



Powering The Center of What's Possible

March 22, 2021

Chair Angelina Galiteva  
Vice-Chair Ashutosh Bhagwat  
Governor Severin Borenstein  
Governor Mary Leslie  
Governor Jan Schori

California Independent System Operator  
250 Outcropping Way  
Folsom, California

## **Silicon Valley Power's Rapid Load Growth and Urgent Need to Plan for Capacity Increases in South Bay**

Dear Chairwoman Galiteva and Governors,

The City of Santa Clara *dba* Silicon Valley Power (SVP) applauds the CAISO staff and management for the work done under the 2021-2022 Transmission Plan.

### **Summary**

SVP's load is expected to grow considerably in the next several years, primarily driven by hyper-scale data centers. Just to provide you some idea about the extent of this load growth, while SVP's actual 2020 peak was **592 MW**, California Energy Commission's (CEC) recently adopted load forecast shows SVP's peak load in 2025 at **1,011 MW**. This forecasted level of load for 2025 is even higher than the SVP peak load of 865 MW that was assumed under the *SVP High Load sensitivity* case for the year 2030 in the CAISO 2020-2021 Transmission Planning process (TPP). With the rapid growth in the SVP internal load and the load surrounding SVP's system in the San Jose sub-area, several violations of the CAISO reliability planning criteria are expected on the multiple PG&E transmission facilities serving the SVP load. Typically, PG&E starts detailed permitting and design of projects following CAISO project approval. **However, SVP requests the Board to direct CAISO Staff to work with PG&E to begin this process now based upon the recognized need to provide transmission capacity increases in South Bay.**

### **SVP's Significant Load Growth and Past TPP Modeling**

The amount of new data center interest and construction has increased dramatically over the last few years. Since the high load expected in the SVP area was not part of the adopted CEC load forecast then, the CAISO's TPP *baseline* cases did not incorporate them. However, the CAISO modeled



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higher load levels based on previously estimated data center load projections as part of the “SVP High Load” sensitivity scenario in the 2019-2020 TPP and 2020-2021 TPP. The CAISO found multiple violations of the CAISO planning criteria on critical facilities serving SVP load in the baseline case in the long-term and the *SVP High Load* sensitivity case both in the short- and long-term in the last two transmission planning cycles. The CAISO has identified “Continue to Monitor Future Load Forecast” or “Sensitivity only” as mitigation measures for those *baseline* and *SVP High Load sensitivity* scenario criteria violations. In summary, because of the agreed State Agency agreement to use the latest adopted CEC forecast in the CAISO planning process, there has not been any approved transmission projects in the last two planning cycles for this area.

### **CEC’s Latest Adopted Load Forecast Accurately Reflects SVP’s Load Projections**

As mentioned earlier, SVP’s load growth is primarily driven by hyper-scale data centers in SVP’s service territory. These new data centers are in construction and will be coming online between 2021 and 2025. CEC’s latest adopted *California Energy Demand Update 2020-2030* managed forecast reflects SVP’s currently expected rapid load growth. The CAISO 2020-2021 Transmission Plan noted multiple violations of the CAISO planning criteria on one of the critical facilities serving SVP load, that is, the *Los Esteros-Nortech 115 kV* line in both the short- and long-term. To mitigate these overloads, the CAISO has indicated that it is working with PG&E to develop a project which could include reconductoring the 115 kV line. SVP welcomes the coordination between the CAISO and PG&E to upgrade PG&E’s south bay area transmission system, which is where SVP load exists. SVP’s preliminary assessment using the latest CEC’s load forecast, which would be used in the CAISO’s 2021-2022 TPP, shows several reliability violations identified on multiple critical facilities serving SVP loads in the year 2025.

### **Significant Rapid Load Growth in San Jose Area Compounds the Need for Advancing to Plan Now for Transmission Capacity Increases**

In addition to the SVP internal load, the load surrounding SVP’s system in the San Jose area is expected to grow precipitously in the near-term. Now that the CEC has adopted a forecast at a much higher level than assumed in the past TPP cycles, we are confident that CAISO Staff will recommend transmission projects to mitigate those overloads in the 2021-2022 TPP. Since historically it has taken PG&E more than four years on average to reductor transmission lines after CAISO approval, PG&E and CAISO need to proceed immediately with planning and design work for multiple facilities serving the South Bay. Therefore, SVP requests the Board to direct CAISO Staff to work with PG&E to begin this process now.

