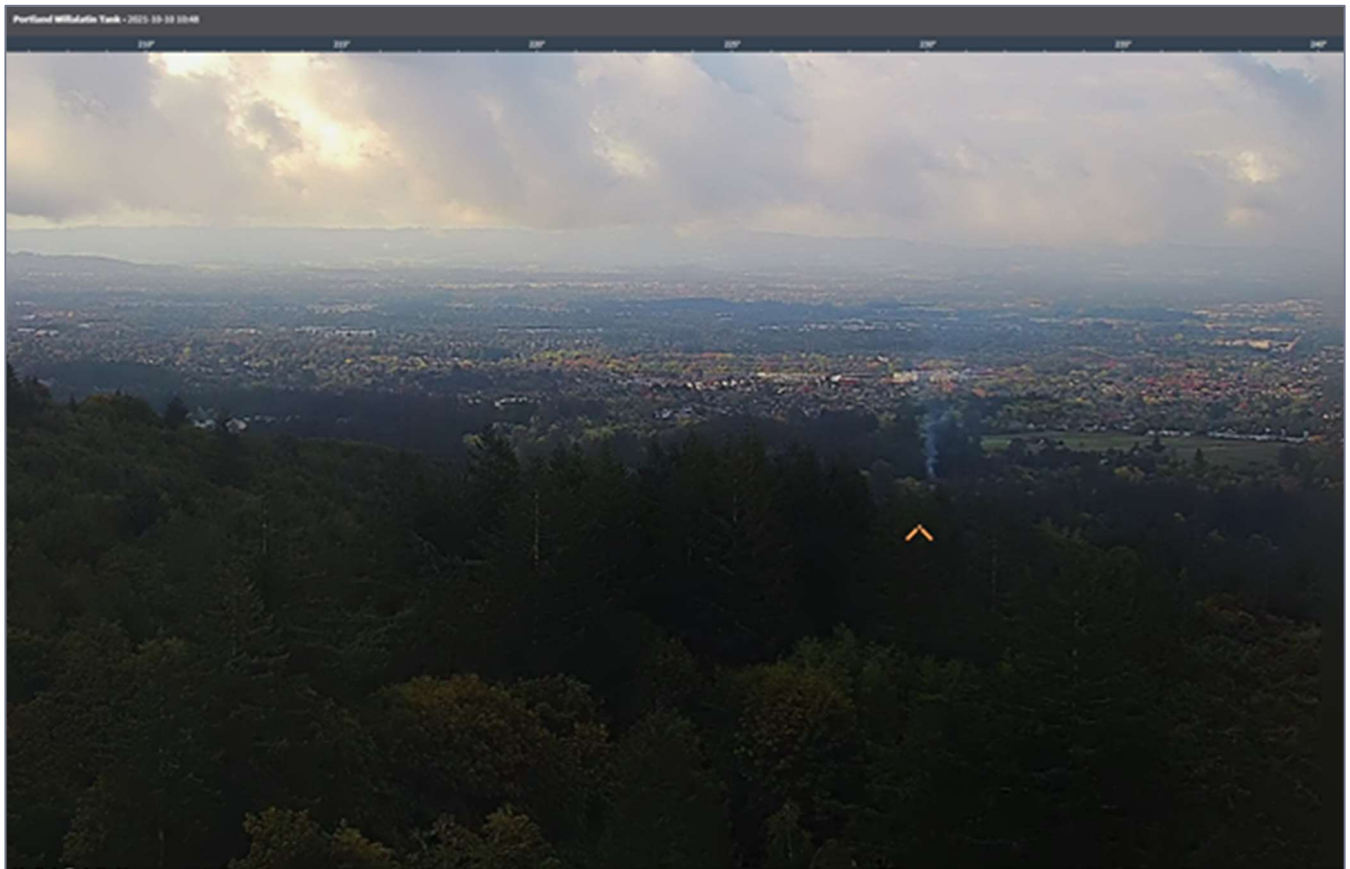


## 15.3   Remote Sensing Pilot Project

In 2021, PGE conducted a Remote Sensing data acquisition project for its HFRZ feeders, to support wildfire and resiliency preparedness and operational design and engineering work in 2022. The project used various high-tech geospatial imaging technologies (listed below) to provide PGE with a detailed understanding of vegetation risk, clearances to poles and wires, and ROW accessibility within PGE's HFRZs.

The 2021 HFRZ Remote Sensing Pilot Project produced precise mobile and aerial LiDAR imaging, spherical imagery, and satellite multispectral imagery surveys of 774 circuit-miles of conductor and nearly 15,000 poles within the PGE HFRZs.

This data and analysis have also been taken into consideration in PGE's 2023 capital planning work, which guides its wildfire investment strategy. It will also help PGE understand how much risk has been mitigated through previous years' AWRR (vegetation management) activities and is being used for 2023 vegetation management program planning.

PGE's Remote Sensing Pilot Project also provides:

- GIS-enabled analyses of vegetation clearance and vegetation health
- Consolidated pole/span inventory
- Pole/span change detection analysis (2019-2021)
- Consolidated tree threat inventory (2019 and 2021)
- Tree change detection analysis (2019-2021).

**Figure 24: Sample Aerial LiDAR Imagery**
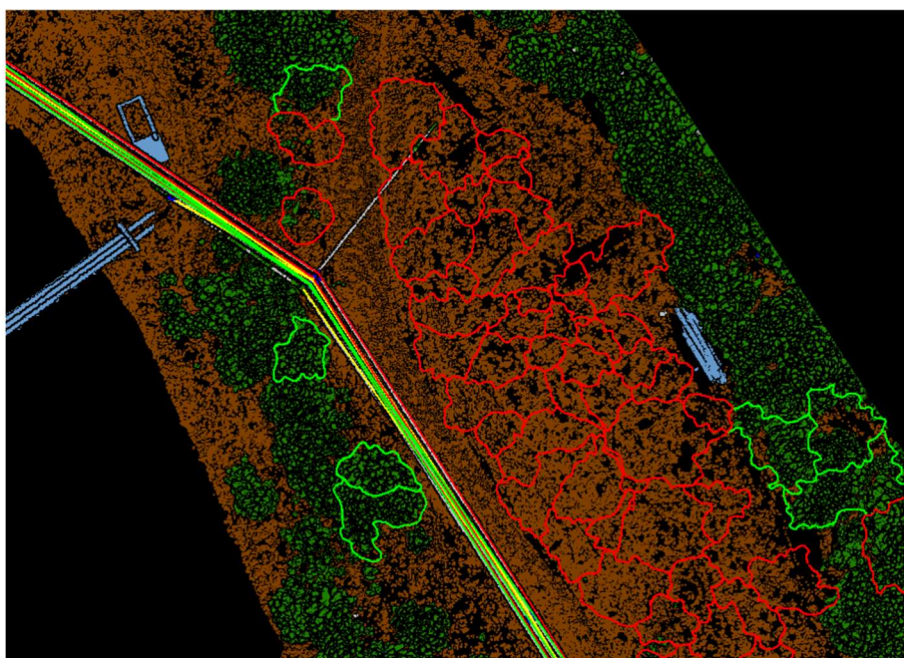


*Areas outlined in red show trees identified as threats in 2019 that have since been removed.*

## 15.4 Storm Predictive Tool

In late 2022 PGE operationalized a prototype version of a Storm Predictive Tool that will assess wildfire weather risk to PGE equipment using weather data from across the PGE service territory. In 2023, PGE will conduct further model testing and validation to assess the Storm Predictive Tool's ability to incorporate more granular and sophisticated inputs to better inform PGE's PSPS execution decision analysis and improve system alarming.

When initialized in Q4 2023, this tool will significantly improve PGE's ability to predict potential equipment outages based on forecasted and real-time meteorological data. The Storm Predictive

Tool will offer co-benefits to PGE's Utility Asset Management program, including increased spare equipment ordering efficiency, spare equipment mobilization, and operational standards and practices.

## 15.5   5G PGE Energy Lab

PGE also leads the 5G PGE Energy Lab, focused on the development of innovative wildfire mitigation technologies. The collaboration is evaluating use cases and developing business cases for wildfire-related surveillance, sensing and data collection, and cloud storage technologies, laying the groundwork for the use of artificial intelligence-driven analysis in these disciplines. Through this collaboration group, PGE has been investigating ways to interface the emerging 5G network with Pano AI to explore how greater communications bandwidth can enhance this fire detection technology. Results from the research will guide the deployment of additional Pano AI wildfire cameras across PGE's service territory in 2023.

In September 2022, T-Mobile US announced a partnership with Pano AI and PGE to connect the network of AI-enabled cameras to T-Mobile's powerful and far-reaching 5G system. The partnership will allow PGE and Pano AI to gather high-quality video in at-risk areas and send "vast amounts"[14] of data to Pano AI's command center in real time. This project is especially important in rural and remote areas; the long range of T-Mobile's 5G network will allow the partnership to bring this state-of-the-art fire detection technology to some of the state's most vulnerable locations.

## 15.6   Proposed Project: Portable Battery Pilot

Based on peer benchmarking learnings from the California utilities, in 2023 PGE proposes to pilot and study a select customer offering of no-cost portable battery devices to provide backup power to PSPS-impacted residential customers also enrolled in PGE's medical certificate program. The purpose of the pilot would be to understand the customers' usage of the battery devices to back up critical medical devices, impacts on feelings of preparedness and resilience, and the customer's experience during an outage prior to and after receiving a device. The budgeted cost to provide a portable battery device to qualified customers and study the impacts for Year 1 is estimated at $100,000. PGE will file a detailed program application for an operational tariff prior to offering this option to customers.

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[14] Link to article: T-Mobile US, Pano AI help detect wildfires with 5G, AI (rcrwireless.com)

## Contact PGE

For information regarding PGE's wildfire mitigation program and wildfire-related emergency kits, plans, checklists, education, and preparedness information, please visit PGE's website (portlandgeneral.com), or call at 1-800-542-8818. Current situational updates, outage status, and wildfire information are also available via social media platforms (Facebook, Twitter, Instagram, and LinkedIn).

