Settlements & Billing

**Configuration Guide: MSS Deviation Penalty Quantity**

Pre-calculation

 Version 5.10

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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 Metered Subsystem (MSS) Positive and Negative Deviation Penalty (DP) Settlement charges (CC 1407 and 2407 respectively) are intended to discourage Load Following Metered Subsystems from deviating from their forward schedules and/or any CAISO instructions. These charges should result in increased predictability of MSS Generators and improved operational stability of the CAISO.

The MSS Operator may elect to operate a System Unit, or Generating Units in the MSS to follow its Load, provided that:

1. the Scheduling Coordinator for the MSS Operator shall remain responsible for purchases of Energy in accordance with the CAISO Tariff if the MSS Operator does not operate its System Unit or Generating Units and schedule imports into the MSS, to match the metered Demand in the MSS and exports from the MSS; and
2. if the deviation between Generation and imports into the MSS and Metered Demand and exports from the MSS exceeds the MSS Deviation Band then the Scheduling Coordinator for the MSS Operator shall pay the additional amounts as indicated below.

The Scheduling Coordinator for a Load-following MSS Operator shall pay amounts for:

1. excess MSS Generation supplied to the CAISO Markets and
2. excess MSS Load relying on CAISO Markets and not served by MSS generating resources.

Where an MSS has elected net Settlement, where all resources inside the MSS are Load following, the Load following resources in an MSS aggregation but outside the MSS are subject to the rules for all Load following resources and settled in CC 1407 and 2407. If there are any Non-Load following resources in an MSS aggregation but outside the MSS, these resources are not subject to CC 1407 and CC 2407 penalty charges. Likewise, for elections of gross Settlement, where some resources within the MSS are not Load following, the Non-Load following resources are not subject to CC 1407 and CC 2407 penalty charges. Therefore, whether net or gross Settlement is elected by the MSS Operator, only MSS Load following resources are subject to CC 1407 and CC 2407 penalty charges.

If the MSS has elected not to follow Load, the CC 1407 MSS Positive Deviation Penalty and CC 2407 MSS Negative Positive Deviation Penalty Charge Codes do not apply.

Regardless of the election of net or gross Settlement, the CAISO Settlements calculates both the positive and negative deviation Billable Quantities for each MSS that has elected (annually) to follow Load in accordance with their MSS agreement and CAISO Tariff, as specified in the Settlement BPM “Pre-calculation MSS Deviation Penalty Quantity”.

Revenues collected from the MSS Deviation Penalty (DP) Charge Codes are used as an off-set to the CAISO’s Grid Management Charge. Accounting and tracking of this amount is accommodated by a CAISO MSS DP Trustee Account.

