

# SF Lifelines Council Presentation

Wildfire Prevention and Preparedness

Greater Bay Emergency Earthquake Restoration Project

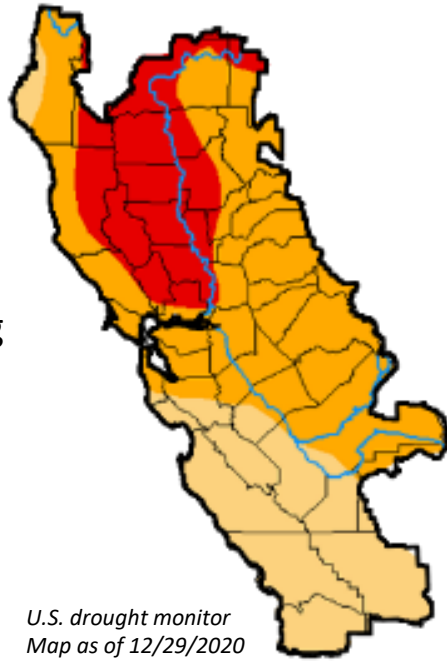
San Francisco Transmission Reliability Projects



# Drought-Intensified Wildfire Risk in Our Service Area

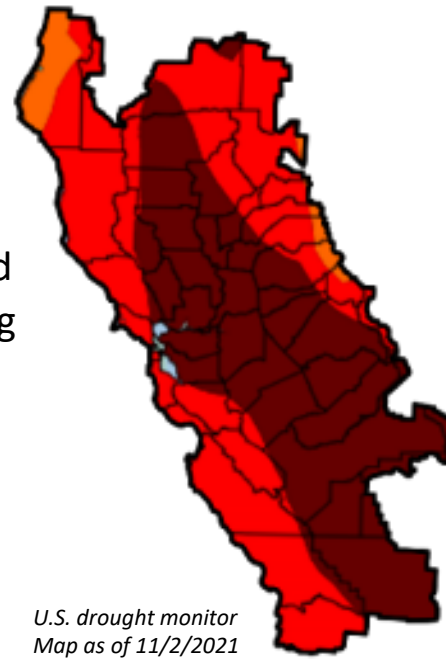
## 2020

**47%**  
of acreage  
burned by  
wildfires ignited  
on non-Red Flag  
Warning days



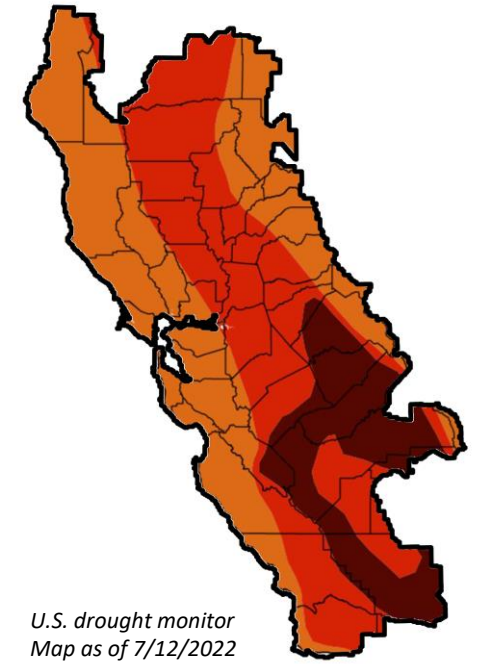
## 2021

**95%**  
of acreage  
burned by  
wildfires ignited  
on non-Red Flag  
Warning days



## 2022

**Driest  
year to  
date**  
over the last  
128 years



### MAP LEGEND



## MITIGATE WILDFIRE RISK



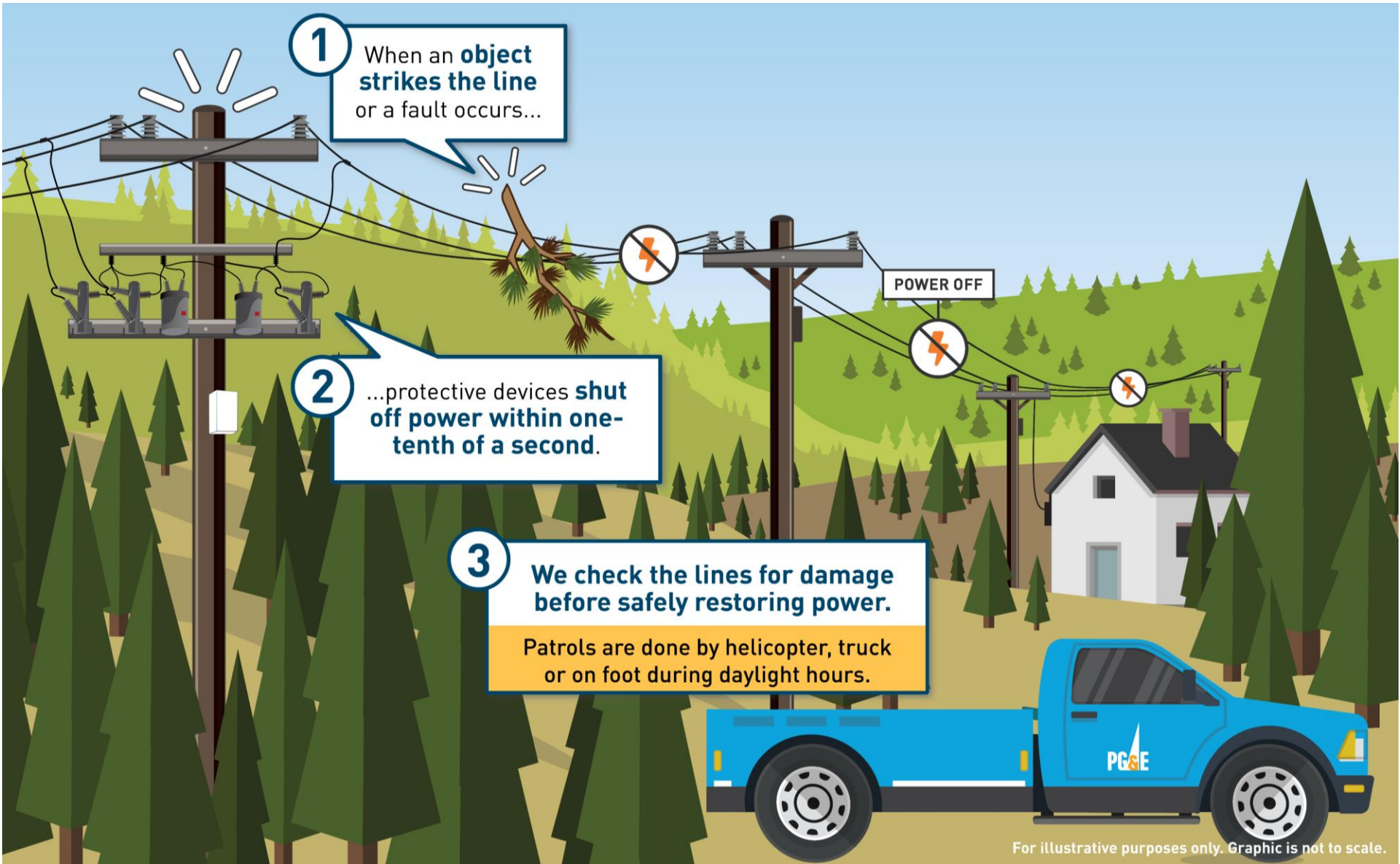
## MINIMIZE CUSTOMER IMPACT



## MAXIMIZE SITUATIONAL AWARENESS



# What Are Enhanced Powerline Safety Settings?





# Enhanced Powerline Safety Settings (EPSS) A Technology To Prevent Wildfires

## How It Works

PG&E powerlines have equipment that allows power to automatically turn off within one-tenth of a second if there is a wildfire risk, like a tree branch or other object striking the line.

