

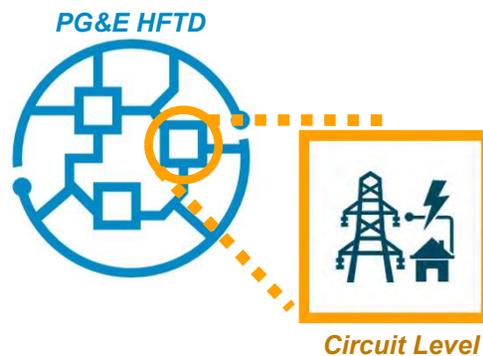


PSPS CIRCUIT CONSEQUENCE MODEL

Need to Move to a More Granular Level

Commitment Language

“PG&E has also modeled PSPS consequences to customers at a program level in terms of MAVF as discussed in Section 4.1(e); and is currently developing a more granular, circuit level model, to assess the impacts of PSPS de-energizations. PG&E currently plans to complete this analysis in collaboration with the WSD and the other California utilities by September 30, 2021.”



Determine the probability of PSPS circuit de-energization using historical look back analysis

Determining the consequences on each circuit based on frequency, customer scope, and duration, including customer type

Improvements since 2021 WMP submission, based on collaboration with other IOUs:

- 1) Moving from using actual 2019/2020 PSPS data into a historical lookback analysis
- 2) Updating the PSPS consequences to include safety and financial consequences, expanding on the reliability only consequence of PSPS

PSPS Circuit Level Framework

Goal

To develop a 2021 PSPS circuit risk model, to evaluate the spatial/circuit variation in risk, to help inform PSPS mitigation efforts to prioritize high risk locations and customers.

Objective

- *Enable risk assessment and mitigation quantification at a more precise, granular level*
- *Allow mitigation quantification at that level of granularity*
- *Create a framework for Risk Scores using MAVF values, allowing comparability between PSPS and Wildfire*
- *Ultimately, consistent measure on the level of consequence for customers experiencing PSPS*

Baseline PSPS Circuit Consequence Model

- Utilize best available representation of meteorological impacts on PG&E system; currently, 10-Year Lookback for Potential PSPS
- Normalize the data to an average impact per year based on:
 - 1) number of events (frequency) per circuit
 - 2) number of customers (customer scope) per circuit
 - 3) average de-energization time (duration) per circuit
- Based on the combination of frequency, customer scope and duration, we can estimate the average customer minutes interrupted (CMI) on each circuit
- Based on total CMI across all circuits, the overall enterprise PSPS risk score is allocated across to each circuit to represent the risk score on each circuit

Ongoing Development

Mitigated PSPS Consequence

- Identify existing mitigation programs that provide customer reduction (by circuit)
- Identify mitigation programs focused on duration reduction (weather, restoration, switching)
- Estimate the PSPS Consequence mitigated from mitigation activities

Wildfire + PSPS Combined View

- Since both Wildfire and PSPS models are represented as MAVF scores, the results of the models can be combined to understand the Wildfire + PSPS risk per circuit

Modeling Framework – Baseline Consequence



Align Risk Modeling of PSPS customer impact at the circuit level based on MAVF risk scoring

Developed framework using the 10-year lookback for potential PSPS consequence at the Circuit Level

Risk per circuit driven meteorology scope, customers affected from Distribution impact, Transmission impact, or both Transmission & Distribution impact

Incorporating weighting for critical customer types to consider elevated risk impacts to these communities

Feeder Name	Cust. Count	Customer Events	Dx Risk %	Tx Risk %	Total Risk Score	Dx Risk Score	Tx Risk Score	Total Risk Rank	Total Dx Rank	Total Tx Rank
Circuit #1	4,555	122,655	59%	41%	30	18	12	1	4	18
Circuit #2	4,489	107,233	41%	59%	26	11	15	2	14	8
Circuit #3	5,152	118,916	52%	48%	26	14	12	3	8	17
Circuit #4	4,932	59,184	0%	100%	25	-	25	4	523	1
Circuit #5	4,223	107,070	53%	47%	23	12	11	5	11	25
Circuit #6	4,365	103,702	54%	46%	23	12	11	6	10	28
Circuit #7	3,668	87,169	41%	59%	21	9	13	7	19	15
Circuit #8	3,418	51,270	0%	100%	21	-	21	8	523	2
Circuit #9	2,823	83,288	59%	41%	21	12	8	9	12	43
Circuit #10	4,882	48,871	100%	0%	20	20	-	10	1	345
Circuit #11	4,022	48,264	0%	100%	20	-	20	11	523	3