## Description

The MSS Deviation Penalty Quantity Pre-Calculation determines the negative and positive MSS deviation billable quantities for charge codes 1407 and 2407. This pre-calculation determines daily, the Dispatch Operating Point Deviation (DOPD) quantity, the MSS deviation Band quantity, the MSS Load Following Instructed Imbalance Energy quantity used in the calculation of the MSS Load Following Deviation Penalty (MSS LFDP) quantity.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | If the metered Generation resources and imports into the MSS exceed the total of: (i) metered Demand and exports from the MSS, and (ii) Energy expected to be delivered by the Scheduling Coordinator for the MSS in response to the CAISO’s Dispatch Instructions and/or Regulation Set Point signals issued by the CAISO’s AGC by more than the MSS Deviation Band, then the payment for excess Energy outside of the MSS Deviation Band shall be rescinded and Scheduling Coordinator for the MSS Operator will pay the CAISO an amount equal to one hundred percent (100%) of the product of the highest LMP paid to the MSS Operator for its Generation in the Settlement Interval and the amount of the Imbalance Energy that is supplied in excess of the MSS Deviation Band. |
| 2.0 | If metered Generation resources and imports into the MSS are insufficient to meet the total of: (i) metered Demand and exports from the MSS, and (ii) Energy expected to be delivered by the Scheduling Coordinator for the MSS in response to the CAISO’s Dispatch Instructions and/or Regulation Set Point signals issued by the CAISO’s AGC by more than the MSS Deviation Band, then the Scheduling Coordinator for the MSS Operator shall pay the CAISO an amount equal to the product of the Default LAP price for the Settlement Interval and two hundred percent (200%) of the shortfall that is outside of the MSS Deviation Band. |
| 3.0 | The MSS Deviation Band is a percent of overall MSS metered Demand by which a Load-following MSS Operator can deviate from its Expected Energy in a Settlement Interval without incurring a Load Following Deviation Penalty. |
| 4.0 | The Dispatch Operating Point Deviation (DOPD) represents MSS Aggregation Imbalance Energy adjusted for Day Ahead Sales or Purchases, MSS expected IIE and Regulation Energy. It is the Load following MSS’s total deviation from Expected Energy that is subject to the MSS Load Following Deviation Penalty. |
| 5.0 | MSS expected IIE (Instructed Imbalance Energy) is an amount calculated by CAISO that represents the Energy dispatched by CAISO that is required to be provided by the MSS. This MSS expected IIE includes Energy from Energy Bids (including those associated with Spinning Reserve and Non-Spinning Reserve), Real-Time Energy from RMR Units, and Exceptional Dispatch Energy. MSS expected IIE does not include energy associated with Load following instructions.  |
| 6.0 | MSS/MSSA (Meter Subsystem Aggregation) Imbalance Energy is the sum of the MSS internal and external generation accounting for the loss factor and the real time trade net of metered demand.  |
| 7.0 | The Fixed Loss Factor in various calculation is a static value which is subject to change based upon the MSS/MSSA agreement. The fixed loss factor must be recorded in CAISO Settlements with effective timestamps. |
| 8.0 | MSS Load Following Instructed Imbalance Energy (MSSLFIIE) per unit for the applicable dispatch Interval is determined as the diference between the supplemental energy and minimum ExPost capacity quantity. |
| 8.1 | For each dispatch interval, the dispatch mode MSS Load Following Instructed Imbalance Energy in the applicable dispatch interval is a non zero value if:1. The ADS Contingency dispatch mode exists
2. The spin energy is null or zero or
3. The non spin energy is null or zero.
 |
| 8.2 | For each dispatch interval, the non dispatch mode MSS Load Following Instructed Imbalance Energy in the applicable dispatch interval is a non zero value if:1. The spin energy is null or zero and
2. The non spin energy is null or zero
 |
| 8.3 | During Market disruption, the CAISO applies fill logic for values that are missing during these intervals. When we calculate the deviation penalty at the MSS portfolio, due to the fills, the MSS LF IIE does not accurately represent their actual flow. Therefore the CAISO will not assess penalty for MSS resources during CAISO market disruption. |
| 9.0 | Excess Behind the Meter Production (EBTMP) is a new type of energy measurement entry which accounts for any excess energy injected into the distribution system from rooftop solar. EBTMP will be reported to CAISO separately from Gross Load in MRI-S using measurement type EBTMP. |
| 9.1 | Gross Load shall be submitted through MRI-s under Measurement type ‘LOAD’ Excess Behind the Meter Load Production shall be submitted through MRI-S as measurement type ‘EBTMP” and shall be mapped a positive energy injected to distribution system reducing distribution Gross Load consumption. |
| 9.2 | EBTMP does not apply to MSS. An MSS must submit generation/load at the citygate pursuant to its MSSA. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| NA |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| MSS Positive Deviation Penalty (CC 1407) |
| MSS Negative Deviation Penalty (CC 2407) |

