



July 9, 2019

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 2019 Informational Report
Energy Imbalance Market – Transition Period Report – Balancing
Authority of Northern California/Sacramento Municipal Utility District**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period for the Balancing Authority of Northern California/Sacramento Municipal Utility District EIM Entity during its first six months of participation in the western Energy Imbalance Market (EIM) for May 2019. 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/ Anna A. McKenna

Roger E. Collanton
General Counsel
Anna A. McKenna
Assistant General Counsel
John Anders
Assistant General Counsel
California Independent System
Operator Corporation
250 Outcropping Way
Folsom, CA 95630
Tel: (916) 608-7182
Fax: (916) 608-7222
amckenna@caiso.com



California ISO

**Energy Imbalance Market
May 1 – May 31, 2019**

**Transition Period Report
BANC-SMUD EIM Entity**

July 9, 2019

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 Sacramento Municipal Utility District (SMUD), which is part of the Balancing Authority of Northern California (BANC), began participating in the EIM on April 3, 2019, and the transition period will apply to the BANC-SMUD balancing authority area (BAA) until October 3, 2019.

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 BANC-SMUD 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 *Cal. 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, BANC-SMUD's second month of participation in the EIM was uneventful. The second month's market performance highlights are as follows:

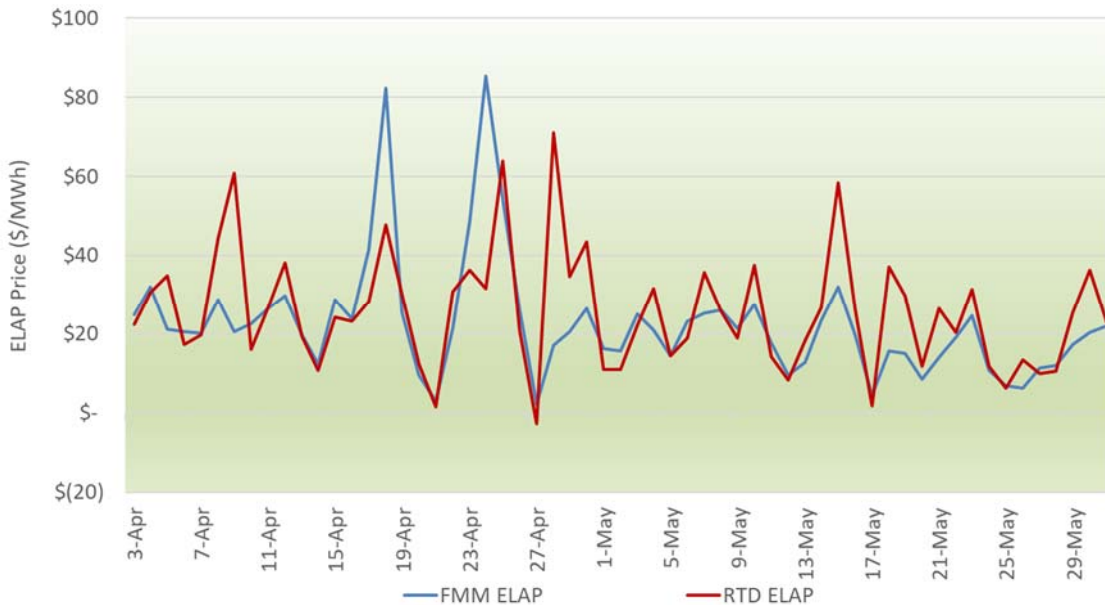
- In May, prices were stable and within reasonable ranges, with the monthly average BANC-SMUD BAA prices being \$17.41/MWh in the fifteen-minute market (FMM) and \$21.75/MWh in the real-time dispatch (RTD).
- Power balance constraint infeasibilities for the under-supply conditions were minimal for the BANC-SMUD BAA with 0.37 percent of the total intervals in the FMM, and with 0.38 percent of the total intervals in the RTD.
- As part of the resource sufficiency test performed for each EIM entity prior to the real-time markets, BANC-SMUD successfully passed over 99.33 percent of its balancing tests in May.
- Also as part of the resource sufficiency test, BANC-SMUD successfully passed over 99.60 percent of its upward flexible ramping sufficiency tests in May.
- The price for upward flexible ramping capacity in the FMM for the BANC-SMUD BAA averaged \$0.58/MWh in May, while prices for the downward flexible ramping product were \$0.22/MWh.

