Pacific Northwest
NATIONAL LABORATORY

Public Safety Power Shutoffs in Wildfire Mitigation Plans

WILDFIRE RISK & RESILIENCE
@PNNL

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U.S. DEPARTMENT of ENERGY BATTELLE

PNNL is operated by Battelle for the U.S. Department of Energy

Background

- Sponsored by the U.S. Department of Energy's Grid Deployment Office, PNNL created a database of all known and discrete utility Wildfire Mitigation Plans (WMPs) from across the United States and Canada.
- The goal is to provide a single consolidated location for access to all WMPs. Plans are organized by various metadata:
  - Location of the authoring utility or entity
  - Year or range of years of the plan implementation period
  - Type of utility or entity
- The database is a component of a larger research program to establish credible industry metrics to assess and mitigate wildfire risk.
- To help make sense of hundreds of WMPs and their contexts, PNNL produced a series of citable short decks, organized by technical topics.

Public Safety Power Shutoff (PSPS)

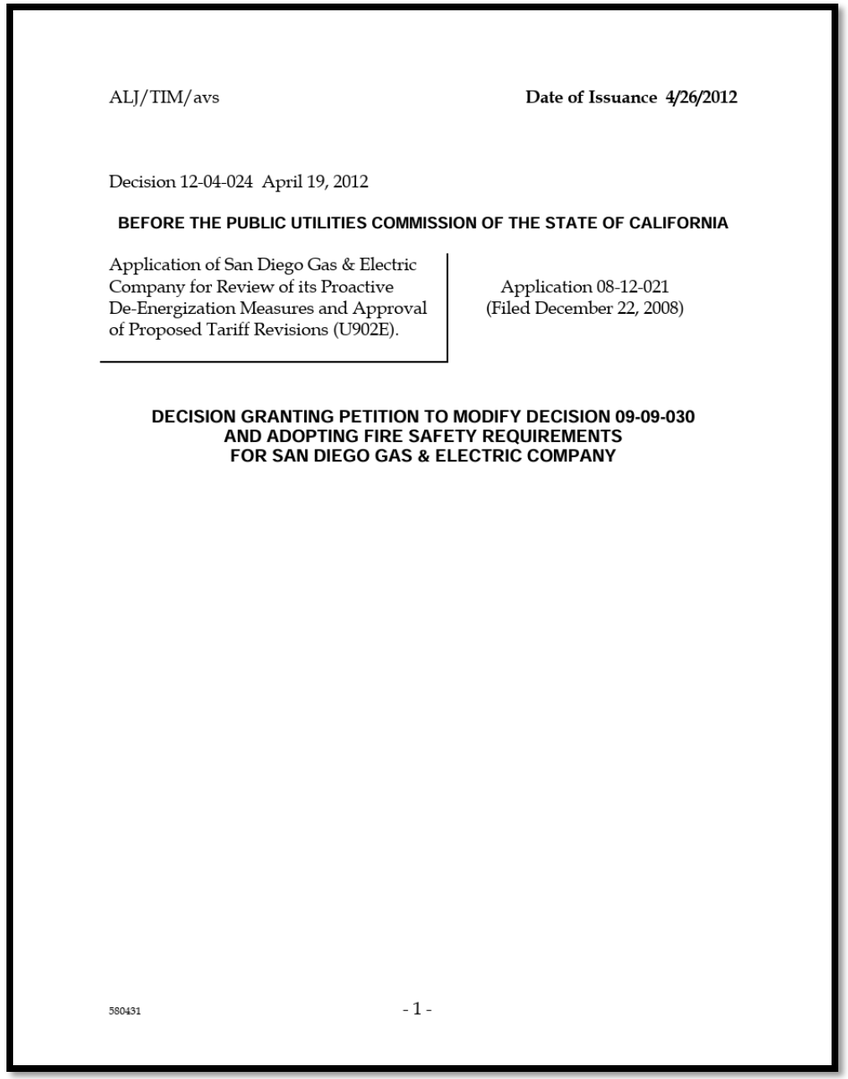
- The North American Electric Reliability Corporation defines a Public Safety Power Shutoff (PSPS) as "the proactive de-energization of power lines that are forecasted to be in the path of critical fire weather conditions" to eliminate the possibility of ignition from the electric system.
- Distribution lines are both more exposed to wildfire risk and less disruptive when de-energized than transmission. PSPS procedures for transmission exist, but implementation is exceedingly rare.
- Implementation of PSPS is very disruptive to consumers, with de-energization typically lasting between 24 and 48 hours.* Because of this, PSPS is often considered a last resort action taken by utilities only if all other mitigation practices fail or are impractical to implement.

