September 3, 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-___
Jun - July 2021 Informational Report
Energy Imbalance Market – Transition Period Report –
NorthWestern Energy EIM Entity

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period of NorthWestern Energy EIM Entity during its first six months of participation in the Energy Imbalance Market (EIM) for June 16, 2021 through July 31, 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: *<u>/s/ John Anders</u>*

Roger E. Collanton
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
janders@caiso.com

Energy Imbalance Market
June 16 – July 31, 2021

Transition Period Report
NorthWestern Energy (NWMT) EIM Entity

September 3, 2021

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] NorthWestern Energy (NWMT), the prospective EIM Entity entered the EIM on June 16, 2021, and the transition period will apply to the NWMT Balancing Authority Area (BAA) until November 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 NWMT 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, NWMT's first month in EIM was smooth and without significant issues. This report covers the period from June 16 through July 31, 2021. The market performance highlights are as follows:

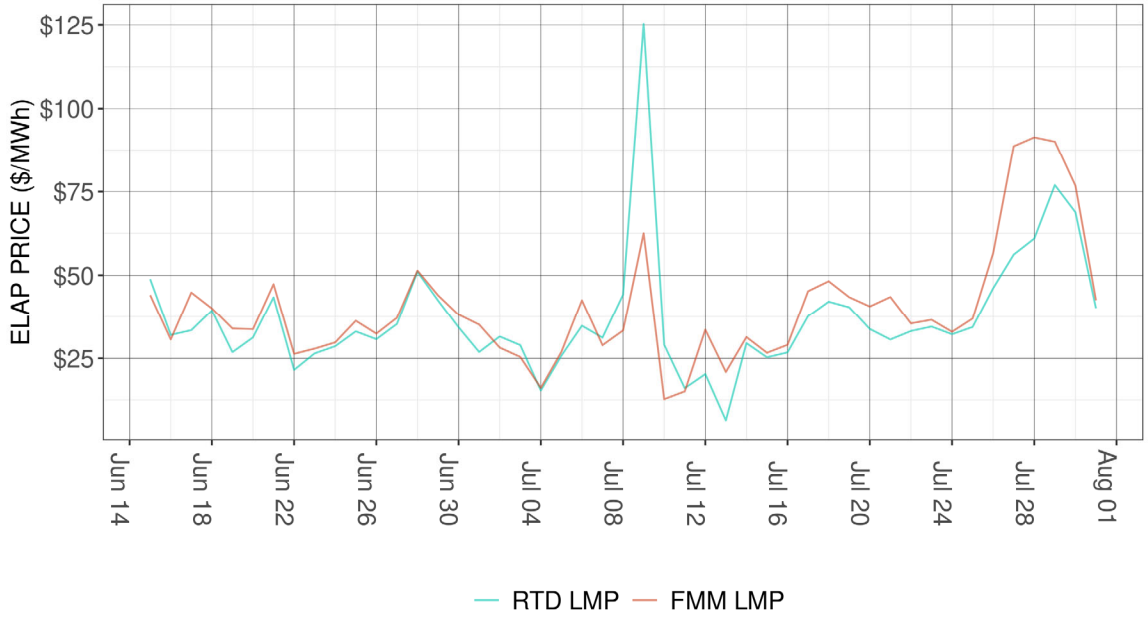
- The monthly average NWMT BAA price was $39.28/MWh in the fifteen-minute market (FMM) and $36.56/MWh in the real-time dispatch (RTD).
- Power balance constraint infeasibilities for the under-supply conditions were minimal for the NWMT BAA with 0.78 percent of the total intervals in the FMM and 0.59 percent of the total intervals in the RTD.
- NWMT passed 99.18 percent of its balancing tests, 99.6 percent in the under supply direction and 99.6 in the oversupply direction
- NWMT passed 99.25 percent of its bid-range capacity tests, 99.25 percent in both the upward direction and downward direction.
- NWMT passed 97.14 percent of it flexible ramping sufficiency tests, 97.69 percent in the upward direction and 99.45 percent in the downward direction.
- The price for upward flexible ramping capacity in the FMM for the NWMT BAA averaged at $1.39/MWh, while prices for the downward flexible ramping product were $0.52/MWh.

