



May 4, 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-\_\_\_\_  
February 2017 Informational Report  
Energy Imbalance Market – Transition Period Report – Puget  
Sound Energy**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period of Puget Sound Energy during its first six months of participation in the Energy Imbalance Market (EIM) for February 2017. 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.

The CAISO will continue filing such reports, consistent with the Commission's order, through the six month reporting period.

Please contact the undersigned with any questions.

Respectfully submitted

**By: /s/ Anna A. McKenna**

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# California ISO

**Energy Imbalance Market  
February 1 – February 28, 2017**

**Transition Period Report  
Puget Sound Energy Entity**

May 4, 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.<sup>1</sup> Puget Sound Energy (PSE) 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 (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 PSE 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 month, and depending on the market performance, 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 applicable month to provide the prior full month's data. 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.

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

**II. Highlights**

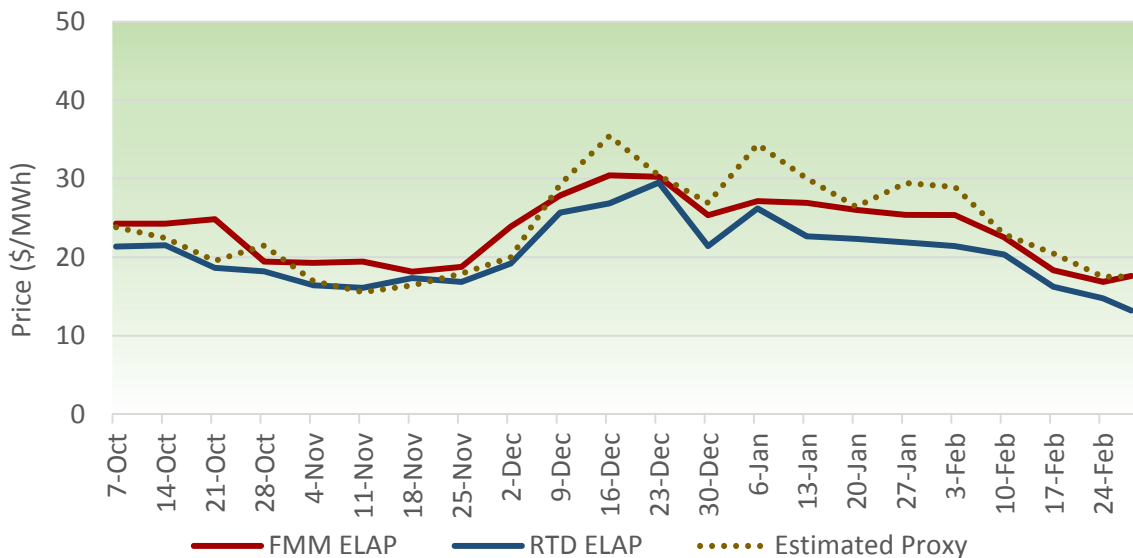
- In February, average prices in the PSE balancing authority area were \$19.71/MWh in the Fifteen-Minute Market (FMM) and \$17.14/MWh in the Real-Time Dispatch (RTD).
- Power balance constraint infeasibilities for under-supply conditions in the PSE balancing authority area were 0.07 percent of the intervals in the FMM and 0.31 percent of the total intervals in the RTD in February.
- The PSE balancing authority area passed over 98.51 percent of its balancing tests in February.
- The PSE balancing authority area passed over 99.62 percent of its flexible ramping sufficiency tests in February.
- The price for upward flexible ramping capacity in the PSE balancing authority area averaged \$3.79/MWh in February.

**III. Report**

**a. Prices**

Figure 1 shows the seven-day average prices in the PSE EIM Load Aggregation Point (PSE ELAP).<sup>2</sup> In February, the average prices were \$19.71/MWh in the FMM and \$17.14/MWh in the RTD. These prices were lower than the respective prices of \$26.17/MWh (FMM) and \$22.9/MWh (RTD) in January.

**Figure 1: Daily average prices for the PSE 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.<sup>3</sup> That is, the trends represent: (1) prices as produced in the market that the CAISO

<sup>2</sup> The ELAP provides aggregate prices that are representative of pricing in the overall PSE balancing authority area.

