



Memorandum

To: ISO Board of Governors

From: Neil Millar, Vice President, Transmission Planning & Infrastructure Development

Date: July 15, 2020

Re: Briefing on 2020 Summer Loads and Resources Assessment results

This memorandum does not require Board action.

INTRODUCTION

The ISO's 2020 Summer Loads and Resources Assessment presents the expected supply and demand conditions for the 2020 summer peak demand period. This annual assessment helps the ISO, industry participants, and other key stakeholders in planning and preparing grid operation for the upcoming summer season. This briefing provides the ISO Board of Governors with results and information on the following topics that are included in this year's assessment:

- Forecast of ISO peak demand for 2020;
- Assessment of capacity margins in the ISO system under diverse operating conditions and scenarios;
- Discussion of current hydro conditions and expectations for the summer power supply;
- Generation additions and retirements; and
- An update on the status of the Aliso Canyon gas storage facility.

Summary

Base case model projections for 2020 show that there is a low probability of encountering operating conditions that could result in less than required operating reserves. However, with below normal hydro conditions, a late summer heat wave, especially if wide spread and impacting imports, would be particularly challenging. The ISO is at greatest risk if hotter than normal weather occurs concurrently in the ISO and neighboring BAs resulting in a reduction of resources available for imports into the ISO. The level of imports during high load peak conditions is a key element for ensuring system reliability. The risk of such an event increases during late August and early

September when hydro availability decreases and the afternoon decline in solar output begins sooner in the day due to shorter daylight.

Major findings for the 2020 Assessment include:

- Forecasted peak demand relatively unchanged from 2019
- Hydro conditions are below normal
- The net of resource additions and retirements is an increase of 1,432 MW, which based on resource type equates to an effective load carrying capability increase of only 38 MW for the month of September
- Aliso Canyon related gas restrictions have eased since 2019, but could result in additional risk

Each of these findings is discussed in greater detail below.

Peak Demand Forecast

The 2020 1-in-2 summer peak demand forecast, derived from the 50th percentile of the historical weather data from weather stations across the ISO, is 45,907 MW. The 2020 forecast is essentially unchanged from the 2019 forecast – the result of projected modest economic growth over 2019, continuing load reductions from behind-the-meter solar installations and energy efficiency programs. The ISO 2020 1-in-10 peak demand forecast is 48,457 MW.

No attempt was made to predict potential ongoing impacts to loads due to COVID-19 through the summer period. At the time of writing this report, too many unknowns existed to produce a viable and meaningful COVID-19 load impact scenario. As of the writing of the report, the ISO has experienced load reductions of 5 to 8 percent on weekdays, and 1 to 4 percent on weekends, with the largest reductions occurring over the morning peak hours. California has entered into summer weather and the ISO balancing authority area is beginning to experience air conditioning driven loads. Until California weather approaches 1-in-2 weather conditions, there is insufficient data to determine the impact of COVID-19 on summer hourly peak demands. The ISO will need enough data to forecast the impacts on its hourly load profile to be able to fully model the reliability impacts from COVID-19.

Hydro Conditions

California hydro conditions for 2020 are below normal. The statewide snow water content for the California mountain regions peaked at 63 percent of the April 1 average and major statewide reservoir storage levels reached 101% of normal. Snow water content is the more accurate indicator of hydro condition because the majority of hydro units are not associated with these large reservoirs, which relying on snowmelt, resulting in declining energy production across the summer. California hydroelectric capability for 2020 is well below 2019 when the statewide snow water content was 162 percent of average.

Hydro conditions for the Pacific Northwest are slightly below normal. As of April 7, 2020, the Northwest River Forecast Center projected the April to August reservoir storage at the Dalles Dam on the Columbia River to be 95 percent of average – roughly equal to the 2019 level of 94 percent of average.

Available Generation

Monthly system capacity projects are 48,012 MW in June, 48,555 MW in July, 46,903 MW in August, and 44,543 MW in September, based on capacity available for resource adequacy. From June 1, 2019, to June 1, 2020, approximately 3,423 MW of installed capacity will reach commercial operation, of which 1,734 MW is dispatchable and 1,689 MW is non-dispatchable. During the same period, 1,991 MW of generation capacity will retire or mothball, of which 1,926 MW is dispatchable and 65 MW is non-dispatchable. In aggregate, the ISO gained 1,432 MW, which based on effective load carrying capability for the various resource types, equates to a negligible increase of 38 MW for the month of September.

Assessment of Reserve Margins

The 2020 Assessment uses an unloaded capacity margin metric to portray the capacity that is available to ISO operations to utilize for spinning and non-spinning reserves and any additional capacity that can be brought on line in a short period of time. Unloaded capacity margin levels above the operating reserve requirement for any given hour (typically around 6 percent) signifies that capacity is available beyond the requirement for operating reserves, which to the extent available, can be used during system contingencies.