## Why We Do It

Quickly and automatically shutting off power when a hazard is detected can help stop wildfires before they have a chance to start.

## Preventing Wildfires

73% decrease in CPUC-reportable ignitions  
in 2022 on EPSS-enabled circuits.  
compared to the prior 3-year average as of 7/31/22.



### **SAFETY SETTINGS IN ACTION**

An example of these settings preventing a potential ignition in Santa Cruz County, when a tree branch fell into a powerline in 2022 and power was quickly and automatically turned off.

# Safety Settings in Action

Watch the full video [HERE](#)



**EPSS Settings ENABLED**

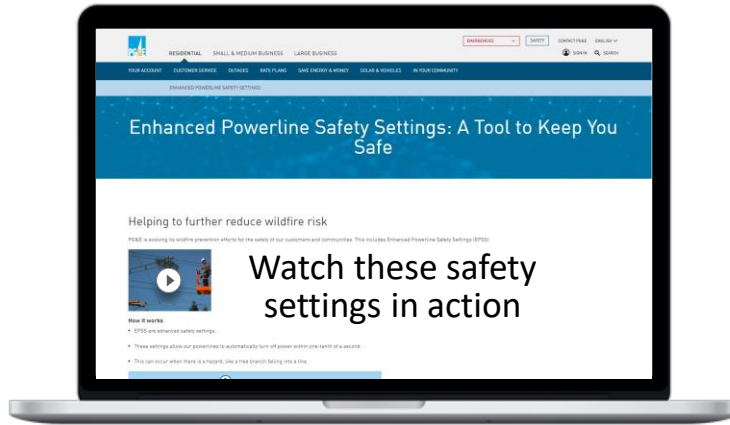


**EPSS Settings DISABLED**



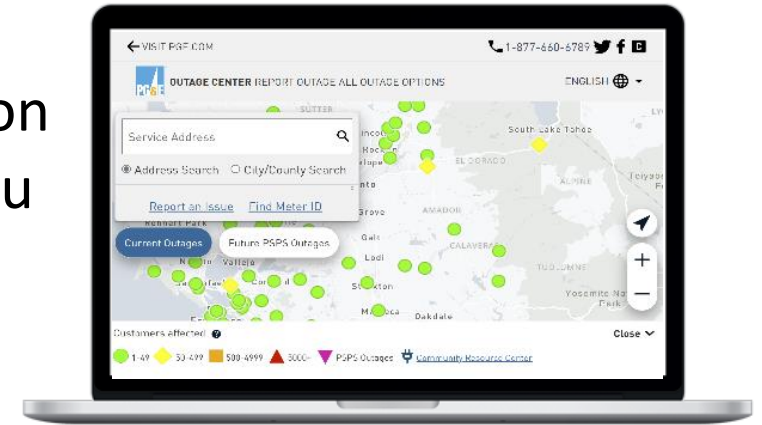
# Learn More, Be Prepared

Learn More About EPSS



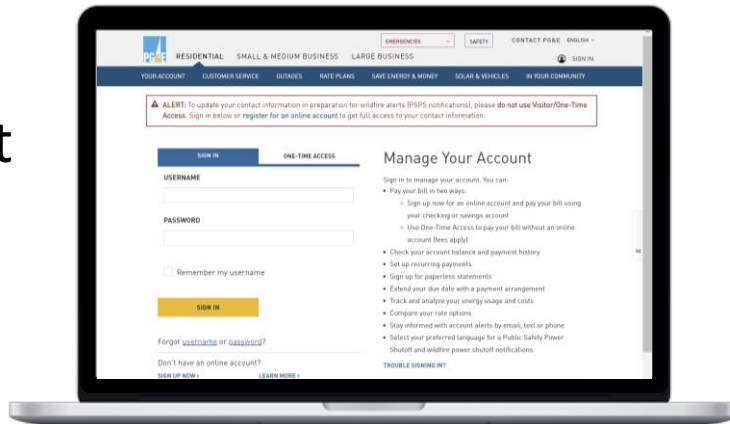
[pge.com/epss](http://pge.com/epss)

