

December 22, 2021

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
September 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 September 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

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California ISO

**Report on energy imbalance market
issues and performance:
NorthWestern Energy
for September 2021**

December 22, 2021

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 November 22, 2021 covering the period from September 1 through September 30, 2021 (September report) for NorthWestern Energy (NWMT) in the energy imbalance market.¹ 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, 2021.²

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 September report. This is the third 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, but experienced greater volatility. In the NWMT area during the month, prices averaged \$66.39/MWh in the 15-minute market and \$48.60/MWh in the 5-minute market.
- The NWMT balancing authority area failed the upward sufficiency test during 46 intervals as well as the downward sufficiency test during 33 intervals in September. Furthermore, the NWMT balancing authority failed the upward capacity test during 6 intervals. NWMT did not fail the downward capacity test during the month.
- The frequency of valid under-supply infeasibilities was far higher in September compared to any prior month, occurring primarily in the 5-minute market. The frequency of over-supply infeasibilities was low and only occurred in the 5-minute market.
- On average for the month, transition period pricing decreased 15-minute and 5-minute market prices in the NWMT area by \$4.55/MWh and \$56.72/MWh, respectively.

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.

¹ The ISO’s September 2021 Report was filed at FERC and posted on the ISO website on November 22, 2021: <http://www.caiso.com/Documents/Nov22-2021-EIMTransitionPeriodReport-NorthWestern-Energy-Sep2021-ER15-2565.pdf>

² 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 September 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 \$66.39/MWh in the 15-minute market and \$48.60/MWh in the 5-minute market.

The primary reason for the volatility in prices in the NWMT area was a lack of incremental transfer capacity due to an outage on the Brady POR POD that has dynamic ETSR paths with IPCO and PACE.^[1] This outage began on September 20th and the loss of this dynamic ETSR path meant the total ETSR transfer capability in NWMT went from approximately 420 MW of imports and 500 MW of export to 0 MW import and 55 MW export.^[2] As shown in Figure 1.3, average daily 15-minute market prices in NWMT were generally below the ISO market area, Mid-Columbia and Palo Verde bilateral market prices until the loss of transfer capacity led NWMT area prices to rise.

DMM reviewed market participant behavior during this time and found that resources in NWMT bid at or below their default energy bid (DEB) during the times when there was little to no competition from imports. Figure 1.4 shows the average incremental energy mitigated in the 15-minute market in NWMT between June and September. The blue bars in the figure show average incremental energy subject to mitigation but whose bids were not lowered in the 15-minute market. As seen in the figure, the amount of bids subject to mitigation increased significantly in September and can be attributed to reduced transfer capacity on the transfer constraints into NWMT. Red bars show the volume of bids lowered as a result of mitigation is very low.

^[1] For more information on this outage and its effects on NorthWestern Energy's transfer capacity, please see Section 3b of the ISO's September 2021 Report.

^[2] ISO's September Transition Period Report for NorthWestern Energy, Section 3b:
<http://www.caiso.com/Documents/Nov22-2021-EIMTransitionPeriodReport-NorthWestern-Energy-Sep2021-ER15-2565.pdf>

Figure 1.1 Average hourly 15-minute price (September 2021)

