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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies.	Rulemaking 19-09-009

ASSIGNED COMMISSIONER AND ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENT ON POLICY QUESTIONS AND AN INTERIM APPROACH FOR MINIMIZING EMISSIONS FROM GENERATION DURING TRANSMISSION OUTAGES

Summary

This ruling solicits comment from interested parties on overall policy questions related to utility deployment of temporary generation and alternatives to diesel fuel and technology for the purpose of providing power to customers at safe-to-energize substations during transmission outages. It also solicits comment on two specific : (1) an interim approach for minimizing the emissions associated with providing temporary power at substations in 2021 while ensuring reliability at just and reasonable rates; and (2) a process for completing the transition to clean technologies and fuels in future years.

Parties who wish to provide formal comments in response to this ruling must file and serve them no later than Friday, September 18, 2020. Opening comments shall not exceed 30 pages. Reply comments must be filed and served no later than Friday, September 25, 2020. Reply comments shall not exceed 20 pages.

1. Background

On July 3, 2020, the assigned Commissioner issued a Scoping Memo and Ruling for Track 2 of this proceeding. The Track 2 Scoping Memo and Ruling focused on resolving the complex issues of commercializing microgrids pursuant to Senate Bill 1339.

Additionally, the Track 2 Scoping Memo and Ruling states that this proceeding may address an array of other topics identified from Decision 20-06-017, which includes activity to shape a transition from diesel generation for backup power during a grid outage toward alternative backup power generation. The schedule of activities set forth an Energy Division Workshop for a diesel alternative discussion.

On August 25, 2020, Energy Division held an all-day online public workshop discussing the challenges and demands associated with energizing safe-to-energize substations during public safety power shutoff events. Officials from the Commission as well as the California Air Resources Board and the California Energy Commission were present.

Following this workshop, this ruling solicits stakeholder comment on the items below, concerning utility deployment of temporary generation and alternatives to diesel fuel and technology and two proposals: (1) an interim approach for minimizing the emissions associated with temporary energizing substations to serve customer loads in 2021 while ensuring reliability at just and reasonable rates; and (2) a process for completing the transition to the use of non-diesel for energizing to customer loads during transmission outages in future years. Temporary generation in this context is a resiliency strategy to help keep the lights on during a public safety power shut off or a grid outage.

2. Request for Formal Comments

2.1. Topics Regarding Emerging Energy Resource Alternatives

To aid the Commission and the public's understanding about the use, reliability, and deployment of emerging diesel alternative technologies and fuels, this ruling directs parties to this proceeding to discuss their positions in response to the questions below. When formally responding to this ruling, parties are directed to file and serve their comments in the same order in which the questions are presented in this ruling below. Finally, attached to this ruling (Attachment A) is the Challenge Statement from the August 25, 2020 Diesel Alternatives Workshop and a proposal outlining an interim approach for 2021 and a process for transitioning to clean temporary generation in 2022 and beyond (Attachment B).

2.1.1. General Policy Questions

1. Regulatory Simplicity & Ratepayer Maximizing Ratepayer Benefit: Are there duplicative efforts relating to infrastructure hardening and resiliency planning occurring between this proceeding, Rulemaking (R.) 19-09-009, and other proceedings such as R.18-10-007, the Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901, or general rate cases, that could expose ratepayers to either duplicative or excessive costs?
2. Energy Resource Cost Effectiveness & Reliability: What fuel and technology resources should the Commission consider, as preferred solutions that reduce reliance on diesel for providing power during transmission outages?
    a. Discuss the costs and benefits for each of the proposed resources;
    b. Discuss the cost implications for each of the proposed resources at utility scale;

c. Discuss the greenhouse gas (GHG) reduction benefits for each of the proposed energy resources;

d. Discuss any constraints or adverse local community impacts the proposed energy resources present;

e. Discuss the availability of alternative deisel fuels for each of the proposed energy resources (including whether in-state procurement is feasible) such as natural gas, renewable natural gas, biodiesel, and renewable diesel. Include impacts such as in-state procurement versus out of state procurement, and the need for proximity to other infrastructure (for example, a gas line);

f. Discuss the quantity and capacity available of the proposed alternative fuel resources that can be readily deployed in 2021;

g. Discuss whether these proposed energy resources have been used for electric utility reliability and/or resiliency in the context of natural and/or man made disasters. This discussion consider should consider population size, demographics, and scale comparable to that of California;

h. Discuss any land acquisition needs including requirements for CEQA review and use permits including authority to construct and permits to operate by air pollution control districts;

i. Discuss any durability requirements that may need to imposed to ensure that a resource can withstand extreme conditions; and

j. Discuss the portability and deployment of the resource and the number of hours of notice necessary to fulfill reliable deployment for immediate customer use? Alternatively, does the resource require permanent installation?

3. Cost Implications: What weight should the Commission give to cost when weighing the need to transition to preferred resources for resiliency? How should alternatives be evaluated for their costs and benefits? How should those costs be allocated and collected?

4. Continuity of Safe and Reliable Service: Is it reasonable for a utility currently relying on fleets of diesel generation to serve substations loads during a transmission outage, to transition incrementally or entirely to: (a) alternative fuel resources by September 1, 2021, or (b) alternative energy resources by September 1, 2021; while ensuring safe and reliable service to customers during an emergency?