Stay Up-to-Date on Outages Near You



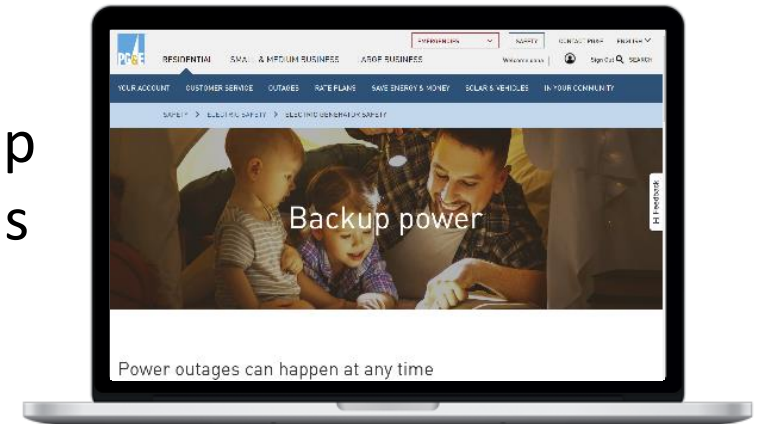
[pge.com/outages](http://pge.com/outages)

Update Contact Information



[pge.com/myalerts](http://pge.com/myalerts)

Explore Backup Power Options



[pge.com/backuppower](http://pge.com/backuppower)



# Notifications by Outage Type

PG&E can notify you in advance of  
**Planned Outages**

## Public Safety Power Shutoff

### ADVANCED NOTIFICATION/REGULAR UPDATES

- Phone calls\*
- Emails
- Texts
- Social media
- News releases
- Local/Tribal government outreach
- CBO\*\* outreach

## Rotating Outages

### ADVANCED NOTIFICATION/REGULAR UPDATES

- Phone calls\*
- Emails
- Texts
- Social media
- News releases
- Local/Tribal government outreach

## Planned Maintenance

### 10-DAY ADVANCE NOTIFICATION

- Phone calls\*
- Emails
- Text

PG&E is unable to notify you before  
**Unplanned Outages**

## Emergency Repairs

## Active Wildfires

## System Damage

## Faults on EPSS-Enabled Lines




### UPDATES DURING AND AFTER OUTAGES

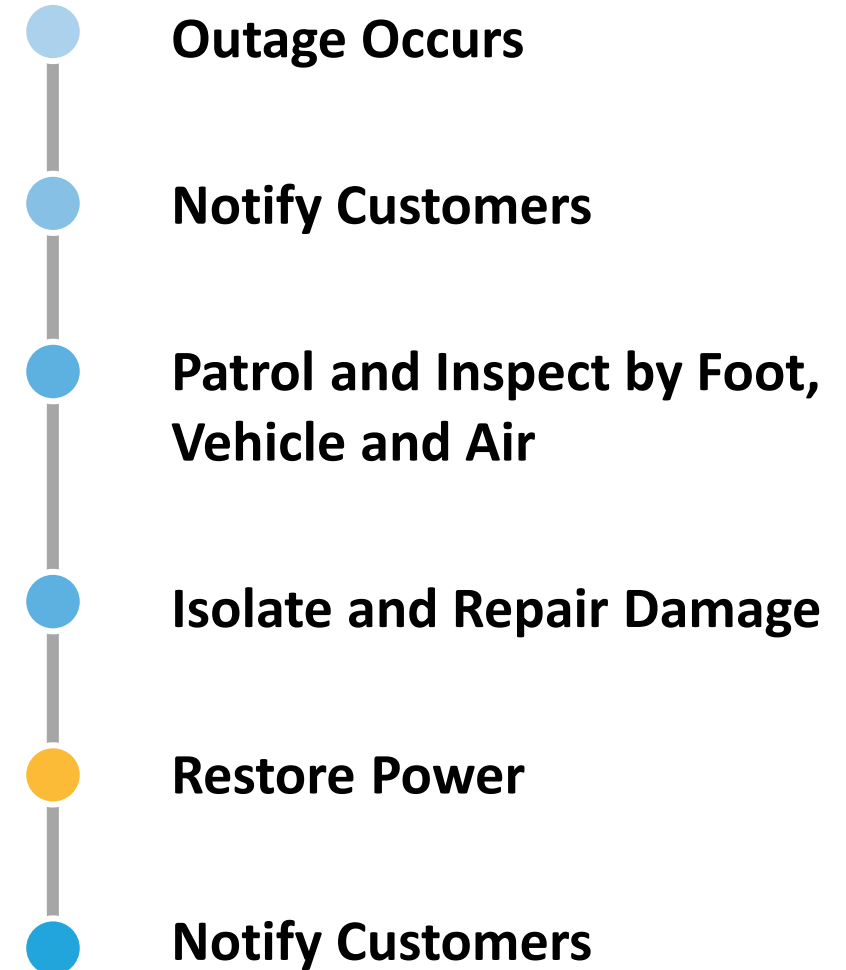
- Phone calls\*
- Emails
- Texts

\*Via interactive voice recordings (IVR)    \*\*Community-based organization



## Restoring Power More Quickly

- 
 Adapting patrol methods to identify outage sources more quickly.
- 
 Installing fault indicators to help patrol crews identify with precision where on a line a fault occurs and safely restore power more quickly.
- 
 PG&E crews now only need to patrol the section of the line from where the power outage originated to the next protective device.



# Differences Between PSPS and Safety Settings

## Public Safety Power Shutoffs (PSPS)

Turning off power to prevent tree branches and debris from contacting energized lines



### WHEN

During times of high winds, low humidity and dry vegetation



### NOTIFICATIONS

In advance through automated calls, texts, and emails along with real-time updates



### 2022 FOCUS

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

## Enhanced Powerline Safety Settings

Turning off power automatically within one-tenth of a second if a problem is detected on the line.



### WHEN

Elevated wildfire risk is present, most likely from May to November, but can occur year-round.



