EXH. RM-1T
DOCKETS UE-240004/UG-240005
2024 PSE GENERAL RATE CASE
WITNESS: RYAN MURPHY

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-240004** **Docket UG-240005**

PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF

RYAN MURPHY

ON BEHALF OF PUGET SOUND ENERGY

FEBRUARY 15, 2024

PUGET SOUND ENERGY

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I. INTRODUCTION

Q. Please state your name, business address, and position with Puget Sound Energy.

A. My name is Ryan Murphy, and my business address is 355 110th Ave. NE, Bellevue, WA 98004. I am the Director of Electric Operations for Puget Sound Energy ("PSE").

Q. Have you prepared an exhibit describing your education, relevant employment experience, and other professional qualifications?

A. Yes, I have. It is Exh. RM-2.

Q. What are your duties as Director of Electric Operations for PSE?

A. As Director of Electric Operations for PSE, I am responsible for the real-time electric operations of PSE's generation, transmission, and distribution systems, as well as the planned and unplanned field response activities across PSE's service territory. The teams in my organization include Generation and Transmission Load Serving Operations, Distribution System Operations, Electric First Response, Substation Operations, Meter Operations, and the Wildfire Risk Management team. I lead teams in support of emergency preparation and response

of safe restoration activities associated with unplanned incidents and major events caused by extreme weather, as well as the execution of projects to achieve improved reliability, resiliency, and the accomplishment of PSE's clean energy initiatives.

Q. What is the purpose of your prefiled direct testimony?

A. My testimony addresses the growing risk of wildfires in PSE's service territory and the analysis, planning, preparations, and investments PSE is making to mitigate that risk. In particular, I describe the wildfire-specific investments PSE plans to make during the multiyear rate plan to mitigate wildfire risk and I introduce the "Wildfire Prevention Tracker" that PSE proposes to facilitate greater visibility, transparency, and accounting treatment for its wildfire investments going forward. PSE requests that the Commission authorize the wildfire mitigation investments proposed in this case and approve the Wildfire Prevention Tracker. More details surrounding the mechanics of the Wildfire Prevention Tracker are provided in the Prefiled Direct Testimony of Susan E. Free, Exh. SEF-1T.

II. OVERVIEW OF PSE'S WILDFIRE RISK

Q. As a utility located in Washington, what is the wildfire risk?

A. Wildfires in Washington are increasing in number, size, and intensity.[1] According to Washington's Department of Ecology, the number of large fires has doubled in the western United States between 1984 and 2015.[2] In Washington, an average of 86,000 acres burned annually in the 1990s.[3] By the 2000s, the average annual acres burned more than doubled to 189,000, with the average annual more than doubling again to 488,000 acres in the latter half of the 2010s.[4]

Washington's risk of wildfire and wildfire-related damage is worsening, not only in eastern Washington, but even in the ordinarily wet forests of western Washington.[5] This change in Washington's wildfire risk is a result of climate change, which has created more flammable forest fuels leading to wildfires that burn hotter and spread faster.[6] As observed by the Washington Utilities and Transportation Commission (the "Commission"), the recorded two-degree Celsius warming that has occurred in the Pacific Northwest since 1990 has already resulted in "serious implications for the state's economy, infrastructure, and

[1] Washington State Department of Natural Resources, *DNR's Plan for Climate Resilience*, at 29 (2023), https://www.dnr.wa.gov/climate-change.

[2] Washington State Department of Ecology, *Tracking wildfire smoke*, https://ecology.wa.gov/air-climate/responding-to-climate-change/wildfire-risks (citing U.S. Global Change Research Program, *Climate Science Special Report, Fourth National Climate Assessment*, Vol. I, at 243 (2017)).

[3] RCW 76.04.505(1).

[4] RCW 76.04.505(1).

[5] *See* 2SH.B. 1578, 68th Leg., 2023 Reg. Sess., § 1(1) (July 23, 2023) ("[J]ust as the forests on the east side of the state are being impacted by climate change, western Washington forests, too, are seeing increasing vulnerabilities to forest health and resilience."); *see also* RCW 76.04.505(1).

[6] Washington State Department of Ecology, *Tracking wildfire smoke*, https://ecology.wa.gov/air-climate/responding-to-climate-change/wildfire-risks (citing U.S. Global Change Research Program, *Climate Science Special Report, Fourth National Climate Assessment*, Vol. I, at 243 (2017)).

public health."[7] Moreover, projections show that should warming continue, an average annual one-degree Celsius rise in temperature in the western United States could increase the median area burned in a typical year by as much as 600 percent.[8]

As wildfire and its impacts intensify and populations in the wildland urban interface increase, risks to community safety and health increase further.[9] This means that electric utilities in Washington state face unprecedented risks that continue to evolve with a rapidly changing climate.[10]

Q. Have wildfire events in other states impacted PSE's assessment of its wildfire risk?

A. Yes, wildfires in recent years in California, Oregon, Colorado, and Hawaii have impacted PSE's assessment of its wildfire risk and provided valuable learnings. Historically, unlike in California and parts of Oregon, wildfire activity in PSE's service territory has not been catastrophic. However, several recent large wildfire events in other states occurred in areas not considered high threat, proving that devastating wildfire events can occur anywhere. This highlights the vulnerability of the northwestern states, and specifically Washington, after decades of fire

[7] Washington Utilities and Transportation Commission, *Issue Brief 1: Climate Trends in Washington State*, at 1, https://www.utc.wa.gov/decarbpathways.

[8] National Oceanic and Atmospheric Administration, *Wildfire climate connection*, https://www.noaa.gov/noaa-wildfire/wildfire-climate-connection.

[9] *See* RCW 76.04.495(18).

[10] Washington Utilities and Transportation Commission, *Issue Brief 1: Climate Trends in Washington State*, at 2, https://www.utc.wa.gov/decarbpathways.

suppression and limited mitigation activity on forest lands.[11] The recent wildfires in places that have historically not had wildfires has forced PSE to expand its wildfire mitigation program.

In addition to keeping our communities, customers, and employees safe, investments in wildfire mitigation minimize financial risks. As recently seen in the extraordinary settlements and damage awards impacting Pacific Gas & Electric[12] and PacifiCorp,[13] wildfires can imperil an electric company's financial health.

Q. How have wildfire events impacted the industry generally?

A. Wildfires have resulted in catastrophic financial losses for many public utilities. Public perception of risk, as described in detail in the Prefiled Direct Testimony of Ann E. Bulkley, Exh. AEB-1T, has created challenges for electric companies from equity investors and credit rating agencies. Wildfire insurance costs is also a major concern to electric companies. Covered in detail in the Prefiled Direct Testimony of Daniel A. Doyle, Exh. DAD-1CT, insurance costs have skyrocketed for electric companies in 2024 following the severe wildfire activity in California,

[11] *See* 2SH.B. 1578, 68th Leg., 2023 Reg. Sess., § 1(4) (July 23, 2023).

[12] PG&E entered into bankruptcy in 2019, emerging in July 2020. California Public Utilities Commission, *PG&E Bankruptcy*, https://www.cpuc.ca.gov/industries-and-topics/pge/pge-bankruptcy. The bankruptcy filing followed litigation resulting from numerous wildfires, including the Camp Fire, which killed 85 people and destroyed more than 18,000 structures. California Department of Forestry and Fire Protection, *Remembering the Camp Fire*, https://www.fire.ca.gov/.

[13] PacifiCorp entered into two settlement agreements in December 2023 related to the 2020 Archie Creek Complex Fire, totaling $549 million dollars. PacifiCorp, *Information on wildfire litigation*, https://www.pacificorp.com/about/information-wildfire-litigation.html.

the tragic wildfire event in Hawaii, and the adverse wildfire-related jury verdict against PacifiCorp[14] in Oregon.