2.1.2. Investor-Owned Utility Questions

1. Logistics and Technical Requirements: What technical requirements must any substation-level generation resource meet? What are the logistical challenges for portable solutions deployed during PSPS events?
2. Third-Party Access: Is it reasonable to allow third-party backup generation to interconnect at substation buses and to authorize third parties to place the third party owned equipment on utility substation property? What, if any, security risks would this present? Could any mitigation measures be placed to reduce risk?

2.1.3. Alternative Resource Proponent Questions

1. Portability: Rather than a permanent, stationary presence at a substation, can a diesel alternative resource be optimized as a mobile or portable solution? Please respond with a "yes" or a "no". If yes, please provide and discuss the schedule, scope of product design, any manufacturing adjustments, and fueling/refueling logistics. If no, discuss your reasoning.
2. Testing at Scale: Discuss the testing and scale of the diesel alternative energy resource that the Commission is being asked to consider. In your discussion, you must state: (a) the extent to which this alternative energy resource has been deployed during a natural disaster or man-made emergency (*i.e.*, earthquake, wildfire, *etc.*); (b) the demographics of the population the alternative energy resource served during this emergency; (c) the context of the regulatory framework under which the alternative energy resource was employed; (d) what stress-testing the alternative energy resource passed to ensure reliability during an emergency; (e) testing of the alternative

energy resource in controlled settings; (f) dynamic tests; and (g) field tests.

3. Implementation: State an estimated timeline for implementing the use and deployment for the diesel alternative energy resource during future PSPS events.
4. Emissions Reduction Benefits: Provide information about the emissions for the proposed alternative energy resource, based on the air contaminants and emissions test data covered by the Portable Engine Registration Program Combined Regulation Airborne Toxic Control Measures.
5. Runtime: Provide information showing the estimated runtime the alternative energy resource has accumulated under commercial operation, for 2020 and by year for the past three years (2017, 2018, 2019).
6. Customer Solar and Storage: Should the Commission consider alternative energy resources that involve centralized management of behind the meter installations of customer solar and storage as a near-term alternative to deploying temporary diesel generation at the substation level? Why or why not? What is the estimated time and uncertainty related to customer adoption of residential solar and storage that could be centrally managed for the purpose of serving all customer load associated with the same substation? What is the basis for these estimates?
7. Critical Loads Microgrids Critical Loads Microgrids: Should the Commission consider alternatives to substation-level temporary generation that focus on serving a small segment of critical loads in lieu of energizing all substation load? (Note: Such an approach would leave some safe-to-energize customers without power.)

2.2. Interim Approach for Minimizing Emissions From Generation During a Transmission Outage in 2021

In addition to the above questions, parties are directed to discuss the proposed interim approach attached to this ruling (Attachment B) that outlines a

process by which the Commission will evaluate a utility request to reserve the diesel generation in advance of the 2021 wildfire season to ensure reliability for customers during a grid outage.

When commenting on this proposal, parties are directed to discuss their positions in response to the questions below. Again, when formally responding to this ruling, parties are directed to file and serve their comments in the same order in which the questions are presented in this ruling below.

1. Do you support the proposal for how the Commission can minimize the use of diesel to serve substation loads in 2021 and 2022? Please respond with a "yes" or a "no" and discuss your reasoning. If you do not support this proposal, provide an alternative proposal that minimizes the use of diesel for energizing substations.
2. Does a utility transmission de-energization event, such as a PSPS or other outage, present an immediate temporary need for the utility to operate generation to help alleviate a threat to public health and safety?
3. Does the proposal articulate appropriate conditions for authorizing a utility to reserve a temporary generation fleet, including diesel generation? Are there additional conditions that should be applied? Are any of the three conditions unreasonable or overly restrictive (Attachment B, Paragraphs 1.1-1.5)? Discuss.
4. As a first step toward transitioning away from diesel generation, is it reasonable to require a utility seeking to deploy temporary generation in 2021 to pilot clean substation microgrid projects that would be operational for the 2021 or 2022 fire seasons?
5. Please indicate support or opposition to the first condition for pilot projects (Attachment B, Paragraph 2.1). Is it reasonable to require a utility to install stationary generation, considering that there is a risk of stranded costs and a more comprehensive framework for transitioning from diesel has not yet been established?

6. Please indicate support or opposition to the second condition for pilot microgrid projects, listing the characteristics of substations where these projects would be developed (Attachment B, Paragraph 2.2). Is this a reasonable way to limit stationary projects to substations where they make sense as long-term, low-risk investments? Are there additional substation characteristics that should be included?
7. Please indicate support or opposition to the third condition for pilot projects, requiring that they be judged feasible by the utility and meet a set of minimum criteria (Attachment B, Paragraphs 2.3). Are there additional criteria that should be included?
8. Is it reasonable to require pilot projects to be cost-competitive with diesel temporary generation, accounting for other revenue streams (Attachment B, Paragraph 2.3)?
9. Please indicate support or opposition to the third condition for permanent microgrid projects, requiring them to meet certain emission reduction requirements? Are the specific reduction targets reasonable (Attachment B, Paragraph 2.4)?

