June 10, 2020

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
Docket No. ER15-2565-___
April 2020 Informational Report
Energy Imbalance Market – Transition Period Report –
Salt River Project EIM Entity

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period of Salt River Project EIM Entity during its first six months of participation in the Energy Imbalance Market (EIM) for April 2020. The Commission also directed the Department of Market Monitoring (DMM) to submit an independent assessment of the CAISO's report, which the CAISO's DMM will seek to file within approximately 15 business days.

Please contact the undersigned with any questions.

Respectfully submitted

By: *<u>/s/ Anna A. McKenna</u>*

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Energy Imbalance Market
April 1 – April 30, 2020

Transition Period Report
Salt River Project (SRP) EIM Entity

June 10, 2020

California ISO Department of Market Analysis and Forecasting

I. Introduction and Background

On October 29, 2015, the Federal Energy Regulatory Commission (Commission) approved the California Independent System Operator Corporation's (CAISO) proposed tariff amendments to allow a transition period for new Energy Imbalance Market (EIM) entities during the first six months of EIM participation, effective November 1, 2015.[1] Salt River Project (SRP), the prospective EIM Entity entered the EIM on April 1, 2020, and the transition period will apply to the SRP balancing authority area (BAA) until October 1, 2020.

During the six-month transition period, the price of energy in the new EIM entity's BAA is not subject to the pricing parameters that normally apply when the market optimization relaxes a transmission constraint or the power balance constraint. Instead, during the six-month transition period, the CAISO will clear the market based on the marginal economic energy bid (referred to herein as "transition period pricing"). In addition, during the six-month transition period, the CAISO sets the flexible ramping constraint relaxation parameter for the new EIM entity's BAA between $0 and $0.01, but only when the power balance or transmission constraints are relaxed in the relevant EIM BAA. This is necessary to allow the market software to determine the marginal energy bid price.

Consistent with the Commission's October 29 Order, the CAISO and the Department of Market Monitoring (DMM) will file informational reports at 30-day intervals during the six-month transition period for any new EIM entity. The CAISO provides this report for SRP to comply with the Commission's requirements in the October 29 Order. The CAISO anticipates filing these reports on a monthly basis. However, because the complete set of data is not available immediately at the end of the applicable month,[2] and depending on the market performance each month, along with the need to coordinate with the EIM entity, the CAISO expects to continue to file the monthly reports approximately 25 days after the end of each month in order to provide the prior full month's data.

[1] *California Indep. Sys. Operator Corp*., 153 FERC ¶ 61,104 (2015) (October 29 Order).

[2] The earliest the CAISO can start gathering the data is 10 business days after the last day for the reporting month since this is when the price correction window expires.

II. Highlights

Overall, SRP's transition into the EIM was smooth and without significant issues. The first month's market performance highlights are as follows:

- Prices were stable and within reasonable ranges, with the monthly average SRP BAA price being $16.77/MWh in the fifteen-minute market (FMM) and $15.91/MWh in the real-time dispatch (RTD).
- Power balance constraint infeasibilities for the under-supply conditions were minimal for the SRP BAA with 0.45 percent of the total intervals in the FMM, and with 0.54 percent of the total intervals in the RTD.
- SRP passed 95.27 percent of its balancing tests and 100 percent of its bid-range capacity tests.
- SRP passed 98.57 percent of its upward flexible ramping sufficiency tests in April.
- The price for upward flexible ramping capacity in the Fifteen Minute Market (FMM) for the SRP BAA averaged at $0.48/MWh, while prices for the downward flexible ramping product were $0.01/MWh.

III. Market Performance Related to the Transitional Period

a. Prices

Figure 1 shows the daily average FMM and RTD prices in the SRP EIM Load Aggregation Point (ELAP) for April 1, 2020 through April 30, 2020. April monthly average price was $16.77/MWh in the FMM and $15.91/MWh in the RTD.

