

# **2021 Pacific Gas & Electric Co. (PG&E) Public Safety Power Shutoffs (PSPS) Preparedness Staff Briefing #2**

July 2, 2021



California Public  
Utilities Commission

# Agenda

10:00 – 10:10 a.m.

## Introduction

*Dru Dunton, California Public Utilities Commission*

10:10 – 10:40 a.m.

## PG&E Presentation

*Chris Bober, Reno Franklin, Lori Geoffroy, Shawn Holder, Aaron Johnson, Tracy Maratukulam, Quinn Nakayama, Scott Strenfel, Jon Eric Thalman*

10:40 – 11:55 a.m.

## Q&A

11:55 am – 12:00 p.m. Closing Remarks

# Thanks to our Presenters, Panelists and Hosts

The Wildfire Safety and Enforcement Branch (WSEB) would like to extend our thanks to:

- The electric Investor-Owned Utilities that have thoughtfully prepared their presentations to the CPUC regarding their readiness for the 2021 Wildfire/PSPS season.
- Panelists/Moderators from the CPUC, Cal OES, and CALFIRE for bringing your subject matter expertise to these fora.
- CPUC Information Technology Host Robert Stanford and Associates.

# Presenters

## Pacific Gas & Electric Co.:

- Chris Bober – Director, Business Strategy in the Customer Care organization
- Reno Franklin – Tribal Liaison
- Lori Geoffroy – Director, Digital Channels
- Shawn Holder – Director, Public Safety Power Shutoff
- Aaron Johnson – Vice President, Bay Area Region
- Tracy Maratukulam – Director, Engagement Strategy and Programs
- Quinn Nakayama – Director Integrated Grid Planning and Integration
- Scott Strenfel – Director, Meteorology and Fire Science
- Jon Eric Thalman – Senior Manager, Risk Data Analytics

# Panelists (Panelists may attend one or more of the second Staff Briefings, June 30-July 2)

Panelist/Moderator	Representing
Mike Massone	Cal OES, Response Operations at California
Vance Taylor	Cal OES, Office of Access and Functional Needs
Jeff Fuentes	CALFIRE, Utility Fire Mitigation, Office of the State Fire Marshall
Jack Chang	CPUC, Climate and Equity Initiatives Section, Energy Division
Jonathan Lakey	CPUC, Customer Generation, Energy Division
Nathan Sarina	CPUC, Electric Safety Reliability Branch
Agatha Wein	CPUC, Outreach, Executive Division
Naveed Paydar	CPUC, Outreach, Executive Division
Dani Tutt	CPUC, Resiliency and Microgrids, Energy Division
Pat Saxton	CPUC, Resiliency and Microgrids, Energy Division
David Van Dyken	CPUC, Risk Assessment and Safety Analytics, Safety Policy Division
Anil Balivada	CPUC, Service Quality and ETC, Communications Division
Michael Truax	CPUC, Transportation Electrification, Energy Division
Kenneth Holbrook	CPUC, Tribal Advisor, Executive Division
Tony Noll	CPUC, Wildfire Safety and Enforcement Branch, Safety and Enforcement Division

# Purpose of 2021 IOU PSPS Preparedness Briefings

- Assess overall preparedness.
- Gauge the status of protections in place for vulnerable populations.
- Determine if actions have been taken to minimize the risk of wildfire.
- Evaluate readiness of notification and communications systems.
- Ensure that lessons learned have been implemented.

# Housekeeping

- Attendees are muted.
- Briefing is being recorded.
- 2<sup>nd</sup> briefing – presentations are short and straight-through; hold questions until the end.
- Questions guidelines:
  - Keep them brief
  - More complex questions can be batched into a data request.
  - Questions about the implementation of Phase 3 Guidelines (D.21-06-034) and the OII into the 2019 PSPS (D.21-06-014) should be considered carefully because these decisions have been issued only recently and may be taken up in the Public Briefings.
- Response guidelines:
  - Keep them as brief and fact-based as time permits.
  - Full, accurate responses may require research. You are welcome to respond at a later time. I will be tracking follow-ups.
- Confidential slides: Please do not share beyond CPUC or trusted agents in your State agency.
- Survey form – distributed after the briefing via email using the Microsoft Teams platform.
- Recording – A link to the recording will be included in the same email as the survey.

# Community Wildfire Safety Program

CALIFORNIA PUBLIC UTILITIES COMMISSION  
PSPS PREPAREDNESS BRIEFING

July 2, 2021



# Agenda

## SECTION 1

1

### PG&E Regions

2

### Identifying and Coordinating with Customers

- Tribes
- Telecommunications providers
- Critical facilities and backup generation
- Medical Baseline, master meter tenant and vulnerable customer status
- Battery storage devices

3

### An Interactive Look at Customer and PSPS Support

4

### Reducing PSPS Impacts

- System hardening
- Microgrids

## SECTION 2: Q&A PORTION

5

### Gathering Feedback, Incorporating Lessons Learned and Collaboration

6

### PSPS Decision-Making and Scoping

# Section One





# PG&E Regions

Region	Counties		
1 North Coast	<ul style="list-style-type: none"><li>Humboldt</li><li>Lake</li><li>Marin</li></ul>	<ul style="list-style-type: none"><li>Mendocino</li><li>Napa</li><li>Siskiyou</li></ul>	<ul style="list-style-type: none"><li>Sonoma</li><li>Trinity</li></ul>
2 North Valley/Sierra	<ul style="list-style-type: none"><li>Butte</li><li>Colusa</li><li>El Dorado</li><li>Glenn</li><li>Lassen</li><li>Nevada</li></ul>	<ul style="list-style-type: none"><li>Placer</li><li>Plumas</li><li>Sacramento</li><li>Shasta</li><li>Sierra</li><li>Solano</li></ul>	<ul style="list-style-type: none"><li>Sutter</li><li>Tehama</li><li>Yolo</li><li>Yuba</li></ul>
3 Bay Area	<ul style="list-style-type: none"><li>Alameda</li><li>Contra Costa</li></ul>	<ul style="list-style-type: none"><li>San Francisco</li><li>San Mateo</li></ul>	
4 South Bay/Central Coast	<ul style="list-style-type: none"><li>Monterey</li><li>San Benito</li></ul>	<ul style="list-style-type: none"><li>San Luis Obispo</li><li>Santa Barbara</li></ul>	<ul style="list-style-type: none"><li>Santa Clara</li><li>Santa Cruz</li></ul>
5 Central Valley	<ul style="list-style-type: none"><li>Alpine</li><li>Amador</li><li>Calaveras</li><li>Fresno</li><li>Kern</li></ul>	<ul style="list-style-type: none"><li>Kings</li><li>Madera</li><li>Mariposa</li><li>Merced</li><li>San Bernardino (Gas Only)</li></ul>	<ul style="list-style-type: none"><li>San Joaquin</li><li>Stanislaus</li><li>Tulare</li><li>Tuolumne</li></ul>



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

# Identifying and Coordinating with Customers





# Tribal Coordination

We have a dedicated team that engages with tribes within our service area before, during and after PSPS events.

In addition, we work with federal agencies with trust responsibilities to tribes and other state agencies.

## TRIBAL SUPPORT



### Before and after a PSPS event

- Tribal Liaisons conduct ongoing tribal government outreach at the regional level



### During a PSPS event

Two Tribal Liaisons and five Cultural Resource Specialists act as agency representatives for tribes in scope to:

- Host dedicated tribal calls
- Answer questions and elevate issues
- Provide real-time event updates
- Coordinate support, as needed
- Embed in tribal EOC, if requested
- Coordinate GIS technical support, if requested

## Summary of Tribes by PG&E Region

REGION	FEDERALLY RECOGNIZED TRIBES	NON-FEDERALLY RECOGNIZED TRIBES
NORTH COAST	32*	5
NORTH VALLEY/ SIERRA	16*	9
BAY AREA	1*	2
SOUTH BAY/ CENTRAL COAST	1	8
CENTRAL VALLEY	15	13

*\*Includes tribes that cross multiple counties*


TOTAL	62	37
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# Telecommunications Providers Coordination

We have **conducted outreach to providers of over 99% of telecommunications facilities** in our service area to discuss resiliency solutions and PSPS readiness.

- ✓ This **99% represents the carriers with facilities** considered **more likely to be impacted** by a PSPS event.
- ✓ The **remaining telecommunications facilities are considered less likely to be impacted** by a PSPS event and we plan to conduct outreach to them by September 1 of this year.

## Summary of Telecommunications Providers by PG&E Region

 <b>Telecommunications Providers</b>	REGION				
	NORTH COAST	NORTH VALLEY/ SIERRA	BAY AREA	SOUTH BAY/ CENTRAL COAST	CENTRAL VALLEY
	16	17	11	11	20

*Please see appendix for telecommunications providers breakdown by county*



# Critical Facilities Coordination

We have an existing process that identifies critical facility customers based on criteria as defined by the CPUC's PSPS Decision 19-05-042. Additionally, and pursuant to the PSPS Phase 3 Decision (18-12-005), we will be working to designate newly defined critical facilities prior to September 1.

We are providing cities, counties and tribal governments with a list of all critical facility customers within their jurisdiction through our secure PSPS portal\*. Agencies are encouraged to review and provide feedback to this existing list in alignment with CPUC criteria.

## Critical Facility Designations

- Public Safety Partners and Emergency Services Providers (**CC1**)
- Critical Facilities Supporting Emergency Response Needs (**CC2**)
- Pandemic Response Site (**PR1**)
- Telecommunications Providers Infrastructure (**TELCO**)

\*Excluding commercially sensitive customer data, including telecommunication facilities.

