Settlements & Billing

Internal Configuration Guide:   
Convergence Bidding DA Energy, Congestion, Loss Settlement

**CC 6013**

Version 5.3

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# Purpose of Document

The purpose of this document is to capture the requirements and design specification for a SaMC Charge Code in one document.

# Introduction

## Background

A Virtual Bid in convergence bidding is defined to be either a Virtual Demand Bid or Virtual Supply Bid. A Virtual Demand Bid is a Bid submitted in the CAISO Day-Ahead (DA) Market that, if cleared in the Integrated Forward Market (IFM), represents a commitment to purchase Energy at the price determined in the DA Market, and to sell any Virtual Award resulting from the Virtual Bid at the price determined in the Real-Time Market. Likewise, a Virtual Supply Bid is a Bid submitted in the CAISO DA Market that, if cleared in the IFM, represents a commitment to sell Energy at the price determined in the DA Market, and to buy the same quantity back at the price determined in the Real-Time Market.

## Description

This Charge Code, “CC 6013 – Convergence Bidding DA Energy, Congestion, Loss Settlement”, provides for the settlement of Energy that has been awarded from Virtual Bids submitted in the Integrated Forward Market (IFM) by Scheduling Coordinators (SC) on the behalf of Convergence Bidding Entities. As specified in the current document, requirements for a CC 6013 configuration in SAMC have been defined to calculate an amount as a payment for each awarded Virtual Supply Bid and as a charge for each awarded Virtual Demand Bid. The calculated amount is based on the LMP at the pricing node location of the awarded bid for the Trading Hour in which the Virtual Award occurs. For each Trading Hour and SC ID for which a Scheduling Coordinator receives a Virtual Award during the Trading Hour, the configuration calculates as a Charge Code output the net settlement amount over all of the Eligible PNodes/APNodes at which there are Virtual Awards associated with the SC ID.

The CC 6013 Charge Code shall be calculated without the application of Congestion Credits due to ETC/TOR/CVR contracts, as convergence bidding has been defined to exclude Congestion Credits for Energy associated with Virtual Bids. Likewise, transmission losses credits that are associated with select TOR contracts shall not apply to this charge code.

To accommodate what are termed “make-whole payments” for after-the-fact price corrections on Virtual Awards, the settlement calculation shall calculate the make-whole payments based on any modified Virtual Bid prices received from upstream market data. A “flag” input received with a bid segment price for a Virtual Award shall indicate that the CC 6013 calculation shall apply a corrected bid price to calculate a make-whole payment or charge in association with the Virtual Award from the bid segment. In calculating the make-whole payment for a Virtual Supply award, the currently defined configuration shall ensure that the SC receives a payment for the awarded Energy that reflects a bid price no lower than the Virtual Bid price. Likewise, a make-whole charge for a Virtual Demand Award shall reflect a bid price no higher than the Virtual Bid price.