Figure 1: Daily average prices for the SRP BAA

Under the CAISO's price correction authority in Section 35 of the CAISO tariff, the CAISO may correct prices posted on its Open Access Same-Time Information System (OASIS) if it finds: (1) that the prices were the product of an invalid market solution; (2) the market solution produced an invalid price due to data input failures, hardware or software failures; or (3) a result that is inconsistent with the CAISO tariff. The prices presented in Figure 1 include all prices produced by the CAISO consistent with its tariff requirements. That is, the trends represent: (1) prices as produced in the market that the CAISO deemed valid; (2) prices that the CAISO could, and did, correct pursuant to Section 35 of the CAISO tariff; and (3) any prices the CAISO adjusted pursuant to the transition period pricing reflected in Section 29.27 of the CAISO tariff.

b. Frequency of Power Balance Constraint Infeasibilities

Figures 2 and 3 show the frequency of intervals in which the power balance constraint was relaxed for under-supply conditions in the SRP BAA for the FMM and RTD, respectively. The under-supply infeasibilities are classified into three categories: Valid, Corrected and Would-Be-corrected. The Corrected category shows the instances of those under-supply infeasibilities impacted by either data input failures or software failures. The CAISO performed price correction pursuant to Section 35 of the CAISO tariff. The Would-Be-Corrected category shows the instances where there are other under-supply infeasibilities impacted by data input failures or software failures which would be subject to price correction, but were not corrected because the price after correction would be the same price as that obtained by the transition period pricing. The Valid category shows the remaining under-supply infeasibilities, which were deemed to be driven by system conditions. In April 2020, the SRP BAA had under-supply power balance infeasibilities in 0.45 percent of total intervals in FMM and 0.54 percent of total intervals in RTD, respectively.

Figure 2: Frequency of FMM under-supply power balance infeasibilities in the SRP BAA

