



California ISO

Energy Imbalance Market Enforcement of Transmission Constraints

NV Energy Inc.

November 10, 2016

I. Introduction and Background

On November 19, 2015, the Federal Energy Regulatory Commission (Commission) issued an order, accepting in part, subject to condition, and rejecting in part Nevada Power Company's and Sierra Pacific Power Company's (collectively, NV Energy), and PacifiCorp's (together with NV Energy, Berkshire EIM Sellers) market-based rate tariff revisions that reflect their participation in the Energy Imbalance Market (EIM) administered by the California Independent System Operator Corporation (CAISO).¹ The Commission allowed the Berkshire EIM Sellers to participate in the EIM at market-based rates on the condition that: (1) the Berkshire EIM Sellers offer their units that are participating in the EIM into the EIM at or below each unit's Default Energy Bid; and (2) the Berkshire EIM Sellers facilitate CAISO's enforcement of all internal transmission constraints in the PacifiCorp and NV Energy balancing authority.

The Commission accepted the market-based rate tariffs, subject to condition, to become effective on the day that NV Energy began participation in the CAISO EIM. NV Energy began to participate in the EIM on December 1, 2015, pursuant to the conditions in the November 19 Order.

The Commission required that the Berkshire EIM Sellers facilitate the CAISO's enforcement of all internal transmission constraints in the PacifiCorp and NV Energy balancing authority areas. The Commission also noted that if the "the enforcement of internal transmission constraints presents reliability or other operational concerns," they expected that the CAISO, PacifiCorp, and NV Energy would inform the Commission of the problems, any solutions, and implications for the EIM.

II. Informational Report

NV Energy facilitates the enforcement of all transmission constraints in its balancing authority area, consistent with the same principles the CAISO applies in enforcing transmission constraints within its own balancing authority area. These principles are reflected in Section 27.5.6 of the CAISO Tariff. While the responsibility of which transmission constraints are enforced in the EIM remain with the EIM Entity, NV Energy has adopted the principles in Section 27.5.6 of

¹ *Cal. Ind. Sys. Operator Corp.*, 153 FERC ¶ 61,206 (2015) (November 19 Order).

the CAISO Tariff in managing the enforcement of transmission constraints within their balancing authority area.²

Section 27.5.6 generally requires that the CAISO manage the enforcement of transmission constraints consistent with good utility practice, to ensure, to the extent possible, that the market model used in each market accurately reflects all the factors that contribute to actual real-time flows on the controlled grid. This is necessary to ensure that the market clearing results are better aligned with actual physical conditions on the controlled grid. Section 28.5.6 further specifies the conditions under, which the CAISO may enforce, not enforce, or adjust a transmission constraint in operating the markets consistent with this overall policy. Specifically:³

(a) The CAISO may enforce, not enforce, or adjust flow-based Transmission Constraints, including Nomograms and Contingencies, if the CAISO observes that the CAISO Markets produce or may produce results that are inconsistent with observed or reasonably anticipated conditions or infeasible market solutions either because (a) the CAISO reasonably anticipates that the CAISO Market run will identify Congestion that is unlikely to materialize in Real-Time even if the Transmission Constraint were to be ignored in all the markets leading to Real-Time, or (b) the CAISO reasonably anticipates that the CAISO Market will fail to identify Congestion that is likely to appear in the Real-Time. The CAISO does not make such adjustments to intertie Scheduling Limits.

(b) The CAISO may enforce or not enforce Transmission Constraints, including Nomograms and Contingencies, if the CAISO has determined that non-enforcement or enforcement, respectively, of such Transmission Constraints may result in the unnecessary pre-commitment and scheduling of use-limited resources.

(c) The CAISO may not enforce Transmission Constraints, including Nomograms and Contingencies, if it has determined it lacks sufficient visibility to conditions on transmission facilities necessary to reliably ascertain constraint flows required for a feasible, accurate and reliable market solution.

² Pursuant to Section 29.4(a)(1), 29.4(a)(3)(D)-(E), and 29.4(b)(1)(B) each EIM Entity remains individually responsible for reliability of the transmission system they control. The CAISO systems are prepared to enforce any modeled constraints.

³ See Section 27.5.6 of the CAISO Tariff.

(d) For the duration of a planned or unplanned Outage, the CAISO may create and apply alternative Transmission Constraints, including Nomograms and Contingencies, that may add to or replace certain originally defined constraints.

(e) The CAISO may adjust Transmission Constraints, including Nomograms and Contingencies, for the purpose of setting prudent operating margins consistent with good utility practice to ensure reliable operation under anticipated conditions of unpredictable and uncontrollable flow volatility consistent with the requirements of Section 7.

(f) The CAISO may adjust Transmission Constraints for the purpose of reserving internal transfer capability in the Day-Ahead or Real-Time Markets, based on anticipated conditions on the natural gas delivery system, to reliably serve load in specific geographic regions of the CAISO Balancing Authority Area, or to assure deliverability of Ancillary Services. The CAISO may or may not release such reserved internal transfer capability based on natural gas and electric system conditions, or observed market inefficiencies. Upon determining that an adjustment is necessary, the CAISO will issue a notification specifying the amount of the adjustment.

