



## *2020 Annual Interregional Information*

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*Annual Interregional Transmission Coordination Stakeholder Meeting*

*March 30, 2021*

# 2020-2021 Transmission Planning Process

December 2019

April 2020

March 2021

## Phase 1 – Develop detailed study plan

State and federal policy  
CEC - Demand forecasts  
CPUC - Resource forecasts and common assumptions with procurement processes  
Other issues or concerns

## Phase 2 - Sequential technical studies

- Reliability analysis
- Renewable (policy-driven) analysis
- Economic analysis

Publish comprehensive transmission plan with recommended projects

## Phase 3 Procurement

ISO Board approved the 2020-2021 transmission plan on March 25, 2021

ISO Board for approval of transmission plan

# Forecast coordination is continuing with CPUC and CEC, with focus on renewable generation:

- Load forecast based on California Energy Demand Updated Forecast 2020-2030 (CED 2019) adopted by California Energy Commission (CEC) on January 22, 2020

<https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report/2019-iepr>

- RPS portfolio direction for 2020-2021 transmission planning process was received from the CPUC and CEC
  - The CPUC IRP Base Case portfolio – is used for the reliability, policy and economic assessment
  - Two sensitivity portfolios to be assessed in the policy assessment

<https://www.cpuc.ca.gov/General.aspx?id=6442464144>

# Emphasis in transmission planning cycle

- A modest capital program, as
  - Reliability issues are largely in hand
  - Policy work considered portfolios submitted by CPUC of “46 MMT scenario” baseline and sensitivity studies
  - Very little new economic-driven opportunity, largely due to past studies and approvals
- Significant interest in development community for transmission lines and storage proposals needing detailed economic analysis
- Continued “special” study efforts on local capacity areas and gas-fired generation requirements
- Initiated wildfire assessment, starting with the PG&E area

# Key Issues in 2020-2021 Transmission Plan Cycle:

- Interregional Transmission Planning Process
  - In year one (even year) of 2 year planning cycle
  - Four ITPs were submitted to the ISO
- A number of studies incorporated in the “other studies” section
  - Frequency Response
  - Flexible Capacity Deliverability
  - Wildfire assessment – PG&E area in this planning cycle
  - 10-year Local Capacity Technical Study (conducted every two years)
    - Continuation of alternatives to gas-fired generation
    - Updated storage capabilities

# Frequency Response Study Results in Previous TPPs

- Frequency response assessment considered the outage of two Palo Verde nuclear units as the most severe credible disturbance
- Off-peak case results appeared to be more severe than peak case results
  - Lower generation dispatch
  - Less frequency-responsive units on-line
- Under off-peak spring conditions (weekend afternoon) there is more solar generation on-line, which historically did not participate in primary frequency response

# Basic Frequency Response Study Parameters

- Total installed Inverter-Based Resources (IBR) capacity in the ISO is expected to reach 33 GW by 2030
- The majority of the existing IBRs do not provide frequency response
  - FERC Order 842 requirements after 5/15/2018
  - Large Generation Interconnection Agreements (LGIA) must address frequency response capability
- High IBR levels require frequency response assessment of the system in future years
  - As of 4/30/2020, around 9.4 GW Behind the Meter Distributed Energy Resources (BTM DER) will be connected to the ISO's network
  - By 2030 the “connected” BTM DER could reach 21 GW in 2030
  - Considering this future, issues should be identified and mitigation measures defined as early as possible

# Study Methodology and Objectives

- Evaluate primary frequency response with high IBR penetration, including DER and BESS
- Assess the CAISO system frequency response in the year 2030 and identify any performance issues related to frequency response
- The Spring off-Peak case will be used as the initial case for 2030
- An outage of two Palo Verde nuclear units considered to be the most severe disturbance
- Run dynamic stability simulations run for 60 seconds
- Utilize the latest updated dynamic stability models



# 2020-2021 TPP Study Conclusions

- Acceptable frequency performance within WECC but not acceptable within the ISO for the base case (Spring Off-Peak of 2030)
- WECC FRM was above the FRO and the ISO FRM was slightly below the ISO FRO
- The reduced headroom assessment resulted in a lower ISO FRM, but WECC FRM was still well above its obligation
- Based on a lower commitment of the frequency-responsive units and no frequency response from the IBR and BESS, the ISO FRM results were lower and the deficiency in frequency response was higher
- Overall, WECC met the required standards considering the large amount of frequency responsive units available, especially in Canada and Northwest.

