October 1, 2015

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Re: California Independent System Operator Corporation
Readiness Certification for NV Energy's Participation in the Energy Imbalance Market and Request for Shortened Comment Period
Docket No. ER15-861-___ and ER15-___-___

Dear Secretary Bose:

The California Independent System Operator Corporation ("CAISO") submits this filing in compliance with section 29.2(b)(6) of the CAISO tariff.[1] The CAISO, in consultation with Nevada Power Company and Sierra Pacific Power Company, d/b/a NV Energy, Inc. (collectively "NV Energy"), has determined that, following market simulation and an adequate period of parallel operations, the CAISO and NV Energy have met all readiness criteria specified in section 29.2(b)(7). This submission provides in support of this determination the sworn CAISO affidavit of Petar Ristanovic, Vice-President, Technology, and the sworn NV Energy affidavit of Walter Spansel, Vice President, Transmission. This filing certifies the readiness of the CAISO and NV Energy to proceed with NV Energy's participation in the CAISO's Energy Imbalance Market ("EIM") on November 1, 2015, without exception.

The CAISO and NV Energy submit this certification with the understanding that the Commission has not yet issued an order approving the proposed readiness criteria filed on August 28, 2015. This filing is consistent with the approved readiness and certification requirements in the CAISO tariff. The CAISO recognizes that some of the proposed compliance filing tariff provisions referenced in this filing are pending in Docket No. ER15-861-004. The CAISO

[1] Many of the tariff provisions referenced in this filing are pending in Docket No. ER15-861-004. The CAISO references proposed tariff revisions in this filing as if they were accepted by the Commission as filed.

and NV Energy have proceeded with the planned market simulation and parallel operations activity while awaiting the Commission's order on its readiness criteria. NV Energy has now undergone a full thirty days, twenty-four hours a day, of parallel operations. The CAISO and NV Energy have applied the readiness criteria reflected in the August 28 compliance filing to these market preparation activities and satisfied such criteria. Because the CAISO and NV Energy have satisfied the criteria reflected in the compliance filing and agree that NV Energy is prepared and ready to enter financially binding operations and operate as an EIM entity, both entities are submitting their respective certifications under cover of this explanatory transmittal letter.

Both the CAISO and NV Energy express confidence that NV Energy is prepared to operate in Energy Imbalance Market as of November 1, 2015 and submit the certification consistent with the requirement to do so at least 30 days prior as reflected in the CAISO tariff section 29.2(b)(6). In the event the Commission modifies or otherwise conditions the tariff provisions and readiness criteria, NV Energy and the CAISO and NV Energy will update this certification accordingly. Based on these certifications, subject to the Commission's direction to do otherwise, the CAISO and NV Energy hope to commence operations with EIM on November 1, 2015. The CAISO and NV Energy respectfully request that the Commission indicate any concerns with CAISO's and NV Energy's proposed course of action as soon as possible prior to November 1, 2015.

I. Background

The EIM provides other balancing authority areas the opportunity to participate in the real-time market for imbalance energy that the CAISO operates in its own balancing authority area. PacifiCorp's balancing authority areas were the first two balancing authority areas to join the Energy Imbalance Market beyond the CAISO balancing authority area. The CAISO's EIM tariff provisions went into effect on October 24, 2014, in time for the first trading day of November 1, 2014.[2]

NV Energy announced its intent to join the Energy Imbalance Market on November 7, 2013. On April 16, 2014, the CAISO and NV Energy executed an Implementation Agreement under which NV Energy projected entry into the EIM

[2] *See Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231 (2014) (June 19 Order) (conditionally accepting tariff revisions to implement Energy Imbalance Market); *Cal. Indep. Sys. Operator Corp.*, 149 FERC ¶ 61,058 (2014) (order denying requests for rehearing, granting in part and denying in part requests for clarification, and conditionally accepting tariff revisions on compliance with regard to order listed above); Commission Letter Order, 149 FERC ¶ 61,005 (Oct. 2, 2014) (order granting CAISO request to extend effective date of Energy Imbalance Market tariff revisions from September 23, 2014, to October 24, 2014, for trading day November 1, 2014).

on October 1, 2015. The Commission accepted the agreement on June 13, 2014.[3]

On January 15, 2015, the CAISO proposed revisions to its tariff to provide a twelve-month transition period for each new entity joining the Energy Imbalance Market. The CAISO stressed that the proposed transition period provides a necessary and prudent transition for entities that are for the first time participating in centralized energy markets. The CAISO explained that for such entities, implementing, participating in, and integrating into a centralized market framework constitutes a significant paradigm shift. This change in operation for the EIM entity, in which the EIM entity allows the CAISO to dispatch its system, requires a period of time after entry for the new EIM entity to gain important experience, make necessary system, operational, and functional changes, and mature its practices so it can manage market systems and processes efficiently and effectively.

In a March 16, 2015 order,[4] the Commission rejected the proposed tariff amendment and a twelve-month period of transition.[5] In addition, the Commission concluded that certain readiness safeguards are necessary prior to activating a prospective EIM entity[6] in the Energy Imbalance Market.[7] Accordingly, the Commission directed the CAISO to submit a compliance filing to include in its tariff requirements to ensure the readiness of any new EIM entity. The Commission further required that the certification of market readiness

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[3] *Cal. Indep. Sys. Operator Corp.,* 147 FERC ¶ 61,200 (2014).

[4] *Cal. Indep. Sys. Operator Corp.,* 150 FERC ¶ 61,191 (2015) ("March 16 Order").

[5] *Id.* at P 34. The Commission also instituted a proceeding under section 206 of the Federal Power Act, in Docket No. EL15-53, to investigate the justness and reasonableness of the EIM provisions in CAISO's tariff as a result of imbalance energy price spikes in PacifiCorp's balancing authority areas. The CAISO had described these price excursions in its tariff filing and in previous filings in which the CAISO sought temporary waiver of the pricing parameters in sections 27.4.3.2 and 27.4.3.4 of its tariff. *Id.* at P 31. The Commission has subsequently issued additional orders regarding these issues. *See Cal. Indep. Sys. Operator Corp.,* 151 FERC ¶ 61,247 (2015); *Cal. Indep. Sys. Operator Corp.,* 152 FERC ¶ 61,060 (2015). On August 19, 2015, the CAISO filed a tariff amendment in these dockets intended to resolve these issues.

[6] In compliance with paragraph 36 of the July 21 order, *Cal. Indep. Sys. Operator Corp.,* 152 FERC ¶ 61,063 (2015) ("July 21, Order"), the CAISO has made the necessary corrections throughout the proposed tariff provisions to use consistent terminology in references to the prospective EIM entity. The CAISO proposes to use the term "prospective EIM Entity" to distinguish the entity from an EIM entity that is fully operational within the EIM. The CAISO uses this same term in this transmittal letter and supporting documentation to avoid confusion.

[7] March 16 Order at P 30.

include a sworn affidavit from an officer of the CAISO and an officer of the prospective EIM entity attesting that both have prepared and made ready the systems and processes for the new EIM entity to commence participation in the Energy Imbalance Market.[8]

Recognizing that developing the readiness criteria for the new EIM entity it was planning to integrate in the fall of 2015 would require considerable time, effort, and interaction with stakeholders, the CAISO commenced the process immediately after the March 16 Order. The CAISO's approach involved preparing draft readiness criteria in parallel with its preparation of the filing to comply with the March 16 Order. The CAISO submitted a filing in compliance with the March 16 Order on May 6, 2015, proposing the tariff revisions. The tariff revisions added two new sub-sections to section 29.2(b) of the CAISO tariff—29.2(b)(4) and 29.2(b)(5)—that implemented the Commission's specific directives. Based upon its understanding of the March 16 Order, the CAISO did not include the specific readiness criteria in its tariff revisions. Rather, as explained in that filing, the CAISO launched a stakeholder process on May 7, 2015 by posting proposed readiness criteria to be included in its business practices manual.

The CAISO held a conference call with stakeholders on May 13, 2015 to discuss the draft readiness criteria. Following the conference call, the CAISO requested that stakeholders submit written comments on the draft readiness criteria by May 21, 2015. The second round of the stakeholder process involved posting revised draft readiness criteria and a matrix responding to stakeholder comments for stakeholder review on June 10, 2015, and holding a second stakeholder conference call on June 16, 2015. This next set of criteria proposed by the CAISO incorporated changes and revisions based on stakeholder comment. Stakeholders again had the opportunity to submit comments and revisions to the draft criteria on or before June 24, 2015. Based on the two rounds of stakeholder process, on July 1, 2015, the CAISO posted the readiness criteria that it intended to apply to NV Energy's market simulation and parallel operations periods scheduled for the two months preceding NV Energy's entry into Energy Imbalance Market.

In the July 21 Order, the Commission accepted in part and rejected in part the CAISO's compliance filing and tariff revision proposal. Specifically, the Commission rejected section 29.2(b)(4)(B). It found that the readiness activities and certificate requirements in sections 29.2(b)(4)(C) and 29.2(b)(5) partially complied with the March 16 Order, and conditionally accepted them. The Commission also accepted the proposed tariff revisions in section 29.2(b)(4)(A) requiring CAISO and the potential EIM entity to make a readiness determination.[9]

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[8] *Id.* n.85.

[9] July 21 Order at P 28.

The Commission also directed the CAISO to clarify certain tariff revisions proposed in its May 6 compliance filing and to include the readiness criteria for new EIM entities in the tariff.[10] The Commission directed a compliance filing within 60 days.

Following the July 21 Order, the CAISO provided stakeholders with new tariff provisions reflecting and incorporating the readiness criteria. The readiness criteria primarily reflected those criteria posted on July 1, 2015, but also incorporated some additions and modifications to enhance certain areas of readiness explicitly addressed in the July 21 Order. The CAISO posted an initial draft of the proposed tariff provisions for stakeholder review on July 31, held a stakeholder conference call on August 10, received written comments through the following week, and posted responses to the written stakeholder comments on August 19, 2015. The CAISO held a final conference call with stakeholders on August 19, 2015, to discuss the CAISO's responses to the written comments on the draft tariff provisions.[11]

The supplemental stakeholder process addressing the readiness criteria and tariff provisions provided the opportunity to further clarify and enhance the readiness criteria and thresholds for meeting those criteria. It also provided further transparency with respect to the readiness activities. On August 28, 2015, the CAISO made the compliance filing incorporating the readiness criteria into its tariff, which is pending before the Commission. The filing reflected the totality of the CAISO's engagement with stakeholders since the March 16 Order. As explained in that filing, the thresholds for meeting the criteria reside in the CAISO business practices manual in accordance with the explicit direction of the Commission in the June 21 Order[12] to allow for the flexibility to adjust the thresholds if necessary, to meet the specific circumstances of future prospective EIM entities.

II. Readiness Reporting, Determination, and Attestations

The CAISO and NV Energy ran market simulation from August 4, 2015 to August 26, 2015. Parallel (*i.e*., financially nonbinding) operations began on September 1, 2015 and ran through September 30. The parallel operations systems will remain supported by the CAISO and available to NV Energy until November 1, 2015. During market simulation and parallel operations the CAISO and NV Energy engaged in daily discussions to track progress and confirm the status of each readiness criterion, and the CAISO regularly reported on readiness status in market forum discussions and publicly posted a table

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10 *Id.* at P 29-30.

11 Morris Declaration at ¶ 12-13.

12 June 21 Order at n 73.

"dashboard" showing progress towards meeting the readiness criteria in section 29.2(b)(7).[13] The process of updating the readiness dashboard through this joint effort engaged representatives from both organizations, up to and including the senior officers who have attested that the parties' processes and systems are ready for NV Energy's participation in the Energy Imbalance Market. These activities satisfy the readiness determination required by section 29.2(b)(5) of the CAISO tariff. The dashboard posted on August 20, 2015 demonstrated that the CAISO and NV Energy were ready to enter parallel operations. The updated dashboard posted on September 15, 2015 showed the progress during parallel operations in terms of additional readiness criteria that were met. A final updated dashboard posted on September 30, 2015 is included as Attachment A. This dashboard shows satisfaction of all readiness criteria and supports the readiness determination and attestations supporting this filing.

The market simulation confirmed system functionality and connectivity by identifying issues and software variances in advance of implementation that have since been resolved. In addition, market simulation permitted the CAISO and NV Energy to validate performance of the systems and processes under a variety of structured scenarios. Having achieved the benefits from market simulation, the CAISO and NV Energy transitioned to parallel operations testing on September 1, 2015.

The parallel operations phase is designed to test performance of the systems and processes in a non-binding environment using historical data and information from production systems to the maximum extent possible. The CAISO and NV Energy engaged in parallel operations twenty-four hours a day in order to examine capabilities at different times and conditions (morning ramp, evening ramp, low load and peak load). Doing so permitted NV Energy to understand the interaction between resource plans, base schedules, outage management, manual dispatch, and the CAISO full network model. This period also allowed the CAISO to identify and resolve software issues.

Although closely resembling actual operations, parallel operations has some differences. The real time market requires a set of data inputs to run. In actual real-time market operations, many of these inputs are dynamic and dependent on the actual performance of participants' resources in accordance with dispatch instructions. In parallel operations, the information regarding resource performance in the non-EIM operations that is input to the market systems may or may not be related to the dispatch instructions issued through

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[13] The readiness criteria reports are distinct from and in addition to the CAISO's regular reporting activities undertaken when it releases new market functionality. More information on the status of these other reports is available on the CAISO website at: http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=06A4150F-8DC5-41EE-A169-235AA32998E2.

the parallel operations environment. For parallel operations, however, it is also not possible to replicate fully the actual tagging process, which may pose an additional challenge to the market's system's handling of the data it receives.

In addition, parallel operations is meant to be a continued period of testing and learning regarding resource characteristics and bids. The three-part bids for generation resources require careful consideration of start-up, minimum load and energy bid costs. During this period, the participant is learning the effects of the resources' constraints on the actual operations of the market and making adjustments accordingly. These factors, among others, affect market results and the quality of the solution. Therefore, conclusions regarding the quality of the market results must consider the input data and the inherent set-up for parallel operations to avoid misleading conclusions regarding the actual functionality of the market.

Parallel operations simulates the power balancing, flexible ramping, capacity testing, and intra-hour dispatch signals that the prospective EIM entity might expect based on its forecasts and real time load and resource deployment. It allows the CAISO and prospective EIM entity to discover and solve the causes of anomalous results, such as large vacillations in dispatch operating targets for a given unit, failure to pass the power balancing and flexible ramp tests when submissions show adequate resources, and out-of-merit dispatches. At times, the root cause of the market result in question is based on the nature of the parallel operations environment and the fact that its simulation cannot interfere with actual operations and real time dispatch.[14] A reasonable parallel operations period ensures that the CAISO and the prospective EIM entity find and solve unexpected market results that demonstrate that the software is not responding as intended and consistent with the tariff given the information provided to it.

