# Aliso Canyon Informational Report

# June 30, 2020

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## Introduction

The California Independent System Operator Corporation (CAISO) files this report pursuant to FERC's order issued on December 30, 2019 in Docket No. ER20-273. This order requires the CAISO to file an annual informational report on the impacts of the maximum gas burn constraint on the CAISO markets when the constraint is enforced. The CAISO enforced the maximum gas constraint in day-ahead (DAM) and real-time market (RTM) on three different periods in 2020 to manage actual and anticipated gas curtailments for planned outages on the gas system. This report provides information regarding (1) the instances when the gas nomogram was implemented and discusses any relevant market issues, such as impacts of gas nomogram implementation on real-time imbalance offset costs; (2) gas system conditions during nomogram implementation; and (3) inputs or information used in shaping the maximum gas burn limits under the nomogram.

## Maximum Gas Burn Constraint

The CAISO enforced the maximum gas burn constraint on three different occasions in 2020 (specifically between April to June 2020) due to planned curtailments on the gas system.[1] The CAISO describes each of these three events separately below.

### April 7 through April 11, 2020

In April 2020, the natural gas supplier for thegenerators in CAISO's southern system (SoCalGas) issued a planned curtailment for CAISO dispatched generation in the San Diego Gas & Electric (SDGE) area due to a line outage on the gas system. The curtailment was in effect from 4:00 AM PDT Tuesday, April 7, 2020, through 11:59 PM PDT Saturday, April 11, 2020. The localized curtailment was limited to the city of Carlsbad and Miramar and only 4mmcf/h gas was available each day for the remaining generators in SDGE territory. Hence, CAISO enforced a flat constraint limit of 4mmcf/h across all the hours of the day when the gas constraint was enforced. Based on the nature of the constraint provided by the gas company, the CAISO did not have a need to shape the profile of the constraint for hourly limitations used in the market. Consistent with information provided by the gas company, the limitation was flat thoughout the period.

[1] The CAISO implements the maximum gas burn constraint through a nomogram that incorporates the expected limitations.

Figure 1 below shows the maximum gas burn constraint profile with the limits and the cleared flows on the constraint in both the integrated forward market (IFM) that is part of the DAM, and the real-time dispatch (RTD) which is part of RTM. The gas constraint was binding generally during the peak hours of the day from hour ending (HE) 18 to HE 22 for April 7 and 10. The constraint was enforced in IFM market from April 7 to April 11. In the RTD, the constraint was enforced up to April 10, HE 17, based on information provided by the gas company CAISO noted the maintenance work had ended by that time and, therefore, was able to determine there was no need to enforce the constraint further in the RTM. However, by the time the CAISO determined the maintenance work had ended, the CAISO had already executed the IFM and had already enforced the constraint for the full trading date of April 11. The constraint was binding for a few intervals across all three markets—IFM, fifteen-minute market (FMM), and RTD—generally during peak hours in the evening.

Figure 2 compares a sample day of gas burn across IFM and RTD with associated shadow prices. It shows that the constraint limit was a flat curve for all the hours across the day, and the constraint was binding in the RTM in HE 20.