## Summary of Critical Facilities by PG&E Region

FACILITY DESIGNATION	REGION					TOTAL
	NORTH COAST	NORTH VALLEY/ SIERRA	BAY AREA	SOUTH BAY/ CENTRAL COAST	CENTRAL VALLEY	
CC1	348	517	606	473	750	2,694
CC2	2,412	2,611	3,788	3,197	3,215	15,223
PR1	261	239	476	313	571	1,860
TELCO	4,650	6,257	13,173	8,781	9,947	42,808
TOTAL	7,671	9,624	18,043	12,764	14,483	62,585



# Medical Baseline, Master Meter Tenant and Vulnerable Customer Status Coordination

In addition to PSPS notifications which all customers receive, **we provide additional notification and outreach** to customers in our Medical Baseline Program, master meter tenants and customers who self-certify as vulnerable customer status.



This includes:

- Hourly texts and calls until contact is made
- Doorbell rings if no positive contact is made
- Leaving a door hanger if no contact is made

## Medical Baseline Program Enrollment Count\*

June 1, 2019	194,940
June 1, 2020	198,532
June 1, 2021	256,428

*\*Totals are incremental and as of the date specified*

## Account and Non-Account Holders Receiving Additional Notification

Medical Baseline Program Master Meter Tenants	Non-account holder	3,389
Medical Baseline Program	Account holder	257,526
Self-certified Vulnerable Customer Status	Account holder	298

# Providing Customers with Battery Storage Devices

We work to provide low-income Medical Baseline customers in high fire-threat districts who have been impacted by PSPS events with portable batteries. This includes providing customers with energy assessments to find the right-sized battery for their individual needs.

	2020	2021		2020 AND 2021 TARGET TO DELIVER TO CUSTOMERS
PROGRAM	BATTERIES DELIVERED	BATTERY INVENTORY	BATTERIES ON ORDER	
Portable Battery Program (PBP)	5,569	4,734	1,225	
California Foundation for Independent Living Centers (CFILC)	1,004	1,108	700	
<b>Total*</b>	<b>6,573</b>	<b>5,845</b>	<b>1,925</b>	<b>11,500</b>

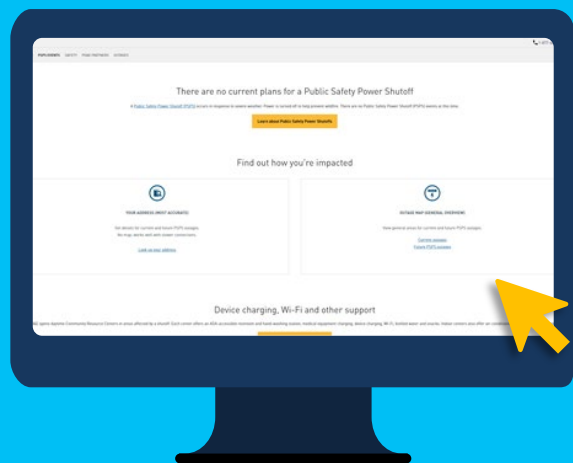
**Note:** 2021 batteries listed as “On Order” may not arrive until the fall due to global shipping delays and Covid-19 impacts affecting shipping ports in Southern China.

*\*Totals are incremental*



Battery Model	NRGGO 400	YETI 500X	Delta 1300	YETI 1500	YETI 3000X	VoltStack 5k	YETI 6000X
<b>Capacity**</b>	411Wh	505Wh	1,260Wh	1,516Wh	3,032Wh	5,600Wh	6,071Wh
<b>Size Classification</b>	Small	Small	Medium	Medium	Large	Extra Large	Extra Large

**\*\*Performance in hours is driven by the customer’s critical load (medical device and other loads plugged into the battery) and the size of the battery (Wh). PG&E ensures that the resiliency assessment that is completed before a battery is provided looks at medical device electrical needs. PG&E and the other Electric IOUs have engaged EPRI to help to understand the critical load needs of vulnerable customers and to ensure that battery solutions can meet this need.**



# An interactive look at how customers can find information on support programs and PSPS

[pge.com/pspsupdates](https://pge.com/pspsupdates)





# Reducing PSPS Impacts



# Hardening The Electric Grid

As part of our ongoing efforts to prevent wildfires, we are **strengthening the electric system with stronger poles, covered power lines and targeted undergrounding** to further reduce wildfire risks and better withstand severe weather. These efforts are known as system hardening and occur overhead and underground.

TYPE OF WORK	BENEFITS	LIMITATIONS
 <p><b>Overhead Electric Line Hardening</b> Installation of equipment designed and built to resist severe weather and wildfire risk</p>	<ul style="list-style-type: none"> <li>▪ Reduces wildfire risk</li> <li>▪ Enhances long-term safety</li> <li>▪ Improves reliability during severe weather</li> <li>▪ Potential to remove circuits from PSPS scope if the entire circuit is hardened</li> </ul>	<ul style="list-style-type: none"> <li>▪ Time delay in model to learn about improved performance from completed hardening work</li> <li>▪ Whole segments need to be hardened to reduce PSPS impact</li> </ul>
 <p><b>Underground Electric Line Work</b> Targeted undergrounding which moves select overhead electric distribution lines below ground in high wildfire risk locations</p>	<ul style="list-style-type: none"> <li>▪ Reduces wildfire risk</li> <li>▪ Enhances long-term safety</li> <li>▪ Improves reliability during severe weather</li> <li>▪ Potential to remove circuits from PSPS scope if the entire circuit is underground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Whole segments need to be underground to completely take circuit out of PSPS scope</li> <li>▪ Poles may still exist to support secondary, service and communications lines overhead</li> <li>▪ Requires extensive and lengthy planning and coordination</li> <li>▪ Involves vegetation removal</li> <li>▪ Not immune to weather and can take longer to repair</li> </ul>

# Reducing the Number of Customers Affected with Microgrids

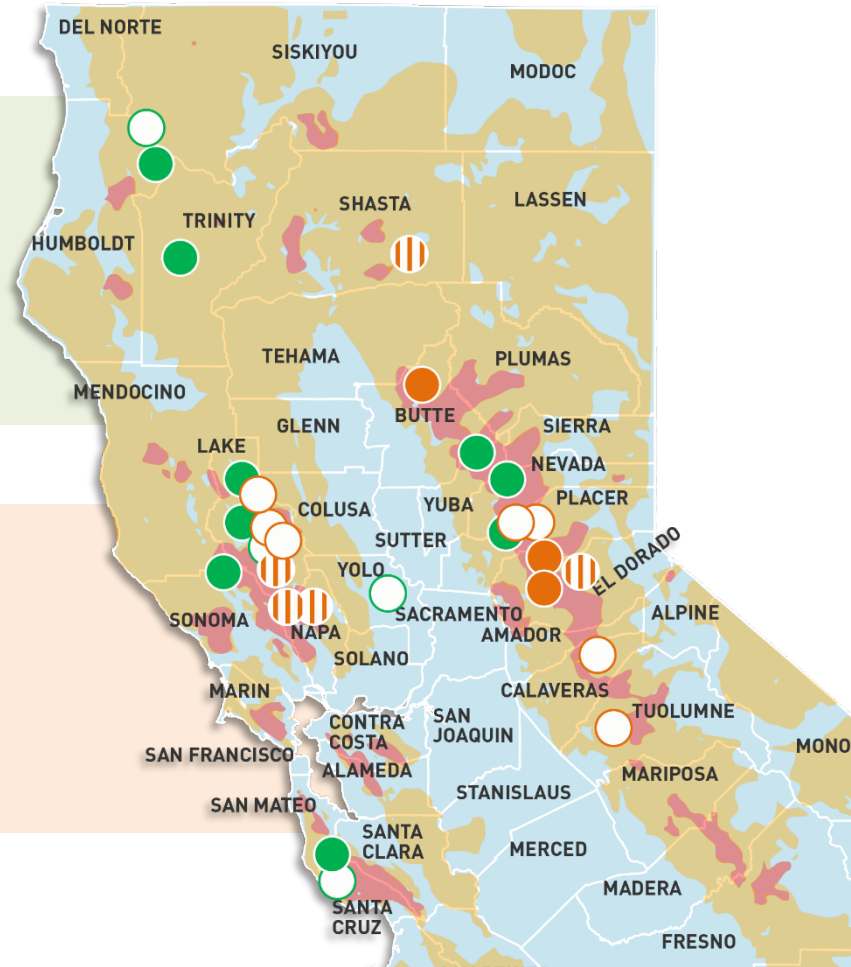
To help prevent wildfires and reduce the number of customers affected by PSPS, we are deploying **technology and investing in a stronger, more flexible grid**. The following are some of the programs that will help keep the lights on for customers and key community resources during a PSPS event.

## Substation Microgrids


Temporary generation at substations to support customers impacted by transmission-level PSPS events


## Distribution Microgrids


Energizing “main street” corridors, central community resources and critical facilities



-  **Substation Microgrids**  
Ready to Operate (9)
-  **Substation Microgrids**  
Planning (4)
-  **Distribution Microgrids**  
Ready to Operate (3)
-  **Distribution Microgrids**  
Near Complete (5)
-  **Distribution Microgrids**  
Planning (7)

 Tier 2 – Elevated\*

 Tier 3 – Extreme\*

 County Boundaries

\*High Fire-Threat Areas

# Additional Information



# Gathering Feedback and Incorporating Lessons Learned





# What We Heard and What We're Doing

We continue to evolve our wildfire safety and PSPS programs based on lessons learned, new data and feedback received from our customers and communities.





