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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future.	Rulemaking 21-06-017

PACIFIC GAS AND ELECTRIC COMPANY'S (U 39 E) SUPPLEMENTAL RESPONSE TO ASSIGNED COMMISSIONER'S RULING SEEKING ADDITIONAL INFORMATION ON DER ENABLED NEAR TERM FLEXIBLE CONNECTIONS

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Pursuant to the *Assigned Commissioner's Ruling Seeking Additional Information on DER Enabled Near Term Flexible Connections* (ACR), filed November 3, 2025, and the Administrative Law Judge's (ALJ) *Email Ruling Response to UCAN's Request for Clarification* (Ruling), filed November 14, 2025, Pacific Gas and Electric Company (PG&E) provides its supplemental responses to the remaining questions, question 20 and questions 23 through 28, as posed in the ACR.

I. PG&E RESPONSES TO QUESTIONS REGARDING FLEXIBLE CAPACITY FOR SINGLE PHASE FEEDER CUSTOMERS

20. Do parties favor adapting existing approaches (e.g., LLL, FlexConnect) to serve single phase customers, or taking a different approach?

a. If parties favor a mix of adaptation and different approaches, please detail which elements (e.g., computing static operating profile, communicating day ahead values, etc.) should be adapted and which should use a different approach.

PG&E's approach involves an array of solutions depending on the customer need.

- Conventional service planning upgrades as needed for customers who need to increase their service (i.e. 100A to 200A panel and service upgrades).
- Existing programs which may help a customer to reduce the need for a panel upgrade or for low income customers programs which might help them to afford these upgrades.

- A new program, in its early stages funded by EPIC, which will enable a customer to electrify without the need for a panel and service upgrade by coordinating their EV charger or a dynamic load with an AMI 2.0 meter. As this concept is proven out, if successful, PG&E will continue to invest and scale this option as a best fit, least cost, and fastest option for the customer electrifying and all ratepayers. This capability is discussed further in Question 23, 24, 25, and 26.
    - This capability is intended to be a residential single-phase version of Flex Connect with a focus on secondary grid upgrades and customer panel upgrades.
    - This capability is intended to be a non-bridging solution mostly, although it is expected with persistent load growth that grid upgrades on the secondary will also need to happen in some portion of cases.

23. Should the Commission pursue non-bridging flexible connections as a way for single phase customers to avoid or defer grid upgrades? Please provide details as to how this could be implemented.

PG&E is pursuing flexible connections for single phase customers to avoid panel upgrades and defer grid upgrades. This endeavor is being accomplished via EPIC pilot funding, and will transition to a long-term offering provided the solution is successful and the GRC request for AMI 2.0 is approved.

PG&E believes Commission support and involvement would be beneficial at the point in time that:

- The solution has first proof-points with customers and the business (estimated end of 2026).
- The AMI 2.0 GRC request is funded, as the calculation of dynamic service limits at the edge of the grid is dependent on real-time monitoring, peer coordination, and edge computing capabilities from these meters.

See the response to question 24 for more details.

24. What current models or methodologies (e.g., AusNet Approximation algorithm, Asset Capacity Operating Envelopes, LV network approximation with AMI data, etc.) have the potential to provide low-cost static or variable operating envelopes for the purpose of minimizing or deferring distribution line or service upgrades on single phase feeders?

For single phase customers who are electrifying (*e.g.*, adding an electric vehicle, building electrification, or other new net load), the method PG&E is developing is as follows:

- An AMI 2.0 smart meter that runs a local DER management application at the customer's home.
- The AMI 2.0 meter will communicate with its peers to understand the real-time load and capacity at the grid edge for the service wires, secondary conductors, and the service transformer.
- This application will connect to the customer's EV charger or smart panel locally over Wi-Fi and sends a real-time dynamic limit reflective of the capacity of the grid and the customer's panel.
- The EV charger or smart panel will adjust their output to keep the load within the limits of the customer's panel and service wire as well as the grid's secondary conductors and the service transformer.

