Public Safety Measures Addressing Extreme Drought

September 28th, 2021

Follow up from September 8th Update

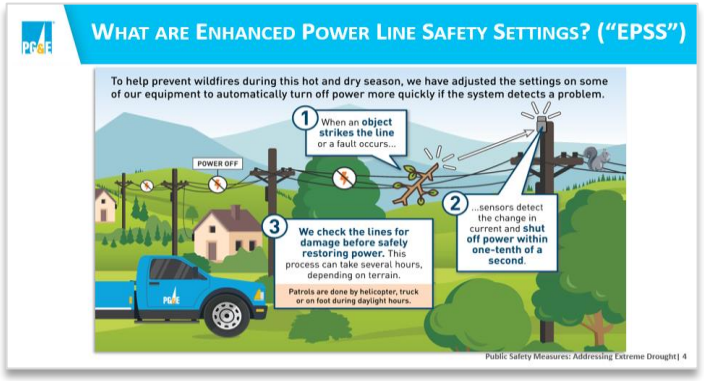
Meeting Objectives

On September 8th, 2021 PG&E briefed the Office of Energy Infrastructure Safety, California Department of Forestry & Fire Protection, California Public Utilities Commission, and California Office of Emergency Services as to how PG&E is taking every available action to mitigate and reduce the potential for its electrical infrastructure to cause an ignition.

Materials & Objectives for Today's Meeting:

1. **Q&A from September 8th Update**

2. **Update on Enhanced Powerline Safety Settings** *(Formerly "Fast Trip")*



Recap / Q&A from September 8th Update

Background: On August 17th, 2021, the Office of Energy Infrastructure Safety ("OEIS") issued a letter to PG&E requesting a briefing no later than September 15th, 2021 as to how PG&E is taking every available action to mitigate and reduce the potential for its electrical infrastructure to cause an ignition.

PG&E Actions & Programs to Reduce Ignition Potential Risk:

Enhanced Powerline Safety Settings *(formerly "Fast Trip")*

HFTD Outage Response

Preventative Fire Retardant Program ("PFRP")

