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With Great Power Comes Great Responsibility: Preparing for Electric Utility De-Energization

Electric line de-energization – the process whereby electric utilities proactively re-route or shut off energy to certain circuits – historically has been used as a last resort, stopgap measure for the southern California utilities when extreme wind and fire conditions prove too precarious to continue flowing electricity over certain high-risk segments of the grid. Upon the adoption of Resolution ESRB-8 in July 2018, the California Public Utilities Commission (CPUC) extended de-energization protocols to all electric investor-owned utilities. De-energization creates a dilemma when contemplating electric utility safety – a safety concern if you keep the power on and downed lines cause wildfires; and a safety concern if you shut off the power and impact communities, first-responders, and customers. An appropriate de-energization protocol must balance these unintended consequences with the benefits brought through wildfire prevention. Yet utilities are being asked to face this dilemma with increasing rapidity and on a case-by-case basis, making the creation of predictable and scrupulous protocols challenging.

The purpose of this hearing is to examine how utilities, state agencies, and local governments maximize public safety during these de-energization events. How do the utilities – and the CPUC – ensure de-energization is used wisely? To what extent are communities preparing for the power being shut off this fire season? How do we ensure de-energization is a temporary, not permanent, tool? California is already in a de-energization regime. The answers to many of these questions cannot wait until all factors are known with certainty. We must create an iterative de-energization process that is refined over time.

Findings

- *The destruction of recent wildfires has left utility and state decisionmakers reaching for every tool available to reduce the likelihood of further power line-caused wildfires. These tools include electric de-energization – the process of shutting off power in fire-prone areas.*
- *Electric de-energization creates a safety dilemma. The CPUC and utilities should work expeditiously to craft de-energization protocols that maximize public safety – ones that reduce wildfire ignitions while minimizing any costs, burdens, or risks imposed on customers and communities.*
- *The CPUC should identify metrics and thresholds to help guide its reasonableness reviews, as well as guide utility and customer risk assessment and planning. It is important to take an iterative approach and set thresholds that enhance, rather than restrict, the judgement of utility decisionmakers.*
- *The CPUC should ensure utilities are de-energizing judiciously; that clear communication occurs before, during, and after a de-energization event; that safety impacts on communities are lessened; and that de-energization is a temporary, not long-term, tool.*

Power Lines and Wildfires

As highlighted by this Subcommittee¹ and others,² wildfire severity in California has grown over the last decade. A number of factors have led to this increased severity: changes to California's climate and weather,^{3,4,5} extraordinary impacts to vegetation and forest health,^{6,7} increased population growth, increased residential development in woodland areas, and increased fire

¹ https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/01-26-18_background.pdf and https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/11-18-15_background.pdf

² "Wildfires and Climate Change: California's Energy Future"; A Report from Governor Newsom's Strike Force; April 12, 2019; https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwi3x4ba0PDjAhW-HjQIHZirD1gQFjAAegQIAhAC&url=https%3A%2F%2Fwww.gov.ca.gov%2Fwp-content%2Fuploads%2F2019%2F04%2FWildfires-and-Climate-Change-California%25E2%2580%2599s-Energy-Future.pdf&usg=AOvVaw2xFSF5B1-_ZBPGajlkApe3

³ National Oceanic and Atmos. Admin. "State Annual and Seasonal Time Series;" (1895-2015) <https://www.ncdc.noaa.gov/temp-and-precip/state-temps/>

⁴ Dept. of Water Resources; "California Climate Science and Data;" June 2015; pg. 3 http://www.water.ca.gov/climatechange/docs/CA_Climate_Science_and_Data_Final_Release_June_2015.pdf

⁵ <http://www.ppic.org/publication/californias-latest-drought/>

⁶ https://www.gov.ca.gov/docs/10.30.15_Tree_Mortality_State_of_Emergency.pdf

⁷

<http://calfire.ca.gov/communications/downloads/newsreleases/2017/CAL%20FIREandU.S%20ForestAnnouce129MillionDeadTrees.pdf>

suppression efforts and forest densification.⁸ All of these trends have greatly increased wildfire risk in California, posing a hazard to people and critical infrastructure.

Over half of the largest, deadliest, and most destructive fires in California have occurred within the last 10-15 years.⁹ The most destructive on record was the 2018 fire season.¹⁰ Electric infrastructure historically account for less than ten percent of wildfires,¹¹ however power line-caused wildfires account for roughly half of the most destructive fires in California history.¹² Several factors contribute to this beyond the already mentioned trends: electric utilities' obligation to serve, requiring stringing power lines through woodland areas; aging infrastructure with slow investment timelines;¹³ and California's strong Diablo and Santa Ana winds that increase the likelihood of damaging electric infrastructure while simultaneously contributing to the spread of any resultant fire. These compounding factors make power line-caused wildfires unlike any other disaster.