III. Market Performance Related to the Transitional Period

a. Prices

Figure 1 shows the daily average FMM and RTD prices in the NWMT EIM Load Aggregation Point (ELAP) for June 16, 2020 through July 31, 2021. The monthly average price was $31.38/MWh in the FMM and $28.68/MWh in the RTD.

Figure 1: Daily average prices for the NWMT 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 that: (1) 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) the market solution produced 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 NWMT BAA for the FMM and RTD. 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, and 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, which were driven by system conditions, are classified as Valid.

From June 16 to July 31 2021, the NWMT BAA had under-supply power balance infeasibilities in 0.78 percent of total intervals in FMM and 0.58 percent of total intervals in RTD.

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

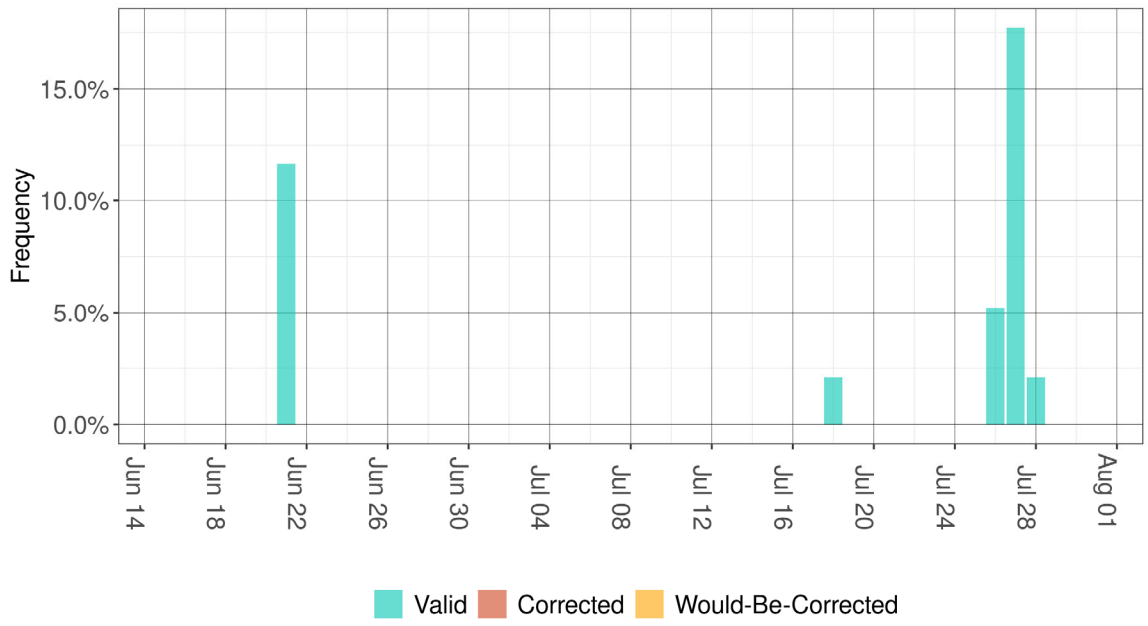
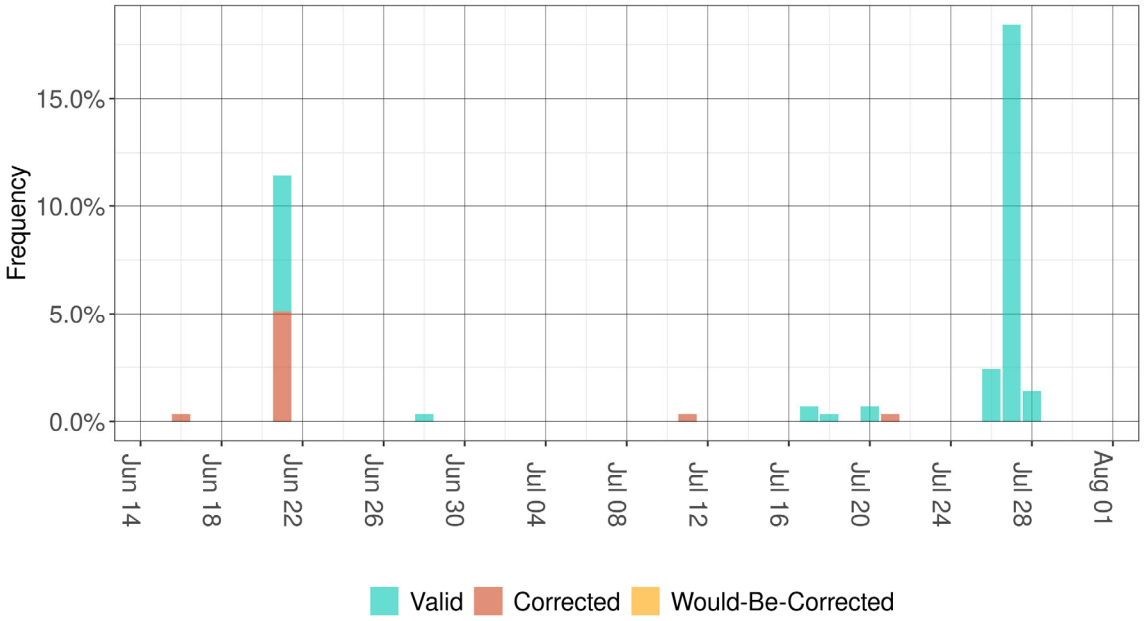


