Horizon West Transmission

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

HWT Response to CPUC Data Request No. 3

On May 21, 2019, the California Public Utilities Commission (CPUC) requested additional information from Horizon West Transmission (HWT), LLC, regarding the Estrella Substation and Paso Robles Reinforcement Project Draft Alternatives Screening Report (ASR).

Request #4:

HWT states that they performed a preliminary assessment of Alternative Battery Storage (BS)-1: Battery Storage to Address the Transmission Objective and concluded it would not solve the reliability problems identified by the CAISO. This conflicts with PG&E's comments that "PG&E agrees with ZGlobal's analysis of the MW and MWh sizing of the transmission connected [battery energy storage system] BESS at the Paso Robles Substation in order to meet the NERC TPL-001-4 P1 requirements" (PG&E comments on pdf p. 21) HWT, please provide your preliminary assessment report, including assumptions, methodology, and results as well as the power flow models used for the assessment.

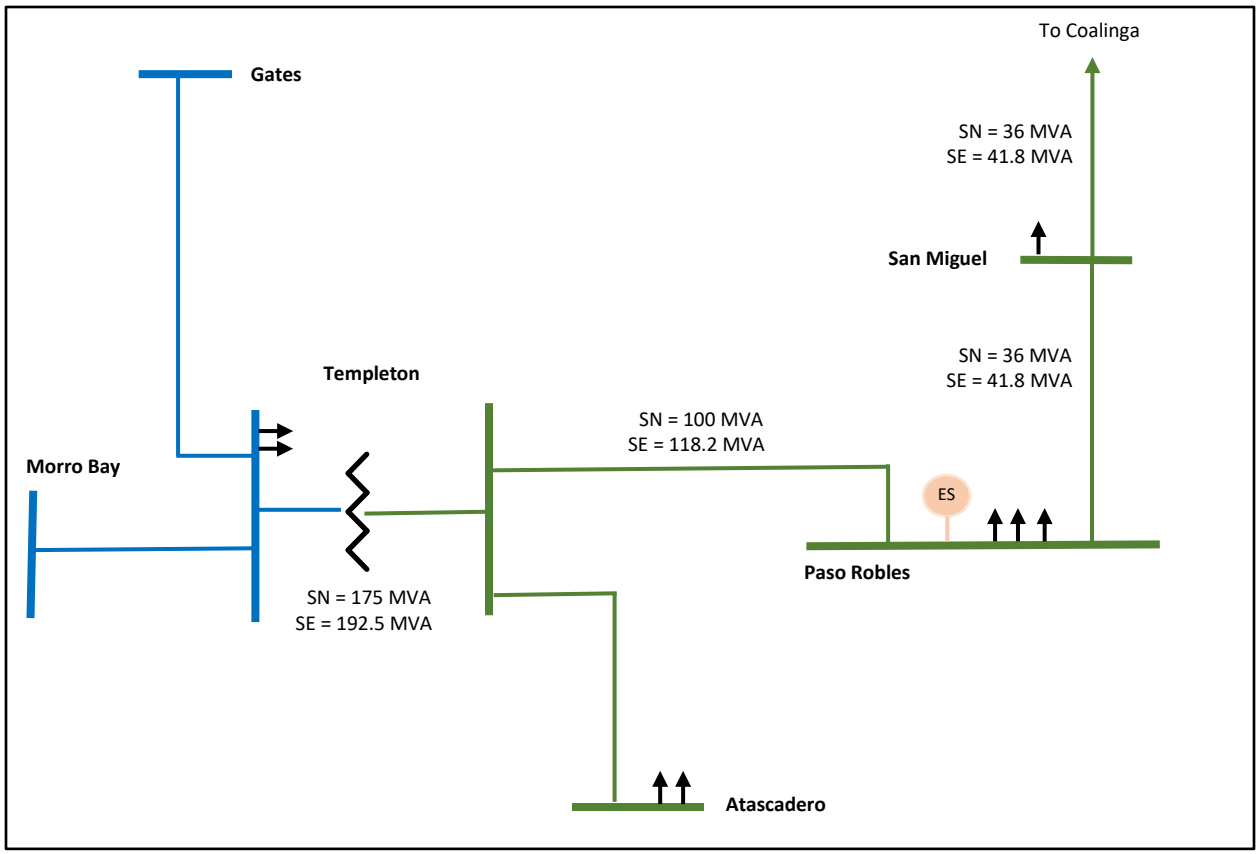
Response:

