Portland General Electric

2024 Wildfire Mitigation Plan

Publication Date: 12/29/2023

Scope

PGE's Wildfire Mitigation Plan (WMP) contains statements that relate to future plans, objectives, expectations, performance, and events. These forward-looking statements represent Portland General Electric's (PGE) estimates and assumptions as of December 1, 2023. Because PGE is continually updating its wildfire data, the information included in the WMP reflects the data available at publication. Furthermore, the estimated costs and schedules contained herein are subject to uncertainties, including delays in supply chain and increased supply costs, nonperformance of counterparties, and other work factors. PGE is unable to update or revise any forward-looking statement resulting from new information, future events, or other factors.

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

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1 Executive Summary

PGE's Wildfire Mitigation team plans and implements the Wildfire Mitigation Program (Program), developing and coordinating wildfire mitigation activities across the company. PGE's approach to wildfire mitigation continues to evolve in response to global climate change, learnings from worldwide landscape-altering wildfire events, and governance from the Oregon Public Utility Commission (OPUC). In compliance with Oregon Administrative Rules (OAR) governing wildfire mitigation plans, the WMP outlines PGE's approach to wildfire risk mitigation and guides PGE's Program. PGE's goal is to improve regional safety by:

- Increasing the resilience of PGE assets to wildfire damage
- Limiting customer impact during Public Safety Power Shutoff (PSPS) events
- Reducing the risk of wildfires
- Engaging in additional mitigation activities involving customers

The WMP presents PGE's approach to risk modeling, which informs PGE's Wildfire Program's. PGE's multiple risk assessment tools and models are collectively referred to as the Wildfire Risk Mitigation Assessment (WRMA) and include Value Spend Efficiency (VSE) calculations to develop and guide activities. The WRMA provides wildfire guidance to PGE through operating protocols, PSPS events, asset management and inspections, vegetation management, Public Safety Partner and community engagement, public awareness and outreach, and research and development. PGE restoration activities also have a risk-informed process that is not unique to wildfire. Restoration relies on outage management by optimizing grid performance and resources.

High Fire Risk Zones (HFRZ) are areas within PGE's service area where vegetation, terrain, meteorological patterns, access and response timing, and wildland-urban interface considerations increase the risks associated with wildfire. PGE implements specific inspection and maintenance, vegetation management, community and customer awareness, and operational actions within these HFRZ during and in preparation for PGE's declared fire season for improved ignition prevention and safety. The 2024 WRMA adds one (1) HFRZ for a total of 11.

In addition, PGE continues to expand its situational awareness capabilities, including installing new remote automated weather stations (RAWS) and artificial-intelligence (AI)-enhanced, ultrahigh-definition Pano AI cameras to automatically notify PGE and its Public Safety Partners in 'real time' when a fire is detected. PGE will continue to invest in mitigation efforts to reduce wildfire risk throughout its system.

At PGE, wildfire-related planning, mitigation, and 'lessons learned' are year-round endeavors. PGE may update this WMP and the Program throughout the year to address new findings, data, and analysis. In addition to its regulatory responsibilities to the OPUC, 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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Acronyms and Glossary

AI: Artificial Intelligence

AWRR: Advanced Wildfire Risk Reduction

BIL: Bipartisan Infrastructure Bill

BPA: Bonneville Power Administration

C1: Vegetation that is an imminent hazard to PGE facilities.

C2: Vegetation that is dead, dying, diseased, or damaged, has fungal or insect infestation, stress, sun scald or overall poor health. This includes mechanical damage, multiple tops, poor site conditions, conks on the trunks, or aggradation in the root zone, or trees too close to PGE facilities.

CIMT: Corporate Incident Management Team

CRC: Community Resource Center

cWTI: Conditional Weather Threat Index

Dead Fuel: Naturally occurring fuels with moisture content that responds solely to ambient environmental conditions and is critical in determining fire potential. When the fuel moisture content is less than 30%, that fuel is considered to be dead.

DOE: Department of Energy

Earned Media: Publicity or articles written without a payment or solicitation from a business.

EEI: Edison Energy Institute

EEMT: Energy Emergency Management Team

EFD: Early Fault Detection

EPRI: Electric Power Research Institute

ERT: Estimated Restoration Times

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 860-300-0010 (2).

FAQ: Frequently Asked Question

Fire Season: Period(s) of the year during which wildland fires are most likely to occur, spread, and affect resources sufficient 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

FPI: Fire Potential Index

GIS: Geographic Information System

High Fire Risk Zone(s) (HFRZ): Geographic areas at elevated risk of wildfire ignition that are identified by PGE in its risk based WMP.

HPA: Heat per Unit Area

HSEEP: Homeland Security Exercise & Evaluation Program

IAM: Institute of Asset Management

IC: Incident Commander

ICS: Incident Command System

International Wildfire Risk Mitigation Consortium (IWRMC): An industry-sponsored collaborative designed to facilitate the sharing of wildfire risk mitigation insights and discovery of innovative and unique wildfire practices from across the globe.

Investor-Owned Utility (IOU): Regulated utilities that generate and distribute power to a customer. These utilities also issue stock owned by shareholders.

IPI: Ignition Potential Index

ISO: International Organization for Standardization

LiDAR: Light Detection & Ranging

Local Community: Any community of people living, or having rights or interests, in a distinct geographical area, per OAR 860-300-0010

Local Emergency Management: Refers to city, county, and Tribal emergency management entities, per OAR 860-300-0010 (4)

Momentary Average Interruption Frequency Index MAIFI: A reliability index commonly used by electric utilities. MAIFI is the average number of momentary (less than five minutes) interruptions that a customer would experience during a given period. It is usually measured over the course of a year.

NEM: Notification Execution Manager

No-Test Policy: PGE will disable auto-reclosing on protective devices and not manually close-in a faulted circuit.

NWCC: Northwest Coordination Center

NWS: National Weather Service

O&M: Operations and Maintenance

OAR: Oregon Administrative Rule

ODF: Oregon Department of Forestry

ODHS: Oregon Department of Human Services

ODOT: Oregon Department of Transportation

OH: Overhead

OJUA: Oregon Joint Use Association

OPUC: Public Utility Commission of Oregon

PAT: PSPS Assessment Team

PIO: Public Information Officer

PSPS: Public Safety Power Shutoff

Public Safety Partners: Includes the Emergency Support Function-12, Local Emergency Management, and Oregon Department of Human Services (ODHS), per OAR 860-300-0010 (7)

QA/QC: Quality Assurance/Quality Control

RAWS: Remote Automated Weather Station

RDPO: Regional Disaster Preparedness Organization

Red Flag Warning (RFW): Issued by the National Weather Service (NWS) to alert forecast users of an ongoing or imminent critical fire weather pattern that would allow for rapid fire starts and/or spread, as well as extreme fire behavior. This pattern must coincide with fuels that are critically dry and fire danger that is moderate to high. Evaluations of fuel conditions will be made in accordance with current National Fire Danger Rating System (NFDRS) Energy Release Component values and in consultation with fire managers.

The weather criteria for RFWs vary depending on location and climate. The products will be issued for specific zones, which are formed based on area with similar vegetation and topography. Our transmission, distribution and generation are covered by the NWS offices in Portland and Pendleton, Oregon.

Representative Concentration Pathway (RCP 4.5): A scenario of long-term, global emission of greenhouse gases, short-lived species, and land-use-land cover which stabilized radiative forcing at 4.5 watts per meter squared. *[For further definition, see Oregon Climate Change assessment, referenced in section 3 of the WMP.]*

Risk Spend Efficiency (RSE): A calculation of the cost effectiveness of mitigation; similar to a cost/benefit analysis using risk points.

ROW: Right-of-way

RVM: Routine Vegetation Management

SME: Subject Matter Expert

SPI: Schroeder Probability of Ignition

Staff: Regulatory employees of the Public Utility Commission of Oregon, excluding commissioners and Administrative Law Judges. Staff serves as an advocate for the public interest and participates in proceedings.

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

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.

System Average Interruption Duration Index (SAIDI): Indicates the total sustained interruption duration for the average customer during a predefined period of time. It is commonly measured in minutes or hours of interruption.

System Average Interruption Frequency Index (SAIFI): A reliability index commonly used by electric utilities. SAIFI is the average number of interruptions per customer. It is usually measured over the course of a year.

T&D: Transmission and Distribution

Tree Attachment: Secondary wires attached to trees. OAR 860-024-0018(2) prohibits utilities from attaching utility supply conductors to live trees in HFRZs.

Tribes: This term is used collectively to describe federally recognized Tribes within the Pacific Northwest.

USFS: United States Forest Service

Utility-Identified Critical Facilities: The facilities identified by PGE within its service area 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.

UTRA: Utility Tree Risk Assessment

Wildfire Mitigation Program: The activities and actions conducted by PGE's Wildfire Mitigation team in support of the 2024 Wildfire Mitigation Plan.

Wildfire Risk Mitigation Assessment (WRMA): 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

WTI: Wildfire Threat Index

2 Introduction

PGE designed the WMP 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 and recommendations. Appendix 1 and Appendix 2 provide an outline of Chapter 860 OAR applicable to the WMP and PGE's response. Appendix 3 addresses Staff's recommendations outlined in Order 23-221 and specifies workshop dates when the recommendations were discussed. Please note that references to specific recommendation numbers within the remainder of this document refer directly to staff's recommendations outlined in Order 23-221. The WMP incorporates 'lessons learned' from the 2023 fire season and describes PGE's wildfire preparedness and response activities for 2024.

The success of the Program relies on the active participation of a broad spectrum of internal and external stakeholders with the coordination of PGE's Wildfire Mitigation organization. The Program is informed by PGE's WRMA and Value Spend Efficiency (VSE) calculations. PGE uses these calculations to develop and guide Program activities and wildfire mitigation investments. Industry benchmarks and WRMA's findings inform our activities aimed at reducing the frequency of utility-caused ignition events, including:

- Use of PSPS to prevent utility-caused ignitions during high or extreme fire danger periods
- Vegetation management
- Engineering of reliable systems that experience fewer events that result in spark failure modes
- Inspection and maintenance of poles and equipment
- Operational readiness during fire season, including using system protection devices such as electronic reclosers
- Situational awareness
- System hardening

PGE reviews its fire season operations and wildfire mitigation preparedness and response actions annually and updates the WMP as needed. PGE will also update the WMP as required to comply with applicable regulatory requirements or changes in law. If PGE substantively updates the plan outside of the annual submission cycle, the WMP in Docket UM 2208 will be refiled with the OPUC and the most current version of the WMP will be posted on PGE's website.

The issues PGE seeks to address with the WMP are dynamic, and the increasing risks of wildfire have been and will continue to be hard to predict. Oregon has been subject to unprecedentedly fierce heat and ice storms, increases in dead fuels, population growth (with accompanied extension of electric service) into the wildland urban interface, and hard to predict local weather conditions that can accelerate the speed and spread of fire, and amplify the destruction of property and critical services. At the recommendation of OPUC staff, PGE is planning to adopt a maturity model that will inform our wildfire management planning and help us to continually improve by developing new tools and incorporating leading practices appropriate to our geography and risk.

Some of the most significant changes made to the 2024 WMP include the ongoing evolution of PGE's WRMA in partnership with PGE's Public Safety Partners. Section 3.2, "Updates to 2024 Wildfire Risk Mitigation Assessment", provides updated methodologies and feedback loops. PGE also expanded its situational awareness capabilities with Pano AI fire detection cameras covering all 11 of PGE's 2024 HFRZ. Dozens of fire agencies have direct access to this technology, potentially improving response time to fires in their areas. In addition, PGE's network now consists of 80 weather stations providing weather data at a

more granular level, allowing for more precisely informed PSPS decision-making as well as informing operational all hazards situational awareness. PGE continues progressing with non-expulsion fuse installation and other ignition prevention investments, such as tree wire and undergrounding projects. One additional capital improvement included the expanded use of intelligent reclosers to reduce the number of customers impacted by PSPS events.

2.1 Operating Environment

Global climate change continues to alter the Pacific Northwest's 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. As the effects of climate change continue to impact the West Coast of North America, there will be competition for available fire suppression, inspection, and vegetation management resources in the Pacific Northwest. Additional details are provided in Section 3.5, "Climate Change".

However, factors beyond PGE's control, including supply chain issues, climate-driven changes to weather patterns, and competition for limited contract resources may impact the delivery of PGE's 2024 Program. Investor-owned utilities (IOUs), the OPUC, and other stakeholders must strive to balance impact on customer rates and meaningful risk reduction.

2.2 PGE Service Area Overview

PGE's service area is distributed over 4,000 square miles of forested, mountainous, urban, and suburban environments. See Figure 1. 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 most of PGE's service area 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), Consumers Power, Inc., Forest Grove Light & Power, McMinnville Water and Light, PacifiCorp, Wasco Electric Cooperative, and West Oregon Electric Cooperative.

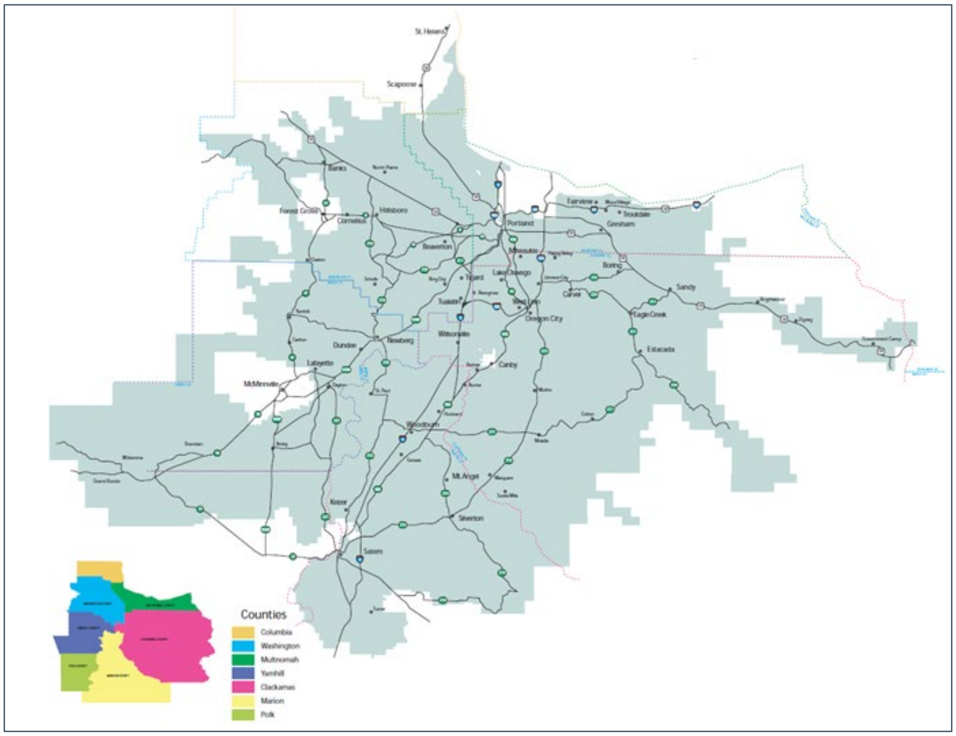


Figure 1. PGE Service Area

3 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, to customers. The Program can be broken down into four risk mitigation approaches and associated objectives which are represented visually in Figure 2.

- **PSPS:** Temporarily turn off power during extreme weather conditions to reduce wildfire risk.
- **Operational Practices:** Implement operational system settings, including protection systems (e.g., reclosers), line and vegetation maintenance, and use a risk-informed protection strategy to reduce the 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.

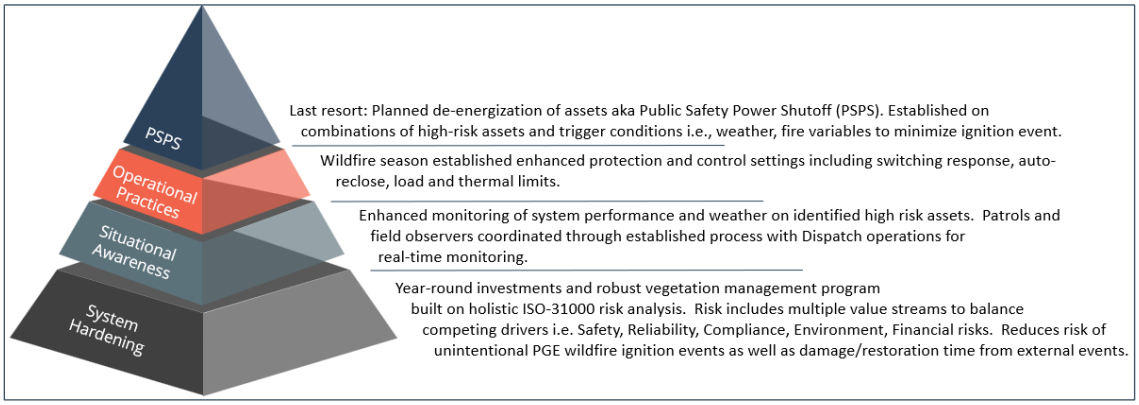


Figure 2. PGE's Wildfire Risk Mitigation Hierarchy

PGE has delivered and continues to find cost-effective ways to maximize wildfire risk reduction by applying risk assessment modeling to guide mitigation strategies. This work aims to deliver the highest risk reduction per dollar spent on mitigation. The company's WRMA methodologies and mitigation measures are discussed in more detail throughout this document.

3.1 Annual Wildfire Risk Assessment

PGE WRMA methodologies include multiple statistical models that use a variety of data sources to identify the areas of highest wildfire risk within PGE's service area to:

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

These methods enable PGE to identify the highest-risk areas within its service area and prioritize wildfire mitigation actions. The assessment results were a key input to developing PGE's 2024 WMP. In addition, PGE evaluates wildfire risk across PGE transmission and generation assets outside our service area.

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 assessment, is provided in Appendix 6.

3.2 Updates to PGE's 2024 Wildfire Risk Mitigation Assessment

PGE improves its WRMA methodologies through engagement with external experts, internal controls, and feedback loops across the organization.

In 2023, this engagement included workshops and field site visits with the Oregon Department of Forestry (ODF), US Forest Service (USFS), and local fire agencies to examine 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, including 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 2024 reassessment of the HFRZ geographical boundaries as described in Section 4, "High Fire Risk Zones".

Through an internal post-fire season 'lessons learned' process, PGE refined its WRMA methodologies by introducing new variables layered onto the assessment framework. These additional variables include:

- Access and egress road density
- Detection probability
- Fire response time/proximity to emergency response (modeled at 5, 10, and 15 minutes)
- Social vulnerability, including income level, vehicle access, and English-as-a-second-language considerations

These risk assessment improvements refined in 2023 were validated with fire agencies, as well as across the industry, through the International Wildfire Risk Mitigation Consortium (IWRMC).

PGE continues investigating improvements to data sets and analytical techniques to evolve its WRMA 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 WRMA:

- Begun to develop a four-year wildfire risk mitigation roadmap, laying out planned mitigation activities through fiscal year 2027.
- Increased the number of individual weather scenarios used to model baseline and seasonal wildfire risk to 216 scenarios, increasing model confidence. Appendix 6 provides additional model details.
- Introduced new spatial variables to PGE's Geographic Information System (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.

3.2.1 Updates to Wildfire Risk Assessment with Fire Agencies

In response to recommendation one (1), Table 1 outlines the coordination between PGE and fire agencies, specific to the review of PGE's HFRZ.

Table 1. PGE and Fire Agency Coordination

Zone	Participants	Date	Area of Change	Rationale	Change	Data Validation
9	Chief, Yamhill Fire Protection District	8/24/23	Join Cherry Grove zones from Stimson Mainline Rd. to Patton Ave, between SW Larson Rd and SW Lee Rd	Yamhill FD does mutual aid with Gaston FD, has access concerns	Increase HFRZ boundary area	Access & Response Timing
9	Chief, Yamhill Fire Protection District Chief, McMinnville Fire Dept.	8/24/23	Extend the zone surrounding Menefee Park to the southeast to include NW Turner Creek Rd until 45.389283,-123.270884	This area includes roads in poor condition with limited access, as well as frequent calls to the FD	Increase HFRZ boundary area	Access & Response Timing
11	Chief, Mt. Angel Fire Chief, Marion County Fire	9/20/23	New zone 11	Wind behavior, past fire behavior, response time	Net new zone	Access & Response Timing & Weather Behavior
3	Chief, Clackamas Fire District Battalion Chief, Clackamas Fire District Division Chief, Operations, Clackamas Fire District	9/25/23	Add a new area on S Ridge Rd. to S. Mosier Rd	Narrow, poorly maintained gravel forest service roads. Dense vegetation and East-West drainage conditions.	Increase HFRZ boundary area	Access and Response Timing and Weather Behavior
11	ODF–North Cascade District	10/13/23	New Zone 11	Wind behavior, past fire behavior, response time and critical infrastructure for suppression.	Net new zone	Access and Response Timing and Weather Behavior and Critical Infrastructure

3.2.2 High Fire Risk Zone Review with Fire Agencies

In response to recommendation one (1), Table 2 lists the dates on which PGE and Fire Agencies coordinated regarding PGE's HFRZ and risk behavior data sets and constraints.

Table 2. PGE and Fire Agency Review of HFRZ

Agency	Representative	Date
United States Forest Service	Fire Planner	1/20/2023
United States Forest Service	Fire Planner	2/03/2023
United States Forest Service	Fire Planner	2/10/2023
Yamhill Fire Protection District	District Chief	8/24/2023
McMinnville Fire Department	District Chief	8/24/2023
Mt. Angel Fire District	District Chief	9/20/2023
Marion County Fire District	District Chief	9/20/2023
Clackamas County Fire District	District Chief, Battalion Chief, Division Chief	9/25/2023
ODF–North Cascade District	Wildland Fire Supervisors, Foresters	10/13/2023

3.2.3 COORDINATION WITH PEER UTILITIES

PGE collaborates with other utilities including BPA, Eugene Water and Electric Board, PacifiCorp, and Idaho Power Company, sharing its HFRZ philosophy and methodology. There are some areas in which different electric utility facilities overlap, such as in the shared ROWs for large transmission corridors. In general, each utility's systems and how they are operated and maintained are different. HFRZ overlap comparison is an area PGE is working to improve and is actively participating in monthly joint IOU meetings to understand fire science, effectiveness, fire, weather, meteorology models and risk drivers.

In response to recommendations three (3) and eight (8), PGE has initiated coordination with other utilities in areas where boundaries overlap to understand where similarities and learnings can be leveraged for HFRZ determination. PGE recognizes this as an ongoing effort, and utilities will continue refining the process to develop best practices and shared datasets. PGE will prioritize any actionable or universal datasets that can be leveraged on this shared journey.

Figure 3 outlines the intended road map of collaboration on HFRZ among PGE and the IOUs. PGE recognizes IOUs will have opportunities to collaborate when wildfire risk boundaries overlap in modeling, asset geographic boundaries, or datasets. PGE will continue to work with other utilities, including PacifiCorp and Idaho Power Company, to coordinate overlapping determinations.

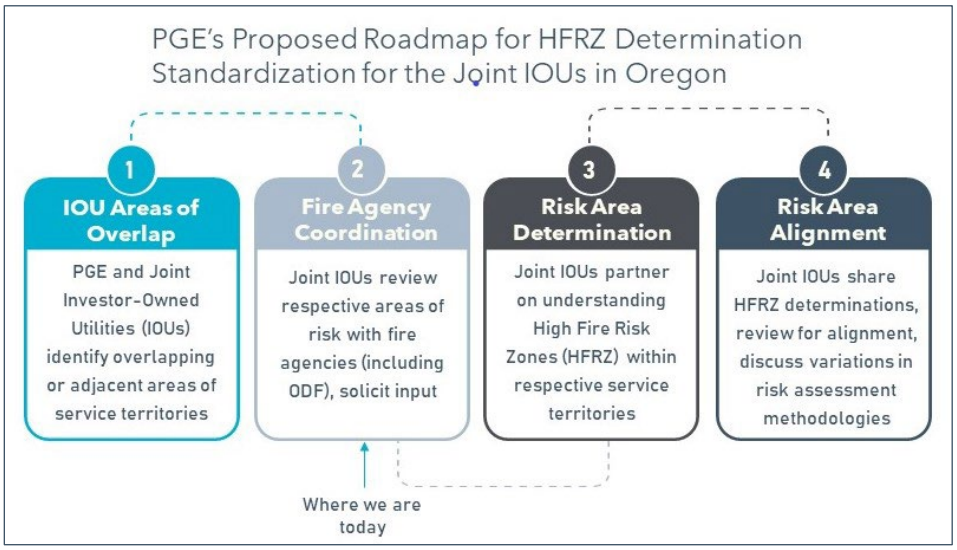


Figure 3. Proposed Roadmap for HFRZ Determination Standardization

3.2.4 PGE Wildfire Planning and Analytics

PGE's Wildfire Planning and Analytics teams determine HFRZ based on where the potential consequences of an ignition caused by PGE equipment would be the highest. Factors such as detection time, road accessibility, fire station proximity, weather patterns, topography, vegetation density, and critical infrastructure locations are considerations. PGE collaborates with fire agencies to review these zones on an annual basis. Figure 4 is a zone graphic outlining changes to HFRZ.

3.2.4.1 What's Changing

- Establishing Zone 11, Salem Hills, south of Salem.
- Adding one square mile to Zone 3, Oregon City, along Mosier Creek.
- Reshaping Zone 9, Central West Hills.
- Removing sections in Zones 1, 5, and 9 where lines are underground.
- Changes of <1% of total overhead (OH) distribution line miles, poles, and meters in HFRZ from 2023 to 2024.

3.2.4.2 What Stayed the Same

- No changes to Zones, 2, 4, 6, 7, 8 or 10.

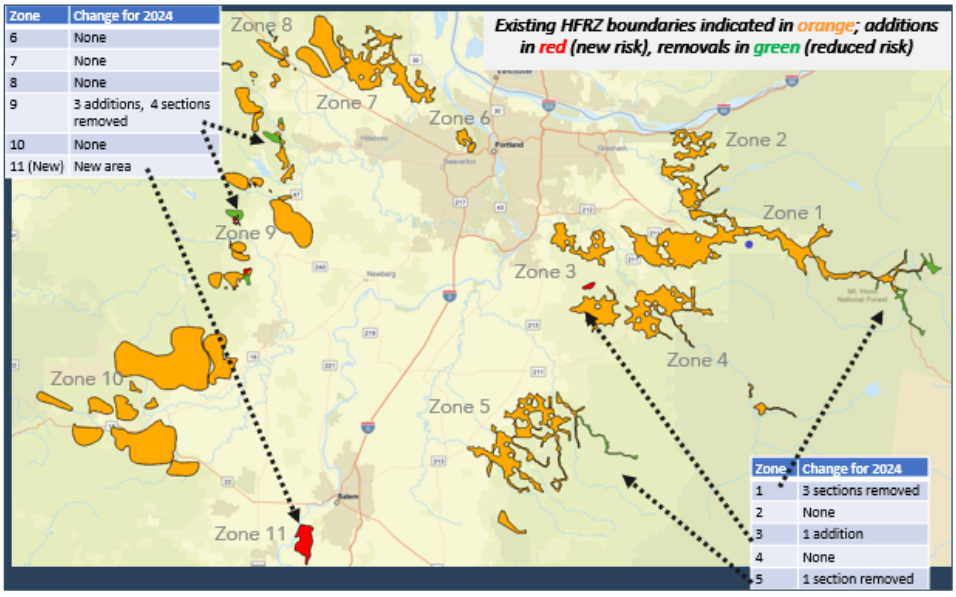


Figure 4. 2024 HFRZ Updates

3.3 Wildfire Risk Categories

PGE's WRMA methodologies consider baseline and seasonal wildfire risk, risk to areas served by PGE, and risks to PGE-owned generation facilities, substations, and powerlines. PGE uses these methodologies and corresponding outputs 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 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.

3.3.1 Baseline Wildfire Risk Seasonal Wildfire Risk

PGE calculates baseline asset risk as 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 and the potential magnitude of the damage it may cause. In most cases, probability values vary with the age and condition of the asset, increasing as the equipment ages.

In addition to modeling baseline risk per OAR 860-300-0030(1)(A), PGE has analyzed fire data back to 1962 to better understand the effect of historical fires in PGE service area. A summary of the statistics is found in Table 3.

Table 3. Historic Wildland Fire Occurrence

Historical Records of Fires Suppressed by Oregon Department of Forestry, 1962–2022		
	Count of Fires	Total Acres Burned
All Fires	67,590	7,235,646
Fires within five miles of PGE transmission and distribution (T&D) circuits	5,852	535,167
Source: Oregon Department of Forestry		

The ODF has suppressed more than 67,500 wildland fires, which have burned over 7 million acres since 1962. Approximately 8% of those fires burned within five (5) miles of PGE T&D circuits.

PGE also models geographic wildfire risk (georisk). For the Program, georisk represents wildfire risk due to vegetation encroachment on the conductor or animal contact impacting the components of the PGE structure (equipment). Georisk is distinct from asset risk; asset risk is defined as risk due to failed equipment. PGE integrates this information into the Strategic Asset Management Structures Model (Structures Model), a WRMA methodology component that allows PGE to evaluate wildfire risk more precisely.

PGE inputs asset and georisk data into the Pyrologix[1] fire physics engine to create simulated probabilistic models that assess fire risk by location for long-term planning and real-time decision support. As discussed in Section 3.2, "Updates to PGE's 2024 Wildfire Risk Mitigation Assessment", 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 new variables include remote sensing data, light detection and ranging (LiDAR) and high-definition imagery, wildfire spread distributions, and situational awareness variables.

Table 4 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.

[1] Pyrologix is a Missoula, MT 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 4. Georisk Modeling Data Sources and Update Cadence

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

3.3.2 Seasonal Wildfire Risk

Seasonal risk is integral to PGE's WRMA. PGE's assessment of seasonal wildfire risk leverages the consequences modeled from 216 fire weather scenarios. PGE also accounts for climate change variability in seasons by leveraging fuel ecology and wildfire studies for the Willamette Valley and Oregon[2]. Appendix 6 provides additional details regarding seasonal risk.

3.3.3 Risk to Residential Areas

PGE recognizes that ignition potential is not limited by HFRZ boundaries, and it models ignition points as a grid across the entire PGE service area. PGE assesses risk to residential areas in the fire behavior models as described in Appendix 6. PGE's modeling includes high-density locations as well as adjusted burn probabilities. Risk-informed decision-making considers that detection probability and fire response time vary with access and population density.

[2] 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).

3.3.4 Risk to PGE Equipment

PGE protects equipment and facilities within its HFRZ with established wildfire design and construction standards (e.g., replacement of wood poles that are damaged with ductile iron poles located in HFRZ, replaced as part of non-wildfire projects, or reached end-of-life). System hardening is further discussed in Section 10, "System Hardening". PGE is developing the capability to assess which equipment items are most likely to be impacted – if a fire occurs in each area – by overlaying asset information geospatially with the weather-specific fire behavior models discussed in Section 3.2, "Updates to PGE's 2024 Wildfire Risk Mitigation Assessment". For real-time determinations of fire risk to equipment, PGE added a new feature to the Pano AI wildfire camera alert viewer that shows the location of PGE assets on a map alongside fires detected by the cameras.

3.4 Risk Assessment Methodologies: Data Quality and Review Frequency

PGE WRMA methodologies include multiple statistical models that use a variety of data sources to identify the areas of highest wildfire risk within PGE's service area. PGE's methodology is consistent with the International Organization for Standardization (ISO) 31000 Monitoring and Review structure, which provides internal controls to enhance confidence while considering the dynamic nature of risk.

PGE's quality assurance and quality control (QA/QC) process for finalized Wildfire Risk Assessment models identifies the cadence of updates and required review tasks. Required QA/QC tasks include:

- Review and affirmation of existing or updated data.
- SME assumptions.
- Review of mathematical formulas.
- Variance testing of updates to confirm that updates are reasonable.

Table 5 defines the cadence of updates for the inputs used in PGE's annual wildfire risk assessment process.

