

February 3, 2016

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 2015 Informational Report
Energy Imbalance Market – Transition Period Report – NV Energy**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period of Nevada Energy during its first six months of participation in the Energy Imbalance Market (EIM) for December, 2015. The Commission also directed the Department of Market Monitoring to submit an independent assessment, which the CAISO will file in approximately 8 days.

The CAISO will continue filing such reports, consistent with the Commission's order, until June 1, 2016.

Please contact the undersigned with any questions.

Respectfully submitted

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California ISO

**Energy Imbalance Market
December 1 – December 31, 2015
Transition Period Report - NV Energy**

February 3, 2016

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 provisions in the CAISO tariff regarding the Energy Imbalance Market (EIM) to allow a transition period for new EIM Entities during the first six months of EIM participation.¹ The provisions were made effective November 1, 2015, as requested. NV Energy entered the EIM on December 1, 2015, and is the first EIM entity to whom the transition period will apply until June 1, 2016.

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 area. This is necessary to allow the market software to determine the marginal energy bid price. In its application for a transition period, the CAISO committed to prepare and file with the Commission reports during the transition period on the types, frequency, and nature of the issues experienced by the EIM entity. In the October 29 order, the Commission directed the CAISO and the CAISO's Department of Market Monitoring (DMM) to file informational reports, consistent with its previous reporting requirements associated with the waiver of the pricing parameters, at 30-day intervals during the six-month transition period for any new EIM entity. The CAISO provides this report for NV Energy consistent with the Commission's requirements in the October 29 order. The Commission noted that it expected that the first report would be filed 30 days from the commencement of financially binding operations for any new EIM entity. Because of the interceding holiday period with the commencement of the new EIM entity, and because the complete set of data is not available so soon after the end of the applicable month, the CAISO could not submit the report at that time. The CAISO will continue to file the monthly reports but expects that it will do so approximately 15 days after the start of each month in order to provide the prior full month's data. In addition, because the DMM must review the ISO's report before completing its own, the DMM will file its report approximately eight days after the ISO files its report.

¹ *California Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,104 (2015) (October 29 order).

II. Highlights

- On December 1, 2015, NV Energy joined the EIM. In the first hours of the transition, the market observed issues mostly related to data synchronization that led to power balance infeasibilities. These issues were quickly resolved in the first hours of operation.
- In the month of December, prices in NV Energy have been on average \$24.6/MWh and \$23.3/MWh, for the fifteen-minute market (FMM) and real-time dispatch (RTD), respectively. During the first month of operation, economic transfers from NV Energy to PacifiCorp and CAISO were on hourly average 160 MW and 198 MW, respectively.
- In its first month of EIM operations, NV Energy passed the 1) hourly balancing test more than 95 percent of the time and 2) the flexible ramping test more than 99 percent of the time.
- NV Energy had zero instances of power balance constraint infeasibilities in the FMM that were not due to circumstances that the CAISO may correct pursuant to its price correction authority in section 35 of its tariff. In the RTD, NV Energy experienced only 2 instances (or 0.02 percent of the time) of power balance constraint infeasibilities that were not eligible for correction under the CAISO's price correction authority.
- Other than the few transitional issues experienced as it crossed over into its first few hours of EIM, NV Energy has experienced few transitional issues and any issues encountered were resolved quickly to prevent adverse market impacts.