Newsweek

*Based on publicly available PSPS data from investor-owned utilities under the jurisdiction of the California Public Utilities Commission; see slide 13 for details.

Public Safety Power Shutoff (PSPS)

- PSPS was first approved as a mitigation strategy in California when SDG&E obtained PUC approval in 2012 through CPUC Decision 12-04-024.
- While there is no comprehensive nationwide record of PSPS implementation, thousands of circuits have been de-energized in California, and PSPS is being used by IOUs in other Western states.
- Among all wildfire mitigation tools, PSPS uniquely affects practicing utilities' customer safety, trust, and reliability.
- Events are high-profile, often controversial, and require significant regulatory oversight – therefore evaluating PSPS planning offers a lens into how utilities balance risk reduction with public disruption.
- 92 utilities with WMPs document PSPS protocols, with varying levels of detail.
- Of these utilities, at least 13 have implemented their PSPS protocols in an actual event.



ALJ/TIM/avs Date of Issuance 4/26/2012

Decision 12-04-024 April 19, 2012

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of San Diego Gas & Electric Company for Review of its Proactive De-Energization Measures and Approval of Proposed Tariff Revisions (U902E).

Application 08-12-021 (Filed December 22, 2008)

DECISION GRANTING PETITION TO MODIFY DECISION 09-09-030 AND ADOPTING FIRE SAFETY REQUIREMENTS FOR SAN DIEGO GAS & ELECTRIC COMPANY

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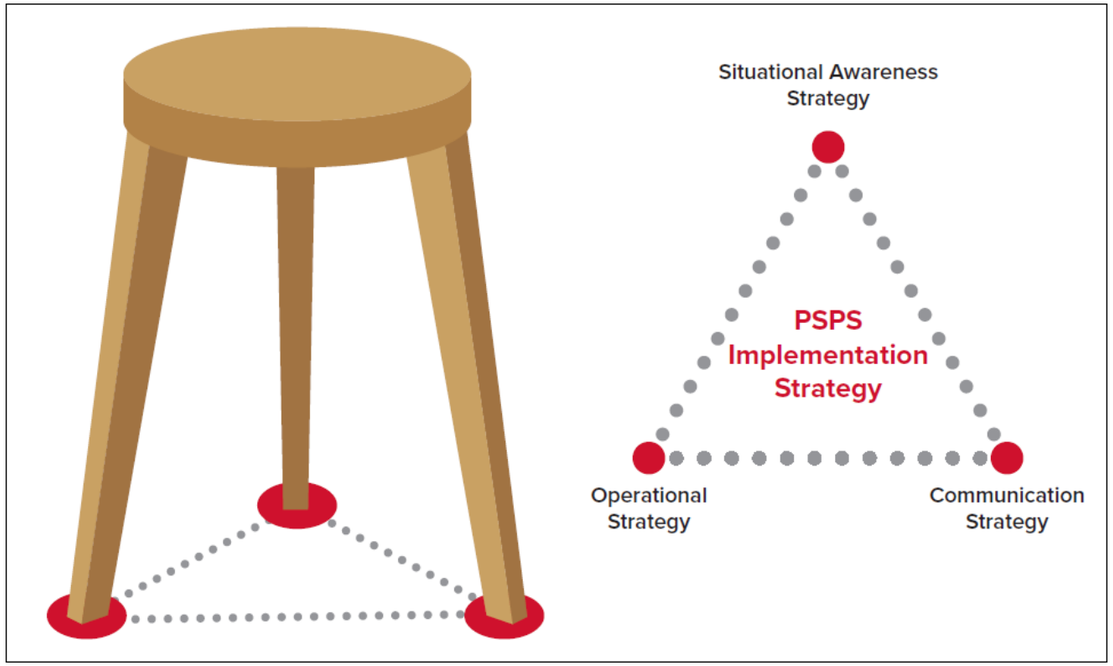
Utility Strategies for De-Energizing Powerlines

