Impact of Convergence Bidding on Real-Time Imbalance Energy Offset

Issue Paper & Straw Proposal

April 27, 2011

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1 Introduction

The Real-Time Imbalance Energy Offset as defined in the ISO tariff is a neutrality account through which the ISO allocates surpluses or deficits through payments or charges, respectively, on a pro rata basis to metered load and exports. Since January 2010, the offset has resulted in an average charge to metered load and exports of $11.2M per month. During this time, the hour ahead scheduling process (HASP) price has been consistently lower than the real-time dispatch (RTD) price, which contributes to the offset. With the implementation of convergence bidding in February 2011, market participants are able to take offsetting positions, by submitting internal virtual demand bids that are equal to the physical/import positions, based on the price differential between HASP and RTD that has further impacted the offset. Based upon an analysis of recent convergence bidding trends, the ISO is proposing a settlement rule that would reverse any gains attributable to the differential between the HASP and RTD price in instances where a scheduling coordinator (SC) submits balanced and offsetting internal virtual demand and physical/virtual import positions. The redesign of the real-time market (HASP and RTD), a longer term solution to address the Real-Time Imbalance Energy Offset, is currently being addressed in the Renewable Integration: Market and Product Review Phase 2 stakeholder initiative.

2 Plan for Stakeholder Engagement

Item	Date
Post Issue Paper & Straw Proposal	April 27, 2011
Stakeholder Conference Call	May 4, 2011
Stakeholder Comments Due	May 11, 2011
Post Draft Final Proposal	May 18, 2011
Stakeholder Conference Call	May 25, 2011
Stakeholder Comments Due	June 1, 2011
Board Meeting	June 29-30, 2011

3 Background

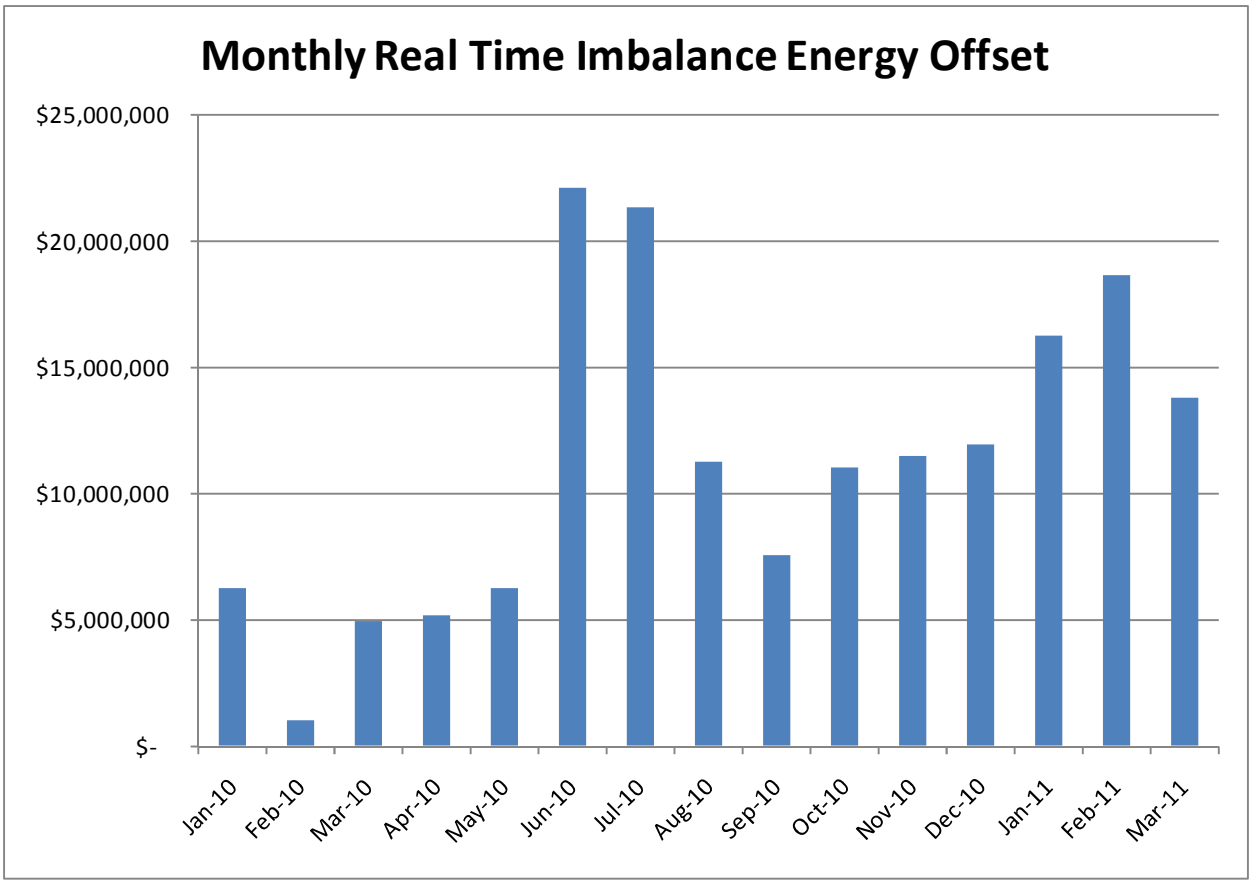
The Real-Time Imbalance Energy Offset (CC 6477) is a neutrality account through which the ISO tracks the settlement dollar values for the following charge codes: Real-Time Instructed Imbalance Energy (CC 6470), Real-Time Uninstructed Imbalance Energy (CC 6475), Real-Time Unaccounted for Energy (CC6474), and the HASP Energy, Congestion and Loss Pre-Dispatch (CC 6051), less the Real-Time Congestion Offset (CC 6774). The offset is allocated to all SCs based upon a pro rata share of their measured demand (i.e., metered load and exports) excluding the demand quantity for the valid and balanced portion of self-schedules related to transmission ownership rights in real-time and net measured demand of load following metered subsystems.[1] This may result in a payment or charge to SCs depending on the whether there is a surplus or deficit.