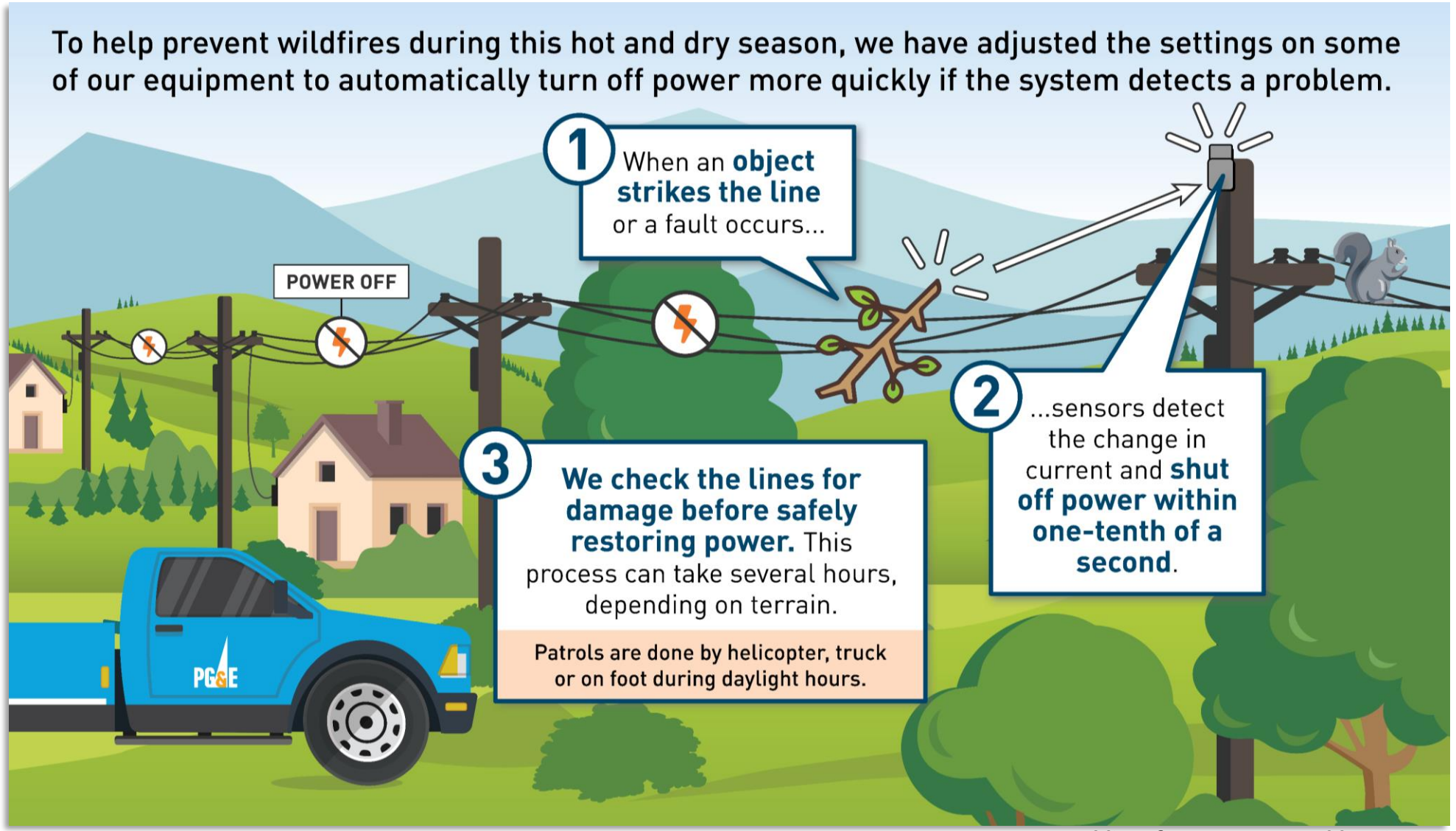
Additional Safety Patrols

Work Method Enhancements

Enhanced Powerline Safety Settings (Formerly "Fast Trip")

Public Safety Measures Addressing Extreme Drought

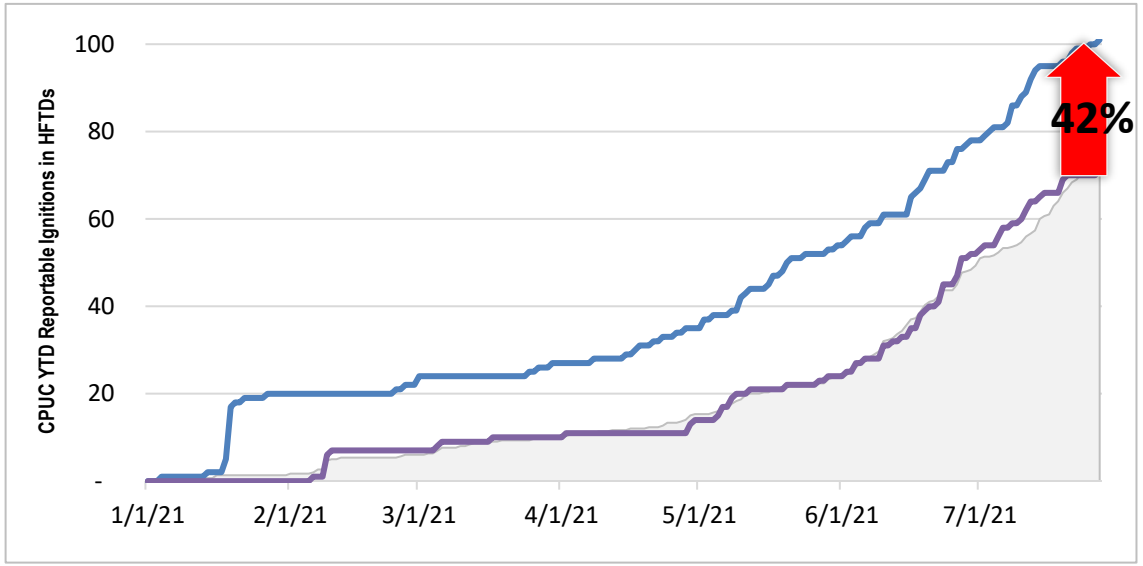
What are Enhanced Powerline Safety Settings? ("EPSS")



