



March 2, 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-\_\_\_\_  
December 2016 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 December 2016. The Commission also directed the Department of Market Monitoring to submit an independent assessment of the CAISO's report, which the CAISO 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  
December 1 – December 31, 2016**

**Transition Period Report  
Puget Sound Energy Entity**

March 2, 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 (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 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 so soon after the end of the applicable month, depending on the market performance each month, and because of the need to coordinate with the EIM entity, the CAISO has not been able to submit the report at regular monthly intervals. The CAISO expects to catch up its reporting for the months of December and January and then continue to file the monthly reports approximately 25 days after the end of each 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

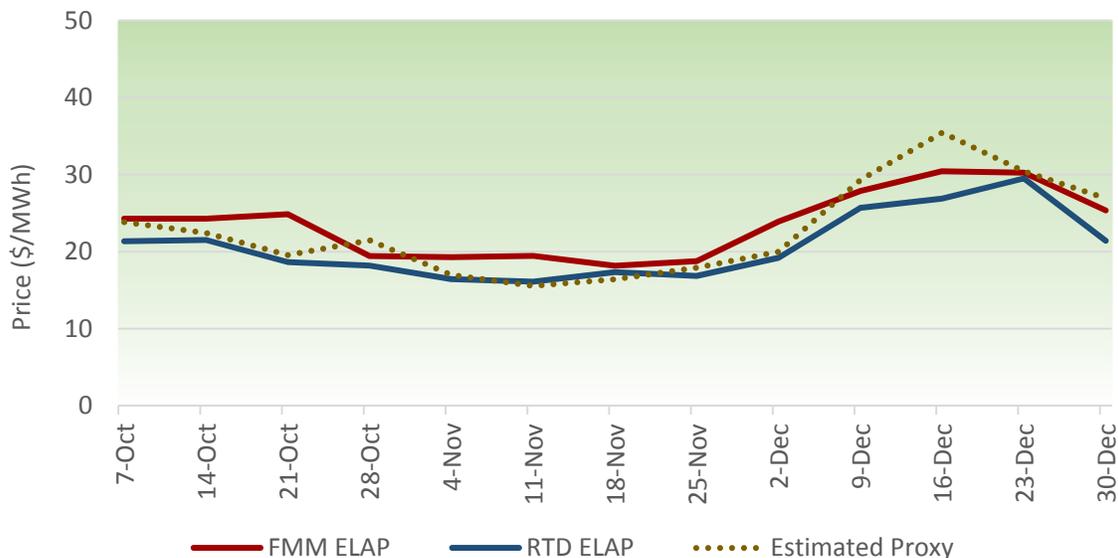
- Average prices in the PSE balancing authority area were \$28.48 and \$25.5/MWh in the Fifteen-Minute Market (FMM) and Real-Time Dispatch (RTD), respectively.
- Power balance constraint infeasibilities for under-supply conditions in the PSE balancing authority area were 0 percent and 0.08 percent of the total intervals in the FMM and RTD, respectively.
- PSE passed over 94.35 percent of its balancing tests during the month of December.
- PSE passed over 98.39 percent of its flex ramp sufficiency tests during the month of December.
- With the low frequency of power balance constraint infeasibilities experienced in the month of December in the PSE balancing authority area, the transitional period pricing had little impact on the EIM prices.

**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 December the average prices were \$28.48/MWh in the FMM and \$25.5/MWh in the RTD, respectively; these prices were higher than in previous months but still lower than the estimated proxy prices of December.