Q. Please provide an overview of PSE's electric infrastructure in Washington, especially as it pertains to wildfires.

A. PSE owns, operates, and maintains 24,015 miles of electric distribution and 1,928 miles of electric transmission system in Washington. PSE's service territory spans approximately 6,000 square miles, primarily in western Washington, but includes portions of central and eastern Washington.

The distribution system is comprised of both overhead and underground infrastructure, with 41 percent (9,787 circuit miles) of the infrastructure being overhead. Ten percent (998 miles) of the overhead system contains covered conductor. There are nearly 350,000 distribution poles, with the average age being over 40 years old. Distribution infrastructure east of the Cascade Mountains accounts for four percent of the total system (987 miles), and of that, 53 percent is underground.

PSE's transmission system is primarily overhead. Less than four miles of the transmission system is underground and all of that underground mileage is on the west side of the Cascade Mountains. There are 34,862 transmission structures (some structures include more than one pole). Ninety percent of the transmission

[14] In June 2023, 17 named plaintiffs in an action against PacifiCorp were awarded $4 million in economic damages and $68 million in noneconomic damages plus punitive damages of 0.25 times the economic and non-economic damages, for a total award of approximately $90 million. PacifiCorp, *Information on wildfire litigation*, https://www.pacificorp.com/about/information-wildfire-litigation.html.

structures are wood. PSE's transmission system includes multiple lines that cross the Cascade Mountains. While portions of the lines border highways and access roads, many miles are very remote and run through state and national forests, watersheds, tribal lands, and private property. On some portions of the lines, access is restricted to walking in or flying via helicopter, and in some cases, flying may not be possible during adverse weather conditions.

Q. What is PSE's assessment of wildfire risk in its service territory?

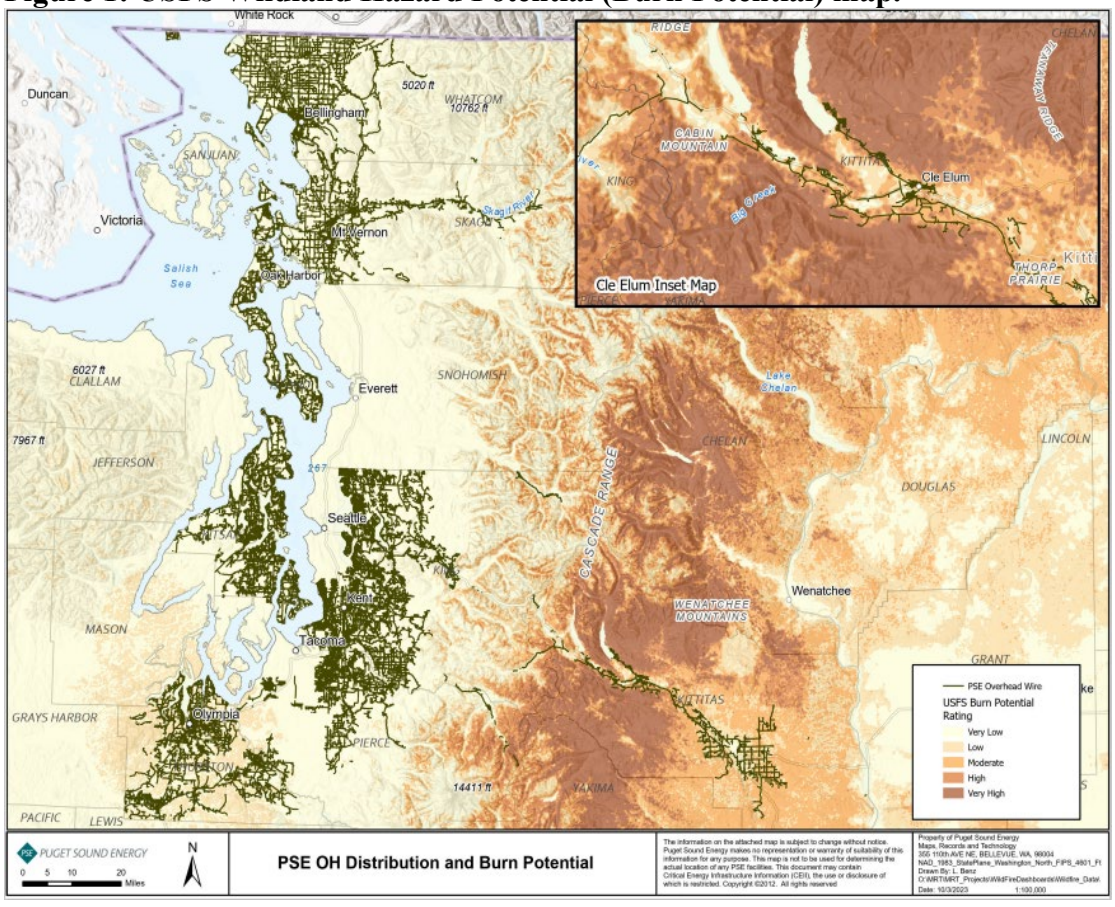
A. Wildfire risk is a top enterprise risk for PSE. Wildfire is a multi-faceted, evolving risk that requires proactive and accelerated investment focus. Although the level of wildfire risk varies geographically across Washington state, PSE's wildfire risk modeling efforts over the past five years have identified specific areas of PSE's service territory with an increased potential for an ignition to develop into a significant wildfire event.

Q. Please describe PSE's wildfire modeling efforts.

A. PSE's early wildfire risk modeling efforts, which began in 2019, quantified risk by considering the likelihood of a wildfire event occurring, multiplied by the impact (potential for growth plus consequence) of a wildfire event in a particular area of PSE's service territory. To perform that modeling, PSE used the Wildland Hazard Potential map, also known as the "Burn Potential" map, produced by the United States Forest Service ("USFS") Fire Modeling Institute, as well as the USFS Wildfire Burn Probability map, to quantify the likelihood of an ignition

propagating into a wildfire. The Burn Potential map is depicted below in Figure 1 and is overlaid with PSE's overhead distribution system. The Burn Potential map indicates the relative potential for wildfire that would be difficult for suppression resources to contain, and combines information on wildfire likelihood, intensity, and fuels. The Burn Probability map depicts the annual probability that wildfire will burn in a specific location and is based on wildfire simulations and weighted by historical wildfire density, ignition points, and weather scenarios.

