

PSPS Resilience

December 12, 2019



Together, Building
a Better California



Overall PSPS Minimization Strategies

Approach to Reduce Need for PSPS:

REDUCE FIRE IGNITIONS	REDUCE FIRE SPREAD
<ul style="list-style-type: none">• Enhanced Vegetation Management• System Hardening• Reclosers and SCADA• Wildfire Safety Inspection Program• Public Safety Power Shutoff	<ul style="list-style-type: none">• Wildfire Safety Operations Center• Weather Stations• Cameras

Approach to Reduce PSPS Customer Impacts:

REDUCE NUMBER OF IMPACTED CUSTOMERS	REDUCE DURATION	REDUCE FREQUENCY
<ul style="list-style-type: none">• Distribution Segmentation• Transmission Line Switching• Distributed Generation Enabled Microgrids	<ul style="list-style-type: none">• Restoration Time	<ul style="list-style-type: none">• Meteorology Guidance• Transmission Line Exclusion



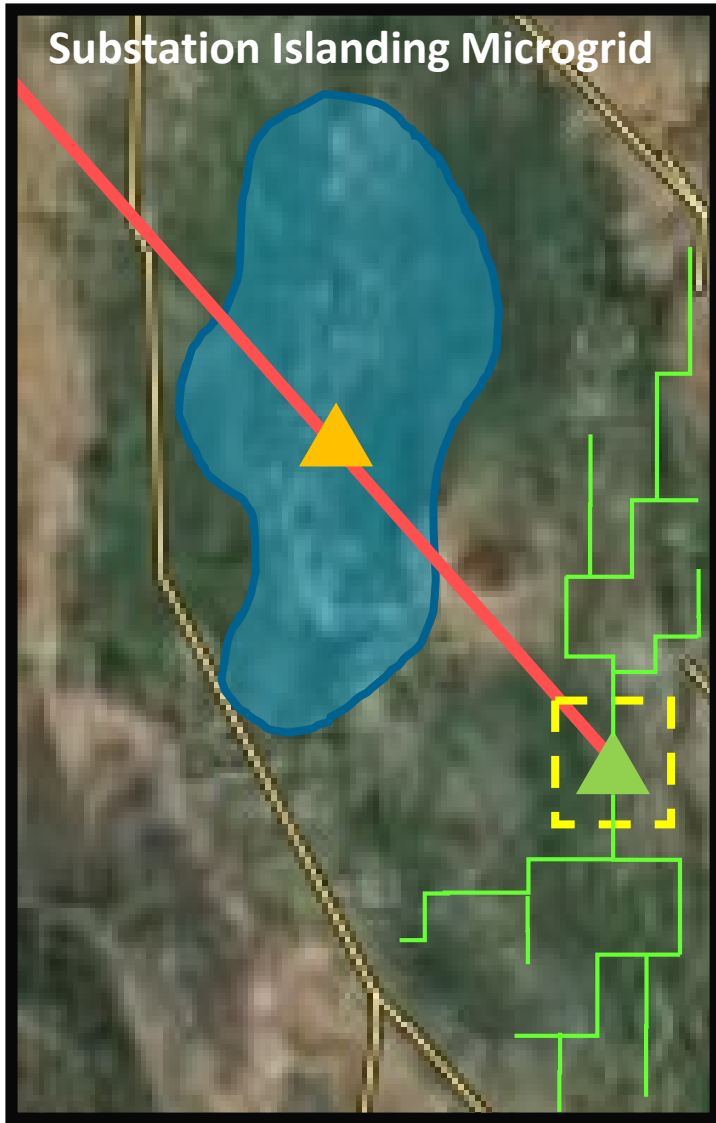
PG&E Microgrid Initiatives for PSPS

Our Goal:

By 2020 fire season reduce the number of customers affected by nearly one-third, relative to October 26, 2019 PSPS events, and cut restoration time in half (after weather “all clear”).