[1] Additional documentation can be found in the Settlements & Billing BPM Configuration Guide available at https://bpm.caiso.com/bpm/bpm/version/000000000000085

In 2009, the ISO conducted a stakeholder process to determine whether modifications to the current design of the allocation of the Real-Time Imbalance Energy Offset were appropriate and necessary. At that time, no clear alternative could be identified because causal attribution to specific market activity was not clear. At the conclusion of the stakeholder process, the ISO left the allocation to measured demand unchanged. The ISO, however, committed to, and has since continued to work on, operational enhancements that would assist in the convergence of the HASP and RTD prices. The ISO also committed to revisit its prior conclusion if the dollar volume in the Real Time Energy Offset Account increased substantially.[2]

As Figure 1 illustrates, from January 2010 through March 2011 the average monthly Real-Time Imbalance Energy Offset has been $11.2M. The offset peaked in June/July 2010 at over $20M and returned to levels consistent with the first half of 2010 in September 2010. Since September 2010 the offset has trended higher.

Figure 1 – Monthly Real Time Imbalance Energy offset January 2010 through March 2011



Since July 2010, the ISO has implemented several market rules changes that impact the offset. First, as required by the ISO tariff, in April 2010, the energy bid cap was raised from $500/MWh

[2] Additional information on the prior stakeholder process is available at http://www.caiso.com/2406/2406e2a640420.html

to $750/MWh and in April of 2011, it was raised to $1000/MWh. Because certain pricing parameters are tied to the energy bid cap, this has increased the level prices can reach in the real-time market when there are short-term imbalances in which the pricing parameters set the market clearing prices. The higher RTD prices impact the Real-Time Imbalance Energy Offset when the ISO is constrained to procure additional energy in RTD at the higher prices. The offset is the mechanism for settling the additional imbalances for energy that are not already allocated to instructed and uninstructed deviations from resources day-ahead schedules. Depending on the condition, the Real-Time Imbalance Energy Offset can increase or decrease. However, because the bid floor remained unchanged at negative $30.00 combined with the lower frequency of negative prices, the relative impact of potential reductions in the offset when negative prices caused by over-generation situations occur (*e.g.,* when the HASP price is greater than RTD) is not symmetric and does not balance the effect of the real-time offset when RTD prices are higher than the HASP price. The data in Figure 1 above does not capture the impact of the bid cap increase from $750 to $1000 because that increase did not occur until after April 1, 2011.

