Settlements & Billing

Configuration Guide: Real Time Instructed Imbalance Energy Settlement

CC 6470

Version 5.14

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# Purpose of Document

The purpose of this document is to capture the business and functional requirements for the Real Time Instructed Imbalance Energy Settlement, Charge Code 6470.

# Introduction

##  Background

The CAISO calculates and accounts for Imbalance Energy for each Dispatch Interval and settles Imbalance Energy for each Settlement Interval for each resource within the CAISO Control Area and all System Resources Dispatched in Real-Time.

Imbalance Energy consists of following:

* IIE – Instructed Imbalance Energy
	+ FMM Instructed Imbalance Energy Settlement (CC 6460)
	+ RTD Instructed Imbalance Energy Settlement (CC 6470)
* UIE – Real Time Uninstructed Imbalance Energy Settlement (CC 6475)
* UFE – Real Time Unaccounted for Energy Settlement (CC 6474)

To the extent that the sum of the Settlement Amounts for IIE, UIE, and UFE does not equal zero, the CAISO will assess Charges or make Payments in Real Time Imbalance Energy Offset (CC 6477) for the resulting differences to all Scheduling Coordinators based on a pro rata share of their Measured Demand for the relevant Settlement Interval.

In the Real-Time Market, the negative and positive Congestion Charges associated with a valid post-Day-Ahead TOR and ETC schedule change (including changes submitted to the Fifteen Minute Market and changes submitted closer to Real-Time where allowed by the contract) will be reversed in CC 6774 RT Congestion Offset. Because Congestion Charges are implicitly collected by the CAISO in the Real-Time settlement and there are no holders of rights to receive Real-Time Congestion revenues, all charges for Real-Time Congestion will be accumulated in a special and separate neutrality account to be distributed back to non-ETC Control Area metered Demand and exports on a per-MWh basis in Real Time Congestion Offset (CC 6774).

## Description

The IIE Settlement Amount per Settlement Interval for each resource shall be calculated as the sum of the Settlement Amounts for the Standard Ramping Energy, MSS Load Following Energy, RTD Optimal Energy, the RTD Minimum Load Energy from units Dispatched in the Real-Time, Energy from Regulation, RTD Real-Time Pumping Energy, Ramping Energy Deviation, RTD Rerate Energy, Residual Imbalance Energy, Operational Adjustments, and the portion of Settlement Amounts for Exceptional Dispatches and emergency Energy as described below.

The Settlement Amounts for Energy dispatched through the Real-Time Market optimization, Minimum Load Energy, Energy from Regulation, Ramping Energy Deviation, Rerate Energy, Real-Time Pumping Energy, MSS Load Following Energy with gross election, and Operational Adjustment shall be calculated as the product of the sum of all of these types of Energy and the Settlement Interval RTD LMP. The Settlement Amount for the Standard Ramping Energy shall be zero.

The Residual Imbalance Energy Settlement Amount shall be calculated as the sum of the products of the Residual Imbalance Energy quantities for the Dispatch Interval and the relevant Bid price that led to the Residual Imbalance Energy from the relevant Dispatch Interval in which the resource was dispatched. Further description on the price used is provided in the business rules section.

Energy instructions that are considered RTD Exceptional Dispatches or that are used to accommodate emergency Energy conditions represent transactions that are entered manually by the operator into the Real-Time Market optimization software so that they will be accounted for and be included in the communication of Dispatch Instructions to Scheduling Coordinators. RTD Exceptional Dispatch and emergency Energy instructions are not determined by the optimization software and shall not be eligible to set the LMP and are settled differently depending on the types of RTD Exceptional Dispatch or emergency Energy conditions that apply. The IIE for RTD Exceptional Dispatch and emergency Energy are first paid at the Settlement Interval RTD LMP in CC 6470, and depending on the exact Energy type, the Excess Cost Payment will either be paid or charged in CC 6482, Real-Time Excess Cost for Instructed Imbalance Energy payment, or CC 6488, Exceptional Dispatch Uplift Settlement. CC 6482 settles the Excess Cost Payments for incremental Energy transactions where the Settlement type is one of the emergency “exceptional” Energy types (“SYSEMR” or “TEMR”). Decremental Energy transactions due to RTD Exceptional Dispatch or emergency Energy conditions are settled completely (without any excess cost breakdown) in CC 6470. CC 6488 covers Excess Cost Payments for both incremental and decremental Energy associated with RTD Exceptional Dispatches to mitigate or resolve Congestion due to Outage or derate conditions, transmission Constraints, or transmission-related modeling limitations.

# Charge Code Requirements

## Business Rules

| **Bus Req ID** | **Business Rule** |
| --- | --- |
| 1.0 | RTD Instructed Imbalance Energy (IIE) is the calculated Energy expected to be produced or consumed as a result of responding to Real-Time Dispatch Instructions |
| 1.3 | RTD IIE consists of one or more of the following components:* RTD Optimal Instructed Imbalance Energy
* Ramping Energy Deviation
* Residual Imbalance Energy
* RTD Minimum Load Energy
* RTD Rerate Energy
* RTD Exceptional Dispatch Incremental Energy (includes emergency Energy)
* RTD Exceptional Dispatch Decremental Energy (includes emergency Energy)
* Regulation Energy
* MSS Load Following Energy
* Standard Ramping Energy
* Operational Adjustment