**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 below represent: (1) prices as produced in the market for which the

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

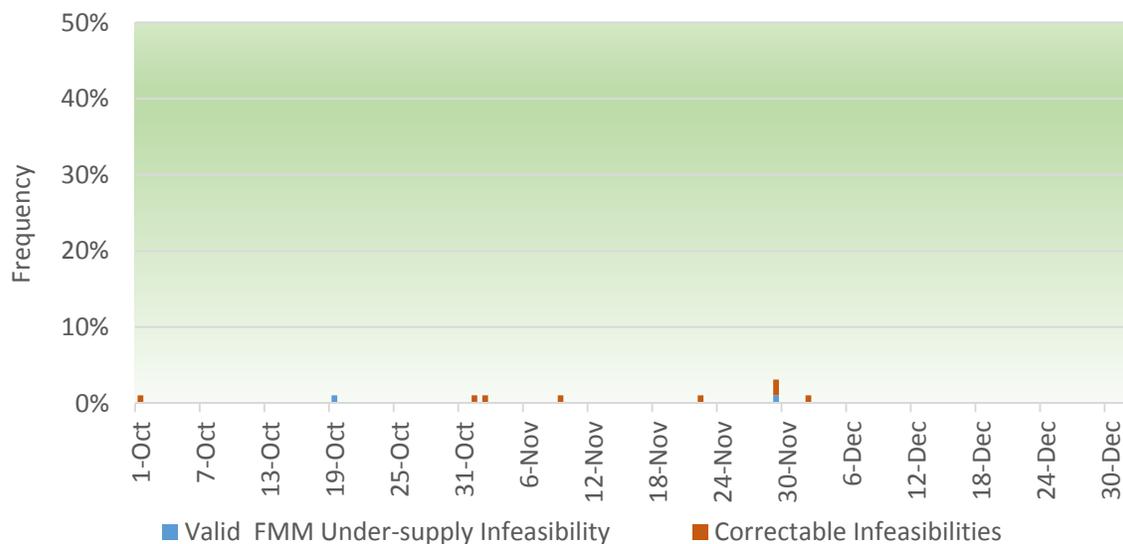
<sup>3</sup> Figure 1 also provides an estimated proxy price, which for PSE is the Mid C hub price taken from the Intercontinental Exchange (ICE).

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. For December, only one instance in the FMM market required a price correction for PSE balancing authority area prices under the CAISO’s price correction authority in Section 35 of the CAISO tariff. There were no such instances in the RTD market in December.

**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 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 those that fell in the “correctable” category were corrected based on provision 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.**

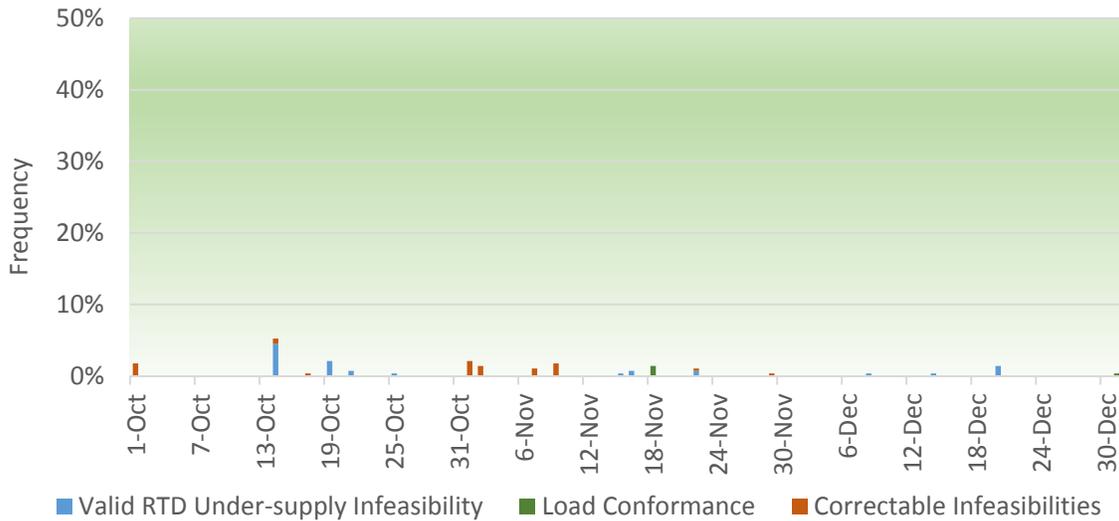


In the PSE balancing authority area, there were no valid under-supply infeasibility in the FMM and seven (0.08 percent of the time) valid under-supply infeasibilities in the RTD. The reasons for these infeasibilities were:

- i) December 8, RTD. Load forecast changes compounded with resources operating below base schedules and interplay with a rate of change constraint.
- ii) December 14, RTD. Limited transfers with adjacent EIM area compounded with a rate of change constraint; this constrains limited upward dispatches of several resources.
- iii) December 20, RTD. Net schedule interchange coming in lower than base schedules.
- iv) December 30, RTD. Renewable deviation compounded with load conformance needed for load forecast deviation.