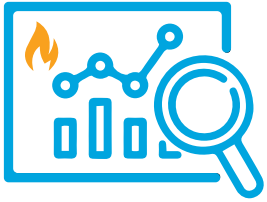
### NOTIFICATIONS

After the outage occurs. Advance notice cannot be provided due to the adjusted settings that allow power to automatically shut off. Regular updates are also provided.



### 2022 FOCUS

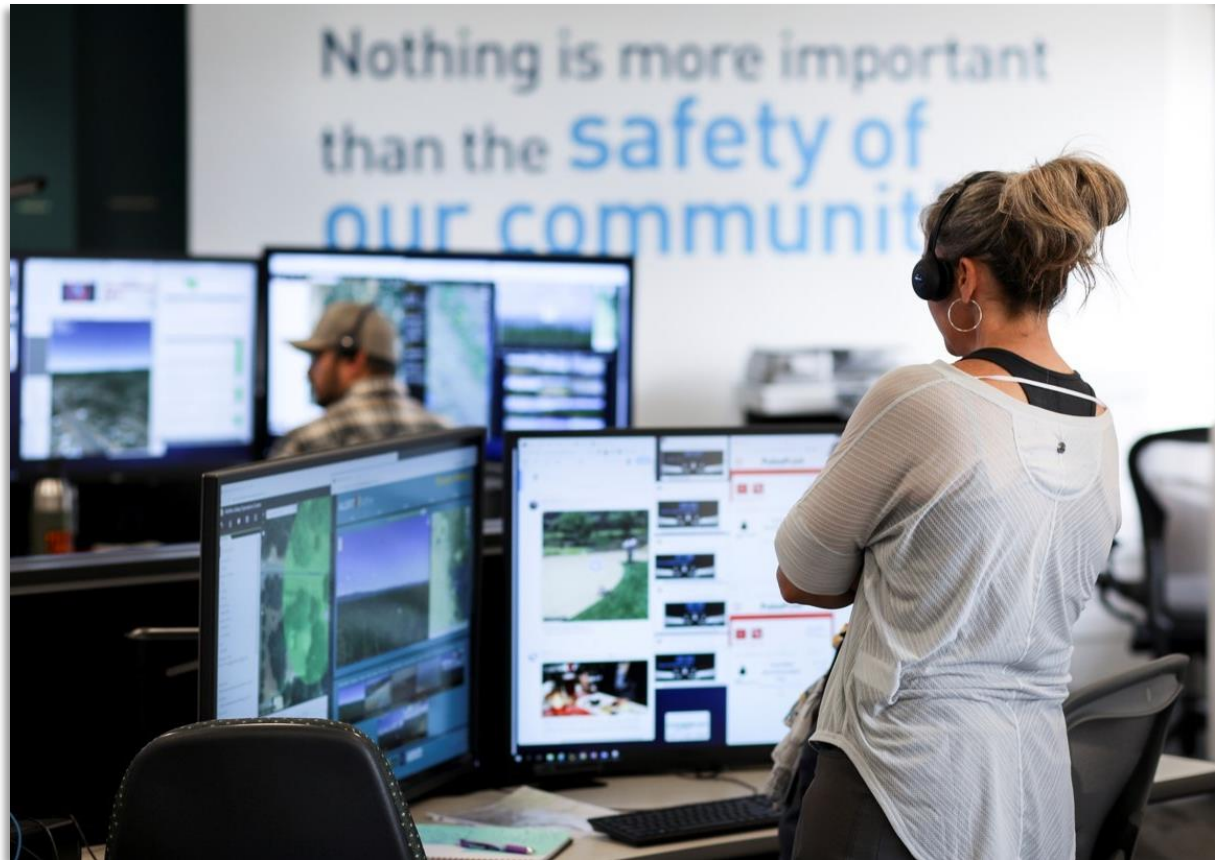
Expanding from ~45% HFTD to 100% of HFRA circuits, increasing customer outreach & improving reliability.



**Fast, early, real-time detection and assessment of wildfire threats (and more) to PG&E assets across the areas we serve**

## Information sharing with:

- ✓ Control Centers
- ✓ Operation Centers
- ✓ Public Safety Specialists (partners)
- ✓ Field Teams
- ✓ Leadership
- ✓ Emergency Operations Center (EOC)
- ✓ Regions during PSPS

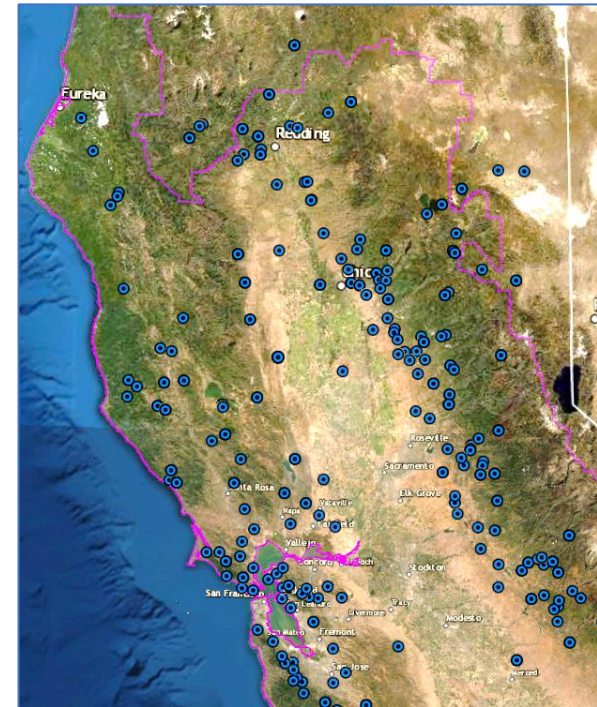


PG&E and the HAWC are partnering with ALERTWildfire to install HD cameras with pan/tilt/zoom (40x) capabilities.

