

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
STATE OF CALIFORNIA**

Order Instituting Investigation pursuant to Senate Bill 380 to determine the feasibility of minimizing or eliminating the use of the Aliso Canyon natural gas storage facility located in the County of Los Angeles while still maintaining energy and electric reliability for the region.

Investigation 17-02-002
(Filed February 9, 2017)

**INFORMAL COMMENTS OF THE
CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

The California Independent System Operator Corporation (CAISO) appreciates this opportunity to provide comments on California Public Utilities Commission's (Commission) Proposed Scenarios Framework (Scenarios Framework) developed by Energy Division staff. The Scenario Framework will inform Investigation (I.) 17-02-002, which will determine whether use of the Aliso Canyon natural gas storage facility (Aliso) can be minimized or eliminated while maintaining energy and electric reliability in the region. The CAISO provides comments in response to the specific questions raised in the Scenarios Framework as well as more general information related to the CAISO's proposed participation in this proceeding.

I. Introduction

The CAISO appreciates Energy Division staff's considerable efforts in preparing the Scenarios Framework. The Scenarios Framework outlines the scope of the Commission's proposed Aliso-related studies. The Commission plans to conduct three types of studies in the course of this investigation: (1) a hydraulic modeling analysis, (2) a production cost modeling analysis, and (3) an economic modeling analysis. The CAISO's comments primarily focus on the Commission's proposed production cost modeling analysis, which is capable of modeling hourly electric grid operations performance. In addition, the CAISO provides suggestions regarding how the Commission should incorporate the CAISO's power flow modeling results into the Commission's production cost modeling analysis.

II. Discussion

A. The Commission Should Incorporate Results of the CAISO's Power Flow Modeling into its Production Cost Modeling Analysis.

The Scenarios Framework indicates that Commission's proposed production cost modeling will be conducted with a "bubble-type" model "where geographic granularities inside bubbles are not enforced as they are in the power flow simulations used for transmission planning."¹ The CAISO understands this limitation in the production cost modeling, but maintains that there are local reliability requirements and transmission constraints that must be recognized in the production cost modeling. As a result, the CAISO recommends that the Commission use CAISO power flow studies as inputs into the production cost modeling to capture local requirements and transmission constraints. The CAISO proposes to conduct power flow modeling and make the assessments and results available for the Commission to incorporate into its production cost modeling analysis. The sections below describe the CAISO's proposed power flow modeling assessments in more detail.

1. Power Flow Modeling Assessments

The CAISO plans to conduct power flow modeling assessments:

- i. **Local capacity requirements (LCR)** to maintain electric transmission reliability in the Los Angeles (LA) Basin and San Diego-Imperial Valley LCR areas. The CAISO proposes to combine the LA Basin and San Diego-Imperial Valley LCR areas into one study, as has been done in all CAISO local capacity studies since the closure of the San Onofre Nuclear Generating Station (SONGS). With the closure of SONGS and planned retirement of conventional generation in both the LA Basin and San Diego-Imperial Valley LCR areas (totaling 7,668 MW by the end of 2020), the electric transmission networks in these two areas are highly interdependent. Changes in resource or load assumptions in one area can have a significant impact on the need for resources in the other.
- ii. **Reliability assessment for the Southern California bulk transmission system**, particularly the area south of Path 26, which is a WECC transmission path linking Northern and Southern California. The CAISO

¹ Scenarios Framework, p. 9.

will evaluate potential reliability impact of the transmission import capability (i.e., Southern California Import Capability or SCIT) to the CAISO and the Los Angeles Department of Water and Power (LADWP) balancing authority areas.

The CAISO plans to coordinate with LADWP on both the LCR and bulk transmission assessments.

2. Power Flow Study Inputs

The CAISO plans to use the following inputs in conducting its power flow assessments:

- i. Reliability Metrics:** The CAISO will use NERC, WECC, and CAISO Board-approved reliability standards in evaluating local capacity requirements and bulk transmission reliability.
- ii. Loads:** The CAISO will use the California Energy Commission's latest load forecast (i.e., 2018 – 2028), which is likely to be available in January 2018. The loads to be modeled will be 1-in-10 year load forecast for the local capacity requirement assessments and 1-in-5 year load forecast for the bulk transmission system reliability assessments. This is consistent with the Commission's Long-term Procurement Plan (LTPP) process for long-term local capacity requirement assessments, as well as this Commission's 2017 Assumptions and Scenario for Long-Term Planning (A&S Document).² In addition to summer peak load conditions, the CAISO will also evaluate minimum generation need for the winter peak load conditions. The loads used for the winter peak load conditions will be approximately 50-65% of the summer peak load assumptions.
- iii. Resources:** Resource assumptions will include conventional and preferred resources that were approved by the Commission. Other resources include battery storage and renewables that are provided in further detail in the A&S Document. For LADWP resource assumptions, the CAISO will depend on LADWP-provided inputs.
- iv. Transmission Upgrades:** The CAISO will model the transmission projects that are approved by the CAISO Board of Governors that are

² <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M176/K948/176948479.PDF>

detailed in the latest California CAISO Transmission Plan. The CAISO will rely on LADWP-provided inputs for transmission upgrades within LADWP.

