Pacific Gas and Electric Company
Estrella Substation and Paso Robles Reinforcement Project
Proponent's Environmental Assessment (A.17-01-023)

Response to CPUC Data Request No. 3

On May 21, 2019, the California Public Utilities Commission (CPUC) requested additional data from Pacific Gas and Electric Company's (PG&E), as well as Horizon West Transmission, LLC and the California Independent System Operator, regarding the Estrella Substation and Paso Robles Reinforcement Project. Below are PG&E's responses to the data requests in Data Request No. 3 that the CPUC requested that PG&E respond to. Each data request is numbered according to the list, followed by PG&E's response.

Request #3-1:

PG&E contends that the restoration time for a 70 kV line outage is a minimum of 24 hours. The Draft ASR accounted for this possibility, but our assumption is that this would be an extensive and unlikely outage duration. The California Independent System Operator (CAISO) suggests that the restoration time typically might be closer to 10 to 12 hours (see attached CAISO comments). Please provide evidence supporting PG&E's restoration time estimate of a "minimum" of 24 hours to restore a 70 kV line outage. Evidence should include a record of local (Paso Robles Distribution Planning Area) and system-wide restoration times for 70 kV facilities along with description of the outages.

Response:

Our statement that "a transmission-level battery energy storage system (BESS) would need to provide a minimum of 24 hours of load relief to allow for sufficient time to conduct repairs" on the Templeton-Paso Robles 70 kV line was not intended to be a blanket statement that all repairs to this line, were an outage to occur, would take a minimum of 24 hours. We proposed 24 hours of load relief as a prudent minimum amount of time to restore an outage on the 70 kV line and to orient our discussion of the BESS alternative. Some outages could be restored in less time, while others may take more time.

As indicated by the data in the spreadsheet provided with this response as Exhibit 1 and incorporated herein, unplanned outages with restoration times ranging from several days to minutes have occurred on 70 kV and 115 kV lines in PG&E's service territory in the last five years, although none of those occurred on 70 kV lines in the Paso Robles DPA. More specifically, the data shows that in the last five years in PG&E's service territory, there have been: (1) 44 outages on 70 kV lines that lasted more than 24 hours (maximum outage duration was over 22 days); and (2) 133 outages on 115 kV lines that lasted for more than 24 hours (maximum outage duration was over 178 days). Given the data presented on actual restoration time, it would be prudent to size the battery to provide several days of power to prepare for a reasonable worst case scenario if a battery was able satisfy the requirements of NERC TPL-001-4. However, as discussed below and in our comments on the Draft ASR, a battery cannot meet the NERC standard in an N-1 contingency such as an unplanned outage on the Templeton-Paso Robles 70 kV line

because the standard requires solving all N-1 contingencies, not just those that are likely to occur as the CPUC's comments suggest ("our assumption is that this [an outage lasting 24 hours or longer] would be an extensive and unlikely outage duration").

With respect to an N-1 contingency, the NERC standard is a strict compliance standard – either the system is in compliance or it is not. There is no consideration of the probability of an event occurring or the probability that the event will last more or less than a certain amount of time. Accordingly, the CPUC's statement that its "assumption is that this [an outage with a minimum restoration time of 24 hours] would be an extensive and unlikely outage duration" is inconsistent with strict compliance requirement of the NERC TPL-001-4 standard for P1 (N-1) contingencies. No matter what size battery is installed, there is always a probability that an N-1 event could occur that would exceed the discharge capability of the battery and result in voltage drop, thermal exceedance, and non-consequential load drop, none of which are allowed under the NERC standard. In addition, once the battery is discharged and the system is returned to normal, the battery cannot secure the grid against load drop should another N-1 contingency occur (see also CAISO's June 13, 2019 responses to Data Request No. 3, Items 5 and 7). The fact that such scenarios could occur conclusively demonstrates that a battery cannot resolve the system reliability issues that CAISO identified in the Los Padres Division and achieve compliance with the NERC standard for an N-1 contingency. Accordingly, a transmission level battery should be screened out from consideration in the Draft EIR.

With respect to your comment that CAISO "suggests that the restoration typically might be closer to 10- to 12 hours," we refer you to CAISO's June 13, 2019 response to Item 7 in Data Request No. 3, which refutes the CPUC's characterization.

Request #3-2:

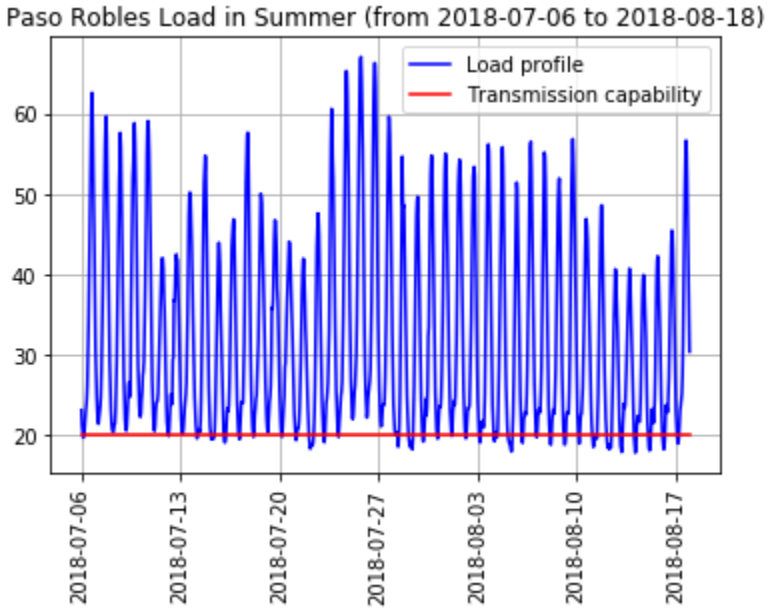
PG&E agrees with the Draft ASR analysis of energy storage in megawatts (MW) and megawatt-hours (MWh) needed to address reliability criteria per North American Electric Reliability Council (NERC) TPL-001-4 P1 requirements (PG&E comments on pdf p. 21) but suggests that a transmission-level battery storage solution is not an adequate alternative to the Proposed Project. PG&E bases this on the potential for a second 70 kV outage occurring subsequent to the restoration of an initial 70 kV outage that impacts the same Paso Robles Substation, with both outages lasting at least 24 hours. We assume that PG&E would agree that sequential, transmission-level outages, impacting the same substation are rare occurrences. Please provide evidence supporting PG&E concerns about the risk of not only one but two 24-hour outages occurring with the second occurring before the battery can sufficiently recharge. The response should include a record of similar historical outages within PG&E's service area that impacted the same substation, which would have eliminated the ability to charge a battery.

