Real-Time Intelligence for Wildfire Safety: The Pacific Gas & Electric Weather Station and Camera Networks

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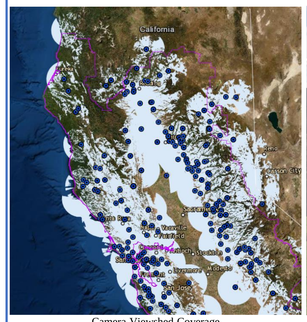
Pacific Gas & Electric Company, Alert Wildfire, Western Weather Group

Introduction

In response to increasing and unprecedented catastrophic wildfire risk across California, Pacific Gas & Electric Company (PG&E) is installing **1,300 weather stations** and **600 high-definition web cameras** as part of their initiative to mitigate wildfire risks across the company's 70,000 sq mile service territory. The stations and cameras serve as one of the company's real-time situational awareness tools that assist data driven decisions at a granular level for the Public Safety Power Shutoff program. PG&E has one of the largest utility-owned mesonets with over 1,070 weather stations installed to date. Over 380 high-definition Alert Wildfire web cameras are currently installed, with a goal of at least 90% view shed coverage of PG&E's highest fire threat risk areas. Both programs will be fully installed by 2022.

This data and imagery is critical information for PG&E as well as external partners such as CALFIRE and The National Weather Service. PG&E makes this information publicly available via MesoWest (ID 227) and www.pge.com/weather, aiding in a more unified multi-agency mission to combat historic wildfire risk impacting our communities across the state of California.

Location Siting and Procedures



Camera Viewshed Coverage

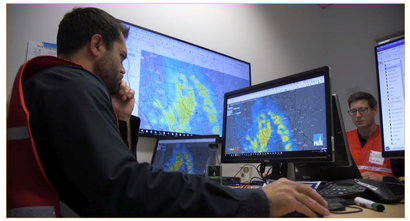
Station Install On Steel Lattice Tower

Cameras

- Sited on exposed mountain and hill tops in high fire threat areas. A 360-degree view is desirable, but if unavailable, multiple cameras may be sited to complete the 360-degree viewshed.
- Sited and installed on existing infrastructure such as comms towers or fire lookouts (not on PG&E assets).
- Sites are chosen to complete the target 90% viewshed coverage of PG&E's Tier 2 and 3 High Fire Threat Districts (over 50% of the service territory).
- Camera siting and installation work completed in cooperation with Alert Wildfire

Weather Stations

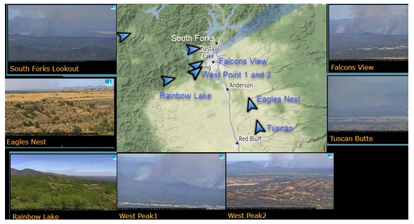
- Sited across Tier2 and 3 High Fire Threat Districts on exposed mountain and hill tops; must have exposure N/NE/E to catch offshore wind events.
- 2 and 3KM 30-year climatology (run by PG&E Hi-Res model) referenced to identify "Diablo hot spots."
- Sites must be bucket truck accessible for install and yearly calibration
- Install on all PG&E assets apart from 500KV equipment. Stand-alone poles are installed to house the stations in remote areas without existing PG&E assets to view and build a network of remote observations in areas where they have never existed