As indicated in the May 10, 2019 response from Horizon West Transmission (HWT) to the California Public Utilities Commission, HWT performed a "*preliminary assessment of battery storage in this area"*. The preliminary assessment was based on a review of the CAISO Reliability Studies and the CAISO Transmission Planning Process (TPP) Reports[1,2] that identify the need for the project, the Estrella Substation requirements and applicable standards. The nature of HWT's preliminary assessment involved evaluation of the Paso Robles Distribution Planning Area topology and ratings, reliability issues identified by the CAISO as well as the impact of the proposed Battery Storage system. Due to the radial nature of the area (e.g., the Paso Robles bus) when analyzing the critical contingencies, HWT did not perform extensive powerflow analysis during its preliminary assessment.

HWT's preliminary assessment of Alternative Battery Storage (BS-1) concluded that it would not solve the reliability problems identified by the CAISO.[1] This analysis determined several fatal flaws with the sizing and location proposed in the Alternative Battery Storage (BS-1). Specifically, the assessment focused on the lack of BS-1 studies performed during charging conditions and the inability of the BS-1 to charge under any area loading conditions and meet NERC Transmission System Planning Performance Requirement TPL-001-4 criteria. Figure 1 below illustrates the Paso Robles Distribution Planning Area and the proposed Energy Storage (ES) along with the Summer Normal (SN) and Summer Emergency (SE) Ratings in the immediate vicinity of the project.

[1] Board-Approved2013-2014TransmissionPlan_July162014.pdf
[2] BoardApproved-2017-2018_Transmission_Plan.pdf