## Inputs – External Systems

| Row # | Variable Name | Description |
| --- | --- | --- |
| 1.0 | BAResourceADSSpinDispatchQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | ADS-instructed energy dispatched from spin capacity (in MWh) for a given resource and Dispatch Interval. |
| 2.0 | BAResourceADSNonSpinDispatchQuantity BrtuT'I'M'Q’M’VL'W'R'F'S'mdhcif | ADS-instructed energy (in MWh) dispatched from non-spin capacity for a given resource and Dispatch Interval. |
| 3.0 | BAResourceDispatchSupplementalEnergyQty BrtT’M'F’S’c’L’mdhcif | The dispatched supplemental energy (in MW) for a given resource and Dispatch Interval. |
| 4.0 | BAMSSLoadFollowingExtGenFixedLossFactor BM’md | The fixed loss factor (as a fractional decimal number close to 1.000) for a given MSS entity and Trading Day. |
| 5.0 | BADispatchIntervalResourceMSSSubmittedCalcEnergyQty BrtT’M’m’F’S’L’mdhcif | Metered Energy quantity (in MWh) for a given resource and Dispatch Interval. |
| 6.0 | BAHrlyResourceDAMSSGenerationScheduleQty BrtT’M’F’S’L’mdh  | DA schedule (in MW) for generation associated with a given resource and Trading Hour. |
| 7.0 | DALoadSchedule BrtuT’I’Q’M’AA’R’pW’F’S’vVL’mdh  | DA scheduled (in MW) for Demand associated with a given resource and Trading Hour. |
| 8.0 | BAMSSDeviationBandFactor Bmd | A value (as a percent of overall MSS metered Demand) by which a Load-following MSS Operator can deviate from its Expected Energy in a Settlement Interval without incurring a Load Following Deviation Penalty. The input is provided for a given Trading Day.  |
| 9.0 | BAResEntityDispatchIntervalMeteredQuantity BrtuT’I’Q’M’AA’m’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif  | Metered Energy quantity (in MWh) for a given resource and Dispatch Interval. |
| 10.0 | DispatchIntervalMSSIIE BrtuT'bI'Q'M'R'W'F'S'VL'mdhcif | MSS IIE (load following Energy) is energy produced or consumed by a MSS resource due to Load Following.  |
| 11.0 | DispatchIntervalTotalExpectedEnergy BrtEuT’I’**Q’**M’AA’W’R’pF’S’VL’mdhcif | Dispatch Interval Total IIE Energy (provided by MQS) that corresponds to the Energy under the DOP for a resource. Energy quantity can be either positive or negative value.  |
| 12.0 | RealTimeUpperOperatingLimit BrtF'S'mdhcif | Resource’s effective upper operating limit as reported in OMS as of the RTM market. |
| 13.0 | BAResourceDispatchIntervalMSSForcedOutageFlag BrtT’M’F’S’L’mdhcif | A 1/0 Flag for each Resource per RTD interval, where 1 represents the resource being on a forced outage. |
| 14.0 | FMMMarketDisruptionFlag mdhc | A 1/0 Flag for each FMM interval, where 1 represents a market disruption interval. |
| 15.0 | RTDMarketDisruptionFlag mdhcif | A 1/0 Flag for each RTD interval, where 1 represents a market disruption interval. |

## Inputs - Predecessor Charge Codes or Pre-calculations

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

## CAISO Charge Code Formula

### **MSS Load Following Deviation Penalty Billable Quantity Determination**

####  IF

#### BASettlementIntervalMSSDOPDQuantity BM'mdhcif > 0

#### THEN

#### BASettlementIntervalMSSPositiveDeviationQuantity BM'mdhcif = Max (0, (BASettlementIntervalMSSDOPDQuantity BM'mdhcif – BASettlementIntervalMSSDeviationBandQuantity BM'mdhcif))