Visuals shown are for demonstration purposes and may not reflect latest developments



Modeling Framework – Mitigating Consequence



Identify top circuits based on PSPS risk ranking



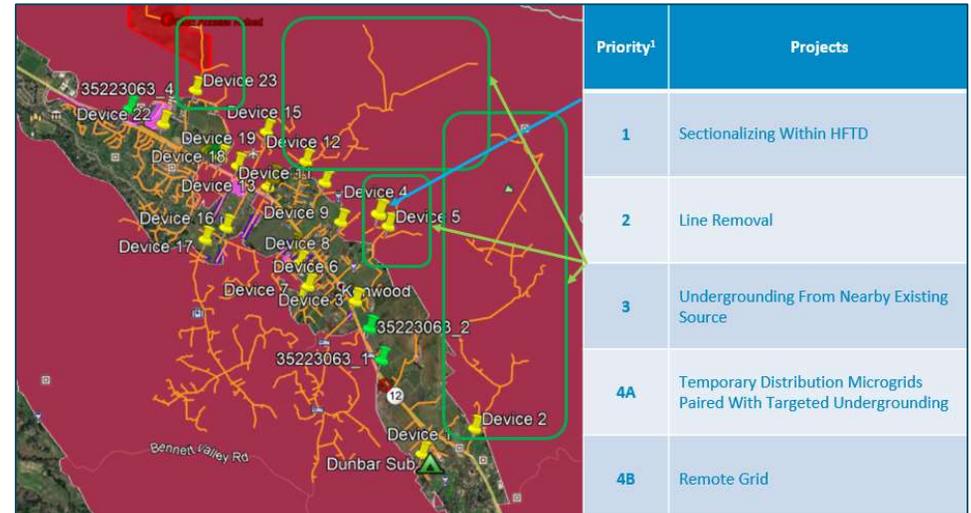
Select mitigations over the planning horizon



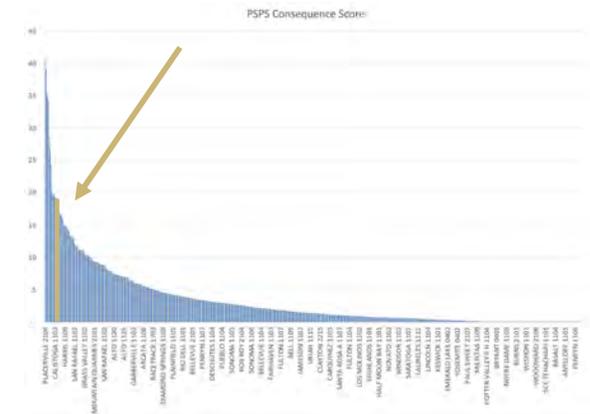
Account for mitigation effectiveness based on upstream impacts



For each circuit, identify mitigation solutions focused on risk reduction & risk spend efficiencies



PSPS Location	Scope #	Scope Cost	Total Cust Saved	Regular Customer	Critical Customer	Cost/Customer	Grid Solution PSPS RSE	Grid Solution PSPS+WF Grid RSE	BTM RSE
10*	Alternative	\$385,000	67	55	12	\$5,746	12.75	13.57	
2	PIH (A)	\$789,000	7	7	0	\$12,457	2.25	2.44	
1*	Alternative	\$131,000	5	5	0	\$26,200	1.07	1.80	
13*	Alternative	\$1,724,000	32	30	2	\$53,875	0.81	1.39	0.45
3	Preferred	\$22,000	1	1	0	\$22,000	1.28	1.28	
18*	Alternative	\$1,610,300	22	20	2	\$73,195	0.70	1.23	0.52
14*	Alternative	\$726,300	8	8	0	\$90,787	0.31	1.02	0.29
12	Preferred	\$6,961,000	67	62	5	\$103,895	0.45	1.02	0.48
23	Preferred	\$4,372,000	22	22	0	\$198,727	0.14	0.80	0.29



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Future Enhancements



Process Development for PSPS Planning for 2022

- Utilizing PSPS model to point teams to plan on high consequence circuits
- Testing out impacts of prioritization and RSE at the project level



Integration of lookback data based on 2021 PSPS Protocols

- Due to the ongoing adjustments of the 2021 PSPS protocols, the same model framework will be updated based on latest available data



PSPS Circuit Segment Consequence Model

- WMP Remedy PG&E 21-05
- Alignment to the Wildfire Distribution Risk Model circuit segments