2.3. Process for Transitioning to Clean Temporary Generation in 2022 and Beyond

Parties are also directed to respond to questions about the proposed process for transitioning to clean temporary generation in 2022 and beyond included in Attachment B. When commenting on this proposal, parties are directed to discuss their positions in response to the questions below. Again, when formally responding to this ruling, parties are directed to file and serve their comments in the same order in which the questions are presented in this ruling below.

1. Do you support the proposal for a process for transitioning to clean temporary generation in 2022 and beyond? Please respond with a "yes" or a "no" and discuss your reasoning. If you do not support this proposal, provide an alternative proposal for a long-term approach.

2. Does the proposal for a long-term approach to temporary generation articulate appropriate topics to be addressed in a utility application? Are there additional topics that should be addressed?

IT IS RULED that:

1. The Proposed Interim Approach and for Minimizing Emissions From Generation During Transmission Outages in 2021 and Process for Completing Transition to Clean Solutions for 2022 and Beyond is hereby entered into the formal record of this proceeding.

2. The Energy Division Challenge Statement from the August 25, 2020 Diesel Alternatives Workshop is hereby entered into the formal record of this proceeding.

3. Parties who wish to provide formal comments in response to this ruling must file and serve them no later than Friday, September 18, 2020. Opening comments shall not exceed 30 pages.

4. Reply comments must be filed and served no later than Friday, September 25, 2020. Reply comments shall not exceed 20 pages.

Dated September 4, 2020, at San Francisco, California.

/s/ GENEVIEVE SHIROMA	/s/ COLIN RIZZO
Genevieve Shiroma	Colin Rizzo
Assigned Commissioner	Administrative Law Judge

ATTACHMENT A

Diesel Alternatives Workshop: Challenge Statement

Overview

The challenge statement aims to a) clarify the primary challenges and risks associated with providing electric power to substations; and b) provide a framework that allows each presenter to explain how their solution addresses those challenges.

The challenge statement consists of four parts: 1) objectives; 2) first question; 3) secondary questions; and 4) appendices.

The objectives should guide the whole presentation. Recognizing that different types of solutions may confront different challenges, the first question and secondary questions should focus presentations on the most relevant issues for your particular solution. The appendices provide additional technical information and detail that may be helpful in preparing the presentation.

In addition, we have attached three concrete scenarios, each describing a specific substation at risk of outages (Alto, Fort Bragg, and Covelo). Ground your presentation by referring to one of these scenarios.

Please reach out to CPUC staff with clarifying questions or to discuss the challenge statement in more detail.

Objectives:

- Maximize the benefits to customers in safe-to-energize areas subject to transmission outages.
- Minimize the need to reserve a large fleet of diesel generation for the purpose of providing substation-scale power in 2021.

Rationale: While PG&E identifies four use cases for its temporary generation fleet in 2020, the large majority of temporary generation capacity is intended to provide power to substations that are only or largely deenergized due to transmission lines that may be taken out of service as part of a public safety power shutoff. Because of the large number of customers that could be affected by transmission line deenergizations, and the amount of temporary generation needed to provide power to those customers, that use case is the highest priority for identifying alternative approaches. CPUC staff is also interested in and committed to exploring alternative solutions for other use cases, understanding that those solutions would be expected to have a much smaller impact on the total quantity of diesel generation deployment needed.

First Question: Does your solution replace diesel generators by supplying power to all customers at a substation level?

- **Yes:** Go on to the secondary questions.

- **No:** Present an argument for why your solution fits the objective statement above. The argument should address how the public interest is better served by your solution rather than one that supplies power to all customers at the substation level.
    - Examples of a 'No' answer: Microgrid for critical facilities only; Microgrid that serves an isolated subset of the distribution grid that benefits certain important facilities (e.g., "Main street").
    - Share a compelling argument for why providing a smaller-scale solution would be preferable to the broader community who would be left out of power.
    - If you believe that your solution should be pursued at the same time as substation-scale solutions, clearly indicate that you do not believe that your solution should take priority over substation-scale solutions.

Secondary Question 1: Does your solution replace diesel generators as a portable and deployable fleet of temporary generation, or is it a permanent installation at a specific substation?

- **Portable:** Reference Appendix A below for more detail. For portable solutions, the following are key difficulties that should be addressed in your presentation:
    - Deployment and logistics – Must be deployed and ready to go within 48 hours, with consistent fueling.
    - Commercial Operation by 2021 – Must meet timeline for 2021 operation, including necessary testing. (Or specify that your solution is for later years.)
    - Islanding Requirements – Must be able to pick up large deenergized loads and fit with existing grid protection devices.
    - Space Requirements – Should be able to fit on available substation land. If not, indicate alternative arrangement.
    - Cost – Should either be relatively cost competitive with diesel generation, or offer an argument justifying increased costs.
- **Permanent:** Reference Appendix B below for more detail. For permanent solutions, the following are key difficulties that should be addressed in your presentation:
    - Timeline to Commercial Operation – Must show consideration of the timeline to operation so CPUC decisionmakers can see if feasible for 10/1/21 or longer term.
    - Cost – For solutions with large permanent capital costs, must recommend how those costs be split between temporary generation and other revenue sources.
    - Applicable Substations – Must show consideration for what conditions make your solution feasible and cost effective at a substation. For example: high solar penetration, available land.