There is no ‘one-size-fits-all’ protocol.

- Many WMPs have no PSPS content at all, either because they do not implement PSPS, or because it is not a requirement in every jurisdiction.
- Several include boilerplate language which describes PSPS capabilities in broad terms and notes its viability as a tool of “last resort.”* This language generally follows protocols established by investor-owned utilities (IOUs) in CPUC jurisdiction.
- Some contain detailed, utility-specific PSPS protocols, especially large IOUs, such as PG&E, Xcel Energy, and NorthWestern Energy.



Source: NorthWestern Energy Wildfire Mitigation Plan, 2024

NorthWestern Energy and other utilities have detailed strategies for implementing PSPS, typically involving some combination of situational awareness, operational practices, and communications. These strategies are outlined in the following slides.

* Source: City of Ashland, 2022

Common Themes in PSPS Protocols

- PSPS is viewed by utilities as a preventive measure to be deployed during extreme fire weather conditions, often as a tool of “last resort”
  - Case-by-case decision-making is emphasized as the prevalent factor for calling events and are often coordinated with emergency agencies.
- Utilities consistently highlight the risk tradeoff between wildfire ignition prevention and the societal impacts of power outages.
  - The cascading impacts of electricity disruptions on interdependent critical services are significant – such as fire response, water supply, emergency communications, and medical needs.
  - Broad community disruption is acknowledged, as events affect infrastructure, traffic, fuel access, and local economies (especially vulnerable populations).
- Many utilities note that PSPS is a tool for them to address low-probability, high-consequence scenarios and that the risks of implementation often heavily outweigh the chances of its distribution system igniting a wildfire.

Process for Triggering PSPS

- Typically, utilities employ weather models as part of their situational awareness strategy to assess fire risk, often incorporating forecasted wind speeds, fuel moisture variables, and National Weather Service Red Flag Warnings as key decision-making inputs.
- Utilities also rely on quantifying risk through metrics such as the USGS Wildland Fire Potential Index (WFPI) or Santa Ana Wind Threat Index (SAWTI).
  - Although the calculation methods utilized as part of the WFPI vary between utilities (custom calibration is often adjusted according to local weather conditions, topography, and real-time wind speed data), it's a near-universal metric used to identify circuits at high risk for ignition.
  - SAWTI is a model developed by the U.S. Forest Service and University of California – Los Angeles based heavily on the Santa Ana winds affecting Southern California.

Sources: SCE, PG&E, SDG&E, PacifiCorp, Rocky Mountain Power, BPA, NorthWestern Energy, Xcel Northern States, Xcel SPS, & Avista Wildfire Mitigation Plans

