Docket No.: A.21-06-022

Exhibit No.:

Date: March 30, 2022

Witness: Jin Noh

TESTIMONY OF JIN NOH
ON BEHALF OF THE CALIFORNIA ENERGY STORAGE ALLIANCE

Q: Please state your name and business address.

A: My name is Jin Noh. I am Policy Director of the California Energy Storage Alliance ("CESA"). My business address is David Brower Center, 2150 Allston Way, Suite 400, Berkeley, CA 94704.

Q: Please summarize your professional and educational background.

A: In my capacity as Policy Director, I manage CESA's engagements at the California Public Utilities Commission ("Commission"), California Independent System Operator ("CAISO"), California Energy Commission ("CEC"), California Legislature, Federal Regulatory Commission ("FERC"), and other agencies. I have more than 8 years of experience in policy and regulatory work at these agencies. I hold a Bachelor of Arts in Public Policy Studies and Economics from Duke University and a Master's in Public Policy ("MPP") from the University of California, Berkeley.

Q: Have you ever testified before this Commission?

A: Yes.

Q: On whose behalf are you testifying?

A: I am testifying on behalf of CESA. Founded in 2009, CESA is a non-profit membership-based advocacy group committed to advancing the role of energy storage in the electric power sector through policy, education, outreach, and research. CESA's mission is to make energy storage a mainstream energy resource that accelerates the adoption of renewable energy and promotes a more efficient, reliable, affordable, and secure electric power system for all Californians. As a technology-neutral group that supports all business models for deployment of energy storage resources, CESA's membership includes technology manufacturers, project developers, system integrators, consulting firms, and other clean tech industry leaders.

Q: What is the purpose of your testimony?

A: The purpose of testimony is to provide our recommendations for creating an effective framework for Pacific Gas and Electric ("PG&E") to assess and procure substation microgrid solutions to mitigate outage events, particularly Public Safety Power Shutoff ("PSPS") events. Overall, CESA supports the creation of a framework to assess the need for substation microgrids given the unpredictability of future weather due to climate change and because of the disproportionate and harmful impacts of power outages. Substation microgrids therefore represent a critical resiliency solution that can serve as cost-effective and/or cleaner alternatives. In this testimony, CESA provides feedback on PG&E's proposed framework and how it can be improved to mitigate outages more effectively. We also address some of the key questions and issues for consideration, as raised in the Scoping Memo issued on September 24, 2021.

Q: Why is the development of PG&E's proposed framework important?

A: As highlighted by PG&E, the scope and frequency of reported PSPS events has decreased over the past three years. In 2019, PG&E had over 2,000,000 "instances" of PSPS customer de-energization, but in 2021, fortunately, the number decreased to 80,000 instances of de-energization.[1] Additionally, the use of PSPS is a relatively recent phenomenon, and although the Commission has allowed San Diego Gas and Electric Company ("SDG&E") to selectively de-energize lines to prevent wildfire since 2012, this approach was only extended to the other California utilities in 2018.[2] Although PSPS usage has been reported as decreasing, wildfires continue to be a threat across California, with the largest two fires in California history occurring in 2020 and 2021.[3] Given the quickly changing climate in California, extreme heat,[4] extensive drought,[5] and severe storms[6] are

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[1] *See* PG&E PSPS Reports. https://www.pge.com/en_US/residential/outages/public-safety-power-shuttoff/psps-reports.page
[2] *See* Resolution ESRB-8, *Resolution Extending De-Energization Reasonableness, Notification, Mitigation and Reporting Requirements in Decision 12-04-024 to All Electric Investor Owned Utilities*, issued on July 12, 2018. https://docs.cpuc.ca.gov/publisheddocs/published/g000/m218/k186/218186823.pdf
[3] CalFire, "Top 20 Largest California Wildfires," published on January 13, 2022. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf
[4] Westervelt, Eric. "The Record Temperatures Enveloping The West Are Not Your Average Heat Wave," published in *National Public Radio* on June 19, 2021. https://www.npr.org/2021/06/19/1008248475/the-record-temperatures-enveloping-the-west-is-not-your-average-heat-wave
[5] *See* "Current U.S. Drought Monitor Conditions for California" published by the National Integrated Drought Information System. https://www.drought.gov/states/california
[6] Mulkern, Anne E. "Climate Change Magnified Recent California Deluge," published in *Scientific American* on October 27, 2021. https://www.scientificamerican.com/article/climate-change-magnified-recent-california-deluge/

predicted to become more common.[7] Last year, 2021, saw record rain in October and snow in December, both causing power outages in PG&E territory,[8] which was followed by unusual and historic dry months in January and February.[9]

