WESTERN POWERPOOL



Western Resource Adequacy Program

206 Settlement Pricing

200 – Operations

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206 Settlement Pricing

1. Introduction

When a Participant has a negative Sharing Calculation result for an hour of an Operating Day, the Operation Program of the Western Resource Adequacy Program (WRAP) requires Participants with surplus to hold back capacity that could result in an Energy Delivery to the deficient Participant that would be supported by bilateral transactions at prices and quantities determined by the Program Administrator and Program Operator as prescribed by theTariff. The Settlement Pricing Business Practice Manual (BPM 206) provides implementing details and practices regarding the WRAP-required pricing for Energy Deployments and Holdback Requirements, the identification of a Subregion-specific Day-Ahead Applicable Index Price and a Real-Time Applicable Price Index used in such pricing, and the calculation and posting of settlement quantities and settlement prices.

1.1. Intended Audience

BPM 206 is intended for WRAP Participants and other interested individuals or entities. BPM 206 is particularly useful for those individuals that are responsible for their Participant organization's implementation of Holdback Requirement and Energy Deployment transactions, and ensuring that the pricing for those transactions complies with WRAP requirements.

1.2. What You Will Find in This Manual

BPM 206 consists of sections detailing the WRAP-required pricing for Energy Deployments and Holdback Requirements, the Applicable Price Indices used in such pricing, and the calculation of settlement prices. Related provisions are addressed in other BPMs. BPM 206 will be paired with *BPM 207 Settlement Process* which covers details such as how to access posted prices, the process for remedying disputed prices, and the process for handling changes in input data etc. In addition, *BPM 204 Holdback Requirement* and *BPM 205 Energy Deployment* provide implementing details on the Tariff rules for determining the seller (surplus Participant), the buyer (deficient Participant), and the transaction quantity for Holdback Requirements and for Energy Deployments.

1.3. Purpose

The purpose of BPM 206 is to provide implementation details of the settlement pricing for Holdback Requirement and Energy Deployment transactions in the WRAP.

1.4. Definitions

All capitalized terms that are not otherwise defined in BPM 206 have their meaning set forth in the Tariff or in another BPM.

Declined Energy: The amount of Holdback Requirement not affirmatively requested by a deficient Participant.

Final Settlement Revenue: The revenue paid by the deficient Participant to the surplus Participant for any hour of a given Day where the deficient Participant was responsible for Holdback Requirement or claimed an Energy Deployment.

Heavy Load Hour (HLH): From hour ending 7 through hour ending 22, Monday through Saturday, excluding North American Electric Reliability Corporation (NERC) holidays.

Light Load Hour (LLH): From hour ending 1 through hour ending 6 and from hour ending 23 through hour ending 24, Monday through Saturday, and all hours of the Day on Sundays and NERC holidays.

Possible Block Sale Revenue: The revenue, calculated separately for HLH and LLH blocks, that would have been realized had the surplus Participant sold a standard block with a MW value equal to the MW value in the hour with the highest sum of such Participant's Holdback Requirements obligated to all deficient Participants.

Unheld Energy: A quantity of energy that was not part of a Holdback Requirement, but that was part of a block that could have been sold in a Day-Ahead market had the Participant not been subject to a Holdback Requirement.

2. Background

When a surplus Participant is assigned a Holdback Rrequirement for a deficient Participant, or provides Energy Deployment to a deficient Participant, the sale is a bilateral transaction between the two parties, but the pricing is dictated by the WRAP Tariff and calculated by the Program Administrator. Under the WRAP Tariff it is possible for a Participant to be allocated a Holdback Requirement for a deficient Participant that does not result in an Energy Deployment as described in *BPM 205 Energy Deployment*. The WRAP Tariff thus provides for calculation of separate prices to compensate for Holdback Requirements and Energy Deployment, along with separate calculations of i) the amounts to be paid and received as compensation for Holdback Requirements; and ii) the amounts to be paid and received as compensation for Energy Deployment. The WRAP Tariff-prescribed pricing also includes a Make Whole Adjustment component to compensate for a specific type of opportunity cost. BPM 206 also provides certain

implementing details that the Program Administrator or Program Operator will use to calculate the settlement prices and quantities.

BPM 207 Settlement Process describes in detail the various settlement processes including but not limited to the mechanics of posting settlement information, invoicing, the process for addressing changes to or errors in published prices, missing data, timing requirements of the bilateral settlement process and changing the Applicable Price Index .

3. Applicable Price Index

Three Subregions have been established within the WRAP Region: 1) the Northwest Subregion, 2) the Southwest Subregion, and 3) the Rockies Subregion, as defined and delineated in *BPM 102 Reliability Metric Setting*. Each Subregion will have a Day-Ahead Applicable Index Price and a Real-Time Applicable Price Index. The Applicable Prices Index are intended to be a fair representation of the price of energy in a given Subregion and were chosen based on a reasonable assumption that they could be utilized to facilitate an efficient and timely settlement process. If necessary the Applicable Price Index can be changed as described in *BPM 207 Settlement Process*.

