



June 13, 2018

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-\_\_\_\_  
April 2018 Informational Report  
Energy Imbalance Market – Transition Period Report – Powerex  
Canadian EIM Entity**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period of Powerex Canadian EIM Entity during its first six months of participation in the Energy Imbalance Market (EIM) for April 2018. 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 transition period.

Please contact the undersigned with any questions.

Respectfully submitted

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

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# California ISO

**Energy Imbalance Market**

**April 4 – April 30, 2018**

**Transition Period Report**

**Powerex Canadian EIM Entity**

June 13, 2018

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## I. Background and Information

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> Powerex Corp. (PWRX Canadian EIM Entity), a British Columbia corporation, entered the EIM on April 4, 2018, and the transition period will apply to PWRX Canadian EIM Entity until October 4, 2018. PWRX Canadian EIM Entity is not a balancing authority area (BAA) or transmission service provider like other EIM entities. PWRX Canadian EIM Entity utilizes residual capability of the British Columbia Hydro & Power Authority (BC Hydro), which is the balancing authority and transmission service provider for that capacity.

During the six-month transition period, the pricing of energy in the 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 between \$0 and \$0.01, but only when the power balance or transmission constraints are relaxed in the relevant EIM entity's location. 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 Powerex 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,<sup>2</sup> and depending on the market performance of 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.

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

<sup>2</sup> 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, PWRX Canadian EIM Entity's transition into the EIM was smooth and without significant issues, with the exception of a minor transitional data issue for the first hour of the implementation.

Since PWRX Canadian EIM Entity began participation in the EIM on April 4, 2018, the market results have been uneventful. The first month's market performance highlights are as follows:

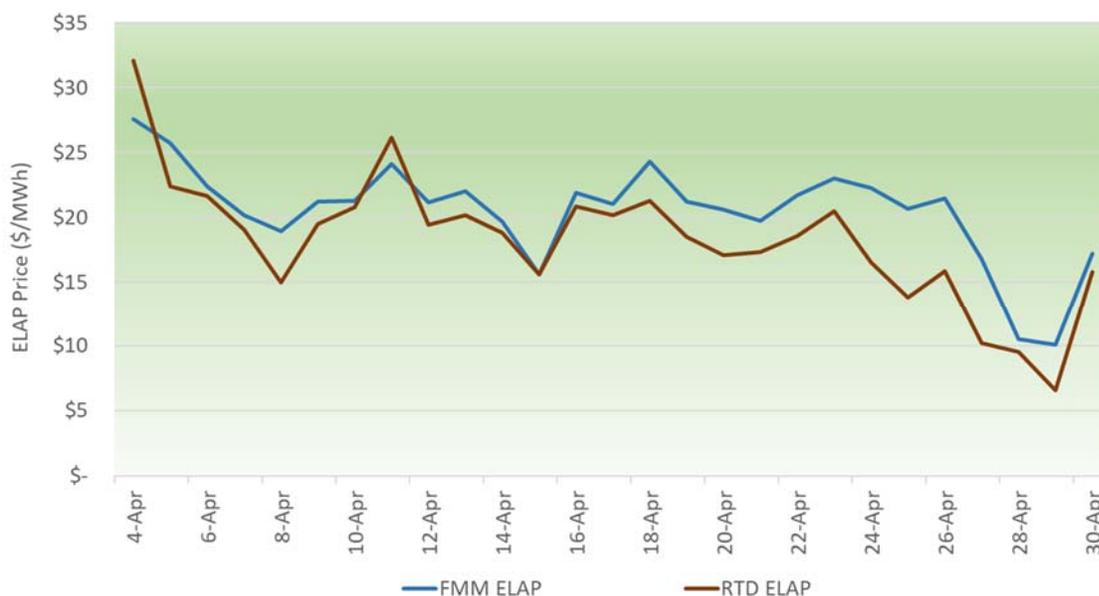
- The monthly average price in the fifteen-minute market (FMM) was \$20.45/MWh and \$18.25/MWh in the real-time dispatch (RTD) for PWRX Canadian EIM Entity.
- There were no power balance constraint infeasibilities for under-supply conditions in either the fifteen- or five-minute markets.
- PWRX Canadian EIM Entity passed its upward flexible ramping sufficiency tests 99.46 percent of the intervals.
- The price for upward flexible ramping capacity in the FMM for PWRX Canadian EIM Entity averaged \$0.69/MWh, while the price for the downward flexible ramping product averaged \$0.16/MWh.