III. Market Performance Related to the Transitional Period

a. Prices

Figure 1 shows the average prices in the BANC-SMUD EIM Load Aggregation Point (ELAP) for the period of April 3, 2019 through May 31, 2019. The monthly average BANC-SMUD ELAP price for the month of May was \$17.41/MWh in the FMM and \$21.75/MWh in the RTD. On May 15, 2019, the daily average price was \$31.97/MWh in the FMM and \$58.34/MWh in the RTD. The daily average prices for May 15, 2019 were the highest observed for the month. The system experienced congestion and transmission constraints because of a planned transmission outage that caused the CAISO controlled grid to operate at its limits. These constraints were the primary contributing factor to the high prices.

Figure 1: Daily average prices for the BANC-SMUD 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 BANC-SMUD BAA for the FMM and RTD, respectively.

The under-supply infeasibilities are categorized into “valid” and “correctable” instances. Prices for the intervals that fell into the “valid” category are instances with under-supply infeasibilities that were not in error and were subject to the transitional period pricing. The infeasibilities that fell into the “correctable” category had a correction based on the provisions of Section 35 of the CAISO tariff due to either a software or a data error.

Figure 2: Frequency of FMM under-supply power balance infeasibilities in the BANC-SMUD BAA.

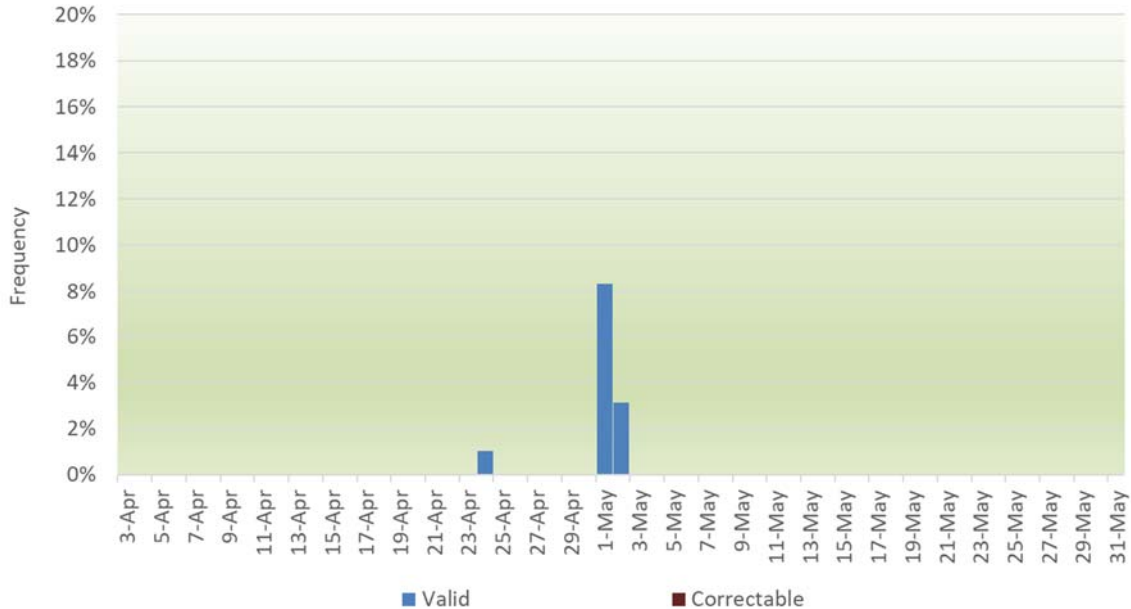
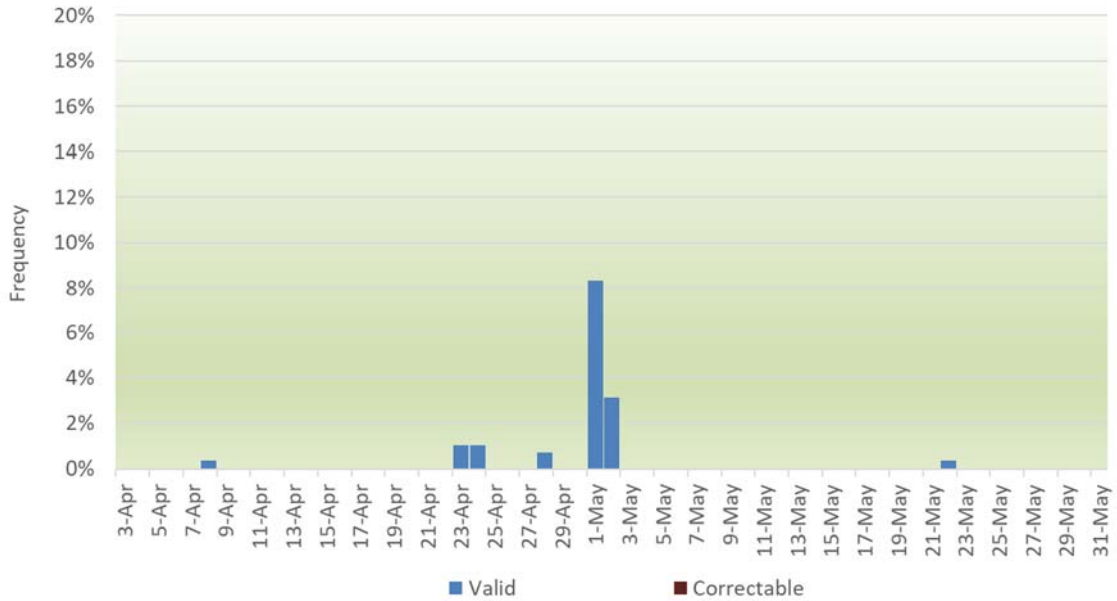