Secondary Question 2: Can your solution sustain islanding for 48 and/or 96 hours? A single wind event will require an outage of 24-48 hours depending on weather and timing. Back-to-back events, while less likely, may require 96 hours of islanding capability.

- Use one or more of the concrete substation scenarios provided (Alto, Fort Bragg, or Covelo) and indicate how your solution would meet both the power and the energy requirements of that substation, keeping in mind the space limitations.

- Islanding duration relates to the energy density of your solution. Reference the land requirement sections in Appendix A for information on diesel energy and power density.

Secondary Question 3: Can your solution be ready for commercial operation by 2021 and can you provide enough labor (to both construct and operate) and ancillary equipment (e.g. cabling, step up transformers, protection, etc.) to execute a full-scale deployment? If not, when can it be ready? Reference Appendix C below for more detail.

Secondary Question 4: Given the constraints detailed above, how many MW can your solution reasonably cover in 2021? In future years? Under what conditions can your solution be reasonably deployed?

Notes on Cost:

Approximate cost figures for diesel temporary generation during the 2020 fire season:

Total Cost for Fire Season	$210,000 – $500,000	per MW
Reservation Cost for Generation and Necessary Equipment	$26	per kW-Month
Estimated Operational Cost (with multiple PSPS events)	$270	per kW
Reservation Cost for Generation Only	$19	per kW-Month

For additional detail, please refer to publicly available data and assumptions, specifically those previously provided by PG&E in its Opening Comments dated January 30, 2020. (Workpaper Table 3-2 to Exhibit (PG&E-1) for Chapter 3.)

As of 07/27/2020

Challenge Statement for Diesel Alternatives Workshop Presentations

Appendix A: Portable Generation

Below is a list of the most significant difficulties and barriers to a portable generation solution.

- **Deployment Logistics:**

  Based on the PG&E process, the scopes for PSPS outages will be available 72-96 hours prior to an event. The deployment strategy and plan would then be finalized 48-72 hours beforehand. This leaves 48-72 hours to successfully deploy the units and prepare them for energization. The following questions are relevant:

  - What is the process for deploying and fueling/charging your solution within the time constraints of a PSPS event? Deployment includes the necessary protection equipment, transformers, cabling and labor to make the solution operational.
  - Can you provide the equipment, fuel and labor to make your solution work?
  - Are you able to safely transport/deploy, construct, operate, refuel and maintain units at scale? For example, can you serve:
    - 10+ Substation
    - 10+ Temporary microgrid locations
    - 20+ Backup power support locations
- **Commercial Operation:**
  - Review Appendix C below, with particular attention to:
    - Testing – Does your timeline include sufficient time to conduct tests to ensure your solution will work in a real-world emergency situation?
    - Certifications and training – Are operating personnel qualified for work on high voltage systems?
- **Islanding requirements:**
  - Review Appendix D below, with particular attention to:
    - For natural gas solutions: Cold Load, Black Start, and Inrush Requirements.
    - For inverter-based solutions: Protection Requirements.
- **Land Requirement:**
  - Can your solution fit on the available land within the substation zone and/or how does it match with diesel generation?
    - A 2 MW diesel unit (1,825kW prime rated power) measures 8x40 feet and can deliver approximately 33 MWh of energy over 24 hours at 75 percent of its prime rated power. The unit has a power density of 4.3 kw/sqft at 75% prime rating. How does your technology (taking account of other necessary equipment required for operational feasibility) match against this?
  - If your solution requires fuel tanks, or additional equipment to meet islanding requirements, please make sure to include these in your consideration of land availability.
    - For Natural Gas solutions, include gas tanks where necessary.
    - For Fuel Cell solutions, include additional battery equipment where necessary to meet protection requirements.

Appendix B: Permanent Generation

Below is a list of the most significant difficulties and barriers to a permanent generation solution.

- **Scale:**
  - There are approximately 900 MW of substation load that are both at-risk for outages and may be safe to energize. In any particular PSPS event, only a subset of this load would be affected, and only a further subset could be addressed by local generation and islanding. For this year, PG&E has contracted about 350 MW of portable generation to serve the entirety of the about 900 MW of load. Permanent solutions do not have this flexibility, and likely make sense only for a limited set of substations.
  - For which substations would your solution be feasible and cost effective? Consider the specific attributes that make your solution feasible and/or cost-effective. For example: high solar penetration on the feeder, large available land area around the substation, available natural gas interconnection, high-risk of PSPS for each of the next 5 years.
- **Cost:**
  - What is the approximate cost of your solution? Provide a cost range in $ per kW.
  - What additional benefits does your solution provide other than temporary generation for PSPS? To what extent can these services offset costs, for example by participating in energy and resource adequacy markets?
  - If you were to offer PSPS backup generation as a service, what would it cost? In other words, how does the cost of your solution compare with diesel generation in terms of providing backup power.
- **Commercial Operation:**
  - Review Appendix C below, with particular attention to:
    - Design and Engineering
    - Land acquisition and permitting
    - Electric interconnection
      - Current PG&E Make Ready work plans for interconnection while the substation is islanded. To operate constantly in parallel with the larger grid, an interconnection study would still be required.
    - Construction and installation
- **Land Requirement:**
  - What amount of land would your solution require?
- **Islanding Requirements:**
  - Review Appendix D below, with particular attention to:
    - For inverter-based solutions: Protection Requirements.