Optimal Instructed Imbalance Energy is dispatched from Real-Time Energy Bids and/or Ancillary Service capacity (Spinning Reserve, Non-Spinning Reserve) |
| 1.4 | A positive Energy value indicates Incremental Energy. |
| 1.5 | A negative Energy value indicates Decremental Energy.  |
| 1.6 | A positive Ramping Energy Deviation indicates positive deviation from Standard Ramping Energy and Scheduled Energy.  |
| 1.7 | A negative Ramping Energy Deviation indicates negative deviation from Standard Ramping Energy and Scheduled Energy |
| 2.0 | The Settlement Interval RTD IIE amount for each Business Associate with MSS and non-MSS resource per Settlement Interval shall be calculated as the sum of the following amounts multiplied by -1:* Settlement Amount for Settlement Interval Total RTD IIE MWh quantity for Non-MSS Resources
* Settlement Amount for Settlement Interval Total RTD IIE MWh quantity for MSS Resources within an MSSA that either elect gross or net settlement (not both)
* Settlement Amount for Residual Imbalance Energy for MSS and non-MSS Resources
* Settlement Amount for RTD Exceptional Dispatch Incremental Energy for MSS and non-MSS Resources
* Settlement Amount for RTD Exceptional Dispatch Decremental Energy for MSS and non-MSS Resources
 |
| 2.1 | Settlement Amount for Settlement Interval Total RTD IIE MWh quantity for Non-MSS Resources for RTD Optimal Instructed Imbalance Energy, Ramping Energy Deviation, RTD Minimum Load Energy, RTD Rerate Energy, Regulation Energy, RTD Real-Time Pumping Energy, and Operational Adjustment shall be calculated as the product of the sum of all of these types of Energy and Settlement Interval Real-Time LMP |
| 2.1 | MSS Operators that have elected net Settlement, the RTD IIE Settlement Amounts for the following* Settlement Interval Total IIE 1 MWh quantity for RTD Optimal Instructed Imbalance Energy, Ramping Energy Deviation, RTD Minimum Load Energy, RTD Rerate Energy, and Regulation Energy
* Operational Adjustment
* MSS Load following Energy with net election

shall be calculated as the product of the sum of all of these types of Energy and the Real-Time Settlement Interval MSS Price specific for the MSS Subgroup. |
| 2.1.1 | MSS Operators that have elected gross Settlement, the IIE Settlement Amounts for the following* Settlement Interval Total IIE 1 MWh quantity for RTD Optimal Instructed Imbalance Energy, Ramping Energy Deviation, RTD Minimum Load Energy, RTD Rerate Energy, and Regulation Energy
* Operational Adjustment
* MSS Load following Energy with gross election

shall be calculated as the product of the sum of all of these types of Energy and Settlement Interval Real-Time LMP |
| 2.2 | Standard Ramping Energy shall be settled as zero Settlement Amount |
| 2.3 | The Residual Imbalance Energy Settlement Amount, which does not include the settlement amount for eligible intermittent resources’ RIE above forecasted output, for non-MSS and MSS regardless of any MSS elections shall be calculated as the sum of the products of the Residual Imbalance Energy quantities for the Dispatch Interval and the relevant Bid price that led to the Residual Imbalance Energy from the relevant Dispatch Interval in which the resource was dispatched. The price is qualified in the succeeding business rules. |
| 2.3.1 | For a full downward ramp, the residual imbalance energy is paid at the bid price for interval from which resource is being dispatched down at full ramp. |
| 2.3.2 | For ramp down from or up to exceptional dispatch, the bid price basis for the relevant residual imbalance energy shall be the same as the basis used for the exceptional dispatch, that is, if the exceptional dispatch was mitigated, then the bid basis is the minimum between default energy bid and final bid, or if the exceptional dispatch was not mitigated, then the bid basis is the final bid. |
| 2.3.3 | For minimum load re-rate that ends at the end of an hour, the relevant residual imbalance energy during the period of ramping up to the minimum load re-rate or down to minimum load re-rate shall be paid at the LMP. Further, this energy is classified as Derate Energy. |
| 2.3.4 | RIE settlement amount is adjusted for persistent deviation of a resource not following CAISO dispatch. |
| 2.3.4.1 | If a resource deviates by six or fewer 5-minute intervals in a rolling two-hour window, adjustment is not made to the RIE settlement amount. |
| 2.3.4.2 | If a resource deviates by seven or more 5-minute intervals in a rolling two-hour window, adjustment is made to the RIE settlement amount. |
| 2.3.4.3 | The RIE settlement adjustment for persistent deviation per resource is:1. for Residual Imbalance Energy above the Day-Ahead Scheduled Energy (dispatch interval RIE MWh quantity is greater than or equal to zero), will be based on the lesser of the applicable default energy bid (DEB) price, the relevant Energy Bid Price, as mitigated, or the applicable RTD Locational Marginal Price,