III. Report

a. Prices

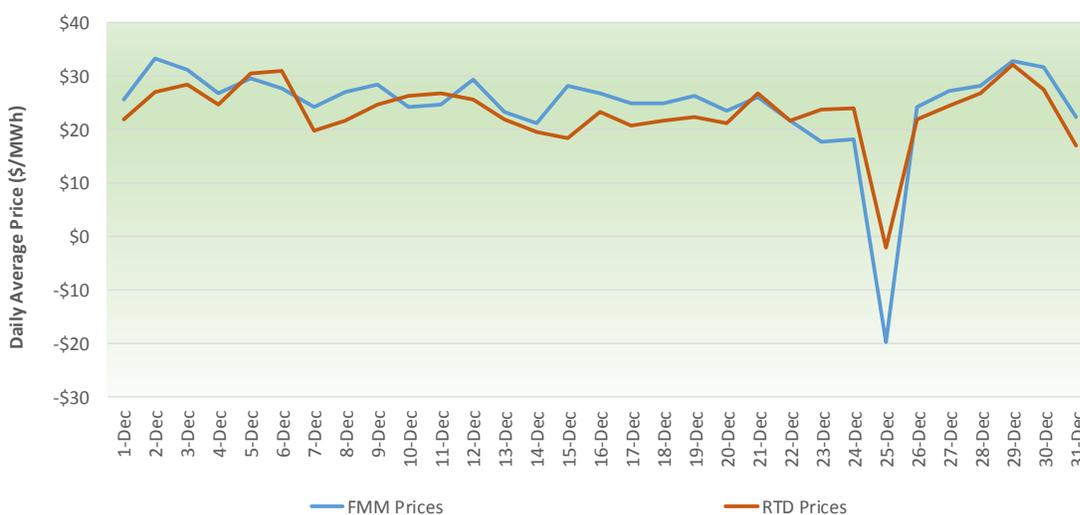
Figure 1 shows that on average, prices in the NV Energy EIM Load Aggregation Point (NV ELAP)² were between \$20/MWh and \$35/MWh in the both the FMM and RTD, except for December 25. On this day, the average prices dropped significantly due to a combination of congestion on the Path 15 constraint and excess supply in the entire EIM system. The negative prices observed for that day were a reflection of a broader system-wide condition beyond those conditions experienced in the NV Energy area.

Under the CAISO's price correction authority in section 35 of its tariff, the CAISO may correct prices posted on its OASIS if it finds that the prices were the product of an

² The ELAP provides aggregate prices that are representative of pricing in the overall area of NV Energy.

invalid market solution or the prices themselves are invalid but the market solution was otherwise valid for the following reasons: data input failures, hardware or software failures, or 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. That is, the trends below represent: 1) prices as produced in the market for which the CAISO deemed valid; 2) prices that the CAISO could and did correct pursuant to section 35; and 3) any prices the CAISO would have adjusted pursuant to transition period pricing reflected in section 29.27.

Figure 1: Daily average price for NV Energy ELAP



As shown in the figures below, in the month of December 2015, the power balance constraint infeasibilities were minimal. Consequently, prices subject to the transition period pricing were essentially the same as though the transition period pricing were not in place. Therefore, the ISO is not providing a plot of the price curves reflecting the counterfactual prices that would have resulted absent the transition period pricing.³

³ In Docket ER15-402, the ISO reported on prices based on the price discovery mechanism in effect during the term of the Commission’s waiver granted in that docket and the prices, as they would be if the waiver were not in effect. *i.e.*, what prices would have been had they been on the penalty prices in the ISO tariff. Because pricing under the waiver pricing is based on the last economic bid price signal, these prices are a proxy of what the prices would have been absent the seven category of learning curve type issues experienced in that market. The difference between the counterfactual pricing and the price in effect during the term of the reports in that docket illustrated the market impact of the waiver pricing.

b. Frequency of Power Balance Constraint Infeasibilities

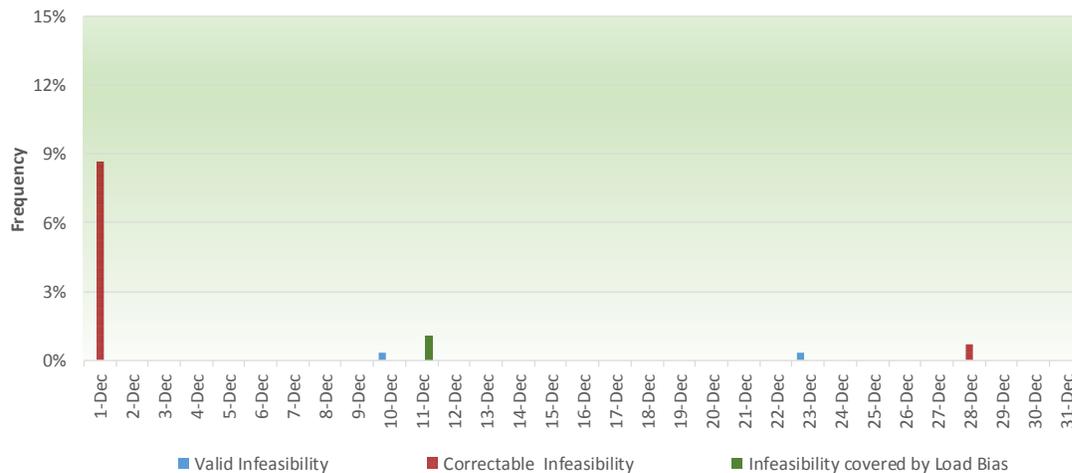
Figures 2 and 3 show the frequency of power balance constraint infeasibilities for under-supply conditions in the NV Energy area for the FMM and RTD, respectively.