	What We Heard	What We're Doing
Agency/Tribal	<b>PSPS Portal:</b> Provide more consistent, timely and accurate info on the PSPS Portal and other channels	Adjusting the layout so files and updates are easier to find and standing up a PSPS Portal Working Group to solicit feedback
	<b>Customer Resources and Support:</b> additional opportunities to partner with community-based organizations	Tracking suggestions and feedback from agency partners and conducting outreach to new community-based organizations
	<b>Community Resource Centers:</b> continued coordination around locations, offerings and signage	Providing quarterly updates on status of CRC locations and soliciting further input from agency partners
	<b>Coordination with Telecom Providers:</b> additional preparedness efforts re: phones still working during outages	Hosting telecom workshops to facilitate PSPS preparedness and expanding on notification databases for increased coordination
Customer	<b>PSPS Notifications:</b> experienced inaccurate or inconsistent information in some cases	Enhance data quality, accuracy and reporting capabilities
	<b>PSPS Restoration Time:</b> customers requested more accurate restoration times	Further refinement of event notification content and timing
	<b>Customer Resources and Support:</b> build on partnerships with CBOs and explore other resource offerings	Increasing resources to help customers and communities before, during and after PSPS events
	<b>Medical Baseline:</b> customers want additional support and information	Drive greater participation in battery programs to help vulnerable and frequently impacted customers

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

# Opportunities to Share Best Practices and Feedback

We host a variety of engagements through various channels that provide a forum for stakeholders to share lessons learned and best practices.

 CPUC Requirement

Outreach Tactic	Audience Scope	2021 Target
 <b>PSPS Advisory Committee</b> Obtain focused input, solicit recommendations and gather feedback regarding PSPS improvements from representatives of select county, city, tribal and state governments.	<ul style="list-style-type: none"> <li>Local and tribal governments</li> <li>County and tribal OES</li> </ul>	<ul style="list-style-type: none"> <li>6 committee meetings</li> <li>3 completed to date</li> </ul>
 <b>PSPS Regional Working Groups</b> Forum for stakeholders to learn about the previous wildfire and PSPS season and share feedback on wildfire safety work, discuss lessons learned and incorporate learnings into future wildfire safety and PSPS plans.	<ul style="list-style-type: none"> <li>Local and tribal governments</li> <li>County and tribal OES</li> <li>Community-based organizations</li> <li>Public Safety Partners</li> <li>Critical customers</li> </ul>	<ul style="list-style-type: none"> <li>5 meetings per quarter, 20 total</li> <li>10 completed to date</li> </ul>
<b>Wildfire Safety Working Sessions</b> Co-hosted with County and Tribal OES, this meeting is an opportunity to partner on PSPS planning efforts, share local progress on wildfire mitigation work and track action items.	<ul style="list-style-type: none"> <li>County and tribal OES</li> </ul>	<ul style="list-style-type: none"> <li>Meetings with all interested counties/tribes</li> <li>25 completed to date</li> </ul>
 <b>PSPS Exercises</b> Exercise simulating a PSPS event with the participation of external agencies and stakeholders to help identify any potential gaps in processes and best practices.	<ul style="list-style-type: none"> <li>Local and tribal governments</li> <li>County and tribal OES</li> <li>Community-based organizations</li> <li>Public Safety Partners</li> <li>Critical customers</li> </ul>	<ul style="list-style-type: none"> <li>2 full-scale exercises and 2 tabletop workshops</li> <li>1 exercise, 1 tabletop completed to date</li> </ul>
<b>Additional PSPS Briefings &amp; Workshops</b> Ad hoc, or as-needed meetings, trainings and workshops for agency partners, tribes, critical customers and other key stakeholders.	<ul style="list-style-type: none"> <li>Local and tribal governments</li> <li>County and tribal OES</li> <li>Community-based organizations</li> <li>Public Safety Partners</li> <li>Critical customers</li> </ul>	<ul style="list-style-type: none"> <li>All interested stakeholders briefed</li> <li>230+ meetings to date</li> </ul>
 <b>PSPS Listening Sessions</b> Open forum for PG&E to share information on the previous wildfire and PSPS season and to listen to county, tribal and critical facilities' concerns and gather important feedback on 2021 PSPS events.	<ul style="list-style-type: none"> <li>Local and tribal governments</li> <li>County and tribal OES</li> <li>Critical customers</li> </ul>	<ul style="list-style-type: none"> <li>Conducted with all interested PSPS impacted counties/tribes</li> <li>35 sessions held</li> </ul>

# PSPS Readiness and Collaboration: Policies and Procedures

Our **Policies and Procedures** guide for **emergency managers** helps us to collaborate with city, county and tribal emergency managers in advance of and during PSPS events.

This document provides a comprehensive look into PG&E's PSPS:

- ✓ Criteria and decision making
- ✓ Operational and coordination improvements
- ✓ Event notification timeline and process
- ✓ Customer engagement and resources

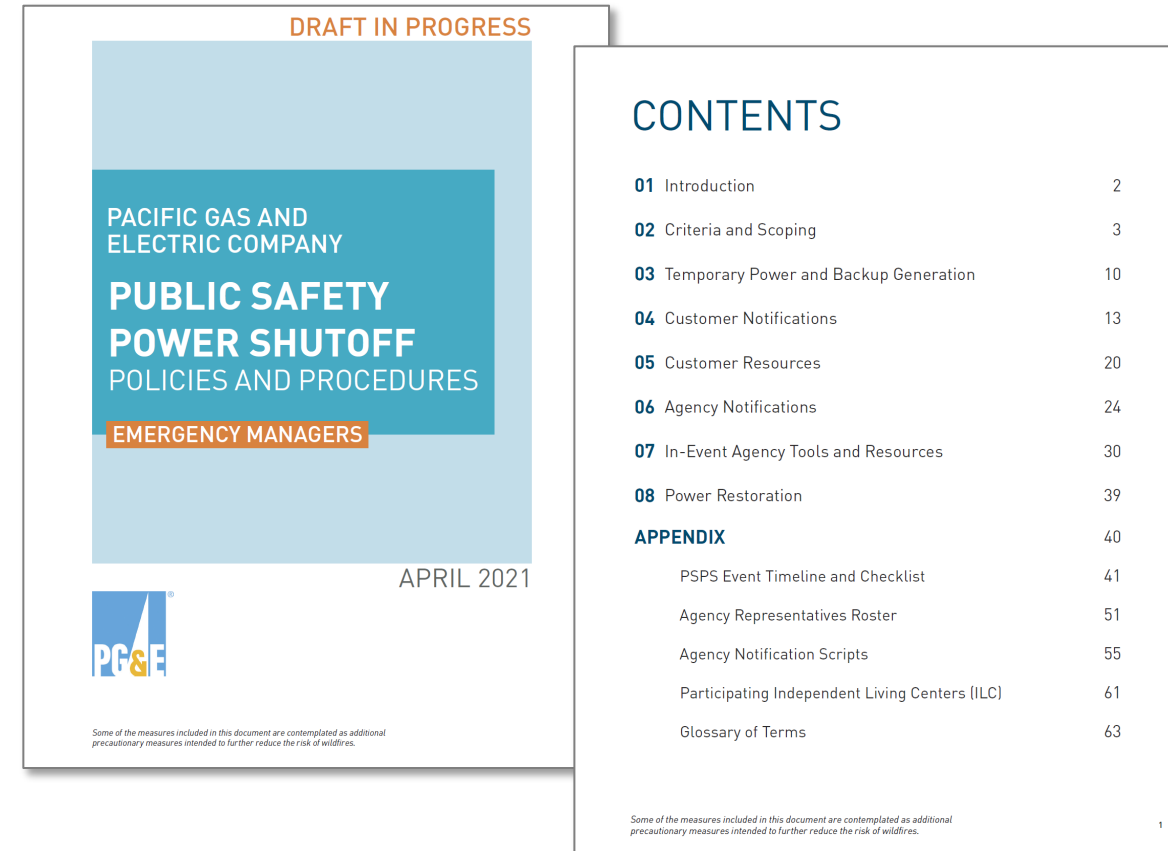
The 2021 PSPS Policies and Procedures is available at

[pge.com/pspsplanningmaps](https://pge.com/pspsplanningmaps)

and

[pge.com/pspsportal](https://pge.com/pspsportal)

Copies are also available upon request from local agency representatives.