Appendix C: Timelines to Commercial Operation and Testing Requirements

Steps to Commercial Operation:

1. Contract Award.
2. Pre-work.
3. Land acquisition and permitting.
4. Design and Engineering.
5. Procurement.
6. Electric and natural gas interconnection.
7. Construction/Installation.
8. Certifications and Training.
9. Testing and final commissioning.

Testing Requirements:

Portable solutions must be tested to make sure they meet operational requirements and can be reliably deployed during an emergency. This testing process will require significant time and may pose a barrier to 2021 operation. The historical testing process is detailed below, and PG&E is currently exploring ways to accelerate this process.

Presenters can offer a critique of this testing process, and should offer details of any tests they have already completed. However, critiques should recognize the need to verify operational capability and reliable deployment, and the implications these have for grid safety and reliability.

- Controlled Testing (1-2 months): This first round of testing focuses on the technical capability of the equipment. The vendor submits a request for testing and works with PG&E to clarify how equipment will be set up, where the test will be located, and a preliminary test program. This preparatory work takes 1-2 months, while the actual test takes 1 day.
- Dynamic Testing (1-2 months): This second round of testing focuses on the human element, on the vendor's ability to operate their equipment in a real-world environment. These tests normally occur on the PG&E grid during a planned outage.
    - Dynamic testing requires the vendor to provide personnel who have completed the training and qualifications required by PG&E for performing work at a substation. It takes about 2 months to complete these requirements, and they should be met before PG&E starts planning a dynamic test.
- Prime Vendor Status (about 6 months): After the successful completion of the controlled and the dynamic tests, PG&E will provide jobs to the vendor. Success at these jobs will build the vendors performance track record, and eventually qualify them for prime vendor status. Prime vendor status indicates that the vendor can deploy at large scale and with little oversight.
- From initial request to prime vendor status has usually taken 8 to 10 months.

Appendix D: Islanding Requirements

The table below, provided by PG&E, lists the islanding requirements for substation-level generation. For portable generation, many of these requirements would be verified through testing. Permanent generation solutions should be designed with these requirements in mind. The requirements would likely be verified during commissioning.

Additional Note: We recognize that Protection Requirements were designed for a system with large rotating machines and may change and develop with new technology. It is possible to upgrade protection systems to correspond to new technologies, though these upgrades may be costly.

Requirement Category	**Requirement**	**Acceptance Criteria**	**Summary**
Protection	Projects must have generator and/or system relays that can be modified to accommodate over and undervoltage protection settings at PG&E's request.	Have necessary utility grade protection and control equipment that can be modified by PG&E	This is required to ensure proper power quality supplied to connected customers.
	Minimum number of machine generators must be running and online during islanding to provide adequate system fault duty.	Meet the minimum number supplied by the utility as required in short circuit modeling assumptions	This is required to ensure fault detecting devices have the proper amount of system fault energy to be able to detect hazardous fault conditions

	Generators must have ability to generate short circuit fault duty for various fault types to allow traditional overcurrent protection to be used to successfully detect and clear utility primary faults. Generator must have ability to generate 3-phase short circuit of at least 250% of the nameplate MVA rating. Generator must have ability to sustain 3-phase fault duty for 10 seconds, Line-Line (L-L) fault duty for 5 seconds and Line-Ground (L-G) fault duty for 2 seconds.	Generating sources meet the requirement defined	This is required to ensure fault detecting devices have the proper amount of system fault energy to be able to detect hazardous fault conditions
	Generators and step-up transformers must be designed such that faults within the island are cleared to ensure the safe operation of the generator while serving the utility loads.	Vendor provided equipment meets PG&E protection criteria for safe and reliable operation	This is required to ensure employee and public safety in the event of a fault condition on the system
	Step-up transformers and generators should be solidly grounded (wye) connected in order to provide a zero-sequence fault source for system line-to-ground fault conditions.	Vendor provided equipment meets PG&E protection criteria for solidly grounded systems.	This is required to ensure employee and public safety in the event of a fault condition on the system

	In order to synchronize to and parallel with the PG&E system, generators shall have the ability to achieve successful synchronization with the utility source. Synch check relays will also be required to provide close supervision for generator breakers when connecting to the utility source.	Vendor provides appropriate equipment and demonstrates to PG&E proper operation	This equipment allows proper paralleling with utility and generation sources. Without this equipment, islanded systems are unable to perform seamless parallels requiring customers to be de-energized during all transitions.
Synchronizing	The system shall have the ability to make small frequency adjustments for PG&E to passively resynchronize the island back to the normal utility source grid.	Control systems in place to be able to make these required adjustments	This allows for the generation island to support real-time adjustment to meet power quality criteria for the islanded load. This also is required to ensure the island can be re- paralleled to the utility grid.
	The system shall have the ability to make small voltage adjustments in order for PG&E to passively resynchronize island back to normal utility source grid.	Control systems in place to be able to make these required adjustments	This allows for the generation island to support real- time adjustments to meet power quality criteria for the islanded load. This also is required to ensure the island can be re- paralleled to the utility grid.

