

Application No.: 24-07-018
Exhibit No.: _____
Witness: Binaya Shrestha
ALJ: Robert Haga
Commissioner: Matthew Baker

Application of LS Power Grid
California, LLC (U-247-E) for a
Certificate of Public Convenience and
Necessity Authorizing Construction of
the Collinsville 500/230 kV Substation
Project.

Application 24-07-018
(Filed July 30, 2024)

**TESTIMONY OF BINAYA SHRESTHA
ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR
CORPORATION**

June 5, 2026

Table of Contents

I. INTRODUCTION 1

II. CAISO’S TRANSMISSION PLANNING PROCESS AND THE PROJECT 1

I. CONCLUSION..... 8

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1 **I. INTRODUCTION**

2 **Q1. What is your name and by whom are you employed?**

3 **A1.** My name is Binaya Shrestha. I am employed by the California Independent System
4 Operator Corporation (CAISO), 250 Outcropping Way, Folsom, California as Manager,
5 Regional Transmission – North.

6
7 **Q2. Please describe your educational and professional background.**

8 **A2.** I am a licensed Professional Electrical Engineer in the State of California. I hold a
9 Master’s degree in Electrical Engineering from Wichita State University, Kansas, and a
10 Bachelor’s degree in Electrical Engineering from Tribhuwan University, Nepal.

11
12 **Q3. What are your job responsibilities?**

13 **A3.** I manage a group of engineers responsible for planning the CAISO controlled
14 transmission system in northern California to ensure efficient and cost-effective
15 compliance with requirements established by the North American Electric Reliability
16 Corporation (NERC), Western Electricity Coordinating Council (WECC), and CAISO
17 Transmission Planning Standards.

18
19 **Q4. What is the purpose of your testimony?**

20 **A4.** The purpose of my testimony is to explain the planning, justification and public need for
21 the Collinsville 500/230 kV Substation Project (“the “Project”) as identified and
22 approved in the CAISO’s Transmission Planning Process.

23
24 **II. CAISO’S TRANSMISSION PLANNING PROCESS AND THE PROJECT**

25 **Q5. Please describe the CAISO’s transmission planning process.**

26 **A5.** The CAISO conducts an annual transmission planning process to identify and plan the
27 development of solutions to meet the future needs of the CAISO controlled grid. The
28 CAISO takes into account a portfolio of needs through a comprehensive assessment of
29 the system to identify the best and least-cost solutions to meet a variety of drivers
30 assessed as a whole. This process culminates in the CAISO Board of Governors

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1 approving a comprehensive transmission plan. The plan identifies needed transmission
2 solutions and authorizes cost recovery through CAISO transmission rates, subject to
3 regulatory approval. The CAISO develops the transmission plan in the larger context of
4 supporting achievement of important state energy and environmental policies and
5 facilitating the transition to a cleaner, lower emission future, while maintaining reliability
6 through a resilient electric system.

7
8 The transmission plan identifies transmission facilities that are needed for three main
9 purposes: reliability, public policy, and economics. In the planning process, the CAISO
10 also considers and evaluates non-transmission alternatives, including conventional
11 generation and preferred resources such as energy efficiency, demand response,
12 renewable resources, and energy storage.

13
14 The transmission planning process is structured in three consecutive phases with each
15 planning cycle identified by a beginning year and a concluding year. Each annual cycle
16 begins in January and extends into the subsequent year.

17
18 In Phase 1 of the annual transmission planning process, the CAISO establishes the
19 assumptions and models to be used in the planning studies, develops and finalizes a study
20 plan, and specifies the public policy mandates that CAISO planners will adopt as
21 objectives in the current planning cycle. This phase takes roughly three months from
22 January through March of the first year of the planning cycle. During Phase 1, the
23 CAISO first posts a draft study plan for stakeholder review and then conducts a public
24 stakeholder session. At the stakeholder session, the CAISO answers questions regarding
25 the draft study plan and requests additional written comments from stakeholders. The
26 CAISO then considers stakeholder comments in completing its final study plan.

27
28 In Phase 2, the CAISO performs studies to identify transmission needs and the necessary
29 solutions to meet those needs, culminating in the annual comprehensive transmission
30 plan. Phase 2 takes approximately 12 months and generally involves three additional

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1 public stakeholder sessions at which the CAISO presents preliminary and draft results for
2 vetting with stakeholders. After each stakeholder session, the CAISO requests and
3 considers stakeholder comments on its planning analyses. Identifying non-transmission
4 alternatives that the CAISO can rely upon in lieu of transmission solutions also occurs
5 during Phase 2. After this process concludes, the draft transmission plan is presented to
6 the CAISO’s Board of Governors for final review and approval. Phases 1 and 2 take a
7 total of 15 months to complete.