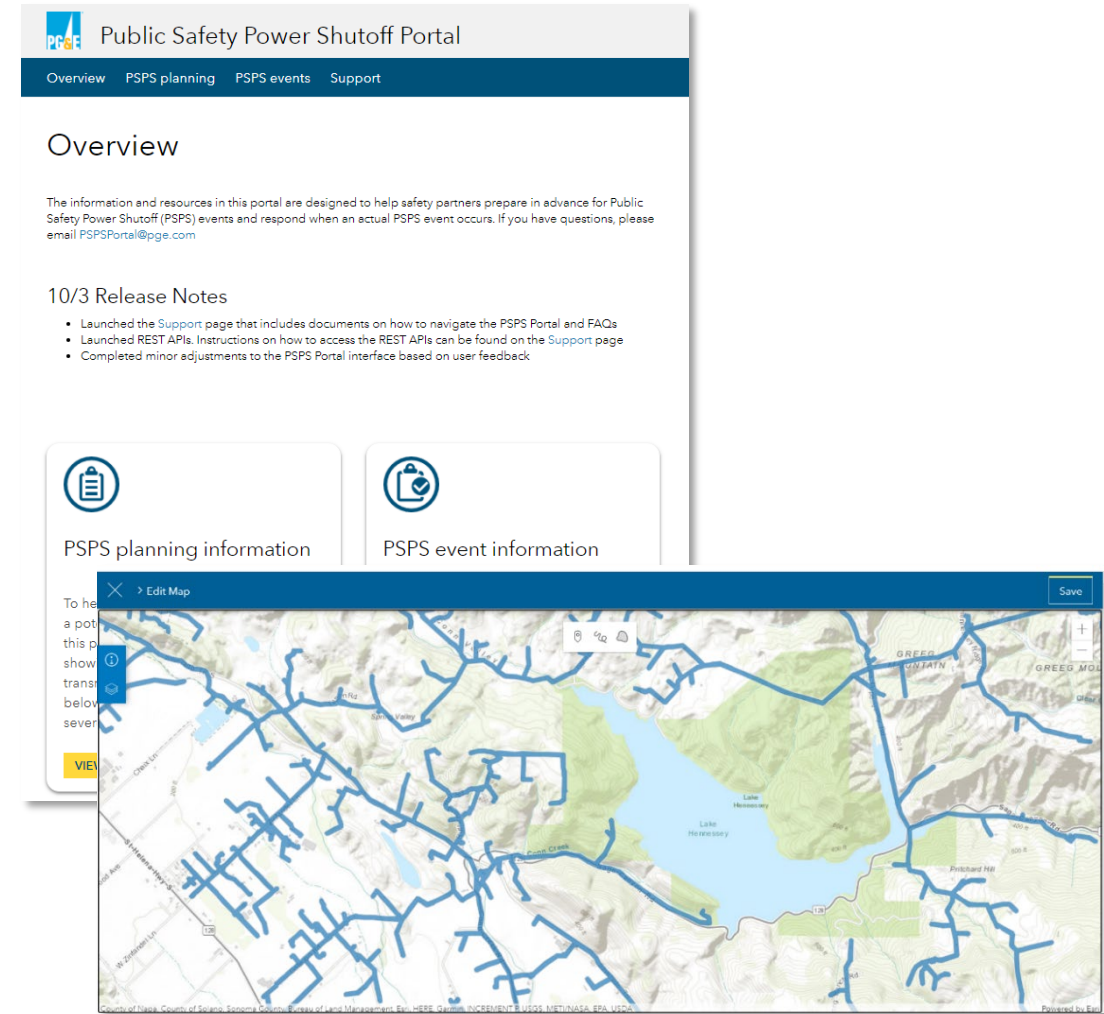
# PSPS Readiness and Collaboration: PSPS Portal

## BEFORE A PSPS EVENT

- ✓ PSPS planning maps
- ✓ Summary of potentially impacted customers
- ✓ List of critical facilities
- ✓ List of Medical Baseline customers more likely to be impacted

## DURING A PSPS EVENT

- ✓ Situation report with event information
- ✓ Interactive event map
- ✓ Outage area and circuit maps
- ✓ Activated CRC location information
- ✓ List of impacted Medical Baseline, customers and critical facilities
- ✓ Status of Medical Baseline notification receipt confirmation
- ✓ Customer impact files by agency, county, city and tribe



# In-Event Resources and Escalation Pathways for Public Safety Partners



During PSPS events, we dedicate points of contact for Public Safety Partners and host calls where they have the opportunity to escalate issues, ask questions and gather updates.

## DAILY UPDATES

	Meeting	Participants
1	Operational Areas Cooperators Communication	• Lead: Agency Reps
2	Tribal Cooperators Call	• Lead: Liaison Tribal Branch Director • Participants: Tribal Agency Reps
3	Systemwide Cooperators Call	• Lead: Liaison Officer • Participants: Coordinator, Liaison County/Tribal Branch Directors, Liaison Branch Deputy, Agency Rep Group and County/City Rep Group Supervisors, Federal Affairs, State Gov Rel, Tribal Agency Reps
4	Operational Areas Cooperators Communication	• Lead: Agency Reps
5	Tribal Cooperators Call	• Lead: Liaison Tribal Branch Director • Participants: Tribal Agency Reps

Sample contacts from our Policies and Procedures for emergency managers

## COUNTY AGENCY REPRESENTATIVE STAFFING

County		Staffing	Email
Alameda	1	John Walsh	John.Walsh2@pge.com
	2	Sarah Chavez Yoell	Sarah.Yoell@pge.com
Alpine	1	Mike Webb	Mike.Webb@pge.com
	2	Sarah Rasheed	Sarah.Rasheed@pge.com
Amador	1	Mike Webb	Mike.Webb@pge.com
	2	Dylan George	Dylan.George@pge.com
Butte	1	David Hawks	David.Hawks@pge.com
	2	Dan Blair	Dan.Blair@pge.com
Calaveras	1	Pam Perdue	Pamela.Perdue@pge.com
	2	Dylan George	Dylan.George@pge.com
Colusa	1	Donovan Lee	Donavan.Lee@pge.com
	2	Ayla Tucker	Ayla.Tucker@pge.com
Contra Costa	1	Mark Van Gorder	Mark.VanGorder@pge.com
	2	Les Putnam	Leslie.Putnam@pge.com
El Dorado	1	Mike Webb	Mike.Webb@pge.com
	2	Brandon Sanders	Brandon.Sanders@pge.com
Fresno	1	Charlotte Jordan	Charlotte.Jordan@pge.com
	2		

## TRIBAL AGENCY REPRESENTATIVE STAFFING

Name	Team	Email
Bronwynn Lloyd	Coast	Bronwynn.Lloyd@pge.com
Mike Taggart	Coast	Michael.Taggart@pge.com
Sophie Minnig	Coast	Sophie.Minnig@pge.com
Arran Bell	North	Arran.Bell@pge.com
Jim Nelson	North	James.Nelson4@pge.com
Kathleen Forrest	North	Kathleen.Forrest@pge.com
Josh Tibbet	South	Josh.Tibbet@pge.com
Matt Armstrong	South	Matthew.Armstrong2@pge.com

## ESCALATION PATHWAY

Primary Agency Representative → Secondary Agency Representative → Group Supervisor → Branch Director

# Planning for Community Resource Centers: Butte County Sample

## 2021 CRC LOCATIONS\*

### Indoor Event-Ready

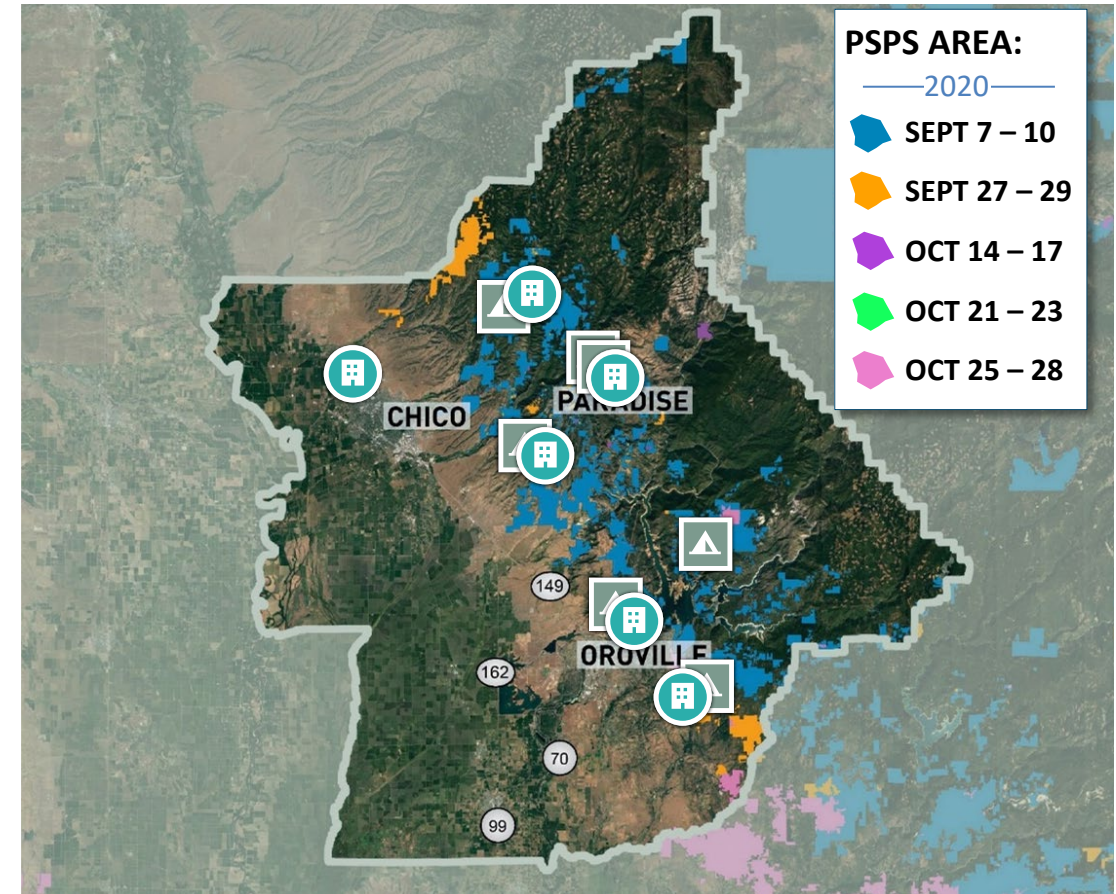
1	<b>Bangor</b>	Bangor Community Center
2	<b>Chico</b>	Pleasant Valley Baptist Church
3	<b>Forest Ranch</b>	Forest Ranch Baptist Church
4	<b>Magalia</b>	Magalia Pines Baptist Church
5	<b>Oroville</b>	Southside Oroville Community Center
6	<b>Paradise</b>	Paradise Parks & Recreation Center (Terry Ashe Center)

### Outdoor Event-Ready

7	<b>Bangor</b>	Bangor Post Office
8	<b>Berry Creek</b>	Berry Creek Elementary
9	<b>Forest Ranch</b>	American Veterans Store
10	<b>Magalia</b>	Magalia Pines Baptist Church
11	<b>Magalia</b>	Strip Mall
12	<b>Oroville</b>	Bird Street School
13	<b>Paradise</b>	Paradise Lutheran Church

\*CRC locations are subject to change over time. Sites in progress or proposed may fall out of the process for any number of reasons. Proposed locations are subject to finding a suitable site.