Figure 2: Frequency of fifteen-minute undersupply power balance infeasibilities.



For the FMM, there were only three infeasibilities for the entire month. NV Energy experienced two infeasibilities during the first hours of transitioning into the EIM on December 1, and experienced one infeasibility on December 3. The CAISO found these infeasibilities due to either (1) synchronization data issues in the first hours of activation or (2) resource records missing in the real-time market during a data update causing an input error, which further resulted in an artificial loss of capacity in the market. Price corrections would have occurred for these invalid infeasibilities regardless of the transition period pricing in effect during the term of this report. There were no valid undersupply infeasibilities in the month of December for the FMM for which the CAISO would have applied the transition period pricing.

Figure 3: Frequency of 5-minute undersupply power balance infeasibilities.



In the RTD, there were 25 instances of invalid power balance constraint infeasibilities observed in the first hours of NV Energy transitioning into the EIM on December 1. Two more invalid infeasibilities occurred on December 28 when the CAISO dispatched certain NV Energy generation units incorrectly due to a software defect, which the CAISO subsequently fixed. These infeasibilities are invalid, and therefore, subject to price correction under section 35 of the CAISO tariff.

Additionally, there were five valid power balance constraint infeasibilities that occurred in the RTD during the month of December, as shown in Figure 3 and listed in Table 1. These infeasibilities reflect short term ramping supply scarcity as a result of increased load and generation outage conditions in the greater system, in and beyond the NV Energy area. This broader system condition is relevant when the transfers between areas are not binding.

Specifically, for December 10, the infeasibility was due to increases in load requirements and generation outages in the CAISO area that reduced the previously-expected transfer into NV Energy area. This condition led to a broader system-wide price of \$866 in both the NV Energy and CAISO areas. This particular infeasibility is subject to the transition period pricing, and in this case, the price was set based on the last economic signal from the broader area, which includes price signals and conditions from CAISO resources as well.

The infeasibilities in the three consecutive RTD intervals observed on December 11 resulted from a combination of load increase in the greater system, particularly the evening load ramp within the CAISO area, changes in the variable energy resource dispatches, the derate of one of NV Energy’s multi-stage generation units in the real-time market to below its base schedule, and NV Energy’s use of positive load conformance.

NV Energy experienced one additional valid five-minute market infeasibility on December 23, when the CAISO area increased its load requirements at the same time while also cutting intertie schedules.

Table 1: List of valid five-minute infeasibilities

Trade date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
10-Dec-15	17	12	13.74	0
11-Dec-15	18	10	86.63	150
11-Dec-15	18	11	122.08	150
11-Dec-15	18	12	82.76	100
23-Dec-15	19	8	53.49	0

The December 11 infeasibilities did not produce parameter-based pricing because the transition period pricing was in effect. It is important to note, however, that the circumstances producing these infeasibilities, absent the transition period pricing, would have been subject to the CAISO's load conformance limiter.⁴ Application of the load conformance limiter prevents supply issues arising from imperfect load conformance from creating invalid infeasibilities that would otherwise inappropriately trigger the parameter price. Therefore, beyond the transition period, the circumstances producing the December 11 infeasibilities might not have produced infeasibilities that trigger parameter pricing because of the load conformance limiter.⁵

An EIM Entity operator may adjust its load forecast – employ load conformance – at times when it believes the CAISO's forecast for the EIM balancing authority areas may not cover its anticipated system needs. These adjustments are somewhat coarse in that they must be made in increments of 10 to 50 MW. In addition, the operators must act quickly within a relatively short time to ensure the market software appropriately reflects system conditions, but cannot know the system-wide ramp requirements in that short time. Based on these two factors, the adjustment may at times exceed the system's ability to respond. For example, an adjustment could exhaust five-minute ramping capability and cause an infeasibility; if the adjustment in

⁴ The load conformance limiter is also sometimes referred to as the load bias limiter. Both refer to the same feature.