Table 5. Cadence of Updates

Sources Data	Inputs	Cadence of Updates
Annual Probability of Asset Failure	Weibull failure curve parameters	**Annual Review** Affirm/update SME assumptions/updated failure data
	Health indexing	**Annual Review** Incorporate condition data as available
	Demographics from database	**Periodic Updates** As data becomes available GIS/Maximo
	GIS data for components on structure	**Annual Update** Address reconfiguration/replacement
Annual Probability of Asset Caused Ignition	Probability of equipment related outage is source of ignition	**Annual Review** Affirm/update SME assumptions
	Probability of equipment in violation of PGE patrol/ guidelines	**Annual Review** Incorporate available inspection data Incorporate updated SME assumptions
	Equipment multipliers	**Annual Review** Affirm/update SME assumptions
Ignition Data	Tracking PGE caused ignitions by failure mode/driver	**Twice-Monthly Review** Propagates into all wildfire risk processes
Intervention Costs	Capital cost estimates for wildfire mitigation	**Annual Review** 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, e.g., min 400 hectare started at each location	**Periodic Updates** As required
Predictive Outage Model	Weather data & outage to understand outage correlation with storms/wind	**Annual Review** Machine learning model will be continuously learning

3.5 Climate Change

In response to recommendation four (4), PGE recognizes that global climate change has far-reaching consequences that impact how PGE approaches risk management and infrastructure planning, as illustrated in Figure 5. The increasing frequency and intensity of extreme weather events, driven by climate change, are not just abstract global statistics; they have tangible impacts on local communities and the electrical grid. Extreme conditions increase the likelihood and the consequences of certain events, such as prolonged outages due to ice storms that make the roads impassable.

The changing climate also places compounding stress on vegetation. Drought conditions and record temperatures have made vegetation more susceptible to wildfires. Dry vegetation serves as fuel, making wildfires more intense and more complex to control. The 2021 Oregon drought, characterized by its early onset and severity, is a testament to this escalating challenge. Such conditions, when combined with the

increased likelihood of extreme weather events, create a feedback loop of vegetation stress and dead fuels that further elevate wildfire risk.

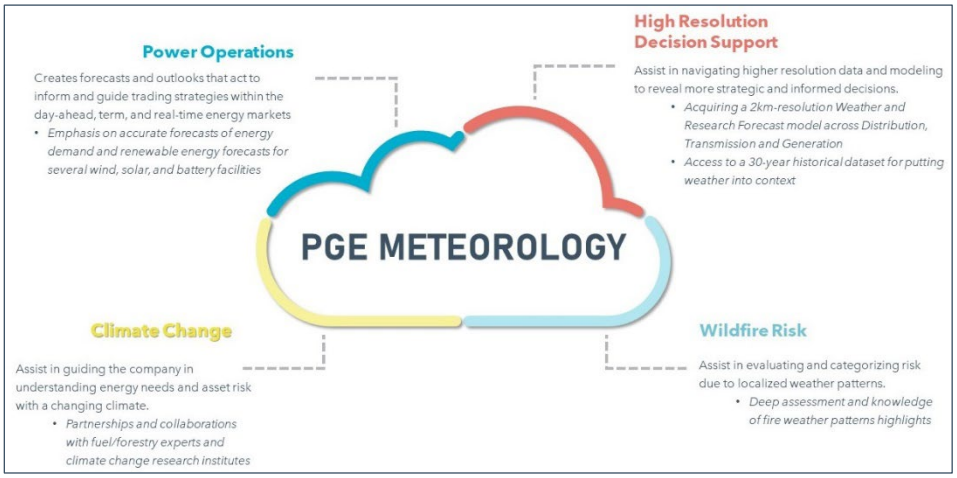


Figure 5. Meteorology Purpose and Accomplishments

3.5.1 Impacts on PGE's Service Area

Figure 6 illustrates the annual mean temperature in Oregon as observed (blue and red bars: relative to the 1970-1999 average, from NOAA Climate at a Glance) and as simulated by the Coupled Model Intercomparison Project Phase 6 (CMIP6) models for the past (heavy black curve and grey shading). The colored bands and solid curves indicate the average of the two CMIP6 scenarios for 2015-2100, and the dashed curve shows the corresponding results for CMIP5 (2006-2100). Shaded regions denote the range between the smoothed minimum and maximum annual mean temperature for the eight models. The modeled time series were smoothed with a LOWESS (Locally Weighted Scatterplot Smoothing) filter. Mean values for the eight models are to the right of the curves and represent the warming relative to the period 1970–1999.

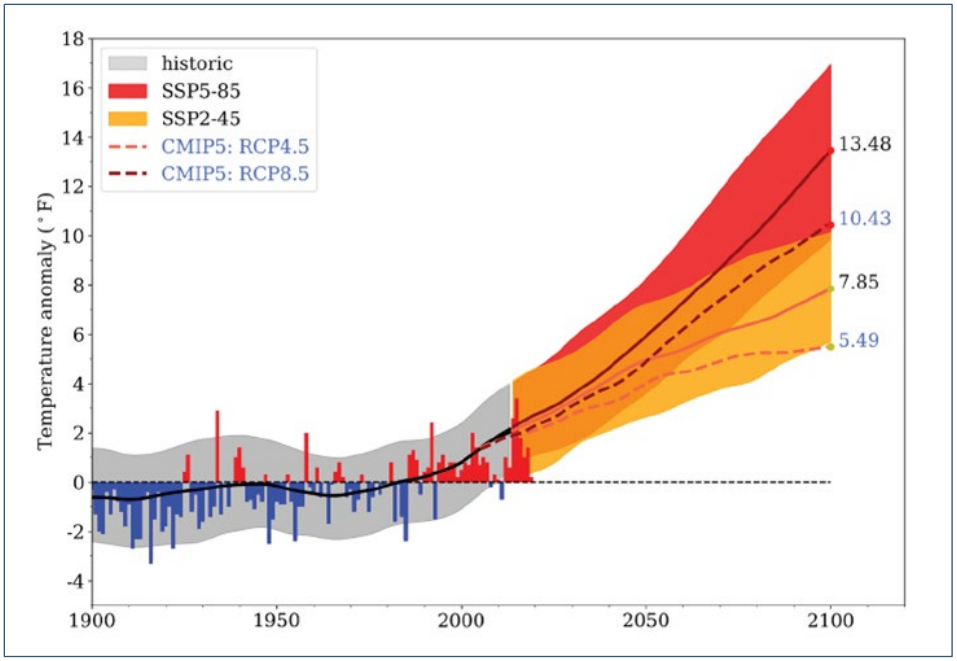


Figure 6. Annual Mean Temperature in Oregon

Key forecasts suggest that fuel in PGE's service area, and the land area that may be burned, is projected to increase by 500–900% over the next 10–20 years. In addition, the burn probability for any ignition source due to the cumulative damage resulting from sustained drought and prolonged increased temperatures means that PGE fire severity, as predicted in Oregon's 5th and 6th climate change assessment, is in the highest severity rating across the state. Figure 6 illustrates that in low-end temperature forecasts for low boundary conditions (Representative Concentration Pathway 4.5), the relationship of land area burned percentage and average annual temperature increase is still significantly more than current conditions as depicted above for 2022 temperatures. The relationship of land area burned is a direct function of temperature increase. For references to land area burned as a function of temperature increase, see sources listed in Table 6. In addition, the fire severity for fuel surrounding and encompassed in PGE's service area is the highest fire regime group, reflecting the fuel conditions are most susceptible to periods of drought and heat for large mega-fires.

3.6 PGE's Inclusion of Climate Change Variables in Risk Assessments

Historically, utilities, including PGE, have looked to past weather and fire behavior to inform the understanding of future weather and fire conditions. However, the past is no longer a reliable predictor of the future, especially in a changing climate. Recognizing this, and in response to recommendation four (4), PGE collaborated with the Oregon Climate Change Research Institute and Oregon State University (OSU) to conduct a comprehensive study. This study aimed to project the impacts of extreme heat, wind, freezing rain, and ice accumulation within PGE's service area through and beyond 2070. Projections were based on two different RCP emissions scenarios, providing insights into potential climate futures. If extreme weather events become more frequent and intense, as suggested by the OSU study, the utilities' risk profile changes dramatically. For instance, a once-in-a-century storm might become a once-in-a-decade event. This shift has profound implications for infrastructure planning, maintenance schedules, and emergency response protocols.

PGE teams assess the impact that climate change projections have on risk profiles. Using projections from Changing Wildfire, Changing Forests: The Effect of Climate Change on Fire Regimes and Vegetation in the Pacific Northwest, USA, published in the Association for Fire Ecology, PGE assumes that the effects of climate change will be increasingly apparent year over year, with a marked uptick beginning around 2030 and plateauing in 2040 at levels far exceeding what we see today.[3]

Climate change risk is reflected in PGE's Structures Model Methodology as a combination of risk factors, including wildfires, floods, extreme heat, and ice storms. Unitless and dollar-value multipliers reflecting climate change risk by year are applied in models as appropriate.

As referenced in Section 12, "Participation in Regional, National, and International Forums", PGE is deeply involved with the IWRMC and continuously learns from presentations and scholarly publications shared by the consortium. Of particular resonance, as PGE looks toward 2024, are the findings of John T. Abatzoglou, Projected Increases in Western US Forest Fire Despite Growing Fuel Constraints,[4] which demonstrate increasing ecological risk beyond what was projected in prior years, as well as

[3] Halofsky, Jessica E., David L. Peterson, and Brian J. Harvey. "Changing Wildfire, Changing Forests: The Effects of Climate Change on Fire Regimes and Vegetation in the Pacific Northwest, USA." Fire Ecology 16, no. 1 (2020). https://doi.org/10.1186/s42408-019-0062-8

[4] Abatzoglou, John T., David S. Battisti, A. Park Williams, Winslow D. Hansen, Brian J. Harvey, and Crystal A. Kolden. "Projected Increases in Western US Forest Fire Despite Growing Fuel Constraints." Communications Earth & Environment 2, no. 1 (2021). https://doi.org/10.1038/s43247-021-00299-0

Tubbesing's Rethinking Fire-Adapted Species in an Altered Fire Regime, which projects the changing vegetation dynamics in areas with similar forest composition.[5]

In addition, the findings from studying Western US forests suggest a clear upward trend in forest aridity over the last two decades, with increased extremes in the burned land area. Results from the Impact of Anthropogenic Climate Change on Wildfire Across Western US Forests are shown in Figure 7.[6] The study suggests the impacts of anthropogenic climate change approximately doubled the western US forest fire area. This finding is beyond expected natural climate variability alone, from 1984–2015. Coupled with data, leading climate experts' judgment that temperature records reflect a higher likelihood that temperature trends are on the RCP 8.5 trajectory suggests that the speed of change in weather patterns, fire behavior, and land area burned will see exponential increases.

PGE recognizes that climate change and wildfire impacts are a global phenomenon. These observations are illustrated in Figure 7 and Figure 8, which depict North American forest fuel aridity and the response of fire activity across forests worldwide, which are realizing drastic increases from wildfires. An important climate change consideration for PGE is the impact of wildfire on carbon capture. As described in "Forest Fire Threatens Global Carbon Sinks and Population Centers Under Rising Atmospheric Water Demand", a key finding is that climate change projections are expected to lead to widespread increases in risk, with at least 30 additional days above critical thresholds for fire activity in forest biomes on every continent by 2100 under rising emissions scenarios.[7] This cyclical activity of wildfire carbon release has a feedback loop with net new carbon emissions that further impacts temperatures and aridity across the world.

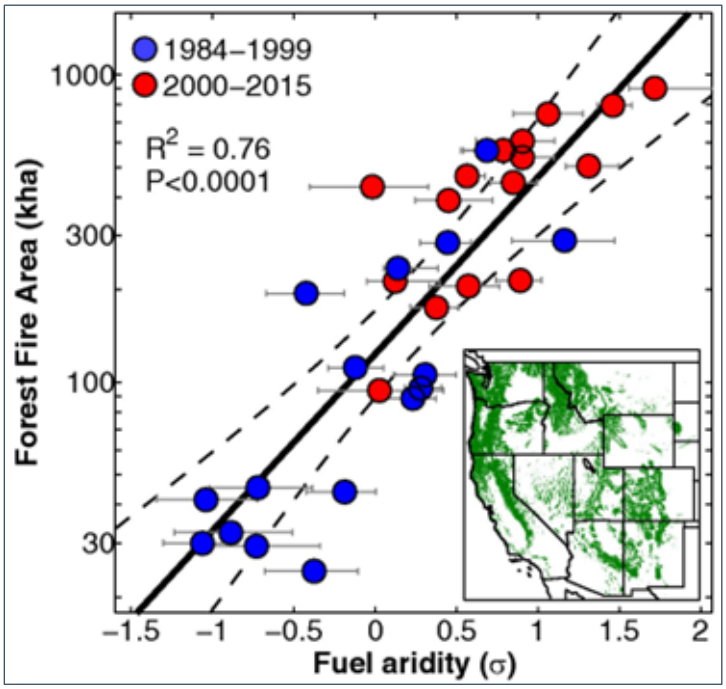


Figure 7. Annual Western Continental US Forest Fire Area vs. Fuel Aridity

[5] Tubbesing, C. L., R. A. York, S. L. Stephens, and J. J. Battles. 2020. Rethinking fire-adapted species in an altered fire regime. Ecosphere 00(00):e03091. 10.1002/ecs2.3091

[6] Abatzoglou, John T., and A. Park Williams. 2016. "Impact of Anthropogenic Climate Change on Wildfire across Western US Forests." Proceedings of the National Academy of Sciences 113 (42): 11770–75. https://doi.org/10.1073/pnas.1607171113.

[7] Clarke, Hamish, Rachael H. Nolan, Victor Resco De Dios, Ross Bradstock, Anne Griebel, Shiva Khanal, and Matthias M. Boer. "Forest Fire Threatens Global Carbon Sinks and Population Centres under Rising Atmospheric Water Demand." Nature Communications 13, no. 1 (2022)

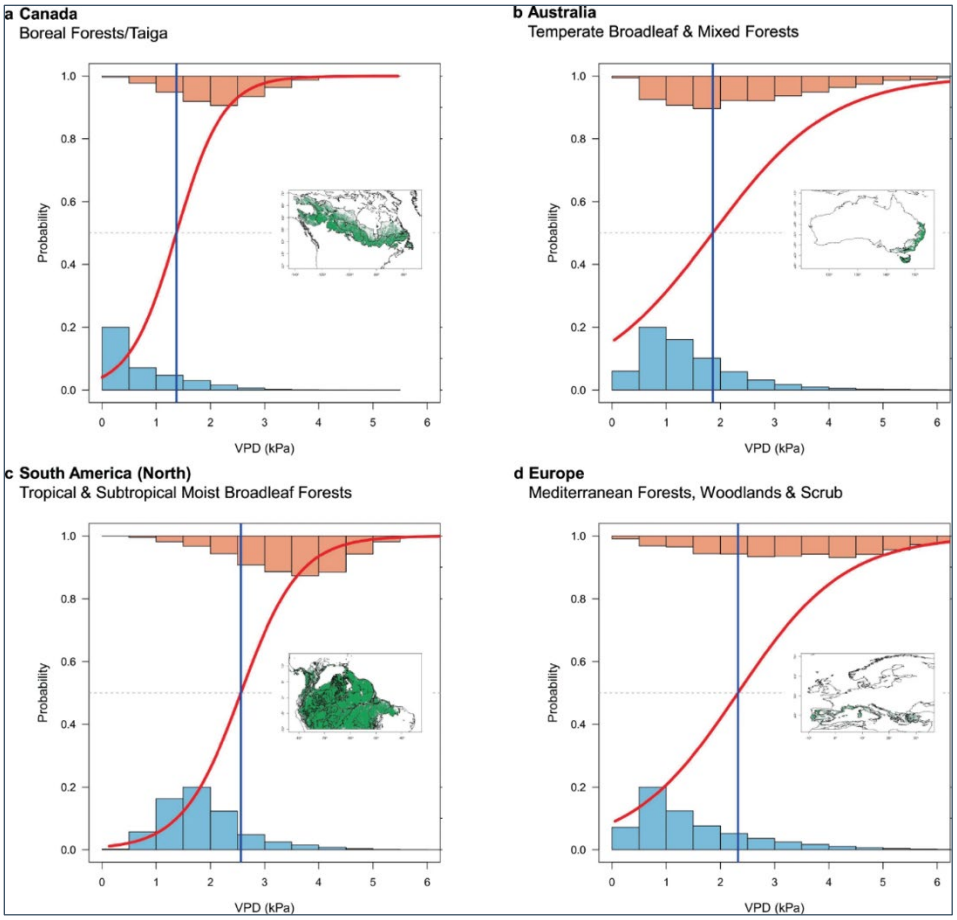


Figure 8. Response of Forest Fire Activity to VPD in Four Continental Forest Biomes[8]

PGE incorporates fire regime and fire history into its understanding of climate and geographical risk using the following definition:[9]

> In general a fire regime characterizes the spatial and temporal patterns and ecosystem impacts of fire on the landscape (Bradstock, Williams, and Gill 2002; Morgan et al. 2001; Brown and Smith 2000; Keeley et al. 2009). The two most important factors for determining fire regimes are vegetation type (or ecosystem) and weather and climate patterns. Fire history provides evidence of past relationships between fire and climate. That evidence makes it clear that changing climate will profoundly affect the frequency and severity of fires in many regions and ecosystems in response to factors such as earlier snowmelt and more severe or prolonged droughts (Westerling et al. 2006; Bowman et al. 2009; Flannigan et al. 2009; Littell et al. 2009; Morgan, Heyerdahl, and Gibson 2008; Kitzberger et al. 2007).

As demonstrated in Figure 9, PGE's service area falls into Fire Regime Groups I, III, and V, reflecting the conifer forests of the area, with the dominant overlay being fire severity V in the areas identified as HFRZ.

Dense conifer forests typically have a higher fuel load due to accumulated needles and branches, leading to less frequent but more intense fires when they occur. In dense conifer forests, especially in cooler or wetter regions, fires might be infrequent but most of the trees are killed when they occur. In contrast,

[8] Forest Fire Threatens Global Carbon Sinks and Population Centres under Rising Atmospheric Water Demand

[9] Joint Fire Science Program

conifer forests dominated by pines, especially those adapted to regular fires, may experience more frequent, low-intensity fires due to the flammability of pine needles and reduced fuel accumulation.[10]

PGE's commitment to participation with industry experts and partners, is reflected in Table 6. Climate change, wildfire risk, and industry learning are reflected throughout this plan. The information in this section addresses recommendation 27.

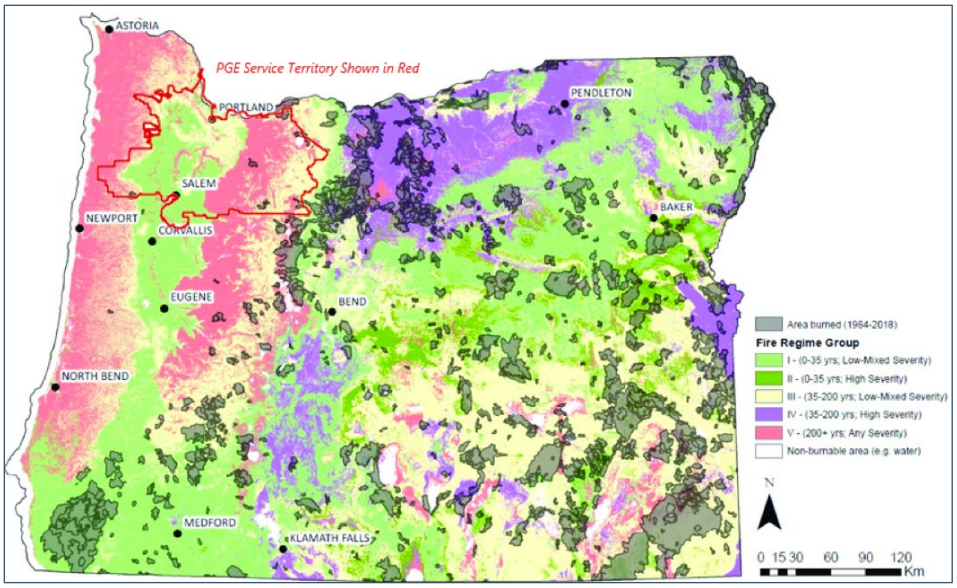


Figure 9. PGE Service Area Overlaid with Fire Regime Group Data[11]

Table 6. Bibliography of Risk Valuation Research, Reports, and Studies

Article	Summary	Implications for Wildfire Mitigation Approaches
Halofsky, Jessica E., David L. Peterson, and Brian J. Harvey. "Changing Wildfire, Changing Forests: The Effects of Climate Change on Fire Regimes and Vegetation in the Pacific Northwest, USA." Fire Ecology 16, no. 1 (2020).	Analyzes the impact of climate change on wildfires and forest ecosystems in the Pacific Northwest.	Climate change intensifies wildfires in the Pacific Northwest, necessitating adaptive management strategies and fuel treatments to enhance forest resilience.
Stephens, Scott L., and Jason J. Moghaddas. "Experimental Fuel Treatment Impacts on Forest Structure, Potential Fire Behavior, and Predicted Tree Mortality in a California Mixed Conifer Forest." Forest Ecology and Management 215, no. 1–3 (2005): 21-36.	Examines the effects of forest thinning on fire severity and tree mortality.	Forest thinning can reduce fire severity and tree mortality, making it a viable strategy for wildfire mitigation.
Agee, James K., and Carl N. Skinner. "Basic Principles of Forest Fuel Reduction Treatments." Forest Ecology and Management 211, no. 1–2 (2005): 83–96.	Discusses the principles and effects of forest fuel reduction treatments.	Fuel reduction treatments can effectively reduce wildfire hazards and promote ecological values.

[10] Eidenshink, J., B. Schwind, K. Brewer, Z. Zhu, B. Quayle, and S. Howard. 2007. A project for monitoring trends in burn severity. Fire Ecology 3(1): 3-21

[11] Fire Regime and Condition Class

Article	Summary	Implications for Wildfire Mitigation Approaches
Kramer, Anu, Gavin M. Jones, Sheila A. Whitmore, John J. Keane, Fidelis A. Atuo, Brian P. Dotters, Sarah C. Sawyer, Sarah L. Stock, R.J. Gutiérrez, and M. Zachariah Peery. "California Spotted Owl Habitat Selection in a Fire-Managed Landscape Suggests Conservation Benefit of Restoring Historical Fire Regimes." Forest Ecology and Management 479 (2021): 118576.	Investigates the impact of past wildfires on the current and future fire regimes.	Past wildfires can influence the characteristics and outcomes of future fires, emphasizing the importance of understanding fire history.
Levine, Jacob I, Brandon M Collins, Zachary L Steel, Perry de Valpine, and Scott L Stephens. "Higher Incidence of High-severity Fire in and near Industrially Managed Forests." Frontiers in Ecology and the Environment 20, no. 7 (2022): 397–404.	Highlights the increased incidence of high-severity wildfires and their ecological and social impacts.	Addressing the causes and consequences of high-severity wildfires is crucial for both ecological preservation and human safety.
Foster, Daniel, John Battles, Brandon Collins, Robert York, and Scott Stephens. "Potential Wildfire and Carbon Stability in Frequent-fire Forests in the Sierra Nevada: Trade-offs from a Long-term Study." Ecosphere 11, no. 8 (2020).	Analyzes the trade-offs between wildfire and carbon stability in frequent-fire forests.	Understanding the balance between wildfire and carbon stability can inform forest management practices and carbon sequestration efforts.
Jones, Gavin M, RJ Gutiérrez, Douglas J Tempel, Sheila A Whitmore, William J Berigan, and M Zachariah Peery. "Megafires: An Emerging Threat to Old-forest Species." Frontiers in Ecology and the Environment 14, no. 6 (2016): 300–306.	Evaluates the effects of the King Fire on spotted owls and the implications for old-forest species.	Large, high-severity fires pose threats to old-forest species, but forest restoration may be more compatible with their conservation than previously believed.
Touma, Danielle, Samantha Stevenson, Daniel L. Swain, Deepti Singh, Dmitri A. Kalashnikov, and Xingying Huang. "Climate Change Increases Risk of Extreme Rainfall Following Wildfire in the Western United States." *Science Advances* 8, no. 13 (April 1, 2022). https://doi.org/10.1126/sciadv.abm0320.	The study predicts a significant increase in the occurrence of extreme fire weather events followed by extreme rainfall events in the western United States, particularly in California and the Pacific Northwest, by the mid-21st century under a high warming scenario.	The projected increase in compound events of extreme fire weather followed by extreme rainfall underscores the need for comprehensive wildfire mitigation strategies that also account for subsequent hydrologic risks, such as flash floods and landslides, in post-fire management and community preparedness.
Fleishman, E., editor. 2023. Sixth Oregon Climate Assessment. Oregon Climate Change Research Institute, Oregon State University	Outlines the current and projected impacts of climate change on Oregon, highlighting increased heatwaves, drought conditions, severe wildfires, and alterations in precipitation patterns, with substantial effects on the environment, economy, and public health.	Oregon should act with urgency to developing and implementing robust wildfire mitigation and adaptation strategies, considering not only environmental but also economic and health-related consequences, with a focus on safeguarding vulnerable communities and ecosystems.

3.7 Wildfire Risk Informed Decision-Making

Climate change will continue to increase wildfire threats, requiring continual adaptation of asset management and other routine business practices. This challenging reality and PGE's responsibility to maintain reliable electric service require a careful balance between often-competing interests and system requirements. As the complexity of this analysis increases with each passing year, the industry's best practice of risk-informed decision-making (selecting mitigation projects based on estimated risk reduction value) continues to guide PGE. The Institute of Asset Management (IAM) criteria in the ISO 55000 standards define value as a function of lifecycle costs, performance, and risk. Figure 10 illustrates this relationship.

In advancing the risk-informed decision-making process, PGE has developed and is evaluating a new method to measure risk. Value Spend Efficiency (VSE), builds off the Risk Spend Efficiency (RSE) concept shared in the 2023 WMP, in which pre-and post-mitigation risk is measured in a quantifiable way and adjusted for qualitative impacts not easily measured in dollars. An example of this is the impact of wildfires on watersheds/drinking water—a critical consequence to understand and factor into decision-making, but not accounted for in the classical RSE equation.

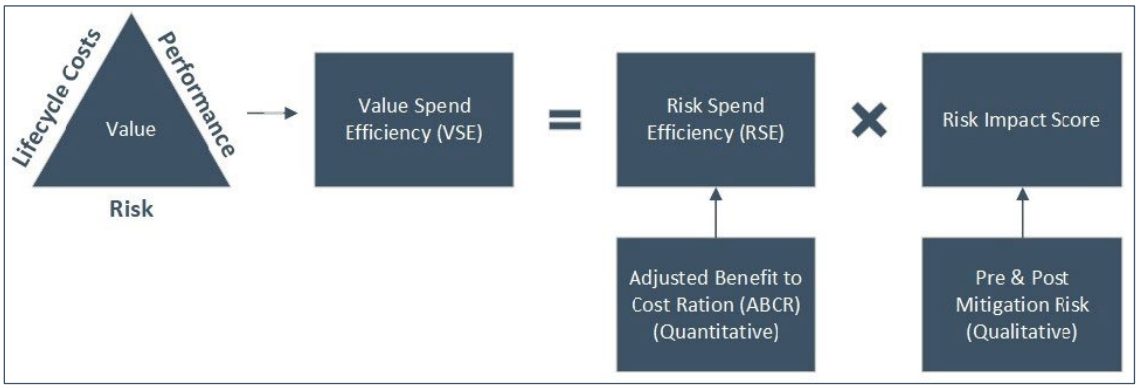


Figure 10. The Value Spend Efficiency Equation

PGE factors in changing environmental conditions, impacts on 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 WRMA methodologies and leverages both IAM and ISO concepts in value quantification to calculate RSE across PGE's Program. This concept allows PGE to factor risk, lifecycle costs, and performance into a single process to guide understanding and estimate the effectiveness of mitigation measures.

PGE works to continuously apply RSE/VSE concepts in assessing mitigation alternatives across various PGE programs, including PSPS, vegetation management, system hardening, capital investment, and operations. PGE continually improves its RSE/VSE assessment approach for long-term and real-time planning and analysis.

PGE recognizes that RSE and VSE only directionally inform the selection of wildfire mitigation options for inclusion in the mitigation strategies within the HFRZ. PGE aims to achieve the highest estimated risk reduction value per dollar invested. This VSE 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, as well as other critical concepts in mitigation, including the speed of execution.

PGE uses data from internal and external benchmarking sources. For example, a statistical understanding of how failure modes and ignition drivers for covered conductors affect risk is critical to effectively

evaluating the appropriate locations to install covered conductors. Through its participation in the IWRMC, PGE has leveraged the experiences of industry peers to inform its fire detection probability analysis and decision-making around the most effective locations for the use of covered wire.

Additional PGE risk-informed decision-making details are discussed in subsequent sections of this Plan.

The ability to understand and forecast the weather on a more granular scale in Oregon's complex terrain is important to utilities, as extreme weather events become more frequent with climate change. This desire propelled the acquisition of a high-resolution (2 km) weather and vegetation moisture forecast model already established and in use across the Pacific Northwest by PacifiCorp. Combining this forecast model with its 30-year historical database allows weather events to be put into context and to create analogs to previous weather events that have resulted in impact to utility infrastructure, which resultingly informs decision-making – including operational strategies and response – as well as understanding and conveying risk. Data science will also utilize this data to understand better reliability impacts in the past and future.

Figure 11 shows PGE's current Weather Research and Forecasting (WRF) roadmap and implementation plan.

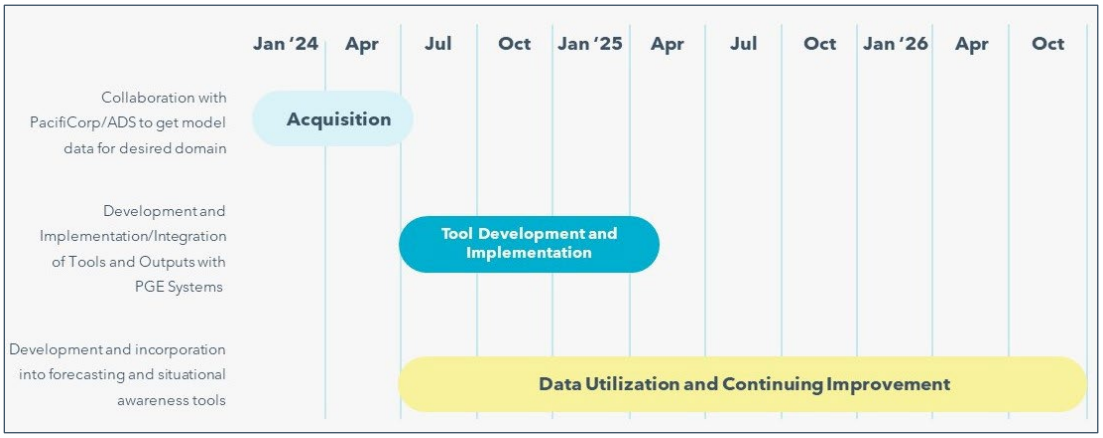


Figure 11. Weather Model: Timeline of Acquisition, Utilization, and Development

4 High Fire Risk Zones

PGE has identified areas where vegetation, terrain, meteorology, population density, and the WUI increase the risks associated with utility-caused wildfire ignition. For this WMP, PGE refers to these areas as HFRZ. PGE may choose to implement a proactive PSPS within a given HFRZ during periods of extreme weather wildfire threat.

