



June 25, 2021

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-____
May 2021 Informational Report
Energy Imbalance Market – Transition Period Report –
Turlock Irrigation District EIM Entity**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period of Turlock Irrigation District EIM Entity during its first six months of participation in the Energy Imbalance Market (EIM) for May 2021. 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: /s/ John Anders

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California ISO

Energy Imbalance Market

May 1 – May 31, 2021

Transition Period Report

Turlock Irrigation District (TIDC) EIM Entity

June 25, 2021

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 Turlock Irrigation District (TIDC), the prospective EIM Entity entered the EIM on March 25, 2021, and the transition period will apply to the TIDC balancing authority area (BAA) until September 30, 2021.

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 TIDC 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, TIDC's market operation in the second month of the transition period was smooth and without significant consequence. The second month's market performance highlights are as follows:

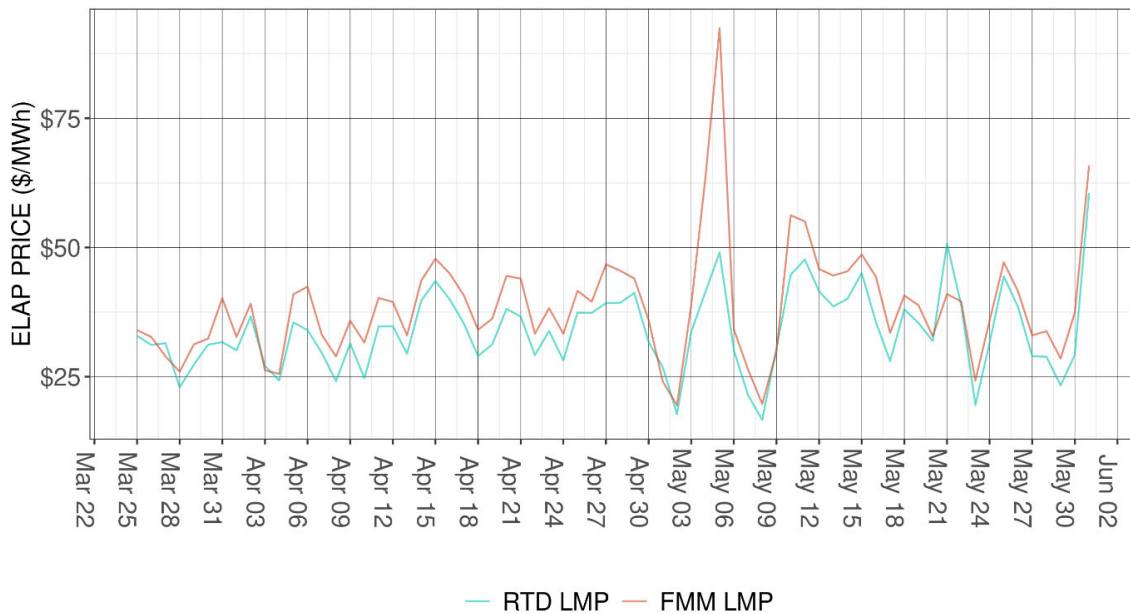
- Prices have been stable and within reasonable ranges, with a monthly average price of \$40.71/MWh in the fifteen-minute market (FMM) and \$35.11/MWh in the real-time dispatch (RTD).
- Power balance constraint infeasibilities for under-supply conditions were minimal for the TIDC BAA with no infeasibilities in the fifteen-minute market and 14 intervals in the five-minute market.
- As part of the resource sufficiency test performed for each EIM entity prior to the real-time markets, TIDC successfully passed over 99.46 percent of its balancing tests and 99.70 percent of its bid-range capacity tests.
- Also as part of the resource sufficiency test, TIDC passed successfully 99.66 percent of its upward flexible ramping sufficiency tests and 99.40 percent of downward flexible ramping sufficiency tests.
- The price for upward flexible ramping capacity in the FMM for the TIDC BAA averaged at \$0.39/MWh in May, while the average price for the downward flexible ramping product was \$0.08/MWh.