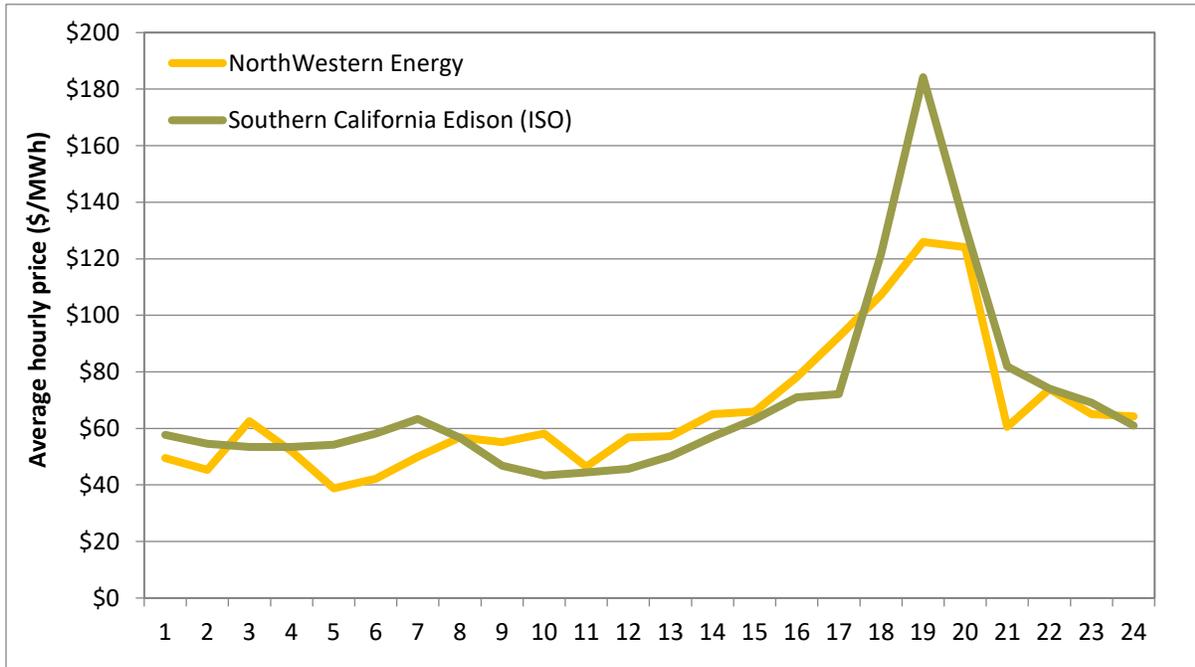


Figure 1.2 Average hourly 5-minute price (September 2021)

