# CPUC Framework for TPP Portfolio Selection

## Document Purpose

This document is intended to support the implementation of the 2022 Memorandum of Understanding[1] between the CPUC, CEC, and CAISO (the MOU). Per the MOU "the CPUC, CEC, and the ISO desire to work together to enhance coordination of resource planning and transmission planning to achieve state reliability and policy needs, and coordinate the timely development of resources, resource interconnections, and the needed transmission infrastructure." This document is also intended to update the previous version of this Framework released in October of 2020 to include updates on portfolio transmittal years, changes in the technologies mapped, new state policy goals, and other updates in the years following. The CPUC provides key inputs to the Transmission Planning Process (TPP) by the California Independent System Operator (CAISO), also known as the ISO. The CAISO will utilize the results of its planning process, interconnection cluster study reports, and any longer-term informational planning exercises conducted by the CAISO to provide the CPUC with an assessment of transmission planning needs and estimates spanning the CAISO balancing authority area for resource planning purposes. The CPUC will incorporate CAISO-provided transmission information into its considerations in developing resource portfolios and will map the resulting portfolio resources to specific electrical locations, through a joint effort with the CEC and CAISO. As the MOU states, "The CEC load forecasts and ISO transmission information together inform CPUC-developed resource portfolios. These portfolios in turn inform further transmission plans and may inform CEC forecasts." Through the Integrated Resource Planning (IRP) process, the CPUC generates portfolios of electrical generation and storage designed to meet the state's greenhouse gas emission reduction targets for the electric sector and other state policy goals while minimizing cost and ensuring reliability. To ensure alignment between the planning and development of generation, storage, and transmission resources, where the ability to serve load is often interdependent, the CPUC's IRP process coordinates closely with the California Independent System Operator's (CAISO's) Transmission Planning Process. The IRP process develops a resource portfolio(s) as a key input to the TPP base case studies, which includes a reliability base case portfolio and a policy-driven base case portfolio. The CPUC may also transmit additional resource portfolios as inputs for sensitivity studies that either provide alternative portfolio(s) that are within a reasonable range of plausible future scenarios or that gather additional transmission information for future portfolio development. These are collectively referred to in this document as "IRP portfolios." Although the resource portfolio(s) to be transmitted to the CAISO for use in the TPP are selected by the CPUC, it is also important to the CPUC that the IRP portfolios

[1] "Memorandum of Understanding Between The California Public Utilities Commission (CPUC) And The California Energy Commission (CEC) And the California Independent System Operator (ISO) Regarding Transmission and Resource Planning and Implementation." December 23, 2022, https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/news-office/mous/cpuc-cec-caiso-mou-december-2022.pdf

adequately meet the CAISO's needs as useful inputs that contribute to an efficient and informative planning process.

The purpose of this framework document is:

- To establish a structure that can be applied to select resource portfolios for the CPUC to transmit to the CAISO for inclusion in the TPP that meet all CPUC and CAISO objectives and requirements, and
- To increase transparency in the selection of portfolios transmitted to the CAISO to be analyzed in the TPP process. Guiding Principles

The following principles are intended to guide the CPUC TPP portfolio selection process. The process should involve minimal divergence from these principles. Where divergence is absolutely necessary, it should be clearly described and justified.

## A. Overarching

1. The objective of each base case and sensitivity portfolio transmitted to the CAISO is clearly conveyed.
2. Portfolios selected for the upcoming TPP cycle should reflect the most up-to-date Preferred System Plan (PSP) portfolio adopted by the Commission and updates when possible.
3. Portfolios should build on prior CPUC resource planning direction.
4. Portfolios should align with IRP-relevant policy goals and mandates as established by legislation and the CPUC regulations
5. Portfolios should minimize the need for post-processing of the transmitted portfolios by the CAISO.

