

The CAISO received comments on the topics discussed at the June 28th, 2023 stakeholder call from the following:

- A. California Public Utilities Commission - Public Advocates Office
- B. LSA

Copies of the comments submitted are located on the Transmission Planning Process page at:

<https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/2023-2024-Transmission-planning-process>

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1. Please provide a summary of your organization’s comments on the Eldorado 230kV Short Circuit Duty Mitigation Project.

No	Submitting Organization	Comment Submitted	CAISO Response
1A	California Public Utilities Commission - Public Advocates Office	<p>The Public Advocates Office at the California Public Utilities Commission (Cal Advocates) is the state-appointed independent consumer advocate at the California Public Utilities Commission (CPUC). Our goal is to ensure that all Californians have affordable, safe, and reliable utility services while advancing the state’s environmental goals. Our advocacy efforts to protect California customers span the areas of energy, water, and communications regulation.[1]</p> <p>Cal Advocates appreciates the opportunity to participate in the discussion on improvement options for 500 kilovolt (kV) Eldorado Substation (Eldorado Substation). Cal Advocates recognizes that the capacity at the Eldorado Substation, which is the entry point for out-of-state (OOS) resources, including wind, is critical for meeting the State’s clean energy goals. For this reason, the proposed mitigation plan is an opportunity to address both the short- and long-term needs at the Eldorado Substation to achieve the most cost-effective solution.</p> <p>Project Background</p> <p>Southern California Edison (SCE) determined during the 2022-2023 Transmission Planning Process (TPP) that the ratings at the 230 kV and 500 kV buses located at the Eldorado Substation would be exceeded by the end of 2023. The bus ratings would be exceeded due to the interconnections of new generation and transmission including the GridLiance West Upgrade (GLW) project.[2],[3] SCE, Los Angeles Department of Water and Power (LADWP) and NV Energy jointly own the Eldorado Substation and its equipment.</p> <p>SCE proposes to split this existing Eldorado 230 kV bus into two sections and relocate lines to address the identified issues. The cost estimate for this project is \$67 million. Because the equipment at the Eldorado Substation is jointly owned, the joint owners would share in the proposed project costs. LADWP and NV Energy propose to fund</p>	

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		<p>\$18.2 million of the project costs, and CAISO ratepayers would fund the remaining project costs at \$48.8 million.[4]</p> <p>CAISO and SCE considered project alternatives that included a new substation and a higher-rated system at the Eldorado Substation. Both improvements have an estimated cost of \$100 million. Other project alternatives were considered but were not recommended because they had limitations.</p> <p>CAISO and SCE request comments on this proposed mitigation plan. Cal Advocates requests that CAISO and SCE provide additional information on their analysis to confirm the proposed solution and cost sharing agreement is the most cost-effective and just and reasonable option for CAISO ratepayers. The following are requests for specific information that were not included in 2022-2023 and 2023-2024 TPP materials.</p> <p>1. Confirm that the mitigation plan analysis considered the expected generation to interconnect at the Eldorado Substation in both the short and long-term.</p> <p>SCE identified the need for this project as part of the reliability assessment for its high-voltage transmission system in the 2022-2023 Transmission Planning Process (TPP).[5] Therefore, Cal Advocates requests confirmation that the proposed transmission solution will accommodate the expected increase in interconnecting generation at the Eldorado Substation with the State’s 2023-2024 resource portfolios.</p> <p>More specifically, the 2022-2023 TPP reliability study case assumed 1,506 megawatts (MW) of Full Capacity Deliverability Status resources, plus 300 MW of Energy Only resources, for a total of 1,806 MW resources seeking interconnection at the Eldorado Substation.[6] Of these resources, 1,198 MW (including out-of-state wind) were modeled at the Eldorado 500kV bus and the remaining 608 MW at the Eldorado 230kV bus.[7]</p>	<p>1. The mitigation plan considers all generation requesting to interconnect at the Eldorado Substation through Cluster 14 and information provided by LADWP and NV Energy. The amount of generation materially affecting short circuit current levels at Eldorado substation in the interconnection request queue through Cluster 14 exceeds the amount of generation in the same area in the State’s 2023-2024 resource portfolios.</p> <p>The CAISO queued local generation (total resources) modeled in this area is approximately 13,000 MW and the CPUC 2023-2024 TPP portfolio is 8,535 MW.</p> <p>The current short circuit duty (SCD) assumptions also include out of state transmission and wind generation that could impact SCD at Eldorado.</p>