Voltage	The system shall maintain steady state generator terminal voltage within one percent (1%) of the setpoint using automatic voltage regulation (AVR) base and have the ability to set the generator terminal voltage within the specified range as specified within PG&E Electric Rule 2.	Vendor meets 1% steady state voltage regulation requirement.	This is required to ensure proper power quality supplied to connected customers.
	During islanded operation, the Project shall hold a voltage target within [+ / - 5%] of the system nominal voltage as dispatched by PG&E.	Vendor can make necessary adjustments up to +/- 5% while operating in island mode.	This is required to ensure proper power quality supplied to connected customers.
	The system shall have the ability to set alarm thresholds to notify operator of over or under voltage conditions. These thresholds shall be set by mutual agreement between PG&E and vendor operations.	Control systems in place to be able to make these required adjustments	This is required to ensure proper power quality supplied to connected customers.
Frequency	The system shall maintain nominal frequency at 60 Hz as specified within PG&E Electric Rule 2. Additionally, PG&E shall require the facility to be able to maintain steady-state frequency response of plus or minus one percent (+/- 1%) of 60 Hz from minimum load to maximum load.	Control systems in place to maintain 60 Hz +/- 1%	This is required to ensure proper power quality supplied to connected customers.

	The system shall have the ability to set alarm thresholds to notify operator of over or under frequency conditions	Control systems in place to be able to make these required adjustments	This is required to ensure proper power quality supplied to connected customers.
Load	The Project shall meet the full microgrid load with no transmission energy supply for a minimum of two consecutive days (48 continuous hours) without any customer load drop, optimally load could be met for four consecutive days (96 continuous hours). While in microgrid operations, the Project's generation shall follow load to meet customer demand, while maintaining appropriate power quality (as defined above in Voltage and Frequency Requirements) and shall meet peak and minimum customer demand throughout microgrid operations.	Generation stays online without any uncontrolled shutdowns or trips for duration specified	This requirement is to meet the overall objective of electric reliability and resilience of the islanded loads.
	The Project shall demonstrate N-1 capability such that the loss of a single engine will allow the island to continue to function within the operational parameters described in voltage and frequency requirements above.	One unit is taken out at peak load and generation island stays online	This requirement is to meet the overall objective of electric reliability and resilience of the islanded loads.

	The Project shall carry maximum load with a load imbalance up to ten percent (10%).	Generation stays online without any uncontrolled shutdowns or trips with 10% load imbalance levels	This requirement is to meet the overall objective of electric reliability and resilience of the islanded loads.
Cold Load, Black Start, and Inrush Requirements	The Project shall be able to provide cold load pick-up with the capability of adding dead load segments of distribution grid and maintain electrical properties while in island operation.	Generation stays online without and uncontrolled shutdowns or trips while energizing portions of the distribution circuitry	This requirement is to meet the overall objective of electric reliability and resilience of the islanded loads.
	The worst-case load acceptance/rejection value will be thirty percent (30%) of total online generation. If block loading is necessary to restore a portion of the island, PG&E will communicate with the Project to start additional engines if needed. All load pickups will be active and reactive loads.	Generation stays online without and uncontrolled shutdowns or trips while energizing portions of the distribution circuitry	This requirement is to meet the overall objective of electric reliability and resilience of the islanded loads.
	The Project shall demonstrate black start capability without parallel operation to the electric grid.	Generation can start and become available to restore loads without any parallel interaction with the existing utility grid	This requirement is to meet the overall objective of electric reliability and resilience of the islanded loads.

	Generator installations must provide black start capability and must be able re-energize previously de-energized distribution feeders with no additional energy sources (distribution or transmission sources) and must be capable of handling high in-rush current. The cold load pickup capability for generators should be 60% of the generator name plate capacity. (Depending on the feeder configuration and technology used, a pickup capability lower than 60% may be acceptable)	Generation can start and become available to restore loads without any parallel interaction with the existing utility grid	This requirement is to meet the overall objective of electric reliability and resilience of the islanded loads.

ATTACHMENT B

Proposed Interim Approach and for Minimizing Emissions from Generation During Transmission Outages in 2021 and Process for Completing Transition to Clean Solutions for 2022 and Beyond

Background and Context

On August 25, 2020 Energy Division held an all-day online public workshop that discussed the challenges associated with serving the load of safe-to-energize substations during public safety power shutoff (PSPS) events.

