

## 2018-19 Transmission Planning Process (TPP)

Submitted by	Company	Date Submitted
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PG&E provides the following comments in the 2018-19 Transmission Planning Process (TPP), with regard to the reliability results and economic and policy study updates presented and discussed during the Stakeholder meeting of September 21-22, 2018. PG&E appreciates the CAISO for recognizing the critical link of generation assumptions in reliability studies when considering the economic pressure being placed on gas-fired resources due to the significant amount of renewable resources being added to grid. This will be an important assumption to coordinate and properly assess system risks to ensure that reliability is optimized at least cost to customers.

PG&E's comments focus on the CAISO's request for stakeholders to propose solutions in this comment window related to the economic study of Local Capacity Requirements (LCR) in select local areas and sub-areas. PG&E recommends CAISO evaluate two different sets of solutions to prepare for the impacts of generation retirements in constrained local areas of the system.

First, PG&E believes there are certain candidate areas with the right load profile characteristics, in which preferred resource solutions (perhaps in combination with low cost transmission equipment upgrades, rerates, or operating procedures) can provide valuable LCR relief today, at a lower cost than either new major transmission capacity or backstop procurement of local generation. PG&E requests CAISO provide the necessary additional load shape information that will help PG&E to pursue economically cost-effective storage and/or preferred resources as part of a future CPUC procurement request.<sup>1</sup>

The second set of options PG&E proposes involves new transmission capacity. Over the longer-term planning horizon, as California moves to meet the accelerated de-carbonization commitments under SB 100 (i.e. 50% RPS by 2026, 60% by 2030, and 100% carbon-free by 2045), much more gas-fired generation will likely need to retire, including units in constrained local areas. PG&E encourages CAISO to begin evaluation now of new transmission projects that

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<sup>1</sup> PG&E understands it is CAISO's position that procurement of "economic" storage and preferred resources should proceed through the normal resource planning and procurement processes at the CPUC, and will not be considered for approval within the TPP, as would occur for new reliability transmission (or storage providing reliability-only duty).

can alleviate LCR constraints in the future, recognizing that major new transmission may take multiple TPP cycles to study and approve (and additional years to site, permit, and construct). PG&E provides proposals for three such projects below. PG&E notes that it is not seeking approval for these projects in the 2018-19 TPP, but rather requesting CAISO to begin the study process toward potential approval in a future TPP.

### **Local Capacity Requirements (LCR) in Select Local Areas and Sub-areas**

Based on the load shapes provided and the LCR needs described within the CAISO study results, there appear to be a number of PG&E LCR areas and sub-areas that would be candidates for preferred resource solutions to replace uneconomic gas-fired generation. PG&E requests that the CAISO confirm the specific estimate and energy-limited resource characteristics for the following PG&E local areas and sub-areas:

- The Bay Area subareas of Llagas and Contra Costa.
- The Sierra subareas of South of Rio Oso and South of Table Mountain.
- The Stockton subareas of Webber and Stanislaus.
- The Greater Fresno subareas of Reedley, Borden, and Herndon.
- The Kern subareas of Kern and Kern Oil.

PG&E identified these areas based upon the peak load profiles projected to exceed capacity for timeframes under an estimated 6 hours, including 4 subareas with projected timeframes of approximately 2 hours or less.

### **Transmission Project Proposals**

#### South Bay-Moss Landing and San Jose Sub-areas

The CAISO's 10-year LCR study results for South Bay–Moss Landing Sub-area identified an LCR need of 2100 MW under Category C contingency. The most limiting contingency is a N-1-1 of Tesla – Metcalf and Moss Landing – Los Banos 500 kV lines, which is expected to overload the Moss Landing – Las Aguilas 230 kV Line. PG&E believes that major transmission upgrades in this area such as bringing a new 500 kV source would be required in order to relieve the identified overloads and drastically reduce the LCR in this sub-area in order to reduce reliance on local resources in the longer term.

