

# Memorandum

**To:** ISO Board of Governors

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

**Date:** May 10, 2023

**Re:** **Decision on the ISO's 2022-2023 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's 2022-2023 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. As per the ISO tariff, Management seeks the ISO Board of Governors' approval of the ISO transmission plan for the 2022-2023 planning cycle, included as Attachment A.

The need for additional generation of electricity over the next 10 years has escalated rapidly in California as it continues transitioning to the carbon-free electrical grid required by the state's clean-energy policies. This in turn has been driving a dramatically accelerated pace for new transmission development in current and future planning cycles – as much as 7,000 MW/year over the next decade. To help ensure we have the transmission in place to achieve this transition reliably and cost-effectively, the ISO's 2022-2023 transmission plan reflects a much more strategic and proactive approach to better synchronize power and transmission planning, interconnection queuing and resource procurement and is put forward in close coordination with the state's primary energy planning and regulatory entities, the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC).

The more proactive and coordinated strategic direction reflected in this year's transmission plan is set forth in a joint Memorandum of Understanding (MOU) signed by the three parties in December 2022. The MOU tightens the linkages between resource and transmission

planning activities, interconnection processes and resource procurement so California is better equipped to meet its reliability needs and clean-energy policy objectives required by Senate Bill 100.

As set out in the MOU, expectations are that the CPUC will continue to provide resource planning information to the ISO as it did for this transmission planning cycle. The ISO will develop a final transmission plan, initiate the transmission projects and communicate to the electricity industry specific geographic zones that are being targeted for transmission projects along with the capacity being made available in those zones. The CPUC will in turn provide clear direction to load-serving entities to focus their energy procurement in those key transmission zones, in alignment with the transmission plan.

To bring this more coordinated approach full circle, the ISO will also give priority to interconnection requests located within those same zones in its generation interconnection process.

The combination of dramatically increasing the pace of renewable generation and load forecast growth are driving an increase in transmission requirements. The ISO found the need for 45 projects totaling \$7.3 billion. The projects recommended in this plan make all of the base amounts available and, in Southern California, also make most of the sensitivity amounts available. As the CPUC has already determined that the sensitivity amounts in this year's plan will be the base in next year's transmission plan, the remaining network upgrades needed to achieve the sensitivity amounts will be approved next year.

Reliability projects driven by load growth and evolving grid conditions as the generation fleet transitions to increased renewable generation represent 24 projects totaling \$1.76 billion. The projects are required to reliably supply the increase in forecasted load related to electrification and electric vehicle transportation loads.

The ISO found the need for 21 policy-driven transmission projects totaling \$5.53 billion to meet the renewable generation requirements established in the CPUC-developed renewable generation portfolios. The ISO also drew on other supporting information from the CPUC sensitivity portfolio and comments in evaluating the alternatives assessed and recommended for approval within this year's transmission plan.

The ISO conducted several economic studies investigating opportunities to reduce total costs to ratepayers through transmission upgrades not otherwise needed for reliability or meeting policy objectives. No projects driven solely by economic considerations are being recommended in this plan.

Other key findings and conclusions from the 2022-2023 transmission plan include:

- **Senate Bill 887:** The Accelerating Renewable Energy Delivery Act, (Becker, 2022) provides state policy direction on a number of resource and transmission planning issues, including direction about requests the CPUC is to make of the ISO in conducting its FERC tariff-based planning processes. The ISO has considered the state policy direction provided by SB 887 in the development of this transmission plan and also conducted a review of high-priority transmission projects as requested by the CPUC for this planning cycle.
- **North Coast Offshore Wind:** Based on the sensitivity portfolio provided by the CPUC, the ISO studied the need for transmission capacity from the North Coast for offshore wind. As the study was only informational and set the stage for future planning, no projects were recommended for approval in this 2022-2023 plan. Given the growing volumes already identified in the North Coast in the renewable generation portfolios provided for the 2023-2024 planning cycle, the ISO expects to make a decision on North Coast transmission in next year's transmission plan.
- **Out-of-State Wind:** The ISO has determined and included in the transmission projects recommended for approval its internal transmission system requirements necessary to access out-of-state wind resources. These out-of-state resources have been identified by the CPUC and considered in the planning analysis by expanding the maximum import capability of the internal ISO paths to import out-of-state wind. In addition to the study of the SWIP North project proposed by LS Power to access Idaho wind resources as a potential regional policy-driven transmission project discussed on the following page, the ISO has also been working with two subscription-based transmission projects seeking to deliver wind resources in Wyoming (TransWest Express) and New Mexico (Sunzia) to the ISO boundary. Both transmission projects have sold transmission capacity on their planned facilities reaching to the ISO border to resource developers seeking to access California markets. That work is ongoing and the timing of those projects is driven by the developers and their subscribers.

The ISO also continues working to refine its recommendation regarding the SWIP North project mentioned above taking into account participation interest of neighboring transmission service providers. This work will be conducted as an extension of the 2022-2023 transmission plan, with ISO Board of Governor approval anticipated to be sought in Q2 or Q3 of this year.

This transmission plan was developed after extensive stakeholder engagement. We communicated preliminary results through stakeholder presentations on September 27 and 28, and on November 17, 2022. The ISO released a draft plan on April 3, 2023, and presented it to stakeholders on April 11, 2023. Based on stakeholder comments received, we conducted additional review and made further revisions, culminating in the revised draft ISO 2022-2023 transmission plan.

Management proposes the following motion:

***Moved, that the ISO Board of Governors approves the ISO 2022-2023 transmission plan attached to the memorandum dated May 10, 2023.***

## 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.*

### **Collaborative planning efforts**

To help ensure we have the transmission in place to achieve this transition reliably and cost-effectively, the ISO's 2022-2023 transmission plan reflects a much more strategic and proactive approach to better synchronize power and transmission planning, interconnection queuing and resource procurement, and is put forward in close coordination with the state's primary energy planning and regulatory entities, the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC).

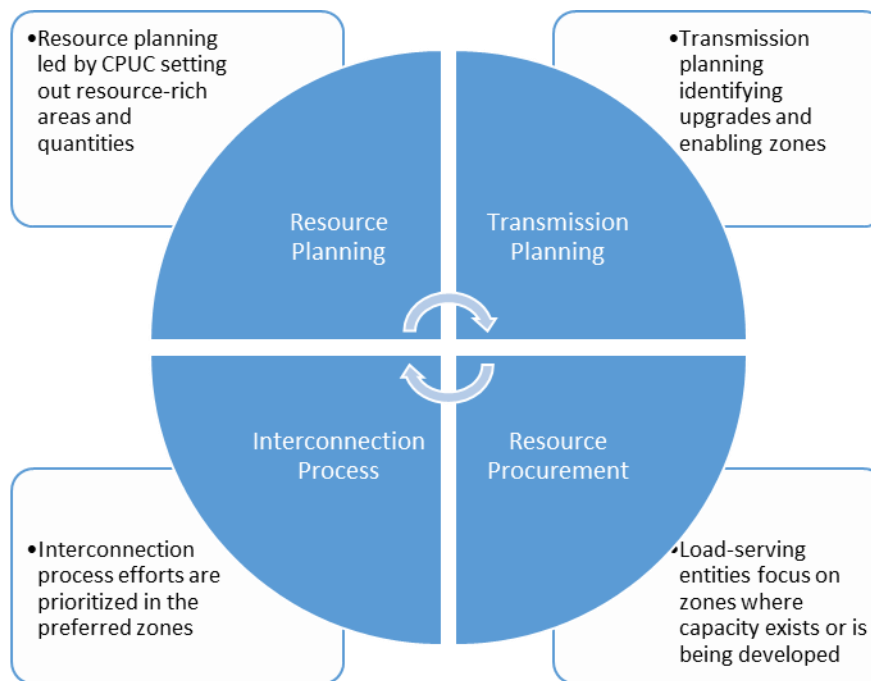
The more proactive and coordinated strategic direction reflected in this year's transmission plan is set forth in a joint Memorandum of Understanding (MOU)<sup>1</sup> signed by the three parties in December 2022. The MOU tightens the linkages between resource and transmission planning activities, interconnection processes and resource procurement so

