:

 Version 5.1

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# Purpose of Document

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

# 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 EIM 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)
	+ FMM Instructed Imbalance Energy EIM Settlement (CC 64600)
	+ RTD Instructed Imbalance Energy Settlement (CC 6470)
	+ RTD Instructed Imbalance Energy EIM Settlement (CC 64700)
* UIE – Uninstructed Imbalance Energy
	+ Real Time Uninstructed Imbalance Energy Settlement (CC 6475)
	+ Real Time Uninstructed Imbalance Energy EIM Settlement (CC 64750)
* UFE – Unaccounted for Energy
	+ Real Time Unaccounted for Energy Settlement (CC 6474)
	+ Real Time Unaccounted for Energy EIM Settlement (CC 64740)
* GHG - Greenhouse Gas Emission Cost Revenue (CC 491)
* GHG – Real Time GHG Offset (CC 495)

To the extent that the sum of the Settlement Amounts for IIE, UIE, and UFE does not equal zero within the CAISO Balancing Authority Area, the CAISO will assess Charges or make Payments in Real Time Imbalance Energy Offset (CC 6477) and in Real Time Imbalance Energy Offset EIM (CC 64770)for the resulting differences to all Scheduling Coordinators based on a pro rata share of their Measured Demand for the relevant Settlement Interval. To the extent that the sum of the Settlement Amounts for IIE, UIE, UFE, and GHG does not equal zero within the EIM Balancing Authority Area, the CAISO will assess Charges or make Payments in Real Time Imbalance Energy Offset EIM (CC 64770) for the resulting differences to EIM Entity Scheduling Coordinator ID, respectively.

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 Hour-Ahead Scheduling Process and changes submitted closer to Real-Time where allowed by the contract) will be reversed in CC 6788 RTM Congestion Credit Settlement. 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 special and separate Balancing Authority Area neutrality accounts. The CAISO Real-Time Congestion Charges less Virtual Bid Adjustment shall be distributed back to non-ETC Control Area metered Demand and exports in Real Time Congestion Offset (CC 6774). The EIM Balancing Authority Area Real-Time Congestion Charges shall be distributed to the applicable EIM Entity Scheduling Coordinator in Real Time Congestion Offset EIM (CC 67740).

## Description

To the extent that the sum of the Settlement Amounts for IIE, UIE, and UFE, Greenhouse Gas Compensation, Real-Time AS Imports Congestion, DA Virtual Award Settlements in Real-Time, and each EIM area Balancing Authority Area Neutrality, less the RT Energy Congestion revenues computed within Real-Time Congestion Offset, and less the Real-Time Marginal Cost of Losses Offset does not equal zero, the CAISO will assess Charges or make Payments in Real Time System Imbalance Energy Offset (CC 6478) for the resulting differences to all Scheduling Coordinators based on a pro rata share of their EIM Measured Demand..

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | This Charge Code shall be calculated and output on a 5-minute Settlement Interval basis. |
| 1.1 | This charge code allocate the System Real Time Imbalance Energy Offset Amount portions of the nonzero sum of IIE, UIE, UFE, Greenhouse Gas Compensation, Real-Time A/S congestion revenues, Virtual Awards settlement, and BAA Real Time Imbalance Energy Offset with congestion credits and loss credits/charges factored in. |
| 2.0 | The allocation of the System Real Time Imbalance Energy Offset for the EIM Area, to Scheduling Coordinators according to their EIM Measured Demand. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| RT Energy Precalculation |
| MSS Netting Precalculation  |
| CC 491 – Greenhouse Gas Emission Cost Revenue |
| CC 495 – Real Time GHG Offset |
| CC 6460 – FMM Instructed Imbalance Energy Settlement |
| CC 64600 - FMM Instructed Imbalance Energy EIM (FMM IIE) |
| CC 6470 – Real Time Instructed Imbalance Energy Settlement (IIE) |
| CC 64700 - Real Time Instructed Imbalance Energy EIM Settlement (RTM IIE) |
| CC 6475 – Real Time Uninstructed Imbalance Energy Settlement (UIE) |
| CC 64750 - Real Time Uninstructed Imbalance Energy EIM Settlement (UIE) |
| CC 6474 – Real Time Unaccounted for Energy Settlement (UFE) |
| CC 64740 – Real Time Unaccounted for Energy EIM Settlement (UFE) |
| CC 6774 – Real Time Congestion Offset |
| CC 67740 – Real Time Congestion Offset EIM |
| CC 6985 – Real Time Losses Offset |
| CC 69850 – Real Time Losses Offset EIM |
| CC 6473 – Convergence Bidding RT Energy, Congestion, and Loss Settlement |
| CC 6477 – Real Time Imbalance Energy Offset |
| CC 64770 – Real Time Imbalance Energy Offset EIM |