Northwest Subregion

The Day-Ahead Applicable Price Index is the ICE Day-Ahead Mid-Columbia (Mid-C) Index.

The Real-Time Applicable Price Index is the Powerdex Real-Time Mid-C Index.

Southwest Subregion

The Day-Ahead Applicable Price Index is the ICE Day-Ahead Palo Verde (PV) Index.

The Real-Time Applicable Price Index is the average of the four 15-minute market (FMM) results for the PV intertie in the California Independent System Operator (CAISO) market (FMM Scheduling Point / Tie Combination Locational Marginal Price; Node: PALOVRDE_ASR-APND; Tie: PVWEST).

Rockies Subregion

The Day-Ahead Applicable Price Index is the average of the hourly Day-Ahead locational marginal prices at the PSCO Node in Southwest Power West (SWPW) BA for applicable LLH or HLH blocks.

The Real-Time Applicable Price Index is the hourly Real-Time locational marginal price at the PSCO Node in SWPW BA.

4. Settlement Pricing Overview and Components

The pricing for Holdback Requirements and Energy Deployments both start with calculation of the Total Settlement Price. The separate prices for Holdback Requirements and for Energy Deployments are then derived (at least in part) from the Total Settlement Price. The price for Holdback Requirements is known as the Holdback Settlement Price. The price for Energy Deployments is known as the Energy Declined Settlement Price. The following subsections show the calculation of the Total Settlement Price (Section 4.1), the Holdback Settlement Price (Section 4.2), and the Energy Declined Settlement Price (Section 4.3).

Section 4.4 shows how the pricing for Holdback Requirements is applied to the transaction quantities for Holdback Requirements, and how the pricing for Energy Deployments is applied to the transaction quantities for Energy Deployments.

Section 4.5 shows how to calculate a Make Whole Adjustment, which is applied if the settlement revenue and the estimated value of the Holdback Requirement not deployed (the sum of the Unheld Energy and Declined Energy) is less than the estimated revenues the surplus Participant would have received had it not been subject to a Holdback Requirement. In other words, the Make Whole Adjustment ensures a surplus Participant is compensated in an amount that is no less than the revenue that it could have made had it sold in a Day-Ahead market the full block that was bifurcated to meet the Holdback Requirement. The Make Whole Adjustment includes both pricing elements and quantity elements, since it is triggered by revenue levels, and results in a minimum revenue amount. As the Make Whole Adjustment compensates a surplus Participant for taking on a Holdback Requirement, it is applied to any surplus Participant that takes on a Holdback Requirement, whether or not it also provides an Energy Deployment.

Section 4.6 shows how to allocate the Make Whole Adjustment when there is a single surplus Participant with a Holdback Requirement that is being allocated to multiple deficient Participants. The surplus Participant with the Holdback Requirement should receive a Make Whole Adjustment equal to their maximum total Holdback Requirement. In such cases, the obligation for providing the Make Whole Adjustment will be shared among multiple Particpants.

If and when a Participant voluntarily takes on a Holdback Requirement or Energy Deployment (meaning that the WRAP Tariff does not require the Participant to take on the Holdback Requirement or Energy Deployment), the pricing will be the same as described in BPM 206 for Holdback Requirements and Energy Deployments that are required by the WRAP Tariff.

A daily settlement reflecting Holdback Requirements and Energy Deployments between two Participants will be calculated any time a deficient Participant has requested holdback resulting in a Holdback Requirement for another Participant.

4.1. Total Settlement Price

The Total Settlement Price is based on a Subregion index price, shaped hourly to reflect changes in energy/capacity value from hour to hour, includes a 10% adder, and will not exceed $2,000/MWh or be lower than $0/MWh. The Total Settlement Price is determined in accordance with the following formula:

$$\textit{Total Settlement Price} = \textit{Maximum of (Minimum of (Hourly Shaping Factor} \times \textit{Day-Ahead Applicable Price Index} \times \textit{110\%, 2000 \$/MWh), 0)}$$

where:

Day-Ahead Applicable Price Index is the Day-Ahead peak/off-peak ICE Index price specified above for the Subregion applicable to the location of the delivering entity, applicable to the Day and hour of the energy delivery (assuming that the surplus and deficient Participants are in the same Subregion; if not, see Section 4.8). If donated transmission was used to facilitate holdback, the Day-Ahead Applicable Price Index is the higher of the two subregional Day-Ahead index prices for that portion of the transaction.

