

# Memorandum

**To:** ISO Board of Governors

**From:** Neil Millar, Vice President of Transmission Planning and Infrastructure Development

**Date:** March 18, 2020

**Re:** **Decision on ISO 2019-2020 transmission plan**

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***This memorandum requires Board action.***

## EXECUTIVE SUMMARY

Each year the California Independent System Operator Corporation undertakes a comprehensive assessment of the transmission needs of the system over a 10-year planning horizon and produces an annual transmission plan. The ISO 2019-2020 transmission plan provides a comprehensive evaluation of the ISO's transmission grid to identify upgrades needed to successfully meet California's policy goals, in addition to examining conventional grid reliability requirements and transmission projects that can bring economic benefits to consumers. The tariff requires Board approval of the transmission plan. Accordingly, Management recommends the Board approve the ISO transmission plan for the 2019-2020 planning cycle, included as Attachment A.

The number and capital costs of recommended projects in the 2019-2020 transmission plan represent a modest increase from the few approved in recent previous transmission plans. While the previous lows were due to the considerable progress made in earlier planning cycles in identifying and approving a wide array of transmission projects, emerging issues and evolving economic opportunities as well as localized load growth have led to more transmission projects being identified in this cycle. While sensitivities have been conducted at higher RPS levels in the past, the 2019-2020 transmission planning cycle was the first for which the policy-driven base case provided by the CPUC exceeded the original 33 percent renewables portfolio standard (RPS) target originally established for 2020 in Senate Bill 2 (1X) (Simitian, 2011). Given the significant amount of policy-driven transmission projects approved in past planning cycles to support meeting California's 33% RPS in 2020, and the fact that these already-approved projects appear to be adequate for meeting a 60% RPS as set out in California Senate Bill 100, the 100 Percent Clean Energy

Act of 2018 which was signed into law on September 10, 2018, no policy-driven project is being recommended for approval in this year's transmission plan. While the CPUC is also focused on achieving greenhouse gas reductions from the electricity sector taking into account input from the California Air Resources Board that may drive to even higher reliance on renewable generation, the implementation details for achieving those goals are not sufficiently developed to inform whether any additional transmission infrastructure is needed.

The reliability assessment identified nine reliability-driven projects as needed to maintain the reliability of the ISO transmission system and is estimated to cost approximately \$141.7 million. Through the 2019-2020 transmission process, seven of the projects, each under \$50 million dollars, were approved by ISO Management with an estimated total cost of approximately \$87.7 million.

In addition to the approval of the overall findings and conclusions documented in the transmission plan, and summarized in this memorandum, Management requests that the Board approve two reliability-driven transmission projects identified as needed to ensure compliance with NERC and ISO planning standards. These two projects are estimated to cost approximately \$54 million in total. None of the projects are eligible for competitive solicitation.

Other key findings and conclusions from the 2019-2020 transmission plan include:

- No policy-driven transmission projects were identified as needed for meeting the 60% RPS state policy objective.
- No economic-driven transmission projects were identified. One of the reliability-driven projects is recommended to be advanced for economic benefit reasons.
- Three previously approved projects will be on hold pending reassessment in future cycles.

The ISO produced this transmission plan after engaging in an extensive stakeholder process. We communicated preliminary results through stakeholder presentations on September 25 and 26, and on November 18, 2019. The ISO released a draft plan on January 31, 2020 and presented it at a stakeholder session on February 7, 2020. Based on comments received from stakeholders, we conducted additional review and made further revisions, culminating in the revised draft ISO 2019-2020 transmission plan.

Management proposes the following motion:

**Moved, that the ISO Board of Governors approves the ISO 2019-2020 transmission plan attached to the memorandum dated March 18, 2020.**

## **BACKGROUND**

A core responsibility of the ISO is to plan and approve additions and upgrades to transmission infrastructure so that as conditions and requirements evolve over time, we can continue to provide a well-functioning wholesale power market through reliable, safe and efficient electric transmission service. Since it began operation in 1998, the ISO has fulfilled this responsibility through its annual transmission planning process.

Board approval of the transmission plan is required. Specifically, section 24.4.10 of the tariff states:

*The revised draft comprehensive Transmission Plan, along with the stakeholder comments, will be presented to the CAISO Governing Board for consideration and approval. Upon approval of the plan, all needed transmission addition and upgrade projects and elements, net of all transmission and non-transmission alternatives considered in developing the comprehensive Transmission Plan, will be deemed approved by the CAISO Governing Board. Transmission upgrade and addition projects with capital costs of \$50 million or less can be approved by CAISO management and may proceed to permitting and construction prior to Governing Board approval of the plan. Following Governing Board approval, the CAISO will post the final comprehensive Transmission Plan to the CAISO website.*

### **Advancing preferred resources**

Increased opportunity for non-transmission alternatives, particularly preferred resources and storage, continues to be a key focus of the transmission planning analysis. In this regard, the ISO's transmission planning efforts focus on not only reliability and on meeting the state's policy objectives through advancing policy-driven transmission, but also on helping transform the electric grid in an environmentally responsible way. The focus on a cleaner, lower-emission future governs not only policy-driven transmission, but also our path for meeting other electric system needs. Of course, opportunities are based on the identified needs.