**Figure 1: Maxburn gas constraint enforced in April**

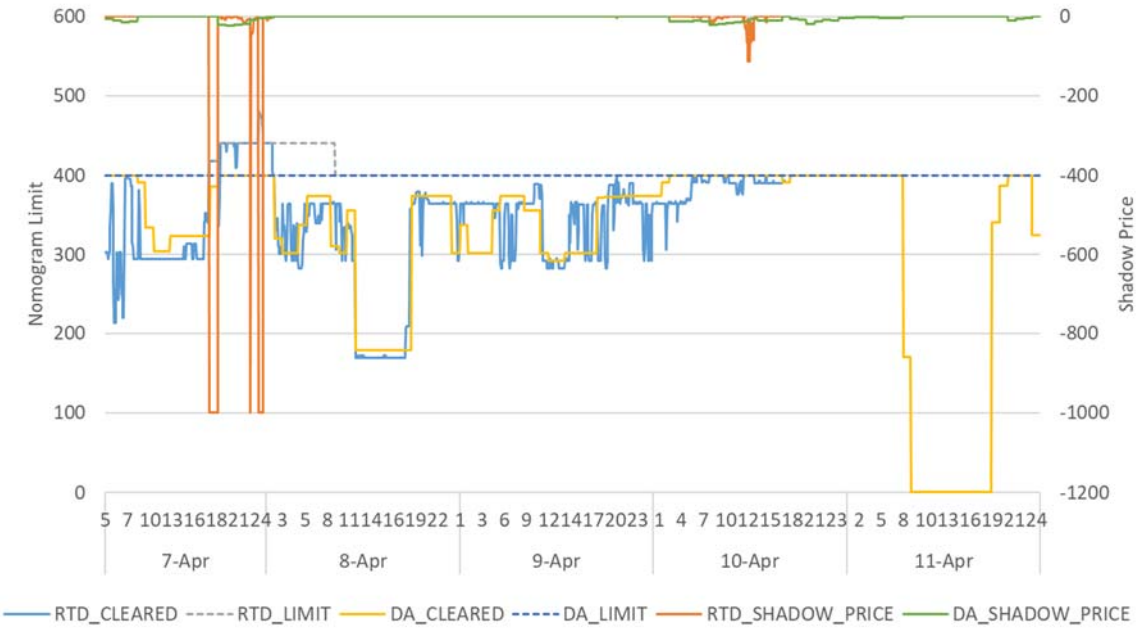


**Figure 2: Sample day gas burn comparison in April**

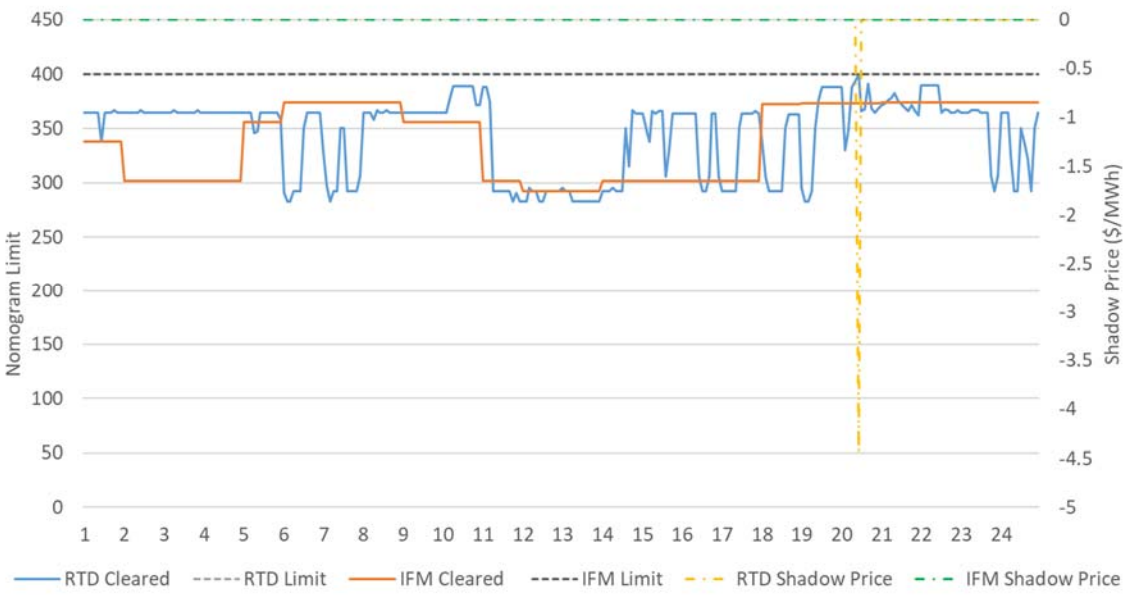
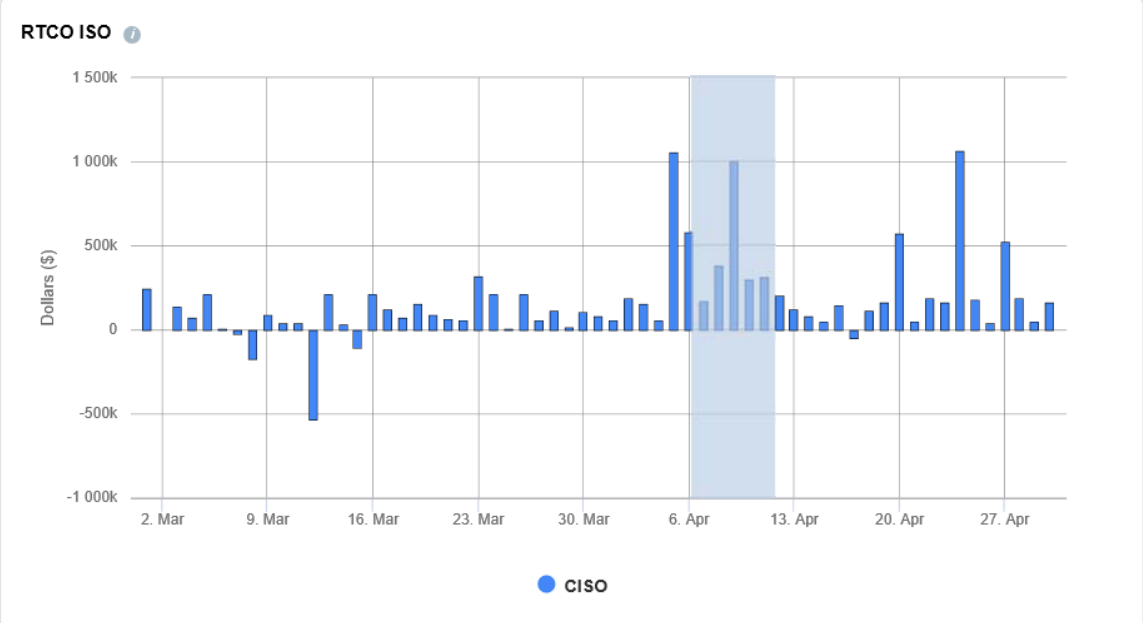



**Figure 3: Real-time congestion offset impact in April**




Regarding the impact of the gas constraint in the real-time congestion offset (RTCO) settlements, the maximum gas burn constraint does not have a direct impact on the RTCO. However, it may have an indirect impact by affecting transmission constraints elsewhere. Figure 3 shows the daily trend of RTCO in the CAISO market. The RTCO was about $1 million for April 9, which is about the same levels observed in adjacent days

when the maximum gas constraint was not enforced. The RTCO was high due to other constraints binding in the RTM and the maxburn constraint did not seem to have an impact on the overall trend.

## May 11 through May 15, 2020

In May 2020, SoCalGas issued a planned curtailment from May 11 to May 15 for the complete southern gas system. The southern gas system includes the SDGE and East of Moreno (EOM) gas forecast zones. Based on information provided by the SoCalGas regarding its concerns over gas system curtailments in the southern gas system, the CAISO determined it was necessary to employ the gas constraint. The CAISO enforced this gas constraint for 5 days in all the markets starting from May 11. The gas limitations in this case were different than those described above for April. In this case, the gas limitations were daily limitations of the gas supply for all generation in the southern gas system generally. The CAISO therefore, enforced the daily limitation and distributed the gas burn across the hours by a ratio of hourly load forecast to the daily load forecast (*i.e.*, gas burn constraint was shaped based on the expected gross load for the day). This limit is shown in the blue and grey dotted lines for DA and RTM, respectively, in Figure 4. The gas constraint was binding in about 1% and 2% of the time in which the constraint was enforced in DAM and RTM, respectively. The constraint was generally binding in HE 19 to HE 21 (evening peak hours) in RTM.