Per Business Associate (BA) per Trading Hour, the Settlement Amount shall be the net of its payments and charges over all of the pricing nodes for which the BA was awarded Energy from a Virtual Bid for the Trading Hour.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
|  | The Settlement Amount per Trading Hour per SC for all its Day-Ahead Virtual Bid Energy associated with a Convergence Bidding Entity shall be calculated as the sum of:   1. the net of the payments and charges for the Energy associated with all of the SC’s awarded Virtual Supply and Virtual Demand Bid segments over all Eligible Nodal locations for the Trading Hour. 2. the make-whole payments for the Energy associated with all of the SC’s awarded Virtual Supply and Virtual Demand Bid segments over all Eligible Nodal locations for the Trading Hour. |
| 1.1 | This charge code applies to EDAM Balancing Authority Area whenever virtual bidding at nodal locations for the EDAM BAA is allowed. |
|  | Nodal locations for virtual bids are Pnodes, Aggregated Pnodes (APnodes), or Pnode/APnode in combination with an intertie. |
|  | Virtual Supply Bids and Virtual Demand Bids, as their names imply, are virtual in the sense that they are not backed-up by a physical supply resource or physical demand. *(Fact)* |
|  | A Virtual Demand Bid is defined to be a Bid submitted in the CAISO Day-Ahead Market that, if cleared in the Integrated Forward Market (IFM), represents a commitment to purchase Energy at the price determined in the Day-Ahead Market, and to sell the same quantity back at the price determined in the HASP or Real-Time Market, as applicable. *(Fact)* |
|  | A Virtual Supply Bid is defined to be a Bid submitted in the CAISO Day-Ahead Market that, if cleared in the Integrated Forward Market, represents a commitment to sell Energy at the price determined in the Day-Ahead Market, and to buy the same quantity back at the price determined in the HASP or Real-Time Market, as appropriate. *(Fact)* |
|  | A Virtual Bid is a Virtual Supply Bid or a Virtual Demand Bid. *(Fact)* |
|  | Convergence Bidding Entities (i.e., entities that register and qualify to become “Convergence Bidding Entities”) will be permitted to submit virtual Supply/Demand Bids (through SCs) at any Eligible Nodal location. *(Fact)* |
|  | The currently specified Charge Code configuration shall calculate for each SC and Trading Hour the Congestion and Loss Components of the Settlement Amount, as well as the entire Settlement Amount. |
|  | The Settlement Amount and its Congestion Component shall be calculated at each Eligible Nodal location for which the SC has been awarded Energy associated with a Virtual Supply Award or Virtual Demand Award over the Trading Hour. |
|  | The currently specified Charge Code configuration shall calculate the CAISO totals for the overall Energy Settlement Amount and its Congestion Component, over all SCs and the Trading Hour. |
|  | The total eligible make-whole payment amount for a SC and Trading Hour shall be calculated as the sum of the make-whole payment amount for the SC over all awarded Virtual Bid segments, and Eligible Nodal locations of the Trading Hour. |
|  | This Charge Code shall be calculated daily on an hourly basis. |
|  | The total settlement amount for Virtual Awards per Trading Hour of the Day-Ahead Market for a particular SC representing a Convergence Bidding Entity (CBE) shall be determined as the sum of the Virtual Supply Award settlement amount and the Virtual Demand Award settlement amount for the SC over the Trading Hour. |
|  | The total settlement amount for Virtual Supply Awards for a SC representing a CBE and a Trading Hour of the Day-Ahead Market shall be determined as   1. the sum of the Virtual Supply Award from each Virtual Supply Bid segment submitted by the SC for the CBE multiplied by the DA LMP at the bid’s Nodal location 2. to which is added the make-whole payment for each of the Virtual Supply Bid segments, if any.   The summation shall be performed for the Trading Hour over all Virtual Supply Bid segments awarded to the SC for the CBE and over all Eligible Nodal locations where bids cleared in the IFM. |
|  | The total settlement amount for Virtual Demand Awards for a SC representing a CBE and a Trading Hour of the Day-Ahead Market shall be determined as   1. the sum of the Virtual Demand Award from each Virtual Demand Bid segment submitted by the SC for the CBE multiplied by the DA LMP at the bid’s Nodal location 2. to which is added the make-whole payment for each of the Virtual Demand Bid segments.   The summation shall be performed for the Trading Hour over all Virtual Demand Bid segments awarded to the SC for the CBE and over all Eligible Nodal locations where bids cleared in the IFM. |