Further details on the background and technical analyses on this topic can be found in SVP’s comments on the 2021-2022 Transmission Study Plan (see Attachment A) and the Draft 2020-2021 Transmission Plan (see Attachment B).



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SVP thanks the CAISO Board and Management for the opportunity to provide these comments and hopes to work closely with the CAISO and PG&E to address SVP's urgent capacity increase needs.

Sincerely,

Manuel Pineda  
Chief Electric Utility Officer at Silicon Valley Power

**Cc**

Mr. Elliot Mainzer, President and Chief Executive Officer, CAISO  
Mr. Mark Rothleder, Senior Vice President and Chief Operating Officer, CAISO  
Mr. Neil Millar, Vice President, Transmission Planning and Infrastructure Development, CAISO  
Mr. Jeff Billinton, Director, Transmission Infrastructure Planning  
Mr. Binaya Shrestha, Manager Regional Transmission – North, PG&E  
Mr. Marco Rios, Manager of Transmission, Substation, and Storage Asset Planning, PG&E  
Mr. Martin Smith, Senior Transmission Contract Manager, PG&E  
Mr. Kevin Kolnowski, Electric Chief Operating Officer, SVP  
Mr. Alan Kurotori, Assistant Director Customer Development & Program Management, SVP  
Mr. Albert Saenz, Principal Electric Utility Engineer, SVP



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**Attachment A: Silicon Valley Power Comments on the CAISO Draft 2021-2022  
Transmission Study Plan**



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March 11, 2021

## Silicon Valley Power Comments on the Draft 2021-2022 Transmission Study Plan

Submitted to: [regionaltransmission@caiso.com](mailto:regionaltransmission@caiso.com)

The City of Santa Clara *dba* Silicon Valley Power (SVP) appreciates the opportunity to comment on the draft 2021-2022 Transmission Study Plan (Study Plan, hereafter) and materials presented at the February 25, 2021 stakeholder meeting. SVP appreciates CAISO's incorporation of SVP-provided load forecast and topology change files for multiple years for the 2021-2022 Transmission Planning Process (TPP).<sup>1</sup>

As we explain below, the CAISO and PG&E must expeditiously approve mitigation plans and a comprehensive action plan to serve the significant load growth the CEC forecasted in the South Bay.

### CEC and SVP Expect a 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. CEC's latest adopted California Energy Demand Update (CEDU) 2020-2030 managed forecast (Demand Forecast 2020) accurately captures SVP's currently expected rapid load growth.

In Table 1, we provide a comparison of the 1-in-10 Summer Peak load for SVP modeled in the CAISO 2020-2021 TPP with the CEC's Demand Forecast 2020 adopted in January 2021. CAISO 2020-2021 TPP was based upon the 2019 IEPR final report (adopted on February 20, 2020). The CEC's Demand Forecast 2020 would be used by the CAISO in its 2021-2022 TPP.

The CEC's recently adopted forecast is significantly higher. For example, the CAISO modeled SVP's 1-in-10 Summer peak load at 657MW (=672MW minus 14.6MW of energy efficiency) in the year 2025 in the 2020-2021 TPP, whereas the CEC's Demand Forecast 2020 now shows SVP's peak load in 2025 at **1,011MW**, which is even higher than the SVP peak load of **865 MW** that the CAISO modeled under the *SVP High Load sensitivity* case for the year 2030.

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<sup>1</sup> Study Plan, p.6



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**Table 1: A Comparison of 1-in-10 SVP Summer Peak Load (MW) Modeled in CAISO 2020-2021 TPP Cases Vs. in CEC Adopted Baseline Demand Forecast 2020**

Scenario	Year	CAISO 2020-2021 TPP*	CEC Adopted 2020-2030 CEDU
<i>Base</i>	2022	624	743
	2025	657	1,011
	2030	670	1,176
<i>SVP High Load Sensitivity</i>	2030	865	

\*Adjusted for energy efficiency amounts

**A Significant Number and Levels of Reliability Violations on the CAISO Controlled Grid Critical Facilities Serving SVP Load Are Expected In the Near-Term**

The CAISO 2020-2021 Draft Plan noted multiple Category P1, P2, and P7 overloads on the Los Esteros-Nortech 115 kV line in both the short and long term.<sup>2</sup> To mitigate these overloads, the CAISO has indicated that it is working with PG&E to develop a project which could include reconductoring the 115 kV line.

