August 20, 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: ER15-2565-_____
Energy Imbalance Market Special Report Transition Period – April 2018 for Idaho Power Company

Dear Secretary Bose:

The Department of Market Monitoring (DMM) hereby submits its Energy Imbalance Market (EIM) special report on the transition period of Idaho Power Company (IPCO) during its first six months of participation in the EIM for April 2018. IPCO entered the EIM on April 4, 2018.

Please contact the undersigned directly with any questions or concerns regarding the foregoing.

Respectfully submitted,

By: _/s/ Eric Hildebrandt_

Eric Hildebrandt
Director of Market Monitoring
California Independent System
Operator Corporation
250 Outcropping Way
Folsom, CA 95630
Tel: (916) 608-7123
Fax: (916) 608-7222
ehildebrandt@caiso.com

California Independent
System Operator Corporation

California ISO

Report on energy imbalance market issues and performance: Idaho Power for April 2018

August 16, 2018

Prepared by: Department of Market Monitoring

Executive summary

Pursuant to the Commission's October 29, 2015 Order on the ISO's energy imbalance market (EIM), the ISO filed a report on June 19, 2018 covering the period from April 4 through April 30, 2018 (April report) for the Idaho Power area in the energy imbalance market.[1] This report provides a review by the Department of Market Monitoring (DMM) of energy imbalance market performance in the Idaho Power area during the period covered in the ISO's April report. Key findings in this report include the following:

- Prices in the Idaho Power area often tracked similarly to system prices on average, except during peak system load hours when Idaho Power prices were significantly lower. Prices averaged about $22/MWh in the 15-minute market and $21/MWh in the 5-minute market.
- Idaho Power failed the upward sufficiency test frequently during April, during over 12 percent of hours. In the downward direction, the balancing area failed the sufficiency test infrequently, during just 5 hours.
- Valid under-supply infeasibilities occurred during almost 0.6 percent of 5-minute intervals during April. These mostly occurred after failing the upward sufficiency test. Valid over-supply infeasibilities occurred in less than 0.1 percent of 5-minute intervals.
- Without special transition pricing provisions in place, the load bias limiter would not have resolved any infeasibilities. Therefore, the load bias limiter would not have had an impact on prices had it been in place and not the transition period pricing mechanism.
- DMM reviewed the results and conclusions in the ISO's April report and found that the results are largely consistent with those reported in this document. However, the ISO's report does not account for the number of over-supply infeasibilities.

Section 1 of this report provides a description of prices and power balance constraint relaxations, section 2 discusses the load bias limiter, and section 3 discusses the flexible ramping sufficiency test.

[1] The ISO's April 2018 Report was filed at FERC on June 19, 2018 and posted on the ISO website on June 20, 2018, http://www.caiso.com/Documents/Jun19_2018_EIMTransitionPeriodReport_IPCo_Apr2018_ER15-2565.pdf.

1 Energy imbalance market prices

Figure 1.1 and Figure 1.2 show hourly average 15-minute and 5-minute prices during April for Idaho Power, PacifiCorp East, and Pacific Gas and Electric (PG&E), as well as the bilateral prices DMM used as an additional benchmark for energy imbalance market prices.

The bilateral price benchmark for Idaho Power is composed of energy prices at the Mid-Columbia hub published by ICE. These are representative of prices used for settling imbalance energy in the Idaho Power area prior to energy imbalance market implementation.

Prices in the Idaho Power area often tracked similarly to system prices on average, except during peak system load hours when Idaho Power prices were significantly lower. Price separation during these hours was largely the result of several days when high system prices caused transfers out of the Idaho Power and PacifiCorp East areas to reach their upper scheduling limits. In the Idaho Power area during the month, prices averaged about $22/MWh in the 15-minute market and $21/MWh in the 5-minute market. During the majority of intervals, real-time prices in Idaho Power and PacifiCorp East were similar.