This fast-changing environment highlights how the need for resiliency solutions will likely persist in the long term. Notwithstanding our questions about how the scope and frequency of PSPS events are being reported or framed in PG&E's Supplemental Testimony, the criteria by which the Commission and PG&E assess the need for substation microgrids should not be solely measured by historical PSPS events but rather a forecast of future climate and grid conditions. It is thus worth considering how this framework can be used to mitigate outages beyond PSPS events by identifying both microgrid and grid-based solutions. We recognize that substation microgrids are not the solution for all such needs, but they should remain a critical part of the toolkit when assessing the nature of the need as well as the costs, capabilities, and environmental attributes of various options (*e.g.*, traditional "wires" solutions, grid hardening, temporary generation).

Q: Please summarize your testimony.

A: In testimony, CESA elaborates on how a framework is an appropriate methodology for transitioning away from temporary generation in line with D.21-01-018. A framework approach can allow PG&E to routinely assess risks and make appropriate investments to mitigate emerging events and reduce reliance on temporary diesel generation. However, we elaborate that PG&E's current proposal based on analysis of historical weather may not be reflective of future conditions and therefore not adequately determine substations

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[7] See "Statewide Summary Report" from *California's Fourth Climate Change Assessment,* published on January 16, 2019. https://climateassessment.ca.gov/

[8] "Much of Bay Area's Power Problems Resolved Before Monday" published in *NBC Bay Area*, updated on October 25, 2021. https://www.nbcbayarea.com/news/local/pge-responding-to-weather-related-power-outages-across-bay-area/2699342/. Also, "PG&E says power could be out through early January | Maps and outage updates" published in ABC10, updated on December 31, 2021. https://www.abc10.com/article/news/local/california/pge-outages-sierra-still-without-power-maps-and-updates/103-685f6bf3-895b-43bb-b0f9-dcc56da7d392

[9] Leonard, Diana. "California endures one of its driest January and February stretches as drought worsens," published in *The Washington Post* on March 1, 2022. https://www.washingtonpost.com/weather/2022/03/01/drought-california-record-dry-february-january/

that are at risk of persistent PSPS or other outages for three years. CESA also recommends that PG&E expand this framework to consider emerging risks beyond PSPS, such as actual wildfire, that are impacting customer reliability. Similarly, we suggest that PG&E consider the wide variety of outages that can be mitigated and/or blue-sky services that can be provided by any microgrid solution.

CESA also asks clarifying questions surrounding the treatment of storage in the proposed emissions standard and how PG&E will consider changing modeling outputs in investment decisions. In terms of evaluating microgrid solutions, we recommend flexibility when considering the incorporation of demand response ("DR") solutions and regional mitigation strategies. Lastly, we make brief comments on the impact of this framework on environmental and social justice communities.

Q: Is PG&E's proposed framework for substation microgrid solutions a reasonable strategy to mitigate substation-level PSPS impacts and should supersede the interim approach set forth in D.21-01-018?

A: Overall, the concept of a framework that can be used to determine future risk of PSPS and evaluate whether solutions to those events, including substation microgrids, are appropriate and reasonable. CESA believes that the flexibility in choosing a framework to conduct analysis on a routine basis can help PG&E incorporate changing conditions, such as weather or load, to identify future outage risk, as opposed to a one-time study that reduces the ability for PG&E to be proactive in identification of outage solutions. For example, this year, PG&E conducted an analysis following the methodology outlined in this framework, finding that no microgrids met the criteria for temporary generation deployment in 2022; therefore, PG&E is not requesting temporary generation at substations to mitigate PSPS in 2022.[10] However, this does not indicate that PSPS risk will not re-emerge, or that other outage risks do not continue. For this reason, CESA supports the creation of a

[10] PG&E Advice 6486-E, *Reservation of 2022 temporary generation and associated makeready improvements for the purposes of mitigating Public Safety Power Shutoff events and system capacity shortfalls*, submitted on January 31, 2022. https://www.pge.com/tariffs/assets/pdf/adviceletter/ELEC_6486-E.pdf

framework to evaluate ongoing risk and expanding that framework to consider other outage risk, particularly in areas with historically low reliability.