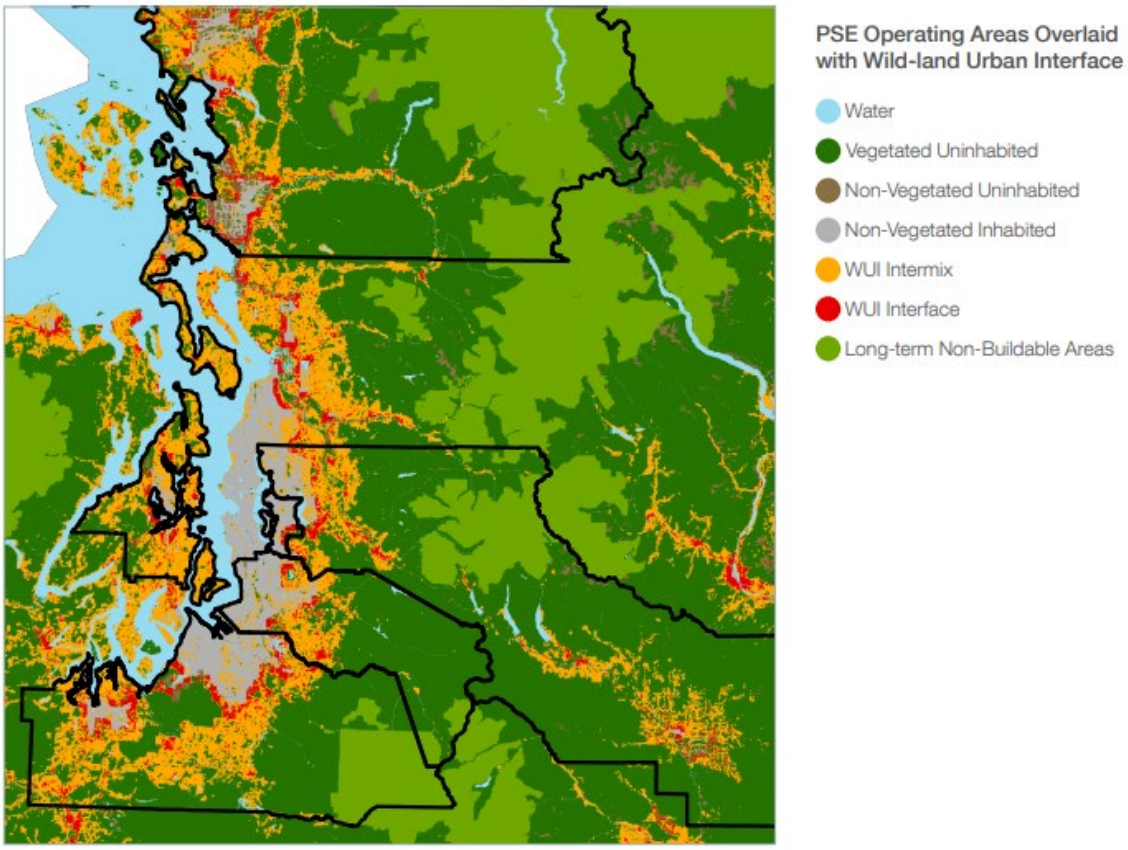
Figure 1: USFS Wildland Hazard Potential (Burn Potential) map.



To understand the impacts or consequences of a wildfire in a given location, PSE used the Washington State Department of Natural Resources ("DNR") Wildland

Urban Interface ("WUI") map, as shown in Figure 2 below. This maps the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Communities adjacent to and surrounded by wildland are at varying degrees of risk from wildfire.

Figure 2: Department of Natural Resources Wildland Urban Interface map.

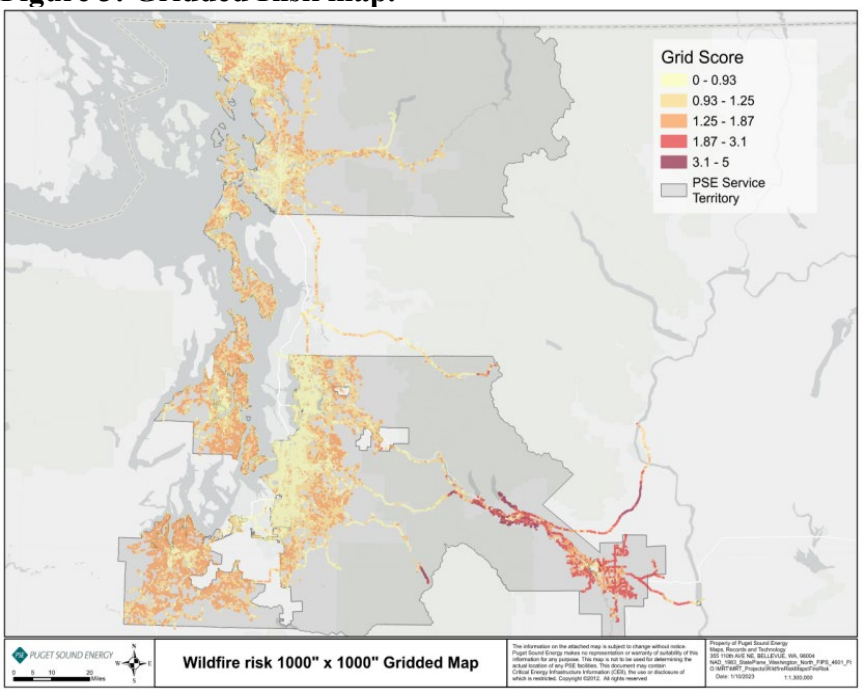


The conductor type (wire size, material and whether covered or bare) is another variable historically used in assessing the general risk of a potential fault. The various types of conductors used throughout PSE's service area have been priority rated as low, medium, and high based on material and level of insulation. Small

conductor size, defined here as #4 and smaller, as well as overhead copper conductor, is ranked as high risk as it is known to have a greater possibility of failure, as compared to larger conductors or other conductor types. As an example, tree wire is ranked as low risk due to the protective coating reducing the risk of ignition from tree limb contact. Based on the latest risk model update, there are approximately 4,100 miles of high risk, 5,600 miles of medium risk, and 122 miles of low risk overhead circuit miles based solely on conductor type.

PSE combined these geospatial datasets quantifying Burn Potential, Burn Probability, conductor type and WUI, with PSE's geospatial datasets of overhead electrical assets, to determine the areas in which each type of risk exists. This data results in a wildfire risk score that is normalized to a five-point scale. These results are presented in the Gridded Risk Map in Figure 3. Together, this information provided PSE insights into wildfire risk variables across the various operating regions.

Figure 3: Gridded Risk map.



Q. What was the outcome of PSE's wildfire risk analysis?

A. PSE's Kittitas County service area, in general, emerged from this early modeling analysis as having environmental conditions most conducive to wildfire as compared with PSE's service areas west of the Cascade Mountains. Kittitas County typically experiences hot, dry, and windy conditions during the summer months which dry out small fuels and create conditions conducive to wildfire propagation. The USFS modeling for Burn Potential, Burn Probability and Wildland Urban Interface all show this area in central Washington as some of the highest risk in PSE's service territory. Additionally, certain areas west of the Cascade Mountains, including the towns of Greenwater and Skykomish, as well as the cross-Cascades transmission corridors, emerged as higher wildfire threats.

Q. How has PSE's wildfire risk analysis evolved over time?

A. While wildfire risk modeling utilizing Burn Potential, Burn Probability, WUI, and conductor-type has enabled PSE to identify relative wildfire risk, these datasets do not provide the granularity needed to make precise and proactive operational decisions. As a result, PSE hired a consultant, Technosylva, who specializes in wildfire risk science, to develop improved wildfire risk modeling, as well as a robust, real-time situational awareness tool. An important component of Technosylva's risk modeling work was the development of the High Fire Threat ("HFT") index for PSE's overhead electrical lines. The HFT is an annually updated index that provides a measure of the historic coincidence of fuels (fuel density and moisture) and severe weather conditions and is used to rank the distribution and transmission lines to indicate higher risk areas of PSE's infrastructure. This data will support the analytics for Public Safety Power Shutoff ("PSPS") scoping and guide investment decisions in situational awareness, fault protection, and fault reduction. See Figure 4 for a map depicting the HFT risk levels throughout PSE's territory. PSE evaluated the range of HFT numeric fire threat levels across its territory and has divided them across five levels of risk: 0-0.2, 0.2-0.4, 0.4-0.5, 0.5-0.6, and 0.6-1.0. The highest circuit HFT level on any circuit in PSE's distribution system is 0.65 and in PSE's transmission system is 0.64. The results of this HFT analysis are now being incorporated into PSE's Wildfire Emergency Operations Procedure. They were also used to guide wildfire project scoping and prioritization of the 2023 portfolio and will guide future wildfire investments.