8
9 During Phase 3, the CAISO solicits competitive bids for the construction and ownership
10 of new regional transmission facilities identified in the approved transmission plan that
11 are eligible for competition. In any given planning cycle, Phase 3 may or may not occur
12 depending on whether the final plan includes transmission facilities that are open to
13 competitive solicitation in accordance with criteria specified in the CAISO tariff.

14
15 **Q6. Please explain the approach the CAISO used to identify the need for the Project.**

16 **A6.** The CAISO transmission planning process is a structured and iterative framework
17 designed to assess future system needs and to develop transmission solutions that ensure
18 system reliability, support public policy objectives, and enhance economic efficiency.
19 The process begins with the establishment of study assumptions and scenarios, informed
20 by load forecasts, anticipated generation portfolios, and applicable state policy
21 requirements.

22
23 Based on these inputs, the CAISO conducts a series of coordinated technical studies.
24 These studies commence with reliability assessments to identify existing facilities that
25 may fail to meet applicable performance requirements as defined by NERC standards,
26 WECC regional criteria, and CAISO’s internal planning standards. This is followed by
27 policy-driven analyses aimed at ensuring adequate transmission capacity to integrate and
28 deliver renewable and clean energy resources. Where appropriate, economic evaluations
29 are also performed to assess opportunities for congestion mitigation and reductions in
30 production costs.

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1
2 Collectively, these analyses identify transmission system needs, upon which CAISO
3 systematically develops and evaluates potential mitigation solutions in a coordinated and
4 comprehensive manner.

5
6 **Q7. When was the Project approved and for what purpose?**

7
8 **A7.** The Collinsville 500/230 kV Substation Project was approved in the 2021–2022
9 transmission planning process on March 17, 2022, by the CAISO Board of Governors.
10 The CAISO transmission plan approved the Project as the best solution to address three
11 distinct issues, assessed together, along with other issues, through the comprehensive
12 analysis of the system needs. First, the CAISO identified multiple thermal overloads on
13 the 230 kV corridor between Contra Costa and Newark substations driven by the
14 California Public Utilities Commission’s (CPUC) portfolio of planned resources. These
15 thermal overloads can cause damage to equipment due to overheating. Notably,
16 Humboldt offshore wind was not included in the base portfolio provided by the CPUC for
17 this transmission planning year’s policy study, and thus other planned resources cause the
18 thermal overloads the CAISO must mitigate. Second, the Project provides an additional
19 supply path from the 500 kV system in California into the northern Greater Bay Area,
20 which aligns with the needs identified in the long-term local capacity requirement
21 studies. The Project is intended to improve system reliability in the region, particularly
22 under the expected load growth in the area. Finally, the CAISO transmission plan also
23 identified the Project as the preferred alternative to support offshore wind development.
24 This third driver was identified through a detailed offshore wind sensitivity portfolio
25 study, which does not create binding mitigation requirements.

26
27 **Q8. Please describe the thermal overloads in further detail.**

28 **A8.** The Collinsville 500/230 kV substation project will address a number of identified
29 transmission constraints, or overloads, within the base portfolio used in the the CAISO’s
30 transmission planning process: Cayetano-North Dublin 230 kV line, Lone Tree-USWP-
31 JRW-Cayetano 230 kV line, and Las Positas-Newark 230 kV line. For all three

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1 overloads, the constraints were identified in the the highest system need (HSN) scenario.
2 The HSN scenario represents the period when the capacity shortage is most likely to
3 occur.

4
5 First, the Cayetano-North Dublin 230 kV line on-peak deliverability constraint was
6 identified because deliverability of renewable and energy storage portfolio resources in
7 the Solano area is limited by thermal overloading of the Cayetano-North Dublin 230 kV
8 line under N-2 conditions. An N-2 condition is a reliability requirement that ensures the
9 system can withstand the simultaneous failure of two major components. Zero (0) MW
10 of renewable and energy storage identified in the CPUC portfolio of resources provided
11 for the 2021-2022 transmission plan would be deliverable without any transmission
12 upgrades.

13
14 Second, the Lone Tree-USWP-JRW-Cayetano 230 kV line on-peak deliverability
15 constraint was identified because the deliverability of renewable and energy storage
16 portfolio resources in the Solano-Sacramento River area is limited by thermal
17 overloading of the Lone Tree-USWP-JRW-Cayetano 230 kV line under N-0 conditions.
18 An N-0 condition refers to the baseline state of the system, when all components are
19 online and operating as designed. Similarly, 0 MW of renewable and energy storage
20 identified in the CPUC portfolio of resources provided for the 2021-2022 transmission
21 plan would be deliverable without any transmission upgrades.