Figure 1 – Paso Robles Distribution Planning Area

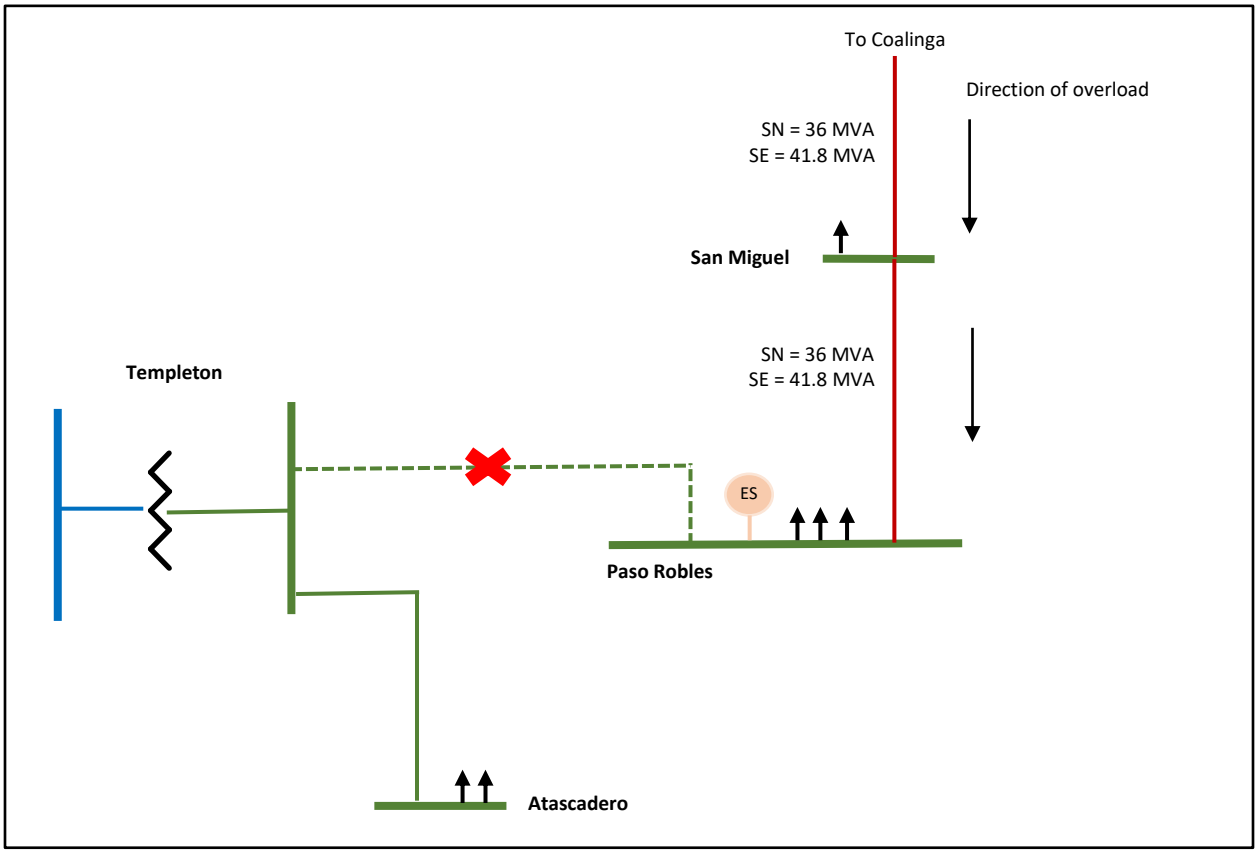


HWT's preliminary analysis determined that the proposed location and size of the battery storage, under charging conditions, would violate NERC TPL-001-4 criteria for critical outages identified by the CAISO and that served as the primary drivers for the Estrella Project. Additional preliminary analysis of critical contingencies is provided below.

N-1: Outage of Paso Robles-Templeton 70 kV line

Figure 2 below outlines the outcome of the critical contingency, Paso Robles-Templeton 70 kV, on the Paso Robles Distribution Planning Area. This P1 outage generates an overload to the San Miguel-Paso Robles 70 kV line and Coalinga #1-San Miguel 70 kV line during any assumed loading conditions of the existing system. The magnitude of the overload on the San Miguel-Paso Robles 70 kV line and Coalinga #1-San Miguel 70 kV line is significant and dependent on the amount of charging proposed (123 MW) plus any off-peak load at Paso Robles. For an outage of the Paso Robles – Templeton 70 kV line, the energy storage facility and the Paso Robles total load cannot exceed 41.8 MVA. By observation, the proposed energy storage far exceeds this limit on its own without accounting for Paso Robles 70 kV off peak load.