Further, preferred resource assumptions are also incorporated into the load forecasts adopted through state energy agency activities that the ISO supports, and provide an additional opportunity for preferred resources to address transmission needs.

The ISO's reliance on preferred resources to address specific reliability needs has been summarized in section 8.3 of the transmission plan, in addition to being discussed throughout the plan on an area-by-area study basis. While no new opportunities for storage were recommended for approval in this transmission plan, a significant number were studied for possible benefits. The ISO is also continuing to work with the local utilities to fine-tune preferred resource requirements, including battery storage, which in conjunction with conventional transmission upgrades will meet reliability needs in several areas – Moorpark and Oakland in particular.

### **Collaborative planning efforts**

The ISO, utilities, the California Energy Commission, the California Public Utilities Commission and other stakeholders worked closely together to ensure alignment of key planning assumptions within the three core planning processes, in particular a single “managed” load forecast, and to assess how to meet the environmental goals established by state policy.

The three core planning processes are the:

- Long-term forecast of energy demand produced by the CEC as part of its biennial Integrated Energy Policy Report (IEPR),
- Biennial integrated resource plan proceedings (IRP) and long term procurement plan proceedings (LTPP) conducted by the CPUC, and
- Annual transmission planning process (TPP) performed by the ISO.

The results of the CPUC's annual process feeding into this 2019-2020 transmission planning process were communicated via a decision in the CPUC's Integrated Resource Plan Process. These assumptions were further vetted by stakeholders through the stakeholder process in developing the 2019-2020 study plan.

## **KEY FINDINGS**

Our comprehensive evaluation of the areas listed above is discussed in the following sections.

### ***Reliability-driven transmission projects***

Nine reliability-driven transmission projects were identified as needed in this planning cycle to ensure compliance with NERC and ISO planning standards, representing an investment of approximately \$141.7 million in infrastructure additions to the ISO-controlled grid. Seven of the projects are located in the PG&E service territory, one of the projects is in the SCE service territory and one of the projects is in the Valley Electric Association / GridLiance West service territory. Through the 2019-2020 transmission planning process, seven of the projects, each under \$50 million dollars, were approved by ISO Management with an estimated total cost of approximately \$87.7 million.

In arriving at these projects, the ISO and transmission owners performed power system studies to measure system performance against the NERC reliability standards and ISO planning standards, as well as to identify reliability concerns that included, among other things, facility overloads and voltage excursions. The ISO then evaluated mitigation measures and identified cost-effective solutions.

The reliability assessment also identified three previously approved projects to be on hold pending reassessment in future cycles.

### ***Transmission elements supporting renewable energy goals***

The CPUC and CEC provided policy direction to the ISO regarding renewable generation portfolios for 2019-2020 policy-driven transmission planning purposes via the CPUC decision referenced above. The CPUC communicated a base portfolio based on its “42 MMT<sup>1</sup> scenario” that results in approximately a 60 percent RPS, and sensitivity portfolios for policy-driven planning efforts.

The ISO has accordingly performed policy-driven study assessments of the 42 MMT scenario and did not identify any new Category 1 policy-driven transmission needs. The ISO is not recommending any new transmission solutions at this time for policy purposes.

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<sup>1</sup> Million Metric Tons

**Elements of 2019-2020 ISO Transmission Plan Supporting 60 Percent  
Renewable Energy Goals**

<b>Transmission Facility</b>	<b>In-Service Date</b>
<b><i>Transmission Facilities Approved, Permitted and Under Construction</i></b>	
West of Devers Reconductoring	2021
<b><i>Additional Major Network Transmission Identified as Needed in ISO Interconnection Agreements but not Permitted</i></b>	
None at this time	
<b><i>Policy-Driven Transmission Elements Approved but not Permitted</i></b>	
Lugo – Eldorado series cap and terminal equipment upgrade	2021
Warnerville-Bellota 230 kV line reconductoring	2024
Wilson-Le Grand 115 kV line reconductoring	2021
Lugo-Mohave series capacitors	2021
<b><i>Additional Policy-Driven Transmission Elements Recommend for Approval</i></b>	
None identified in 2019-2020 Transmission Plan	

### **Economically-driven transmission projects**

The objective of the ISO’s economic studies is to identify transmission congestion and analyze if the congestion can be cost-effectively mitigated by network upgrades. Generally speaking, transmission congestion increases consumer costs because it prevents lower-priced electricity from serving load. Resolving congestion bottlenecks is cost-effective when projected ratepayer savings are greater than the cost of the project. In such cases, the transmission upgrade can be justified as an economic project. Further, the ISO’s tariff and transmission economic assessment methodology enables review of other economic benefits, including the reduction of local capacity costs, as a consideration in assessing the benefits of potential transmission upgrades.