Figure 3: Frequency of RTD under-supply power balance in feasibilities in the BANC-SMUD BAA.



In the BANC-SMUD BAA, there were 11 under-supply infeasibilities in the FMM, and there were 34 valid under-supply infeasibilities in the RTD. Tables 1 and 2 list the FMM and RTD intervals with infeasibilities observed in May, respectively.

Table 1: List of valid FMM under-supply infeasibilities in the BANC-SMUD BAA.

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
1-May-19	9	1	64.99
1-May-19	9	2	61.04
1-May-19	9	3	53.46
1-May-19	9	4	29.51
1-May-19	10	1	40.98
1-May-19	10	2	45.36
1-May-19	10	3	47.29
1-May-19	10	4	57.87
2-May-19	9	1	72.01
2-May-19	9	2	88.38
2-May-19	9	3	83.17

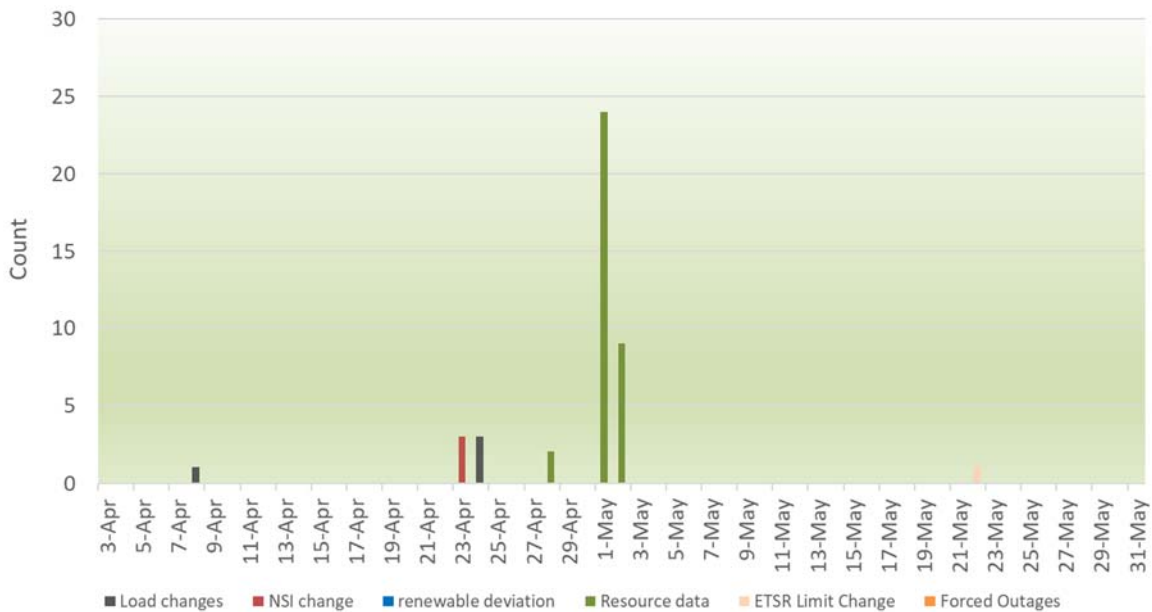
Table 2: List of valid RTD under-supply infeasibilities in the BANC-SMUD BAA.

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
1-May-19	9	1	113.66
1-May-19	9	2	107.1
1-May-19	9	3	74.43
1-May-19	9	4	43
1-May-19	9	5	40.31
1-May-19	9	6	36.32
1-May-19	9	7	37.47
1-May-19	9	8	35.42
1-May-19	9	9	33.71
1-May-19	9	10	35.67
1-May-19	9	11	33.23
1-May-19	9	12	33.53
1-May-19	10	1	55.5
1-May-19	10	2	53.09
1-May-19	10	3	38.91
1-May-19	10	4	54.41
1-May-19	10	5	51
1-May-19	10	6	48.79
1-May-19	10	7	44.64
1-May-19	10	8	65.92
1-May-19	10	9	63.66
1-May-19	10	10	65.71
1-May-19	10	11	69.5
1-May-19	10	12	69.74
2-May-19	9	1	46.28
2-May-19	9	2	40.7
2-May-19	9	3	96.05
2-May-19	9	4	92.18
2-May-19	9	5	90.91
2-May-19	9	6	89.68
2-May-19	9	7	84.26
2-May-19	9	8	83.74
2-May-19	9	9	40.83
22-May-19	24	5	23.4