#### ELSE

 BASettlementIntervalMSSPositiveDeviationQuantity BM'mdhcif = 0

####  IF

#### BASettlementIntervalMSSDOPDQuantity BM'mdhcif < 0

THEN

#### BASettlementIntervalMSSNegativeDeviationQuantity BM'mdhcif = Min (0, (BASettlementIntervalMSSDOPDQuantity BM'mdhcif +BASettlementIntervalMSSDeviationBandQuantity BM'mdhcif))

ELSE

BASettlementIntervalMSSNegativeDeviationQuantity BM'mdhcif =0

####  BASettlementIntervalMSSDeviationBandQuantity BM'mdhcif = BAMSSDeviationBandFactor Bmd \* BASettlementIntervalMSSMeteredLoadQuantity BM'mdhcif

####  (1- DispatchIntervalMarketDisruptionFlag mdhcif) \*IF

#### BASettlementIntervalMSSLFDPInstructedImbalanceEnergyQuantity BM'mdhcif <>0

#### THEN

#### BASettlementIntervalMSSDOPDQuantity BM'mdhcif = BASettlementIntervalMSSCalculatedImbalanceEnergyQuantity BM'mdhcif - BASettlementIntervalMSSLFDPInstructedImbalanceEnergyQuantity BM'mdhcif - BASettlementIntervalMSSDASalesPurchaseQuantity BM'mdhcif- BASettlementIntervalMSSRegulationEnergyQuantity BM'mdhcif

#### ELSE

#### BASettlementIntervalMSSDOPDQuantity BM'mdhcif = BASettlementIntervalMSSCalculatedImbalanceEnergyQuantity BM'mdhcif - BASettlementIntervalMSSLFSubmittedInstructedImbalanceEnergyQuantity BM'mdhcif - BASettlementIntervalMSSDASalesPurchaseQuantity BM'mdhcif - BASettlementIntervalMSSRegulationEnergyQuantity BM'mdhcif

#### DispatchIntervalMarketDisruptionFlag mdhcif = Max(FMMMarketDisruptionFlag mdhc,RTDMarketDisruptionFlag mdhcif)

####  BASettlementIntervalMSSLFSubmittedInstructedImbalanceEnergyQuantity BM'mdhcif = BADispatchIntervalResourceMSSSubmittedCalcEnergyQty BrtT’M’m’F’S’L’mdhcif

Where

S’ (ENTITY\_COMPONENT\_SUBTYPE) = ‘EXP\_ENGY’

####  BASettlementIntervalMSSRegulationEnergyQuantity BM'mdhcif =  BADispatchIntervalResourceMSSSubmittedCalcEnergyQty BrtT’M’m’F’S’L’mdhcif

Where

#### S’ (ENTITY\_COMPONENT\_SUBTYPE) = ‘REG\_ENGY’

####  BASettlementIntervalMSSDASalesPurchaseQuantity BM'mdhcif = BASettlementIntervalSumDAMSSInternalGenerationScheduleQuantity BM'mdhcif + BASettlementIntervalSumDAMSSExternalGenerationScheduleQuantity BM'mdhcif+ BASettlementIntervalMSSTradeDAPreferredQuantity BM'mdhcif - BASettlementIntervalSumDALFMSSSelfScheduleDemandQuantity BM'mdhcif

####  BASettlementIntervalSumDALFMSSSelfScheduleDemandQuantity BM'mdhcif = ( (-1) \* (1/12) \* DALoadSchedule BrtuT’I’Q’M’AA’R’pW’F’S’vVL’mdh )

Where

T’ (ENTITY\_TYPE) = ‘MSS’

And

 L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

####  BASettlementIntervalMSSTradeDAPreferredQuantity BM'mdhcif = (-1) \*BADispatchIntervalResourceMSSSubmittedCalcEnergyQty BrtT’M’m’F’S’L’mdhcif

S’ (ENTITY\_COMPONENT\_SUBTYPE) = ‘TRADEIO’