One potential option PG&E would propose for reducing the LCR need within South Bay – Moss Landing Sub-area is to bring one more 500 kV transmission line from Tesla into the Bay Area terminating at Metcalf in order to increase power transfer capability from the bulk system. Specifically, PG&E proposes to utilize existing 230 kV line facilities emanating from Tesla Substation towards the Bay Area by rebuilding into a single 500 kV line. Then a new 500/230 kV Substation would be installed in the Sunol area, where multiple 230 kV Lines from Newark turn north or south. The proposed Sunol Substation will be a stop for the new 500 kV line between

Tesla and Metcalf. The section of the new 500 kV line between Sunol and Metcalf substation would also be developed by rebuilding existing 230 kV line facilities already going into Metcalf Substation.

The new Sunol Substation will have one 500/230 kV transformer and also loop into multiple 230 kV lines in the area to maintain existing connections, to further increase the power transfer capacity and improve overall reliability.

Permitting for a project of this scale is expected to be complex and lengthy. In service date could be about 10 years from approval and the cost would likely range between \$500 million to \$1 billion.

In addition to the New Tesla – Sunol – Metcalf 500 kV Line with Sunol 500/230 kV Substation described above, and in order to fully realize the LCR reduction for both the South Bay – Moss Landing and San Jose Sub-areas, a few 115 kV facility overloads will need to be mitigated. PG&E has identified that the 115 kV lines from Newark to NRS and Newark to Kifer, a total of about 28 circuit miles would need to be reconducted. Alternatively, installation of about 400 MW of energy storage in this area may also mitigate some of these concerns.

Together this collection of upgrades would enable the reduction of generation of about 1500 MW in the South Bay – Moss Landing and San Jose Sub-areas.

Please refer to “Attachment 1 – PGE 2018\_LCR Reduction Projects-Sunol.pdf” for a pre and post single line diagram, vicinity maps and for pre and post power flow solutions for this option.

A second alternative would include upgrading (unbundling and reconductoring) the same existing 230 kV tower line above to create a new Tesla – Metcalf 230 kV Line (~ 46 mi). The new 230 kV line would provide additional importing capability support from Tesla to Metcalf area and relieve the strain on the southern importing boundary of South Bay – Moss Landing Sub Area. However, PG&E studies show that the reduction of LCR with this 230 kV only option would be limited to about 300 MW and thus the area would still be reliant on local area generation in the long term particularly as load grows in the area. This alternative should be further evaluated with additional preferred resources in the area to potentially have a greater impact on meeting or reducing the LCR. The cost for this option is expected to be lower than Alternative 1 but much of the tower rebuilding and reconductoring still remains. The in-service date is also expected to be about 10 years from approval.

A third alternative would be to reconductor the Moss Landing – Las Aguilas 230 kV and Moss Landing – Coburn – Las Aguilas 230 kV Lines (~52 mi). This alternative is likely to reduce the LCR by about 300-400 MW. This alternative should also be further evaluated with additional preferred resources in the area to potentially have a greater impact on meeting or reducing the LCR. The cost for this option is expected to be lower than Alternative 1 and 2 but may still be

significant due to the length of the line and the amount of tower rebuilding expected to be needed.

Similar to Alternative 1, in order to fully realize the LCR reduction indicated, the limitations identified for the San Jose Sub-area will also need to be mitigated. PG&E estimates that a total of about 28 circuit miles of 115 kV lines would need to be reconductored or preferred resources such as energy storage would need to be installed within the San Jose 115 kV system.

#### Ames/Pittsburg/Oakland Sub-area

CAISO identified a 10-year LCR requirement of 2022 MW under Category C contingencies for this sub-area. The most limiting contingencies include 1) Newark – Ravenswood and Tesla – Ravenswood 230 kV Line and 2) Moraga – Sobrante and Moraga – Claremont No.1 115 kV lines which overload the Ames – Ravenswood No.1 115 kV line and Moraga – Claremont No.2 115 kV lines, respectively. PG&E believes major transmission upgrades in this area such as bringing a new 500 kV source would be required in order to relieve the identified overloads as well as to further reduce reliance local resources and further reduce the LCR requirement.

