Pacific Gas and Electric Company CALIFORNIA PUBLIC UTILITIES COMMISSION WORKSHOP ON PUBLIC SAFETY POWER SHUTOFF (PSPS)

February 23, 2022



PG<mark>s</mark>e

| 01 | 2021 PSPS Performance and Lessons Learned | PG&E Speakers: Sumeet Singh |
|----|--|--|
| 02 | Focus Areas: Customer and Community Support | Executive Vice President, Interim Chief Safety and Risk |
| 03 | PSPS Criteria (including Tree Overstrike) | Officer Mark Quinlan |
| 04 | Enhanced Powerline Safety Settings (EPSS) and PSPS | Vice President, Electric System Operations |

Year-Over-Year PSPS Overview

In 2021, we continued to evolve and improve, keeping our customers safe and reducing the impact of PSPS events.

| | 2021 Commonitoren ha 2020 | | | |
|---|---------------------------|---------|---------|---|
| Event Details | 2019 | 2020 | 2021 | 2021 Comparison to 2020 |
| PSPS Events | 7 | 6 | 5 | 17% fewer outages |
| Customers Impacted | 2,014,000 | 653,000 | 80,400 | 88% fewer customers impacted |
| Average Number of Counties Impacted | 17 | 17 | 10 | 41% fewer counties impacted |
| Average Outage Duration (hours) | 43 | 35 | 31 | 11% less time without power |
| Average Outage Restoration Time (hours) | 17 | 10 | 12 | 20% increase in restoration time |
| Damage/Hazards | 722 | 257 | 442 | (13% decrease in restoration time when excluding January PSPS event) |
| Peak Wind Gusts | 102 MPH | 89 MPH | 102 MPH | , , , |
| Potential Impacted Acreage Prevented* | 3.5M | 912K | 691K | |
| Potential Damaged Structures Prevented* | 280K | 196K | 86K | *According to studies prepared by Technosylva |







Some of the measures included in this presentation are contemplated as additional precautionary measures intended to further reduce the risk of wildfires.

Post-PSPS Customer Survey Feedback

In 2021, we began to survey customers about their PSPS experience. This information is being used to guide programmatic improvements in 2022.

Methodology

- 3 online surveys (August, September and October 2021)
- Sent to customers deenergized and notified about events
- Topics included outage notifications, PSPS resources and suggested areas for improvement

~9% total response rate

34,542 surveys distributed

Top Themes

- October PSPS events showed significant improvement compared to August and September events
- Top issues identified across all surveys:
 - Accurate restoration time estimates
 - Resources to those with disabilities, medical or other critical needs
- Generally low awareness and usage of resources (e.g. CBOs)
- Most common verbatim comments about lost food and added costs (e.g. fuel for generators)

Actions To Address Feedback:

- Improving awareness of community-based organizations, food resource partnerships and more through increased outreach and education
- **Updating notifications** to be more clear, concise and accurate, working in coordination with our customers
- **Expanding access** to portable batteries and generator rebates
- Increasing availability of food banks, Meals on Wheels and grocery delivery
- Reducing impacts by installing more sectionalizing devices and distribution microgrids

County/Tribal Agency and Critical Customer Feedback

We regularly engage with agency/tribal leaders, public safety partners and customers before, during and after PSPS events to listen, gather feedback and identify areas for improvement.

2021 Engagement

- 10 Post-Season Listening Sessions
- **20** Regional Working Groups
- 4 PSPS Advisory Committee
- **400+** Ongoing Stakeholder Meetings
- **4** Post-Event Agency Surveys
- 26 Wildfire Safety Working Sessions
- **4** Tabletop and Full-Scale Exercises
- Engagement with critical facility stakeholders

What We Heard

- 95% of post-event survey respondents' PSPS experience improved in 2021
- Notable process improvements for critical customers
- Data and information sharing improved but requires further refinement
- Portal sometimes contained inaccurate maps or outdated information
- Event scope/criteria changes needed more quickly and through established channels
- **Proactively share information** about Enhanced Powerline Safety Settings (EPSS)

