

Submit comment on Reliability Assessment and Study Updates

2024-2025 Transmission planning process

1. Provide your organization's comments on the preliminary reliability results for the North area:

The City of Santa Clara, dba Silicon Valley Power (SVP), appreciates the opportunity to comment on developing the 2024-25 Transmission Plan. The comments and questions below address the material presented at the CAISO Stakeholder meeting on September 23-24, 2024. SVP acknowledges the significant efforts of the CAISO and PTO staff to develop this material.

SVP's Load Continues to Grow At a Dramatic Rate, and CEC and SVP Expect Significant Load Growth Over the Next Several Years

As the CAISO is aware, SVP's load is expected to grow considerably in the next several years, primarily driven by hyper-scale data centers.¹ SVP has had five new 60 kV-connected data centers come into service in the past three years, and SVP is actively working with fifteen future data center customers. Four 60 kV-connected data centers are under construction and expected to be in service in the next two years. Eight 60 kV-connected data centers are waiting for SVP's approval to connect to the SVP system contingent upon the completion of the CAISO-proposed "Hybrid" Transmission projects and identified PG&E 115 kV transmission projects. Each of these existing and future data centers are expected to ramp up significantly in the future 10-year planning horizon and beyond, causing SVP's 1-in-10 peak load forecast to increase to 1,368 MW in 2034.

SVP Supports CAISO-Proposed "Hybrid" Transmission Project for the San Jose Area

During the stakeholder meeting on September 23, 2024, the CAISO presented the San Jose Area Transmission Plan Update.² The CAISO-proposed "Hybrid" transmission project ("Hybrid project," hereafter)

- 1. Replaces the previously-approved HVDC line between Newark and NRS with a high capacity 230 kV AC line;
- A 1,000 MW HVDC link between Metcalf and San Jose B 230 kV, instead of a 500 MW HVDC project that was approved in 2021-2022 TPP³; and

¹ SVP's load growth includes load where back-up generation has been granted CEC-approved small generator exemptions for the hyper-scale data centers in SVP's service territory.

² "San Jose Area Transmission Plan Update," CAISO 2024-25 Transmission Planning Process Stakeholder Meeting September, 23-24, 2024.

³ SVP acknowledges that the ultimate HVDC plan envisioned a 1,000MW HVDC converter station at Metcalf with two HVDC lines with 500MW capacity connected to San Jose B and Newark.

3. A high capacity 230 kV AC circuit between San Jose B and NRS.

SVP's independent assessment indicates that adding the high capacity 230 kV AC circuit between San Jose B and NRS (assuming PG&E's FMC-KRS 115 kV line connecting SVP with the PG&E system were reconductored as well) would increase SVP's import capability and improve the San Jose area's overall reliability. However, SVP's assessment indicates a potential adverse impact on SVP's transmission system that must be addressed if the Hybrid project is approved, as described in the subsequent sections below.

SVP agrees with the CAISO that "other local 230 kV and 115 kV upgrades to the existing facilities…" must be "…included in the 2024-2025 TPP"⁴ to further increase SVP's load serving ability. Therefore, SVP requests that the CAISO management recommendation of the "Hybrid" project in the CAISO Board meeting on 11/12/2024 be approved, including the mitigation measures needed to address the adverse impacts to SVP identified below.

SVP's Studies Indicate That Replacement of Newark - NRS HVDC with 230 kV AC and Addition of San Jose B – NRS 230 kV AC Cause Significant Fault Duty Issues on NRS 115 kV and 230 kV Lines That Need to be Addressed

SVP performed its own studies, using the 2028 and 2034 short circuit cases from the 2023-2024 TPP as the starting (pre-project) cases. SVP then added the above-mentioned Hybrid project to develop the post-project cases for the years 2028 and 2034. In the 2028 post-project cases, SVP assumed all the elements of the Hybrid project would be built, except for the San Jose B to NRS 230kV line.⁵ Table 1 summarizes the breaker fault duty issues under both pre- and post-project cases in 2028 and 2034 on the NRS 230kV bus. It shows that with the original (previously-approved) CAISO plan (pre-project case), none of the 230kV breakers at NRS are overdutied. With the addition of the 230kV lines between Newark and NRS and San Jose B to NRS, the overduty issues increase significantly (well exceeding the threshold of **90%**) on the existing NRS 230kV breakers. These results demonstrate that the four existing 40kA breakers at NRS are insufficient with the Hybrid project and will need to be replaced.