|  | The total Congestion amount for Virtual Awards per Trading Hour of the Day-Ahead Market for a particular SC representing a Convergence Bidding Entity (CBE) shall be determined as the sum of the Virtual Supply Award congestion amount and the Virtual Demand Award congestion amount for the SC over the Trading Hour. |
|  | The total Congestion amount for Virtual Supply Awards for a SC representing a CBE and a Trading Hour of the Day-Ahead Market shall be determined as   1. the sum of the Virtual Supply Award from each Virtual Supply Bid segment submitted by the SC for the CBE multiplied by the LMP congestion component (the MCC price) at the bid’s Nodal location; 2. to which is added the make-whole payment for each of the Virtual Supply Bid segments, if any.   The summation shall be performed for the Trading Hour over all Virtual Supply Bid segments awarded to the SC for the CBE and over all Eligible Nodal location where bids cleared in the IFM. |
|  | The total Congestion amount for Virtual Demand Awards for a SC representing a CBE and a Trading Hour of the Day-Ahead Market shall be determined as   1. the sum of the Virtual Demand Award from each Virtual Demand Bid segment submitted by the SC for the CBE multiplied by the LMP congestion component (the MCC price) at the bid’s Nodal location 2. to which is added the make-whole payment for each of the Virtual Demand Bid segments, if any.   The summation shall be performed for the Trading Hour over all Virtual Demand Bid segments awarded to the SC for the CBE and over all Eligible Nodal locations where bids cleared in the IFM. |
|  | The difference in amount between the total settlement amount for Virtual Awards and the total Congestion amount for Virtual Awards per Trading Hour of the Day Ahead market shall be calculated for each SC. |
|  | When a price correction has been made in the Day-Ahead Market, all Virtual Awards at Eligible Nodal location where the correction has been made must be evaluated for “make-whole” payment eligibility per Trading Hour. *(Fact)* |
|  | To identify the need to perform a make-whole payment(s) SAMC shall process a flag input received from an upstream system performing the price correction(s) for Virtual Bid Awards. |
|  | The flag shall identify each SC, Eligible Nodal location, awarded Virtual Bid segment, Trading Hour and Trading Day for which a make-whole payment is to be evaluated. |
|  | For a Virtual Supply Bid to be eligible for a make whole adjustment payment, the price corrected LMP must be less than the bid segment price and the final cleared MW must be greater than the lower end of the bid segment MW range. *(Fact)* |
|  | Virtual supply shall be processed as negative Virtual Demand for the purpose of applying the make-whole payment. |
|  | For a Virtual Demand Award to be eligible for a make whole adjustment, the price corrected LMP must be greater than the bid segment price and the final cleared MW must be greater than the lower end of the bid segment MW range. *(Fact)* |
|  | For all eligible Virtual Awards and for each eligible bid segment, a make-whole payment amount shall be calculated by the following formula:  Payment amount ($) = Max(0,Min(higher end of bid segment, final cleared MW) – lower end of bid segment) \* abs (price-corrected LMP – bid price) |
|  | An alternate equation for the make-whole payment amount is:  Payment amount ($) = Final cleared bid segment MW \* abs (price corrected LMP – bid price) *(Derivation)* |
|  | The bid price will be > price corrected LMP in the case of a make-whole payment for an eligible Virtual Supply Award. |
|  | The bid price will be < price corrected LMP in the case of a make-whole payment for an eligible Virtual Demand Award. |
|  | The make-whole payment for an eligible Virtual Award shall be considered congestion revenue and allocated as the congestion component of a Virtual Award settlement amount. |
|  | For adjustments to the Charge Code that cannot be accomplished by correction of upstream data inputs, recalculation or operator override, Pass Through Bill Charge adjustment shall be applied. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| < None > |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| CC 6477 – Real Time Imbalance Energy Offset |
| CC 6636 – IFM Bid Cost Recovery Tier 1 Allocation |
| Day Ahead Congestion Pre-calculation |
| CC 8826 – RUC Reliability Capacity Up Tiered Allocation |
| CC 6947 – IFM Marginal Losses Surplus Credit Allocation |
| CC 4560 – GMC Market Services Charge |