Section 29(b)(6) requires that a senior officer of the CAISO and a prospective EIM entity attest (1) that the processes and systems of the prospective EIM Entity have satisfied or will have satisfied the readiness criteria set forth in section 29.2(b)(7) as of the Implementation Date; (2) to any known issues requiring resolution prior to the Implementation Date in accordance with section 29.2(b)(8); (3) to any exceptions from the established thresholds specified in the Business Practice Manuals, and that despite such exceptions the criteria were met or will be met as specified in 29.2(b)(7); and (4) that the Implementation Date is conditional on the resolution of the known issues identified in the certificates and any unforeseen issues that undermine the

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[14] The CAISO has recommended other measures independent of market simulation and parallel operations to address infeasibilities resulting from entry of an EIM entity that must continue to adapt its operations to EIM, including the EIM Entity transitional period proposal. *See* Docket Nos. ER15-861-003 and ER15-2565-000.

satisfaction of the readiness criteria. Attachments B and C, respectively, contain the sworn CAISO affidavit of Petar Ristanovic, Vice-President, Technology, and the sworn NV Energy affidavit of Walter Spansel, Vice President, Transmission, in satisfaction of this requirement.

The affidavits are based upon the engagement by these senior officers in assessing the readiness criteria as reported in the dashboard, including supporting documentation. The CAISO believes that the market simulation and parallel operations to date demonstrate that NV Energy is prepared to enter financially binding production Energy Imbalance Market operations on November 1, 2015. Below is a summary of the information reported in the dashboard demonstrating that each of the readiness criteria proposed to be included in the CAISO tariff has been met. Neither the CAISO nor NV Energy has identified any exception to any of the readiness criteria.

III. Compliance with Readiness Criteria

Attachment A documents that the CAISO and NV Energy have satisfied all of the proposed tariff readiness criteria.[15] Below the CAISO explains compliance with each of the readiness criteria.

1. Full Network Model Integration

Proposed section 29.2(b)(7))(A) requires a demonstration that the prospective EIM entity's full network model is completely integrated into the CAISO's full network model. To ensure the CAISO establishes operationally feasible dispatches in the Energy Imbalance Market that reflect actual system conditions, the CAISO must integrate the full network model of the prospective EIM entity into the CAISO's full network model. There are four elements to this proposed criterion:

> (1) the load, EIM internal interties and EIM external interties and generating unit definitions in the full network model must be consistent with the load, EIM internal interties and EIM external interties and generating unit definitions in the exported prospective EIM entity network model file;
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> (2) the supervisory control and data acquisition ("SCADA") measurements used in the prospective EIM entity's energy management system model must match the measurements observed by the CAISO through the CAISO's energy management system;

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[15] The proposed readiness criteria are pending in Docket No. ER15-861-004. The CAISO references all of the proposed tariff readiness criteria in this filing as if they were accepted by the Commission as filed.

> (3) the state estimator solution must be equivalent or superior to the prospective EIM entity's state estimator solution for its balancing authority area; and
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> (4) the physical representation of the prospective EIM entity network must match the base market model that accounts for non-conforming load, behind-the-meter generation, pseudo-ties, and dynamic schedules, and third party transmission service providers and path operator information that the CAISO agrees is used to support EIM transfers and dispatch in the Energy Imbalance Market, as applicable.

For the first element, the CAISO has adopted the threshold requirement that the data between the CAISO full network model and the prospective EIM entity's network model must match within 10 percent, measured in MW capacity, prior to starting parallel operations, and within five percent before full integration of the prospective EIM entity. Data during the week prior to the commencement of parallel operations showed that average differences between the CAISO full network model and the prospective EIM entity's network model for the flows of load, generation, and interchange values were less than 1.5 percent, *i.e.,* less than the five percent tolerance band required prior to full activation. The less-than-5-percent average difference has been sustained during parallel operations. The CAISO expects that the full network model will continue to be in compliance with this criterion on November 1, 2015.

For the second element, the CAISO has adopted the threshold requirement that the critical and used supervisory control and data acquisition ("SCADA") measurements match 90 percent, measured in MW, to start parallel operation, and 95 percent, measured in MW, before full activation outside of any exception in the energy management system model. At the start of parallel operations, comparative analysis at the unit level of SCADA and the state estimator showed differences of less than 10 percent. During parallel operations the two comparison measurements, total deviation and average deviation, matched more than 95 percent of the time. The results of the individual comparison measurements used in this threshold were 99.34 percent and 98.1 percent. The CAISO expects that the systems will continue to be in compliance with this criterion on November 1, 2015.

For the third element, the CAISO has adopted the threshold requirement that the state estimator solutions between the two systems converge more than 90 percent of the time for at least two days before parallel operations begin, and for at least three days before full integration of the prospective EIM entity. For more than two weeks prior to the start of parallel operations, the state estimator solved for all intervals with no exception. For the last two days before the start of parallel operations, measurements show the state estimator solutions converged 96.9 percent of the time. During parallel operations the state estimator solved over 99.7 percent of the time, and the solution differences between the state

estimator and the SCADA were less than 1.5 percent. The CAISO expects that the systems will continue to be in compliance with this criterion on November 1, 2015.

For the fourth element, the CAISO has adopted the threshold that the EIM entity must model the major nonconforming loads that exceed five percent of the prospective EIM entity total actual load in MW separately from conforming load in the market model.[16] There are no nonconforming loads in the NV Energy balancing authority area.

2. Operations Training

Proposed section 29.2(b)(7))(B) requires that prior to the start of parallel operations, all operations staff responsible for Energy Imbalance Market operations and, when relevant, transactions and settlements, identified by the prospective EIM entity, have completed necessary training. The elements of this criterion include completing (1) a training module introducing the Energy Imbalance Market, (2) a training module on the specific hourly and daily tasks and duties for a normal operation, and (3) a training module on the assessment of market results and response to contingencies and abnormal situations. The thresholds for the operations training criterion are that the prospective EIM entity operators complete training and an assessment of their competency in the subject matter ("associated completion assessment") as outlined in the following CAISO training modules: "100 series" – an introduction to Energy Imbalance Market, "200 series" – the specific hourly and daily tasks and duties for normal operation, "300 series" – the assessment of market results and response to contingencies and abnormal situations. NV Energy has confirmed that the relevant identified personnel completed all required training sessions prior to the start of parallel operations.

3. Forecasting Capability

Proposed section 29.2(b)(7))(C) requires the CAISO and the prospective EIM entity, to the extent the prospective EIM entity will use its own forecasts or is otherwise required to provide forecasting information to the CAISO, to (1) establish the definition of EIM demand forecast boundaries based on the conforming and non-conforming load characteristics, as applicable; (2) examine the accuracy of the forecast of EIM demand based on historical actual load data for the defined EIM demand forecast boundaries; (3) identify weather station locations used in forecasting, as applicable; and (4) identify the identity of the

[16] A non-confirming load is a load that does not conform to the characteristics used in load forecasting, such as a smelter or other large industrial load with unique process characteristics.

source of variable energy resource forecasts. NV Energy has elected to use the CAISO forecast for balancing purposes.

The stated threshold for the first three elements of this criterion requires a comparison of all plant information tags and historical data for defined load areas and nonconforming loads, if applicable, with the relevant load forecasts. Prior to the start of parallel operations, the CAISO had completed this task for NV Energy's load forecast. The average accuracy for the CAISO load forecast during parallel operations was within 1.08 percent of the load for each 60-minute forecast interval, within 0.86 percent of the load for each fifteen-minute forecast interval, and within 0.53 percent of the load for each five-minute forecast interval.

For the fourth element, the threshold states that the forecasting entity must demonstrate the ability to deliver VER unit forecasts in MWs at five-minute intervals for at least three hours ahead of the trading hour. The threshold also requires that the forecasting entity be able to provide base schedules by T-75, T-55, and T-40 and that the prospective EIM entity provide real-time production plant information tags to CAISO. These forecasts and tags were provided during market simulation consistent with the threshold, continued to be provided throughout parallel operations, and are ready to be moved into production.

4. Balanced Schedules

Proposed section 29.2(b)(7))(D) requires that the prospective EIM entity's scheduling coordinator demonstrate its capability to submit balanced schedules consistent with the resource sufficiency evaluation.[17] The criterion requires that the CAISO and the prospective EIM entity demonstrate (1) the ability to balance EIM demand and EIM supply; (2) the ability to pass the capacity test set forth in section 29.34(l) of the CAISO tariff; and (3) the ability to pass the flexible ramping sufficiency test set forth in section 29.34(m) of the CAISO tariff.[18]

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[17] The resource sufficiency evaluation consists of three separate tests. First the prospective EIM entity must pass the balancing test which requires that its base schedules match its forecasted load. Second, and perhaps most importantly, the prospective EIM entity must ensure it has sufficient bid-in capacity to meet the total forecasted demand in each fifteen-minute interval. Third, the prospective EIM entity's bid-in resources must have sufficient flexible ramping capability to meet the tests as outlined in the CAISO tariff and business practice manuals.

[18] The dashboard reports information specifically required to meet the readiness criteria associated with these three tests. The market quality report included as Attachment D provides additional information on the results from NV Energy's parallel operations with respect to each of these three tests. This section of the filing focuses only on information demonstrating that the associated readiness criteria have been met.

With respect to the prospective EIM entity's ability to balance EIM demand and supply, the CAISO adopted the threshold requirement that, before the commencement of parallel operations, 90 percent or more of the base schedule balance tests performed during monitored hours are within 10 percent of the average imbalance of load forecast over a one-day period.[19] NV Energy submitted balanced base schedules within 10 percent of the average imbalance load forecast more than 90 percent of the monitored hours over one day prior to the start of parallel operations.

Prior to full integration of the prospective EIM entity, 90 percent or more of the base schedule tests performed during parallel operations must be within five percent of the average imbalance of load over five non-consecutive days during the parallel operations period. NV Energy successfully balanced its base schedules 90 percent of the time on at least five individual trade days, including weekdays and weekend days.

With respect to the prospective EIM entity scheduling coordinator's ability to pass the flexible ramping sufficiency test, the CAISO has adopted the threshold that the prospective EIM entity must pass the test at least 90 percent of the time over the monitored hours of one day before commencement of parallel operations and five non-consecutive days of parallel operation before full integration of the prospective EIM Entity. NV Energy successfully passed the flexible ramping test 90 percent of the monitored hours on at least one trade day prior to parallel operations and at least five individual trade days during parallel operations, representing weekdays and weekend days, prior to September 30.

With respect to the requirement that the prospective EIM entity's scheduling coordinator demonstrate its ability to pass the capacity test, the threshold requires the scheduling coordinator to pass the test at least 90 percent of the time over monitored hours of one day before parallel operation and over five non-consecutive parallel operations days before full integration of the prospective EIM entity. NV Energy successfully passed the capacity test at least 90 percent of the monitored hours on at least one trade day prior to parallel operations and at least five individual trade days during parallel operations, representing weekdays and weekend days, prior to September 30.

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[19] Monitored hours during market simulation include regular business hours. 09:00 – 18:00 PPT, Monday through Friday. *See* Market Simulation Plan; http://www.caiso.com/Documents/MarketSimulationPlanFall2015Release.pdf at p.16; *see also* Parallel Operation Plan; http://www.caiso.com/Documents/ExternalParallelOperationPlan.pdf.

5. System Readiness and Integration

Proposed section 29.2(b)(7))(E) requires that the CAISO and prospective EIM entity evaluate system readiness and integration by testing system elements and integration in accordance with documentation posted on the CAISO website.[20] In addition, the prospective EIM entity must issue all necessary certificates to its employees that require system access to perform EIM-related job functions. The CAISO adopted specific thresholds regarding this criterion that require completion without significant issues of all tasks identified in the functional and system testing documentation. Any exceptions must be explained as appropriate. During market simulation, the parties tested, *inter alia*, telemetry, variable energy resource forecasting, all data interfaces among and between the various systems that must communicate with each other, and that all tools could receive inputs and provide rational outputs. All system integration tests were completed successfully during market simulation without exception.

The CAISO thresholds for system readiness and integration require testing of all data interfaces between the prospective EIM entity's systems and the CAISO's systems and that any exceptions be explained or have an interim solution that is functionally equivalent. All data interfaces have been tested and system integration has been confirmed without the need for exception or an interim solution.

The CAISO also requires that (1) the prospective EIM entity identify all employees performing job functions for the Energy Imbalance Market, (2) the prospective EIM entity request all CAISO-issued certificates within the appropriate timeframes, and (3) the prospective EIM entity provide all identified employees the necessary EIM system access certificates. NV Energy identified all employees performing EIM functions requiring CAISO system access certification and requested that certificates be issued within the required timeframes. Market simulation and parallel operations activities confirmed all identified users have appropriate access. Complete access configuration in the production environment was also confirmed on September 30.

6. Settlements

Proposed section 29.2(b)(7))(F) requires an evaluation of (1) whether the CAISO settlement statements and invoices match the operational data fed into the settlement system and the resulting calculations correspond to the formulas defined in the CAISO tariff and applicable business practice manuals, and (2) whether the settlement statements and invoices of the prospective EIM entity that

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[20] *See, e.g.,* http://www.caiso.com/Documents/StructuredScenariosEIM-NevadaEnergyand1YearEnhancements.pdf .

allocate charges and credits to its customers accurately reflect system and market data during parallel operations.

To evaluate this criterion, the CAISO has adopted two thresholds. First, the monthly settlement statement and invoice with corresponding daily statements produced by the CAISO during market simulation must be verifiably accurate against available data. The CAISO verified the accuracy of its settlements against available data during market simulation and parallel operations for trade days August 20, September 9 and September 16.[21] The CAISO posted the monthly settlement statement on September 24.

Second, the prospective EIM entity's settlement statements and invoices that allocate charges and credits to its customers must accurately reflect system and market data during parallel operations. NV Energy verified that its settlement statements and invoices accurately reflected system and market data during one parallel operation trade day, September 16.[22]

7. Outage Management

Proposed section 29.2(b)(7))(G) requires that the CAISO and prospective EIM entity evaluate the prospective EIM entity's ability to submit and retrieve outage information to the CAISO within the required timelines. The threshold requires that the prospective EIM entity validate its ability to submit and retrieve transmission out-of-service outages, generation Pmax derates, generation Pmin rerates, and generation out-of-service outage tickets within the required timelines. The CAISO and NV Energy verified the ability of NV Energy to submit and retrieve this information within the required timelines during parallel operations.

8. Communications between the CAISO and the Prospective Entity

Proposed section 29.2(b)(7))(H) requires that the CAISO and the prospective EIM entity confirm the readiness of communications. This considers whether the process and procedures used for voice and electronic messaging are identified and incorporated into the prospective EIM entity's business processes before the start of market simulation and whether the operations staff identified by the prospective EIM entity are trained on the relevant operating

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[21] The CAISO also issued statements and invoices for other trade days but only notes those associated with this criterion and the associated NV Energy criterion.

[22] The CAISO notes that there are some limits of testing the settlements process in parallel operations because full data sets are not readily available. For example, EIM transfers do not occur except for designated intervals and are necessary for the allocation of certain charges, including imbalance energy and congestion offset charges.

procedures and tools used for EIM-related communications before the start of parallel operations, including communications associated with Energy Imbalance Market use of third-party transmission system provider systems that that the CAISO agrees are used to support EIM transfers and dispatch.