- Real-time, visual assessment, such as location, size, behavior
- Critical “eyes on” capabilities to help quickly assess the threat to PG&E assets and the population
- Help guide PG&E responses and keep people safe
- Shared camera access with first responders means more accurate deployment of resources for initial attack and intel throughout the life of a fire
- LINK: <http://www.alertwildfire.org/>

## PG&E Installations

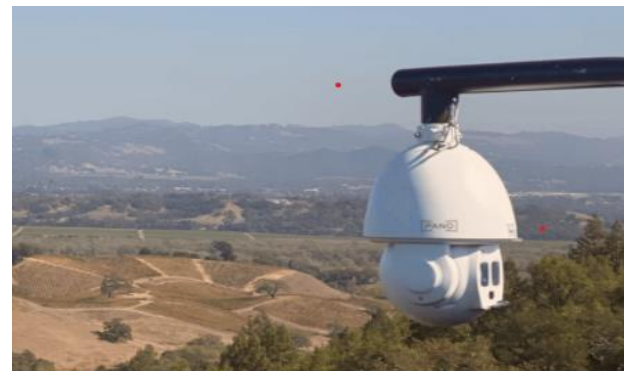
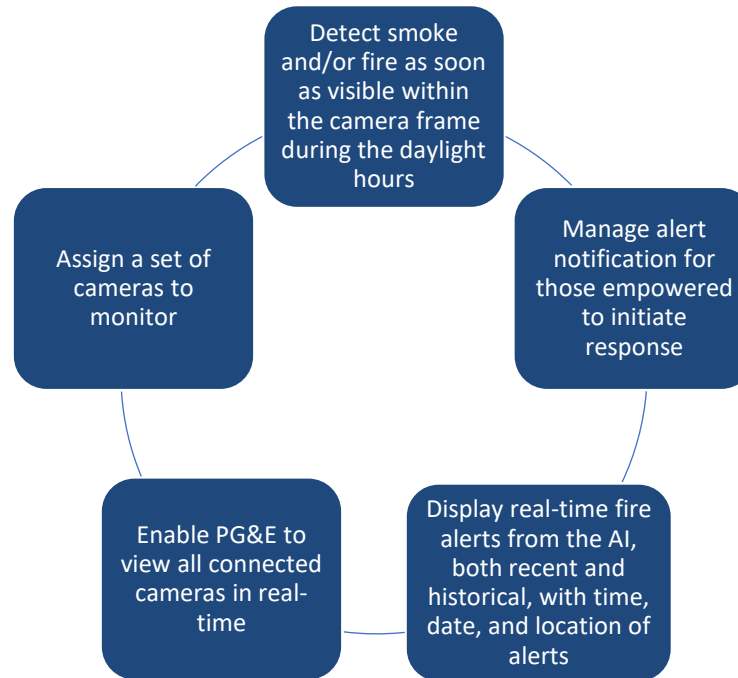
To Date: 585  
 2022 Target: 98 (83 YTD)  
 End 2022 Goals: 600 cameras, 90% coverage of HFTDs



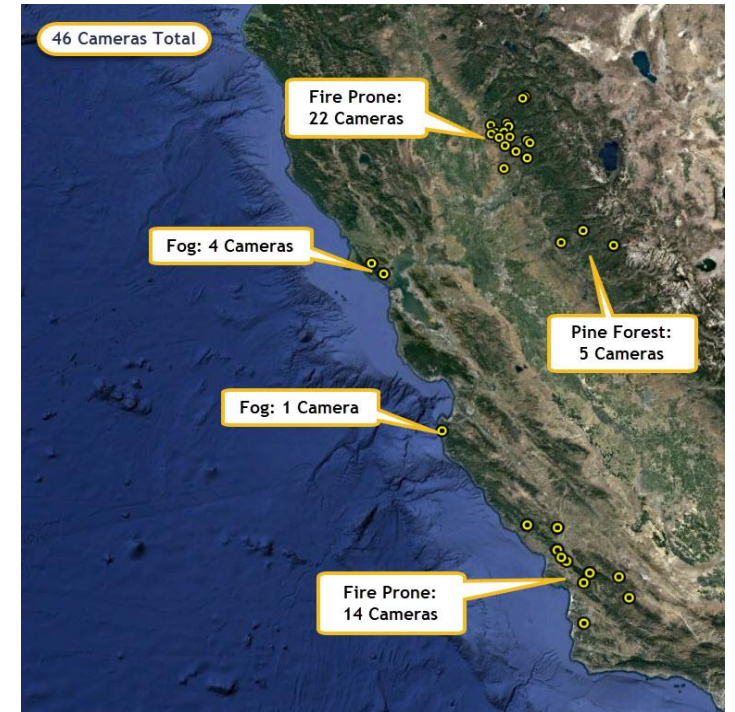
## Desired AI Pilot Outcome



Automated Fire Detection from Wildfire Alert Cameras:  
 Demonstrate an automated fire detection model using machine learning, computer vision, or Artificial Intelligence (AI) techniques that accurately detects fires based on visual and infrared camera data streams; optimize for automated fire detection alerts.



Pano Station installation in Healdsburg, CA



Pano AI detection on HPWREN images, <https://hpwren.ucsd.edu>

# Questions?



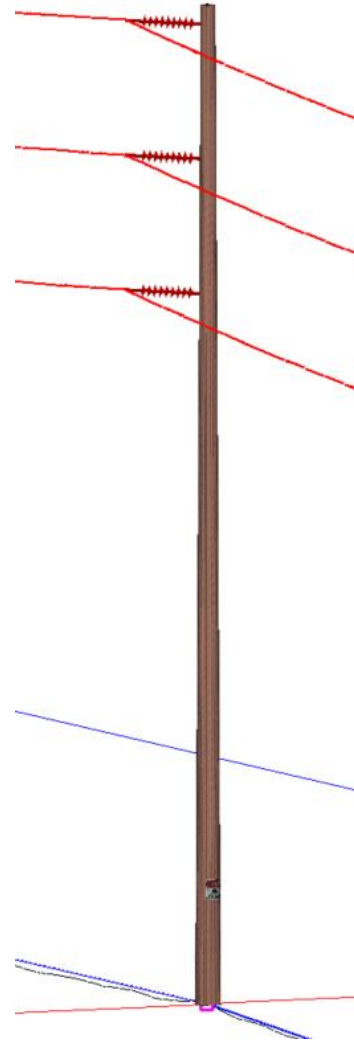
# Greater Bay Emergency Earthquake Project

