Application No.:	18-05-007
Exhibit No.:	CAISO-
Witness:	Neil Millar

In the Matter of the Application of SOUTHERN CALIFORNIA EDISON COMPANY (U 338-E) for a Certificate of Public Convenience and Necessity: Eldorado-Lugo-Mohave Series Capacitor Project

Application 18-05-007

TESTIMONY OF NEIL MILLAR ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

November 4, 2019

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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

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In the Matter of the Application of SOUTHERN CALIFORNIA EDISON			
	CON	Application 18-05-007	
	Public Convenience and Necessity: Eldorado-		
r	Lugo	o-Mohave Series Capacitor Project	
3 4 5 6 7 8		TESTIMONY OF ON BEHALF OF THE CALIFORNIA IN CORPOR	DEPENDENT SYSTEM OPERATOR
9	I.	INTRODUCTION	
10	Q1.	What is your name and by whom are you	u employed?
11	A1.	My name is Neil Millar. I am employed by	the California Independent System Operator
12		Corporation (CAISO), 250 Outcropping W	ay, Folsom, California as the Executive
13		Director, Infrastructure Development.	
14			
15	Q2.	Please describe your educational and pro	ofessional background.
16	A2.	I received a Bachelor of Science in Electric	al Engineering degree at the University of
17		Saskatchewan, Canada, and am a registered	l professional engineer in the province of
18		Alberta.	
19			
20		I have been employed for over 30 years in	the electricity industry, primarily with a major
21		Canadian investor-owned utility, TransAlta	Utilities, and with the Alberta Electric
22		System Operator and its predecessor organ	izations. Within those organizations, I have
23		held management and executive roles respo	onsible for preparing, overseeing, and
24		providing testimony for numerous transmis	ssion planning and regulatory tariff
25		applications. I have appeared before the A	lberta Energy and Utilities Board, the Alberta
26		Utilities Commission, and the British Colu	mbia Utilities Commission. Since November,
27		2010, I have been employed at the CAISO,	leading the Transmission Planning and Grid
28		Asset departments.	

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1	Q3.	What is the purpose of your testimony?
2	A3.	The purpose of my testimony is to provide an overview of the CAISO's transmission
3		planning process that identified the policy-driven need for the Eldorado-Lugo-Mohave
4		Series Capacitor Project (Proposed Project).
5		
6	Q4.	What are your recommendations in this proceeding?
7	A4.	I recommend that the Commission approve Southern California Edison Company's
8		(SCE) Application for a certificate of public convenience and necessity for the Proposed
9		Project. As explained in my testimony and the supporting technical testimony of Mr.
10		Sushant Barave, the Proposed Project is necessary to (1) reliably provide the requested
11		level of service to generators seeking transmission service under the CAISO's Federal
12		Energy Regulatory Commission (FERC) approved tariff, (2) meet policy requirements of
13		the State of California, and (3) meet North American Electric Reliability Corporation
14		(NERC) and CAISO planning standards.
15		
16	II.	BACKGROUND
17 18	Q5.	What role did the CAISO's transmission planning process play in determining the need for the Proposed Project?
19	A5.	The CAISO's annual transmission planning process confirmed the need for the Proposed
20		Project to meet the State of California's renewable generation goals through the planning
21		cycles that took place since the Proposed Project was first identified through an earlier
22		generator interconnection process.
23		
24	Q6.	Please provide an overview of the CAISO's transmission planning process.
25	A6.	The CAISO conducts an annual transmission planning process to identify and plan the
26		development of solutions to meet the future needs of the CAISO controlled grid. This
27		annual process culminates in the CAISO Board of Governors approving a comprehensive
28		transmission plan. The transmission plan identifies needed transmission solutions and
29		authorizes their cost recovery through CAISO transmission rates, subject to regulatory