What We're Doing

- Refining PSPS Portal information and timeliness
- Enhancing coordination between patrol teams to reduce variability in restoration time estimates
- Refining existing AI and machine learning models to surgically target PSPS in areas experiencing severe weather
- Enhancing helicopter utilization during patrols and developing a mobile platform to coordinate on-the-ground patrol crews
- Sharing information and resources about EPSS, PSPS and other wildfire safety efforts

"PG&E has been a true partner allowing our hospitals to provide Californians with the healthcare they need, when they need it. **PG&E's partnership with our hospitals is one that has helped our hospitals save lives."**

- Bryan Bucklew, President and CEO, Hospital Council – Northern and Central California

Customer Support Programs



To reflect customer feedback, we are focused on more accurate notifications, expanded access to backup power and resources for vulnerable customers.

| PROGRAM | 2021 STATUS | 2022 TARGET | | | |
|--|---|--|--|--|--|
| | Access to accurate notifications for any address in multiple languages | | | | |
| Customer Notifications | Address Alerts for customers and expanded for non-customers Notifications in 16 languages | Shorter, more clear notification language, developed in partnership with customers More accurate Estimated Times of Restoration | | | |
| | Support and | resources for all interested vulnerable customers | | | |
| Community-Based Organization Partnerships | 60+ resource and 280+ info partnerships in place Increased coordination with AFN stakeholders | Expand and diversify resource CBO partnerships (+5 resource partners serving 65+, disabled, and/or deaf or hard of hearing) Partner with paratransit agencies on accessible transportation options Additional resources as identified by AFN Collaborative Planning team during quarterly meetings | | | |
| | Res | sources to replace food lost during PSPS | | | |
| Food Resource Partnerships | Partnerships with: 23 food banks in 37 counties 25 Meals on Wheels in 22 counties | Build awareness through increased promotion Explore expansion of grocery gift card partners | | | |
| | Portable batteries made available to all interested and qualified customers | | | | |
| Portable Batteries | 6,500+ batteries distributed in 2021 Beat initial targets by ~500 batteries ~13,000 batteries distributed to date | Distribute ~6,000 batteries (Portable Battery Program + DDAR) Expand eligibility to non-income qualified Medical Baseline customers in HFTDs or impacted by two or more PSPS outages | | | |
| Community Resource | Multiple CRC sit | es available in each potentially impacted community | | | |
| Centers | 393 total ADA-accessible sites availablePartnership with county and tribal agencies | Enable new locations based on county feedback | | | |
| | Rebates available for all Medical Bas | eline, well pump and small and micro-sized business customers in HFTDs | | | |
| Generator and Battery Rebate Program | Launched full rebate program, including batteries ~1,200 rebates provided in 2021 (~1,300 to date) | Adjust tiered rebate amounts to support more customers (~1,300) Expand pilot to provide Backup Power Transfer Meters (~1,500) Expand to customers on EPSS-affected circuits | | | |
| Multi-Solution | Territory-wide, full-servi | ce solutions for individuals with Access and Functional Needs | | | |
| Partnerships | CFILC's DDAR - 16 centers serving 48 counties 211 contract established | Build awareness through radio and direct to customer outreach Launch 211's proactive care coordinator program | | | |

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Agency/Tribal Engagement and Support



We work in partnership with agencies/tribes to share information and incorporate local feedback to improve PSPS events each year.