## 2020-2021 TPP Study Conclusions (continued)

- BESS and IBR having frequency response will significantly improve the system frequency performance and will allow the ISO to fulfill its FRO
- Both BESS and IBR are effective in enhancing frequency stability and providing compliance with the BAL-003-2 Standard
- The response from IBR appears to be more effective than the response from the BESS
- Being in compliance with the BAL-003-2 Standard, while having 100% of energy provided by renewable resources in the ISO, is possible
  - IBR resources have frequency response and have at least 10% headroom
  - Other generation in WECC has sufficient frequency response

# Generator Model Update

- The ISO added a section to the Transmission Planning Process BPM regarding data collection (Section 10)
- Five categories of participating generators were developed based on size and interconnection voltage
- The ISO developed data templates for the generator owners to provide the data
- ISO is requesting validated modeling data from all generators
- The process started in May 2019 and the plan is to have updated models for all generators by 2022.

# Next Steps

- Current efforts on the collecting and improving modeling data will continue
- The WECC dynamic modeling database is being updated and will continue to be updated as the responses from generation owners are received
- Future work will include validation of models based on real-time contingencies and studies with modeling of behind the meter generation
- Further work will also investigate measures to improve the ISO frequency response post contingency
- More work on the BESS models is needed and is underway
- The ISO is working with WECC staff to coordinate their modeling efforts



## 2021-2022 Unified Planning Assumptions & Study Plan

# 2021-2022 Transmission Planning Process

January 2021

April 2021

March 2022

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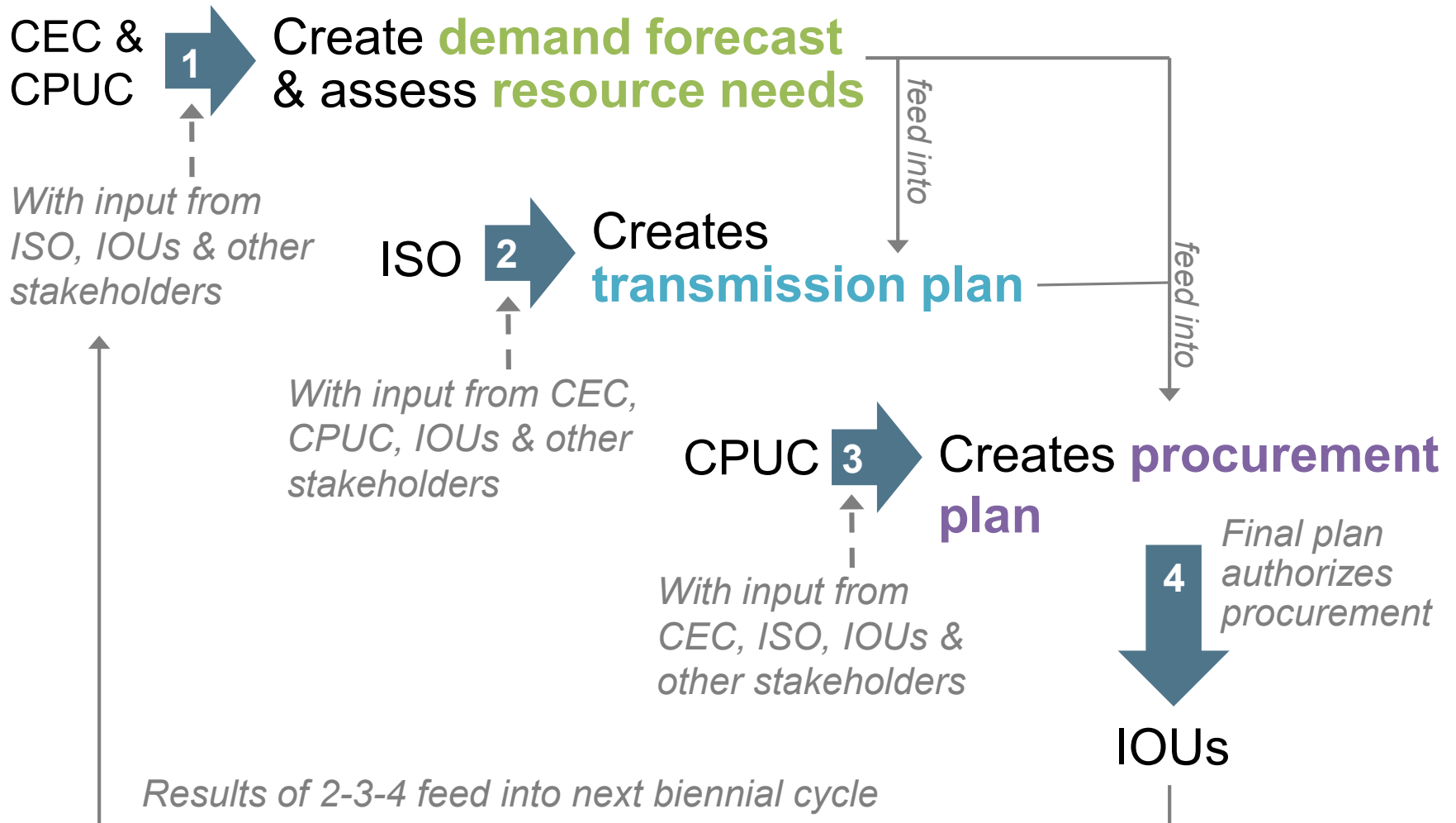
## Phase 3 Procurement