Figure 1.1 Average hourly 15-minute price (April 2018)

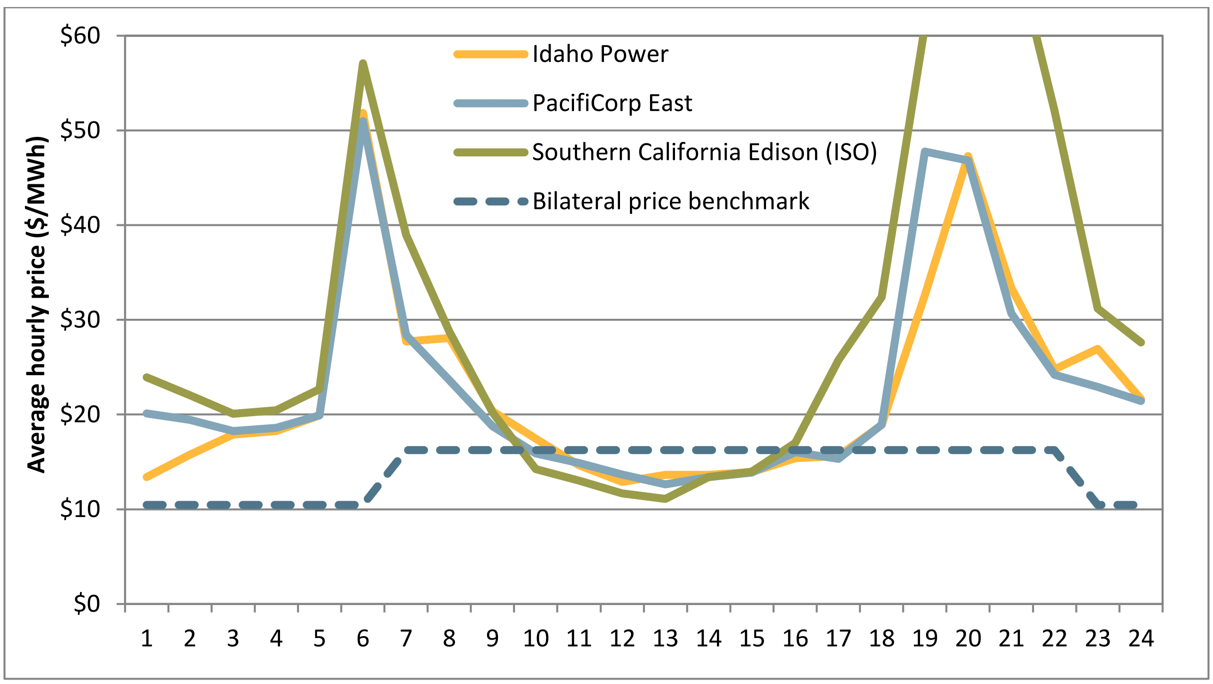
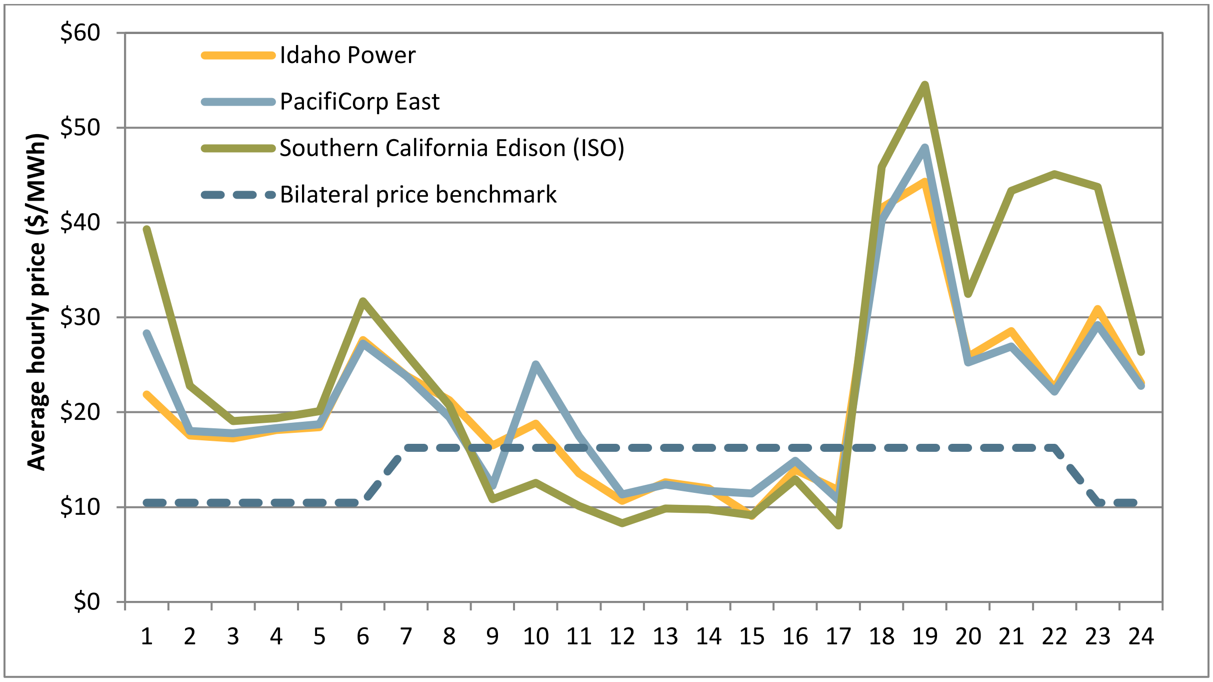