| PROGRAM | 2021 STATUS | 2022 PLAN |
|--|---|---|
| In-Event Communications | Improved State briefings Enhanced information-sharing portal Simplified situation reports | New processes to make information-sharing portal a more accurate source of information Increased communications resources to share with community members (e.g. educational social media) |
| PSPS Exercises and Trainings | 2 tabletop exercises with external partners 2 full-scale exercises with external partners | Comprehensive full-scale exercise and workshop with external partners |
| Wildfire Safety Working Sessions | 26 working sessions held with county and tribal stakeholders | Replacing Working Sessions with Local Government Forums Offered to 290+ cities and counties (21 held to date) Include city-level stakeholders, in addition to counties and tribes |
| Regional Working Groups and Advisory Committees | 20 quarterly Regional Working Groups with key agencies and AFN stakeholders 4 quarterly PSPS Advisory Committee meetings Joint IOU Statewide AFN Advisory Council and People with Disabilities and Aging Advisory Council | 20 Quarterly Regional Working Groups (5 regions per quarter) Ongoing AFN Advisory Council coordination meetings 4 quarterly CWSP Advisory Committee meetings (formerly PSPS Advisory Committee) |
| Ongoing Outreach and Engagement | 400+ meetings on wildfire safety and PSPS | Hosting and participating in meetings; 60 meetings to date in 2022 (estimated 400+ total) More refined city-level data and information |

Operational Improvements



We are taking additional actions to improve situational awareness, reduce wildfire risk on the system and minimize the impacts of PSPS

| PROGRAM | 2021 STATUS | 2022 TARGET |
|---|---|--|
| Improved Situational Awareness | 1,313 advanced weather stations installed 502 HD cameras installed | 100 additional weather stations, for a total of 1,413 98 additional HD Cameras, for a total of 600 |
| Sectionalizing Devices and Transmission Switches | 1,195 distribution and transmission sectionalizing devices | 30 additional distribution sectionalizing devices and transmission line switches for a total of 1,225 |
| Microgrids/ Temporary Generation | 8 distribution microgrids ready to operate Temporary backup generation that supported ~1,760 customers with ~4MW of capacity | 5 additional distribution microgrids for a total of 13 Ongoing support for critical facilities, including pre-season preparedness |
| Undergrounding | Launched plan to underground 10,000 miles of powerlines in high fire-threat areas 70-line miles undergrounded in 2021 | 175 miles line miles undergrounded for a total of 245 Coordination with local officials to help prioritize efforts |
| System Hardening | 740+ circuit miles hardened with stronger poles and lines | 295 additional circuit miles prioritized in areas with highest wildfire risk for a total of 1,035+ |
| Enhanced Powerline Safety Settings | Launched new safety settings on 10,000 line miles 80% reduction in reportable ignitions, compared to the past 3-year average | Expanding program to 25,500 line miles in and around high fire-threat districts |

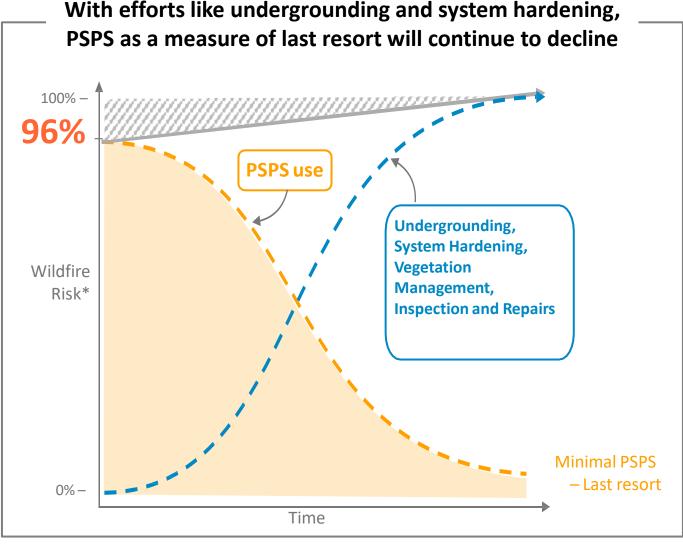
Incorporating Tree Overstrike into PSPS Decision-Making

- In 2021, the Outage Producing Weather (OPW) model was enhanced with Ignition Probability Weather (IPW) model
- IPW incorporates tree overstrike data as one of its key inputs