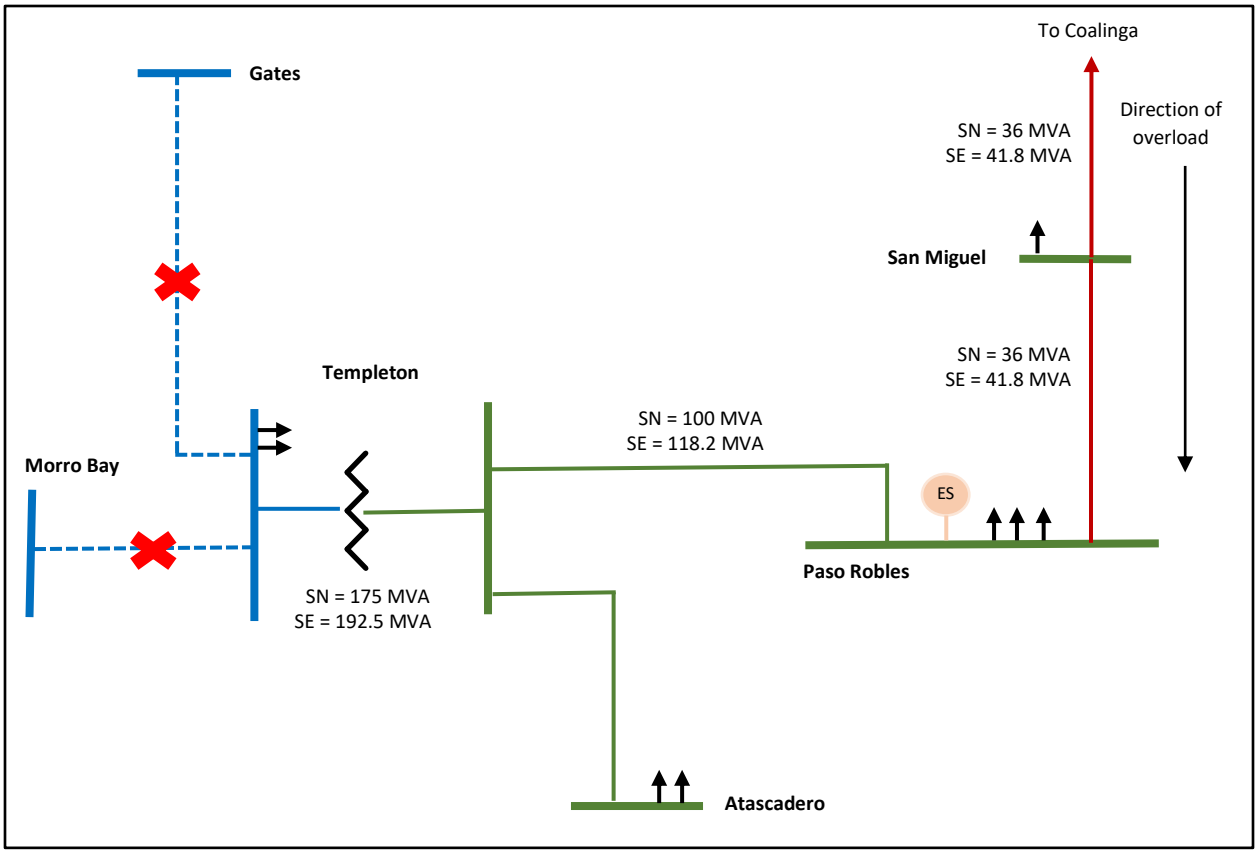
Figure 2 – N-1: Paso Robles-Templeton 70 kV



N-2: Outage of Gates-Templeton and Morro Bay-Templeton 230 kV Lines

Figure 3 below outlines the outcome of the critical contingency, Gates-Templeton combined with Morro Bay-Templeton 230 kV lines, on the Paso Robles Distribution Planning Area. This outage generates an overload to the San Miguel-Paso Robles 70 kV line and Coalinga #1-San Miguel 70 kV line during any assumed loading conditions of the existing system. The magnitude of the overload on the San Miguel-Paso Robles 70 kV line and Coalinga #1-San Miguel 70 kV line is significant and dependent on the amount of charging proposed (123 MW) plus any off-peak load at Paso Robles. For an outage of the Gates-Templeton combined with Morro Bay-Templeton 230 kV lines, the energy storage facility and the Paso Robles, Templeton, and Atascadero load cannot exceed 41.8 MVA. By observation, the proposed energy storage far exceeds this limit on its own without accounting for Paso Robles 70 kV off peak load.