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<sup>1</sup> <http://www.caiso.com/Documents/ISO-CEC-and-CPUC-Memorandum-of-Understanding-Dec-2022.pdf>

California is better equipped to meet its reliability needs and clean-energy policy objectives required by Senate Bill 100.<sup>2</sup>

As set out in the MOU, expectations are that the CPUC<sup>3</sup> will continue to provide resource planning information to the ISO as it did for this transmission planning cycle. The ISO will develop a final transmission plan, initiate the transmission projects and communicate to the electricity industry specific geographic zones that are being targeted for transmission projects along with the capacity being made available in those zones. The CPUC will in turn provide clear direction to load-serving entities to focus their energy procurement in those key transmission zones, in alignment with the transmission plan.

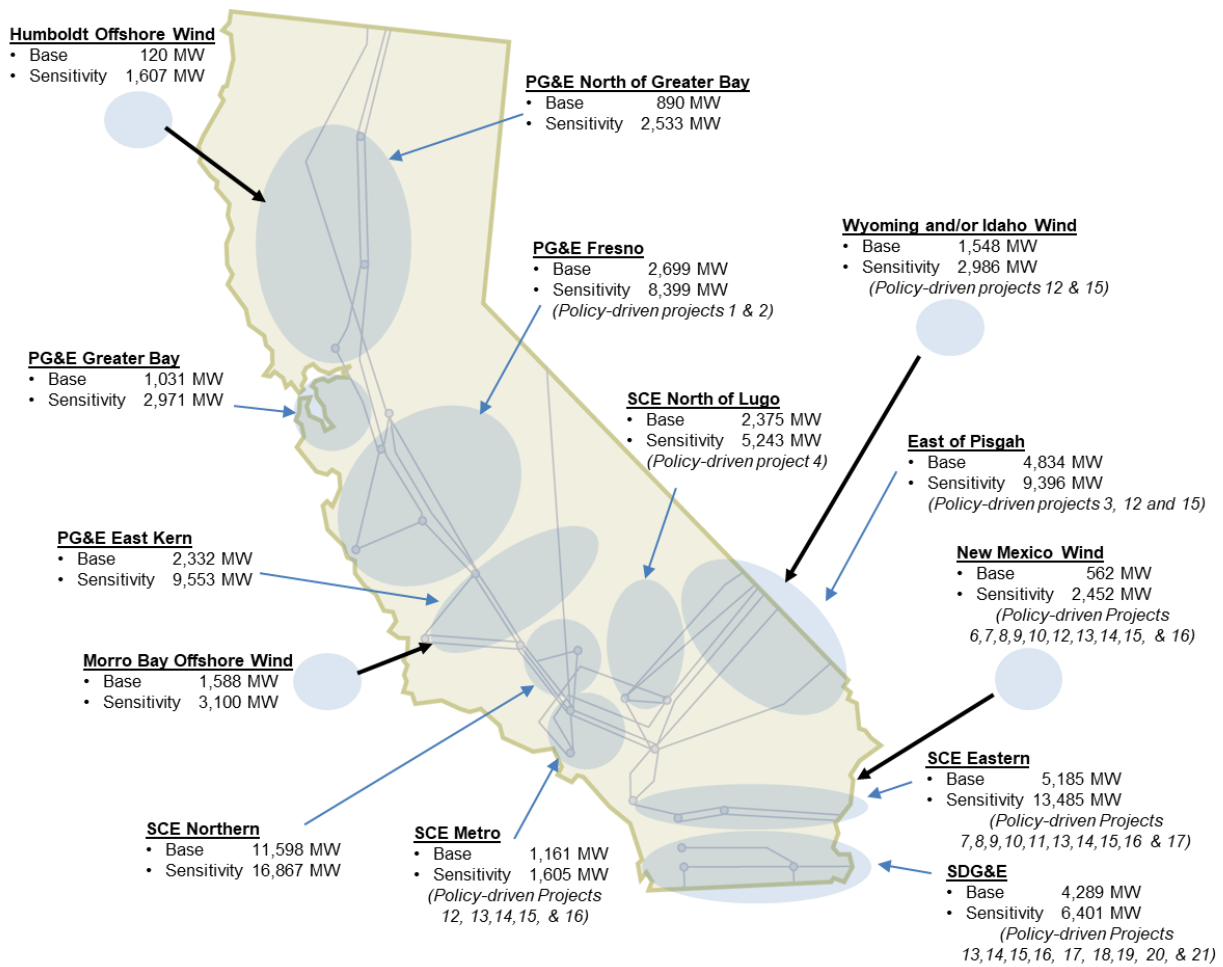


<sup>2</sup> SB 100, the 100% Clean Energy Act of 2018, authored by Senator Kevin De León, was signed into law by Governor Jerry Brown on September 10, 2018. Among other provisions, SB 100 built on existing legislation including SB 350 and revised the previously established goals to achieve the 50% renewable resources target by December 31, 2026, and to achieve a 60% target by December 31, 2030. The bill also set out the state policy that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045.

[https://leginfo.ca.gov/faces/billNavClient.xhtml?bill\\_id=201720180SB100](https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100)

<sup>3</sup> In addition to the needs of the jurisdictional load serving entities in the ISO's footprint, the CPUC currently works to include the needs of the publicly owned utilities and other non-CPUC-jurisdictional utilities in its resource planning efforts for the ISO balancing authority area, and this is an issue that will be receiving additional attention in future planning cycles to ensure the needs of these parties are being addressed.

To bring this more coordinated approach full circle, the ISO will also give priority to interconnection requests located within those same zones in its generation interconnection process.