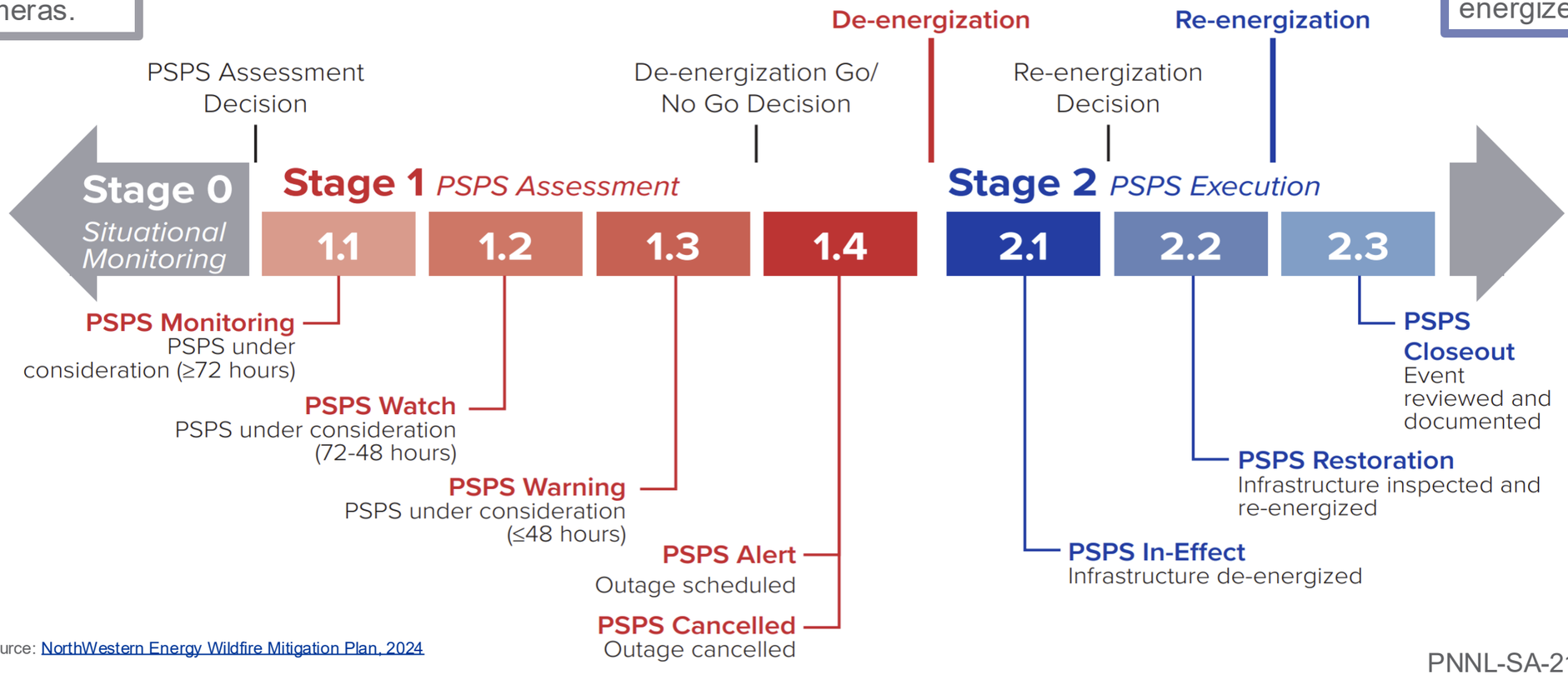
PSPS Implementation Procedure

All PSPS implementation starts with situational awareness, often with the use of models, weather data, or AI-assisted cameras.

Utilities with PSPS policies outline efforts to communicate PSPS events ahead of time and often offer community resource centers for affected customers.

Because de-energization can have severe impacts on medical baseline customers, WMPs prioritize mitigation efforts to avoid shutoffs to certain critical infrastructure.