or1. for Residual Imbalance Energy below the Day-Ahead Scheduled Energy (dispatch interval RIE MWh quantity is less than zero), will be based on the greater of the applicable default energy bid (DEB), the relevant Energy Bid Price, or the applicable RTD Locational Marginal Price.
 |
| 2.4 | Settlement Amount for each non-MSS and MSS resource regardless of any MSS elections for each Settlement Interval for RTD Exceptional Dispatch Incremental Energy shall be calculated as the sum of the product of the Dispatch Interval RTD Exceptional Dispatch Incremental Energy and the relevant price. |
| 2.5 | Settlement Amount for each non-MSS and MSS resource regardless of any MSS elections for each Settlement Interval for RTD Exceptional Dispatch Decremental Energy shall be calculated as the sum of the product of the Dispatch Interval RTD Exceptional Dispatch Decremental Energy and the relevant price. |
| 2.6 | The RTD Exceptional Dispatch IIE Price or emergency Energy price for RTD Exceptional Dispatch or emergency Energy Incremental or Decremental IIE with Exceptional Type of SYSEMR, TEMR, Tmodel, or NonTModel is the higher of the resource’s Settlement Interval RTD LMP, Energy Bid Price or, if applicable, the Default Energy Bid price for Energy that does not have an Energy Bid Price, or, as applicable to System Resources providing emergency Energy, the pre-established or negotiated price as recorded by the CAISO operator at the time of Dispatch. |
| 2.6.1 | For resource who have declined an CPM Designation for Supplemental Revenue assessment, the RTD Exceptional Dispatch IIE Price or emergency Energy price for RTD Exceptional Dispatch for emergency Energy Incremental IIE with Exceptional Type of SYSEMR, TEMR, TModel, or Non-TModel during the Supplemental Revenue designation period where resources supplemental Revenue does not exceed relevant CPM amount is the higher of the resource’s Settlement Interval RTD LMP or Energy Bid Price or, if applicable, the Default Energy Bid price for Energy that does not have an Energy Bid Price, or, as applicable to System Resources providing emergency Energy, the pre-established or negotiated price as recorded by the CAISO operator at the time of Dispatch. |
| 2.6.2 | For resource who have declined an CPM Designation for Supplemental Revenue assessment, the RTD Exceptional Dispatch IIE Price or emergency Energy price for RTD Exceptional Dispatch for emergency Energy Incremental IIE with Exceptional Type of SYSEMR, TEMR, TModel, or Non-TModel during the Supplemental Revenue designation period where resources supplemental Revenue exceeds relevant CPM amount is the higher of the resource’s Settlement Interval RTD LMP or the Default Energy Bid price for Energy.  |
| 2.7 | The RTD Exceptional Dispatch IIE Price for RTD Exceptional Dispatch Incremental or Decremental IIE with Exceptional Dispatch type of ASTEST or TEST is the resource’s Settlement Interval RTD LMP except in the case when the resource has a Bid (that is higher than the Settlement Interval RTD LMP for incremental IIE or lower than the Settlement Interval Real-Time LMP for decremental IIE). |
| 2.8 | The Exceptional Dispatch Incremental IIE Price for RMRS, RMR and RMR Condition 1 and 2 units is a Settlement Interval Real-Time LMP and the difference between Contract Price and Settlement Interval Real-Time LMP is paid on the RMR Invoice |
| 2.9 | The Exceptional Dispatch Incremental IIE Price for RMR Condition 2 units is the Contract Price on the RMR Invoice |
| 2.10 | The Exceptional Dispatch Decremental IIE Price for RMR Condition 2 units is the Contract Price on the RMR Invoice. |
| 2.11 | For each settlement interval, the settlement amount for eligible intermittent resource RIE above forecasted output shall be the product of the MWh of such RIE and the applicable RTD Locational Marginal Price. |
| 2.11.1 | The settlement amount from the previous rule shall not be subject to the application of Persistent Deviation Metric. |
| 2.11.2 | For an MSS Operator electing net settlement, the price to use for an eligible intermittent resource’s RIE above forecasted output shall be the RTD MSS level LMP price. |
| 3.0 | For adjustments to the Charge Code that cannot be accomplished by correction of upstream data inputs/recalculation or operator override Pass Through Bill Charge logic will be applied. |
| 4.0 | For RMR resources subject to new Tariff, variable energy cost opportunity cost adders shall reduce bid cost per MWh of exceptional dispatches. |
| 4.1 | For RMR resources subject to new Tariff, market revenues in excess of qualified costs shall be subject to a true up. This excess revenue will be subtracted from capacity payments. The qualified cost is the bid cost less variable energy costs opportunity cost adder. |
| 5.0 | When an eligible resource has an interval with a negative MWh meter, CAISO will not charge for the energy of those intervals. |

## Predecessor Charge Codes

| **Charge Code/ Pre-calc Name** |
| --- |
| Real-Time Energy Quantity |
| Real-Time Price |
| Metered Energy Adjustment Factor Pre-calculation |
| Pre-calculation – Metered Demand TAC Area and CPM |

## Successor Charge Codes

| **Charge Code/ Pre-calc Name** |
| --- |
| Real-Time Excess Cost for Instructed Imbalance Energy Settlement (CC 6482) |
| Exceptional Dispatch Uplift Settlement (CC 6488) |
| Real Time Unaccounted for Energy Settlement (CC 6474) |
| Real-Time Uninstructed Imbalance Energy Settlement (CC 6475) |
| Real-Time Imbalance Energy Offset (CC 6477) |

