Settlements and Billing

Configuration Guide: Metered Energy Adjustment Factor

**Pre-calculation**

**Version: 5.16**

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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

Bid Cost Recovery (BCR) is the process by which the CAISO ensures Scheduling Coordinators (SCs), including EDAM Entities, are able to recover Start Up Costs (SUC), Minimum Load Costs (MLC), Transition Costs (TC), and Energy Bid Costs. In order to recover SUC and MLC, a Generating Unit, Pumped-Storage Unit, or resource-specific System Resource must be committed by the CAISO. Likewise, the CAISO must commit a Multi-Stage Generating Resource in order for it to receive TC compensation. BCR for Energy and Ancillary Services (A/S) Bids applies to Bid Cost Recovery Eligible Resources in general (for example, Generating Units, Pumped-Storage Units, Proxy Demand Resources, and System Resources) scheduled or dispatched by the CAISO, independent of whether they are CAISO-committed or instead are self-committed.

For purposes of determining BCR eligibility, the CAISO uses a concept called Commitment Period. A Commitment Period consists of the consecutive time periods within a Trading Day when a resource is on-line, synchronized to the grid, and available for dispatch. A Commitment Period is comprised of two distinct sub-types --- Self-Commitment Period and CAISO Commitment Period. The portion of a Commitment Period where a resource submits an Energy Self-Schedule or A/S self provision is called a Self-Commitment Period. A Self-Commitment Period may include time periods when a resource is not operating pursuant to an Energy Self-Schedule or A/S self-provision, but must be on due to Ramping Constraints or a minimum up time or minimum down time requirement. Resources are not eligible for BCR of SUC, MLC or TC during Self-Commitment Periods, but are eligible for BCR of awarded Energy and A/S. The portion of a Commitment Period that is not a Self-Commitment Period is called CAISO Commitment Period. Resources are eligible to receive BCR for SUC, MLC, TC, awarded Energy and A/S during a CAISO Commitment Period.

For each resource, the total SUC, MLC, TC, Bid Costs, together with the Energy and A/S bid costs, and market revenues from Reliability Capacity Up (RCU) or Reliability Capacity Down (RCD), and RTM are netted together for each Settlement Interval. If the difference between the total costs and the market revenues is positive in the relevant market, then the net amount represents a Shortfall. If the difference is negative in the relevant market, the net amount represents a Surplus. For each resource or, in the case of a Metered Subsystem (MSS) entity that has elected net settlement, all MSS resources collectively, the RCU/RCD, and RTM Shortfalls and Surpluses are then netted over all hours of a Trading Day. Net Surpluses from either of the RCU/RCD or RTM markets offset any net shortfalls from the RTM or RCU/RCD market, respectively, over the entire Trading Day. If the net Trading Day amount is positive (a Shortfall), the Scheduling Coordinator, or EDAM Entity, receives a BCR Uplift Payment equal to the net Trading Day amount.

Bid Cost Recovery for resource costs in the IFM, RCU/RCD and RTM markets is determined for each Settlement Interval based upon a resource’s performance and delivered energy relative to its Expected Energy. The Metered Energy Adjustment Factor (MEAF) pre-calculation is defined to determine and provide various performance-centric adjustment factors and flags that are used by the pre-calculation’s successor configuration calculations to calculate the resource’s BCR amount.

## Description

The Metered Energy Adjustment Factor (MEAF) Pre-calculation will perform the calculations necessary to implement the business rules identified in the Business Rules section below. In particular, the pre-calculation will provide ouput for the functional components listed with Business Rule 1.1. The association of each component with the various charge codes or pre-calculations that rely upon the Metered Energy Adjustment Factor Pre-calculation calculations is as follows:

|  |  |
| --- | --- |
| **Pre-calculation MEAF Component** | **Dependent Charge Code or Pre-calculation** |
| Day-Ahead (DA) Metered Energy Adjustment Factor (MEAF) | Pre-calc IFM Net Amount |
| Real-Time Performance Metric | Pre-calc IFM Net Amount,  Pre-calc RUC Net Amount, Pre-calc RTM Net Amount |
| Tolerance Band Flag for Day-Ahead MEAF Application | Pre-calc MEAF (for DA MEAF) |
| Tolerance Band Flag for RT Performance Metric Application | Pre-calc Start-up and Minimum Load Cost, Pre-calc MEAF |
| Exceptional Dispatchal Metered Energy Adjustment Factor (ED MEAF) | CC 6482 – RT Excess Cost for Instructed Energy Settlement, CC 6488 – Exceptional Dispatch Uplift Settlement |
| Determination of Persistent Deviation with 2-Hour Inspection Windows | Pre-calc MEAF (for Persistent Deviation Metric) |
| Persistent Deviation Metric | Pre-calc RTM Net Amount Pre-calc Start-up and Minimum Load Cost |