- HFRZ 1: Mt. Hood Corridor/Foothills
- HFRZ 2: Columbia River Gorge
- HFRZ 3: Oregon City
- HFRZ 4: Estacada
- HFRZ 5: Scotts Mills
- HFRZ 6: Portland West Hills
- HFRZ 7: Tualatin Mountains
- HFRZ 8: Northwest Hills
- HFRZ 9: Central West Hills
- HFRZ 10: Southern West Hills
- HFRZ 11: Salem Hills

PGE relies on the ISO-31000 wildfire risk analysis framework for annual HFRZ assessment. For 2024, PGE incorporated new variables and refined boundary conditions to improve its understanding of:

- Climate change impact projections
- Fire behavior and consequences
- Location-based wildfire intensity and behavior
- Wildfire risk
- Critical state fire protection infrastructure

PGE's wildfire risk assessment factors in the likelihood that a given PGE asset could become an ignition source and that such an ignition could spread into a large, uncontrolled fire. Additional analytical factors include:

- Detection probability
- Fire response time
- Fuel dryness
- Potential for extreme weather conditions
- Presence of structures and other infrastructure
- Probability of mechanical control
- Vegetation density

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

4.1 Changes in HFRZ from 2023 to 2024

PGE performs an annual review of HFRZ, which may result in adding new areas to existing zones, adding new zones, or removing areas previously identified as HFRZ. New areas within existing HFRZ and new zones are evaluated based on conditions, including input from fire authorities, forestry authorities, egress models, observed fire behavior, and location of critical infrastructure and resources. For 2024, PGE added new areas in Zone 3 (Oregon City) and Zone 9 (Central West Hills), as well as a net new zone: Zone 11 (Salem Hills).

PGE may reduce HFRZ size if SMEs determine that system hardening efforts, such as undergrounding, have reduced risk of a utility-related wildfire in the area. After evaluating underground network performance within the PGE network, extensive benchmarking among other utilities, and knowledge-sharing in the industry forums in which PGE participates, PGE determined undergrounding reduces the risk of wildfire from utility infrastructure enough to merit removing such areas from HFRZ, barring other potential risk factors specific to an area. For 2024, PGE removed several areas from its 2023 HFRZ in which distribution mainlines and taplines are underground. Those HFRZ are Zone 1 (Mt. Hood Corridor/Foothills), Zone 5 (Scotts Mills), and Zone 9 (Central West Hills). Figure 12 identifies changes to HFRZ from 2023 to 2024.

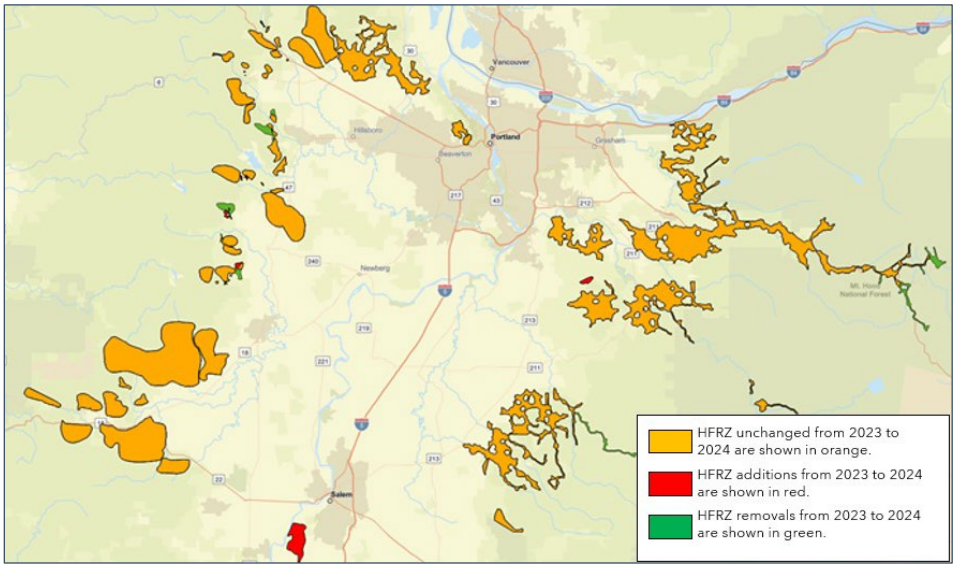


Figure 12. HFRZ Changes 2023 to 2024

Figure 13 and Table 7 indicate mapped relative locations of 2024 HFRZ within PGE's distribution service area and comparisons of key statistics by HFRZ, respectively.

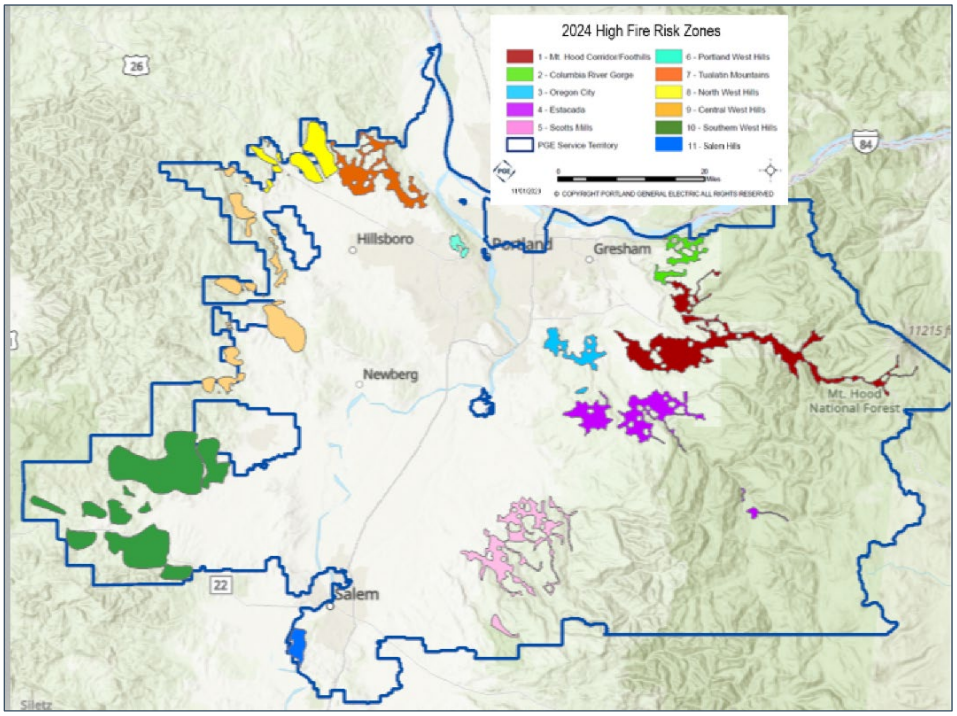


Figure 13: PGE 2024 HFRZ

Table 7. Changes in Distribution Line Miles in PGE's HFRZ 2023 vs. 2024

	Distribution Line Miles (Primary OH Miles)			Distribution Line Miles (Primary UG)			T&D Poles (Distribution structures + Transmission poles)			Customers (meters)		
HFRZ	'23	'24	Net Change	'23	'24	Net Change	'23	'24	Net Change	'23	'24	Net Change
Zone 1	250	249	0%	184	166	-11%	7,930	7,851	-1%	9,513	9,535	0%
Zone 2	25	25	0%	38	38	0%	710	704	-1%	456	458	0%
Zone 3	47	50	6%	34	36	6%	1,268	1,349	6%	1,743	1,800	3%
Zone 4	139	138	0%	68	68	0%	3,726	3,693	-1%	2,652	2,654	0%
Zone 5	151	150	0%	63	50	-26%	3,442	3,426	0%	2,000	2,005	0%
Zone 6	15	16	6%	13	13	0%	702	743	6%	960	1121	14%
Zone 7	92	91	0%	52	52	0%	2,182	2171	-1%	1,524	1,527	0%
Zone 8	43	43	0%	28	28	0%	1,068	1,061	-1%	762	768	1%
Zone 9	78	82	5%	51	43	-19%	1,820	1,916	5%	1049	1043	-1%
Zone 10	134	133	0%	83	84	1%	3,085	3,084	0%	1,710	1,724	1%
Zone 11	N/A	18	N/A	N/A	17	N/A	N/A	466	N/A	N/A	425	N/A

4.2 Enhanced Monitoring and Technology in HFRZ

PGE has invested in enhanced monitoring and technology tools to reduce wildfire risk in HFRZs. See Section 10, "System Hardening", for additional details.

In a partnership with the Electric Power Research Institute (EPRI), PGE installed a network of connected, intelligent fire detection cameras equipped with AI within its HFRZ, beginning in 2021. These ultra-high-definition camera systems give PGE a 360-degree fire detection triangulation capability across its service area, accurate to within 100 yards. The Pano AI platform's machine learning algorithms automate fire detection, awareness, and notifications, helping expand and improve regional fire detection resources. These real-time data feeds and predictive capabilities allow PGE to proactively manage risks, enable a faster emergency response by fire suppression agencies, and minimize the spread of wildfires.

In 2023, PGE installed six (6) more AI-equipped UHD cameras. See Figure 14. For additional details on PGE's Wildfire Capital Investment Strategy, please refer to Section 11, "Expected Wildfire Mitigation Program Costs".

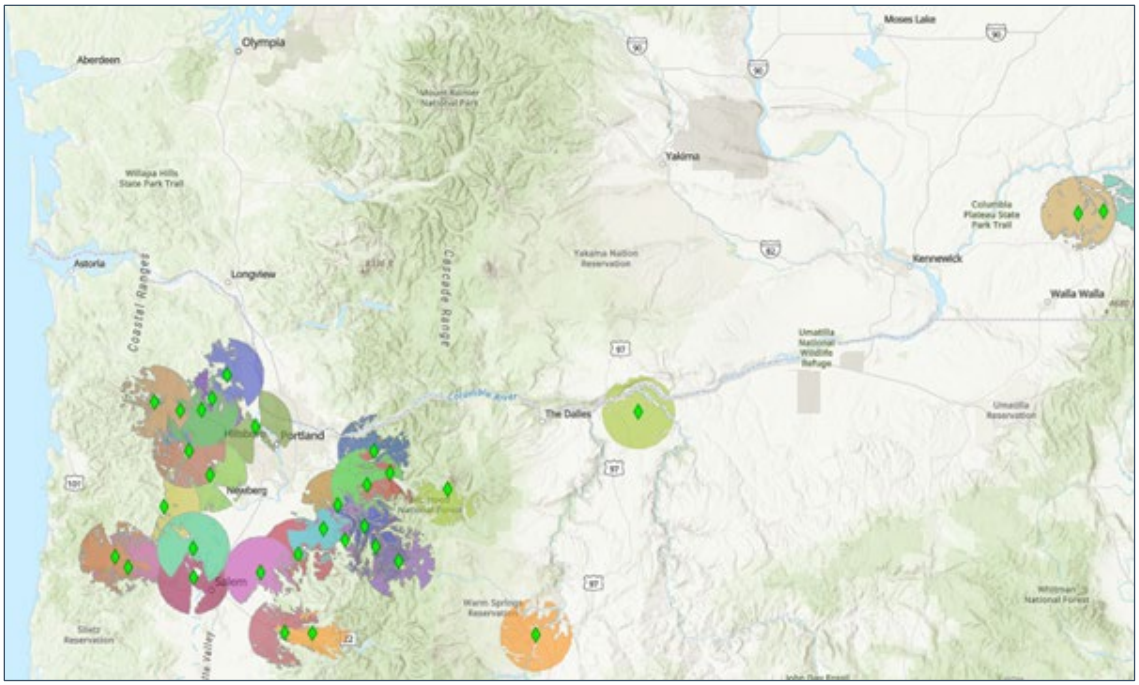


Figure 14. 2023 PGE Pano AI Camera Locations & Minimum Viewsheds

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, district foresters, and private landowners. As of October 2023, 46 fire/emergency/communications agencies are actively using PGE's network of cameras, with more than 140 users and alert subscribers. The agencies using the network are listed in Table 8. Information in this table is in response to recommendation 27.

These cameras have proved to be an essential asset for PGE, as well as the many fire agencies and emergency service leaders to whom PGE has granted access and real-time alerts. Feedback from these users, often fire department chiefs themselves, has been consistently positive. There are now numerous detections on named fires, sometimes up to two hours before traditional detection methods like satellite and 911 calls. Early detection of wildfires from this technology has garnered more than ten instances of media coverage by outlets in PGE's service area in the first eight months of 2023. Figure 15 shows smoke detected by an AI-equipped camera.

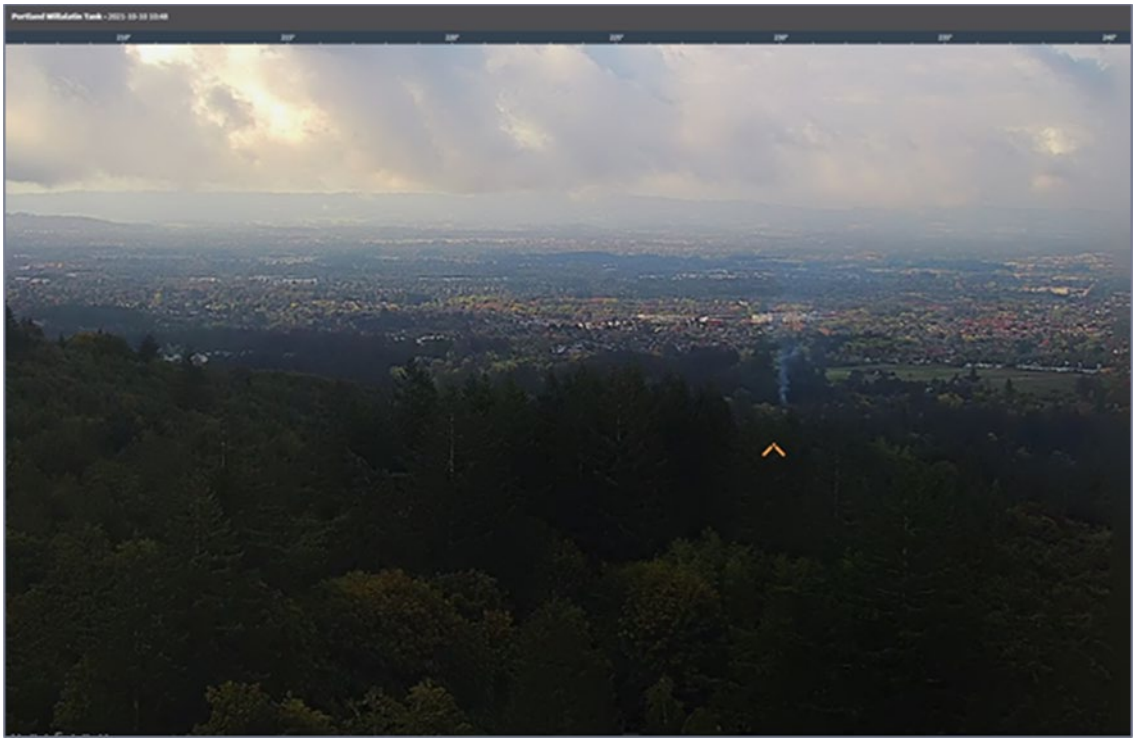


Figure 15. Smoke Detected by an AI Equipped Camera

The camera feeds and alerts system are utilized by a large contingent of PGE's Public Safety Partners, including the Columbia Cascade Interagency Communications Center (which provides camera access to USFS, ODF, US Fish & Wildlife Service, and other agencies), three ODF Forest Protection Districts, and the Confederated Tribes of Grande Ronde, among others. See Table 8 for a complete list of agencies with access to PGE's Pano AI network.

Table 8. Agencies Using PGE Pano AI Cameras

Agencies Using PGE Camera Network	
Canby Fire	NWCG
CCOM Dispatch	NWS Portland
City of Portland	ODF Forest Grove
Clackamas County	ODF North Cascades
Clackamas Fire	ODF Western Region
Clackamas Sheriff	Oregon State Fire Marshal
Colton Fire	Portland BOEC
Columbia 911 Dispatch	Portland Fire and Rescue
Columbia Cascade Dispatch	Portland Water Bureau
Columbia County Fire District 3	Scappoose Fire
Confederated Tribes of Grand Ronde	Sheridan Fire
Confederated Tribes of Warm Springs	State of Oregon
Corbett Fire	TVFR
Estacada Fire	USFS Mt Hood East
Forest Grove Fire	USFS Mt Hood West
Gaston Fire	USFS Northwest
Gresham Fire	Walla Walla Fire District #2
Hillsboro Fire	Washington County
Hoodland Fire	WCCCA
Lafayette Fire	Yamhill County
Lake Oswego Fire	Yamhill Fire
McMinnville Fire	YCOM Dispatch
Mt Angel Fire	

To illustrate the value of this technology, at 3:25 pm on July 14, 2022, PGE's Bald Peak Pano AI camera notified users that smoke in a rural area in the western part of PGE's service area was detected. At 4:25 pm, PGE's High Compromise camera issued a second smoke detected 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 and land management agencies have provided feedback that the early detection information and triangulation accuracy obtained through PGE's Pano AI camera network is increasing crew deployment optimization and initial attack speed.

As per recommendation two (2), PGE has provided detailed quantities of assets within PGE's HFRZ in Table 9.

Table 9. PGE Assets Grouped by HFRZ

HFRZ	Ductile Iron Poles	Substations	Transformers	Reclosers	Trip Savers	Fuses
Zone 1	412	4	4206	29	21	1802
Zone 2	30	0	340	1	2	144
Zone 3	23	0	939	3	1	428
Zone 4	162	3	1698	22	4	839
Zone 5	56	0	1399	9	6	768
Zone 6	2	0	373	4	5	168
Zone 7	44	0	1080	6	0	530
Zone 8	20	0	549	0	0	304
Zone 9	105	0	848	0	3	424
Zone 10	89	0	1408	4	1	673
Zone 11	0	18	310	0	0	155

5 Operating Protocols

PGE relies on various weather and fuel models, as well as human analysis, to obtain the granularity of information required to forecast and model hazardous fire weather conditions accurately. The goal is to use these models to forecast potential hazardous fire weather conditions 7–10 days in advance. These models provide decision-makers with a detailed understanding of the uncertainties and range of outcomes possible for a given weather pattern.

The Wildfire Mitigation organization is developing a methodology to gauge the Fire Potential Index (FPI) in the PGE service area. PGE is developing a framework for determining FPI using information shared by IOUs across the West Coast. While many of the elements of the underlying calculation for FPI are readily accessible, some have proven to be more difficult to procure and/or evaluate, such as vegetation greenness scores. Many utilities leverage Landsat Normalized Difference Vegetation (LNDV) satellite imagery to determine the density of green in an area of land.

PGE declares the beginning and end of its fire season based on 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 area. The annual fire season declaration initiates a series of PGE operational changes.

PGE's fire season declaration:

- Changes how PGE operates the system, initiating fire-season-specific settings within parts of the grid, including reducing or disabling reclosing/testing capabilities, where applicable.
- Initiates fire season operational work practices in the field.
- Activates internal 24×7 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 service within one (1) mile of a PGE facility in the last hour (five (5) miles for PGE Parks).
  - A Red Flag Warning (RFW) has been issued covering an area within one (1) mile of a PGE facility within the last 24 hours (five (5) miles for PGE Parks).
  - A confirmed fire perimeter is updated by the National Interagency Fire Center within one (1) mile of a PGE facility in the last hour (five (5) miles for PGE Parks) in the event of an expanding wildfire.

5.1 System Operations During Fire Season

At 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 HFRZ, 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 10. When a fault occurs within a HFRZ during fire season, PGE patrols the downstream circuit before re-energizing to verify that the cause of the fault has been cleared.

PGE may also change settings outside of fire season, when fire danger is elevated, or when a RFW is in effect. In these instances, PGE proactively blocks automatic reclosing on SCADA-controlled devices within PGE's HFRZ.

PGE annually reviews and updates settings for protection and control devices located within PGE HFRZ. In 2024, PGE will continue implementing circuit breaker and recloser protection to minimize fault energy and reduce the risk of utility-caused ignitions during fire season.

The distribution feeder breakers servicing PGE's HFRZ (those equipped with relays and SCADA) are set to one of three modes: normal, fire season, or red flag. The 13 kV feeders that do not have relays utilize the electronic reclosers' necessary protection settings: normal, wildfire, and red flag mode.

Table 10 and Table 11 detail 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 10. Distribution System Operations In and Out of Fire Season SCADA Devices

Mode	Description	Reason
Normal	The feeder breaker or electronic recloser will have 2-3 attempts at reclosing and trip on time delay or instantaneous if it is normally enabled.	Maximize reliability
Fire Season	The feeder breaker or electronic recloser will have one attempt at reclosing and trip on definite time instantaneous (a programmed delay before the relay trips).	Minimize risk of ignition
RFW during fire season	The feeder breaker or electronic recloser trips on definite time instantaneous and reclosing is blocked.	Minimize risk of ignition

Table 11. Pelton and Round Butte Transmission System Operations

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

Transmission lines located east of the Cascades, which route outside PGE's HFRZ, 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 not equipped with SCADA-enabled reclosing will be blocked from reclosing throughout fire season. Transmission lines equipped with SCADA-enabled reclosing will remain in normal operation with one attempt at reclosing when PGE declares fire season. If a SCADA-enabled line trips and recloses, reclosing will be blocked, and the lines will be patrolled before returning to normal operation.

PGE began implementing safety-adjusted protection settings on protection devices to mitigate ignition risk for a full fire season in HFRZ starting in 2021. These settings are coupled with operational protocols that require PGE personnel to physically patrol the area following protective device operations in HFRZ during fire season before re-energization, likely resulting in additional sustained interruptions and longer interruption durations.

Using 2019 and 2020 as reference years, PGE performed calculations to capture the system-wide reliability impacts of implementing safety-adjusted protection settings, using the System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), and Momentary Average Interruption Frequency Index (MAIFI) reliability metrics (excluding Major Event Days).

Table 12, which addresses recommendation 13, compares system-wide metrics of SAIDI, SAIFI, and MAIFI metrics from June 1–October 31 before and after safety-adjusted settings were implemented by PGE (again, beginning in 2021).

Table 12. System Wide Daily Reliability Performance June 1-October 31

Timeframe	SAIDI		SAIFI		MAIFI	
	Non RFW	RFW Day	Non RFW	RFW Day	Non RFW	RFW Day
2019-2020	0.29897	0.32451	0.00182	0.00250	0.00545	0.00345
2021-2023	0.29167	0.33027	0.00176	0.00211	0.00505	0.00601
% Difference	Negligible	2%	Negligible	Negligible	Negligible	74%

Due to PGE's implemented safety-adjusted protection settings for wildfire in 2021, the average annual impact to SAIDI has been 1.05 minutes; SAIFI and MAIFI impacts have been negligible.

Given uncertainties and challenges in predicting future weather conditions (e.g., RFWs) and interruption frequencies and impacts, PGE will continue monitoring reliability performance impacts for safety-adjusted protection settings on protection devices to mitigate ignition risk in HFRZ.

Based on the limited sample size, PGE's safety-adjusted protection settings have a negligible overall impact on reliability during most fire seasons. Still, they are causing longer-duration outages on days when weather conditions are more extreme. Although affected, there is no overall appreciable impact on reliability because HFRZ are a fraction of the PGE's service area. Red flag days account for a small fraction of the total days during fire season.

5.2 Preparedness and Training

PGE provides annual wildfire operations and safety training to keep employees and contractors who will be working in the field during Fire Season safe. This includes non-field personnel that may perform work in the field on an as-needed basis. Participants receive training that has historically covered topics such as fire suppression tools and equipment required during Fire Season, basic suppression tactics, operational practices, ignition reporting requirements, and more. This training curriculum, along with its delivery method(s), is evaluated and adjusted annually.

5.3 Event Response Management

PGE closely monitors active wildfires in or near its distribution service area and generation asset areas in Oregon and Washington. As an incident expands in size and complexity, PGE contacts the appropriate agency-incident management team to offer PGE resource assistance at the incident command post. This strategy aims to enhance interoperability, share information, and promote collaboration with Public Safety Partners, utility peers, 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. Section 6, "Operations During PSPS Events", provides additional details.

PGE uses the Incident Command System (ICS) as its framework for managing incidents and events that exceed the scope of routine management. ICS allows PGE to scale up a response that requires additional internal and external resources and clear lines of command and control. It also enables interoperability with other utilities and public safety partners. For PSPS, PGE's ICS Command and general staff organizational chart is shown in Figure 16.

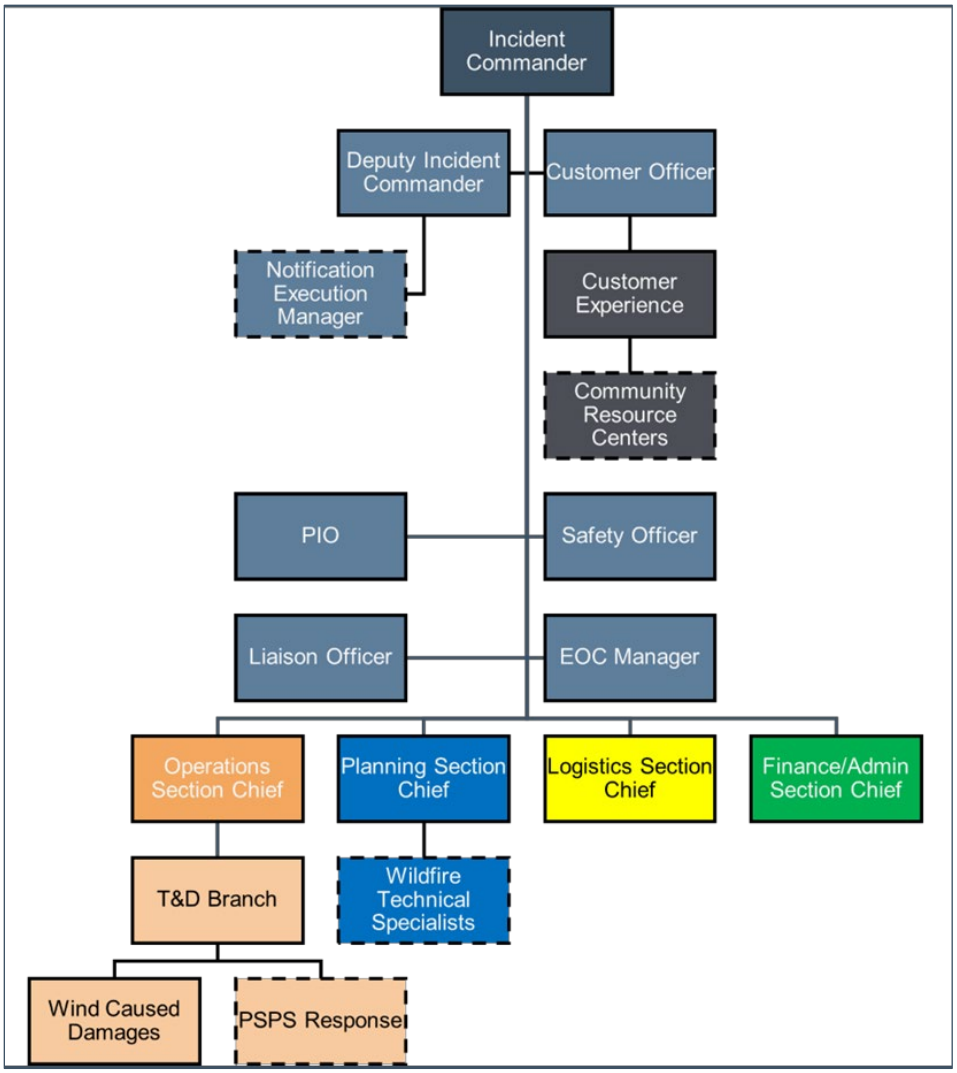


Figure 16. PGE's ICS Command and General Staff

PGE evaluates the PSPS Command and general staff organizational chart and may make changes based on feedback from exercises or events. Based on internal feedback from PGE's September 2022 PSPS, in 2023 the Notification Execution Manager (NEM) reporting was moved from the Public Information Officer (PIO) to the Deputy Incident Commander (IC) to raise visibility and allow the PIO to focus on more strategic outreach during a PSPS. See Section 6, "Operations During PSPS Event", for decision-making throughout a PSPS activation. The information in this section partially addresses recommendation 14.

Real-time de-energizations, which are for reasons other than extreme weather conditions, can occur during and outside of fire season. PGE personnel on-site also have the 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 a real-time de-energization from PGE via 911.

6 Operations During PSPS Event

This section provides a high-level overview of the escalating levels of a PSPS event, and the actions taken within each level. In internal documentation libraries, PGE maintains detailed, annually-updated operational plans and protocols for PSPS events. Details describing PSPS decision-making are found in Section 6.2, "Levels of a PSPS Event", through Section 6.9, "Community Resource Centers". These sections, along with Figure 16, address recommendation 14.

PGE uses meteorological, outage data, and predictive analytics to make risk-informed decisions regarding PSPS events and curtailment decisions. PGE closely monitors Fire Weather Forecasts before and during fire season from several NWS offices around the region, including Seattle, Pendleton, and Medford, fire activity briefings, fire potential forecasts, and data from PGE weather stations strategically located throughout the service area. PGE makes its weather station data publicly available via MesoWest to improve regional forecasting and the analysis of extreme weather events.

In 2024, PGE plans to improve its risk-informed decision-making through improved situational awareness capabilities. PGE plans to install five new RAWS and deploy its four mobile weather stations, as needed, within HFRZ. As RAWS are installed, they will be incorporated into PGE situational awareness intake. Site selection for RAWS will consider utility, meteorology, and stakeholder requirements for optimal placement, as discussed in Section 13, "Research and Development". In late 2022, PGE operationalized a prototype of a Storm Predictive Tool that will incorporate weather data from across PGE's service area to inform PGE's PSPS execution decision analysis. As additional RAWS come online, the data they record is intended to refine the Predictive Outage model further.

The PSPS Process bell curve in Figure 17 correlates the various incident levels defined in internal PGE emergency operations plans to illustrate typical operations during the multiple phases of a PSPS event. It only provides a point of reference, 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 area impacted by a PSPS can be found on PGE'S Wildfire Outages and PSPS webpages. PGE's website has the bandwidth capable of handling web traffic surges expected during PSPS events, and all web-based PSPS information is easily readable and accessible on mobile devices.

Prior to the 2024 fire season, PGE will provide multiple options for Public Safety Partners to access real-time GIS information pertaining to PSPS outages. These options will include a link to PGE's public PSPS web layer service and an ArcGIS Online web map containing PSPS information, as required by OAR 860-300-0060, both of which are currently available. 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 2024 fire season.

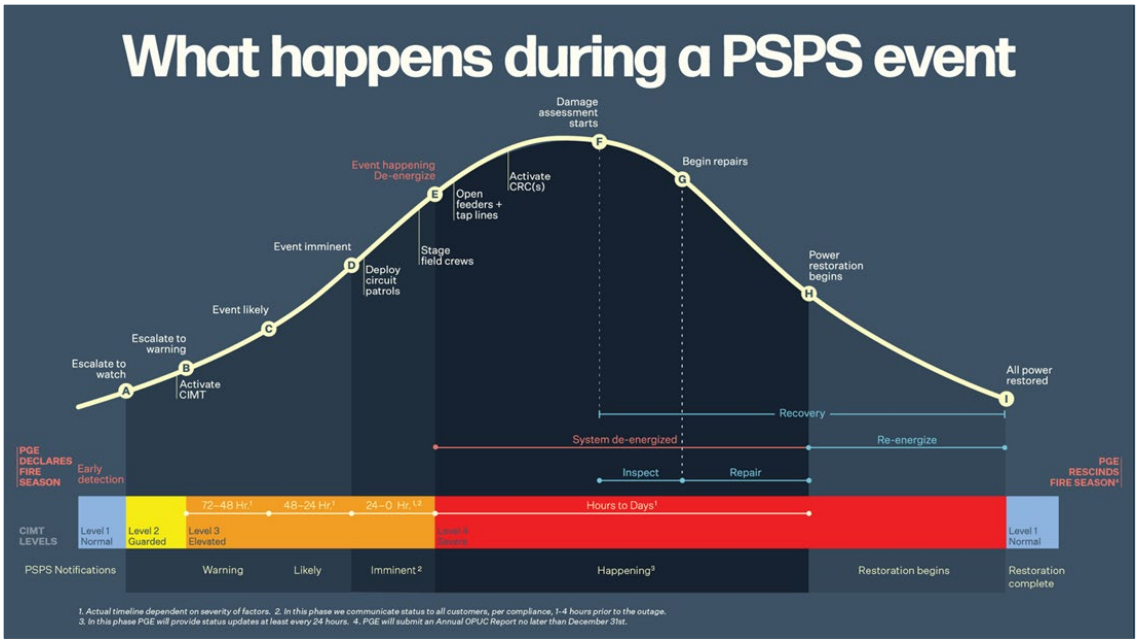


Figure 17. PSPS Process Bell Curve

6.1 De-Energizing 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 when conditions threaten the ability to operate the grid safely. PGE's declaration of a PSPS is not limited to an HFRZ and may occur anywhere in the service area, based on the same criteria used to declare a PSPS within an HFRZ. When PSPS events are declared, PGE keeps customers and stakeholders well-informed and strives to mitigate customer impacts by limiting the outage duration, as much as conditions allow.