⁵ The implementation of the price discovery method during the transition period obviates the need to also employ the load conforming limiter because the price discovery method leads to prices that are based on the last economic signal all circumstances, including when the load conforming is limited by the limiter. Once the transition period expires, the load conforming limiter will be activated for the NV Energy areas as it is for the other EIM areas.

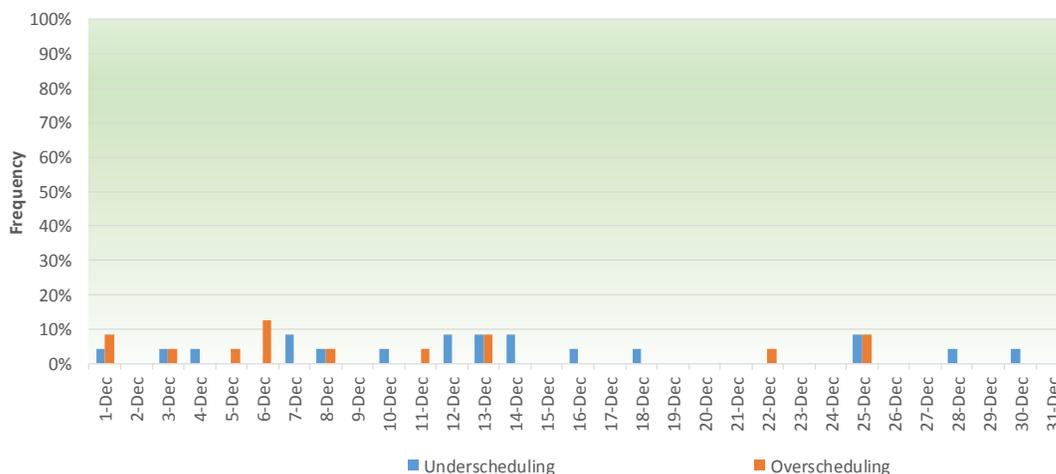
fact exceeds actual system needs, it has caused an infeasibility that otherwise would not exist.

The CAISO uses a load conformance limiter in the CAISO balancing authority area to prevent such an over-adjustment and thus prevent an artificial infeasibility – that is, 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 feasibility. 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 successfully avoided invalid constraints that arise through operations rather than as a result of real supply issues.

c. Balancing and Sufficiency Test Failures

Figure 4 shows the trend of balancing test failures for the month of December, which the CAISO performs pursuant to Section 29.34 (k) of the CAISO ISO Tariff. NV Energy passed the balancing test in 95.56 percent of the hours. It failed in 2.55 percent and 1.88 percent of the hourly intervals for under-scheduling and over-scheduling, respectively.

Figure 4: Frequency of Balancing test failures for NV Energy area.

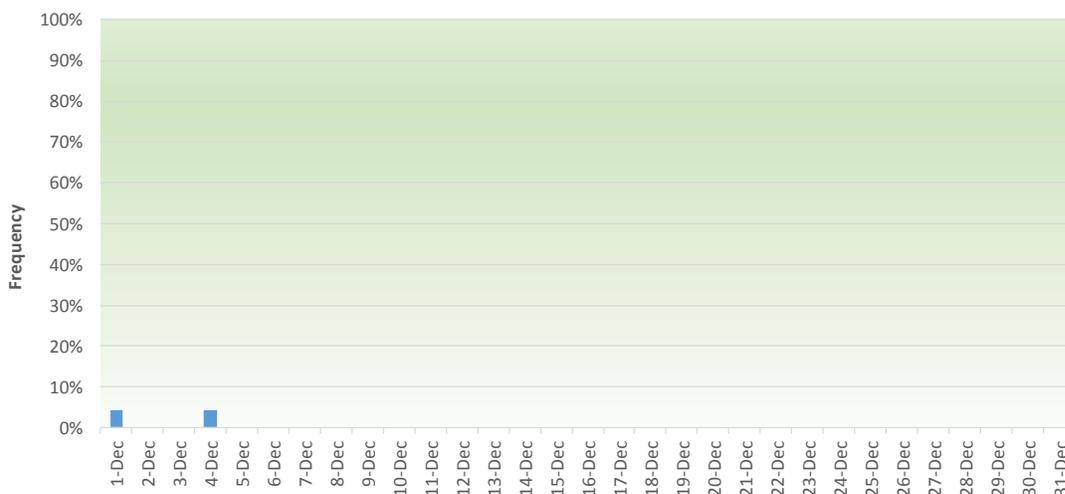


The CAISO also performs the ramping sufficiency test as specified in section 29.34(m) of the CAISO tariff. NV Energy passed the test in 99.73 percent of the intervals in December (frequency obtained by dividing the number of hours passed by 24 hours/day). As specified in Section 29.34(n) of the CAISO tariff and section 10.3.2.1