Another important market rule change was the ISO's implementation of convergence bidding in February 2011, which allows market participants to take virtual supply and virtual demand positions in the day-ahead market at interties, load aggregation points, trading hubs and individual pricing nodes. With the introduction of convergence bidding, market participants are able to hedge price differences between the day-ahead and real-time market. Virtual positions at the intertie are liquidated and settled at the relevant HASP LMP in the same way as any changes in physical intertie schedules in HASP are settled based on the relevant HASP LMP. Virtual positions on eligible pricing locations internal to the ISO are liquidated and settled at the real-time relevant LMP. Therefore any differences in the HASP and RTD price affecting the offsetting volume of virtual position on interties and internal locations will affect the real-time energy offset.

Since the start of the ISO LMP-based market in 2009, prices set in the HASP have historically been lower than those observed in RTD.[3] While there are several potential reasons for this, the difference is often driven by modeled and forecasted imbalance condition differences as well as having small quantities of short-term ramping capability available to accommodate such changes in imbalance conditions.

The persistent average price differential between HASP and RTD described above has encouraged the use of internal virtual demand bids, which has corresponded with an increase in the Real-Time Imbalance Energy Offset. Prior to implementation of convergence bidding, market participants could not bid to arbitrage price differentials between HASP and RTD caused by market participants that were not allocated the Real-Time Imbalance Energy Offset because only load serving entities (LSE) could bid internal demand, and virtual demand bids were non-existent. With the commencement of convergence bidding, market participants that do not serve load now can combine an internal virtual demand bid and an intertie physical/virtual supply bid at the same price and quantity, which in essence allows the market participant to arbitrage the lower HASP price relative to the RTD price. In the IFM, excluding congestion and losses, the market participant is therefore able to supply (sell) and clear virtual demand (buy) at the same price. In real-time, excluding congestion and losses, the market participant is then able to liquidate (sell) virtual demand at the RTD price, while the intertie supply is liquidated (bought) at the HASP price. This apparent arbitrage activity results in the ISO net payment for

[3] Additional information and analysis can be found in Department of Market Monitoring (DMM) quarterly and annual reports, Market Performance and Planning Forum reports, and various presentations to stakeholders.

energy MWh quantity bought by the ISO in RTD multiplied by the difference between the HASP price and the RTD price. The price at which the intertie supply is liquidated in HASP does not impact the successful arbitrage of the price differential. The successful implementation of the apparent arbitrage activity is only dependent on a RTD price higher than the HASP price, which has been common. See the table below for a numeric example.

Table 1 – Numeric Example of Bidding Strategy to Arbitrage HASP Price > RTD Price

	Day Ahead Market			HASP			Real Time Market		
	MW	Price	Revenue	MW	Price	Revenue	MW	Price	Revenue
Intertie Virtual Supply	100	$ 35.00	$ 3,500	100	$ (40.00)	$ (4,000)	N/A	N/A	N/A
Internal Virtual Demand	100	$ (35.00)	$ (3,500)	N/A	N/A	N/A	100	$ 45.00	$ 4,500
Total by Market			$ -			$ (4,000)			$ 4,500
Total for Bidding Strategy			$ 500						

However, this bidding pattern does not contribute to any physical commitment nor do they contribute to the convergence of conditions and prices between the day-ahead and real-time market. Rather these balanced and offsetting virtual positions contribute to economic inefficiencies depending on the HASP and RTD price differentials. The ISO continues to take measures to reduce the amount of price difference between HASP and RTD prices by addressing the conditions that results differences. While these efforts are expected to improve, it is unreasonable to expect that HASP and RTD differences will be eliminated and therefore additional measures to address the economic incentives for the apparent arbitrage of HASP and RTD price differentials must be addressed.