Breaker	Breaker		2028	2034	
	Rating	Pre- Project	Post-Project	Pre- Project	Post- Project
NRS-SSS 230kV	40kA	58%	81%	60%	94.9%
NRS 230/115kV transformer	40kA	75%	99%	77%	111%
NRS 230kV to HVDC	63kA	47%	N/A	48%	N/A
NRS 230kV to Newark	63kA	N/A	47%	N/A`	55%
NRS 230kV to San Jose B	63kA	N/A	N/A	N/A	64%

Table 1: Pre-and Post-Hybrid Project Fault Duty (%) on NRS 230kV Bus

N/A: Not Applicable

⁴ "San Jose Area Transmission Plan Update," CAISO 2024-25 Transmission Planning Process Stakeholder Meeting September, 23-24, 2024, page 33.

⁵ Per CAISO, the proposed *San Jose B to NRS 230kV* line is expected to be operational by 2030. See "San Jose Area Transmission Plan Update," CAISO 2024-25 Transmission Planning Process Stakeholder Meeting September, 23-24, 2024.

SVP's studies indicate a similar breaker fault overduty occurs with respect to the NRS 115kV bus. Table 2 summarizes the breaker fault duty issues under both pre- and post-project cases in 2028 and 2034 on the NRS 115kV bus. It shows that with the original (previously-approved) CAISO plan, none of the 115kV breakers at NRS are overdutied. With the addition of the Hybrid project, the overduty issues increased significantly (well exceeding the threshold of **90%**) for the NRS 115kV breakers. These results demonstrate that the 63kA breakers (existing and future) at the NRS 115kV switchyard are insufficient with the Hybrid project. This means that the Hybrid project would require replacing all the NRS 115kV existing and newly installed 63kA breakers with new breakers with a minimum rating of 80kA.

Breaker	2028		2034	
	Pre-Project	Post- Project	Pre-Project	Post- Project
NRS300 CB 312 to KRS	84.9%	97.0%	86.2%	97.6%
NRS300 CB 322 to KRS	86.1%	98.1%	86.5%	98.5%
NRS300 CB 342 to Newark F	82.1%	94.7%	81.8%	95.6%
NRS300 CB 372 to 230kV Xfmr	81.9%	90.6%	83.3%	90.9%
NRS300 CB 382 to 60kV Xfmr	85.6%	97.6%	87.1%	98.0%
NRS400 CB 402 to 60kV Xfmr	86.8%	99.5%	N/A	N/A
NRS400 CB 412 to 230kV Xfmr	83.7%	93.3%	83.3%	93.7%
NRS400 CB 442 to NewarkD	83.0%	96.3%	82.5%	97.3%
NRS400 CB 462 to SRS	87.3%	100.0%	86.9%	100.5%

Table 2: Pre-and Post-Hybrid Project Fault Duty (%) on NRS 115kV Bus

N/A: Not Applicable

Currently, there is only one vendor that manufactures 80kA breakers rated for 123kV, and due to supply chain challenges and long delivery timelines, it will not be possible to procure 80kA breakers by 2028, when the Newark-NRS 230kV portion of the Hybrid project is expected to be operational. SVP will investigate with the original equipment manufacturer if the 63kA breakers that have already been ordered will be capable of interrupting fault duties that will exceed 90% in 2028. The alternative means to mitigate the overduty condition will be to open the NRS 392 breaker until such time as the breakers can be replaced with 80kA-rated breakers. To be clear, SVP's NRS substation has no space to accommodate the addition of series reactors to address short circuit issues. Without short circuit mitigation planned for the CAISO San Jose Long Term plan, the NRS 115kV 80kA breakers planned for service in 2030 will be operating with fault duties starting at 80%, which is unacceptably high given the magnitude of resources and additional projects that will be required to meet future power delivery requirements in the area. Each of these future projects will exacerbate the overduty condition on these breakers. SVP recommends that CAISO's San Jose Long Term plan include short circuit mitigation plans for the new LS Power 230kV AC transmission line and for the future San Jose B to NRS 230kV AC transmission line anticipated to be proposed in the CAISO's 2024-2025 Transmission Plan.

Hybrid Project Requires Additional Upgrades to SVP's Transmission System and SVP Import Facilities

SVP used the CAISO 2024-2025 TPP preliminary reliability assessment cases for the Greater Bay Area (GBA) Summer Peak conditions for years 2029, 2034, and 2039 to perform steady state power flow analysis to assess the potential for adverse impacts of the Hybrid project on SVP's system.

Table 3 below summarizes SVP's findings that the adverse impacts to SVP's key facilities, which occur with both pre- and post-project loadings, are not fully mitigated by the proposed Hybrid project in 2029, 2034, and 2039.