III. Market Performance Related to the Transitional Period

a. Prices

Figure 1 shows the daily average Fifteen-Minute Market (FMM) and Real-Time Dispatch (RTD) prices in the TIDC EIM Load Aggregation Point (ELAP) for March 25, 2021 through May 31, 2021. The average price for this period in the FMM was \$40.71/MWh and \$35.11/MWh in the RTD.

Figure 1: Daily average prices for the TIDC 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 TIDC BAA for the FMM and the RTD, respectively. The under-supply infeasibilities are classified into three categories: Valid, Corrected and Would-Be-Corrected. Some of the under-supply infeasibilities affected by either data input failures or software failures were corrected under the price correction authority in Section 35 of the CAISO tariff are classified as Corrected. There are other under-supply infeasibilities that were impacted by data input failures or software failures, and 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. These instances are classified as Would-be-Corrected. All remaining under-supply infeasibilities driven by system conditions are classified as Valid.

Between May 1, 2021 and May 31 2021, the TIDC BAA had no valid under-supply power balance infeasibilities for FMM and 14 valid under supply infeasibilities in the RTD.

Figure 2: Frequency of FMM under-supply infeasibilities in the TIDC BAA

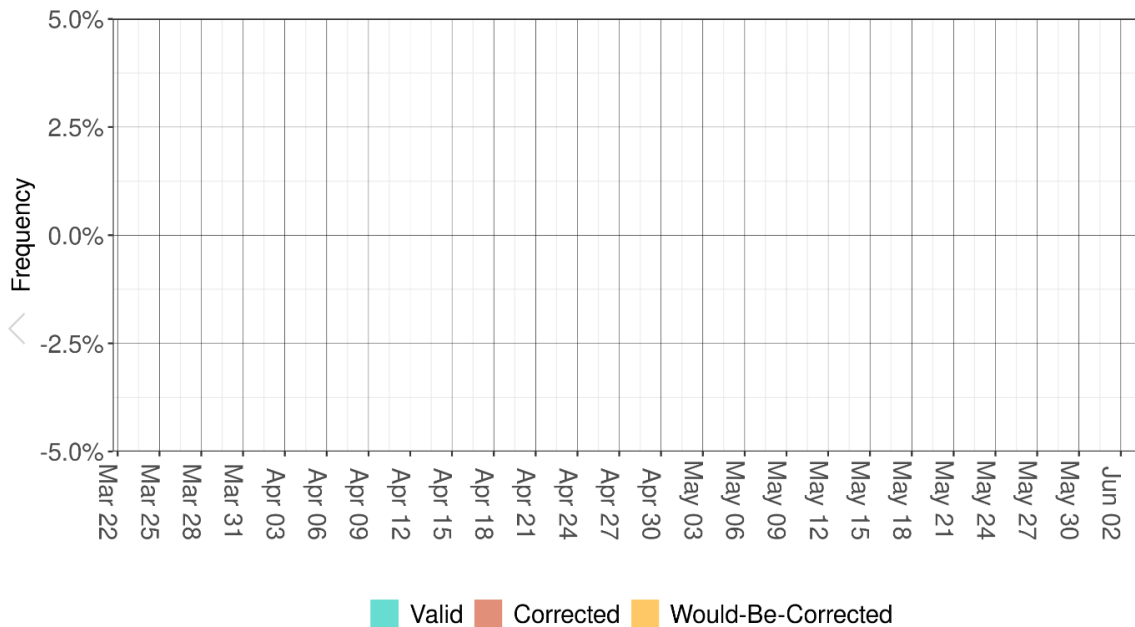
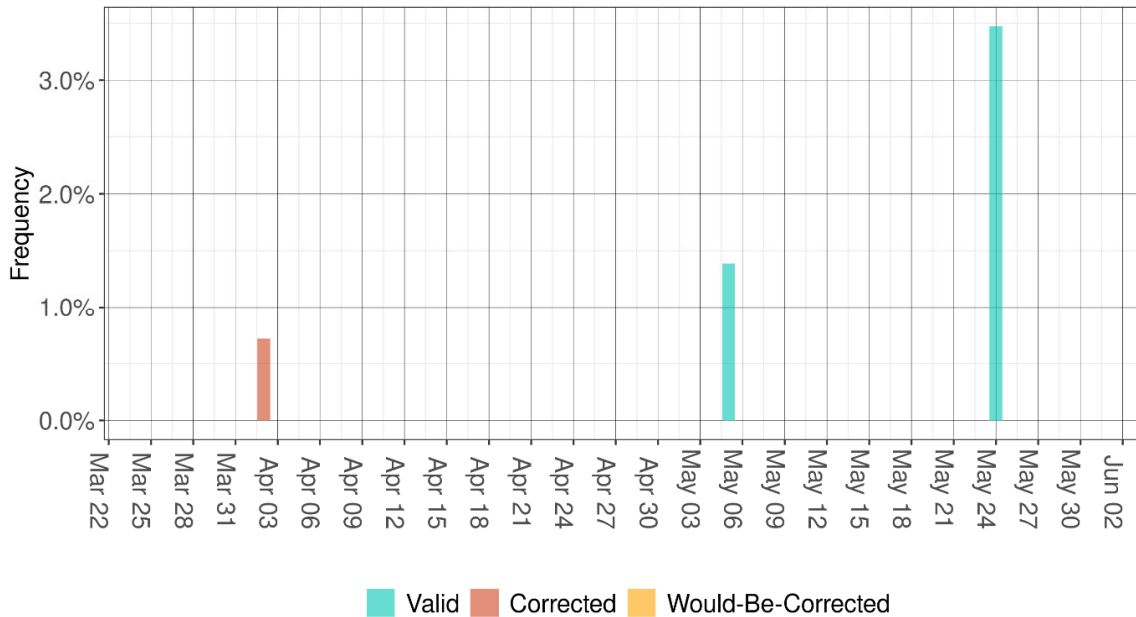