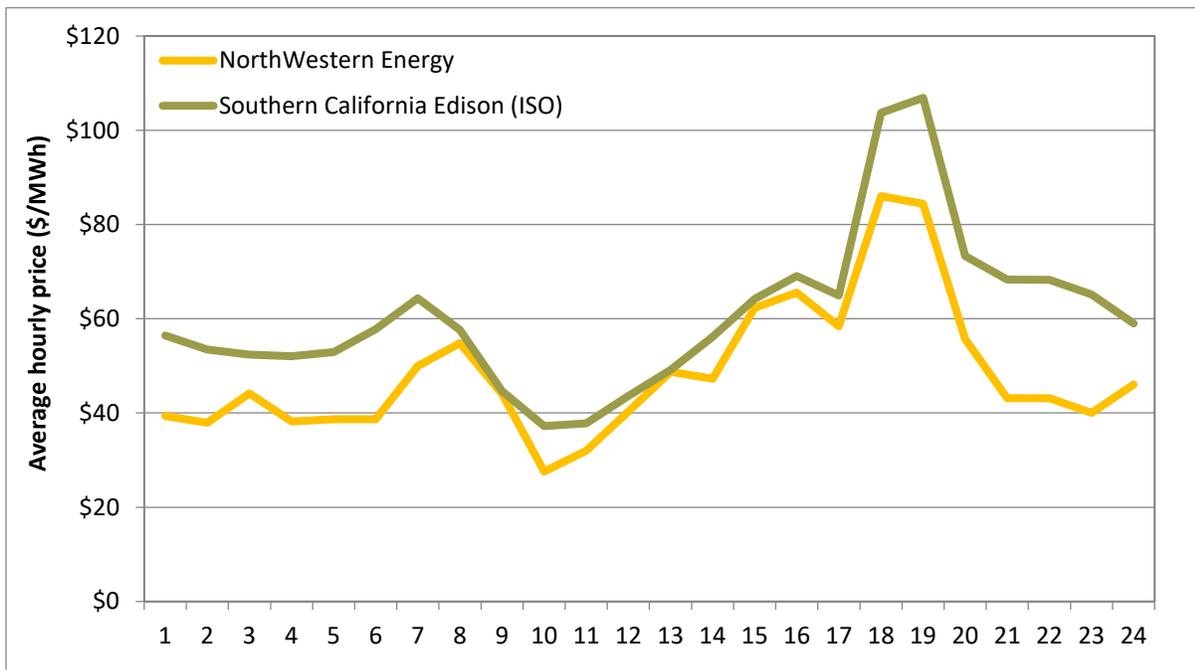


Figure 1.3 Daily average 15-minute and bilateral prices

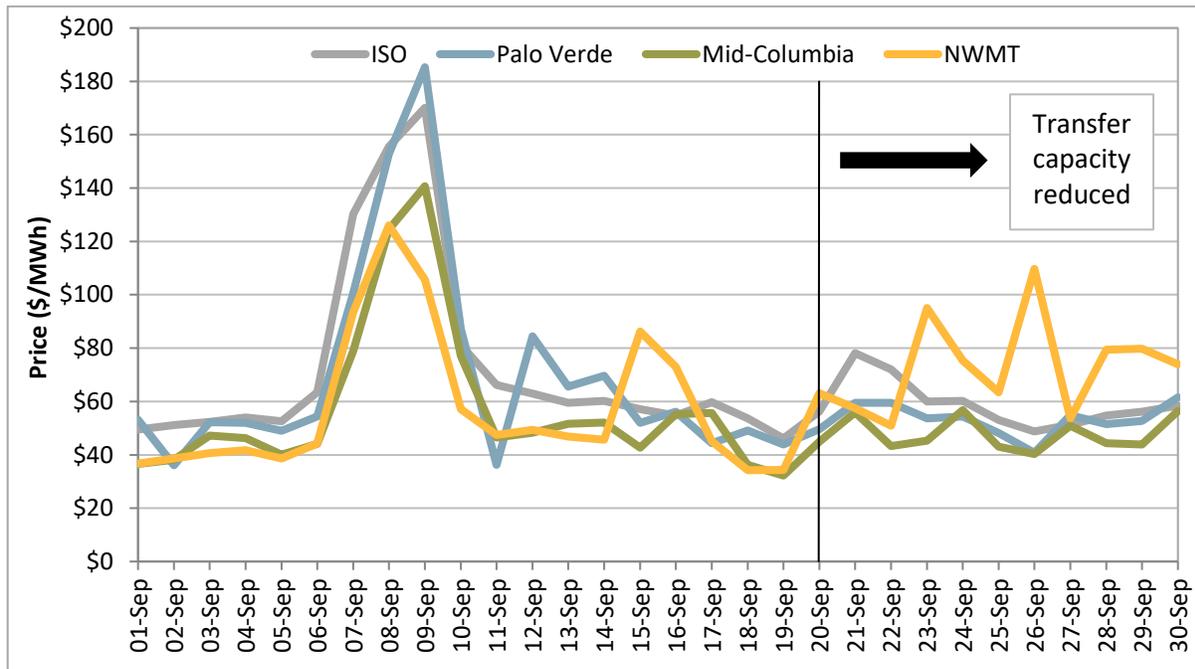
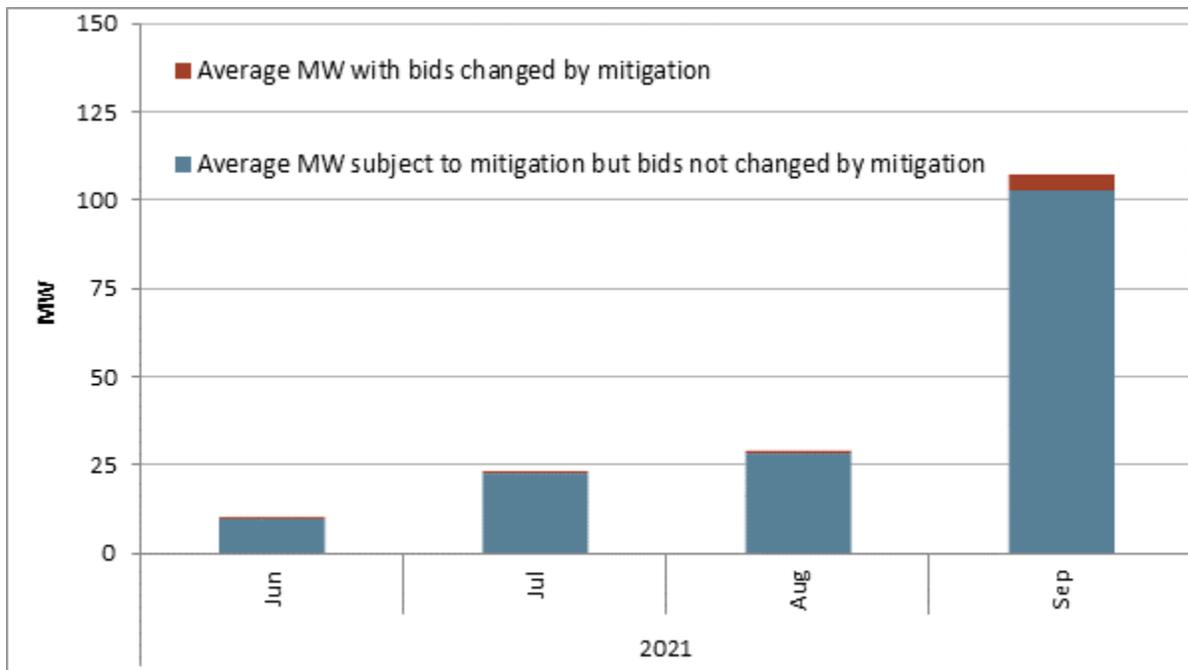