Figure 1.2 Average hourly 5-minute price (April 2018)



All power balance constraint relaxations that occurred in April were subject to the six-month transition period pricing that expires in October 2018. The transition period pricing mechanism sets prices at the highest cost supply bid dispatched to meet demand rather than at the $1,000/MWh penalty parameter while relaxing the constraint for shortages, or the -$155/MWh penalty parameter while relaxing the constraint for excess energy.[2] Power balance constraint relaxations can be grouped in the following categories:

- **Valid under-supply infeasibility** (power balance constraint shortage). These occurred when the power balance constraint was relaxed because load exceeded available generation. The ISO validated that ISO software was working appropriately during these instances.
- **Valid over-supply infeasibility** (power balance constraint excess). These occurred when the power balance constraint was relaxed because generation exceeded load. The ISO validated that ISO software was working appropriately during these instances.
- **Load bias limiter would have resolved infeasibility.** These occurred when a load adjustment entered by operators exceeded the amount of the power balance constraint relaxation and in the same direction. During the transition period, the load bias limiter did not change price outcomes because transition period pricing was applied during these intervals instead. However, in these

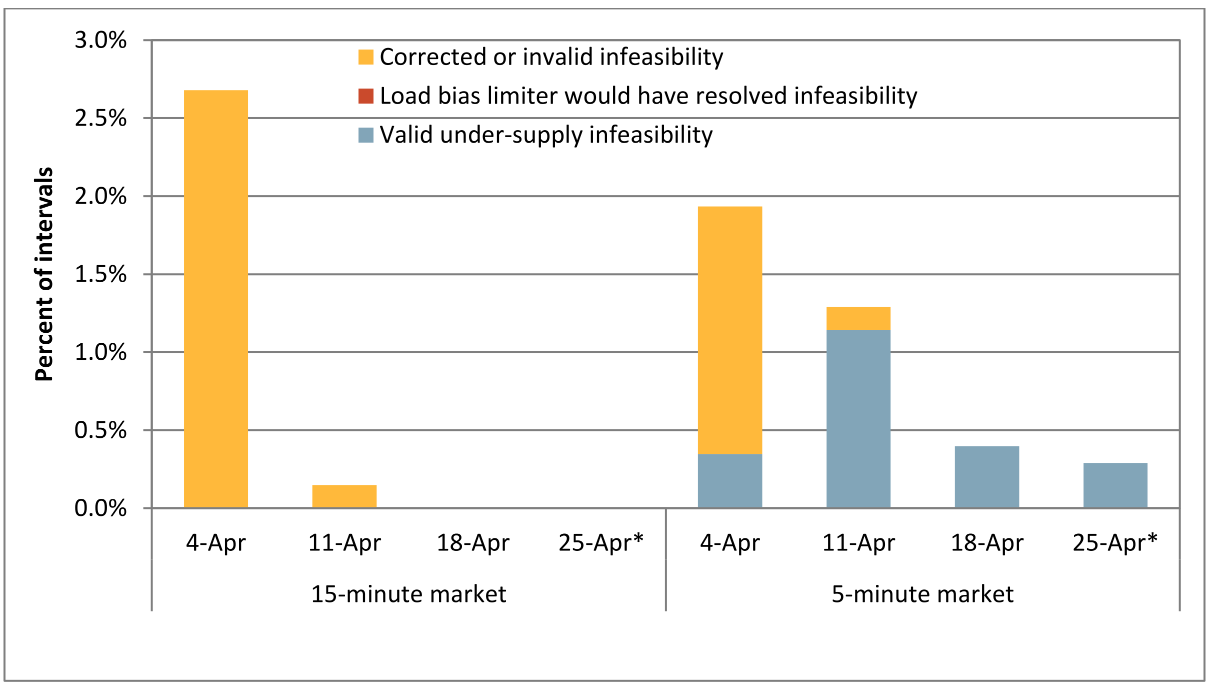
[2] When transition period pricing provisions are triggered by relaxation of the power balance constraint, any shadow price associated with the flexible ramping product is set to $0/MWh to allow the market software to use the last economic bid dispatched.

cases, the load bias limiter would have reduced the operator adjustment in the pricing run to resolve the infeasibility had transition period pricing not been in effect.

- **Correctable infeasibility.** These occurred when the ISO software relaxed the power balance constraint because of either a software error or data error. These required a price correction or would have triggered a price correction if transition period pricing were not active.[3]

Figure 1.3 and Figure 1.4 show the weekly frequency of under-supply and over-supply infeasibilities, respectively, in the 5-minute market and 15-minute market. As shown in Figure 1.3 and Figure 1.4, valid infeasibilities did not occur in the 15-minute market for Idaho Power during April. In the 5-minute market, valid under-supply infeasibilities occurred during almost 0.6 percent of 5-minute intervals. These mostly occurred after failing the upward sufficiency test. Valid over-supply infeasibilities occurred in less than 0.1 percent of 5-minute intervals during April.

Figure 1.3 Frequency of under-supply power balance infeasibilities by week Idaho Power



[3] Section 35 of the ISO tariff provides the ISO authority to correct prices if it detects an invalid market solution or issues due to a data input failure, occurrence of hardware or software failure, or a result that is inconsistent with the ISO tariff. During erroneous intervals, the ISO determined that prices resulting under transition period pricing were equivalent to prices that would result from a price correction, so no further price adjustment was appropriate. http://www.caiso.com/Documents/Section35_MarketValidationAndPriceCorrection_May1_2014.pdf.