Figure 4 displays the frequency of RTD under-supply power balance infeasibilities by reason for the BANC-SMUC BAA for the period of April 3 through May 31, 2019. In May, there were 34 under-supply power balance infeasibilities in the RTD. All but one of these instances were driven by resource data, and the one interval was impacted by a change in the Energy Transfer System Resource limit.

The intervals captured under “resource data” were impacted by the base schedule set-up for a generating resource in the BANC-SMUD BAA. For these intervals, a Multi-Stage Generating (MSG) resource was expected to operate in configuration 2, which was in accordance with its base schedule, however, the resource was operating in a lower configuration because it had not completed its transition from configuration 1. The BANC-SMUD BAA lost 100 MW of energy from this resource. Concurrently, the BANC-SMUD BAA had failed the flexible ramping sufficiency test so that it could no longer rely on import EIM transfer to meet demand. This resulted in an under-supply power balance infeasibility for the BANC-SMUD BAA. Additionally, at mid-night on May 23, 2019, the CAISO upgraded its full network model database. It is a common practice to lock EIM transfers during full network model upgrades, the CAISO operator locked the EIM transfers for all of the BAAs in the EIM footprint. Prior to locking the EIM transfers, the BANC-SMUD BAA had 90 MWs of import of EIM transfers, which were lost due to the EIM transfer lockdown. The resources within the BANC-SMUD BAA didn’t have enough ramping capacity to meet this loss of transfers, which drove the under-supply power balance infeasibility.