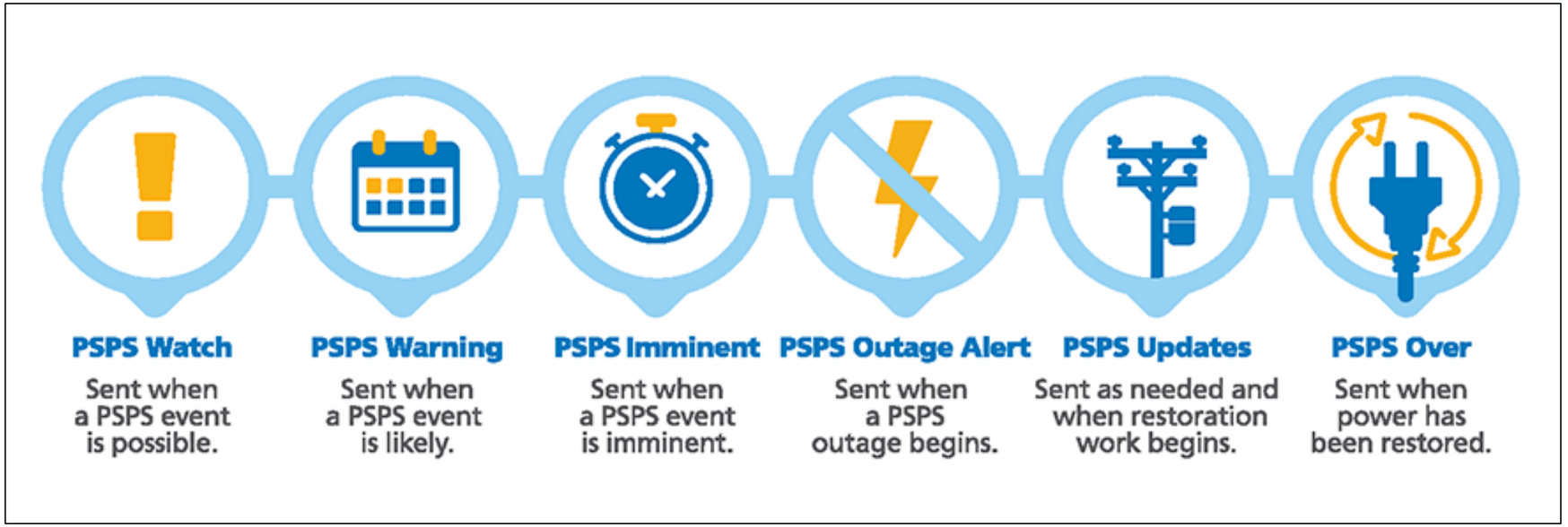
All affected power lines need to be individually inspected after each PSPS event is over before they can be re-energized.



Source: NorthWestern Energy Wildfire Mitigation Plan, 2024

Communication and Customer Outreach

- Utility customers are generally notified 24 to 96 hours prior to a PSPS event, when possible, via email, voice calls and/or SMS (SCE, 2023-2025, p. 626); (PacifiCorp, 2023-2025, p.320); (RMP, 2024-2025, p. 67)
- Customers with medical or access and functional needs are prioritized for notifications, often via outbound live agent calls (PacifiCorp, 2023-2025, p.309); (RMP, 2024-2025, p. 66); (Xcel PSC of CO, 2025-2027, p. 91)



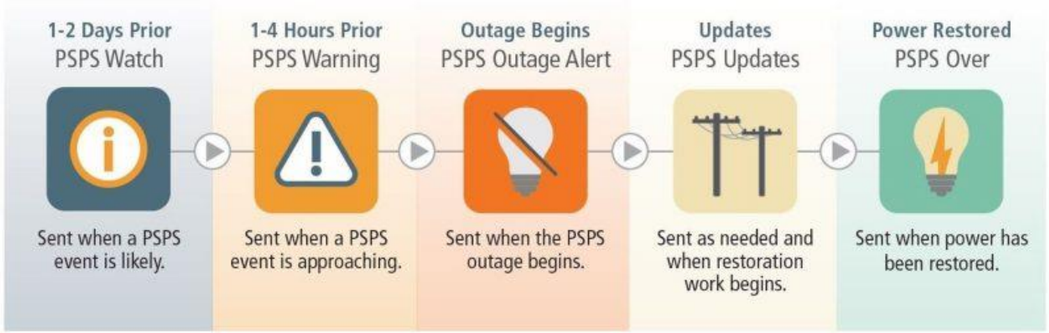
Communication and Customer Outreach

Source: APU 2024, pg. 46

- Up-to-date event information can also be found on most provider's websites and social media (SCE, 2023-2025, p. 588); (PacifiCorp, 2025, p.35); (PacifiCorp, 2023-2025, p.320); (RMP, 2024-2025, p. 67)
- Public safety partners across local government, emergency management agencies, and other critical facilities and partners are notified 48-72 hours prior to a PSPS event when possible (SCE, 2023-2025, p. 851); (PG&E, 2023-2025, p. 852); (RMP, 2024-2025, p. 67); (Xcel PSC of CO, 2025-2027, p. 92)