Figure 3: Frequency of RTD under-supply infeasibilities in the NWMT BAA



Tables 1 and 2 list the FMM and RTD intervals with under-supply infeasibilities observed in mid-June to the end of July. There were 36 valid FMM intervals with under-supply power balance infeasibilities and there were 86 valid RTD intervals with under-supply power balance infeasibilities in the reported period.

Table 1: Valid FMM under-supply infeasibilities

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
21-Jun-21	19	3	136.1
21-Jun-21	19	4	79.51
21-Jun-21	20	1	17.58
21-Jun-21	20	2	13.47
21-Jun-21	20	3	1.52
21-Jun-21	20	4	8.91
21-Jun-21	21	1	45.16
21-Jun-21	21	2	47.24
21-Jun-21	21	3	32.33
21-Jun-21	21	4	32.61
18-Jul-21	22	1	74.16
18-Jul-21	22	2	53.57
26-Jul-21	18	1	8.07
26-Jul-21	18	2	4.49
26-Jul-21	18	3	0.06

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
26-Jul-21	18	4	15.15
26-Jul-21	19	1	72.74
27-Jul-21	12	3	35.18
27-Jul-21	12	4	127.75
27-Jul-21	13	1	160.46
27-Jul-21	13	2	259.29
27-Jul-21	13	3	257.99
27-Jul-21	13	4	265.76
27-Jul-21	14	1	19.32
27-Jul-21	14	3	26.94
27-Jul-21	15	3	20.02
27-Jul-21	15	4	26.25
27-Jul-21	18	1	8.35
27-Jul-21	18	3	10.88
27-Jul-21	20	1	13.69
27-Jul-21	23	1	24.36
27-Jul-21	23	2	26.13
27-Jul-21	23	3	25.3
27-Jul-21	23	4	40.15
28-Jul-21	23	1	42.65
28-Jul-21	23	2	14.17

Table 2: Valid RTD under-supply infeasibilities

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
21-Jun-21	19	12	3.01
21-Jun-21	20	1	25.33
21-Jun-21	20	11	60.3
21-Jun-21	21	1	120.28
21-Jun-21	21	2	122.53
21-Jun-21	21	3	122.85
21-Jun-21	21	4	115.63
21-Jun-21	21	5	113.07
21-Jun-21	21	6	110.89
21-Jun-21	21	7	106.63
21-Jun-21	21	8	105.48
21-Jun-21	21	9	100.99
21-Jun-21	21	10	89.74

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
21-Jun-21	21	11	40.97
21-Jun-21	21	12	22.83
21-Jun-21	22	1	6.55
28-Jun-21	23	9	2.17
17-Jul-21	20	2	8.51
17-Jul-21	20	3	10.05
18-Jul-21	22	2	5.72
20-Jul-21	24	1	30.73
20-Jul-21	24	2	0.46
26-Jul-21	18	1	33.98
26-Jul-21	18	2	36.38
26-Jul-21	18	3	36.04
26-Jul-21	18	4	39.83
26-Jul-21	18	5	72.18
26-Jul-21	18	6	70.27
26-Jul-21	18	7	45.45
27-Jul-21	11	11	5.72
27-Jul-21	11	12	6.39
27-Jul-21	12	1	84.97
27-Jul-21	12	2	93.53
27-Jul-21	12	3	98.58
27-Jul-21	12	4	113.22
27-Jul-21	12	5	118.34
27-Jul-21	12	6	127.97
27-Jul-21	12	7	162.7
27-Jul-21	12	8	166.14
27-Jul-21	12	9	177.36
27-Jul-21	12	10	218.2
27-Jul-21	12	11	233.08
27-Jul-21	12	12	233
27-Jul-21	13	1	236.54
27-Jul-21	13	2	218.17
27-Jul-21	13	3	250.21
27-Jul-21	13	4	223.15
27-Jul-21	13	5	196.28
27-Jul-21	13	6	196.36
27-Jul-21	13	7	189.65
27-Jul-21	13	8	193.01