Figure 4: Count of RTD under-supply power balance infeasibilities by reason.



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.³ These tests occur prior to the real-time market.

Performance of a balancing test prior to each trading hour ensures that each BAA participating in the EIM submits a balanced base schedule of generation and a net schedule interchange to meet its demand.⁴ In addition, the BAA participating in the EIM is required to submit bids with enough ramping capability to meet its net load forecast uncertainty and its net load movement requirements.

Figure 5: Frequency of Balancing test failures in the BANC-SMUD BAA.

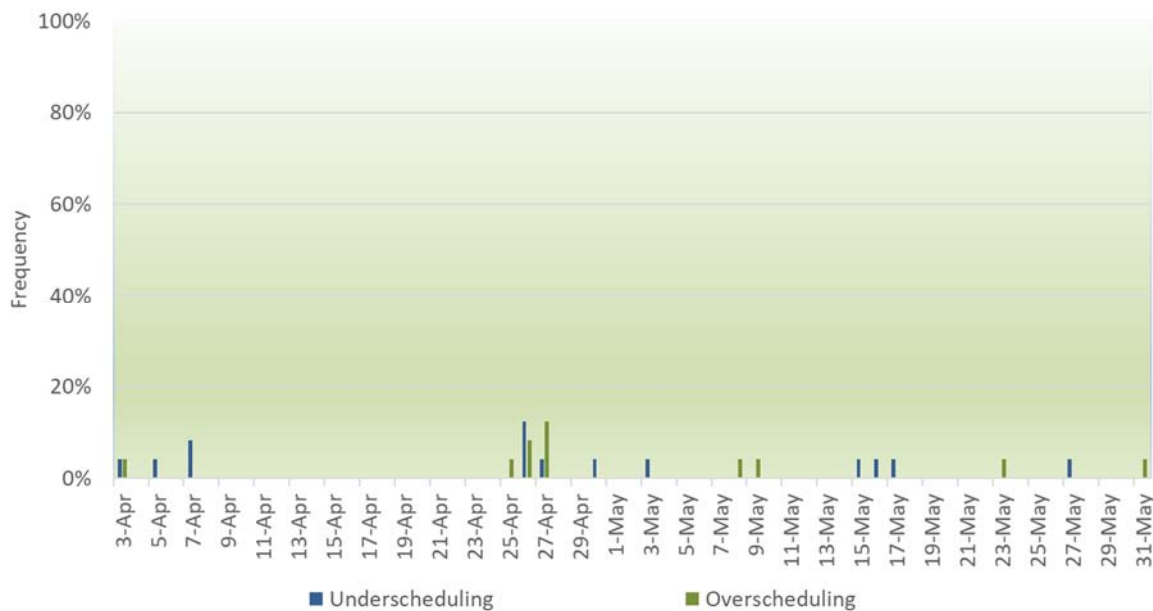


Figure 5 shows the trend of balancing test outcomes for the period of April 3, 2019, through May 31, 2019. During this period, the BANC-SMUD BAA passed the balancing test in 99.33 percent of the intervals. The frequency of these failures is within expected performance tolerances for balancing tests.