Switching It Off: How to Reduce the Likelihood of Power Line-Caused Wildfires

Despite wildfires being characterized as capricious and natural events, many of California's recent fires are marked by human influence. As such, human intervention and management could offer solutions to mitigating fire's associated risks. For power line-caused wildfires, they tend to ignite under high wind conditions that stress utility infrastructure. The electric utilities, as demonstrated in their recently adopted Wildfire Mitigation Plans,¹⁴ have embarked on a number of mitigation strategies to reduce the likelihood of their power lines igniting a fire. One such strategy, only used in Southern California until recently, is electric "de-energization" where utilities proactively cut power to lines. The utilities have adopted the term "public safety power shutoff" (PSPS) to refer to this proactive de-energization.

⁸ Stephens, S.L. et al, 2017. "Drought, Tree Mortality and Wildfire in Forests Adapted to Frequent Fire." *Bioscience* Advance Access XX, 1–38. <https://doi.org/10.1093/biosci/bix146>.

⁹ CalFire redbooks; <https://www.fire.ca.gov/stats-events/>

¹⁰ CalFire report "Top 20 Most Destructive California Wildfires"; Camp Fire (Nov. 2018) listed as most destructive with 153, 336 acres burned and 85 fatalities.

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=2ahUKEwjDu8-P1PDjAhVxFjQIHTiICIYQFjADegQICBAC&url=https%3A%2F%2Fwww.fire.ca.gov%2Fmedia%2F5511%2Ftop20_destruction.pdf&usg=AOvVaw3-UCE39J7vcpTciLeb7o1S

¹¹ CPUC D. 19-05-042, at pg. 3

¹² CalFire report "Top 20 Most Destructive California Wildfires"; Camp Fire (Nov. 2018) listed as most destructive with 153, 336 acres burned and 85 fatalities.

¹³ CPUC Policy and Planning Division; "Utility Investment Valuation Strategies: A Case for Adopting Real Options Valuation;" Oct. 3, 2013;

http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divisions/Policy_and_Planning/Final2RRM.pdf

¹⁴ CPUC OIR 18-10-007

What is the process for a PSPS? Electric utilities routinely de-energize their equipment – via a planned outage – to conduct repairs, upgrade equipment, or respond to emergencies. However, the proactive de-energization contemplated under a PSPS is a recent expansion of these planned outages, specific to wildfire-prone weather events with a likelihood for damaging electrical equipment. Prior to a PSPS event, areas identified as having significant fire risk would, ideally, be segmented into regions where electrical power can be operated independently. Fire severity factors – like wind speed, humidity, vegetation conditions, age or condition of infrastructure – would be available for each segment and monitored on a real-time basis. During a weather event, if factors show that a power line fire is likely to occur in any segment, the electrical power to that segment would be turned off. Care would then be taken – most likely through ground observations – to ensure equipment is functioning and safe prior to re-energizing the segment.

Ensuring PSPS events are as precise and infrequent as possible is dependent upon the utility’s ability to monitor conditions in real-time (via weather stations and ground crews), their having a full understanding of the risks associated with their system, and their system being designed to isolate power losses to as small an area as possible. The utility must also maintain clear communication with customers and first responders before, during, and after a PSPS. Regardless of these protections, removing power brings a number of societal costs and safety risks. These may include:¹⁵

- Disruption to other utilities, such as water or sewage districts or telecommunications providers;
- Increased or severe risk to vulnerable customers, such as the disabled or electrically-dependent populations;

Tools in the Toolbox

As demonstrated in the recently adopted Wildfire Mitigation Plans (R. 18-10-007), California utilities are employing – or piloting – a multitude of strategies to mitigate the risk of their equipment igniting a wildfire. These include:

- Vegetation management*
with larger clearance zones
- Power line inspections*
Manual or automated
- Weather station monitoring
- Pole replacement
Wood-to-steel, coated poles, or accelerated replacement programs
- Equipment to reduce or suppress line energization during a fault
(i.e. disabling reclosers or installing fault current limiters)
- Replacing copper conductors
- Coating power lines
Reduces likelihood of breaking or sparking during wind event or impact with vegetation
- Remote control and data analytics on power lines
(i.e. SCADA or line telemetry)
- Animal abatement
- Proactive line de-energization
i.e. PSPS

*Required by CPUC General Orders

¹⁵ pg. 7 “When to Turn Off the Power? Cost/Benefit Outline for Proactive De-Energization”; Joseph Mitchell, Ph.D.; March 27, 2009; <http://www.mbartek.com/power-lines-fire/17-cost-benefit-outline-for-proactive-de-energization>