## Inputs – External Systems

| Row # | Variable Name | Description |
| --- | --- | --- |
| 1 | BAHourlyDAVirtualAwardNodalQuantity BQ’AA’Qpay’mdh | The input provides the DA Virtual Award cleared Energy quantity in association with Business Associate. (MW)  Mapping includes Balancing Authority Area associated with the nodal locations. |
| 2 | HourlyDANodalLMPPrice AA’Qpmdh | Day-Ahead LMP for Energy at nodal location. ($/MW) |
| 3 | BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh | The input provides the DA Virtual Award cleared Energy quantity in association with Business Associate. The input is defined only when the flag input HourlyNodeDAVirtualAwardMakeWholeFlag AA’Qpmdh is also defined; the input is “blank” when the flag input is not defined. (MW)  Mapping includes Balancing Authority Area associated with the nodal locations. |
| 4 | BAHourlyDAVirtualAwardBidSegPrice BbAA’Qpamdh | The input provides the bid price of the DA Virtual Award cleared Energy quantity in association with Business Associate. The input is defined only when the flag input HourlyNodeDAVirtualAwardMakeWholeFlag AA’Qpmdh is also defined; the input is not valid when the flag input is not defined. ($/MW) |
| 5 | HourlyNodeDAVirtualAwardMakeWholeFlag AA’Qpmdh | The input (when = 1) indicates that a make-whole payment applies to virtual awards at Eligible Nodal location.. The input shall be used in the mapping of incoming data to create inputs BAHourlyDAVirtualAwardBidSegQuantity BbAA’Qpamdh and BAHourlyDAVirtualAwardBidSegPrice BbAA’Qpamdh. (3-state – 0/1/blank) |
| 6 | HourlyDANodalMCCPrice AA’Qpmdh | Received from the Pnode Clearing payload, the input represents the Marginal Cost of Congestion (MCC) Component of the Day-Ahead LMP for Energy at Eligible Nodal location.. ($/MW) |
| 7 | PTBChargeAdjustmentBANetHourlyDAVirtualAwardSettlementAmount **BQ’Jmdh** | PTB adjustment amount for the currently configured Charge Code. ($) |

## Inputs – Predecessor Charge Codes or Pre-calculations

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Predecessor Charge Code/ Pre-calc Configuration |
|  | < None > |  |

## CAISO Formula

The formulas in this section use the following sign conventions:

1. Energy quantities associated with a Virtual Demand Award at a Nodal location are negative.
2. Energy quantities associated with a Virtual Supply Award at a Nodal location are positive.
3. A Virtual Award resulting from a Virtual Bid at a Nodal location can be either a Virtual Demand Award or a Virtual Supply Award.

**– CC 6013 Summary Variables –**

BAATotalMonthlyDAVirtualMakeWholeAmount Q’m =

Sum over (B) {BAMonthlyDAVirtualMakeWholeAmount BQ’m }

CAISOTotalMonthlyDAVirtualMakeWholeAmount m =

Sum over (Q’) {BAATotalMonthlyDAVirtualMakeWholeAmount Q’m }

Where Q’ = ‘CISO’

BAMonthlyDAVirtualMakeWholeAmount BQ’m =

Sum over (d) {BADailyDAVirtualMakeWholeAmount BQ’md }

BADailyDAVirtualMakeWholeAmount BQ’md =

Sum over (h) { BAHourlyDAVirtualDemandMakeWholeAmount BQ’mdh + BAHourlyDAVirtualSupplyMakeWholeAmount BQ’mdh }

BAATotalHourlyDAVirtualSupplyAwardQuantity Q'mdh=

Sum over (B) {BAHourlyDAVirtualSupplyAwardQuantity BQ’mdh }

CAISOTotalHourlyDAVirtualSupplyAwardQuantity mdh =

Sum over (Q’) { BAATotalHourlyDAVirtualSupplyAwardQuantity Q'mdh }

Where Q’ = ‘CISO’

BAHourlyDAVirtualSupplyAwardQuantity BQ’mdh =

Sum over (A, A’, Q, p, a, y’) {BAHourlyDAVirtualAwardNodalQuantity BQ’AA’Qpay’mdh }

Where a = ‘SUP’

BAATotalHourlyDAVirtualDemandAwardQuantity Q'mdh=

Sum over (B) {BAHourlyDAVirtualDemandAwardQuantity BQ’mdh }

CAISOTotalHourlyDAVirtualDemandAwardQuantity mdh=

Sum over (Q’) {BAATotalHourlyDAVirtualDemandAwardQuantity Q'mdh }

Where Q’ = ‘CISO’

BAHourlyDAVirtualDemandAwardQuantity BQ’mdh =

Sum over (A, A’, Q, p, a, y’) {BAHourlyDAVirtualAwardNodalQuantity BQ’AA’Qpay’mdh }

Where a = ‘DMND’

BAAHourlyTotalDANetVirtualSupplyAwardQuantity Q’mdh  =

Max(0, BAATotalHourlyDAVirtualSupplyAwardQuantity Q'mdh - BAATotalHourlyDAVirtualDemandAwardQuantity Q'mdh)