The cost impact of this bidding pattern to the Real-Time Energy Offset has been increasing. Figure 2 shows the relative impact of the balanced supply/demand position by individual SCs, the impact of offsetting virtual supply/demand position remaining in the market, and other drivers. The columns in the graph represent the 30 day cumulative dollar impact for each of the three buckets. Since March 2011, the impact of the balanced supply/demand position by individual SCs has been steadily increasing, the impact of offsetting virtual supply/demand positions remaining in the market has remained relatively unchanged, and the other drivers have reduced over time.

Figure 2 – Impact of Bidding Strategy on Real-Time Energy Offset since March 2011

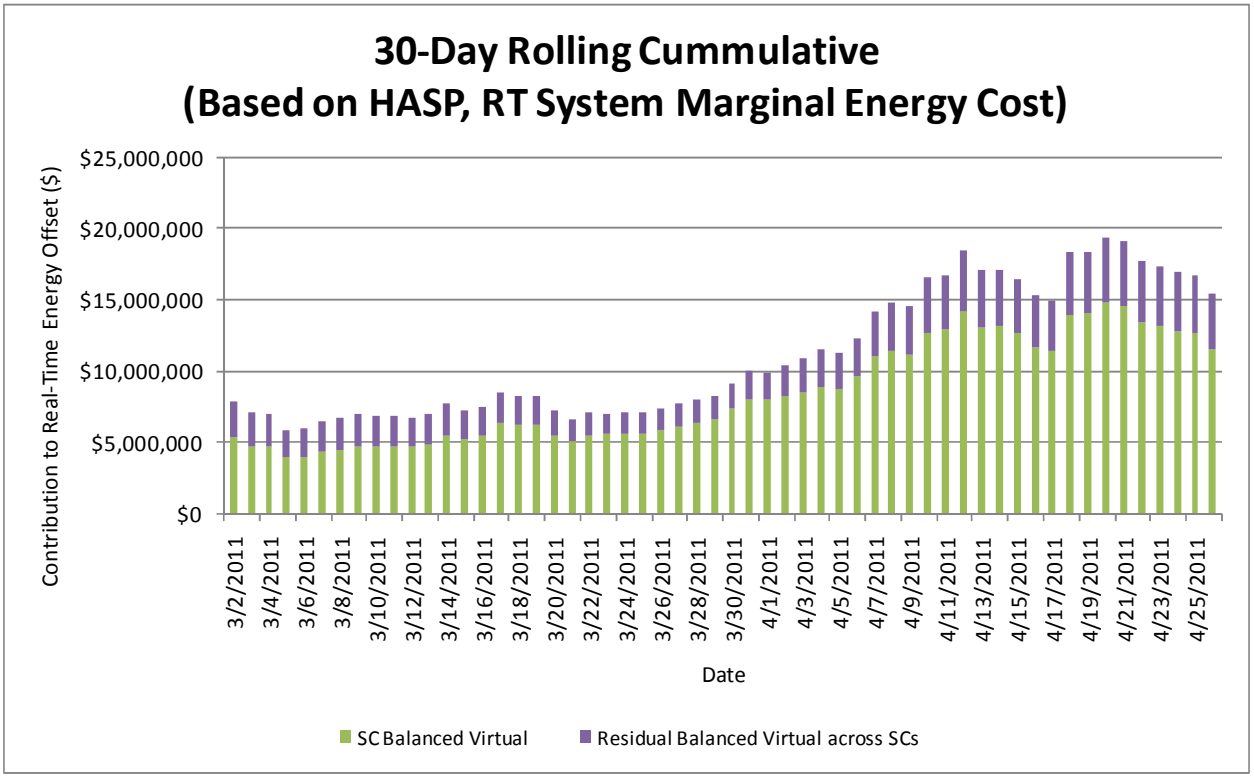
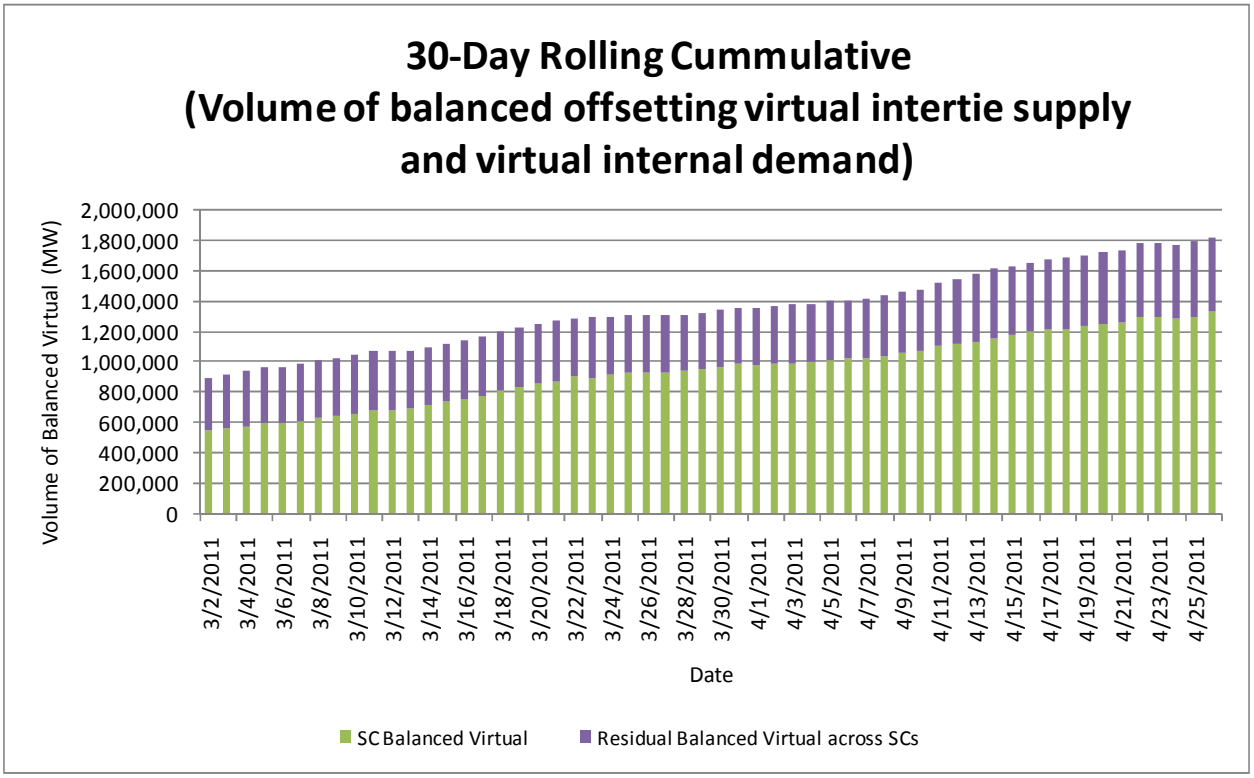