CAISO Board for approval of transmission plan

# 2021-2022 Transmission Plan Milestones

- Draft Study Plan posted on February 18
- Stakeholder meeting on Draft Study Plan on February 25
- Comments to be submitted by March 11
- Final Study Plan to be posted on March 31
- Preliminary reliability study results to be posted on August 13
- Stakeholder meeting on September 27 and 28
- Comments to be submitted by October 12
- Request window closes October 15
- Preliminary policy and economic study results on November 18
- Comments to be submitted by December 6
- Draft transmission plan to be posted on January 31, 2022
- Stakeholder meeting in February
- Comments to be submitted within two weeks after stakeholder meeting
- Revised draft for approval at March Board of Governor meeting

# Planning and procurement overview





# Load Forecast Assumptions

## *Energy and Demand Forecast*

- California Energy Demand Updated Forecast 2020-2031 adopted by California Energy Commission (CEC) on January 25, 2021 will be used:
  - Using the Mid Baseline LSE and Balancing Authority Forecast spreadsheets
  - Additional Achievable Energy Efficiency (AAEE)
    - Consistent with CEC 2020 IEPR
    - Mid AAEE will be used for system-wide studies
    - Low AAEE will be used for local studies
  - CEC forecast information is available on the CEC website at:  
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=20-IEPR-03>

# Additional guidance from the CPUC

## Base Portfolio

- A 46 MMT portfolio that includes approximately 1 GW of OOS renewables and approximately 600 MW of pumped storage
- Due to the uncertainty of the transmission implication of the injection point of the 1 GW OOS wind resource in the base portfolio, it will be studied with Palo Verde and Eldorado as alternative injection points

## Sensitivity Portfolios

- Sensitivity 1 – A 38 MMT GHG target scenario, with updates to account for the more recent IEPR load forecast, load shapes, and BTM resource forecasts
- Sensitivity 2 – A 30 MMT GHG target scenario with offshore wind as a main focus of study. The expected product would include the cost of upgrading transmission to accommodate the 8.3 GW OSW in the portfolio with an outlook study to potentially increase up to 21.1 GW

# CPUC portfolio documentation for the 2021-2022 TPP

- CPUC decision transferring the portfolios:

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M366/K426/366426300.PDF>

- Modeling Assumptions for the 2021-2022 Transmission Planning Process

[ftp://ftp.cpuc.ca.gov/energy/modeling/Modeling\\_Assumptions\\_2021\\_22\\_TPP\\_Final.pdf](ftp://ftp.cpuc.ca.gov/energy/modeling/Modeling_Assumptions_2021_22_TPP_Final.pdf)

- Final busbar mapping results for non-battery resources for the base and sensitivity portfolios

<https://caenergy.databasin.org/documents/documents/a618da529cd346dfa5bec12148161b71/>

- Final busbar mapping results for battery storage for the base and sensitivity portfolios

[ftp://ftp.cpuc.ca.gov/energy/modeling/Battery\\_Mapping\\_Dashboard\\_All\\_Portfolios\\_Final.xlsx](ftp://ftp.cpuc.ca.gov/energy/modeling/Battery_Mapping_Dashboard_All_Portfolios_Final.xlsx)