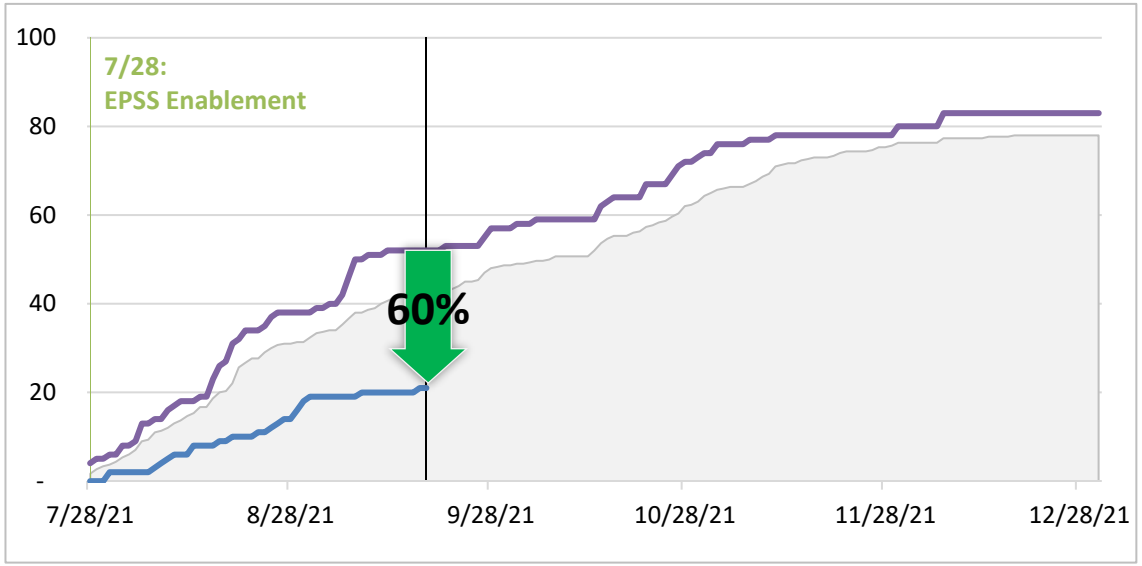
EPSS Overall HFTD Ignition Reduction

EPSS and our Wildfire Mitigation Plan programs have resulted in a **60% decrease** as compared 2020 and a **50% decrease** as compared to the 3-year average of CPUC Reportable Ignitions in HFTDs that could lead to a potential catastrophic wildfire

2021 ignitions were trending 42% above 2020 and 35% above the 3 year historical average ignitions…



…Until EPSS, which lowered the ignitions 60% vs. last year and 50% from our 3 year average



EPSS Circuit-Specific Ignition Reduction

On EPSS enabled circuits, the CPUC Reportable Ignition-to-outage ratio is **down nearly 80%** across the same time period last year.

For EPSS-Enabled Circuits only…

PERIOD	CPUC REPORTABLE IGNITIONS (7/28 – 9/18)	OUTAGES (7/28 – 9/18)	IGNITION % OF OUTAGES
2021	1	302	**0.3%**
2020	18	1,291	**1.4%**
3-YEAR AVERAGE (2020-2018)	17	763	**2.2%**

79% REDUCTION VS. 2020

86% REDUCTION VS. 3 YR. EPSS CIRCUIT AVERAGE

92% REDUCTION VS. 3 YEAR SYSTEM-WIDE AVERAGE

MAY – NOVEMBER SYSTEM-WIDE IGNITION % OF OUTAGES[1]:	3.6%

[1] CPUC reportable ignitions to outages observed from 2015-2020 between May-November excluding weather days that included rain, winter storm, low snow, lightning, for each of those cause classes