However, the framework outlined by PG&E in its Application is quite similar to the interim approach set in D.21-01-018. In the Decision, the Commission allows utilities to reserve temporary generation less than 120% of the coincident peak deployment of the previous year or a fleet justified using, "a. Historical meteorological data showing probability of public safety power shutoff. b. Historical outage data. c. Fire spread modelling and incorporation of consequences to customers. d. Transmission asset condition information; and e. Transmission operability assessment information."[11] The framework PG&E has proposed is based on historical meteorological data, fire spread modeling, and asset conditions, both present and future, and, in this sense, extends the approach of the interim methodology.

While a framework that can be used to regularly assess outage risk is helpful, CESA questions whether the particular framework as outlined in PG&E's Prepared Testimony will reasonably capture future risk and help PG&E transition away from an interim approach to one that can regularly assess the need for substation microgrid solutions. While historical trends and performance can be an indicator of future needs, it may not be sufficient when looking ahead to future conditions where climate change impacts and extreme weather events persist and exceed past expectations.

Q: Is PG&E's proposed framework compliant with D.21-01-018 requirements to transition to cleaner backup power?

A: D.21-01-018 set a requirement that any IOU seeking to reserve temporary generation for 2021 must file an application with the "utilities' plan for transitioning to clean sources of generation in future years to power customers during PSPS events."[12] Additionally, the application should provide a list of substations where PSPS will persist for three years or longer and, "must detail the utility's plan for generation investments,

[11] D.21-01-018 at A-2.
[12] D.21-01-018 at A-6.

justified with a comparative analysis of alternatives considered, the expected persistence of the need and why it will not be reduced or eliminated by other infrastructure investments, and its proposed procurement framework."[13]

In its Application, PG&E has not proposed any particular grid investments but has instead presented a proposal for a framework to evaluate whether substations are at risk of PSPS, whether a microgrid is the most cost-effective solution, and how to procure these solutions. However, PG&E has currently not proposed any temporary substation generation for 2022[14] and under its proposed methodology identifies no substations where microgrids will be deployed currently.[15] Given this lack of specific proposed microgrids or investments, it is not clear whether PG&E's Application and framework comply with D.21-01-018. Concerns surrounding the adoption of a framework that has never been fully executed are understandable; however, CESA believes that a framework approach complies with the intention of the decision by providing details on how investments will be evaluated, without the need for specific investments that are rushed. In 2022, PG&E has not proposed to use temporary generation at substations for PSPS; therefore, there are no specific substations that need to be transitioned currently. However, given that needs may arise in the future, the creation of a framework will allow PG&E to conduct analyses and submit investment plans to the Commission in a manner that has been vetted by parties and approved by the Commission.

At the same time, CESA sees several shortcomings of the methodology that PG&E is using to determine whether substations are at risk of PSPS and has additional questions surrounding the application of the proposed emissions standard. Notwithstanding needs for modifications, CESA believes that a framework approach generally complies with D.21-01-018 given PG&E's current position.

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[13] D.21-01-018 at A-6.
[14] *See* PG&E Advice 6486-E at 1.
[15] *See* PG&E Substation Safety Information Supplemental Testimony, served on January 31, 2022, at p. 8, lines 4-10.

Q: Is PG&E's proposed framework reasonable for determining substations most likely to be impacted by transmission-related PSPS outages?

A: Recent reductions in PSPS usage is encouraging and represents movement in the right direction. However, some customers are still experiencing multiple PSPS events during the season, with outages still lasting multiple days.[16] Furthermore, as mentioned early, in the face of climate change, outages resulting from various causes will continue to affect customers, and PSPS may even re-emerge as a necessary measure to reduce wildfire risk. Although the climate change is dramatically changing future wildfire risk, Step 1 of PG&E's proposed framework for determining ongoing PSPS risk is based on a historical weather analysis looking at the previous ten years, where PG&E will consider whether *past* weather will trigger PSPS given *current and future* grid conditions. While this approach was recommended by the Commission for assessing interim, temporary generation needs, it does not consider how future weather patterns will impact PSPS, whether outage risks reemerge over time, and where it may be reasonable to procure substation microgrid solutions now, given the lead time necessary to procure cleaner and more permanent solutions. Additionally, considering substation microgrid solutions can be permanent in nature, an assessment of future grid conditions and needs are critical to determining whether such a solution is needed after all.