- Disruption to critical facilities – police and fire stations, 9-1-1 dispatch centers, healthcare facilities (hospitals, nursing homes, surgical centers);
- Potential for hampered evacuations due to loss of traffic lights, communications equipment, and public transit, and disruption to electric vehicle and shelter power;
- Economic consequences of business disruptions (airports, schools, retail stores, gas stations, and restaurants without power);
- Ratepayer inequities – reliability impacts unequally felt; discrepancies in paying utility charges;
- Incentivizing private generator purchases, which may increase the overall fire risk due to poor maintenance or improper use and may increase greenhouse gas emissions;
- Moral hazard: utilities given an incentive to postpone or cancel needed maintenance and system upgrades;
- Prompting California Independent System Operator (CAISO) grid balancing – PSPS in a fire threat area results in ordered load shedding in an un-impacted area.¹⁶

For these reasons, PSPS creates a dilemma when contemplating electric utility safety – a safety concern if you keep the power on and downed lines cause wildfires; and a safety concern if you shut off the power and impact communities, first-responders, and customers who need constant electricity for medical needs. An appropriate PSPS protocol must account for the unintended consequences of PSPS. As noted by Mussey Grade Road Alliance (MGRA)¹⁷ *“the general problem posed by the issue of utility power shutoff is that it is in the interest of utilities as investor-owned corporations to minimize liability. This is distinct from the Commission’s goal of maximizing public safety.”* A PSPS design must remain focused on maximizing public safety – balancing the reduction of power line fires while minimizing customer impacts.

History of PSPS in California.

In 2008, following the devastating wildfires in San Diego Gas & Electric’s (SDG&E) territory, SDG&E filed an advice letter¹⁸ and subsequent application¹⁹ requesting CPUC approval of proactive de-energization measures SDG&E proposed in its Fire Preparedness Plan.²⁰ The initial decision²¹ denied SDG&E’s application without prejudice, noting:

¹⁶ CAISO “Briefing on California’s Public Safety Power Shutoff (PSPS) program”; John Phipps; July 24, 2019; <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwiJ9-7x7fDjAhXTFzQIHQYZBKwQFjAAegQIAhAC&url=http%3A%2F%2Fwww.caiso.com%2FDocuments%2FBriefing-CaliforniasPublicSafetyPowerShut-OffProgram-Presentation-Jul2019.pdf&usq=AOvVaw1OVzByVg71WeD-UNdPaoll>

¹⁷ Mussey Grade Road Alliance Phase I De-Energization Comments in R.18-12-005; filed March 25, 2019

¹⁸ 2025-E

¹⁹ A. 08-12-021

²⁰ https://www.sdge.com/sites/default/files/documents/SDGE_Fire_Prevention_Plan_2018.pdf

²¹ D. 09-09-030

“SDG&E did not provide any evidence or analysis that shows the benefits from the reduction in the number of power-line fires made possible by its Power Shut-Off Plan exceeds the increase in public-safety risk from wildfires that threaten communities in areas where power is shut off.”²²

The decision instructed SDG&E to engage in a collaborative process with stakeholders in order to develop a PSPS which results *“in a net reduction in wildfire ignitions”* with benefits that *“outweigh any costs, burdens, or risks the program imposes on customers and communities.”²³*

The 2009 decision also noted that its denial did not *“affect SDG&E’s authority under §451 and §399.2(a) [of the Public Utilities Code] to shut off power in emergency situations when necessary to protect public safety.”* This statutory authority provided SDG&E with the ability to shut off power under conditions it deemed hazardous, a position which elicited many stakeholder concerns regarding proper notifications and customer protections during such events. Ultimately, a Petition for Modification (PFM) was filed by the Disability Rights Advocates²⁴ requesting the CPUC clarify that SDG&E must take appropriate steps to warn the public if and when it shuts off power. The subsequent decision²⁵ granted the PFM, affirmed SDG&E’s authority to issue a PSPS during hazardous conditions, and clarified the CPUC’s authority to conduct a post-event reasonableness review of any PSPS decision.

In July 2018, following the devastating wildfires in the fall and winter of 2017, the CPUC issued a resolution (ESRB-8)²⁶ to apply the rules of SDG&E’s de-energization program to all utilities. The resolution additionally ordered utilities to engage local communities in developing de-energization programs and strengthened customer notification requirements. The resolution made clear California utilities’ statutory authority to issue PSPS events.

Utilities are now required to submit a report to the CPUC within 10 days after each announced PSPS event, regardless of whether an actual event occurred. The CPUC is to assess the reasonableness of the utility’s decision to enact a PSPS according, but not limited, to the following factors:

- The utility’s decision to shut off power was necessary to protect public safety.
- The utility relied on other measures, to the extent available, as alternatives to shutting off the power.
- The utility must reasonably believe that there is an imminent and significant risk that strong winds will topple its power lines onto dry tinder vegetation or will cause major vegetation-related impacts on its facilities during periods of extreme fire hazard.