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



Note: PPS impact areas are approximate and may overlap

### CRC LEGEND:



Indoor  
Event-Ready



Outdoor  
Event-Ready

# PSPS Decision-Making



# Foundational Data to Build 2021 Machine Learning Models

We partnered with external experts (ADS, DTN) in numerical weather prediction to build rich historical datasets and forecast models

## 31 Year High Resolution Weather and Fuels Climatology (historical data):

- 2x2 km grid-cell spatial resolution, hourly temporal, from 8/1/1988 to 4/1/2021
- ~10,000 cells cover distribution assets in HFRA, ~40,000 cells in the PG&E territory

## Variables:

- Hourly Weather (temp, relative humidity, wind, precipitation, pressure, etc.)
- Hourly Dead and Live Fuel Moisture

## PSPS Applications:

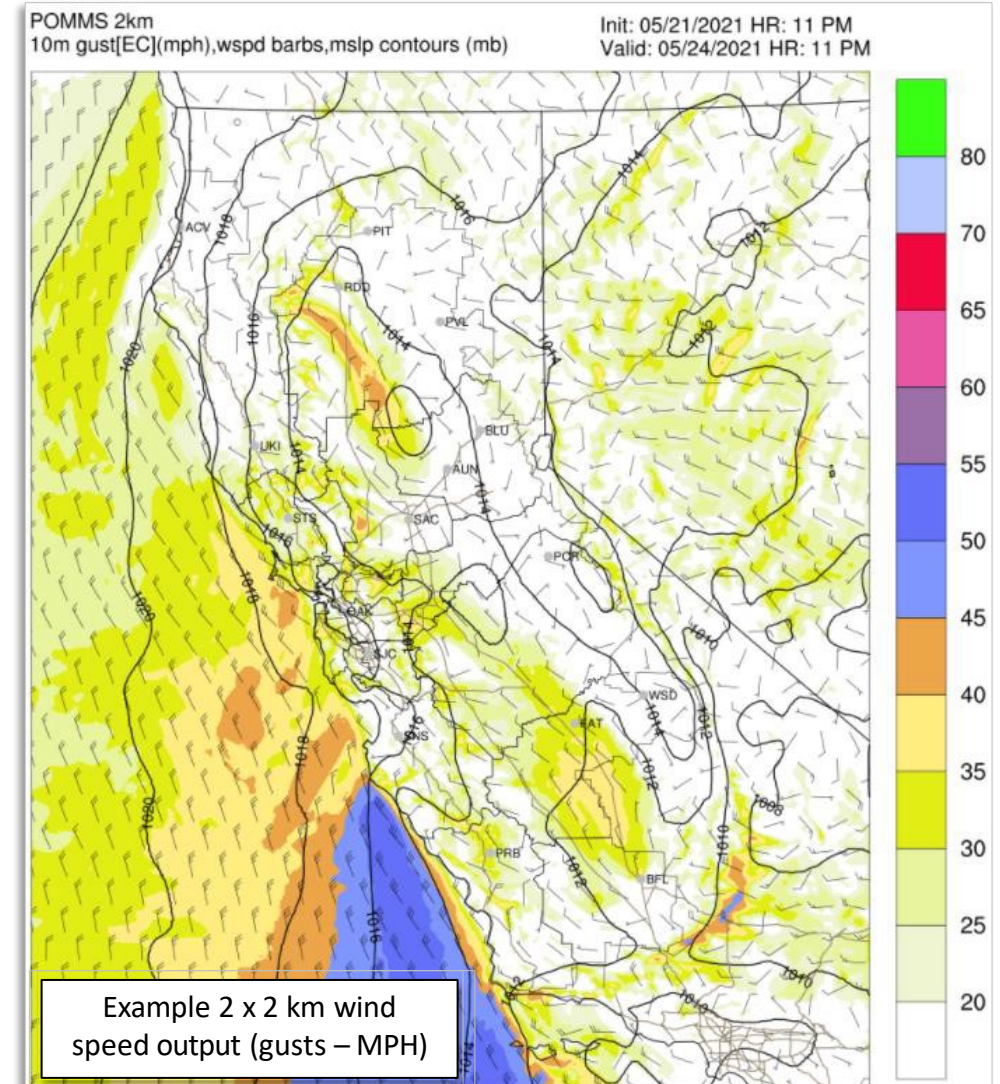
- Determine historical wind-outage relationships and ignition propensity of each outage cause type (OPW, IPW models)
- Develop and calibrate fire model with historical fires (FPI)
- Input data to drive dynamic fire spread modeling (Technosylva)
- Calibrate guidance for operational decision-making (PSPS Models)

The same model configuration used to build this climatology is used in forecast-mode, allowing equivalent understanding between historical and forecast events.

~190,000 2x2 km cells in model domain, with data per weather variable per cell per hour back 31 years.

>100 trillion data points across full model domain, >20 Trillion data points in the PG&E Territory.

Stored, processed and analyzed in the PG&E-Amazon Web Services Cloud





# PG&E Catastrophic Fire Probability Model

## Features of the new 2021 Machine Learning Outage & Ignition Probability Models

### Weather



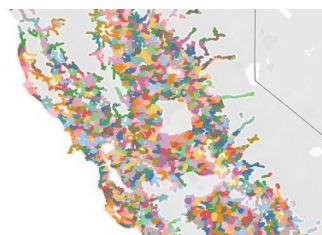
Wind Speed, Turbulence  
Temperature, Precipitation,  
Vapor Pressure Deficit

### Vegetation Exposure



Aerial Lidar Tree Overstrike  
in each 2x2 km grid cell.

### Local Performance



Outage trends specific to each  
location through node feature.

Key enhancement: exponentially **weighting recent years more heavily to learn and predict system performance changes** due to vegetation management and system hardening. Outage Probability Weather (OPW) is transformed to Ignition Probability Weather (IPW) using **unique outage to ignition relations by cause**, with vegetation and equipment-structural having the highest ignition per outage relation.

## Features of the new 2021 Machine Learning PG&E Fire Potential Index (FPI) Model

### Weather



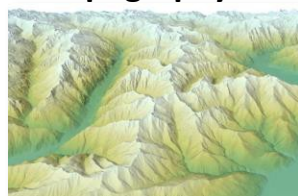
Wind Speed  
Turbulence  
Temperature  
Vapor Pressure Deficit

### Fuel Moisture



Dead Fuel Moisture  
Woody Live Fuel Moisture  
Herbaceous Live Fuel Moisture

### Topography



Ruggedness  
Slope  
Wind-terrain Alignment

### Fuel Model Type

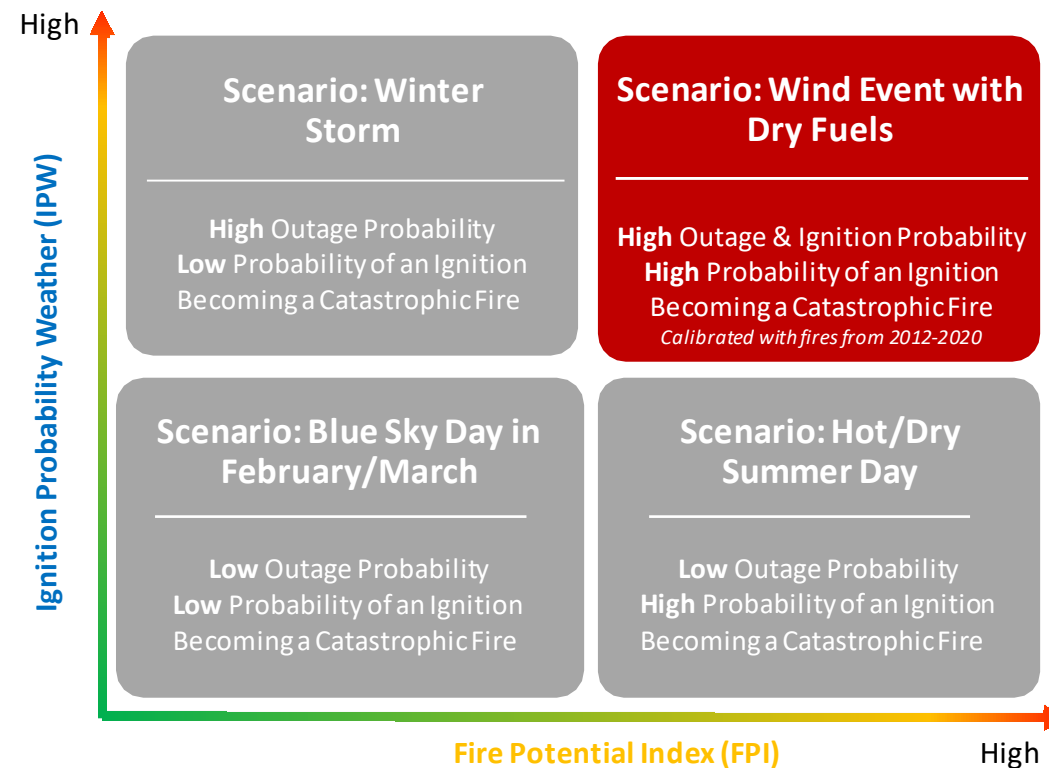


Grass  
Shrub  
Timber  
Urban

## Catastrophic Fire Probability

A risk-based assessment of the probability of fire ignitions due to weather combined with the probability of catastrophic fires. It is the Ignition Probability Weather Model (IPW)\* combined with the Fire Potential Index (FPI)\* Probability Catastrophic Fire in space and time.