Outage Types Analyzed

PRS

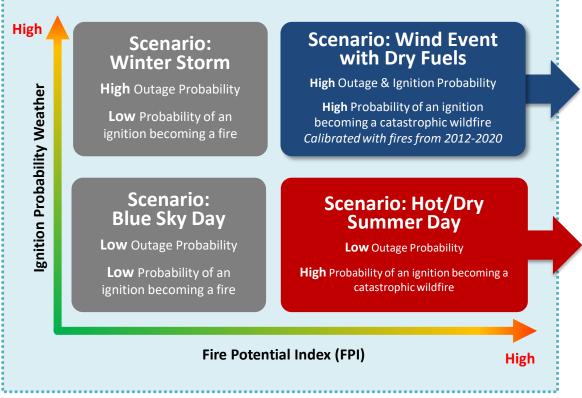




Weather-Driven Wildfire Prevention Efforts

Year-Round Wildfire Mitigation

- Undergrounding
- System Hardening
- Enhanced Inspection and Repair



Weather-Driven Response

Public Safety Power Shutoff (PSPS)

Turning off power during severe weather to prevent tree branches and debris from contacting energized lines.

PSPS IN 2021

17% fewer outages*

88% fewer customers impacted*

2022 FOCUS

Continuing to refine program and reducing impacts in the areas at highest risk

Enhanced Powerline Safety Settings (EPSS)

Using equipment on powerlines that allows them to turn off power within one tenth of a second if a tree branch or object strikes the line.

EPSS IN 2021

In place on **~45%** of HFTD circuit miles

2022 FOCUS

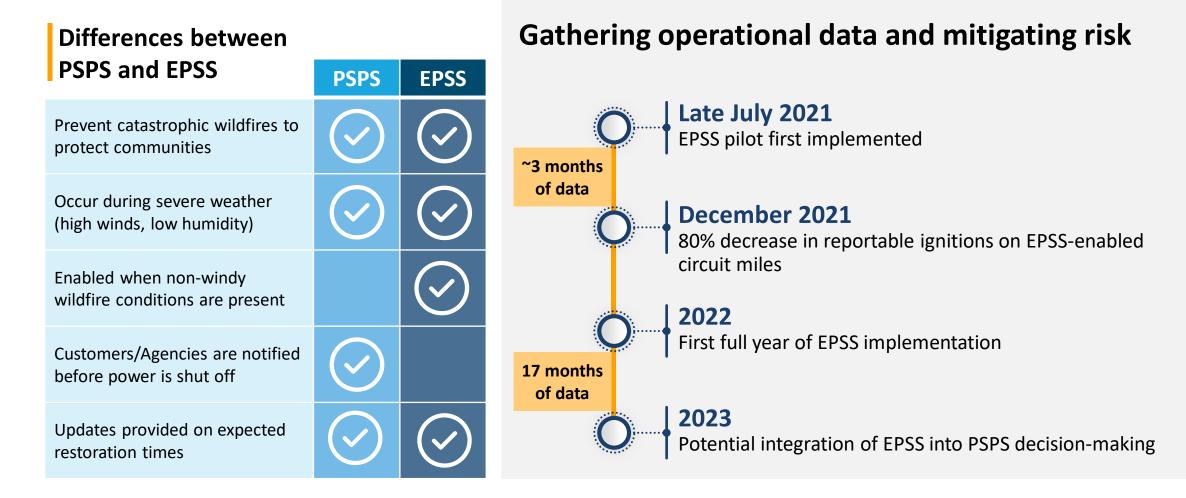
Expanding to **100%** of HFTD

circuit miles (Due to **80%** CPUC Reportable ignition reduction in 2021 for EPSS-enabled circuits)

*Compared to 2020

Interaction Between EPSS and PSPS

EPSS and PSPS are weather-driven responses to increased wildfire risk. By analyzing additional EPSS data gathered through the end of this year, the potential PSPS threshold criteria may be revised.