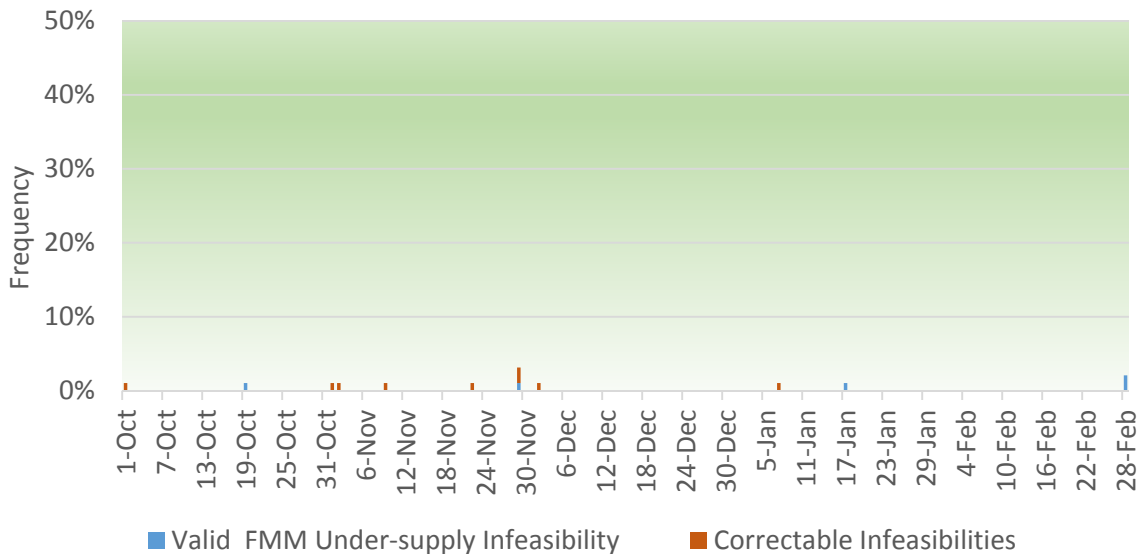
<sup>3</sup> Figure 1 also provides an estimated proxy price, which for PSE is the Mid C hub price taken from the Intercontinental Exchange (ICE).

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 February, four intervals in the RTD market required a price correction for the PSE 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 that the power balance constraint was relaxed for under-supply conditions in the PSE 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 the under-supply infeasibilities that fell in the “correctable” category were corrected 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 PSE balancing authority area.**



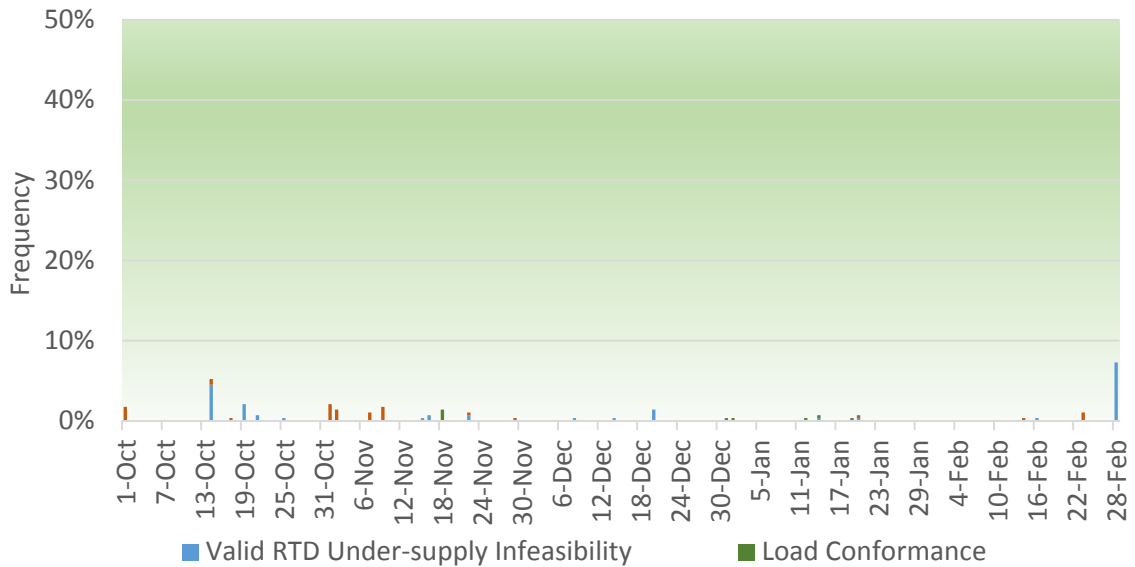
In the PSE balancing authority area, there were two (0.07 percent of the time) valid under-supply infeasibility in the FMM and 22 (0.31 percent of the time) valid under-supply infeasibilities in the RTD. The reasons for these infeasibilities were:

- i) February 16, RTD. Renewable deviation in another area that required the retraction of transfer into the PSE balancing authority area.

