

January 7, 2022

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-\_\_  
Independent Assessment by the Department of Market Monitoring  
November 2021 Energy Imbalance Market Transition Period Report for  
NorthWestern Energy**

Dear Secretary Bose:

The Department of Market Monitoring (DMM) hereby submits its independent assessment on the transition period of NorthWestern Energy (NWMT) during its first six months of participation in the Energy Imbalance Market (EIM) for November 2021, as NWMT joined the EIM on June 16, 2021.

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](mailto:ehildebrandt@caiso.com)

## California ISO

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# Report on energy imbalance market issues and performance: NorthWestern Energy for November 2021

**January 7, 2022**

**Prepared by: Department of Market Monitoring**

## Executive summary

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Pursuant to the Commission’s October 29, 2015 Order on the ISO’s energy imbalance market (EIM), the ISO filed a report on December 21, 2021 covering the period from November 1 through November 30, 2021 (November report) for NorthWestern Energy (NWMT) in the energy imbalance market.<sup>1</sup> NWMT joined the energy imbalance market on June 16, 2021, and the transition period will apply to the NWMT balancing authority area (BAA) until November 30, 2021.<sup>2</sup>

This report provides a review by the Department of Market Monitoring (DMM) of energy imbalance market performance for the NWMT balancing authority area during the period covered in the ISO’s November report. This is the fifth and final report for the transition period for the NWMT balancing authority area. Key findings in this report include the following:

- Prices in NWMT area generally tracked lower than prices in the ISO. During the month, prices averaged \$38.32/MWh in the 15-minute market and \$35.59/MWh in the 5-minute market
- The NWMT balancing authority area failed the upward sufficiency test during 14 intervals as well as the downward sufficiency test during 4 intervals. Furthermore, the NWMT balancing authority failed the upward capacity test during 34 intervals in November.
- The frequency of valid under-supply infeasibilities was significantly lower in November compared to October, occurring primarily in the 5-minute market. The frequency of over-supply infeasibilities continued to be low and only occurred in the 5-minute market.
- On average for the month, transition period pricing did not impact 15-minute market prices, while it decreased 5-minute market prices in the NWMT area by \$1.08/MWh.

Section 1 of this report provides a description of prices and power balance constraint relaxations and section 2 discusses the flexible ramping sufficiency and bid range capacity tests.

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<sup>1</sup> The ISO’s November 2021 Report was filed at FERC and posted on the ISO website on December 21, 2021: <http://www.caiso.com/Documents/Dec21-2021-EIM-TransitionPeriodReport-NorthWesternEnergy-Nov2021-ER15-2565.pdf>

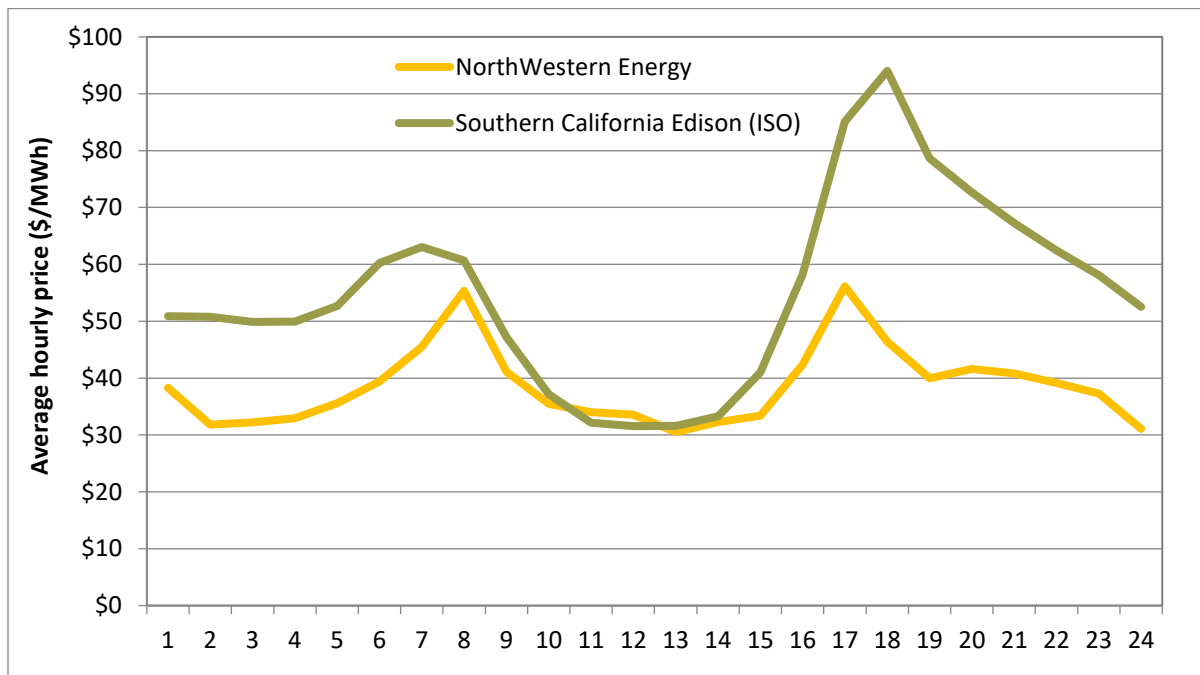
<sup>2</sup> This follows from the application of CAISO Tariff section 27(b)(1), which refers to a number of months rather than a number of days.