And where:

Hourly Shaping Factor for the Operating Day being settled is derived using the System Marginal Energy Component of the Locational Marginal Price, as defined in the CAISO tariff, which price component is the same at all locations in the CAISO energy market as described generally below and more fully in the CAISO Business Practice Manual for Market Instruments, Section P.2 Maximum Import Bid Price Calculation, located here: https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Instruments. Specifically, the Hourly Shaping Factor uses the most recent High-Priced Day for the current season, defined as a Day in which at least one hour has a System Marginal Energy Cost ("SMEC") greater than $200/MWh, and is calculated as follows:

$$\textit{Hourly Shaping Factor} = 1 + \{[\textit{CAISO Hourly Day-Ahead SMEC} - \textit{CAISO Average Day-Ahead SMEC (on- or off-peak hours)}] / [\textit{CAISO Average Day-Ahead SMEC (on- or off-peak hours)}]\}$$

The Hourly Shaping Factor is published by the CAISO and can be found on their Open Access Same-Time Information System (OASIS) located here:

http://oasis.caiso.com/mrioasis/logon.do using the following navigation: Prices -> Energy Prices -> Hourly Energy Price Shaping Factor.

4.2. Holdback Settlement Price

The Holdback Settlement Price is the Energy Declined Settlement Price subtracted from the Total Settlement Price.

Holdback Settlement Price =
Total Settlement Price - Energy Declined Settlement Price

4.3. Energy Declined Settlement Price

The Energy Declined Settlement Price is the Real-Time Applicable Price Index for the hour. This price is used both as the price paid by the deficient Participant for energy delivered and as the credit the deficient Participant receives towards the Make Whole Adjustment for any of the surplus Participant's Holdback Requirement that was not delivered. It is termed Energy Declined Settlement Price because the calculation of settlement prices is from the perspective of the surplus or selling Participant.

Energy Declined Settlement Price =
Real-Time Applicable Price Index

4.4. Application of Pricing and Quantities for Holdback Requirements and Energy Deployment Transactions

A surplus Participant assigned a Holdback Requirement on a Preschedule Day for any hour of an Operating Day shall be paid the Holdback Settlement Price multiplied by the MW quantity of the Holdback Requirement. A surplus Participant that provides energy to a deficient Participant pursuant to an Energy Deployment shall be paid the Energy Declined Settlement Price multiplied by the MWh of energy provided to the deficient Participant. A surplus Participant assigned a Holdback Requirement also shall be paid, when applicable, a Make Whole Adjustment (see Section 4.5).

A Participant that had a negative Sharing Calculation for any hour of an Operating Day (a deficient Participant) and confirmed to the PA its need for the Holdback Requirement, which was incorporated in the calculation of Holdback Requirements of any surplus Participants for such hour, determined as of the Preschedule Day, shall pay the Holdback Settlement Price multiplied by the MW quantity of such negative Sharing Calculation. Such a deficient Participant shall also pay the Energy Declined Settlement Price multiplied by the MW quantity deployed. In addition, any Participant that had a negative Sharing Calculation and confirmed to the PA its need for the Holdback Requirement, that was incorporated in the calculation of a Holdback Requirement shall

contribute to the payment of the Make Whole Adjustment based on its negative Sharing Calculation.

$$\textit{Final Settlement Revenue} = \textit{(Holdback Settlement Price * MW of Holdback Requirement)} + \textit{(Energy Declined Settlement Price * MW Energy Deployed)}$$

4.5. Make Whole Adjustment

The Make Whole Adjustment is a single value calculated, separately for HLH and LLH blocks, on a daily basis applied in the event that the settlement revenue and the estimated value of the Unheld Energy and Declined Energy for a given Day is less than the estimated revenues the surplus Participant would have received had the surplus Participant not been subject to a Holdback Requirement and had sold a Day-Ahead block of energy with a MW value equal to the maximum amount of Holdback Requirement for the hours in the block. If the Holdback Requirement occurs on a HLH the Possible Block Sale Revenue will be calculated using the peak Day-Ahead Applicable Index Price. If the Holdback Requirement occurs on a LLH the Possible Block Sale Revenue will be calculated using the off-peak Day-Ahead Applicable Price Index. The Make Whole Adjustment has a minimum value of 0 and is determined as follows:

$$\textit{Make Whole Adjustment (when applicable)} = \textit{Maximum of (Possible Block Sale Revenue - Final Settlement Revenue - Real-Time Value of Declined Energy - Real-Time Value of Unheld Energy, 0)}$$

Where:

$$\textit{Real-Time Value of Declined Energy} = \textit{Declined Energy} \times \textit{Declined Energy Settlement Price}$$

Provided that Declined Energy is only applicable to those hours where there was a positive Holdback Requirement.