- ii) February 27. Net schedule interchange variation.
- iii) February 28, FMM and RTD. Net schedule interchange and renewable resources deviations, compounded with these intervals having limited upward capacity available and a failure on the upward direction.

Three out of the 25 valid under-supply infeasibilities in the RTD in the PSE balancing authority area coincided with load conformance. The CAISO uses a load conformance limiter in the CAISO balancing authority area 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 had it been in effect instead of transition period pricing during the transition period in the PSE balancing authority area.

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



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

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

Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
28Feb2017	8	3	3.66	
28Feb2017	8	4	1.67	

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

Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
16Feb2017	20	3	21.11	
27Feb2017	11	1	8.48	40
27Feb2017	11	2	25.57	40
27Feb2017	11	3	3.74	40
28Feb2017	8	1	31.6	
28Feb2017	8	2	38.24	
28Feb2017	8	3	67.21	
28Feb2017	8	4	94.75	50

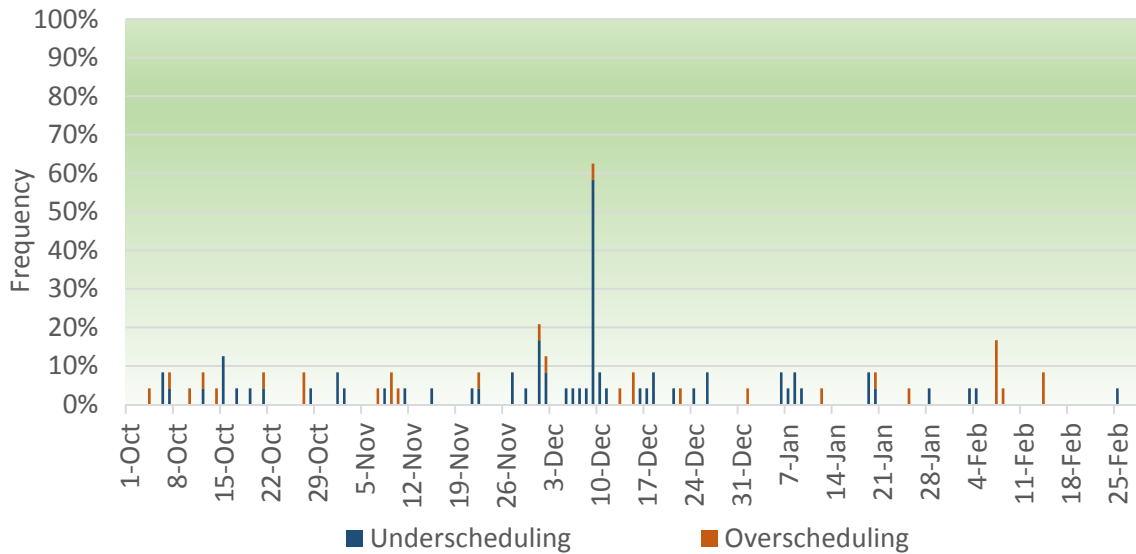


Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
28Feb2017	8	5	106.15	50
28Feb2017	8	6	98.73	50
28Feb2017	8	7	115.17	50
28Feb2017	8	8	114.99	50
28Feb2017	8	9	121.55	50
28Feb2017	8	10	120.4	50
28Feb2017	8	11	116.25	50
28Feb2017	8	12	97.91	50
28Feb2017	9	1	93.5	
28Feb2017	9	2	17.95	
28Feb2017	9	5	46.98	
28Feb2017	9	6	43.53	
28Feb2017	9	7	25.9	
28Feb2017	9	8	33.97	
28Feb2017	9	9	25.64	
28Feb2017	9	10	9.44	
28Feb2017	13	5	17.88	

### c. Balancing and Sufficiency Test Failures

Figure 4 shows the trend of balancing test outcomes from October 2016 through February 2017. The CAISO performs these balancing tests pursuant to Section 29.34(k) of the CAISO tariff. The PSE balancing authority area passed the balancing test in 98.51 percent of the intervals in February. About 30 percent of the failures were due to under-scheduling. The frequency of these failures are within expected performance tolerances for balancing tests.

**Figure 4: Frequency of balancing test failures in the PSE 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 February 2017. The PSE balancing authority area passed the ramping sufficiency test in 99.62 percent of the intervals in February.