Out of the seven RTD infeasibilities, only one instance coincided with the use of load conformance. 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 PSE balancing authority area.

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



There were no FMM intervals with valid undersupply infeasibilities; Table 1 lists the FMM and RTD intervals with infeasibilities observed in December, including the amount of load conformance to reflect the instances in which the load conformance limiter would have triggered and offset the infeasibility.

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

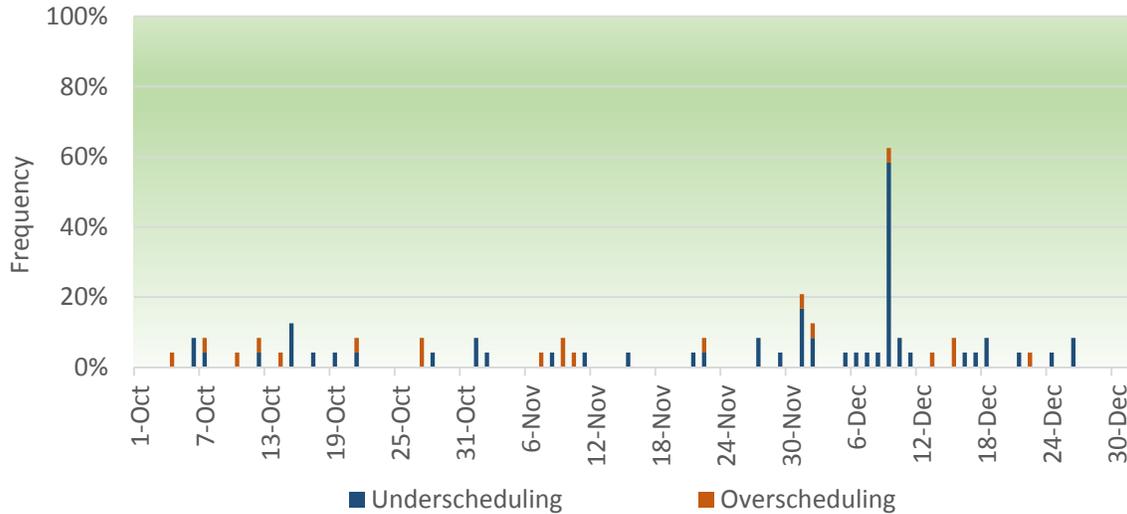
Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
08Dec2016	23	3	23.34	
14Dec2016	15	12	52.57	
20Dec2016	1	1	63.07	
20Dec2016	1	2	88.24	
20Dec2016	1	3	58.66	
20Dec2016	1	4	79.15	
30Dec2016	7	9	6.88	100

**c. Balancing and Sufficiency Test Failures**

Figure 4 shows the trend of balancing test outcomes for the month of December, which the CAISO performs pursuant to Section 29.34 (k) of the CAISO tariff. PSE passed the balancing test in 94.35 percent of the intervals in December. For the 5.65 percent of the intervals with failures observed, 4.7 percent of the failures were for under-scheduling and 0.95 percent for over-

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 1 through December 31, 2016. PSE passed the test in 98.39 percent of the intervals in December. For the 1.61 percent of intervals with failures, 0.62 percent was for upward capacity test failures and 0.99 percent of the failures were for downward capacity test.