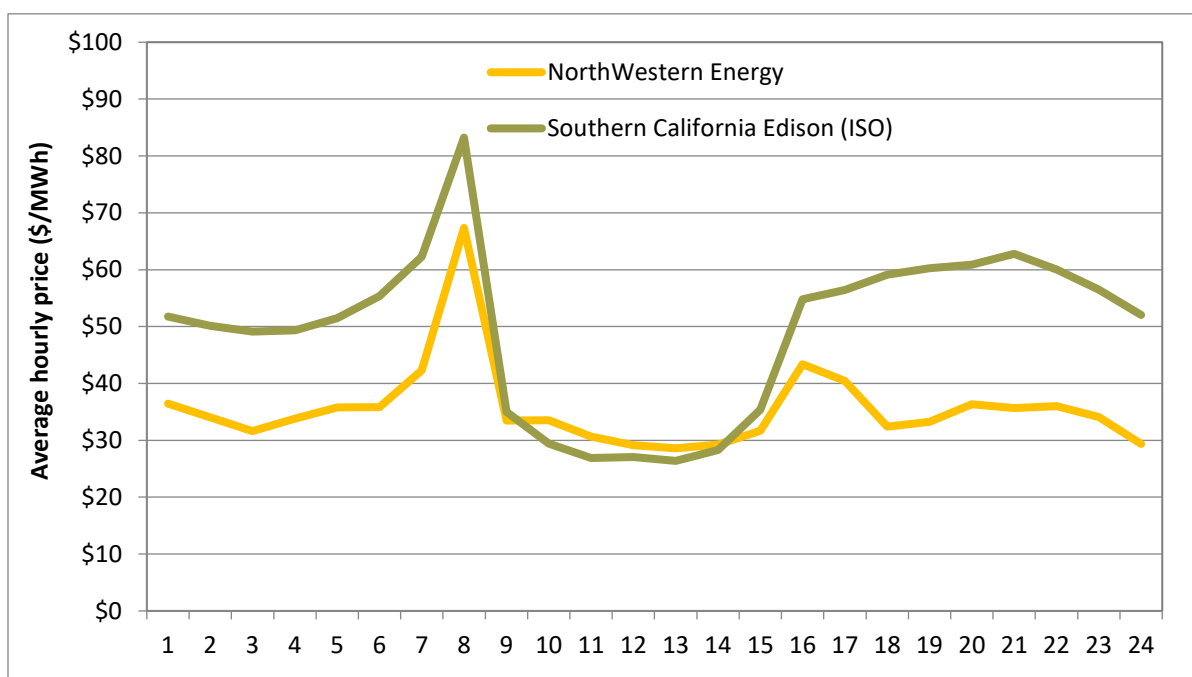
# 1 Energy imbalance market prices

Figure 1.1 and Figure 1.2 show hourly average 15-minute and 5-minute prices for November in the NWMT area compared with prices in the ISO at the Southern California Edison (SCE) default load aggregation point.

Prices in NorthWestern Energy area followed the same general trend as prices the Southern California Edison (SCE) default aggregation point within the ISO. Separation between the areas occurred frequently over all hours. In the NWMT area during the month, prices averaged \$38.32/MWh in the 15-minute market and \$35.59/MWh in the 5-minute market.