To assess resource adequacy, the analysis reviewed the operating reserve margins that fall below 6 percent, the range where stage 2 or stage 3 emergencies could be declared. If operating reserves fall within this range, the ISO may be required to take out of market actions to secure additional reserves. Should ISO system operating conditions go into the emergency stages, the ISO will implement its mitigation operating plan to minimize loss of load in the ISO Balancing Area.

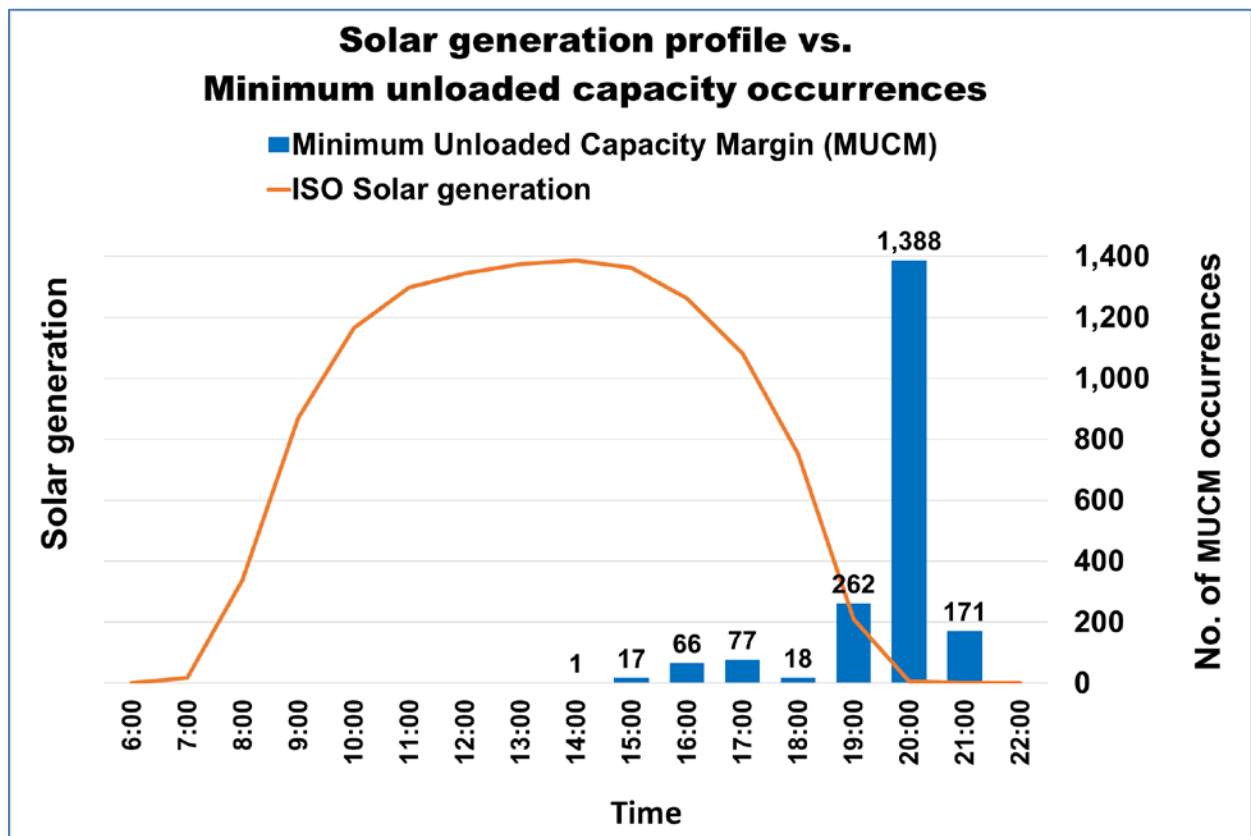
For the 2020 Assessment the ISO performed two stochastic model runs, a base case assuming historical import levels, and a moderate import sensitivity case assuming more conservative import levels. The sensitivity case was developed to simulate the decreasing availability of imports during summer heat waves that are more wide spread, impacting neighboring balancing authority areas, which typically negatively impact the availability of imports from neighboring balancing authorities.

Of the 2,000 scenarios run by the model, the results of the base case for the ISO system are a 3.7 percent probability of operating within the stage 2 emergency range, and 1.1 percent probability of operating within the stage 3 emergency range – the point where firm load shedding would begin. Upon entering these severe operating conditions, the ISO will issue a notice of potential load interruptions to utilities – whether

actual interruptions would occur depends on the specific circumstances and potential for recovering reserve deficiencies.

