Decision on ISO 2022-2023 Transmission Plan

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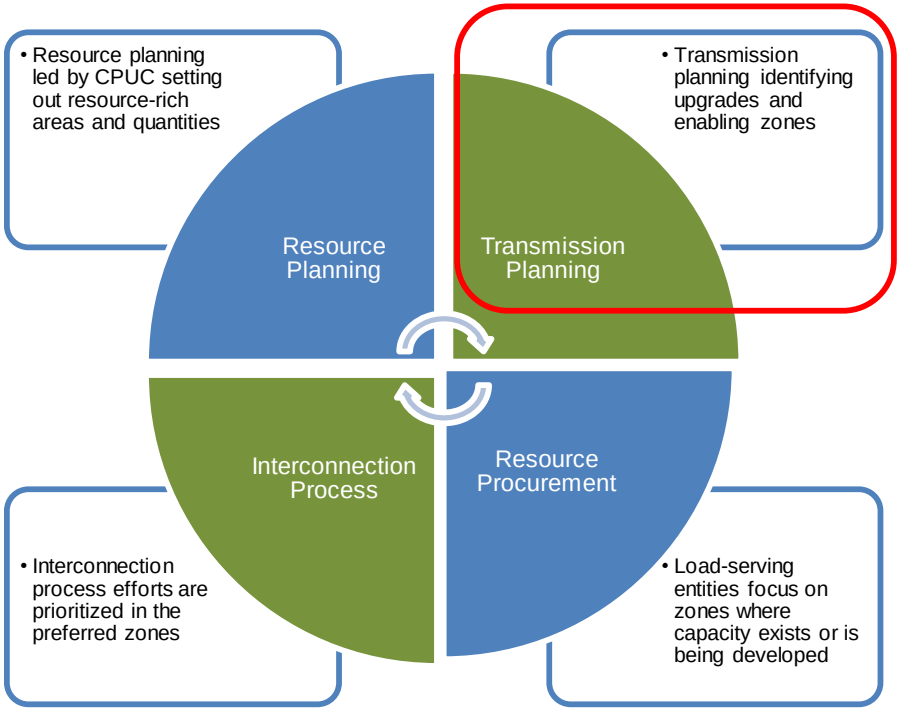
Introduction of the 2022-2023 transmission plan

- The annual transmission plan is being presented for approval
- At inflection point with an acceleration of new resource requirements to meet state policy goals and increases in the pace of load growth, with this, the capital costs within this years plan has increased from the plans in recent years
- The ISO is always focused on costs; recommendations are based on the long term effectiveness and efficiency of solutions

The 2022-2023 transmission plan addresses rapidly escalating need for new resources and sets the foundation for a focused zonal approach to resource development