**Figure 1.1 Average hourly 15-minute price (November 2021)**



**Figure 1.2 Average hourly 5-minute price (November 2021)**

All power balance constraint relaxations that occurred in November were subject to the six-month transition period pricing that expires on December 1, 2021.<sup>2</sup> 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.<sup>3 4</sup> 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 conformance limiter would have resolved infeasibility.** The load conformance limiter automatically reduces the size of an operator load adjustment and sets prices at the last economic

<sup>3</sup> 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.

<sup>4</sup> The penalty parameter while relaxing the constraint for shortages may rise from \$1,000/MWh to \$2,000/MWh, depending on system conditions, per phase 2 implementation of FERC Order 831.

signal when the conditions for the limiter are met.<sup>5</sup> During the transition period, the limiter does not change price outcomes because transition period pricing is applied during these intervals instead. However, in these cases, the load conformance limiter *would have resolved the infeasibility* had transition period pricing not been in effect.

- **Correctable infeasibility.** These occurred when the ISO software relaxed the power balance constraint concurrent with a software error or data error that resulted in a price correction or would have triggered a price correction if transition period pricing were not active.<sup>6</sup>

Figure 1.3 and Figure 1.4 show the monthly frequency of under-supply and over-supply infeasibilities, respectively, in the 15-minute and 5-minute markets. As shown in Figure 1.3, there were 11 valid under-supply infeasibilities in the 5-minute market, and none in the 15-minute market during November.

As shown in Figure 1.4, there were 3 valid over-supply infeasibilities in the 5-minute market, and none in the 15-minute market.

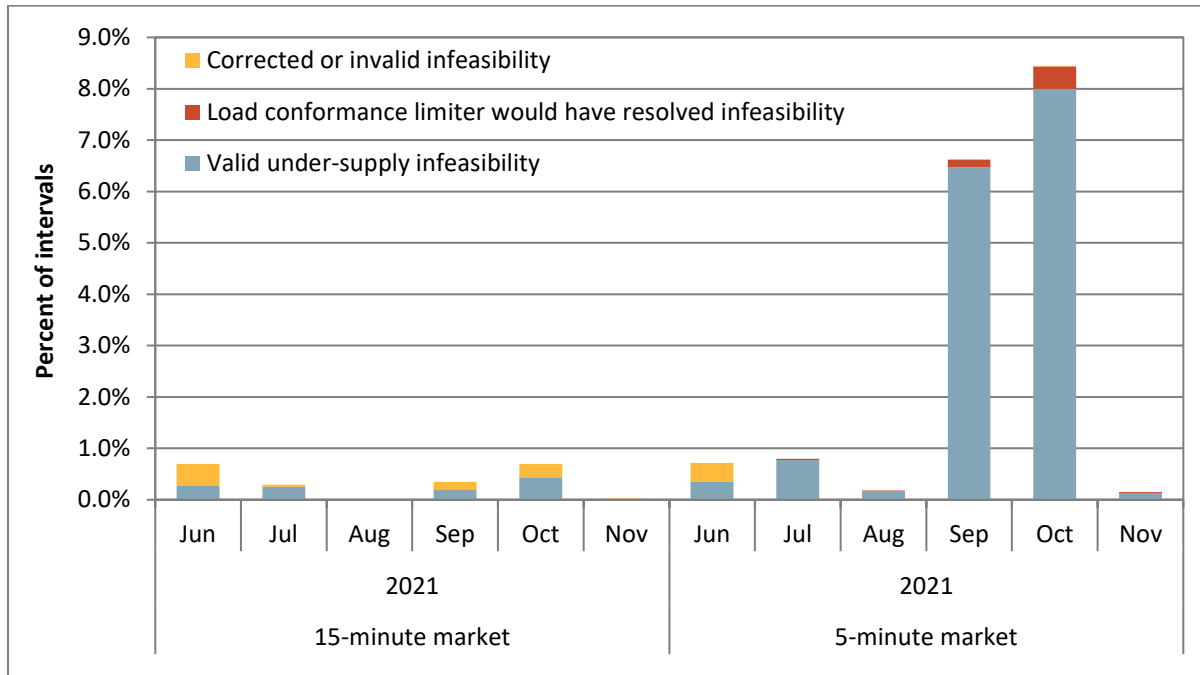
There were 2 intervals in the 5-minute market during November when the load conformance limiter would have triggered for the NWMT balancing authority area had transition period pricing not been in effect.