####  BASettlementIntervalSumDAMSSExternalGenerationScheduleQuantity BM'mdhcif = (1/12)\* ( BAHrlyResourceDAMSSGenerationScheduleQty BrtT’M’F’S’L’mdh \*(1- BAMSSLoadFollowingExtGenFixedLossFactor BM’md) )

Where

S’ (ENTITY\_COMPONENT\_SUBTYPE) = ‘EG’

And

T’ (ENTITY\_TYPE) = ‘MSS’

And

 L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

####  BASettlementIntervalSumDAMSSInternalGenerationScheduleQuantity BM'mdhcif = (1/12)\*  BAHrlyResourceDAMSSGenerationScheduleQty BrtT’M’F’S’L’mdh

Where

S’ (ENTITY\_COMPONENT\_SUBTYPE) = ‘IG’

And

T’ (ENTITY\_TYPE) = ‘MSS’

And

 L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

####  BASettlementIntervalMSSCalculatedImbalanceEnergyQuantity BM'mdhcif = BASettlementIntervalSumMSSGenerationEnergyQuantity BM'mdhcif + BASettlementIntervalMSSTradeRTQuantity BM'mdhcif - BASettlementIntervalMSSMeteredLoadQuantity BM'mdhcif

####  BASettlementIntervalMSSTradeRTQuantity BM'mdhcif = (-1) \*  BADispatchIntervalResourceMSSSubmittedCalcEnergyQty BrtT’M’m’F’S’L’mdhcif

Where

#### S’ (ENTITY\_COMPONENT\_SUBTYPE) = ‘IMP\_EXP’

####  BASettlementIntervalSumMSSGenerationEnergyQuantity BM'mdhcif = (BASettlementIntervalSumMSSInternalGenerationEnergyQuantity BM'mdhcif+ BASettlementIntervalSumMSSExternalGenerationEnergyQuantity BM'mdhcif )

####  BASettlementIntervalSumMSSExternalGenerationEnergyQuantity BM'mdhcif =  BASettlementIntervalResourceLFMSSMeteredEnergyQuantity BrtM’m’F’S’mdhcif \*(1- BAMSSLoadFollowingExtGenFixedLossFactor BM’md)

Where Entity Component Subtype = ‘EG’

####  BASettlementIntervalSumMSSInternalGenerationEnergyQuantity BM'mdhcif = BASettlementIntervalResourceLFMSSMeteredEnergyQuantity BrtM’m’F’S’mdhcif

Where

Entity Component Subtype = ‘IG’

#### BASettlementIntervalMSSMeteredLoadQuantity BM'mdhcif = (-1)\* (BASettlementIntervalResourceLFMSSMeteredEnergyQuantity BrtM’m’F’S’mdhcif )

Where

t (RSRC\_TYPE) = ‘LOAD’

#### BASettlementIntervalResourceLFMSSMeteredEnergyQuantity BrtM’m’F’S’mdhcif

#### = BAResEntityDispatchIntervalMeteredQuantity BrtuT’I’Q’M’AA’m’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif

Where

T’ (ENTITY\_TYPE) = ‘MSS’

And

 L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

####  BASettlementIntervalMSSLFDPInstructedImbalanceEnergyQuantity BM'mdhcif =  (BAResource5MMSSLFDPDispatchModeEnergyQuantity BrtT’M’F’S’L’mdhcif + BAResource5MMSSLFDPNonDispatchModeEnergyQuantity BrtT’M’F’S’L’mdhcif)

####  BAResource5MMSSLFDPDispatchModeEnergyQuantity BrtT’M’F’S’L’mdhcif =

#### Where Exists

BAResourceDispatchSupplementalEnergyQty BrtT’M'F’S’c’L’mdhcif

#### And Where

c’ (Contingent\_Flag) = ‘YES’

And

T’ (ENTITY\_TYPE) = ‘MSS’