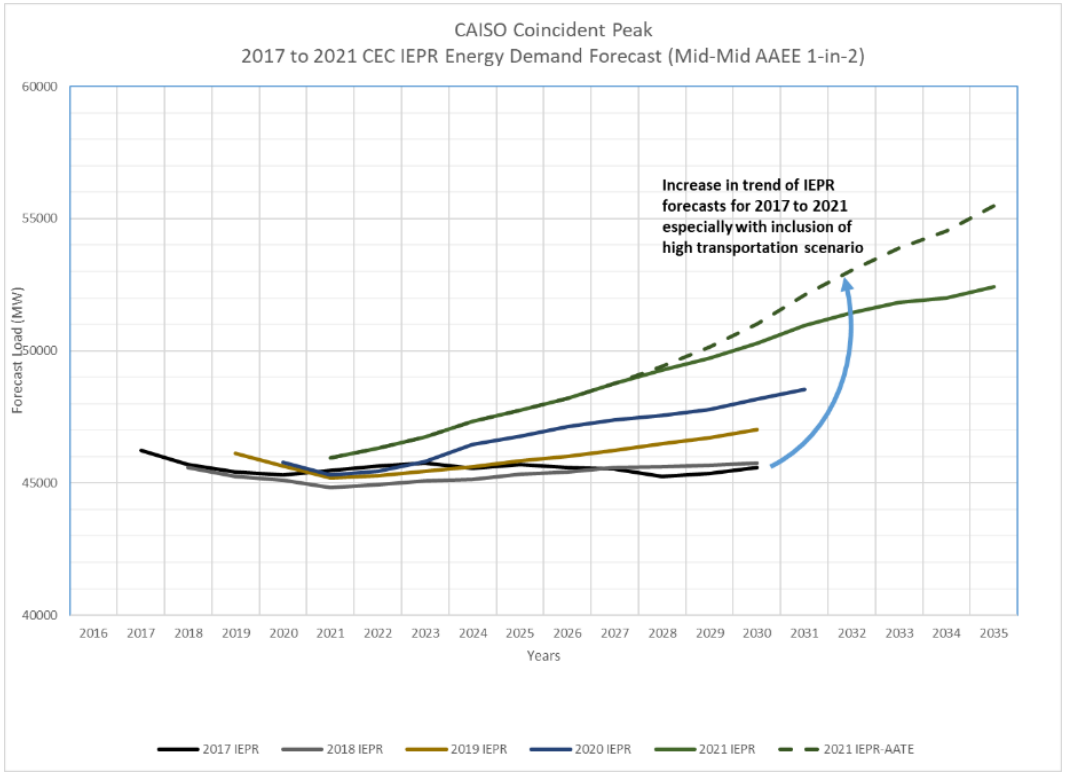


The strategic direction for transformational change was established in the CPUC/CEC/ISO Memorandum of Understanding signed in December 2022 to:

- Tighten the linkage between resource and transmission planning, procurement direction, and the ISO interconnection process to the greatest extent possible
- Create formal linkage between CEC SB 100/IEPR activities and the ISO and CPUC processes
- Reaffirm the existing state agency and single forecast set coordination