# 15. Revisions Log

The following table details the nature, date, and primary author of major revisions to this document. All impactful revisions—revisions that make significant changes to PGE Wildfire Mitigation strategies—will be described in the Revision Description column.

| Date | Version | Revision Description |
|---|---|---|
| **12/21/2022** | 1 | Issued for implementation by WM&R |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# Appendices

# Appendix 1: Oregon Wildfire Mitigation Rules In the WMP

**Oregon Administrative Rules - Wildfire Mitigation Plans**

| Oregon Administrative Rule: Chapter 860, Division 300 | |
|---|---|
| **Rule Citation** | **Where addressed in PGE Wildfire Mitigation Plan** |
| 860-300-0020: | **Public Utility Wildfire Mitigation Plan Filing Requirements** |
| 1(a) | **Section 6.1** (Risk Assessment Overview) |
| 1(a)(A) | **Section 6.1** (Risk Assessment Overview)<br>**Section 7** (High Fire Risk Zones) |
| 1(a)(B) | **Section 6.1** (Risk Assessment Overview)<br>**Appendix 9** (PGE Wildfire Risk Assessment Overview & Process) |
| 1(b) | **Section 6.5** (Wildfire Risk-Based Making) |
| 1(c) | **Section 6.5** (Wildfire Risk-Based Making) |
| 1(d) | **Section 13.4** (Wildfire Community Outreach and Awareness Strategy) |
| 1(e) | **Section 9** (Operation During PSPS Events and Protocols for De-Energization of Power Lines)<br>**Section 9.1** (Power System Operations During PSPS Events)<br>**Section 9.2** (Levels of a PSPS Event)<br>**Section 9.3** (Communication Requirements During PSPS Events) |
| 1(f) | **Section 13.4.2** (Outreach and Awareness Timing)<br>**Appendix 5** (2022 Wildfire Outreach and Awareness Efforts) |
| 1(g)[15] | **Section 10** (Ignition Prevention Inspections) |
| 1(h)[16] | **Section 11** (Vegetation Management) |
| 1(i) | **Section 12** (Wildfire Program Costs) |
| 1(j) | **Section 14** (Participation in National and International Forums) |

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[15] Utility infrastructure inspection consistent with OAR 860-024-0018
[16] Vegetation management within HFRZs consistent with OAR 860-024-0016

| Oregon Administrative Rule: Chapter 860, Division 300 | |
|---|---|
| **Rule Citation** | **Where addressed in PGE Wildfire Mitigation Plan** |
| 1(k)[17] | **Section 10** (Ignition Prevention Inspections) |
| 2 | **Section 1** (Introduction) |
| 3 | **Section 1** (Introduction) |
| 4 | Not applicable. |
| 860-300-0030: | **Risk Analysis** |
| 1 | **Section 6.1 (Risk Assessment Overview) , 6.2** (Updates to the 2023 Wildfire Risk Mitigation Assessment) Appendix 9 (PGE Wildfire Risk Assessment Overview & Process) |
| 1(a) | **Section 6.3** (Wildfire Risk Categories) |
| 1(a)(A) | **Section 6.3.1** (Baseline Wildfire Risk) |
| 1(a)(B) | **Section 6.3.2** (Seasonal Wildfire Risk) |
| 1(a)(C) | **Section 6.3.3** (Risk to Residential Areas) |
| 1(a)(D) | **Section 6.3.4** (Risk to PGE Equipment) |
| 1(b) | **Section 6.2** (Updates to 2023 Wildfire Risk Mitigation Assessment) |
| 1(c) | **Section 6.3.5** (Georisk) **Appendix 9** (PGE Wildfire Risk Assessment Overview & Process) |
| 1(c)(A) | **Section 6.4** (Risk Assessment Methodologies: Data Quality and Review Frequency) |
| 1(c)(B) | **Section 6.4** (Risk Assessment Methodologies: Data Quality and Review Frequency) |
| 1(d) | **Section 6.5** (Wildfire Risk-Based Decision Making) |
| 1(d)(A) | **Section 6.5.1** (Risk-Based Decision Making for PSPS Events) |
| 1(d)(B) | **Section 6.5.2** (Risk-Based Decision Making and Mitigation Actions for Vegetation Management) |
| 1(d)(c) | **Section 6.5.3** (Risk-Based Decision Making and Mitigation Actions for System Hardening) |
| 1(d)(D) | **Section 6.5.4** (Risk-Based Decision Making and Mitigation Actions for Capital Improvements) |
| 1(d)(E) | **Section 6.5.5** (Risk-Based Decision Making and Mitigation Actions for Operations) |

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[17] Ignition inspection program per OAR 860-024.

| Oregon Administrative Rule: Chapter 860, Division 300 | |
|---|---|
| **Rule Citation** | **Where addressed in PGE Wildfire Mitigation Plan** |
| 2 | **Section 6.2** (Updates to 2023 Wildfire Risk Mitigation Assessment) |
| 860-300-0040: **Wildfire Mitigation Plan Engagement Strategies** | |
| 1 | **Section 13.3** (2023 WMP Engagement Strategy) |
| 1(a) | **Section 13.3** (2023 WMP Engagement Strategy) |
| 1(a)(A) | **Section 13.3** (2023 WMP Engagement Strategy) |
| 1(a)(B) | **Section 13.3** (2023 WMP Engagement Strategy) |
| 1(b) | **Section 13.3** (2023 WMP Engagement Strategy) |
| 2 | **Section 13,.4** (Wildfire Community Outreach and Awareness Strategy) |
| 2(a) | **Section 13,.4** (Wildfire Community Outreach and Awareness Strategy) |
| 2(a)(A) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(a)(B) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(a)(C) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(a)(D) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(b) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(b)(A) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(b)(B) | **Section 13.4.2** (Outreach and Awareness Timing) <br> **Appendix 4** (Inventor of Community Outreach and Engagement Materials and Channels) |
| 2(b)(C) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(b)(C)(i) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(b)(C)(ii) | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 3 | **Section 13.5** (Assessing Effectiveness of Wildfire Community Outreach and Awareness Efforts) |
| 4 | **Section 13.6** (Public Safety Partner Coordination Strategy) |
| 4(a) | **Section 13.6.1** (Prior to Fire Season) |
| 4(b) | **Section 13.6.1** (Prior to Fire Season) |
| 4(c) | **Section 13.6.1** (Prior to Fire Season) |
| 860-300-0050: **Communications Requirements Prior, During, and After a Public Safety Power Shutoff** | |

| Oregon Administrative Rule: Chapter 860, Division 300 | |
|---|---|
| **Rule Citation** | **Where addressed in PGE Wildfire Mitigation Plan** |
| 1 | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(a) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(A) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(B) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(C) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(D) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(E) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(F) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(G) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(b)(H) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(c) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(c)(A) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(c)(B) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(c)(C) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(c)(D) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(c)(E) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 1(d) | Not applicable |
| 2 | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(a) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(a)(A) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(a)(B) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(a)(C) | **Section 9.3** (Communication Requirements During PSPS Events) **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 2(b)) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(b)(A) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(b)(B) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(b)(C) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(b)(D) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(b)(E) | **Section 9.3** (Communication Requirements During PSPS Events) |

| Oregon Administrative Rule: Chapter 860, Division 300 | |
|---|---|
| **Rule Citation** | **Where addressed in PGE Wildfire Mitigation Plan** |
| 2(b)(F) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 2(b)(G) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 3 | **Section 9.3** (Communication Requirements During PSPS Events) |
| 3(a) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 3(b) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 3(c) | **Section 9.3** (Communication Requirements During PSPS Events) |
| 4 | Not applicable |
| 5 | Not applicable |
| 860-300-0060: | **Ongoing Informational Requirements for Public Safety Power Shutoffs** |
| 1 | **Section 9** (Operations During PSPS Events) |
| 2 | **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns) |
| 3 | **Section 9** (Operations During PSPS Events) |
| 4 | **Section 9** (Operations During PSPS Events) |
| 860-300-0070: | **Reporting Requirements for Public Safety Power Shutoffs** |
| 1 | In the event of a PSPS event, PGE will file with the OPUC, an annual report(s) on de-energization lessons learned, no later than December 31. |
| 2 | Non-confidential versions of annual reports filed with the OPUC under this section will be made available on PGE's website. |

# Appendix 2: PGE Ignition Prevention Inspection Standards

The following checklist is used by PGE's Utility Asset Management organization to ensure a thorough and consistent ignition prevention inspection process for PGE assets.

| | |
|---|---|
| 1 | Permanently out of service or abandoned electrical equipment |
| 2 | Blocked access roads to supporting structures |
| 3 | Abandoned/coiled service wire hanging from pole |
| 4 | Broken secondary lashing wire |
| 5 | Service/primary neutral touching guy, transformer, or pole |
| 6 | Damaged, broken, or frayed power conductor |
| 7 | Broken/cut/missing ground |
| 8 | Broken communication mainline lashing wire |
| 9 | Broken power insulator or tie wire |
| 10 | Slack, corroded, or broken power guy |
| 11 | Anchor pulled loose/not holding |
| 12 | Crossarm brace damaged/broken, missing, or loose |
| 13 | Damaged/broken/corroded/loose distribution hardware and connectors |
| 14 | Equipment leaking oil—transformer, regulator, etc. |
| 15 | Damaged/broken cutout, lightning arrestor, or similar pole-mounted equipment |
| 16 | Damper damaged, slipped, or missing |
| 17 | Service or conductor attached to tree |
| 18 | Midspan horizontal clearance to unattached pole per NESC requirements |
| 19 | Missing cotter key, insulator nut, or other line hardware |
| 20 | Power hardware, including transmission, not properly grounded/bonded |
| 21 | Midspan vertical (pole-to-pole) |
| 22 | Midspan horizontal primary (conductor close to building or sign per NESC requirements) |
| 23 | Midspan vertical |
| 24 | Low transmission or primary conductor close to neutral, secondary or communications or other equipment/conductors per NESC requirements |
| 25 | Midspan vertical—power over drivable surface |
| 26 | Midspan vertical—power over driveway or pedestrian surface |
| 27 | Midspan vertical—communications over drivable surface |
| 28 | Overloaded pole |
| 29 | Damaged or decayed pole |
| 30 | Severely leaning or washed-out pole |
| 31 | Vegetation—hazard trees, limbs laying on conductor, impaired clearances to vegetation, tree limbs burning or burned in |
| 32 | Crossarm damaged/broken |

# Appendix 3: Comments Received During PGE's 2022 WMP Engagement Sessions

## We Hear You—Customer Feedback

- Customers are both appreciative and frustrated. Some recognize the depth of the plan and appreciate how hard PGE works to get them this information. But others feel ignored and want to know how they can help to improve the outage map.