The CAISO adopted the following thresholds to evaluate this criterion. To test that the prospective EIM entity's process and procedures used for voice and electronic messaging are ready, the CAISO will require that the prospective EIM entity has incorporated the process and procedures into the prospective EIM entity's business processes before the start of market simulation. The CAISO and NV Energy completed this task as of July 23, 2015, prior to the market simulation, as part of the NV Energy real-time desk certification process. This process, among other tasks, included unannounced calls between real-time operations.

To test whether staff are trained on communication procedures and tools, the CAISO requires that the prospective EIM entity's operations staff are trained on the relevant operating procedures and tools used for Energy Imbalance Market related communications before the start of parallel operations. NV Energy confirmed completion of training on communication procedures and tools for its staff who will have responsibility for EIM operations, transactions and settlements on August 27, 2015.

Regarding third-party transmission provider information, the CAISO must confirm during parallel operations that third-party transmission service provider and path operator information that supports EIM transfers and real-time dispatches is in fact made available. This threshold is not relevant to the NV Energy implementation because there are no third-party transmission service providers upon which NV Energy will rely to support EIM transfers.

9. Market Simulation

Proposed section 29.2(b)(7))(I) requires that the market simulation requirement include (1) the establishment and testing of all necessary scheduling coordinator identifications and resource identifications for the prospective EIM entity's balancing authority area; (2) a day-in-the-life simulation, including end-to-end daily market workflow with no critical defects; (3) a structured scenarios simulation with execution of all structured scenarios provided by CAISO that resolves all significant issues; (4) an unstructured scenarios simulation with execution of all unstructured scenarios provided by the prospective EIM entity that resolves all significant issues; (5) a determination that market results are appropriate based on inputs; and (6) a validation of CAISO prices based on input data for parallel operations.

The CAISO has several thresholds for this criterion. First, the CAISO must establish, and the prospective EIM entity must test, all necessary

scheduling coordinator identifications and resource identifications for the prospective EIM entity's balancing authority area. The CAISO established the necessary identifications and the CAISO and NV Energy confirmed the necessary identifications through testing on March 16, 2015.

Second, the prospective EIM entity's operations staff must complete an end-to-end daily market workflow with no critical defects. NV Energy confirmed completion of the end-to-end workflow in a simulation environment on August 3, 2015.

Third, all significant issues in the structured scenarios simulation must have been resolved or have an interim solution that is functionally equivalent. NV Energy successfully completed all 22 structured scenario simulations.

Fourth, all significant issues in the unstructured scenarios market simulation must have been resolved or have an interim solution that is functionally equivalent. NV Energy successfully completed all attempted unstructured scenario simulations.

Fifth, the prospective EIM entity and CAISO executive project sponsors must have approved the market results reports during market simulation. As explained above, NV Energy and CAISO executive project sponsors met and approved the market result report of market simulation performance prior to entering parallel operations.

Sixth, the CAISO market quality team has validated the prices and schedules based on input data prior to entry into parallel operations. In addition, the market quality team prepared a report on market performance during parallel operations, which is included as Attachment D. This report includes additional information associated with parallel operations that is discussed below.

10. Parallel Operations.

Proposed section 29.2(b)(7))(J) requires that parallel operations runs consistently and in accordance with the parallel operations plan. The CAISO adopted a threshold for this criterion requiring that parallel operations run consistently within normal production market disruption tolerances.[23] The parallel operations plan was posted on August 26 and has run consistently within the normal production tolerances.

[23] Production operations experiences occasional performance issues. Tolerance of performance issues within parallel operations is equivalent to production operation tolerances.

11. Additional Criteria

Proposed section 29.2(b)(7))(K) includes the following additional criteria:

(1) *Execution of Necessary Agreements.* The prospective EIM entity must execute any necessary agreements for operating as an EIM entity, including any necessary non-disclosure agreements for the exchange of information. NV Energy has executed, in its capacity as an EIM entity, the Energy Imbalance Market Implementation Agreement, the EIM Entity Agreement, the EIM Entity Scheduling Coordinator Agreement, and the Meter Service Agreement for Scheduling Coordinators. NV Energy signed a non-disclosure agreement for CAISO operating procedures on April 22. 2015, and the CAISO subsequently shared the applicable operating procedures with NV Energy.[24]

(2) *Operating Procedures*. Prior to the start of parallel operations, the CAISO and the prospective EIM entity must define, complete, and test operating procedures for the prospective EIM entity's and its scheduling coordinator's participation in the Energy Imbalance Market. NV Energy has confirmed that it has updated, tested, and validated all required operating procedures as of August 28, 2015, which included CAISO participation during testing.

(3) *Identification of Additional Available Balancing Capacity*. The prospective EIM entity must identify those EIM participating and non-participating resources with additional balancing capability that it intends to include in the EIM resource plan to resolve under-supply or over-supply conditions in the prospective EIM entity's balancing authority area consistent with the CAISO tariff.[25] NV Energy has identified the additional balancing capacity that it may make available in the resource plan.

(4) *Flexible Capacity Requirements*. The CAISO must have received and stored all historical data from the prospective EIM entity necessary and sufficient for the CAISO to perform the flexible ramping requirement evaluation, and the CAISO must have established flexible capacity requirements for the prospective EIM entity's balancing authority area and the combined EIM area including the prospective EIM entity. The CAISO has received and stored all the information and established flexible capacity requirements that were tested in parallel operations.

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[24] In addition, NV Energy's merchant function has entered into agreements and submitted various forms to the CAISO to identify the resources that will be participating in the Energy Imbalance Market and define the characteristics of those resources for operations purposes.

[25] The EIM available balancing capacity proposal submitted by the CAISO remains pending in Docket No. ER15-861-003.

(5) *Monitoring.* Sufficient and adequate data must be available to the CAISO and the Department of Market Monitoring (DMM) to enable effective market monitoring as of the implementation date. DMM confirmed that it has access to the information necessary to monitor the Energy Imbalance Market.

IV. Market Quality Report on Parallel Operations

Parallel operations is an excellent environment to test the readiness of the systems and processes of the prospective EIM entity but it is not the same as production, and these differences can manifest in the market solution as infeasibilities.[26] Parallel operations allowed the CAISO and NV Energy to identify and resolve numerous input, process, and software issues prior to the commencement of financially binding operations.[27] The CAISO and NV Energy worked diligently during parallel operations to identify the cause of the infeasibilities that arose during parallel operations. The report demonstrates that the majority of the power balance infeasibilities identified during parallel operations were caused by input data issues, some of which are unique to parallel operations and software issues, all of which have been resolved by the date of the report.

Notwithstanding these differences and challenges, the CAISO validated both prices and schedules based on the data input to the market systems throughout parallel operations. This validation demonstrates that the market solution produced is as expected and consistent with the market rules as designed based on the input data. The analysis conducted for the report accounts for the fact that input data may be influenced by limitations inherent in the parallel operations environment and these limitations may affect the quality of the solution. When factors affecting the input data are controlled for, the numerical quality of the market solution is good and indicates that the systems and processes of NV Energy are ready to operate in production.

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[26] The relationship between parallel operations and actual production is explained in section II and the market quality report on parallel operations included as Attachment D.

[27] The market quality report on parallel operations explains how each of these issues impacted the market results and how they were resolved by the CAISO and NV Energy.

V. Relationship of Readiness Certification to the Transition Period Proposal and the EIM Available Balancing Capacity Proposal

1. The Transition Period Proposal

In Docket No. ER15-2565, the CAISO filed for a six-month transition period for new EIM entities during which the CASIO would not apply transmission and power balance relaxation parameters specified in the CAISO tariff to new EIM entity balancing authority areas and would instead clear the market based on the marginal economic bid in the new EIM entity's balancing authority area.[28] The transition period is designed to protect against the anomalous pricing issues that arose when PacifiCorp began participation in the Energy Imbalance Market. It only operates as a safety net. The CAISO's available balancing capacity proposal is designed to address the structural issues that contributed to the pricing anomalies. Moreover, the observed modeling infeasibilities, which were unrelated to actual supply conditions, have significantly declined since the initial months of EIM operations to less than one percent frequency in the PacifiCorp balancing authority areas. This decline has occurred even without implementation of the available balancing capacity proposal, discussed below.

The proposed transition period provides appropriate customer protections to address the separate issues of transition and learning curve during the initial period of Energy Imbalance Market operations in the new EIM entity's balancing authority area. It recognizes that no period of non-binding testing can resolve all potential issues. The CAISO supported its proposal for the transition period with the Declaration of Mark Rothleder, the CAISO's Vice President of Market Quality and Renewable Integration.[29] Mr. Rothleder explained that it is not possible to fully test, even with a robust readiness process, the manner in which the Energy Imbalance Market systems will react to the actions of a new EIM entity when the market is actually operational in its balancing authority area.[30] Neither market

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[28] Other matters associated with the implementation of NV Energy and enhancements to the Energy Imbalance Market are also pending Commission action, including: EL15-53 and ER15-861-003 (CAISO's available balancing capacity proposal); ER15-1196 (NV Energy's proposed revision to implement the available balancing capacity proposal); ER15-2591 (PacifiCorp's proposed revision to implement the available balancing capacity proposal); ER15-1919 (CAISO's year one, phase 1 enhancements – including the use of available transfer capacity); ER15-2272 (CAISO's request to implement market power mitigation on the NV Energy interties); ER15-2281, ER15-2282, and ER15-2283 (filings to authorize NV Energy and PacifiCorp to use market-based rates); and ER15-861-004 (CAISO's compliance filing on readiness criteria).

[29] *See* CAISO August 28th Filing in Docket No. ER15-2565 at Attachment C.

[30] *Id*. at P 9.

simulation nor parallel operations can precisely simulate actual system conditions.[31] Mr. Rothleder noted that a new EIM entity requires experience with actual Energy Imbalance Market operations to accurately evaluate its resource plans that reflect the total use of system capacity, and then to appropriately reflect its decisions through the available balancing capacity designations and manual dispatches and outages associated with its management of the contingency reserves.[32] It is not possible to complete the learning curve without commencing and experiencing actual operations. Moreover, the CAISO and NV Energy have in place the requisite reversion plans to address any major system failures.

The transition period being requested by CAISO is thus complementary to and fully consistent with this certification filing. It does not represent any lack of confidence on the part of the CAISO or NV Energy regarding the readiness of NV Energy for participating in the Energy Imbalance Market. As demonstrated by the experience of PacifiCorp, there is no reason to forgo the significant benefits of the Energy Imbalance Market when the market is operating as designed and the prospective EIM entity has demonstrated that it is prepared for participation, as is the case here.

The CAISO has requested Commission action in that proceeding by October 27, 2015. Having met robust readiness criteria and with the provision of the transition period, the CAISO believes NV Energy can integrate into the EIM.

2. The EIM Available Balancing Capacity Proposal

As described in footnote 4 above, the Commission's response to the CAISO's initial request for a transitional period for new EIM entities included a mandate that the CAISO address causes of the price excursions in the Energy Imbalance Market other than prospective EIM entity readiness. On August 19, 2015, the CAISO filed proposed tariff revisions to enhance the Energy Imbalance Market functionality so that it will automatically recognize and account for capacity that the balancing authority area has available to maintain reliable operations, known as "EIM Available Balancing Capacity." Unlike the transition period, the available balancing capacity solution addresses structural concerns raised by the Commission in its March 2016 Order and provides a long-term means for EIM entities to recognize additional capacity within their balancing authority areas. On September 24, 2015, Commission staff issued a deficiency letter requesting additional information. The CAISO is in the process of providing the requested additional information.

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31 *Id*.

32 *Id*. at PP 11-14.

The Commission's ongoing consideration of the EIM Available Balancing Capacity proposal should not delay the Commission's acceptance of this readiness certification and expansion of the Energy Imbalance Market to include the NV Energy balancing authority area. As of today, the Energy Imbalance Market with PacifiCorp is functioning well and producing significant benefits. On September 25, 2015, DMM issued its Report on the Energy Imbalance Market Issues and Performance for June 2015, showing an extremely low instance of infeasibilities. The DMM noted that the instances of price infeasibilities in PacifiCorp West have diminished to one instance in the fifteen-minute market, and to 0.6 percent in the intervals in the five-minute market. In PacifiCorp East the frequency of infeasibilities during the last period was 0.1 percent of fifteen-minute intervals and 1.4 percent of five-minute intervals. Moreover, DMM noted that overall, "[a]verage prices in the fifteen-minute and five-minute markets in both PacifiCorp areas during July that would have *resulted even without special price discovery features in effect* were slightly below bilateral market price indices for trading points upon which energy imbalance charges in these balancing areas were based prior to EIM.".[33] Therefore, although the CAISO's proposed solution remains an important enhancement to the Energy Imbalance Market, expansion of the Energy Imbalance Market to include NV Energy need not wait until the enhancement is in place. In any event, the Commission has determined that the price waiver will remain in effect until the remedy to the unwarranted application of the parameter penalty prices is in effect.[34]

In addition, participation by NV Energy with its transfer capacity linking the CAISO and PacifiCorp East balancing authority area is an important part of the remedy to the limited instances of modeling infeasibilities. Accordingly, the CAISO, as supported by NV Energy, respectfully requests the Commission accept this readiness certification and NV Energy's readiness to operate in the Energy Imbalance Market under its existing, currently effective tariff provisions.

The Commission's ruling on those matters will not affect the fact that, as certified herein, NV Energy's systems and processes are ready for participation in the Energy Imbalance Market revisions. The CAISO does not believe that the

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[33] DMM September 25 Report at 3. In PacifiCorp East, without price discovery provisions in place, Energy Imbalance Market prices in the fifteen-minute market during July would have been about 27 percent lower than these bilateral market price indices, while prices in the five-minute market would have been about 18 percent lower than bilateral prices. In PacifiCorp West, without these price discovery provisions, fifteen-minute prices during July would have been about 27 percent lower than these bilateral market price indices, while prices in the five-minute market would have been about 13 percent lower than bilateral prices. *Id.*

[34] *Cal. Indep. Sys. Operator Corp.,* 151 FERC ¶ 61,247 (2015).

pendency of the available balancing capacity proposal should delay the benefits that NV Energy customers will receive from the Energy Imbalance Market.

VI. Attachments

Attachment A:	Readiness Dashboard Report
Attachment B:	Affidavit of Petar Ristanovic
Attachment C:	Affidavit of Walter Spansel
Attachment D:	Parallel Operations Market Quality Review

VII. Comments and Commission Consideration

To the extent that any parties raise valid concerns regarding the readiness of NV Energy to participating in the Energy Imbalance Market, it would be the CAISO's intent to address them expeditiously so as not to delay the planned November 1, 2015 implementation. For this reason, the CAISO respectfully requests that the Commission establish a shortened comment period for this filing.