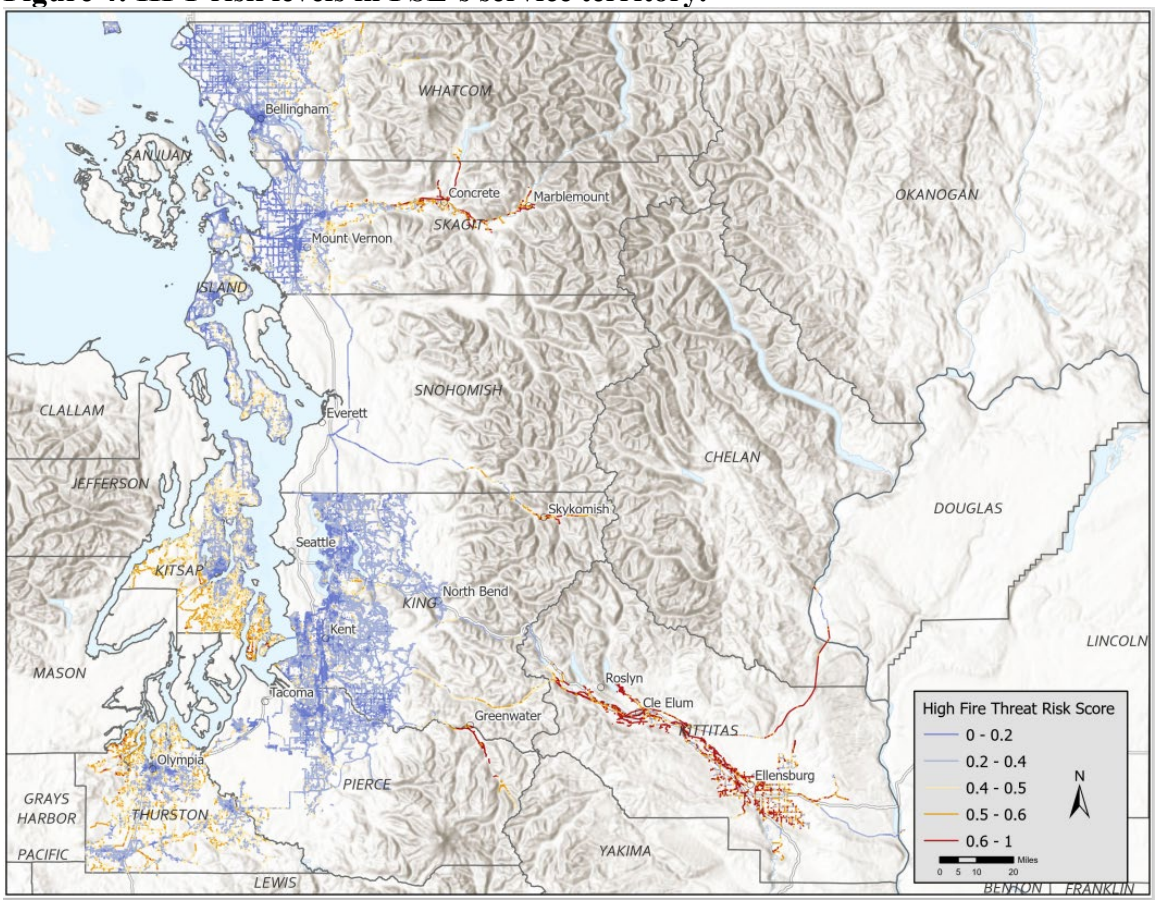
An additional component of the risk modeling analysis performed by Technosylva aligned historical outage data from PSE's Outage Management System ("OMS") in combination with the applicable, historical weather from nearby weather stations. The outcome of this analysis was the creation of "Impact Curves." These curves reveal the level of sustained and gusty wind levels that begin to create damage to PSE's electrical system. This analysis, which is based on actual historical damage levels, allowed PSE to improve the wind trigger thresholds of the Wildfire Emergency Operations Procedure. It also provides foundational data as PSE works to create a PSPS procedure.

Finally, PSE has also commissioned Technosylva to develop a real-time situational awareness tool that will depict real-time fire behavior risks throughout PSE's territory. This tool, referred to as "Fire Risk," will give PSE daily situational awareness where weather and fire behavior risk are elevated. The Fire Risk tool, in concert with weather forecast analysis, will provide the basis for daily risk monitoring and enables the effective deployment of the Wildfire Emergency Operations Procedure, including the potential execution of a PSPS as a tool of last resort. The Fire Risk platform will be supplemented by field technology to improve PSE's real-time situational awareness including PSE-deployed weather stations and the installation of continuously monitored, artificial intelligence, high-definition cameras that detect smoke. PSE is working to complete the first round of installations of weather stations and cameras prior to the start of 2024 fire season.

Q. How does this new risk model compare to the previous risk model?

A. As shown in Figure 4 below, this new model validates the same areas of higher wildfire risk, including Kittitas County, Greenwater, and Skykomish and the cross-Cascade Mountains transmission lines. It also shows some higher fire threat scores in new areas, including Skagit County, as well as some limited areas of Kitsap and Thurston Counties. This is largely due to the additional fuels data that shows a higher fuel risk score in many areas on the west side of the state. PSE plans to continue to update and refine both the internal gridded risk model as well as the Technosylva model going forward. The gridded risk model supplements the risk knowledge from Technosylva's model that is more operationally focused and will also inform PSE's system investment decision making with additional risk knowledge.

Figure 4: HFT risk levels in PSE's service territory.



III. PSE'S WILDFIRE MITIGATION PLANS AND PROCESSES

A. Overview of PSE's Wildfire Mitigation Efforts

Q. Given the wildfire risks described above, has PSE taken actions to mitigate that risk?

A. Yes. PSE has a formal wildfire mitigation program that it began developing in late 2018. PSE's wildfire mitigation program is managed by PSE's "Wildfire Risk Mitigation" organization, which I oversee. PSE has prepared a Wildfire

Mitigation and Response Plan, discussed in detail below, and that has been provided to the Commission. It is also provided as Exh. RM-3 to my testimony.[15]

Q. Please summarize PSE's historical wildfire mitigation efforts.

A. PSE's historical programmatic and infrastructure investments, aimed at improving safety, reliability, and resiliency, have long served to mitigate the potential for wildfire ignitions. Infrastructure work such as vegetation management, conductor upgrades, structure replacements, underground conversions, expansion of protective devices, distribution and transmission automation, and others, reduce the potential of an ignition.

However, PSE's formal wildfire mitigation efforts began in the summer of 2019 when PSE created its first circuit-based wildfire risk assessment methodology, as described above in the discussion of PSE's wildfire modeling. This risk assessment methodology identified areas of heightened Burn Potential risk and Burn Probability, as well as WUI areas. The outcome of this analysis provided a ranked list of PSE's higher risk transmission and distribution lines. Beginning in 2019, and continuing forward to the present, PSE has utilized this risk assessment information to perform key, pre-wildfire season patrols, vegetation management, and corresponding proactive repairs. Furthermore, in 2020, this increased

[15] The plan is also available on PSE's wildfire preparedness website, https://www.pse.com/en/pages/Wildfire-preparedness.

situational awareness allowed PSE's Planning Department to begin prioritizing wildfire mitigation projects within the annual selected portfolio of projects.

Q. When did PSE prepare the Wildfire Mitigation and Response Plan?

A. In April 2020, PSE finalized the first version of the Wildfire Mitigation and Response Plan, which encompasses PSE's strategic approach to situational awareness, fault reduction, fault protection, operational procedures, and emergency response and community outreach. The Wildfire Mitigation and Response Plan is on file with the Commission and PSE provides annual updates to the plan. The Wildfire Mitigation and Response Plan is further described below.