*I did read the entire 65 page report and **appreciated the depth and detail of the plans documented.** Thank you for investing the time and resources to develop it, I look forward to the hard work in the years ahead to put it all into practice.*

*My only comment on the PSPS is that **I wish that communication was more frequent than every 24 hours.** It would be preferable to have it at least every 6-12 hours.*

*Thank you for the presentation and your work.*

*I would like to **know how those of us who live in rural areas could help in reporting** obvious power outages and/or line issues we observe before an emergency occurs*

*Thank you for doing these events and having the opportunity to connect with PGE.*

*I very much appreciate PGE. I realize your challenges are significant. I am frustrated with my current frequent power outages (almost once a month). However, **I was encouraged about what I learned at the presentation about mitigation steps you are taking to prevent planned power shutoffs and how this could also improve the current (un)reliability of my power.** I appreciate PGE's environmental consciousness. **You are heads above other power companies I have dealt with.** I appreciate your front line folks. Your operators on the phone are pleasant, informative and helpful (and I can be cranky when my power is off since I have to water, no heat, no phone, no septic). Your linemen are super - I know they are working long hours but I have found them to be helpful, cheerful and informative. Thanks for your service!*

**They told me they would call me. Nobody has. Not impressed**

*As a long time customer, we do not support your strategy to mitigate your liability during infrequent fire weather events that severely hampers rural landowners ability to care for livestock, maintain food safety, personal hygiene, and most importantly protect their homes and outbuildings from fire. **You are transferring your risk and costs to your customers who have to invest in expensive backup systems to maintain their own safety** without your power supply while you reap additional profits by shipping customer power out of state. Your "Public Safety" power redistribution has made me a very unsatisfied customer.*

**Communicate more frequently during PSPS.** *Every 6-12 hours instead of once every 24 hours.*

Question:
Was there anything you wanted to bring up during the workshop, but you were unable to at the time? Tell us what it was here.

## We Hear You—Customer Feedback

- Clarity and preemptive communication are highly important. And the PSPS led to some customer suspicion as to PGE's motives. More communication about the connection between power lines and fires is needed help customers understand the importance of the PSPS.

*Just stop doing power outages to limit your liability under the guise of public safety. If your infrastructure is built and maintained according to PUC standards, there should be no problems, especially when red flag warnings are so broadly forecast with significant variation in actual on the ground weather conditions within the geographic area. **Rural customers have no way to protect their property from fire when they lose power to their wells.** Communication with customers without power lose internet **and cannot do business or receive updates from you via email.***

*Being clear about when power would be restored to those of us who had our power turned off.*

*They need to listen to customers. **They should have listening sessions regarding the psps map.***

*I do not want to place all of the blame on PGE as it is clear they made an effort to contact our business. **I would like to know minimum 1 week prior to the shut off event.** This is obviously hard to estimate when dealing with weather. **Info on where the resource centers are would be nice.** I did not know PGE had created those. Again I will be more attentive now that I know the situation is likely to happen again.*
***Perhaps PGE could work in conjunction with The Dept of Land Conservation and Development to establish lower risk areas that include state zoned farm land that did not seem high risk at all.***

*Our power goes off all the time up here and I am tired of it!! The power lines should be underground so you don't disrupt so many people! Is this going to be a constant thing to just turn off our power when the wind blows? **You're forcing everyone to get a generator, which I would love to have but can't afford!!***

Question:
What would you change or improve about PGE's communications during a PSPS?

## Appendix 4: Inventory of Community Outreach and Engagement Materials and Channels (2022)

| Channel | Effort/Deliverable | Campaign | Audience | Timing |
|---|---|---|---|---|
| Stakeholder outreach around new HFRZs with one-pager on wildfire mitigation and HFRZ information | Emails, phone calls, meetings | Wildfire Preparation & PSPS Awareness | All Stakeholders | Dec. 2021 |
| PortlandGeneral.com wildfire and PSPS information | https://portlandgeneral.com/outages-safety/wildfire-outages https://portlandgeneral.com/en-esPanol/apagones-por-incendios-forestal https://portlandgeneral.com/outages-safety/safety/wildfire-safety https://portlandgeneral.com/outages-safety/be-prepared https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-home https://portlandgeneral.com/en-esPanol/prepare-su-hogar https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-business | Wildfire Preparation & PSPS Awareness | Broad awareness | March 2022 through Fire Season |
| Tool kit in 15 languages that provided preparedness tips and info about PSPS areas | Direct email | Wildfire Preparation & PSPS Awareness | Community-Based Organizations | June 24, 2022 |
| Statewide press release for Wildfire Awareness Month | Press release | Wildfire Preparation | Media, public | May 9, 2022 |
| Public Information Officers (regional and in cities/counties that have PSPS areas) | Toolkit | Wildfire Preparation + PSPS Awareness | Broad public | July 13, 2022 |
| Advertising | | | | |
| Direct customer communications & PGE newsletters | | | | |
| Media engagement about wildfire preparedness & PSPS awareness | Interviews and information shared with KGW, KATU, KOIN, KPTV, Oregon Capital Chronicle, Oregon Public Broadcasting, KDRV, KTVZ, Bloomberg, Utility Dive, and others. | Wildfire preparation & PSPS Awareness | Broad public | May through Sept. 2022 |

| Channel | Effort/Deliverable | Campaign | Audience | Timing |
|---|---|---|---|---|
| Community wildfire preparedness meetings to share preparedness and PSPS information | WM&R presentations at six events focused on wildfire preparedness at the request of government officials and public safety partners. Brochures about wildfire awareness and PSPS were available in English and Spanish. | Wildfire Preparation & PSPS Awareness | Public, customers | May and June 2022 |
| Social media posts about wildfire preparedness and PSPS | Posts on @portlandgeneral on Twitter and @portlandgeneralelectric on Facebook | Wildfire preparation & PSPS Awareness | Public, customers | May through Sept. 2022 |

Digital ads

**Wildfire season is coming.**
GET PREPARED

**Se acerca la temporada de incendios forestales.**
PREPÁRESE

Print ads in 5 languages

**Wildfire season is coming.**
Get prepared.

**Сезон лесных пожаров скоро начнется.**
Успейте подготовиться.

**Mùa cháy rừng đang đến gần.**
Hãy đề phòng.

**Se acerca la temporada de incendios forestales.**
Prepárese.

野火季節即將來臨。
做好防範。
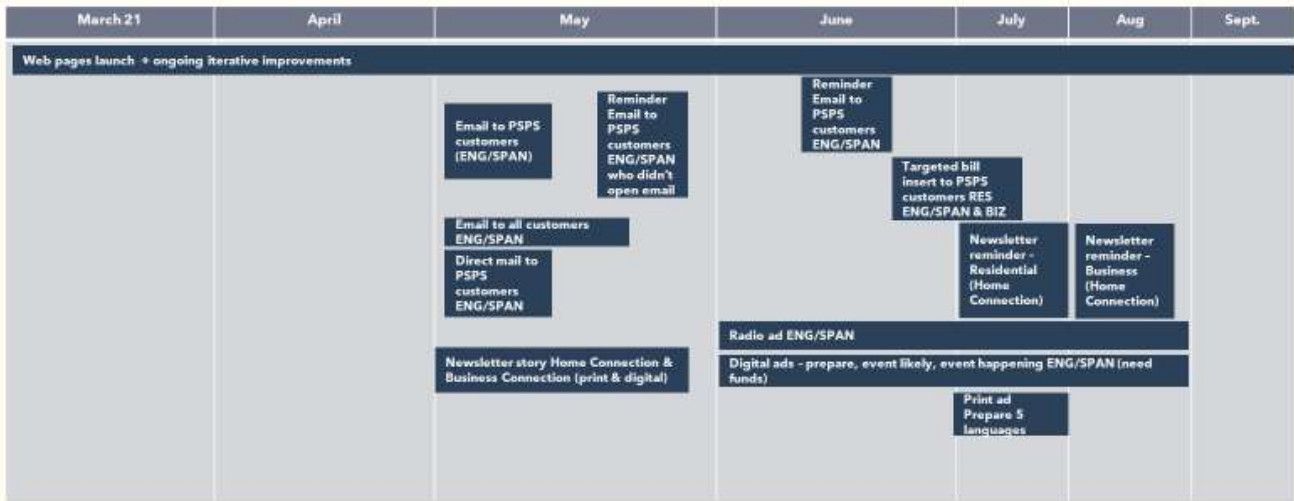
Direct mailing with brochure

\+

Newsletter stories

**Are you ready for fire season?**
Hot and dry weather could lead to a Public Safety Power Shutoff, or PSPS.

**Let's all be prepared.**
Fire season means possible safety-related outages.

Reminder bill insert

**Wildfire season is here. Get prepared.**

- STAY IN THE KNOW
- CREATE A SUMMER OUTAGE KIT
- MAKE A PLAN

**Llegó la temporada de incendios forestales. Prepárese.**

- MANTÉNGASE INFORMADO
- ARME UN KIT PARA ARMADORES DE VERANO
- PREPARE UN PLAN

Emails (ENG + SPA)

**It's prep time. Let's get ready for wildfire season together.**

Web English

Web Spanish

Addtl. info in 13 languages

# Wildfire event customer comms



### Digital ads – Event likely (ENG + SPA)

**Wildfire risks may lead to a power shutoff in your area in the next 24–48 hrs**

**Be prepared**

Learn more

### Digital ads - Event happening (ENG + SPA)

**We are shutting off power in your area**

**To protect lives and property**

**Now is the time to implement your outage plan**

**Stay safe**

Learn more

### Emails (ENG + SPA)

**As a safety precaution, your power will be shut off in 1 to 4 hours**

Web banner & PSPS active page

SP to screenshot

# Expanded details

## March – May

- March/April: Web pages (test pages: landing, /prepare, /preparebiz, /wildfireoutages, /psps, /wildfire) live + constant, iterative improvement
- May 10: PSPS letter/DM sent to customers with 4-panel brochure
- May 9 - 20: Email to ALL residential & biz customers, excluding customers in PSPS zone
- May 2 - 6: Email 1 to PSPS customers (RES & BIZ)
- May 23 - 27: Email 2 to PSPS customers (RES & BIZ) who didn't email open

# May – September

May 1: Newsletter story in Home Connection & Business Connection

Web pages (test pages: landing, /prepare, /preparebiz, /wildfireoutages, /psps, /wildfire) live + constant, iterative improvement

- Paid and organic social
  - Run through September
- June 1: Radio ads
  - Run through September
  - Streaming targeted: 80% of spend focused on PSPS areas, 20% territory-wide
  - Terrestrial radio, focused on country and oldie stations
- June 1: Digital ads
  - Run through September
  - Targeted: 80% of spend focused on PSPS areas, 20% territory-wide

- June 27-July 11: Reminder email to PSPS customers (RES & BIZ)

- July: Print ads

# Web pages (ENG/SPA/Multi lang)

Launch 3/21 with constant, iterative improvement through September

- Prepare landing – Generic landing for residential or business customers, links to preparedness pages and helpful outage information.
- Prepare your home - Educate residential customers about what they need to do to prepare for summer outages.
- Multilanguage page – Educate customers in 13 languages on how to use interactive map, how to prepare and where to get the latest information.
- Prepare your business – Educate general business and key customers about what they need to do to prepare for summer outages.
- Wildfire outages – Educate customers (and media) about wildfire threat and resulting PSPS possibility. Define a PSPS, show map of zones, answer FAQs.
- Wildfire safety - Educate stakeholders (and customers) about wildfire threat & what we're doing to keep they system safe.