SVP welcomes the coordination between the CAISO and PG&E to upgrade PG&E’s south bay area transmission system, which is where SVP load exists. SVP conducted a preliminary reliability assessment using the 2020-2021 TPP GBA 2025 Summer Peak power flow case as the starting case. SVP assumed certain topology changes to update the SVP network to the 2026 Summer configuration and scaled the SVP load to 1,011MW consistent with the CEC Demand Forecast 2020 (see Table 1).

As shown in Table 2, this assessment indicates that the P1, P7, and P6 overloads on the Los Esteros-Nortech 115 kV line and additional PG&E transmission facilities serving the SVP load are expected to be even worse as early as 2025 than those envisioned in 2030 under the *SVP High Load sensitivity* case studied in the 2020-2021 Plan.<sup>3</sup> These PG&E facilities include the Newark-Northern Receiving Station (NRS) 115kV line, the Newark-Zanker-Kifer 115kV line, and the FMC-Kifer 115kV line the as shown in Table 2 below. For the year 2025, SVP’s preliminary assessment using the latest CEC load forecast shows that the P1 contingency of the loss of the SSS-NRS 230 kV causes **39%** overload on the Los Esteros-Nortech 115 kV Line, which is significantly higher than the **2%** and **25%** overloads identified under the two SVP load scenarios in 2030.

<sup>2</sup> Draft Plan, p. 102.

<sup>3</sup> See 2020-2021 ISO Reliability Assessment - Preliminary Study Results, PG&E Greater Bay Area, CAISO 2020-2021 TPP, August 15, 2020.



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**Table 2: A Comparison of Loadings (%) on the Critical Facilities Serving SVP Load in 2030 Identified by CAISO in 2020-2021 TPP and SVP's Preliminary Assessment for Year 2025**

Overloaded Facility	Contingency	Category	Base Summer Peak 2030 with SVP load at 670MW*	SVP High Load Sensitivity Summer Peak 2030 with SVP load at 865MW*	Summer Peak 2025 Case with SVP load at 1,011MW**
Los Esteros-Nortech 115 kV Line	SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	<b>102%</b>	<b>125%</b>	<b>139%</b>
Los Esteros-Nortech 115 kV Line	LS ESTRS 230kV - Middle Breaker Bay 8	P2	<b>102%</b>	<b>124%</b>	<b>139%</b>
Los Esteros-Nortech 115 kV Line	Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	88%	<b>110%</b>	<b>121%</b>
Newark-NRS #1 115kV Line	Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	97%	<b>Diverge</b>	<b>147%</b>
Newark-NRS #2 115kV Line			80%	<b>Diverge</b>	<b>130%</b>
Newark-Zanker-KRS 115kV Line			<100%	<b>Diverge</b>	<b>112%</b>
San Jose A-San Jose B 115kV Line			<100%	<b>Diverge</b>	<b>106%</b>
Newark-NRS #1 115kV Line	Phase Shifter Path and Los Esteros-Nortech 115kV Line	P6	<100%	<100%	<b>160%</b>
Newark-NRS #2 115kV Line			<100%	<100%	<b>151%</b>
Newark-Zanker 115kV Line			<100%	<100%	<b>121%</b>
FMC-Kifer 115kV Line			<100%	<100%	<b>107%</b>
Los Esteros-Nortech 115kV	Phase Shifter Path and San Jose B-FMC 115kV	P6	<100%	<100%	<b>159%</b>
Newark-NRS #1 115kV			<100%	<100%	<b>103%</b>

\*Source: 2020-2021 CAISO Reliability Assessment – Preliminary Study Results, PG&E Greater Bay Area, CAISO 2020-2021 TPP, August 15, 2020.

\*\*Source: SVP Preliminary Assessment



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## Significant Rapid Load Growth in SVP-San Jose Area Requires Timely Comprehensive Actions

In addition to the SVP internal load, the load surrounding SVP's system in the San Jose sub-area is expected to grow rapidly in the near-term. For example, Microsoft has proposed to construct and operate the San Jose City Data Center (99MW) connected to Los Esteros Substation.<sup>4</sup> Therefore, several P1, P7, and P6 overloads on the Los Esteros-Nortech 115 kV Line and Newark-NRS #1 & #2 115kV lines identified under the SVP's Preliminary Assessment in the year 2025 (Table 2) would be even worse with the interconnection of the San Jose Data Center. The necessity to plan for projects to alleviate future overloads is critical given the timing of the SVP-San Jose new loads.

We believe it is important for the CAISO to timely develop and approve a plan to relieve the overloads delineated above. SVP is concerned that even if CAISO had already identified and approved transmission projects, they would not be completed in time to eliminate expected planning criteria violations. **Since any reinforcement of the transmission grid in the SVP/San Jose area will probably take significant time to construct, it is critical for CAISO and PG&E to approve mitigation plans and a comprehensive action plan expeditiously.** SVP expects to work closely with PG&E and the CAISO in such efforts.