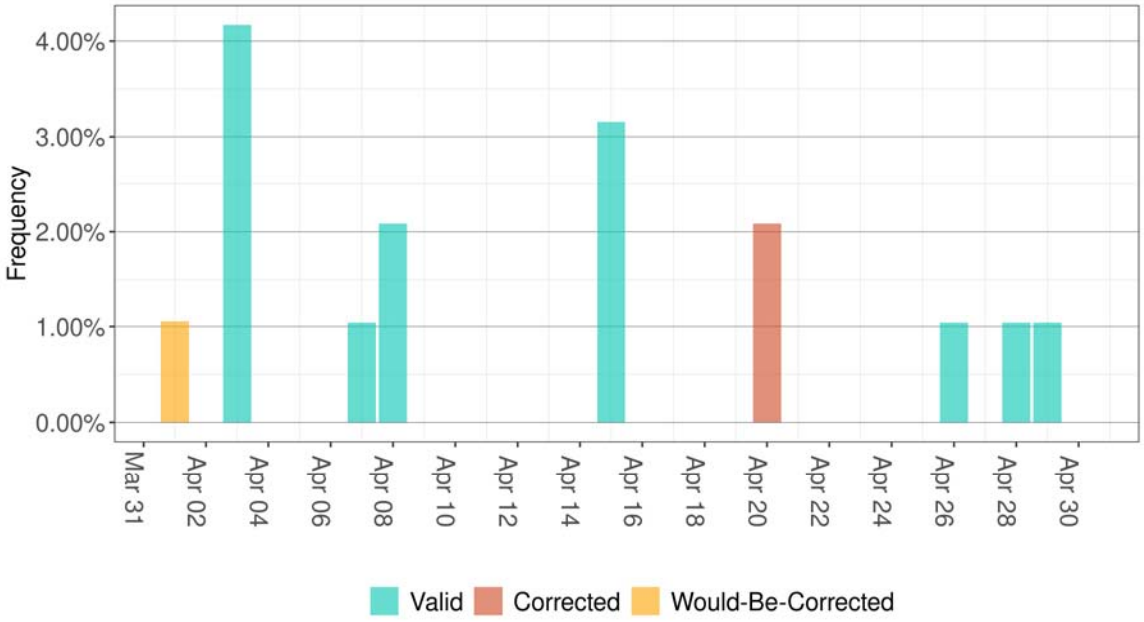
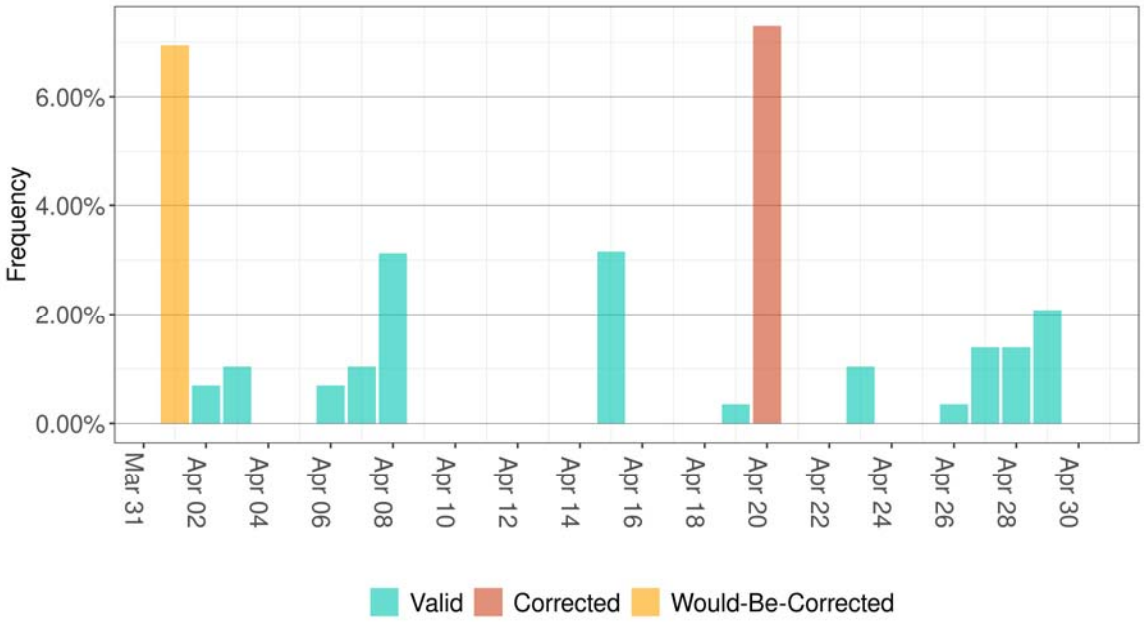


Figure 3: Frequency of RTD under-supply power balance infeasibilities in the SRP BAA



Tables 1 and 2 list the FMM and RTD intervals with under-supply infeasibilities observed in April. There were 13 valid FMM intervals with under-supply power balance infeasibilities and there were 47 valid RTD intervals with under-supply infeasibilities for the month.

Table 1: List of valid FMM under-supply infeasibilities in the SRP BAA

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
3-Apr-20	21	1	78.76
3-Apr-20	21	2	49.75
3-Apr-20	21	3	22.66
3-Apr-20	21	4	2.19
7-Apr-20	22	1	39.55
8-Apr-20	21	1	89.73
8-Apr-20	21	2	53.45
15-Apr-20	1	2	216.00
15-Apr-20	1	3	147.64
15-Apr-20	1	4	100.75
26-Apr-20	22	1	51.00
28-Apr-20	20	1	17.36
29-Apr-20	20	1	0.93