In addition, as discussed above, although the CAISO and NV Energy are confident of NV Energy's readiness for participation in the Energy Imbalance Market, the CAISO recognizes that the Commission will evaluate this informational filing and reach its own conclusion. To the extent that the Commission concludes that it must take any action regarding this certification, the CAISO requests that it do so prior to the implementation date, November 1, 2015.

VIII. Conclusion

The CAISO respectfully requests that the Commission accept this certification as consistent with section 29.2(b)(6) of the CAISO tariff. The CAISO or NV Energy will notify the Commission in the event of any subsequent determination that the implementation of NV Energy into the Energy Imbalance Market on November 1, 2015 should be delayed, the reason for the delay, the new implementation date if it can be determined, and whether a portion or all of this certification needs to be reissued.

Respectfully submitted,

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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 Washington, D.C. this 1st day of October, 2015.

/s/ Michael E. Ward

Michael E. Ward
Alston & Bird LLP
The Atlantic Building
950 F Street, NW

Attachment A – Readiness Dashboard Report

Readiness Certification
for
NV Energy's Participation in the Energy Imbalance Market

October 1, 2015

California Independent System Operator Corporation

No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
1	Prospective EIM Entity Full Network Model Integration	Generation, Interchange and Load comparison	Load, EIM Internal Intertie and EIM External Interties, and Generating Unit definition in the Full Network Model is consistent with the Load, EIM Internal Intertie and EIM External Interties, and Generating Unit definition in the exported prospective EIM Entity network model file that it delivered to the CAISO.	Data matches within 10%, measured in MW capacity to start parallel operation, and within 5% before full activation. Discrepancies, if any, are accounted for in terms of imbalance adjustment	Complete	Records for August 17, 2015 - August 28, 2015 show averages for load, generation and intechange values within 5% tolerence. Comparison analysis of load and generation for SCADA vs SE estimate in the EMS over the past two weeks shows differences of less than 1.7% Interchange values, being derived values for Generation and Load, one can state that Load, Generation and interchange are with 1.4 %.	Tariff section 29.2(b)(7)(A)(i)
2	Prospective EIM Entity Full Network Model Integration	Comparison of SCADA measurement	SCADA measurements used in prospective EIM Entity EMS model match the measurements observed by the CAISO through the CAISO EMS model	Critical and used SCADA measurements match 90% to start parallel operation and 95% before full activation, measured in MW, outside of any exception in EMS model	Complete	Comparison analysis at unit level for SCADA vs SE estimate in the EMS shows differences for less than 10% prior to parallel operations. SCADA measurements match the CAISO SE solutions within 95% in paralell operations. Two comparison measurements are used, 1. Total Deviation / Total Actual MW = 99.34%; 2. Average of deviation percentage based on generating units with capacity greater than 48 MW equals 98.1%	Tariff section 29.2(b)(7)(A)(ii)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
3	Prospective EIM Entity Full Network Model Integration	State Estimator solution	CAISO state estimator solution is equivalent or superior to the prospective EIM Entity state estimator solution for its Balancing Authority Area.	State Estimator solutions converge >90% of the time in two days before parallel operation and three days before full activation. Solution differences within 10% before parallel operation and 5% before full activation measured in MW or justified due to different external BAA modeling	Complete	SE solutions converged 96.9% of the time within two days prior to parallel operations. SE, including the network model of NV Energy, solved 99.97% of all cases as 'Valid Solutions' during the period Sep 15 , 2015 midnight to Sep 28, 2015, 1500. Solution differences average are less than 1.5% between SE and SCADA MW.	Tariff section 29.2(b)(7)(A)(iii)
4	Prospective EIM Entity Full Network Model Integration	Non-Conforming Load, Behind-the-Meter Generation, Pseudo Ties, and Dynamic Schedules	Physical representation of the prospective EIM Entity's network matches the Base Market Model that accounts for nonconforming load, behind the-meter generation, pseudo-ties, and dynamic schedules, and third party transmission service provider and path operator information that supports EIM Transfers and Real-Time Dispatch in the Energy Imbalance Market, as applicable	Prospective EIM Entity major non-conforming loads > 5% of prospective EIM Entity total actual load in MW are modeled separately from conforming load in market model	Complete	There are no non-conforming loads in NV Energy BAA.	Tariff section 29.2(b)(7)(A)(iv)
5	Agreements	Execution of Necessary Agreements	The prospective EIM Entity has executed all necessary agreements.	The prospective EIM Entity will execute all agreements, as outlined in Section 5 of the EIM BPM within the required timelines outlined in Section 5.	Complete	NV Energy has executed all agreements, as outlined in Section 5 of the EIM BPM within the required timelines.	Tariff section 29.2(b)(7)(K)(i)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
6	Operations Training	Completion of mandatory training courses	Prospective EIM Entity operators who will have responsibility for EIM operations, transactions and settlements, will complete CAISO training modules.	Prospective EIM Entity operators will complete training and close-of-training assessment in the appropriate timeframes as outlined in - “100 series”– an introduction to Energy Imbalance Market training - “200 series”– the specific hourly and daily tasks and duties for normal operation training module; and - “300 series”– the assessment of market results and response to contingencies and abnormal situations training module.	Complete	NV Energy confirms full completion of all training series and knowledge testing with minimum required score for all NV Energy operators.	Tariff section 29.2(b)(7)(B)
7	Forecasting Capability	Load forecast capability	Definition of EIM demand forecast boundaries based on the conforming and non-conforming load characteristics, as applicable Accuracy of the CAISO forecast of EIM demand based on historical actual load data for the defined EIM demand forecast boundaries. Identification of weather station(s) locations used in forecasting, if applicable,	All Plant Information (PI) tags and historical data for defined load area(s), and nonconforming load, if applicable, compared with load forecasts provided from CAISO (if a CAISO load forecast used).	Complete	All plant information and historical data for NV Energy load areas have been defined. Full compliance with threshold metric for all intervals during parallel operations: Average Load forecast error for T-60 is 1.08%; Average Load forecast error for the 15-minute is 0.86%; Average Load forecast errorfor the 5-minute is 0.53%;	Tariff sections 29.2(b)(7)(C)(i)-(iii)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
8	Forecasting Capability	Variable Energy Resource (VER) forecast capability	Identification of the source of VER forecasts. (If a participating wind or solar unit requires a CAISO forecast, then BPM/tariff requirements apply.)	Forecasting entity must demonstrate delivery of Unit MW forecast at 5 min intervals for at least three hours ahead. Forecasting entity must also provide base schedule by T-75, T-55 and T-40. EIM Entity provides to CAISO real-time MW production PI tags.	Complete	Full compliance with threshold metric. NV Energy forecasting entity has demonstrated delivery of VER forecasts. VER forecasts are provided in parallel operations and ready to move to production. In addtion, NVE energy has also successfully submitted corresponding base schedules within appropriate timeframes.	Tariff section 29.2(b)(7)(C)(iv)
9	Forecasting Capability	Flexible capacity requirements	CAISO has established flexible capacity requirements for the prospective EIM Entity Balancing Authority Area and the combined EIM Area including the prospective EIM Entity	The CAISO has received and stored all historical data from the prospective EIM Entity necessary and sufficient for the CAISO to perform the flexible ramp requirement.	Complete	Full compliance with threshold metric. CAISO has established flexible capacity requirements based on received and stored data from NV Energy.	Tariff section 29.2(b)(7)(K)(iv)
10	Balanced Schedules	Base schedule balancing capability	The prospective EIM Entity Scheduling Coordinator demonstrates its ability to balance EIM demand and EIM supply for the prospective EIM Entity's Balancing Authority Area	90% or greater of base schedules balance tests during monitored hours are within 10% average imbalance of load forecast over one day period before parallel operation, and 5% average over five full days before full activation. The CAISO will provide examples of MW thresholds for each prospective EIM Entity to indicate a reasonable threshold as it applies to a given EIM Entity and indicate the potential implications of a swing from 5% over to 5% under forecast in one hour to the next.	Complete	Full compliance with threshold metric met prior to parallel operations. Full compliance with threshold metric during parallel operations on the following 5 days: 9/1, 9/2, 9/4, 9/6, 9/7. NV Energy successfully balanced schedules on the following trade dates; 9/1, 9/2, 9/4, 9/6, 9/7, 9/10 and 9/12 - 9/30.	Tariff section 29.2(b)(7)(D)(i)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
11	Balanced Schedules	Flexible ramping sufficiency test capability	The prospective EIM Entity \ Scheduling Coordinator demonstrates its ability to pass the flexible ramping sufficiency test	Passes 90% of the time or greater over monitored hours of one day before parallel operation and five nonconsecutive days before full activation	Complete	Full compliance with threshold metric met prior to parallel operations. Full compliance with threshold metric. NV Energy successfully met flexible capacity requirements on the following trade dates; 9/18 - 9/30.	Tariff section 29.2(b)(7)(D)(iii)
12	Balanced Schedules	Capacity test capability	The prospective EIM Entity Scheduling Coordinator demonstrates its ability to pass capacity test	Passes 90% of the time or greater over monitored hours of one day before parallel operation and five nonconsecutive days before full activation. The CAISO will explain the implications of any potential issues with the reliability of an EIM Entity to meet its capacity requirements.	Complete	Full compliance with threshold metric met prior to parallel operations. Full compliance with threshold metric. NV Energy successfully met capacity test capability of at least 90% over monitored hours.	Tariff section 29.2(b)(7)(D)(ii)
13	Operating Procedures	CAISO Operating Procedures (relevant to EIM operations)	The prospective EIM Entity signs CAISO nondisclosure agreement and receives appropriate CAISO “public” and “restricted” operating procedures	Operating procedures NDA signed by the prospective EIM Entity. The prospective EIM Entity receives CAISO operating procedures four months prior to the parallel operations date.	Complete	NDA - signed - April 22, 2015	Tariff section 29.2(b)(7)(K)(i)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
14	Operating Procedures	Prospective EIM Entity operating procedures	The prospective EIM Entity operating procedures are defined, updated, and tested for the EIM Entity Scheduling Coordinator	The prospective EIM Entity operating procedures are updated tested and implemented prior to parallel operations date.	Complete	NV Energy confirms all required operating procedures are updated, tested and validated as of August 28, 0215.	Tariff section 29.2(b)(7)(K)(ii)
15	System Readiness & Integration	Functional Testing	The prospective EIM Entity and the CAISO will test the functional and system elements in accordance with functional and system testing documentation posted on the CAISO website	All tasks identified in the functional and system testing documentation are completed and will not have any issues deemed significant. Any exceptions will be explained or have an interim solution that is functionally equivalent.	Complete	Confirmation of successful completion for all functional and system tests.	Tariff section 29.2(b)(7)(E)(i)
16	System Readiness & Integration	System Integration	The prospective EIM Entity and CAISO will test system integration testing in accordance with the system integration testing documentation posted on the CAISO website	All tasks identified in the system integration testing documentation are completed and will not have any issues deemed significant. Any exceptions will be explained or have an interim solution that is functionally equivalent.	Complete	All system integration tests completed successfully in CAISO simulation environment.	Tariff section 29.2(b)(7)(E)(ii)
17	System Readiness & Integration	The prospective EIM Entity system access complete	All prospective EIM Entity employees who require system access to perform EIM-related job functions identified and have necessary certificates.	All prospective EIM Employees performing job functions for EIM market are identified. All CASIO issued certificates are requested within the appropriate timeframes. All identified employees provided the necessary EIM system access certificates.	Complete	Complete access configuration in production environment completed on September 30, 2015.	Tariff section 29.2(b)(7)(E)(iii)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
18	System Readiness & Integration	ISO - prospective EIM Entity interfaces	Data interfaces between prospective EIM Entity's systems and CAISO systems are tested	ISO and prospective EIM Entity identify significant data interface issues. EIM Entity and CAISO executives to approve exceptions.	Complete	Confirmation of successful completion of all data interfaces including, automated meter data upload completed on September 21, 2015.	Tariff section 29.2(b)(7)(E)(i)
19	Market Simulation	Day in the life simulation	The prospective EIM Entity operators are able to meet the market timelines	The prospective EIM Entity grid operations staff complete end-to-end daily market workflow with no critical defects.	Complete	NV Energy confirms completion of end-to-end workflow in simulation environment on August 3, 2015.	Tariff section 29.2(b)(7)(I)(ii)
20	Market Simulation	Structured scenarios simulation	The prospective EIM Entity operators execute and pass all structured scenarios provided by CAISO	All significant issues resolved or have an interim solution that is functionally equivalent.	Complete	CAISO and NV Energy confirms completion of all market simulation structured scenarios including NV Energy validation of settlements statements.	Tariff section 29.2(b)(7)(I)(iii)
21	Market Simulation	Unstructured scenarios simulation	The prospective EIM Entity operators execute and pass all unstructured scenarios provided by prospective EIM Entity	All significant issues resolved or have an interim solution that is functionally equivalent.	Complete	NV Energy confirms completion of all related unstructured scenarios in simulation environment.	Tariff section 29.2(b)(7)(I)(iv)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
22	Market Simulation	Market results reports	Market results are appropriate based on inputs	The prospective EIM Entity and CAISO executive project sponsors approve the market results reports during market simulation.	Complete	CAISO and NV Energy executive project sponsors have approved the market results reports during market simulation.	Tariff section 29.2(b)(7)(I)(v)
23	Market Simulation	Market quality review	Prices are validated based on input data	Market simulation prices and MWs schedules/dispatches are validated by CAISO market quality team for entry into parallel operation	Complete	CAISO confirms validation of market prices and MWs schedules/dispatches observed during market simulation exercises.	Tariff section 29.2(b)(7)(I)(vi)
23b	Parallel Operations	Market quality review	Prices are validated based on input data	Parallel operations prices and MWs schedules/dispatches are validated by CAISO market quality team	Complete	Market solution in general, including prices are being validated for parallel operations; there have been data quality, set-up and functionality issues identified, which have been and are being resolved.	Tariff section 29.2(b)(7)(I)(vi)
25	Settlements	ISO Settlement Statements and Invoices published to the prospective EIM Entity and EIM Participating Resources	The CAISO Settlement statements and invoices match the operational data published to stakeholders or fed into settlement system and the resulting calculations correspond to the formulas defined in ISO's tariff and BPMs	Monthly settlement statement and invoice with corresponding daily statements produced during market simulation and parallel operations are verifiably accurate against available data.	Complete	Successful verification of criteria during market simulation testing for trade date August 20,2015. CAISO published initial statements for trade date September 9, 2015 and September 16, 2015 in parallel operations, monthly statement posted on September 24, 2015.	Tariff section 29.2(b)(7)(F)(i)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
26	Settlements	The prospective EIM Entity settlement statements and invoices reflect accurate allocations to the prospective EIM Entity customers prior to financially binding operations.	Verification that settlement statements and invoices accurately reflects system and market data	The prospective EIM Entity settlement statements and invoices that allocate charges and credits to its customers accurately reflect system and market data during parallel operations.	Complete	NV Energy prepared settlement statements and invoices that allocate the associated charges and credit to their customers and accurately reflects system and market data for trade date September 16, 2015 parallel operation.	Tariff section 29.2(b)(7)(F)(ii)
27	Monitoring	Data Monitoring	Sufficient and adequate data is available to the CAISO and the Department of Market Monitoring	All required market monitoring data is available during testing and during post go-live for the key metrics (any exceptions will be addressed). CAISO will provide a market report that will provide publicly available information to all market participants.	Complete	Currently all requested data is available and DMM started evaluation of correctness and completeness of data.	Tariff section 29.2(b)(7)(K)(v)
28	Parallel Operations Plan	Deployment Plan	Parallel operations run consistently and in accordance with the timeframe set forth in the prospective EIM Entity specific parallel operation plan	Parallel operations runs consistently within normal production CAISO Market disruption tolerances.	Complete	Parallel operations plan posted on August 26, 2015. CAISO verified parallel operations ran consistently within normal CAISO disruption tolerences. From September 10, 2015 through September 30, 2015 RTD/RTPD cummulative uptime average of 99.97%; RTD - 99.40%, FMM - 97.67%, and STUC - 97.42%	Tariff section 29.2(b)(7)(J)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
29	Outage Management System	Transmission and generation outage submittal and retrieval	The prospective EIM Entity will verify its ability to submit and retrieve outage information with the CAISO	The prospective EIM Entity validate their ability to submit and retrieve transmission out of-service outages, generation Pmax derates, generation Pmin rerates, and generation out-of-service outage tickets within the required timelines.	Complete	NV Energy verifies its ability to submit and retrieve outage information with CAISO.	Tariff section 29.2(b)(7)(G)
30	Communications between the CAISO and the EIM Entity Initiate	Voice and/or electronic messaging	Implemented process and procedures used for voice and/or electronic messaging	The process and procedures are incorporated into the prospective EIM Entities business processes before the start of market simulation.	Complete	Completed as part of the NV Energy real-time desk certification process.	Tariff section 29.2(b)(7)(H)(i)
31	Communications between the CAISO and the EIM Entity Initiate	Communication tools	Staff are trained on communication procedures and tools	The prospective EIM Entity operations staff who will have responsibility for EIM operations, transactions and settlements are trained on the relevant operating procedures and tools used for EIM related communications before the start of parallel operations.	Complete	NV Energy confirms completion of training on communication procedures and tools for staff who will have responsibility for EIM operations, transactions and settlements.	Tariff section 29.2(b)(7)(H)(ii)
32	Communications between the CAISO and the prospective EIM Entity	3rd party transmission service provider	The third party transmission service provider information that supports EIM Transfers and Real-Time Dispatch included in the Full Network Model is available during parallel operations	The CAISO provides third party transmission service provider and path operator information to the prospective EIM Entity through parallel operations.	Complete	Not applicable for NV Energy EIM integration.	Tariff section 29.2(b)(7)(H)(iii)