### III. Market Performance Related to the Transitional Period

#### A. Prices

Figure 1 shows the average prices for PWRX Canadian EIM Entity’s EIM Load Aggregation Point (ELAP) for the period of April 4, 2018, through April 30, 2018. In April, the monthly average price in the FMM was \$20.45/MWh and \$18.25/MWh in the RTD. The maximum daily average price in the five-minute market peaked on April 4, 2018, at \$27.59/MWh, which was mainly driven by prices as high as \$40/MWh in hour ending eight during the early morning ramping hours, which occurred in the entire EIM footprint. The daily average price for PWRX Canadian EIM Entity dipped on April 28 and 29, 2018, because of over-supply conditions observed in the entire EIM footprint between hours ending 10 and 14. This scenario occurred due to high solar output and low load conditions that were due to mild temperatures during the spring months.

**Figure 1: Daily Average Prices for PWRX Canadian EIM Entity.**



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 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.

<sup>3</sup> Figure 1 also provides an estimated proxy price, which for PWRX Canadian EIM Entity is the simple average of Mid C hub price taken from the Intercontinental Exchange (ICE).

**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 for PWRX Canadian EIM Entity in the FMM and RTD, respectively. There were no power balance infeasibilities observed for the PWRX Canadian EIM Entity residual capacity.

**Figure 2: Frequency of FMM Under-Supply Power Balance Infeasibilities for PWRX Canadian EIM Entity.**



**Figure 3: Frequency of RTD Under-Supply Power Balance Infeasibilities for PWRX Canadian EIM Entity.**



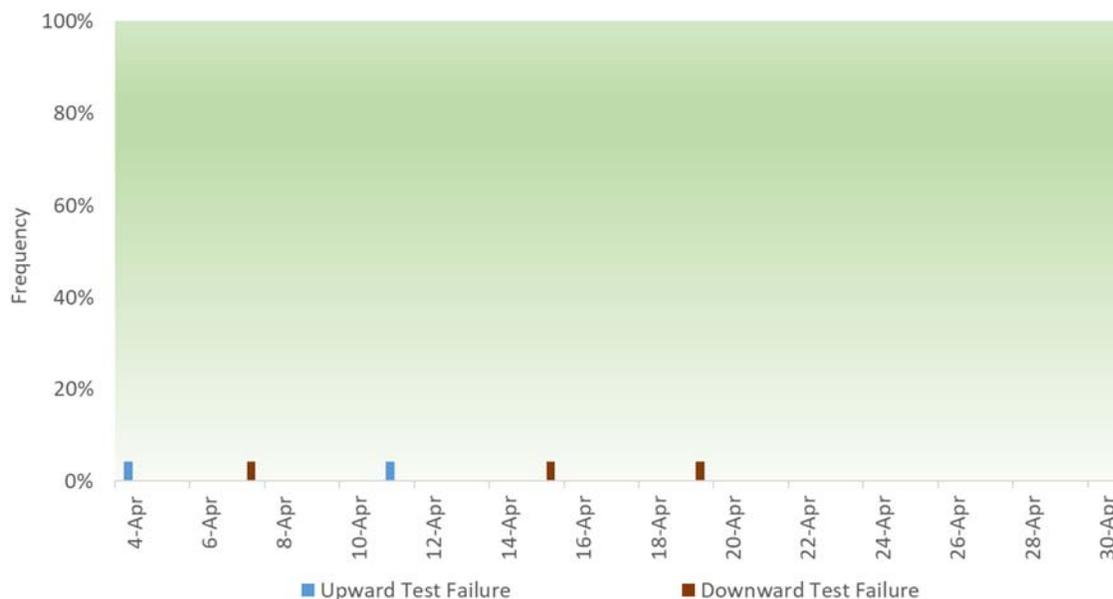
### C. Balancing and Sufficiency Test Failures

The EIM provides participating BAAs an opportunity to serve their 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. These tests occur prior to each run of the real-time market.

Under the arrangements approved by the Commission, BC Hydro provides its own load forecast to support PWRX Canadian EIM Entity’s participation in the EIM, rather than using a load forecast provided by the CAISO. Thus, the CAISO is not performing the balancing test as required under section 29.34(k) of the CAISO tariff. Consistent with Section 29.11(d), because if PWRX Canadian EIM Entity does not use the CAISO’s forecast, Powerex will be subject to over-scheduling or under-scheduling penalties for actual load imbalances.

Although the CAISO does not perform balancing tests for PWRX Canadian EIM Entity, it does perform the flexible ramping sufficiency test as required by section 29.34(m) of the CAISO tariff. Figure 4 shows the trend of the test failures for flexible ramping for the month April 2018. PWRX Canadian EIM Entity passed the flexible ramping-up test in 99.69 percent of the intervals in April 2018, which is well within the expected and typical rate observed in the EIM.