Table 2: List of valid RTD under-supply infeasibilities in the SRP BAA

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
2-Apr-20	17	4	54.03
2-Apr-20	17	5	95.51
3-Apr-20	21	2	8.08
3-Apr-20	21	3	80.05
3-Apr-20	22	3	54.08
6-Apr-20	24	5	62.77
6-Apr-20	24	6	92.72
7-Apr-20	12	12	4.14
7-Apr-20	22	2	36.71
7-Apr-20	22	3	49.17
8-Apr-20	21	1	77.63
8-Apr-20	21	2	108.21
8-Apr-20	21	3	77.68
8-Apr-20	21	4	22.70
8-Apr-20	21	5	5.45
8-Apr-20	21	6	2.85
8-Apr-20	21	7	5.43
8-Apr-20	21	8	12.87
8-Apr-20	21	9	0.26
15-Apr-20	1	4	185.21
15-Apr-20	1	5	206.07
15-Apr-20	1	6	215.17
15-Apr-20	1	7	100.69
15-Apr-20	1	8	127.88
15-Apr-20	1	9	92.71
15-Apr-20	1	10	55.94
15-Apr-20	1	11	33.15
15-Apr-20	1	12	45.25
19-Apr-20	16	2	8.55
23-Apr-20	21	2	11.62
23-Apr-20	23	2	97.13
23-Apr-20	23	3	136.96
26-Apr-20	12	4	24.55
27-Apr-20	12	4	28.93
27-Apr-20	12	7	19.63
27-Apr-20	12	8	24.84

27-Apr-20	12	9	12.14
28-Apr-20	13	4	11.41
28-Apr-20	13	7	27.20
28-Apr-20	13	9	10.65
28-Apr-20	13	10	12.53
29-Apr-20	12	6	41.64
29-Apr-20	12	7	78.36
29-Apr-20	12	8	55.76
29-Apr-20	12	9	13.33
29-Apr-20	14	6	5.95
29-Apr-20	14	7	6.90

In general, there are a number of factors driving changes to either supply or demand that cause under-supply infeasibilities for a BAA in a five-minute RTD interval. The CAISO performed a root cause analysis for all RTD under-supply infeasibilities listed in Table 2 and identified the main driver of each of the infeasibilities. Figure 4 shows the daily count of RTD under-supply infeasibility categorized into various reasons. The top three reasons identified for under-supply infeasibilities are Resource Economics, Resource Set-Up, and Load Changes. Resource Economics refers to those RTD under-supply infeasibilities in intervals where SRP resources were operating below base schedules; and at the same time, either EIM transfers were limited or there was a cap on EIM transfers because there were also flexible ramp-up test failures. As result, the loss of generation capacity caused by the resource operating below the base schedule could not be counter-balanced by import EIM Transfers. In these intervals, a Multi-Stage Generator (MSG) resource would operate below the base schedules because it was transitioned below its base schedules by the FMM. After the resource is transitioned down, the system conditions change but the resource cannot be transitioned back to the upper configuration because of its inter-temporal constraints like minimum uptime, minimum downtime, or transition times. Even though SRP has enough capacity on its MSG resource, the resource is operating below base schedule and cannot meet the five-minute imbalance energy requirements, resulting in under-supply infeasibility.

The SRP BAA uses a third party optimization tool to submit its hourly base schedules. For some market intervals, an MSG resource had zero base schedule to reserve non-spin capacity. With this set-up, the market application had to turn off the resource in order to preserve non-spin capacity, at the same time, SRP had failed the flex ramp sufficiency test and there was no additional capacity in the BAA available to the market application. This resulted in an under-supply infeasibility. However, the resource did not shut down and was online for the entire hour. These intervals are shown as Resource Set-up in

Figure 4 and they are part of SRP's fine-tuning processes during the first days of operations in the market.

Another condition of Resource Set-Up that led to under-supply was misalignment of energy bids and resource plan. The MSG resources were committed one hour earlier by the market relative to expected resource start-up. As a result, when the market was dispatching the resources at the upper limit of transitioned configuration the resources were still in transition. This condition along with limited import EIM transfers resulted in undersupply.