Figure 3: Frequency of RTD under-supply infeasibilities in the TIDC BAA



Tables 1 and 2 list the valid FMM and RTD intervals with infeasibilities observed in May, including the amount of load conformance. There were no valid under-supply power balance infeasibilities in FMM and 14 intervals in RTD with valid under-supply infeasibilities between May 1, 2021 and May 31, 2021. There were two sets of under-supply infeasibilities on May 5, 2021, first in the hour ending 19 and second in the hour ending 21. The RTD under-supply infeasibilities on May 5, 2021, in the hour ending 19, is driven by higher demand forecast in RTD than the hourly demand forecast and limited ramp capacity from generators in TID BAA. The BAA EIM import transfer capacity was limited because it failed the bid range up capacity test for the first fifteen-minute interval in the hour ending 19. Similarly, the root cause of RTD under-supply infeasibility in the hour ending 21 was a higher RTD demand forecast than the hourly demand forecast and limited import EIM transfer capacity. For hour ending 21, the TIDC BAA failed the flexible ramp-up sufficiency test for the first three fifteen-minute intervals of the hour. On May 24, 2021, there were ten valid under-supply infeasibilities in RTD in hours ending 18 and 19 because a multi-stage generator was slow to follow its transition instructions from 1X1 to 2X1 configuration. At the same time, there was limited ramp capacity from internal generating units and limited import EIM transfer capacity.

Table 1: List of valid FMM under-supply infeasibilities in the TIDC balancing authority area

Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance

Table 2: List of valid RTD under-supply infeasibilities in the TIDC balancing authority area

Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
05-05-2021	19	2	0.41	0
05-05-2021	19	3	3.57	0
05-05-2021	21	2	3.05	0
05-05-2021	21	3	5.81	0
05-24-2021	18	4	3.63	0
05-24-2021	18	5	4.2	0
05-24-2021	18	6	5.48	0
05-24-2021	18	7	5.96	0
05-24-2021	18	8	6.92	0
05-24-2021	18	9	7.46	0
05-24-2021	18	10	2.98	0
05-24-2021	18	11	4.16	0
05-24-2021	18	12	6.6	0
05-24-2021	19	2	0.97	0