Response:

When we stated that we agree with ZGlobal's analysis of the MW and MWh sizing of the transmission connected BESS at the Paso Robles Substation in order to meet the NERC TPL-001-4 (P1) (N-1) requirement, we meant that we agreed that a battery with storage capacity of 65 MW / 715 MWh would be sufficient to sustain load at Paso Robles Substation for 24 hours if the system was in an N-1 condition resulting from a loss of the Templeton-Paso Robles 70 kV line;

we meant nothing more. As we stated on PDF page 20 of our comments on the Draft ASR, "Alternative BS-1C is sized to address an outage of 24 hours." However, we were not stating that we agree that connecting a battery of this size will comply with the NERC TPL-001-4 (P1) standard. It will not, as we explained in our response to Item 1 above (citing also to CAISO's responses to this data request) and as detailed further below.

Compliance with the NERC TPL-001-4 (P1) standard requires that the 70 kV system must have the capability to return to the normal state when the N-1 event is resolved. In other words, after the N-1 event is resolved the system must return to a state in which no load will be dropped if another N-1 event occurs. A BESS with a storage capacity of 65 MW / 715 MWh connected to the Templeton-Paso Robles 70 kV line cannot secure against load drop under all scenarios. If a 24-hour outage of the Templeton-Paso Robles 70 kV line occurred, the BESS would be completely discharged and, therefore, would not be ready to pick up load when the Templeton-Paso Robles 70 kV line is restored. During the peak summer months there are many days in which little to no charging of the battery would be possible. As shown in Figure 2 in our comments on the Draft ASR, there are days during the summer in which the minimum load demand is greater than the maximum of 20 MW that can be supplied by the Paso Robles-San Miguel 70 kV line. We are supplementing Figure 2 in our comments on the Draft ASR with the following figure showing load data at the substation for the period July 6 to August 18, 2018, which further demonstrates that there will be no charging window or an insufficient charging window during the summer peak period. If the system is in an N-1 condition for greater than 24 hours during this period, the battery will not be able to recharge at all and unable to secure the system against another N-1 contingency.



The transmission level BESS introduces uncertainty into the NERC compliance equation, which is not allowed. The NERC standard is a strict compliance standard. The BESS provides a solution for only as much power as it can store. The Proposed Project, by contrast, would provide a redundant 70 kV source to Paso Robles Substation that can provide power to the substation if the Templeton-Paso Robles 70 kV line has an outage, for as long as necessary. Accordingly, the

Proposed Project is best able to achieve compliance with the NERC standard, in addition to being the best project for achieving the Applicants' other reliability, capacity and flexibility objectives.

We acknowledge that we used an example of two consecutive 24-hour P1 (N-1) contingencies in our comments on the Draft ASR to illustrate the limitations of a transmission level BESS as a solution. We were not able to identify in our records a situation in which a second 70 kV outage occurred subsequent to the restoration of an initial 70 kV outage that impacted the same substation. However, the purpose of describing this scenario was to illustrate why a transmission level battery storage system cannot achieve compliance with the NERC TPL-001-4 (P1) standard. Even if it is unlikely that a second outage on the Templeton-Paso Robles 70 kV line would occur within hours after a 24-hour outage on the same line was restored, the probability of such an event is irrelevant. The simple fact is that a 65 MW / 715 MWh BESS would not be able to secure the system and prevent load drop during the second N-1 event because it would not be able to recharge sufficiently to secure the system against non-consequential load drop.

This scenario highlights the fundamental point we are trying to make: compliance with the NERC TPL-001-4 (P1) standard is a strict requirement – it is not based on the probability of an N-1 event occurring. The CPUC's comment that "We assume PG&E would agree that sequential, transmission-level outages, impacting the same substation are rare occurrences" misses this point. Whether we agree with the CPUC's comment or not does not change what the NERC standard requires or limit our obligation to comply with it.

Given the fact that installing a transmission-level BESS cannot achieve compliance with NERC TPL-001-4 (P1), this alternative should be screened out from further consideration in the Draft EIR.

Request #3-3:

PG&E has implemented an undervoltage load-shedding (UVLS) scheme within the Paso Robles DPA. This scheme, as we understand, is designed to shed non-consequential load in the event of unacceptably low voltages on the distribution system. Please verify the intent and functions of the UVLS.

In addition, please provide the historical record, since UVLS installation, of the (UVLS) operating. The record should include date, time, duration, cause, and impacted customers for every time the UVLS was initiated.

Response:

The intent of the undervoltage load-shedding scheme (UVLS) is to shed load in pre-determined blocks if the Paso Robles Substation 70 kV bus voltage remains at or below 63.5 kV until the voltage is stabilized above this level. We agree with the understanding you stated. The UVLS within the Paso Robles DPA was installed in 2006. To date, the UVLS has not been activated.