3. Power Flow Study Scenarios

The CAISO intends to conduct power flow assessments based on the following scenarios:

- i.** Three years of study scenarios: In line with the Commission's proposed scenarios, the CAISO recommends a short-term, mid-term and long-term assessment. The CAISO suggests using 2019 for the short-term assessment rather than 2018. The CAISO agrees with using 2022 and 2027 for the mid-term and long-term assessments.
- ii.** The CAISO agrees with the Commission on the use of three gas inventory levels for Aliso Canyon: zero (Aliso Canyon gas storage closure), the 715 report value (currently at 23.6 Bcf) and a level that is to be determined by the hydraulic modeling to maintain LCR area reliability. However, the CAISO suggests adding one more gas inventory level: 15 Bcf. This gas inventory level is currently maintained at Aliso Canyon gas storage field.
 - a.** The CAISO will perform LCR and Southern California bulk system studies to determine minimum generation needed to comply with applicable NERC, WECC, and CAISO planning standards;
 - b.** The minimum generation requirements for the CAISO and LADWP in the LA Basin will be combined for an aggregated generation requirement;
 - c.** This will be converted to total gas usage (based on 8 hours), also known as gas burn, and compared with the supported gas demand for electric generation determined by hydraulic modeling study. For the purpose of this study, supportable gas demand for electric generation will be calculated as follows:

Supportable gas demand for electric generation = Total demand supportable by SoCalGas – Core and Non-Core demand supportable

4. Power Flow Study Results/Outputs

The results from both the LCR and the bulk transmission reliability assessments should be used for the following:

- i.** As inputs for minimum generation requirements into the production cost modeling study. The minimum generation requirements in the LA Basin and San Diego areas should be modeled as nomograms in the production cost modeling study. The hourly outputs of the production cost modeling study will be used as inputs to the hydraulic modeling to determine total aggregate gas demand supportable by SoCalGas, core and non-core gas demand supportable by SoCalGas, and the residual (i.e., difference of these two parameters will be the supportable gas demand for electric generation, to be expressed as MMcfd).
- ii.** The results of the hydraulic modeling study can determine the potential impact to the gas pipeline transmission system and the potential gas curtailment volume if reduced storage inventory or closure of Aliso Canyon gas storage.
- iii.** The minimum generation requirements needed to meet applicable NERC, WECC, and CAISO planning standards that were determined from the CAISO and LADWP for the LCR and bulk electric transmission reliability assessment should also be used as inputs for the assessment of the electric impact of gas curtailments for a peak summer or winter gas usage day (similar to the analysis from Table 2 of the Summer 2017 Aliso Canyon Risk Assessment Technical Report³).
- iv.** As part of the LCR and Southern California bulk system reliability impact analysis, the CAISO will identify the following:
 - a.** Potential megawatt demand impact due to various gas inventory levels at Aliso Canyon;
 - b.** Potential gas burn shortfalls for supporting electric generation;

³ http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-11/TN217639_20170519T104800_Aliso_Canyon_Risk_Assessment_Technical_Report_Summer_2017_Asses.pdf

- c. Potential customer impact (i.e., estimated amount of customer impacts);
- d. Potential high-level transmission upgrades and high-level estimated costs and any preliminary comments regarding the feasibility of potential transmission upgrades.

B. Answers to Questions Posed in the Scenarios Framework

In this section, the CAISO responds to specific questions regarding the hydraulic and production cost modeling as posed in the Scenarios Framework. The CAISO has reproduced each of the relevant questions below with the associated CAISO responses.

1. Hydraulic Modeling Questions

Are the proposed modeling dates reasonable, i.e. 2018, 2022, and 2027?

Generally yes, but the Commission should study 2019 rather than 2018 for the short-term analysis because the studies will likely not be finalized until mid- to late-2018.

Is the proposed process for determining the minimum Aliso inventory level reasonable?

Yes, the CAISO agrees with the proposed methodology. The inventory level should be sufficient to meet gas need for core and non-core customers, including electric generation needed to maintain LCR as indicated in the CAISO's power flow assessments.

Is it reasonable to estimate 2027 gas demand by reducing the 2022 peak day forecasts by 0.6% per year?

The gas demand forecast should take into account electric generation demand in the 2027 time frame based on the CAISO's power flow assessments.