Overloaded	Contingency	2029		2034		2039	
Facility		Pre- Project	Post- Project	Pre- Project	Post- Project	Pre- Project	Post- Project
FMC-KRS 115kV	New San Jose B to NRS 230kV (P1)	N/A	155.0%	N/A	151.0%	N/A	142.0%

Table 3: Pre-and Post- Hybrid Project Loadings: 2029, 2034 and 2039

As shown in Table 3, there were no P1 overloads found on one of the SVP's import facilities , i.e., FMC-KRS (Kifer) 115kV found in the pre-Project case. However, with the Hybrid project, under the loss of the new San Jose B to NRS 230kV, significant overloads are identified as early as in 2029. The reconductoring of PG&E's 115 kV lines is necessary to maximize the impact of the proposed 230 kV project. Therefore, SVP supports the PG&E Request Window (RW) project alternative that includes the reconductoring of the FMC-KRS 115kV line.⁶

SVP also observed considerably lower voltages with the Hybrid Project under both normal and contingency conditions. In particular, voltages at Newark are 0.98 PU (1.0 PU), and NRS 230 kV are 0.973 PU (0.992 PU) under N-0 in post-Project (pre-Project) cases. Such low voltages under the post-project case would indicate the need for adding more voltage support (shunt capacitors) at appropriate locations, preferably at Newark. Given the long lead time required to secure the land needed for these mitigation measures, SVP recommends the evaluation of land procurement to house the new equipment as soon as possible.

The CAISO has also identified potential additional upgrades, such as the reconductoring of Los Esteros (SSS) to NRS 230kV lines with advanced conductors (with a 1,000MVA rating), to increase reliability in the area. The SSS-NRS 230kV capacity is currently limited by the rating of SVP's Phase-Shifting Transformer (PST), which is ~420MVA. SVP notes that the rating of the bundled 230kV cables is ~827MVA (normal rating). SVP submits that further studies should be conducted to assess the adequacy of the ratings of these existing facilities. Meanwhile, SVP is considering installing a second PST at SSS to improve the controllability of the flows on the SSS-NRS 230kV line.

The CAISO's estimated in-service date for the NRS-San Jose B 230kV AC line is 2030.⁷ While a proposed five (5) year project timeline is standard and appropriate, SVP's studies show that any delay in this anticipated timeline will create additional overloads on SVP's system. SVP performed a sensitivity study without the NRS-San Jose B 230kV AC line for the year 2034. Under the P6 contingency entailing the loss of the Newark-NRS 230kV line followed by the loss of the PST path, as summarized in Table 4, SVP observes significant overloads on key SVP import facilities.

⁶ See "SOUTH BAY 115KV SYSTEMS REINFORCEMENT PROJECT," pp-80-81, PG&E's 2024 Request Window Proposals, CAISO 2024-2025 Transmission Planning Process , September 24, 2024

⁷ "San Jose Area Transmission Plan Update," CAISO 2024-25 Transmission Planning Process Stakeholder Meeting September, 23-24, 2024, page 30.

Table 4: Overloads Observed With Hybrid Project, but Without Proposed NRS-San Jose B 230kV AC Line

Overloaded Facility	Los Esteros-Nortech Reactor Bypassed	Los Esteros- Nortech Reactor Inserted
Los Esteros – Nortech 115 kV	156.4%	121.2%
Nortech-NRS 300 115 kV	142.0%	105.1%
Newark D – NRS 400 115 kV	111.5%	125.6%
Newark F – NRS 300 115 kV	<100%	101.8%
FMC Jct – KRS 115 kV	135.3%	152.8%
FMC – San Jose B 115 kV	110.4%	121.4%

These overloads indicate that certain PG&E 115kV facilities, such as PG&E's Los Esteros–Nortech 115 kV line, PG&E's Nortech-NRS 300 115 kV line, and PG&E's Newark-NRS 115kV, should be reconductored if the NRS-San Jose B 230kV AC segment of the Hybrid project cannot be constructed and energized by the expected in-service date.

2. Provide your organization's comments on the preliminary reliability results for the South area:

No comments at this time.

3. Provide your organization's comments on the PTO's proposed reliability alternatives (SDG&E, PG&E, SCE, VEA):

PG&E proposed a "South Bay 115kV Systems Reinforcement Project (Conceptual)" during the September 24th stakeholder meeting.⁸ One element of PG&E's proposal is to upgrade the PG&E and SVP 115kV corridor. SVP supports Alternative 1A, which includes reconductoring the Kifer-FMC 115kV line for the reasons described in SVP's response to Q.1 above.

4. Provide your organization's comments on the high voltage TAC update:

No comments at this time.

5. Provide your organization's comments on the policy assessment update:

No comments at this time.

6. Provide your organization's comments on the economic assessment update:

No comments at this time.

⁸ See "SOUTH BAY 115KV SYSTEMS REINFORCEMENT PROJECT," pp-78-81, PG&E's 2024 Request Window Proposals, CAISO 2024-2025 Transmission Planning Process , September 24, 2024.

7. Provide any additional comments your organization has on the September 23-24 Transmission Planning Process Meeting:

No comments at this time.