The Load Change category depicts the infeasibilities in intervals in which the five-minute RTD requirement increased above the FMM load forecast such that the SRP BAA was short of the ramp-up to meet the increase in requirement. These infeasibilities usually last for two or three five-minute RTD intervals until the resources are able to ramp-up to meet the imbalance requirement.

Figure 4: Count of RTD under-supply power balance infeasibilities in the SRP BAA categorized by reasons

c. Balancing and Sufficiency Test Failures

The EIM provides an opportunity to various BAAs to serve its load while realizing the benefits of increased resource diversity. Since the EIM does not include resource adequacy requirements or obligations for resources to submit bids, the CAISO performs a series of resource sufficiency tests comprised of: (i) a balancing test; (ii) a capacity test; and (iii) a flexible ramping sufficiency test. These tests occur prior to the real-time market.

Performance of a balancing test before each trading hour ensures that each participating BAA submits a balanced base schedule of generation and a net schedule interchange to meet its demand. In addition, the participating BAA is required to submit bids with enough ramping capability to meet its net load

forecast uncertainty and net load movement requirements. Figure 5 shows the trend of balancing test outcomes for the period of April 1, 2020, through April 30, 2020, and Figure 6 shows the pattern of bid-range capacity test outcomes for the period of April 1, 2020, through April 30, 2020.[3] If data input or software failures affect a balancing test or the bid-range capacity test, the affected test results are shown as correctable events.

The SRP BAA passed the balancing test in 95.27 percent of the intervals in April, which is within the acceptable range of balancing test failures. There were three main reasons identified for SRP BAA balancing test failures. First, the CAISO market applications performs balancing tests three times before the trading hour at the following intervals: 75 minutes before the trading hour, 55 minutes before the trading hour, and 40 minutes before the trading hour. The balancing tests performed at 75 minutes and 55 minutes before the trading hour are advisory results and provide EIM operators an opportunity to adjust the resource base schedules to pass the final balancing tests performed 40 minutes before the trading hour. Several instances of balancing test failures were identified as learning opportunities for the EIM operators to improve the process of analyzing the advisory balancing test results before adjusting base schedules for the final test performed 40 minutes before the trading hour.

Figure 5: Frequency of Balancing test failures in the SRP BAA.

Second, for some hours, the SRP BAA failed the balancing test due to a manual dispatch that was limiting the total output from that resource. This

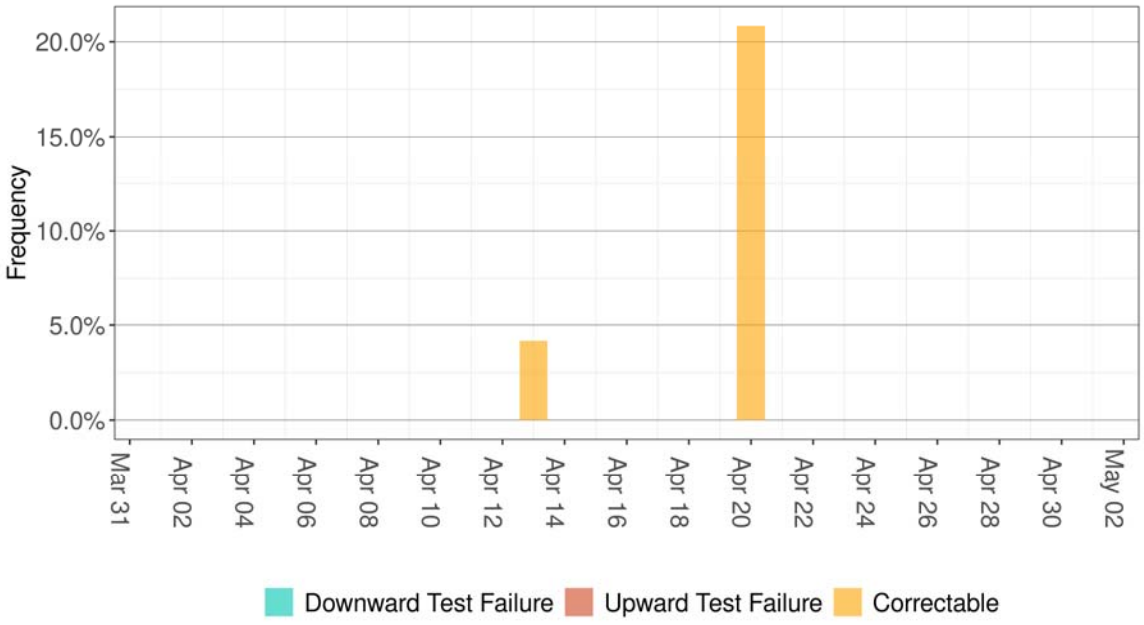
[3] The CAISO performs resource sufficiency tests pursuant to Section 29.34(k) of the CAISO tariff.