Trade Date	Trade Hour	Trade Interval	MW Infeasibility
27-Jul-21	13	9	187.47
27-Jul-21	13	10	183.24
27-Jul-21	13	11	160.07
27-Jul-21	13	12	128.78
27-Jul-21	15	2	7.19
27-Jul-21	15	3	15.57
27-Jul-21	15	4	11.56
27-Jul-21	15	5	10.15
27-Jul-21	15	6	12.54
27-Jul-21	15	7	16.81
27-Jul-21	15	8	25.43
27-Jul-21	15	9	32.62
27-Jul-21	15	10	38.23
27-Jul-21	15	11	27.23
27-Jul-21	15	12	13.1
27-Jul-21	18	2	13.78
27-Jul-21	18	3	21.29
27-Jul-21	18	7	22.67
27-Jul-21	18	8	6.12
27-Jul-21	20	1	16.03
27-Jul-21	20	2	17.38
27-Jul-21	23	1	89.54
27-Jul-21	23	2	152.15
27-Jul-21	23	3	159.28
27-Jul-21	23	4	139.07
27-Jul-21	23	5	104.69
27-Jul-21	23	6	52.29
27-Jul-21	23	7	53.21
27-Jul-21	23	8	79.12
27-Jul-21	23	9	79.19
27-Jul-21	23	10	1.35
28-Jul-21	21	9	0.51
28-Jul-21	23	2	20.3
28-Jul-21	23	3	12.43
28-Jul-21	23	4	12.43

In general, under-supply infeasibilities for a BAA could be driven by various changes to either supply or demand for a market interval. A root cause

analysis was performed for all FMM and RTD under-supply infeasibilities listed in Table 1 and 2. The main reason for each RTD under-supply infeasibility is identified and shown in Figure 4. The top reasons are Resource de-rates, Load Bias, Resource de-rates and VER deviations.

The infeasibilities classified as Resource de-rate and Load Bias, are those intervals in which a generating unit either tripped offline completely or partially and a load bias was used during this time. Load bias is used to get incremental energy to compensate for the loss of supply. These infeasibilities all occurred on July 27th and can be broken down into two incidents. The first incident occurred after the generation unit tripped offline. During this time, there was a capacity failure, which limited the EIM import capability. In response, the operator biased the RTD load up to 235 MWs. With the import capability limited and lack of participating generation, this load bias led to larger infeasibilities. When there isn't enough internal generation to cover the bias and the transfers are limited, the infeasibility becomes larger. This was viewed as a training opportunity. In the second incident, similar behavior occurred a couple hours after the initial tripping, and was related to passing the capacity test with the unit on outage. With the failure of the test, the operator did bias during the capacity failure hours with limited import and incremental participating energy available.

In Mid-June through July, VER deviations led to shortages along with flex ramp sufficiency failures. This occurred when VER forecast dropped from the hourly forecast to the 15 minute and 5 minute forecast. This led to flex ramp sufficiency failures that led to capped import limits. Then the uncertainty materialized for the VER forecast, leading to RTD infeasibilities.