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<sup>5</sup> The ISO implemented an enhancement to the load conformance limiter, effective February 27, 2019. With the enhancement, the load conformance limiter triggers by a measure based on the change in load adjustment from one interval to the next, rather than the total level of load adjustment.

<sup>6</sup> 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](http://www.caiso.com/Documents/Section35_MarketValidationAndPriceCorrection_May1_2014.pdf).

**Figure 1.3 Frequency of under-supply power balance infeasibilities by month NorthWestern Energy**



**Figure 1.4 Frequency of over-supply power balance infeasibilities by month NorthWestern Energy**

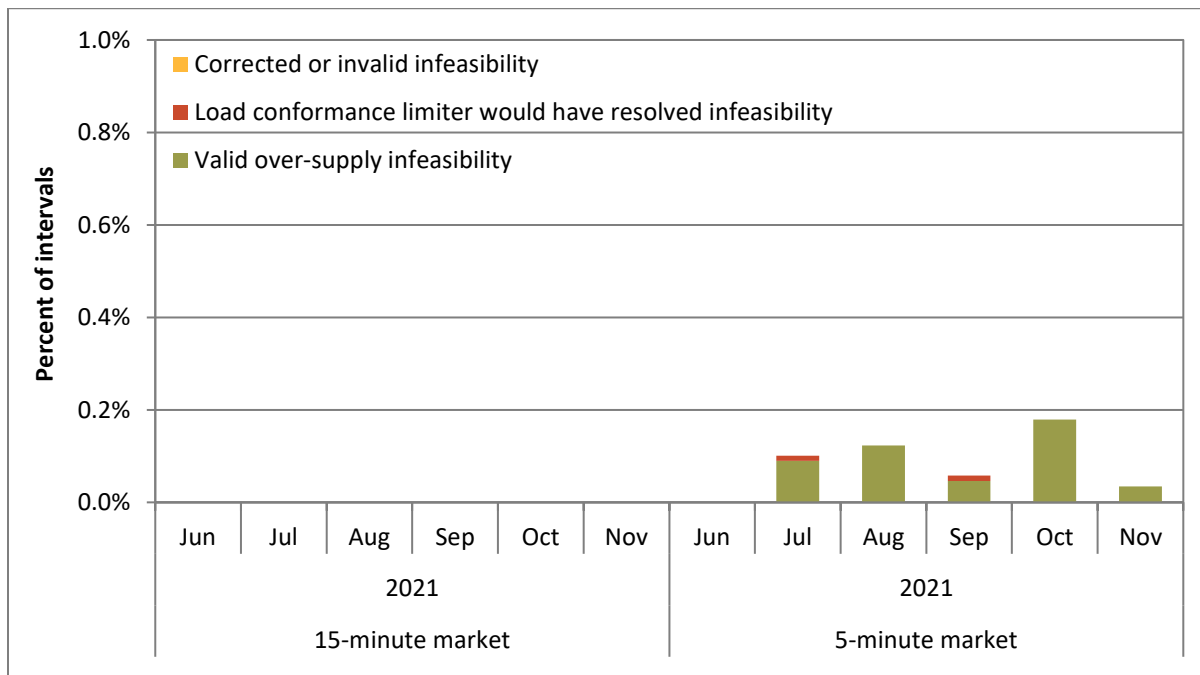
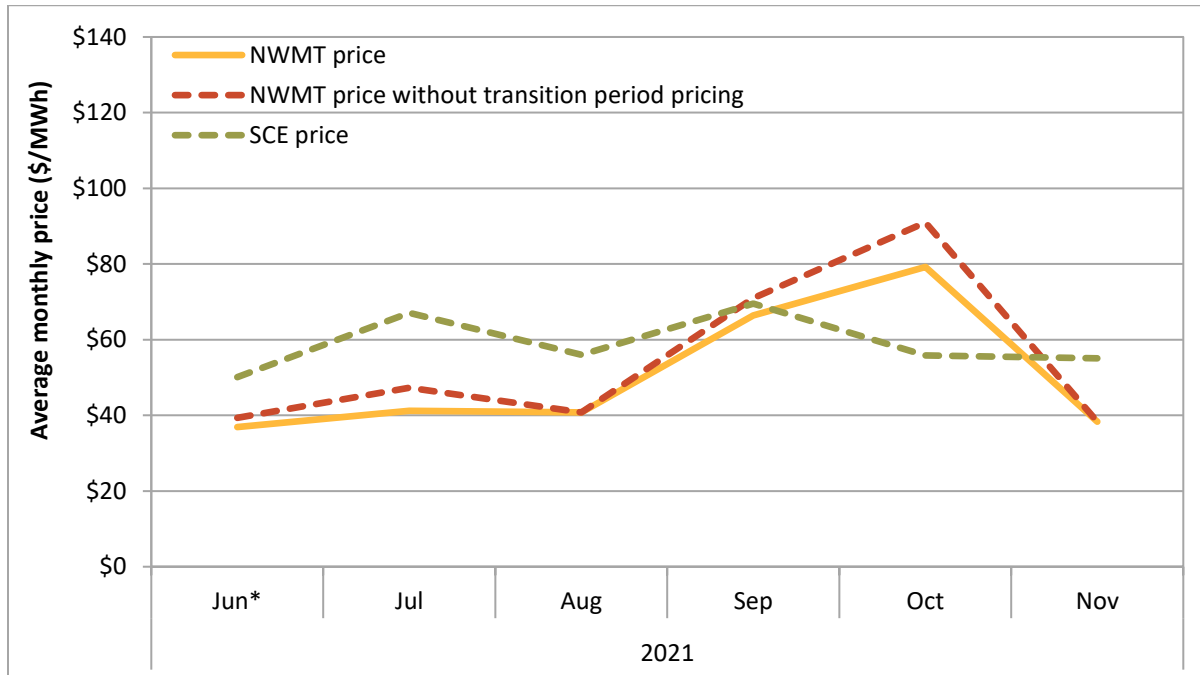