BAAHourlyTotalDANetVirtualDemandAwardQuantity Q’mdh  =

Max(0, BAATotalHourlyDAVirtualDemandAwardQuantity Q'mdh - BAATotalHourlyDAVirtualSupplyAwardQuantity Q'mdh)

BAHourlyDANetVirtualSupplyAwardQuantity BQ’mdh =

Max(0, BAHourlyDAVirtualSupplyAwardQuantity BQ’mdh -BAHourlyDAVirtualDemandAwardQuantity BQ’mdh )

BAATotalHourlyDAVirtualAwardSettlementAmount Q’mdh=

Sum over (B) {BAHourlyDAVirtualAwardSettlementAmount BQ’mdh }

CAISOTotalHourlyDAVirtualAwardSettlementAmount mdh =

Sum over (Q’) {BAATotalHourlyDAVirtualAwardSettlementAmount Q’mdh }

Where Q’ = ‘CISO’

BAAHourlyDAVirtualAwardMinusCongestionAmount Q’mdh=   
Sum over (B) {BAHourlyDAVirtualAwardMinusCongestionAmount BQ’mdh }

CAISOHourlyDAVirtualAwardMinusCongestionAmount mdh=   
 Sum over (Q’) {BAAHourlyDAVirtualAwardMinusCongestionAmount Q’mdh }

Where Q’ = ‘CISO’

BAHourlyDAVirtualAwardMinusCongestionAmount BQ’mdh=   
BAHourlyDAVirtualAwardSettlementAmount BQ’mdh– BAHourlyDAVirtualAwardCongAmount BQ’mdh

**– CC 6013 Settlement Statement Report Backup Variables –**

The following two (2) variables are provided to provide on a settlement statement, along with the settlement amount, the quantity and price that corresponds to the amount.

BAHourlyDAVirtualAwardSettlementPrice\_Reporting BQ’mdh=

IF BAHourlyDAVirtualAwardSettlementQuantity\_Reporting BQ’mdh <> 0

THEN

BAHourlyDAVirtualAwardSettlementPrice\_Reporting BQ’mdh=   
(-1) \* BAHourlyDAVirtualAwardSettlementAmount BQ’mdh/ BAHourlyDAVirtualAwardSettlementQuantity\_Reporting BQ’mdh

ELSE

BAHourlyDAVirtualAwardSettlementPrice\_Reporting BQ’mdh= 0

BAHourlyDAVirtualAwardSettlementQuantity\_Reporting BQ’mdh=   
 Sum over (A, A’, Q, p, a, y’) {BAHourlyDAVirtualAwardNodalQuantity BQ’AA’Qpay’mdh }

Where a = ‘DMND’ or ‘SUP’

Implementation Note: Filtering is not a change since attribute (a) can only be either ‘DMND’ or ‘SUP’.

**– CC 6013 Amount Variables –**

BAHourlyDAVirtualAwardSettlementAmount BQ’mdh=   
(-1) \* (BAHourlyDATotalVirtualSupplyAwardAmount BQ’mdh+ BAHourlyDATotalVirtualDemandAwardAmount BQ’mdh)

BAHourlyDATotalVirtualSupplyAwardAmount BQ’mdh =   
BAHourlyDAVirtualSupplyAwardAmount BQ’mdh+ BAHourlyDAVirtualSupplyMakeWholeAmount BQ’mdh

Where

BAHourlyDAVirtualSupplyAwardAmount BQ’mdh = Sum over (A, A’, Q, p, a, y’) {BAHourlyDAVirtualAwardNodalAmount BQ’AA’Qpay’mdh }

Where a = ‘SUP’

BAHourlyDAVirtualAwardNodalAmount BQ’AA’Qpay’mdh = BAHourlyDAVirtualAwardNodalQuantity BQ’AA’Qpay’mdh\* HourlyDANodalLMPPrice AA’Qpmdh

BAHourlyDAVirtualSupplyMakeWholeAmount BQ’mdh =

Sum over (A, A’, Q, p, b) {BAHourlyDAVirtualSupplyBidSegMakeWholeAmount BQ’bAA’Qpmdh }

BAHourlyDAVirtualSupplyBidSegMakeWholeAmount BQ’bAA’Qpmdh =

Sum over (a) {BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh \* BAHourlySupplyMakeWholeAdjustmentPrice BQ’bAA’Qpamdh}

Where BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qp**a**mdh exists.