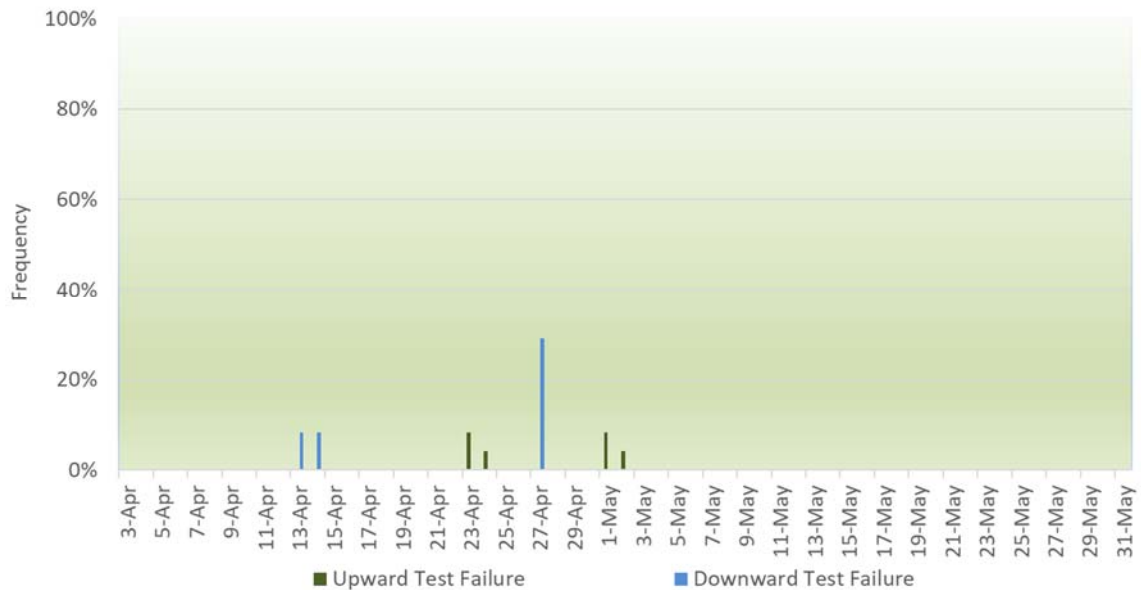
The CAISO also performs the flexible ramping sufficiency test as specified in Section 29.34(m) of the CAISO tariff. Figure 6 shows the trend of the test failures for flexible ramping for the period of April 3, 2019, through May 31, 2019. During this period, the BANC-SMUD BAA passed the upward flexible ramping

³ The CAISO performs these resource sufficiency tests pursuant to Sections 29.34(j), 29.34(l), and 29.34(m) of the CAISO tariff.

⁴ The CAISO performs the balancing tests pursuant to Section 29.34(j) of the CAISO tariff.

test in 99.60 percent of the intervals, and it passed the downward flexible ramping test in 100 percent of the intervals.

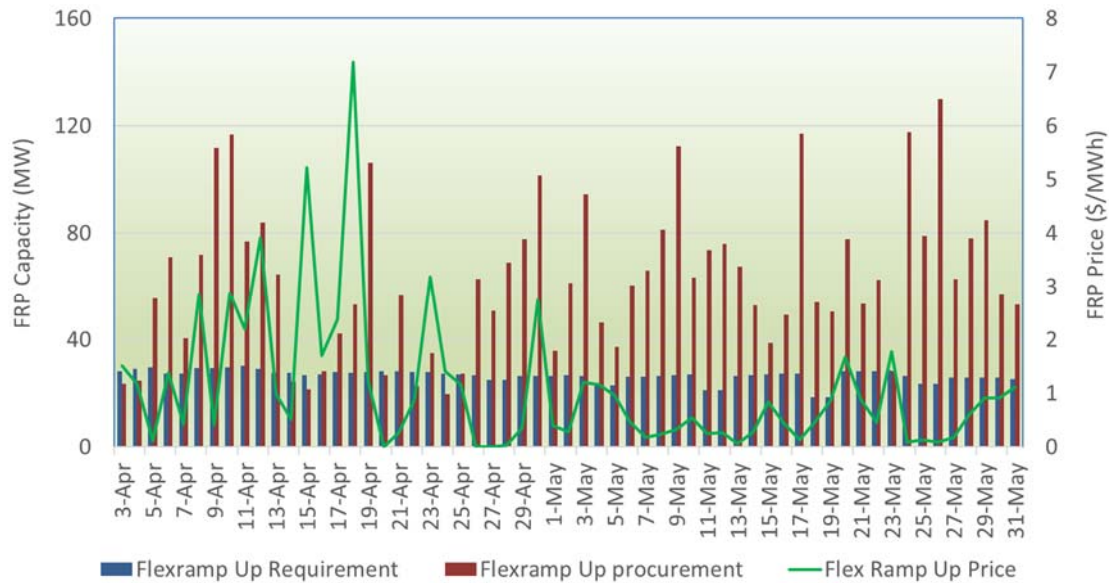
Figure 6: Frequency of flexible ramping sufficiency test failures in the BANC-SMUD BAA.



