



August 15, 2017

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-____
March 2017 Informational Report
Energy Imbalance Market – Transition Period Report – Arizona
Public Service**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its final report on the transition period of Arizona Public Service during its first six months of participation in the Energy Imbalance Market (EIM) for March 2017. Arizona Public Service entered the EIM on October 1, 2016. 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

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California ISO

**Energy Imbalance Market
March 1 – March 31, 2017**

**Transition Period Report
Arizona Public Service Entity**

July 17, 2017

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 Arizona Public Service (APS) entered the EIM on October 1, 2016, and the transition period will apply to its balancing authority area until April 1, 2017.

During the six-month transition period, the pricing of energy in the balancing authority area of a new EIM entity 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 balancing authority area between \$0 and \$0.01, but only when the power balance or transmission constraints are relaxed in the relevant EIM balancing authority area. 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 APS to comply with the Commission's requirements in the October 29 order. The CAISO notes that, in compliance with the Commission's October 29 order, this will be the last monthly transition period report that the CAISO will submit to the Commission for the APS balancing authority area. In addition, because the DMM must review the CAISO's report before completing its own independent assessment, the DMM will file its report approximately 15 business days after the CAISO files its report.

II. Highlights

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

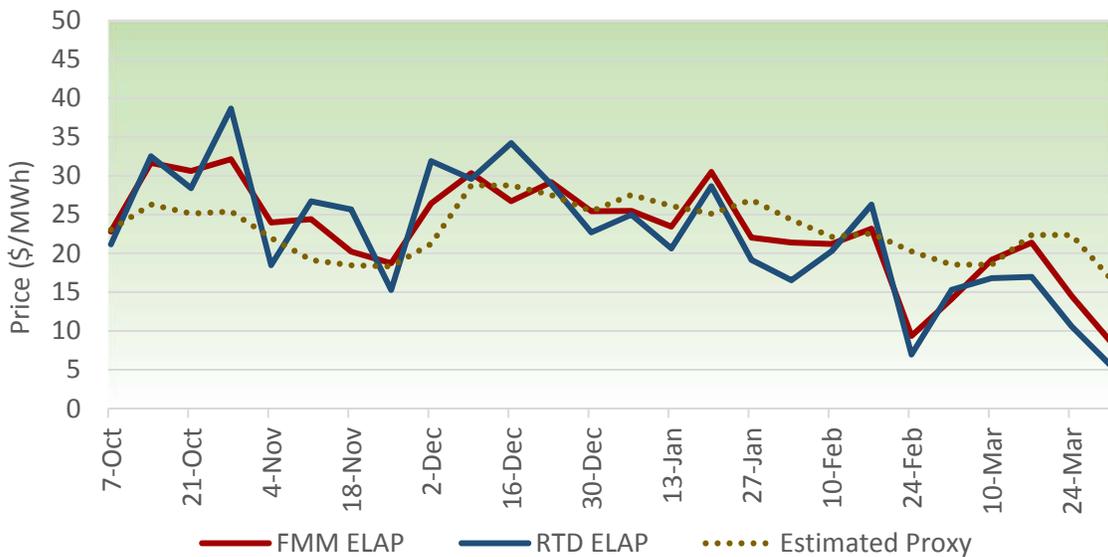
- In March, average prices in the APS balancing authority area were \$15.91/MWh in the Fifteen-Minute Market (FMM) and \$12.92/MWh in the Real-Time Dispatch (RTD).
- Power balance constraint infeasibilities for under-supply conditions in the APS balancing authority area were 0.2 percent of the total intervals in the FMM and 0.46 percent of the total intervals in the RTD.
- The APS balancing authority area passed over 93.95 percent of its balancing tests in March.
- The APS balancing authority area passed over 99 percent and 78.1 percent of its flexible ramping sufficiency tests for upward and downward capacity, respectively, in March.
- The price for upward flexible ramping capacity in the APS balancing authority area averaged \$5.43/MWh in March.

III. Report

a. Prices

Figure 1 shows the seven-day average prices in the APS EIM Load Aggregation Point (APS ELAP).² In March, the average prices were \$15.91/MWh in the FMM and \$12.92/MWh in the RTD. These prices were lower than the respective prices of \$17.4/MWh in the FMM and \$17.34/MWh in the RTD in February.

Figure 1: Daily average prices for the APS balancing authority area.