\* New machine learning models with increased predictive skill



$$CFP_D = P(\text{Ignition}) * P(\text{Catastrophic Fire} | \text{Ignition})$$

# Technosylva Fire Spread Simulations

We partnered with an industry expert in wildfire spread technology – Technosylva. Billions of fires were simulated from 2000-2020 to determine if a practical application to PSPS is feasible in forecast mode. Utilizing Fire Behavior outputs was a key breakthrough.





## Catastrophic Fire Behavior

Even if probability of an ignition is unlikely, we may still turn off power where **Technosylva** fire spread modeling indicates catastrophic fires (intense, fast-spreading fires) are possible.

- Collaborated directly with Technosylva fire scientists for PSPS application.
- Technosylva simulates forecast and historical fires started every 200m along PG&E electric assets in burnable areas.
- Billions of fires were simulated over 574 worst-case fire days from 2000 – 2020 to verify catastrophic fires in time and space.
- Fire behavior outputs include flame length and rate of spread, which help explain containment difficulty.

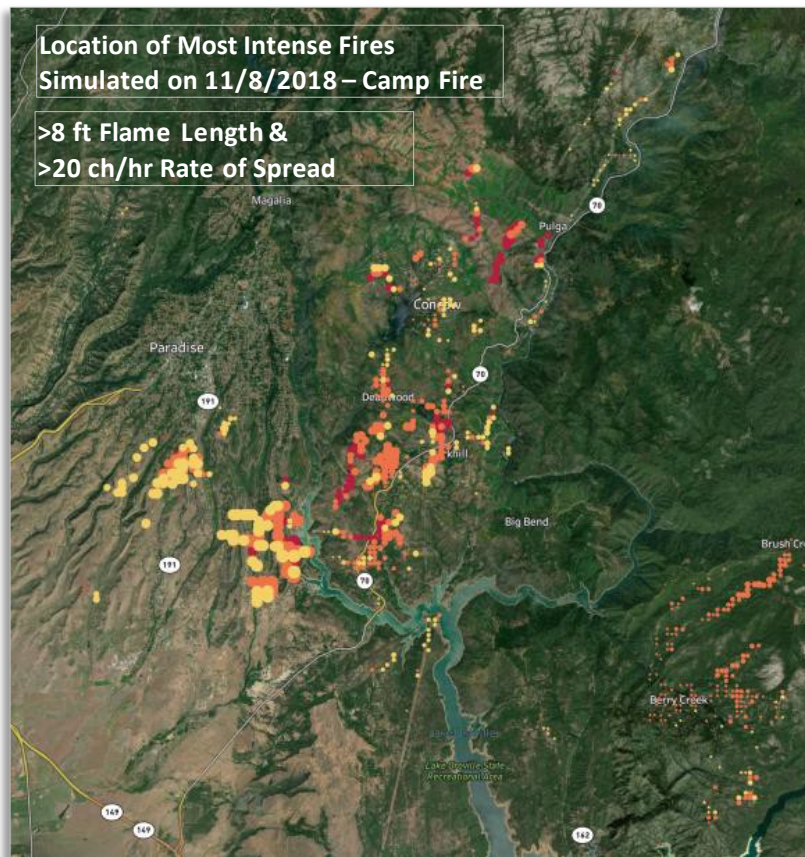
Logic	Variable	Sign	Value
&	Flame Length (ft.)	>	8
&	Rate of Spread (Ch/hr)	>	20
&	Area Burned [8 hours] (acres)	≥	100

Table 1—Relationship of surface fire flame length and fireline intensity to suppression interpretations.

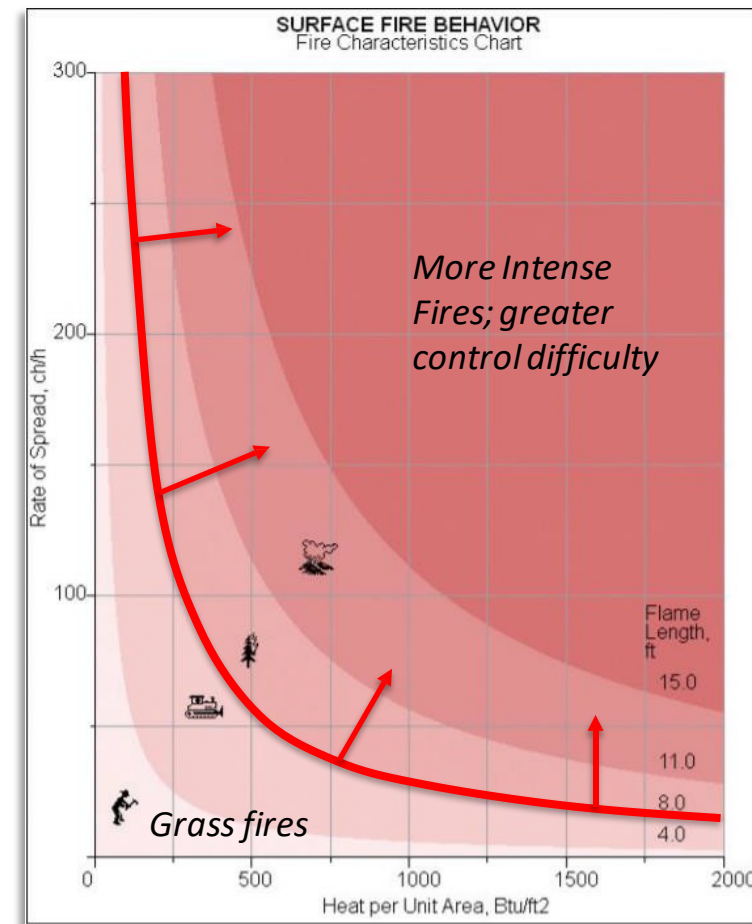
Flame length		Fireline intensity		Interpretation
ft	m	Btu/ft/s	kJ/m/s	
< 4	< 1.2	< 100	<350	 <ul style="list-style-type: none"> <li>• Fires can generally be attacked at the head or flanks by persons using hand tools.</li> <li>• Hand line should hold the fire.</li> </ul>
4 – 8	1.2 – 2.4	100 – 500	350 – 1700	 <ul style="list-style-type: none"> <li>• Fires are too intense for direct attack on the head by persons using hand tools.</li> <li>• Hand line cannot be relied on to hold the fire.</li> <li>• Equipment such as dozers, pumpers, and retardant aircraft can be effective.</li> </ul>
8 – 11	2.4 – 3.4	500 – 1000	1700 – 3500	 <ul style="list-style-type: none"> <li>• Fires may present serious control problems—torching out, crowning, and spotting.</li> <li>• Control efforts at the fire head will probably be ineffective</li> </ul>
> 11	> 3.4	> 1000	> 3500	 <ul style="list-style-type: none"> <li>• Crowning, spotting, and major fire runs are probable.</li> <li>• Control efforts at head of fire are ineffective.</li> </ul>

# Technosylva Fire Spread Simulations (Cont'd.)

## Industry Standards and Dynamic Fire Spread Modeling



Date	WeatherSignal	Distinct count of Igni Id	Avg. Flame L..	Avg. Rate Of Sp..
10/8/2017	NorthEast	11,728	25	42
9/8/2020	PSPS	9,394	21	43
10/25/2020	PSPS	9,349	22	45
10/14/2018	PSPS	7,196	21	40
10/23/2019	PSPS	6,651	20	39
10/26/2019	PSPS	6,552	22	41
10/9/2019	PSPS	6,392	17	41
9/7/2020	PSPS	6,108	18	39
10/29/2019	PSPS	5,871	19	40
9/27/2020	PSPS	5,517	18	37
10/15/2020	PSPS	5,175	18	37
10/27/2019	PSPS	5,149	16	36
11/7/2018	BlueSky	4,710	15	37
11/8/2018	NorthEast	4,627	12	37
10/1/2017	BlueSky	3,940	11	37
9/6/2020	Heat	3,644	10	32
10/14/2017	NorthEast	3,416	10	34
11/10/2018	BlueSky	3,387	13	34
10/13/2018	BlueSky	3,307	18	34
10/10/2019	Other	3,233	10	43
7/26/2018	BlueSky	3,004	10	33
10/13/2017	BlueSky	2,937	11	40
7/9/2018	Heat	2,925	10	36
9/26/2017	BlueSky	2,889	10	31
10/14/2020	PSPS	2,881	11	35
8/6/2018	BlueSky	2,831	10	35
10/2/2017	NorthEast	2,753	10	33
10/26/2020	PSPS	2,691	11	31
10/22/2020	PSPS	2,681	13	36
8/19/2020	Other	2,667	10	35