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1 approval. The CAISO develops the plan in the larger context of supporting achievement 2 of important state energy and environmental policies, and facilitating the transition to a 3 cleaner, lower emission future, while maintaining reliability through a resilient electric 4 system. 5 6 The transmission plan identifies transmission facilities that are needed for three main 7 purposes: reliability; public policy; and economics. In the planning process, the CAISO 8 also considers and evaluates non-transmission alternatives, including conventional 9 generation and preferred resources such as energy efficiency, demand response, 10 renewable resources, and energy storage. 11 12 The annual planning process is structured in three consecutive phases with each planning 13 cycle identified by a beginning year and a concluding year. Each annual cycle begins in 14 January and extends into the subsequent year. 15 16 In Phase 1 of the annual transmission planning process, the CAISO (1) establishes the 17 assumptions and models to be used in the planning studies, (2) develops and finalizes a 18 study plan, and (3) specifies the public policy mandates that CAISO planners will adopt 19 as objectives in the current planning cycle. This phase takes roughly three months from 20 January through March of the first year of the planning cycle. During Phase 1, the 21 CAISO first posts a draft study plan for stakeholder review and then conducts a public 22 stakeholder session. The study plan provides the unified planning assumptions that the 23 CAISO will use in its planning studies. At the stakeholder session, the CAISO answers 24 questions regarding the draft study plan and requests additional written comments from 25 stakeholders. The CAISO then considers stakeholder comments in completing its final 26 study plan. 27

In Phase 2, the CAISO performs studies to identify transmission needs and solutions to
 meet those needs, culminating in the annual comprehensive transmission plan. Phase 2

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1		takes approximately 12 months and generally involves three additional public stakeholder
2		sessions at which the CAISO presents preliminary and draft results for vetting with
3		stakeholders. After each stakeholder session, the CAISO requests and considers
4		stakeholder comments on its planning analyses. Identifying non-transmission alternatives
5		that the CAISO can rely upon in lieu of transmission solutions also occurs during Phase
6		2. After this process concludes, the draft transmission plan is presented to the CAISO's
7		Board of Governors for final review and approval. Together, Phases 1 and 2 take a total
8		of 15 months to complete.
9		
10		During Phase 3, the CAISO solicits competitive bids for the construction and ownership
11		of new transmission facilities identified in the approved transmission plan eligible for
12		competition. In any given planning cycle, Phase 3 may or may not occur depending on
13		whether the final plan includes transmission facilities that are open to competitive
14		solicitation in accordance with criteria specified in the CAISO tariff.
15		
16 17	Q7.	Does the CAISO's annual transmission planning process assume that all transmission solutions approved in previous transmission plans will proceed?
18	A7.	Generally, yes. Each annual study plan assumes that all transmission previously
19		approved through earlier transmission planning processes is developed as approved.
20		Projects may be reviewed on a case by case basis if material changes in circumstance are
21		identified by the CAISO or other stakeholders. However, these circumstances do not
22		apply in the case of the Proposed Project. The need for the Proposed Project was first
23		established in the CAISO's Generator Interconnection Process and was then verified in
24		the transmission planning process. No material changes in circumstance have been
25		identified by the CAISO or other stakeholders that would render the Proposed Project
26		unnecessary.
27		
28		
20		

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1Q8.Please provide additional detail regarding the CAISO's process to identify public2policy-driven transmission solutions.

3 **A8.** As part of Phase 2 of the annual transmission planning process, the CAISO evaluates public policy-driven transmission solutions needed to meet federal, state, and local policy 4 5 requirements. The CAISO added public policy requirements and directives as a category 6 of transmission need in 2010. Planning transmission to meet public policy directives is 7 now a federal requirement under FERC Order No. 1000. The state directive in SBX1-2 8 has been the primary driver of policy driven analysis in the transmission plans since it 9 came into effect. SBX1-2 established the Renewables Portfolio Standard (RPS) by 10 requiring 33 percent of electricity sold annually in the state to be supplied from qualified 11 renewable resources by the year 2020. In particular, the CAISO evaluates whether 12 transmission solutions are necessary to meet the state RPS. State legislation has, since 13 the approval of the Proposed Project through the 2012-2013 and 2013-2014 transmission 14 planning processes, added additional requirements for higher RPS levels reaching out to 15 2045, but to this point, the CAISO has only identified policy-driven transmission projects 16 to meet the 33% requirement.¹

17

18To evaluate necessary transmission additions, the CAISO relies on RPS portfolios19developed by the Commission and submitted to the CAISO for use in the CAISO's20transmission planning process. These Commission-developed RPS portfolios provide21expected renewable buildouts for capacity and energy by location and by technology.22The CAISO uses these RPS portfolios in its 10-year forward transmission planning23analysis to identify the need for policy-driven upgrades that provide area-wide benefits24by relieving deliverability constraints in areas specified for generation development. The

¹ 33 percent RPS portfolios were used as the basis for policy-driven transmission planning in all CAISO transmission plans from the 2012-13 Transmission Plan through to the 2017-2018 Transmission Plan. The CPUC declined to provide a base RPS portfolio for policy-driven transmission planning in the 2018-2019 Transmission Plan, citing the status of the integrated resource planning process and the expectation that additional policy-driven transmission was unlikely to be needed to achieve 2030 goals. A base RPS portfolio has been provided for the 2019-20 transmission planning process that is expected to achieve a 56 to 57 percent RPS level by 2030.