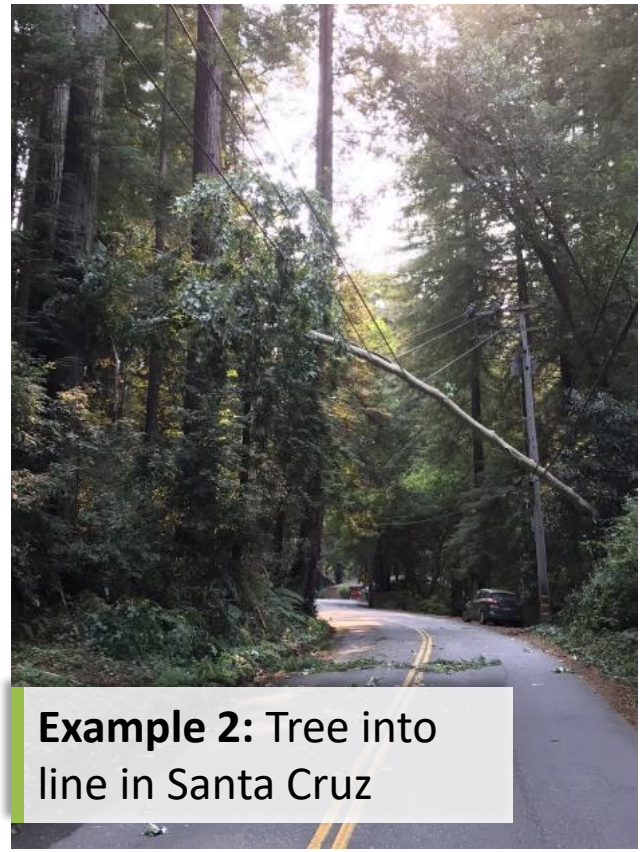
EPSS Risk Reduction Examples

We have an unwavering focus to mitigate reliability impacts while maintaining the risk reduction from instances where a hazard was found from an EPSS outage that potentially prevented a wildfire

Example 1: Oakhurst Veg Contact & Wires Down

On September 7th, ~1,000 customers in the Oakhurst area lost power when a device in EPSS tripped on the Coarsegold 2104 circuit and deenergized the line.

During the restoration patrol, a PG&E qualified technician arrived on site to find what appeared to be **a green healthy oak tree that had broken and fallen on the line, taking down two poles and the conductor with it.** The tree failure occurred in an area of dense dry fuels along a narrow road – an area with high potential for fire spread that could be challenging to suppress quickly.



Example 2: Tree into line in Santa Cruz

Example 3: Tree into line in Santa Cruz

EPSS Overall Customer & Reliability Impact

Adjusting circuit devices to EPSS makes the system safer and helps to reduce potential wildfires, **however it has also resulted in more frequent and longer outages for customers.**

On EPSS Circuits between 7/28 to 9/18:

302	EPSS outages
380,317	Impacted Customers
495	Customer Average Interruption Duration Index (CAIDI)
34	Counties experiencing an EPSS – related outage

We understand what these impacts mean to our customers & communities:

Increase in outage frequency: increase in outage for certain circuits in specific geographic locations

More Customers with power interruptions: ~120% increase in Total Customers Out

More customers out of power for longer: ~500% increase in Customer Outage Minutes

Longer outage Durations: ~107% increase in CAIDI (Customer Average Interruption Duration Index)

[1] Reference Table 2, 2020 Reliability Report: Combined T&D system indices including MEDs

Efforts to Reduce EPSS Customer Impacts

Improvements In Place

- **Fine tuning sensitivity** on our equipment to reduce likelihood of an outage
- **Increasing communication** between our devices to reduce the size of outages
- **Improved internal coordination** of patrol crews for faster restoration times
- **Amended patrol guidance** for EPSS-enabled circuits

Improvements Underway

- Installation of additional **animal protection on our equipment**
- **Targeted vegetation clearing** to prevent branch and tree fall-ins
- Targeted **asset hardening and inspections**

Planned Improvements

- Dedicated crews for **restoration and readiness response**
- **More accurate restoration times** during outages