In the economic planning analysis performed as part of this transmission planning cycle in accordance with the unified planning assumptions and study plan, approved reliability and policy network upgrades and those recommended for approval in this plan were modeled in the economic planning database. This ensured that the results of the analysis would be based on a transmission configuration consistent with the reliability and public policy results documented in this transmission plan.

Beyond screening congestion results to select key focus areas for detailed economic studies, the ISO:

- Received a number of economic study requests, which included projects that would more reasonably be categorized as interregional transmission projects;
- Received several proposed reliability projects that cited material economic benefits;
- Completed the expanded 10-year local capacity technical study initiated in the 2018-2019 planning cycle, examining not only the need and the characteristics of the need but alternatives to reduce local gas-fired generation capacity requirements, and selected a subset of local capacity areas for detailed economic analysis where options appeared potentially viable.

A number of the above proposals and submissions overlapped, enabling them to be studied in single study areas.

The ISO's studies were impacted by certain conditions existing in this planning cycle:

- The longer-term requirements for gas-fired generation for system and flexible capacity requirements continue to be examined, both in the CPUC integrated resource planning process as well as ISO studies – studies conducted outside of the annual transmission planning process for purposes of supporting CPUC efforts. As no actionable direction has yet been set regarding the future of the existing gas-fired generation fleet beyond known retirements, the uncertainty necessitated taking a conservative approach in this planning cycle in assigning a value to upgrades potentially reducing local gas-fired generation capacity requirements;
- A number of project sponsors requesting economic studies proposed projects that were proposed and considered in the 2018-2019 transmission planning cycle.

While the tariff allows the ISO to limit the number of economic evaluations to five, the ISO studied proposals in 10 study areas in this year's planning cycle.

In summary, no new projects were found to be needed as economic-driven projects in the 2019-2020 planning cycle, and one project already found to be needed for reliability needs is recommended to be advanced for economic benefit reasons.

### **Interregional Transmission Coordination Process**

The ISO's 2019-2020 (annual 15-month process) transmission planning cycle marked the second year of the second biennial cycle since these coordination processes were put in place addressing the interregional requirements of FERC Order No. 1000.

Six interregional transmission projects were submitted into the biennial process through the 2018-2019 transmission planning cycle. Of those, three were screened out, and the remaining three were fed into the ISO's economic study process for further analysis in that 2018-2019 planning cycle. This aligns with the requirement to examine, if proposed, interregional transmission projects that may provide more economic and cost-effective solutions than regional proposals for meeting identified needs. The remaining three projects were studied in detail but were not found to be more economic and/or cost-effective solutions than regional proposals for meeting identified needs.

Consistent with the Order No. 1000 Common Interregional Tariff, no further consideration of the submitted interregional transmission projects was required in this 2019-2020 transmission planning cycle.

### **Informational Studies**

As in past transmission planning cycles, the ISO undertook additional informational studies to help inform future transmission planning and resource procurement processes. The ISO has identified the need to perform a number of these studies on an ongoing basis, at least for the foreseeable future, and has therefore documented these studies in the "other studies" in chapter 6, instead of categorizing them as "special studies." Noteworthy changes are set out below.

- **Frequency Response and Dynamic System Modeling.** Consistent with the 2018-2019 transmission planning cycle, the ISO undertook frequency response studies and reported on associated modeling improvement efforts as an ongoing study process inside the annual planning cycle despite not being a tariff-based obligation. Within this cycle, the ISO has also examined the benefits of potential modifications to frequency response settings for grid-connected inverter-based resources.



- **Reliance on Gas-fired Generation in Local Capacity Areas.** The ISO conducted additional analysis of local capacity requirements in local capacity areas over the 2018-2019 and 2019-2020 transmission planning cycles, to help inform resource planning efforts. First, the 10-Year Local Capacity Study conducted as part of the 2018-2019 planning cycle was expanded to include detailed information regarding the characteristics of the local capacity area needs that are the basis for assessing non-transmission and preferred resource solutions. Second, transmission or other hybrid alternatives were developed for half of the area and sub-area needs, selected on a prioritized basis. These first two steps were considered to be of use in future resource procurement processes. Third, a subset of those areas and sub-areas were fed into the ISO's economic study process to assess the viability of moving forward with some level of local capacity requirement reduction on the economic basis used to assess transmission development. In the 2019-2020 planning cycle, the ISO repeated steps 2 and 3, relating to exploring alternatives, for those areas with local capacity requirements for gas-fired generation that were not already studied, and reviewed several specific areas from the 2018-2019 planning process where it was warranted.
- **Flexible Capacity Deliverability Requirements.** The ISO developed a methodology and tested the deliverability of flexible capacity in the 2019-2020 transmission planning cycle, recognizing that the tests applied to ensure deliverability of system capacity may not reflect the conditions and limitations that could constrain the ability of flexible capacity resources to provide ramping when most needed.