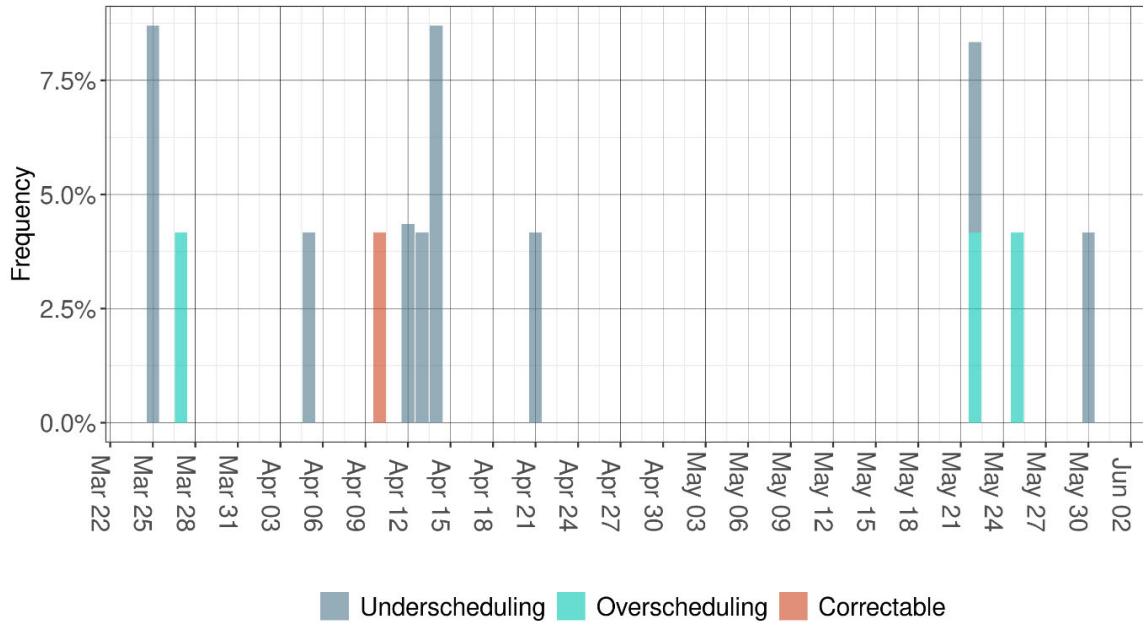
c. Balancing and Sufficiency Test Failures

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 4 shows the trend of balancing test outcomes for the period of March 25, 2021, through May 31, 2021, and Figure 5 shows the pattern of bid-range capacity test outcomes for

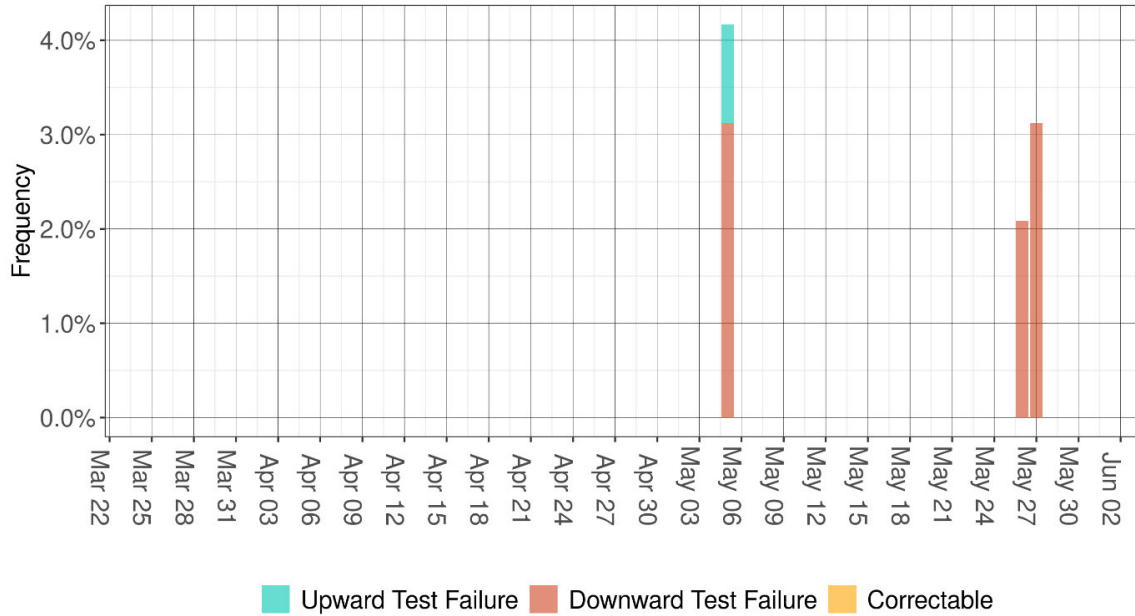
the period of March 25, 2021, through May 31, 2021.³ If a balancing test or the bid-range capacity test is affected by data input failures or a software failures, those test results are shown as correctable events. The TIDC BAA passed the balancing test in 99.46 percent of the intervals in May, which is within the acceptable range of balancing test failures. The TIDC BAA passed the bid-range capacity test in 99.7 percent of the intervals, which is within the acceptable range of bid-range capacity test failures. The TIDC failed the bid range up capacity on May 5 due to fifteen-minute demand forecast coming in higher than the hourly forecast and there was not enough bid range capacity from participating units in TIDC to meet the incremental bid-range capacity requirement.