Figure 1.5 and Figure 1.6 show the average monthly prices in the 15-minute and 5-minute market *with* and *without* the special transition period pricing provisions applied to mitigate prices in the NWMT area

during November.<sup>7</sup> On average for the month, transition period pricing did not impact 15-minute market prices, while it decreased 5-minute market prices in the NWMT area by \$1.08/MWh.

**Figure 1.5 Average prices by month – NorthWestern Energy (NWMT) (15-minute market)**

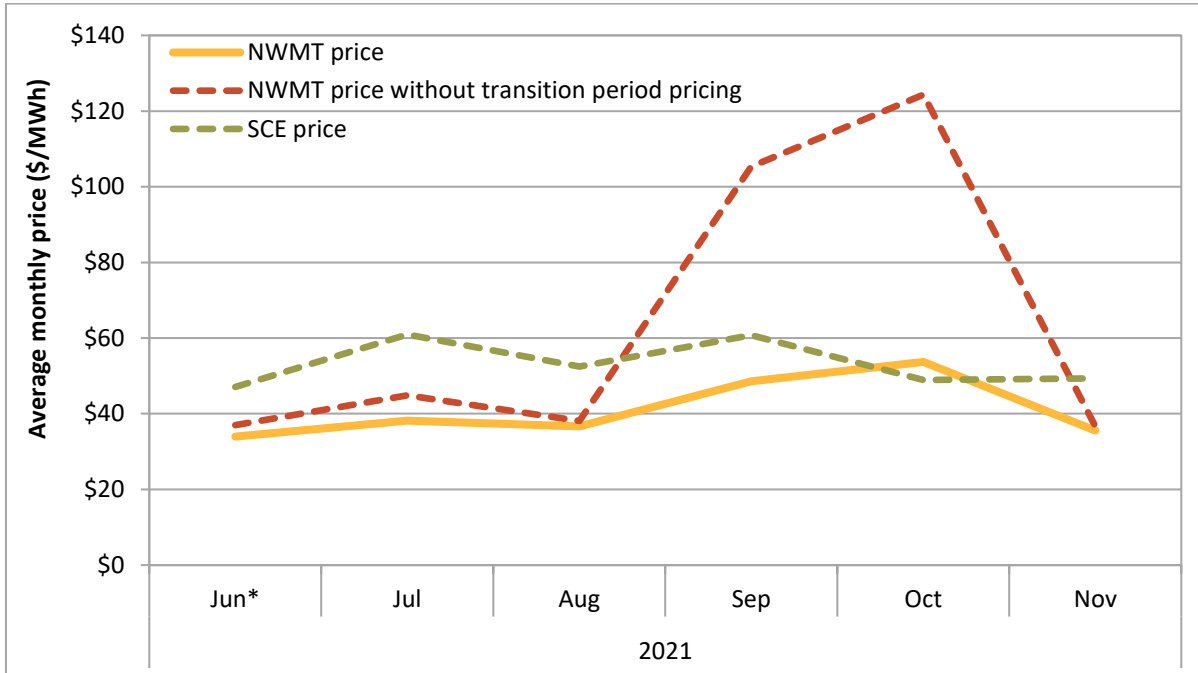


\*The June time frame covers June 16 to June 30.

