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PG&E Comments on Microgrid Roadmap

Additional submitted attachment is included below.

Pacific Gas and Electric Company

Wm. Spencer Olinek
Sr. Representative
CEC Regulatory Relations

77 Beale Street, B23C
San Francisco, CA 94105

(415) 973-5540
Spencer.Olinek@pge.com

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Re: Docket 16-EPIC-01: Pacific Gas and Electric Company Comments on the October 2, 2017 California Microgrid Roadmap Scoping Workshop

Pacific Gas and Electric Company (PG&E) appreciates the opportunity to provide comments on the draft *Roadmap to Commercialize Microgrids in California* (Draft Roadmap). For reasons described below, PG&E offers general observations on the Draft Roadmap, but additional stakeholder discussion is necessary to make the document more robust to guide actual implementation activities.

PG&E is a proponent of distributed energy resources (DERs). PG&E is also a strong supporter of microgrids, and has a growing number within its service area. As such, PG&E is uniquely positioned to offer specific feedback on items that should be considered as part of the broad framework to commercialize microgrids. Finally, PG&E supports efforts that its customers and communities are taking to ensure that critical community services can be available to customers during natural disasters that might impact the macrogrid. Community resilience embodies a number of principles that are core to PG&E, including public safety and the ability to respond in states of emergency. In light of a growing list of climate-related challenges, PG&E looks forward to continuing work with customers to identify ways in which microgrids can work in concert with the broader system. It is based on this experience and vantage point that PG&E offers these high-level comments on the Draft Roadmap.

- PG&E agrees with the Draft Roadmap's acknowledgement that there is a need to define, "…what a microgrid is and how it operates," while recognizing the wide range of possible, site-specific configurations.[1] PG&E also agrees that, "…there is clearly an added cost to design, install, and operate microgrid."[2] However, the Draft Roadmap does not sufficiently distinguish the difference between DERs that are part of an organized microgrid and DERs that are standalone. For example, a microgrid that includes DERs

[1] *Draft Roadmap for Commercializing Microgrids in California*, page 21.
[2] *Id.*at 6.

but is capable of operating in islanded mode is not discussed separately from grid-connected DERs that are not part of a microgrid configuration. This is an important distinction. The vast majority of the potential services that microgrids might offer utilities or independent system operator (ISO) while operating in "grid-connected" mode are virtually identical to those of the same DERs that are not part of a microgrid configuration. The Draft Roadmap attributes these services to microgrids, while in fact they can appropriately be attributed to grid-connected DERs, thus blurring the unique characteristics of microgrids and making it challenging to chart a course towards microgrid commercialization.

- Enhanced customer resilience is the primary incremental value of DERs that are part of a microgrid configuration, as compared to DERs not in microgrid configurations. The incremental costs required to enable islanded operation would need to be identified and compared with the incremental value to the participating members of the community to truly provide a Microgrid Roadmap. Accordingly, the Roadmap should include an activity to assess and recommend a process to determine the incremental costs and benefits associated with islanded operation.
- To fully realize the value of grid services provided by DERs, including DERs in microgrid configurations while they are in grid-connected mode, the Draft Roadmap should note that utilities will require enhanced granular visibility of the grid and into DER operational performance to be able to validate grid benefits as well as maintain safe and reliable grid operations. Furthermore, it is also important for the Draft Roadmap to note that there may be additional distribution grid infrastructure investments to enable DERs providing services to the ISO via the wholesale energy market (e.g., ancillary services or frequency regulation, etc.) on the transmission system. Accordingly, the Roadmap should include an assessment of what tools are needed to provide this visibility and any associated tariff modifications.

I. Detailed Comments

To expand the presence of microgrids that rely on clean resources and supporting resiliency interests, it is critically important to consider what makes microgrids distinct from a somewhat overlapping trend of high penetration DERs installed by customers and developers to provide clean energy and possibly desired services to the ISO and/or the utility distribution company. This distinction is critical and what makes a microgrid unique. Relative to growing DER penetration, which is significant in PG&E's service area, a microgrid is expressly designed to be capable of operating in islanded mode when there is no live grid connection. This requires an extremely time- and cost-intensive design to ensure that load and supply remain balanced at every instant for the period of time that the microgrid is islanded and that grid separation and reconnection can be performed in a manner that does not compromise the assets serving the microgrid, the microgrid customers, the macrogrid, etc. To determine microgrid viability, these unique, additional cost-elements need to be weighed against the unique, additional resiliency benefits that the microgrid customers receive by virtue of their ability to perform their mission-critical functions when the rest of the grid is unavailable.

During the vast majority of the year that the DER elements of a microgrid are connected to the macrogrid, they are capable of providing value to the host customers and potentially the ISO and distribution company in essentially the same form and same measure as DERs that are not part of a microgrid configuration might. Thus, it is important to not attribute to a microgrid the value that would be provided by the resources in a standalone or grid connected configuration -- that would place an artificially higher value on a microgrid configuration. For example, a PV system or battery storage unit that is part of a microgrid operating in blue sky mode is virtually indistinguishable from the same PV system or battery storage unit that is not part of a microgrid configuration. Falsely attributing these values will blur the important distinction that makes a microgrid a microgrid and that distinguishes a microgrid from DER penetration, thereby making it challenging to develop policies, programs and tariffs expressly for microgrids.