22
23 Finally, the Las Positas-Newark 230 kV line on-peak deliverability constraint was
24 identified because the deliverability of renewable and energy storage portfolio resources
25 in the Solano-Sacramento River area is limited by thermal overloading of the Las Positas-
26 Newark 230 kV line under N-2 conditions. Again, 0 MW of renewable and energy
27 storage identified in the CPUC portfolio of resources provided for the 2021-2022
28 transmission plan would be deliverable without any transmission upgrades.

29
30 **Q9. Are the identified reliability issues still a concern?**

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1 **A9.** Given the load growth currently being observed in the Greater Bay Area, the Project's
2 reliability benefits and its contribution toward reducing local capacity requirements in the
3 region are even more significant now than they were at the time of approval in the
4 CAISO's 2021–2022 transmission plan. All else being equal, increasing transmission
5 capacity into the region will reduce the local capacity requirements. These two drivers
6 taken together, thermal overloads driven by CPUC portfolios, and the need for an
7 additional supply path into the northern Greater Bay Area justify the need for the project.
8

9 **Q10. Please describe the need for the Project based on offshore wind.**

10 **A10.** The CAISO's 2021-2022 transmission planning process analyzed several potential
11 concepts for the interconnection of North Coast offshore wind. The option including
12 injection at Collinsville was selected because it effectively addresses identified policy-
13 driven deliverability needs within the 230 kV corridor between Contra Costa and
14 Newark, enhances reliability in supplying the Greater Bay Area load, and facilitates the
15 integration of offshore wind resources in the Humboldt region.
16

17 Alternative options were also evaluated, including a 500 kV AC transmission line to the
18 Fern Road 500 kV Substation and a VSC-HVDC subsea cable connection to a converter
19 station in the Bay Area. The VSC-HVDC subsea cable alternative was not selected due to
20 its comparatively higher cost. Although the AC connection to the Fern Road Substation
21 presented a similar overall cost, it was not advanced because it does not provide the same
22 level of reliability improvement for serving the Greater Bay Area load, nor does it
23 address the policy-driven needs identified in the 230 kV corridor between Contra Costa
24 and Newark.
25

26 **Q11. Would the Collinsville Substation still be required without offshore wind
27 interconnecting?**

28 **A11.** Yes. As described earlier in my testimony, the Collinsville Substation was approved due
29 to thermal overload constraints identified in the Northern California region and to provide
30 an additional supply path from the 500 kV system into the northern Greater Bay Area.

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1 These overloads exist in CPUC portfolio-driven policy studies, and would continue to be
2 present regardless of the future of offshore wind in California. Also, given the load
3 growth currently being observed in the Greater Bay Area, the Project’s reliability benefits
4 and its contribution toward reducing local capacity requirements in the region are even
5 more significant now than they were at the time of approval in the CAISO’s 2021–2022
6 transmission plan.

7
8 **Q12. Please describe at a high level the purpose of any CAISO presentations which link**
9 **the Collinsville Substation to offshore wind and whether those can be relied on to**
10 **identify a single need for the Project.**

11 **A12.** The CAISO periodically presents information on discrete topics, such as offshore wind,
12 in written materials or public presentations. This information may describe a certain
13 transmission solution in the context of the issue being discussed, but is not intended to
14 suggest that a transmission solutions only serve that single purpose. For example,
15 portions of the annual transmission plan, 20 year transmission outlook, and any
16 associated stakeholder meetings, discuss the solutions relevant to offshore wind. As the
17 focus of those portions is on offshore wind specifically and not on the solutions
18 themselves, the CAISO may not describe all the needs associated with a particular
19 solution. The CAISO’s documents, presentations, etc. must be reviewed as a whole.
20 Such is the case with Collinsville. At several points where offshore wind is described, be
21 that in written documents or in public presentations, the Collinsville Substation is
22 described as a solution. However, Collinsville Substation was identified to mitigate other
23 reliability concerns, as is detailed in other areas of the transmission plan and during the
24 associated stakeholder meetings. The CAISO’s transmission planning process is targeted
25 at finding the efficient and cost-effective solutions to reliability, policy, and economic
26 needs and drivers. It is therefore possible, as in this case, that a solution addressing one
27 need, such as specific thermal overloads, may also be used to address another, such as
28 integrating offshore wind.

29
30
31

**TESTIMONY OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
A.24-07-018**

1 **I. CONCLUSION**

2 **Q13. Please summarize your recommendations.**

3 **A13.** The CAISO's transmission planning process identified the need for the Collinsville
4 Substation not exclusively to support offshore wind development. Significant thermal
5 overloads exist in the Northern California region, which the Project is needed to mitigate.
6 This project is also needed to provide an additional supply path from the 500 kV system
7 in California into the Greater Bay Area.

8

9 **Q14. Does this conclude your testimony?**

10 **A14.** Yes.