D.21-01-018 only requires that PG&E consider substations where, "transmission related PSPS outages are expected to persist for 3 years or longer."[17] In determining whether outages will persist in the future, PG&E should consider weather that is more likely to reflect future weather conditions. This may be done by continuing with a 10-year historical lookback but creating criteria that emphasize PSPS occurring in the most recent years. For example, if one event happens in the most recent year of the historical analysis, then that substation will go through the following steps to consider whether a microgrid is appropriate, instead of considering 10 events over 10 years. Alternatively, modeling can be done using predicted weather patterns and substations can be

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[16] For example, the Corning 1101 Circuit was de-energized during PSPS events on August 17-19 and September 20-21, 2021, with events lasting 41 and 18 hours respectively. *See* PG&E PSPS Reports. https://www.pge.com/en_US/residential/outages/public-safety-power-shuttoff/psps-reports.page

[17] D.21-01-018 at A-6.

evaluated that meet the Commission's criteria of having PSPS events that continue at least 3 years past the year of evaluation. CESA recommends conducting this type of analysis to consider whether PSPS events may emerge in the future, even if none would be triggered given previous weather conditions. In this scenario, needs that emerge in the future may not need temporary solutions for the immediately following years, and PG&E can instead focus on procuring a longer-term, clean solution for anticipated needs.

CESA also questions why PG&E chooses to prioritize the number of PSPS events and only those events with over 100 safe-to-energize ("STE") customers. Neither of these metrics capture the importance of the duration or severity of the PSPS event. Instead of focusing on the number of PSPS events, which should be better defined,[18] reliability metrics that consider the duration of the outages experienced by customers, such as metrics based on the System Average Interruption Duration Index ("SAIDI"). To this end, PG&E could establish a certain threshold duration metric that signifies severity of event (*e.g.*, average customer experiencing an outage more than 8 or 24 hours).

Lastly, CESA recommends that PG&E and the Commission consider extending this framework approach to consider non-PSPS, weather-related outages as well, such as those caused by wildfires themselves, rain, and snow. For example, of the top 10 major unplanned power outage evens of 2020, the largest event was the August wildfire complex itself, which was caused by lightning.[19] Also in the top 10 were outages caused by 3 PSPS events, two snowstorms, two rainstorms, one instance of extreme wind, and one heat wave. As highlighted by PG&E, 17 out of 19 of PG&E's worst performing circuits are located in high-fire threat districts ("HFTD").[20] While PG&E may proactively de-energize transmission lines through PSPS to reduce wildfire

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[18] What constitutes a PSPS event should be defined, especially since it is being used as a screening criterion within the proposed framework. PSPS reports are defined by weather events and associated de-energization. However, in the context of the Self-Generation Incentive Program ("SGIP") in R.20-05-012, for example, there was confusion surrounding the difference between PSPS events and de-energization due to actual wildfire. PSPS events are also defined with no respect for duration, with separate PSPS events being counted any time customers are re-energized and de-energized again, "whether this occurred days, weeks or months later." D.21-06-005 at 65.

[19] PG&E *2020 Annual Electric Reliability Report* submitted July 15, 2021 at 300. https://www.pge.com/pge_global/common/pdfs/outages/planning-and-preparedness/safety-and-preparedness/grid-reliability/electric-reliability-reports/CPUC-2020-Annual-Electric-Reliability-Report.pdf

[20] *Ibid* at 285.

ignition risk, transmission lines can also be de-energized or directly impacted by outage in response to active wildfire caused by non-electric sources. In addition to modeling whether PSPS is triggered based on wildfire consequence, PG&E should consider the likelihood of fire ignition by non-electric causes and consequence of a wildfire related outage or de-energization. To the extent that other weather events, e.g., snow or rain, are determined to likely cause outages, CESA recommends that they be incorporated as well. PG&E can then apply the same evaluation criteria to determine whether all events, PSPS and non-PSPS combined, meet criteria for the number of outage events, impacted customers, and event duration scores.

Q: Is PG&E's proposed framework reasonable for comparing substation microgrid solutions against other PSPS mitigation alternatives?