# Email/Direct Mail/Newsletter story

**Email -**

May 2 - 6 – PSPS customers – you are in a high-risk area for wildfires, here's how you prepare

- Residential English
- Business English
- Residential Spanish
- Customers with both residential and commercial accounts

May 9 - 20 – All customers – Get prepared for wildfire season

- Residential English
- Residential Spanish
- Business English

May 23-27: Reminder only to customers who didn't open first email – PSPS customers – reminder to get prepared

- Residential English
- Residential Spanish
- Business English

June 27-July 11: Reminder email to all PSPS customers (BIZ & RES)

**Direct Mail**

May 9 & 10: PSPS customers – you are in a high-risk area for wildfires, here's how you prepare

- PSPS residential customers English
- PSPS residential customers Spanish
- PSPS business customers English
- Customers with both residential and commercial accounts

**Newsletter story in Home Connection & Business Connection**

May bill cycles – Get prepared (Home Connection & Business Connection)

- Residential English
- Business English

July bill cycles: Reminder newsletter (Home Connection)

Aug. bill cycles: Reminder newsletter (Business Connection)

**Targeted bill insert to PSPS customers (RES & BIZ)**

- June 15 – July 15: targeted bill insert

# Advertising

**Digital**
- English and Spanish
- June - September
- 80% of spend targeted to PSPS areas, 20% territory-wide

**Radio**
- English and Spanish
- June - September
- Streaming radio will target 80% of spend on PSPS areas, 20% territory-wide
- Terrestrial radio English, focused on oldie and adult contemporary or country stations
- Terrestrial radio Spanish will play on all stations in local media network, Bustos.

**Print (Oregonian, Gresham Outlook, Beaverton Valley Times, Hillsboro News Times, Statesman Journal, El Latino De Hoy, + Chinese/Vietnamese/Other non-English outlets)**
- July
- English will target local community papers in PSPS areas
- Spanish will run in largest local Spanish-language publication

# Appendix 6: Outcomes of 2022 Outreach and Awareness Efforts

## 1. Wildfire Webpage Visits (May-September)

- 4,403 sessions to https://portlandgeneral.com/psps-info
- 186,177 sessions to https://portlandgeneral.com/outages-safety/wildfire-outages
- 10,168 sessions to https://portlandgeneral.com/en-esPanol/apagones-por-incendios-forestales10,168 sessions to https://portlandgeneral.com/en-esPanol/apagones-por-incendios-forestales
- 4,689 sessions to https://portlandgeneral.com/outages-safety/safety/wildfire-safety
- 27,962 sessions to https://portlandgeneral.com/outages-safety/be-prepared
- 48,805 sessions to https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-home
- 3,175 sessions to https://portlandgeneral.com/en-esPanol/prepare-su-hogar3,175 sessions to https://portlandgeneral.com/en-esPanol/prepare-su-hogar
- 1,421 sessions to https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-business

## 2. Newsletter and Email Results

### Newsletter

- **Home Connection – goes to 325k+**
    - May – 40% OR; 3.12 Click-to-open rate
    - July – 50% OR; 3.47 Click-to-open rate
- **Business Connection – goes to 12k+**
    - May – 38% OR; 2.8% Click-to-open rate
    - August – 44% OR; 2.4% Click-to-open rate

### Email

- **Round 1**
    - In Zone: Early May – 43% OR: 2.9% Click through rate
    - In Zone: Late May reminder – 17% OR; 1.9% Click through rate
    - Not In Zone – 48% OR; 1.4% Click through rate
- **Round 2**
    - In Zone (biz, res (Eng/Span) and biz+res) – 44% OR; 1.7% Click through rate
    - Not In Zone – 49% OR; 1.4% Click through rate

### Digital Banner Ads

- *English:*
    - Impressions: 5,179,558
    - Clicks: 6972
    - Click-through rate: 0.13%
- Spanish
    - Impressions: 2,124,270
    - Clicks: 4033

- o Click-through rate: 0.19%

**Pandora Digital Radio**
- English
  - o Impressions: 1,721,154
  - o Clicks: 2038
  - o Click-through rate: 0.19%
- Spanish
  - o Impressions: 227,042
  - o Clicks: 346
  - o Click-through rate: 0.27%

# Appendix 7: Toolkit for Community-Based Organizations (CBOs)—Sample Outage Preparedness Messages for Social Media, email, Newsletter and Website Messaging

## Toolkit – Wildfire Preparedness

May 2022

## Social media posts

| English | Hot and dry weather conditions increase the risk of wildfires and the likelihood of safety-related power outages. So, PGE wants you to be prepared. Learn how to stay in the know, create an outage kit and make a plan to keep your family safe at **portlandgeneral.com/prepare.** |
|---|---|
| *Arabic* | إن حالات الطقس الجاف والحار تزيد من خطر نشوب الحرائق في الغابات واحتمال انقطاع التيار الكهربائي للسلامة العامة. ولهذا، تود شركة PGE إعدادك لمواجهة ذلك. تعرَّف على كيفية البقاء على علم بالمستجدات، وأنشئ مجموعة أدوات انقطاع التيار الكهربائي وارسم خطة للحفاظ على سلامة أسرتك عبر موقع **portlandgeneral.com/pspsinfo**. |
| *Chinese (simplified)* | 炎热干燥的天气条件会增加发生野火的风险，与安全相关的停电的可能性也会增加。所以，PGE 希望您做好准备。在 **portlandgeneral.com/pspsinfo** 上学习如何了解最新情况、如何打造停电工具包以及如何制定家庭安全计划。 |
| *Chinese (traditional)* | 炎熱乾燥的天氣條件會增加發生野火的風險，與安全相關的停電的可能性也會增加。所以，PGE 希望您做好準備。在 **portlandgeneral.com/pspsinfo** 上學習如何瞭解最新情況、如何打造停電工具包以及如何制定家庭安全計畫。 |
| *Farsi* | شرایط آب‌وهوایی گرم و خشک خطر آتش‌سوزی جنگل‌ها و احتمال قطعی برق مرتبط با ایمنی را افزایش می‌دهد. بنابراین، PGE از شما می‌خواهد آماده باشید. نحوه مطلع ماندن، تهیه کیت لوازم ضروری در زمان قطعی برق و برنامه‌ریزی برای ایمن نگه داشتن خانواده خود را در **portlandgeneral.com/pspsinfo** |
| *Japanese* | 気候が熱く乾燥していると、山火事のリスクや安全に関わる停電発生の可能性が高まります。そこで、PGEから万が一に備えた準備についてご案内いたします。**portlandgeneral.com/pspsinfo**にアクセスして、ご家族皆様の安全をお守りできるよう、役立つ情報をご確認の上、停電キットを作成してください。 |
| *Korean* | 덥고 건조한 날씨는 산불 위험과 안전 관련 정전 가능성을 높입니다. PGE와 함께 위험에 대비하시기 바랍니다. **portlandgeneral.com/pspsinfo**에서 최신 정보를 파악하고, 정전 |

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| | 키트를 만들고, 가족을 안전하게 지키기 위한 계획을 세우는 방법을 알아보십시오. |
| **Rohingya** | Goróm ar fúwana abaháwar haálot ókkol ólla bouli zoñlor-oin or hótara ar óitfaredé héfazoti-mutalek kaáren bon táka ókkol bari zargoi. Étolla, PGE é oñnorare toiyar rákito saár. Zanifuni keengori tákiba, outage kit (kaáren bon tákar saaman) toiyari ar oñnor fémelire héfazot rákibar plan ókkol zaniloiyó eçe **portlandgeneral.com/pspsinfo.** |
| **Russian** | Жаркие и засушливые погодные условия повышают риск возникновения лесных пожаров и вероятность отключения электроэнергии для обеспечения безопасности. Поэтому компания PGE хочет подготовить вас к этому. С советами о том, как оставаться в курсе событий, подготовить набор необходимых вещей на случай летних отключений электроэнергии и составить план по обеспечению безопасности своей семьи можно ознакомиться на странице **portlandgeneral.com/pspsinfo.** |
| **Somali** | Xaaladaha cimilada kulul ee qalalan ayaa kordhinaaya khatarta dabka iyo suurtagalnimada koronto jarista la xariirta badqabka. Marka, PGE waxay doonaysaa inaad diyaar garoowdo. Baro sida aad ku helayso xogtii ugu danbaysay, furo kiishada xogta ee ku saabsan koronto go'a kadibna samayso qorshe aad ku dhawrayso badqabka qoyskaaga adoo galaaya **portlandgeneral.com/pspsinfo.** |
| **Spanish** | Los climas cálidos y secos aumentan el riesgo de incendios y la probabilidad de apagones por seguridad. Por eso, PGE quiere que esté preparado. Conozca cómo estar informado, crear un kit para apagones y un plan para mantener a su familia segura en **portlandgeneral.com/prepararse.** |
| **Swahili** | Hali ya hewa ya joto na kavu huongeza hatari ya moto wa mwituni na uwezekano wa kupotea kwa nguvu za umeme kwa sababu ya usalama.<br><br>Hivyo basi, PGE ingependa uwe tayari. Pata maelezo kuhusu jinsi ya kupata taarifa, kuunda zana ya kupotea kwa umeme na kuweka mpango wa kudumisha usalama wa familia yako kwenye **portlandgeneral.com/pspsinfo.** |
| **Vietnamese** | Điều kiện thời tiết nóng và khô làm tăng nguy cơ cháy rừng và khả năng cắt điện vì lý do an toàn. Do đó, PGE muốn quý vị chuẩn bị sẵn sàng. Tìm hiểu cách luôn cập nhật thông tin, tạo lập một bộ công cụ phòng khi cắt điện và lập kế hoạch giữ an toàn cho gia đình quý vị tại **portlandgeneral.com/pspsinfo.** |

## Newsletter or web copy

| | |
|---|---|
| **English** | If extreme weather conditions threaten PGE's ability to safely operate the electrical grid, they may need to turn off power to help protect |