Figure 1.4 Frequency of over-supply power balance infeasibilities by week Idaho Power

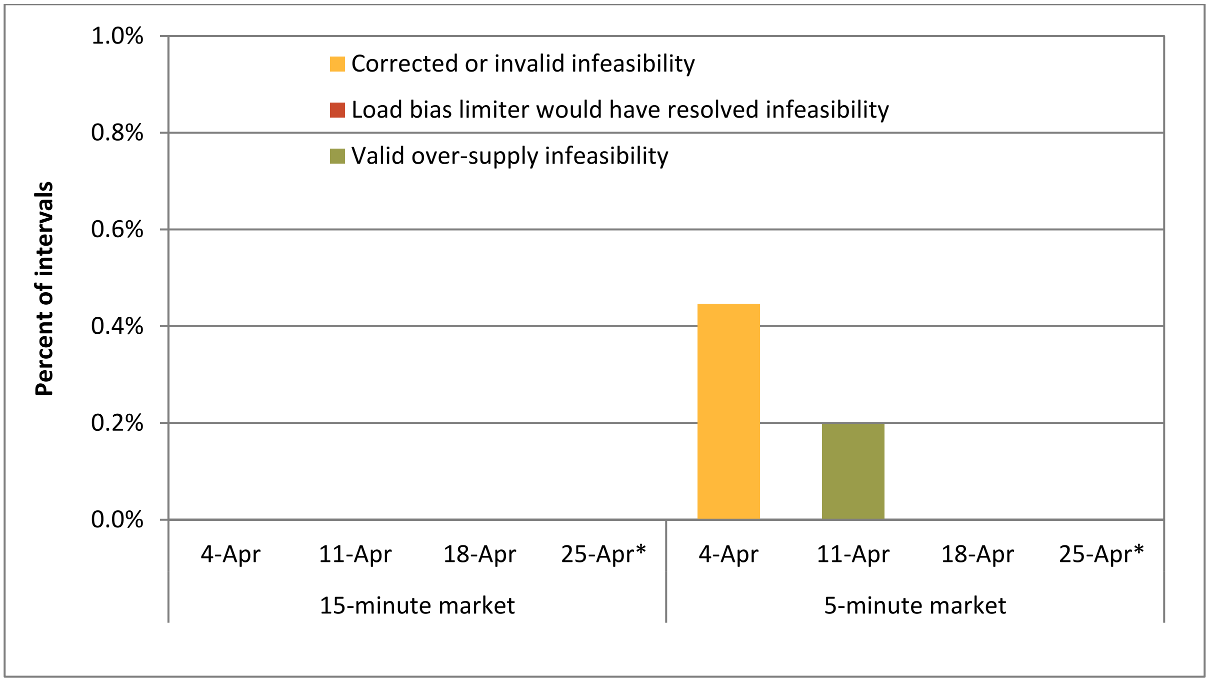
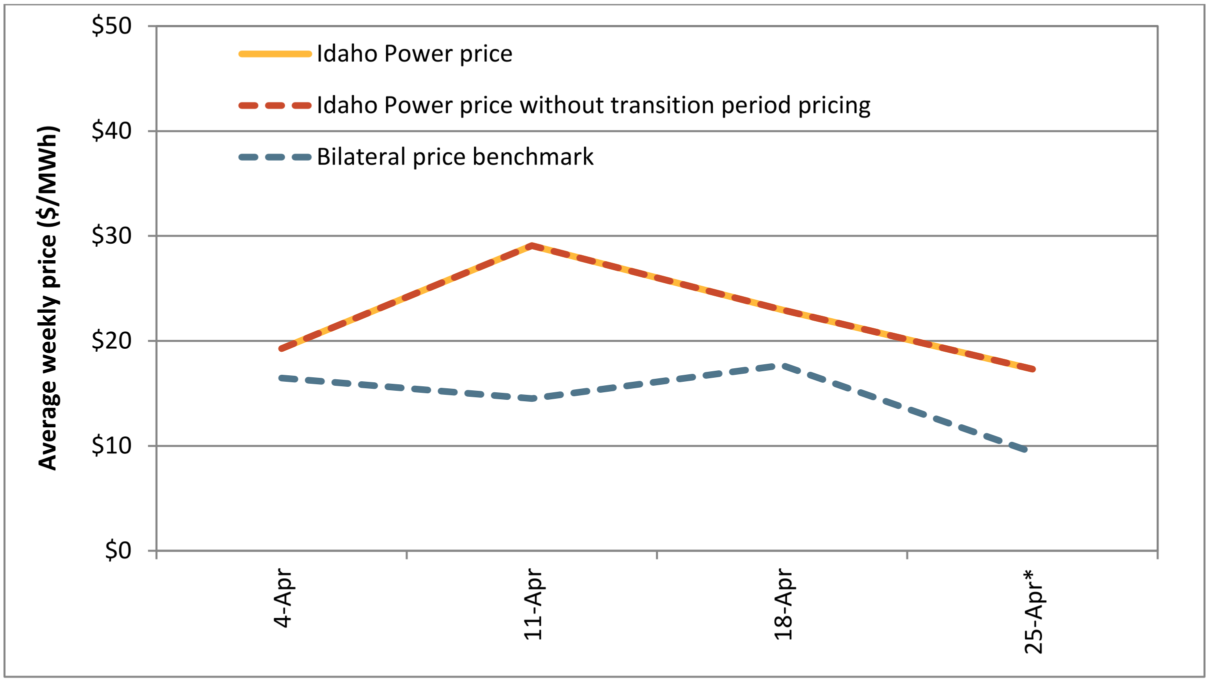