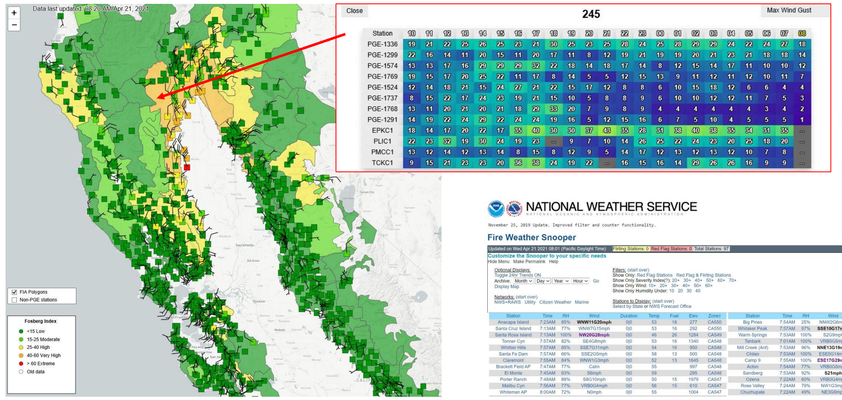


Operational Use

The PG&E weather stations and cameras are critical real-time situational awareness and decision support tools during dangerous wildfire and wildfire weather events. This information is publicly available and shared with multiple stakeholders within the wildfire safety and emergency response communities.

Agencies like the National Weather Service and CALFIRE utilize this information to protect lives and property. In fact, when CALFIRE commands use of a PG&E camera for fire response, they are given full control of the equipment as needed.





Real-time Tools for Predictive Gains

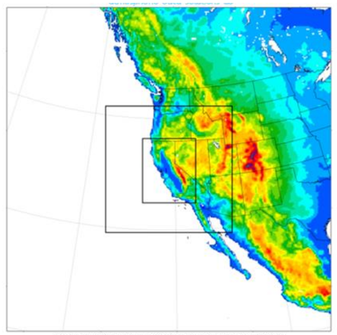
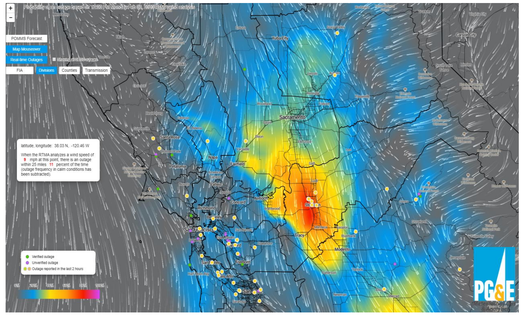
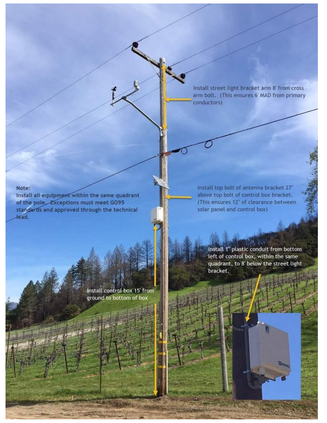


Figure 1: Operational WRF domain configuration.



- In 2020, PG&E deployed a 2 x 2 km operational WRF, upgrading from a 3 x 3 km model
- Run 4x per day / 129 hour forecast horizon
- Observations from offshore flow (Public Safety Power Shutoff, or PSPS) events were used to calibrate the model before deployment
- A 30-year downscaled climatology was created using the same WRF configuration and was used to train an Outage Producing Wind Model and Fire Potential Index that can be run real-time
- Building a long-term database of observations will continue to be used to improve modeling used in wildfire weather forecasts and PSPS decision support
- Future opportunities include MOS output for each observation site

Equipment



CAMPBELL SCIENTIFIC

- EE181-L Air Temperature and Relative Humidity Sensor
- 05103-L Wind Monitor
- CR1000X Measurement and Control Datalogger
- RV50 Industrial 4G LTE Cellular Gateway
- CH200 Smart 12V Charging Regulator (charges system from the 20W solar panel)
- Sensors installed at 20' (whenever possible – some assets not permitting)

WESTERN WEATHER GROUP

- Axis Q6055-E PTZ Dome Network Camera
- 1080P HD
- 32X zoom
- Day/night functionality
- Automatic de-fog
- Enhanced distance surveillance

ALERT Wildfire

Project Collaborators

Siting is done in collaboration with various wildfire safety stakeholders including CALFIRE, The National Weather Service, US Forest Service, and various local government and fire agencies.

Contacts and Links

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www.pge.com/weather

www.alertwildfire.org

Station equipment sourcing and data monitoring by www.westernweathergroup.com