In parallel with the release of the Wildfire Mitigation and Response Plan, the PSE Operations team implemented PSE's Wildfire Emergency Operations Procedure, which directs the daily, proactive actions to be taken on the electrical system when fire threat weather is forecasted by the National Weather Service.

Q. Please describe PSE's Wildfire Emergency Operations Procedure further.

A. PSE's Wildfire Emergency Operations Procedure has continued to improve and evolve since 2019, as PSE gains knowledge, information, and experience. The Wildfire Emergency Operations Procedure outlines daily actions for higher risk wildfire circuits, and provides defined, weather-driven, trigger thresholds to implement proactive actions. These triggers are based on the presence of Fire Watch and Red Flag Warnings, combined with forecasted wind thresholds. The

primary data source for these forecasted thresholds is the National Weather Service Spokane and Seattle offices. These proactive actions, which are implemented in three escalating phases, include de-energizing lines where service is not interrupted, blocking the reclosing function, enabling fast trip settings on targeted transmission and distribution protective devices, and cancellations of planned work. The execution of the Wildfire Emergency Operations Procedure is managed by PSE's transmission and distribution control center and utilizes the real-time situational awareness tools that PSE built in 2020 and continues to invest and improve upon.

Q. What else is PSE doing to mitigate wildfire risk?

A. In late 2021 and early 2022, PSE hired a Wildfire Asset Engineer and dedicated Wildfire Program Manager. These resources, along with cross-enterprise support teams, play an important role in helping PSE continue to better understand wildfire risks, improve PSE's situational awareness, and focus on wildfire mitigation investments that achieve the greatest value. For example, working with PSE's Communications, Operations, and Government Affairs teams, PSE's wildfire team engaged and collaborated with bill sponsors and stakeholders in the development of House Bill 1032. House Bill 1032 provides a collaborative framework between key state and local agencies and utilities to make a substantive difference in reducing wildfire risk.

Since 2021, PSE has continued to develop its wildfire program by building and improving upon the aforementioned tools, learnings, investments, and actions. As

described in detail in the Equity and Community Engagement section, in 2022, PSE began engaging and connecting with PSE's most impacted communities. In late 2022, PSE also added a dedicated Wildfire Risk Communications Initiative Consultant whose primary responsibility is to help PSE build and execute a strong plan for community connection, feedback, and communication strategy development. And, in 2023, PSE formally created a "Wildfire Risk Mitigation" organization adding a dedicated manager to the team who collectively oversee the ongoing development and improvement of the wildfire mitigation program.

B. PSE's Wildfire Mitigation and Response Plan

Q. Please summarize PSE's Wildfire Mitigation and Response Plan.

A. As noted above, PSE's Wildfire Mitigation and Response Plan documents PSE's strategies, programs, procedures, and specific actions to respond to and mitigate the risk of wildfire. The Wildfire Mitigation and Response Plan incorporates best practice models from risk management, operations, emergency management, communications, training, and continuous improvement. The ultimate priority is the safety of the communities and customers that PSE serves and of the personnel that serve them.

Q. What are the objectives of the Wildfire Mitigation and Response Plan?

A. The objectives of the Wildfire Mitigation and Response Plan are as follows:

- Uphold safety for PSE's communities and employees.

- Embed equity into the planning and execution of wildfire mitigation strategies.

- Understand the real-time and long-term wildfire risk in PSE's service area through development and maturity of the appropriate assessment tools.

- Implement mitigation solutions that balance the risk of wildfire with safe and reliable energy delivery by prioritizing higher risk assets and geographic areas.

- Leverage existing grid modernization programs to improve wildfire resiliency.

- Incorporate communication and collaboration with fire agencies into operational processes to promote the safety of PSE employees during an active fire event.

- Inform customers of PSE's wildfire preparedness measures and our communication protocols in the event of a specific wildfire risk.

- Engage with customers and communities in the ongoing development of the Plan and acquire feedback particularly as it relates to customer safety and electric reliability.

- Continuously improve the plan by learning from others.

Q. How does the Wildfire Mitigation and Response Plan achieve those objectives?

A. The plan is broken into five main elements: (1) situational awareness, (2) fault reduction, (3) fault protection, (4) operational procedures and emergency response, and (5) communication and outreach. Each are described as follows:

1. **Situational awareness.** PSE's wildfire risk modeling, field technology and weather forecast monitoring enables grid operators to proactively identify emerging risks associated with fire weather and informs proactive actions that are taken to reduce risk. Situational awareness tools and analysis, including weather stations and artificial intelligence smoke detection cameras, the "Fire-Risk" platform, HFT indices, and "Impact

Curves," advance PSE's continual learning about higher risk areas of PSE's region and electrical infrastructure.

2. **Fault reduction.** This element focuses on decreasing the number of failures or fault occurrences along PSE's electrical system by prioritizing reliability projects and programs that strengthen PSE's infrastructure within higher wildfire risk areas. Each electrical fault has the potential to be an ignition source by creating a spark. By supporting programs that reduce the number of faults on the system, including infrastructure investments and vegetation management practices (such as tree trimming and off-Right-of-Way hazard tree remediation), PSE reduces wildfire risk and benefits overall reliability.

3. **Fault protection.** PSE deploys a variety of technologies and approaches to prevent the normal operation of utility fault protection equipment from igniting dry grass or vegetation during fire weather events. This includes reducing the duration and extent of fault energy that results during a failure or fault as well as reducing the arcing and expulsion of hot metal, which can occur in the operation of standard fuses. These approaches include fast trip settings and disabling reclosing functions so that PSE's system does not close into an active fault during high fire risk conditions. PSE is also working to implement advanced fault protection tactics, such as enhanced fast trip settings. These enhanced protection settings will increase the sensitivity of fault detection for protective devices and also eliminate any time delay in tripping, which will de-energize the line faster.

   Disabling reclosing functions and implementing advanced fault protection have the potential to reduce reliability by creating larger and more frequent outages by not automatically energizing quickly after a temporary fault. But these changes are merited during high risk wildfire conditions. PSE implements these tools using thresholds identified in the Wildfire Emergency Operations Procedure. PSE is also installing additional reclosing devices that will provide places to de-energize a line segment, thereby minimizing the number of customers without power during a PSPS.

   Installing fuse savers and arc suppression fuses rather than standard fuses is another tool PSE is using to minimize the risk of a fault resulting in an ignition.

4. **Operational procedures and emergency response.** Operation within higher risk wildfire zones and during wildland fire weather events may be different than traditional operating procedures, increasing the need to predict conditions, respond proactively, and coordinate emergency response activities with other entities. Operations teams use the most up-to-date situational awareness tools and employ the tools and prescriptive

actions documented in the Wildfire Emergency Operations Procedure. If a wildfire event occurs within PSE's service territory, PSE has identified additional points of contact and coordination needed to provide swift and appropriate response.

5. **Communication and outreach.** Effective external and internal communication is essential for coordinated prevention and response to wildfire risks. PSE is committed to keeping customers and communities informed and engaged through education, equitable public involvement, feedback and collaboration, and timely and effective communications.

Q. How do the wildfire investments PSE proposes in this case align with the Wildfire Mitigation and Response Plan?

A. All of the proposed wildfire investments described in this testimony are consistent with the strategies and investments documented in the Wildfire Mitigation and Response Plan.