One potential option that can be consider for the long term, is to build a new 500 kV and 230 kV substation to be located in Solano County which would connect to the Vaca Dixon – Tesla 500 kV line. This option would then include building two new 230 kV lines from the new substation to Pittsburg 230 kV Substation which is approximately 5.3 miles in distance. The new 230 kV lines will likely need to cross under the Sacramento River to the East Bay. The new substation connecting to the Vaca Dixon – Tesla 500 kV line along with the 230 kV lines would add a new and diverse source into the area that could effectively reduce reliance on local generation and reduce the LCR in the sub-area. Resources can be utilized from the northern or southern part of the system giving more flexibility for renewable power to serve Bay Area load.

Permitting for a project of this scale is expected to be complex and lengthy. In service date could be about 10 years from approval and the cost would likely range between \$500 million to \$1 billion.

Please refer to attachment “Attachment 2 – PGE 2018\_LCR Reduction Projects-Collinsville.pdf” to find a pre and post single line diagram, vicinity maps and for pre and post power flow solutions for this option.

As a general matter, please note that with the options presented above for either or both local sub-areas, the implication is that the greater Bay Area generation could be significantly reduced in the longer term. PG&E strongly recommends CAISO to fully evaluate how new projects, transmission addition and/or preferred resources, such as these would be integrated in such a way that no other overall reliability concerns are created as a result of the lack of generation in such a large load pocket as the Greater Bay Area.

### Oakland Sub-area

CAISO's 2028 Long-Term LCR study results for Oakland sub-area indicated that the worst Category C contingency of Oakland C-X#2 & #3 115 kV cables can overload the Oakland D-L 115 kV cable, which established 14 MW of LCR need in Oakland sub-area. With the Alameda CT in service, there is no deficiency identified. PG&E recommends monitoring the load forecast in this sub-area and if needed to increase the amount of preferred resources to be installed in this area to ensure the longer term 10 year horizon is appropriately covered.

### Pease Sub-area

CAISO's long-term LCR study results for Pease Sub-area indicated an LCR need of 92 MW under Category C contingency. The most limiting contingency is N-1-1 of losing Palermo – Pease 115 kV and Pease – Rio Oso 115 kV lines, which will overload the Table Mountain – Peachton and Peachton – Pease 60 kV Lines.

As shown during the stakeholder meeting, it is clear that this sub-area is radially served from Table Mountain Substation with a long 60 kV line when losing the Pease 115 kV source (either through L-1-1 of losing the two 115 kV lines terminated at Pease or through T-1-1 of losing the two 115/60 kV transformers). As such, PG&E notes that it is possible that such contingencies may result in local voltage collapse before thermal limits are reached. This would be particularly the case if no local generation is present.

To address the identified concerns driving the LCR need in the Pease Sub-area, PG&E would like to propose the following alternatives for the CAISO to consider:

Alternative 1: Install a DTT to trip the load at Harter upon the loss of Palermo – Pease and Pease – Rio Oso 115 kV Lines (P7-1). Depending on the remaining generation, voltage support equipment (25 MVARs) will need to be installed in order to reduce the local LCR need to roughly 50 MW.

Alternative 2: Looping Palermo – Nicolaus 115 kV line into Pease 115 kV Bus. Pease 115 kV bus is being rebuilt into BAAH. Looping in the line will require a 5th bay to be installed. The new loop would be installed on a double circuit pole and be about 5.5 miles in length. This alternative is expected to remove all local LCR needs.

Alternative 3: Convert Table Mountain – Peachton and Peachton – Pease 60 kV Lines to 115 kV lines. This line is about 30 miles in length and has several substations along the way. Assuming no reconductoring is required, in order to convert to 115 kV operation, this option would require conversion of at least 5 substations, needing to replace a total of seven (7) distribution transformers, building new bus terminations at Table Mountain and Pease Substations and upgrading any limiting elements along the lines and inside each substation. This alternative could reduce the LCR needs to about 20 MW. This project is not recommended due to the potential high cost while not entirely mitigating the need for local generation.