A: In its framework, PG&E outlines how it will assess whether other solutions are appropriate for mitigating PSPS events, including transmission line repairs, transmission line switching, transmission right of way ("ROW") expansion, targeted fall-in tree removal, rebuilding of transmission lines, relocating transmission lines underground, and transmission system expansion.[21] After finding that planned grid investments do not mitigate PSPS events, a site-specific analysis of alternative solutions would be conducted. PG&E shares an example of how this type of analysis would be done by providing a similar analysis done for substations impacted by PSPS in 2019 that considers other mitigation efforts, whether they would reduce PSPS, and their cost versus a microgrid solution.[22]

While CESA considers this methodology to be reasonable in comparing PSPS mitigation and costs, PG&E should expand comparisons of alternatives to consider their ability to mitigate different types of outages and consider whether alternatives can cost-effectively provide multiple services during blue-sky operations, such as increased system or local distribution capacity. Estimates for the value of services that can be provided by the solution, either the grid-based solution or microgrid, could be credited against the estimated cost of that

[21] PG&E Prepared Testimony at p. 3-2, lines 22-28.
[22] *See* PG&E Prepared Testimony Chapter 3, Attachment A.

solution in some cases or highlight value-stacking opportunities that third parties can take advantage of in other cases.

Q: Is PG&E's proposed emissions standard reasonable and should it supersede the interim emission standards set forth in D.21-01-018?

A: Overall, PG&E's proposed emissions standards are reasonable, and CESA agrees that the mix of DERs used in the substation microgrid should reduce PM and NOx emissions compared to a Tier 2 diesel engine by at least 90 percent, in line with the interim standards set in D.21-01-018. Lifecycle greenhouse gas ("GHG") emissions of the microgrid should also be below grid power at the time of contract execution, at a minimum, to contribute to California's climate goals.

CESA appreciates the detail in PG&E's Supplemental Testimony on the emissions standard and how different engines would qualify or not under the standard. However, there is still ambiguity surrounding the treatment of storage in the emissions standard. CESA assumes that storage charging from microgrid generation devices will be evaluated with the GHG profiles of that generation. However, it is unclear how PG&E will evaluate GHG emissions from grid charging, which seems to be allowed under PG&E's proposal. While any generation or storage must be "capable of running on renewable fuels",[23] there is no requirement that devices solely use renewable energy. While grid charging for use in islanded mode will be limited, PG&E will be executing contracts for blue-sky services, during which storage charging from the grid may be more common. Given that microgrid emissions are calculated on a lifecycle basis,[24] CESA's understanding is that blue-sky operations will be considered in lifecycle emissions, and therefore that grid charging will need to be considered. In order to consider GHG emissions from grid charging, CESA recommends that PG&E consider expected charging patterns in line with expected wholesale market energy operations and/or contract obligations, such as Resource Adequacy ("RA") Must-Offer Obligations, and calculate marginal GHG emissions during expected

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[23] PG&E Prepared Testimony at p. 4-14, lines 3-5.
[24] *See* PG&E Supplemental Testimony served October 15, 2021, Chapter 4S.

charge-discharge cycles. For simplicity, a detailed emissions analysis of grid-charging energy storage operations may not be necessary if energy storage is integrated in the wholesale market during blue-sky operations, which will represent the majority operations, given the strong correlation of wholesale market prices and marginal GHG emissions rates in California.[25]

Q: Is PG&E's proposed procurement framework reasonable?

A: Once a substation-level microgrid is determined to be an appropriate solution, PG&E's methodology for procurement generally seems appropriate, including separate considerations for temporary single-season solutions and multi-season solutions, as CESA agrees that clean, multi-season solutions may need additional time to develop and construct. CESA also agrees that an expedited Request for Offers ("RFO") schedule will be needed for interim, single-season solutions. For multi-season solutions, additional yet streamlined consideration for community needs and consideration for the multiple products and services that can be offered is appropriate. If needs are determined to emerge in the future but not in the upcoming season, CESA encourages PG&E to move straight to an RFO for the multi-season solution.

However, it is unclear how PG&E will evaluate changing scenarios, particularly given that this framework is sensitive to weather/fire conditions and other modeling input/assumption updates. Sensitivity to modeling parameters has already been shown through PG&E's existing Prepared Testimony in this Application. Between PG&E's original Prepared Testimony submitted in June 2021 and Supplemental Testimony submitted in December 2021, the predictions of impacts to substations changed drastically, with only one substation, Clear Lake, appearing in the both the top ten most impacted substations in both analyses.[26] Brunswick Substation was

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[25] As highlighted by the Commission in Resolution E-5142 at 11, "Energy storage resources can store inexpensive power, often generated by zero marginal cost renewable generation, and release it at later times when prices are higher. Those higher prices are often set by gas fired generation." Due to the highly correlated nature of GHG emissions and CAISO wholesale market prices, CESA recommends that PG&E use market prices as a proxy for GHG emissions.