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No.	Readiness Category	Criteria	Measureable Element	Threshold	Status	Update	Tariff Mapping
33	EIM Available Balancing Capacity	Identification of EIM Available Balancing Capacity	Participating resources and non-participating resources for EIM Available Balancing Capacity.	The prospective EIM Entity has identified EIM participating resources and non-participating resources that it intends to designate in the EIM Resource Plan as EIM Available Balancing Capacity	Complete	NV Energy designated EIM participating resources and/or non-participating resources in the EIM Resource Plan as EIM Available Balancing Capacity.	Tariff section 29.2(b)(7)(K)(iii)

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Attachment B – Affidavit of Petar Ristanovic

Readiness Certification
for
NV Energy's Participation in the Energy Imbalance Market

October 1, 2015

California Independent System Operator Corporation

California ISO

Affidavit of Petar Ristanovic Certifying Readiness of

NV Energy to Operate as an EIM Entity

I, Petar Ristanovic, Vice President of Technology for the California Independent System Operator Corporation ("CAISO"), hereby certify as follows:

1. As the Vice President of Technology, I am responsible for the systems and processes that support and enable the Energy Imbalance Market and, as such, I have overall responsibility for the implementation of NV Energy into that market.

2. I have reviewed the readiness dashboard and find that it is accurate and complete. All readiness criteria set forth in the CAISO's business practice manual and in tariff revisions pending before the Commission have been satisfied.

3. Based on the readiness dashboard and other materials prepared for me or for those that report directly to me and my own review of relevant information and direct involvement with readiness efforts, including testing, market simulation, training and parallel operations, and barring unforeseen developments, the systems and processes of the CAISO and NV Energy will be ready to implement NV Energy into the Energy Imbalance Market on November 1, 2015.

4. I will ensure that the CAISO maintains resource commitments necessary to sustain readiness through November 1, 2015 and address any unexpected conditions that may arise before November 1, 2015 that could undermine grid operation or market operation within the existing EIM Area. I will continue to monitor progress and resolve any unexpected conditions that may arise.

California ISO

5. Actual implementation of NV Energy on November 1, 2015 is conditioned upon the lack of any unexpected and unresolved issues that could undermine grid operation or market operation within the existing EIM Area. I will update this certification in the event any unexpected issues are not resolved as of November 1, 2015.

I hereby declare under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge, information, and belief:

Petar Ristanovic, Vice President of Technology

October 1, 2015

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Sacramento)

Subscribed and sworn to (or affirmed) before me on this 1st day of October, 2015, by **Petar Ristanovic**, proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

MARTHA M. SEDGLEY
Commission # 2080184
Notary Public - California
Sacramento County
My Comm. Expires Sep 27, 2018

Martha M. Sedgley
Notary Public

Attachment C – Affidavit of Walter Spansel

Readiness Certification
for
NV Energy's Participation in the Energy Imbalance Market

October 1, 2015

California Independent System Operator Corporation

Affidavit of Walter Spansel
Certifying Readiness of NV Energy to Operate as an EIM Entity

I, Walter Spansel, Vice President of Transmission for Nevada Power Company and Sierra Pacific Company, collective d/b/a NV Energy (collectively, "NV Energy"), hereby certify as follows:

1. As the Vice President of Transmission, I am ultimately responsible for the systems and processes that support and enable NV Energy to operate as an EIM Entity in the Energy Imbalance Market and, as such, I have overall responsibility for the implementation of NV Energy's entry into that market.

2. I have reviewed the readiness dashboard and find that it is accurate and complete. All readiness criteria set forth in the California Independent System Operator Corporation ("CAISO") business practice manual and pending before the Commission have been satisfied.

3. This certification is based on my own direct involvement in the activities of NV Energy Transmission, as a Prospective EIM Entity, surrounding market simulation and parallel operations; my careful review of the readiness dashboard and other communications and materials prepared for me by the CAISO or by those that report directly to me; my knowledge and information concerning readiness efforts, including testing, market simulation, training and parallel operations; consultation with CAISO personnel involved in preparing NV Energy for operation as an EIM Entity; and my opinion that the efforts have resulted in satisfaction of the readiness criteria as of this date. I certify that NV Energy will be ready to enter the Energy Imbalance Market on November 1, 2015 as an operating EIM Entity.

4. I will ensure that NV Energy maintains resource commitments necessary to sustain readiness through November 1, 2015 and after implementation of operation as an EIM Entity, and that it will address any unexpected conditions that may arise before November 1, 2015 and that could undermine grid operation or market operation within the existing EIM Area. I will continue to monitor for any unexpected conditions that may arise and will submit the necessary notifications in advance to the Federal Energy Regulatory Commission to advise if unanticipated conditions affect the planned operational date of November 1, 2015.

5. NV Energy entry into the Energy Imbalance Market on November 1, 2015 is conditioned upon completion of any unexpected conditions that could undermine grid operation or market operation within the existing EIM Area. I will update or withdraw this certification in the event the identified or unexpected items are not resolved as of the Implementation Date.

I hereby declare under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge, information, and belief:

Walter Spansel, Vice President of Transmission
NV Energy
October 1, 2015

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Sacramento)

Subscribed and sworn to (or affirmed) before me on this 1st day of October, 2015, by **Walter Spansel**, proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

MARTHA M. SEDGLEY
Commission # 2080184
Notary Public - California
Sacramento County
My Comm. Expires Sep 27, 2018

Martha M. Sedgley
Notary Public

Attachment D – Parallel Operations Market Quality Review

Readiness Certification
for
NV Energy's Participation in the Energy Imbalance Market

October 1, 2015

California Independent System Operator Corporation

Market Quality of Parallel Operations for NV Energy EIM

September 30, 2015

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Author: MVQA

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Executive Summary

Parallel operations of the Energy Imbalance Market (EIM) started on September 1, 2015 for purposes of evaluating the readiness of NV Energy, the prospective EIM Entity. The readiness criteria requires the ISO to provide a market performance report for the month of parallel operations carried out for the integration of the NV Energy balancing authority area (BAA) in the real-time energy imbalance market. This report fulfills that requirement and summarizes the main findings of market validation carried out by the ISO with an emphasis on the EIM results for the NV Energy BAA. This report encompasses both the fifteen and five-minute real-time markets.

The purpose of this market performance report is to provide with the results of the analysis and validation of the market solutions, looking at prices, schedules, and market infeasibilities are performing as expected based on the data input. The ISO's market performance validation shows that the market solution produced is as expected and consistent with the market rules as designed based on the given input data. The analysis conducted for this report accounts for the fact that input data is influenced by limitations inherent in the parallel operations environment and these limitations may affect the quality of the solution. When factors affecting the input data are controlled for, the numerical quality of the market solution is good and indicates that the systems and processes of NV Energy are capable of operating in production. The majority of the power balance infeasibilities identified during parallel operations were caused by input data issues, some of which are unique to parallel operations and software issues, all of which have been resolved by the date of this report. Parallel operations allowed the ISO and NV Energy to identify and resolve numerous input, process, and software issues prior to the commencement of financially binding operations.

Background and Scope

The purposes of parallel operations is to run the market to simulate as close as possible actual system operating conditions, and to provide NV Energy with an opportunity to go over specific day-to-day processes and activities required for the operation of the Energy Imbalance Market (EIM). This set-up provides NV Energy and the ISO with an opportunity to tune and test their systems and procedures in advance of financially binding market operations. The parallel operations conducted for NV Energy's EIM readiness proved to be successful in identifying and resolving numerous input set-up issues and software defects that will be instrumental in minimizing spurious infeasibilities after financial operations commence.

Although closely resembling actual operations, the parallel operation is an inherently limited operational environment and not as robust as actual operations. Some of these limitations may affect the outcome of the market solution and, therefore, they must be considered when evaluating market results in parallel operations. These include:

i) The real time market requires a set of data inputs in order to execute. In actual real-time market operations, many of these inputs are dynamic, dependent on the participants' resources actual performance, and resources following ISO dispatch instructions, as well as participants' actions. For example, in an actual operations environment, telemetry received from resources informs the ISO system of the resources actual operating status, which changes dynamically and interacts with the market systems as the conditions change. During parallel operation, this iterative and interactive data processing is limited because the resources of the prospective EIM entity are not yet required to follow their five-minute dispatch instruction. Therefore, while they may operate consistent with that market solution dispatch, it is often not the case and there may be mismatches between what the actual system is running with versus what the market is projecting due to units potentially not following closely the market instructions. Nevertheless, the market systems react to the information fed back to the system, thereby observing inconsistencies in actual supply conditions and what the market believes should happen, which could create anomalous market results.

ii) In actual operations, intertie resources require a closed loop for the market system to fully reflect the system and market conditions and intertie schedules eventually need to be tagged in order to reflect the system data flows. For parallel operations, it is not possible to replicate fully the actual tagging process without affecting the actual production system, which may pose an additional challenge based on the data input into the market system.

iii) During parallel operations, the market participant is still learning to manage their resources' data including characteristics and bids, which consist of three-part bids used for generation resources that require careful consideration of start-up, minimum load, and energy bid costs. The participant is also learning the impacts of the resources constraints on the actual

operations of the market, and correcting their actions as necessary to ensure the market systems accurately observe and consider their resources.

iv) During parallel operation, except for limited controlled periods no EIM transfer capability was modeled to avoid inadvertent transfers in the actual production that would otherwise occur if the prospective EIM entity was actually following some of the parallel operations dispatches for its resources. Therefore, parallel operations may be operating in a more constrained environment than it would in actual operations.

These factors, among others, can influence the market results and the quality of the solution. Therefore, any evaluation of the quality of the market results during parallel operations must consider the quality of the input data and the inherent limitations of parallel operations to avoid misleading conclusions about the actual functionality and robustness of the market. For example, these limitations may result in a number of infeasibilities that are not reflective of true operations, or of what the market solution would look like in a financially binding environment. Therefore, it is appropriate to take into consideration that these limitations will not exist after full implementation and market performance is likely to improve just because these constraints are removed.

However, despite these inherent limitations, the parallel operation provides as near production environment as possible in which the ISO and the prospective EIM entity can test and evaluate their procedures, actions and systems. The ISO can test and evaluate the market solution to ensure the market systems produce outcomes consistent with market expectations. Similarly, the prospective EIM entity can evaluate how the market reacts to its actions, evaluate its procedures and systems, and evaluate its readiness.

Market Performance

Sufficiency Tests

There are three tests that the CAISO will conduct during financially binding operations prior to the execution of the real-time market for each trading hour, which includes the EIM: the balancing test, the capacity test, and the flexibility test.[1] The balancing test provides a reference of how well balanced (energy supply and demand based on base schedules and forecast, respectively) the area is going to come into the real-time energy imbalance market. Having a large percentage of positive imbalance means the real-time market will be the last resort to balance the area incrementally with respect to the base schedules. The incremental balancing of supply will come from the bid-in capacity made available in the market in addition to the base schedule or EIM transfers between the participating EIM entities' BAAs. The capacity test evaluates whether the total supply in the base schedules and bid in capacity equals the demand forecast. The flexibility test evaluates whether the EIM entity has sufficient flexible capacity relative to the flexibility requirement determined by the market operator based on submitted self-schedules at the time.

Figures 1 through 3 show the frequency with which the EIM entity passed or failed these three tests during parallel operations for each day. The ISO calculated the frequency for each day, by dividing the number of hours where the prospective EIM entity failed the balancing test by 24 hours (regardless of any hours removed noted below). The figures below present the results for both under-schedule and overschedule cases. For figure 1, the ISO removed the data used to produce the figure three hours on September 9th, 17 hours on September 26, and seven hours on September 27 because in these hours there were software issues that led to incorrect balancing results. Also, the ISO removed 12 fifteen-minute intervals on September 16 from the data in figure 3 since these intervals failed the balancing test due to a software issue that inflated the requirement for flexible ramp up to four times the expected value.

Figure 1 shows the percentage of hours in which the balancing test passed. For the period of parallel operations, the NV Energy area passed the balancing test in 96 percent of the hours.

[1] These tests are required under sections 27.34 (k), (l), and (m) of the ISO tariff respectively.