Figure 1.5 and Figure 1.6 show the average weekly prices in the 15-minute market and 5-minute market *with* and *without* the special transition period pricing provisions applied to mitigate prices in the Idaho Power area during April.[4] These figures also include the average bilateral price benchmark for comparison to Idaho Power prices, depicted by the dashed blue line.

Because there was a relatively high frequency of power balance constraint relaxations in the 5-minute market for Idaho Power during April, average prices without transition period pricing would have been much higher than actual prices with transition period pricing. On average for the month, transition period pricing decreased average 5-minute market prices by around $5/MWh. Transition period pricing did not impact 15-minute market prices.

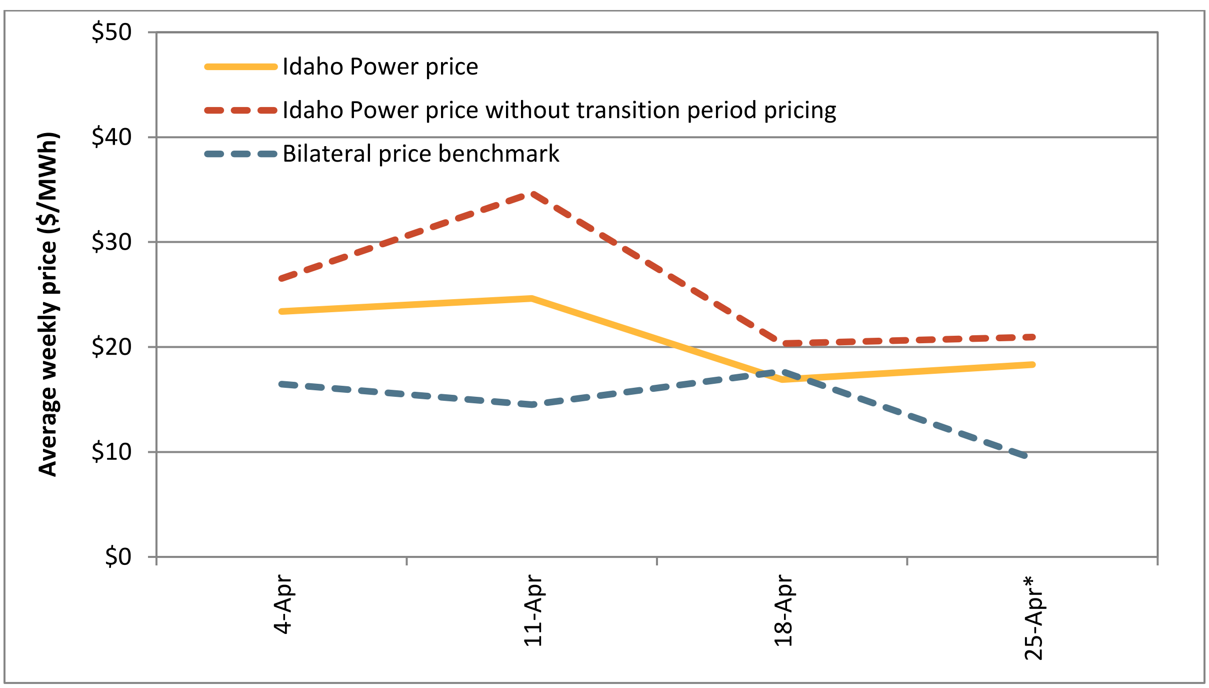
[4] A detailed description of the methodology used to calculate these counterfactual prices that would result without transition period pricing was provided on p. 7 of the January 2017 report for Arizona Public Service from DMM: https://records.oa.caiso.com/sites/GCA/legal/mm/Records/EIM/FERC%20Report/2017-01%20Arizona/EIM%20Special%20Report%20January%20APS.pdf.