And where:

$$\textit{Real-Time Value of Unheld Energy} = \textit{(Maximum Holdback MW in Block of Energy} - \textit{Holdback MW Requested)} \times \textit{Real-Time Applicable Price Index}$$

Provided that the calculation of Unheld Energy is only applicable to those hours where there was not a Holdback Requirement and will be calculated for all remaining hours in

the heavy load period if the Holdback Requirement is in the HLHs or for all remaining hours in the light load period if the Holdback Requirement is in the LLHs.

For which purpose:

Real-Time Applicable Index Price is the real-time index price above for the Subregion applicable to the location of the surplus Participant, applicable to the Day and hour of the energy delivery (assuming the surplus and deficient Participants are in the same Subregion; if not, see Section 4.8);

And block of energy means a product having a set number of hours corresponding to either the LLH or HLH where the MW amount is the same in all hours and equal to the maximum amount of the Holdback Requirement.

The Make Whole Adjustment is the maximum of the result of the formula and zero. The Make Whole Adjustment is intended to ensure the surplus Participant is made whole for lost opportunity cost so in the event the result of the calculation is less than or equal to zero there will be no Make Whole Adjustment. The Make Whole Adjustment will be calculated for each Day on a regular cadence.

4.6. Allocation of Holdback Settlement to Multiple Participants

Any Participant having a Holdback Requirement that is allocated to multiple deficient Participants shall have their Possible Block Sale Revenue calculated based on the MW amount in the hour with their largest Holdback Requirement.

To determine how much of the holdback MW used to derive the Possible Block Sale Revenue is attributable to each deficient Participant receiving an allocation of the Holdback Requirement the following methodology will be utilized.

1. Each deficient Participant's maximum allocation of the Holdback Requirement will be organized into tranches where the portion of the total Make Whole Adjustment attributable to each tranche is separately calculated and allocated to the Participants claiming the Holdback Requirement MW in each tranche.

2. A deficient Participant's portion of the Make Whole Adjustment attributable to the MW in each tranche will be allocated based on the following:

    a. On hours where there is a Holdback Requirement those Participants receiving the allocation will be responsible for the settlement associated with that holdback MW amount.

b. On hours where there is no Holdback Requirement the settlement associated with the MW amount used to calculated the Possible Block Sale Revenue will be split equally amoung those Participants with Holdback Requirement MW in the tranche.

3. The total Make Whole Adjustment is derived by calculating the Make Whole Adjustment attributable to the Holdback Requirement MW in the first tranche, allocating the resulting adjustment value to Participants in the first tranche, increasing the Holdback Requirement MW for those Participants in the second tranche, recalculating the Make Whole Adjustment, and allocating the delta in the Make Whole Adjustment from the previous calculation to each Particpant in the second tranche equally. This continues until there are no more tranches to process.

The Real-Time Value of Declined Energy will be credited to the Participant that declined the energy delivery.

The Real-Time Value of Unheld Energy will be credited to each Participant receiving holdback based on the amount of MW they are obligated for in the calculation of Possible Block Sale Revenue.

The sum of the Make Whole Adjustment obligation allocated to each Participant shall always equal the Make Whole Adjustment that would have been calculated between a single surplus Participant and a single deficient Participant.

An example is provided in the Settlement Pricing Examples document which is posted on the Western Power Pool website.

4.7. Transmission Service

The WRAP Tariff does not separately address pricing for transmission service used in WRAP transactions in which the surplus Participant and deficient Participant are in the same Subregion. Participants are individually responsible for the cost of the transmission to deliver to a point (when such Participant is surplus) or take receipt at a point (when such Participant is deficient). These costs will not be included in the WRAP Tariff defined settlement.

4.8. Settlement Pricing for Subregions

Settlement prices recognize pricing differences among Subregions. Where the surplus Participant and deficient Participant are located in the same Subregion, the Applicable Price Index shall be the price index specified above for that Subregion. Where the surplus Participant and deficient Participant are located in different Subregions, the

following components of the settlement price calculation will be calculated using the Applicable Price Index for the Subregion that has the higher index price: (i) Possible Block Sale Revenue; (ii) Total Settlement Price; (iii) Energy Declined Settlement Price; and (iv) Real-Time Value of Unheld Energy. When there are only two Participants there is no explicit settlement for transmission as the surplus Participant receives the higher of the two Subregions' Applicable Index Price. If a third Participant is involved by providing transmission service rights between Subregions, the Participant that provided holdback or Energy Deployment shall receive the settlement price of the Subregion from which the Holdback Requirement or Energy Deployment was sourced, and the Participant that provided Subregion to Subregion transmission service rights pursuant to the WRAP Tariff shall receive the difference in the Total Settlement Price between the Subregion where the holdback was sourced and the Subregion where the energy was delivered, or zero, whichever is greater.