Pursuant to the November 19 Order, the CAISO, and NV Energy have been coordinating in the enforcement of transmission constraints in the NV Energy balancing authority area. NV Energy advised the CAISO that as of December 18, 2015, all elements that are 138 kV and above, and subject to constraint enforcement, should be enforced without exception. NV Energy further advised the CAISO that as of February 11, 2016, all elements that are over 100 kV, and subject to constraint enforcement, should be enforced without exception. NV Energy has not since applied any exceptions to any of the elements in the model. Today, NV Energy supports enforcement of the constraints for all elements above 100 kV that are subject to enforcement. As explained further below, not all elements are subject to enforcement of a constraint. Attachment A provides the list of all constraints NV Energy has modeled in their system and identifies whether each constraint is currently enforced or not, together with a classification of the reason for the constraints not enforced.⁴

⁴ The CAISO treats information related to the full network model and the enforcement of transmission constraints as sensitive and protected pursuant to a Non-Disclosure Agreement. See Sections 6.5.1. Accordingly, the CAISO requests privileged treatment of the information provided in Attachments A pursuant to 18 C.F.R § 388.112 as information that is treated as

Table 1 below summarizes the information of the constraint enforced in NV Energy balancing authority area, including below 100kV elements. As a percentage of elements over 100 kV that are subject to enforcement, 100% of all such elements are flagged for enforcement.

Type of Constraint	Not Enforced	Enforced
Transmission Lines	39.8%	59.4%
Phase shifters	100%	0%
Transmission Corridors	100%	0%
Transformers	52.6%	46.4%

Reasons for why NV Energy does not enforce some the constraints include:

1. Transmission lines. There are multiple voltage levels used in the transmission system, such as 500KV, 345kV, 230KV, 138KV, 120kV, 69KV, 60kV and 55kV. Any transmission line for a voltage level under 100 KV is not enforced in the NV Energy area. This voltage criteria applies consistent with NV Energy's statement in its compliance filing submitted December 21, 2015 in Docket Nos. ER15-2281 and -2282, in which it represented that it would review constraints enforcement for all elements 100 kV and above. The limit reflects the fact that all facilities on the NV Energy system less than 100 kV are distribution facilities. Also, any transmission line that links NV Energy with other balancing authority areas, commonly referred as intertie elements, are not enforced – either because these constraints are managed as scheduled paths or enforcing them as flow-based constraints will not provide any mechanism to the market to manage the flows since they are defined with tie schedules. Certain lines in the model are not NV Energy's and/or NV Energy does not operate the line; therefore, NV Energy cannot activate the constraint for enforcement.
2. Phase shifters. Phase shifters are typically not subject to enforcement of a constraint because constraints are actively managed through phase shifter operation.

Critical Energy Infrastructure Information exempt from the disclosure requirements under the Freedom of Information Act, 5 U.S.C. 552, and should be withheld from public disclosure. The information contained in those attachments is Critical Energy Infrastructure Information because it provides details regarding the transmission of energy and vulnerabilities on the system that can be useful to a person in planning an attack on the critical infrastructure.

3. Transmission corridors. These are typically elements linking NV Energy area with the CAISO area and as such, they are defined more like intertie limits. Intertie limits are controlled through scheduling limits and are therefore not enforced through constraints enforcement.
4. Transformers. All transformers at 100 kV and above, and that are elements of NV Energy's Transmission System are subject to constraints enforcement. About a half of transformers in the NV Energy balancing authority area are not enforced: Load serving transformers are not subject to constraints enforcement because they are distribution level elements, and the market operator does not have any ability to control resources to enforce constraints. Generator step up transformers are also not subject to constraints enforcement because they are generator elements subject to limitation through the operation of the generator. Regulators and tap changers are likewise not subject to constraint enforcement because they are subject to operational limitations of the transmission element to which they belong.

The CAISO and NV Energy have been working together since before NV Energy commenced EIM operations to ensure that the proper transmission constraints are enforced. As noted above, NV Energy performed its analysis and advised the CAISO in early February 2016 of its intention that all elements above 100 kV should be subject to enforcement of their constraints. Later in the year, with the help of the Department Market Monitoring, NV Energy and CAISO discovered that that certain constraints were not being enforced. After investigation of the issue, the CAISO and NV Energy determined that the CAISO had not identified in all cases the voltage of the particular constraints due to naming conventions. While both NV Energy and the CAISO believed that the parties had performed all steps necessary to enforce all the requested constraints, some constraints were left unenforced since December 1, 2015. Over the summer 2016, NV Energy and the CAISO worked together and were able to clearly identify each element in the model, whether each element should be subject to constraint enforcement, and the reasons why certain elements should not be activated based on one of the reasons above. This process required some time to compare various updates to the model and generate the complete list of elements, and discuss the reasons enforcement did nor did not apply. Through multiple exchanges, the missing constraints were incrementally enforced to have the full set enforced in September 2016.

Since the implementation of the EIM for NV Energy in December 2015, there has been very infrequent transmission constraints binding in NV Energy balancing authority area, including for the constraints enforced as of or shortly after commencement of EIM operations. Almost all elements overlooked for enforcement in early 2016 were 120 kV or less. Furthermore, the constraint enforcement is designed to trigger price mitigation during times of constraint. Because NV Energy is required to bid at its default energy bid, it is subject to that mitigation regardless of whether the constraint is enforced or not. Therefore, the unintended delay on enforcing constraints for certain relevant elements – unknown to NV Energy or the CAISO at the time – should not have undermined the mitigation that the constraint enforcement is designed to enable.

Informational Filing: Energy Imbalance Market – Enforcement of Transmission Constraint

November 10, 2016

California Independent System Operator Corporation

Attachment A

Confidential Constraints Table

**[ATTACHMENT CONSISTS OF PRIVILEGED MATERIAL REDACTED
PURSUANT TO 18 C.F.R. 388.112]**

CERTIFICATE OF SERVICE

I certify that I have served the foregoing document upon the parties listed on the official service list in the captioned proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 10th day of November, 2016.

/s/ Grace Clark
Grace Clark