Figure 1.5 Average prices by week – Idaho Power (15-minute market)



*Indicates partial week

Figure 1.6 Average prices by week – Idaho Power (5-minute market)



*Indicates partial week

2 Load bias limiter

When the load bias limiter is triggered it has the same effect as the transition period pricing feature and causes prices to be set by the last economic bid dispatched rather than the $1,000/MWh penalty price for under-supply power balance relaxations or the -$155/MWh penalty price for over-supply power balance relaxations. A more detailed description of the load bias limiter is included in DMM's April 2015 report.[5]

Table 2.1 shows average 15-minute and 5-minute market prices with transition period pricing as well as counterfactual estimates for prices without transition period pricing and without either transition period pricing or the load bias limiter.

While the frequency of power balance constraints in the 5-minute market was relatively high, the load bias limiter would not have triggered during any of the infeasibilities. As a result, the load bias limiter would not have impacted prices, had transition period pricing not been in effect.

Table 2.1 Impact of load bias limiter on Idaho Power prices (April 2018)

	Average proxy price	Price with transition period pricing	Estimated price without transition period pricing	Estimated price without transition period pricing or load bias limiter	Potential impact of load bias limiter	
					Dollars	Percent
Idaho Power						
15-minute market (FMM)	$14.32	$22.33	$22.33	$22.33	$0.00	0.0%
5-minute market (RTD)	$14.32	$20.90	$25.80	$25.80	$0.00	0.0%

[5] *Report on Energy Imbalance Market Issues and Performance*, Department of Market Monitoring, April 2, 2015, pp.34-35. http://www.caiso.com/Documents/Apr2_2015_DMM_AssessmentPerformance_EIM-Feb13-Mar16_2015_ER15-402.pdf.

3 Flexible ramping sufficiency test

The flexible ramping sufficiency test ensures that each balancing area has enough ramping resources over each hour to meet expected upward and downward ramping needs. The test is designed to ensure that each energy imbalance market area has sufficient ramping capacity to meet real-time market requirements without relying on transfers from other balancing areas.

When the energy imbalance market was initially implemented there was an upward ramping sufficiency test. In November 2016, the ISO implemented an additional downward ramping sufficiency test in the market with the introduction of the flexible ramping product, which replaced the flexible ramping constraint. If an area fails the upward sufficiency test, energy imbalance market imports cannot be increased.[6] Similarly, if an area fails the downward sufficiency test, exports cannot be increased. In addition to the sufficiency test, each area is also subject to a capacity test. If an area fails the capacity test, then the flexible ramping sufficiency test automatically fails as a result.[7]