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CAISO's analysis also ensures that there are not undue limitations on renewable generation output so that energy-based RPS goals can be achieved.

4 The CAISO's policy-driven assessment is based on the CAISO's deliverability 5 assessment methodology, which is the test the CAISO relies upon to determine if 6 sufficient transmission capacity exists to allow new resources to reasonably be delivered 7 to load during peak system stress conditions. The CAISO uses the deliverability 8 assessment to provide interconnecting generators with Full Capacity Deliverability Status,² which is necessary for generators to provide resource adequacy capacity. The 9 10 CAISO's deliverability study methodology for resource adequacy purposes was 11 discussed extensively and generally adopted in the Commission's 2004 Resource 12 Adequacy Proceeding. The Federal Energy Regulatory Commission (FERC) also 13 accepted the CAISO's deliverability study methodology as a reasonable implementation 14 of the large generator interconnection connection process during the FERC Order 2003 15 compliance filing process.

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Although the CAISO's deliverability analysis alone suffices in most cases to ensure that 17 18 adequate transmission capacity is planned to be in place to meet RPS needs, the CAISO 19 conducted additional analysis to confirm the need for the Proposed Project because the 20 affected portion of the transmission network operates in parallel with the neighboring Los 21 Angeles Department of Water and Power (LADWP) transmission system. This 22 additional analysis ensures that the CAISO is relying on its own rights and entitlements 23 and not unduly limiting access to entitlements that LADWP has on its own or CAISO-24 controlled facilities. The CAISO's additional analysis confirmed that the transmission 25 system that is planned respects LADWP's transmission ownership and entitlements. Mr. 26 Barave's testimony addresses this additional study in detail.

² Capitalized terms not otherwise defined in this testimony are used as defined in the CAISO Tariff. The CAISO Tariff states that "Full Capacity Deliverability Status entitles a Generating Facility to a Net Qualifying Capacity amount that could be as large as its Qualifying Capacity and may be less pursuant to the assessment of its Net Qualifying Capacity by the CAISO."

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Q9. How does the CAISO rely on Commission-developed portfolios detailing volumes 1 2 and locations of future renewable generation for transmission planning purposes? 3 A9. Since the 2011-2012 planning cycle, the CAISO has relied upon forecasts developed by the Commission for information regarding the location and volume of future renewable 4 5 energy development. The Commission provides this information to the CAISO in the form of renewable generation portfolios for use in the transmission planning process. 6 7 As stated most recently in the CAISO's 2018-2019 transmission plan: 8 The ISO formulates the public policy-related resource portfolios in collaboration 9 with the [Commission], and with input from other state agencies including the 10 CEC and the municipal utilities within the ISO balancing authority area. The [Commission] as the agency that oversees the bulk of the supply procurement 11 12 activities within the ISO area, plays a primary role formulating the resource 13 portfolios. The ISO reviews the proposed portfolios with stakeholders and seeks 14 their comments, which the ISO then considers in determining the final portfolios. 15 The resource portfolios have played a crucial role in identifying needed public 16 policy-driven transmission elements. Meeting the renewables portfolio standard 17 has entailed developing substantial amounts of new renewable generating 18 capacity, which in turn required new transmission for delivery. The ISO has 19 managed the uncertainty as to where the generation capacity will locate by 20 balancing the need to have sufficient transmission in service in time to support the 21 renewables portfolio standard against the risk of building transmission in areas 22 that do not realize enough new generation to justify the cost of such infrastructure. 23 This has entailed applying a "least regrets" approach, whereby the ISO first 24 formulates alternative resource development portfolios or scenarios, then 25 identifies the needed transmission to support each portfolio, and then selects for 26 approval those transmission elements that have a high likelihood of being needed and well-utilized under multiple scenarios.³ 27 28 29 The Commission and the CAISO have acknowledged the importance of agency

- 30 coordination in developing and studying the renewable energy portfolios to identify
- 31 policy-driven transmission projects. The Commission most recently reiterated this
- 32 commitment to agency coordination in Decision 19-04-040 in the Integrated Resource
- 33 Planning (IRP)⁴ proceeding, which recommended that the CAISO utilize the IRP-

³ CAISO 2018-2019 Board of Governor Approved-Updated Transmission Plan, March 29, 2019, pp. 34.