California's climate change goals are driving escalating load forecasts

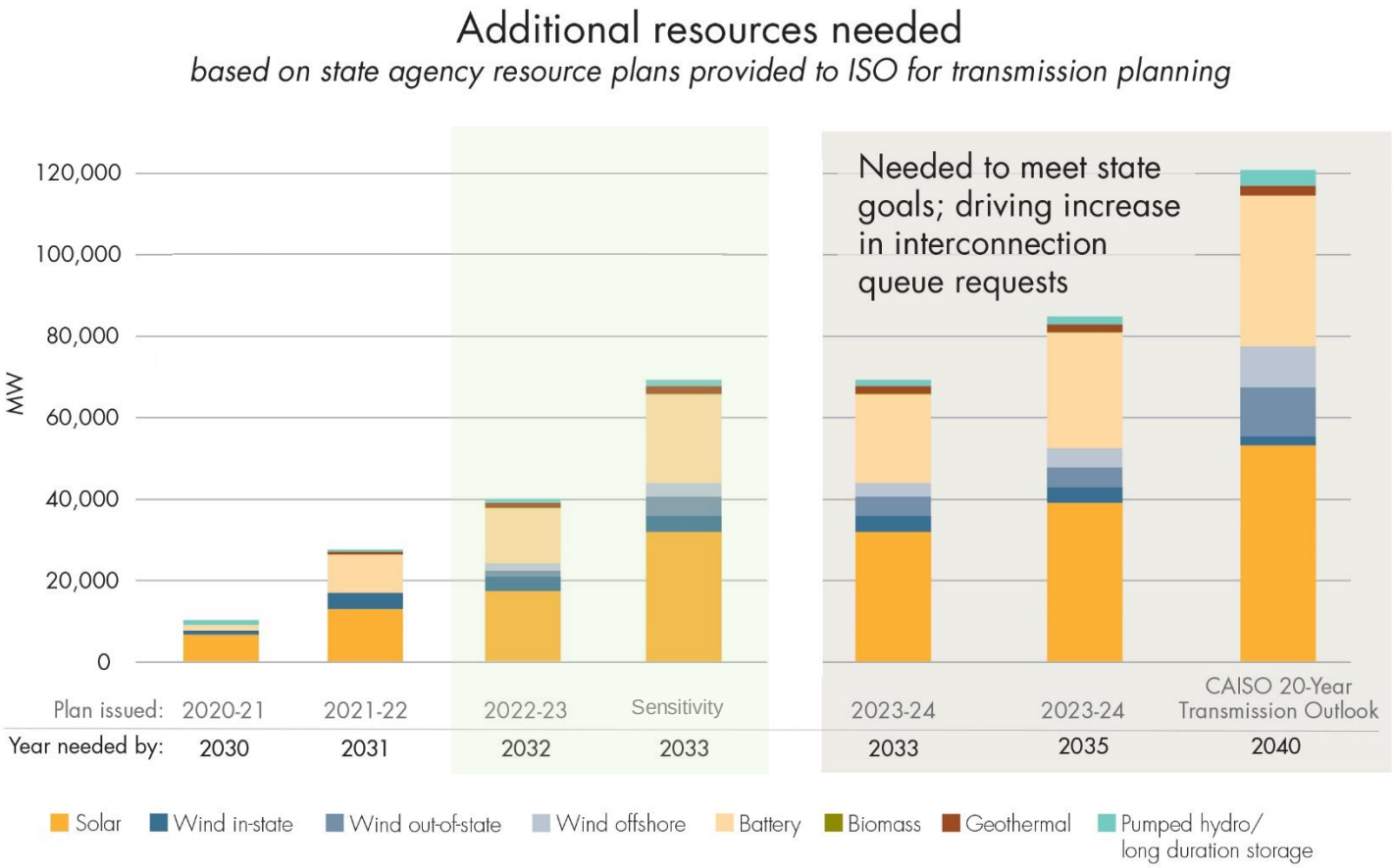
The CEC's load forecast is used in both the CPUC's Integrated Resource Planning process and the ISO's transmission planning process.



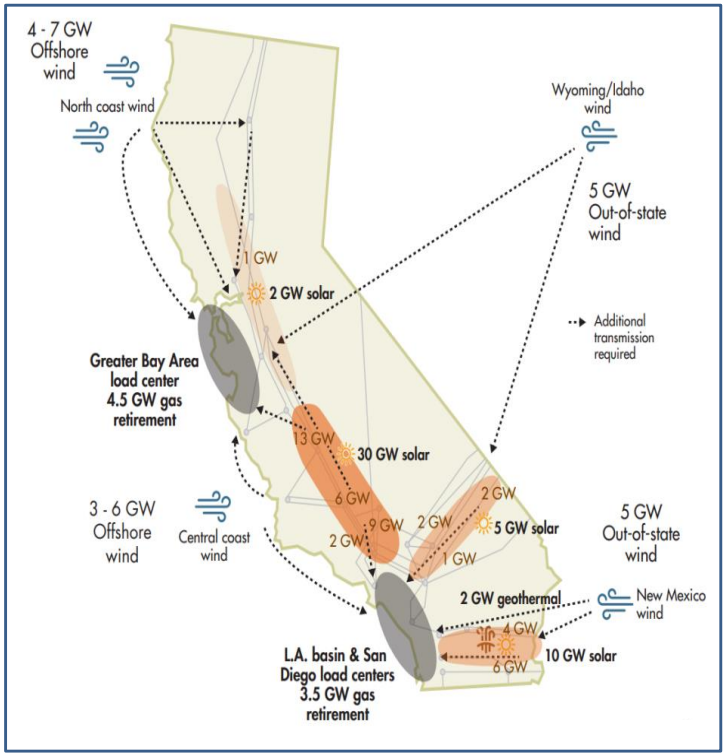
The ISO uses:

- 1-year-in-10 weather event forecast for local reliability studies
- 1-year-in-5 weather event forecast for bulk system reliability-driven and policy-driven studies
- 1-year-in-2 weather event forecast for economic (market efficiency) studies

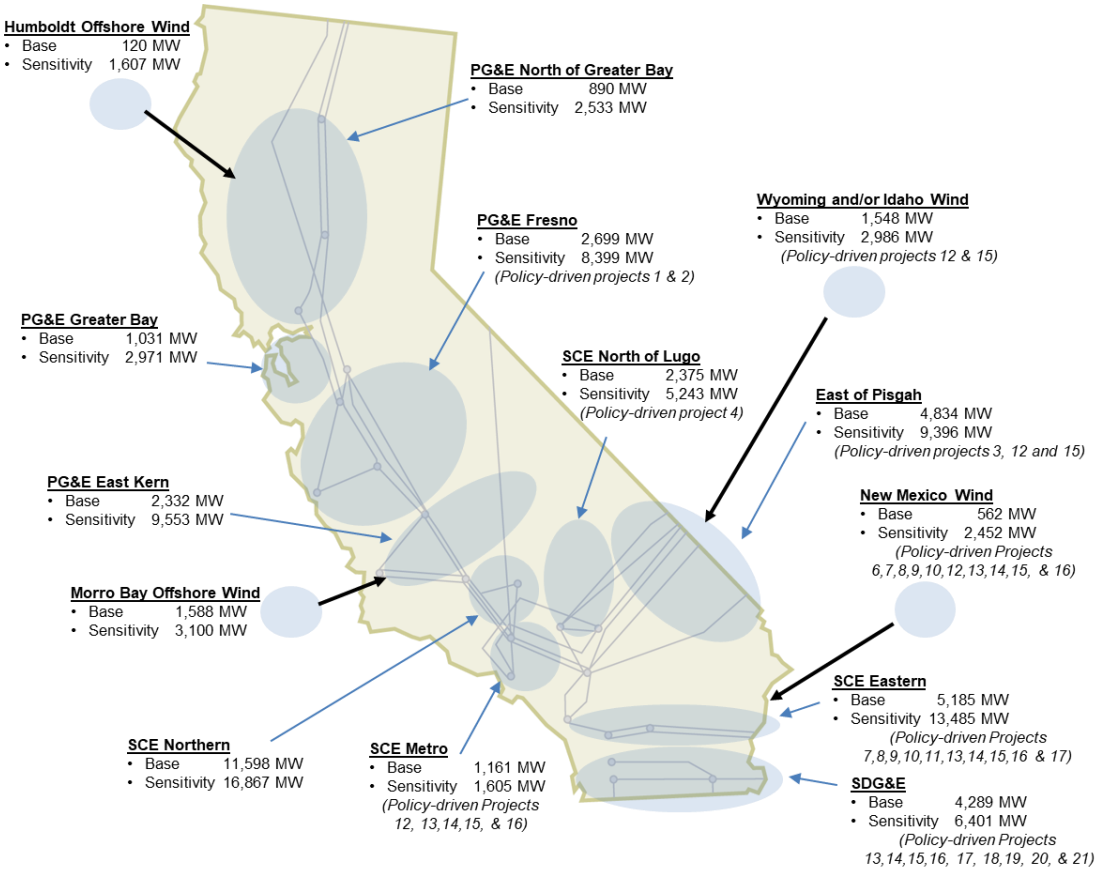
California's climate change goals and escalating load forecasts lead to unprecedented resource needs



2022-2023 draft transmission plan uses a zonal approach which enables clear direction and prioritization