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

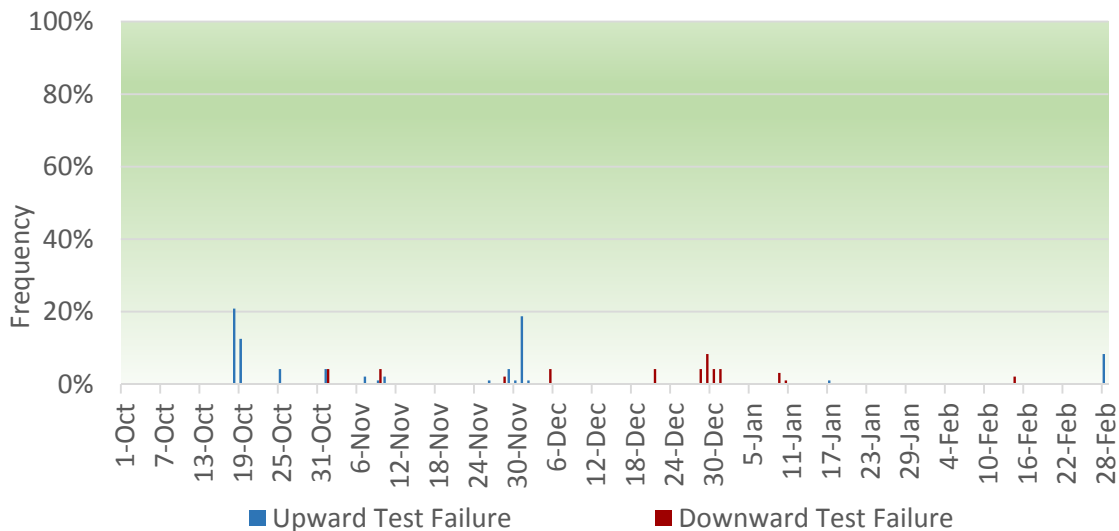
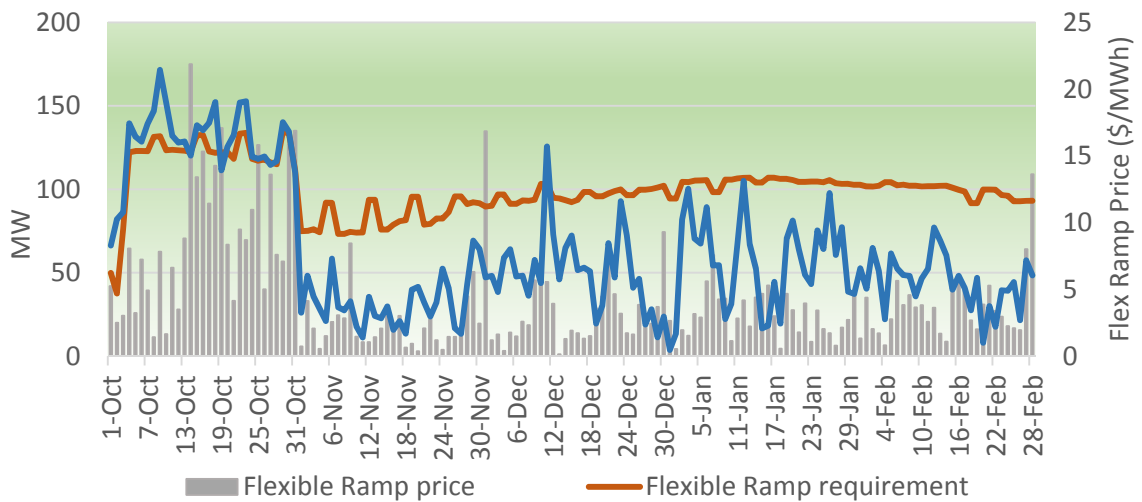


Figure 6 shows the daily average of the flexible ramping constraint requirement and procurement in the FMM. With the implementation of the

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 PSE 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 PSE balancing authority area capacity towards meeting the overall EIM-system-wide area requirement. This is the main reason why the individual PSE balancing authority area procurement may generally fall below the individual PSE 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 PSE balancing authority area plus the shadow price of the EIM system-wide area. On average, the price for upward flexible ramping went to 3.79/MWh in February from \$3.02/MWh in January.

**Figure 6: Average requirement and procurement of flexible ramping in the FMM in the PSE 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 4<sup>th</sup> day of May, 2017.

*/s/ Grace Clark*  
Grace Clark