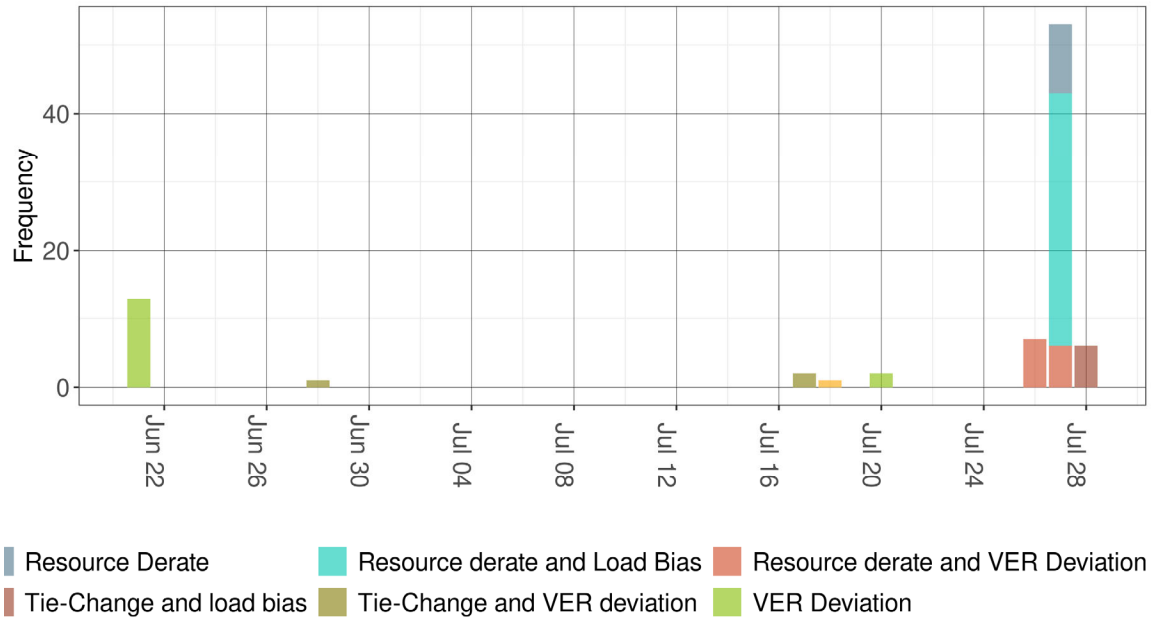
Some infeasibilities happened due to both Resource de-rates and VER deviations. This occurs when there is a supply side issue where the upward capacity is limited along with the decrease in VER forecast that occurred in the hourly to 5 minute forecast horizon. This decreased supply to the participating resource and decreased VER energy led to flex ramp sufficiency failures where the import transfer is limited and VER continues to decrease past the T-40 test that led to the RTD infeasibilities.

Additionally, infeasibilities could be driven by tie changes, or in a combination of tie changes with another driver. This tie change occurs similar to a supply reduction. A tie-change would occur where the decreased amount of NSI is larger than the total ramp capability available from the participating solution. This occurrence usually happens for NWE between high and low-load time frames. The variation of the net schedule interchange leads to failures in

the flex ramp sufficiency and the tie change and other combinations lead to RTD infeasibilities.

The remaining infeasibility reasons is a combination of the reasons already described.

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



c. Balancing and Sufficiency Test Failures

The EIM provides an opportunity to various BAAs to serve load while realizing the benefits of increased resource diversity. Because 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.

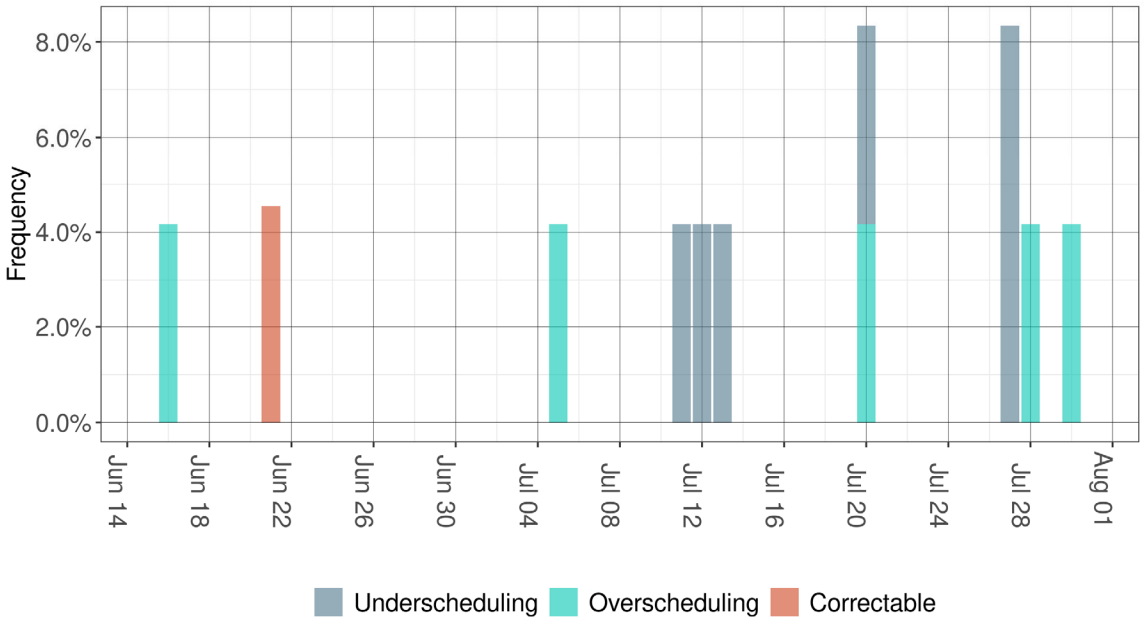
Performance of a balancing test before each trading hour ensures that each participating BAA submits a balanced base schedule of generation and a net schedule interchange to meet its demand. In addition, the participating BAA is required to submit bids with enough ramping capability to meet its net load forecast uncertainty and net load movement requirements. Figure 5 shows the trend of balancing test outcomes for the period of June 16, 2020, through July 31, 2021, and Figure 6 shows the pattern of bid-range capacity test outcomes for