This year's transmission plan is based on state projections<sup>4</sup> provided to the ISO in 2022 that California needs to add more than 40 gigawatts (GW) of new resources over the next 10 years, and a sensitivity<sup>5</sup> study projection calling for 70 GW by 2032 reflecting the potential for increased electrification<sup>6</sup> occurring in other sectors of the economy, most notably in transportation and the building industry. The CPUC has recently established that next year's transmission plan is to be based on this projection of 70 GW by 2033.

As in the past, the ISO has continued to explore with stakeholders cost-effective solutions to meeting long term needs and will continue to do so in the future.

### **Advancing preferred resources**

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 assessment of preferred resources to address specific reliability needs has been undertaken within each of the planning area assessments, in Appendix B, and is summarized in section 8.3 of the transmission plan. The ISO is also continuing to work with

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<sup>4</sup> In planning for the new resources required to meet system-wide resource needs, CPUC portfolios also took into account the announced retirements of approximately 3700 MW of gas-fired generation to comply with state requirements for thermal generation relying on coastal water for once-through cooling, and the planned retirement of the Diablo Canyon Power Plant. The ISO is not relying on the gas fired generation or Diablo Canyon Power Plant to meet any local capacity or grid support purposes beyond the planned retirement dates. However, the ISO must continue to ensure that they are reliably interconnected and can continue to operate through any potential extension period, so the resources are modeled in the ISO's studies for those purposes only.

<sup>5</sup> Each year, the CPUC provides a base resource portfolio that the ISO is expected to use in determining the need for new transmission projects. As well, the CPUC typically provides one or more sensitivity portfolios with higher or different levels of resource development that the ISO studies to develop transmission capacity and cost information that the CPUC uses in the next annual cycle of resource portfolio development. The sensitivity case, on its own, does not provide a basis for the ISO to approve a new transmission project. However, the ISO can consider the sensitivity case in selecting the preferred alternative to meet a need identified in the base studies.