Planned Customer Education and Outreach for EPSS and PSPS

We are educating customers about both PSPS and EPSS using a multi-channel approach that includes direct mail/email, social media, customer events and expanded educational resources.

| Customer Outreach and Engagement | Social Media Engagement | HOW CAN YOU PREPARE FOR POSE PUBLIC SAFETY POWER SHUTOFFS? |
|---|--|---|
| Letters and Emails | EPSS/PSPS AwarenessLocal EPSS Impacts | For public safety, we may need to turn off power during severe weather to prevent wildfires. This is called a Public Safety Power Shutoff or PSPS, Even if you don't have a PG&E account, you can still be affected by power shutoffs. What Factors Lead to a PSPS? As each weather shuting in unique, we review a some shutoff or the second as some a some as we can, and the second as |
| Awareness Emails | PSPS Announcements | Cent humidity levels, generally 30% or bolow Montfactuations Second Secon |
| Educational Brochures | Customer Support Resources | Ret Flag Warning discussed by the Kational Weathing Service On-the ground, reak-time Construction of the On-the ground, reak-time |
| Customer Postcards | Weather Updates | We may also need to turn off power if there are tail trees that could strike a power line during |
| Local Progress Updates | System Improvement Information | Were deviced. Address Auftress Auft |
| Targeted Medical Baseline Outreach | | See if you qualify for extra help from the |
| | Customer Events | POSE tares real-time updates on social media. POSE tares real-time updates on social media. Fellow us at: #@POSEALE @escificoasandelectric |
| Educational Materials | Safety Town Halls | Forources, <u>page.com/pspssupport</u> For more information on our wildfire safety efforts, visit <u>gae.com/wildfiresafety</u> Made y effet Supports that found is an effective Support of Subjects |
| Expanded Website Resources | Regional Events | Learn About |
| Educational Videos | In-language | BACKUP POWER Options |
| Fact Sheets | Schools and educators | We know how important power is to you. |

- Infographics
- Regional Progress Summaries

Access and Functional Needs

Critical Customers/Hospitals

That is why we are offering

additional resources to help support you and your medica device power peeds





Appendix



Resources for Customers with Access and Functional Needs

Outreach and resources for customers who could be more acutely impacted by PSPS continues to be a primary focus for preparedness and in-event support.

- **Offseason Preparedness**
 - **Contact Info Acquisition**
 - Understanding Support **Options**

Pre-PSPS Event Support

In-Event Support

- CBO Partnerships
 - CFILC DDAR support
 - 211
 - Meals on Wheels in-event food delivery and food bank post-event food replacement
- Community Resource Centers

- Resource Referral Process MBL Escalation Process

2021 Event Examples

In-Event Notifications -

Hourly Retries

Doorbell Rings

 Hotel accommodations and food stipend

Watch and Warning Notifications

Acknowledgement Required

- In-event portable backup battery delivery
- Delivery of fuel gift card







We exceeded our program goals for portable batteries and generator rebates and will continue to expand our customer offerings in 2022.

| Program | 2021 Goal | 2021 Performance | Program to Date | 2022 Goals | | |
|---|----------------------------------|----------------------------------|----------------------------------|--|---|--|
| Portable Battery Program | 4,000 BATTERIES | 5,135 BATTERIES | 10,704 BATTERIES | 5,000 BATTERIES | Expand eligibility to non-income qualified Medical Baseline customers in HFTDs or impacted by two or more PSPS outages. | |
| Generator and Battery Rebate Program | 700 REBATES | 1,223 REBATES | 1,327 REBATES | 1,300 REBATES Support eligible customers with read devices and expand to custom EPSS circuits. | | |
| Disability Disaster Access & Resource Program | 1,000 BATTERIES | 1,371 BATTERIES | 2,375 BATTERIES | 1,000 BATTERIES • Expand program eligibility to support of the s | | |
| Self Generation Incentive Program | 2,100 BATTERY PROJECTS | 2,112 BATTERY PROJECTS | 6,840 BATTERY PROJECTS | Dependent on customer need | Work with stakeholders to improve program's ability to support AFN customers. | |

Expanding Resource Partnerships for Vulnerable Customers

We expanded our support for customers with Access and Functional Needs, with more partnerships and resources.