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.³ That is,

² The ELAP provides aggregate prices that are representative of pricing in the overall APS balancing authority area.

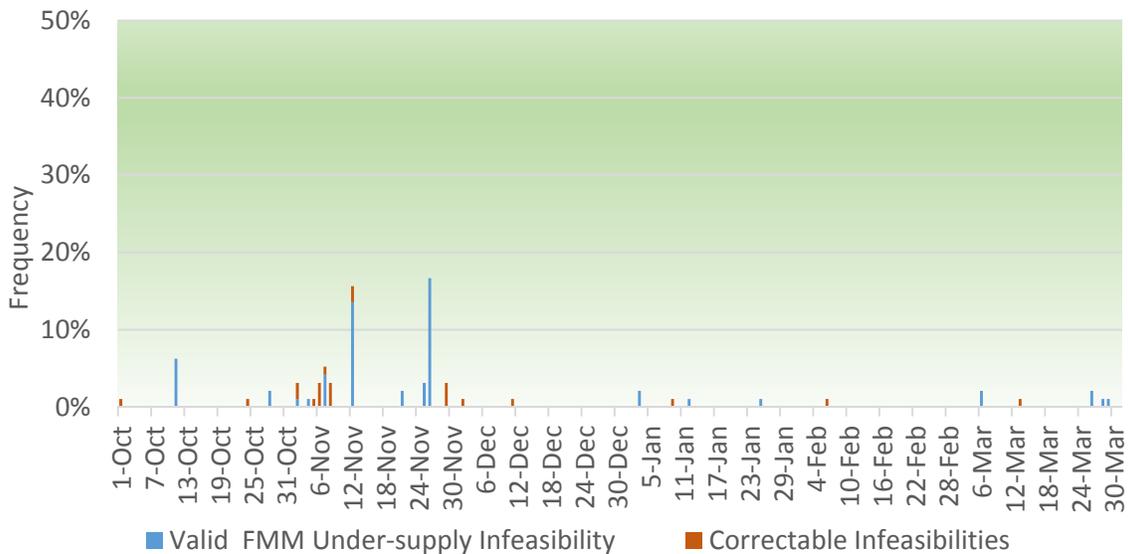
³ Figure 1 also provides an estimated proxy price, which for APS is the Mid C hub price taken from the Intercontinental Exchange (ICE).

the trends below represent: (1) prices as produced in the market for which 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 transition period pricing reflected in Section 29.27 of the CAISO tariff. In March, there was one instance in the FMM and 17 instances in the RTD market that required a price correction for the APS balancing authority area prices under the CAISO’s price correction authority provided in Section 35 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 APS balancing authority area for the FMM and RTD, respectively. The under-supply infeasibilities are grouped into “valid” and “correctable” instances. Prices for the intervals that fell in the “valid” category are instances with under-supply infeasibilities not in error and that are subject to the transitional period pricing, whereas those that fell in the “correctable” category were corrected due to either a software or a data error, pursuant to Section 35 of the CAISO tariff.

Figure 2: Frequency of FMM under-supply power balance infeasibilities in the APS balancing authority area.



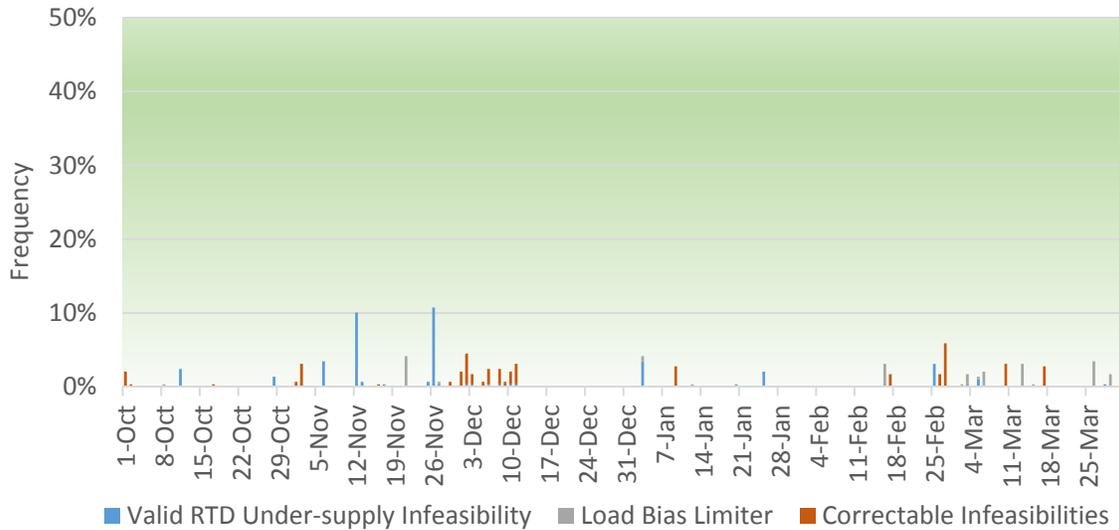
In March, there were six instances (0.2 percent of the time) of valid under-supply infeasibilities in the FMM, while there were 41 instances (0.46 percent of the time) of valid under-supply infeasibilities in the RTD for the APS balancing authority area. The reasons for these infeasibilities were:

- i) March 3, RTD. Reduction of net imports and load conformance.
- ii) March 5, RTD. Reduction of transfers into the APS balancing authority area due to events in another balancing authority area and load conformance.
- iii) March 6, FMM and RTD. Import changes and limited import capability as the result of flexible ramping sufficiency test failure.
- iv) March 13, RTD. Increase in exports, load conformance, and a resource under-generating.
- v) March 15, RTD. Renewable deviation and load conformance.
- vi) March 26, FMM, RTD. Increase in net exports and load conformance.
- vii) March 28, FMM, RTD. Increase in net export and load forecast, compounded with the failure of the flexible ramping sufficiency test.
- viii) March 29. Load conformance and resource re-dispatches.

For the 41 instances of valid infeasibilities in RTD, 38 instances in the APS balancing authority area coincided with the use of a load conformance limiter. The CAISO uses a load conformance limiter in the CAISO and in each of the EIM balancing authority areas to prevent over-adjustments with the use of load conformance, and thus prevent an artificial infeasibility – one that does not reflect actual scarcity. When the quantity of the infeasibility is less than the operator's adjustment, and the infeasibility is in the same direction as the adjustment, the load conformance limiter automatically limits the operator's adjustments to at, or below, the infeasibility. In the pricing run, the limiter will remove an infeasibility that is less than or equal to the operator's adjustment, *i.e.*, the load conformance. The limiter will not apply to infeasibilities greater than or in the opposite direction of the load conformance. Use of the load conformance limiter in the CAISO balancing authority area has avoided invalid constraints that arise through operational adjustments that do not reflect supply issues. During the transition

period, the CAISO does not apply the load conformance limiter because it applies the transition period pricing, which obviates the need for the load conformance limiter. Therefore, Figure 3 illustrates the infeasibilities that would have been avoided by the load conformance limiter were it in effect instead of transition period pricing during the transition period in the APS balancing authority area.

Figure 3: Frequency of RTD under-supply power balance in feasibilities in the APS balancing authority area.



Tables 1 and 2 list the FMM and RTD intervals with infeasibilities observed in March, including the amount of load conformance to reflect the instances in which the load conformance limiter would have been triggered and offset the infeasibility.

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

Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
6-Mar-17	9	3	89.69	200
6-Mar-17	10	1	63.1	300
26-Mar-17	1	3	15.28	100
26-Mar-17	1	4	20.44	100
28-Mar-17	21	2	22.69	175
29-Mar-17	8	1	34.97	150