**Note:** The input variable BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh will exist only when flag input HourlyNodeDAVirtualAwardMakeWholeFlag AA’Qpmdh = 1.

BAHourlySupplyMakeWholeAdjustmentPrice BQ’bAA’Qpamdh =

MAX(0,BAHourlyDAVirtualAwardBidSegPrice BbAA’Qpamdh – HourlyDANodalLMPPrice AA’Qpmdh)  
Where a = ‘SUP’ and

Where BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qp**a**mdh exists.

BAHourlyDATotalVirtualDemandAwardAmount BQ’mdh =   
BAHourlyDAVirtualDemandAwardAmount BQ’mdh+ BAHourlyDAVirtualDemandMakeWholeAmount BQ’mdh

BAHourlyDAVirtualDemandAwardAmount BQ’mdh =

Sum over (A, A’, Q, p, a, y’) {BAHourlyDAVirtualAwardNodalAmount BQ’AA’Qpay’mdh }

Where a = ‘DMND’

BAHourlyDAVirtualDemandMakeWholeAmount BQ’mdh =

Sum over (A, A’, Q, p, b) {BAHourlyDAVirtualDemandBidSegMakeWholeAmount BQ’bAA’Qpmdh }

BAHourlyDAVirtualDemandBidSegMakeWholeAmount BQ’bAA’Qpmdh =

Sum over (a) {BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh \* BAHourlyDemandMakeWholeAdjustmentPrice BQ’bAA’Qpamdh}

Where BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh exists.

**Note:** Input variable BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh will exist only when flag input HourlyNodeDAVirtualAwardMakeWholeFlag AA’Qpmdh = 1. For a Demand Award BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh is expected to have a negative value.

BAHourlyDemandMakeWholeAdjustmentPrice BQ’bAA’Qpamdh =

MIN(0,BAHourlyDAVirtualAwardBidSegPrice BbAA’Qpamdh – HourlyDANodalLMPPrice AA’Qpmdh)

Where a = ‘DMND’ and

Where BAHourlyDAVirtualAwardBidSegQuantity BQ’bAA’Qpamdh exists.

BAATotalHourlyDAVirtualAwardCongAmount Q’mdh=   
Sum over (B) { BAHourlyDAVirtualAwardCongAmount BQ’mdh }

CAISOTotalHourlyDAVirtualAwardCongAmount mdh=

Sum over (Q’) {BAATotalHourlyDAVirtualAwardCongAmount Q’mdh}

Where Q’ = ‘CISO’

BAHourlyDAVirtualAwardCongAmount BQ’mdh=   
(-1) \* (BAHourlyDATotalVirtualSupplyAwardCongAmount BQ’mdh+ BAHourlyDATotalVirtualDemandAwardCongAmount BQ’mdh)

BAHourlyDATotalVirtualSupplyAwardCongAmount BQ’mdh = BAHourlyDAVirtualSupplyAwardCongAmount BQ’mdh+ BAHourlyDAVirtualSupplyMakeWholeAmount BQ’mdh

BAHourlyDAVirtualSupplyAwardCongAmount BQ’mdh =

Sum over (A, A’, Q, p, a, y’) { BAHourlyDAVirtualAwardNodalQuantity BQ’AA’Qpay’mdh\* HourlyDANodalMCCPrice AA’Qpmdh }

Where a = ‘SUP’

BAHourlyDATotalVirtualDemandAwardCongAmount BQ’mdh = BAHourlyDAVirtualDemandAwardCongAmount BQ’mdh+ BAHourlyDAVirtualDemandMakeWholeAmount BQ’mdh

BAHourlyDAVirtualDemandAwardCongAmount BQ’mdh = Sum over (A, A’, Q, p, a, y’) { BAHourlyDAVirtualAwardNodalQuantity BQ’AA’Qpay’mdh\* HourlyDANodalMCCPrice AA’Qpmdh }

Where a = ‘DMND’