Figure 4: Frequency of Balancing test failures in the TIDC BAA



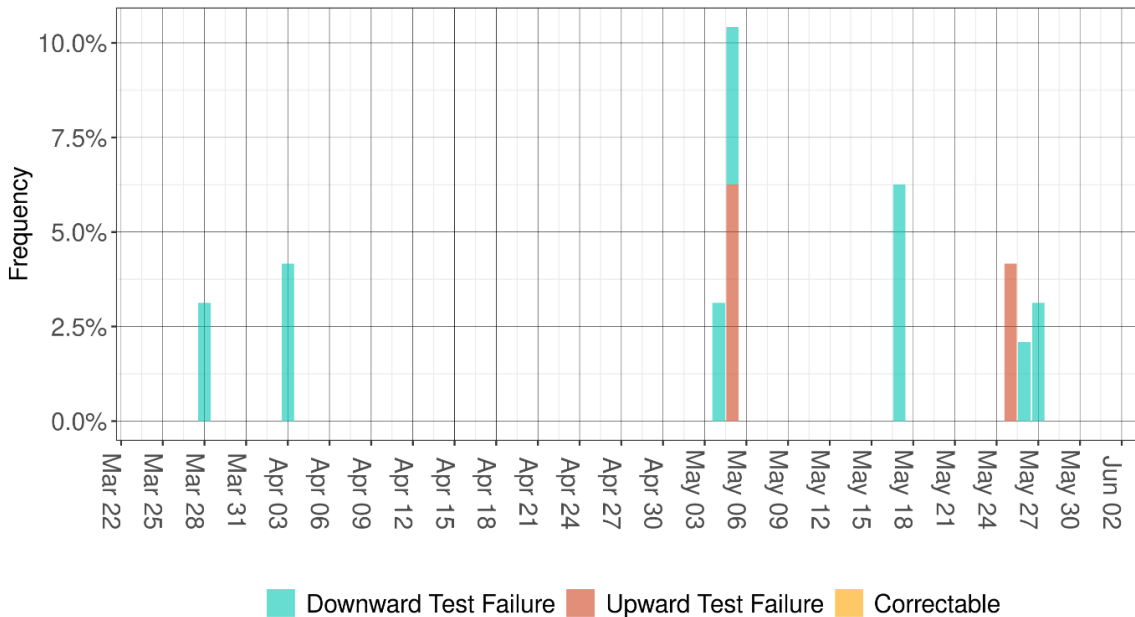
³ The CAISO performs resource sufficiency tests pursuant to Section 29.34(k) of the CAISO tariff.