Figure 5 shows the sample day of gas burn constraint enforced to highlight the daily limitation shape acrross the hours of the day, using the hourly load ratio over the daily load ratio. This limitation shaping is the logic that CAISO has historically used to distribute the daily limiation throughout the day.

**Figure 4: Maxburn gas constraint enforced in May**

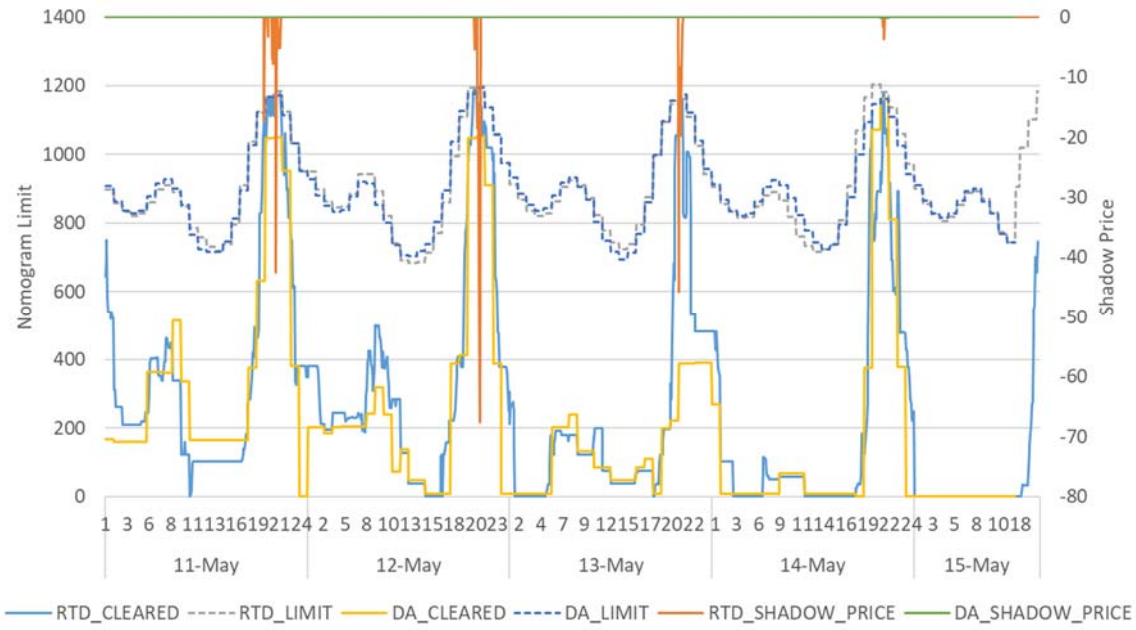
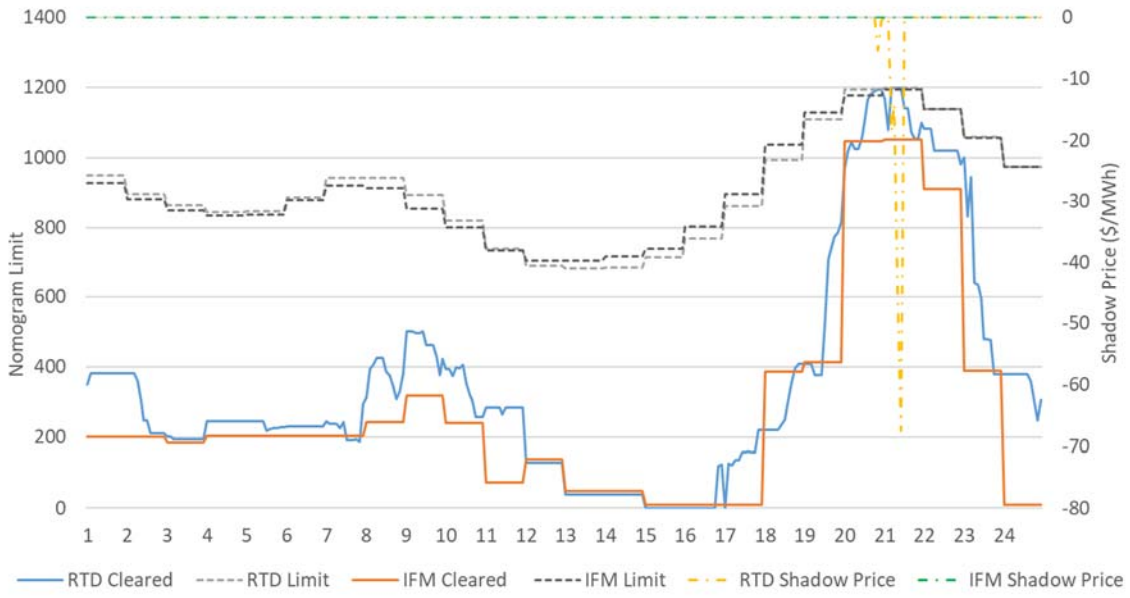