Figure 3 tracks the 30-day cumulative MWh of the bidding pattern. The MWh include only the balance supply/demand position of individual SCs. Since March 2011, the cumulative MWh has steadily increased to approximately 1,400,000 MWhs. Assuming the frequency and magnitude of price spikes remains unchanged, the higher volume from the apparent attempts to price arbitrage will increase charges allocated through the Real-Time Imbalance Energy Offset.

Figure 3 – MWh Quantity of Cleared Balanced Virtual Scheduling Coordinators



The ISO proposes to address the systematic arbitrage price differentials between HASP and RTD. While the ISO has historically experienced higher prices in RTD relative to HASP, the ISO is proposing a settlement rule which eliminates price arbitrage when the HASP price is less than the RTD price and when the RTD price is greater than HASP the price.

4 Proposal to Address HASP-RT Price Arbitrage Activity under Convergence Bidding

To address the issue described above, the ISO is contemplating a new settlement rule and a potential filing at FERC. For each SC, the settlement rule would result in a charge or credit based upon the difference between the System Marginal Energy Cost (SMEC) in HASP and RTD for the SC's balanced supply/demand position at the interties and internal to the ISO. When the RTD price is greater than the HASP price, the balanced position will be based upon internal virtual demand and imports. When the HASP price is greater than the RTD price, the balanced position will be based upon internal virtual supply and exports.