the same period.[3] If a balancing test or the bid-range capacity test is affected by a data input failure or a software failure, that test result is shown as a correctable event.

The NWMT BAA passed the balancing test in 99.18 percent of the intervals in the reported period, which is within the acceptable range of balancing test failures. There were two main reasons identified for NWMT BAA balancing test failures. First, the CAISO market applications perform 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.

Second, the NWMT BAA uses a software application to submit base schedules. Software issues for scheduling and managing outages of NWMT resources resulted in some balancing test failures.

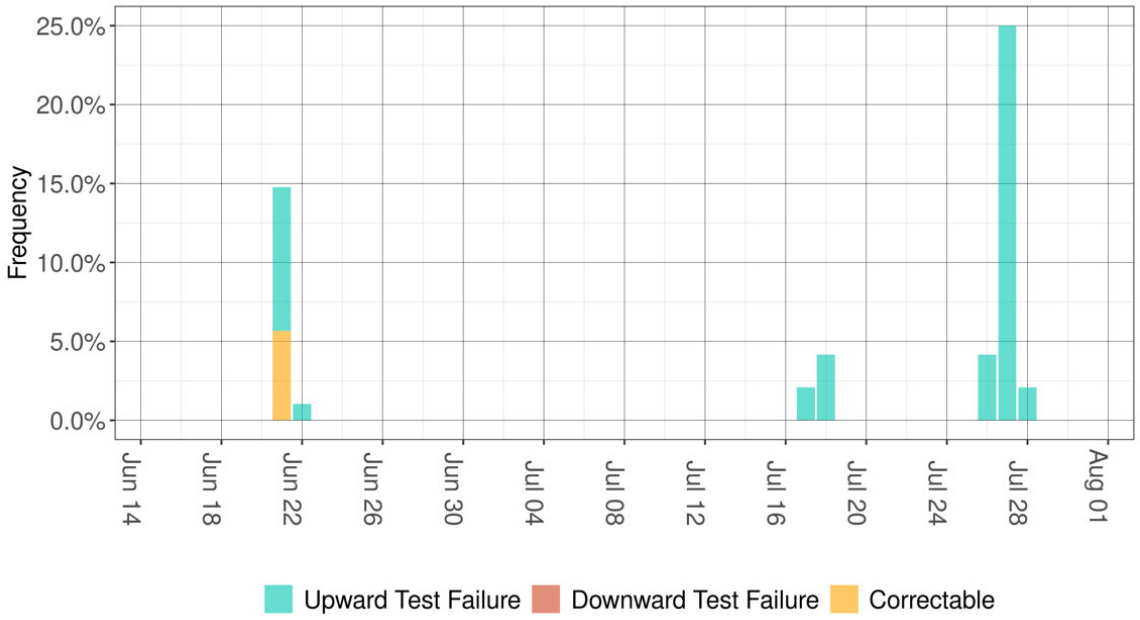
Figure 5: Frequency of Balancing test failures in the NWMT BAA.