EPSS Implementation Update

During the 9/8 Update we outlined how EPSS works and the key steps to enable these settings across high-risk circuits:

Fine tuning sensitivity
on our equipment to reduce likelihood of an outage

Increasing communication
between our devices to reduce the size of outages

Implementation Step	*As of 9/27:*	*Next Steps:*
Fine tuning sensitivity Manual adjustments to circuit breakers ("CB") and line reclosers ("LR") for high risk circuits to enable preliminary settings	**~11,500 Miles** (45% of HFTDs)	*Pending additional review*
Engineering Circuit Review & Device Coordination Engineering reviews circuit from source-to-load to coordinate device response timing to fault detection	**94%** Complete	**Reviews completed by 10/1**
Implementation of SCADA Schemes Control center implements coordinated device settings from Engineering into SCADA scheme settings	**59%** Complete	**Implemented by 10/15**

EPSS Impact From High-Frequency Outages

EPSS outages have not been evenly distributed across the service territory, three counties in particular have seen roughly a quarter of all EPSS outages since enablement:

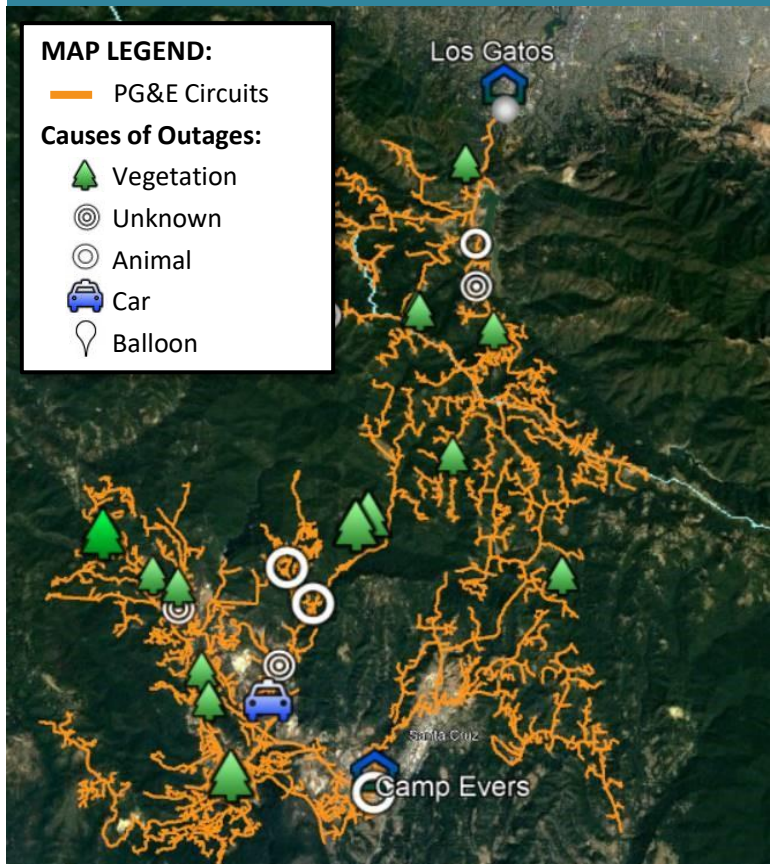
COUNTY	OUTAGE COUNT	OUTAGE CAUSE				OUTAGE AVERAGE IMPACT	
		ANIMAL	TREE	EQUIPMENT	OTHER & UNKNOWN	CAIDI	CUSTOMERS
Santa Cruz	**38**	4	11	1	22	**8.1 hrs**	**1,599**
El Dorado	**27**	1	3		23	**10.3 hrs**	**1,511**
San Luis Obispo	**22**	3	-	2	17	**8.1 hrs**	**1,214**

This setting can help prevent wildfires, **but we know that it has created a hardship for our communities**.

Example Community-Level Outage Data & Actions

Since we implemented these adjusted settings in late July 2021, there have been approximately 25 instances of outages in the San Lorenzo Valley Community.