These types of blurred attributions are embedded throughout the Draft, making it challenging to isolate and value the unique attributes of microgrids relative to grid connected DER. For example:

- "The microgrid provides opportunities to address load leveling, energy conservation, and participate in energy programs like demand response, ancillary services and other utility grid support services."[3]
- "…a major consideration that distinguishes microgrids from other types of customer generation is the ability to provide services to the grid.//…//The grid connection also benefits the system more broadly to the extent the microgrid provides operational services to the grid, such as ancillary services or frequency regulation.[4]
- "Microgrids can provide many different services to the grid including:
    - Any necessary voltage support for distributed generation and solar;
    - Consumption of excess generation by charging batteries, other storage devices, or customer products; and,
    - Provision of additional wholesale ancillary services, such as regulation."[5]

Accordingly, to meet California's climate goals affordably and sustainably, it is important to first develop an accurate view of the important role microgrids can play, but in a manner that explicitly acknowledges and isolates the incremental cost of the microgrid which can then be balanced against the incremental value.

II. Microgrid Configuration Categories

PG&E is a strong proponent of microgrids, and has a growing number of them within its service area. PG&E relies on the DOE microgrid definition[6], and categorizes microgrids into three

[3] *Id.* at 7.
[4] *Id* at 18.
[5] *Id* at 20.
[6] "A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can connect and

categories: 1) grid-connected, single customer; 2) grid-remote, multiple customers, and 3) grid-connected, multiple customers. While most of the experience and associated projects in PG&E's service area are in the first category, PG&E is actively engaged in pursuing opportunities in the second and third categories.

Microgrids that are under development have evolved to increasingly rely on clean energy resources and storage ("distributed energy resources"), in addition to conventional back-up generation such as diesel generators, and are becoming more commonplace at customer facilities that have an important public service role to play in the event of a natural disaster-driven grid outage. These resiliency-oriented efforts align well with PG&E's partnership role with our communities on efforts to prepare for natural disasters that might produce extended grid outages that challenge our collective abilities to ensure that critical services can continue to be delivered to our customers.

A. Grid-Connected, Single Customer

PG&E has long supported the development of customer-side microgrids through a range of technical and administrative services, as well as financial incentives for qualifying technologies.

PG&E services to assist individual customers in siting and interconnecting facility microgrids include:

- Evaluating early-stage plans and proposals
- Participating on project-level Technical Advisory Committees
- Conducting interconnection studies to assess the impact of proposed microgrids to identify any necessary equipment needed to ensure safety, power quality, and reliability
- Working with customers to establish interconnection agreements for their microgrid systems
- Conducting on-site inspection to support approval of the microgrid system interconnection with the PG&E distribution grid
- Processing financial incentives

The Santa Rita Jail microgrid is a well-known operational example which relies on a range of DERs including solar photovoltaic arrays, fuel cell, diesel generator, and storage. The management and control system enables this grid-connected system to seamlessly island in the event of a system outage.

PG&E also supports emerging demonstrations of facility microgrid concepts. For example, PG&E is pleased to have participated in the Humboldt State University Sponsored Programs Foundation/Schatz Energy Research Center's (HSUSPF/SERC's) proposal, "Demonstrating a Secure, Reliable, Low-carbon Community Microgrid at the Blue Lake Rancheria." The project was awarded under the Electric Program Investment Charge (EPIC) Program grant solicitation

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disconnect from the grid to enable it to operate in both grid-connected or island-mode." (DOE Microgrid Exchange Group. Available online: https://building-microgrid.lbl.gov/microgrid-definitions.)

PON-14-301. It is demonstrating a microgrid at the Blue Lake Rancheria (BLR) that will provide reliable power to critical facilities during times of public emergency. The project will also demonstrate the viability of a microgrid with a high penetration of renewable energy integrated with energy storage and existing diesel back-up generation. It will use automation and communication strategies to optimize reliability, safety, customer energy cost savings, and environmental benefits.

B. Grid Remote, Multiple Customers

Remote microgrids can be connected to the macrogrid, although in many instances might not be. They can serve either a single customer, or possibly multiple customers. PG&E is interested in exploring remote applications where there could be low-cost and high reliability alternatives leveraging microgrid-related technologies.

C. Grid-Connected, Multiple Customers

PG&E recognizes that there is growing interest in community-scale DER deployment and microgrids, and understands and aligns with the drivers behind this interest. Community resilience embodies a number of principles that are core to PG&E, including efficient resource utilization, public safety and the ability to respond in states of emergency. We look forward to working with communities to identify ways in which these arrangements can work for interested communities and in concert with the broader system.

III. Conclusion

PG&E appreciates this opportunity to comment on the Draft Roadmap. PG&E looks forward to continuing to work with the CEC to further develop and refine the Roadmap.

Sincerely,

/s/

Wm. Spencer Olinek