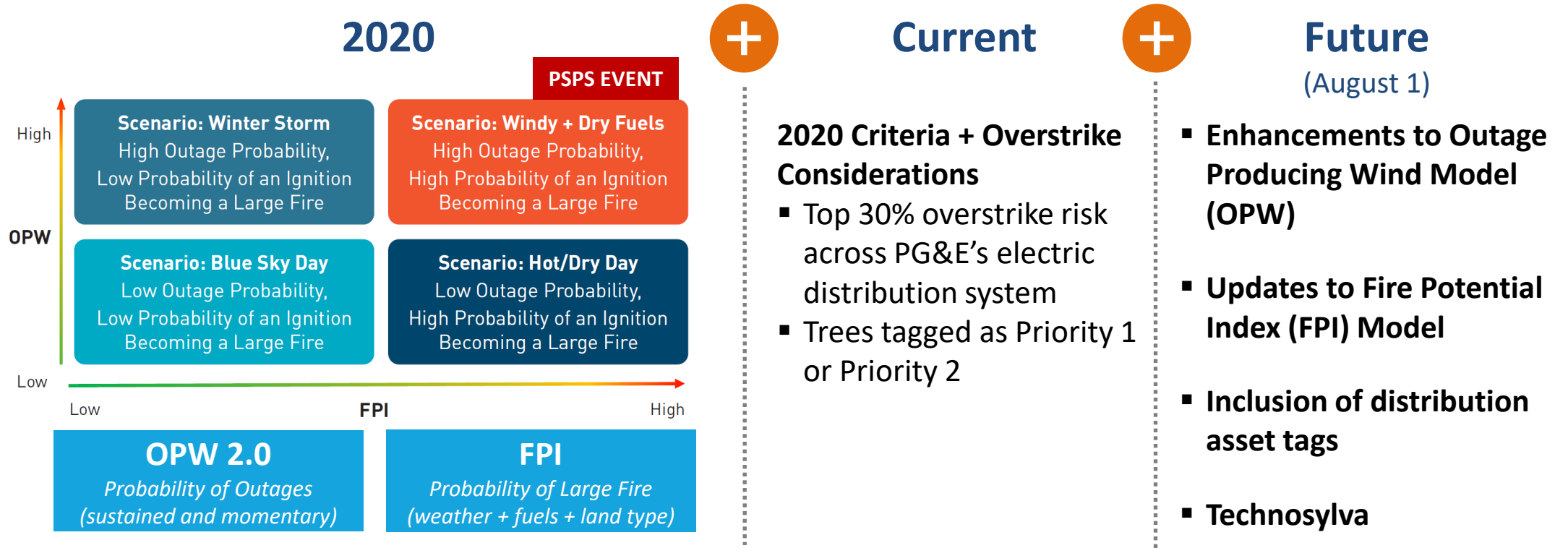


# Additional Information



# Updates to Wildfire Mitigation Plan and PSPS Scoping

The 2020 PSPS Protocols plus Overstrike Tree Potential and Priority Tags are currently being used to determine when to initiate a PSPS event and this approach will change in August 2021. This may substantially modify the current 2020 PSPS Protocols Plus Tree Overstrike Potential and Priority Tags.



# Anticipated Impact to PSPS Events

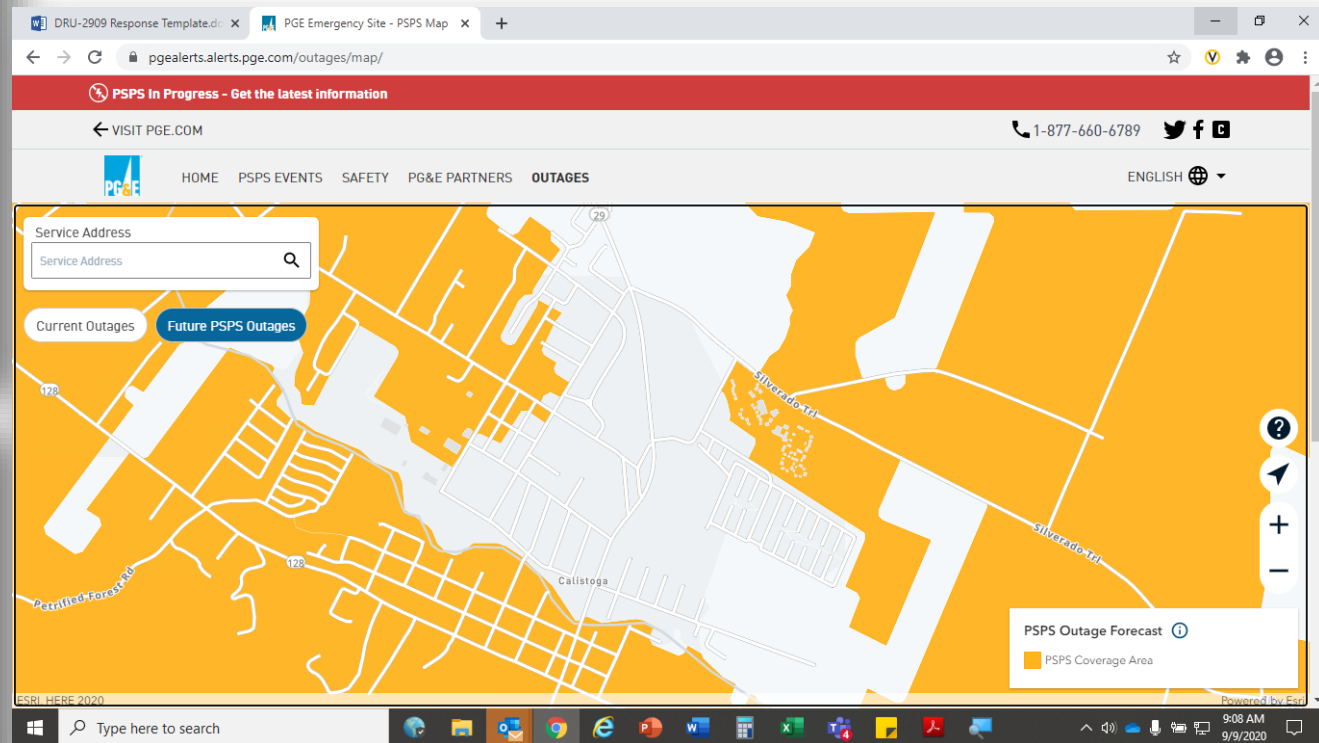
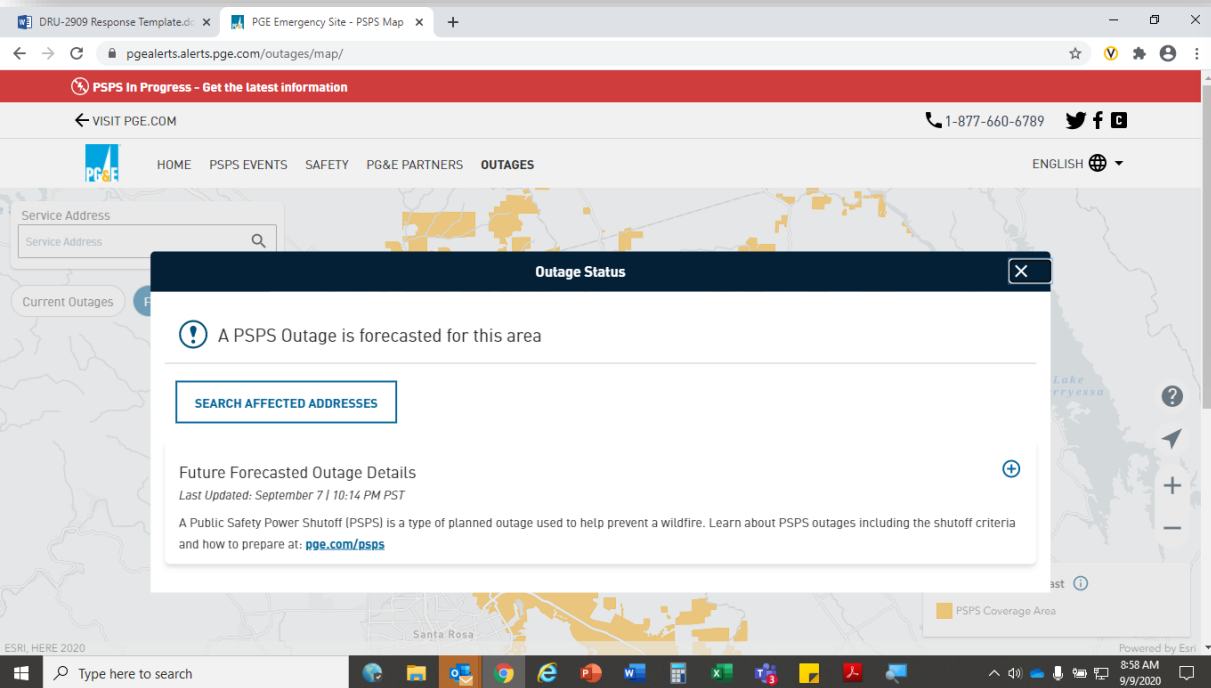
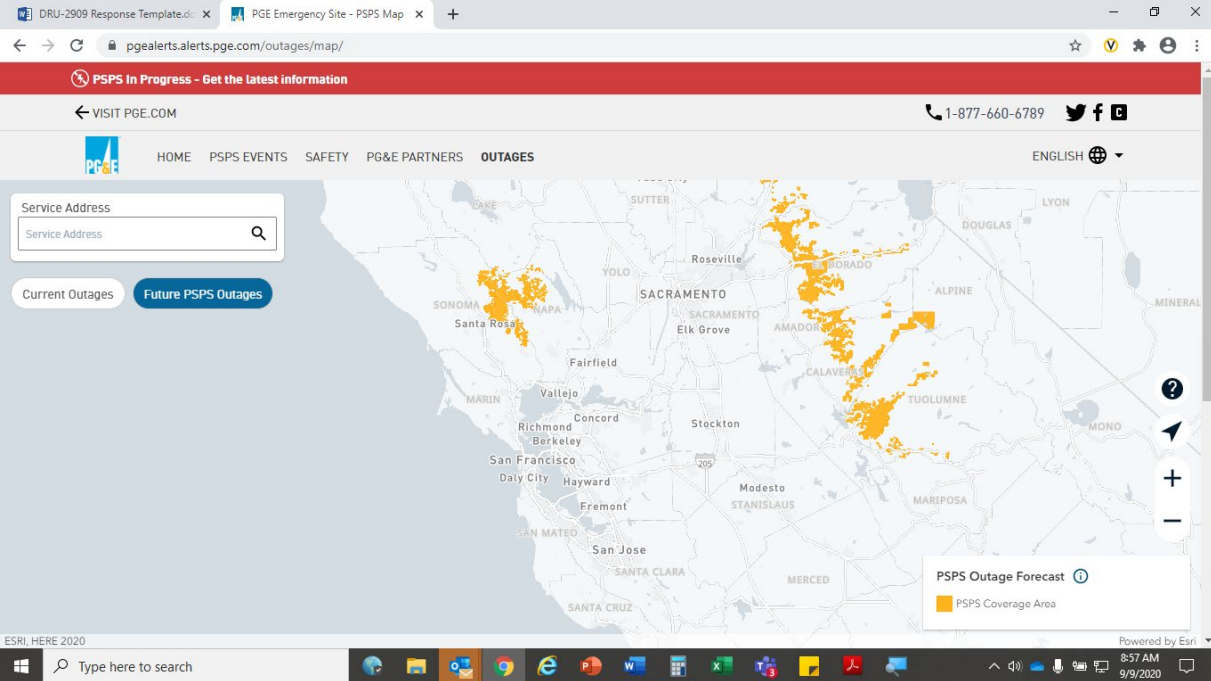
**PSPS mitigations planned for this year will help to offset potential increases to event frequency due to the incorporation of overstrike criteria.** The following table shows the impact of these mitigations in comparison to our 2020 PSPS protocols.