##  Inputs – External Systems

| **Input Req ID** | **Variable Name** | **Description** |
| --- | --- | --- |
|  | DispatchIntervalResidualIIE BrtuT’bI’Q’M’R’W’F’S’VL’mdhcif | Residual Imbalance Energy is IIE produced or consumed at the start or end of a Trading Hour outside the hourly schedule-change band for resource r. (MWh)This does not include quantity for eligible intermittent resources for their RIE above forecasted output. |
|  | DispatchIntervalResidualIEBidPrice BrtbQ’mdhcif | Bid Price for Dispatch Interval Residual IIE for resource r and bid segment number b. ($/MWh)This does not include price for eligible intermittent resources for their RIE above forecasted output. |
|  | DispatchIntervalRIEAboveForecast BrtuT’bI’Q’M’R’W’F’S’VL’mdhcif | Residual Imbalance Energy that is classified above forecasted output of eligible intermittent resources. (MWh) |
|  | ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif | IIE due to an Exceptional Dispatch for resource r and Exceptional Dispatch Type O.(MWh)  |
|  | ExceptionalDispatchIIEPrice BrtObmdhcif | Price for Exceptional Dispatch IIE ($/MWh)One of the following: (1) Bid, (2) the Default Energy Bid, (3) negotiated price, or (4) calculated price. |
|  | PTBChargeAdjustmentSettlementIntervalIIEAmount BJmdhcif | Real Time Instructed Imbalance Energy Settlement Amount PTB Charge Adjustment Amount for Business Associate B, PTB Id J, Trading Hour h, and Settlement Interval i. $ |
|  | ResidualImbalanceEnergyBidPriceFlag BrtubM’mdhcif  | Flag that identifies when Residual Imbalance Energy Bid Price has been scheduled.Bid Price is present = ‘1’. Flag = ‘0’ when Bid Price is Null and SC is a price taker. |
|  | RTMDefaultRIEBidBasedPrice BrtuT’bI’Q’M’VL’W’R’F’S’mdhcif | Real-time Energy Bid Price (in $/MWh) based on the Default Energy Bid (DEB) applicable for RIE. The input is provided by MQS as an output of expected energy allocation quantity. |
|  | DispatchIntervalDEBBasisRIE BrtuT’bI’Q’M’VL’W’R’F’S’mdhcif | Incremental or Decremental Residual Imbalance Energy (in MWh) provided by MQS as an expected energy allocation quantity based on the Default Energy Bid (DEB).  |
|  | BASettlementIntervalResourceRTExceptionalDispatchDEBQty BrtuT’ObI’AA’Q’M’R’W’F’S’VL’Pmdhcif  | Exceptional Dispatch Energy (in MWh) dispatched through RTD for the specified DEB segment and Settlement Interval. |
|  | BASettlementIntervalResourceRTExceptionalDispatchDEBPrc BrtObmdhcif | Bid price (in $ / MWh) of Exceptional Dispatch IIE Energy dispatched in real-time for the specified DEB segment and Settlement Interval. |
|  | ResourceETSRElectSettlementFlag rmd | Flag (value defaults to be 1) that indicates that the specified ESTR resource is an EIM Transfer System Resource (ETSR) that is required to settle its ETSR IIE and OA at the real-time LMP. |
|  | DispatchIntervalRTDNodeLMP AA’Qpmdhcif | The Dispatch Interval RTD Locational Marginal Price (LMP) for Aggregated Pricing Node and Pricing Node (Pnode) p. ($/MWh) |

## Inputs - Predecessor Charge Codes or Pre-calculations

|  |  |  |
| --- | --- | --- |
| **Input Req ID** | **Variable Name** | **Predecessor Charge Code/ Pre-calc Configuration** |
|  | SettlementIntervalRealTimeLMP BrtuM’mdhcif | Real-Time Price Pre-Calculation |
|  | SettlementIntervalTotalIIE1BrtuT’I’Q’M’F’S’mdhcif | Real-Time Energy Pre-calculation |
|  | SettlementIntervalOAEnergy BrtuT’I’Q’M’F’S’mdhcif  | Real-Time Energy Pre-calculation  |
|  | SettlementIntervalRealTimeMSSPrice uM’mdhcif | Real-Time Price Pre-Calculation |
|  | SettlementIntervalMSSIIE BrtuT’I’Q’M’F’S’mdhcif | Real-Time Energy Pre-calculation |
|  | BAAResourceSettlementIntervalRTDTransferToQuantity BrQ’AA’Qpmdhcif | Real-Time Energy Pre-calculation |
|  | BAAResourceSettlementIntervalRTDTransferFromQuantity BrQ’AA’Qpmdhcif | Real-Time Energy Pre-calculation |
|  | BAHourlyResourcePersistentDeviationFlag BrtuT’I’M’F’S’mdh | Metered Energy Adjustment Factor Pre-calculation |
|  | BASettlementIntervalResourceSurplusSupplementalRevenueFlag Brtmdhcif  | Pre-calculation – Metered Demand TAC Area and CPM |
|  | SettlementIntervalRTDLMPPriceBrtuT’I’M’mdhcif | Real-Time Price Pre-Calculation |
|  | RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif | Real-Time Price Pre-Calculation |
|  | RTDExceptionalDispatchIIECostAboveLMPPrice BrtObmdhcif | Real-Time Price Pre-Calculation |
|  | ResourceWholesaleExemptionFlag *rmdhcif* | Real-Time Energy Pre-calculation |