⁴ Rulemaking (R.) 16-02-007.

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1		developed Preferred System Plan as the reliability base case and the policy-driven base
2		case in the 2019-2020 Transmission Planning Process. ⁵ FERC also recently supported
3		the CAISO's reliance on the Commission-developed renewable portfolios for
4		transmission planning purposes, which had been challenged in a complaint. ⁶
5		
6		In addition, the Commission relied upon the portfolios as the basis for its public
7		convenience and necessity findings, in whole or in part, in approving both the West of
8		Devers Upgrade Project ⁷ and the Suncrest Dynamic Reactive Support Project. ⁸
9		
10 11	Q10.	Why must the CAISO provide Full Capacity Deliverability Status to generators in the renewable generation portfolios to achieve the state's percent RPS?
12	A10.	Full Capacity Deliverability Status was a necessary and reasonable requirement for the
13		renewable generation portfolios to achieve the 33 percent RPS. Energy-only service was
14		not sufficient for these resources, as explained in more detail below.
15		
16		The CAISO's policy-driven transmission analysis and the Commission-developed
17		renewable portfolios for achieving the 33 percent RPS were designed on the basis that
18		renewable generation projects would achieve Full Capacity Deliverability Status. Power
19		purchase agreements approved by the Commission for purposes of meeting RPS goals
20		overwhelmingly require renewable generators to provide resource adequacy capacity,
21		which, in turn, requires Full Capacity Deliverability Status as a prerequisite. As a result,
22		renewable generators have consistently requested Full Capacity Deliverability Status in
23		the CAISO generation interconnection process. Because virtually all renewable
24		generation procured to meet California's RPS request Full Capacity Deliverability Status
25		and the portfolios have been developed with that expectation, the CAISO policy-driven

⁵ Commission Decision 19-04-040, p. 3.
⁶ Paragraph 77, Page 29, Docket EL-19-81-000, Order denying Complaint, Issued October 17, 2019
⁷ Application 13-10-020, D.16-08-017.
⁸ Application 15-08-027, Decision 18-09-030.

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transmission analysis ensures that the generation in the Commission-developed renewable portfolios will be deliverable.

In developing renewable generation portfolios to achieve higher levels of RPS, and in
particular, the Reliability and Policy-Driven Base Case⁹ transmitted for the purpose of the
current 2019-2020 transmission planning process, the Commission identified volumes of
generation requiring Full Capacity Deliverability Status and additional volumes of
Energy Only resources (*i.e.*, resources that need not be deliverable to load during peak
demand). These updated portfolios do not detract from previously-identified needs or the
volumes requiring Full Capacity Deliverability Status, but build on previous plans.

12 Maintaining deliverability for new renewable generation is consistent with providing 13 industry certainty for generation developers, as the CAISO has highlighted in the past. 14 The Commission has also recognized that re-planning generation portfolios after transmission plans have been developed creates an untenable framework for generation 15 16 developers. Each year's portfolio development builds on previous years' efforts. 17 Constantly tinkering or re-optimizing portfolios would create the uncertainty that 18 undermines the fundamental goals of the policy-driven transmission development-19 namely, to send signals to the generation development community regarding preferred 20 areas for development and to provide generation developers with reasonable assurance 21 that necessary longer-lead-time transmission would be developed to avoid stranding 22 generation resources. Both the Commission and the California Energy Commission have 23 acknowledged this concern in the past, specifically noting that: "It is undesirable to use a 24 renewable portfolio in the [transmission planning process] base case that might require reexamination of previously approved transmission investment decisions."10 25

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https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/ElectPo werProcurementGeneration/irp/2018/IRP_TPP_ReliabilityAndPolicyBaseCase_ToBePosted.xlsx

¹⁰ 201617 Transmission Planning Process. Letter to CAISO Chief Executive Officer Steve Berberich from Commission President Michael Picker and California Energy Commission Chair Robert Weisenmiller <u>http://www.caiso.com/Documents/2016-2017RenewablePortfoliosTransmittalLetter.pdf</u>

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Mr. Barave's testimony documents the renewable generation advancing through the
 CAISO's generation interconnection queue that depends on the Proposed Project to
 achieve deliverability.