manual dispatch was effectively reducing the total base scheduled generation that was used to balance against the hourly demand.

Lastly, the SRP BAA uses a software application to submit base schedules; software issues affecting this application resulted in some balancing test failures.

The SRP BAA passed the bid-range capacity test in all intervals. On April 13, SRP appeared to fail the bid-range capacity test due to a missing load forecast in the CAISO's Real-Time Balancing Test (RTBS) application. The lack of load forecast resulted in an unusually high requirement for the downward bid capacity. Since a data input failure affected the capacity test, it is shown as a correctable event in Figure 5. For all trade hours, EIM BAAs must submit hourly base schedules, energy bids, and hourly transaction data to participate in the market. Most EIM BAAs use a software application to provide this data to the CAISO. On April 20, 2020, the SRP BAA had a software failure, which limited their ability to submit this information to the CAISO systems. According to Section 35 of the CAISO tariff, all intervals affected by data input failures are evaluated for a price correction. Consequently, all bid-range capacity test failures for April 20, 2020 are classified as corrected in Figure 6.

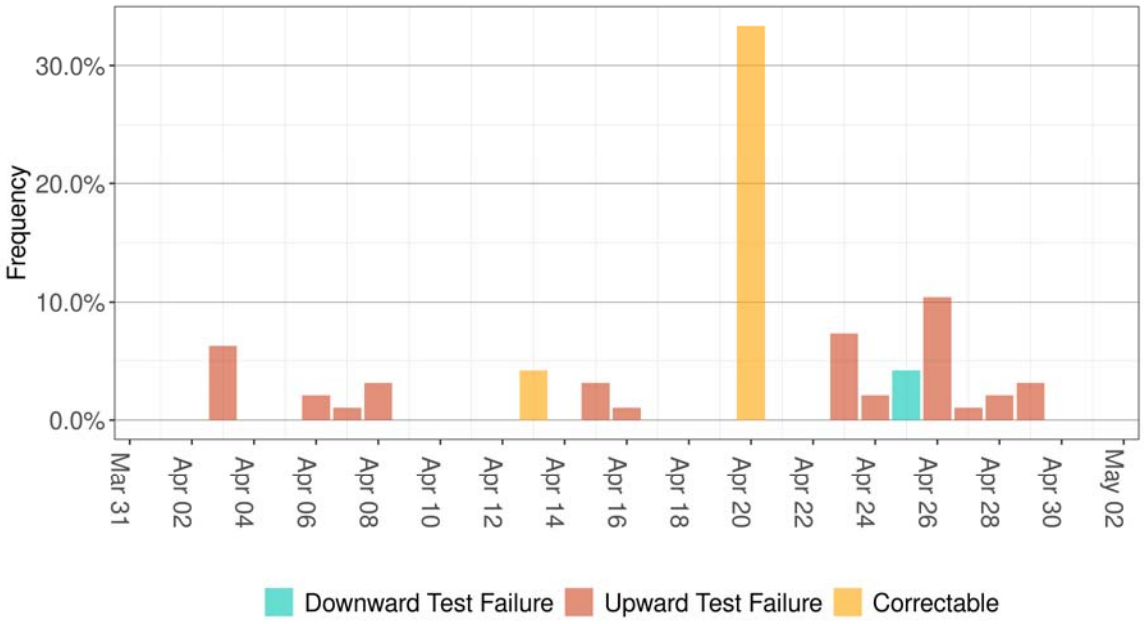
Figure 6: Frequency of Bid Range Capacity test failures in the SRP BAA.