SVP appreciates the opportunity to comment on the Draft 2020-2021 Transmission Plan and acknowledges the significant effort of the CAISO staff in its development. We look forward to working with PG&E and the CAISO to develop the needed transmission projects.

If you have any questions concerning these comments, please contact Albert Saenz at [ASAENZ@santaclaraca.gov](mailto:ASAENZ@santaclaraca.gov).

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<sup>4</sup> See 19-SPPE-04 (Small Power Plant Exemption) located at <https://ww2.energy.ca.gov/sitingcases/sj2/>



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**Attachment B: Silicon Valley Power Comments on the CAISO Draft 2020-2021  
Transmission Plan**



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February 23, 2021

## Silicon Valley Power Comments on the Draft 2020-2021 Transmission Plan

Submitted to: [regionaltransmission@caiso.com](mailto:regionaltransmission@caiso.com)

The City of Santa Clara *dba* Silicon Valley Power (SVP) appreciates the opportunity to comment on the draft 2020-2021 Transmission Plan (Draft Plan, hereafter) and materials presented at the February 9, 2020 stakeholder meeting.

The Draft Plan notes multiple Category P1, P2, and P7 overloads on the Los Esteros-Nortech 115 kV line in both the short and long term.<sup>5</sup> To mitigate these overloads, the CAISO has indicated that it is working with PG&E to develop a project which could include reconductoring the 115 kV line. SVP welcomes the coordination between the CAISO and PG&E to upgrade PG&E's south bay area transmission system, which is where SVP load exists. SVP also observes that these overloads on the Los Esteros-Nortech 115 kV line and additional PG&E transmission facilities serving the SVP load are even worse in the *SVP High Load sensitivity* case studied in the 2020-2021 Plan.<sup>6</sup> These PG&E facilities include the Los Esteros-SVP Switching Station 230 kV line, the Newark-Kifer 115kV line, and the Newark-Northern Receiving Station 115kV line as shown in Table 1 below. SVP believes that the results of the *SVP High Load sensitivity* case should be thoroughly considered in developing a plan of service for the area. SVP load growth projections are primarily driven by large-scale data center block loads that result in an SVP average annual load factor of as high as 80%, do not follow traditional load models. As SVP indicated in its comments on the 2020-2021 Transmission Planning Process (TPP) Preliminary Reliability Assessment Results and PTO Request Window Submissions, we have been concerned with SVP's projected load growth not being reflected.<sup>7</sup>

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<sup>5</sup> Draft Plan, p. 102.

<sup>6</sup> See 2020-2021 ISO Reliability Assessment - Preliminary Study Results, PG&E Greater Bay Area, CAISO 2020-2021 TPP, August 15, 2020.

<sup>7</sup> See (1) SVP's comments on the 2020-2021 TPP Preliminary Reliability Assessment Results and PTO Request Window Submissions, dated October 8, 2020 located at <http://www.caiso.com/Documents/SVPComments-2020-2021TransmissionPlanningProcess-Sept23-24-2020StakeholderCall.pdf>, (2) SVP's comments on the 2020-2021 Transmission Study Plan, dated March 16, 2020 located at <http://www.caiso.com/Documents/SVPComments-2020-2021TransmissionPlanningProcess-Feb282020StakeholderMeeting.pdf>



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**Table 1: Loadings (%) on the Critical Facilities Serving SVP Load Identified by CAISO in 2020-2021 TPP\***

Overloaded Facility	Contingency	Category	Base Summer Peak 2022	Base Summer Peak 2025	Base Summer Peak 2030	SVP High Load Sensitivity Summer Peak 2030
Los Esteros-Nortech 115 kV Line	SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	100%	98%	102%	125%
Los Esteros-Nortech 115 kV Line	LS ESTRS 230kV - Middle Breaker Bay 8	P2	99%	98%	102%	124%
Los Esteros-Nortech 115 kV Line	Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	85%	84%	88%	110%
Los Esteros-Silicon Switching Station 230 kV	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	96%	94%	97%	Diverge
Newark-Kifer 115kV Line	LOS ESTEROS 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	58%	68%	76%	101%
Newark-Northern Receiving 115kV Line	LOS ESTEROS 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	83%	97%	103%	131%

\*Source: 2020-2021 CAISO Reliability Assessment – Preliminary Study Results, PG&E Greater Bay Area, CAISO 2020-2021 TPP, August 15, 2020.