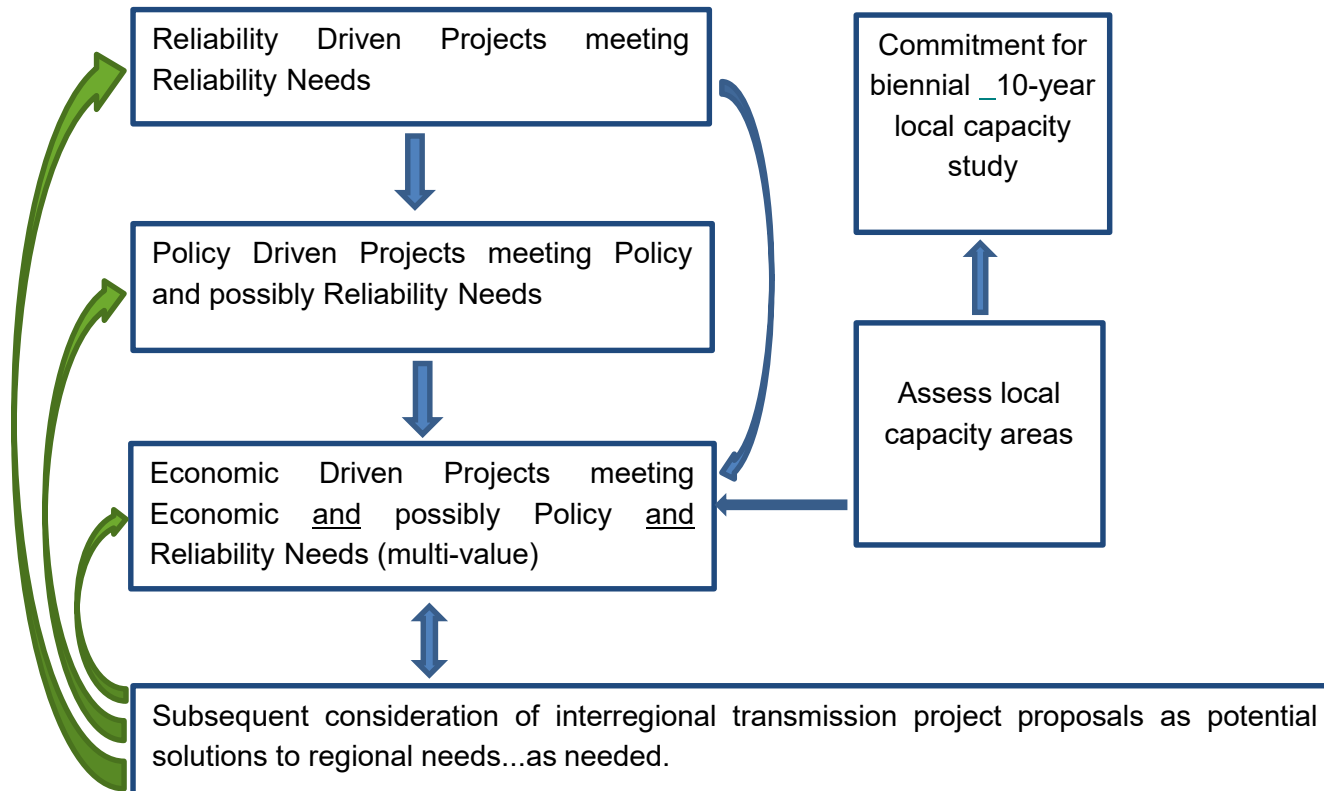
- Retirement list for the policy-driven sensitivity

[ftp://ftp.cpuc.ca.gov/energy/modeling/Retirement\\_List\\_for\\_Sensitivity\\_Portfolios.xlsx](ftp://ftp.cpuc.ca.gov/energy/modeling/Retirement_List_for_Sensitivity_Portfolios.xlsx)

# 2021-2022 Transmission Plan Study Plan

- Reliability Assessment to identify reliability-driven needs
- Policy Assessment to identify policy-driven needs
- Economic Planning Study to identify needed economically-driven elements
- Interregional Transmission Planning Process
  - In year two (odd year) of 2 year planning cycle
- Other Studies
  - Long-term Congestion Revenue Rights
  - Frequency response
  - Flexible deliverable capacity
    - Considering biennial assessment
  - Wildfire Assessment – Southern California