²² Id. Pg. 53

²³ Id. Pg. 59

²⁴ PFM of D. 09-09-030 by DRA; Sept. 7, 2010; A.08-12-021

²⁵ D. 12-04-024

²⁶ <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M217/K801/217801749.PDF>

- The utility must consider efforts to mitigate the adverse impacts on the customers.

Historical data of PSPS events are now listed on the CPUC’s website,²⁷ but only date back to 2017. According to a data request submitted by SDG&E,²⁸ fourteen PSPS reports were submitted by SDG&E to the CPUC from October 2013 to November 2018; in three of these reports, damage to equipment or vegetation contact with equipment were reported. Pacific Gas & Electric Company (PG&E) and Southern California Edison (SCE) have issued reports since autumn 2018. For PG&E’s widely publicized²⁹ PPS in October 2018, PG&E reported extensive damage to electrical facilities.³⁰

Concurrent to the developments in PPS event reporting and customer notification, the CPUC opened rulemaking R. 18-12-005 in December 2018 to examine utility de-energization protocols. The first decision in the proceeding was adopted in June 2019³¹ and updated the notification guidelines of ESRB-8 to clarify first points of contact, necessary information to specific customer groups, and more thorough post-event reporting requirements.

For example, following PG&E’s October 2018 PPS event the CPUC, the California Department of Forestry and Fire Protection (CalFire), and the Governor’s Office of Emergency Services (OES) sent a letter to the Chief Executives of the three major investor-owned utilities outlining specific notification information and real-time data these agencies require during and after a PPS.³² The joint utilities filed a response seven days later asking for clarification on the data needs of the agencies.³³ In the June 2019 PPS decision,³⁴ the CPUC required the utilities to report geographic information system (GIS) data – as requested in the October 2018 joint agencies letter – suggesting the utilities’ requested clarifications have been resolved. The utilities have now established data sharing protocols with the joint agencies and local governments. In its most recently public PPS report,³⁵ PG&E noted a *“secure web portal was established to share maps and information on customers and critical facilities with cities, counties, agencies and critical service providers.”*

²⁷ <https://www.cpuc.ca.gov/deenergization/>

²⁸ SDG&E response to TURN request 1 in R. 18-10-005; and referenced in Citation 18

²⁹ “PG&E Cuts Power in Nor Cal Counties as High Winds Raise Risk of Wildfire”; CBS SF Bay Area; October 14, 2018; <https://sanfrancisco.cbslocal.com/2018/10/14/pge-power-high-wind-warning-wildfire-risk/>

³⁰ Pg. 9; Oct. 31, 2018 “PG&E’s Public Safety Power Shut-Off Event”

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/PGE%20PSPS%20Report%20Letter%2020181031.pdf

³¹ D. 19-05-042

³² Joint Letter from CPUC, Cal OES, and CalFire re: Utility Public Safety Power Shut-Off; October 26, 2018;

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/10.26.18%20-%20Joint%20Letter%20to%20Utilities%20re%20Public%20Safety%20Power%20Shut-off.pdf

³³ Joint Utility Response, November 2, 2018;

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Response%20to%20Public%20Safety%20Power%20Shut-Off%20Letter.pdf

³⁴ D. 19-05-042

³⁵ Pg. 23; “June 21, 2019: PG&E’s Public Safety Power Shut-Off Event Report”;

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/PGE%20PSPS%20Report%20Letter_06-21-19.pdf

The utilities have also filed generalized PSPS protocols within their Wildfire Mitigation Plans (WMPs).³⁶ Table 1 summarizes the various information on PSPS in the WMPs of the three largest investor-owned utilities, based on their February 6, 2019 compliance filings. Those compliance filings were not standardized, so information missing from Table 1 does not necessarily indicate its absence in the overall PSPS strategy of the utility.

Table 1 - PSPS Protocols

	PG&E ³⁷	SCE ¹⁸	SDG&E ¹⁸
Service Areas Included	All distribution and transmission lines at all voltages that traverse Tier 2 and Tier 3 High Fire Threat Districts [beginning in 2019] ^a	All distribution and transmission [beginning in 2019]	
PSPS Decision Factors	Undertakes a “risk-informed methodology” based upon: <ul style="list-style-type: none"> • Declaration of Red Flag Warnings • Low humidity levels (< ~ 20 %) • Forecasted sustained winds (> 25 mph) • Wind gusts (> 45 mph) • Moisture content of dry fuel and live vegetation in area • “Computer simulations of ignition spread and consequence modeling based on current conditions”^b • Real-time field 	<ul style="list-style-type: none"> • Potential impacts to customers and communities • Declaration of Red Flag Warnings • Known local conditions (wind speed, humidity, temperature, fuel moisture, etc.) • Real-time feedback from ground personnel • Input from local and state fire authorities • Ability to re-route power • Expected impact of PSPS on essential circuits • Wildfire activity in other parts of the 	<ul style="list-style-type: none"> • Weather conditions • Vegetation conditions • Field observations • Information from first responders • Flying debris • Meteorology • Expected duration of conditions • Location of any existing fires • Wildfire activity in other parts of the state