## Successor Charge Codes

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

## Inputs – External Systems

## Inputs - Predecessor Charge Codes or Pre-calculations

| Row # | Variable Name | Predecessor Charge Code/ Pre-calc Configuration |
| --- | --- | --- |
|  | EIMEntityRealTimeImbalanceEnergyOffsetAllocationAmount BQ’mdhcif | CC 64770 Real Time Imbalance Energy Offset EIM |
|  | CAISOTotalRealTimeImbalanceEnergyOffsetAmount mdhcif | CC 6477 Real Time Imbalance Energy Offset. |
|  | EIMBAARTMarginalLossesOffsetAmount  Q’mdhcif  | CC 69850 Real Time Losses Offset EIM |
|  | CAISOTotalRealTimeMarginalLossOffsetAllocationAmount mdhcif | CC 6985 Real Time Losses Offset |
|  | EIMBAARTCongestionOffsetAmount Q'mdhcif  |  Real Time Congestion Pre-calculation |
|  | BA\_EIMBAA\_SettlementInterval\_UnaccountedforEnergy\_SettlementAmount BuQ’mdhcif | CC 64740 – Real Time Unaccounted for Energy EIM Settlement (UFE) |
|  | CAISOTotalUFESettlementAmount mdhcif | CC 6474 – Real Time Unaccounted for Energy Settlement (UFE) |
|  | EIMSettlementIntervalUIESettlementAmount BrtuT’I’Q’M’mdhcif |  CC 64750 - Real Time Uninstructed Imbalance Energy EIM Settlement (UIE) |
|  | CAISOTotalRealTimeUIESettlementAmount mdhcif |  CC 6475 - Real Time Uninstructed Imbalance Energy Settlement (UIE) |
|  | EIMBA5MResourceFMMIIESettlementAmount BrtuQ’M’mdhcif | CC 64600 - FMM Instructed Imbalance Energy EIM (FMM IIE) |
|  | CAISOTotalRealTimeIIESettlementAmount mdhcif | CC 6460 - FMM Instructed Imbalance Energy (FMM IIE) |
|  | EIMSettlementIntervalIIEAmount BrtQ’mdhcif | CC 64700 - Real Time Instructed Imbalance Energy EIM Settlement (RTM IIE) |
|  | CAISOTotalRealTimeIIESettlementAmount mdhcif | CC 6470 – Real Time Instructed Imbalance Energy Settlement (IIE) |
|  | BAResourceEIMGHGPaymentAmount BrtQ’F’S’mdhcif | CC 491 – Greenhouse Gas Emission Cost Revenue  |
|  | RealTimeGreenhouseGasOffsetAllocationAmount BQ’G’’mdhcif | CC 495 – Real Time GHG Offset |
|  | BAHourlyRTVirtualSupplyOrDemandAwardEnergySettlementAmount BAQpmdh | CC 6473 – Convergence Bidding RT Energy, Congestion, and Loss Settlement  |
|  | BASettlementIntervalEIMAreaMeasuredDemand BuT’I’Q’M’AA’W’VL’mdhcif | MSS Netting Precalculation |

## CAISO Formula

BASystemRealTimeImbalanceEnergyOffsetAllocationAmount Bmdhcif

BASystemRealTimeImbalanceEnergyOffsetAllocationAmount Bmdhcif =

****** (-1) \* TotalSystemRTIEOSettlementAmount mdhcif \* (BASettlementIntervalEIMAreaMeasuredDemand BuT’I’Q’M’AA’W’VL’mdhcif / TotalEIMAreaMeasuredDemand mdhcif)