Figure 3 – N-2 Gates-Templeton and Morro Bay-Templeton 230 kV lines

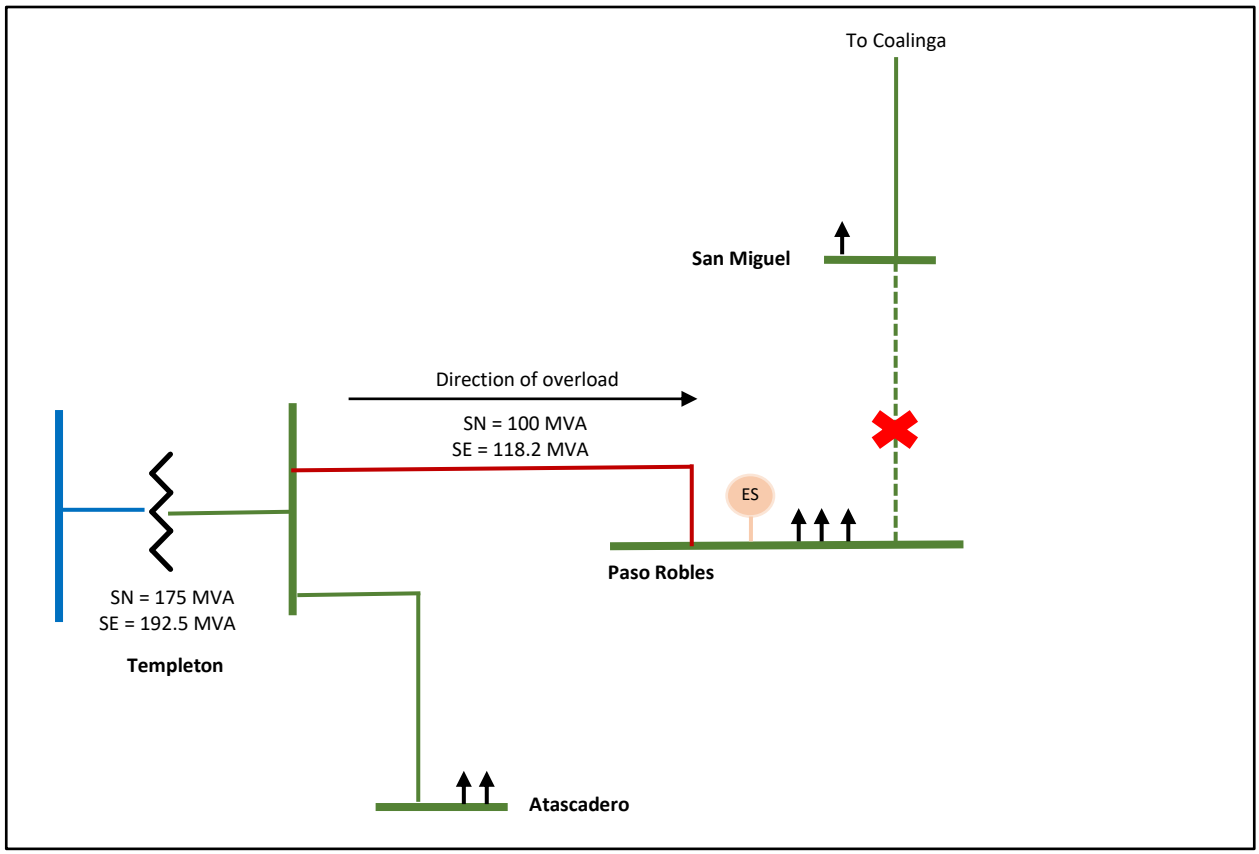


In addition to the proposed storage not resolving the CAISO identified critical outages, it also generates new overloads not present on the system today including a normal overload and emergency overload of the Templeton-Paso Robles 70 kV line following loss of the San Miguel-Paso Robles line. Although not all contingency combinations were evaluated for this preliminary assessment, an emergency overload during charging conditions for an outage of the San Miguel-Paso Robles 70 kV line is anticipated at a minimum and potentially others if a full assessment is to be performed.