<sup>6</sup> The CEC adopted the 2021 IEPR Energy Demand Forecast, 2021-2035 on January 26, 2022 [<https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2021-integrated-energy-policy-report/2021-1>] The CEC subsequently adopted 2021 IEPR Additional Transportation Electrification Scenario that on July 1, 2022, the CEC and CPUC requested the ISO utilize in the 2022-2023 transmission plan. [<http://www.caiso.com/InitiativeDocuments/2022-2023TransmissionPlanningProcess-PortfolioTransmittalLetter.pdf>]



local utilities to fine-tune preferred resource requirements identified in earlier transmission plans, including battery storage, which in conjunction with conventional transmission upgrades will meet reliability needs in several areas – Moorpark and Oakland in particular.

## KEY FINDINGS

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

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

Reliability projects driven by load growth and evolving grid conditions as the generation fleet transitions to increased renewable generation represent 24 projects totaling \$1.76 billion.

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 two 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 2022-2023 policy-driven transmission planning purposes via the CPUC issued Decision 22-02-004.<sup>7</sup> The CPUC communicated a base portfolio based on the 38-million metric ton (MMT) greenhouse gas (GHG) target by 2030 and the 2020 Integrated Energy Policy Report demand forecast utilizing the high electric vehicle assumptions, and a sensitivity portfolio based on a 30-million metric ton greenhouse gas target for policy-driven planning efforts.

The ISO found the need for 21 policy-driven transmission projects totaling \$5.53 billion to meet the renewable generation requirements established in the CPUC developed renewable generation portfolios. The ISO also drew on other supporting information from

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<sup>7</sup> <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M451/K412/451412947.PDF>

the CPUC sensitivity portfolio and comments in evaluating the alternatives assessed and recommended for approval within this year's transmission plan.

The ISO identified the need to reinforce the 500 kV network from southwest Nevada to Lugo in this plan, and considered recommending approval of the Trout Canyon – Lugo 500 kV Line. The ISO received a letter from Lotus Infrastructure Partners on April 25, 2023, identifying an additional alternative that the ISO needs additional time to assess. The ISO will undertake the assessment and will bring forward a recommended mitigation plan as an extension of the 2022-2023 transmission planning process or in the next planning cycle.

### **Economically-driven (market efficiency) 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 year's transmission plan.

The ISO conducted several economic studies investigating opportunities to reduce total costs to ratepayers through transmission upgrades not otherwise needed for reliably accessing renewables and serving load. No projects driven solely by economic considerations are being recommended in this plan.

### **Interregional Transmission Coordination Process**

The ISO's 2022-2023 transmission planning cycle marked the beginning of the fourth biennial cycle since these coordination processes were put in place addressing the interregional requirements of FERC Order No. 1000.

The ISO is required to integrate its examination of potential interregional projects submitted by stakeholders into the ISO's process and the processes of the ISO's neighboring planning entities in the western interconnection - WestConnect and Northern Grid. Of the seven potential projects submitted into the ISO's 2023 interregional transmission project (ITP) submission window in the first quarter of 2022, only the North Gila – Imperial Valley No. 2 project met the requirements of an interregional transmission project in the submission validation process and received further detailed review by WestConnect and the ISO. Although WestConnect's subsequent review did not find a need for the project, it was determined to be necessary by the ISO and is recommended for approval as a regional ISO project.

### **Informational Studies**

As in past transmission planning cycles, the ISO undertook additional technical studies to help inform future transmission or resource planning activities. These are informational only but may be of interest to stakeholders. They include additional local capacity technical study analyses, frequency response analysis, examination of viability of congestion revenue rights, and a preliminary assessment of the transmission impact of potential reduced reliance on the Aliso Canyon Natural Gas Storage Facility. The latter informational study highlights the potential need for additional transmission in the LA Basin and San Diego local capacity areas if there is reduced reliance on Aliso Canyon in the future and is being shared with the CPUC.