And

 L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

#### IF

####  (

#### BAResource5MLoadFollowingMSSSpinQuantity BrtT’M'F'S’L’mdhcif<> 0

#### OR

#### BAResource5MLoadFollowingMSSNonSpinQuantity BrtT’M'F'S’L’mdhcif<> 0

#### )

#### )

#### THEN

#### BAResource5MMSSLFDPDispatchModeEnergyQuantity BrtT’M’F’S’L’mdhcif = Sum(c’)

#### BAResource5MTEELessMSSLFEandOutageQuantity BrtT’M'F’S’L’mdhcif - (1/12) \* INTDUPLICATE(BAHrlyResourceDAMSSGenerationScheduleQty BrtT’M’F’S’L’mdh)

 ELSE

BAResource5MMSSLFDPDispatchModeEnergyQuantity BrtT’M’F’S’L’mdhcif = 0

####  BAResource5MMSSLFDPNonDispatchModeEnergyQuantity BrtT’M'F’S’L’mdhcif =

Where Exists

BAResourceDispatchSupplementalEnergyQty BrtT’M'F’S’L’c’mdhcif

#### And Where

c’ (Contingent\_Flag) <> ‘YES’

 And

T’ (ENTITY\_TYPE) = ‘MSS’

And

L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

#### BAResource5MMSSLFDPNonDispatchModeEnergyQuantity BrtT’M'F’S’L’mdhcif = Sum(c’)

#### BAResource5MTEELessMSSLFEandOutageQuantity BrtT’M'F’S’L’mdhcif - (1/12) \* INTDUPLICATE(BAHrlyResourceDAMSSGenerationScheduleQty BrtT’M’F’S’L’mdh)

BAResource5MTEELessMSSLFEandOutageQuantity BrtT’M'F’S’L’mdhcif =

Sum(E,u,I’,Q’A,A’,W’,R’,p,V)

DispatchIntervalTotalExpectedEnergy BrtEuT’I’**Q’**M’AA’W’R’pF’S’VL’mdhcif - BAResource5MMSSIIEConversionQuantity BrtuT'I'Q'M'R'W'F'S'VL'mdhcif – BAResource5MMSSForcedOutageQuantity BrtT’M’F’S’L’mdhcif

Where T' (Entity Type) = MSS

BAResource5MMSSIIEConversionQuantity BrtuT'I'Q'M'R'W'F'S'VL'mdhcif =

Sum(b)

DispatchIntervalMSSIIE BrtuT'bI'Q'M'R'W'F'S'VL'mdhcif

#### BAResource5MMSSForcedOutageQuantity BrtT’M’F’S’L’mdhcif =

(BAResourceDispatchIntervalMSSForcedOutageFlag BrtT’M’F’S’L’mdhcif \* Min(0, RealTimeUpperOperatingLimit BrtF'S'mdhcif -BAHrlyResourceDAMSSGenerationScheduleQty BrtT’M’F’S’L’mdh))/12

Where T’ (Entity Type) = MSS

BAResource5MLoadFollowingMSSNonSpinQuantity BrtT’M'F'S’L’mdhcif = sum(u,I’,V,W’,Q’,R’)

BAResourceADSNonSpinDispatchQuantity BrtuT'I'M'Q’M’VL'W'R'F'S'mdhcif

Where

T’ (ENTITY\_TYPE) = ‘MSS’ and L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

#### BAResource5MLoadFollowingMSSSpinQuantity BrtT’M'F'S’L’mdhcif =sum( u,I’,V,W’,R’,Q’) BAResourceADSSpinDispatchQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif

Where

T’ (ENTITY\_TYPE) = ‘MSS’ and L’ (LOAD\_FOLLOWING\_FLAG) = ‘YES’