C. Equity and Community Engagement

Q. How does PSE consider equity in its Wildfire Mitigation and Response Plan?

A. PSE is committed to the equitable investment in and delivery of safe, clean, and reliable energy. A core objective in PSE's Wildfire Mitigation and Response Plan is to "embed equity into the planning and execution of wildfire mitigation strategies throughout the communities we serve."[16] In 2023, PSE created a new Energy Equity team to create equitable business processes across the enterprise. This team has been consulted in the development of PSE's Wildfire Mitigation and Response Plan and the ongoing PSPS procedure development work. To

[16] Wildfire Mitigation and Response Plan, at 5.

embed equity into PSE's plans and strategies, PSE considers the four core tenets of energy justice:

1. **Recognition Justice.** Understanding the existing history, context, and environmental conditions, and analyzing how the program might create additional social or environmental impacts.

2. **Procedural Justice.** Creating meaningful opportunities for engagement and soliciting and incorporating feedback from interested and impacted parties.

3. **Distributive Justice.** Providing the equitable distribution of benefits, especially safety, and that burdens created or experienced in the process of achieving program goals do not inadvertently fall on disadvantaged communities.

4. **Restorative Justice.** Pursuing activities that reach program goals while creating opportunities to improve environmental and social conditions within communities.

PSE strives to apply these tenets in key areas of its wildfire mitigation program, including community engagement, feedback and collaboration, the development of key communication tools and strategies, wildfire mitigation investments, and evaluating and addressing equity impacts inherently created by operational activities, including PSPS.[17]

Q. What strategies does PSE utilize to support equity in community engagement?

A. As documented in PSE's Wildfire Mitigation and Response Plan, PSE is committed to engaging and listening to customers and impacted communities and

[17] *See* Exh. RM-3.

collaborating with partner agencies and community organizations.[18] PSE's wildfire communications and outreach strategies focus on equitable community engagement, education, and timely communications before, during, and after an emergency.

PSE aims to engage all interested parties and communities in its wildfire program, with particular focus on those areas at highest risk for wildfire. By employing recognition and procedural justice principles, PSE is identifying highly impacted and vulnerable populations within these areas and developing strategies for meaningful engagement with those groups. For example, if an area at higher risk for wildfire also has a significant population of non-English speaking residents, engagement strategies include translation and trans-creation of outreach materials or targeted advertising with language-specific media outlets. In areas with a greater proportion of older adults, PSE may pursue partnerships with local Community Benefits Organizations who serve seniors; or in areas with more children, PSE might design age-appropriate educational games or worksheets. Where high wildfire risk intersects with Tribal lands, PSE will engage with Tribal leadership to understand their concerns and anticipated impacts. This analysis will inform appropriate strategies to engage with impacted communities, promote effective and accessible communications, and obtain and respond to important feedback.

[18] *See* Wildfire Mitigation and Response Plan at 33.

Q. What kinds of outreach has PSE participated in so far?

A. PSE continues to conduct targeted outreach to customers in areas at highest risk for wildfire in the service territory. In 2022, PSE held three community meetings in Kittitas and east Pierce counties regarding wildfire mitigation and response planning, which included two-way community discussion about potential implementation of PSPS, community questions and concerns, anticipated impacts, and community needs.

In 2023, PSE sent pre-season email and postcard correspondence to customers in these same areas, which included more detailed wildfire season preparation and safety information, detailed information about PSE's vegetation management practices, any relevant system hardening projects, and information about how PSE is incorporating the feedback from the 2022 community meetings as PSE further develops its wildfire plans.

PSE also aims to provide wildfire mitigation information to all customers across its service territory, as well as easy-to-access forums and tools for customers to provide feedback. PSE provides information about its Wildfire Mitigation and Response Plan, outlines steps customers can take to reduce risk and prevent wildfires, and directs customers to resources available to help prepare their families, homes, and communities for wildfire season. In 2023, this outreach was conducted via PSE's webpage and customer bill inserts, social media, and attendance at community events, including DNR's Wildfire Ready Neighbors events in Orting and Wilkeson, Washington, and Day of Preparedness events on

Bainbridge and Whidbey Islands. In 2024, PSE plans to expand upon this pre-season engagement to prepare customers for the potential use of PSPS, including more information about how and where to receive updates and notifications, how to prepare for PSPS, and additional resources available.

In addition to community engagement, PSE continues to cultivate a variety of strong and mutually beneficial partnerships with first responders; city, county, and state emergency management departments and personnel; law enforcement, fire, and sheriff departments; and state agency partners. Some tangible examples of the collaboration with peer emergency response partners include county emergency management summer hazards workshops, the Department of Commerce's pre-wildfire season workshop, the King County Emergency Advisory Committee, the Thurston County Fire Chief's monthly meetings, the Pierce County Wildfire Coordination Group, the DNR Utility Wildland Fire Prevention Advisory Committee, and the Pacific Northwest Utility Wildfire Work Group. In 2024, PSE plans to meet with county Emergency Management Offices and local jurisdictions to discuss PSPS development and identify opportunities for collaboration to address community needs and provide support during a PSPS. These partnerships continue to prove extremely valuable, enabling PSE to enhance relationships and better understand nuances in emergency response across the diverse communities and jurisdictions within PSE's service territory.

Q. What strategies does PSE utilize to support equity in the execution of the Wildfire Emergency Operations Procedure?

A. Through ongoing engagement and feedback, PSE is learning about community concerns and potential impacts. PSE is using principles of distributive justice to offer and provide operational benefits equitably, and identify and mitigate burdens when possible.

During the 2022 community meetings, PSE asked how it could best support communities during a PSPS. Participants in all three community meetings stressed the importance of timely and reliable informational updates via an array of methods, including website, social media, text message, and email. Each community also identified existing informal communication methods (such as notices posted at the community center or neighborhood social media groups) and trusted sources for disseminating emergency communications. PSE is using this feedback to develop a multi-pronged notification system for customers and impacted communities in the lead up to, during, and after a PSPS event.

Community members were also concerned about the loss of cell and internet service, the safety of vulnerable populations, potential transportation impacts during a high-wind event (such as highway closures), and water availability for those who rely on electric water pumps. PSE has documented and analyzed these and other potential impacts and is evaluating communication methods and protocols, identifying potential PSPS resources, and partnering with agencies and

community-based organizations to provide additional support around these concerns.

Q. What strategies does PSE utilize to support equity in wildfire mitigation investments?

A. The process of prioritizing and selecting candidates for planned investments in PSE's energy delivery system includes the use of an investment decision optimization tool, called "iDOT." Built using principles of Distributive Justice, iDOT includes both equity and safety as prioritization weighting factors in selecting the portfolio. For discussion of equity considerations in iDOT project portfolio development, please refer to the Prefiled Direct Testimony of David J. Landers, Exh. DJL-1T, Section II. B. This process builds equity into the initial planning and prioritization of planned investments, many of which also include a wildfire mitigation benefit.

In addition to the Planning prioritization process, which includes weighting factors for both safety and equity, investment opportunities that drive primary wildfire mitigation benefits are also discovered through the work completed by PSE's Wildfire Risk Mitigation team, including operational experience and field feedback, as well as feedback received at community engagement meetings. One example of where community feedback has led to a key infrastructure investment is the undergrounding of infrastructure along State Route 903, in eastern Washington, which is now in the planning phase. These investment opportunities include targeted infrastructure projects that feed back to the planning portfolio,

investments in situational awareness tools and field technologies, pre-wildfire season patrols, repairs and vegetation management work, and expansion of remote-operable protection devices. The details of these investments are covered in detail below in the Wildfire Prevention Tracker section of this testimony.