Figure 1: Daily frequency of power balancing performance

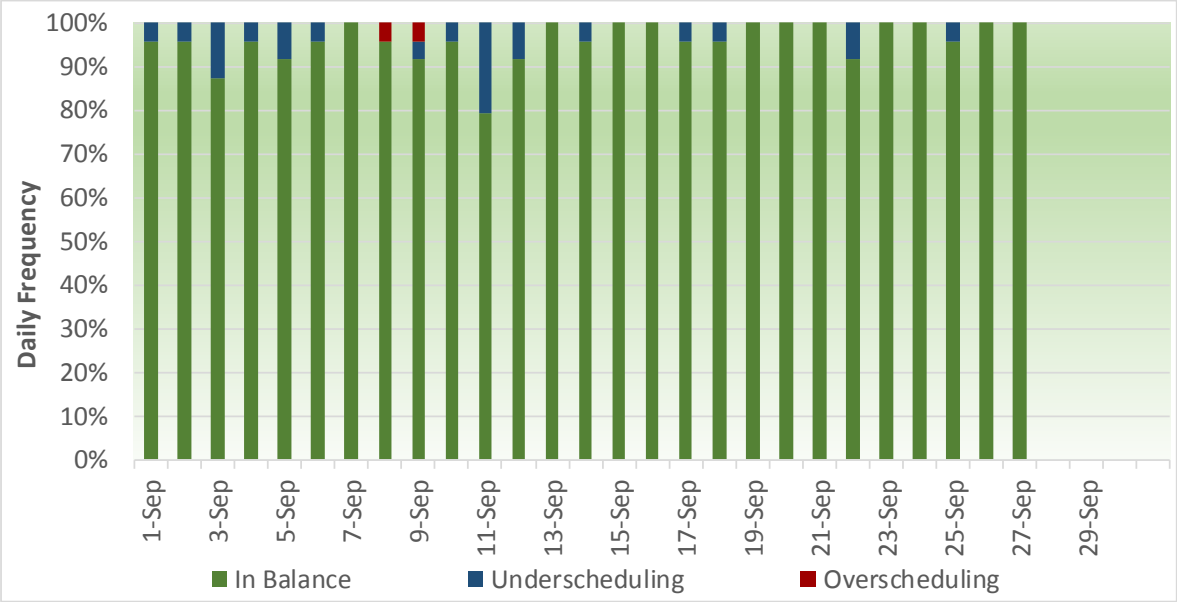


Figure 2 below shows that for this period, NV Energy passed the capacity test in in all but one hour.

Figure 2: Daily frequency of capacity test performance

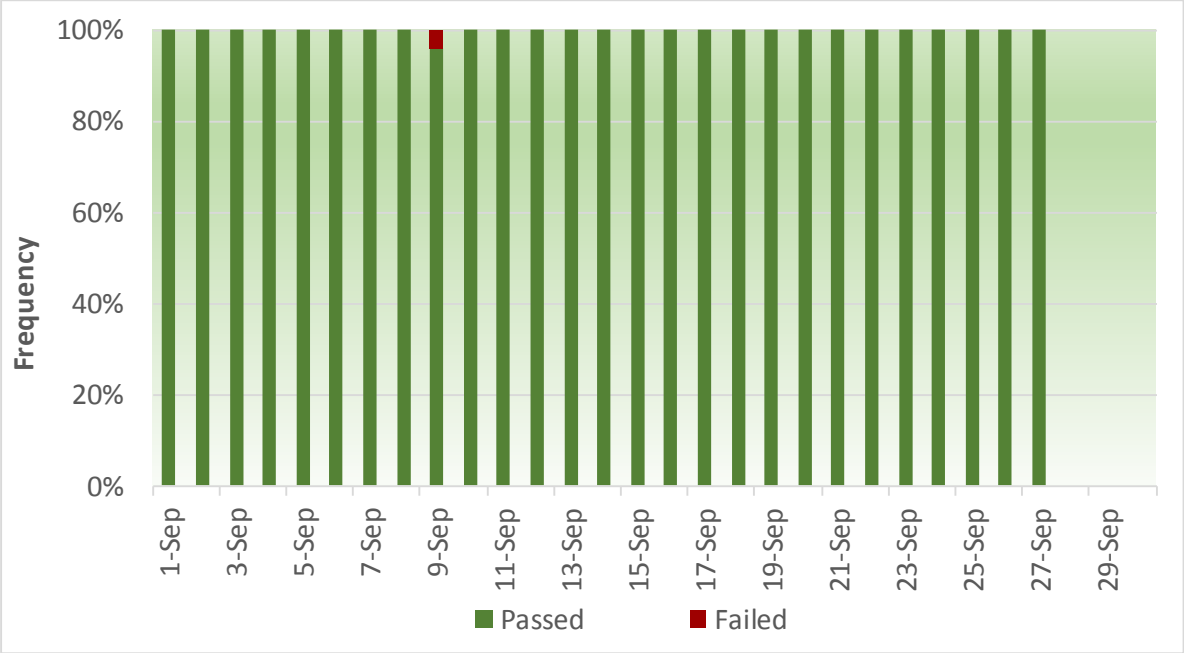
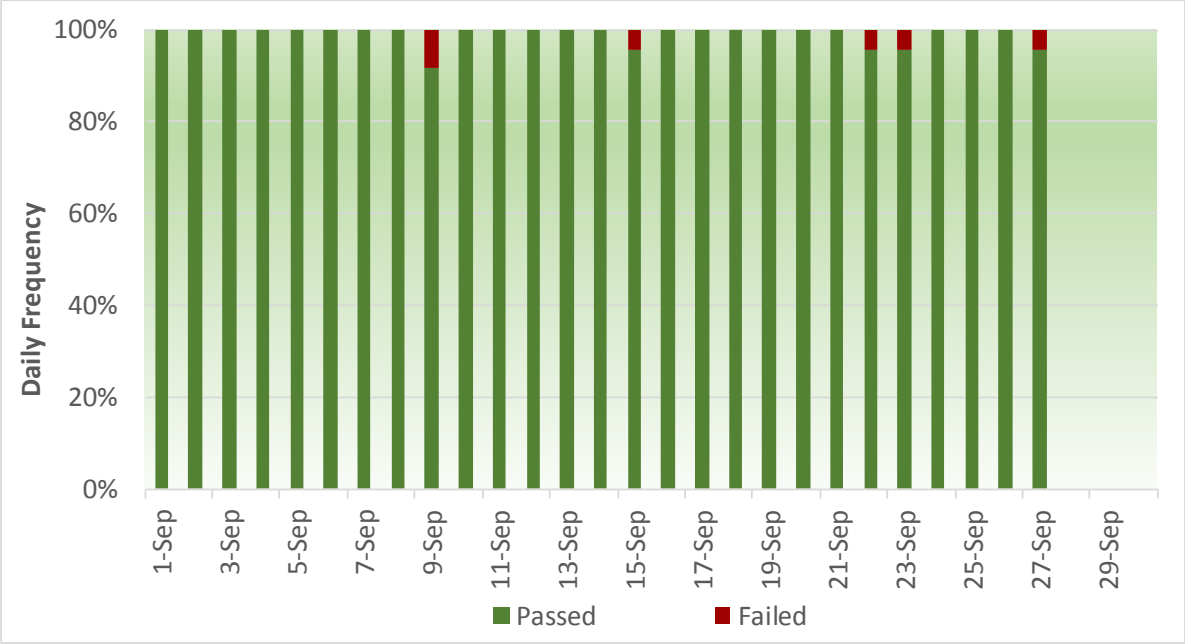


Figure 3 shows NV Energy passed in 99 percent of the hours.

Figure 3: Daily frequency of flexible ramp capacity test performance



Infeasibilities

Figure 4 and 5 shows the frequency of power balance infeasibilities for under-generation conditions in the 15-minute and 5-minute market, respectively. In parallel operations, the power balance infeasibilities are priced based on the corresponding penalty prices, which are pegged to the bid caps and bid floors specified in the tariff.

Figure 4: Daily frequency of under-generation infeasibilities in the fifteen-minute market

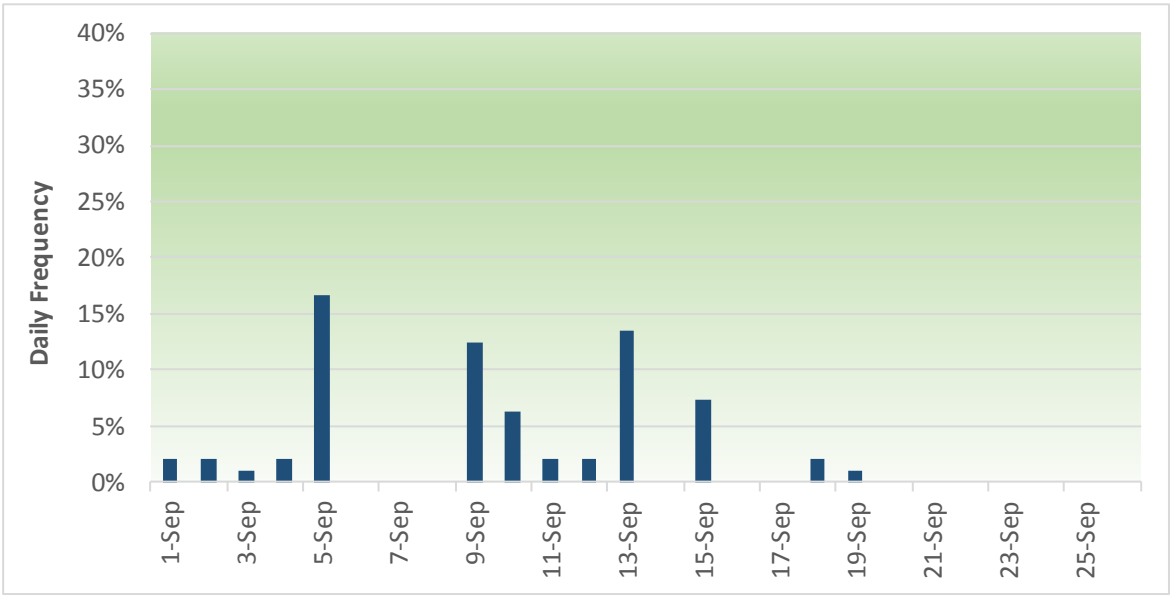
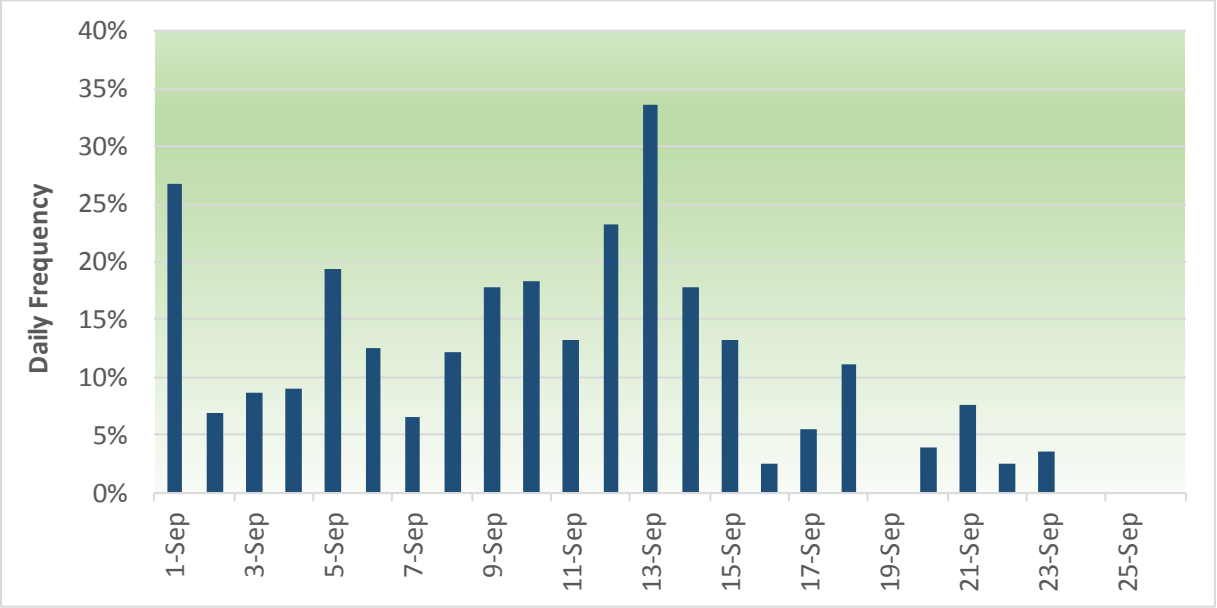


Figure 5: Daily frequency of under-generation infeasibilities in the five-minute market



The frequencies in these two trends are illustrated in two subgroups. The first group that covers the period of September 1 through September 15 shows all power balance infeasibilities for under-generation conditions, regardless of the magnitude of the power balance infeasibility and regardless of whether the case reflects a valid infeasibility or an erroneous infeasibility driven by data input errors, software issues, or resource set-up conditions. During the first half of the month a series of set-up, software defects and data input issues impacted the market solution systematically. The issues causing the anomalous market results are described in the next section of this report. As described there, a number of these issues were software issues and issues that caused input errors of one form or another. In actual operations, when the ISO has input or software issues that render the market solution unreliable for settlements purposes, the ISO has authority under section 25 of the ISO tariff to correct prices for these types of conditions. The pricing data only focuses on the days after September 16 during which the bulk of the issues were being resolved and the market solution was more reliable for purposes of this analysis. Prior to September 16, it is difficult to determine whether the infeasibility is due to the input or software issue, or whether it is due to true infeasibility.

After September 16, 2015, many fixes and mitigation measures were being implemented and in this period the main drivers of the infeasibilities were known. Therefore, the ISO was able to generally identify the intervals that that were subject to infeasibilities due to software or input errors, and was able to filter those intervals out, which are the intervals that in actual production would be subject to price correction or are unique to parallel operations and would not repeat in production. Even after such corrections, there were still some infeasibilities for the second half of the month in which the ISO could not conclusively identify, given the volume and the limited time, whether these are reflective of existing or new data or software issues or not.

Pricing

Figure 6 and 7 show the daily average prices for the NV Energy area at the aggregate ELAP. For both the fifteen- and five-minute markets, respectively, for the second half of the month once the invalid infeasibilities are filtered out.