The CAISO also performs the flexible ramping sufficiency test as specified in Section 29.34(m) of the CAISO tariff. Figure 7 shows the trend of the test failures for flexible ramping for the period of April 1 through April 30. The SRP BAA passed the flexible ramp up test in 98.57 percent of the intervals in April and

passed the flexible ramp down test in 99.86 percent of the intervals in April. When a BAA fails the bid-range capacity test in either up or down direction, it automatically fails the flexible ramp sufficiency test for that interval in the same direction. Since on April 13, 2020 and April 20, 2020, the SRP BAA failed the bid-range capacity test due to data input failures, these instances were classified as correctable on Figure 6. Similarly, the flex ramp test failures impacted by these data input failures are shown as correctable events on Figure 7.

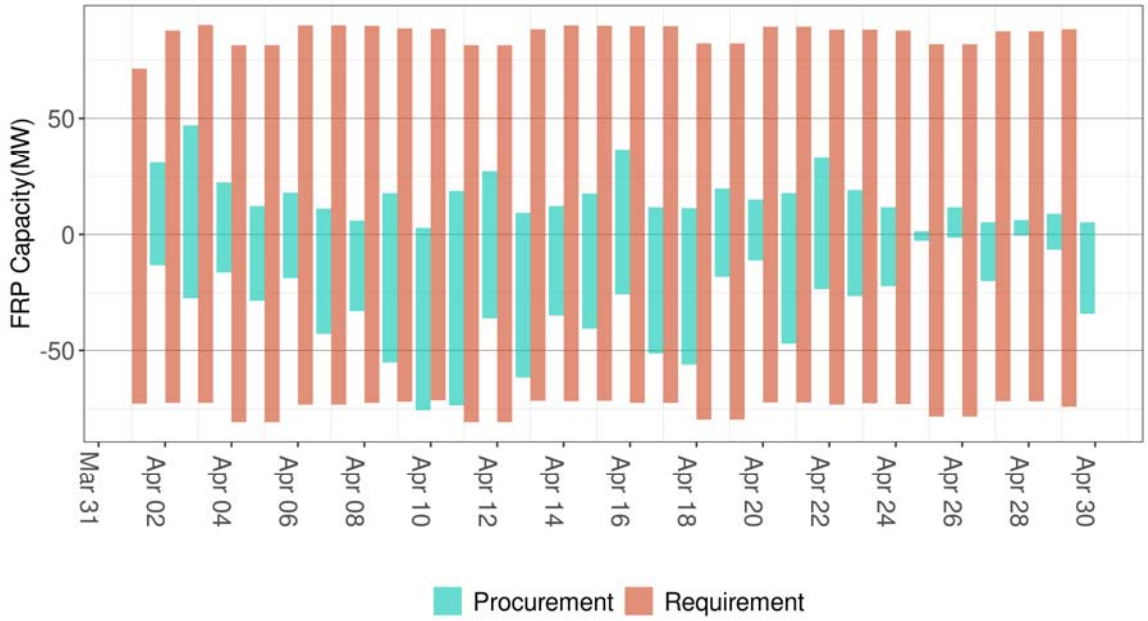
Figure 7: Frequency of flexible ramping sufficiency test failures in the SRP BAA.