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		<p>In contrast, the 2023-2024 TPP portfolios modeled 4,105 MW at the Eldorado Substation (with 3,176 MW of resources on the 500kV bus and 929 MW of resources on the 230 kV bus).[8]</p> <p>2. Confirm the mitigation evaluation timeframe.</p> <p>The proposed mitigation plan to split the 230 kV bus appears reasonable if it will accommodate the expected energy flow for the next 10-20 years.</p> <p>3. Confirm the forecast short circuit duty in 10 years versus 25 years.</p> <p>Does CAISO anticipate that another upgrade to the Eldorado Substation or that a new substation will be needed to accommodate the State's resource portfolios within the next 10 years?</p> <p>4. Provide the impact of the interconnection of the proposed Southwest Intertie Project (SWIP)-North project at the Eldorado Substation. Specifically, provide the short circuit values before and after the SWIP-North project is interconnected.</p> <p>5. Provide confirmation on the just and reasonableness of the proposed project cost sharing agreement.</p> <p>As mentioned, the equipment at the Eldorado Substation is jointly owned. The joint owners are pursuing generation and transmission interconnections at the Eldorado Substation, which are driving the need for a substation upgrade. The discussion so far has not identified the projects from LADWP and NV Energy that may be contributing to the project need. The information provided only mentions the CAISO's transmission project, which is the Gridliance West upgrade. For this reason, Cal Advocates requests the following.</p> <p>A. Provide information on the generation or transmission projects (both generation or transmission owner and anticipated</p>	<p>2. See response to item 1.</p> <p>3. The mitigation plan will reduce the short circuit current from 75.3 kA to 53.9 kA. By comparison replacing the 63 kA breakers with 80 kA breakers which is the largest size available would provide less short circuit duty relief. With almost 10 kA of short circuit duty margin, the project is expected to provide relief well beyond the planning horizon. Assuming that gas fired synchronous generation in the area is retired during that time frame, additional short circuit mitigation may never be needed.</p> <p>4. The SWIP-North project is not connecting to the SCE system, so SCE has not performed any studies to determine the incremental impact of that project. However, that project is not expected to dramatically increase short circuit levels at Eldorado 230 kV bus.</p> <p>5. Per the Eldorado Co-Tenancy agreement, the cost sharing is divided among the co-owners based on the initial investment to the substation/ lines/ transformers which in turn gives capacity rights on each of the equipment. SCE is a majority owner of the capacity at Eldorado so SCE will be allocated a percentage based on its share of the capacity of the equipment at Eldorado.</p>

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		<p>customers) that were considered in the short circuit studies that caused the breakers to overstress at the 230 kV and 500 kV buses.</p> <p>B. Provide the short circuit values before these transmission or generation projects are interconnected.</p> <p>C. Explain the difference between generation/transmission queue and operational queue. Please also identify the projects that were included in each of these queues for the short-circuit calculations. The CAISO presentation (slide #4) states: “the short circuit duty for the joint-owned Eldorado 230kV bus would be 75.3 kA by the end of generation/transmission queue and would be 64.2 kA by the 2023 operational queue.”^[9] However, the CAISO does not explain the difference between the mentioned queues.</p> <p>[1] Pub. Utilities Code, § 309.5.</p> <p>[2] CAISO 2022-2023 Transmission Plan, CAISO, May 18, 2023 at p. 57.</p> <p>[3] The GridLiance West Upgrade project was approved in the CAISO 2021-2022 Transmission Planning Process (TPP) cycle. This project was amended in the CAISO 2022-2023 TPP cycle.</p> <p>[4] 2023-2024 Transmission Planning Process Eldorado 230 kV Short Circuit Duty Mitigation Project, June 28, 2023, CAISO, (CAISO presentation) at p. 7.</p> <p>[5] CAISO 2022-2023 Transmission Plan, CAISO, May 18, 2023 at p. 57.</p> <p>[6] Refer to the publicly available preferred system plan and portfolios for the 2022-23 Transmission Planning Process on the CPUC web site, Updated Mapping Dashboard Workbook – increase alignment</p>	<p>A. For clarification, the proposed project only addresses overstress of the 230 kV circuit breakers at the jointly-owned Eldorado Substation.</p> <p>While SCE was able to study the impacts on Eldorado substation due to the generation/transmission projects in CAISO, LADWP, and NVE’s area, SCE is not able to provide the specifics in terms of generation/transmission owner and anticipated customers. This is due to the confidentiality processes that each utility has implemented as per their interconnection tariff requirements.</p> <p>B. When there is a fault on the transmission system, many generators across a wide area will contribute current into that fault, which then becomes the current that transmission circuit breakers must be able to interrupt safely. Due to the diversity of resource interconnection in this area and interconnection of multiple transmission systems with different tariffs, tools, and methodologies, the precise triggering project could not be identified between the utilities. Without having the specific identities of LADWP and NV Energy’s generation and transmission projects, we cannot provide the short circuit values as requested (refer to response to question 5A)</p> <p>C. The term generation/transmission queue references the chronological timeline in which projects submitted requests for interconnection to the electric power system. The 75.3 kA refers to the calculated SCD based on the generation/transmission application queues that are part of the Eldorado co-owners’ respective Generation Interconnection Processes as of June 23,2022,</p>