[26] PG&E Prepared Testimony at p. 2-AtchA-8 to 2-AtchA-11; PG&E 10-Year Historic Lookback 2021 Update Supplemental Testimony, served on December 17, 2021, at p. 7-9.

found to have 14 PSPS events with 100+ STE customers in the original analysis but only 4 events with 100+ STE customers in the updated analysis.[27]

Given the changes that can happen between modeling cycles, if a microgrid has been procured for a particular substation, will that substation continue to be included in the next year's evaluation? Additionally, what will happen if there are changes to the modeled grid need after a microgrid has already been procured (*e.g.*, estimated PSPS duration increases or decreases)? CESA recommends that once an RFO has been put out for solicitation, that no changes be made, as any "moving target" issue due to forward uncertainty will make any procurement challenging. By reference, these complications have been seen in RFOs released under the Distribution Investment Deferral Framework ("DIDF"), where changing energy and capacity requirements, as well as costs, have made procurement difficult.[28] If future PSPS needs are uncertain, CESA recommends that PG&E more heavily consider offers that can provide other services or provide non-PSPS-related resiliency, which anchors the substation microgrid solution in delivering other key value streams to impacted customers and ratepayers at large and reduces the risk of any stranded investment.

Q: Is PG&E's cost recovery and allocation framework, subject to the review of the specific substation-level microgrid solutions and contracts via advice letter filing, reasonable?

A: Yes, approval of a specific framework will give the Commission confidence surrounding the process that PG&E will use to determine needed investments. Given changing grid needs and circumstances, regular solicitations may be needed, and expeditious contract approval will be critical to addressing near-term needs and reducing the burden of outages on customers. Requiring PG&E to formally open an application for every year of analysis and formally engage with parties will very likely lead to delays and increased reliance on temporary solutions. Instead, the Commission and interested parties can have adequate oversight via the Advice

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[27] *Ibid*.
[28] For example, the DIDF Independent Evaluator found that for Southern California Edison's 2020 DIDF RFO, "the largest challenges in the evaluation arose from the changes that occurred throughout the RFO process." Southern California Edison Advice 4316-E at Appendix D p.26.

Letter process. With sufficient and detailed upfront procurement parameters, an Advice Letter filing process best balances the need for expediency while having guardrails and guidance in place to realize the intent and goals of D.21-01-018 and to align with other Commission policies and principles.

Q: Is it reasonable to develop new Demand Response programs, or use existing Demand Response programs, under circumstances in which all of the following are true: (1) a substation is both intended to be, and actually is, energized during PSPS via a microgrid; (2) the distribution feeder serving a particular enrolled demand response customer or set of customers is safe to energize; and (3) enrolled demand response customers fall within the microgrid and safe to energize boundaries?

A: It is reasonable to consider how DR can be incorporated into the design of a substation microgrid in order to reduce costs of a microgrid solution or create a more flexible solution that can last different durations depending on load. However, existing DR programs are not well adapted for use in microgrids given their integration with the CAISO market (*e.g.*, the Capacity Bidding Program [“CBP”] and resources procured through the Demand Response Auction Mechanism [“DRAM”]), or status as pilot programs (*e.g.*, Emergency Load Reduction Program [“ELRP”]). Overall, PG&E’s Base Interruptible Program (“BIP”) seems to be the best fit for managing load during a PSPS event given that this is an IOU program and there is flexibility to call events during transmission system contingencies. While CESA encourages PG&E to consider how BIP may be leveraged to reduce the needs of a substation microgrid, BIP is limited in scope given that only customers with peak demands over 100 kW are eligible to participate.

Creating a new DR program may be difficult given that the need for substation microgrid solutions is unknown. However, DR may be able to be used flexibly in a manner similar to the DIDF Partnership Pilot. In this type of framework, DR would be contracted for a specific operational profile compatible with the rest of the microgrid portfolio. The simplest way for PG&E to allow for participation of DR is to evaluate it within the portfolio submitted as a part of a bid. This will give DR providers flexibility to consider the local DR portfolio and payments need to achieve particular load shapes.

Q: Should PG&E's proposed framework include consideration of regional mitigations involving multiple substations?