of the Business Practice Manual for the EIM, if the EIM entity balancing authority area fails the sufficient ramp test, or is deemed to have failed the test because it failed the capacity (resource plan) test, the CAISO will restrict additional EIM transfer imports into that EIM entity balancing authority area during the hour. The CAISO will enforce the individual EIM entity balancing authority area flexible ramp requirement in the isolated EIM Entity balancing authority area and will not include those balancing authority area-to-area group constraints. This sufficiency test applies to the NV Energy area on an hourly basis.

Figure 5 shows the trend of the test failures for flexible ramping for December – a single one-hour interval on each of December 1 and December 4.

Figure 5: Frequency of flexible ramp sufficiency test failures in NV Energy area.



d. Flexible Ramping Constraint Infeasibilities

In this section, the CAISO discusses the frequency with which and the reasons why the flexible ramping constraint was binding in the NV Energy balancing authority area. The flexible ramping constraint is a minimum-requirement constraint that the CAISO enforces in the FMM to set aside flexible capacity in the FMM for use in the RTD to address ramping needs. While this information is not directly related to the reporting requirements under the transition period, the CAISO believes this explanation will assist in understanding the overall performance of the EIM with the addition of NV Energy. As explained below, while the flexible ramping constraint was binding frequently in the NV Energy area, this was an expected outcome of the sharing of the diversity benefits of the EIM.

During the month of December, the flexible ramping constraint in the NV Energy EIM area was infeasible, on a daily average, in 1.5 percent of the FMM intervals, mostly

during the morning and evening ramps. When the constraint is infeasible, it is indicating that the system cannot meet the constraint and it must be relaxed in order to clear the market. In addition, the flexible ramp constraint within NV Energy's area was frequently binding. When the constraint is binding, it means that the requirement is fully procured but there is an associated opportunity cost to meet that constraint. This constraint, like many others in the CAISO market, has a pricing parameter associated with its relaxation. The parameter price is currently set to \$60/MWh for the NV Energy area, except that, during the transition period, when the power balance or transmission constraint is relaxed, in which case the parameter will be set to a number between 0 and 0.01. In the cases reported in this part (d) of the report, the power balance and transmission constraints were not relaxed and therefore, the applicable flexible ramping parameter for these intervals was \$60.

With the market co-optimizing the procurement of energy and flexible ramp capacity, an opportunity cost may arise between energy and flexible ramping constraint when the market optimization has to decide whether to dispatch it for energy or reserve it for flexible ramping capacity. This trade-off triggers the shadow cost of the flexible ramping constraint, which represents the cost of reserving the capacity for flexible ramp capacity. This opportunity cost plays an important role between the procurement of flexible ramp capacity in the system overall and determining the amount of economic transfers between balancing authority areas in the EIM, within the limitations of the amount of capacity available for transfers between the participating balancing authority areas.

Because the addition of NV Energy provided significantly more transfer capacity between the EIM areas, the EIM transfer constraint was binding infrequently. In the month of December, there were on average 160 MWh and 198 MWh of transfers from NV Energy to PACE and CAISO, respectively. There were also 89 MWh and 227 MWh of transfer from PACE and CAISO, respectively, to NV Energy. When the transfers between the participating EIM balancing authority areas are not binding, the participating EIM entities and the CAISO can share in the benefits of the diversity offered in the various areas. Therefore, the energy bids from all areas are seen by the market as effectively a single bid stack that is composed of bids from all the participating areas below. The composed stack of bids will include bids from the CAISO or other EIM area that are lower than the opportunity cost of the \$60 parameter for flexible ramping constraint relaxation. Therefore, the opportunity cost for flexible ramping constraint in the NV Energy area can be set by resources within the other balancing authority areas, and vice-versa. This means that there may be resources in NV Energy area that are incrementally dispatched to provide energy through economical transfers into the CAISO area instead of procuring flexible ramping capacity for the NV Energy's area. In fact, during the month of December, this is why flexible

ramp constraint was binding frequently in the NV Energy area, most frequently during the heavy winter load pulls in CAISO that occur in hours ending 17 and 18.