### TotalEIMAreaMeasuredDemand mdhcif

TotalEIMAreaMeasuredDemand mdhcif =

******BASettlementIntervalEIMAreaMeasuredDemand BuT’I’Q’M’AA’W’VL’mdhcif

### TotalSystemRTIEOSettlementAmount mdhcif

TotalSystemRTIEOSettlementAmount mdhcif =

EIMAreaTotalRTDIIESettlementAmount mdhcif + EIMAreaTotalFMMIIESettlementAmount mdhcif + EIMAreaTotalUIESettlementAmount mdhcif+

EIMAreaTotalUFESettlementAmount mdhcif + CAISOTotalVirtualAwardSettlementAmount mdhcif + TotalGHGCompensationSettlementAmount mdhcif + EIMAreaTotalNeutralityOffsetAmount mdhcif - EIMAreaTotalRTEnergyCongestionAmountmdhcif -EIMAreaTotalRTLossOffsetAmount mdhcif

### TotalGHGCompensationSettlementAmount mdhcif

TotalGHGCompensationSettlementAmount mdhcif = TotalEIMGHGPaymentAmount mdhcif + TotalGHGOffsetAllocationAmount mdhcif

#### TotalEIMGHGPaymentAmount mdhcif =

#### Sum(B,r,t,Q’,F’,S’,G’’) BAResourceEIMGHGPaymentAmount BrtQ’F’S’G’’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 491

#### TotalGHGOffsetAllocationAmount mdhcif

Sum (B,Q’,G’’) RealTimeGreenhouseGasOffsetAllocationAmount BQ’G’’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 495

### EIMAreaTotalRTDIIESettlementAmount mdhcif

EIMAreaTotalRTDIIESettlementAmount mdhcif =

CAISOTotalRealTimeIIESettlementAmount mdhcif +

EIMTotalRTDIIESettlementAmount mdhcif

### EIMTotalRTDIIESettlementAmount mdhcif

EIMTotalRTDIIESettlementAmount mdhcif =

****** EIMSettlementIntervalIIEAmount BrtQ’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 64700

### EIMAreaTotalFMMIIESettlementAmount mdhcif

EIMAreaTotalFMMIIESettlementAmount mdhcif =

CAISOTotalRealTimeIIESettlementAmount mdhcif +

EIMTotalFMMIIESettlementAmount mdhcif

### EIMTotalFMMIIESettlementAmount mdhcif

EIMTotalFMMIIESettlementAmount mdhcif =

****** EIMBA5MResourceFMMIIESettlementAmount BrtuQ’M’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 64600

### EIMAreaTotalUIESettlementAmount mdhcif

EIMAreaTotalUIESettlementAmount mdhcif =

CAISOTotalRealTimeUIESettlementAmount mdhcif +

EIMTotalUIESettlementAmount mdhcif

### EIMTotalUIESettlementAmount mdhcif

EIMTotalUIESettlementAmount mdhcif =

****** EIMSettlementIntervalUIESettlementAmount BrtuT’I’Q’M’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 64750

### EIMAreaTotalUFESettlementAmount mdhcif

EIMAreaTotalUFESettlementAmount mdhcif =

CAISOTotalUFESettlementAmount mdhcif +

EIMTotalUFESettlementAmount mdhcif

### EIMTotalUFESettlementAmount mdhcif

EIMTotalUFESettlementAmount mdhcif =

****** BA\_EIMBAA\_SettlementInterval\_UnaccountedforEnergy\_SettlementAmount BuQ’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 64740

### CAISOTotalVirtualAwardSettlementAmount mdhcif

CAISOTotalVirtualAwardSettlementAmount mdhcif =

****** BAHourlyRTVirtualSupplyOrDemandAwardEnergySettlementAmount BAQpmdh / 12

### EIMAreaTotalRTEnergyCongestionAmount mdhcif

EIMAreaTotalRTEnergyCongestionAmount mdhcif =

****** EIMBAARTCongestionOffsetAmount Q’mdhcif

### EIMAreaTotalRTLossOffsetAmount mdhcif

EIMAreaTotalRTLossOffsetAmount mdhcif =

CAISOTotalRealTimeMarginalLossOffsetAllocationAmount mdhcif+

EIMTotalRTLossesOffsetAmount mdhcif

### EIMTotalRTLossesOffsetAmount mdhcif

EIMTotalRTLossesOffsetAmount mdhcif =

****** EIMBAARTMarginalLossesOffsetAmount Q’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 69850

### EIMAreaTotalNeutralityOffsetAmount mdhcif

EIMAreaTotalNeutralityOffsetAmount mdhcif =

CAISOTotalRealTimeImbalanceEnergyOffsetAmount mdhcif + EIMRealTimeImbalanceEnergyOffsetAmount mdhcif)