2021 PSPS Support

| partnerships and resources. | | CBO RESOURCE PART | INERS JAN 19 – 21 | AUG 17 – 19 | SEPT 20-21 | ОСТ 11-12 | ОСТ 14-16 |
|--|--|-------------------|----------------------|----------------|---------------|--------------|-------------------|
| California Foundation for Independent Living Centers (CFILC) | 16 centers serving 48 counties | FOOD BANKS | 525 | 404 | 87 | 549 | 0 |
| Meals on Wheels | 25 organizations serving 22 counties | MEALS ON WHEELS | 300 | 100 | 0 | 107 | 2 |
| Food Banks | 23 organizations serving 37 counties | OTHER | 0 | 10 | 0 | 0 | 1 |
| Portable Battery Program | DDAR Program | 2021 Totals | | | | | |
| Providers serving 42 counties | | Hotel Stays | Food Vouchers | Trans | portation | | ard for erator |
| In-Language and Additional Partnerships | 12 services serving 21 counties | 267 | 348 | | 2 | Э | 86 |

Providing Hometown Support and Resources

Community Resource Centers (CRC) provide customers a safe location to meet their basic power needs and access resources.

In 2021, we opened **92 CRCs** to support customers during PSPS Outages.

| PSPS OUTAGE DATE | CRCS OPENED | ATTENDANCE |
|------------------|-------------|------------|
| January 19 | 14 | 2,199 |
| August 17 | 34 | 3,376 |
| September 20 | 9 | 265 |
| October 11 | 24 | 5,534 |
| October 14 | 11 | 347 |
| GRAND TOTAL | 92 | 11,721 |

RESOURCES PROVIDED INCLUDE:



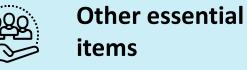
Charging for medical equipment and electronic devices



Up-to-date outage information







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We engage with and support facilities that provide services that are essential to public safety.

| Throughout 2021 PSPS events, we provided temporary backup generation that supported ~1,760 customers across 8 counties within our service territory. | | | 2021 PSPS Event Support | | | | |
|---|---|------|-------------------------|----------------|---------------|---------------|--|
| | | | AUG. 17-19 | SEPT. 20-21 | ОСТ. 11-12 | ОСТ. 14-16 | |
| Key Customer Coordination | Requests for backup power | 0 | 4 | 2 | 7 | 4 | |
| PG&E and Telecommunications Providers Resiliency Collaborative | Percent of requests met | 100% | 100% | 100% | 86% | 100% | |
| Partnership with the Hospital Council of | Total MW capacity supplied | 0 | 2.2 | 0.056 | 1.125 | 0.456 | |
| Northern and Central California Collaborating with the Association of California Water Agencies (ACWA) and individual water agencies | Critical facility support incl Backup power evaluations Prioritized restoration Additional communication Other resources, as needed | S | | | <u>م</u> | · | |

Agency/Tribal Outreach and Education

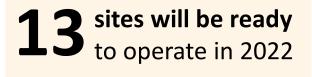
Throughout 2021, we listened to public safety partners and gathered feedback on how we could improve and identified areas for further cooperation.