Figure 6: Frequency of flexible ramp constraint infeasibilities.

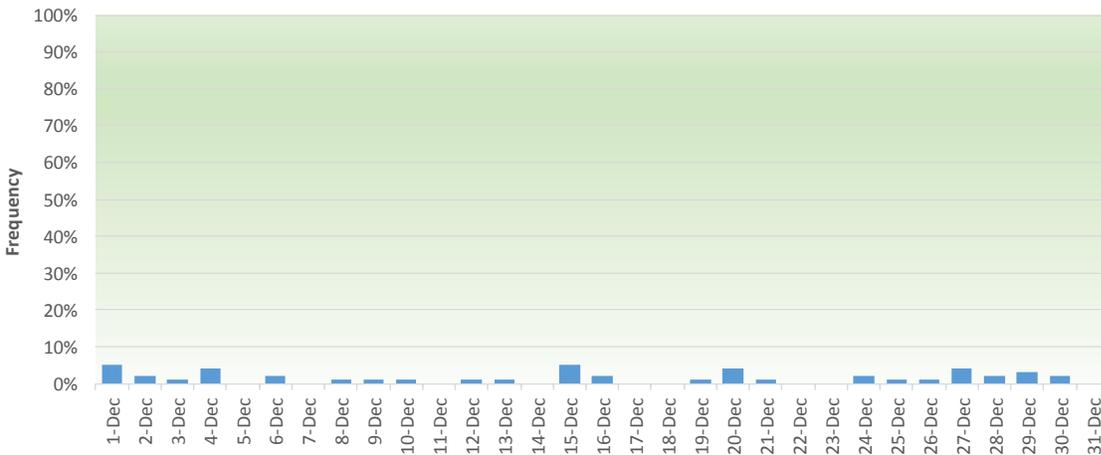
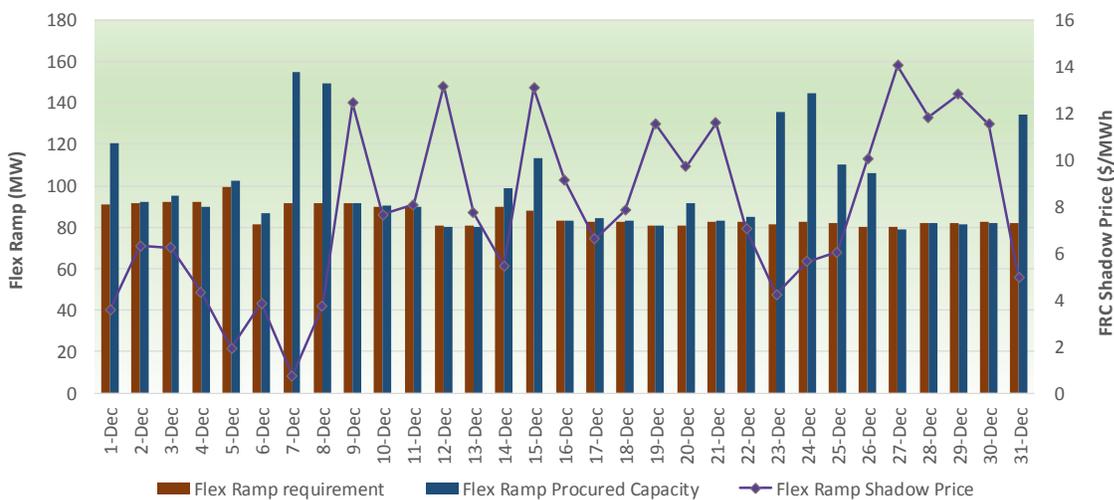


Figure 7 shows the daily average of the flexible ramp constraint requirement and procurement. In the vast majority of the hours, NV Energy is meeting its flexible ramping requirement. In addition, there is an excess of flexible ramp capacity in the NV Energy area during the midday hours. This plot also shows the daily average of the shadow price for the flexible ramp constraint in NV Energy area

Figure 7: Average requirement and procurement of flexible ramp in the fifteen-minute market.



CERTIFICATE OF SERVICE

I hereby 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 3rd day of February 2016.

Anna Pascuzzo

Anna Pascuzzo