P1: Outage of San Miguel-Paso Robles 70 kV line

Figure 4 below outlines the outcome of the San Miguel-Paso Robles 70 kV line on the Paso Robles Distribution Planning Area. This N-1 outage generates an overload to the Templeton-Paso Robles 70 kV line. For an outage of San Miguel – Paso Robles 70 kV line, the magnitude of the overload on the Templeton-Paso Robles 70 kV line is driven by the amount of charging proposed (123 MW) plus the local load at Paso Robles. The total of these two values are required to be less than 118 MVA, which the energy storage exceeds on its own, even without accounting for any Paso Robles 70 kV off-peak load.

Figure 4 - P1 Paso Robles-San Miguel 70 kV



In addition to the preliminary assessment discussed above, HWT also reviewed additional assessments[3] concerning the Paso Robles Distribution Planning Area performed by the CAISO and PG&E. In a communication to the CPUC dated 2/23/2018, the CAISO indicates that it "*studied the need for the project in the near-term planning horizon using the 2019 and 2022 summer peak base cases used in the 2017-2018 transmission planning process with the Estrella project removed from the model.*" The results were found to be similar to those identified in the original CAISO TPP assessments, including overload of the Coalinga-San Miguel 70 kV and San Miguel-Paso Robles 70 kV lines, as well as voltage collapse for NERC TPL-001-4 P1 contingencies. In addition to the Estrella project, the CAISO reviewed an alternative which was found to result in a higher estimated cost than the Estrella Substation project while failing *to "address the need identified by PG&E for a new load interconnection point for the distribution system in the area"*. HWT agrees with the results of the CAISO assessment concerning the reliability issues in the area and need for the Estrella Substation project.

As detailed in the same letter, PG&E indicated to the CAISO that "*building the Estrella substation project will allow normal switching reconfiguration to occur; eliminate forecasted overloads of facilities and provide operational flexibility by allowing the extra load to be shifted over to these facilities during events that require the system to be reconfigured.*" The letter also makes reference that a battery storage assessment performed by PG&E found that it "*did not provide the same level of reliability and operational flexibility to the system.*" The assessment indicated that "*to charge the battery, available bank capacity and construction of new feeders would be required, reducing the existing system capacity*

[3] Attachment 4-3.1c Letter from CAISO responding to the CPUC.pdf

available during the battery charging period." As a result, the location of the Estrella substation relative to the anticipated growth area, "*would be better able to project additional capacity throughout the distribution planning area because of the circuit ties and transfer capabilities that the three new 21 kV feeders would provide."* HWT concurs with the observations of this assessment and limitations concerning the proposed battery storage solution.

An additional concern pertains to potential load shedding. As indicated by CAISO[4], "*the interim operational action plan to address the reliability constraints in the area, until the Estrella substation project is in-service, is to rely on an undervoltage load shedding (UVLS) scheme that will trip load in the area that addresses the overload and voltage stability conditions under the P1 contingency.*" HWT concurs that replacing the Estrella Project with the proposed Battery Storage will require the use of UVLS on an indefinite basis to address the reliability issues and thus increasing the potential to load shedding.

Please note that for the Estrella Substation project, all primary studies and any assessment of drivers, impacts, mitigations and compliance for the Transmission System were performed by the CAISO. With respect to the specific statement by PG&E quoted in this request, HWT notes that the full sentence on p. 21 of PG&E's May 10, 2019 comments stated: "PG&E agrees 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, *but a transmission-level BESS is not a viable solution based on the following observations.*" HWT understands that battery and energy storage systems can provide relief to the bulk power system for certain conditions. However, HWT concurs with PG&E's conclusion that *"a transmission-level BESS is not a viable solution*" at this location, based on the observations noted in PG&E's May 10 comments as well as the other concerns and observations by the CAISO, PG&E, and HWT described above.

[4] Attachment 4-3.1c Letter from CAISO responding to the CPUC.pdf