Figure 1.4 Average incremental energy mitigated in 15-minute real-time market (Nwmt)



All power balance constraint relaxations that occurred in September were subject to the six-month transition period pricing that expires on December 1, 2021.² 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.^{3 4} 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 signal when the conditions for the limiter are met.⁵ 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.⁶

Figure 1.5 and Figure 1.6 show the weekly frequency of under-supply and over-supply infeasibilities, respectively, in the 15-minute and 5-minute markets. As shown in Figure 1.5, there were 16 valid under-supply infeasibilities in the 15-minute market, and 559 in the 5-minute market during September. This high number of under-supply infeasibilities is due to the lack of transfer capacity that began on September 20, when the Brady POR POD went on outage.

As shown in Figure 1.6, there were 4 valid over-supply infeasibilities in the 5-minute market, and none in the 15-minute market.

There was 1 interval in the 15-minute market and 14 intervals in the 5-minute market during September when the load conformance limiter would have triggered for the NWMT balancing authority area had transition period pricing not been in effect.

³ 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.

⁴ 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.

⁵ 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.

⁶ 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 1.5 Frequency of under-supply power balance infeasibilities by week NorthWestern Energy

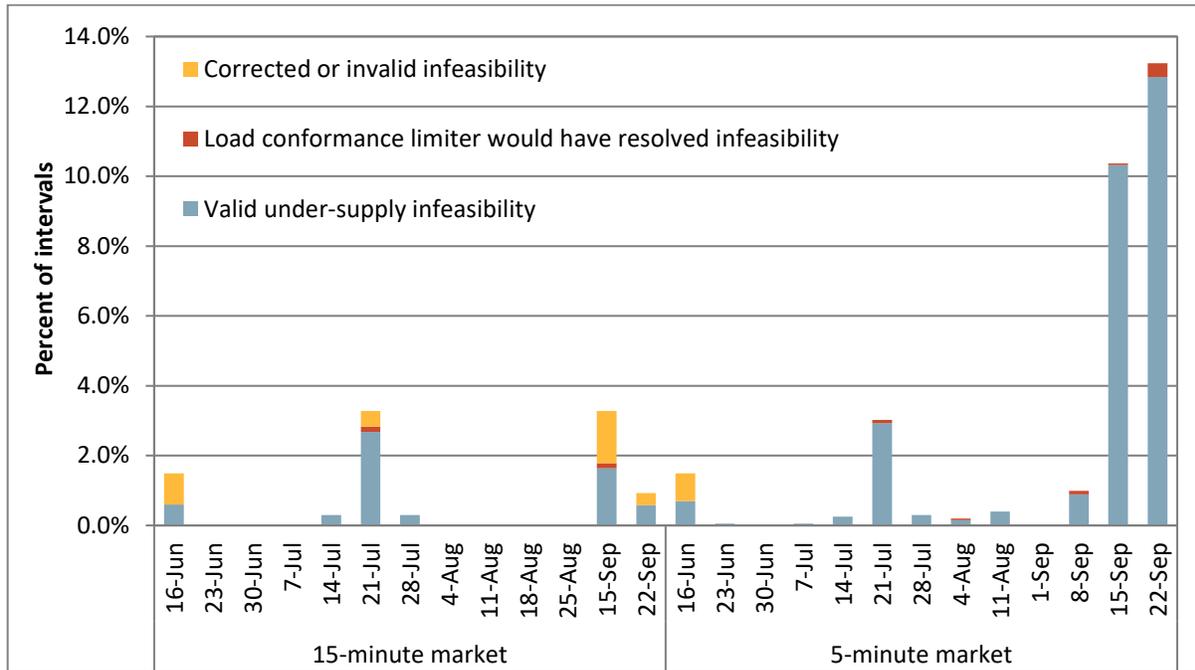


Figure 1.6 Frequency of over-supply power balance infeasibilities by week NorthWestern Energy