6.2 Levels of a PSPS Event

When PGE makes the decision to execute a PSPS event, the order of operation generally follows the PSPS Process Bell Curve. PGE will adapt actual PSPS event operations as required to address evolving, dynamic, and unpredictable circumstances. Event posture decision-making authority is assigned to the PSPS Assessment Team (PAT) IC when PGE moves from Level 1: Normal to Level 2: Guarded. The PAT IC makes the decision to escalate or de-escalate the PSPS event based on data and input from Wildfire Mitigation SMEs. If the event posture is escalated to Level 3: Elevated, the event posture decision-making authority is transferred to the CIMT ICs and remains with the CIMT until the end of the PSPS event.

6.3 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 weekday operations call. Should weather or other related events warrant communications outside the normal schedule, PGE may convene the daily operations call on weekends or holidays. During fire season, this daily briefing includes:

- Fire weather forecasts and fire potential specific to PGE's service area
- Reporting of NWS-issued watches and 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-level situational awareness, assistance with forecast modeling validation, fire suppression resource pre-positioning, and activity/growth updates for fires in near PGE assets.

6.4 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's Senior Director of Wildfire & Operational Compliance or their designee, will activate the PAT to monitor conditions, evaluate conditions, and prepare to initiate the next phase of PSPS plans and procedures, if necessary. PGE also issues a preliminary notification to internal stakeholders, Emergency Support Function (ESF) 12, and 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 full CIMT on standby and build its duty roster.

6.5 Level 3: Elevated

PGE's decision to escalate from Level 2: Guarded to Level 3: Elevated status is predicated on conditions on the ground, and the pace of the onset of weather conditions at the time. Once the PAT IC has made the decision 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 hours–1 hour prior to de-energization.

6.6 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 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, the strategic pre-positioning of Field Observers personnel and Community Resource Centers (CRCs). 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 has 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 IC.

6.7 Level 4: Severe Event Happening

Transitioning from Level 3: Elevated to Level 4: Severe is triggered by the IC decision to de-energize the area impacted by PSPS. Immediately after, operational resources are given the "Go" signal to open feeder and line devices and strategically isolate the circuit to support a safe, efficient re-energization when weather conditions allow. Also, at this step, the Customer Officer will order the mobilization of CRCs to support customers, as described in Section 6.9, "Community Resource Centers".

6.8 Level 4: Severe Restoration

Once weather conditions necessitating a PSPS de-energization subside, PGE crews conduct patrols to assess damages and begin necessary repairs. Once given authorization by the IC, based on input and data provided by the Situation Unit, line crews execute cutsheets to restore power. PGE sends an "End of PSPS" notification when all power is restored.

6.9 Community Resource Centers

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

PGE has identified multiple potential locations for CRCs within or near each HFRZ to provide the flexibility to select the location that best suits customers' needs based on event specifics. PGE may not activate CRCs at all pre-designated locations during a particular PSPS event. Depending on the nature of the event, PGE may determine some CRC locations are not needed, or it is possible to serve areas that have been impacted by a PSPS event from a common CRC location. Pre-identifying multiple CRC locations within each HFRZ 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. However, specific circumstances may make this impractical. Decisions need to be made quickly regarding where and how many CRCs are required. In 2023, PGE developed a CRC staffing model that includes an Activation Lead who coordinates directly with Fire DAWG and the CIMT to stand up and operate the CRCs. In addition, PGE trains employees in advance to act as either Customer Experience Leads or general support staff that report to any active CRC location to assist visitors as needed and report vital real-time information impacting the CRC to the acting CRC Activation Lead. PGE trained enough employees to staff up to 10 CRCs in rotation for as long as necessary. PGE will implement the same recruiting and training strategy for the 2024 fire season. This content addresses recommendation 15.

PGE's decision-making process for potentially deploying CRCs begins during the Level 3: Elevated PSPS Likely. 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 regardless of whether a pre-determined location is available for the specific PSPS event. For example, if a location is outside the known HFRZ areas, PGE will work quickly to identify an appropriate location. PGE uses the community's customer demographic data to inform location placement to select sites that are fully accessible (on or near main roads) and known locations within the community. PGE will notify Public

Safety Partners and adjacent Public Safety Partners as soon as CRC locations and activation schedules are confirmed. PGE will try to have CRCs operational within 24 hours of de-energization and keep these locations operational for as long as they benefit customers. Sometimes, PGE may not establish a CRC in an impacted PSPS Area; this may be due to resources being provided by a county, Red Cross, or other entity, when a single CRC is serving multiple PSPS areas, or when safety concerns preclude PGE's ability to site a particular CRC. Figure 18 is a photo of PGE Volunteers.

Figure 18. September 2022 PGE CRC Volunteers

6.10 Communications During a PSPS Event

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 time periods identified in Table 13. If possible, PGE will provide priority notifications to Public Safety Partners, Adjacent Public Safety Partners, and utility-identified critical facility operators 72–48 hours before de-energization.

In addition, before and during PSPS events, PGE makes current PSPS status information, including location, de-energization estimates, and ERTs for each impacted PSPS Area, available on www.portlandgeneral.com's wildfire and PSPS outage webpage. All PSPS information on portlandgeneral.com is easily readable and accessible on mobile devices.

Table 13. Notification Cadence

Notification Cadence	Audience		
	Public Safety Partners, Adjacent Public Safety Partners, Stakeholders	Utility-identified critical facilities[12]	Customers
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	√	√	√
PSPS Happening At de-energization	√	√	√
Restoration Begins	√	√	√
Restoration Complete	√	√	√
At a minimum, status updates at 24-hour intervals until service has been restored[13]	√	√	√

PGE uses multiple media channels to inform impacted customers, communities, and stakeholders throughout the PGE service area per OAR 860-300-0050. Special attention is given to those within areas affected by a PSPS event. PGE will deliver notifications in multiple formats across multiple channels, including 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 language, access to broadband, and accessibility for those who are visually impaired or hard of hearing, through the following strategies:

- All of PGE's PSPS-related written communications are in English and Spanish.
- PGE Customer Service offers a language hotline to answer customer questions in 200 languages.
- PGE works closely with Public Safety Partners, broadcast, and print media to provide regular PSPS -related text messages and news reports to help customers who may not have in-home broadband access.
- All PSPS-related content on the portlandgeneral.com website is designed to be ADA-compliant for vision-impaired, deaf, and hard-of-hearing customers.[14] PGE provides both audible and written messaging options and closed captioning on all videos posted to the website.

[12] Including Communications facilities

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

[14] Reference to Web Content Accessibility Guidelines

- Throughout the event, PGE distributes PSPS-related information through various platforms and formats such as text messaging, online content, traditional media, paid advertising, written materials, and information sharing with community-based organizations and Public Safety Partners to achieve the broadest reach possible.

PGE recognizes the importance of effective communication with stakeholders before, during, and after a PSPS event. Figure 19 provides a visual summary of PGE's PSPS notifications process.

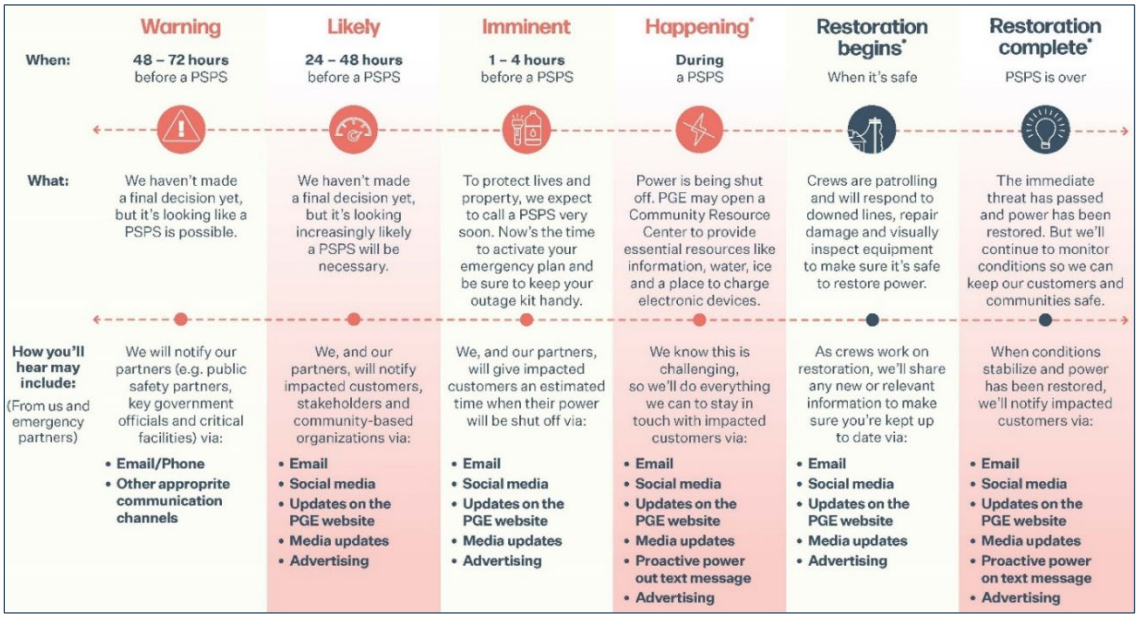


Figure 19. PSPS Notification Strategy

Throughout the PSPS event, PGE provides the elements of notification information required by OAR 860-300-0050 to Public Safety Partners, Adjacent Public Safety Partners, operators of utility-identified critical facilities (including communications facilities), and customers as summarized in Table 14. PGE developed the CIMT role of NEM for PSPS events. The NEM sends required notifications to the required audience at the prescribed times and intervals.

Table 14. Notification Information

Notification Information	Audience		
	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 Area, which would include GIS 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 fire season			√

7 Wildfire Safety, Prevention, Communication and Engagement Strategies

PGE employs a three-pronged strategy to educate, engage, and solicit feedback regarding wildfire safety and prevention with customers and stakeholders.

- **Wildfire Awareness and Education Communications Campaign:** This 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 comprehensive efforts using multiple mediums and communication channels to reach customers and community stakeholders.
- **WMP Engagement:** This strategy focuses on partnering with Public Safety Partners and local communities to host public forums where customers can learn about PGE's WMP, associated programs, and to solicit feedback during or after each event. PGE hosts these events throughout the service area before or during fire season each year.
- **Public Safety Partner Engagement:** PGE works closely with our Public Safety Partners to facilitate information sharing, community outreach, and wildfire preparedness and response. PGE divides its Public Safety Partner coordination approach into three phases: before, 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.

The overriding purpose of these strategies is to prepare communities for fire season by providing information about specific preparedness actions they can take, as well as steps PGE may take, including PSPS events. Communications utilizes multiple partners, stakeholders, and channels to reach customers and communities throughout the PGE service area.

This approach incorporates stakeholders, Public Safety Partners, customer feedback, and insights from survey data about how customers engage with the information PGE provides.

As fire season approaches, PGE activates a communications campaign to raise awareness of its wildfire mitigation efforts and the potential for PSPS events. In May of 2022 and 2023, PGE teamed up with PacifiCorp, Idaho Power, and the OPUC to issue a joint press release in support of National Wildfire Awareness Month. PGE plans to continue this approach to present a unified front and promote the need to be prepared.

Similar to previous years, PGE will conduct awareness and education activities before and during the 2024 fire season to reach customers, critical facility operators, federal, state, and local governments and elected officials, agencies, Tribes, and Public Safety Partners. Communication activities are carried out during fire season through media outreach, website information, social media, paid advertising, and strategic direct customer outreach. Based on learnings from 2022 and 2023, direct customer communications will begin in July when the information is more relevant, with cadence and medium tailored to specific target audiences, including residential and business customers, key managed accounts, and customers inside and outside of HFRZ.

7.1 Education Approach

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, Public Safety Partners, and

local municipalities to raise awareness about PGE's wildfire mitigation efforts, beginning with the annual submittal of PGE's WMP and continuing through fire season.

In 2024, 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 before PGE declares 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.

Additionally, PGE continues coordinating with utilities throughout the state to align on similar PSPS and safety settings language for Public Safety Partners and communities. This coordination is to help Public Safety Partners and communities clearly understand measures and modifications made to protect communities during fire season. This collaborative work is ongoing with the approach for safety setting language planned for completion before the 2024 fire season. This coordination addresses recommendation 16.

In 2024, PGE plans to build on its 2023 communications, education, and preparedness campaigns, revising and expanding, where applicable, existing communication materials and by working collaboratively with community leaders and Public Safety Partners and learning from customer survey results to refine and update the direction and content to keep customers informed.

7.2 Education Campaign: Channels and Outcomes

PGE employs a multichannel communication strategy to reach local communities effectively and equitably with wildfire safety and prevention information. The goal is to equip customers and the broader public with actionable, timely information throughout fire season.

The Wildfire Outages & PSPS page on the PGE website serves as a primary information hub for customers to learn about ways the company is reducing wildfire risks, tips to prepare for a PSPS event, and general information on wildfire safety. This resource for wildfire-related information is annually updated in English and Spanish and provides information in 13 additional languages.

The Wildfire Outages & PSPS hub provides information on the following:

- A high-level overview of measures and investments PGE is making to mitigate wildfire.
- An interactive map of PGE's service area with zones most likely to experience a PSPS, showing which areas are currently experiencing a safety outage. The map allows users to enter a service address and check if the location is within an active PSPS Area.
- How to prepare a home or business for a PSPS event, including information about emergency plans, kits, and checklists.
- Link to the PGE WMPs.
- PSPS Frequently Asked Questions (FAQs).
- Safety tips to prepare for and prevent wildfires.

In 2024, PGE plans to split the current wildfire safety and preparedness information web page into two (2) separate web pages. The purpose is to improve the customer experience by bifurcating the information into separate sections so customers can access the information they need depending on the time of year or situation.

- Wildfire Safety and Prevention: A page with information relevant to preparedness activities, the WMP and FAQs relative to:

  - How to prepare for wildfire-related outages.
  - Programs and initiatives PGE is implementing to mitigate wildfire risk.
  - Wildfire safety system settings and the potential impact of forecasted weather on company readiness posture.
- PSPS: A page dedicated to PSPS-specific information, how they work, what to expect, and why PGE would need to call one:
  - Central location for up-to-date information/resources if PGE is activating PSPS.
  - Status of PSPS in PGE's service area.
  - Interactive PSPS map.
  - PSPS-specific FAQs to include information on CRCs.
  - PSPS information in multiple languages.

PGE will continue to improve the web-based interface used during the September 2022 PSPS. Real-time, dynamic location information is provided via a map. De-energization and re-energization estimates are provided by the area impacted and PSPS. More information on how the web-interface worked during the 2022 PSPS can be found in PGE's Public Safety Power Shutoff 2022 Annual Report.

Another key channel PGE uses to generate awareness is engagement with broadcast, print, and radio news outlets. In 2023, PGE strategically engaged with national, trade, and Portland Metro media outlets to promote the strategies and investments PGE is making to mitigate wildfire risk, sharing wildfire safety information and general information on PSPS.

Before the 2023 season, PGE hosted a wildfire preparedness media day at the Sherwood Training Center in May to launch its awareness and education efforts. The event was a focused opportunity to share PGE's wildfire mitigation efforts, educate about PSPS, and encourage customers to take preparedness steps. All four broadcast affiliates, OPB, The Oregonian, Pamplin Media, and KXL sent reporters to cover the event, which generated significant educational news coverage.

Throughout the fire season, an array of national and local media outlets published nearly 30 different stories highlighting the company's innovative use of technology, strong public safety partner coordination, and strategic investments that help to protect life, property, and public spaces. Safety and preparedness messages from PGE were included as the headline or at the beginning of articles/reports. For national stories, PGE was cited as an industry leader in planning and delivering an effective WMP.

Advertising is essential in our integrated communication approach to educate customers about how PGE prepares for wildfire and how they can prepare for a PSPS event. We garnered over 16 million combined impressions during the summer months across digital banners, radio, print ads, and a sponsorship with KPTV.

PGE promoted safety and preparedness messages in multiple languages across various channels. Print ads ran in five languages (English, Spanish, Chinese (Mandarin), Vietnamese, and Russian) in publications including *Afisha*, *Asian Reporter*, *Latino De Hoy*, *Oregonian*, *Pamplin Media Group*, *Phuong Dong News*, *Portland Chinese Times*, and the *Statesman Journal*. Pandora and digital ads were in English and Spanish.

PGE worked with KPTV on a paid sponsorship that synchronized storytelling across paid media and earned media outreach and customer emails. Throughout the summer, we share important safety-themed information, including weather and safety, year-round preparedness, and fire season and outage preparedness.

We bolster our customer reach via earned media and digital communication when we pair those efforts with in-person engagement at community events. In August 2023, PGE attended community information meetings in response to the Camp Creek Fire burning near the Bull Run Watershed. PGE representatives attended meetings in three different cities, Sandy, Welches, and Corbett-to share PSPS related information. PGE will continue to attend wildfire preparedness events and town halls hosted by county and fire agencies to share information about the potential for wildfire-related power outages.

PGE provides PSPS preparedness checklists translated into multiple languages, available through the PGE website and PSPS preparedness one-pagers available for Community-Based Organizations, food banks, and schools serving customers in the PGE service area. PSPS preparedness information provided on the PGE website is available in 15 languages. In addition, throughout fire 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."

Another key pillar of the communication campaign is educating PGE employees about the company's wildfire mitigation efforts and fire season's operational and logistical impacts, including providing employees with visibility into company investments and work to mitigate wildfire risks and the plans needed to perform an effective PSPS or safety-related power outage.

PGE shares employee communications across all internal channels, including the intranet, all-employee weekly emails, digital boards, and direct employee communications specifically for those living in HFRZ. The focus was to help our employees better understand PGE's wildfire mitigation efforts to aid them in understanding the impacts fire season has on our operations and what that means for our customers. Information also included a detailed look at our WMP, support from the company if employees are affected by mandatory wildfire evacuations, profiles on new wildfire mitigation technologies and resources, and a full breakdown of what it means for PGE and our customers if the company calls a PSPS.

In 2024, PGE will continue employee communication by building on 2023 efforts, as we equip employees with up-to-date and timely wildfire safety information.

7.3 Education Campaign and Customer Survey Results

In 2023, PGE launched the first ongoing semi-annual Safety Message Awareness and Knowledge Tracking survey to understand its communication effectiveness better. The survey was emailed to a representative sample of PGE's customers, both within and outside of HFRZ, to gauge general awareness of message recall and awareness. Survey topics included wildfire mitigation efforts, whether customers acted to prepare for wildfire and wildfire-related outages and measured general understanding of PSPS. The survey aims to collect and analyze feedback to improve communication plans and meet customers where they are. Access to the survey will be expanded in the spring to gather additional input through non-English versions.

Survey Methodology

- Successfully delivered 9,516 survey invitations.
- Received 420 completed surveys across two customer groups of interest for a 4.4% response rate.
- 200 customers in HFRZ.
- 220 customers outside the HFRZ, within the service area.

Survey Instrument

- Based on their response, customers were asked up to 18 total questions.
  - 1 PGE brand-level satisfaction question
  - 6 PSPS awareness/understanding questions
  - 5 Outage experience/preparedness questions
  - 5 demographic questions
  - 1 survey sweepstakes question

Key Findings

- Customers are aware of PSPS events and why PGE has or would use them.
  - Customers within PGE's HFRZ, awareness of PSPS is at 84%
  - Customers outside of PGE's HFRZ, awareness of PSPS is 47%
- Seventy-three percent of HFRZ customers say they can explain a PSPS to someone, and when asked, it was very common for them to include wildfires, severe weather, and downed power lines in their explanations.
  - While less confident they could explain a PSPS to others, non-HFRZ customers still often mentioned wildfires, severe weather, and downed power lines in their explanations.
- PGE is a more common source of PSPS information (45% across all channels included in survey) than new stories (36%) for HFRZ customers.
  - Non-HFRZ customers are 29% more likely to have heard of PSPS from the news than from PGE (11% across all channels included in the survey).
- Customers residing in an HFRZ are more likely to have experienced an outage in the past six (6) months. They are also likely to have taken steps to prepare for a future severe weather event/outage.
- Customers in HFRZ are more likely to be homeowners, this gives them more of an opportunity to make severe weather/outage preparations, like purchasing a generator or clearing yard debris from the property.

Survey results show that customers who live within a HFRZ are generally more aware of PGE's wildfire mitigation efforts compared to those who live outside a HFRZ. These results are consistent with our previous focus on communicating specifically with customers who live in HFRZ about PSPS preparedness, given they are more likely to experience one. As we evolve our operational PSPS efforts to include the entire service area, we can increase awareness with customers who do not live within HFRZ. Though there is a disparity in awareness level between HFRZ and non-HFRZ customers, most are aware of PSPS events, and generally know why PGE has or would use it. Expanded survey results can be found in Appendix 6.

PGE and the Joint IOU's will continue to mature the effectiveness measures discussed during the 2023 WMP Recommendations Workshop held on August 22, 2023. The list of effective measures that will be tracked, as applicable, are included in Appendix 7. Appendix 8, and the information in Section 7.3, "Education Campaign and Customer Survey Results", addresses recommendation 18.

7.4 2023 Engagement Activities and 2024 Engagement Strategy

PGE uses OPUC regulations and event feedback to shape the WMP Engagement Strategy. PGE remains committed to evaluating and implementing, when possible, the recommendations received from customers, local communities, and Public Safety Partners at annual WMP Engagement Strategy public events.

In planning for 2023, PGE identified several areas of focus based on lessons learned in 2022. Emphasis was placed on holding the 2023 events by the end of Q2, furthering collaboration with Public Safety Partners by inviting them to participate and improving inclusivity and accessibility for access by functional needs populations. Figure 20 is a photo from PGE's 2023 Wildfire Ready event in Mt. Angel.

PGE achieved each of these goals. All six events, including four in-person and two virtual, were hosted between June 5th–June 16th, 2023. Invitations to participate were extended to various relevant partners including:

- Clackamas Co. Disaster Management
- ESF-12
- FireWise, USA Community P2B
- Grand Ronde Emergency Services
- Mt. Angel Fire District
- ODHS Office of Resilience & Emergency Management
- ODF
- Oregon Office of State Fire Marshall
- OSU's Extension Fire Program
- Sandy Fire District
- Sheridan Fire District
- Yamhill Co. Emergency Management
- Washington Co. Emergency Management

American Sign Language and Spanish interpreters were present at in-person and virtual events. PGE verified Americans with Disabilities Act accessibility before selecting each location.

Overall, 2023 showed an increased interest in PGE hosting events like these from both the public and partners. The feedback received from attending partners was overwhelmingly positive as they appreciated the opportunity these events afforded them to speak directly to their communities and asked to be invited to future PGE-hosted events. Customer attendance tripled from the previous year. Survey results indicate that, on average, 80% of public attendees felt their one-on-one conversations with PGE's SMEs increased their knowledge of topics like PSPS, wildfire-related investments, and overall wildfire preparedness.

A complete 2023 WMP engagement event registry is provided in Appendix 9. Along with this information, Appendix 5 and Appendix 10 respond to recommendation 12.

Figure 20. 2023 Wildfire Ready Event in Mt. Angel

As 2024 planning commences, PGE remains committed to continuously improving the WMP Engagement Strategy and compliance with OAR 860-300-0040. Although PGE will remain flexible throughout the planning process, feedback and internal evaluation point towards the following being the significant areas of focus for 2024:

- Growing the breadth of topics and variety of partners participating in the events to provide customers with a more holistic and well-rounded experience. This will build upon the steps taken by PGE in 2023 and fulfill recommendation 17 for 2024.
- Expanding the reach and methods of event promotion to enhance awareness and drive attendance.
- Continuing to improve the inclusivity and accessibility of the events and promotion for access and functional needs populations by partnering with PGE's internal diversity, equity, and inclusion experts and local Public Safety Partners.
- Coordinating with PacifiCorp and Idaho Power Corporation in the planning process to determine if any coordination opportunities exist with Public Safety Partners.

7.5 Public Safety Partner Coordination Strategy

In 2023, PGE collaborated with its Public Safety Partners, utilizing various channels to support the development of the 2024 WMP. PGE provides a full listing of all supported events coordinated with Public Safety Partners in Appendix 9. This additional coordination will partially address recommendation 18.

7.5.1 Coordination Approach

PGE works closely with our Public Safety Partners to facilitate information sharing, community outreach, and wildfire preparedness and response. PGE divides its Public Safety Partner coordination approach into three phases: before, 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. PGE will collaborate with our Public Safety Partners to determine meeting frequency and location.

7.5.1.1 Before Fire Season

Before fire season, PGE will engage as requested in joint planning processes and deliver presentations to Public Safety Partners at existing information sharing and preparedness coordination forums. PGE will also include wildfire preparedness topics in one of the all-hazards bi-annual summits with Public Safety Partners. PGE and ESF-12 coordinate the location, time, and topics for summits.

PGE will also host at least one annual pre-fire season tabletop exercise with Public Safety Partners focusing on PSPS notification procedures and processes. This tabletop will occur before the end of the second quarter and will follow the Homeland Security Exercise and Evaluation Program (HSEEP) principles and guidelines. As part of each exercise, PGE will provide the relevant details of the CIMT structure. All Public Safety Partners will receive an invitation to attend the tabletop exercise and participate in the After-Action Review. When possible, PGE will engage in exercises developed by other Public Safety Partners to improve interoperability during an actual event. Section 7.5.1, "Coordination Approach", addresses recommendation 14.

7.5.1.2 During Fire Season

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

During fire season, PGE enhances situational awareness monitoring and maintains a state of operational readiness. Should a new fire start, or an expanding fire threaten PGE infrastructure, a company representative will contact either the specific agency managing the fire or the dispatch center dispatching for the fire to coordinate an appropriate utility response.

For all incidents, PGE acts as a cooperating partner supporting public and first responder life safety, incident priorities, and objectives, or when company infrastructure is at risk and is impacted by a wildfire. Additionally, PGE prioritizes sharing information and intelligence with fire agency partners and dispatch centers in an effort to provide enhanced situational awareness for new or existing fires.

In August 2023, PGE's Pano AI fire detection camera network was leveraged and proved invaluable technology for first responding, initial attack resources responding to a lightning-caused wildfire burning in the Bull Run Watershed, a critical water source for over 1 million people in the greater Portland metro area. Even though it was nighttime, the cameras could detect, triangulate, and provide the exact location of the (then unnamed) Camp Creek Fire. Armed with coordinates and high-definition, live-streaming, 30× optical zoomed video of the fire-depicting the fire area's fuel type, behavior, and rate-of-spread, PGE staff were able to exercise existing agency relationships to share this critical, time-sensitive intelligence quickly and efficiently.

The technology did exactly what it was deployed to do: rapidly detect, validate, and communicate fire starts. Agency representatives involved in the initial attack confirmed that response time is a critical element in fire suppression, particularly in remote areas and/or overnight periods. The technology and actions taken by PGE provided the Camp Creek IC with more than four (4) hours of advanced planning time than if the fire had been reported at daybreak by traditional, human detection methods. The advanced notification resulted in getting the correct type and quantity of both air and ground resources ordered and routed early, setting the tempo going into the first full operational period.

If an incident requires the activation of PGE's CIMT, PGE will notify impacted stakeholders and initiate in-person and virtual coordination activities. PGE will deploy dedicated utility representatives to jurisdictional Emergency Operations Centers, Emergency Coordination Centers, or Incident Command Posts as needed.

After wildfire incidents, PSPS events, or PGE-led tabletop or functional exercises, PGE will conduct an after action-review consistent with HSEEP and utility sector best practices, reviewing incident response and identifying continuous improvement action items. A summary of input from our Public Safety Partners and lessons learned captured through exercises and events from 2023 is in Appendix 4.

7.5.1.3 After Fire Season

When PGE declares an end to fire season, the company will inform the Public Safety Partners that safety-adjusted device settings and other operating protocols have returned to normal operations. PGE will hold meetings and make phone calls to solicit feedback from Public Safety Partners about the Wildfire Mitigation Program and any opportunities for improvement.

8 Ignition Prevention Inspections

PGE conducts annual Ignition Prevention Inspections within its HFRZ and in areas subject to heightened wildfire risk within PGE's ROW for generation and transmission assets located outside of PGE's service area in accordance with OAR 860-024-0018(3)(4). PGE inspects each supporting structure (pole or tower) within the HFRZ or area subject to heightened risk. Each year approximately 27,214 structures are inspected, scattered across more than 995 line-miles located within PGE's service area and over 63 line-miles located outside of PGE's service area. Table 15 quantifies the number of structures to be inspected in 2024.

Table 15. Number of Inspected Structures and Line Miles

Location	Structure Count	Line Miles
PGE HFRZ 1–11 (2024)	26,464	995
PGE Generation and Transmission Outside the Service Area	750	63

Using a competitive bidding process, PGE selects the vendor to perform the Ignition Prevention Inspections within the HFRZ. The pricing structure of the competitive bidding process is based on unit rates associated with specific inspection and correction tasks. The vendor's crews who perform the inspection and correction tasks are signatories to the International Brotherhood of Electrical Workers (IBEW), Local 125. This information addresses recommendation 19.

8.1 Inspection Procedures

Two (2) person crews perform PGE's Ignition Prevention Inspections. Under PGE's inspect-correct methodology, crews perform inspection tasks and complete many corrections during the initial visit to the structure. This is important because it significantly reduces PGE's average correction times and completes most corrections before each year's fire season. Additionally, the inspect-correct methodology reduces customer impact by eliminating the need for multiple site visits. This description addresses recommendation 19.

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

Figure 21 illustrates the data displayed and tracked through PGE's mobile GIS structure tracking application.

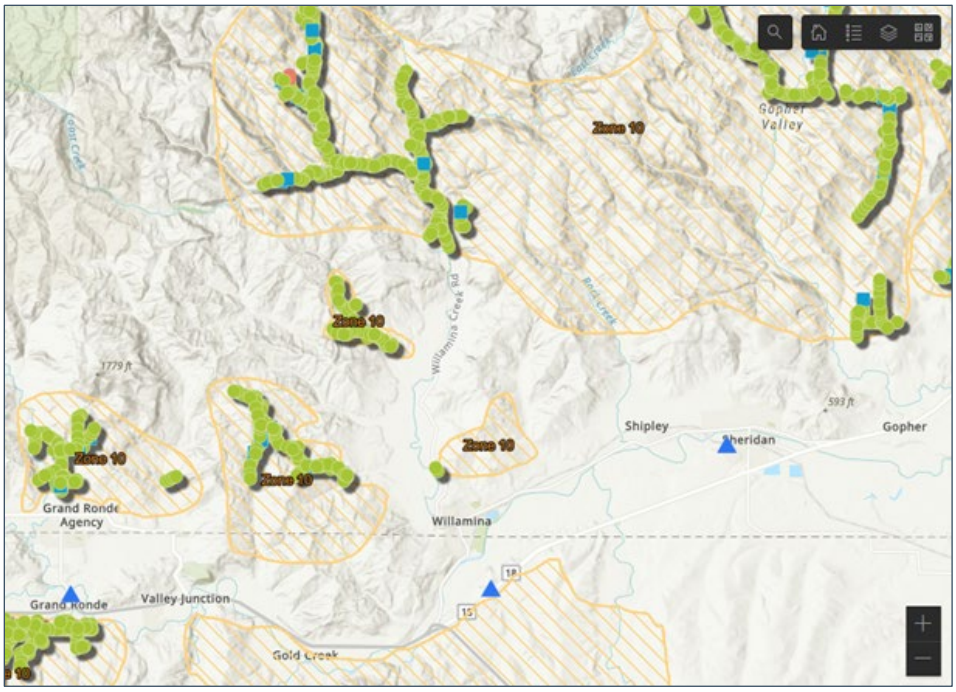


Figure 21. PGE ARCGIS Online Structure Tracking Data

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

8.2 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, in compliance with OAR 860-024-0011 and OAR 860-024-0012. The FITNES Program inspects approximately 28,000 poles annually, or approximately 10% of PGE's system, for non-compliance with safety rules governing PGE's and pole occupant facilities. Two (2) person crews perform the FITNES inspections. The vendor performing the work is a signatory to IBEW, Local 125. This addresses recommendation 19.