Figure 6: Daily average of fifteen-minute prices

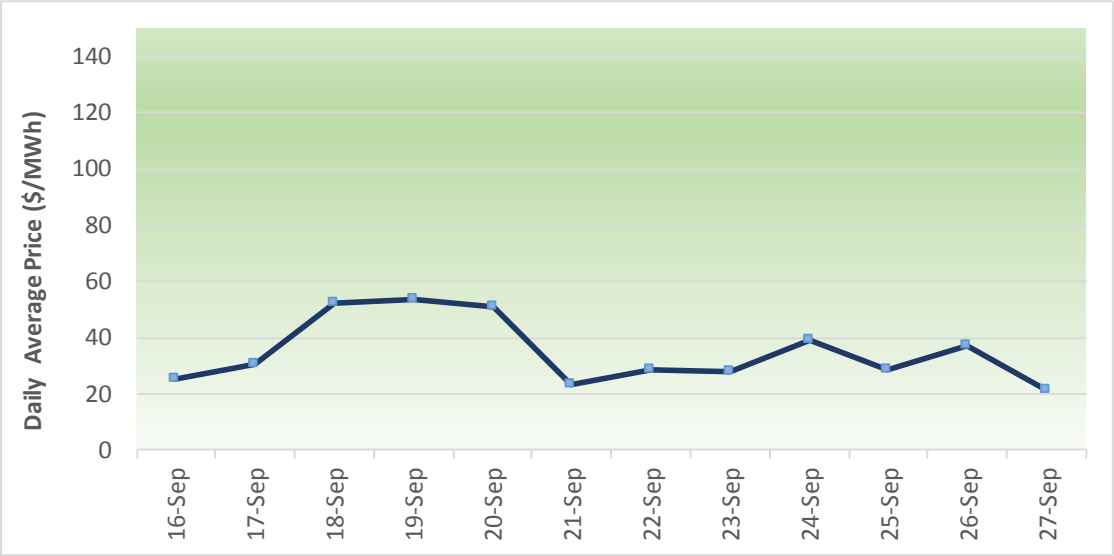


Figure 7: Daily average of five-minute prices

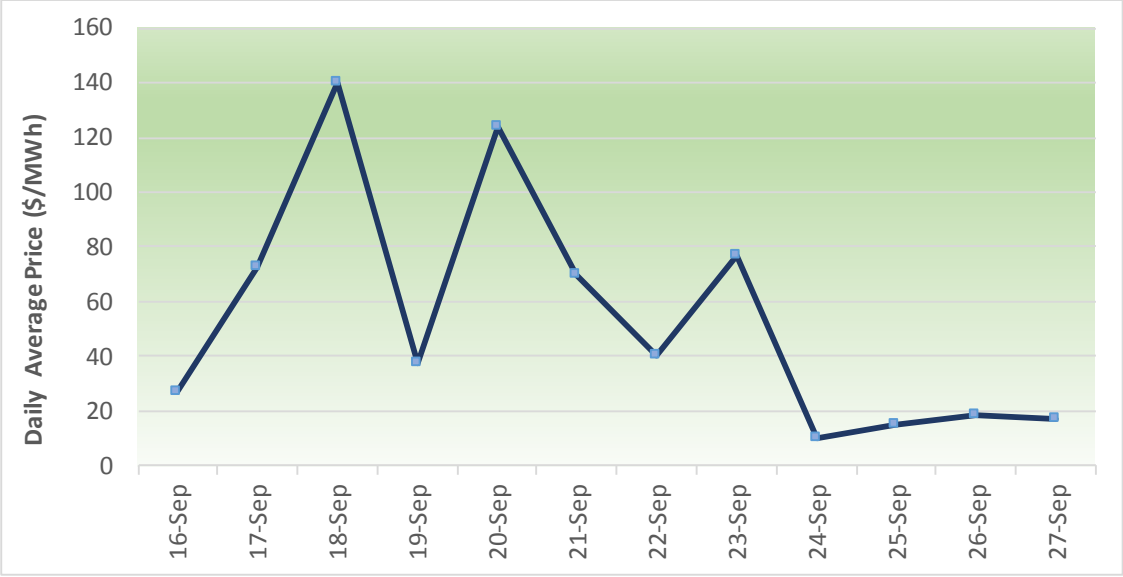


Figure 8 and 9 show the frequency of prices organized by various price ranges. The "Negative" category represents the frequency of prices that were below $0/MWh. The "Missing" category represents the frequency of prices that were missing; one driver for these missing prices is when the market application

fails or does not run. The remainder of the price categories represent frequency prices within the ranges specified for each category.

Figure 8: Daily frequency of fifteen-minute prices organized by price ranges

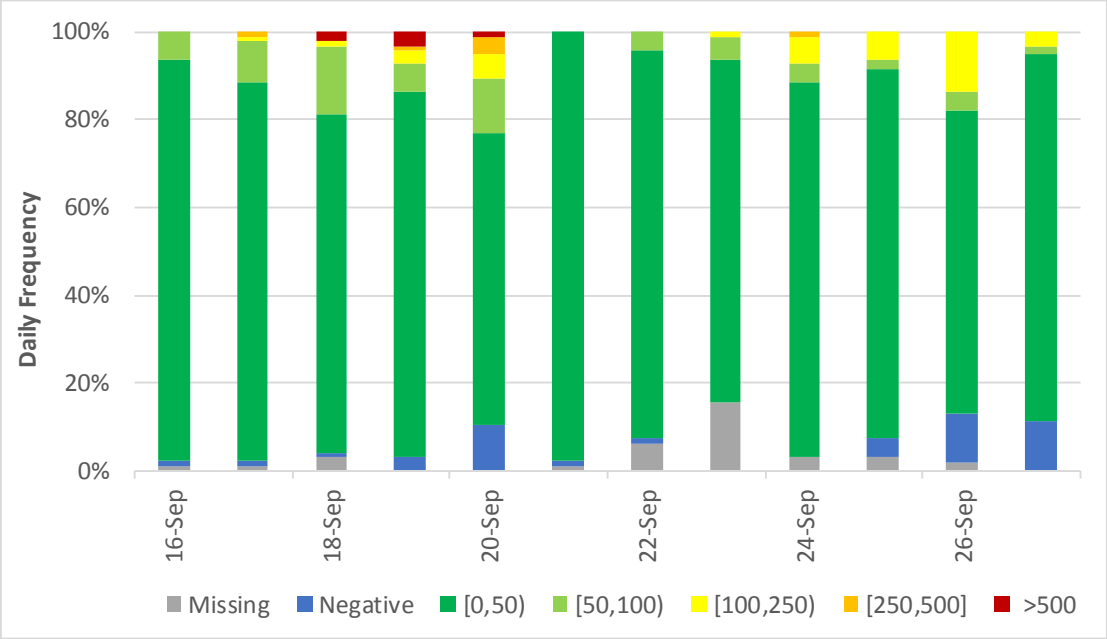
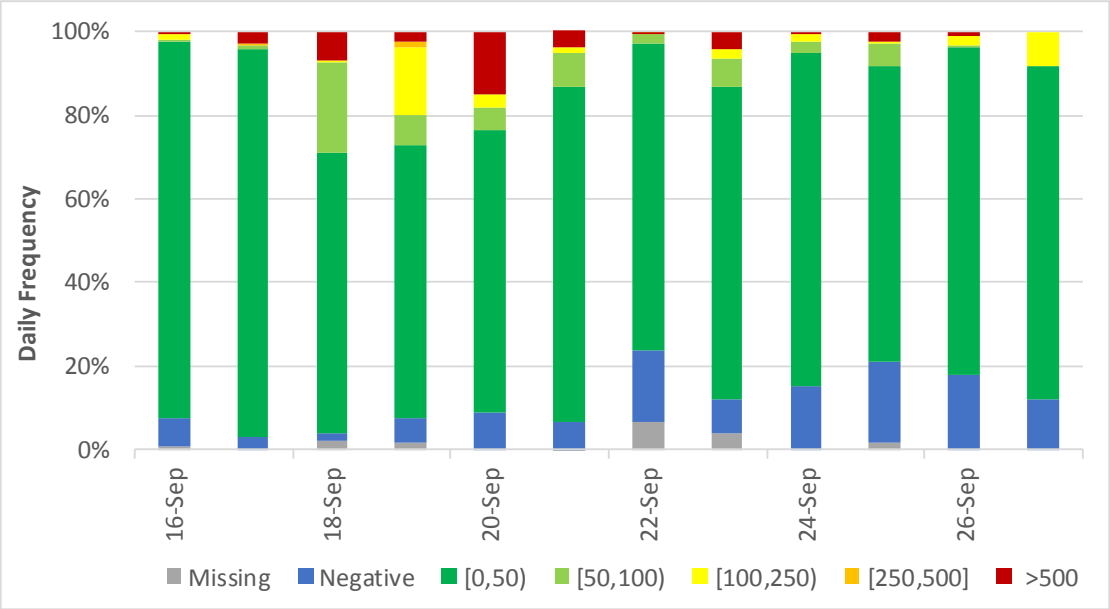


Figure 9: Daily frequency of five-minute prices organized by price ranges



The price bins in green shows the frequency of prices in the range of $0/MWh to $100/MWh. About 80 percent of prices in the 15- and 5-minute markets, respectively, fall between $0 and $100/MWh.

Market Validation Items

The ISO analyzed and validated EIM market results in parallel operations following the same process and criteria used for actual operations of the market. This section lists the issues identified that led to findings of incorrect or unintended market results in pricing and dispatches. The ISO described the issues and their resolution. Some of the issues were only relevant to the parallel operations environment because of the nature of parallel operations and are not transferable to the financially binding operations. Such issues, to the extent feasible, were resolved so that the ISO could analyze better the market solutions produced in parallel operations.

In some cases, the issues identified below if left unaddressed would also affect the market solution in actual production and could have contributed to infeasibilities in actual production. The ISO has resolved all the issues identified below.

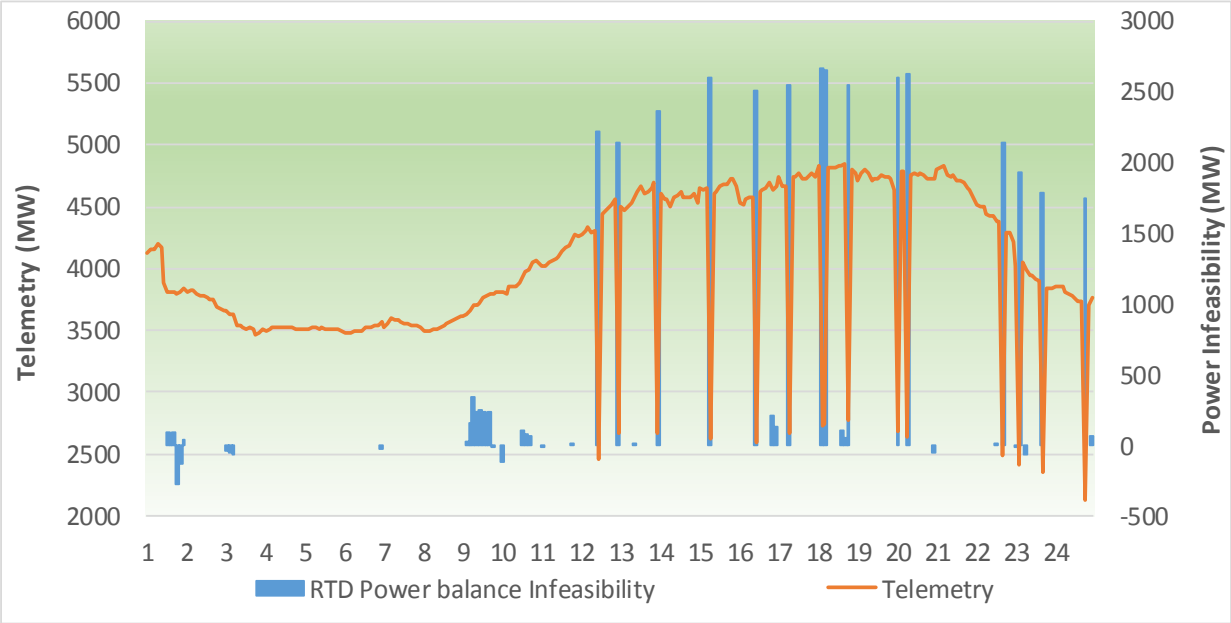
1. Incorrect telemetry feeding into the parallel operations real-time market.

   Type of issue: Set-up of input data only related to parallel operations environment and not transferrable to actual production.

   Status: Issue resolved on September 20.

   This issue affected the streaming of telemetry/state estimator data into the real-time market for parallel operations. This data allows the market to recognize the current operating point of generation units in the actual production environment to determine the optimal dispatch operating target for each five-minute market interval. For parallel operations, there are two options for feeding this data into the real-time market i) using data generated through a simulator of telemetry/state estimator data, or ii) streaming actual production data into the parallel operations system. When the ISO used the second option, there was an issue causing loss of data for multiple generation resources intermittently. This loss of data points resulted in in the market observing a significant loss of generation in the five-minute real time market, leading to severe and frequent under-generation power balance constraint infeasibilities. Figure 10 shows a trading date when the ISO changed the telemetry feed from the simulator to streaming from production data.

Figure 10: Sample day of supply profile in NV Energy area



The ISO switched from using simulator data to production data around hour ending 12. Figure 10 above[2], shows that the intermittent and large drops of supply in the five-minute market afterwards is driven by the sudden loss of telemetry on several units and resulted also in power balance infeasibilities. The infeasibilities were not reflective of actual system or market conditions but were rather due to the errors in transfer of data in the parallel operations system. This specific issue was the main the driver for a significant number of power balance infeasibilities in the five-minute market.

2. Incorrect pricing of power balance infeasibilities.

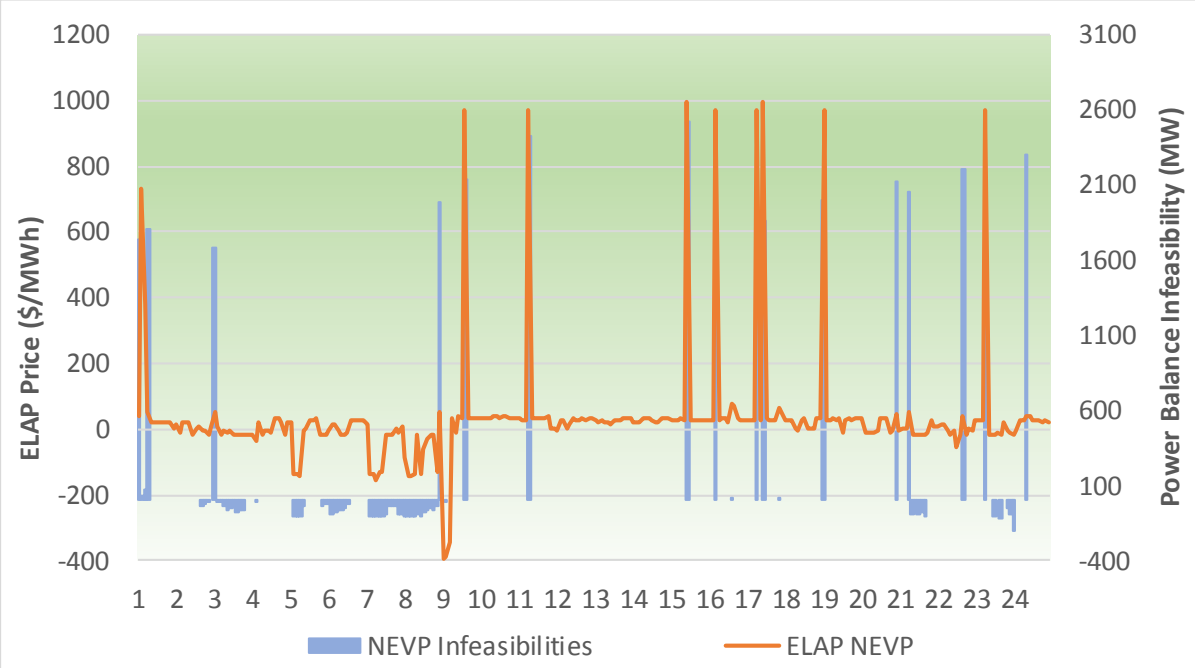
   Type of issue: System set-up issue in parallel operations.