Figure 5: Frequency of Bid Range Capacity test failures in the TIDC BAA



The CAISO also performs the flexible ramping sufficiency test as specified in Section 29.34(m) of the CAISO tariff. Figure 6 shows the trend of the test failures for flexible ramping for the period of March 25 through May 31. The TIDC BAA passed the flexible ramp up test in 99.66 percent of the intervals in May and passed the flexible ramp down test in 99.40 percent of the intervals.

Figure 6: Frequency of flexible ramping sufficiency test failures in the TIDC BAA



d. Flexible Ramping Product

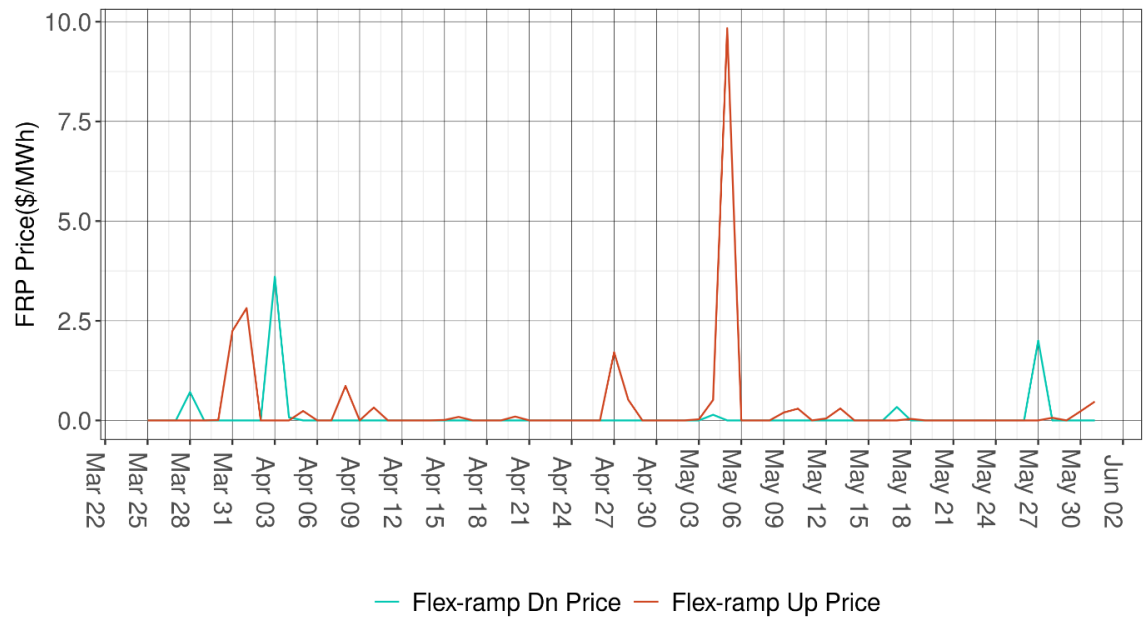
Figure 7 shows the daily average of the upward and downward flexible ramping constraint requirement and procurement in the FMM. Figure 8 shows the daily average of the upward and downward flexible ramping constraint prices in the FMM. With the implementation of the flexible ramping product on November 1, 2016, calculation of the requirements consists of historical data for uncertainty with any applicable net import/export capability or credit. This effectively reduces the amount of flexible ramping the TIDC 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 TIDC BAA capacity towards meeting the overall EIM-system-wide area requirement. This is the main reason why the individual TIDC procurement may generally fall below or be above the individual TIDC flex ramp requirement. For most of the time, the flexible ramping up procurement was below the area requirements

Figure 7: Daily Average requirement and procurement of upward and downward flexible ramping in the FMM for the TIDC BAA



The price trend provided in Figure 8 is the nested price determined by the summation of the shadow price of the individual TIDC BAA plus the shadow price of the EIM system-wide area. Between May 1, 2021 and May 31, 2021, the average FMM upward flexible ramping capacity price was \$0.39/MWh and the average downward flexible ramping capacity price was \$0.08/MWh.

Figure 8: Daily Average flexible ramping up and down price in FMM for the TIDC 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 25th day of June 2021.

/s/ Anna Pascuzzo
Anna Pascuzzo