## Outputs

| Output Req ID | Name | Description |
| --- | --- | --- |
|  | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
|  | BAATotalMonthlyDAVirtualMakeWholeAmount Q’m | BAA monthly total virtual make whole amount. |
|  | CAISOTotalMonthlyDAVirtualMakeWholeAmount m | Total of make-whole payment amounts for all DA Virtual Awards, all BAs of the CAISO Balancing Authority Area. ($) |
|  | BAMonthlyDAVirtualMakeWholeAmount BQ’m | Make-whole payment amount for all DA Virtual Awards. ($) |
|  | BADailyDAVirtualMakeWholeAmount BQ’md | Make-whole payment amount for all DA Virtual Awards ($) |
|  | BAATotalHourlyDAVirtualSupplyAwardQuantity Q'mdh | Total of DA Virtual Supply Awards for all BAs of the Balancing Authority Area. (MW) |
|  | CAISOTotalHourlyDAVirtualSupplyAwardQuantity mdh | Total of DA Virtual Supply Awards for all BAs of the CAISO Balancing Authority Area . (MW) |
|  | BAHourlyDAVirtualSupplyAwardQuantity BQ’mdh | DA Virtual Supply Awards. (MW) |
|  | BAATotalHourlyDAVirtualDemandAwardQuantity Q'mdh | Total DA Virtual Demand Awards for all BAs for the Balancing Authority Area. (MW) |
|  | CAISOTotalHourlyDAVirtualDemandAwardQuantity mdh | Total of DA Virtual Demand Awards for all BAs of the CAISO Control Area. (MW) |
|  | BAHourlyDAVirtualDemandAwardQuantity BQ’mdh | DA Virtual Demand Awards. (MW) |
|  | BAAHourlyTotalDANetVirtualSupplyAwardQuantity Q’mdh | BAA total net virtual supply award, if any. (MW) |
|  | BAAHourlyTotalDANetVirtualDemandAwardQuantity Q’mdh | BAA total net virtual demand award, if any. (MW) |
|  | BAHourlyDANetVirtualSupplyAwardQuantity BQ’mdh | Net virtual supply award, if any, for the BA. (MW) |
|  | BAATotalHourlyDAVirtualAwardSettlementAmount Q’mdh | Total DA Virtual Award Settlement amounts for all BAs for the Balancing Authority Area. (MW) |
|  | CAISOTotalHourlyDAVirtualAwardSettlementAmount mdh | Day-Ahead Virtual Award settlement amount over the CAISO control area, calculated as the sum of the Day-Ahead Virtual Award settlement amounts for all Business Associates that represent Convergence Bidding Entities. ($) |
|  | BAAHourlyDAVirtualAwardMinusCongestionAmount Q’mdh | Total DA Virtual Award settlement amount minus Congestion amounts for all BAs for the Balancing Authority Area. (MW) |
|  | CAISOHourlyDAVirtualAwardMinusCongestionAmount mdh | The algebraic difference between the Day-Ahead Virtual Award settlement amount and the congestion component of the Day-Ahead Virtual Award settlement amount over the CAISO Control Area. ($) |
|  | BAHourlyDAVirtualAwardMinusCongestionAmount BQ’mdh | The algebraic difference between the Day-Ahead Virtual Award settlement amount and the congestion component of the Day-Ahead Virtual Award settlement amount. ($) |
|  | BAHourlyDAVirtualAwardSettlementPrice\_Reporting BQ’mdh | Day-Ahead Virtual Award settlement price. ($/MWh) |
|  | BAHourlyDAVirtualAwardSettlementQuantity\_Reporting BQ’mdh | Day-Ahead Virtual Award settlement quantity. (MWh) |
|  | BAHourlyDAVirtualAwardSettlementAmount BQ’mdh | Day-Ahead Virtual Award settlement amount. ($) |
|  | BAHourlyDATotalVirtualSupplyAwardAmount BQ’mdh | Overall Day-Ahead Virtual Supply Award settlement amount, including make-whole payments as well as Virtual Bid amounts. ($) |