### **STAKEHOLDER FEEDBACK**

Stakeholders have provided feedback on the draft ISO 2022-2023 transmission plan that was released on April 3, 2023, and presented at a stakeholder meeting on April 11, 2023. 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.

- ***General support for the transmission plan*** – Stakeholders generally provided complimentary feedback on the transmission plan itself.

**ISO response:** The ISO appreciated the positive feedback, has reviewed all of the stakeholder comments carefully, and has concluded that the recommendations made in the transmission plan are appropriate.

- **Concerns with advancing of projects identified in sensitivity portfolio** – a few stakeholders identified concerns with advancing projects where the need for mitigation in the base portfolio was considered marginal and the projects were sized

to meet the sensitivity portfolio. One example of this was the Trout Canyon-Lugo 500 kV transmission project.

**ISO response:** The ISO acknowledges that in some cases such as the Trout Canyon-Lugo 500 kV transmission project, the constraints in the base case driving the need for upgrades may be considered marginal. However, the sensitivity study has identified significant constraints that the Trout Canyon-Lugo 500 kV project will mitigate and the sensitivity case is the base portfolio for next year's 2023-2024 transmission planning process. The ISO believes it is prudent to bring forward a mitigation in this area. The ISO received an additional alternative on April 25, 2023, that the ISO will assess and the ISO will bring forward a recommendation once it completes that assessment is completed as an extension of this transmission planning process or in the next planning cycle.

- **Transmission development in the Fresno and Kern area** - There were comments that there is a need to advance alternatives that were identified in the sensitivity portfolio to access renewable resources in the Fresno and Kern area.

**ISO response:** The ISO has recommended two transmission projects in the Fresno area that were found to be needed in the base portfolio. There are a number of constraints identified in the sensitivity portfolio, however, that were not identified in the base portfolio and therefore cannot be recommended for approval in this year's planning cycle based on the ISO tariff. The ISO will continue to assess the mitigation alternatives in the next planning cycle.

- **Impact on the High-Voltage Transmission Access Charge (TAC)** – there was concern expressed by a number of stakeholders with the impact on TAC the recommended projects will have.

**ISO response:** The ISO appreciates the concerns related to the impact the recommended projects will have on the High-Voltage TAC. In assessing the alternatives to mitigate the constraints to meet the reliability needs and policy objectives to integrate the resources in the CPUC portfolios, the ISO seeks the most efficient and cost effective alternative to mitigate the identified constraints. The ISO has included in Chapter 8 of the Revised Draft the impacts of the recommended transmission projects on the High-Voltage TAC.

## CONCLUSION

The ISO 2022-2023 transmission plan provides a comprehensive evaluation of the ISO's transmission grid to identify upgrades needed to adequately meet California's policy goals, address grid reliability requirements and bring economic benefits to consumers. The combination of a dramatically increased pace of renewable generation and load forecast growth are driving an increase in transmission requirements. The ISO found the need for 45 projects totaling \$7.3 billion. The projects developed in this year's planning cycle represent a transition to expected additional growth in requirements in next year's transmission planning process, providing reliability, access to renewable generation needed to meet state goals, and effective economic benefits into the future. Further, the plan has recommended that one previously approved project currently on hold to remain on hold pending further review, one previously approved project on hold to be cancelled and one previously approved project on hold to proceed with a minor scope change.

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's system, Management recommends that the ISO Board of Governors approve the attached ISO 2022-2023 transmission plan.

The ISO also continues working to refine its recommendation regarding the SWIP North project mentioned above taking into account participation interest of neighboring transmission service providers. This work will be conducted as an extension of the 2022-2023 transmission plan, with ISO Board of Governors approval anticipated to be sought in Q2 or Q3 of this year.