The flexible deliverability test relies on the deliverability assessment and adds new criteria to address scenarios not already covered in the deliverability assessment. A testing procedure was developed to monitor the generation pockets for flexible deliverability. However, no study or requirements will be proposed to be considered for enforcement on new generators in the generation interconnection study procedure until: 1) it becomes clear how the flexible capacity will be counted, especially for the wind and solar capacity through past policy initiative; 2) the revised on-peak and off-peak deliverability methodologies are approved and adopted; and 3) the transmission planning process analysis identifies flexible deliverability constraints. The assessment did not identify any flexible deliverability concerns. However, future work is needed to improve the assessment methodology.

## STAKEHOLDER FEEDBACK

Stakeholders have provided feedback on the draft ISO 2019-2020 transmission plan that was released on January 31, 2020, and presented at a stakeholder meeting on February 7, 2020. Stakeholders generally provided complimentary feedback on the transmission plan itself and the scope of the ISO's analysis, and in particular, the additional analysis conducted to extend the scope of the 10-year Local Capacity Technical Study. The ISO has reviewed all of the stakeholder comments carefully, and has concluded that the recommendations made in the transmission plan are appropriate. The more significant stakeholder concerns, and our response to those concerns, are summarized below.

- ***Dissatisfaction with CPUC-coordinated study assumptions*** – A number of stakeholders expressed dissatisfaction with the transmission plan study assumptions, particularly concerning CPUC portfolios including “energy only” resources instead of requiring all additional renewable generation to achieve full capacity deliverability status.

**ISO response:** The ISO does not believe it would be reasonable or practical to act contrary to the coordinated efforts with the CPUC and CEC. The ISO encourages stakeholders to raise their concerns within the CPUC's Integrated Resource Planning proceedings, where they may be addressed more appropriately.

- ***Further consideration of alternatives submitted*** – A number of stakeholders expressed concerns that further consideration of alternatives submitted should have further consideration for approval in this year's planning cycle.

**ISO response:** The ISO appreciated the alternatives submitted by stakeholders to address identified needs in the planning cycle, has reviewed all of the stakeholder comments carefully, and has concluded that the recommendations made in the transmission plan are appropriate. For projects that have been put on hold or where the potential for mitigation may be required, the ISO will continue to assess the need for these projects in future cycles. With respect to the Contra Costa sub-area late-submitted economic alternative, the ISO will continue to assess the sub-area and Greater Bay Area overall needs in the 2021 local capacity technical study currently under way.

- ***Capital maintenance projects*** – A number of stakeholders expressed concerns that review of all PTO capital maintenance should be reviewed in the ISO transmission planning process, and when reviewing the capital maintenance the ISO should consider other alternatives to the proposed capital maintenance of the participating transmission facility owners.

**ISO response:**

The ISO does not agree with the comments, as the ISO's role regarding expansion planning is carefully defined and coordinated with state agency activities.

- **Concerns with renewable curtailment** – Stakeholders expressed concerns of renewable curtailment in the high renewable scenarios that are not being addressed in the transmission plan.

**ISO response:** A significant portion of the identified curtailment is related to the system curtailment and not local transmission curtailments. The ISO will continue to assess curtailment in the policy and economic assessments. The ISO encourages stakeholders to raise their concerns within the CPUC's Integrated Resource Planning proceedings, where they may be addressed more appropriately.

## CONCLUSION

The 2019-2020 ISO transmission plan provides a comprehensive evaluation of the ISO transmission grid to identify upgrades needed to adequately meet California's policy goals, address grid reliability requirements and bring economic benefits to consumers. This year's plan identified nine transmission projects, having an estimated cost of approximately \$141.7 million, as needed to maintain the reliability of the ISO transmission system and provide for the economic operation of the grid. Through the 2019-2020 transmission process, seven of the projects, each under \$50 million dollars, were approved by ISO Management with an estimated total cost of approximately \$87.7 million. Further, the plan has identified three previously approved projects to be on hold requiring further review.

Based on the findings that the transmission solutions listed above are the most cost-effective, feasible solutions for meeting the identified transmission needs in the ISO system, Management recommends that the Board approve the attached ISO 2019-2020 transmission plan.