d. Flexible Ramping Product

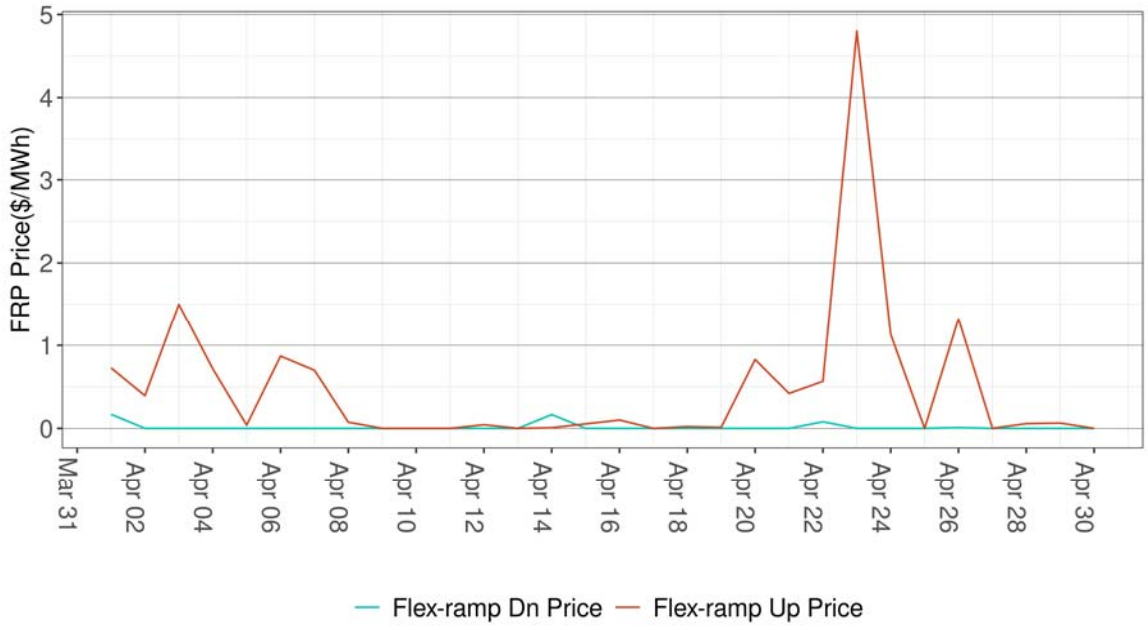
Figure 8 shows the daily average of the upward and downward flexible ramping constraint requirement and procurement in the FMM. Figure 9 shows the daily average of the upward and downward flexible ramping constraint prices in the FMM. With the implementation of the flexible ramping product on November 1, 2016, calculation of the requirement consists of historical data for uncertainty with any applicable net import/export capability or credit. This effectively reduces the amount of flexible ramping the SRP BAA has to procure and, generally, the EIM system-wide area (which includes all the BAAs in the EIM, including the CAISO BAA) will drive the requirements. The market clearing process may result in procuring the SRP BAA capacity towards meeting the overall EIM-system-wide area requirement. This is the main reason why the individual SRP procurement may generally fall below or be above the individual SRP flex ramp requirement. For most of the days, the SRP BAA FRP procurement was below the FRP requirement.

Figure 8: Daily Average requirement, procurement, and price of upward flexible ramping in the FMM in the SRP BAA.



In addition, the price trend provided in Figure 9 is the nested price determined by the summation of the shadow price of the individual SRP BAA plus the shadow price of the EIM system-wide area. In April, the average upward flexible ramping capacity price was $0.48/MWh and the average downward flexible ramping capacity price was $0.01/MWh.

Figure 9: Daily Average requirement, procurement, and price of downward flexible ramping in the FMM in the SRP BAA



CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service list in the above-referenced proceeding, 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 10th day of June 2020.

/s/ Anna Pascuzzo

Anna Pascuzzo