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|---|---|
| | public safety. These last-resort safety outages are called a Public Safety Power Shutoffs, or PSPS. No one likes an outage but being prepared makes them a little easier to get through. Find tips at **portlandgeneral.com/pspsinfo.** |
| *Arabic* | إذا كانت الظروف الجوية القاسية تهدد قدرة PGE على تشغيل شبكة الطاقة الكهربائية بأمان، فيتعيّن عليهم فصل التيار الكهربائي للمساعدة في حماية السلامة العامة. تُعرف عمليات انقطاع التيار الكهربائي لدواعي السلامة التي يتم اللجوء إليها كحلٍّ نهائيّ باسم Public Safety Power Shutoffs (انقطاع التيار الكهربائي للسلامة العامة)، أو PSPS. لا أحد يحب قطع التيار الكهربائي ولكن الاستعداد لذلك يُسهّل عملية تجاوز تلك الفترة. اطلع على النصائح على **portlandgeneral.com/pspsinfo** |
| *Chinese (simplified)* | 如果极端天气条件威胁到 PGE 安全运行电网的能力，他们可能需要关闭电源，以帮助保护公共安全。这种停电是最后的手段，被称为 Public Safety Power Shutoffs（公共安全电源关闭），或 PSPS。没有人喜欢停电，但做好准备会让停电不那么难熬。在 **portlandgeneral.com/pspsinfo** 上查找提示。 |
| *Chinese (traditional)* | 如果極端天氣條件威脅到 PGE 安全運行電網的能力，他們可能需要關閉電源，以幫助保護公共安全。這種停電是最後的手段，被稱為 Public Safety Power Shutoffs（公共安全電源關閉），或PSPS。沒有人喜歡停電，但做好準備會讓停電不那麼難熬。在 **portlandgeneral.com/pspsinfo** 上查找提示。 |
| *Farsi* | اگر شرایط آب‌وهوایی غیرعادی توانایی PGE برای اداره ایمن شبکه برق را تهدید کند، ممکن است لازم باشد آنها برای کمک به محافظت از ایمنی عمومی برق را قطع کنند. این قطعی‌های برق با هدف حفظ ایمنی، که آخرین راه‌حل هستند، Public Safety Power Shutoffs (قطعی‌های برق جهت حفظ ایمنی عمومی) یا PSPS نامیده می‌شوند. هیچ‌کس قطعی برق را دوست ندارد، اما آمادگی قبلی پشت سر گذاشتن قطعی برق را کمی آسان‌تر می‌کند. نکات را در **portlandgeneral.com/pspsinfo** پیدا کنید. |
| *Japanese* | 気候の状況があまりにも過酷でPGEが送電網を安全に操作できない場合は、公衆安全を保護するために電気を停止させていただくことがあります。このような停電は最後の手段となり、Public Safety Power Shutoffs(保護停電公衆安全）またはPSPSとも呼ばれます。停電は誰もが不便を感じるものですが、停電に向けて準備をすることで少しは乗り越えやすくなります。**portlandgeneral.com/pspsinfo**にアクセスして、役立つヒントをご確認ください。 |
| *Korean* | 극한의 기상 조건이 PGE의 안전한 전력망 운영 능력에 위협이 되는 경우, 공공 안전을 보호하기 위해 전력 공급을 중단해야 할 수도 있습니다. 이렇게 안전을 위한 최후의 수단으로서 실시하는 정전을 Public Safety Power Shutoff(PSPS, 공공 안전 전원 차단)라고 합니다. 정전을 좋아하는 사람은 아무도 없지만 미리 준비한다면 좀 더 수월하게 대응할 수 있습니다. 관련 팁은 **portlandgeneral.com/pspsinfo**에서 제공됩니다. |
| *Rohingya* | Zodi ódorbaára abaháwar haálot é PGE ír héfazoti kaáren bebosta gorár kaabiliyotire dómkidile, ítara aám maincor héfazot ólla bouli kaáren bon gori fílit fare. Héfazotílla kaáren bon tákede é ahéri mouka íyan ore Public Safety Power Shutoffs (Páblik or Héfazoti Kaáren Bon |

| | Táka), yáto PSPS bouil hoó.   Kiyóu kaáren no tákare fosón no gore kintu toiyar tákile cómoi iín faráite asán ó. Mocuwara ókkol tuwai so eçe **portlandgeneral.com/pspsinfo.** |
|---|---|
| *Russian* | Если ввиду экстремальных погодных условий компания PGE не может гарантировать безопасность эксплуатации электрической сети, компания может быть вынуждена отключить электроснабжение для обеспечения общественной безопасности. Такие крайние меры в виде аварийных отключений называются Public Safety Power Shutoffs (отключения электроэнергии для обеспечения общественной безопасности) или PSPS. Никому не нравятся подобные отключения, но их легче пережить, будучи готовым. Больше советов по ссылке **portlandgeneral.com/pspsinfo.** |
| *Somali* | Haddii xaaladaha cimilada daran ay khatar gashaan awooda PGE ee ku shaqaynta si amaan ah qalabka korontada, waxay u baahan karaan inay damiyaan korontada si loo dhawro badqabka dadwaynaha. Koronto jaristaan ah talaabada ugu danbaysa ee badqabka ayaa loogu yeeraa Public Safety Power Shutoffs (Koronto Jarista Badqabka Dadwaynaha), ama PSPS. Ma jiro qof jecel koronto goyn laakiin inaad u diyaar garoowdo ayaa yaraysa niyad jabka hadhoow imaan kara. Tilmaamo ka fiiri **portlandgeneral.com/pspsinfo.** |
| *Spanish* | Si, debido a condiciones meteorológicas extremas, se ve afectada la capacidad de PGE para operar la red eléctrica de manera segura, cortaremos la energía para contribuir a la protección de la seguridad pública. Estos apagones se realizan como último recurso de seguridad y se denominan Public Safety Power Shutoffs (Interrupciones del Suministro Eléctrico por Motivos de Seguridad Pública) o PSPS. A nadie le gustan los apagones, pero estar preparado hace que sean un poco más fáciles de sobrellevar. Encuentre consejos en **portlandgeneral.com/prepararse.** |
| *Swahili* | Ikiwa hali mbaya ya hewa inatishia uwezo wa PGEwa kuendesha gridi ya umeme kwa usalama, wanaweza kuhitaji kuzima nguvu za umeme ili kusaidia kulinda usalama wa umma. Hatua hii ya mwisho ya kupoteza umeme inajulikana kama Public Safety Power Shutoffs (Kuzima Umeme kwa Sababu ya Usalama wa Umma), au PSPS. Hakuna mtu anayependa kupotea kwa umeme lakini kuwa tayari kunarahisisha kidogo kukabili hali hii. Pata vidokezo kupitia **portlandgeneral.com/pspsinfo**. |
| *Vietnamese* | Nếu điều kiện thời tiết khắc nghiệt có nguy cơ làm trở ngại khả năng của PGE trong việc vận hành an toàn mạng lưới điện, công ty có thể cần cắt nguồn điện để giúp bảo vệ an toàn công cộng. Các biện pháp an toàn cuối cùng bằng cách cắt điện này được gọi là Public Safety Power Shutoffs (Cắt Điện Vì An Toàn Công Cộng), hay PSPS. Không ai thích rơi vào tình trạng mất điện nhưng việc chuẩn bị sẵn sàng sẽ giúp họ vượt qua điều đó dễ dàng hơn một chút. Hãy xem các lời khuyên tại **portlandgeneral.com/pspsinfo.** |

**PIO Toolkit**

# PGE Wildfire + PSPS Toolkit

## Overview

Portland General Electric (PGE) is preparing for the 2022 Wildfire Season and the possibility of proactive Public Safety Power Shutoffs (PSPS) as a tool to help protect lives and property—like we did in the Mt. Hood corridor during the September 2020 wildfires that swept across Oregon.

This year, parts of 10 areas in communities we serve are at higher risk for Public Safety Power Shutoffs, including:

1. Mt. Hood Corridor/Foothills
2. Columbia River Gorge
3. Oregon City
4. Estacada
5. Scotts Mills
6. Portland West Hills
7. Tualatin Mountains
8. North West Hills
9. Central West Hills
10. Southern West Hills

A map of those PSPS areas is at portlandgeneral.com/wildfireoutages. That page is available in English and Spanish and includes a link to portlandgeneral.com/psps-info for information and brochures about wildfire preparedness and information about PSPS's in Arabic, Burmese, Chinese (simplified and traditional), Farsi, Japanese, Korean, Romanian, Rohingya, Russian, Somali, Swahili, and Vietnamese. Our customer service advisors can also assist customers in 200+ languages.

While we have sectioned off our system to reduce the number of customers who may be impacted by a PSPS, and we are communicating broadly and directly to all who may be impacted, we would appreciate your help encouraging communities to plan and prepare.

You may use the information below on your website, in newsletters and on your social media channels. In the event that we experience extreme weather conditions that may lead to a PSPS, PGE will share information over numerous channels, including via portlandgeneral.com, PGE's social media channels, through FlashAlert and outreach to PIOs, Public Safety Partners and media in affected areas.

If you have any questions about these materials or want to make sure you're on our PIO contact list, please contact PGE via PGECommunications@pgn.com.

**Wildfire Brochure**

You may print and share the document attached to your email titled *PGE 2022 Wildfire + PSPS One Pager May* or post it on your website. It provides an overview of PGE's year-round focus on wildfire protection and steps customers can take to get prepared. It also includes an explanation of Public Safety Power Shutoffs, when they are called and what to expect.

**Web Copy**

*As Oregon's weather gets hotter and drier, the possibility of wildfires and a Public Safety Power Shutoff is increasing. If you're a PGE customer, learn how to stay in the know, make a summer outage kit and a plan. Check PGE's interactive map to see if your home or business is in an area where PGE may proactively shut off power to protect public safety. Visit [portlandgeneral.com/wildfireoutages](portlandgeneral.com/wildfireoutages).*

**Newsletter Copy**

*Hot and dry weather could lead to a Public Safety Power Shutoff, or PSPS.*

*As Oregon's weather changes, the summer months bring increased risk of fires. Everyone has a role to play when it comes to being prepared. If you're a PGE customer:*

- ***Stay in the know*** *by updating your email address and phone number on your PGE account so they can stay in touch in the event of an outage.*
- ***Create an outage kit*** *by gathering what you'll need to keep employees, customers and your family safe if power goes out. Make sure your employees and family members know where to find it.*
- ***Make a plan*** *to keep your business or family safe during an outage, especially if a medical condition or water for livestock or crops requires electricity. Know where you'll go if you need to relocate.*

**Social Media Copy**

PGE is posting wildfire preparedness information on Twitter (@[PortlandGeneral](PortlandGeneral)), Facebook (@[PortlandGeneralElectric](PortlandGeneralElectric)) and Instagram (@[PortlandGeneral](PortlandGeneral)). Posts are available in English and Spanish.

Please use the links below to retweet on Twitter, share on Facebook and/or share to your organization's stories on Instagram. Feel free to tag us!

Also, please note that in the event we call a PSPS, we will share updates on Facebook, Instagram and Twitter and would appreciate your amplification.

**Social Posts to Amplify**

Please consider liking and sharing these posts on Facebook, retweeting PGE posts and sharing PGE posts as Instagram stories.

- Post on 5/11: Summertime means Prep Time! Fire Season is here – now is the time to start thinking about the proactive steps you can take to best prepare for the potential of wildfire and corresponding power outages. Learn more: bit.ly/3F4nbCm

  *Twitter:*
  https://twitter.com/portlandgeneral/status/1524426615660453889?s=20&t=1Bbyv8rEt WnO-vdG2_kh4w
  *Facebook:*
  https://www.facebook.com/PortlandGeneralElectric/posts/5873100286050493
  *Instagram:* https://www.instagram.com/p/CdbK1tguYks/?utm_source=ig_web_copy_link

- Post on 5/18: As Oregon's weather gets hotter and drier, wildfires can hit suddenly and grow quickly. NOW is the time to confirm your contact information is up to date in our system so that we can alert you ahead of, and throughout, potential wildfire outages.