³⁶ R. 18-10-007

³⁷ Table data from the referenced utilities’ Wildfire Mitigation plans, as filed on February 6, 2019 in OIR 18-10-007; a) ~25,200 circuit miles of distribution and ~5,500 circuit miles of transmission; PGE at pg. 96; b) being developed for 2019; PGE at pg. 98, footnote 63; c) in pilot phase now with temporary mobile generation, potential for future microgrid development; PGE at pg. 99; d) “PGE would neither own nor operate this equipment, instead helping to facilitate the awareness and benefits an onsite system would provide”; PGE at pg. 103; e) PGE at pg. 95; f) protocols applying to all IOUs, pursuant to D. 19-05-042, Appendix A; g) Comments of SCE on OIR 18-12-006; filed Feb. 8, 2019, pg. 4; h) Comments of SDGE on OIR 18-12-006; filed Feb. 8, 2019, pg. 3; i) to gather, charge cell phones, obtain current information, and obtain water, snacks, or ice; SDGE at pg. 57

	observations	state	
		<ul style="list-style-type: none"> Progress of notifications 	
Threshold established?	No. <i>“No singular algorithm...exists today that yields an objective result”</i>	No. <i>“SCE does not recommend establishing a set of uniform metrics...”^g</i>	No. <i>“...it is not appropriate to use a prescriptive technique to determine when to use PSPS because wildfire conditions are highly dynamic.”^h</i>
Communication Protocols ^f	<ul style="list-style-type: none"> 48-72 hrs in advance : public safety/priority entities 24-48 hrs in advance : all other affected customers/populations 1-4 hrs in advance (if possible): additional notification of all affected customers / populations When PSPS is initiated; immediately before re-energization; and when re-energization is complete : all affected customers / populations 		
Mitigation Strategies	<ul style="list-style-type: none"> Line isolation (i.e. “sectionalizing”) Dedicated areas/facilities protected from PSPS (“Resilience Zones”)^c Facilitating back-up generator sales^d “Enhanced Cooling Centers” [forthcoming] 	<ul style="list-style-type: none"> Line isolation (i.e. “sectionalizing”) Mobile generator deployment for critical facilities [upon request] Vehicles equipped with back-up power (Community Outreach Vehicles) Community Resource Centers [Assessing] Community Outreach and engagement to bolster preparedness 	<ul style="list-style-type: none"> Line isolation (i.e. “sectionalizing”) Opened nine “Community Resource Centers”ⁱ Generator Grant Program [forthcoming]
Re-energization Strategies	<ul style="list-style-type: none"> Helicopter patrols in areas where visibility is not limited Taskforce of employees at each circuit Power restored on a rolling basis (i.e. as soon as an isolated circuit is deemed safe) 	<ul style="list-style-type: none"> Ground patrol circuits to assess any safety concerns prior to restoration Helicopter patrols in areas where visibility is not limited Unmanned Aerial Vehicles to expedite restoration [pilot] 	<ul style="list-style-type: none"> Helicopter patrols in areas where visibility is not limited; ground patrol elsewhere

Alternative Approaches	<ul style="list-style-type: none"> • Fault current limiter • Wires down detection 	<ul style="list-style-type: none"> • Fault current limiter and arc suppression coils; • Advanced fault detection; • Exempt surge arrestors; • Wires down alarm 	
Comments	<p>PG&E notes its program was “modeled...on SDG&E’s [PSPS], as PG&E understands them, to learn from their eight years of experience in this area.”^e</p>	<p>SCE notes it “had pre-established hardening and operational protocols but did modify said protocols based on a number of inputs including industry best practices.”</p>	

Entering the Next Phase

As evidenced by the proposed phase 2 topics in the PSPS proceeding,³⁸ the CPUC still has many issues to untangle in determining the best way to maximize public safety during a PSPS. The additional post-event reporting requirements adopted in the June 2019 decision allows the CPUC to not only understand the circumstances surrounding the individual incidents, but aids in determining the safest path forward for PSPS, especially the requirement that the utility explain “how [it]...determined that the benefit of de-energization outweighed potential public safety risks.”³⁹

Central to the considerations in the subsequent phase of the PSPS proceeding are ensuring:

- Utilities are using PSPS judiciously;
- Utilities and communities have clear communication and coordination before, during, and after a PSPS;
- Safety impacts on communities are lessened; and
- PSPS is a temporary, not long-term, tool.