## CAISO Formula

### SettlementIntervalIIEAmount Brtmdhcif

IF

ResourceWholesaleExemptionFlag *rmdhcif* = 0

THEN

SettlementIntervalIIEAmount Brtmdhcif= SettlementIntervalTotalIIEPart1Amount Brtmdhcif + SettlementIntervalOAEnergyAmount Brtmdhcif + SettlementIntervalMSSIIEAmountBrtmdhcif + SettlementIntervalResidualIEAmount Brtmdhcif + SettlementIntervalExceptionalDispatchIncAmount Brtmdhcif+ SettlementIntervalExceptionalDispatchDecAmount Brtmdhcif

ELSE

SettlementIntervalIIEAmount Brtmdhcif= 0

SettlementIntervalTotalIIEPart1Amount Brtmdhcif

IF (I’ = ‘NET’)

THEN

####  SettlementIntervalTotalIIEPart1Amount Brtmdhcif = (-1) \* ( SettlementIntervalRealTimeMSSPrice uM’mdhcif\* SettlementIntervalTotalIIE1 BrtuT’I’Q’M’F’S’mdhcif) + BA5MSettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif

Where Q’ = ‘CISO’

ELSE (for non-MSS resources and MSS GROSS resources)

SettlementIntervalTotalIIEPart1Amount Brtmdhcif = (-1)\*(  SettlementIntervalRealTimeLMP BrtuM’mdhcif \* SettlementIntervalTotalIIE1 BrtuT’I’Q’M’F’S’mdhcif ) + BA5MSettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif

Where Q’ = ‘CISO’

END IF

SettlementIntervalOAEnergyAmount Brtmdhcif

IF (I’ = ‘NET’)

THEN

SettlementIntervalOAEnergyAmount Brtmdhcif = (-1) \*(  SettlementIntervalRealTimeMSSPrice uM’mdhcif\* SettlementIntervalOAEnergy BrtuT’I’Q’M’F’S’mdhcif )

Where Q’ = ‘CISO’

ELSE (for non-MSS resources and MSS Gross resources)

SettlementIntervalOAEnergyAmount Brtmdhcif = (-1) \*( SettlementIntervalRealTimeLMP BrtuM’mdhcif \* SettlementIntervalOAEnergy BrtuT’I’Q’M’F’S’mdhcif)

Where Q’ = ‘CISO’

END IF

SettlementIntervalMSSIIEAmount Brtmdhcif

IF (I’ = ‘NET’)

THEN

SettlementIntervalMSSIIEAmount Brtmdhcif = (-1) \* ( SettlementIntervalRealTimeMSSPrice uM’mdhcif\* SettlementIntervalMSSIIEBrtuT’I’Q’M’F’S’mdhcif)

Where Q’ = ‘CISO’

ELSE (for non-MSS resources and MSS Gross resources)

SettlementIntervalMSSIIEAmount Brtmdhcif = (-1) \* (

SettlementIntervalRealTimeLMP BrtuM’mdhcif \* SettlementIntervalMSSIIE BrtuT’I’Q’M’F’S’mdhcif )

Where Q’ = ‘CISO’

END IF

SettlementIntervalExceptionalDispatchIncAmount Brtmdhcif

SettlementIntervalExceptionalDispatchIncAmount Brtmdhcif =  (SettlementIntervalExceptionalDispatch1IncAmount BrtOmdhcif + SettlementIntervalExceptionalDispatch2IncAmount BrtOmdhcif + SettlementIntervalExceptionalDispatch3IncAmount BrtOmdhcif )

Where Exceptional Dispatch Type O is in (SYSEMR, SYSEMR1, TEMR, TMODEL, TMODEL1, TMODEL2, TMODEL3, TMODEL4, TMODEL5, TMODEL6, TMODEL7, TMODEL8, TMODEL9,TORETC, TORETC1, RMRR, RMRS, RMRT, SLIC, and OTHER)

SettlementIntervalExceptionalDispatch1IncAmount BrtOmdhcif =

 (-1) \* (Max (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif , 0) \*

SettlementIntervalRTDLMPPriceBrtuT’I’M’mdhcif

NOTE: For implementation purpose the following Exceptional Dispatch Types will be excluded: Exceptional Dispatch Type O NOT in (NONTMOD, ASTEST, TEST, BS, VS, RMRRC2)

Where Exceptional Dispatch Type O is in ( NONTMOD, ASTEST, TEST)

IF

BASettlementIntervalResourceSurplusSupplementalRevenueFlag Brtmdhcif = 1

THEN

SettlementIntervalExceptionalDispatch2IncAmount BrtOmdhcif =        (-1) \* (Max (BASettlementIntervalResourceRTExceptionalDispatchDEBQty BrtuT’ObI’AA’Q’M’R’W’F’S’VL’Pmdhcif, 0) \* Max ( SettlementIntervalRTDLMPPriceBrtuT’I’M’mdhcif , BASettlementIntervalResourceRTExceptionalDispatchDEBPrc BrtObmdhcif)

ELSE

SettlementIntervalExceptionalDispatch2IncAmount BrtOmdhcif =        (-1) \* (Max (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif , 0) \* Max ( SettlementIntervalRTDLMPPriceBrtuT’I’M’mdhcif , RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif)

Where Exceptional Dispatch Type O is in (RMRRC2)

SettlementIntervalExceptionalDispatch3IncAmount BrtOmdhcif =

      

(-1) \* (Max (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif , 0) \*

RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif )

SettlementIntervalExceptionalDispatchDecAmount Brtmdhcif

SettlementIntervalExceptionalDispatchDecAmount Brtmdhcif =  (SettlementIntervalExceptionalDispatch1DecAmount BrtOmdhcif + SettlementIntervalExceptionalDispatch2DecAmount BrtOmdhcif + SettlementIntervalExceptionalDispatch3DecAmount BrtOmdhcif )

Where Exceptional Dispatch Type O is in (TEMR, TMODEL, TMODEL1, TMODEL2, TMODEL3, TMODEL4, TMODEL5, TMODEL6, TMODEL7, TMODEL8, TMODEL9, TORETC, TORETC1, RMRR, RMRS, RMRT, SLIC, and OTHER)

SettlementIntervalExceptionalDispatch1DecAmount BrtOmdhcif =

 (-1) \* (Min (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif ,0) \* SettlementIntervalRTDLMPPriceBrtuT’I’M’mdhcif )

NOTE: For implementation purpose the following Exceptional Dispatch Types will be excluded: Exceptional Dispatch Type O NOT in (NONTMOD, ASTEST, TEST, BS, VS, RMRRC2, SYSEMR, SYSEMR1)

Where Exceptional Dispatch Type O in (NONTMOD, ASTEST, TEST, SYSEMR, SYSEMR1)

SettlementIntervalExceptionalDispatch2DecAmount BrtOmdhcif =  (-1) \* (Min (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif ,0) \* Min ( SettlementIntervalRTDLMPPriceBrtuT’I’M’mdhcif , RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif ))

Where Exceptional Dispatch Type O in (RMRRC2)

SettlementIntervalExceptionalDispatch3DecAmount BrtOmdhcif =

 (-1) \* (Min (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif ,0) \* RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif ))

###  SettlementIntervalResidualIEAmount Brtmdhcif

SettlementIntervalResidualIEAmount Brtmdhcif = (BASettlementIntervalResourceResidualIEAmountBrtuT’I’M’R’W’F’S’VL’mdhcif + SettlementIntervalRIEAboveForecastAmount BrtuT’I’M’R’W’F’S’VL’mdhcif )

### BASettlementIntervalResourceResidualIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

IF

BAHourlyResourcePersistentDeviationFlag BrtuT’I’M’F’S’mdh = 1

THEN

BASettlementIntervalResourceResidualIEAmountBrtuT’I’M’R’W’F’S’VL’mdhcif = BASettlementIntervalResourceWithPD\_RIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

ELSE

BASettlementIntervalResourceResidualIEAmountBrtuT’I’M’R’W’F’S’VL’mdhcif =

BASettlementIntervalResourceWithoutPD\_RIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

END IF

### BASettlementIntervalResourceWithoutPD\_RIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif =

#### (-1) \* SettlementIntervalFinalBidEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

### BASettlementIntervalResourceWithPD\_RIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

BASettlementIntervalResourceWithPD\_RIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif =
(-1) \* Min(SettlementIntervalDEBEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif, SettlementIntervalFinalBidEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif, SettlementIntervalLMPEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif)

Where SettlementIntervalResourceResidualIIE BrtuT’I’M’R’W’F’S’VL’mdhcif exists

### SettlementIntervalResourceResidualIIE BrtuT’I’M’R’W’F’S’VL’mdhcif

SettlementIntervalResourceResidualIIE BrtuT’I’M’R’W’F’S’VL’mdhcif =  DispatchIntervalResidualIIEBrtuT’bI’Q’M’R’W’F’S’VL’mdhcif

Where Q’ = ‘CISO’

### SettlementIntervalDEBEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

SettlementIntervalDEBEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif =

( DispatchIntervalDEBBasisRIE BrtuT’bI’Q’M’VL’W’R’F’S’mdhcif \* RTMDefaultRIEBidBasedPrice BrtuT’bI’Q’M’VL’W’R’F’S’mdhcif )

Where Q’ = ‘CISO’

### SettlementIntervalFinalBidEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif=

#### (DispatchIntervalResidualIIE BrtuT’bI’Q’M’R’W’F’S’VL’mdhcif \*

#### (IF

ResidualImbalanceEnergyBidPriceFlag BrtubM’mdhcif = 1

THEN

DispatchIntervalResidualIEBidPriceBrtbQ’mdhcif

ELSE

IF

I’ = ‘NET’ (MSS Net entities)

THEN

SettlementIntervalRealTimeMSSPrice uM’mdhcif

ELSE (means I’ <> ‘NET’ (non-MSS entities and MSS Gross))

SettlementIntervalRealTimeLMP BrtuM’mdhcif

END IF

END IF)

Where Q’ = ‘CISO’

### SettlementIntervalLMPEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

IF

I’ = ‘NET’ (MSS Net entities)

THEN

SettlementIntervalLMPEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif = (DispatchIntervalResidualIIE BrtuT’bI’Q’M’R’W’F’S’VL’mdhcif \* SettlementIntervalRealTimeMSSPrice uM’mdhcif)

ELSE (means I’ <> ‘NET’ (non-MSS entities and MSS Gross))

SettlementIntervalLMPEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif =

(DispatchIntervalResidualIIE BrtuT’bI’Q’M’R’W’F’S’VL’mdhcif \* SettlementIntervalRealTimeLMP BrtuM’mdhcif)

END IF

Where Q’ = ‘CISO’

### SettlementIntervalRIEAboveForecastAmount BrtuT’I’M’R’W’F’S’VL’mdhcif

IF

I’ = ‘NET’ (MSS Net entities)