Transmission Shoo-Fly



## What is a Shoo-Fly?

- ❑ Informal trade name for a temporary power line to maintains critical load-serving capability during construction or emergency conditions
- ❑ Level of design and engineering review varies depending on application, available time, resources and materials
- ❑ T-Line shoo-fly employs PG&E standard overhead materials and configurations, full engineering review



## Other shoo-flies:

**PG&E Crews Build Shoo-Fly in Oroville**  
 February 27, 2017


When massive storms threatened the Oroville Dam spillway in early February, several PG&E crews were called in to remove wire and towers that were going to be in the emergency spill channel. IBEW Local 1245 members from PG&E completed the work the day before the lake started to spill from the emergency spill. The crews were then tasked with building a shoo-fly around the spill channel to restore power to that circuit.

The shoo-fly consisted of nine locations with 13 light duty steel poles being set to complete the shoo-fly. In these photos, the crews are seen sagging wire, and once sagged, the dead ends were clipped and cut so they could restore the circuit. The crews utilized helicopters to fly materials to the locations.

-Kyle Whitman, IBEW 1245 Business Rep

<https://ibew1245.com/2017/02/27/pge-crews-build-shoo-fly-in-oroville/>

About NIPCO | We Are Member Owned | We Power Rural Iowa | We Provide Sustainable Energy



NIPCO crews gather, together, at a job site to discuss the work to be done and any hazards that might be associated with it.

The Iowa Association of Electric Cooperatives (IAEC) is responsible for the education and training of cooperative employees across the state of Iowa to support a safe working environment and to protect cooperative members and the public. A valuable resource in this capacity, IAEC staff members conduct required training, safety and OSHA-type audits, assist in maintaining required record keeping, aid in inspection of cooperative equipment and facilities for safety and mechanical problems, and perform a minimum of two crew observations to assess how line workers follow safety rules and procedures when working on electric infrastructure in the field.

On August 8, 2018, IAEC Job Training/Safety Instructor Scott Meinecke observed NIPCO's Le Mars Transmission Crew as they installed a temporary line, known as a "shoo fly". The shoo fly will bypass electric transmission line around NIPCO's L2 Substation (northwest of Kingsley, Iowa) while it is being upgraded.

<https://www.nipco.coop/news-and-events/news/nipco-crews-earn-high-marks-for-safety-on-job-site>





## History

Probabilities failure for the SF underground electric system

E	G
Line	Pf (50 years w/ PGA=0.07g)
TBC	
A-H-W #1	93%
A-H-W #2	93%
A-P #1	93%
P-X #1	93%
P-X #2	93%
A-Y #1	85%
H-Y #1	86%
A-X #1	84%
A-Y #2	68%
H-Z #1	49%
H-Z #2	46%
X-Y #1	93%
Z-A #1	2%
H-P #3	83%
H-P #2	
H-P #1	93%
H-P #4	93%

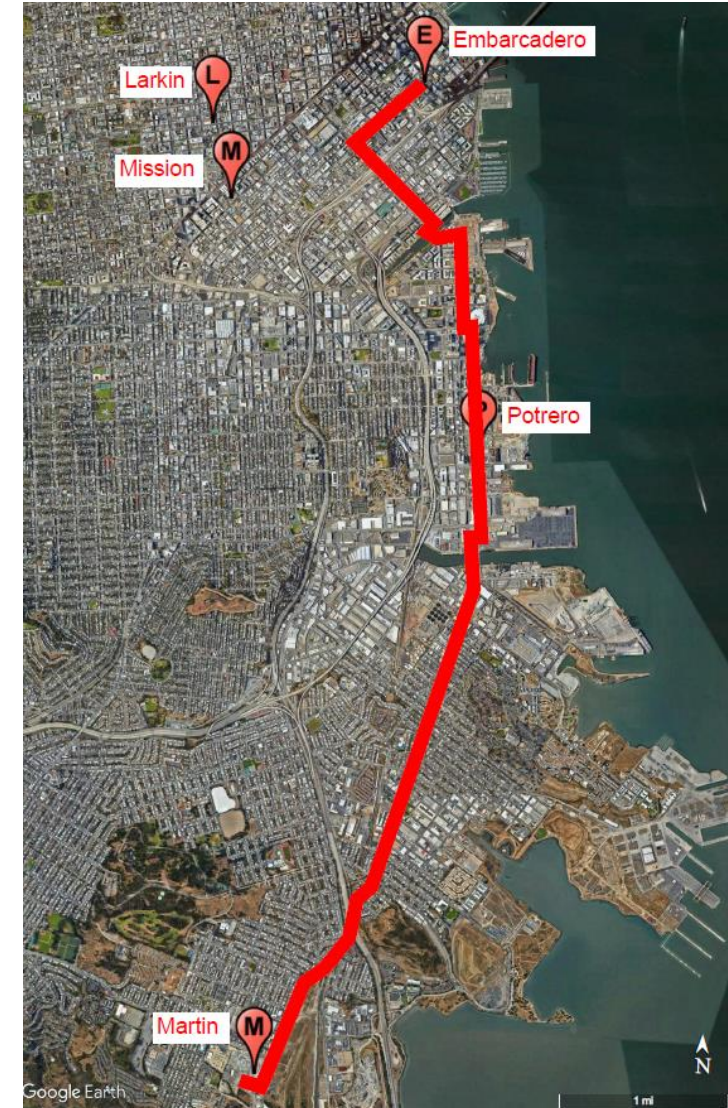
Over the last 10 years, seismic studies have been completed to evaluate the “vulnerability” of the underground electric transmission systems serving the Cities of San Francisco and Oakland. The results from those studies show that some of the underground transmission lines are in high liquefaction areas and have a risk of failure in a major seismic event.