A: Considering regional mitigations of outages at multiple substations may increase cost-effectiveness by leveraging large projects that can serve hundreds or even thousands of MWs of load. There could be benefit in economies of scale and could be viewed in some ways as reducing complexity by having one point of development and operation rather than a portfolio of substations. However, CESA is cautious about the technical challenges surrounding this approach given islanding considerations and risks of larger outages if equipment or devices fail. If multiple, connected substations meet the criteria for microgrid evaluation, it may be appropriate for PG&E to consider whether a regional microgrid is an appropriate solution for outages in that area. This could be done by following the subsequent alternatives analyses on the portfolio of substations. There could also be an added step considering the relative costs of single substation microgrid versus regional solutions. Multiple RFOs could also be released to compare offers for single versus multiple substations.

Q: Is PG&E's Substation Microgrid Proposal reasonably consistent with and coordinated with its Wildfire Mitigation Plan?

A: In the framework, PG&E will consider how investments outlined in their Wildfire Mitigation Plan ("WMP") will affect the need for microgrids substations by creating three planning scenarios based on 3-, 5-, and 10-year planning horizons. Within each of these scenarios, planned grid investments, including those outlined in the WMP, as well as the General Rate Case ("GRC") or other proceedings will be included. CESA believes that this is a reasonable way to incorporate planned grid investments that are likely to be developed. The development and evaluation of these scenarios will allow for evaluation of whether these investments will impact or mitigate PSPS risk.

However, as highlighted by PG&E, the WMP is "focused on the core objective of wildfire risk mitigation,"[29] with a reduction in PSPS as a consequence, given that PSPS is triggered to reduce wildfire

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[29] PG&E Prepared Testimony at p. 3-7, lines 13-14.

ignition risk. CESA suggests that, generally, PG&E consider not only how investments in the WMP may impact the need for microgrids, but also how substation-level microgrids impact broader needs for mitigation measures.

Q: Is PG&E's Substation Microgrid Proposal reasonably consistent with and coordinated with PG&E's publicly announced intention to underground 10,000 miles of overhead electric lines?

A: As highlighted above, CESA believes that PG&E proposes a reasonable approach to incorporate planned grid investments. It is CESA's understanding that PG&E's intention to underground overhead electric lines will be manifested in its WMP. To the extent that these plans are specified in the WMP and impacts on specific substations can be identified, undergrounding lines should be incorporated into planning scenarios. If plans to underground overhead electric lines are not incorporated into the WMP or other planning proceeding, CESA encourages PG&E to timely develop plans in the appropriate venues, which can then be incorporated into the planning scenarios outlined in the Microgrid Framework.

Q: To what extent does PG&E's Application align with or impact environmental and social justice communities including the extent to which PG&E's Application impacts achievement of any of the nine goals of the Commission's Environmental and Social Justice Action Plan?

A: Currently, PG&E's Application does not explicitly consider the impact it will have on environmental and social justice ("ESJ") communities. Nowhere in the evaluation criteria will PG&E consider whether substations are serving ESJ communities. However, to the extent that PG&E does deploy clean solutions that reduce outage impacts in ESJ communities, this Application will help achieve Goal 2 of improving local air quality, by installing clean energy microgrids and reducing reliance on polluting temporary generation, and Goal 4 of increasing climate resiliency by reducing outage events for these communities. However, PG&E can further progress towards these goals by prioritizing solutions for substations in ESJ communities experiencing outages and expanding this framework to evaluate solutions for areas with historical lower levels of reliability.

Q: Does this conclude your testimony?

A: Yes. I appreciate the opportunity to submit this testimony on behalf of CESA.

Appendix A:

Declaration in Support of Testimony of Jin Noh on Behalf of the California Energy Storage Alliance

DECLARATION IN SUPPORT OF TESTIMONY OF JIN NOH ON BEHALF OF THE CALIFORNIA ENERGY STORAGE ALLIANCE

I, Jin Noh, am the Policy Director for the California Energy Storage Alliance (CESA). Having worked for CESA for over six years, I am currently managing policy and regulatory affairs for CESA and its over 100 member companies. My business address is 2150 Allston Way, Suite 400, Berkeley, CA 94704. I declare under penalty of perjury that the foregoing facts in this document are true and correct to the best of my knowledge.

Executed on March 30, 2022 at Berkeley, California.

Jin Noh