PSPS Event Reporting Data Availability

- Due to differential reporting requirements, the availability of PSPS statistics and other information varies between jurisdictions.
- Few annual WMP updates document past PSPS events directly.
  - Some utilities do provide generalized PSPS event summaries on their public website, but these are not exhaustive records of all PSPS implementation to date.
  - As such, evidence for events can typically only be found through media coverage.
- While some Public Utility Commissions – notably **California** and **Oregon** – have codified requirements to ensure PSPS event recording, most do not.



Source: Idaho Power

PSPS Event Reporting Data Availability

California

- In California, CPUC Resolution ESRB-8 (2018) defines specific notification, reporting, and mitigation parameters for regulated IOUs governed by the California Public Utilities Commission (CPUC).
- California is the only state maintains a publicly accessible, comprehensive database of all PSPS events implemented in IOU service territories.
- According to CPUC records, which capture events at the circuit level, there have been 6,375 circuits de-energized since October 2013 – over 62% of which have been de-energized since 2020.

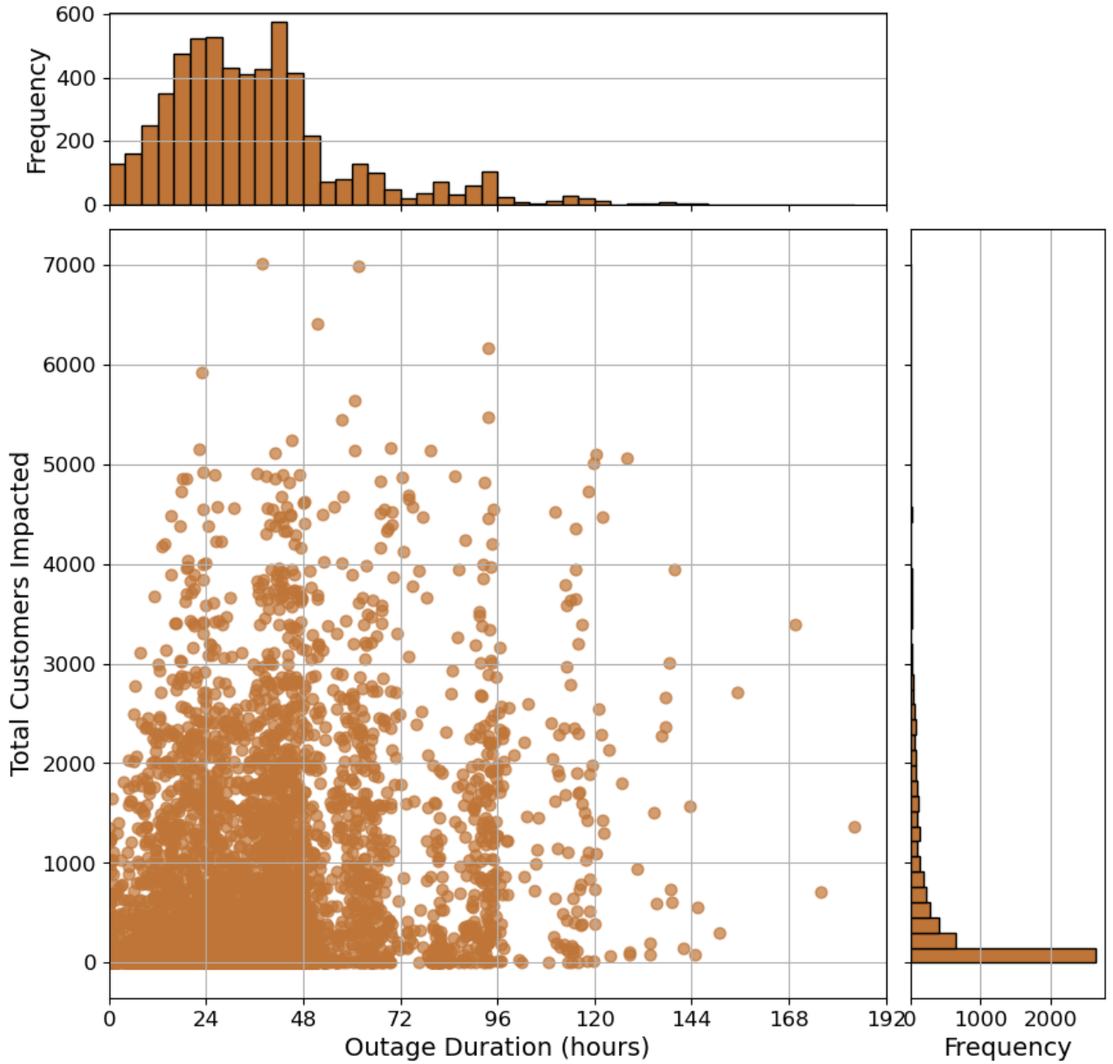
PSPS Event Reporting Data Availability

California

Since CPUC's database tracks all circuits de-energized by IOUs with service territory within California dating back to 2013, this data has been used to develop some event statistics.