THEN

SettlementIntervalRIEAboveForecastAmount BrtuT’I’M’R’W’F’S’VL’mdhcif =

(-1) \* (DispatchIntervalRIEAboveForecast BrtuT’bI’Q’M’R’W’F’S’VL’mdhcif \* SettlementIntervalRealTimeMSSPrice uM’mdhcif)

ELSE (means I’ <> ‘NET’ (non-MSS entities and MSS Gross))

SettlementIntervalRIEAboveForecastAmount BrtuT’I’M’R’W’F’S’VL’mdhcif =

(-1) \* ( DispatchIntervalRIEAboveForecast BrtuT’bI’Q’M’R’W’F’S’VL’mdhcif \* SettlementIntervalRealTimeLMP BrtuM’mdhcif)

END IF

Where Q’ = ‘CISO’

### Transfer Settlement Calculations

#### BA5MSettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif

####  BA5MSettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif = ResourceETSRElectSettlementFlag rmd \* SettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif

#### SettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif

####  SettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif = sum over (A, A’, Q, p) ((-1) \* DispatchIntervalRTDNodeLMP AA’Qpmdhcif \* (BAAResourceSettlementIntervalRTDTransferToQuantity BrQ’AA’Qpmdhcif - BAAResourceSettlementIntervalRTDTransferFromQuantity BrQ’AA’Qpmdhcif)) Where Q’ = ‘CISO’

#### BA5MSettlementIntervalRTDETSRAdvisorySTLMTAmount BrQ’mdhcif

####  BA5MSettlementIntervalRTDETSRAdvisorySTLMTAmount BrQ’mdhcif = ResourceETSRElectSettlementFlag rmd \* SettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif

#### SettlementIntervalRTDETSRAdvisorySTLMTAmount BrQ’mdhcif

####  SettlementIntervalRTDETSRAdvisorySTLMTAmount BrQ’mdhcif = sum over (A, A’, Q, p) ((-1) \* DispatchIntervalRTDNodeLMP AA’Qpmdhcif \* (BAAResourceSettlementIntervalRTDTransferToQuantity BrQ’AA’Qpmdhcif - BAAResourceSettlementIntervalRTDTransferFromQuantity BrQ’AA’Qpmdhcif)) Where Q’ = ‘CISO’

### RMR Related Calculations:

Where Exceptional Dispatch Type O is in ( NONTMOD, ASTEST, TEST)

RMRSettlementIntervalExceptionalDispatch2IncTrueUpAmount BrtOmdhcif =        (-1) \* (Max (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif , 0) \* Min (0, RTDExceptionalDispatchIIECostAboveLMPPrice BrtObmdhcif)

Where Exceptional Dispatch Type O in (NONTMOD, ASTEST, TEST, SYSEMR, SYSEMR1)

RMRSettlementIntervalExceptionalDispatch2DecTrueUpAmount BrtOmdhcif =  (-1) \* (Min (ExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’PVL’mdhcif ,0) \* Max (0, RTDExceptionalDispatchIIECostAboveLMPPrice BrtObmdhcif)

RMRDailyRTDExceptionalDispatch2TrueUpAmount Brmd

= Sum over (t, O, h, c, i, f)

{(RMRSettlementIntervalExceptionalDispatch2IncTrueUpAmount BrtOmdhcif + RMRSettlementIntervalExceptionalDispatch2DecTrueUpAmount BrtOmdhcif )}