Judiciously Used. During the PSPS proceeding’s initial scoping memo, the CPUC signaled their intention that PSPS should be “used as a last resort measure to protect the public

³⁸ D. 19-05-042, Appendix B

³⁹ Appendix A; pg. A 24, #7; D. 19-05-042

*safety.*⁴⁰ How the utilities or the CPUC determine whether or not a PSPS was a “last resort measure” remains to be determined. Many parties have commented⁴¹ on the need to create specific metrics or thresholds to guide PSPS decisionmaking. As The Utility Reform Network (TURN) noted in its opening comments: *“the choice to de-energize must be more science than art. While there may be some room for discretion, the majority of the de-energization criteria need to be transparent and objective...”*⁴² The utilities disagreed with this position, referring to the dynamic conditions at play during a PSPS event as limiting the efficacy of thresholds.

After the June 2019 PSPS decision required the utilities to “*determine that the benefit of de-energization outweighed potential public safety risks,*”⁴³ PG&E in its comments on the decision proposed “*to present metrics related to the severity of wildfire risk identified during an event such as the Fire Potential Index, humidity, fuel dryness, the wind levels and possible fire spread rate as well as metrics related to de-energization such as count of customer impacts to various customer types and estimated outage duration.*”⁴⁴ While unique from a threshold determination – factors that must be exceeded prior to a PSPS being called – the reporting and evaluation of metrics used in utility PSPS decisionmaking is a valuable first step.

Established criteria and thresholds could additionally provide better forecasting and transparency to impacted customer groups, many of whom are urgently assessing the risks of a potential PSPS impacting their businesses or medical needs. For large consumers – many of whom are connected directly at the transmission level like silicon manufacturers, the SLAC National Accelerator Laboratory, or oil refineries – financial impacts from a single PSPS event could grow into the tens of millions of dollars and be catastrophic to their business longevity. It is unclear how corporate insurance policies would contemplate such PSPS events, where traditional coverage for power outages could be abrogated due to the planned nature of a PSPS. The development of risk matrices⁴⁵ based on the customer’s likelihood of a PSPS could be helpful to impacted customer groups. Such an analysis, however, is predicated on customers understanding the criteria the utility uses in calling a PSPS.

A determination of threshold criteria seems necessary in order to decide whether a utility used PSPS as a “last resort.” That such threshold criteria be established prior to a PSPS, rather than in a post-event review, seems prudent. Yet it takes time to establish appropriate thresholds, and California’s utilities are already operating in a PSPS regime. Post-event review can provide needed guidance as metrics and thresholds are developed within the PSPS proceeding. According to the CPUC’s PSPS website, the Commission’s Safety Enforcement Division (SED)

⁴⁰ Assigned Commissioner’s Scoping Memo and Ruling, R. 18-12-005; filed March 8, 2019; pg. 4

⁴¹ i.e. Mussey Grade Road Alliance, The Utility Reform Network, and William Abrams.

⁴² “Opening Comments of TURN on the Assigned Commissioner’s Scoping Memo and Ruling (Phase 1);” R. 18-12-005; March 25, 2019; pg. 2

⁴³ Appendix A; pg. A 24, #7; D. 19-05-042

⁴⁴ Pg. 9; “Comments of Pacific Gas and Electric Company (U39 E) on Proposed Decision Adopting De-Energization Guidelines;” R. 18-12-005; filed May 16, 2019

⁴⁵ Fully recognizing the limitations of risk matrices. <https://www.juliantalbot.com/post/2018/07/31/whats-right-with-risk-matrices>

has conducted only one review of PSPS events: the December 2017 PSPS events in SDG&E territory.⁴⁶ The CPUC's timeline for reviewing the other PSPS events to date⁴⁷ remains uncertain, although the CPUC's PSPS website notes the CPUC will perform "*a thorough review of de-energization events as they occur.*"

An additional concern in the establishment of thresholds is the tragic consequences of over- or underestimating; for example, if a threshold was not reached and a PSPS was not called, but a power line fire ignites. Aside from the potential loss of life and property, this scenario has the potential to shift liability to the state. The CPUC must be mindful in setting thresholds that enhance, rather than restrict, the judgement of utility decisionmakers. For example, utility decisionmakers retain discretion but must provide evidence to justify their decision if calling a PSPS in circumstances under the established threshold.

In 2009 MGRA's expert witness, Dr. Joseph Mitchell, issued a report on potential cost/benefit calculations that could be made to determine the need for PSPS.⁴⁸ While acknowledging that the models used in the presented analysis were simplistic and dependent on the input variables, he noted "*...the setting of trigger points that take into account a best estimate of ALL hazards should not wait until all factors are known with certainty, but should be an iterative process that is refined over time as estimates and calculation methods are improved.*" The CPUC should identify metrics and thresholds to help guide its reasonableness reviews as well as guide utility and customer risk assessment and planning. It is important for the utilities to take an iterative approach and set thresholds that enhance utility decisionmaking.