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

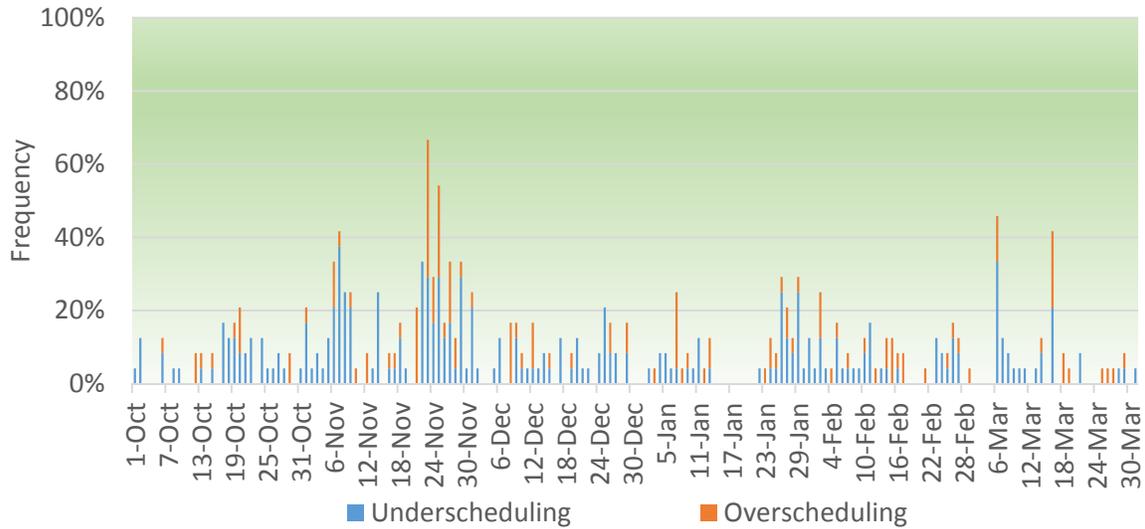
Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
03Mar2017	1	1	26.62	100
03Mar2017	1	2	35.41	50
03Mar2017	1	3	38.61	50
03Mar2017	17	8	21.56	100
03Mar2017	17	9	115.9	100
05Mar2017	8	6	211.39	200
05Mar2017	8	7	219.57	200
05Mar2017	8	8	400.27	400
05Mar2017	8	9	148.43	400
06Mar2017	2	2	30.66	70
06Mar2017	9	4	89	300
06Mar2017	9	5	84.17	300
06Mar2017	9	6	64.39	300
06Mar2017	9	7	34.85	300
06Mar2017	9	8	35.74	300
13Mar2017	14	2	2.18	100
13Mar2017	14	3	7.93	100
13Mar2017	14	4	6.16	100
13Mar2017	14	5	113.07	200
13Mar2017	14	6	122.07	200
13Mar2017	14	7	123.06	200
13Mar2017	14	8	124.14	200
13Mar2017	14	9	132.45	200
13Mar2017	14	10	54.16	200
15Mar2017	4	2	4.28	120
26Mar2017	1	3	39.08	100
26Mar2017	1	4	44.53	100
26Mar2017	1	5	43.65	100
26Mar2017	1	6	27.33	100
26Mar2017	1	7	10.09	100
26Mar2017	1	9	2.15	100
26Mar2017	1	12	7.29	100
26Mar2017	18	10	99.41	100
26Mar2017	18	11	84.41	100
26Mar2017	18	12	81.99	100
28Mar2017	6	6	62.15	100
29Mar2017	8	1	107.49	175
29Mar2017	8	2	114.32	175
29Mar2017	8	3	83.32	175

Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
29Mar2017	8	4	15.83	175
29Mar2017	17	10	77.55	250

c. Balancing and Sufficiency Test Failures

Figure 4 shows the trend of balancing test outcomes from October 2016 through March 2017. The CAISO performs these balancing tests pursuant to Section 29.34(k) of the CAISO tariff. The APS balancing authority area passed the balancing test in 93.95 percent of the intervals in March. About half of the failures were for under-scheduling.

Figure 4: Frequency of Balancing test failures in the APS balancing authority area.



The CAISO also performs the ramping sufficiency test as specified in Section 29.34(m) of the CAISO tariff. Figure 5 shows the trend of the test failures for flexible ramping from October 2016 through March 2017. The APS balancing authority area passed the flexible upward and downward tests in 99 percent and 78.1 percent of the intervals in March.

Figure 5: Frequency of flexible ramping sufficiency test failures in the APS balancing authority area.