## B. Base Case Portfolios should:

1. Be "actionable" so that the CAISO can conduct the transmission planning process and recommend approval of identified transmission needs resulting from base case assessments.
2. Reflect CPUC policy guidance, which the CPUC would be expected to implement if transmission is approved to satisfy those policy needs.
3. Provide regulatory certainty and consistency.
    a. If the TPP determines that new transmission needs are approved as a result of the resources mapped in the base case portfolio, the CPUC may be expected to take appropriate action to encourage development of resources in that area. For any out-of-state resources, the CPUC will engage with the CAISO and support CAISO efforts as required. The CAISO and the public should have confidence that the support will remain in place through the transmission permitting process.
    b. Sustain previously approved transmission investment decisions in future resource planning.
4. Include CPUC guidance on significant gas-fired resource retention and retirement with sufficient locational specificity for the CAISO to conduct TPP modeling and analysis.

## C. Policy-Driven Sensitivity Portfolios should:

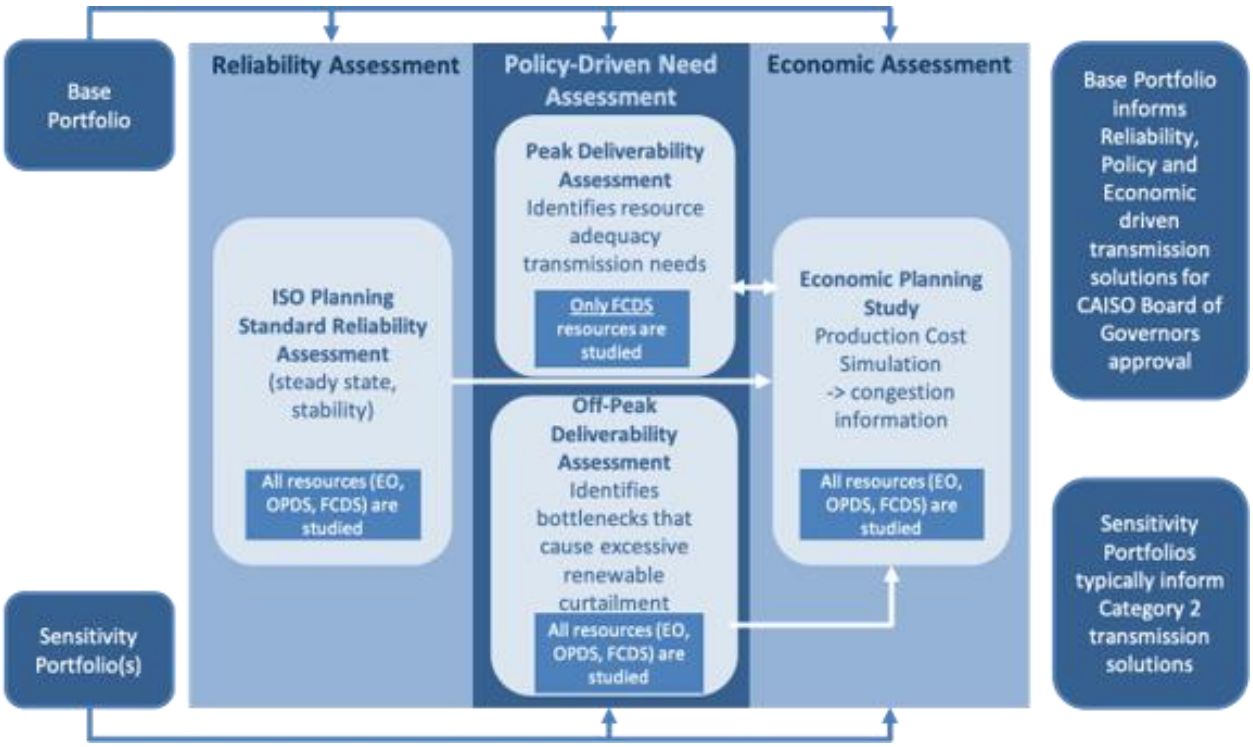
1. Be reasonably linked to the overall aim of either
    a. Supporting a "least regrets" approach that provides an alternative portfolio that is within a reasonable range of plausible future scenarios that can be associated with the base case, or
    b. Gathering additional transmission information for future portfolio development that explores incremental optionality or risk.
2. Seek to avoid unreasonably contradicting significant policy decisions that are incorporated within the base case or previous base cases.