## Output Requirements

| Output Req ID | Name | Description |
| --- | --- | --- |
| 1.0 | In addition to any outputs listed below, all inputs shall be included as outputs. | All inputs |
| 2.0 | BASettlementIntervalMSSPositiveDeviationQuantity BM'mdhcif | The MSS Positive Deviation represents the positive quantity Quantity (in MWh) outside of the Deviation Band to which penalties will apply for a given MSS entity and Settlement Interval. |
| 3.0 | BASettlementIntervalMSSNegativeDeviationQuantity BM'mdhcif | The MSS Negative Deviation Quantity represents the negative quantity (in MWh), outside of the Deviation Band to which penalties will apply for a given MSS entity and Settlement Interval. |
| 4.0 | BASettlementIntervalMSSDOPDQuantity BM'mdhcif | The Deviation Energy (“DOPD”) represents the MSS Aggregation Imbalance Energy (in MWh) adjusted for Day-Ahead Sales or Purchases, and MSSA expected Instructed Imbalance Energy and Regulation Energy. The output is calculated for a given MSS entity and Settlement Interval. |
| 5.0 | BASettlementIntervalMSSDeviationBandQuantity BM'mdhcif | MSS Deviation Band is the amount (in MWh) by which a Load following MSS Operator can deviate from Expected Energy without incurring a Load Following Deviation Penalty. for a given resource and Settlement Interval. |
| 6.0 | BASettlementIntervalMSSCalculatedImbalanceEnergyQuantity BM'mdhcif | MSS Imbalance Energy as a calculated value for a given MSS entity and Settlement Interval. |
| 7.0 | BASettlementIntervalMSSLFDPInstructedImbalanceEnergyQuantity BM'mdhcif | MSS Load Following Deviation Penalty Instructed Imbalance Energy quantity (in MWh) for a given MSS entity and Settlement Interval. |
| 8.0 | BAResource5MMSSLFDPNonDispatchModeEnergyQuantity BrtT’M’F’S’L’mdhcif | MSS Load Following Deviation Penalty Non Dispatch Mode Energy quantity (in MWh) for a given resource and Settlement Interval. |
| 9.0 | BAResource5MMSSLFDPDispatchModeEnergyQuantity BrtT’M’F’S’L’mdhcif | MSS Load Following Deviation Penalty Dispatch Mode Energy quantity (in MWh) for a given resource and Settlement Interval. |
| 10.0 | BASettlementIntervalMSSDASalesPurchaseQuantity BM'mdhcif | This energy (in MWh) can be positive for a sale or negative for a purchase, and is considered sold or purchased with the CAISO in the Day-Ahead Integrated Forward Market. The resulting sale or purchase is obligated to be delivered to or from the CAISO in real-time. The output is presented for a given MSS entity and Settlement Interval.  |
| 11.0 | BASettlementIntervalMSSLFSubmittedInstructedImbalanceEnergyQuantity BM'mdhcif | MSS Submitted Load Following Instructed Energy Quantity (in MWh) for a given MSS entity and Settlement Interval.  |
| 12.0 | BASettlementIntervalMSSMeteredLoadQuantity BM'mdhcif | MSS Load Following Metered Load Energy Quantity (in MWh) for a given MSS entity and Settlement Interval.  |
| 13.0 | BASettlementIntervalMSSRegulationEnergyQuantity BM'mdhcif | MSS Load Total Regulation Energy Quantity (in MWh) for a given MSS entity and Settlement Interval. |
| 14.0 | BASettlementIntervalMSSTradeDAPreferredQuantity BM'mdhcif | MSS Load Following DA Prefered Trade Energy Quantity (in MWh) for a given MSS entity and Settlement Interval. |
| 15.0 | BASettlementIntervalSumDAMSSExternalGenerationScheduleQuantity BM'mdhcif  | MSS Load Following DA External Generation Schedule Energy Quantity (in MWh) for a given MSS entity and Settlement Interval.  |