IV. PROPOSED WILDFIRE PREVENTION TRACKER AND WILDFIRE MITIGATION INVESTMENTS DURING MULTIYEAR RATE PLAN

A. Wildfire Investment Overview and Proposed Wildfire Prevention Tracker

Q. Please describe the regulatory mechanism PSE proposes for managing its investments in wildfire mitigation.

A. As discussed in this testimony, PSE, the State of Washington, the Commission, and the financial community have recognized the increasing risk of wildfires. To facilitate PSE's wildfire-specific investments, PSE is proposing to create a Wildfire Prevention Tracker to create greater visibility, focus, transparency, and accounting treatment for its wildfire investments. As described below, the Wildfire Prevention Tracker will account for clearly-defined wildfire mitigation investments within the forward-looking rate period. Please see the Prefiled Direct Testimony of Susan E. Free, Exh. SEF-1T, who discusses the proposed mechanics of the tracker in more detail.

Q. How does PSE prioritize its investments in wildfire mitigation?

A. All investments included in the Wildfire Prevention Tracker target wildfire risk mitigation benefits within higher wildfire risk areas, and they will be accounted separately from the reliability portfolio.

As described in this testimony, the process of prioritizing and selecting initial candidates for planned investments in PSE's energy delivery system includes the use of a decision optimization tool, iDOT, including the use of a safety weighting factor. Please reference Landers, Exh. DJL-1T. Meanwhile, other investments and projects are identified and scoped by the Wildfire Risk Mitigation team.

Q. How does PSE determine if a given investment is included in the Wildfire Prevention Tracker, or if it is categorized as a reliability investment?

A. The proposed 2025 projects contained in the Wildfire Prevention Tracker were prioritized and identified using the 2023 risk model, and these projects are documented in the Wildfire Mitigation and Response Plan. The proposed 2026 projects included in the Wildfire Prevention Tracker utilized the HFT methodology described in this testimony, and are predominately located on circuits with an HFT index of 0.5 and higher. A few projects, including those with unique environmental risk factors and wildfire benefits, are located on circuits with a HFT index of 0.4 and higher.

Q. Do the wildfire investments contained in the Wildfire Prevention Tracker address the same assets contained in the reliability portfolio, such that there could be double counting of investments or benefits?

A. No. While the assets may be similar, PSE has defined objective measures to determine if a given investment should be included in the Wildfire Prevention Tracker or categorized as a reliability benefit, thereby preventing double-counting within the proposed revenue requirements.

Q. Please describe the wildfire investments PSE plans to make during the multiyear rate plan to mitigate wildfire risk.

A. In alignment with the Wildfire Mitigation and Response Plan, PSE's planned wildfire investments have been categorized into the following areas: situational awareness, fault reduction and fault protection. each of these categories are discussed in more detail below. As depicted in Table 1, in total, PSE anticipates the below capital investments on wildfire mitigation that will be in-service during the multiyear rate plan:

Table 1: Summary of wildfire capital investments by year.

Program	Rate Plan Year 1 2025 ($ Millions)	Rate Plan Year 2 2026 ($ Millions)
Situational Awareness	3.82	4.70
Fault Reduction	33.33	55.54
Fault Protection	11.96	7.05

The communications and outreach category does not have projected capital spend. Collectively, there are operation and maintenance ("O&M") expenses of approximately $5.63 million for 2025 and $6.43 million for 2026.

While PSE is not requesting funding in the category of operational procedures and emergency response, the expenditures in the situational awareness category support PSE's ongoing progress in this area by giving operational teams better awareness of existing conditions and the ability to respond in a more targeted and effective manner. PSE will continue to update its Wildfire Emergency Operations Procedure as more situational awareness tools become available and more is learned about the most effective operational techniques in the PSE service territory.

Q. Describe how PSE's management has been involved in the decision to invest in the Wildfire Prevention Tracker investments.

A. The Wildfire Risk Management team, along with cross-enterprise wildfire program team members, holds monthly meetings where leadership and internal stakeholders are apprised of program updates, program focus, status of investments, and targeted initiatives to reduce wildfire risks. Wildfire Steering Committee meetings with directors and executive sponsors are utilized to support key program goals, strategies and investments. The Steering Committee meetings give an opportunity for the wildfire program team to present learnings and recommendations for a particular goal or investment, including a review of alternative options that were considered. Ongoing accountability to deliver

wildfire mitigation benefits is maintained by the Steering Committee and the executive sponsors. financial targets and the successful delivery of benefits are monitored and forecasted by the Manager of Wildfire Risk Management.

Q. What documentation is PSE providing regarding these investments?

A. The program and project documentation recorded by PSE for these programmatic and specific investments are discussed in the Prefiled Direct Testimony of Roque B. Bamba, Exh. RBB-1T.

B. Situational Awareness Investments

Q. What are situational awareness investments?

A. PSE is investing in situational awareness tools and resources that are vital to personnel making real-time operational decisions. As described throughout this testimony, these investments include the real-time "Fire-Risk" software platform, enhanced risk modeling, artificial intelligence smoke detection cameras, weather stations, and meteorologists.

Q. What is PSE's proposed capital investment in situational awareness expenditures that will be in-service during the multiyear rate plan?

A. The capital investments PSE plans to make in situational awareness investments that will be in-service during the multiyear rate plan are detailed in Table 2 below.

Table 2: Summary of Situational Awareness Investments by year.

Program	Rate Plan Year 1 2025 ($ Millions)	2025 Projects*	Rate Plan Year 2 2026 ($ Millions)	2026 Projects*
Risk Modeling	0.29	NA	1.15	NA
A.I. Cameras	2.21	8	2.22	8
Weather Stations	1.32	20	1.33	20

*Project counts are estimates based on project execution plans.

Additionally, there is an incremental O&M expense associated with the above capital investments of approximately $0.54 million for 2025 and $0.83 million for 2026.

Q. How did PSE determine what situational awareness investments to invest in?

A. Continuing to enhance situational awareness is an important component of mitigating wildfire risks. PSE chose to use a variety of situational awareness tools that complement one another. The Fire-Risk software provides a five-day outlook of fire risk across PSE's system using weather stations to inform operational decisions, including when to consider the use of a PSPS. In 2024, PSE plans to install weather stations near areas that are most likely to experience a PSPS. These stations will provide more frequent weather data pinpointed near PSE assets to supplement data from stations that are sometimes miles away and may not be indicative of weather behavior near PSE assets. This plan continues in the

future with investments in weather stations to expand the weather data available throughout areas of higher wildfire risk in PSE's service territory.

Smoke-detection cameras complement PSE's situational awareness by identifying and pinpointing locations of a fire early-on. In collaborating with fire response agencies, this technology enables faster response time, thereby reducing the fire severity and improving the opportunity for firefighters to extinguish the fire on initial attack. Research on fires in California indicate that if response times were reduced by 15 minutes, large uncontained fires would be reduced between three and seven percent.[19]

Peer utilities have found that using these smoke detection cameras has provided notification of one to two hours ahead of historic notification timeframes in multiple fires. PSE plans to install smoke-detecting cameras on approximately two higher risk transmission lines per year, in addition to the cameras on the transmission line in the Greenwater watershed that are planned for installation in 2024.

Q. How do the situational awareness investments benefit customers?

A. These tools and resources benefit customers by providing real-time situational awareness that will be used in making operational decisions during high risk wildfire conditions, including whether to enact a PSPS or deploy PSE and fire

[19] Gordon and Betty Moore Foundation, *The economic, fiscal, and environmental costs of wildfires in California* (Aug. 24, 2023), https://www.moore.org/article-detail?newsUrlName=the-economic-fiscal-and-environmental-costs-of-wildfires-in-california.

department resources in response to smoke detection. These tools will improve PSE's efficiency in investments, by helping PSE to make better informed decisions that reduce wildfire risks while also maximizing its ability to provide reliable service. Additionally, notifications of smoke detection on A.I. cameras will be shared with external stakeholders to improve response and minimize the impact of any ignitions.