During 2020 fire season, the PG&E Temporary Generation Program has the potential to energize a subset of up to 63 safe-to-energize substations by deploying 350 megawatts of leased diesel generators. At peak, these 63 substations energize about 968 megawatts load involving about 357,000 customer accounts. If an event like the October 9, 2019 and October 26, 2019 wind events recurred, deployment of the 2020 temporary generation program could provide power for customers who would otherwise be subject to an outage. For example, if only the top 20 substations based on greatest number of customers impacted were energized using temporary generation, 138,160 fewer customer meters would experience a PSPS outage.[1]

Although the workshop revealed potential pathways away from diesel temporary generation, several significant concerns were also raised. These concerns included: whether the solutions presented could meet all technical feasibility requirements; whether the solutions could be ready by fire season 2021; and the potential for significant stranded costs from long-term investments, given that the extent and locations of PSPS events in future years is still uncertain. Notably, there were few proposals that would directly replace a fleet of diesel temporary generation as a commercially available and portable solution deployable within 48 hours, and multiple proposals for permanent microgrid installations at specific substations.

A clear path forward for the complete replacement of diesel for the purpose of serving the load of safe-to-energy substations during a transmission outage did not emerge from the workshop. This indicates the need for a longer, open, and deliberative stakeholder process—which cannot practically conclude in time to deploy solutions in advance of the 2021 fire season. Thus, we propose here an interim approach aimed at 2021, followed by a proposed process for the development of a longer-term framework for completing the transition away from diesel temporary generation in the years thereafter.

[1] PG&E Prepared Testimony in CPUC Rulemaking R.19-09-009, dated January 21, 2020, page 2-9, Table 2-1.

I. Proposed Interim Approach for 2021

The interim approach, outlined below, has two guiding aims:

1. Keep the lights on: To maximize the ability to keep power on during a transmission outage where safe to do so in 2021, while ensuring just and reasonable rates.
2. Start the transition towards clean generation: To increase utility and market experience and understanding of alternatives to diesel generation to facilitate a transition away from diesel in future years.

1. Keep the Lights On:

A utility seeking to reserve temporary generation in advance of the 2021 wildfire season for the purpose of serving substation load subject to transmission outages would be required to submit a Tier 2 Advice Letter detailing how the conditions described below have been met.

The Commission would authorize a utility to reserve temporary generation for 2021, including diesel as well as other temporary generation, under the following conditions:

1.1. The utility justifies the scope and scale of the need for providing temporary generation by providing the basis and justification why it is reasonable to prepare for specific transmission lines to be de-energized under specific conditions, including but not limited to:
   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.

   Rationale: Meeting this condition indicates that the utility is reserving the appropriate quantity of temporary generation and whether other alternative solutions have been evaluated, such that use of PSPS events and temporary generation is a last resort.

1.2. The utility's previous temporary generation program, if any, proves effective at serving customer loads in 2020 that would have otherwise been without power during PSPS or other outage events, if and when it is activated to do so.

   Rationale: Meeting this condition indicates that the Temporary Generation Program contributes to the aim of keeping the lights on where safe to do so.

1.3. The utility provides evidence that there is resource scarcity that makes it prudent to pay a nonrefundable reservation fee which guarantees generator availability for the duration of fire season in advance of need, or that advance reservation is necessary for logistical reasons to safely mobilize and stage equipment.

   Rationale: Meeting this condition indicates that it is reasonable to reserve temporary generation in advance.

1.4. The utility demonstrates that it has undertaken an analysis of the costs associated with reserving the temporary generation and that the costs are reasonably close to that associated with deploying similar equipment under normal conditions, such as for a planned maintenance outage.

Rationale: Meeting this condition indicates that the costs associated with reserving diesel generation are reasonable.

1.5 The utility demonstrates that positioning portable generation at substations for the duration of 2020 and 2021 fire seasons complies with local air quality agency[2] regulations for using prime power.

Rationale: Use of the California Air Resources Board (ARB) Portable Engine Reservation Program (PERP) program is not intended to thwart local air district jurisdiction and applicable permitting requirements for new stationary sources of air pollution. Meeting this condition demonstrates that PG&E has addressed legal and regulatory issues related to emissions and public health with local air districts.

[2] Local air quality agencies may include local air pollution control districts or air quality management districts.

2. Start the Transition towards Clean Generation

A utility seeking to reserve temporary generation in advance of the 2021 wildfire season for serving substation loads would also be required, in its Tier 2 Advice Letter, to document its plans to establish clean substation microgrid pilot projects located at, or able to serve, up to three substations. If the utility determines, based on the conditions described below, that it is not feasible to move forward with such projects, it must document the specific conditions that have not been met in its Advice Letter.

The following conditions apply to the clean substation microgrid pilot projects:

2.1. Projects may be either mobile or stationary.

2.2. For projects that involve stationary installations, the utility must identify at least three substations where, with high confidence:

a. Transmission lines serving the substation may be de-energized because of the fire risk, despite safe-to-energize load at the substation. The probability of power loss with safe-to-energize load is relatively high. Evidence to support this claim may include, but is not limited to, temporary generation was deployed and ready-to-energize at the substation in 2020.
b. This risk of power loss is long term, i.e. likely to persist for 10 years based on modeling and the feasibility and cost-effectiveness of mitigation measures, such as infrastructure hardening or replacement

2.3. Proposed projects must be judged technically feasible, safe, and financially competitive by the utility. At minimum, these solutions should meet the following requirements (see also the Challenge Statement included as Attachment A):
a. Design should be capable of islanding for 48 hours.
b. Design should be able to black start.
c. Design should meet cold load pickup requirements.
d. Design must meet frequency and frequency response requirements.
e. Design should meet protection requirements or include protection upgrades.
f. Vendor has considered timeline to commercial operation, and microgrid should reasonably be operable by October 2021 or June 2022.
g. Accounting for other revenue streams, projects should cost no more than $500 per kw-year, a high estimate for diesel reservation and operation costs.