The calculation of the settlement rule is as follows:

Equation 1 calculates the internal net position: $Pint = Vd - Vs$

Equation 2 calculates the external net position: $Ptie = Vs + Ri - Vd - Re$

Equation 3 determines the balanced MW quantity:

If Pint * Ptie > 0

Then If Pint > 0

Then Q = MIN (Pint, Ptie)

Else Q = MAX (Pint, Ptie)

Else Q = 0

Equation 4 calculates the settlement amount: S = Q * (RTD SMEC – HASP SMEC)

Where:

Pint is the net position internal to the ISO

Ptie is the net position at the interties

Vd is virtual demand

Vs is virtual supply

Ri is the quantity of day ahead physical imports which have been reduced in HASP

Re is the quantity of day ahead physical exports which have been reduced in HASP

Q is the quantity of MW of the balanced internal/external supply and demand

S is the settlement amount charged/credited to Scheduling Coordinator

The following are numeric examples:

Table 2 – Settlement Rule when RTD Price is greater than HASP Price

RTD > HASP	Example 1	Example 2	Example 3	Example 4	Example 5
HASP SMEC	$ 30.00	$ 30.00	$ 30.00	$ 30.00	$ 30.00
RT SMEC	$ 35.00	$ 35.00	$ 35.00	$ 35.00	$ 35.00
Internal Virtual Demand (MW)	100	100	100	100	100
Intertie Virtual Supply (MW)	50	100	50	100	150
DA Import - HASP Import (MW)	0	0	50	50	50
Balanced Amount (MW)	50	100	100	100	100
Charge to Entity	$ 250.00	$ 500.00	$ 500.00	$ 500.00	$ 500.00

Table 3 – Settlement Rule with HASP Price is greater than RTD Price

HASP > RTD	Example 1	Example 2	Example 3	Example 4	Example 5
HASP SMEC	$ 35.00	$ 35.00	$ 35.00	$ 35.00	$ 35.00
RT SMEC	$ 30.00	$ 30.00	$ 30.00	$ 30.00	$ 30.00
Internal Virtual Supply (MW)	100	100	100	100	100
Intertie Virtual Demand (MW)	50	100	50	100	150
DA Export - HASP Export (MW)	0	0	50	50	50
Balanced Amount (MW)	50	100	100	100	100
Charge to Entity	$ 250.00	$ 500.00	$ 500.00	$ 500.00	$ 500.00

The charge/credit from the proposed settlement rule will be applied to the Real-Time Imbalance Energy Offset. The allocation of the Real-Time Imbalance Energy Offset to Measured Demand will remain unchanged.

If imports/exports and internal demand/generation were cleared in the same market, the divergence between HASP pricing and RTD pricing would no longer be relevant to the Real-Time Imbalance Energy Offset. The redesign of the real-time market, a long term solution, is currently being addressed in the Renewable Integration: Market and Product Review Phase 2 stakeholder initiative.

5 Threshold for Emergency Filing

The ISO has developed internal metrics to determine if the impact of the arbitrage bidding activity outlined above reaches a threshold which would trigger an emergency action. The ISO plans to complete this expedited stakeholder initiative and seek Board approval in June unless the threshold is reached sooner. The ISO will establish the threshold for considering an emergency filing if the 30-day rolling cumulative quantity real-time imbalance energy offset attributable to balancing and offsetting virtual intertie supply and virtual internal demand exceeds $25 million based on the differential of the system marginal energy component of the HASP and RTD prices.

6 Next Steps

The ISO will discuss the Issue Paper and Straw Proposal with stakeholders during a teleconference to be held on May 4, 2011. In addition, this topic will be discussed during the Market Surveillance Committee meeting to be held on April 29, 2011. The ISO is seeking comments on the proposed enhancements. Stakeholders should submit written comments by May 11, 2011 to RToffset@caiso.com.