PGE continues to refine its Ignition Prevention Inspection work practices through active participation in industry discussions and forums.

PGE's Ignition Prevention Inspection standards direct inspection teams to identify conditions that, 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:

- Bonding
- Broken lashing wire
- Conductor clearances

- Damaged conductor
- Damaged, broken, missing, or loose hardware and equipment
- Damaged or decayed poles
- Tree attachments
- Other potential sources of ignition

A full list of PGE's Ignition Prevention Inspection standards is found in Appendix 11. 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 OAR 860-024-0011(2)(c). Depending on the facility to be inspected, PGE may also choose to accomplish both the FITNES inspection (OAR 860-024-0011(1)(b)) and the ignition prevention inspection during the same site visit.

8.3 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, before 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:

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

During the initial one (1) to two (2) weeks of the HFRZ Ignition Prevention Inspection period, a PGE Quality Control Inspector accompanies each inspection crew to verify the work performed, provide feedback, and answer 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 must complete the same training and initial PGE observer requirements. During each year's inspection season, PGE's Quality Control Inspector performs several QA tasks, in addition to the QC of Ignition Prevention Inspection results and corrections. For example, the PGE Quality Control Inspector reviews inspection results and conducts periodic refresher training with the crew. They meet onsite with crews to answer questions, perform fieldwork to assess

access constraints, and verify mapping information. Section 8.3, "Ignition Prevention Inspection Program Oversight", addresses recommendation 21.

Ignition Prevention Inspections conducted outside PGE's service area 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's 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.

8.4 Timing of Annual Ignition Prevention Inspections

PGE's goal is to begin its annual Ignition Prevention Inspections as early as possible during the first quarter of each year and to complete the inspections no later than July 31, with most inspections completed before PGE declares the start of fire season. PGE continues to study the timing of its inspections to identify any conditions associated with PGE's facilities caused by seasonal winter weather events. Additionally, accumulated snowfall at higher elevations within the HFRZ 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.

8.5 HFRZ Correction 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 correlating to a heightened risk of utility-caused ignition shall be corrected no later than 180 days after discovery unless notification is received under OAR 860-028-0120(6). This OAR specifies 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 public.
- All other conditions requiring correction shall be corrected consistent with OAR 860-024-0012.

8.6 Ignition Prevention Inspection Learnings

- **Joint Use:** In 2022, the OPUC adopted OAR 860-024-0018, which sets forth several new duties for operators of electric facilities, including requirements to address conditions not associated with utility facilities and conditions involving supporting structures to which PGE is attached but does not own. In response, PGE performed new tasks in connection with its year 2023 Ignition Prevention Inspections. In accordance with OAR 860-024-0011(2)(b), PGE provided inspection notice concerning its 2023 HFRZ to every entity in which PGE maintains a joint use relationship, including pole owners and occupants. Additionally, PGE has adhered to the notice of violation requirements outlined in OAR 860-024-0018(6). In terms of actions that the electric operator must take if a condition is not remedied timely by a different pole or equipment owner, OAR 860-024-0018 also sets forth specific requirements. In 2023, PGE actively utilized the mechanism afforded by OAR 860-024-0018(7). When the equipment owners failed to complete the corrections timely, PGE performed the repair and charged the equipment owner for the cost of the work plus a 25% fee. In the future, PGE will continue to administer and refine its process

for addressing conditions associated with other pole and equipment owners and may utilize the complaint process provided by OAR 860-024-0016.

- **Tree Attachments:** PGE remains active in identifying and correcting conditions associated with PGE conductors attached to trees. OAR 860-024-0018(2) provides: "Utility supply conductors shall not be attached to trees and should only be attached to poles and structures designed to meet strength and loading requirements of the National Electrical Safety Code." This section does not apply to customer-supplied equipment at the point of delivery. Compliance with this section must be achieved prior to December 31, 2027. Most tree attachments PGE identified are in PGE's HFRZ 1: Mt. Hood Corridor/Foothills. In 2023, PGE maintained discussions with the USFS Zig Zag Ranger District concerning coordination, as several tree attachments are located on federal lands.
  - Additionally, PGE is actively working with many individual property owners. Information sharing has been essential in PGE's program to remedy tree attachments. PGE maintains a tree attachment informational website with contact information to improve communication.
  - PGE is in active partnership with USFS in seeking funding opportunities as it relates to wildfire risk reduction and tree attachment removal.

8.7 Ignition Tracking Database

In 2024, PGE will leverage its ignition tracking database to identify possible changes or additions to its 2025 Ignition Prevention Inspections standards. Ignition probability values and historic ignition tracking address recommendations 20 and 30, as both the database tracking (recommendation 20) and root cause analysis (recommendation 30) are described in detail below.

In 2021, as our response to new OAR requirements, PGE created an ignition management tracking process and database.[15] PGE uses this information to evaluate the system hardening investments described in Section 10, "System Hardening". For example, if analysis shows that georisk represents a circuit's only risk, but 99% of all the ignitions recorded at that site are caused by animal contact, installing animal protection devices would likely be the appropriate risk mitigation outcome for that location.

Since developing the ignition management tracking database in 2021, PGE has made several updates to the accompanying processes to capture a complete data picture. After a series of meetings with users, PGE revised the ignition reporting form to include additional failure modes and ignition details and removed the requirement to enter observational weather data. Weather data is now supplemented by data pulled directly from the nearest PGE weather station to the ignition point, which is more accurate and reduces the time and effort required to fill out the form. Features currently in development will allow for easier entry of ignition reports by repair workers when responding to an outage and increased data integrity between outage reports and ignition reports.

Ignition events identified from a regular review of outage data, including comments from dispatchers and responders, supplement the data submitted via the ignition form. PGE collects data points from the outage management system, reliability database, weather stations, follow-up conversations with crews, and reports submitted in the field to paint a complete picture of each ignition. In line with recommendations five (5) and six (6), this data is regularly compiled and evaluated in geospatial programs

[15] PGE tracked historic ignition event data since May 2021

to determine ignition density and intersection in HFRZ. Dashboards and visuals relating to ignition counts and details are prepared in Tableau; a data visualization tool that integrates data for advanced analytics.

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. Based on quantifiable drivers, these risk projections allow PGE to map risk velocity (risk forecasted through time) and link it to the strategies described in Section 3.7, "Wildfire-Risk Informed Decision-Making", to drive the highest-value risk mitigations.

8.8 Ignition Reporting

To address recommendations five (5), six (6), and 20, ignition reporting, database tracking, and root cause investigation processes are described below in detail.

PGE tracks ignitions potentially caused by PGE equipment and fires that impact PGE facilities as required by OAR 860-024-0050. Tracking and reporting include documentation of the initial observation and recording of ignition events in the field and the specific geographic and ROW location of any impacted PGE equipment.

PGE reviews all ignition events reported in the field. PGE submits reportable ignition event information to the OPUC Safety Department. In addition, PGE archives ignition event reports for future compliance purposes. PGE uses historic ignition event data to inform strategic asset management decisions, including system hardening measures, with a more granular understanding of risk. PGE continues to scale and improve its ignition tracking and reporting database as a key component of understanding ignition event drivers.

8.9 Ignition Management and Root Cause Analysis

PGE considers an ignition event to be a fire caused by PGE's infrastructure, when fire impacts PGE infrastructure, or when excessive heat results in the burning or charring of PGE equipment or the surrounding area. Table 16 details how WM is informed of ignition events and the data points available.

Table 16. WM Information Distribution

	Data Points Available					
Current ways WM is informed of ignition events	Photos	Observational weather	Impacted device	Voltage (as a form field)	What burned	Fire suppression type/agency
Field reports in IQGeo[16] (feed to Quickbase, email)	Yes	Yes	Yes	Yes	Yes	Maybe
Media	Maybe	No	Yes	No	Yes	Yes
Legal Affairs	Maybe	No	Yes	No	Yes	Maybe
Conversational (ex: discussion of ignition event during a meeting)	No	No	Yes	No	Maybe	Maybe
Outages caused by vegetation during PGE WF Season	No	No	Yes	No	Maybe	Maybe
Outages with OMS operator notes indicating ignition and fire department response	No	No	Yes	No	Maybe	Maybe
Other searching in OMS as related to WM initiatives	No	No	Yes	No	Maybe	Maybe

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. Based on quantifiable drivers, these risk projections allow PGE to map risk velocity (risk forecasted through time) and link it to the strategies described in Section 3.7, "Wildfire Risk-Informed Decision-Making", to drive the highest-value risk mitigations. Refer to Table 17 for details on the ignition tracking database. This table addresses recommendation 20.

[16] Ignitions recorded in IQGeo can be traced back to an OMS event. Data only captured by an IQGeo form is only available for ignitions reported in the field.

Table 17: Ignition Tracking Database Fields

Associated Asset	Facility Notified	Outage (OMS) Number
Contributing Factor	Facility Type	Outage Occurred
Created Date	Failed Equipment	Precipitation
Created User	Fire Size	Property Type
Database Updated Date	Fire Suppressed By	OPUC Reportable
Device Operated Line Fuse	Fire Suppression Agency	Source
Device Operated Other Device	Foreign Object Contact	Status
Device Operated Poletop Recloser	Initiating Event	Temperature
Device Operated Substation Breaker	IQGeo ID	Updated Date
Device Operated Transformer	IQGeo Link	Updated User
Device Operated Tripsaver	Item Burned	Visibility
Event Cause	Latitude	Visibility Other
Event Start Date	Longitude	Voltage
Event Start Time	Notes	Wind

8.9.1 OPUC Reportable Ignitions Process

PGE reviews ignition events reported in the field to determine if they meet the criteria for being reported to OPUC and prepares the necessary forms. 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 informs strategic asset management decisions, including system hardening measures, with a more granular understanding of risk. PGE continues to scale and improve upon its ignition tracking/reporting database as a key component of understanding ignition events by drivers.

8.9.2 Ignition Engineering Review Task Force

At the end of 2022, PGE chartered a task force to meet monthly to reduce wildfire risk and equipment failure through an ongoing collaborative review of engineering standards and strategy in areas of reported ignition events. This task force formalized the strategic integration of key SMEs between separate organizations to affirm best practices for engineering and standards are utilized in areas where ignition events have occurred and reflect a commitment to continuous learning and data-informed strategic decision-making. The deeper insights into engineering, asset management, standards, fire science, and wildfire risk variables gleaned from this group's efforts help determine priorities and projects for the WM organization. This team establishes corrective actions post-ignition to minimize ignition events and informs root cause analysis for systemic trends. Figure 22, depicting PGE's ignition review process, integration into business processes, and risk decision-making addresses recommendations six (6) and 30.

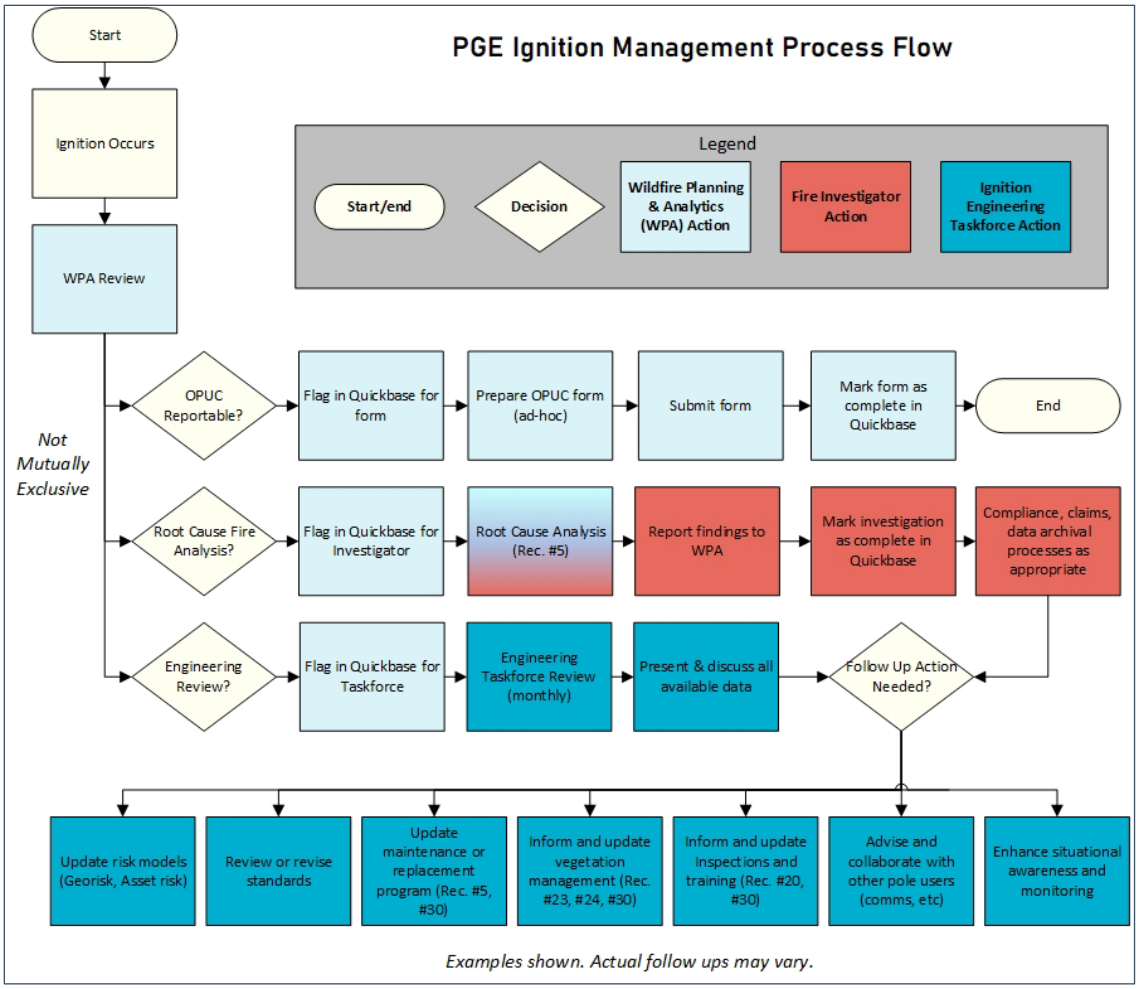


Figure 22. PGE Management Process Flow

In addition to the engineering review task force, PGE also has in-house fire investigation capabilities. This allows PGE to have dedicated SMEs to perform root cause investigations for focused ignition events. PGE has completed an estimated total of 52 root-cause fire investigations since 2022. PGE recognizes this information has a variety of potential learnings to understand and explore integration across the wildfire programs; however, where PGE can take on specific and intentional learnings, that information is prioritized.

To address recommendation 20, PGE has taken 'lessons learned' from ignitions to inform patrols and inspections to look for specific conditions that may pose ignition risks. The examples below provide real-world programmatic changes to ignition inspections due to these industry learnings.

An example is a root cause analysis of tree wire high impedance faults where an ignition undetected by protective devices can result in long thermal events with high burning potential. These root cause findings have been critical in testing PGE's detection and response time modeling to inform fall-in risk where tree wire or insulated cable is not the best value alternative.

PGE has also leveraged root cause investigations from other utilities where ignitions have resulted from specific equipment to inform PGE programs. For example, when open wire secondary or copper conductor has caused fires, PGE has aligned its inspection criteria to identify these locations to inform corrective or capital/maintenance actions that reduce wildfire risk. Section 8.8.2, "Ignition Engineering Review Task Force", addresses recommendation 30.

8.9.3 Role of Vegetation in Ignitions

Vegetation plays an unpredictable role in PGE's identified ignitions. Approximately 90% of ignitions identified by PGE resulted from contact with a foreign object, with trees and tree limbs comprising the majority. As discussed in Section 3.5, "Climate Change", extreme weather strains vegetation and increases the likelihood of fall-in, both from wind and spontaneously. Given that PGE's ROWs are densely vegetated, vegetation contact with equipment happens year-round across the service area despite scheduled and *ad hoc* trimming.

PGE recognizes that risk-based decision-making to the vegetation management program is critical for reducing wildfire risk and maximizing customer value. Ignitions resulting from vegetation contact are captured in PGE's ignition management database and help inform the vegetation management program where applicable. An example that addresses recommendation 24 has been ignitions in areas designated as HFRZ, which PGE can escalate for corrective action prioritization.

To address recommendation 23, cause code delineation of the ignition's root cause of vegetation contact is captured. It is critical that this data helps complement the vegetation management program but is only one of the sources of designing an advanced wildfire risk reduction (AWRR) program.

PGE anticipates that learnings from our EPRI participation in 2024 and continued industry discussions with fellow utilities and OPUC learnings will result in continued feedback loops and learning opportunities for exploration and adoption.

9 Vegetation Management

PGE's vegetation management strategy has two major components: PGE's routine vegetation management (RVM) program which addresses non-HFRZ, and the AWRR program which is executed entirely in HFRZ. Including both RVM and AWRR, PGE manages approximately 2.2 million trees within its ROW of 12,000 miles of overhead conductor. PGE's vegetation management strategy includes cyclical and routine inspections and maintenance of the entire PGE distribution system. One of the primary goals of PGE's AWRR program is to inspect and mitigate identified trees within its HFRZ annually. PGE will continue to implement a phased approach to the implementation of its AWRR work within the HFRZ. PGE establishes internal targets for completing various work scopes in line with the activities listed below.

Annual AWRR activities are guided by the designated boundaries of PGE's HFRZ, data from PGE's remote sensing project (which uses LiDAR and hyper-spectral 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 below.

The evolution of PGE's Vegetation Management program also illustrates the influence of the WRMA methodologies on PGE's wildfire-related investment decision-making. Dedicated initially 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-related ignitions. Risk-based decision-making protocols have allowed PGE's Vegetation Management program to prioritize how resources are allocated.

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 co-benefits shared across PGE workflows, including design and vegetation maintenance. PGE's GIS, Strategic Assessment Management, Wildfire Mitigation, and Vegetation Management organizations all use LiDAR data independently and cooperatively to benefit operational efficiency.

9.1 Routine Vegetation Management Inspection and Maintenance

In recent years, PGE has expanded its vegetation management program to include increased clearances and remove more dead, dying, diseased vegetation 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.[17] PGE documents relevant tree -trimming and provides the documentation 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, RVM activities are ongoing year-round.

[17] 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.

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:

- Clearance requirements to avoid off-cycle pruning.
- Line configuration.
- Line voltage.
- Location.
- Potential sag under various environmental conditions.

PGE inspectors create project-specific work layouts for vegetation contractors to complete while moving through the system and performing RVM activities. Line clearance pruning 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. During the three-year standardized maintenance cycle, PGE vegetation contractors trim identified trees to PGE specifications to comply with OAR Division 24 Safety Standard, and American National Standards Institute 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 RAW process to verify that vegetation management tasks have been completed to specification. To increase the RVM program's effectiveness, PGE coordinates vegetation management activities closely with external stakeholders, including USFS, ODF, Oregon Department of Transportation (ODOT), municipalities, and private landowners.

9.2 Advanced Wildfire Risk Reduction Vegetation Management Program

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

For 2024, PGE will continue to refine its vegetation management activities, including the AWRR program, to address current climate conditions and focus on OPUC requirements. OAR 860-024-0016 provides PGE’s Vegetation Management regulatory framework, therefore influencing PGE’s operational practices for AWRR-related activities. Most of this work occurs outside 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 HFRZ and mitigates vegetation to PGE specifications, which may include mowing (Figure 23) and whole tree removal (Figure 24). Following OAR 860-024-0016 PGE performs QA/QC of vegetation management work completed by crews, documents vegetation management activities, and coordinates 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 establishing 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.

Regardless of a tree's condition, removal practices associated with AWRR apply to any tree within striking distance of PGE electrical infrastructure. PGE classifies trees that are an imminent hazard to PGE facilities as C1 trees. PGE classifies trees that pose a probable hazard to PGE lines or facilities as C2. A C2

designation refers to any trees that are dead, dying, diseased, or damaged, or that have fungal or insect infestation or stress, sun scald, overall poor health, mechanical damage, multiple tops, poor site conditions, conks on trunk, excavation, or aggradation in the root zone, as well as trees too close to PGE facilities.

In 2024, PGE will conduct as much of the AWRR Program's vegetation and C1 inspections and subsequent pruning and C2 mitigation within designated HFRZ as possible during the year's first six months. However, this work will be ongoing throughout the year.

Figure 23. SlashBuster Clearing Right of Way

Figure 24. Aerial Lift Removing Dead Tree on Border of AWRR Zone

9.3 Inspection and Maintenance Frequencies for AWRR

Table 18 outlines the cadence of PGE's inspections and describes the AWRR inspection cycles. Corrective actions and preventative maintenance actions are described in Section 8.2, "Ignition Prevention Inspection Standards".

Table 18. PGE HFRZ Inspection and Maintenance Strategies

AWRR Mitigation	Inspection or Maintenance	Cadence	Description
Patrol & Mitigation 1 (PM1)	Inspection	Annual	During this inspection, occurring in the first six months of the year, PGE AWRR inspectors identify C1 trees and vegetation inside of HFRZ that is within five feet of high-voltage conductors (V5) (in compliance with OAR Division 24 safety standards), and newly established vegetation that is not suitable for a given location. Inspectors verify ongoing vegetation clearance compliance and identify any vegetation encroaching PGE assets since the previous inspection.
Patrol & Mitigation 2 (PM2)	Maintenance	Annual	Contract tree crews mitigate vegetation identified by AWRR inspectors during PM1 by pruning trees and brush to PGE specifications in compliance with OAR Division 24 safety standards. Tree crews will target mitigation of C1 trees as quickly as possible, frequently within 24 hours of identification. C2 trees are targeted for mitigation within one year of identification.
Full-scope Patrol (FSP)	Inspection	2-year Cycle	AWRR inspectors perform a comprehensive inspection along designated HFRZ lines. Inspectors identify C1, C2, and V5 (per OAR Division 24 safety standards) 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.
Full-scope Mitigation (FSM)	Maintenance	2-year Cycle	PGE contracted tree crews mitigate, as directed by AWRR inspectors, any C1, C2, and V5 trees. Crews also address the areas identified by AWRR inspectors that may include sections of line that require more intensive clearance work (per OAR Division 24 safety standards), including increased side-clearance, overhang removal, selective removal of tree parts, expansion of ROW widths, ROW mowing, and whole tree removal. Due to the scale and logistics of C2 mitigation, some projects planned for a given year may carry over for completion in the subsequent year.

9.4 Risk Informed Vegetation Management

PGE recognizes the critical role of vegetation management in reducing wildfire risks and ignition potential. As part of recommendation 22, PGE will participate in a national EPRI study in 2024 to understand if a methodology can be internally developed or adopted from an external source to help inform a vegetation management program. Without this methodology, PGE embraces risk-based vegetation management, including how PGE looks at vegetation and assesses the likelihood of failure and corrective measures for those failures. The following overview on determining assessment levels, and their definitions showcase how PGE risk-informed decision-making is used to manage the vegetation program.

9.4.1 Levels of Assessment

In response to recommendation 23, PGE has addressed how vegetation risk assessments are conducted in support of AWRR work. All assessments are done according to Level 1 and Level 2 as defined by the ISA Utility Tree Risk Assessment (UTRA):

Level 1: Limited Visual Assessment from a specified perspective, such as foot, vehicle, or aerial patrol of an individual tree or a population of trees near set targets to identify specified conditions or obvious defects (ISA UTRA 2020).

Level 2: Basic Assessment is a detailed visual assessment of a tree and surrounding site that may include using simple tools. The forester must walk entirely around the tree trunk, looking at the site, above-ground roots, trunk, and branches (ISA UTRA 2020)

Level 3: Beyond the scope of AWRR routine program objectives, vegetation management activities will only be conducted on an as-needed basis with SME contribution. Examples of these activities include, utilizing a sonograph, extracting core-samples, or sounding. This is a more intrusive inspection methodology that would be used for removal activities when the burden of proof is elevated (ex. sensitive customers).

The AWRR forester is only required to perform a Level 3 assessment if requested by the forestry manager.

9.5 Determining Likelihood of Impact on Target

The likelihood of impact is combined with the likelihood of tree failure to predict the likelihood of failure from a tree impacting the target, as shown in Table 19. This information guides the forester in determining the likelihood of failure.

Table 19. Likelihood of Impacting the Target

Likelihood of Failure	Likelihood of Impacting the Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat Likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat Likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat Likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Appendix 11 provides definitions for Likelihood of Failure and Likelihood of Impacting the Target probabilities.

10 System Hardening

PGE continues to leverage its SAM Structures Model and Fire-Safe Construction Standard to harden the T&D system within its HFRZ. 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, fire-safe fusing, 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.

PGE will deploy additional reliability and wildfire risk mitigation improvements within the HFRZ to achieve these goals. Its annually updated Fire-Safe Construction Standard guides PGE in executing equipment replacements in HFRZ. As specified in the Fire-Safe Construction Standard, the company will evaluate the following assets for replacement, installation, or implementation when warranted:

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

In assessing project alternatives and prioritization of capital investments for wildfire risk mitigation, PGE uses risk-informed decision-making, the VSE methodology discussed in Section 3.7, "Wildfire Risk Informed -Decision-Making". 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 the prioritization of PGE's capital budget. It is important to note these values are a critical input to the planning process but are not the sole indicators of value. They are complemented by other risk analysis variables, including executing mitigation speed to complete the VSE methodology.

Section 11, "Expected Wildfire Mitigation Program Costs", details the information involving year-to-year actual and planned Wildfire Mitigation Operations and Maintenance (O&M) and capital expenditures.

For example, undergrounding and reconductoring distribution lines are two of the most effective ways to shield PGE equipment from vegetation and animal contact that could ignite wildfire. Table 20 shows the planned undergrounding and reconductoring investments in PGE's 2024 wildfire capital investment strategy.

Table 20. Planned Underground Reconductoring Investments in Line Miles 2024-2027

UG/RECON	Line Miles	VSE
Grande Ronde-Agency (UG)	9.8	322
Scoggins-Cherry Grove (UG)	10.8	234
Leland-Carus (RC)	45.0	132
Willamina-Buell (UG)	33.3	482
Orient–Oxbow (UG & RC)	20.0	In Planning Phase N/A
Summit–Summit 13 (UG)	7.0	In Planning Phase N/A
North Plains–Mason Hill (RC)	16.0	In Planning Phase N/A
TOTAL	**141.9**	

PGE is revising its 2024–2027 wildfire capital investment strategy, which distributes planned capital spending among multiple asset and mitigation programs in alignment with the WRMA of wildfire risk change over time. This effort aims 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 consistently evaluates its long-term investment strategy in response to R&D findings, risk modeling, and industry experience. The company will continue to optimize its investment strategy for wildfire risk mitigation based on the best available information and analysis. Table 21 reflects PGE's planned investment estimates and timelines, current at publication of the 2024 WMP. However, PGE recognizes factors outside of the company's control (e.g., resource scarcity or cost increases from unforeseen disruption) or to customer advantage may require adjustments to this schedule of activities. Planned line-miles per year are targets that may be adjusted based on several factors to reduce wildfire risk and increase system resiliency.

Table 21. Planned Situational Awareness Programmatic Investments, 2024

Programmatic	Quantities/Scope
AI-Equipped UHD Cameras	2
Weather Stations	5
Reclosers	37 (VSE of 1332)
Fire-Safe Fuses	2 Feeders (VSE of 59)
Fire Mesh Pole Wrap	1,200 poles
Early Fault Detection (EFD)[18]	1 distribution and 1 transmission circuit

PGE's portfolio of planned capital investment projects offers co-benefits in addition to their wildfire mitigation value. For example, PGE feeders with the highest CEMI values (feeders that experience multiple outages per year) are designated for hardening under this strategy [19]. By aligning its strategy to prioritize both wildfire mitigation and CEMI, PGE is investing in outcomes that offer customer benefits beyond wildfire hardening. With appropriate planning and permitting to mitigate any short-term construction impacts, system hardening may also reduce the risk of negative wildfire impacts to environmentally sensitive areas, species, and habitats.

[18] 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.

[19] CEMI is an industry standard metric of system reliability.

When an asset needs repair, and the repair cost is higher than the asset's value, PGE will mobilize crews to evaluate the asset for replacement. There may be reliability and economic benefits to proactive asset replacement, particularly within HFRZ. PGE assesses the cost/benefit of proactive asset replacement during planned improvement/maintenance activities on other nearby assets whenever possible. This approach helps PGE maintain reliable electric service and increase cost efficiency.

PGE prioritizes capital investments and maintenance activities that provide the highest benefits to the system, including outage prevention, 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.

To address recommendations seven (7) and 25, PGE showcases its wildfire prioritization process for investments, which combines VSE, climate science, and execution speed as strategic variables. This process is performed and updated throughout the year to reduce wildfire risk through a holistic and data-informed approach. PGEs process is represented in Figure 25.

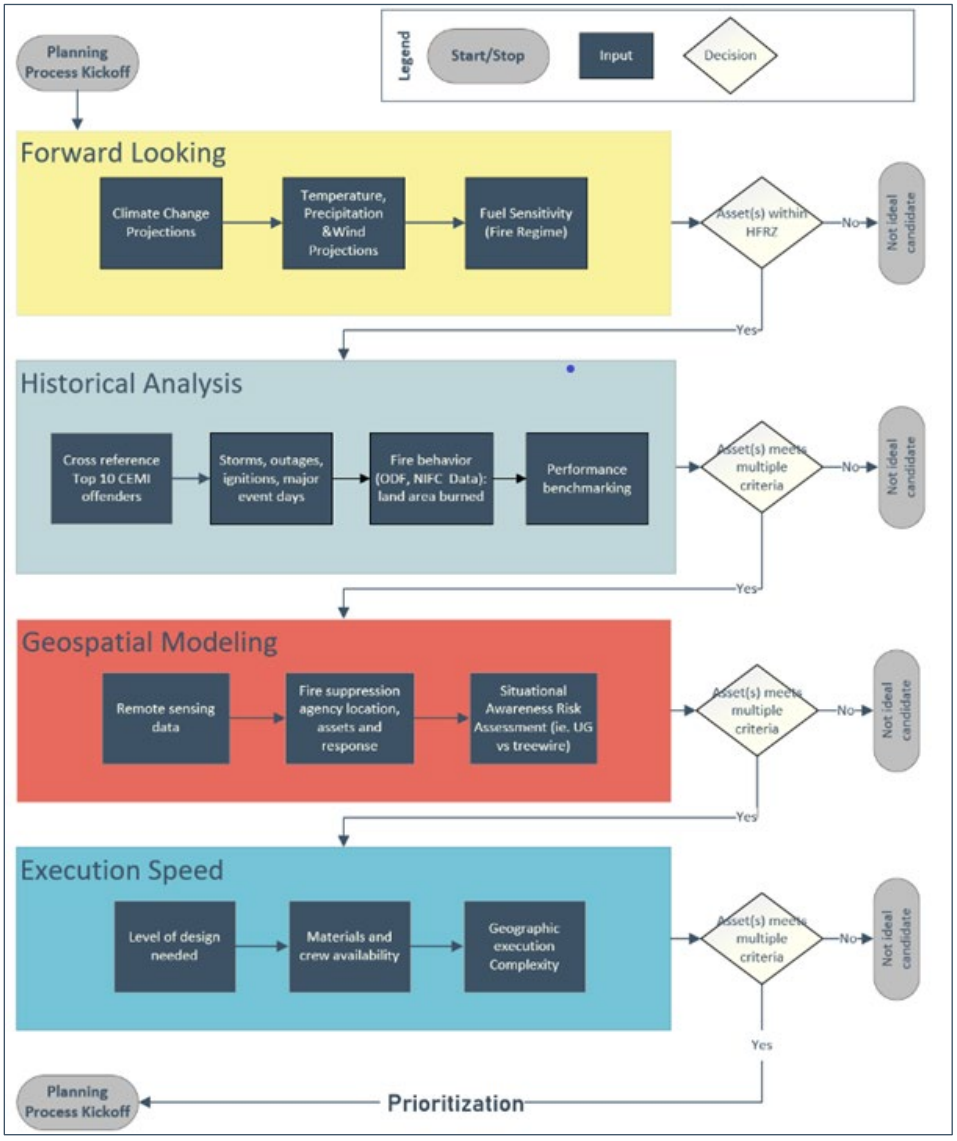


Figure 25. Inputs Considered for Wildfire Investment Prioritization

Upon completion of the measures referenced above, these system-hardening investments will reduce PGE's wildfire risk while shrinking the geographic boundaries of existing HFRZ. As line-miles of PGE infrastructure are hardened over the next several years, PGE anticipates no longer needing to de-energize

those circuits to prevent potential ignitions during PSPS events. PGE estimates these risk reduction values with a combination of volumetric mileage in a mitigated state and the 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 cost/benefit ratios. Table 20 and Table 21 show PGEs planned undergrounding reconductoring projects and situational awareness/programmatic investments, by region, for 2024.