**Figure 5: Sample day of gas burn comparison in May**




## May 29 through June 12, 2020

From May 29 through June 12, SoCalGas issued another planned curtailment for the southern gas system due to maintenance work at the Blythe compressor station,

severely limiting the imports into the southern gas system. Based on this information, the CAISO enforced the gas burn constraint for the southern gas system, which included the SDGE and EOM gas forecast zones. This planned curtailment was in effect from May 29 to June 12. The gas restrictions provided by SoCalGas were a daily limitation for all the generators in the southern gas system. The CAISO distributed the daily limitation across all the hours of the day by a ratio of hourly load forecast to daily load forecast as shown in Figure 6.

**Figure 6: Maxburn gas constraint enforced in June**

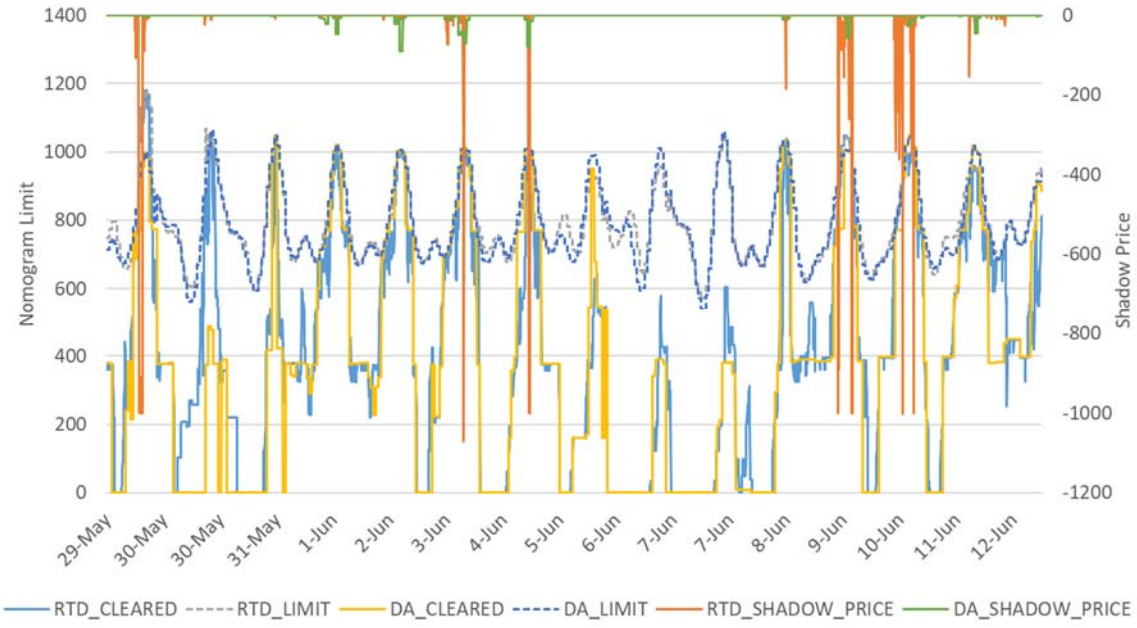
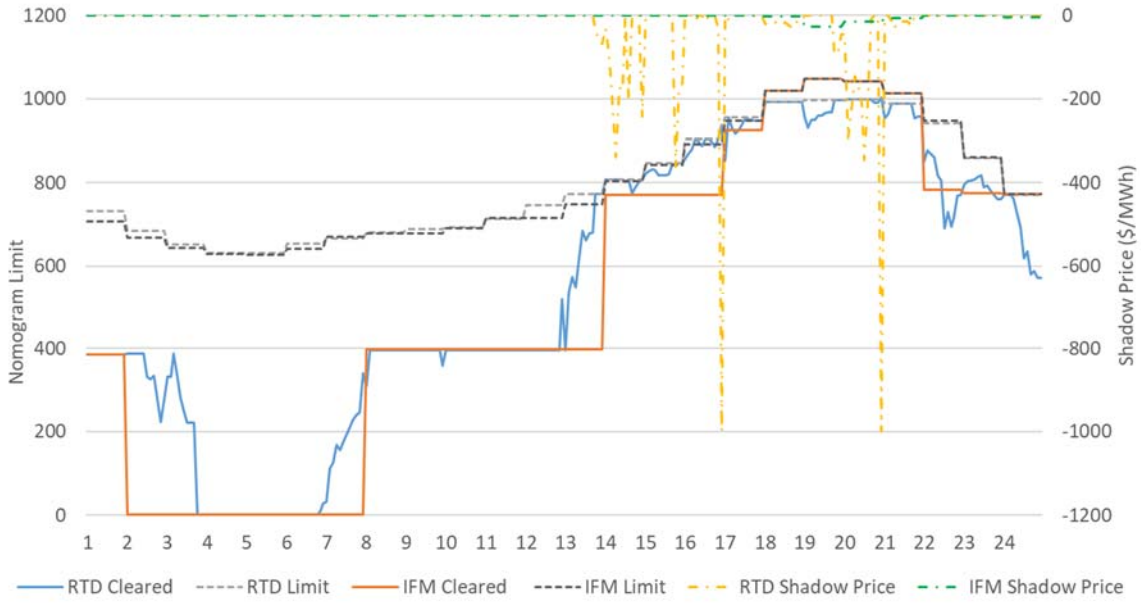