| Enga | Completed | |
|--|---|---------------------------|
| PSPS Tabletop and Full-Scale Exercise | Testing our policies and procedures and gathering feedback from stakeholders in real-time | 4 (June) |
| Post-Season CWSP Engagement | Outreach to gather lessons learned and areas for improvement | 10 (Nov. – Dec.) |
| Wildfire Safety Working Sessions | Local wildfire safety, PSPS, resiliency and AFN information and support resources | 26 (Apr. – Jun.) |
| PSPS Advisory Committee | Gathering feedback and coordinating on areas for improvement | 4 (Quarterly) |
| Regional Working Groups | A regional forum for collaborating on wildfire safety, resiliency and temporary generation | 20 (5 per quarter) |
| Undergrounding Advisory Group | Sharing undergrounding plans and gathering input from key stakeholders and industry experts | 5 (Ad-Hoc) |
| Joint IOU Statewide AFN Advisory Council and People with Disabilities and Aging Advisory Council | Gathering feedback on our approaches for communicating with and serving customers | 8 (Quarterly) |

Temporary Distribution Microgrid Support



We use distribution microgrids to reduce the number of customer impacts by PSPS outages, when safe to do so.





5 Distribution Microgrid sites are planned in 2022

Colfax

Lucerne

Clearlake North

Arnold

Groveland

- **5** Distribution Microgrid sites were new in 2021
- Georgetown

- Foresthill
- Pollock Pines
- Magalia

Middletown

3 Distribution Microgrid sites from 2019-2020

Angwin

Calistoga

Shingletown

Some of the measures included in this presentation are contemplated as additional precautionary measures intended to further reduce the risk of wildfires. For illustrative purposes. Locations are approximate.

Public Safety Power Shutoff and System Improvements Map

See where wildfire safety improvements are taking place with our **NEW** planning map tool.

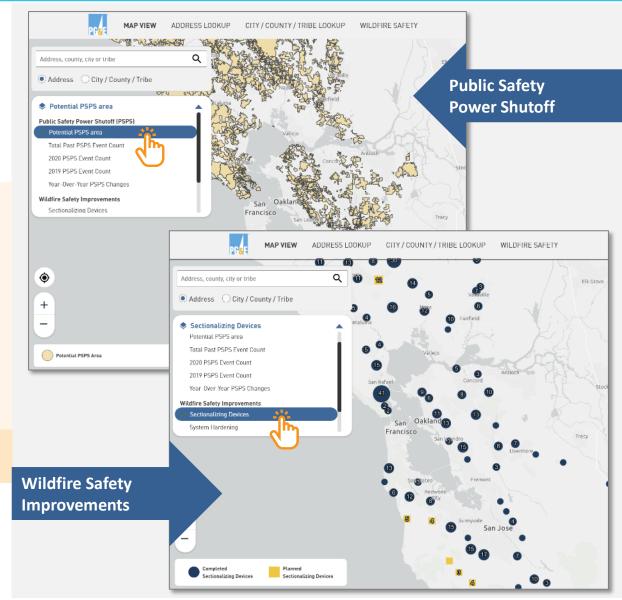
Search ANY location to find:

- The likelihood of being impacted by a PSPS
- The number of past PSPS outages per year
- Completed and planned wildfire safety improvements such as system hardening, enhanced vegetation management, sectionalizing devices and temporary microgrids

Information is available by individual address and by county, city and tribe, including federally recognized tribes with land in trust.

To learn more, visit:

pge.com/customerpspsplanningmaps



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*Locations are approximate and subject to change. Map is not intended to determine the react location of future PSPS outages.



BEFORE PSPS AND EPSS OUTAGES

See if you qualify for backup power support at pge.com/backuppower.

Generator rebates for customers who rely on well water **Portable batteries** for Medical Baseline customers in high fire risk areas

- Apply for the Medical Baseline Program to receive energy savings and extra outreach before a PSPS at <u>pge.com/medicalbaseline</u>.
- Self-identify for Vulnerable Customer Status if your life or health would be at risk should electric or gas service be disconnected at pge.com/vulnerable.