<sup>7</sup> 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: [http://www.caiso.com/Documents/May1\\_2017\\_Department\\_MarketMonitoring\\_EIMTransitionPeriodReport\\_ArizonaPublicService\\_Jan2017\\_ER15-2565.pdf](http://www.caiso.com/Documents/May1_2017_Department_MarketMonitoring_EIMTransitionPeriodReport_ArizonaPublicService_Jan2017_ER15-2565.pdf)



**Figure 1.6 Average prices by month – NorthWestern Energy (NWMT) (5-minute market)**



\*The June time frame covers June 16 to June 30.

## 2 Flexible ramping sufficiency and bid range capacity tests

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As part of the energy imbalance market, each area including the California ISO is subject to a resource sufficiency evaluation. The evaluation is performed prior to each hour to ensure that generation in each area is sufficient without relying on transfers from other balancing areas. The evaluation includes two tests:

- **The bid range capacity test (capacity test)** requires that each area provide incremental bid-in capacity to meet the imbalance between load, inertia, and generation base schedules.
- **The flexible ramping sufficiency test (sufficiency test)** requires that each balancing area has enough ramping flexibility over an hour to meet the forecasted change in demand as well as uncertainty.

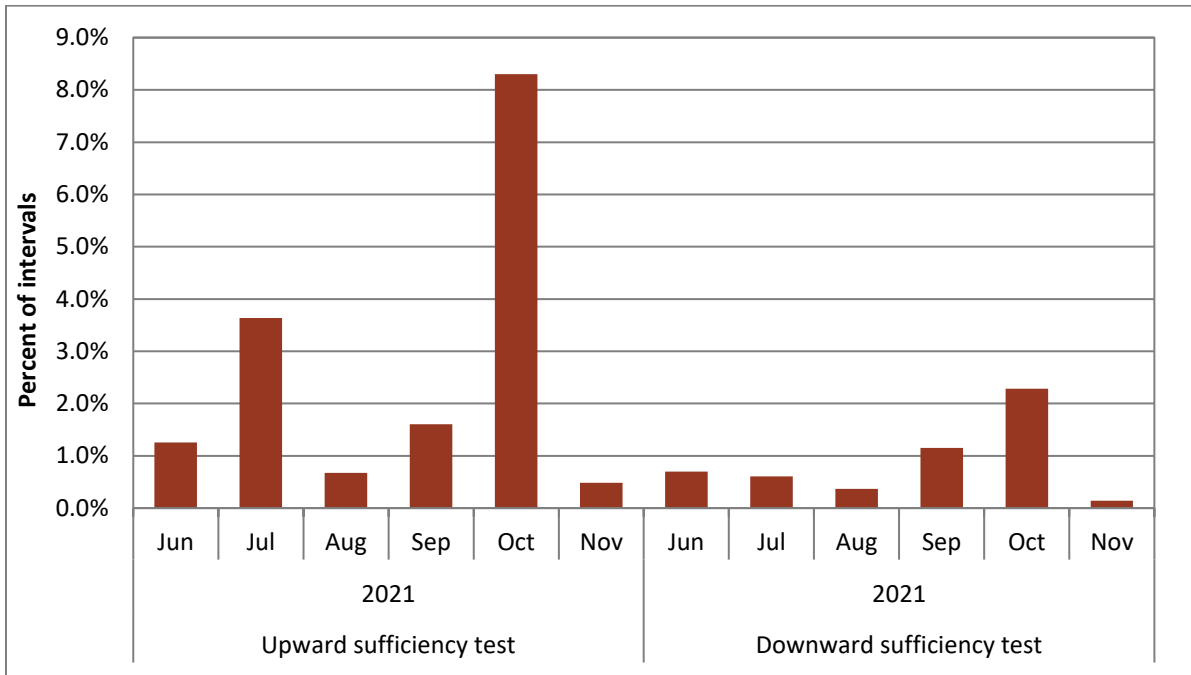
If an area fails either the bid range capacity test or flexible ramping sufficiency test, energy imbalance market transfers into that area cannot be increased.<sup>8</sup> Failures of the capacity and sufficiency test are important because these outcomes limit transfer capability. Constraining transfer capability may affect the efficiency of the EIM by limiting transfers into and out of a balancing area that could potentially provide benefits to other balancing areas. Reduced transfer capability also affects the ability for an area to balance load, since there is less availability to import-from or export-to neighboring areas. This can result in local prices being set at power balance constraint penalty parameters.