SVP's load growth includes California Energy Commission (CEC)-approved small generator exemptions granted to hyper-scale data centers in SVP's service territory. SVP has been working with the CEC's Energy Assessments Division on its demand forecast process to ensure that the CEC's forecast accurately captures future demand growth in the SVP area.<sup>8</sup> As a result of these

<sup>8</sup> See the City of Santa Clara dba Silicon Valley Power Comments - Commissioner Workshop on Updates to the California Energy Demand located at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=20-IEPR-03>



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efforts, CEC’s adopted (on January 25, 2021 at the CEC Business Meeting<sup>9</sup>) California Energy Demand Update (CEDU) 2020-2030 managed forecast (Demand Forecast 2020), accurately captures SVP’s currently expected rapid load growth. In Table 2, we provide a comparison of the 1-in-10 Summer Peak load for SVP modeled in the CAISO 2020-2021 TPP based upon the 2019 IEPR final report (adopted on February 20, 2020) with the CEC’s Demand Forecast 2020, which presumably would be used by the CAISO in its 2021-2022 TPP for different study years. For example, the CAISO modeled SVP’s 1-in-10 Summer peak load at 657MW (=672MW minus 14.6MW of energy efficiency) in year 2025, whereas the CEC’s Demand Forecast 2020 now shows SVP’s peak load in 2025 at **1,011MW**, which is even higher than the SVP peak load of **865 MW** that the CAISO modeled under the *SVP High Load sensitivity* case for the year 2030. This means that the P1 overload of 25% on the *Los Esteros-Nortech 115 kV line*, that CAISO identified in 2030 in the SVP High Load sensitivity case as shown in Table 1, would be significantly higher than 25% by 2025 itself. This is one example of numerous planning criteria violations that are expected to occur based on the fact that additional overloads were identified by the CAISO, and in some cases the power flow case diverged, in 2030 as shown in Table 1.<sup>10</sup> SVP, therefore, expects significant reliability issues will be identified in the 2021-2022 TPP on the transmission network serving the SVP Load as early as 2025-2026.

**Table 2: A Comparison of 1-in-10 SVP Summer Peak Load (MW) Modeled in CAISO 2020-2021 TPP Cases Vs. in CEC Adopted Baseline Demand Forecast 2020**

Scenario	Year	CAISO 2020-2021 TPP*	CEC Adopted 2020-2030 CEDU <sup>11</sup>
<i>Base</i>	2022	624	743
	2025	657	1,011
	2030	670	1,176
<i>SVP High Load Sensitivity</i>	2030	865	

\*Adjusted for energy efficiency amounts

The necessity to plan for projects to alleviate future overloads is critical given the timing of the SVP new loads. In SVP’s comments on the 2020-2021 TPP Study Plan, dated February 28, 2020, we provided a table identifying examples of PG&E projects with long implementation lead times in the

<sup>9</sup> Slides #19-20 of the CEC Business Meeting Presentation located at <https://www.energy.ca.gov/event/meeting/2021-01/energy-commission-business-meeting>

<sup>10</sup> *Ibid.*

<sup>11</sup> California Energy Demand 2020-2030 Managed Forecast - Mid Demand / Low AEE Case, 1-in-10 Net Electricity Peak Demand by Agency and Balancing Authority (MW), January 2021. See **1.5d** tab in the *TN236520\_20210129T170205\_CEDU 2020 Managed Forecast - LSE and BA Tables Mid Demand - Low AEE Case.x*



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range of 6 to 15 years. We believe it is important to timely develop and approve a plan to relieve the overloads delineated above. SVP is concerned that even if CAISO had already identified and approved transmission projects, they would not be completed in time to eliminate expected planning criteria violations. **Since any reinforcement of the transmission grid in the SVP/San Jose area will probably take significant time to construct, it is critical for CAISO and PG&E to approve mitigation plans based upon the SVP High Load sensitivity study in the current planning cycle itself - before new reliability studies are completed in next transmission planning cycle.** SVP expects to work closely with PG&E and the CAISO in such efforts.

SVP appreciates the opportunity to comment on the Draft 2020-2021 Transmission Plan and acknowledges the significant effort of the CAISO and PG&E staffs in its development. We look forward to working with PG&E and the CAISO to develop needed transmission projects.

If you have any questions concerning these comments, please contact Albert Saenz at [ASAENZ@santaclaraca.gov](mailto:ASAENZ@santaclaraca.gov).