  *Twitter:*
  https://twitter.com/portlandgeneral/status/1526963325371826176?s=20&t=1Bbyv8rEt WnO-vdG2_kh4w
  *Facebook:*
  https://www.facebook.com/PortlandGeneralElectric/posts/5893798357314019

- Post on 5/25: When wildfires hit and electricity outages occur, what's your plan? With a little planning, we can all be ready for Wildfire Season together.

  *Twitter:* *https://twitter.com/portlandgeneral*
  *Facebook:* *https://www.facebook.com/PortlandGeneralElectric*
  *Instagram*: *https://www.instagram.com/portlandgeneral/*

- Post on 6/1: For us, being prepared is a year-round effort to protect people, property, and natural environments. Our crews regularly inspect our poles and equipment and make necessary modifications or replacements to reduce the risk of a spark.

  *Twitter:* *https://twitter.com/portlandgeneral*
  *Facebook:* *https://www.facebook.com/PortlandGeneralElectric*
  *Instagram*: *https://www.instagram.com/portlandgeneral/*

**Next Steps**

As we move through Wildfire Season, additional toolkit content may be shared. Please reach out to PGECommunications@pgn.com if you have questions or need additional information and resources. We appreciate your help getting information out and raising awareness!

# It's fire season. Be prepared.

Oregon's climate is getting hotter and drier, and that means wildfires can hit suddenly and grow quickly. If extreme weather conditions make it unsafe to keep our equipment on, we may need to turn off the power as a last-resort safety measure.

These outages, also known as a **Public Safety Power Shutoff (PSPS)**, could last several hours or multiple days, so it's important to be prepared.

> You can find a map of areas that are at higher risk for safety-related outages at **portlandgeneral.com/wildfireoutages**.

## Here's how you can prepare:

**1** **Stay in the know** by updating your email on your PGE account so we can send you notices in the event of a safety-related outage.

**2** **Create a summer outage kit** and make sure everyone in your home knows where to find it.

### Some basic items include:

- Emergency phone numbers, including PGE Customer Service: 503-228-6322

  **Our customer service advisors can assist you in 200+ languages.**

- Flashlights or headlamps

- Battery-powered or hand-crank radio and clock or watch

- Battery-powered or hand-held fans

- Extra batteries

- Car chargers for cell phones, laptops and/or tablet computers

- Bottled water for people and animals (if you rely on electricity to pump water)

- Frozen cold packs or water frozen in bags or plastic bottles (keep ready in your freezer)

**3** **Make a plan** to keep your family and your home safe during an outage.

- Plan ahead to relocate with a friend, family member or to a shelter, especially if you have a medical condition that requires electricity or if you'll need to work or learn from home during an outage.

- Plan for medical needs so you can still power medical equipment during an outage and consider enrolling in our Medical Certificate program. This will help us proactively communicate with you about outages. Visit **portlandgeneral.com/medical** or call 503-612-3838 to learn more about the program.

- Consider buying a backup generator and follow manufacturers' guidelines for its safe operation.

- Plan for feeding and watering pets or livestock if you rely on an electric pump for water.

- Get more information from your county's website or the **National Fire Protection Association**, the **Red Cross** and **Ready.gov**.

Find additional tips on how to get prepared at **portlandgeneral.com/prepare**.

# Appendix 8: Summary of Input from Public Safety Partners and Lessons Learned Captured During the 2022 Fire Season

The following improvement plan includes a set of recommendations for identified actions that are based on observations presented in PSPS Tabletop AAR, Public Safety Partners communication conference calls, and September 2022 PSPS AAR. As appropriate, these actions have been incorporated throughout the 2023 WMP.

| Core Capability | Objective ID | Objective |
|---|---|---|
| Public Information and Sharing | A | Identify what sequential and iterative notifications need to be made, the process to be taken, and who will support notifications. |
| | B | Identify customer communications needs and conduct appropriate stakeholder outreach. |
| Operational Coordination | C | Determine how the Corporate Incident Management Team (CIMT) is activated and structured. |
| | D | Identify key points of coordination with jurisdictional Emergency Operations Centers (EOCs). |
| Intelligence and Information Sharing | E | Identify what data and information are required to support decision making including identification of specific information and data products. |
| Operational Coordination | F | Identify primary and alternate means of communicating with internal and external partners. |
| | G | Identify communications/data management failure points with limited or no redundancy that could lead to failures in informing customer information needs. |

Recommended actions that have been added are:

| Objective ID | Opportunities for Improvement | Recommended Actions |
|---|---|---|
| D | Confusion in difference of communications between emergent, PSPS, restoration, etc. | Designate specific communications for Preventative Outage Area initiation, PSPS, and restoration. |
| D, F | Need for enhanced coordination with external partners to identify required information and updates needed during a PSPS. | Create unique templates for critical Public Safety Partners with partner input. |
| G | Public Safety Partners asked to expand the socialization of the PSPS plan with external partners. | Develop and socialize external facing PSPS plan elements (e.g., PSPS Bell Curve) that can be aligned with or incorporated into Public Safety Partner operational plans. |

| Objective ID | Opportunities for Improvement | Recommended Actions |
|---|---|---|
| A | Public Safety Partners identified need to coordinate timing of messaging to minimize confusion and the impact of other emergency alerts. | Coordinate with public safety partners to align notification procedures including cadence of notifications and use of mass notification systems. |
| All | Internal and External observations regarding vocabulary and acronym confusion. | Formalize a shared vocabulary within internal and external partners to ensure consistent messaging. |
| A, B | Establish and socialize triggers signaling PGE staff to send updates to Public Safety Partners | Document list of triggers to send updates to public partners to include with PSPS Playbook and NEP Tracker. |
| E | PGE acknowledged it is helpful when customer resource centers publicize hours of service. | Coordinate with public safety partners around messaging provided at facilities providing assistance to impacted populations (e.g., cooling centers) to support consistency and alignment of messaging |
| D | Align PSPS response, with cadence of communications withing the CIMT structure. | Align PSPS response in PSPS Playbook and with reference to the timing a news cycle. |

The following table summarizes Lessons Learned from the September 2022 PSPS event in PGE's service territory:

| Strengths | |
|---|---|
| **Crisis Communications** | PGE demonstrated a sincere commitment to communicate and coordinate with external partners. |
| **Whole Community** | Stakeholder communications were robust and comprehensive |
| | On-the-fly adjustments to community support strategies were effective |
| | Working collaboratively with PGE, some counties stood up their own CRCs at public locations, while PGE donated supplies to these locations for distribution to impacted communities |
| **Operations** | Additional recloser installations prior to the event enabled PGE to reduce the September 2022 PSPS event's customer impacts |
| | The expanded (for 2022) network of PGE weather stations provided an accurate view of meteorological conditions closer to PGE infrastructure when compared to other weather stations in the regional network |
| **Community Resource Centers** | Customers were grateful that PGE was present—CRCs are invaluable during PSPS events and a positive expression of PGE's care for the community |

| Opportunities for Improvement | |
|---|---|
| **Crisis Communications** | Advise and support Public Safety Partners to host a workshop to clarify cross-jurisdictional coordination responsibilities for alerts and warnings. |
| | PGE and Public Safety Partners should evaluate the use of WEA for PSPS events and define policies and agreements to facilitate its successful and beneficial deployment and reduce "overspray" confusion for notification recipients |
| **Operations** | Define additional internal controls for PSPS Areas to more precisely align appropriate PSPS boundaries and actual outage areas. |
| | Invest in additional tools and equipment to allow more targeted and automated control of PSPS Areas |
| | Update PSPS Area data to include all critical facilities with consideration for seasonality such as back-to-school dates. |
| | Designating additional Preventive Outage Areas, in real-time, created communications, operational, logistical and community support challenges. |
| | During future PSPS events, Ops will use QEWs for patrol crews; field weather observations, however, could be conducted by classifications other than QEWs. |
| | Cutsheets should be finalized as far as possible in advance of the PSPS event and should be named by feeder and by HFRZ. During the September 2022 PSPS event, crews had to do a lot of sorting through the cutsheets to identify the feeders that needed to be de-energized for each zone; each cutsheet should include a list of feeders within the HFRZ |
| **Whole Community** | Establish and document clear lines of responsibility between PGE and Public Safety Partners for CRCs, locations and information sharing. |
| | Evaluate the use of Wireless Emergency Alerts for PSPS events, with our Public Safety Partners, to reduce "overspray" confusion for notification recipients. |
| | Assess options to improve the PSPS map functionality and simplify the customer experience |
| **Community Resource Centers** | Review site locations using updated criteria and finalize contracts for all locations. |
| | Formalize CRC volunteer strategy, templates, and training. |
| | Supplemental employees signed up and trained in advance of the PSPS event. |
| | Renew contract with CRC vendor for 2023 wildfire season. |
| | Incorporate vendor recommendations into contract. |

| | Plan prior to fire season for worst-case scenario – identify CRC locations and ensure that adequate MRUs and supplies are available even if all 10 HFRZs are impacted by a PSPS event |
|---|---|

# Appendix 9: PGE Wildfire Risk Assessment Overview & Process

PGE consults with wildfire risk experts to model fire behavior while also benchmarking its risk methodology/modelling and data with local and international wildfire programs. Key terms in this process are identified below.

**Ignition Potential Index**

The Ignition Potential Index (IPI) is a relative measure of the propensity for weather conditions and fuel characteristics at a given location to result in a utility-related wildfire ignition that escapes initial suppression efforts to become a large and potentially damaging fire. PGE models the potential for a wildfire ignition as a function of wind speed, fuel dryness, and heat per unit area, using a model patterned after the California Public Utilities Commission's electric utility Ignition Index and Utility Threat Index. The model derives its base weather observations from gridMET, a historical 4-km resolution, gridded daily weather dataset; PGE applies downscaling and bias-correction algorithms to increase model precision and weather data accuracy. The following sections provide additional details regarding the weather factors considered in PGE's Ignition Potential Index model.

**Wind Speed**

PGE explored the use of two gridded historical wind speed datasets (gridMET and National Renewable Energy Laboratory (NREL)) in its Ignition Potential Index model. Neither dataset alone was sufficiently detailed to allow PGE to determine the influence of wind speed on the potential for a utility-caused ignition to result in significant fire damage. The gridMET dataset provides detailed daily wind speed grids but includes bias on annual timescales relative to other national products with finer spatial resolutions. PGE corrected this bias using the NREL annual mean wind speed dataset (Draxl et al. 2015) by deriving a daily calibration factor from the overlapping time periods of the two datasets (2007-2013). This approach allows the model to coordinate wind speed and dryness observed in gridMET using the precision of the NREL dataset. The bias correction factor was derived by dividing the mean annual NREL wind speed by the average annual gridMET wind speed during the overlapping time periods. This factor was then applied to daily gridMET wind speeds.