Some of these planned investments include the early scoping and planning phases and are not intended to reflect a final construction energization schedule.

To address recommendation seven (7), PGE has included the VSE for the investments in the execution phases. Not all investments have a VSE score. PGE is working towards focusing its efforts on value spending efficiency on the hardening projects and continues to make strides in the other areas (e.g., programmatic investments). A map of PGEs 2023 planned wildfire investments is shown in Figure 26.

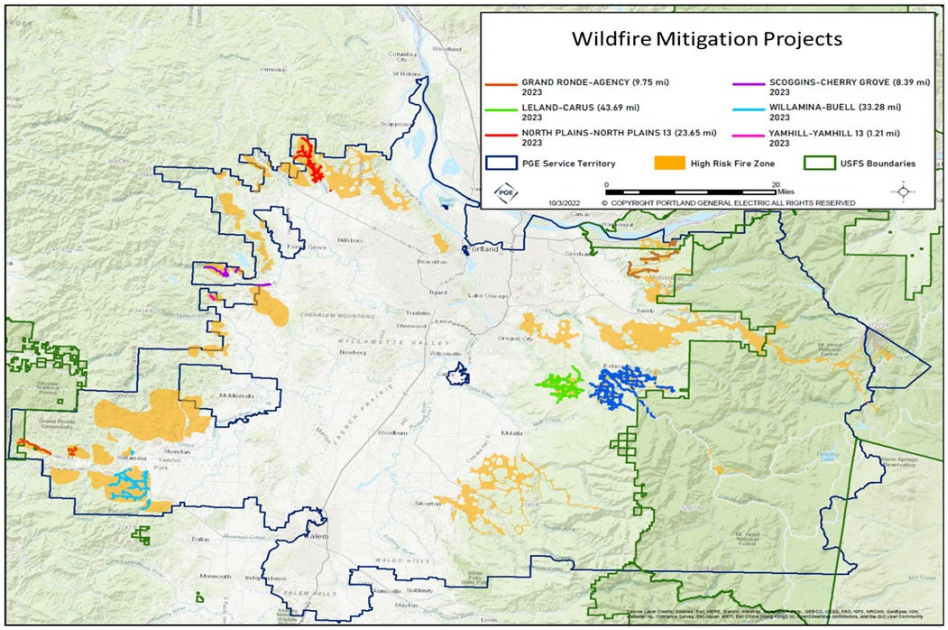


Figure 26. PGE Planned Wildfire Mitigation Investments, 2023

11 Expected Wildfire Mitigation Program Costs

PGE develops an annual implementation and administrative cost budget and an administrative costs and forecasted capital budgets for the Program. This section is added to address recommendation 11. The activities and expenditures are outlined in the following sections.

11.1 Wildfire-Related Operations, Maintenance, and Construction

For the 2024 WMP, PGE has updated O&M and Capital Cost Areas to be more descriptive of the activities and associated budget forecasts compared to the 2023 WMP.

- O&M forecasted cost areas of Wildfire Mitigation and Support Services were split into new, more program-focused cost areas as detailed in Table 22.

Table 22. PGE 2024-2027 Wildfire Mitigation Forecasted O&M Costs

HFRZ 1–11 O&M Forecast (millions, including direct loadings) [20]				
Cost Area	2024	2025	2026	2027
Wildfire Mitigation Program & Compliance	$2.1	$2.7	$2.8	$2.9
Risk Mapping & Simulations	$0.8	$1.1	$1.1	$1.2
Grid Operations & Protocols	$0.5	$0.7	$0.7	$0.7
PSPS Program	$0.9	$1.1	$1.1	$1.2
WMP Engagement, Public Awareness & Education, and Public Safety Partner Coordination	$0.7	$0.8	$0.9	$0.9
Asset Management & Inspections	$3.6	$3.7	$3.5	$3.7
Vegetation Management & Inspections (AWRR)	$36.2	$39.3	$38.3	$39.7
Investment O&M	$0.5	$0.5	$0.5	$0.5
WMP Total	$45.3	$48-$50	$47-$49	$49-$51

Capital cost areas of Utility Asset Management (Project Management Office) and Utility Asset Management have been combined into Utility Asset Management for clarity and detailed in Table 23.

Table 23. PGE 2024–2027 Wildfire Mitigation Forecasted Capital Costs

HFRZ 1–11 Capital (millions, including direct loadings)				
Cost Area	2024	2025	2026	2027
Wildfire Mitigation	$39.5–$44.4	$52.6–$73.7	$57.9–$73.7	$61.1–$78.9
Wildfire-Related Utility Asset Management	$3.5–$4.8	$4.0–$4.6	$4.2–$4.7	$4.4–$5.7
WMP Total Range	$43–$49.2	$56.6–$78.3	$62.1–$78.4	$65.5–$84.6

For reference, as of the filing of PGE's 2024 WMP, $14.9 million, excluding all loadings, has been executed in 2023 capital investments. Figure 27 compares the 2023 WMP Plan vs Actuals for Planned Wildfire Undergrounding/Reconductoring Investments and illustrates the multiyear projects at various stages of execution. The percentage completed is compared to the goal of 2023 progress, not the overall project schedule.

[20] See OPUC Order 23-370, Appendix A Page 10

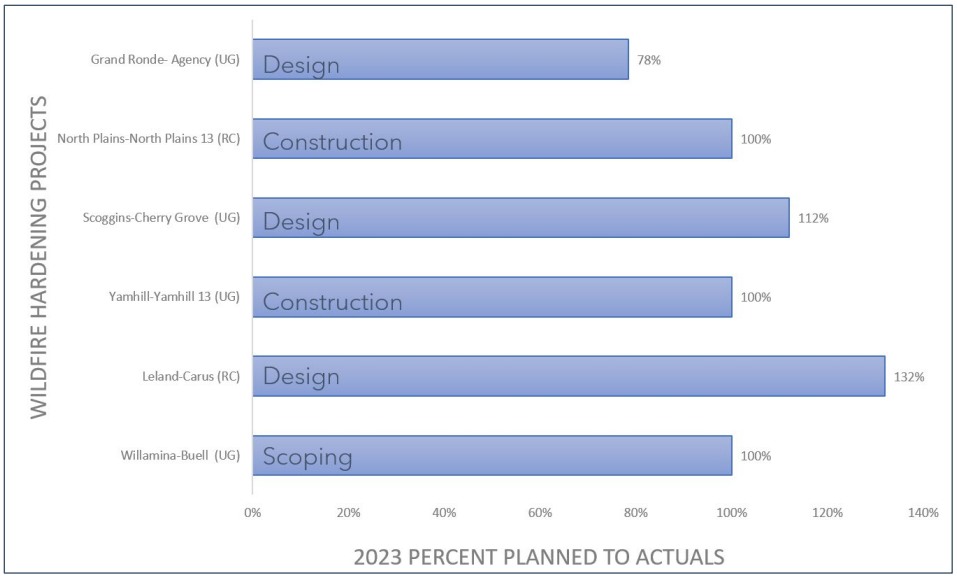


Figure 27. 2023 WMP Undergrounding/Reconductoring Investment: Planned vs. Actuals

Figure 28 reflects the programmatic planned to actuals for 2023 activities. As programmatic efforts are at various stages throughout the year, progress is measured to construction only. It is important to note that work that includes scoping, design, and permitting for targets can be a much higher percentage than that of the physical installation.

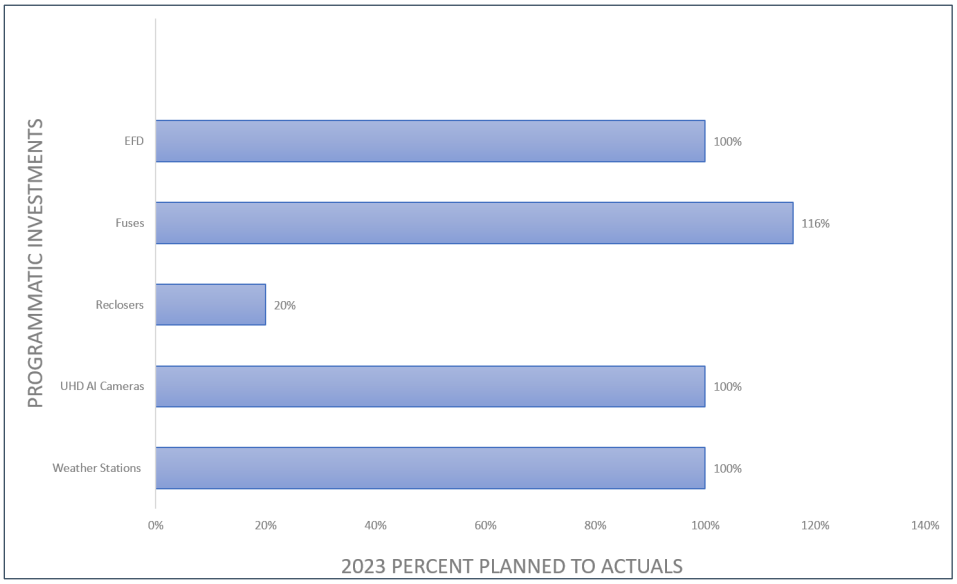


Figure 28. 2023 WMP Situational Awareness/Programmatic Investment Planned vs. Actuals

Discussion of 2023 planned versus actual investments are in PGE's Retrospective Reports. PGE files these reports biannually with the OPUC in Docket UE-412. Table 24 provides 2024 WMP activities and descriptions for O&M and Capital.

Table 24. 2024 WMP Activity and Descriptions

Activity	Description
Operations and Maintenance	
Wildfire Mitigation Program and Compliance	Develop, monitor, and track compliance to PGE's WMP. Includes Industry Engagement and Research & Development.
Risk Mapping & Simulation	Activities included in PGE's WRMA, HFRZ development, and valuation of capital projects and O&M programs.
Grid Operations and Protocols	Develop, implement, and monitor changes to PGE's Operations during fire season. Includes fire season training to select employees.
PSPS Program	Continue maturing PGE's de-energization protocols for public safety. Includes CRC and Customer Programs associated with supporting customers during a PSPS.
WMP Engagement, Public Awareness & Education, and Public Safety Partner Coordination	Engage customers, communities, and public safety partners to educate and gather feedback on PGE's WMP.
Asset Management & Inspections	Ignition Prevention Inspections and corrections performed under PGE's Inspect-Correct methodology in HFRZ.
Vegetation Management & Inspections (AWRR)	AWRR annual inspections, trimming, and tree removals within HFRZ.
Investment O&M	O&M associated with prior investments in system hardening and situational awareness to reduce wildfire risk in HFRZ.
Capital	
Wildfire Mitigation	System hardening and situational awareness investments that are focused on risk reduction in HFRZ
HFRZ Utility Asset Management	Capital additions and/or replacements in HFRZ based on inspection results or specific programs.

PGE will continue to refine its WRMA program in 2024 and beyond and will continue to forecast its wildfire mitigation capital and O&M spending needs based on the results of that analysis. State or Federal grant funds may augment PGE's planned programs if PGE receives an award. PGE is pursuing further grant funding for wildfire risk reduction and resiliency improvement. These programs include Federal Emergency Management Agency's Building Resilient Infrastructure and Communities grants and the Department of Energy's (DOE) Bipartisan Infrastructure Bill (BIL) with grant funding opportunities through the Grid Resilience and Innovation Partnerships section. PGE also explores additional opportunities through the State of Oregon's formula grants under the BIL.

11.2 Co-Benefits

To address recommendation 26, PGE demonstrates how both hardening and O&M bring benefits to customers and the region beyond wildfire mitigation. PGE has also partnered with peer IOUs to align on realizing co-benefits from investments, operations & maintenance. Table 25 illustrates how these activities overlap in co-benefits.

Table 25. Co-Benefits from Investments and O&M

Projects	Utility Definition	DSP	Safety	Reliability	Resilience
Utility Definition					
Vegetation Management	Includes Base & AWRR		X	X	
Asset Inspections and Corrections	Safety & Wildfire Inspections/ Corrections		X	X	
Grid Hardening	i.e., Undergrounding/ Reconductor	X	X	X	X
Situational Awareness	i.e., AI Cameras/Weather Stations	X	X	X	X
R&D					
Remote Sensing	i.e., Imagery/LiDar	X	X	X	X
Advanced Weather Forecasting	Predictive Forecasting		X	X	X
Updated Study Cost Power Interruptions	Value of Service Modeling	X		X	
POET Projects	Value of Resiliency Modeling	X			X

12 Participation in Regional, National, and International Forums

In 2024, as in previous years, PGE will actively participate in various regional, 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 NWCC and fire dispatch center personnel to assist with strategic decision-making and incident coordination.

In addition, PGE participates in industry forums that discuss wildfire-related topics, as discussed in the following sections.

12.1 International Wildfire Risk Mitigation Consortium

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 holds leadership positions on the Risk Management and Asset Management working groups and chaired the 2023 Risk Management committee. PGE uses this forum to test PGE climate change assumptions and how climate change plays a role in both strategic risk management as well as understanding the value proposition of investments. 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. For example, through IWRMC, PGE will participate in The Hazard / Strike Tree Benchmarking and Best Practices Study to formulate a process and approach for identifying, assessing, and mitigating Hazard/Strike Trees with industry peers. This effort is scheduled to conclude in 2024.

PGE attended the IWRMC Annual Meeting on February 12–February 16, 2023. Key learnings PGE will consider in 2024 and future WMPs:

- Wildfire modeling results are increasingly diverging from observed fires. Temperature, as well as fire and fuel behavior are off by orders of magnitude from a predicted-to-actuals standpoint. Due to the combination of fuels in WUI being unique, climate change stresses on vegetation and wind patterns.
- Vegetation stress from cumulative drought suggests higher probability of down trees and limbs during any time of year. Failure of root system and poor moisture penetration driven by drought can result in down trees even in the absence of wind.
- Utilities are implementing a new standard for breakaway disconnects to mitigate the impact of limbs or trees falling into overhead secondary circuits. This design reduces PSPS impacts driven by overhead secondary risk and minimizes outage restoration time with easy reconnecting.
- Community engagement is recognized as a vital part of any WMP effort. A number of utilities have dedicated teams to support this work.

Through the IWRMC, PGE can leverage 'lessons learned' for specific wildfire mitigation strategies already implemented by other utilities, such as using covered conductors 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 the 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 an 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 helped PGE avoid pitfalls and select more cost-effective and successful risk mitigation measures.

12.2 Electric Power Research Institute

PGE engages with its research partners at EPRI through multiple programs to address wildfire mitigation research. It is leveraging EPRI-led programs such as the Incubatenergy Network to gain knowledge of new technologies and start-ups in wildfire-related disciplines. PGE Senior Leadership actively engages in EPRI roles, and some are specific to wildfire, details of which are shared below in Section 12.7, "Summary of PGE Participation in Industry Forums.

In 2023, PGE participated in multiple EPRI climate advisory workshops and asset management peer reviews. Different learnings and applications were shared across industry, (e.g., benefits vs. risks of tree wire). In 2024, PGE plans to participate in a dedicated vegetation management EPRI study to understand if and how an RSE metric or calculation might be possible for its vegetation management program.

12.3 Oregon Joint Use Association

PGE is active in the leadership of the Oregon Joint Use Association (OJUA), a non-profit industry workgroup. The OJUA's 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 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.

12.4 Other National and Regional Forums

PGE engages with industry research partners at the Western Energy Institute, Edison Energy Institute (EEI), and the US DOE. This is evidenced by PGE's participation in the leadership of these organizations, as well as its active engagement in the industry technical sessions and conferences. PGE attended the EEI Wildfire Technologies Conference February 15–16, 2023. Key learnings were how utilization of the FPI could give Operations more advanced notice of Operational changes due to weather and some use cases that can augment safety-adjusted settings to reduce wildfire risk.

12.5 Regional Disaster Preparedness Organization

PGE is an active participant in the Regional Disaster Preparedness Organization (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.

12.6 Oregon Wildfire Detection Camera Interoperability Committee

PGE participates in the Oregon Wildfire Detection Camera Interoperability Committee. This committee's primary goals and objectives include developing and maintaining statewide wildfire camera detection system(s) and fostering coordination and collaboration among its members. 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.

12.7 Summary of PGE Participation in Industry Forums

Below is a summary of engagement by PGE personnel in industry forums. This list is not exhaustive and does not capture the engagements in numerous forums within broader organizations, for example, EEI and WEI. Table 26 partially fulfills recommendation 28 for 2024. Recommendation 28 is supported by specific examples of those learnings included throughout the 2024 WMP.

Table 26. PGE Industry Forum Participation

Industry Forum	PGE Participant	Role
IWRMC Risk Management	Manager, Wildfire Planning & Analytics	Chair
IWRMC Asset Management	Senior Manager, Wildfire Operations Program Management	Vice-chair
IWRMC Vegetation Management	Manager Forestry	Participant
IWRMC Operations & Protocols	Director, Wildfire Mitigation & Resiliency	Participant
EPRI	Manager, Wildfire Planning & Analytics	Senior Advisory Board
Oregon Joint Use Association	Senior Manager, Strategic Asset Management	Chair
Regional Disaster Preparedness Organization	Manager, Business Continuity & Emergency Management	Steering Committee Member
Oregon Wildfire Detection Camera Interoperability Committee	Senior Manager, Wildfire Operations Program Management	Participant

13 Research and Development

PGE is participating in a variety of wildfire related research projects with public and private research institutes and industry partners.

13.1 Early Fault Detection Pilot Program

As a result of its collaboration with EPRI, PGE deployed the EFD pilot project in 2021.[21] EFD uses sensors to detect anomalies on the circuit in real-time, allowing PGE to replace or repair the affected component(s) before a failure that could result in ignition. Figure 29 is a damaged conductor identified by the EFD system and corrected by PGE in 2022.

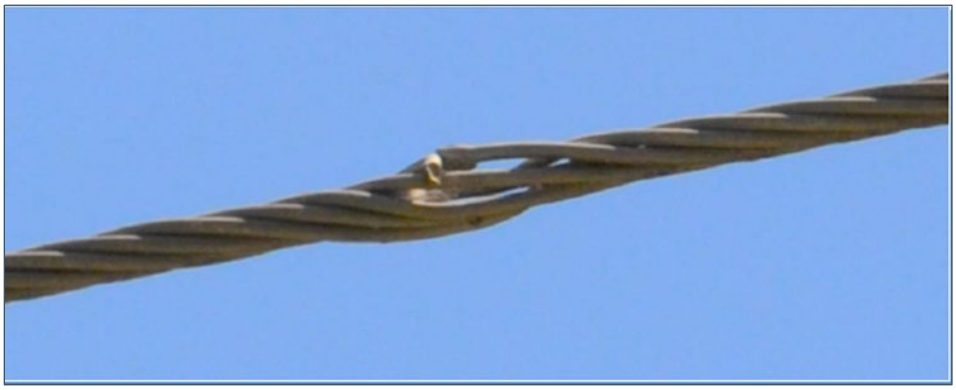


Figure 29. Damaged Conductor Identified by EFD System

In 2023, PGE expanded the EFD system from the original pilot program on Mt. Hood by adding sensors covering the Sandy-Sandy 13 overhead circuit. In preparation for the expansion, business processes were identified and refined to have a clear chain of responsibility for responding to alerts. As a result, PGE's work order management and dispatching tools have been updated to include response to EFD alerts as a standard procedure. Additional process refinement around proactive pattern identification, signal monitoring, and response prioritization will come with the program's expansion. PGE plans to expand EFD to additional circuits, both distribution and transmission lines in 2024. Figure 30 is an example of an installed EFD system.

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

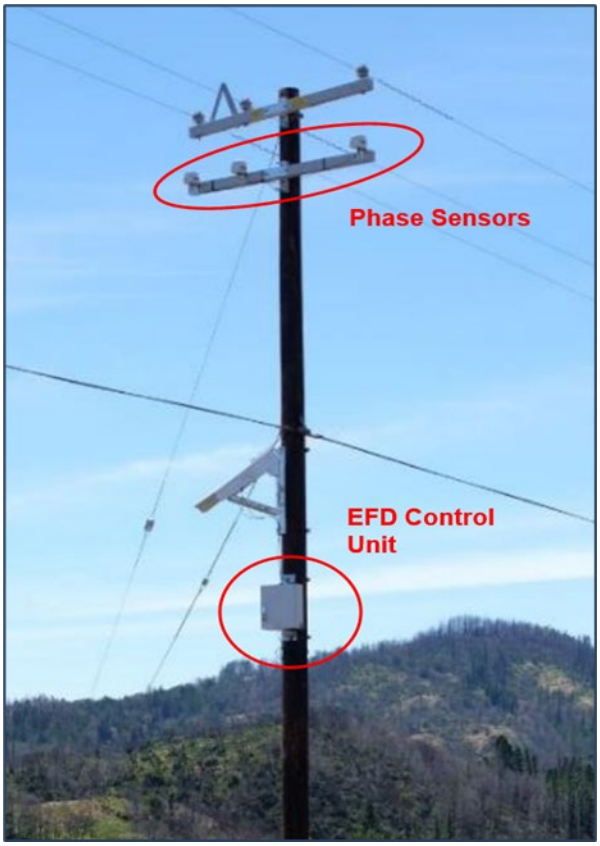


Figure 30. Installed EFD System

13.2 Remote Sensing Pilot Project

In 2021, PGE conducted a remote sensing data acquisition project for its HFRZ circuits 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 HFRZ.

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 HFRZ. Figure 31 is a sample aerial LiDAR image.

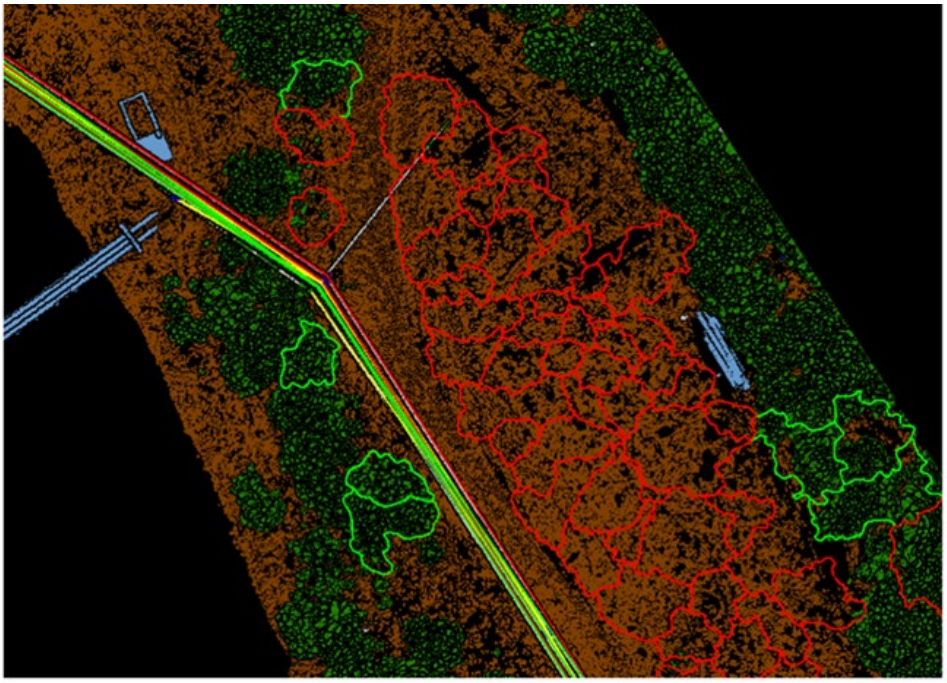


Figure 31. Sample Aerial LiDAR Imagery

Areas outlined in red are trees identified as threats in 2019 which have been removed.

PGE considered this data and analysis in the 2023 capital planning work, which guides its wildfire investment strategy. The data will also help PGE understand how much risk has been mitigated through previous years' AWRR (vegetation management) activities. PGE is using this information to plan our 2023 vegetation management program.

PGE's Remote Sensing Pilot Project also provided the following:

- 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 changes detection analysis (2019–2021)

Additionally, PGE acquired satellite imagery for all HFRZ, 1,100 miles of conductor, to administer pilots using machine learning models to assess vegetation clearance, visualize line of sight, and identify hazard trees along T&D lines. PGE plans to expand its remote sensing capabilities and refresh data, including LiDAR, Orthoimaging, and satellite in all HFRZ. PGE will also invest in standardizing an imagery and inspection program to deliver organized and structured inspection data on a centralized data platform.

13.3 Storm Predictive Tool

PGE has operationalized version 1.0 of a Storm Predictive Tool that assesses high wind conditions that can be leveraged for winter storm and wildfire weather scenarios. Throughout 2023, PGE has conducted further model testing and validation to assess the Storm Predictive Tool's ability to incorporate more granular and sophisticated inputs to inform PGE's PSPS execution decision analysis, crew positioning, sparing strategy and improve system alarming. As the machine learning tool matures and learns, it 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 including equipment demand planning, spare equipment mobilization, and operational standards and practices, such as positioning crews geographically to respond to outages faster. Figure 32 is a sample of the predictive outage model output.

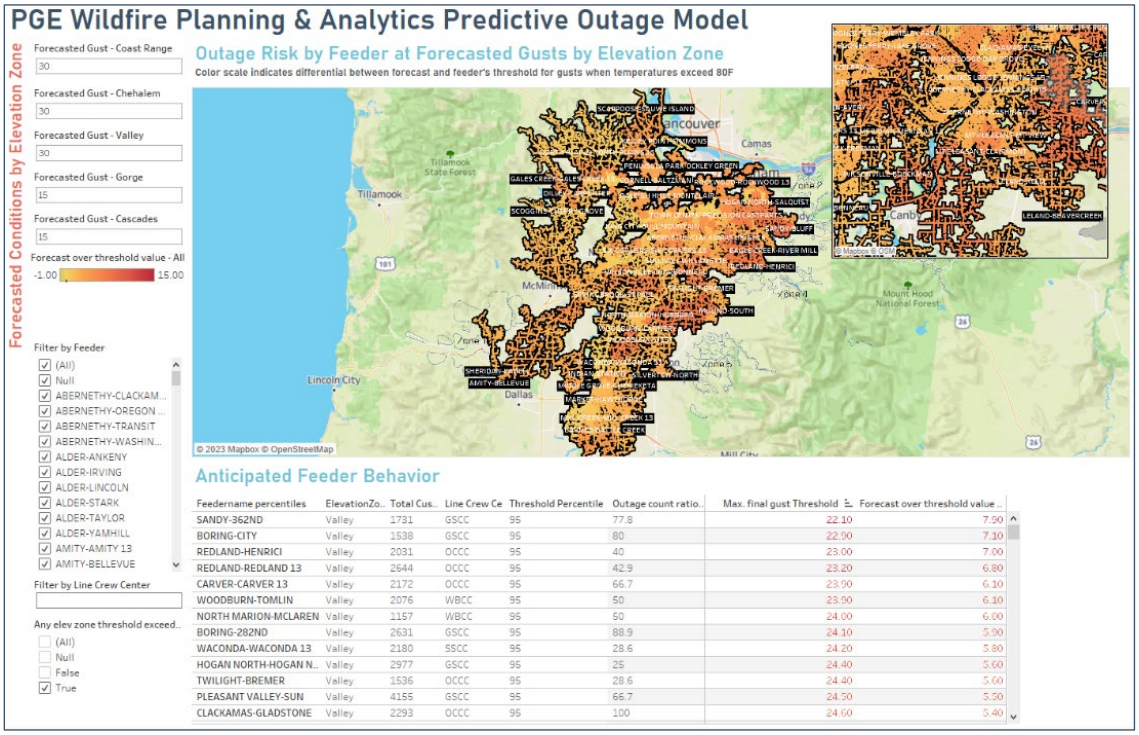


Figure 32. Sample Predictive Outage Model Output

13.4 PGE 5G Energy Lab

PGE leads the 5G PGE Energy Lab which is focused on developing innovative wildfire mitigation technologies. The collaboration evaluates use cases and develops business cases for wildfire-related surveillance, sensing and data collection, and cloud storage technologies, laying the groundwork for using AI-driven analysis in these disciplines. Through this collaboration group, PGE has investigated ways to interface the emerging 5G network with fire detection technology, EFD, and weather stations.

13.5 Customer Medical Battery Support

In the 2023 plan, PGE proposed to provide no-cost portable batteries to select qualified customers based on peer benchmarking learnings from the California utilities. The budget request to give these portable batteries and study the impacts for Year 1 was $100,000. The key objective of the offering was to understand the customers' usage of the battery devices to back up critical medical devices, customers perception of preparedness and resilience, and the customers experience during an outage before and after receiving a device.

PGE filed a promotional concession notifying the OPUC of the intent to offer portable batteries to PSPS-impacted residential customers enrolled in PGE's medical certificate program and the Income-Qualified Bill Discount Program on May 19, 2023, pre-identified 46 qualified customers in July of 2023, and began the initial outreach to deliver portable batteries to the identified customers in August. PGE contacted customers via email, mail, and phone calls to make them aware of the offering, and

as customers signed up and returned liability waivers, the devices were shipped directly to them from PGE's supplier, Goal Zero.

As of the close of the 2023 fire season, 37 pre-identified customers who had been contacted received their battery, a Goal Zero Yeti 1500x. This model has enough energy for 1,516 watt hours and can power a CPAP for 24 hours or a refrigerator for 21 hours.[22] This model was chosen after a competitive RFP selection process. PGE secured favorable battery purchase pricing, allowing the Company to purchase enough devices to continue the offering into 2024.

PGE will conduct surveys and interviews with customers who have received these devices to understand their experiences and feelings of preparedness, tentatively planning for Spring of 2024 after the customer has been through a winter season and prior to fire season.

13.6 Future Offerings & Research

PGE has budgeted for $200,000 per year through this plan to continue evaluating and piloting new innovative customer solutions to support customer needs not otherwise addressed within this plan. The CRCs are an important element of PGE's customer support during PSPS events, but PGE recognizes that not all customers have equal access or benefit from the CRCs. The medical battery offering was the first step in providing additional support to customers who may be disproportionately harmed by a power outage or unable to access a CRC readily. However, PGE knows this is not the end of the need. PGE is exploring expanded support for medical needs, such as solutions to keep insulin cold and more options to get resilience solutions to those who could benefit from them.

PGE would like to explore solutions for ensuring customers have continued access to water, especially in the rural areas affected by PSPS, where many customers rely on wells that fail to work during an outage. Besides the apparent comfort, health, and hygiene impacts of losing access to water, water loss removes the primary mechanism for preventing wildfire spread in times of extreme wildfire risk. PGE seeks to explore solutions supporting water supply continuity for personal and community wells.