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

The NWMT BAA passed 99.25 percent of the bid range capacity test. Failures of the test were typically due to resource de-rates or transfer between high and low load hours. The correctable hours were due to CISO system issues that led to the test incorrectly being failed.

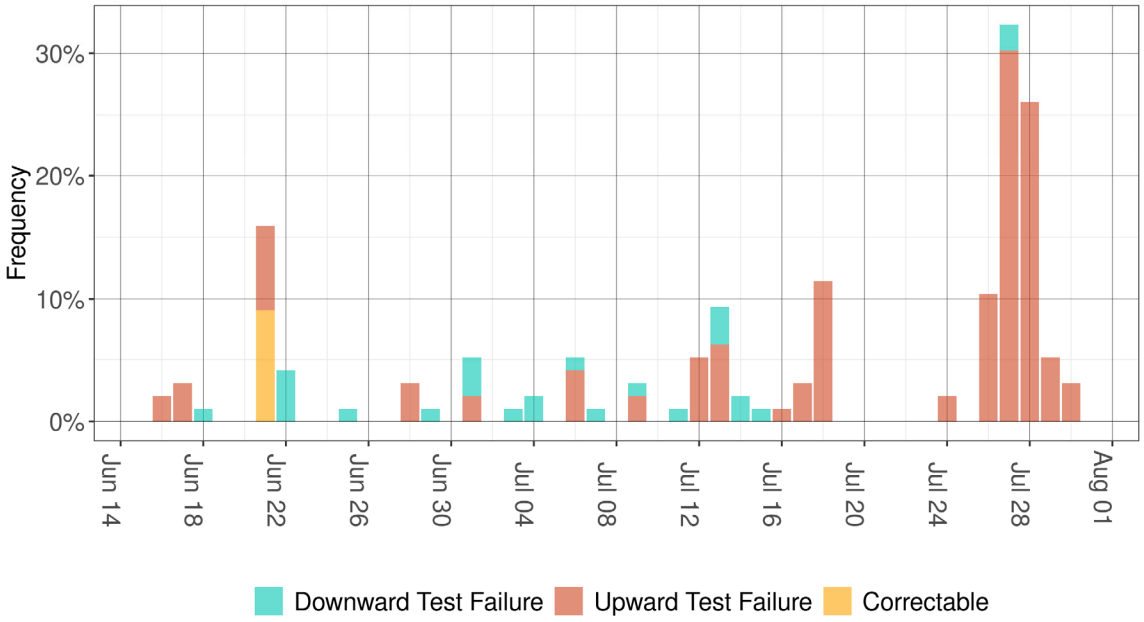
Figure 6: Frequency of Bid Range Capacity test failures in the NWMT BAA



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 June 16, 2020, through July 31, 2021. The NWMT BAA passed the flexible ramp up test in 97.69 percent of the intervals in mid- June to the end of July and passed the flexible ramp down test in 99.45 percent of the intervals.

Most of the failures were due to large changes on inter-tie resources during high to low-load hours or due to limited supply conditions due to resource de-rates.

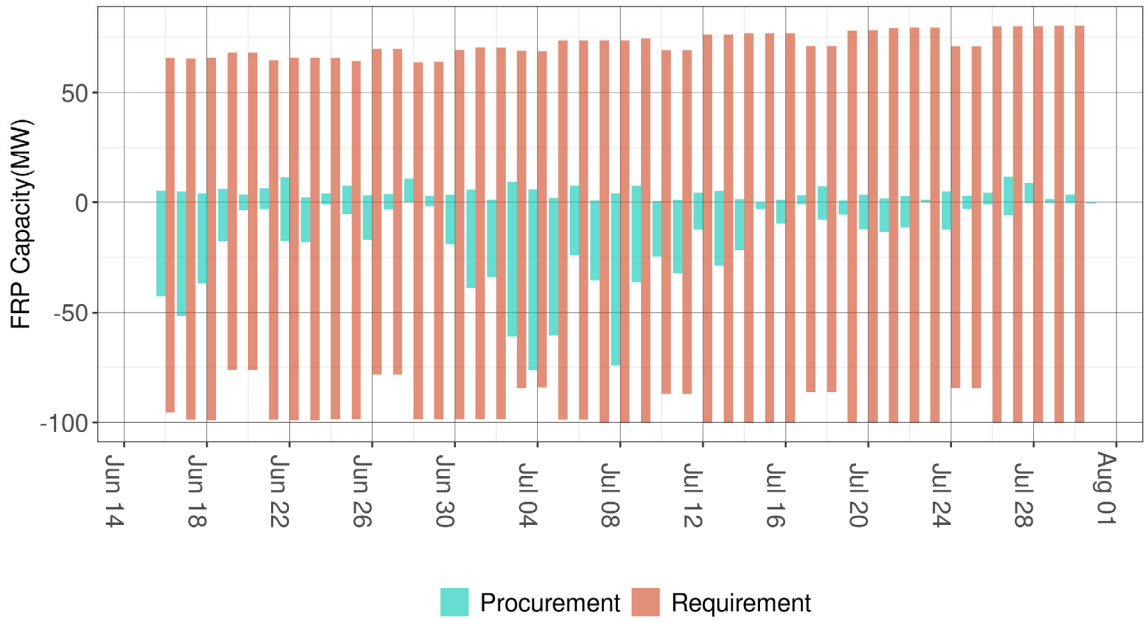
Figure 7: Frequency of flexible ramping sufficiency test failures in the NWMT BAA.