DURING PSPS OUTAGES

- Find Community Resource Centers to charge devices and get basic supplies during a PSPS event at <u>pge.com/crc</u>.
- Find meal replacements at your local food bank during and up to three days after an outage, visit <u>pge.com/disabilityandaging</u>.
- Learn about accessible transportation resources and hotel stays at <u>CFILC.org</u>.

Visit PG&E's YouTube Channel

To view more safety information, tips to be prepared and other resources

www.youtube.com/user/pgevideo

To view webinar slides and recordings, visit

pge.com/firesafetywebinars

For more information

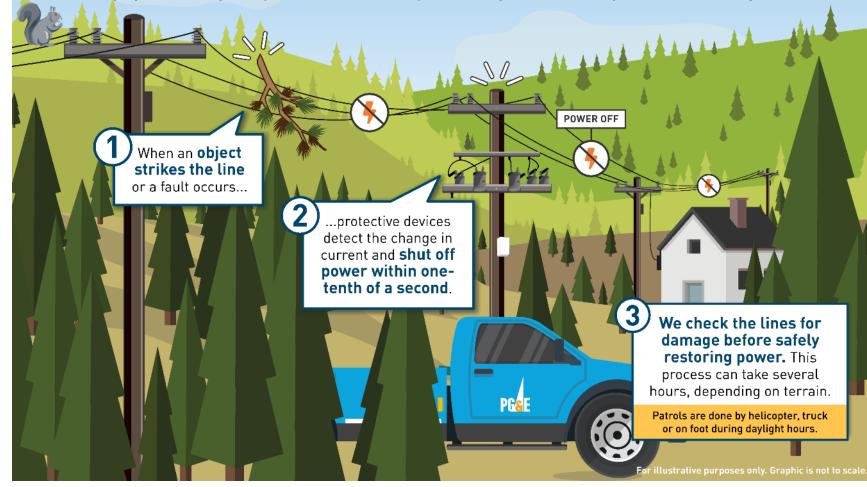
Visit **pge.com/wildfiresafety** Call us at **1-866-743-6589*** Email us at **wildfiresafety@pge.com**

*Translated support available

Enhanced Powerline Safety Settings Background and Overview

To help prevent wildfires during the hot and dry season, we adjust the sensitivity settings on our equipment to quickly and automatically turn off power if the system detects a problem.

PFSF



Enhanced Powerline Safety Settings make our system devices more responsive to wildfire risks by...

Faster Fault Detection

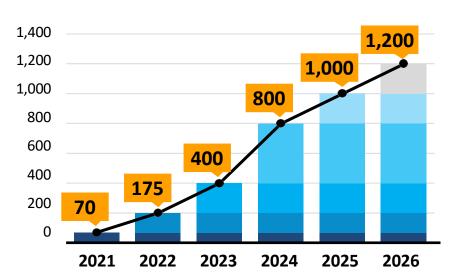
Faster trip settings detect distribution primary faults more quickly to reduce incident fault energy

Reduce Fuse Single Phase Operation Detect faults beyond fuses to clear across all three-phases

Higher Impedance Fault Detection Sensitive earth fault (SEF) elements implemented to help isolate for higher impedance faults

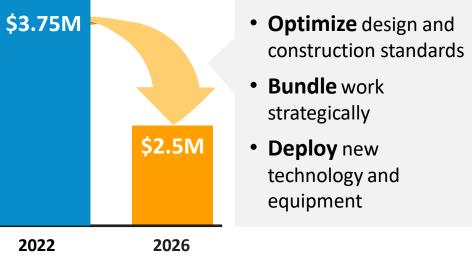
E Undergrounding 10,000 Miles

PG&E is undertaking a major new initiative to underground approximately 10,000 miles of power lines in high fire risk areas.



Target Miles Per Year

Target Cost Per Mile



This commitment
represents the largest
effort in the U.S. to
underground power
lines as a wildfire risk
mitigation measure.SafeDependableSustainableImproves ReliabilityImproves ReliabilityImproves ReliabilityImproves ReliabilityImproves Reliability

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