13.7 Advanced Meter & Data Analytics

In addition to fulfilling recommendation 27, PGE's participation in Association of Edison Illuminating Companies and the EEI has led to the adoption of an advanced meter analytics initiative. The goal is to leverage advanced meter infrastructure data to identify opportunities on the network to increase reliability for customers with reduced customer minutes of interruption and truck rolls. PGE, leveraging these industry forums and learnings, has been able to pilot evaluating voltage drops to predict hot wires on the ground and reduce public safety hazards. PGE anticipates this effort to continue to grow over time.

Contact PGE

For information regarding PGE's wildfire mitigation program and wildfire-related emergency kits, plans, checklists, education, and preparedness information, visit PGE's website, 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.

[22] GoalZero Yeti 1500 Portable Power Station

14 Appendix and Compliance Index

14.1 Appendix 1: Chapter 860, Division 024 Applicable Rules

Rule Citation	Document Sections
860-024-0018	
1	Appendix 10: PGE Ignition Prevention Standards
2	8.6 Ignition Prevention Inspection Learnings
3	8.1 Inspection Procedures
3(a)	4.2 Enhanced Monitoring and Technology in HFRZ
	5.1 System Operations During Fire Season
	Table 10: Distribution System Operations In and Out of Fire Season SCADA Devices
	8 Ignition Prevention Inspections
	Table 15: Number of Inspected Structures and Line Miles
	4.2 Enhanced Monitoring and Technology in HFRZ
3(b)	5.1 System Operations During Fire Season
	Table 11: Pelton and Round Butte System Operations
	8 Ignition Prevention Inspections
	Table 15: Number of Inspected Structures and Line Miles
	8.5 HFRZ Correction Timeframes
	8.5 HFRZ Correction Timeframes
4	8.5 HFRZ Correction Timeframes
5	8.5 HFRZ Correction Timeframes
5(a)	8.5 HFRZ Correction Timeframes
5(b)	8.5 HFRZ Correction Timeframes
5(c)	8.6 Ignition Prevention Inspection Learnings
6	8.6 Ignition Prevention Inspection Learnings
7	8.6 Ignition Prevention Inspection Learnings
8	8.6 Ignition Prevention Inspection Learnings
9	Note to utility about rule intentions.
10	Appendix 10: PGE Ignition Prevention Standards

14.2 Appendix 2: Chapter 860, Division 300 Applicable Rules

Rule Citation	Document Sections
860-300-0030	3 Wildfire Risk Mitigation Program Overview
860-300-0040	7 Wildfire Safety, Prevention, Communication and Engagement Strategies
	7.4 2023 Engagement Activities and 2024 Engagement Strategy
1	7.4 2023 Engagement Activities and 2024 Engagement Strategy
1(a)	7.4 2023 Engagement Activities and 2024 Engagement Strategy
1(a)(A)	7.5 Public Safety Partner Coordination Strategy
	7.5.1.1 Before fire season
	7.5.1.3 After fire season
1(a)(B)	7 Wildfire Safety, Prevention, Communication and Engagement Strategies
	Appendix 4: Summary of Input from Public Safety Partners
1(b)	7.2 Education Campaign: Channels and Outcomes
2	7.1 Education Approach
2(a)	7.2 Education Campaign: Channels and Outcomes
	6.10 Communications During a PSPS Event
2(a)(A)	7.2 Education Campaign: Channels and Outcomes
2(a)(B)	7.2 Education Campaign: Channels and Outcomes
2(a)(C)	7.2 Education Campaign: Channels and Outcomes
2(a)(D)	7.2 Education Campaign: Channels and Outcomes
2(b)(A)	7.2 Education Campaign: Channels and Outcomes
2(b)(B)	7.5.1 Coordination Approach
	7.5.1.1 Before Fire Season
2(b)(C)	7.4 2023 Engagement Activities and 2024 Engagement Strategy
2(b)(C)(i)	7.2 Education Campaign: Channels and Outcomes
2(b)(C)(ii)	7.2 Education Campaign: Channels and Outcomes
3	Appendix 7: Community and Stakeholder Engagement Metrics
4	8.5.1.1 Before Fire Season
4(a)	7.5.1.1 Before Fire Season
4(b)	7.5.1.1 Before Fire Season
	7.5.1.2 During Fire Season
	7.5.1.3 After Fire Season
4(c)	Appendix 4: Summary of Input from Public Safety Partners
860-300-0050	6 Operations During PSPS Event
1	6 Operations During PSPS Event
1(a)	6.10 Communications During a PSPS Event
1(b)	6.10 Communications During a PSPS Event
1(b)(A)	6 Operations During PSPS Event
1(b)(B)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy

1(b)(C)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
1(b)(D)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
1(b)(E)	6.3 Level 1: Normal
1(b)(F)	Table 14: Notification Information
1(b)(G)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
1(b)(H)	Note to Utility that this rule does not preclude additional communication.
1(c)	6 Operations During PSPS Event
1(c)(A)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
1(c)(B)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
1(c)(C)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
1(c)(D)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
1(c)(E)	6 Operations During PSPS Event
1(d)	6.4 Level 2: Guarded
2	6 Operations During PSPS Event
2(a)	6 Operations During PSPS Event
2(a)(A)	6.10 Communications During a PSPS Event
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(a)(B)	6.10 Communications During a PSPS Event
2(a)(C)	2 Introduction
	6 Operations During PSPS Event
2(b)	6.10 Communications During a PSPS Event

	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(b)(A)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(b)(B)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(b)(C)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(b)(D)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(b)(E)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(b)(F)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
2(b)(G)	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information
	Figure 19: PSPS Notification Strategy
3	6.4 Level 2: Guarded
3(a)	6.5 Level 3: Elevated
3(b)	6.5 Level 3: Elevated
3(c)	6.5 Level 3: Elevated
4	Note to Utility that this rule does not replace emergency alerts.
5	Note to Utility that this rule allows for additional communication beyond stated rule.
860-300-0060	6 Operations During PSPS Event
1	6 Operations During PSPS Event
	Appendix 4: Summary of Input from Public Safety Partners
2	6.10 Communications During a PSPS Event
	Table 13: Notification Cadence
	Table 14: Notification Information

	Figure 19: PSPS Notification Strategy
3	6 Operations During PSPS Event
4	6 Operations During PSPS Event
860-300-0070	
1	In the event of a PSPS event, PGE will file with OPUC an annual report(s) on de-energization lessons learned, no later than December 31.
2	The non-confidential versions of PGE's annual report filed with the OPUC will be made available on PGE's website.
860-300-0080	Not Applicable

14.3 Appendix 3: 2023 WMP Recommendations and Workshop Dates

Recommendation	Document Sections	Workshop Date
1. Detail recommendations from local partners in establishing HFRZ.	3.2.1 Updates to Wildfire Risk Assessment with Fire Agencies 3.2.2 High Fire Risk Zone Review with Fire Agencies	October 17, 2023
2 Provide explicit details of assets within and outside the HFRZ. Staff further recommends that PGE provide explicit details of assets within and outside the HFRZ. Staff believes this should be constructed using a common reporting structure across the IOUs.	4.2 Enhanced Monitoring and Technology in HFRZ Figure 14: 2023 PGE Pano AI Camera Locations Table 8: Agencies Using PGE Pano AI Cameras Figure 13: PGE 2024 HFRZ Table 9: PGE Assets Grouped by HFRZ	August 2, 2023
3 Joint IOUs explore calibration of wildfire risk modeling methods to coordinate that when and where overlaps occur, they are consistent, or explicably inconsistent, in their risk designation. Such designation and coordination across utilities may lend greater clarity for stakeholders and Staff to understand relative risks.	3.2.2 High Fire Risk Zone Review with Fire Agencies 3.2.3 Coordination with Peer Utilities Figure 3: Proposed Roadmap for HFRZ Determination Standardization	August 22, 2023
4 Provide details for incorporation of climate change modeling in establishing the HFRZ.	4.5 Climate Change 4.5.1 Impacts on PGE's Service Area 4.6 PGE's Inclusion of Climate Change Variables in Risk Assessments	August 2, 2023
5 Provide historic root cause analysis supporting equipment ignition risk determinations.	8.9 Ignition Management and Root Cause Analysis Table 17: Ignition Tracking Database Fields Figure 22: PGE management Process Flow	October 5, 2023
6 Demonstrate the Company's ignition management tracking database and processes.	8.6 Ignition Prevention Inspection Learnings 8.9 Ignition Management and Root cause Analysis Table 17 Ignition Tracking Database Fields 8.9.2 Ignition Engineering Review Task Force	October 5, 2023
7 Provide valuation for undergrounding and reconductoring projects identified in the Company's 2023 WMP, in addition to any subsequently identified hardening projects.	10 System Hardening Table 20:Planned Underground Reconductoring Investments in Line Miles 2024-2027 Figure 26: PGE Planned Wildfire Mitigation Investments, 2023 11 Expected Wildfire Mitigation Program Costs 11.1 Wildfire-Related Operations, Maintenance, and Construction Table 22: PGE 2024-2027 Wildfire Mitigation Forecasted O&M Costs Table 23: PGE 2024-2027 Wildfire Mitigation Forecasted Capital Costs Figure 27: 2023 WMP Undergrounding/Reconductoring Investment: Planned vs. Actuals	August 2, 2023 August 22, 2023

Recommendation	Document Sections	Workshop Date
	Figure 28: 2023 WMP Situational Awareness/Programmatic Investment Planned vs. Actuals Table 24: 2024 WMP Activity and Descriptions	
8 Detail progress made towards a uniform risk-spend valuation methodology.	1 Executive summary 3.4 Risk Assessment Methodologies: Data Quality and Review Frequency Table 5: Cadence of Updates 3.6 PGE's Inclusion of Climate Change Variables in Risk Assessments Table 6: Risk Valuation Research, Reports, and Studies References 3.7 Wildfire Risk Informed Decision Making Figure 10: The Value Spend Efficiency Equation	August 22, 2023
9 Provide planned and actual work by program for the prior and future years, as well as associated estimations of risk reduction for the work completed.	3 Wildfire Risk Mitigation Program Overview 3.3 Wildfire Risk Categories 3.7 Wildfire Risk Informed Decision Making 8.9.3 Role of Vegetation in Ignitions 9 Vegetation Management 9.2 Advanced Wildfire Risk Reduction Vegetation Management Program 10 System Hardening Table 20Planned Underground Reconductoring Investments in Line Miles 2024-2027 Figure 26: PGE Planned Wildfire Mitigation Investments, 2023 11 Expected Wildfire Mitigation Program Costs 11.1 Wildfire-Related Operations, Maintenance, and Construction Table 22: PGE 2024-2027 Wildfire Mitigation Forecasted O&M Costs Table 23: PGE 2024-2027 Wildfire Mitigation Forecasted Capital Costs Figure 27: 2023 WMP Undergrounding/Reconductoring Investment: Planned vs. Actuals Figure 28: 2023 WMP Situational Awareness/Programmatic Investment Planned vs. Actuals Table 24: 2024 WMP Activity and Descriptions	August 2, 2023
10 Provide planned and actual work by program for the prior and future years, as well as associated estimations of risk reduction for the work completed.	Duplicate of recommendation 9	
11 Provide a multiyear plan (at least four years out) with project-level details for any capital investments and the estimated risk reduction for the selected mitigation method.	10 System Hardening Table 20Planned Underground Reconductoring Investments in Line Miles 2024-2027 Figure 26 PGE Planned Wildfire Mitigation Investments, 2023 11 Expected Wildfire Mitigation Program Costs	August 2, 2023

Recommendation	Document Sections	Workshop Date
	11.1 Wildfire-Related Operations, Maintenance, and Construction Table 22: PGE 2024-2027 Wildfire Mitigation Forecasted O&M Costs Table 23: PGE 2024-2027 Wildfire Mitigation Forecasted Capital Costs Figure 27: 2023 WMP Undergrounding/Reconductoring Investment: Planned vs. Actuals Figure 28: 2023 WMP Situational Awareness/Programmatic Investment Planned vs. Actuals Table 24: 2024 WMP Activity and Descriptions	
12 Include as an appendix to its WMP a registry of Public Safety Partner events, with feedback and actions taken as a result of the feedback.	7.4 2023 Engagement Activities and 2024 Engagement Strategy 7.5 Public Safety Partner Coordination Strategy Appendix 4: Summary of Input from Public Safety Partners	October 17, 2023
13 Provide findings of analyses on operational modifications based upon Fire Season or other relevant elevated wildfire periods.	5.1 System Operations During Fire Season Table 12: System Wide Daily Reliability Performance June 1-October 31	August 2, 2023
14 Staff recommends that PGE outline roles and responsibilities that are in place during PSPS activations; PGE should communicate this structure to Public Safety Partners, at a minimum during tabletops or exercises.	5.3 Event Response Management 6 Operations During PSPS Event 6.1 De-Energizing Power Lines and Power System Operations During PSPS Event 6.2 Levels of a PSPS Event 6.3 Level 1: Normal 6.4 Level 2: Guarded 6.5 Level 3: Elevated 6.6 Preparation for De-Energization 6.7 Level 4: Severe Event Happening 6.8 Level 4: Severe Restoration 6.9 Community Resource Centers 7.5.1.1 Before Fire Season	October 17, 2023
15 Staff recommends that PGE continue to develop its experience in placing and operating CRCs when activated.	6.9 Community Resource Centers Figure 17 PSPS Process Bell Curve	October 17, 2023
16 Joint IOUs establish language for Public Safety Partners and communities regarding modified operational practices, including "sensitive settings", PSPS and other utility operational modes to mitigate wildfire risk.	7.1 Education Approach	August 2, 2023
17 Coordinate community outreach with partners, including ESF-12, and consider broadening the workshop to include relevant community safety topics, inviting Public Safety Partners regarding	6.4 Level 2: Guarded 7.4 2023 Engagement Activities and 2024 Engagement Strategy 7.5.1.1 Before Fire Season	October 17, 2023

Recommendation	Document Sections	Workshop Date
other topics appropriate to the community.		
18 Detail methods for determining the effectiveness of customer outreach and describe any modifications made to outreach strategies as a result. Further Staff recommends that the IOUs consider coordinating community outreach (where overlap of Public Safety Partners may exist) and developing consistent methods for evaluating the effectiveness of their public outreach and their Public Safety Partner outreach and establish methods.	Appendix 7: Community and Stakeholder Engagement Metrics Table 30: Customer Campaign Metrics Appendix 9: 2023 Public Safety Partner Event Registry	August 22, 2023
19 Portland General Electric provide cost analysis supporting its inspection correction process for Ignition Prevention Inspections, including demonstrable details that substantiate this selection.	8 Ignition Prevention Inspections 8.1 Inspection Procedures 8.2 Ignition Prevention Inspections Standards	August 22, 2023
20 Portland General Electric demonstrate the use of its ignition management tracking database to support its approach to ignition prevention inspections.	8.6 Ignition Prevention Inspection Learnings 8.9 Ignition Management and Root cause Analysis Table 17: Ignition Tracking Database Fields 8.9.2 Ignition Engineering Review Task Force Figure 22: PGE Management Process Flow	October 5, 2023
21 Portland General Electric explore the results of its QA/QC program for ignition prevention inspections and determine a reasonable quality assurance level and associated costs for administering the program.	8.3 Ignition Prevention Inspection Program Oversight	October 17, 2023
22 Staff recommends PGE utilize the previously recommended RSE methodology to determine the risk reduction that AWRR delivers to customers.	9.4 Risk Informed Vegetation Management	August 22, 2023
23 Staff recommends that root cause analysis for vegetation-related risks be conducted to support the determination of how AWRR is employed.	8.9.2 Ignition Engineering Review Task Force Figure 22: PGE Management Process Flow 8.9.3 Role of Vegetation in Ignitions 9.4.1 Levels of Assessment	October 5, 2023
24 Staff recommends that PGE demonstrate its use of its ignition management tracking database to evaluate the logic of its programmatic decisions for vegetation management in HFRZ.	8.9 Ignition Management and Root cause Analysis Table 17: Ignition Tracking Database Fields 8.9.2 Ignition Engineering Review Task Force Figure 22: PGE Management Process Flow 8.9.3 Role of Vegetation in Ignitions	October 5, 2023

Recommendation	Document Sections	Workshop Date
25 PGE include a summary of the quantitative analysis used in the choice and prioritization of specific solutions and investments.	10 System Hardening Table 24: 2024 WMP Activity and Descriptions 11.1 Wildfire-Related Operations, Maintenance, and Construction 13 Research and Development	August 2, 2023 August 22, 2023
26 PGE include how solutions providing co-benefits have been considered in its investment strategies.	11.2 Co-Benefits Table 25: Co-Benefits from Investments and O&M	August 2, 2023 August 22, 2023
27 PGE discuss the impact of participation in expert forums on identification of solutions most likely to provide the benefits anticipated. This should include: a. Cited research, reports, and studies used in any analysis, unless the source is confidential. b. How the factors unique to the Company's facilities and service territory were used when considering the applicability of specific options to its systems.	4.2 Enhanced Monitoring and Technology in HFRZ Table 6: Risk Valuation Research, Reports, and Studies References 13.7 Advanced Meter Analytics	October 17, 2023
28 In Recommendation 27, Staff recognized certain of the industry learnings were likely related to risk valuation, however directly responsive to the broader research and development and industry participation, Staff recommends PGE provide specifics on program changes made in response to learnings from industry forums, as well as greater detail of who from the company participates and in what roles they function in various industry forums.	12.7 Summary of PGE Participation in Industry Forums Table 26: PGE Industry Forum Participation 13 Research and Development	October 17, 2023
29 Staff recommends PGE and joint utilities evaluate the CPUC WSD maturity model and develop an Oregon IOU rubric as part of their 2024 WMPs; Staff would welcome the opportunity to participate in such a collaborative work effort.	Appendix 12: Joint IOU Evaluate CPUC Maturity Model & Develop an Oregon IOU Rubric Figure 36: Oregon Maturity Model Timeline	August 22, 2023
30 Staff recommends PGE demonstrate the use of its ignition management database to perform root cause analyses which led to any ignition inspection program changes.	8.6 Ignition Prevention Inspection Learnings 8.9 Ignition Management and Root cause Analysis Table 17: Ignition Tracking Database Fields 8.9.2 Ignition Engineering Review Task Force Figure 22: PGE Management Process Flow	October 5, 2023

14.4 Appendix 4: Summary of Input from Public Safety Partners

The following improvement plan includes recommendations for actions from the PSPS Tabletop after action review from the Public Safety Partners Spring Summit. As appropriate, these actions have been incorporated throughout the 2024 WMP. Please see Appendix nine (9) and Appendix 10 for complementary information on a registry of events PGE facilitated.

Table 27. PSPS Strengths and Opportunities

Strengths	
Public Information	Regional Joint Information System: PGE's (PIO) and support staff are a part of the regional network of PIOs that would activate the Regional Joint Information System (RJIS) during Events
Public Information	Public/Private collaboration of PSPS Messaging: Local electric utilities in Oregon have partnered to develop PSPS related terms and messaging that can be used by public agencies in their jurisdiction's alert and warning messaging platforms.
Whole Community	PGE has programs and initiatives that can assist in preparedness or be activated during a response to mitigate impacts to critical facilities and customers. Examples include processes to escalate disaster assistance facilities, convey customer public safety issues to human services agencies, and offer limited back up battery systems to qualified vulnerable customers. Public Safety Partners suggested that PGE should add information about batteries for residential use on PGE's website, like information provided about backup generators.
Operational Coordination	Daily Coordination Call: PGE's response procedures include a daily coordination call with Public Safety Partners during a PSPS event. Public Safety Partners agree this is a helpful way to convey key information critical to public safety partners.
Opportunities for Improvement	
Public Information	Maps & Incident visualization: PGE's GIS team to evaluate the feasibility of making enhancements to PGE public facing website for PSPS information. Enhancements could include visually depicting the different PSPS stages, streamlined updates to Raptor for just-in-time PSPS areas, and standardized symbols and conventions with electric utilities.
Whole Community	Customer and community care responsibilities: • PGE Business Continuity & Emergency Management (BCEM) leadership to meet with county emergency management agency leadership and OREM to explore Community Resource Centers alternatives that are complimentary and scalable. • During PSPS events, the PGE Customer Officer to share the CRC implementation strategy and criteria used for allocating available customer care resources during daily coordination calls with public safety partners. • Public safety partners develop a scalable regional mass care strategy for PSPS events and engage PGE to supplement the strategy with PGE resources, information, and capabilities.
Operational Coordination	Meeting Schedule Conflicts: • PGE BCEM will follow its standard meeting cadence and will consider adjusting the schedule for Public Safety Partner coordination calls based on regional or state coordination calls involving the same stakeholders. • BCEM will evaluate the potential of uploading a standard PSP situation report into OpsCenter for jurisdictions to access when a daily coordination meeting is not possible.

14.5 Appendix 5: PGE Wildfire Risk Assessment Overview and Process

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

Ignition Potential Index: The Ignition Potential Index (IPI) measures 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 significant and potentially damaging fire. Using a model patterned after the California Public Utilities Commission's Ignition Index and Utility Threat Index, PGE models the potential for wildfire ignition as a function of wind speed, fuel dryness, and heat per unit area (HPA). 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 in PGE's IPI model.

Wind Speed: In its IPI model, PGE explored using two gridded historical wind speed datasets (gridMET and National Renewable Energy Laboratory (NREL)). 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 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 yearly gridMET wind speed during overlapping periods. PGE applied this factor 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: HPA measures the heat content of the fuel bed (kJ/m2). HPA is primarily a function of the fuel loading by size class and component for surface fuels. For crown fires, HPA also includes the proportion of canopy fuel expected to be involved in a fire.

HPA varies with wind speed and fuel moisture content for a given fuel complex. PGE classified each day in the record into one (1) 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 fire line intensity).

Conditional IPI: Conditional Ignition Potential Index provides PGE with a modeled representation of expected IPI for each weather type studied. The daily IPI dataset assesses fire potential based on historical observations; however, not all potential weather conditions were represented for each location in the analysis area. PGE created a set of IPIs 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. Using the daily historical record, PGE calculated a mean SPI for each fuel moisture class. 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 also applied the same supplemental data approach to model the mean Large Fire Probability for each moisture class.

Weather Type Probabilities: Weather type probabilities are 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 × 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: PGE used downscaling and smoothing to achieve a final cell resolution of 120 meters × 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 the 30-meter HPA estimates for each 27-wind speed and fuel moisture combination to the coarser resolutions of 120-meter and 4-kilometer (depending on the data set). 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, was used.

For WTP, the smoothing process included a re-normalization to verify the results and confirm 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 relationships of elevation to temperature and humidity and modeled the local topographic effect on prevalent wind direction and speeds. For each 120-meter × 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 a 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 a 120-meter resolution. After downscaling the temperature, humidity, and wind speed, PGE then calculated daily IPI at a 120-meter resolution.

Conditional Impact: Conditional Impact (CI) measures 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 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 results for a particular set of inputs) mathematical solution. To generate CI, PGE applies fire growth modeling to specific ignition locations and 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 meter representing 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 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. Weather types were derived from gridMET weather data as described above.

Table 28 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 216 weather types. These wind speeds are banded in nine (9) groups of five (5) mph increments.

Table 28. Example Inputs for the 216 Weather Types

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

Randig and WindNinja downscaled the modeled weather types within each wildfire simulation by running 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 specific points based on burnability characteristics; the resulting analysis yielded 84,749 wildfire ignition points for simulation. Figure 33, 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 panel A show the location of concentrated ignition points.

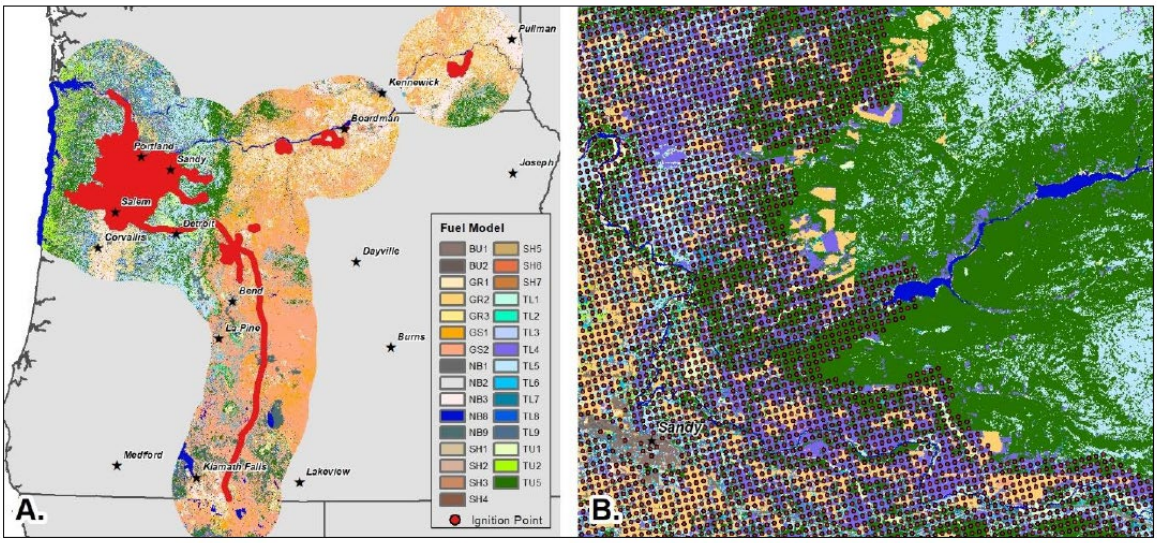


Figure 33. Extent of the Wildfire Simulation Ignition Points

Additionally, to account for the potential for wildfire spread into urban areas (mapped by LANDFIRE[23] as non-burnable), PGE used an iterative smoothing process to spread distributions of flame-length 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. 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 the housing unit density 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) and 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) is 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 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

[23] 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.

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 WTI as the product of conditional IPI, CI, and the weighting of the WTP, which are calculated at the original gridMET resolution and smoothed to the coincident 120 m resolution.

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

Table 29. Wildfire Benchmarking and Risk Methodology

	Zone	1	2	3	4	5	6	7	8	9	10	11
Asset Density	Total Meter Count	162	46	150	78	57	374	61	33	27	16	71
	T&D pole density per mi^2	127	70	111	108	97	123	82	44	48	27	68
	Share of HFRZ T&D poles	0	0	0	0	0	0	0	0	0	0	0
	Land area mi^2	59	10	12	34	35	3	25	23	39	111	6
Pyrologix Probability	Probability exceeding manual control	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%
	Probability exceeding mechanical control	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%
	Probability extreme fire behavior	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%	2%-4%
Pyrologix Weather Scenario	Heat Intensity per unit area	10096	12775	10199	13221	7882	7541	6854	7333	8565	12451	12617
	WTI MEAN Scenario 158	1141609	472579	1575943	2030959	1312534	611661	767440	798307	1557185	1436931	6580233
	CI MEAN Scenario 158	424	209	906	135	476	624	333	152	148	138	228
	IPI MEAN Scenario 158	2789	6213	6729	3549	3047	3313	3892	3897	4684	5227	6441
Accessibility	Average drive time from a fire station	5-10 min.	10+min.	5-10 min.	10+min.	10+min.	5-10 min.	10+min.	10+min.	10+min.	10+min.	10+min.
	Slope-mean	6	8	5	6	6	9	7	9	9	9	7
	Aspect-mean	262	272	337	296	306	124	201	164	92	97	316
Social Indicators	Households below 200% Federal Poverty Line	25%	22%	16%	22%	15%	7%	16%	16%	22%	36%	17%
	Household Disability Composition	18	13	12	15	14	8	13	11	15	20	10
	Hispanic or Latino	7	8	2	3	3	4	5	9	5	7	9
	Age 65+	25	17	20	18	22	16	20	13	18	16	20
	Housing / transportation vulnerability	30	30	20	46	35	12	56	30	32	78	40

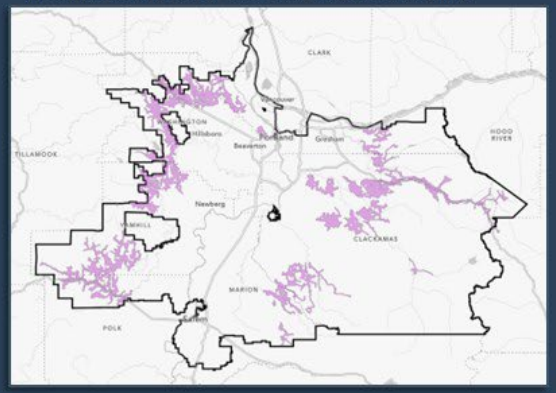
	Social vulnerability index	30	35	22	37	34	5	11	16	30	65	35
Ecological & Cultural Vulnerability	Critical Habitat 1-5 (1 is least relative presence of attribute)	2	3	1	2	3	1	3	2	2	2	1
	Cultural / historical protected areas (relative rank 1-5)	3	3	3	3	2	2	1	1	2	3	1
Rural / Urban Divide	Percent in WUI	77	57	100	77	64	82	71	72	53	52	99
Outage History	June–Sept 2018–2022 on UG	79	12	19	14	7	9	12	0	17	5	4
	June–Sept 2018–2022 on UG average duration	2705	647	419	367	1412	655	253	0	695	420	442
	June–Sept 2018–2022 on OH	265	31	72	98	106	54	103	50	203	76	126
	June–Sept 2018–2022 on UG average duration	1758	2344	327	805	1418	527	538	325	381	299	168

14.6 Appendix 6: Message Awareness & Knowledge Tracking Survey

Overview

PGE Service Territory Map

w/ High-Risk (PSPS) Zones Highlighted in pink



SURVEY PURPOSE

- This survey was commissioned by John Farmer and Brett Phillips and the Wildfire Ops group at PGE.
- It was designed to be the first of an on-going, bi-annual survey to capture the knowledge level of our customers around PGE communications related to severe weather and wildfires.

SURVEY METHODOLOGY

- On September 26, 2023, we successfully delivered 9,516 survey invites
- We received 420 total completed surveys across two customer groups of interest, for a 4.4% response rate:
  - 200 customers in High Fire Risk Zones (HFRZ)
  - 220 customers outside the HFRZ, within the service territory

SURVEY INSTRUMENT

- Customers were asked 15-18 questions based on their responses.
  - 1 PGE brand-level satisfaction question (standard across MiT surveys)
  - 6 PSPS awareness/understanding questions
  - 5 Outage experience/preparedness questions
  - 5 demographic questions
  - 1 survey sweepstakes question

Key Findings

- Customers are not only aware of Public Safety Power Shutoffs (PSPS), but generally know why PGE has or would use them.
  - Within PGE's HFRZ, customer awareness of PSPS is at 84%.
  - Outside the HFRZ (the rest of the service territory), awareness is 47%.
- A majority of HFRZ customers say they can explain a PSPS to someone (73%) and when asked, it was very common for them to include wildfires, severe weather, and downed power lines in their explanations.
  - While less confident they could explain a PSPS to others, Non-HFRZ customers still often mentioned wildfires, severe weather, and downed power lines in their explanations.
- PGE is a more common source of PSPS information (45% across all channels included in survey) as stories in the news (36%) for HFRZ customers.
  - Non-HFRZ customers are much more likely to have heard of PSPS from the news (29%) than from PGE (11% across all channels included in survey).
- If you reside in an HFRZ, it is much more likely you've experienced an outage in the past six months. You're also extremely likely to have taken steps to prepare for a severe weather event/outage in the future.
- Customers in HFRZ are more likely to be living in a single-family home they own. This gives them more of an opportunity to make severe weather/outage preparations like purchasing a generator or clearing yard debris from the property.


PSPS Awareness & Knowledge

How Aware are Customers of Public Safety Power Shutoffs?

- An encouraging sign is 84% of customers in our HFRZ said they have heard of the term Public Safety Power Shutoff.
- By comparison, customers in Non-HFRZ's reported less than 50% awareness of the term.