The probabilities for operating at the stage 2 and 3 emergency conditions are based on the minimum unloaded capacity margin – the lowest unloaded capacity margin within each of the model’s 2,000 scenarios. The minimum unloaded capacity margin is used to show the likelihood of reaching various levels of low operating reserves for at least one hour over the summer period. *Figure 1* shows the base case distribution of the minimum unloaded capacity margin over the hours of the day that they occurred. The hours of solar generation anticipated during the 2020 summer peak day is shown to demonstrate that over 90 percent of the minimum unloaded capacity margins occurred during the ISO’s daily peak hours ending 17:00 to 21:00 – the hours of little to no production from solar resources. *Figure 1* demonstrates that resource adequacy levels are most challenged in the post-solar window, as reductions in the gas fleet have not yet been offset by sufficient new energy storage resources to compensate for the loss of capacity available in that window.

Figure 1



The results from the moderate import sensitivity case assuming more conservative import levels are presented alongside the base case results in *Table 1* and reveal the criticality of imports to the ISO during system peak hours at high load conditions. If the ISO is limited to the more conservative import levels of the sensitivity case, the probability of falling into stage 2 conditions is three times more likely, and falling into stage 3 conditions where firm load is shed is over four times more likely. The sensitivity study results reveal that 85 percent of the most extreme conditions occurred from August 28 to September 28, further indicating that the ISO will be at the greatest operational risk during late summer as available hydro energy tappers off significantly. The ISO would face its most challenging conditions if a late summer heat wave concurrently impacts California and its neighboring balancing authority areas, resulting in low net imports into the ISO.

Table 1

Probabilities for System Capacity Shortages

| Result | Base Case | Sensitivity Case |
|--------------------------|------------------|-------------------------|
| Stage 2 | 3.7% | 10.6% |
| Stage 3 | 1.1% | 4.7% |
| Unserviced energy | 0.2% | 1.6% |

Status of the Aliso Canyon Gas Storage Operating Restrictions

Natural gas needs in Southern California are met by a combination of major gas pipelines, distribution gas infrastructure and gas storage facilities. Four major gas storage facilities are located in the Southern California Gas system, the largest of which is the Aliso Canyon facility located in Los Angeles County. Following a significant natural gas leak in late 2015, the injection and withdrawal capabilities of the Aliso Canyon were severely restricted.

Aliso Canyon directly supplies 17 gas-fired power plants with a combined total 9,800 MW of electric generation in the Los Angeles basin and indirectly impacts 48 plants with a combined total 20,120 MW of electric generation across Southern California. There are limitations in attempting to shift power supply from resources affected by Aliso Canyon to resources that are not affected because of certain factors, such as local generation requirements, transmission constraints and other resource availability issues.

On April 15, 2020, the CPUC staff published the Summer 2020 Southern California Reliability Assessment¹, which concluded that conditions had improved as compared to the same time last year. This is the result of having more gas in storage at Aliso Canyon and SoCalGas' three other storage fields going into the summer, the return to service of Line 235-2 which had been out of service since October 2017, and regulatory actions by the CPUC. Specifically, on July 23, 2019 the CPUC made revisions to the Aliso Canyon Withdrawal Protocol to remove its classification as “an asset of last resort” to provide SoCalGas with more flexibility to use Aliso Canyon to balance the system and ease energy price spikes². The Summer 2020 Southern California Reliability Assessment also presented an analysis of a peak demand summer day under the base and worst-case gas balance scenarios. While findings show that non-Aliso withdrawals would be sufficient to meet demand under both scenarios at the daily level, hourly demand and gas deliveries on a peak day may still trigger a need for withdrawal at Aliso Canyon³.

Preparation for Summer Operation

Producing this report and publicizing its results is one of many activities the ISO undertakes each year to prepare for summer system operations. Other activities include coordinating meetings on summer preparedness with the Western Electricity Coordinating Council (WECC), California Department of Forestry and Fire Protection (Cal Fire), natural gas providers, transmission operators and neighboring balancing areas. The ISO's ongoing coordination activities with these entities help to ensure everyone is prepared for the upcoming summer operational season.

¹ California Public Utilities Commission, Summer 2020 Southern California Reliability Assessment, April 15, 2020. Available at: https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/News_Room/NewsUpdates/2020/Summer2020-ReliabilityAssessment_Final.pdf In prior years, this had been a joint report between the staffs of the CPUC, CAISO, Los Angeles Department of Water and Power, and California Energy Commission.

² Aliso Canyon Withdrawal Protocol: https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/News_Room/NewsUpdates/2019/UpdatedWithdrawalProtocol_2019-07-23%20-%20v2.pdf.

³ Summer 2020 Southern California Reliability Assessment, pp. 14-15.