## TPP Portfolios Use Cases

The CPUC-transmitted portfolios are used in various TPP studies that are used to capture the impact of the build out of new energy resources on transmission infrastructure, identifying any required upgrades, and generating transmission inputs for use by the CPUC in the next cycle of portfolio development. Figure 1 depicts the main three types of technical studies the portfolios support and the outcomes driven by those studies. The CAISO may also use the portfolios in other assessments within the TPP, including the local capacity technical studies. The portfolios' role in the CAISO TPP studies and the studies themselves are described below in more detail. The key uses for the portfolios are the 10- year and15-year policy-driven need assessments within the TPP in compliance with the requirements of SB 887 (Stats. 2022, Ch. 358).[2]

Figure 1: Overview of CAISO's TPP policy-driven assessment methodology and study components

[2] SB 887 established PUC § 454.57 which requires, amongst other things, the CPUC to transmit to the CAISO for its TPP resource portfolios for at least 15 years into the future to ensure adequate lead-time for transmission planning and development.




*Reliability Assessment*

- The base case portfolio is included by the CAISO in the reliability assessment, which includes ensuring compliance with North American Electric Reliability Corporation (NERC) standards, Western Electricity Coordinating Council (WECC) regional criteria, and CAISO transmission planning standards.
- Identified mitigation plans are recommended to the CAISO Board of Governors for approval of the transmission solutions within the mitigation plan.

*Policy-Driven Need Assessment*

- This assessment is geared towards capturing the impact of resource build-out on transmission infrastructure, identifying any required upgrades, and providing new transmission information for use by the CPUC in the next cycle of portfolio development.
- The base case portfolio and any sensitivity portfolios are incorporated into the CAISO's Policy-Driven Need Assessment
- The overarching public policy objective is the state's mandate for meeting renewable energy and greenhouse gas (GHG) reduction targets while maintaining reliability.
- For the TPP, this high-level objective is comprised of two sub-objectives:
    - To support Resource Adequacy (RA) deliverability status for the renewable generation and energy storage resources identified in the portfolio as requiring that status (Peak Deliverability Assessment)

    - To support the economic delivery of renewable energy during all hours of the year and identify potential system limitations that may cause excessive renewable energy curtailment (Off-Peak Deliverability Assessment)
- Powerflow, deliverability, and production cost simulation analysis are used to assess the need for transmission upgrades under scenarios where resources are considered most likely to be located, considering the policy and strategic goals identified by the CPUC.
- In general, identified transmission solutions driven by the base case portfolio resources and for which the CAISO finds sufficient analytic justification are recommended to the CAISO Board of Governors for approval.
- Transmission solutions driven by the sensitivity portfolios alone are not recommended for approval. However, if the portfolios are plausible alternative scenarios to the base case, these transmission solutions can help identify least regret transmission investments and guide the CAISO's development of transmission solutions identified as needed for the base case portfolio.
- Transmission solutions not recommended for approval including those identified through the sensitivity portfolios provide useful information for future IRP modeling.

*Economic Planning Study*

- The relevant years of the base case portfolio is used by the CAISO in its economic planning study. The CAISO may use relevant years of the sensitivity portfolio when conducting additional analysis.
- Explores economic-driven transmission solutions that may create opportunities to reduce ratepayer costs within the ISO.
- Uses production cost simulation performed for all hours of the study year to potential study areas, prioritize study efforts, and to assess benefits by identifying grid congestion and assessing economic benefits created by congestion mitigation measures.
- Potential economic benefits are quantified as reductions of ratepayer costs based on the CAISO's documented Transmission Economic Analysis Methodology (TEAM).
- Candidate projects with a benefit-to-cost ratio of 1.0 or more may go before the CAISO Board of Governors for approval.

*Long-term Local capacity technical (LCT) Analysis (currently assessed every two years)*

- Used to determine the minimum local capacity requirement (LCR) in local capacity areas and sub areas that is needed to meet reliability criteria.
- Intended to provide an indication of whether there are potential deficiencies that need to trigger a new procurement proceeding.
- Only resources with full or partial deliverability status are counted to meet LCR.
- The economic benefit of a transmission solution that would reduce LCR needs may be quantified as part of the economic planning study and used for justification for recommending approval of that transmission solution.

## Criteria

The CPUC will consider options for TPP portfolios by comparing how each potential portfolio meets the following criteria. If a portfolio does not meet a criterion, the CPUC will seek CAISO guidance, before the portfolio is formally selected, to determine what mitigation/improvement options exist.