|  | BAHourlyDAVirtualSupplyAwardAmount BQ’mdh | Day-Ahead Virtual Supply Award settlement amount from awarded Virtual Supply Bids. ($) |
|  | BAHourlyDAVirtualAwardNodalAmount BQ’AA’Qpay’mdh | Day-Ahead Virtual Award settlement amount ($) |
|  | BAHourlyDAVirtualSupplyMakeWholeAmount BQ’mdh | Day-Ahead Virtual Supply Award make-whole payment amount associated with awarded Virtual Supply Bids . ($) |
|  | BAHourlyDAVirtualSupplyBidSegMakeWholeAmount BQ’bAA’Qpmdh | Day-Ahead Virtual Supply Award make-whole payment amount associated with awarded Virtual Supply Bid segment . ($) |
|  | BAHourlySupplyMakeWholeAdjustmentPrice BQ’bAA’Qpamdh | Day-Ahead Virtual Supply Award make-whole payment price calculated for awarded Virtual Supply Bid segment . ($/MW) |
|  | BAHourlyDATotalVirtualDemandAwardAmount BQ’mdh | Overall Day-Ahead Virtual Demand Award settlement amount, including make-whole payments as well as Virtual Bid amounts. ($) |
|  | BAHourlyDAVirtualDemandAwardAmount BQ’mdh | Day-Ahead Virtual Demand Award settlement amount from awarded Virtual Demand bids . ($) |
|  | BAHourlyDAVirtualDemandMakeWholeAmount BQ’mdh | Day-Ahead Virtual Demand Award make-whole payment amount associated with awarded Virtual Demand Bids . ($) |
|  | BAHourlyDAVirtualDemandBidSegMakeWholeAmount BQ’bAA’Qpmdh | Day-Ahead Virtual Demand Award make-whole payment amount associated with awarded Virtual Demand Bid segment . ($) |
|  | BAHourlyDemandMakeWholeAdjustmentPrice BQ’bAA’Qpamdh | Day-Ahead Virtual Demand Award make-whole payment price calculated for awarded Virtual Demand Bid segment . ($/MW) |
|  | BAATotalHourlyDAVirtualAwardCongAmount Q’mdh | Total DA Virtual Award Congestion amounts for all BAs for the Balancing Authority Area. (MW) |
|  | CAISOTotalHourlyDAVirtualAwardCongAmount mdh | Day-Ahead Virtual Award congestion amount over the CAISO control area. ($) |
|  | BAHourlyDAVirtualAwardCongAmount BQ’mdh | Day-Ahead Virtual Award congestion amount. ($) |
|  | BAHourlyDATotalVirtualSupplyAwardCongAmount BQ’mdh | Overall Day-Ahead Virtual Supply Award congestion amount, including make-whole payments as well as Virtual Bid amounts. ($) |
|  | BAHourlyDAVirtualSupplyAwardCongAmount BQ’mdh | Day-Ahead Virtual Supply Award congestion amount from awarded Virtual Supply Bids. ($) |
|  | BAHourlyDATotalVirtualDemandAwardCongAmount BQ’mdh | Overall Day-Ahead Virtual Demand Award congestion amount, including make-whole payments as well as Virtual Bid amounts. ($) |
|  | BAHourlyDAVirtualDemandAwardCongAmount BQ’mdh | Day-Ahead Virtual Demand Award congestion amount from awarded Virtual Demand Bids. ($) |

# Charge Code Effective Dates

| Charge Code/  Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| CC 6013 – Convergence Bidding DA Energy, Congestion, Loss Settlement | 5.0 | 02/01/11 | 01/31/11 | Configuration Impacted |
| CC 6013 – Convergence Bidding DA Energy, Congestion, Loss Settlement | 5.1 | 02/01/11 | 12/31/11 | Documentation Edits and Configuration Impacted |
| CC 6013 – Convergence Bidding DA Energy, Congestion, Loss Settlement | 5.1a | 1/1/12 | 9/30/14 | Documentation Edits Only |
| CC 6013 – Convergence Bidding DA Energy, Congestion, Loss Settlement | 5.2 | 10/1/14 | 4/30/26 | Configuration Impacted |
| CC 6013 – Convergence Bidding DA Energy, Congestion, Loss Settlement | 5.3 | 5/1/26 | Open | Configuration Impacted |