2.4. Proposed permanent solutions for the three pilot substation projects should meet the following general criteria:

If feasible by 2021:

1. Reduce PM emissions and NOx emissions by 90 percent compared to large Tier 2 Diesel Generators, and
2. Reduce greenhouse gas (GHG) emissions compared to large Tier 2 Diesel generators, by:
    a. 10 percent if generation assets are contracted for 5 years or less.
    b. 30 percent if generation assets are contracted for between 6 years and 10 years.
    c. 50 percent if generation assets are contracted for between 11 and 15 years; OR

If feasible by 2022:

1. Be a fully renewable microgrid, practically eliminating PM, NOx and GHG emissions compared to Tier 2 Diesel generators.

Requiring a utility to initiate three clean substation microgrid pilot projects gives room for multiple different solutions to be tested, and a broader baseline of knowledge be developed, while working on a full framework in 2021 for future years (see process proposal below). The accompanying conditions ensure that projects are feasible, clean, cost-effective, and low risk.

Although these alternatives should be partially or fully ready for commercial operation by the 2021 fire season, permanent solutions at the three proposed substation pilot projects may run into delays that make this date unfeasible. Thus, as a contingency or fallback plan, the Commission would authorize the utility to reserve temporary generation to cover these three substations as well, to the extent the utility determines this is necessary.

II. Process for Transitioning to Clean Temporary Generation in 2022 and Beyond

The long-term approach would require utilities wishing to deploy temporary or permanent generation for the purpose of serving customers during transmission outages to file applications that detail their proposed procurement framework.

Utilities' applications must address the following topics:

1. How will the utility scope the need for temporary generation? Indicate how these methods may be improved over time to enhance accuracy and precision regarding how much generation is needed and where it should be deployed.

2. How will the utility minimize the need for temporary generation over the next 5/10 years in a cost-effective way? Provide an approximate timeline detailing, at minimum:
    a. Transmission line exclusion from PSPS scoping.
    b. Tower Replacement, for example, PG&E Wildfire Mitigation Plan (WMP) Section 5.3.3.15.
    c. Targeting undergrounding for certain transmission circuits or portions of transmission circuits, per WMP section 5.3.3.16.
    d. Transmission Line System hardening or equipment replacement, per WMP Section 5.3.3.17.5.
    e. Increased grid flexibility and sectionalizing.
    f. Permanent microgrid development.
3. How will the utility support the development of clean temporary generation resources? This support should include, but is not limited to:
    a. A testing process for vendors of cleaner temporary generation products, so that products that meet the technical requirements in controlled tests can be quickly field tested and the utility can gain confidence in the logistical and operational capabilities of new vendors.
    b. A review to validate the technical and logistical requirements for temporary generation, focusing on the requirements that present the largest barriers to the use of clean generation resources.
4. Present an overall timeline, detailing how the combination of improvements in scoping, minimization of the need for temporary generation, and support for cleaner temporary generation products will reduce the need to deploy diesel and other fossil resources over the next 5/10 years.
5. Referring to the overall timeline and other included information, lay out a set of criteria and/or targets for the procurement of temporary generation resources that could apply over the next 5/10 years.
6. Referring to the overall timeline and other included information, lay out a set of criteria and/or targets for the development of permanent generation resources that replace the need for temporary generation over the next 5/10 years.
    a. Address whether resilience needs and resource adequacy needs would be addressed within this form of procurement.
    b. Address whether, due to the circumstances of the Governor's emergency proclamation related to the stage 3 emergency of August 2020, there are short term reliability and resiliency needs that need to be expedited, and how should these circumstances be addressed in this procurement process.
    c. In the event ARB offsets are used, ensure they are fully compliant with 17 Code of California Regulations, section 95970.
7. Establish and justify clear targets for reducing the emissions associated with temporary generation and permanent generation.
8. Identify criteria to be used to evaluate generation and storage technologies and vendors to be considered in the long-term plan for temporary or permanent generation.
9. Describe a process for subjecting any proposed contracts with temporary or permanent generation providers to oversight and review.
10. Document any solicitation protocols to be used to procure resources needed to provide temporary or permanent generation over time.

11. Describe a process for engaging community choice aggregators (CCAs) and local governments for their input regarding land use matters in the development of permanent generation resources to replace temporary generation that is consistent with CPUC jurisdiction and General Order 131-D section XIV.B.
12. Propose an approach for cost control, allocation, and recovery for all costs associated with temporary or permanent generation over the covered period of the application.
13. Propose an ongoing process for subjecting the utility's temporary or permanent generation emissions targets, needs, plans, evaluation criteria, solicitation protocols, and costs to oversight and review.