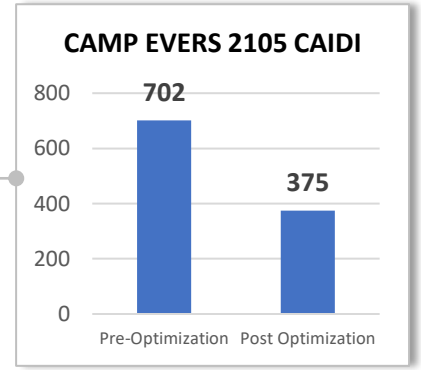
LOCAL CIRCUIT MAP



CIRCUIT NAME	# OF OUTAGES	AVERAGE CUSTOMER COUNT PER OUTAGE	AVERAGE OUTAGE DURATION
CAMP EVERS 2105	13	~2,041	~8.9 HOURS
LOS GATOS 1106	9	~2,273	~11.6 HOURS
CAMP EVERS 2106	3	~2,142	~12.4 HOURS

To further reduce outage impacts we have:

- Deployed dedicated crews with small bucket trucks for restoration and readiness response
- Prioritized engineering review & implementation of device optimization
- Streamlined our patrol and restoration process



County-Level Engagement & Focus

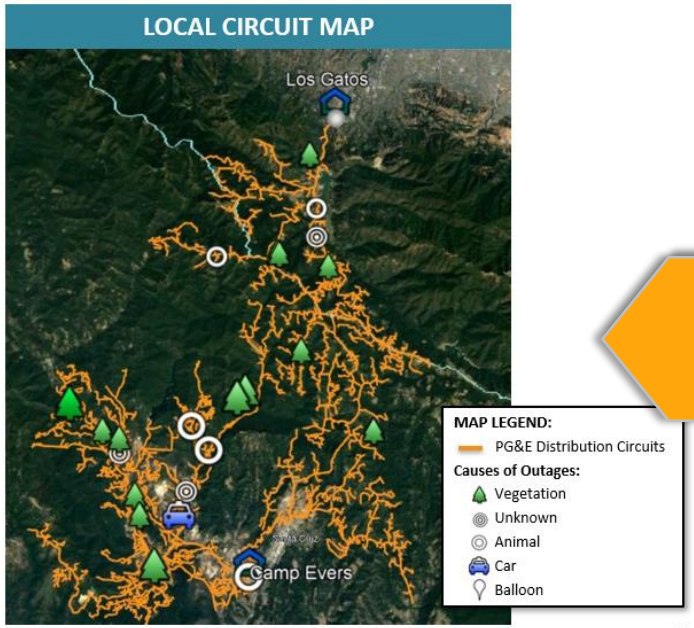
We are engaging with our customers and communities to provide visibility and transparency as to why these outages are occurring, and what we are doing to improve. During our webinars, we cover:

Outages in Your Community

Since we implemented these adjusted settings in late July 2021, there have been approximately 25 instances of outages in your community.

Circuit Name	# of Outages	Average Customer Count per Outage	Average Outage Duration
Camp Evers 2105	13	~2,041	~8.9 hours
Los Gatos 1106	9	~2,273	~11.6 hours
Camp Evers 2106	3	~2,142	~12.4 hours

Data as of 9/22/21



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

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The rationale for **why** we are enhancing and implementing these critical safety measures

Information about Enhanced Powerline Safety Settings and how they are keeping communities safer

Data and **localized insight** about the recent outages in your community

Information and contact information for **Customer Resources and Support**

Expanded Communications

- **Email notice and/or postcard** sent to all customers who may be impacted
- **Sprinter mobile command vehicle** on site of outages in Santa Cruz locations
- **Social media postings** targeted to highly impacted communities
- **Letters to customers** on high impacted circuits
- **Engagement** with local elected officials, hospitals, schools, water agencies, and telecommunication customers
- **We are committed** to responding to every customer question and feedback. Customers can email us at **wildfiresafety@pge.com**
- **Automated calls** supporting enhanced reliability patrols and Enhanced Powerline Safety Setting outages

Appendix

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HFTD Outage Response Overview

Since inception 7/28 PG&E is targeting to respond to outages safely in HFTDs within 60 minutes to identify and mitigate public safety hazards beyond the outage and also allowing for quicker notification and more efficient resource allocation from public agencies (e.g., local police and fire, CalFIRE).