   Status: Issue resolved on September 8.

   When there is an insufficiency of effective economic bids to balance supply and demand, the market software will relax the power balance constraint and will trigger penalty price based pricing, currently pegged at the $1000/MWh bid cap for under-generation conditions or -$150 for under-generation conditions. In the first days of parallel operations both under- and over-generation relaxations were not being priced at the penalty price levels as expected. Instead, the resulting prices were based on submitted economic prices. Figure 11 below shows a sample of these instances.

[2] A sample day is presented from actual parallel operations. Since telemetry reflects actual production data from NV Energy, the actual telemetry values were mocked in this plot; however, the actual pattern of the telemetry data loss in the market was preserved.

Figure 11: Five-Minute ELAP Price in NVE and PBC infeasibilities.



The bars in green stand for the magnitude of the power balance infeasibilities while the line in orange shows the ELAP price. In some instances of infeasibilities the price was set actually by the penalty prices, but on other instances such as hour ending 20 and 24 when under-generation infeasibilities were present the resulting prices were in the economical range of less than $50/MWh. Similar behavior was observed for overgeneration infeasibilities. In some cases, such as hour ending 5, the resulting prices were about -$150, but in other instances like hour ending 3, the resulting prices were about $0. The driver for such outcomes in the first days of parallel operations was a default setting of the penalty prices for NV Energy balancing area within the market application. Once the ISO identified the issue, it defined these parameters properly in the parallel operations environment.

This issue of the parameter set-up also had impacted infeasibilities for flexible ramp constraints in the same fashion; *i.e.*, when the flexible ramp constraint was relaxed, in some instances the clearing price was not set at the penalty price.

3. Incorrect system-wide energy prices.

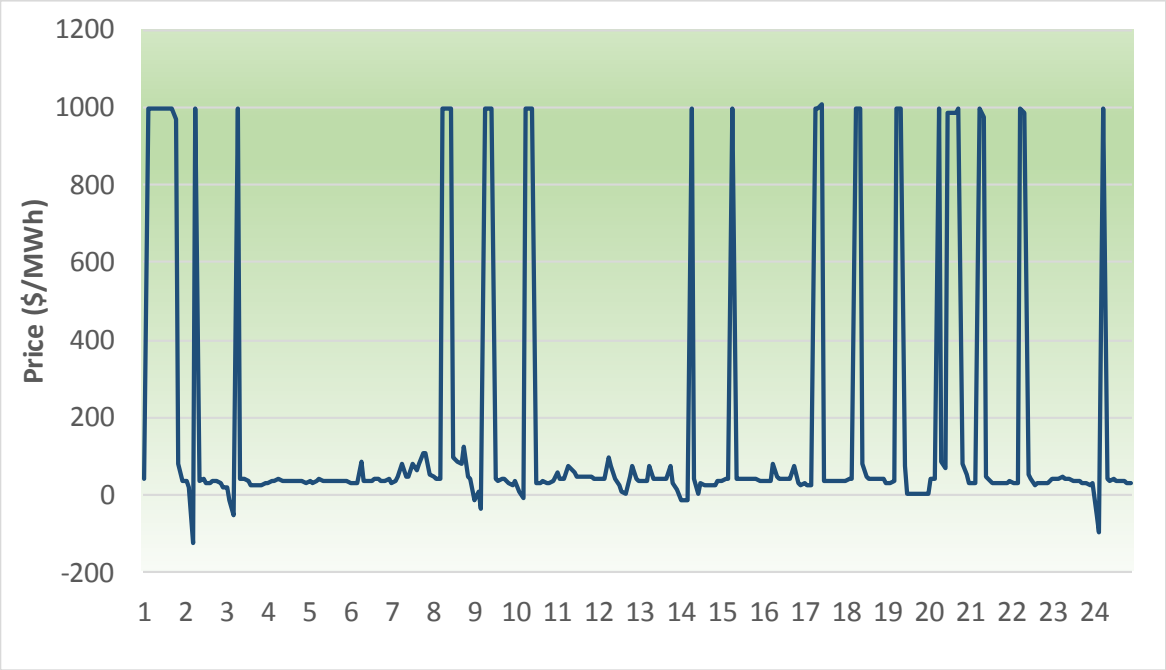
Type of issue: Set-up related to parallel operations. No repeatable in Production

Status: Issue was resolved in the fifteen minute market on September 18, and in the real-time market on September 29.

The ISO identified instances where the system-wide energy price, commonly referred as the system marginal energy component (SMEC) was intermittently reaching a $1000 price. The pattern was

intermittently observed in the same intervals of the five-minute. The ISO subsequently discovered that this was also present in the same timeframe of the fifteen-minute market, even though the prices did not reach the $1000 prices. Figure 12 shows the pattern of such prices being affected by this issue.

Figure 12_: Sample day of five-minute system marginal energy price



This issue was identified to be a limitation in the parallel operations environment to provide scheduling information to the market, and replicate all the processing that takes place when participants submit tie-related information to the scheduling system. This was a factor present only in parallel operations and driven by the limitations to fully emulate the logic and dynamics of the scheduling process in parallel operations.

4. Incorrect profile of intertie resources.

   Type of issue: Software functionality.

   Status: Issue was resolved on September 22.

   A pattern was identified where certain intertie schedules were dispatched incorrectly in the fifteen minute market. This behavior did not affect the power balance of the fifteen minute market and, thus, it did not result in more power balance constraint infeasibilities.

5. Incorrect commitment of MSG unit.

   Type of issue: Software functionality.

   Status: Two different software defects were on September 18.

   There were two software defects that impact the dispatch of MSG units under certain conditions of the market, which led to power balance infeasibilities. After identifying the issue, a software fixed was delivered.

6. Excessive cycling of unit commitments.

   Type of issue: Process from NV Energy.

   Status: NV Energy will submit updated registration data by October 4, 2015.

   The energy imbalance market is comprised of both the 15-minute and the 5-minute market. The FMM market allows for unit commitments (start-up, shutdown and transitions) of generation resources. Such commitment depends on both the overall economics of the system and the various inter-temporal constraints such as start-up times, minimum down and up times, and transition times. Unit commitments are determined based mainly on the start-up cost, minimum load cost, and transition costs. If such costs are relatively cheaper to the overall economics of the market, depending on other conditions, the market may find that it is more economical to leverage on unit commitments instead of dispatching upwards or downwards units already committed. This dynamic has been observed for various units in the NV Energy area. When units have such low commitment costs, the end result is that the market may commit units too frequently to address short temporal conditions. NV Energy is in the process of updating the commitment costs and resource parameters to be more reflective of actual costs in the market. This will consequently reduce the excessive frequency of unit commitments.

7. Incorrect dispatch of certain NV Energy resources.

   Type of issue: Process related for CAISO.

   Status: Root caused identified and resolved on September 10 in parallel operations. An item was added to the check list for production implementation.

   Some instances of power balance infeasibilities were driven by improper dispatches of certain NV Energy resources that was caused by setting improperly these resources in the market. Once this issued was identified the set-up was corrected and an item in the check list for production deployment has been added.

8. Incorrect pricing for Shared resources.

   Type of issue: Software functionality.

   Status: Root cause was identified and addressed via a software patch received on September 30.

   The congestion pricing for some NV Energy resources in the energy imbalance market was not correct, the marginal congestion component was as twice as high as the expected value in reference to the given congestion.

9. Incorrect dispatch of certain NV Energy resources.

   Type of issue: Network model related.

   Status: Issue resolved on September 29 for parallel operations; the upcoming network model update for Production scheduled for October 22 will include this item.

   Some resources in the NV Energy area were shutdown unexpectedly in the market, which led to power balance constraint infeasibilities. The ISO determined that this happened due to a missing element of these resources in the network model.

10. Incorrect profile of intertie resources in NV Energy.

    Type of issue: Issue with schedule values coming from NV Energy system.

    Status: Root cause was identified and addressed via a software fix on September 29.

    The ISO identified an issue with the submitted schedules for some interchanges from NV Energy system that caused both over- and under-generation infeasibilities in the five-minute market. This problem was driven by the values coming from NV Energy scheduling system into the market system for parallel operations.

11. Inconsistent requirements for flexible ramp requirements.

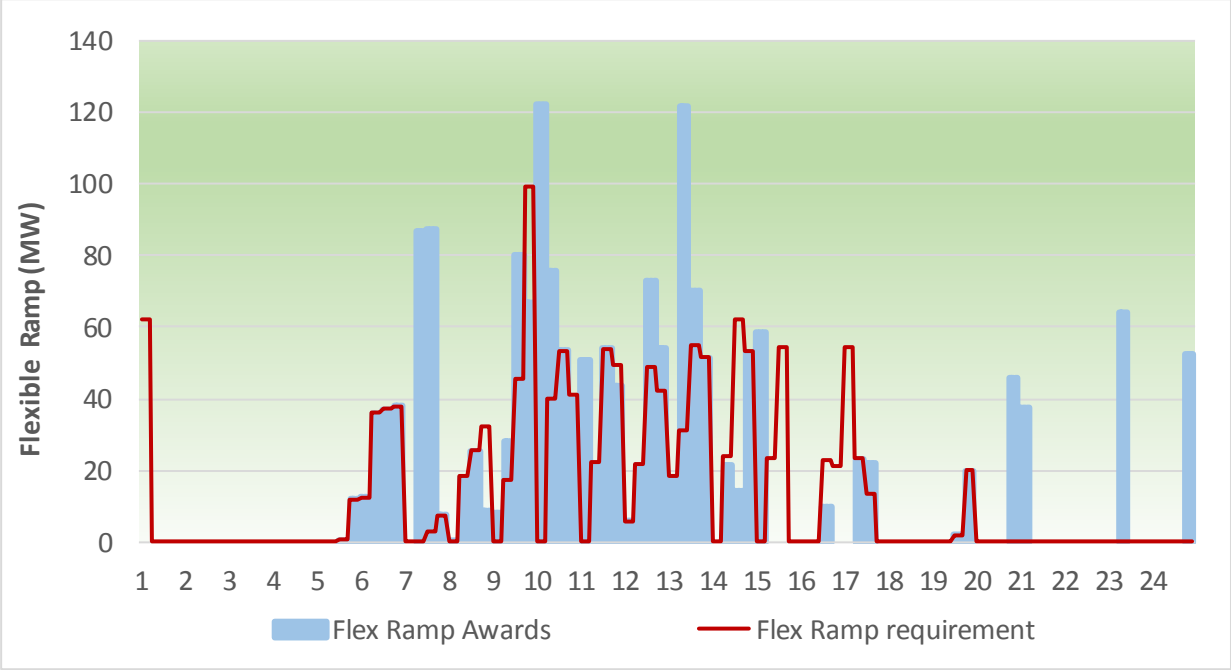
    Type of issue: Software defect.

    Status: Root cause was identified and addressed via a software fix on September 29.

    The flexible ramp requirements are calculated by a system application external to the market application and then pass to the market application for consumption. These requirements consist of two parts, one is the MW net movement and a second one is the MW related to uncertainty. The flexible ramp constraint procurement targets or requirements in the fifteen-minute market are based on the estimates of variability and uncertainty. However, it was found that the fifteen minute market was not using the uncertainty value but rather the net movement, resulting in requirements

that may be too low; this consequently could have set the procurement for flexible ramp capacity too low and potentially exposed the real-time market to more power balance constraint infeasibilities. The following plot shows a representative day for the requirements of flexible ramp capacity.

Figure 13: Five Minute ELAP Price and PBC Infeasibilities in NV Energy.



12. Missing telemetry data point for a dynamic resource.

    Type of issue: Set-up in parallel operations.

    Status: Root caused identified and resolved on September 29.

    Certain resources in the market were missing telemetry value and thus the real-time interval dispatch consistently dispatched them to low MW value; this led to the five-minute market to lose capacity and have power balance infeasibilities; this also created a misalignment between the fifteen-minute market and the five-minute market. This problem was present when telemetry was fed from production data into the parallel operation system.

13. VER forecast missing for NV Energy resources

    Type of issue: missing input data in parallel operations

    Status: Root cause identified and resolved by ISO on September 2.

    During the start of parallel operation the payload contains the NV Energy VER resources forecast was not coming to the parallel operation market system. This resulted in the market to consider these resources at their hourly base schedule value, which was very different from their actual generation causing both over-generation and under-generation infeasibilities in the market during several times at the start of parallel operation. This issue was caused by missed configuration setup in the ISO forecasting system.

14. NV Energy base schedule submission not adjusted for outages and derates

    Type of issue: NV Energy incorrect input data submission

    Status: Root cause identified and resolved by NV Energy on September 17

    A software defect on NV Energy side prevented the adjustment of the base schedules values to be consistent with the corresponding derate values. This issue caused NV Energy to think that BAA was balanced (in balancing tool) before the final balancing test was performed, but when the balancing test was actually performed in the market and these derates were taken into account, the results showed that the BAA was not balanced (as shown in CMRI application).

15. Conflicting MSG Plant and corresponding configurations static data submission

    Type of issue: Incorrect static data submission

    Status: Root cause identified and input data was corrected by NV Energy on September 16

    A couple of large MSG resources had base schedules submitted at one of their configurations but market kept dispatching these resource to zero (shut down) causing severe under-generation infeasibilities in the market. The issue was traced to the static input data registered by NV Energy for the minimum down time of the plant which was lower than the minimum down of the configuration. This is in conflict with a market rule and caused incorrect commitment and shut-down of these MSG resources. NV Energy corrected the registered static data and issue was fixed on September 16.

16. Incorrect submission of MSG availability data for overlapping configurations

    Type of issue: NV Energy incorrect input data submission

    Status: Root cause identified and input data was corrected by NV Energy on September 17

    The outages and availability of MSG resources for the overlapping configurations such as the duct fire configuration and associated normal configuration were not correctly submitted to reflect the ambient derate limitations on these configurations. This caused dispatch of these resources in configurations that resulted in over-generation and under-generation conditions.

17. Incorrect hourly load forecast values used for balancing

    Type of issue: Delay in data publishing

    Status: Root cause was identified and fixed by ISO on September 11

    The ISO calculates and publish the hourly load forecast at T-80' for use in the T-75' balancing test, and at T-60' for use in the T-55' balancing test. NV Energy is also using these hourly load forecast to balance their BAA. The ISO system was publishing the T-60' forecast few minutes late and the NV Energy process which was pulling the forecast at T-60' was using the older forecast at T-80' since the new T-60' was not published and received by NV Energy system yet. NV Energy would balance their system based on the T-80' value, but the market balancing test would use the T-60' to judge the balance. This issue caused NV to fail the balancing test during the first 11 days of parallel operation every time the changes between the T-80' and T-60' load forecast is significant