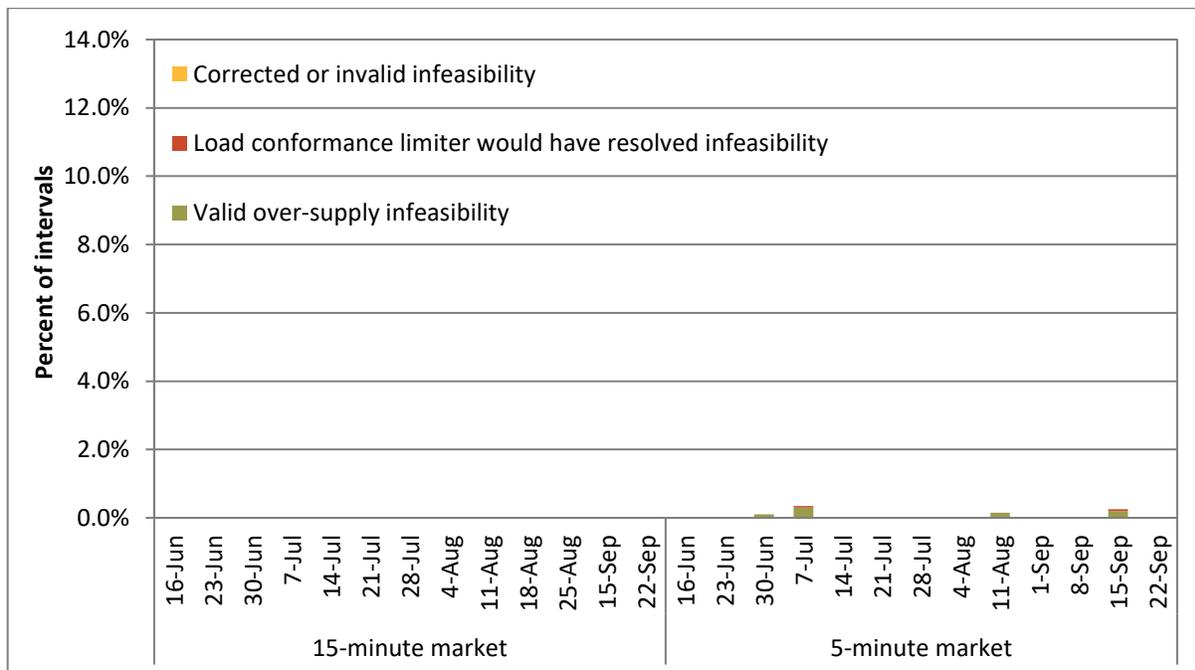
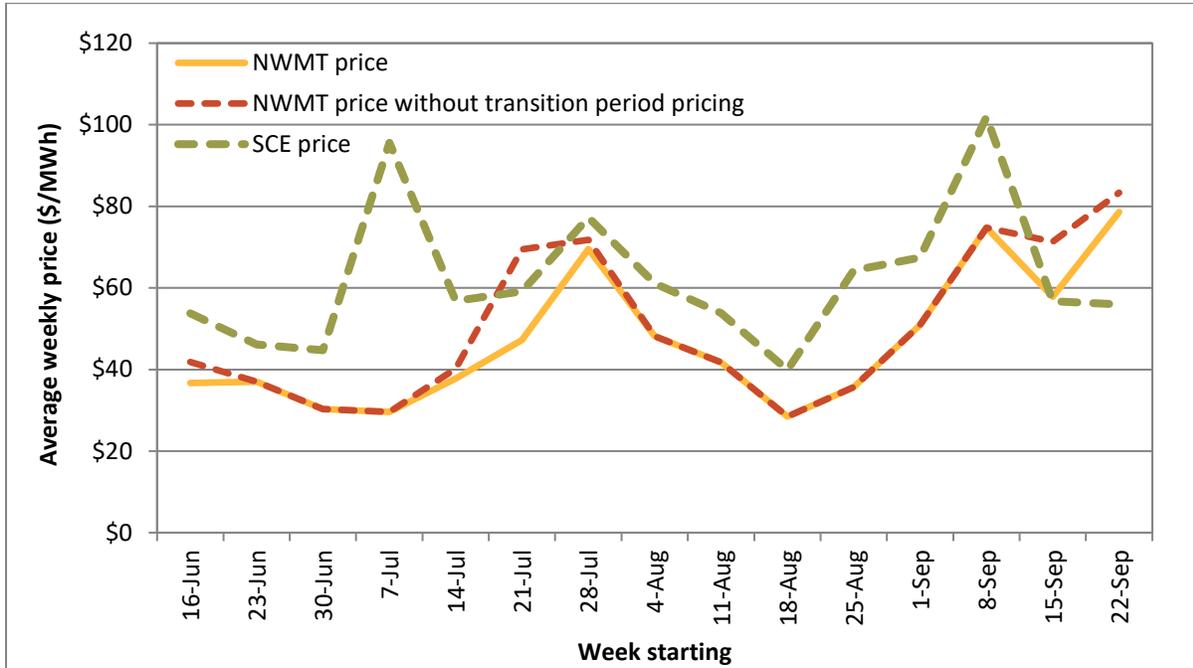