**Figure 7: Sample day gas burn comparison in June**

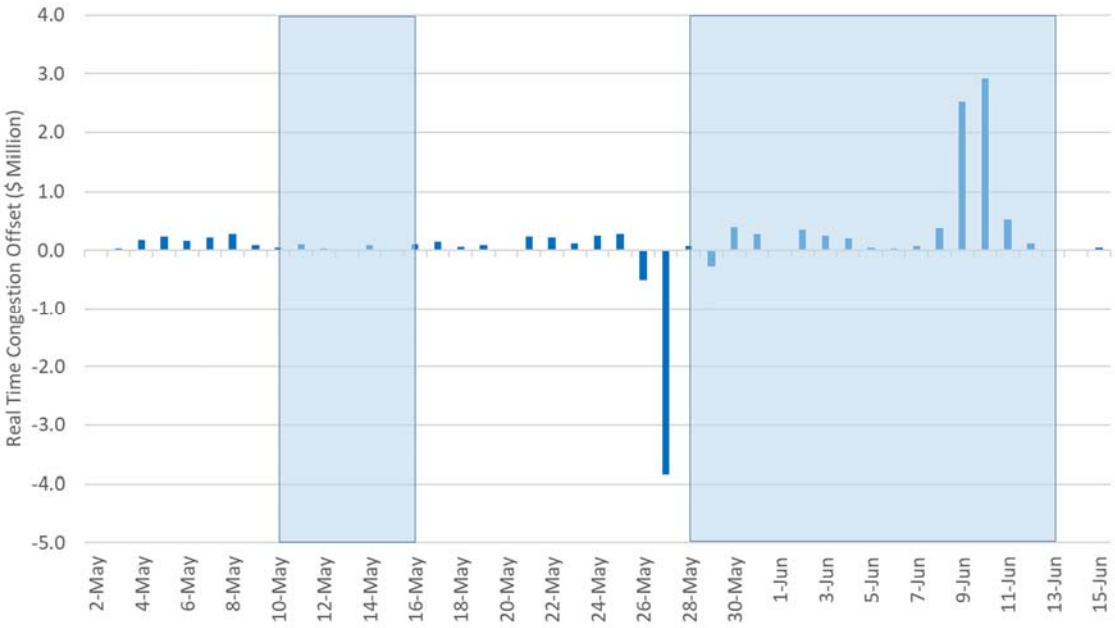



The gas constraint was binding generally during the evening peak hours from HE 18 to HE 22. The gas constraint was binding in the RTM for about 10% of intervals in which it was enforced. In addition, the constraint was binding in about 14% of intervals in the IFM for the period of May 29 to June 12.

Figure 7 shows the gas burn comparison between the RTM and the DAM for a sample day along with shadow prices. It shows the gross load shape of the constraint limit based on the ratio of hourly gross load forecast to daily load forecast.

Figure 8 shows the RTCO trend for the month of May through mid-May and highlights the periods in which the gas constraint was used in the CAISO's markets.

**Figure 8: Real - time congestion offset for May - June**




The maxburn gas constraint does not seem to have any meaningful impact on RTCO from May 11 to May 15. However, it shows there may be some impact on the high RTCO for June 9 and 10 when the constraint was binding with maximum $1000/MWh shadow prices from hour ending 16 to hour ending 21. The RTCO for June 9 and 10 in particular were about $2.5 million and $2.9 million respectively. The RTCO accrued about $850K only on HE 20 during both days. There are other factors contributing to such high congestion offsets such as local area congestion on certain 500kV transmission constraints and outages. The maximum gas constraint had a minimal impact on the congestion offsets for these days.

## Next Steps

This report provides a summary of the conditions and trends of the gas constraint used in the CAISO market as of June 2020. When the limitation provided by the gas company relies on a daily limit, the CAISO continued to distribute it on an hourly basis using a gross load shaping profile.