Out of this sample, 92 circuit de-energizations (1.4%) are reported to have impacted zero customers.

Most events last less than 48 hours, with 32% of events lasting less than 24 hours, and an additional 49% lasting between 24 and 48 hours. 62% of circuit de-energizations have occurred since 2020.



Source: California Public Utilities Commission

PSPS Event Reporting Data Availability

Oregon

- In Oregon, OAR 860-024-0160 (2021) outlines reporting requirements for IOUs regulated under the Oregon Public Utilities Commission (OPUC) associated with documenting PSPS events.
- Under OPUC's requirements, non-confidential versions of PSPS reports must be publicly accessible and obtainable through dockets, filings, or direct requests to the utility or the Commission.
  - Utilities must document why a PSPS event was initiated, including the fire-weather conditions, risk assessments, alternatives considered, and how the benefits of de-energization were determined to outweigh the risks.
  - Utilities must also report the scope and duration, number of customers affected, re-energization procedures and timelines, and any lessons learned following the event.
- Since 2022, there have been three events affecting OR IOU customers.

PSPS Event Reporting Data Availability

- Availability of known PSPS events outside of CPUC or OPUC's jurisdiction is limited and typically only found via company website, media, or WMPs.
  - Below is a table of known non-CPUC/OPUC PSPS events since 2020:

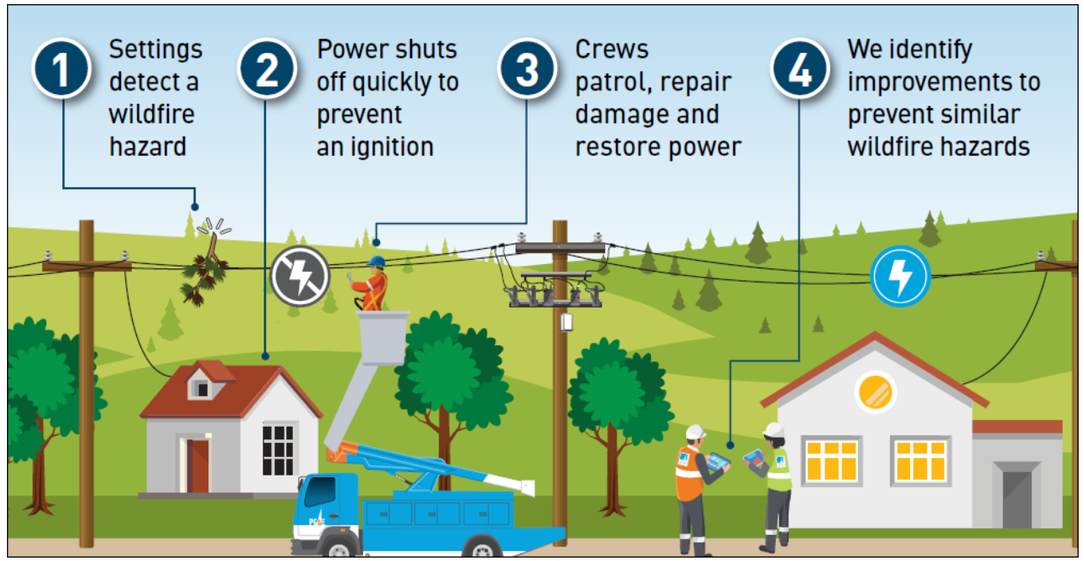
Utility	Events	State	Year	Source
Turlock Irrigation District	2	CA	2020	2024 WMP
Silicon Valley Power	1	CA	2020	2023 WMP
City of Palo Alto	1	CA	2021	2022 WMP
City of Palo Alto	1	CA	2022	2023 WMP
Bonneville Power Authority	1	WA	2022	Local Media
Rocky Mountain Power	1	UT	2022	Company Website
Seattle City Light	1	WA	2023	2024 WMP
Xcel Energy	1	CO	2024	Company Website
Idaho Power	1	ID	2024	2025 WMP
Rocky Mountain Power	1	UT	2025	Company Website

Case Studies in PSPS History

- Prior to 2024, Xcel Energy Public Service Company of Colorado did not have a PSPS plan in any of its WMPs. Following the Marshall Fire (December 2021 – January 2022), for which Xcel was found to be partially liable, Xcel Colorado began including a PSPS plan in all WMPs published after 2023 (Xcel Energy PSCO, 2025-2027).
- Similarly, Hawaiian Electric Company had not published any WMP before the Lahaina Fire (August 2023), the ignition of which was found to be the premature re-energization of a downed HECO power line. Both WMPs published after the fire include detailed PSPS plans (HECO, 2024).
- Despite having a PSPS plan in every WMP published since 2019, PacifiCorp did not implement PSPS during the Labor Day Fires in Oregon (September 2020) (PacifiCorp, 2025).
- Risk reduction from successful implementation of PSPS is difficult to quantify, but post-event inspections identifying damaged and destroyed assets validate the value of PSPS as a tool to avoid large wildfires (PG&E, 2021). The value of avoided risk compared to the cost of disruptions due to de-energizations remains uncertain and merits further study.

Enhanced Powerline Safety Settings (EPSS)

- Unlike PSPS, which requires manual decision-making by operators, EPSS automatically de-energizes lines based on real-time fault detection.
- EPSS is often referred to as “PSPS-Lite” or a “Pre-PSPS” strategy by targeting localized risk without the broader disruption of full shutoffs.
- Piloted by PG&E in High Fire Threat Districts (HFTDs), EPSS has since been adopted by other CPUC-regulated IOUs and is now more widely implemented.
- Uses reclosers set to “fast-trip,” cutting power within ~0.1 seconds after a fault is detected with one shot to lockout and no automatic reclosing.



Source: Pacific Gas & Electric, 2025

Enhanced Powerline Safety Settings (EPSS)

- Unlike PSPS, EPSS events occur automatically and instantaneously in response to detected faults – therefore advance notice to customers is not only not required, but not possible.
  - Utilities must report EPSS deployment and impacts in WMPs
  - Utilities report 60–70% reductions in ignitions on circuits where EPSS is active
- As utilities continue refining their wildfire strategies, EPSS reflects a broader shift toward automation, precision, and layered mitigation to complement the role of PSPS in extreme conditions.

Source: Avista Utilities, 2025

Citation, Contacts, and Project Links

Please cite this slide deck as:

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All WMPs used in this analysis can be found at:

https://wildfire.pnnl.gov/MitigationPlans

For more information, contact wildfire@pnnl.gov

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Thank you