**Schroeder Probability of Ignition**

Schroeder Probability of Ignition ([SPI], Schroeder 1969) is a long-established measure of the likelihood that a competent ignition source will result in a fire start. SPI is a function of fuel temperature and moisture content. By making some simplifying assumptions, PGE calculates SPI from air temperature and relative humidity, both of which are standard weather variables included in historical summaries and weather forecasts (such as gridMET), and both can be adjusted adiabatically (occurring without loss or gain of heat) for elevation.

**Heat Per Unit Area**

Heat per unit area (HPA) is a measure of the heat content of the fuelbed (kJ/m2). For surface fuels, HPA is largely a function of the surface fire behavior fuel model (fuel loading by size class and

component). For crown fires, HPA also includes the proportion of canopy fuel expected to be involved in a fire.

For a given fuel complex, HPA varies with wind speed and fuel moisture content. PGE classified each day in the record into one of 27 weather types, then computed Daily HPA using a proprietary version of the FlamMap fire modeling system as a function of each cell's fuel characteristics and weather type.

During wildfire events, higher HPA values manifest in greater flame length and increased resistance to firefighter control. HPA can vary by several orders of magnitude. PGE's IPI model takes the square root of HPA to obtain an estimated flame length (flame length is roughly the square root of fireline intensity).

## Conditional IPI

Conditional Ignition Potential Index (cIPI) provides PGE with a modeled representation of expected IPI for each weather type studied. The daily IPI dataset provides an assessment of fire potential based on historical observations; however, not all potential weather conditions were represented for each location in the analysis area. PGE therefore created a set of Ignition Potential indices applicable for future weather observations organized by the weather-type classification used throughout this analysis.

PGE applied this general IPI calculation with the following customizations: To calculate localized wind speed, PGE applied the downscaling factors developed to calibrate predominant winds to local, terrain-influenced wind speeds at the mid-point wind speed of each weather type. PGE calculated a mean SPI for each fuel moisture class using the daily historical record. For moisture classes with fewer than 50 observations in the historical record, PGE incorporated the SPI observations of the nearest moisture class to increase the sample size. This was necessary primarily in the northwest corner of the analysis area, where the driest moisture types rarely, if ever, occur in the historical record. PGE applied the same supplemental data approach to model the mean Large Fire Probability (LFP) for each moisture class as well.

## Weather Type Probabilities

Weather type probabilities (WTP) are a set of weighting factors derived from the IPI within each weather type relative to the total IPI for a given raster cell. Rasters are matrices of cells organized into rows and columns or grids, where each cell contains a value representing information, such as temperature. Rasters are often displayed as data layers along with other geographic data on maps or used as the source data for spatial analysis.

WTPs integrate the relative ignition potential for that weather type and its relative frequency within the observed record. A weather type with high wind speed, high SPI, etc. will receive a high weighting according to the larger IPI value, but weather types with lower IPI values may also receive a higher weighting if they occur at high frequency.

## Spatial Resolution

PGE used downscaling and smoothing to achieve a final cell resolution of 120 meters x 120 meters (3.56 acres). The fuel layers necessary for HPA are available at a 30-meter resolution. To resolve the spatial resolution issue, PGE resampled (using bilinear interpolation, a statistical method by which related known values are used to estimate an unknown value, using other established values located in sequence with the unknown value) the 30-meter HPA estimates for each of the 27-wind speed and fuel moisture combinations to the coarser resolutions of 120-meter and 4-kilometer (depending on the data set).

## Smoothing

Data smoothing uses an algorithm to remove "noise" from a data set, such as one-time outlier data points, to allow important patterns to stand out and help the user predict trends. This relatively standard process allows PGE to resample coarse raster cells to a finer resolution—for the IPI model, from 4-kilometer (gridMET native resolution) to 120-meter. PGE used an additional custom process to remove any visible artifacts of the original 4-kilometer resolution, to maintain the fidelity of the synoptic weather processes seen in the gridMET data while achieving spatial coherence with the other provided data products at the 120-meter resolution.

For WTP, the smoothing process included a re-normalization to verify the results and ensure that the weighting factors were still valid (a fraction of the total IPI and therefore all WTP values still summed to one for a given raster cell).

## Downscaling

To assess the local effects of topography on weather, PGE downscaled gridMET weather data using adiabatic[18] relationships of elevation to temperature and humidity and modeled the local topographic effect on prevalent wind direction and speeds. For each 120-meter x 120-meter cell and day in the record, PGE adjusted the observed gridMET temperature by the relative difference in elevation between the gridMET 4-kilometer cell and the finer 120-meter cell. This also changed the relative humidity at the 120-meter cell under the assumption that the same absolute water content in an area persisted under variable elevation and temperature.

To assess localized wind speeds, PGE used the WindNinja modeling system (a fluid dynamics physics model that accounts for the effects of topography on wind speed and direction) to run simulations with the prevalent wind at the eight cardinal (indicating the numerical value) and ordinal (indicating the position of the value in a series) directions. This produced eight factors that modified the 4-kilometer wind speed to show the local effects of terrain at the 120-meter resolution. For each day in the record, PGE classified the wind direction to the nearest corresponding factor and adjusted the wind speed to produce a terrain-adjusted wind speed estimate at 120-meter resolution. After

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[18] "Adiabatic" refers to a process in which no heat transfer takes place.

downscaling the temperature, humidity, and wind speed, PGE then calculated daily IPI at a 120-meter resolution.

## Conditional Impact

Conditional Impact (CI) is a measure of the relative impact of a wildfire (i.e., loss), given that a fire has occurred. CI is a function of fire growth potential and the vulnerability of assets and resources in the area around potential source locations. Fire growth potential is a function of fuel, weather, and topography. Vulnerability is a function of the exposure and susceptibility of homes, resources, and assets across the landscape where the fire occurred.

Unlike IPI, CI does not lend itself to a deterministic (models that produce the same exact results for a particular set of inputs) mathematical solution. To generate CI, PGE applies fire growth modeling to specific ignition locations, then ties the spatial data within the final simulated perimeters back to the ignition location. After generating the final fire-perimeter event set, PGE's model overlays each simulated wildfire with spatial data representing the impacts of wildfire—conditional losses associated with high-value resources and assets.

PGE generalized the event-set results to produce a CI raster at 120 m that represents the tendency for fires originating in that area to impact resources and assets. Thus, PGE was able to model the potential for a wildfire to result in an urban conflagration (such as the 2020 Almeda Fire in Ashland) by including burnable urban fuel models within the appropriate weather types.

## Wildfire Simulation

PGE conducted wildfire simulation modeling using the Minimum Travel Time (MTT) algorithm, called Randig. Randig models short duration burn periods under constant weather conditions, assuming no suppression effects. This assumption is appropriate for modeling extreme wildfire spread events, where fire weather and fire behavior can overwhelm suppression resources. PGE applied the Randig algorithm in iterative runs using the 216 unique weather types and other parameters shown in Table 2 (weather types were derived from gridMET weather data as described above).

The following table shows example inputs for the 216 weather types included in PGE's IPI model. Each set of parameters is repeated for each of the eight cardinal direction wind bins (0, 45, 90, 135, 180, 225, 270, 315), yielding a total of 216 unique weather types. These wind speeds are banded in 9 groups of 5 mph increments.

**Example PGE Weather Types IPI Model Inputs**

| 20-ft Wind Speed (mi/hr) | MC Class | 1-hr MC | Live Herb MC | Live Woody MC | Duration (min) | Spot prob | Burnable Urban? |
|---|---|---|---|---|---|---|---|
| 1 | very dry | 3% | 45 | 80 | 60 | 10% | N |
| 1 | dry | 5% | 60 | 90 | 60 | 0% | N |
| 1 | moderate | 8% | 90 | 100 | 60 | 0% | N |
| 5 | very dry | 3% | 45 | 80 | 120 | 30% | N |
| 5 | dry | 5% | 60 | 90 | 120 | 15% | N |
| 5 | moderate | 8% | 90 | 100 | 120 | 0% | N |
| 10 | very dry | 3% | 45 | 80 | 180 | 50% | N |
| 10 | dry | 5% | 60 | 90 | 180 | 35% | N |
| 10 | moderate | 8% | 90 | 100 | 180 | 20% | N |
| 15 | very dry | 3% | 45 | 80 | 240 | 70% | Y |
| 15 | dry | 5% | 60 | 90 | 240 | 55% | N |
| 15 | moderate | 8% | 90 | 100 | 240 | 40% | N |
| 20 | very dry | 3% | 45 | 80 | 300 | 80% | Y |
| 20 | dry | 5% | 60 | 90 | 300 | 65% | Y |
| 20 | moderate | 8% | 90 | 100 | 300 | 50% | Y |
| 25 | very dry | 3% | 45 | 80 | 375 | 85% | Y |
| 25 | dry | 5% | 60 | 90 | 375 | 70% | Y |
| 25 | moderate | 8% | 90 | 100 | 375 | 55% | Y |
| 30 | very dry | 3% | 45 | 80 | 450 | 90% | Y |
| 30 | dry | 5% | 60 | 90 | 450 | 75% | Y |
| 30 | moderate | 8% | 90 | 100 | 450 | 60% | Y |
| 35 | very dry | 3% | 45 | 80 | 525 | 95% | Y |
| 35 | dry | 5% | 60 | 90 | 525 | 80% | Y |
| 35 | moderate | 8% | 90 | 100 | 525 | 65% | Y |
| 40 | very dry | 3% | 45 | 80 | 600 | 100% | Y |
| 40 | dry | 5% | 60 | 90 | 600 | 85% | Y |
| 40 | moderate | 8% | 90 | 100 | 600 | 70% | Y |

The modeled weather types were further downscaled within each wildfire simulation by running Randig with both WindNinja and fuel moisture conditioning functionality. PGE used pre-calculated WindNinja grids representing terrain-adapted wind speed and direction, generated at 120 m resolution, and then up-sampled to 30 m resolution as inputs to Randig. The model applied 10 adjusted moisture contents to individual cells based on canopy cover and topography (slope and aspect).

PGE then applied the Randig algorithm to a lattice grid of ignition points across the analysis area, generating a 270 m grid of ignition points based on a one-kilometer buffer of PGE features within the analysis area. PGE removed certain points based on burnability characteristics; the resulting analysis yielded a total of 84,749 wildfire ignition points for simulation. Figure 4, below, depicts the overall extent of the wildfire simulation ignition points (Panel A) and a detailed view of the ignition lattice (Panel B) near the community of Sandy, Oregon. The red areas in the left-hand panel (left) show the general location of where ignition points are concentrated.