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

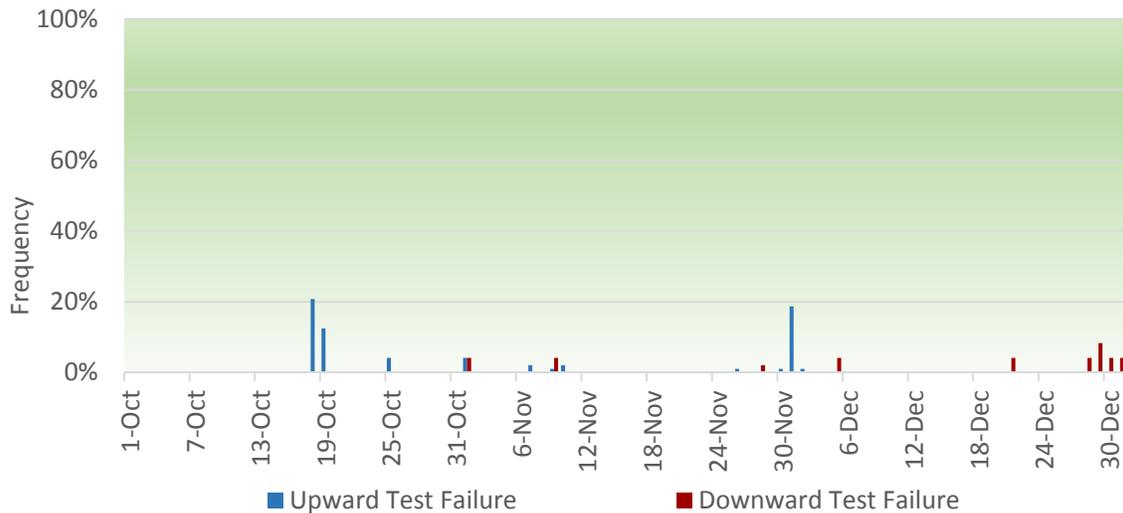
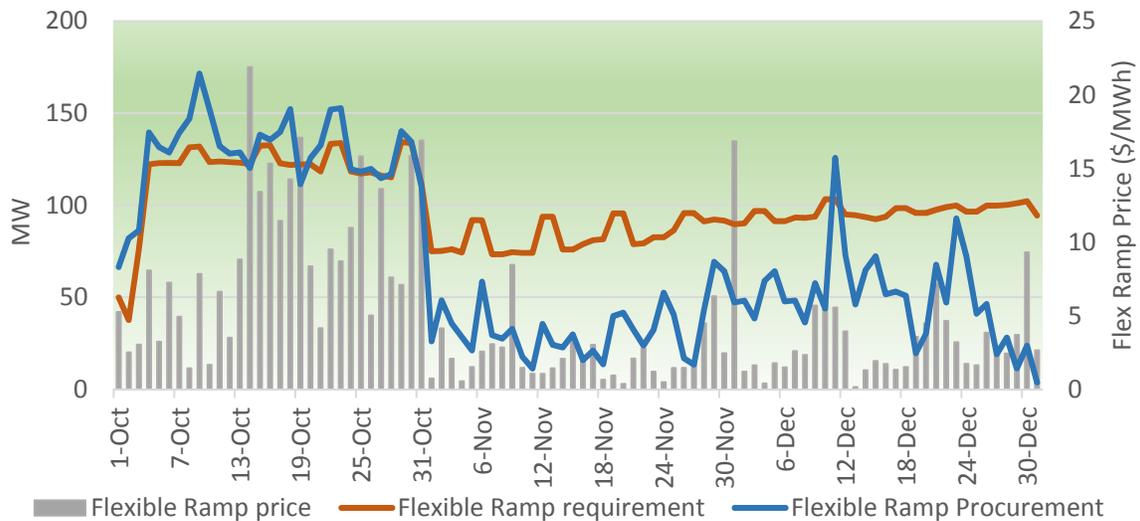


Figure 6 shows the daily average of the flexible ramp product requirement and procurement in the FMM. With the implementation of the flexible ramp product on November 1, 2016, the requirements are calculated based on historical data for uncertainty and offset with any applicable net import/export capability or credit. This effectively reduces the amount of flexible ramp capacity 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 ramp went from \$2.26/MWh in November up to \$3.48/MWh in December.

**Figure 6: Average requirement and procurement of flexible ramp 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 2<sup>nd</sup> day of March 2017.

*/s/ Grace Clark*  
Grace Clark