Microgrid PSPS Initiatives:

- 1. Make Ready Program:** PG&E has identified numerous substations that are in “safe to energize” areas and will work to upgrade a portion of these substations to accommodate generation.
- 2. Microgrid RFO:** PG&E launching an all-source RFO to procure clean generation to power the “Make Ready” substations.
- 3. Enable Customer-Requested Microgrids:** PG&E will implement the Commission’s decisions of the use of SGIP for customer-sited resources, including critical services, vulnerable households, resiliency and equity.



Impact: Potential to energize 1,000s to 10,000s of customers per islanded substation

Plan: PG&E issuance of all-source RFO for RA procurement (IRP decision) to acquire generation resources that can meet requirements for PSPS resiliency

Key Operations Requirements:

- 24 hour / multiple consecutive day operations
- load following / black start / cold load pickup
- located within “safe to energize” areas

Methodology: Identify highest priority substations from 2019 events:

- frequency of de-energizations
- total customer count impact



High fire weather footprint



Substation within wind and PSPS footprint



De-energized transmission line



Substation indirectly impacted by t-line de-energization



Safe to energize area distribution lines

1. Make Ready Program: PG&E substations ready to accommodate generation

- **Issue 1: Commission Consideration of Make Ready Program**
 - PG&E needs expedited Commission consideration of its Make Ready Program in time to implement for 2020 fire season.
 - The Resiliency/Microgrids OIR provides a forum for expedited consideration.
- **Issue 2: Land Rights to Accommodate Generation Resources**
 - Additional land rights would need to be acquired near substations to accommodate generation resources.
 - Partnering with state and local officials to make land available within the “safe to energize” to support clean supply technology solutions.
- **Issue 3: Local and State Permitting**
 - Local and state permitting issues and overall local community support.
 - Partnering with state and local officials for expedited and streamlined permitting and approval.

2. Microgrid RFO: Generation to power the “Make Ready” substations.

• Issue 1: Commission Consideration of Generation Contracts

- PG&E needs Commission approval of contracts with suppliers to get resources installed in time for 2020 fire season.
- PG&E needs expedited consideration of contracts once PG&E files Tier 3 Advice Letter.

• Issue 2: Interconnection Study for Deliverability

- Cost uncertainty and timeline associated with T-line upgrades.
- Generation procured through the RFO may face RA deliverability constraints without T-line upgrades.
- Deferred deliverability would allow resources to be available for 2020 fire season.

• Issue 3: IRP Eligibility

- All-source solicitation that meets resilience requirements.
- If solution includes fossil, possibility to use RNG.
- RNG cost and availability uncertain at this time.

• Issue 4: Local and State Permitting

- Local and state permitting issues and overall local community support.
- Partnering with state and local officials for expedited and streamlined permitting and approval.



Use of Temporary Generation

While permanent generation is in process, temporary generation can be utilized to bridge the transition to implementation of permanent generation for 2020 PSPS and beyond

PG&E needs clear regulatory direction on extensive use of temporary gen and path for cost recovery:

- Annual reservation costs to reserve temp gen units for 2020 fire season
- Operational/fuel costs to utilize generation units during actual PSPS event

Illustrative Cost Estimate for Temp Gen (can be scaled)

MWs	Annual Reservation	Operational Usage*	Annual Total
300	\$95M	\$80M	\$175M

* Usage assumes 4 events, total run time of 2 weeks

California does not currently have enough CA-permitted temp gen units

- Expedited permitting or exemption
- Cost recovery assurances to reserve units for vendors to bring units into California

Appendix

A new utility service replacing overhead distribution lines with stand-alone DERs to cost-effectively reduce wildfire ignition risk for the long term

Example: Two adjacent homes in Tier 3 High Fire Threat District

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|---|----|---|
| <ul style="list-style-type: none"> • 2.2 Miles of Rebuilt • Hardened OH Conductor NPV Cost¹: \$4.9 M or • Underground NPV Cost¹: \$11.6 M | VS | <ul style="list-style-type: none"> • One stand-alone system (PV, BESS, LPG) • 40-Year Lifetime NPV Cost¹: \$1.6M |
|---|----|---|

Residual ignition risk of “hardened” overhead



Minimizes ignition risk by eliminating overhead



Note 1: Preliminary desktop lifetime cost estimate including all maintenance costs over 40 years.