d. Flexible Ramping Product

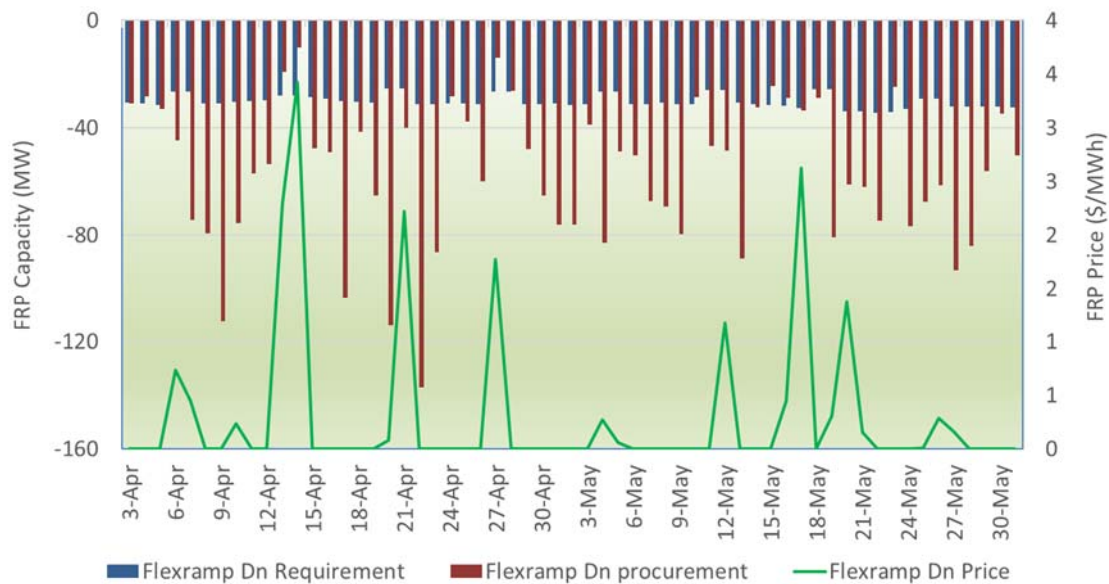
Figure 7 shows the daily average of the upward flexible ramping constraint requirement, procurement, and prices in the FMM for the period of April 3, 2019, through May 31, 2019. Figure 8 shows the daily average of the downward flexible ramping constraint requirement, procurement, and prices in the FMM during this same period. If an EIM BAA passes the flexible ramping sufficiency test, then it may rely on its net import/export capability to meet its flexible ramping requirement. At the same time, the entire EIM area footprint must procure enough flexible ramping capability to meet the footprint requirement, which takes into account the diversity benefit of all the BAA’s combined together as one area. The market clearing process may result in procuring the BANC-SMUD BAA capacity towards meeting the overall EIM footprint requirement. This is the main reason why the individual BANC-SMUD BAA procurement may generally fall below or be above the individual BANC-SMUD BAA flexible ramping requirement.

Figure 7: Daily Average requirement, procurement, and price of upward flexible ramping in the FMM in the BANC-SMUD BAA.



In addition, the price trends provided in Figures 7 and 8 are the nested price determined by the summation of the shadow price individually for the BANC-SMUD BAA, plus the shadow price of the entire EIM footprint.

Figure 8: Daily Average requirement, procurement, and price of downward flexible ramping in the FMM in the BANC-SMUD BAA.



For the month of May, the average upward flexible ramping capacity price was \$0.58/MWh and the average downward flexible ramping capacity price was \$0.22/MWh. For the majority of this period, the flexible ramping procurement was above the BANC-SMUD BAA’s flexible ramping requirements.

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 9th day of July, 2019.

/s/ Grace Clark
Grace Clark