Figure 1.7 and Figure 1.8 show the average weekly prices in the 15-minute and 5-minute market *with* and *without* the special transition period pricing provisions applied to mitigate prices in the NWMT area

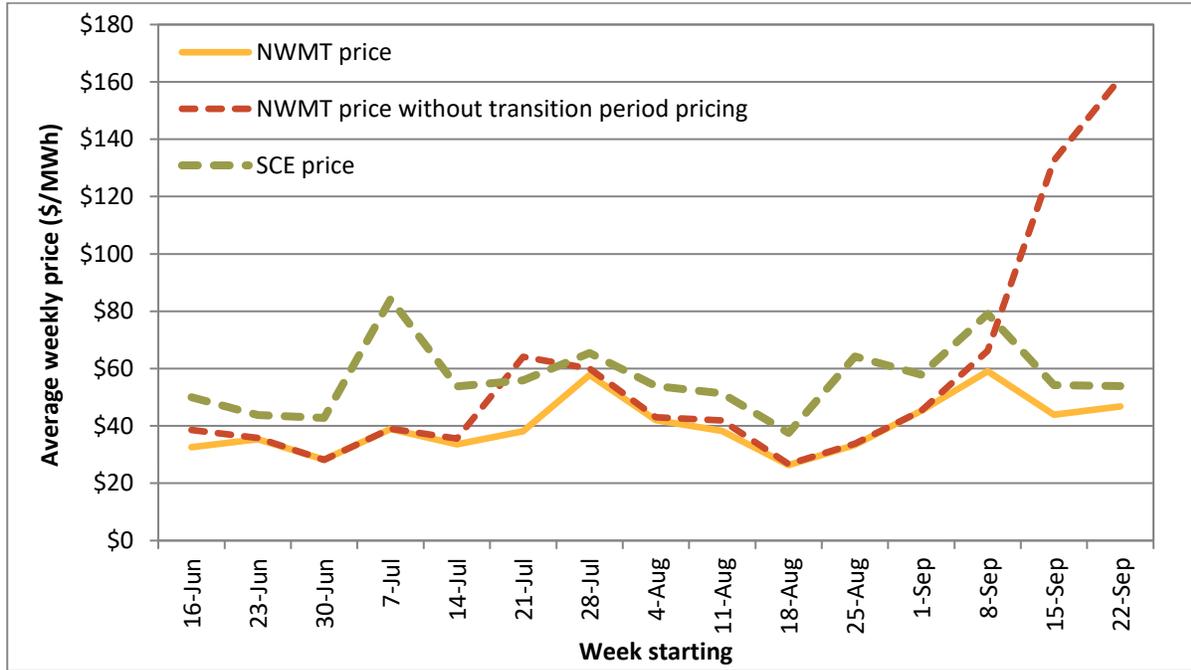
during September.⁷ On average for the month, transition period pricing decreased 15-minute and 5-minute market prices in the NWMT area by \$4.55/MWh and \$56.72/MWh, respectively.

Figure 1.7 Average prices by week – NorthWestern Energy (NWMT) (15-minute market)



⁷ 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

Figure 1.8 Average prices by week – NorthWestern Energy (NWMT) (5-minute market)



2 Flexible ramping sufficiency and bid range capacity tests

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 have 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 the flexible ramping sufficiency test, energy imbalance market transfers into that area cannot be increased.⁸ 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.

The NWMT balancing authority area failed the upward sufficiency test during 46 intervals as well as the downward sufficiency test during 33 intervals in September. Furthermore, the NWMT balancing authority failed the upward capacity test during 6 intervals but did not fail the downward capacity test during the month.

⁸ 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.

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 22nd day of December, 2021.

/s/ Jennifer Shirk