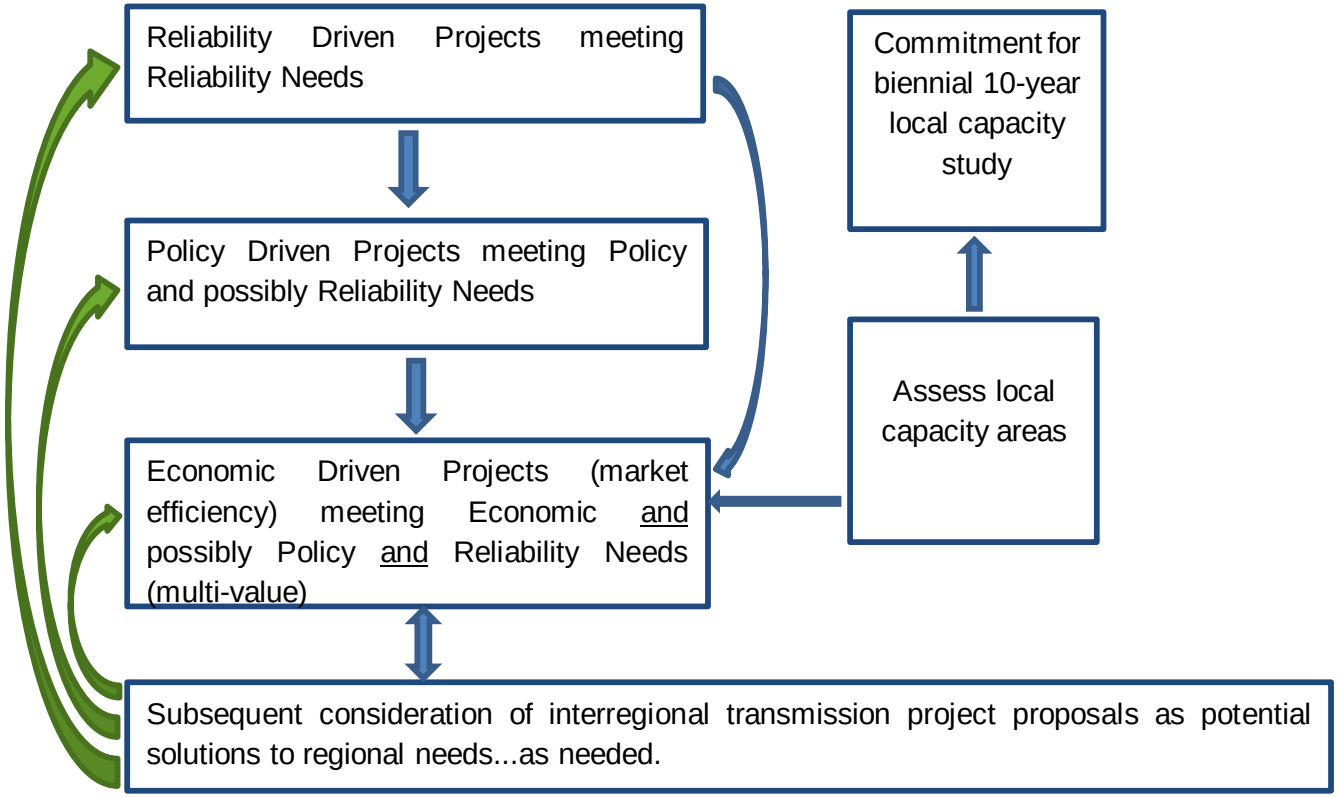


CAISO 20-year Transmission Outlook - 2022



CAISO 2022-2023 draft Transmission Plan

Studies are coordinated as a part of the transmission planning process



Recommended Reliability-Driven Projects

- 24 reliability projects driven by load growth and evolving grid conditions as the generation fleet transitions to increased renewable generation have been recommended, totaling $1.76 billion
- All are upgrades to the existing system or low voltage – not eligible for competitive procurement