d. Flexible Ramping Product

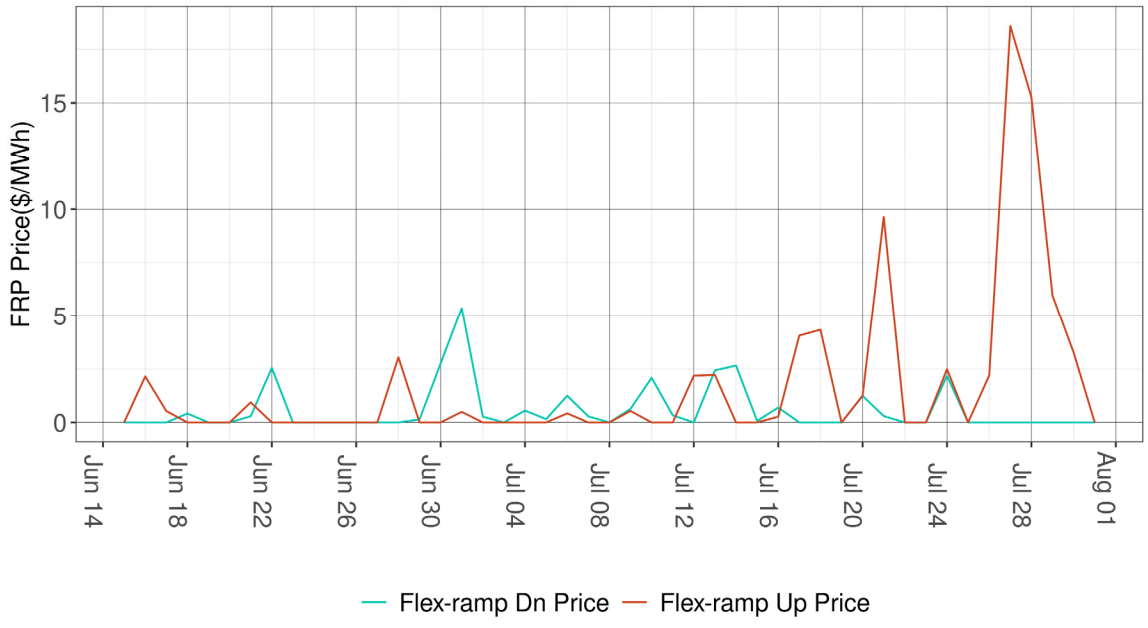
Figure 8 shows the daily average of the upward and downward flexible ramping constraint requirement and procurement in the FMM. Figure 9 shows the daily average of the upward and downward flexible ramping constraint prices in the FMM. With the implementation of the flexible ramping product on November 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 NWMT 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 NWMT BAA capacity towards meeting the overall EIM-system-wide area requirement. This is the main reason why the individual NWMT procurement may generally fall below or be above the individual NWMT flex ramp requirement. For most of the days, the NWMT 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 NWMT 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 NWMT BAA plus the shadow price of the EIM system-wide area. In September, the average upward flexible ramping capacity price was $1.39/MWh and the average downward flexible ramping capacity price was $0.52/MWh.

Figure 9: Daily Average price of downward flexible ramping in the FMM in the NWMT 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 3rd day of September 2021.

/s/ Anna Pascuzzo

Anna Pascuzzo