## Outputs

| **Output ID** | **Name** | Description |
| --- | --- | --- |
|  | SettlementIntervalIIEAmount Brtmdhcif | The RTD IIE Settlement Amount for Resource r. (Total IIE Part 1 Amount, OA Amount, MSS IIE Amount, Residual IIE Amount, and Exceptional Dispatch Amounts) ($) |
|  | SettlementIntervalTotalIIEPart1Amount Brtmdhcif | Settlement Interval Total IIE Part 1 (Optimal, Minimum Load, Ramping Energy Deviation, Rerate, Real-Time self-Schedule) Amount for resource r. ($) |
|  | SettlementIntervalOAEnergyAmount Brtmdhcif | Amount of Operational Adjustments for Resource r. ($) |
|  | SettlementIntervalMSSIIEAmount Brtmdhcif | Settlement Interval MSS Imbalance Energy Settlement Amount for Resource r. ($) |
|  | SettlementIntervalResidualIEAmount Brtmdhcif | Settlement Interval Residual Imbalance Energy Settlement Amount for Resource r.This amount includes settlement for all types of RIE, including that classified as RIE above forecasted output for eligible intermittent resources.  |
|  | SettlementIntervalExceptionalDispatchIncAmount Brtmdhcif  | The Total Settlement Interval Exceptional Dispatch Incremental Settlement Amount for Resource r. ($) |
|  | SettlementIntervalExceptionalDispatchDecAmount Brtmdhcif  | Settlement Interval Exceptional Decremental Dispatch Settlement amount for Resource r. ($) |
|  | BASettlementIntervalResourceResidualIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif | Settlement Interval Residual Imbalance Energy Settlement amount. ($) |
|  | SettlementIntervalRIEAboveForecastAmount BrtuT’I’M’R’W’F’S’VL’mdhcif | Settlement Interval Residual Imbalance Energy Settlement amount for RIE above forecasted output of eligible intermittent resource. ($) |
|  | BASettlementIntervalResourceWithoutPD\_RIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif | The RIE amount where persistent deviation is not assessed. ($) |
|  | BASettlementIntervalResourceWithPD\_RIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif | The RIE amount where persistent deviation is assessed for resource r. ($) |
|  | SettlementIntervalResourceResidualIIE BrtuT’I’M’R’W’F’S’VL’mdhcif | Resource level Settlement interval RIE quantity, summed across bid segments. (MWh)This does not include RIE above forecasted output for eligible intermittent resources. |
|  | SettlementIntervalDEBEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif | The RIE Amount in case default energy bid price is applied to RIE. ($) |
|  | SettlementIntervalFinalBidEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif | The RIE Amount in case reference hour final energy bid price for RIE is applied to RIE, and if no reference bid, the LMP is applied. ($) |
|  | SettlementIntervalLMPEligibleRIEAmount BrtuT’I’M’R’W’F’S’VL’mdhcif | The RIE Amount in case LMP price is applied to RIE. ($) |
|  | SettlementIntervalExceptionalDispatch1IncAmount BrtOmdhcif | The Settlement Interval Exceptional Dispatch Incremental Amount for Resource r and where Exceptional Dispatch Type O value is SYSEMR, SYSEMR1, TEMR, TMODEL, TMODEL1, TMODEL2, TMODEL3, TMODEL4, TMODEL5, TMODEL6, TMODEL7, TMODEL8, TMODEL9,TORETC, TORETC1, RMRR, RMRS, RMRT, SLIC, or OTHER |
|  | SettlementIntervalExceptionalDispatch2IncAmount BrtOmdhcif | The Settlement Interval Exceptional Dispatch Incremental Amount for Resource r and where Exceptional Dispatch Type O value is NONTMOD, ASTEST, or TEST |
|  | SettlementIntervalExceptionalDispatch3IncAmount BrtOmdhcif | The Settlement Interval Exceptional Dispatch Incremental Amount fr Resource r and where Exceptional Dispatch Type O value is RMRRC2 |
|  | SettlementIntervalExceptionalDispatch1DecAmount BrtOmdhcif | The Settlement Interval Exceptional Dispatch Decremental Amount for Resource r and where Exceptional Dispatch Type O value is SYSEMR, SYSEMR1, TEMR, TMODEL, TMODEL1, TMODEL2, TMODEL3, TMODEL4, TMODEL5, TMODEL6, TMODEL7, TMODEL8, TMODEL9,TORETC, TORETC1, RMRR, RMRS, RMRT, SLIC, or OTHER |
|  | SettlementIntervalExceptionalDispatch2DecAmount BrtOmdhcif | The Settlement Interval Exceptional Dispatch Decremental Amount for Resource r and where Exceptional Dispatch Type O value is NONTMOD, ASTEST, or TEST |
|  | SettlementIntervalExceptionalDispatch3DecAmount BrtOmdhcif | The Settlement Interval Exceptional Dispatch Decremental Amount fr Resource r and where Exceptional Dispatch Type O value is RMRRC2 |
|  | BA5MSettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif | Settlement Interval RTD amount for a transfer resource associated with the CISO BAA. ($) |
|  | SettlementIntervalRTDETSRSTLMTAmount BrQ’mdhcif | Settlement Interval RTD amount for a transfer associated with the CISO BAA and an ETSR that has elected to settle its IIE at the RTD nodal LMP. ($) |
|  | BA5MSettlementIntervalRTDETSRAdvisorySTLMTAmount BrQ’mdhcif | Settlement Interval RTD amount for a transfer resource associated with the CISO BAA. ($) |
|  | SettlementIntervalRTDETSRAdvisorySTLMTAmount BrQ’mdhcif | Settlement Interval RTD amount for a transfer associated with the CISO BAA and an ETSR that has elected to settle its IIE at the RTD nodal LMP. ($) |
|  | RMRSettlementIntervalExceptionalDispatch2IncTrueUpAmount BrtOmdhcif | RMR true up for RTD for incremental ED of type NONTMOD, ASTEST, TEST. |
|  | RMRSettlementIntervalExceptionalDispatch2DecTrueUpAmount BrtOmdhcif | RMR true up for RTD for decremental ED of type NONTMOD, ASTEST, TEST. |
|  | RMRDailyRTDExceptionalDispatch2TrueUpAmount Brmd | RMR daily true up for RTD for ED of type NONTMOD, ASTEST, TEST. |

# Charge Code Effective Dates

| Charge Code/Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version update Type |
| --- | --- | --- | --- | --- |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.0 | 04/01/09 | 03/31/09 | Documentation Edits Only |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.1 | 04/01/09 | 4/30/14 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.2 | 5/1/14 | 4/30/14 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.3 | 5/1/14 | 4/30/14 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.4 | 10/1/14 | 9/30/14 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.5 | 5/1/14 |  04/30/14 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.6 | 10/1/14 | 9/30/14 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.7 | 5/1/14 | 9/30/14 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.8 | 10/1/14 | 9/30/16 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.9 | 10/1/16 | 10/31/16 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.10 | 11/1/16 | 12/31/19 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.11 | 1/1/20 | 9/30/20 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.12 | 10/1/20 | 10/31/21 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.13 | 11/1/21 | 4/30/26 | Configuration Impacted |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) | 5.14 | 5/1/26 | Open | Configuration Impacted |