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		<p>with CAISO TPD, September 20, 2022, at the Mapping_bySub tab. 2019-2020 IRP Events and Materials (ca.gov)</p> <p>[7] The Eldorado 500 kV substation includes a high voltage bus at 500 kV and low-voltage bus at 230 kV.</p> <p>[8] Refer to the publicly available Portfolio and Modeling Assumptions for the 2022-2023 Transmission Planning Process, Final 2035 busbar Mapping dashboard, February 22, 2023 at Portfolios and Modeling Assumptions for the 2023-2024 Transmission Planning Process (ca.gov), BusbarDashboard2035_30MMT_HEBase_vD_02-22-23 at excel tab Mapping by Sub.</p> <p>[9] CAISO Presentation at p. 4.</p>	<p>An operational study assesses the generation/transmission projects that are existing in-service and may include additional projects by their anticipated in-service date depending on the timeline of the study. The 64.2 kA refers to a snapshot of the calculated SCD based on existing generation and transmission that were connected to the Eldorado substation co-owners' electric systems as of March 2023.</p>
1B	LSA	<p>The Large-scale Solar Association (LSA) appreciates CAISO's efforts to expedite approval of a solution to mitigate the Eldorado 230 kV short circuit duty issue. Evaluating these proposed solutions out of cycle as part of the 2023-24 Transmission Planning Process (TPP) is critical to ensure that the necessary upgrades are completed as soon as possible, and developers receive the transparency required to continue development at this location.</p> <p>However, LSA is concerned that CAISO and Participating Transmission Owners (PTOs) have, once again, identified this issue very late in the process which, according to the schedule shared on the June 28th call, could lead to significant generation project delays. Projects with commercial operation dates (CODs) in 2029 and</p>	<p>The issue arises due to the diversity of the resource interconnection in this area and interconnection of multiple transmission system with different tariffs, tools, and methodologies. As Eldorado Substation sits at an interconnection nexus in which the area has more than several PTOs and balancing authorities that have a limited visibility to their respective generation/transmission interconnection customers and appropriate technical data.</p> <p>SCE is currently working with the Eldorado co-owners and the CAISO to overhaul the coordination effort in which the necessary data and timeliness of the impacts of each of the interconnection processes match more closely and have the necessary controls</p>

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		<p>beyond may not be impacted because the proposed solution may be in place in time. Projects with earlier CODs, however, have no assurance that their projects will proceed on schedule unless SCE can identify a short-term solution. According to comments from Southern California Edison (SCE) during the June 28th call, the overload already exists in 2023 and they are currently evaluating interim measures to create additional headroom so that projects with 2023 CODs can come online. SCE explained that for each year until the proposed mitigation is completed in 2029, they will continue to assess the level of generation planning to come online and evaluate the possibility for short term solutions. Although they committed to doing all they can to make sure projects can connect as planned, they can offer no guaranties, even for projects that have already obtained Phase II studies and deliverability allocations. LSA is concerned that developers interconnecting at Eldorado between now and 2029 will experience delays, which could result in complications with financing, power purchase agreement damages, and could impact the state's ability to achieve climate and reliability goals.</p> <p>Further, LSA is concerned that CAISO/SCE will not provide timely information about which projects are impacted and how SCE intends to pick the projects that will be able to come online as the 2029 date approaches. Developers need to know as soon as possible which projects will be able to move forward and by when, and which will have to wait.</p> <p>LSA notes that similar short circuit duty issues arose in late 2021 and 2022 in Pacific Gas & Electric's (PG&E's) and San Diego Gas & Electric's (SDG&E's) service territories. Stakeholders raised similar concerns at that time about why PG&E and SDG&E identified these issues in reassessments, rather than in initial studies, and the lack of transparency about which projects would be impacted and how those decisions were made. CAISO and PTOs committed to improving their focus on these issues in future studies, yet the same issue</p>	<p>to have a better assurance that impacts to customers and regulators will be timely.</p>

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		<p>seems to have appeared late in the study process again, this time for SCE. LSE requests more transparency around why this type of significant issue continues to come up late in the interconnection study process, what CAISO is doing to increase transparency between SCE and interconnection customers at this location, and what CAISO can do to avoid PTOs identifying these issues so far into the development cycle to avoid this problem in the future.</p> <p>LSA appreciates the opportunity to submit these comments.</p>	

2. Provide your organization's comments on the alternatives considered.			
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2A	California Public Utilities Commission - Public Advocates Office	<p>Cal Advocates requests confirmation that SCE and CAISO considered available grid enhancing technologies (GETs) for this project, such as a Fault Current Limiter (FCL). An FCL limits the amount of current flowing through the system and allows for the continual, uninterrupted operation of the electric system. This grid-enhancing technology was not mentioned during CAISO's June 28, 2023 project presentation. As an attachment to these comments, Cal Advocates provides an overview of FCL benefits and forthcoming FCL projects from the Department of Energy.</p> <p>In closing, Cal Advocates seeks additional information to confirm that the proposed transmission solution is the only available option to address the immediate need at the Eldorado Substation and the best and most cost-effective option for the long-term.</p> <p>Attachments</p> <ul style="list-style-type: none"> • fault-current-limiters-fcl-fact-sheet.pdf 	Based on the IEEE paper 978-1-5386-9482-4 in which the authors did a comprehensive review of fault current limiters as published in 2019, the fault current limiters were not rated for the fault currents seen at Eldorado.
2B	LSA	LSA has no comments at this time	