Clear Communication. In the first phase of the PSPS proceeding,⁴⁹ the CPUC largely addressed communication protocols and data sharing before, during, and after PSPS events, although they acknowledged additional refinements may be necessary. Remaining questions include who should be responsible for customer messaging around PSPS in areas served by imbedded municipal utilities or community choice aggregators (CCAs), or how non-residents in the area should be notified. While the utilities have devoted time and resources to educate the public on the increased likelihood of PSPS and its associated impacts, a question for the Legislature to consider is whether this outreach should be specific to the investor-owned utilities. Should critical customer groups – such as hospitals, police stations, chemical plants and refineries, or public transit – receive unique notifications relative to the general customer base, and if so, should the utilities be responsible for delivering that message? Or should local governments identify one or two points of contact that receive communications from the utilities and in turn relay the information downstream? Should critical services impacted during a PSPS,

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http://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/About_Us/Organization/Divisions/News_and_Outreach_Office/May%202018%20SED%20Review%20of%20SDGE%20December%202018%20Deenergization%20Events_.pdf

⁴⁷ Twenty-plus PSPS events to date

⁴⁸ "When to Turn Off the Power? Cost/Benefit Outline for Proactive De-Energization"; Joseph Mitchell, Ph.D.; March 27, 2009; <http://www.mbartek.com/power-lines-fire/17-cost-benefit-outline-for-proactive-de-energization>

⁴⁹ R.18-12-005

such as water or telecommunications systems, notify state and local governments of potential service disruptions?⁵⁰

Additionally, it is important for decisionmakers – while calling for enhanced awareness and operational readiness of the utilities – to be aware of potential partnerships with state and local governments to best maximize resources. As noted in a joint county filing in the PSPS proceeding, *“because the technology that models and monitors weather can be inaccurate, or can fail to present a complete picture of the conditions in specific locations, and because utility personnel cannot be everywhere at all times, the Counties recommend that local government emergency response, fire, or other boots-on-the-ground personnel provide situation reports to PG&E, as possible, during high-fire-risk conditions.”*⁵¹ While the initial decision to call a PSPS – and the notification of that decision – resides with the utilities,⁵² it is important for the Legislature to consider areas where messaging between overlapping jurisdictions and private and public entities may be streamlined to deliver the most effective response.

Impacts Lessened. Alongside considerations of when to call a PSPS, and how to notify customers if one occurs, are strategies of mitigating the impacts of a PSPS event. For example, SDG&E established centers where members of the public impacted by a PSPS can gather and receive updated information, water and snacks, and temporary charging for their devices.⁵³ Other utilities are considering implementing this service.⁵⁴ Such charging shelters, however, might provide little relief for customers dependent on electric service for medical needs or who lack access to transportation.

Utilities are currently working with local governments to identify vulnerable populations. However, such data sharing presents challenges, as reported in the *Wall Street Journal* in April 2019:

*“Conflicting estimates of how many people will be affected can make it hard to plan. In February, a lawyer representing Napa County wrote in a regulatory filing that PG&E told the county there were 150 people on a list of residents who received low-cost electricity because they used medical devices such as motorized wheelchairs and respirators. The state later said there were 1,691 people on the list. Meanwhile, the county had a separate list of 900 residents who needed electricity for medical reasons.”*⁵⁵

⁵⁰ Note: this is currently pending before the Legislature in SB 560 (McGuire, 2019)

⁵¹ Pg. 2; “Comments of the County of Mendocino, the County of Napa, and the County of Sonoma on R. 18-12-005”; R. 18-12-005; filed Feb. 8, 2019

⁵² D. 19-05-042; Findings of Fact #25, pg. 119

⁵³ pg. 8-9; “Comments of SDG&E (U 902-E) in Response to Order Instituting Rulemaking”; R. 18-12-005; filed Feb. 8, 2019

⁵⁴ Pg. 103; PG&E WMP; R. 18-10-007; filed Feb. 6, 2019

⁵⁵ R. Gold and K. Blunt; “PG&E’s Radical Plan to Prevent Wildfires: Shut Down the Power Grid”; *Wall Street Journal*; April 27, 2019.

The CPUC is trying to address these discrepancies by clearly defining access and functional needs (AFN) populations and critical facilities, so that all parties are clear which populations need priority attention.

Other strategies such as line redundancy, sectionalizers – which isolate faulted line sections – or microgrids – which isolate (i.e. island) pockets of generation and load – could provide re-routing capabilities so that vulnerable populations retain power during a PSPS on a neighboring line. While many utilities are exploring such strategies, their deployment is still in the pilot stages.