# Studies are coordinated as a part of the transmission planning process



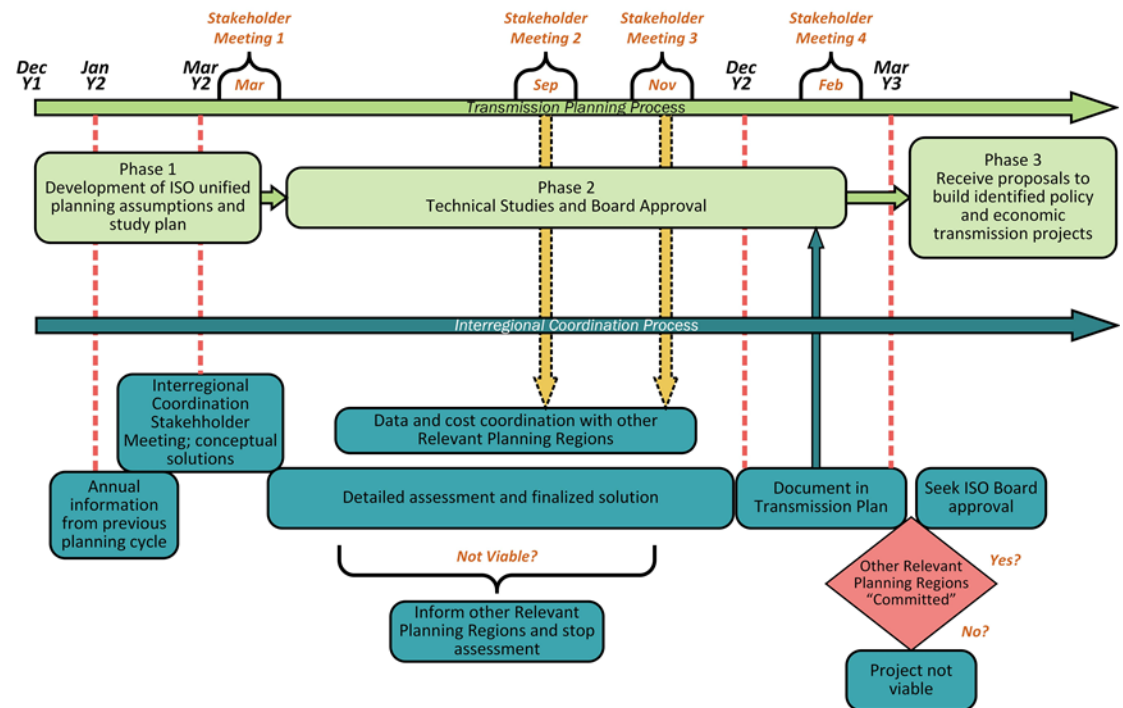
# Production cost model (PCM)

- 2030 ADS PCM will be used as a starting point
  - WECC and planning regions continue to update the 2030 ADS PCM in 2021
  - The CAISO will use the latest available ADS PCM to start the 2021-2022 planning PCM development
- The unified planning assumptions will be used to update the CAISO system model in the PCM, consistent with the CAISO's TPP reliability study
  - Transmission topology
  - Generator assumptions for existing generators, renewable portfolio (CPUC Base Portfolio), energy storage, and retirement
  - CEC Load forecast for 2031
- Other model updates would be also needed through the PCM development and validation process
  - Will be discussed in future stakeholder meetings

# Interregional Transmission Coordination - Year 2 of 2

- Participate in a western planning regions' stakeholder meeting; and
- Based on the assessment of ITP in the previous year's TPP cycle, the CAISO determines whether to further evaluate the project during the odd year of the planning cycle. The 2020-2021 TPP did not identify a need for any of the ITP's submitted to the CAISO during its open window. As such, no further consideration of the ITPs will occur during the 2021-2022 TPP.

## Year 1 (Even Year) - Interregional Coordination Process



<http://www.aiso.com/planning/Pages/InterregionalTransmissionCoordination/default.aspx>

# Study Information

- Final Study Plan will be posted on 2020-2021 transmission planning process webpage on March 31<sup>st</sup>  
<http://www.caiso.com/planning/Pages/TransmissionPlanning/2020-2021TransmissionPlanningProcess.aspx>
- Reliability base cases will be posted on the Market Participant Portal (MPP)
  - For reliability assessment in Q3
- Market notices will be posted in the Daily Briefings to notify stakeholders of meetings and any relevant information  
<http://www.caiso.com/dailybriefing/Pages/default.aspx>