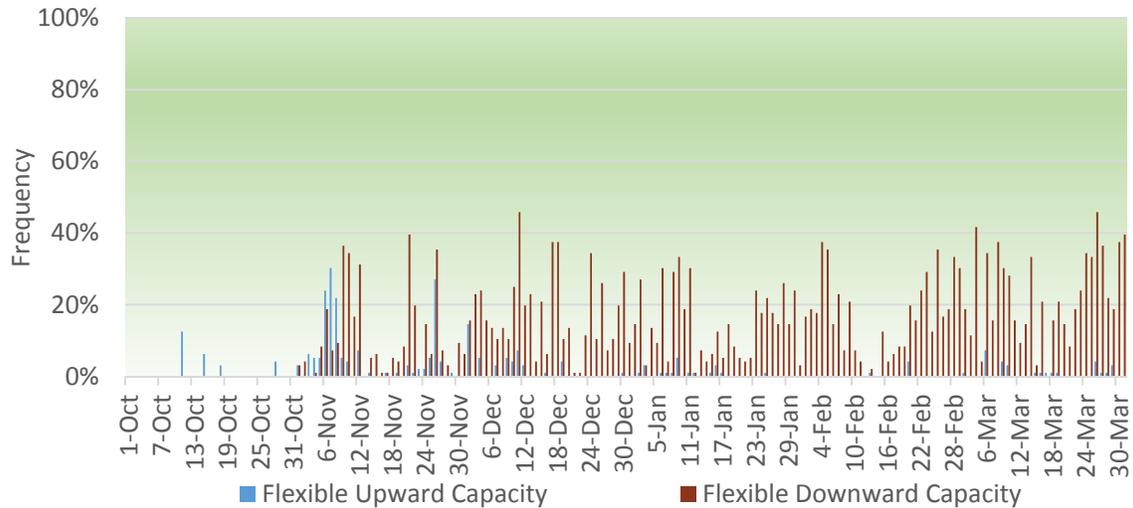
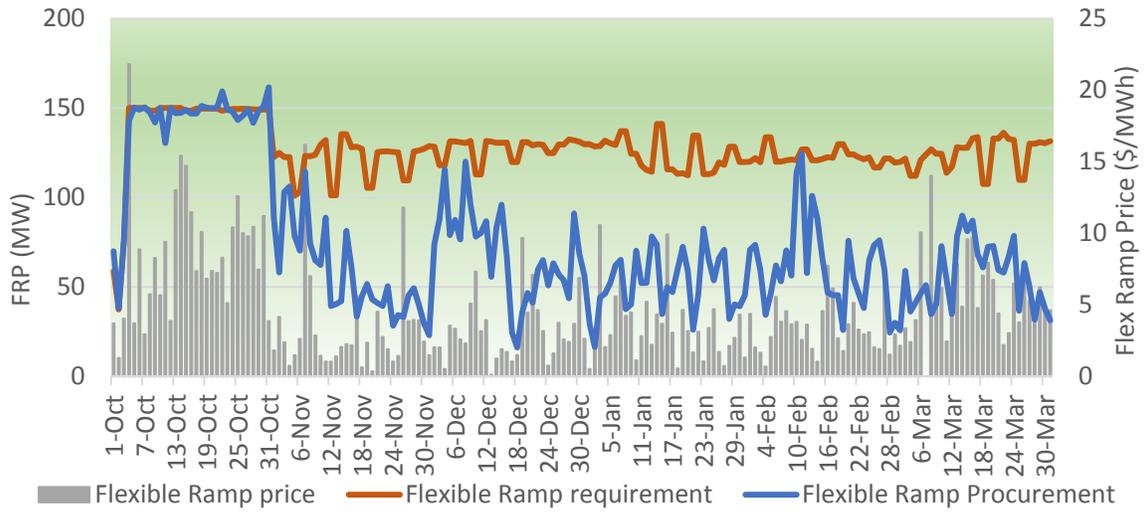


Figure 6 shows the daily average of the flexible ramping product requirement and procurement in the FMM. With the implementation of the flexible ramping product on November 1, 2016, the requirements are calculated based on historical data for uncertainty and offset with any applicable net import/export capability or credit. This effectively reduces the amount of flexible ramping the APS balancing authority area has to procure and, generally, the EIM system-wide area (which includes all the balancing authority areas in the EIM, including the CAISO balancing authority area) will drive the requirements. The market clearing process may result in procuring the APS balancing authority area capacity towards meeting the overall EIM-system-wide area requirement. This is the main reason why the individual APS balancing authority area procurement may generally fall below the individual APS balancing authority area requirement as of November 1, 2016. In addition, the price trend provided in Figure 6 is the nested price determined by the summation of the shadow price of the individual APS balancing authority area plus the shadow price of the EIM system-wide area. On average, the price for upward flexible ramping in March was about \$5.43/MWh.

Figure 6: Average requirement and procurement of flexible ramping in the FMM in the APS balancing authority area.



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 15th day of August, 2017.

/s/ Grace Clark
Grace Clark