The gas constraint capabilities currently implemented in the market applications distribute the daily maximum gas volume, specified by SoCal Gas, to hourly maximum gas volumes based on an assigned forecast zone load forecast. This results in the constraint binding in some intervals when the hourly gas volume allocated is lower than necessary because excessive gas volume is allocated to other hours where the gas need is less likely. CAISO is working on modifying the gas constraint so that it can distribute the constraint based on a net load approach instead of gross load approach. It is possible, that on some days the net load approach may better reflect the system conditions and allocate gas more appropriately. The net load assessment would consider the total system load net of generation by solar and wind resources, which may more closely resemble the actual gas burn requirement. This approach will account for changes that may happen from day-to-day because it will be based on forecasted production of wind and solar resources. In addition, the CAISO is planning to consider the last available day ahead historical gas burn to shape the limitation profile. Having this additional functionality at hand, will enable the CAISO to better determine how to enforce the constraints to better fit to current system conditions.

It will continue to be the case that in certain circumstances, the gas system limitation is a fixed value for all hours as observed in the April case. The gas constraint capabilities will also be enhanced to apply an hourly fixed maximum burn constraint throughout the operating day.

The CAISO expects to implement these changes by the end of 2020. These enhancements will be introduced to and discussed with the market stakeholders through its standard BPM change management process.

**CERTIFICATE OF SERVICE**

I hereby certify that I have served the foregoing document upon the parties listed on the official service lists in the above-referenced proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California, this 30th day of June, 2020.

*/s/ Anna Pascuzzo*
Anna Pascuzzo