### A. Base Case Portfolio for Reliability, Policy and Economic Assessment

1. Portfolios should be comprehensive. The base case portfolio should be a total portfolio (baseline, new builds, plus retirements) that reflects CPUC policy guidance.
2. All resources can foreseeably be mapped to busbars (including baseline, new build, and retired resources), or the CPUC can provide policy guidance on the location of resources.
3. The CAISO can reasonably expect that generic resources will come online so that they can be confidently modeled in the TPP.
4. Portfolios need to include explanation of the underlying policies that are directly affecting the portfolio development.
5. The entire portfolio should meet state policy goals and CPUC requirements, such as meeting RPS mandates and GHG reduction targets, and should provide overall supply adequacy reliability.
6. Portfolios should generally be cumulative year-over-year and should not unreasonably shift large amounts of resources in ways that would likely impact transmission needs.
7. Portfolios should be updated from the previous portfolios by incorporating appropriate inputs such as key changes to the load forecast.

### B. Sensitivity Portfolios for Policy Assessment

1. Articulate the purpose for such analysis. Per the 2022 MOU between the CPUC, CEC, and CAISO, "the ISO transmission planning process will consider and incorporate the scenarios and portfolios developed by the CPUC with input from the CEC, and the subsequent CPUC siting/permitting process will then give substantial weight to project applications that are consistent with the ISO's final transmission plan." The explanation of a sensitivity portfolio's purpose will be developed accordingly and will be included in the formal CPUC ruling that conveys these sensitivities.
    a. The purpose for the analysis of each sensitivity portfolio should be included in the formal CPUC ruling that conveys the portfolios. Per the guiding principles, the description should communicate whether the aim is to gather additional transmission impact information for future portfolio development, or to support the recommendation of "least regrets" transmission upgrades to the CAISO Board of Governors by providing a reasonable range of future scenarios.

b. Portfolios should include explanation of the policy intent that drives the purpose for the sensitivity analysis.

## Portfolio Selection Process

CPUC staff will first identify a range of portfolios for consideration that meet IRP and TPP objectives. For each portfolio, staff will consider the following questions:

### A. Policy objectives

1. What policy objectives does the portfolio aim to progress?

### B. Intended Use Case

2. What questions does the use of this resource portfolio in the TPP answer?
    - Examples may include the following:
        - Understand transmission implications of CPUC-approved IRP portfolios or potential future IRP portfolios.
        - Test the transmission implications of potential policy direction.

### C. Expected TPP Outputs

3. What type of information is expected to be produced by the TPP analysis?
4. Is the TPP information expected to flow as an input into the IRP process?
5. What is the expected format of the results and how will this information be considered in the IRP process?

### D. Work Required

6. What level of human resources and time are required to develop the portfolio and formally transmit it? This may include work such as:
    - Portfolio formation
        - Model runs required, if any
        - Use of LSEs' plans required, if any
    - Busbar mapping