The San Francisco substations supplied with power from these underground transmission lines are:

- Embarcadero (Z) --- 37,500 customers
- Larkin (Y) --- 91,700 customers
- Mission (X) --- 64,600 customers
- Potrero (A) --- 89,300 customers
- Hunters Point (P) --- 20,900 customers
- Bayshore (W) --- 1 customer (BART)
- Martin Substation (H)

## History

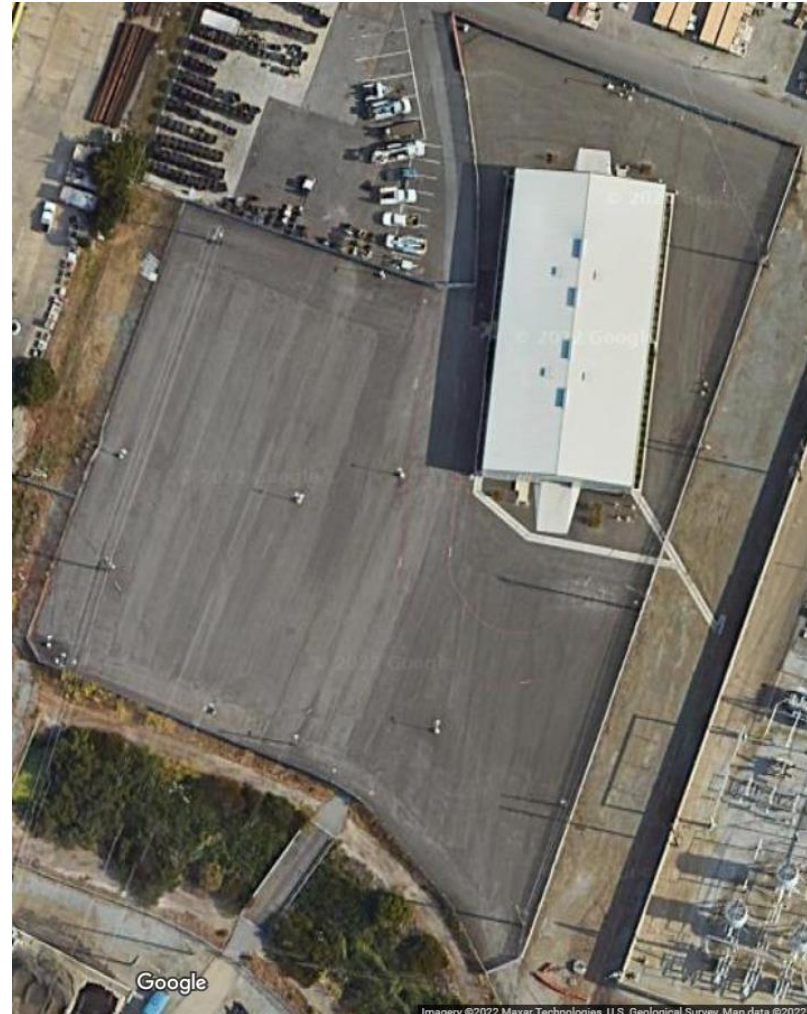
- ❑ Should multiple underground cables in San Francisco have failures in a major seismic event, possibly over 100,000 customers could experience sustained or rotating outages for months, given the repair time.
- ❑ To reduce the customer outage risk in San Francisco a project was initiated back in 2011 to develop a plan to procure and store materials for temporary overhead lines (or “shoo-fly”) that could be more quickly built to restore service. Two shoo-flies were planned for San Francisco:
  - 6.7-mile 230 kV shoo-fly in San Francisco from Martin Substation to Embarcadero Substation;
  - 4.1-mile 115 kV shoo-fly in San Francisco from Potrero Substation to Mission and Larkin Substations



## Preparedness

- Yards are located on either side the Bay
- All materials physically stored and available
- Warehouse or yard
- UG cable, termination kits
- Poles, conductors, insulators, hardware
- Foundations, anchors

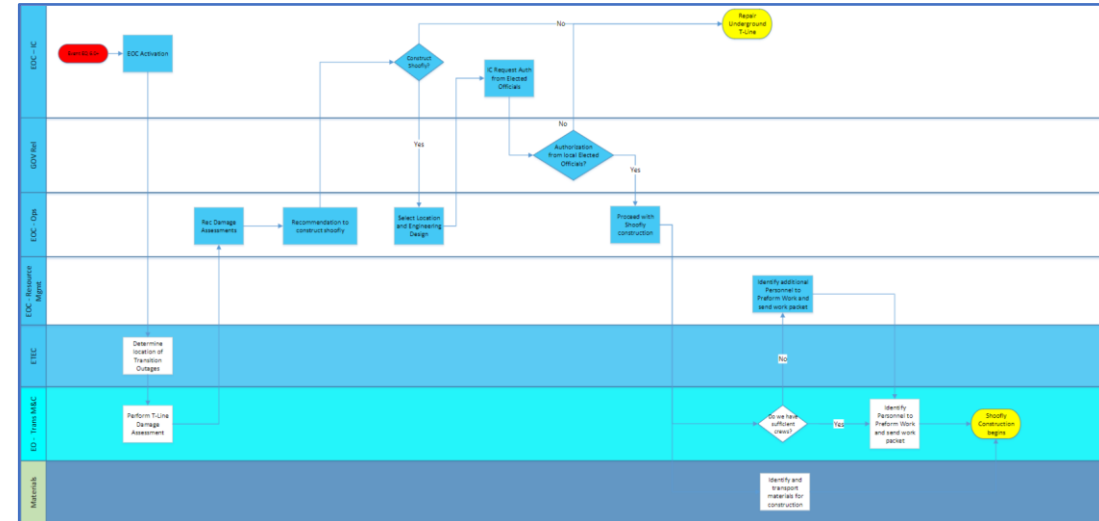
## Brisbane, adjacent to Martin Substation



## Shoo-fly Authorization & Construction Timetable

- ❑ The trigger for a shoo-fly is met if the length of the repair to the underground cable is greater than the estimated time to construct the shoo-fly.
  - The EOC Ops Chief must receive authorization from the EOC Commander to construct a shoo-fly.