| 16.0 | BASettlementIntervalSumDAMSSInternalGenerationScheduleQuantity BM'mdhcif | MSS Load Following DA Internal Generation Schedule Energy Quantity (in MWh) for a given MSS entity and Settlement Interval.  |
| 17.0 | BASettlementIntervalMSSTradeRTQuantity BM'mdhcif | MSS Load Following Real Time Trade Energy Quantity (in MWh) for a given MSS entiry and Settlement Interval. |
| 18.0 | BASettlementIntervalSumMSSExternalGenerationEnergyQuantity BM'mdhcif | Day-Ahead external generation schedule quantity (in MWh) for a given MSS entity and Settlement Interval. |
| 19.0 | BASettlementIntervalSumMSSInternalGenerationEnergyQuantity BM'mdhcif | Day-Ahead MSS internal generation quantity (in MWh) for a given MSS entity and Settlement Interval. |
| 20.0 | BAResource5MLoadFollowingMSSSpinQuantity BrtT’M'F'S’L’mdhcif | ADS-instructed energy (in MWh) dispatched from spin capacity for a given resource and Settlement Interval. |
| 21.0 | BAResource5MLoadFollowingMSSNonSpinQuantity BrtT’M'F'S’L’mdhcif | ADS-instructed energy dispatched from non-spin capacity for a given resource and Settlement Interval. |
| 22.0 | BASettlementIntervalResourceLFMSSMeteredEnergyQuantity BrtM’m’F’S’mdhcif | Metered Energy quantity (in MWh) for a given Settlement Interval and resource of a Load-Following MSS Entity. |
| 23.0 | BASettlementIntervalSumMSSGenerationEnergyQuantity BM'mdhcif | Metered Energy quantity (in MWh), calculated as the sum of all MSS external and internal Generation schedule quantities for a given MSS entity and Settlement Interval. |
| 24.0 | BASettlementIntervalSumDALFMSSSelfScheduleDemandQuantity BM'mdhcif | MSS Load-Following DA Self-Schedule Demand Energy Quantity (in MWh) for a given Load-Following MSS entity and Settlement Interval. |
| 25.0 | BAResource5MMSSIIEConversionQuantity BrtuT'I'Q'M'R'W'F'S'VL'mdhcif | MSS Load-Following resources’ Load Following Energy (in MWh) for a given Settlement Interval |
| 26.0 | BAResource5MTEELessMSSLFEandOutageQuantity BrtT’M'F’S’L’mdhcif | MSS Load-Following Total Expected Energy Less Load Following Energy and Outage Energy (in MWh) for a given Settlement Interval |
| 27.0 | BAResource5MMSSForcedOutageQuantity BrtT’M’F’S’L’mdhcif | MSS Load Following resources’ Forced Outage Quantity (in MWh) for a given Settlement Interval |
| 28.0 | DispatchIntervalMarketDisruptionFlag mdhcif | A 1/0 Flag that represents both FMM and RTD intervals, where 1 is a market disruption interval and 0 is not. |

# Charge Code Effective Date

| Charge Code/Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| MSS Deviation Penalty QuantityPrecalculation | 5.0 | 10/01/12 | 4/30/14 | Configuration Impacted |
| MSS Deviation Penalty QuantityPrecalculation | 5.1 | 05/01/14 | 9/30/14 | Documentation Edits and Configuration Impacted |
| MSS Deviation Penalty QuantityPrecalculation | 5.2 | 10/01/14 | 9/30/14 | Configuration Impacted |
| MSS Deviation Penalty QuantityPrecalculation | 5.3.2 | 10/01/14 | 12/31/17 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.4.1 | 11/1/2018 | 10/31/18 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.5.1 | 1/1/18 | 10/31/19 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.6 | 11/1/19 | 12/31/20 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.7 | 1/1/21 | 12/31/20 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.7.1 | 1/1/21 | 4/30/22 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.8 | 5/1/22 | 6/30/23 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.9 | 07/1/23 | 4/30/2026 | Configuration Impacted |
| MSS Deviation Penalty Quantity Precalculation | 5.10 | 5/1/2026 | Open | Configuration Impacted |