**Figure 4: PGE Wildfire Simulation Modeling Results – Potential Ignition Points**
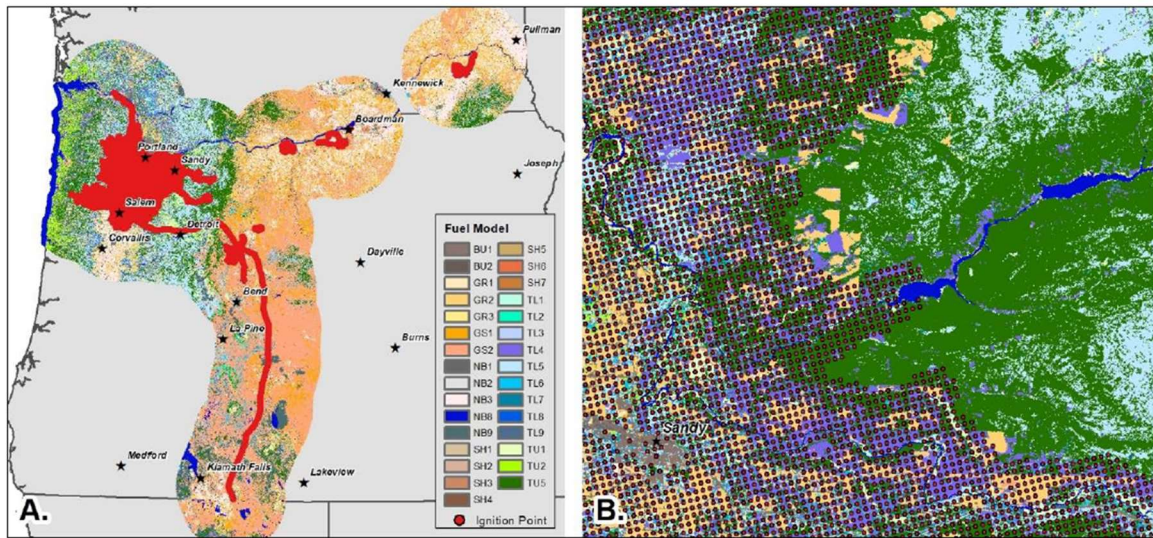


PGE simulated each ignition point using each of the 216 weather types described above, at a 90m resolution, resulting in a total of 18,305,784 simulated fires. Modeling wildfire ignition potential at such a fine-scale resolution across such a large area is a computationally intensive exercise, occupying a series of Windows 10 machines with 48-thread CPUs for nearly 3,600 machine-hours.

## Highly Valued Resources and Assets (HVRA) Impact Raster

PGE updated the Conditional Net Value Change (cNVC) or "Impact" raster using data produced originally for the Pacific Northwest Quantitative Wildfire Risk Assessment (PNRA)1. PGE adjusted response functions used in the PNRA assessment to remove the beneficial effects of fire, replacing positive values with zero. The final list of Highly Valued Resources and Assets (HVRA) includes (but is not limited to) People and Property, Timber, Wildlife, Infrastructure, and Surface Drinking Water.

All data inputs, including response to fire and relative importance weights, were leveraged from PNRA1, with one exception: the dataset and methodology used to represent housing-unit density was updated in the People and Property HVRA to use the Housing-Unit Density (HUDen) data built for the Wildfire Risk to Communities Project (Scott et al. 2020). This dataset uses population data at the census block level and Microsoft Building footprints to allocate people and homes spatially within a census block.

Additionally, to account for the potential for wildfire spread into urban areas (mapped by LANDFIRE[19] as non-burnable), PGE used an iterative smoothing process to spread distributions of flame-length

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[19] LANDFIRE (Landscape Fire and Resource Management Planning Tools), is a shared, government-developed program used by the wildland fire management programs of the U.S. Forest Service and U.S. Department of the Interior, that uses landscape-scale geospatial products to support cross-boundary planning, management, and operations.

probabilities into non-burnable land cover (other than open water or ice) within 1.5 km of contiguous, burnable land cover at least 500 ha in size. These areas would otherwise have a zero probability of burning in the fire model (FSim). This allowed PGE to recalculate cNVC using response functions and relative importance values assigned by the PNRA1 project, while accounting for wildfire spread into urban areas.

Finally, PGE applied a fractional exposure value based on the distance from the burnable fuel (the source of exposure) to account for the decreased exposure of housing units within the 1.5 km distance from burnable fuel. PGE adjusted housing-unit density exposure by multiplying HUDen by the exposure mask value in each pixel. The final People and Property HVRA included housing units directly exposed to wildfire (located in burnable pixels) as well as those indirectly exposed to wildfire (within a 1.5 km distance of burnable fuel).

PGE applied these modified response functions to all other HVRA cNVC layers; the layers were otherwise unaltered from the PNRA1 project. The final cNVC map (summed for all HVRA) serves as the impact raster necessary for the spatial intersection with the simulated fire perimeters—it provides the key to unlocking and understanding the HVRA impact simulations.

**Impact Raster Overlays**

PGE ran an overlay script to sum the total cNVC within each simulated wildfire perimeter. The total cNVC reported within each perimeter (including spot fires) was attributed back to the original ignition location. This allowed PGE to apply cNVC values (representing the estimated HVRA impacts for each of the 216 modeled weather conditions) to each of the original 84,749 modeled (simulated) ignition points.

**Rasterization**

Once it had attributed impacts by fire simulation to the corresponding ignition locations, PGE applied a smoothing process to convert the vector datatype to rasters, while also gap-filling the vector data. PGE first converted each set of vector ignitions for a given weather type to a 120 m raster, using an inverse distance weighting (IDW) algorithm using the four nearest ignition points, an exponential distance weighting of 1.5, and a maximum search distance of 1,500 m. The maximum search distance was intentionally large to fill in data gaps created by the original ignition lattice falling on areas of non-burnable fuel cells, accounting for fires that do not spread beyond the ignition cell.

**Wildfire Threat Index (WTI)**

PGE calculates the Wildfire Threat Index (WTI) as the product of conditional IPI, CI, and the weighting of the WTP, which were calculated at the original gridMET resolution and smoothed to the coincident 120 m resolution.

The resulting WTI raster and vector data provide an estimate of relative wildfire threat across the analysis area for the range of weather conditions specified. As the product of IPI and CI, WTI allows PGE to identify locations with the greatest combination of utility-related ignition and resulting wildfire damage potentials.

**Conditional Wildfire Threat Index**

The overall WTI integrates the results from all 216 weather types, while a conditional WTI (cWTI) for each individual weather type provides an estimate of wildfire threat for specific weather conditions. The cWTI is simply the product of the individual weather type IPI and CI.

# PGE Wildfire Risk Assessment Results by HFRZ

| Zone # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Asset Density | Relative Commercial and Res Meter Count | 6 | 2 | 5 | 3 | 4 | 8 | 5 | 4 | 3 | 3 |
| Asset density (per SqMi) | | 252 | 147 | 260 | 194 | 161 | 497 | 165 | 88 | 77 | 51 |
| | Share of all HFRZ assets | 32 | 3 | 6 | 214 | 12 | 3 | 9 | 4 | 7 | 12 |
| Land area SqMi | | 61 | 10 | 11 | 34 | 34 | 3 | 25 | 22 | 42 | 111 |
| Weather Threat/ Pyrologix Calculations | Probability of Exceeding Manual Control | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Extreme Burn Probability | | .2-.4 | .2-.4 | .2-.4 | .2-.4 | .2-.4 | .2-.4 | .2-.4 | .2-.4 | .2-.4 | .2-.4 |
| | Heat Intensity per unit area - Scenario 18 | 10523 | 13221 | 7778 | 7537 | 7069 | 8798 | 8570 | 12520 | 12979 | 12774 |
| WTI MEAN - Scenario 118 | | 2793110 | 14649487 | 19637320 | 20570382 | 11673496 | 7232637 | 4728634 | 4627615 | 17186568 | 35309464 |
| | CI MEAN - Scenario 118 | 315 | 106 | 582 | 496 | 305 | 119 | 162 | 114 | 263 | 163 |
| IPI MEAN - Scenario 118 | | 80 | 87 | 82 | 78 | 97 | 134 | 141 | 184 | 218 | 221 |
| Accessibility / Terrain | Fire station within 5 min | 4 | 1 | 3 | 2 | 1 | 5 | 1 | 1 | 1 | 2 |
| Road condition vulnerability | | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 3 |
| | Slope – Mean | 477 | 308 | 129 | 351 | 319 | 256 | 231 | 183 | 176 | 195 |
| Aspect – Mean | | 260 | 263 | 324 | 283 | 298 | 92 | 199 | 168 | 104 | 112 |
| Social Indicators | % households 200% below fed poverty line | 25 | 26 | 18 | 23 | 16 | 8 | 17 | 16 | 22 | 37 |
| Household Disability Composition | | 18 | 13 | 12 | 15 | 14 | 8 | 13 | 11 | 15 | 20 |
| | Hispanic or Latino | 7 | 8 | 2 | 3 | 3 | 4 | 5 | 9 | 5 | 7 |
| Age 65+ | | 25 | 17 | 20 | 18 | 22 | 16 | 20 | 13 | 18 | 16 |
| | Housing/transportation vulnerability | 30 | 30 | 20 | 46 | 35 | 12 | 56 | 30 | 32 | 78 |
| Overall social vulnerability | | 30 | 35 | 22 | 37 | 34 | 5 | 11 | 16 | 30 | 65 |
| Ecological & Cultural Vulnerability | Critical Habitats | 2 | 3 | 1 | 2 | 3 | 1 | 3 | 2 | 2 | 2 |
| Cultural/historical/protected areas | | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 3 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wildland / Urban Interface | % in WUI | 90 | 75 | 100 | 90 | 20 | 85 | 70 | 70 | 50 | 50 |
| USDF WF Risk to Communities | | 1778 | 657 | 146 | 7 | 69 | 75 | 28 | 6.3 | 6 | 7 |
| Outage History | June-Sept outages 2017-2021 on UG | 101 | 28 | 41 | 20 | 9 | 15 | 13 | 7 | 16 | 18 |
| June-Sept outages 2017-2021 on UG - avg duration | | 2960.405 | 575.72 | 430.8725 | 336.616 | 1165.777 | 453.5525 | 257.5067 | 184.19 | 1118.426 | 342.285 |
| | June-Sept outages 2017-2021 on OH | 246 | 44 | 77 | 130 | 105 | 55 | 90 | 55 | 203 | 83 |
| June-Sept outages 2017-2021 on OH - avg duration | | 1940.033 | 921.71 | 292.6325 | 722.6057 | 1259.567 | 659.32 | 547.1725 | 317.1633 | 391.9871 | 277.6914 |