Figure 2.1 shows the monthly frequency of upward and downward flexible ramping sufficiency test failures, while Figure 2.2 shows the number of bid range capacity test failures by month. The NWMT balancing authority area failed the upward sufficiency test during 14 intervals (0.5 percent) as well as the downward sufficiency test during 4 intervals (0.1 percent) in November. Furthermore, the NWMT balancing authority failed the upward capacity test during 34 intervals (1.2 percent). There were no downward capacity test failures by the NWMT balancing authority in November.

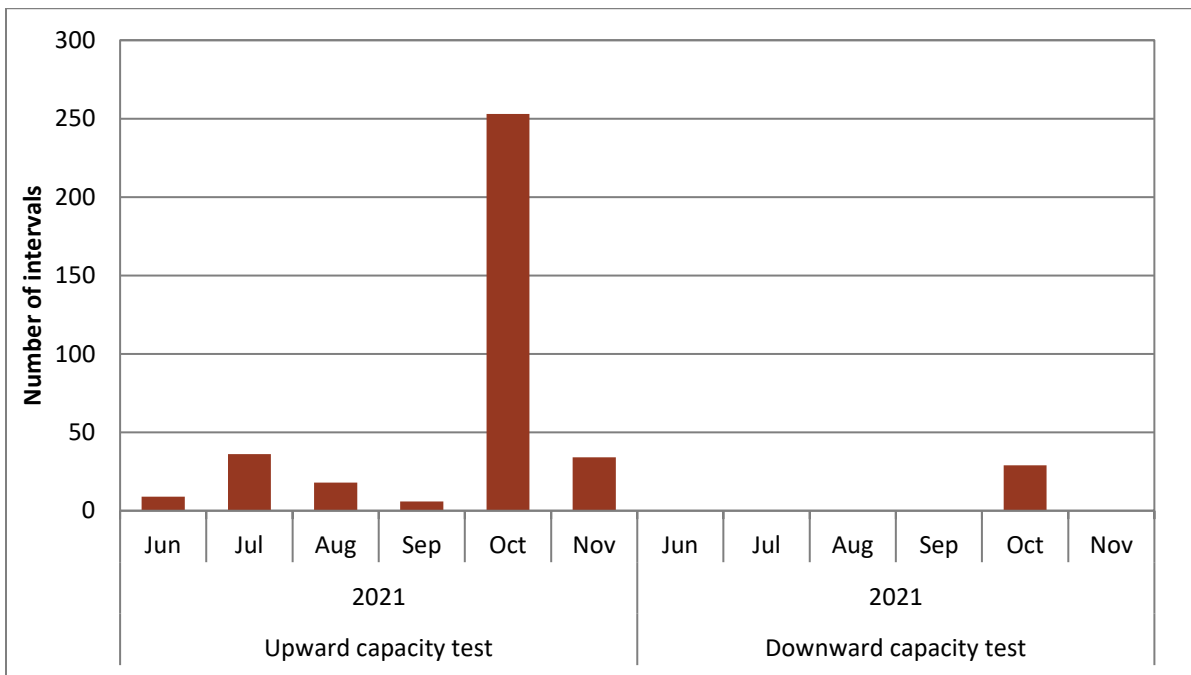
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<sup>8</sup> If an area fails either test in the upward direction, net EIM imports (negative) during the hour cannot exceed the lower of either the base transfer or optimal transfer from the last 15-minute interval prior to the hour.

**Figure 2.1 Frequency of upward and downward sufficiency test failures by month NorthWestern Energy (NWMT)**



**Figure 2.2 Number of upward and downward capacity test failures by month NorthWestern Energy (NWMT)**



**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, this 7<sup>th</sup> day of January, 2022.

*/s/ Jennifer Shirk*