### EIMRealTimeImbalanceEnergyOffsetAmount mdhcif

EIMRealTimeImbalanceEnergyOffsetAmount mdhcif =

****** EIMEntityRealTimeImbalanceEnergyOffsetAllocationAmount BQ’mdhcif

Note: This calculation is being performed in the hierarchy of Charge Code 64770

##

## Outputs

| Output ID | Name | Description |
| --- | --- | --- |
|  | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
|  | BASystemRealTimeImbalanceEnergyOffsetAllocationAmount Bmdhcif | Allocation of Total System Real Time Instructed Imbalance Energy Settlement Amount for the EIM Area by Business Associate ID (B). |
|  | TotalEIMAreaMeasuredDemand mdhcif | EIM Area Measured Demand by settlement interval. |
|  | TotalSystemRTIEOSettlementAmount mdhcif | Total System Real Time Imbalance Energy Settlement Amount for the EIM Area. |
|  | TotalGHGCompensationSettlementAmount mdhcif | Total Greenhouse Gas Compensation settlement. |
|  | TotalEIMGHGPaymentAmount mdhcif | Total GHG payment amount from EIM BAAs. |
|  | EIMAreaTotalRTDIIESettlementAmount mdhcif | Total Real Time Instructed Imbalance Energy Settlement Amount for Balancing Authority Areas participating in EIM. |
|  | EIMTotalRTDIIESettlementAmount mdhcif | Total Real Time Instructed Imbalance Energy settlement amount for EIM Balancing Authority Areas.  |
|  | EIMAreaTotalFMMIIESettlementAmount mdhcif | Total Fifteen Minute Market Instructed Imbalance Energy settlement amount for Balancing Authority Areas participating in EIM. |
|  | EIMTotalFMMIIESettlementAmount mdhcif | Total Fifteen Minute Market Instructed Imbalance Energy settlement amount for EIM Balancing Authority Areas. |
|  | EIMAreaTotalUIESettlementAmount mdhcif | Total Real Time Uninstructed Imbalance Energy Settlement Amount for Balancing Authority Areas participating in EIM. |
|  | EIMTotalUIESettlementAmount mdhcif | Total Real Time Uninstructed Imbalance Energy Settlement Amount for EIM Balancing Authority Area. |
|  | EIMAreaTotalUFESettlementAmount mdhcif | Total Unaccounted for Energy Settlement Amount for Balancing Authority Areas participating in EIM. |
|  | EIMTotalUFESettlementAmount mdhcif | Total Unaccounted for Energy Settlement Amount for EIM Balancing Authority Area. |
|  | CAISOTotalVirtualAwardSettlementAmount mdhcif | Total Virtual Award Energy Settlement |
|  | EIMAreaTotalRTEnergyCongestionAmount mdhcif | Total Real Time Energy Congestion amount for Balancing Authority Areas participating in EIM. |
|  | EIMAreaTotalRTLossOffsetAmount mdhcif | Total Real Time Loss Offset Amount for Balancing Authority Areas participating in EIM. |
|  | EIMTotalRTLossesOffsetAmount mdhcif | Total Real Time Losses Offset Amount for EIM Balancing Authority Area. |
|  | EIMAreaTotalNeutralityOffsetAmount mdhcif | Sum of Real Time Imbalance Energy Offset Settlement Amount of all Balancing Authority Areas participating in the EIM Market. |
|  | EIMRealTimeImbalanceEnergyOffsetAmount mdhcif | EIM Balancing Authority Area’s Real Time Imbalance Energy Offset Amount. |
|  | TotalGHGOffsetAllocationAmount mdhcif | Sum of GHG Offset Allocation Amount of all Balancing Authority Areas participating in the EIM Market. |

# Charge Code Effective Dates

| Charge Code/Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| CC 6478 – System Real Time Imbalance Energy Offset | 5.0 | 10/01/14 | 9/30/014 | Initial Version |
| CC 6478 – System Real Time Imbalance Energy Offset | 5.0a | 10/01/14 | 4/30/26 | Documentation Only |
| CC 6478 – System Real Time Imbalance Energy Offset | 5.1 | 5/1/26 | Open | Configuration |