Should historical gas days also be modeled?

Yes. The Commission should pay particular attention to peak winter gas demand days and regional (i.e., multiple state) gas peak demand days.

Is it reasonable to assume that SoCalGas will be restricted to tubing-only flow?

Yes.

2. Production Cost Modeling Questions

Are the inputs described above appropriate for use in the model as described?

Pages 8-10 of the Scenarios Framework describe the inputs to be used in the Commission's production cost modeling analysis. The CAISO addresses each of the inputs described in the Scenarios Framework.

Geography of the Model

As described in detail above, the CAISO believes that the Commission should use the CAISO's power flow modeling assessments to establish minimum generation requirements in the production cost modeling. The production cost modeling alone will ensure that system maintains a minimum planning reserve margin, but it will not consider localized constraints and risks.

Characteristics of Gas Storage Facilities

The CAISO agrees with the suggestion that Honor Rancho and Playa del Rey storage facilities be modeled using the maximum tubing-only flow from these fields. This assumption is the most reasonable based on expected future performance at these storage facilities. The Commission should also note that more than 17 electric generation facilities will be impacted by the natural gas limitations. The entire SoCalGas generation fleet may be impacted.

Utility Capacity Expansion and Plant Retirement Plans

The CAISO agrees that it will be important to consider capacity expansion and plant retirement plans. Some known retirements, including those plants retiring as a result of compliance with the state's once-through-cooling policy, have the potential to have a significant impact on the nature of gas utilization in the area. Remaining plants, especially combustion turbines (CTs) and other peaking plants, may have different gas burn patterns. For example, retirement of significant gas generation could result in decreased overall gas burn, but increased variability and ramping from remaining units.

The Commission's production cost modeling and any hydraulic modeling should also carefully consider different solar conditions and effects on hourly rate of gas needed in its analysis. As the penetration of solar generation increases, the performance of these solar resources is increasingly important to maintaining reliability. The Commission's modeling should seek to test reliability under various solar output scenarios.

Lastly, the CAISO notes that generation retirement outside of the Southern California area may also affect reliability. For example, the planned closure of the Diablo Canyon Power Plant and other Northern California resources could lead to limitations in Path 26 imports into the LA Basin.

Weather Data

The Scenarios Framework notes that Energy Division plans to use hourly historical weather data to generate synthetic electricity demand and hourly profiles for wind and solar

generating facilities.⁴ By the time the Commission's analysis begins, the California Energy Commission will likely have developed hourly demand profiles through its Integrated Energy Policy Report (IEPR) process. The CAISO recommends that the Commission's development of hourly electricity demand forecasts be coordinated with CEC's hourly profiles.

Generating Resources

The CAISO reiterates that more than 17 gas-fired generation resources will be impacted by the closure or reduction of storage at Aliso. The Commission's analysis should consider impacts throughout the integrated Southern California electric grid.

The Scenarios Framework indicates that ramp rates and heat curve rates for generating resources will come from the CAISO Masterfile. The CAISO will work to provide this information to the extent possible but may need to provide generic ramp rates and heat curve rates to maintain individual resource confidentiality while maintaining transparency.

Is SERVUM an appropriate modeling tool?

The CAISO believes that SERVUM may be an appropriate tool for the production cost modeling but reiterates that it must 1) be accompanied by power flow modeling to ensure local reliability; and 2) recognize applicable transmission constraints and hydraulic modeling to ensure the hourly rate of gas needed by the electric system can be supported by the gas infrastructure. If SERVUM cannot accommodate these concerns, the Commission should consider using Plexos for its production cost modeling.

Is the proposed time horizon appropriate?

For the short-term analysis, the CAISO believes that Commission should study 2019 rather than 2018 because the analysis will likely not be finalized until late in 2018.

Are both the LOLE and LOLH appropriate metrics for reliability?

Yes, but the CAISO suggests providing Expected Unserved Energy results as well. Expected Unserved Energy values will provide insight regarding the magnitude of loss of load events.

What is the best way to simulate the output of the 17 plants with reduced gas flow?

The output of the gas plants in the Southern California should reflect the results of the power flow assessments conducted by the CAISO. The CAISO looks forward to cooperating

⁴ Scenarios Framework, p. 4.

with the Commission and stakeholders regarding how the power flow assessments are used to simulate the output of the gas generation.

What is the best methodology to translate inventory at Aliso, Playa del Rey, and Honor Rancho to withdrawal rates / rate of delivery to the 17 power plants?

Similar to the question above, the inventory withdrawal/rates of delivery should be modeled based on the results of the power flow analysis.

III. Conclusion

The CAISO appreciates this opportunity to comment on the Scenarios Framework and looks forward to cooperating with the Commission going forward in this proceeding.

Dated July 24, 2017