5 III. NEED FOR THE ELDORADO-LUGO-MOHAVE SERIES CAPACITOR 6 PROJECT

7 Q11. Please describe the Proposed Project.

8 A11. The Proposed Project consists of series capacitor upgrades on the Lugo-Eldorado 500 kV 9 transmission line and the Lugo-Mohave 500 kV line in addition to associated terminal 10 equipment upgrades. The CAISO identified the policy-based need for the Lugo-11 Eldorado series capacitors and terminal equipment upgrade in the 2012-2013 12 Transmission Plan. Subsequently, in the 2013-2014 Transmission Plan, the CAISO 13 identified a policy-based need for the Lugo-Eldorado series capacitors and terminal 14 equipment upgrade. The policy-based purpose of the project was to integrate renewable 15 resources sufficient to meet the State's RPS requirements.

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17 The need for both components of the Proposed Project was initially identified in Phase II 18 of the cluster 3 and 4 generator interconnection process. In the 2012-2013 transmission 19 planning cycle, however, the CAISO found that the Lugo-Eldorado upgrades were 20 needed by a large quantity of generation projects spread across a large geographic area. 21 As a result, the CAISO approved the series capacitor upgrades on the Lugo-Eldorado 500 22 kV transmission line as a policy-driven upgrade through the 2012-2013 transmission 23 planning process. The CAISO targeted an initial operation year of 2016 and the planning 24 level cost estimate was \$121 million for the Lugo-Eldorado 500 kV upgrades. 25 The 2013-2014 CAISO Transmission Plan built on the expectation that the Lugo-26 Eldorado 500 kV series capacitor and terminal equipment upgrade combined with 27 another project in the area— re-routing of a portion of the existing Eldorado–Lugo 500 28 kV line—would proceed as approved in the 2012-2013 Transmission Plan. 29 In the 2013-2014 transmission planning process, the CAISO found that the Commission-30 developed RPS portfolios caused overloads in the LADWP transmission system. This

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constraint limited deliverability in a wide electrical area that covers several renewable zones. To reduce the loop flow through LADWP's system, the CAISO identified the need to upgrade the series capacitor and terminal equipment at the Mohave substation for Lugo–Mohave 500 kV line. The CAISO targeted an initial operation year of 2016 and the planning level cost estimate for the Mohave series capacitor was \$70 million.

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Q12. Please describe the process by which the CAISO identified the Proposed Project as a necessary policy-driven upgrade.

9 A12. The CAISO followed its FERC-approved transmission planning process, as generally
10 described above. The CAISO subsequently re-studied the need for the Proposed Project
11 using the latest available information in preparation for this proceeding, as discussed
12 below. The CAISO confirmed that no other transmission system changes occurred in the
13 interim that changed the need for the project while providing the same level of
14 transmission system performance.

15

16 Q13. Based on the CAISO's most recent analysis, is the Proposed Project still necessary?

17 Yes. Although some changes have occurred since the time the Proposed Project was A13. 18 approved as part of the 2012-2013 and 2013-14 Transmission Plans, the Proposed Project 19 remains necessary to integrate renewable resources necessary to meet the State's RPS 20 goals and provide adequate transmission capability to reliably operate the grid. Further, 21 additional benefits have evolved over time since the Proposed Project was approved, 22 including facilitating LADWP's participation in the advancement of the joint Lugo-23 Victorville 500 kV upgrade project that was approved in the CAISO's 2016-2017 transmission planning process. Additional benefits in enabling path rating increases and 24 25 relaxing scheduling limitations on the West of River import path have also been 26 identified and assessed, which is also further validation of the deliverability of resources 27 located in areas including the southern Nevada, Eldorado and Mountain Pass areas. It is 28 also needed to avoid disrupting the development of generation projects advancing 29 through the CAISO's interconnection queue, that are dependent upon these facilities for 30 deliverability and that are aligned with the renewable generation portfolios provided by

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	the Commission for purposes of guiding transmission planning and renewable generation
	development. Mr. Barave's testimony provides the CAISO's updated analysis
	demonstrating the continued need for the Proposed Project.
IV.	CONCLUSION
Q14.	Please summarize your recommendations.
A14.	As explained in my testimony and the supporting technical testimony of Mr. Sushant
	Barave, the Proposed Project is necessary to meet policy requirements of the State of
	California. As a result, I recommend that the Commission approve the Application filed
	by Southern California Edison for a certificate of public convenience and necessity for
	the Proposed Project.
Q15.	Does this conclude your testimony?
A15.	Yes, it does.
	Q14. A14. Q15.