Project Name	PTO Area	Planning Area	Cost ($M)
Banta ring bus*	PG&E	Central Valley	17.5
Metcalf 230/115 kV Transformers Circuit Breaker Addition*	PG&E	Greater Bay Area	15.0
South Bay Area Limiting Elements Upgrade*	PG&E	Greater Bay Area	11.0
Equipment Upgrade at CCSF Owned Warnerville 230 kV Substation*	PG&E	Greater Fresno	1.6
Barre 230 kV Switchrack Conversion to Breaker-and-a-Half *	SCE	Main	45
Mira Loma 500 kV Circuit Breaker Upgrade*	SCE	Main	10
Garberville area reinforcement project	PG&E	Humboldt	204.0
Tulucay-Napa #2 60 kV line resonductoring project	PG&E	North Coast & North Bay	4.6
Santa Rosa 115 kV lines reconductoring project	PG&E	North Coast & North Bay	74.0
Tesla 115 kV Bus Reconfiguration Project	PG&E	Central Valley	55.0
Lone Tree – Cayetano – Newark Corridor Series Compensation	PG&E	Greater Bay Area	25.0
Los Banos 70 kV Area Reinforcement Project	PG&E	Fresno	60.0
Redwood City Area 115 kV System Reinforcement	PG&E	Greater Bay Area	110.8
Pittsburg 115 kV Bus Reactor project	PG&E	Greater Bay Area	26
Los Banos 230 kV Circuit Breaker Replacement	PG&E	Fresno	66
Panoche 115 kV Circuit Breaker Replacement and 230 kV Bus Upgrade project	PG&E	Fresno	184
North East Kern 115 kV Line Reconductoring Project	PG&E	Kern	256.0
Mesa Spare Transformer Installation	PG&E	Central Coast & Los Padres	24
Coolwater 1A 230/115 kV Bank Project	SCE	North of Lugo	47
Control 115 kV Shunt Reactor	SCE	North of Lugo	4
Serrano 4AA 500/230 kV Transformer Bank Addition	SCE	Main	120
Sylmar Transformer Replacement	SCE	Main	23
Antelope-Whirlwind 500 kV Line Upgrade Project	SCE	Main	6
Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest Projec	SDG&E	SDG&E	375
		Total	**1,764.5**

* These projects have already been approved by ISO Management, ahead of the rest of the Plan for approval by the ISO's Board of Governors, pursuant to the ISO tariff, after stakeholders were informed of Management's intention to approve, and given an opportunity to raise concerns with Management or the ISO Board of Governors.

Reliability-Driven Projects
Previously Approved Projects On-Hold

- For the three previously approved transmission projects on hold from the previous planning cycle, Management recommends the following:
  - Keep the Moraga-Sobrante 115 kV Line Reconductor project on hold;
  - Cancel the North of Mesa project. Relocate the previously recommended procured storage at Mesa substation from the 115 kV bus to the 230 kV bus, and approve the Mesa Spare Transformer project; and
  - Remove from being on hold and proceed with the Wheeler Ridge Junction project with a minor scope modification

Recommended Policy-Driven Projects

- To meet the renewable generation requirements established in the CPUC-developed renewable generation portfolios, an additional 21 transmission projects that are policy driven are recommended, totaling $5.53 billion
- Three are eligible for competitive procurement
- A recommendation for an additional project, Trout Canyon-Lugo 500 kV, has been held pending additional analysis of stakeholder input and will be brought to the Board at a later date