### Shoo-fly Process Map



1. A 6.0M  $\geq$  earthquake occurs on the San Andreas or Hayward faults
2. The EOC activates
3. ETEC ID outage areas
4. M&C performs a damage assessment
5. Repair timeline est. to be 10 weeks  $\geq$
6. EOC Ops Chief requests construction of a shoo-fly to EOC Cmdr.



## Current & Ongoing Risk Mitigation Efforts in San Francisco

### □ System Hardening

- A new 230kV submarine and underground hybrid transmission line was released to operations in 2016 between two, new indoor gas insulated substations (GIS), one adjacent to the existing Embarcadero Substation in downtown San Francisco and one adjacent to the Potrero 115kV Switchyard, near the de-commissioned Potrero Power Plant. This mitigated the risk of outages to the San Francisco Financial District, Chinatown and South Beach neighborhood
- A project is currently in the regulatory permitting and design phase to replace three, 115kV underground circuits one from Potrero to Mission Substation, one from Potrero to Larkin Substation and one from Mission to Larkin Substation. When completed in 2026, it will mitigate the risks of outages in commercial and residential neighborhoods served by the Mission and Larkin Substations

# Questions?

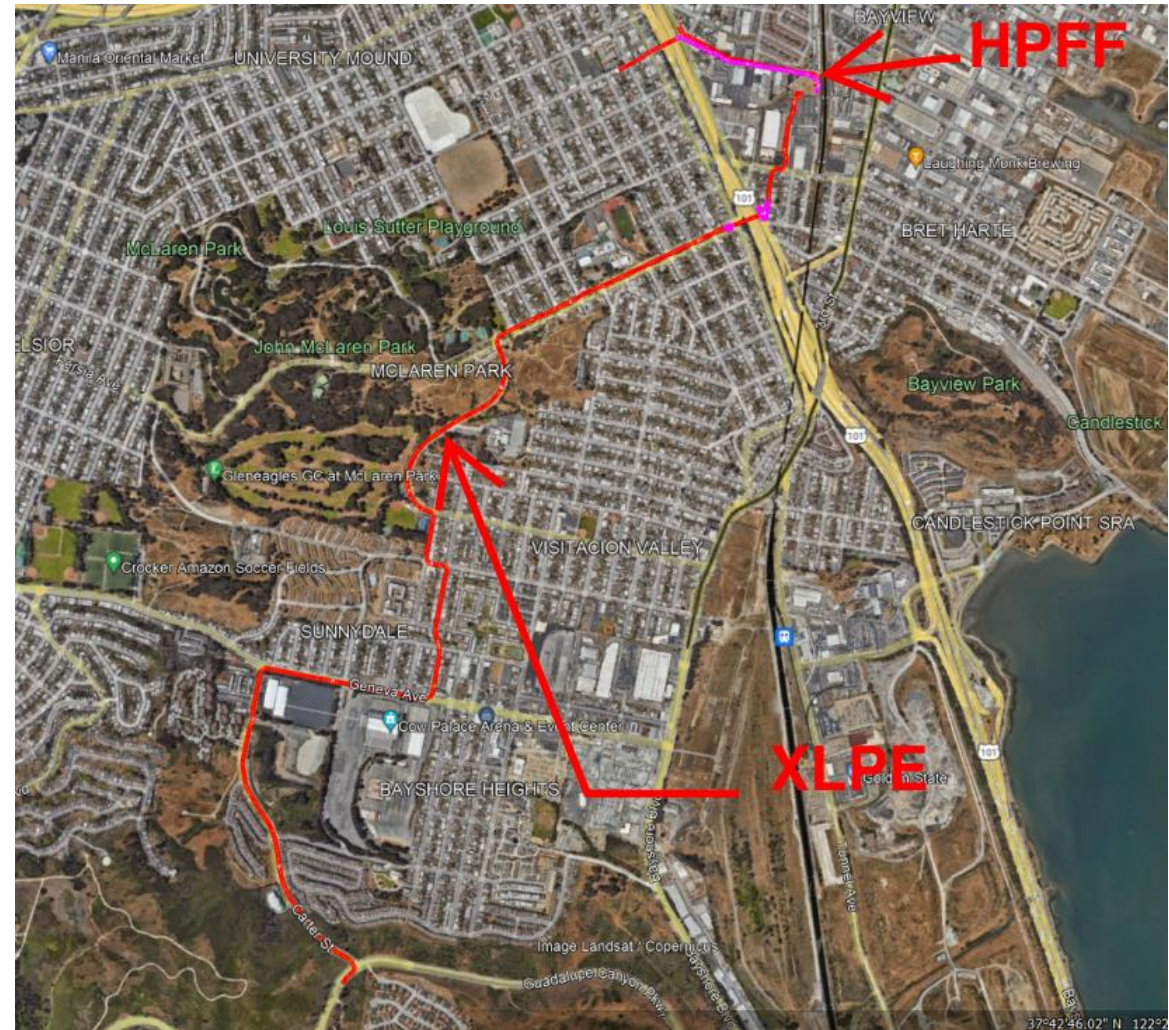


# San Francisco Transmission Reliability Projects



# Martin Substation Bypass – Egbert Project

- Martin Substation supplies ~60% of power to San Francisco
- Intercept existing 230kV Jefferson-Martin circuit and connect to new Egbert Switchyard
- Connect to existing Martin-Embarcadero circuit
- Construction initiated this year;
- Anticipated completion 2024





# San Francisco Seismic Upgrade

- Existing transmission lines in high-liquefaction zones
- Project replaces 115kV circuits into new alignments:
  - Potrero-Mission
  - Potrero-Larkin
  - Mission-Larkin
- Construction estimated to begin in 2024



# Q&A