The most commonly considered mitigation measure is the deployment of back up generators, such as diesel, battery, or solar + storage systems. Large energy consumers that own cogeneration capacity are exploring the ability to run their critical facilities from on-site generation during a PSPS. For customers currently lacking on-site generation, the Legislature may consider whether to fund the deployment of such technology, whether ratepayers or other funding sources should cover the cost, which populations might need priority access to such funding, and whether technical issues with inverter settings may exist and be remedied. Additionally, decisionmakers should be mindful of incentivizing private generator purchases, which may increase the overall fire risk due to poor maintenance or improper use.

Temporary Tool. PSPS is a cultural shift in utility thinking – from the mission of always keeping the lights on, to a mission that *decides* when to keep them on. This suggests the basic tenet of utility service – delivering electricity both safely and reliably – may be internally conflicting in the PSPS regime. It will be important, then, for reliability to remain a principle goal of utility service.

Alongside their PSPS programs, the utilities have proposed billions of dollars in investments to upgrade their electric systems, including targeted pole replacement, wood to steel pole replacement (with higher wind thresholds), replacement of bare overhead wire with insulated (polyethylene coated) wire, and replacement of fuses or switches with low fire risk equipment.⁵⁶ Increasing the overall system strength, replacing aging assets, and reducing risk from vegetation contact improve both safety and reliability. Therefore, the goal of such investments should be to make PSPS obsolete.

Yet it will be a question of what level of investment will be enough. Keeping the goal toward *maximizing public safety*, rather than minimizing liability, will be key. As noted by TURN:

“De-energization is a wildfire mitigation tool that can be utilized immediately, while other mitigation measures are being assessed and implemented. ...The Commission, however, should acknowledge that best practices and future reliance on de-energization

⁵⁶ As PG&E notes on pg. 62 of its WMP (R. 18-10-007; filed Feb 6, 2019): “*replacement of existing primary line equipment such as fuses/cutouts, and switches with equipment that has been certified by CAL FIRE as low fire risk and therefore exempt from vegetation clearance.*”

as a wildfire mitigation tool are subject to continued development as lessons are learned and the system is made safer.”⁵⁷

⁵⁷ “Opening Comments of TURN on the OIR”; R. 18-12-005; filed Feb. 8, 2019; pg. 3

Appendix A

Recent Legislative Proposals Related to PSPS

SB 901 (Dodd, Chapter 626, Statutes of 2018) – among other provisions, requires the utilities in their WMPs to include “*protocols for disabling reclosers and deenergizing portions of the electrical distribution system*”; those protocols must include mitigation as well as notification procedures.

SB 969 (Dodd, Chapter 621, Statutes of 2018) – requires residential automatic garage door openers manufactured for sale, sold, or installed in California on or after July 1, 2019, to have a backup battery that is designed to operate during an electrical outage, and prohibits replacement garage doors from being installed to an opener that does not have a backup battery.

SB 1339 (Stern, Chapter 566, Statutes of 2018) – requires the CPUC, in consultation with the California Energy Commission, and the CAISO, to take specified actions by December 1, 2020, to facilitate the commercialization of microgrids for distribution customers of large electrical corporations. Additionally requires the governing board of a local publicly owned electric utility to develop and make available a standardized process for the interconnection of a customer-supported microgrids, including separate electrical rates and tariffs, as necessary.

SB 167 (Dodd, 2019) – updates the WMP PSPS protocols from SB 901 to include more specificity around impacted customers, including critical first responders, health and communications infrastructure, medical baseline customers, life-support users, and CARE customers, among others. (*Currently in Assembly Appropriations Committee.*)

SB 560 (McGuire, 2019) – expands the protocols required as a result of a de-energizing of electrical lines. Additionally requires telecommunication providers, upon receipt of PSPS notification, to coordinate with appropriate stakeholders for the affected area including, but not limited to, public safety offices, emergency response offices, electrical corporations, local publicly owned electric utilities, and electrical cooperatives. (*Currently in Assembly Appropriations Committee.*)

SB 774 (Stern, 2019) – requires specified actions related to the deployment of microgrids, including requiring exclusive utility-ownership, and, as such, ratepayer funding, of microgrids that are located in the electrical corporation’s side of the electrical distribution grid. (*Currently in Assembly Utilities & Energy Committee.*)

AB 1144 (Friedman, 2019) – requires the CPUC to allocate ten percent (\$16.6 million) of the annual allocation of the self-generation incentive program (SGIP) in 2020 for the installation of energy storage and other distributed energy resources for customers that provide critical infrastructure to communities in high fire threat districts. (*Currently in Senate Appropriations Committee.*)