No.	Project Name	PTO Area	Geographic Area	Cost ($M)
1	Borden-Storey 230 kV 1 and 2 Line Reconductoring	PG&E	Fresno	50
2	Henrietta 230/115 kV Bank 3 Replacement	PG&E	Fresno	20
3	Beatty 230 kV	VEA/GLW	East of Pisgah	155
4	Lugo–Victor–Kramer 230 kV Upgrade	SCE	North of Lugo	482
5	Colorado River-Red Bluff 500 kV 1 Line Upgrade	SCE	SCE Eastern	50
6	Devers-Red Bluff 500 kV 1 and 2 Line Upgrade	SCE	SCE Eastern	140
7	Devers-Valley 500 kV 1 Line Upgrade	SCE	SCE Eastern	40
8	Serrano-Alberhill-Valley 500 kV 1 Line Upgrade	SCE	SCE Eastern	60
9	San Bernardino-Etiwanda 230 kV 1 Line Upgrade	SCE	SCe Eastern	65
10	San Bernardino-Vista 230 kV 1 Line Upgrade	SCE	SCE Eastern	18
11	Vista-Etiwanda 230 kV 1 Line Upgrade	SCE	SCE Eastern	13
12	Mira Loma-Mesa 500 kV Underground Third Cable	SCE	SCE Metro	35
13	Imperial Valley–North of SONGS 500 kV Line and Substation	SDG&E	SDG&E	2,288
14	North of SONGS–Serrano 500 kV line	SDG&E / SCE	SDG&E and SCE Metro	503
15	Serrano–Del Amo–Mesa 500 kV Transmission Reinforcement	SCE	SCE Metro	1,125
16	North Gila–Imperial Valley 500 kV line	SDG&E	SDG&E (Potential Joint Project with IID)	340
17	Upgrade series capacitors on HW-NG and HA-NG to 2739 MVA	APS	APS	27
18	Rearrange TL23013 PQ-OT and TL6959 PQ-Mira Sorrento	SDG&E	SDG&E	21
190	Reconductor TL680C San Marcos-Melrose Tap	SDG&E	SDG&E	28
20	3 ohm series reactor on Sycamore-Penasquitos 230 kV line	SDG&E	SDG&E	8
21	Upgrade TL13820 Sycamore-Chicarita 138 kV	SDG&E	SDG&E	60
			Total	**5,528**

Economic-Driven (Market Efficiency) Projects

- Economic studies investigating opportunities to reduce total costs to ratepayers through transmission upgrades not otherwise needed for reliably accessing renewables and serving load were conducted.

- No projects driven solely by market efficiency considerations are being recommended in this plan.

Additional recommendations may be made at later date as a part of this planning cycle on the following

- SWIP-North transmission project;
  - Accessing wind from Idaho
- Pacific Transmission Expansion Project; and
  - Facilitating gas-fired generation in LA Basin and potential joint project with LADWP
- Trout Canyon-Lugo 500 kV transmission project
  - Recommendation for the Trout Canyon-Lugo 500 kV has been held back pending additional analysis of stakeholder input

FERC Order No. 1000 Interregional Coordination Process

- Seven potential projects were 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
  - WestConnect's subsequent review did not find a need for the project
  - The North Gila-Imperial Valley 500 kV line was determined to be necessary for the ISO and management is recommending approval as a regional policy-driven project

Stakeholder Comments

- General support for reliability, policy and economic assessment
- Concerns with advancing of projects largely driven by sensitivity portfolio
- Adequacy of transmission development in the Fresno and Kern area
- Impact on the High-Voltage Transmission Access Charge (TAC)

Summary

- 45 projects totaling $7.3 billion were found to be needed
  - Recommendation for the Trout Canyon-Lugo 500 kV, estimated at $2 billion, has been held back pending additional analysis of stakeholder input

- Three projects eligible for competitive procurement:

Project	Need
Imperial Valley-North of SONGS 500 kV Line and Substation	Policy-driven
North of SONGS-Serrano 500 kV line	Policy-driven
North Gila-Imperial Valley 500 kV line	Policy-driven

Management recommends the ISO Board of Governors approve the ISO 2022-2023 Transmission Plan

- Establishes a zonal basis for resource development as a foundation for interconnection process prioritization and focus for procurement activities
- Continues to pursue low emission strategies in addressing reliability needs on the ISO controlled grid
- Sets a foundation for higher renewable energy goals
- Provides for prudent and economic development of the transmission system