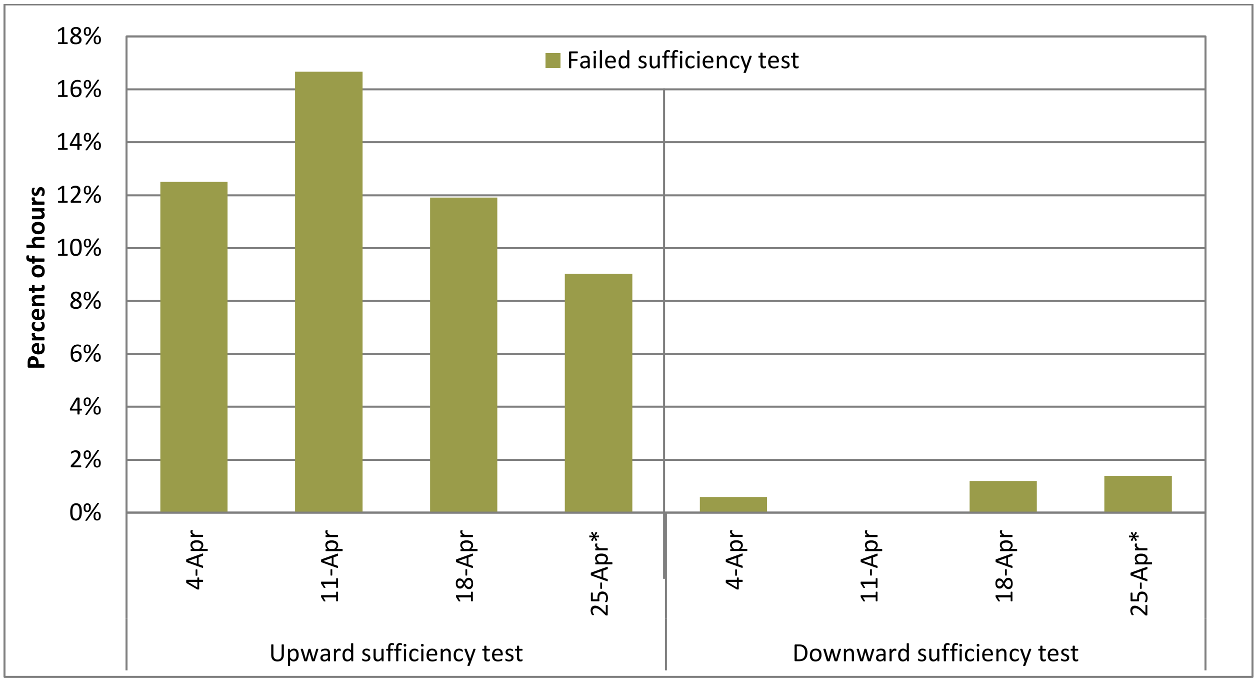
Limiting transfers can impact the frequency of power balance constraint relaxations and, thus, price separation across balancing areas. Constraining transfer capability may also impact the efficiency of the energy imbalance market by limiting transfers into and out of a balancing area that could potentially provide benefits to other balancing areas.

Figure 3.1 shows the frequency that Idaho Power failed the sufficiency test in the upward or downward direction. As shown in Figure 3.1, Idaho Power failed the upward sufficiency test frequently during April, during over 12 percent of hours. In the downward direction, the balancing area failed the sufficiency test infrequently, during just 5 hours.

[6] *Business Practice Manual for the Energy Imbalance Market*, August 30, 2016, p. 45-52: https://bpmcm.caiso.com/BPM%20Document%20Library/Energy%20Imbalance%20Market/BPM_for_Energy%20Imbalance%20Market_V6_clean.docx.

[7] *Business Practice Manual for the Energy Imbalance Market*, August 30, 2016, p. 45.

Figure 3.1 Idaho Power flexible ramping sufficiency test results



*Indicates partial week

CERTIFICATE OF SERVICE

I certify that I have served the foregoing document upon the parties listed on the official service list in the captioned proceedings, 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, on this 20th day of August, 2018.

/s/ Grace Clark
Grace Clark