### E. Stakeholder Engagement

7. How has stakeholder engagement or the formal decision-making process informed the portfolio?

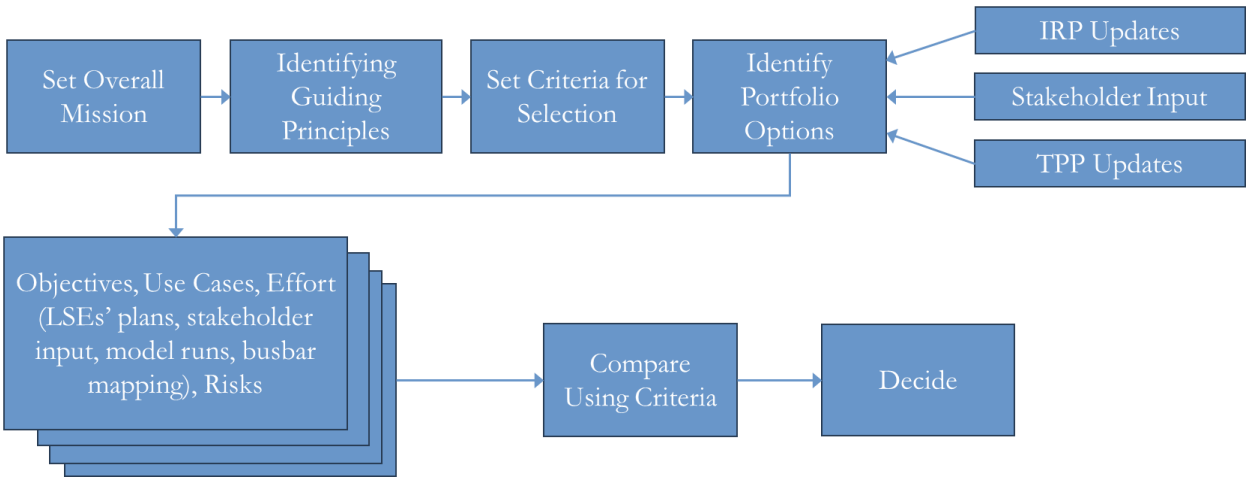
### F. Risks

8. What are the risks of the portfolio not adequately meeting an objective of the CAISO's TPP or the CPUC's IRP process?

### G. Mitigations

9. What mitigations can be applied to address the identified risks?

Figure 2: IRP Resource Portfolio Selection Process for the CAISO's TPP




## Portfolio Comparison

After identifying portfolios of interest that meet the criteria explained in this framework document, staff will compare all portfolio options against the criteria.

## Conclusion

Staff expect to recommend selected portfolios in accordance with this framework and after careful comparison of portfolio options. After selecting portfolios, for continuation of transparency, staff will produce a Selected Portfolio Description, which describes each portfolio and the rationale for its selection.

# VIII. Appendix

## A. Previous CPUC Portfolios Submitted to the CAISO

- For the 2025-2026 TPP:
  - Base Case: 25 MMT GHG target by 2035, 2035 and 2040 mapped results transmitted, using the 2023 IEPR's load forecast
  - Sensitivity: High long lead-time (LLT) resource deployment
- For the 2024-2025 TPP:
  - Base Case: 25 MMT GHG target by 2035 (the adopted 2023 PSP portfolio), 2034 and 2039 mapped results transmitted, using the 2022 IEPR's load forecast
  - Sensitivity: High gas retirement (Retired 12.2 GW of non-OTC (once-through cooling) gas plants by 2039)
- For the 2023-2024 TPP:
  - Base Case: 30 MMT GHG target by 2030, 2033 and 2035 results transmitted, using the 2021 IEPR's load forecast
  - Sensitivity: Offshore Wind Sensitivity Portfolio
- For the 2022-2023 TPP:
  - Base Case: 38 MMT GHG target by 2032 with 2020 IEPR High EV Portfolio, using the2020 IEPR's load forecast

    - Sensitivity: 30 MMT GHG target by 2032 with High Electrification
- For the 2021-2022 TPP:
    - Base Case: 46 MMT GHG target by 2031 established in D.20-03-028 but with minor updates to include more updated information, using the2019 IEPR's load forecast
    - Sensitivity #1: 38 MMT GHG target by 2031 Policy-driven Sensitivity Portfolio. This portfolio includes nearly 22,000 MW of new renewable generation, including 3,000 MW of out-of-state wind
    - Sensitivity #2: Offshore Wind Sensitivity (8,000 MW of offshore wind at various potential locations)
- For the 2020-2021 TPP:
    - Base Case: the updated 2018 Preferred System Portfolio (PSP) with updates to reflect more in-service resources, less planned resources and effective busbar mapping, using the 2018 IEPR's load forecast
    - Sensitivity #1: 2019-2020 Reference System Portfolio (RSP) with the 46 MMT target for 2030
    - Sensitivity #2: 2019 30 MMT target for 2030, testing the impacts of energy only deliverability status on congestion and generator curtailments.
- For the 2019-2020 TPP:
    - Base Case: 42 MMT GHG target by 2030 of the RESOLVE 2017-2018 RSP, using the2017 IEPR's load forecast
    - Sensitivity #1: RESOLVE 32 MMT GHG target by 2030 portfolio, allowing out-of-state on existing transmission only.
    - Sensitivity #2: RESOLVE 32 MMT GHG target by 2030, allowing up to 4,250 MW of out-of-state (NM and WY) wind on new transmission.