By engaging this process, PG&E anticipates that a panel upgrade will be avoided and defer an anticipated service upgrade, thereby potentially saving a single customer thousands of dollars and ratepayers as a whole tens of thousands of dollars for each service upgrade deferred. The customer will be enabled to electrify at the lowest cost and in the shortest amount of time. The system is all local, not relying on the cloud, and is designed to meet the requirements of PG&E's service planning and distribution grid needs, as well as the local AHJ and National Electric Code.

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25. Are there power control systems or smart inverter functions (e.g., voltage support or reactive power) that should be leveraged to maximize the available load and generation capacity for these low-cost options?

Yes.

a. If yes, are there existing solutions that can be quickly implemented without relying on ADMS/DERMS and communications?

PG&E's main focus for single phase residential customer is to bring on electric load within the limits of the local grid. To that end, voltage support and reactive power appears to have limited value versus management of real power limits.

The main solution PG&E is focusing on is coordinated net-new load with edge limits calculated by an AMI 2.0 meter. Within the real-time power space we are enabling two types of edge control protocols:

- Dynamic service limits streamed to level 2 EV chargers over OCPP 1.6J.
- Dynamic service limits streamed to UL3141 PCS compliant smart panels over Matter.

These limits are reflective of load on the secondary grid and customer panel today but could be expanded over time to include limits from primary distribution or export limits once the technology is proven out at scale.

b. If yes, should we prioritize these solutions in addition to focusing on larger customers?

PG&E is prioritizing testing this system now with customers in 2026 H1 and, if successful, scaling to ability for full scale availability in 2026 H2.

26. Are there aggregators/equipment manufacturers that have the capability to coordinate the power use of multiple single phase customer sites connected to shared infrastructure such that capacity can be safely shared within that infrastructure?

Yes.

a. If yes, what steps would be required to prove and scale the coordinated control of multiple sites for safe flexible connections?

PG&E is building this capability by leveraging PG&E's AMI network to allow for communications between peer meters such that they self organize to determine appropriate "dynamic service limits" in real time for a customer. With this limit, the output of the customer's load is then constrained allowing for the avoidance of a panel upgrade and a deferral of a service upgrade. This system will function with multiple customers on shared infrastructure.

27. Should Rules, Tariffs, or policies be modified in order to allow for the implementation of static or variable operational envelopes for single phase customers?

No. PG&E believes that variable and dynamic operational envelopes are currently allowed as a part of customer interconnection under existing Rules and Tariffs.

PG&E's understanding is that implementing variable and dynamic operational envelopes requires the IOU to invest in an ADMS or DERMS system that can generate short-term forecasts and dispatch limits based on these forecasts to customers. PG&E has already implemented such a system and is currently using variable operational envelopes for multiple live sites.

a. If yes, please provide suggestions regarding the specific Rules, Tariffs, or policies, and any suggested modifications.

28. Should existing and new customers utilizing variable or dynamic operating envelopes be required to enroll in dynamic rate pilots, when available in their territory, and then be defaulted to dynamic rates when the pilots are no longer available? Please provide rationale for your response.

No. Customers utilizing variable or dynamic operating envelopes should not be required to enroll in dynamic rates for two reasons: 1) the operating envelope may constrain a customer's ability to optimize load response to prices; and 2) even if a customer is able to respond to dynamic prices within the constraints of their operating envelope, customers should be given a choice of whether to enroll on a dynamic pricing rate. This choice is important because not all

customers who can manage load within a variable or dynamic operating envelope may be able to manage load under a complex dynamic pricing structure.

PG&E recognizes that customers who have the capability to flex load in response to variable or dynamic operating envelopes could also be good candidates for responding to dynamic prices, especially if/once they no longer are required to abide by the operating envelope. However, responding to price signals requires leveraging algorithms that enable price arbitrage and bill savings optimization that may add complexity beyond what is needed to respond to capacity-based operating envelopes. PG&E would propose that instead, existing customers utilizing variable or dynamic operating envelopes be provided information about dynamic rate pilots and that customers make the active choice to enroll on such rates. For some customers, this may especially be an attractive opportunity if/once they roll off programs that require variable or dynamic operating envelopes.

II. CONCLUSION

PG&E appreciates the opportunity to provide these supplemental responses to the remaining questions posed in the ACR. PG&E looks forward to continuing to review these responses with the Commission and Stakeholders.

Respectfully Submitted,

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