	Scenario 1: 2020 PSPS Protocols + 2021 Planned WMP Mitigations	Scenario 2: 2020 PSPS Protocols + Overstrike Potential and Priority Tags	Scenario 3: 2020 PSPS Protocols + Overstrike Potential and Priority Tags + 2021 Planned WMP Mitigations
Average PSPS Scope Per Event	8% Reduction	7% Reduction	14% Reduction
Per-Customer Duration Per Event	2% Reduction	2% Reduction	4% Reduction
Event Frequency	No impact relative to 2019 and 2020	74% Increase	74% Increase

*Data is for planning purposes only. Actual PSPS events will be dependent on weather and local conditions.*

# Interactive Screen Share: Step-By-Step





<a href="#">Alpine OutageArea PDF PSPS 09072020 0908 1309.pdf</a>	1.41 MB	Last Updated: 9/8/2020 at 02:17 PM
<a href="#">Amador OutageArea PDF PSPS 09072020 0908 1309.pdf</a>	3.17 MB	Last Updated: 9/8/2020 at 02:17 PM
<a href="#">Butte OutageArea PDF PSPS 09072020 0908 1309.pdf</a>	3.16 MB	Last Updated: 9/8/2020 at 02:17 PM
<a href="#">Calaveras OutageArea PDF PSPS 09072020 0908 1309.pdf</a>	3.30 MB	Last Updated: 9/8/2020 at 02:17 PM
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⚡ **PSPS In Progress - Get the latest information**

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📞 1-877-660-6789



HOME PSPS EVENTS SAFETY PG

ENGLISH 🌐 ▼

Service Address

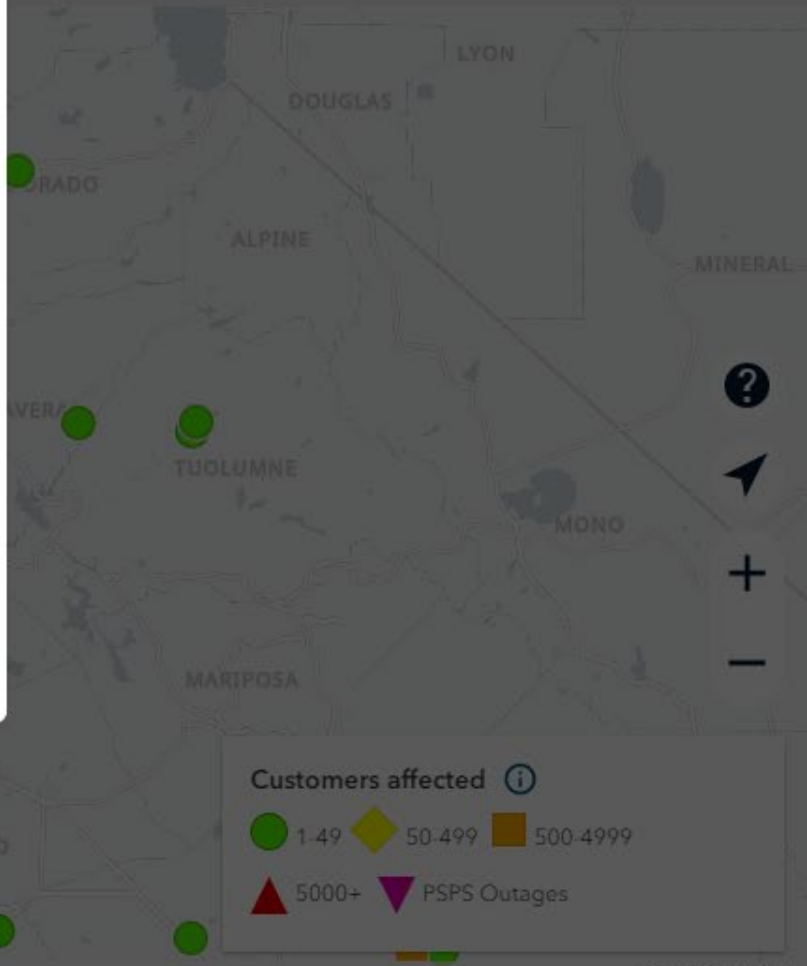
Service Address 🔍

Current Outages Future PSPS Outages

✕




**PUBLIC SAFETY  
POWER SHUTOFF  
(PSPS) ANNOUNCED:**  
For the most accurate  
information, enter an  
address.

CONTINUE




⚡ **PSPS In Progress - Get the latest information**

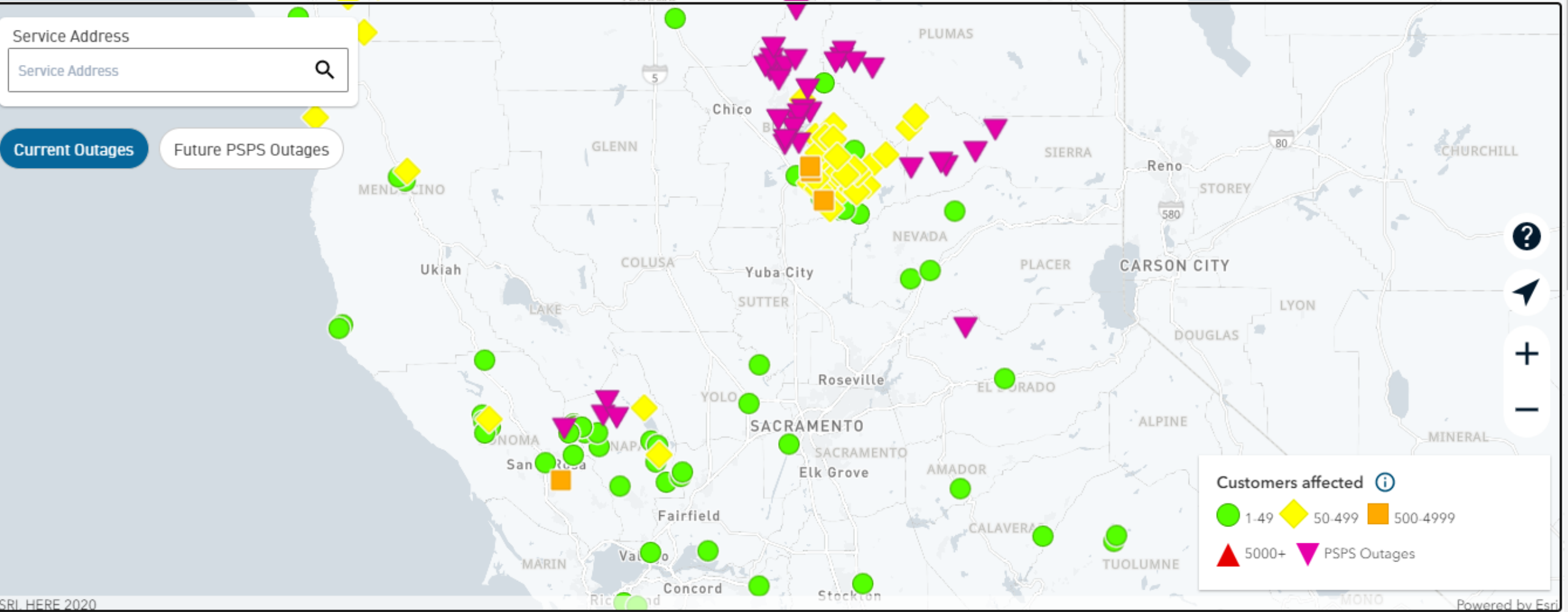
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HOME PSPS EVENTS SAFETY PG&E PARTNERS **OUTAGES**

ENGLISH 



# Appendix





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

## Closing Remarks

- Survey form – distributed after the briefing via email using the Microsoft Teams platform.
- Recording – distributed in the same email.

## Schedule of Remaining Briefings

- ❖ SMJU Public Briefing – August 2<sup>nd</sup> 9:00 a.m. – 12:00 p.m.
- ❖ SDG&E Public Briefing – August 2<sup>nd</sup> 2 p.m. – 5 p.m.
- ❖ SCE Public Briefing – August 3<sup>rd</sup> 9:00 a.m. – 12:00 p.m.
- ❖ PG&E Public Briefing – August 3<sup>rd</sup> 1 p.m. – 4 p.m.



# California Public Utilities Commission

Questions?

Contact Dru Dunton at [dd4@cpuc.ca.gov](mailto:dd4@cpuc.ca.gov)