Progress is captured and reported to leadership regularly through PG&E's daily and weekly operating reviews.

Performance to date *as of 9/26/21:*

#	911 RESPONSE TARGET	FULL SYSTEM 911 RESPONSE (SINCE 1/1/21)	HFTD OUTAGE RESPONSE[1] (SINCE 7/28/21)
VOLUME	-	6,600	1,239
RATE	96.7% of Responses < 60 min	97.8%	58.0%

[1] Reporting enhancement implemented since 9/6 to separate PSPS & planned outages from HFTD outages; reducing each of these metrics since previous update

Given the rural and remote nature of HFTD circuits, PG&E is enacting the following additional mitigations to improve response rates:

- ✓ Prioritizing outage response and augmenting resources in rural & remote areas
- ✓ Leveraging 65 pre-staged helicopters for to support outage response for otherwise hard to access areas

PFRP Scoping Execution Overview

The 2021 PFRP program is underway with two primary objectives for 2021: (1) Protect areas with higher density of equipment slated for repair / replace and (2) Build out an additional control for use during drought.

PFRP Execution Progress to Date *as of 9/24/21:*

SCOPE	1 SCOPING & ENVIRONMENTAL	2 OUTREACH			3 RETARDANT APPLICATION
	2021 PLAN MILES	OUTREACH COMPLETED	RESPONSES	APPROVAL %	MILES APPLIED
PHASE 1 (SHASTA, SOLANO AND TEHAMA COUNTY)	**80**	**625**	**362** 58% OF OUTREACH	**257** 71% OF RESPONSES	**8.4**
STATE LANDS & R.O.W.[1]	**45 – 290 Miles** PENDING PROCESS PILOT RESULTS				

Pending Ph.1 results to evaluate resource capacities

INSIGHT: Customers who have rejected application have cited **environmental concerns, wildlife impact, and existing defensible space or pre-existing retardant application**

[1] Scoped mileage after considering agriculture, federal, and environmentally sensitive land within 700+ miles of state land and right of ways.

Additional Safety Patrols

Driven by an increasing trend of vegetation-related ignitions in historical fire scar areas, PG&E is conducting additional aerial safety patrols on HFTD circuits to identify hazard trees.

Progress & Next Steps *as of 9/26/21:*

Tranche 1 & 2 Patrol Flights
Completed 55 Circuits in top two risk tranches and over 5,500 miles. Risk Tranches based on overlap between high-risk circuits including fire scar areas.

Tranche 1 & 2 Patrol Finding Mitigations
Remediate 17 P1 and P2 findings

Risk Tranche 3 Patrol Flights & Mitigations
Conduct remaining patrol flights on 480 miles and mitigate findings as appropriate

	TRANCHE 1 & 2	TRANCHE 3[1]
CIRCUIT MILES	5,529[1]	~6,400
P1 TREES IDENTIFIED	3	*Pending Patrols*
P2 TREES IDENTIFIED	14	*Pending Patrols*

1. Detailed scope review underway for Tranche 3 Mileage

Work Method Enhancements in HFTD

PG&E is reinforcing the requirements in Utility Standard TD-1464S*, Preventing and Mitigating Fires While Performing PG&E Work* and biasing towards performing field work in HFTDs on de-energized equipment during critical fire danger conditions (e.g., Fire Potential Index of R4, R5, or R5+).

CURRENT STANDARD	ADDITIONAL WORK METHOD ENHANCEMENTS
Fire watch needed for R5 rating day work	Dedicated Fire watch now needed for R4, R5 rating day work
Water buffalo needs to be on jobsite	Water buffalo needs to be as close as possible to jobsite with hose laid out on the ground and be ready to operate
No ground clearing required or wetting of trees considered	When working in areas of forests, clear the area to bare mineral soil and consider wetting the trees in the immediate vicinity of the work location