C. Fault Reduction Investments

Q. What are fault reduction investments?

A. Fault Reduction investments are investments in the infrastructure that reduce the likelihood of a fault on an electrical circuit. The reduction of a fault eliminates the corresponding potential for ignition. Investments in this category include the following types of projects:

- **Overhead upgrades.** These include copper replacement, covered conductor installation, and upgrading the capacity of overhead lines, thus eliminating small diameter conductor that is more prone to failure and adding operational flexibility.

- **Underground upgrades.** These include converting overhead circuits to underground as well as upgrading or adding underground lines for operational flexibility.

- **Pre-season patrols.** These patrols are performed annually on higher-risk lines and identify abnormal conditions that have occurred since the last patrol and result in proactive corrections or repairs prior to the start of fire season.

- **Pole replacements.** Pole replacements are part of a programmatic approach to upgrade aging infrastructure.

- **Enhanced vegetation management.** Enhanced vegetation management measures are in addition to normal vegetation management performed in

PSE's entire service territory. This enhanced vegetation management is performed annually on higher risk lines and includes vegetation management patrols, tree trimming, and removal of hazard trees.

- **Transmission line hardening.** This includes targeted transmission structure inspections, replacements, component upgrades, and condition-based maintenance on PSE's higher risk transmission lines.

Q. What is PSE's proposed capital investment in fault reduction expenditures that will be in-service during the multiyear rate plan?

A. The capital investments PSE plans to make in fault reduction investments that will be in-service during the multiyear rate plan are detailed in Table 3 below.

Table 3: Summary of Fault Reduction investments by year.

Program	Rate Plan Year 1 2025 ($ Millions)	2025 Projects*	Rate Plan Year 2 2026 ($ Millions)	2026 Projects*
Overhead Upgrades	1.87	3	5.58	5
Underground Conversion and Upgrades	23.37	6	42.09	8
Pole Replacement	2.44	11	2.23	12
Preseason Patrols	0.55	716 miles	0.56	716 miles
Transmission Line Hardening	5.10		5.08	

*Project counts are estimates based on project execution plans.

Additionally, there is an incremental O&M expense associated with the above capital investments of approximately $0.96 million for 2025 and $1.51 million for

2026. There is also $3.54 million of O&M expense annually for enhanced vegetation management planned for both 2025 and 2026.

Q. How did PSE determine what fault reduction investments to invest in?

A. Fault reduction investments are identified and scoped in three primary ways. First, to identify projects in the overhead and underground upgrades categories, PSE uses the iDOT tool. As described in Landers, Exh. DJL-1T, iDOT includes a variety of weighting factors in selecting the portfolio, including safety, or wildfire mitigation benefits. Second, fault reduction investments include investments in the pole program, which are programmatic investments in upgrading aging infrastructure. Third, fault reduction investments include targeted inspections and associated remediations on the higher HFT wildfire risk lines.

Q. How do the fault reduction investments benefit customers?

A. Fault reduction investments reduce wildfire risk by decreasing the likelihood of faults, which reduces both the number of potential ignition events and power outages.

D. Fault Protection Investments

Q. What are fault protection investments?

A. Fault protection investments are intended to prevent utility equipment from igniting dry grass or vegetation during fire weather events. Projects in this category use protection, controls, and automation to reduce the risk of wildfire

ignition by reducing the duration and extent of fault energy during a failure occurrence, including the benefits of providing greater sectionality capabilities of the system, remote controls, and visibility for operators. Projects in this category include the following:

- **Substation SCADA.** These projects enable remote visibility and control of substation components resulting in the ability to remotely de-energize and re-energize substations or circuits as needed to reduce wildfire risk.

- **Grid automation.** This includes distribution automation and transmission automation projects that automate the detection and isolation of faults, as well as expanding protective devices on the system to give operators flexibility in isolating higher risk portions of the system during warranted conditions. Recloser installations in the distribution system provide similar wildfire benefits. This category also includes the design and implementation of Enhanced Protection Settings, which when enabled, increases the sensitivity and speed of fault detection and isolation thereby reducing the likelihood that falling tree limbs, off right-of-way trees, animals or other conditions result in an ignition.

Q. What is PSE's proposed capital investment in fault protection expenditures that will be in-service during the multiyear rate plan?

A. The capital investments PSE plans to make in fault protection that will be in-service during the multiyear rate plan are detailed in Table 4 below.

Table 4: Summary of Fault Protection investments by year.

Program	Rate Plan Year 1 2025 ($ Millions)	2025 Projects*	Rate Plan Year 2 2026 ($ Millions)	2026 Projects*
Substation SCADA	4.75	19	1.75	8

Grid Automation	7.21	58	5.30	60

*Project counts are estimates based on project execution plans.

Additionally, there is an incremental O&M expense associated with the above capital investments of approximately $0.17 million for 2025 and $0.13 million for 2026.

Q. How did PSE determine what fault protection investments to invest in?

A. Fault protection investments are identified and scoped in three primary ways. First, like fault reduction investments, PSE uses iDOT for the initial selection of candidates and prioritization of projects in the transmission and distribution automation, recloser, and substation SCADA categories. Second, the operations teams identify projects based on experience and lessons learned that include the circuits with the highest likelihood of a PSPS. This review identifies projects to install new reclosers and upgrade to SCADA reclosers. Third, PSE expects to identify and prioritize projects when scoping, designing and implementing Enhanced Protection Settings.

Q. How do the fault protection investments benefit customers?

A. Fault protection investments benefit customers by reducing the likelihood of a fault ignition on the electric system, thereby preventing a potential wildfire event. Companies like Pacific Gas & Electric that have matured their protection settings

in high-risk wildfire areas have seen a 68 percent reduction in ignitions after implementing fast trip settings.[20]

Fault protection investments also benefit customers by providing system operators with controls and automation to be able to sectionalize the system remotely. This enables PSE to respond efficiently during high-risk wildfire conditions, and also enables PSE to reduce the potential size and duration of reliability impacts, including a PSPS.

E. Communications and Outreach Expenditures

Q. What are communications and outreach expenditures?

A. Communications and outreach investments involve and serve PSE's customers and communities; these are an important part of wildfire mitigation. These initiatives are discussed earlier in this testimony in the Equity and Community Engagement section.

Q. What are PSE's proposed expenditures in communications and outreach during the multiyear rate plan?

A. The planned expenditures associated with this work are O&M and are $0.42 million, annually, for both 2025 and 2026.

[20] Pacific Gas and Electric Company, *Enhanced Powerline Safety Settings*, at 1 (May 25, 2023), https://www.pge.com/epss.

Q. How did PSE determine what communications and outreach programs to fund?

A. PSE's expenditures for communications and outreach have two primary aims: to provide a foundation of wildfire mitigation information to all customers across PSE's service territory, and to conduct targeted outreach with customers in areas at highest risk for wildfire, including a focus on highly impacted and vulnerable populations. PSE is investing in tools to provide timely notifications during an emergency or PSPS, educational materials to help customers prepare for wildfire season and take steps to mitigate risk, and easy-to-access forums for customers to provide feedback to PSE. PSE also invests in outreach and relationship-building with emergency response partners and community-based organizations to gain a deeper understanding of impacted communities and utilize appropriate engagement strategies and effective communications.

Q. How do the communications and outreach expenditures benefit customers?

A. PSE understands that the customers and communities it serves are critical partners in effective wildfire mitigation. communications and outreach investments will help PSE listen to and learn from customers and impacted communities, and thereby respond better to customers' concerns. PSE's communication and outreach expenditures inform communities both inside and outside of historically high-risk wildfire areas, providing accessible and timely information about PSE's wildfire mitigation program and empowering customers to prepare for and mitigate wildfire risk.

V. CONCLUSION

Q. Does that conclude your prefiled direct testimony?

A. Yes, it does.