**Figure 4: Frequency of Flexible Ramping Sufficiency Test Failures for PWRX Canadian EIM Entity.**

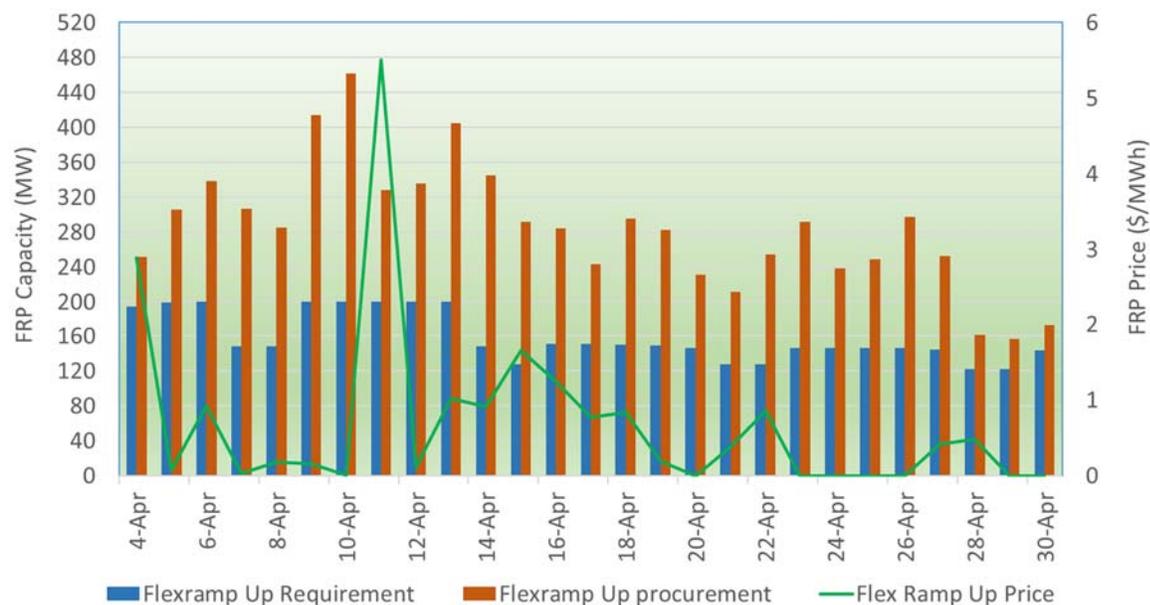


### D. Flexible Ramping Product

Figure 5 shows the daily average of the upward flexible ramping constraint requirement, procurement, and prices in the FMM. Figure 6 shows the daily average of the downward flexible ramping constraint requirement, procurement, and prices in the FMM. With the implementation of the flexible ramping product on November 1, 2016, the requirements is calculated based on historical data for uncertainty with any applicable net import/export capability or credit. This effectively reduces the amount of flexible ramping PWRX Canadian EIM Entity has to procure and, generally, the EIM system-wide area (which includes all of the BAAs in the EIM, including the CAISO BAA) will drive the requirements. The market clearing process may result in procuring PWRX Canadian EIM Entity capacity towards meeting the overall EIM-system-wide area requirement. This is the main reason why the individual PWRX Canadian EIM Entity procurement may generally fall below or be above its requirement.

In addition, the price trend provided in Figure 5 and Figure 6 is the nested price determined by the summation of the shadow price of the PWRX Canadian EIM Entity plus the shadow price of the EIM system-wide area. In April, the average upward flexible ramping capacity price was \$0.69/MWh and the average downward flexible ramping capacity price was \$0.16/MWh.

**Figure 5: Daily Average Requirement, Procurement, and Price of Upward Flexible Ramping in the FMM for PWRX Canadian EIM Entity**



**Figure 6: Daily Average Requirement, Procurement, and Price of Downward Flexible Ramping in the FMM for PWRX Canadian EIM Entity.**



For most of the time, the procurement of upward flexible ramping was above the area requirements, which naturally will lead to zero prices for PWRX Canadian EIM Entity. Still, with the EIM area binding, the net price for PWRX Canadian EIM Entity may be greater than zero.

### E. Impact on Non-EIM Nodes

With the implementation of the EIM on November 1, 2014, there was a price reporting issue for shared locations between the CAISO market and the EIM. These shared locations schedule energy for the CAISO BAA and are located in the EIM system-wide area, and have associated mirror resources. In late 2014, the CAISO worked on improving these shared locations' modelling, and reported its progress in the corresponding transitional period reports for PacifiCorp's BAAs (PAC East and PAC West).

In July of 2017, the CAISO detected an issue related to these non-EIM nodes, and the CAISO corrected these issues in March of 2018. Currently, there are no known issues related to these types of locations.

## 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 13<sup>th</sup> day of June, 2018.

*/s/ Grace Clark*  
Grace Clark