Before today, have you ever heard of the term Public Safety Power Shutoff or PSPS?

**Percentages represent sample population*

Question text: Before today, have you ever heard of the term Public Safety Power Shutoff or PSPS?
Base: Total HFRZ Customers – 200; Total Non-HFRZ Customers - 220

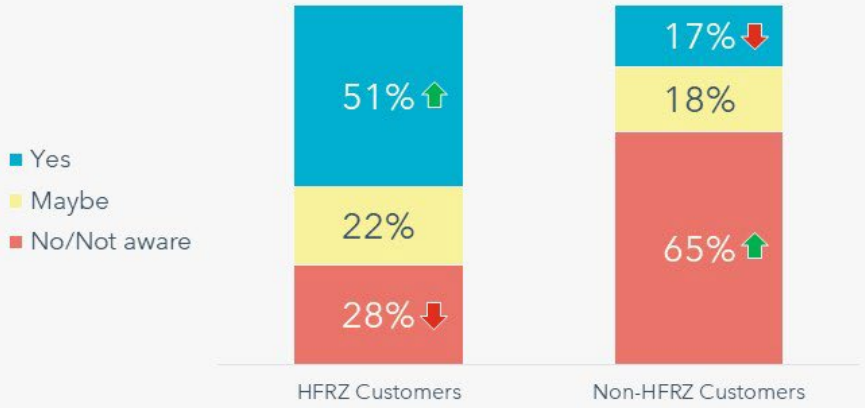
Significance testing at 90% Confidence Level

Awareness is High, but do Customers Feel They Know About PSPS?

- We asked customers if they thought they could explain the term to others and over 50% of HFRZ customers said they could confidently explain a PSPS. Another 22% thought they might be able to.
- Non-HFRZ customers were significantly less confident. Most were not aware of PSPS at all.

Would you say you know enough about the term to explain it to others?

**Percentages represent sample population*



Question text: Would you say you know enough about the term Public Safety Power Shutoff to explain it to others?
Base: Total HFRZ Customers – 200; Total Non-HFRZ Customers - 220

Significance testing at 90% Confidence Level

How do Customers Describe a PSPS?

- Customers that have heard of a PSPS tended to know what they were talking about when describing it.
  - Most included "fire" or "wildfire" in their explanations as well as the need for shutting power off to prevent them. It's important to note though that "Power Shutoff" was included in the question text. This may have hinted at its purpose, but customers were descriptive.

Word Frequency Ranking (Approx.)

	HFRZ Customers	Non-HFRZ Customers
1	Power	Power
2	Fire/Fires/Wildfire	Fire/Fires/Wildfire
3	Shut	Shut
4	High	Weather
5	Lines	High
6	Weather	Prevent
7	Wind/Winds	Risk
8	Conditions	Lines
9	Danger	Conditions
10	PGE	Wind/Winds

Question text: Could you give a brief example of the explanation you'd give about Public Safety Power Shutoffs? One or two sentences would be fine.
Base: HFRZ Customers Answering "Yes" or "Maybe" able to explain a PSPS – 145;
Total Non-HFRZ Customers Answering "Yes" or "Maybe" able to explain a PSPS - 76

More PSPS explanations from customers…

Key:
HFRZ Customers | Non-HFRZ Customers

Public Safety Power Shutoffs are done to keep people, wildlife & property safe during extreme weather conditions. Summer is a more dangerous time with the climate change that is happening. **Drier conditions, drought, high winds, thunder & lightening storms put us all at risk so when PGE feels the conditions are dangerous enough, they need to employ PSPS procedures**. Do I like it when it happens? Not particularly, but I understand the reasons why it is necessary & I prefer a little inconvenience if it will keep us all safer.

When the **temperature rises and there is a higher-than-normal wind predicted**, shutting off the power helps to prevent the increased risk of wildfires… **when in fact, the only risk you're worried about is the risk of litigation happening again**.

The power is **shut off to the lines in a danger zone such as wildfires**. I believe it would keep the live lines from sparking new fires.

In **high wind or storms, sometimes the power needs to be shut off to prevent fires** from downed wires or arcing

Due to **natural or unnatural disasters** the utility company can **shut down service to avoid a most catastrophic situation**.

Sometimes the electric company might need to turn off power to an area to **reduce the risk of wildfires**.

Public Safety Power Shutoff is when a power company cuts power to help **protect communities in high fire-risk zones by proactively shutting off electricity during extreme and dangerous weather conditions**.

I live less than a mile from where a downed line started a fire in Sept 2020. PSPS are used to help **prevent downed lines from starting fires during extreme weather events**.

If **conditions are dry and strong winds**, power could be turned off in case of fires starting with downed lines…?

PGE will **shut off power during extreme dry conditions/very low humidity along with wind** to protect against wildfires

It's a **proactive shut down** of the grid to prevent damage to the system or **wildfire ignition**

PSPS is when PGE has to **turn off power on parts of the grid to prevent harm**, for example turning off power **during high winds to avoid a wildfire**.

Question text: Could you give a brief example of the explanation you'd give about Public Safety Power Shutoffs? One or two sentences would be fine.
Base: HRZ Customers Answering "Yes" or "Maybe" able to explain a PSPS – 145;
Total Non-HRZ Customers Answering "Yes" or "Maybe" able to explain a PSPS - 76

When do Customers Think a PSPS Might be Called?

- HFRZ customers focused on the high winds as conditions for a PSPS while Non-HFRZ customers mentioned dry conditions more often.
- Regardless of the customer group, there was a high level of knowledge of conditions for a PSPS.

HFRZ Customers

Non-HFRZ Customers

Word Cloud Key

Size = Frequency; Color = Group

Highest

Second

Third

Lowest

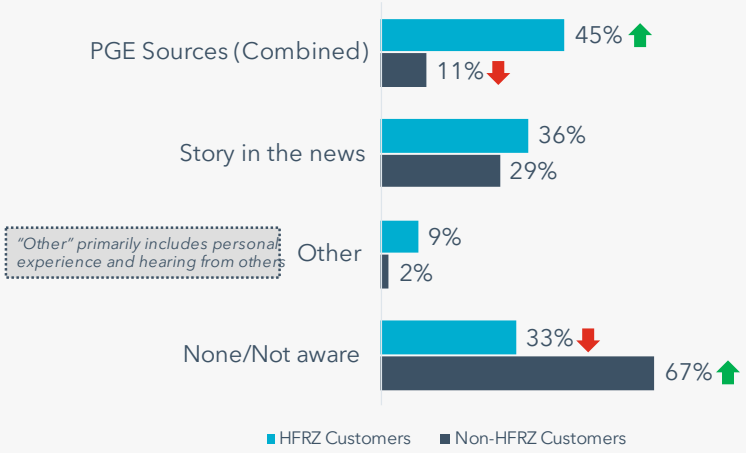
Question text: Based on this definition (PGE definition provided for a PSPS), what are some examples of conditions you would expect PGE to call a Public Safety Power Shutoff?
Base: Total HFRZ Customers – 200; Total Non-HFRZ Customers - 220

How Far is PGE's Reach with PSPS Information?

- For HFRZ customers, PGE has contributed the highest level of PSPS information. Email leads the way while the website and Wildfire Ready Events contribute, but to a smaller degree.
- Outside of not knowing, Non-HFRZ customers said the news was their primary source of information.

Do you recall where you've heard about Public Safety Power Shutoffs most recently ?

**Percentages represent sample population*



PGE Sources

**Percentages based to total respondents*

	HRZ Customers	Non-HRZ Customers
PGE Email	**35%** ↑	8% ↓
PGE Wildfire Ready Event	14% ↑	3% ↓
PortlandGeneral.com	13% ↑	4% ↓

Question text: Do you recall where you've heard about Public Safety Power Shutoffs most recently?
Base: Total HRZ Customers – 200; Total Non -HRZ Customers - 220

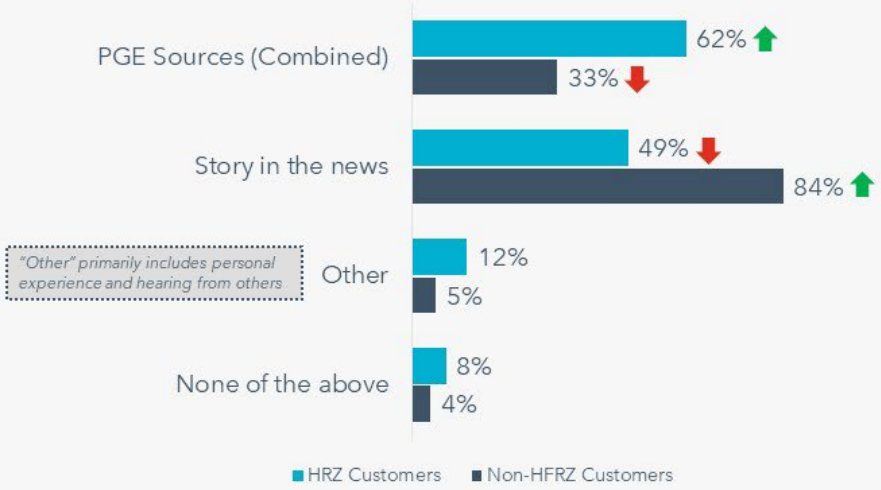
↑/↓ Significance testing at 90% Confidence Level

Focusing on Those Aware of PSPS, Where Does PGE Land?

- A very high proportion of Non-HFRZ Customers said that the news was a source of PSPS information. Only a third said PGE was a source.
- Even among Non-HFRZ Customers aware of PSPS, there is significant room to grow PGE's presence.

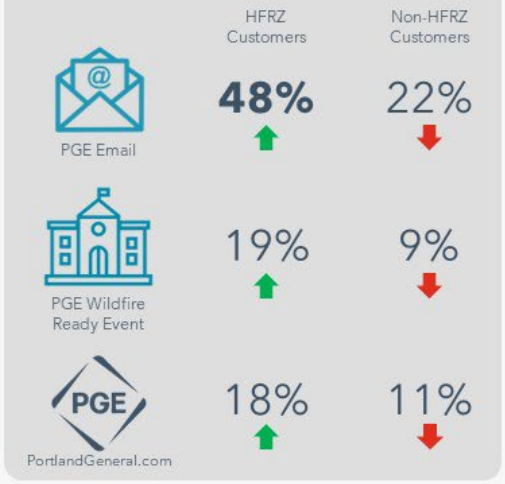
Do you recall where you've heard about Public Safety Power Shutoffs most recently?

*Percentages represent customers aware of PSPS



PGE Sources

*Percentages represent customers aware of PSPS

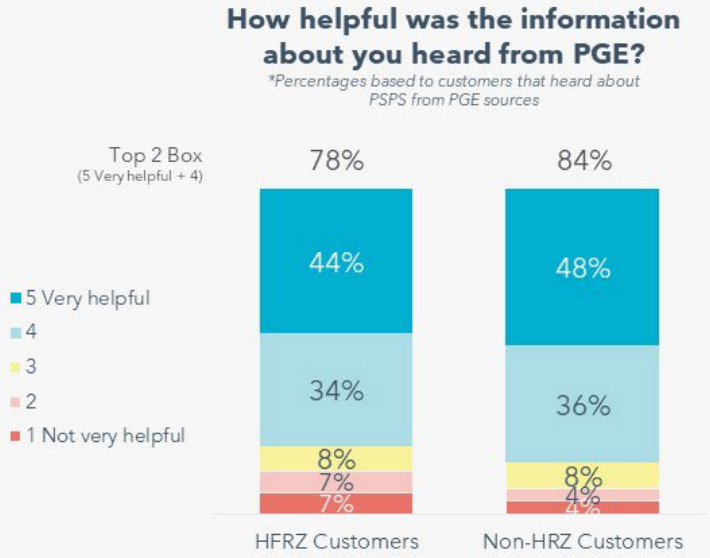


Question text: Do you recall where you've heard about Public Safety Power Shutoffs most recently?
Base: HFRZ Customers Answering "Yes" or "Maybe" able to explain a PSPS – 145;
Total Non-HFRZ Customers Answering "Yes" or "Maybe" able to explain a PSPS - 76

Significance testing at 90% Confidence Level

How Helpful is Information from PGE?

- When customers have gotten PSPS information from PGE, they have generally found it to be helpful. Over 75% gave a score of 4 or 5.
- A small proportion said PGE info was not helpful, but that may be tied to their dissatisfaction with PGE rather than the content being shared.



Explanations of PSPS

Information Helpfulness Scores of 1-3

This is an opportunity for PGE to shut power off in SW Portland and send it to California in collaboration with BPA as a façade for safety.

There's a fire/wind danger in your area, so we're going to shut your power down, sucker!!

PGE is more concerned about their liability than the impact on the public that they shut power down. The Loss of food in freezer and refrigerator are not their concern vs their image of protecting the public. But as with everything... follow the money.

A PSPS is PGEs way of not taking responsibility for their overhead lines. So rather than fix the problem they are just bailing on their customers, shutting off their power, and forcing customers to buy generators and install expensive transfer switches, all because PGE refuses to do what should have been done to begin with and PUT THE LINES UNDERGROUND

Public Safety Power shutoff is what PGE does to control the amount electricity used and will not reimburse you for damages caused at their expense. Example: freezers thawed and full of meat. Also, PGE will give you little to no notice before shutting off power, unapologetically.

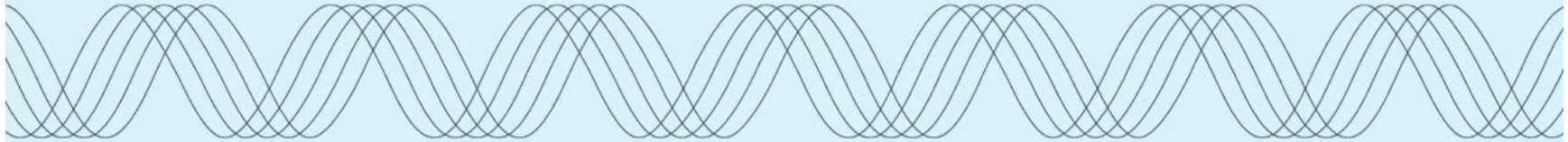
Diplomatic B.S.

The power is shut off to prevent fires during wind events and dry conditions. Even though last time we barely had any wind, and it was off for days with very poor communication. It was complete ridiculous and poorly executed. If I had a choice, I would choose a different power company. We have way too many power outages as it is.

Question text: How helpful was the information about Public Safety Power Shutoffs you heard from PGE?
Base: HFRZ Customers Heard of PSPS from PGE Source – 145;
Total Non-HFRZ Customers Heard of PSPS from PGE Source - 76

Significance testing at 90% Confidence Level

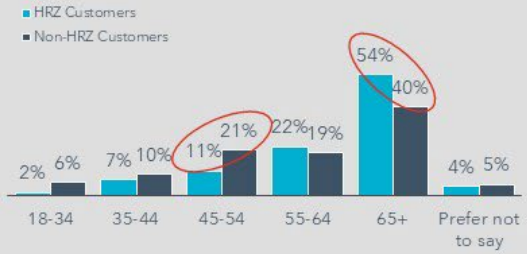
Demographics



Demographic Differences

- Between the two sample groups, there were a few significant demographic differences. Demographics were less descriptive of differences in survey metrics than whether you lived in a High Fire-Risk Zone or not OR your recent outage experience.

Age

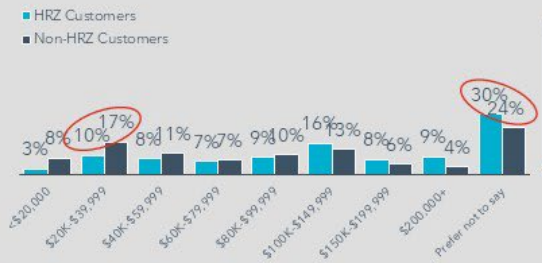


Age Highlights
- HFRZ customers are older than Non-HFRZ
- Significantly more likely to be 65+

Race/Ethnicity

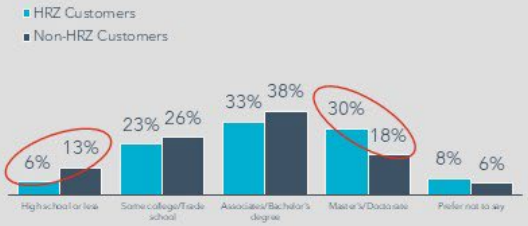
Race/Ethnicity Highlights
- HFRZ customers are more likely to be Caucasian/White
- Non-HRZ has higher representation of Asian and Hispanic/ Latino

Household Income



HHI Highlights
- Non-HFRZ customers are significantly more likely to have an HHI under $100K

Education



Education Highlights
- HFRZ customers are more likely to have a Master's/Doctorate
- Non-HFRZ more likely to have HS education or less

Base: Total HFRZ Customers – 200; Total Non-HFRZ Customers - 220

Significance testing at 90% Confidence Level

14.7 Appendix 7: Community and Stakeholder Engagement Metrics

PGE and the joint IOUs will continue to measure the effectiveness measures discussed during the 2023 WMP Recommendations workshop held August 22, 2023. These metrics address recommendation 18.

These metrics are indicators for the effectiveness of customer engagement campaigns, but they are not definitive and may be influenced by other factors. For example, customers who have been directly impacted by PSPS may have better recall of PSPS messaging and more likely to complete a PSPS video.

Table 30. Customer Campaign Metrics

Metric	Definition	Success Criteria	Justification for Inclusion
Social Media Engagement	Clicks/Impressions	Baseline average click through rate (CTR) for utility campaigns	Metric can identify how well customers are engaging with key messaging.
Video Completion Rate (VCR)	Video completion / clicks (a type of CTR)	Prior year's VCR for a category of video messaging.	Metric can identify how well customers are engaging with a particular campaign
Email Campaign	Count of emails successfully sent to customers.	Positive customer feedback from biannual engagement surveys.	Informs preferred direct customer communication medium.
Customer Bill Inserts	Count of bill inserts mailed to customers.	Positive customer feedback from biannual engagement surveys.	Informs preferred direct customer communication medium.
Phone Engagement	Count of inbound / outbound calls.	Call rate.	Used to identify customer concerns and overall call volume related to wildfire.
Face-to-face Engagement	In-person conversation.	Attendance at events and number of conversations.	Community outreach directly informs customers, and validates they are being heard.

14.8 Appendix 8: 2024 Wildfire Mitigation Plan Event Registry

Date	Event Name	Location
March 16, 2023	Northeast Multnomah County Community Association Board Meeting	Corbett, OR
April 10, 2023	Grand Ronde + PGE WMP	Virtual
May 10, 2023	Mount Hood Corridor Wildfire Partnership (MHCWP) Monthly Meeting	Welches, OR
May 10, 2023	Oregon Small Woodlands Association Meeting	Virtual
May 13, 2023	Mt. Hood 26 Corridor Wildfire Mitigation Fair	Government Camp, OR
May 18, 2023	PGE UAM Customer Meeting	Virtual
May 20, 2023	Wildfire Preparedness Weekend	Portland, OR
May 21, 2023	Wildfire Preparedness Weekend	Portland, OR
May 31, 2023	Estacada Community Wildfire Preparedness	Estacada, OR
June 5, 2023	Wildfire Ready	Virtual
June 6, 2023	Wildfire Ready	North Plains, OR
June 9, 2023	Wildfire Ready	Sandy, OR
June 12, 2023	Wildfire Ready	Sheridan, OR
June 14, 2023	Wildfire Ready	Virtual
June 15, 2023	Wildfire Ready	Mt. Angel, OR
July 20, 2023	Northeast Multnomah County Community Association Board Meeting	Corbett, OR
August 17, 2023	Portland Public Schools/PGE Heat/Smoke Events and Potential Power Outages	Virtual
September 26, 2023	Tonquin Project Community Meeting	Tualatin, OR
September 30, 2023	Tonquin Project Community Meeting	Wilsonville, OR
October 7, 2023	Woodburn Fire Department Open House and Safety Fair	Woodburn, OR
October 14, 2023	Gaston Fire Open House	Gaston, OR
October 15, 2023	Fire on the Mountain Film Festival	Government Camp, OR

14.9 Appendix 9: 2023 Public Safety Partner Event Registry

Date	Event Name	Location
February 6, 2023	RDPO Steering Committee	Virtual
February 15, 2023	What's Up, Estacada	Estacada, OR
March 6, 2023	RDPO Steering Committee	Virtual
March 16, 2023	OR Fire Resilience Learning Network	Salem, OR
March 21, 2023	RDPO PSPS Communications AAR	Virtual
March 22, 2023	2022 PSPS PSP Kickoff-1st Offering	Virtual
March 24, 2023	Pre-season Meeting at the NWCC	Portland, OR
March 29, 2023	2023 PSPS PSP Kickoff-2nd Offering	Virtual
April 3, 2023	East County Wildfire Workshop AAR	Virtual
April 6, 2023	PGE/Pano AI Summit	Wilsonville, OR
April 11, 2023	Pre-Season Meeting at the Portland NWS	Portland, OR
April 18, 2023	Bull Run CPO Meeting	Welches, OR
May 1, 2023	RDPO Steering Committee	Virtual
May 10, 2023	Mt Hood Corridor Wildfire Partnership	Zigzag, OR
May 26, 2023	PGE PSP PSPS Exercise Planning Meeting 1	Virtual
June 9, 2023	PGE PSP PSPS Exercise Planning Meeting 2	Virtual
June 21, 2023	PGE PSP PSPS Exercise/Prep Summit	Virtual
June 21, 2021	OR Fire Resilience Learning Network	Virtual
June 30, 2023	PGE PSP PSPS Exercise After Action Meeting	Virtual
July 12, 2023	Marion County Emergency Management Collaboration	Salem, OR
July 19, 2023	RDPO Regional Wildland Fire Project Presentation	Virtual
September 14, 2023	Lake Oswego Emergency Preparedness Fair	Lake Oswego, OR

14.10 Appendix 10: PGE Ignition Prevention Standards

The following is used by PGE's Utility Asset Management organization to assure 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, Lighting 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

14.11 Appendix 11: Definitions of Failure and Impact Probability

Likelihood of Failure Definitions	
Improbable	The tree or branch is not likely to fail during normal weather conditions and may not fail in many severe weather conditions within the specified period.
Possible	Failure could occur, but it is unlikely during normal weather conditions within the specified period.
Probable	Failure may be expected under normal weather conditions within the specified period.
Imminent	Vegetation has come in contact with or caused damage to electric facilities; or pruning or removing the vegetation is necessary to protect life or property or restore electric service.
Likelihood of Impact Definitions	
Very Low	The chance of the failed tree or branch impacting the specified target is remote.
Low	Not likely that the failed tree or branch will impact the target. This is the case in a constant target that is well protected from the assessed tree.
Medium	The failed tree or branch may or may not impact the target, with nearly equal likelihood. This is the case in a constantly occupied area that is partially protected from the assessed tree.
High	The failed tree or branch will most likely impact the target. This is the case when a fixed target is fully exposed to the assessed tree or near a high-use road or walkway with an adjacent street tree.

14.12 Appendix 12: Joint IOU Rubric Evaluation and Development

On August 22, 2023, PGE, Idaho Power Company, and PacifiCorp met with OPUC Safety Staff to discuss recommendation 29 from OPUC Order 23-221. Staff recommended PGE and joint utilities evaluate the CPUC WSD maturity model and develop an Oregon IOU rubric as part of their 2024 WMPs. Staff welcomed the opportunity to participate in such a collaborative work effort.

The Joint IOUs with Staff approval, invited leadership from IWRMC to discuss their experiences with CPUC Wildfire Safety Division (WSD) Utility Wildfire Mitigation Maturity Model and how the IWRMC maturity model compares and contrasts. The outcome of the meeting was acknowledgement that PGE and joint utilities had evaluated CPUC Utility Wildfire Mitigation Maturity Model and secured agreement with Staff to incorporate the IWRMC Maturity Model as the basis of an Oregon IOU rubric.

The IWRMC Maturity Model is comprised of 50 Key Capabilities organized into 10 broad categories as shown in Figure 35, Overview of Key Capabilities. Each Key Capability has been defined in a detailed manner, with examples provided for each scoring level.

Maturity Category	Key Capabilities					
A. Risk assessment and mapping	1. Estimation of ignition probability	2. Estimation of wildfire consequences	3. Estimation of wildfire and pre-emptive power shutoff risk-reduction impact	4. Climate/Weather scenario modeling and sensitivities	5. Risk maps and simulation algorithms	
B. Situational awareness and forecasting	6. Weather variables utilized	7. Weather data resolution	8. Weather forecasting	9. Weather vulnerability and damage prediction	10. Wildfire detection	
C. Grid design and system hardening	11. Prioritization and justification of wildfire risk mitigation grid design/ system hardening initiatives	12. Grid design for minimizing ignition risk	13. Grid design for resiliency and minimizing pre-emptive power shutoffs (if applicable)	14. Risk-based grid hardening and cost efficiency	15. Evaluation and Deployment of Technology & Innovations	
D. Asset management and inspections	16. Asset inventory and condition assessments	17. Asset inspection cycle	18. Asset inspections & diagnostic effectiveness	19. Asset maintenance and repair efficiency, effectiveness, and compliance	20. QA / QC for asset management	
E. Vegetation management and inspections	21. Vegetation inventory and condition assessment data	22. Vegetation analytics & diagnostic effectiveness	23. Vegetation grow-in inspection and trimming / treatment process & cycle times	24. Vegetation fall-in / hazard inspection and mitigation process & cycle times	25. Fuel Load Management	26. QA / QC for vegetation management
F. Grid operations and protocols	27. Protective equipment and device settings	28. Incorporating ignition risk factors in grid control	29. Pre-emptive power shutoff operating model and consequence mitigation (if applicable)	30. Pre-emptive power shutoff initiation protocols (if applicable)	31. Pre-emptive power shutoff re-energization protocols (if applicable)	32. Ignition prevention and suppression
G. Data governance	33. Data quality and comprehensiveness	34. Data management	35. Data democratization & literacy	36. Data & cyber security	37. Analytic solutions	
H. Resource allocation methodology	38. Benefit-cost assessment and scenario analysis	39. Portfolio-wide initiative allocation methodology	40. Portfolio-wide innovation in new wildfire initiatives	41. Wildfire Organization design, resourcing, and skills		
I. Emergency planning and preparedness	42. Wildfire plan consistency with overall disaster / emergency plan	43. Plan to restore service after wildfire related outage	44. Emergency community engagement during and after wildfire	45. Protocols in place to learn from wildfire events	46. Processes for continuous improvement after wildfire and pre-emptive power shutoffs (if applicable)	
J. Stakeholder cooperation and community engagement	47. Data and practices sharing, and cooperation with external stakeholders	48. Engagement with communities and stakeholders on wildfire mitigation planning and mitigation initiatives	49. Engagement and communication with disadvantaged populations	50. Collaboration with emergency response agencies		

Figure 34. Overview of Key Capabilities

A significant difference between the IWRMC Maturity Model and that of the CPUC relates to the incorporation of a Risk Exposure element. The IWRMC approach considers the objective level of wildfire risk the utility faces and adjusts the scoring scale in accordance with this level. Without this adjustment, utilities may invest in technologies and approaches that may deliver marginal risk reduction at a disproportionate cost. Figure 35, is a graphical representation of how Wildfire Risk Exposure can be compared to Wildfire Risk Mitigation Capability to provide alignment on where to focus efforts due to risk and maturity.

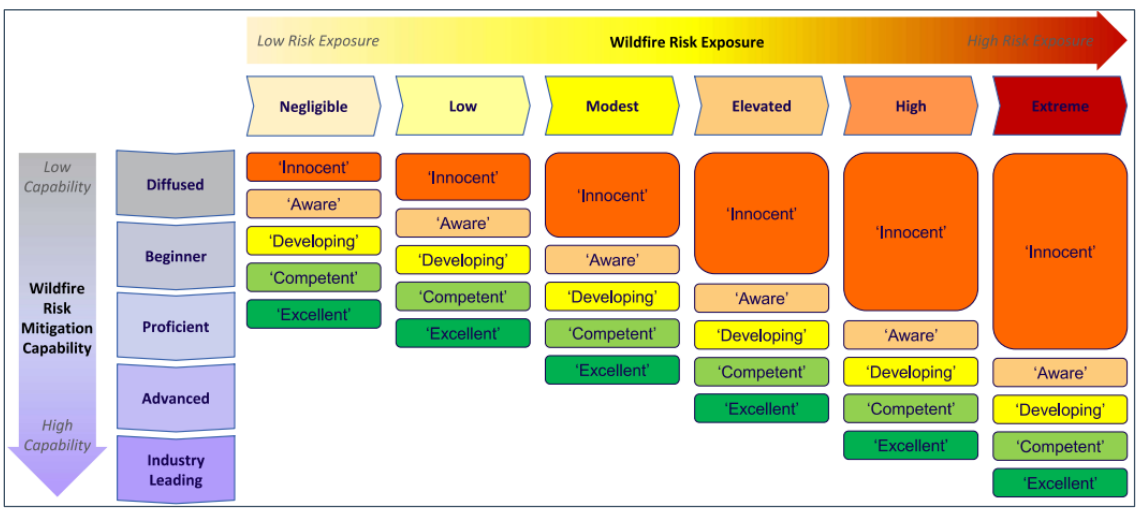


Figure 35. Wildfire Risk Exposure vs. Wildfire Risk Mitigation

Recognizing that accurately evaluating the more than 250 elements of the IWRMC Maturity Model as well as jointly developing the framework, governance, and structure to fully implement a sustainable, value-add maturity model will take time, PGE and the joint utilities propose the following.

The proposed Oregon Maturity Model timeline, Figure 36, is broken into four elements in 2024 to align on results-oriented outcomes while utilizing a pilot to test the value prior to fully incorporating the process in 2025.

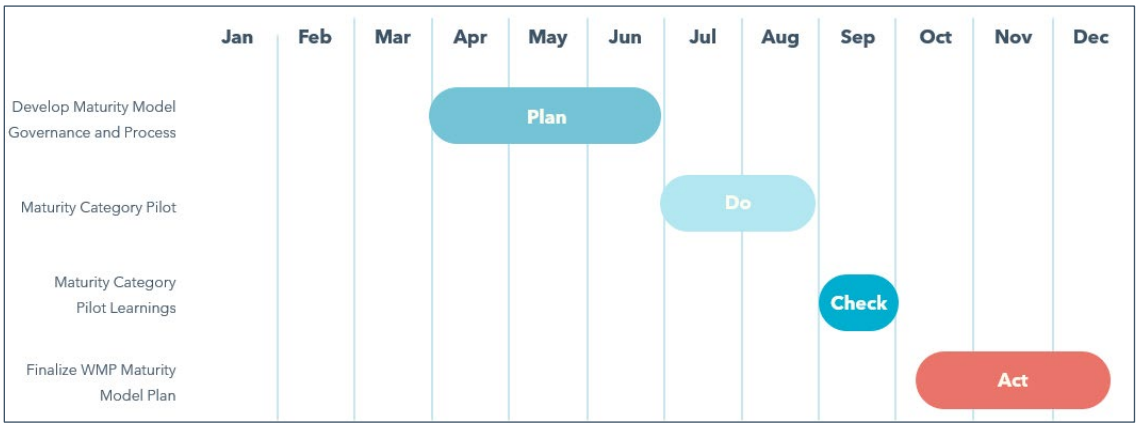


Figure 36. Oregon Maturity Model Timeline

Table 31. Schedule Elements

Schedule Element	Description
Develop Maturity Model Governance and Process	Overall structure of the Maturity Model program. How the maturity model will be used. Development of annual maturity model schedule. Engagement on reviewing results and sharing learnings.
Maturity Category Pilot	PGE chooses a Maturity Category to pilot. Completes Risk Assessment. Completes Maturity Category Survey.
Maturity Category Pilot Learnings	PGE and OPUC Safety Staff discuss Maturity Category Pilot results and learnings. PGE and OPUC Safety Staff adjust as necessary to the Governance and Process model.
Finalize WMP Maturity Model Plan	PGE incorporates Maturity Model Governance and Process into 2025 WMP. PGE includes 2025 plan to evaluate all Maturity Categories.