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
|  | This pre-calculation shall be computed daily for each resource on a Dispatch Interval basis. |
|  | This precalculation configuration consists of calculations that generate results for the following functional components used by successor configurations:   1. Day-Ahead (DA) Metered Energy Adjustment Factor (MEAF), 2. Real-Time Performance Metric, 3. Tolerance Band Flag for Day-Ahead MEAF Application, 4. Tolerance Band Flag for RT Performance Metric Application 5. Exceptional Dispatch Metered Energy Adjustment Factor, 6. Determination of Persistent Deviation with 2-Hour Inspection Windows, and 7. Persistent Deviation Metric   The calculated results shall be used by successor charge codes. |
|  | The Day-Ahead Metered Energy Adjustment Factor (DA MEAF) is a factor that serves to determine the portions of a Scheduling Coordinator’s, including for an EDAM Entity, resource’s relevant Day-Ahead Schedule that are to be included in the BCR calculations based on the resource’s actual performance reflected in its Metered Energy. *(Fact)* |
| 2.1 | This pre-calculation applies to EDAM Entities’ BCR-eligible resources that participate in the DA market. |
|  | Effective Day-Ahead Scheduled Energy is defined to be the minimum of the Expected Energy and the Day-Ahead Scheduled Energy. *(Fact)* |
|  | The CAISO shall calculate the Day-Ahead Metered Energy Adjustment Factor for each resource through the following steps: |
|  |  |
|  | 1. For Generation Unit or resource Specific System Resource scheduled by CAISO in the Day-Ahead Market |
|  | Step 1:  If the resource’s Effective Day-Ahead Scheduled Energy is greater than or equal to its Day-Ahead Minimum Load Energy, and is greater than zero, then the calculation shall proceed to step two. Otherwise, the calculation shall proceed to step six. |
|  | Step 2:  If (1) the resource’s Metered Energy less Regulation Energy is less than its Day-Ahead Minimum Load Energy less the Tolerance Band; or (2) the resource’s Metered Energy less Regulation Energy is less than or equal to zero, then the Day-Ahead Metered Energy Adjustment Factor shall be set to zero (0). Otherwise, the calculation shall proceed to step three. |
|  | Step 3:  If the absolute value of the result of the resource’s Metered Energy less its Regulation Energy less the Effective Day-Ahead Scheduled Energy, is less than or equal to the Performance Metric Tolerance Band, then the Day-Ahead Metered Energy Adjustment Factor shall be set to one (1). Otherwise, the calculation shall proceed to step four. |
|  | Step 4:  If the resource’s Effective Day-Ahead Scheduled Energy less its Day-Ahead Minimum Load Energy is equal to zero, then the Day-Ahead Metered Energy Adjustment Factor shall be set to one (1). Otherwise, the calculation shall proceed to step five. |
|  | Step 5:  The resource’s Day-Ahead Metered Energy Adjustment Factor shall be set to the minimum of: (A) the number one (1); or (B) the maximum of (i) the number zero (0), and (ii) the ratio of the resource’s (a) Metered Energy less the Day-Ahead Minimum Load Energy and less the Regulation Energy, and (b) the Effective Day-Ahead Scheduled Energy, less the Day-Ahead Minimum Load Energy. Then, the calculation shall proceed to step six. |
|  | Step 6:  If the resource’s Effective Day-Ahead Scheduled Energy is less than its Day-Ahead Minimum Load Energy and if the resource’s Effective Day-Ahead Scheduled Energy is greater than zero (0), then the resource's Day-Ahead Metered Energy Adjustment Factor shall be set to one (1). Otherwise, the calculation shall proceed to step seven. |
|  | Step 7:  If the Day-Ahead Scheduled Energy is positive and the resource’s Expected Energy is less than or equal to zero, and its Metered Energy is less than or equal to zero,  then the resource's Day-Ahead Metered Energy Adjustment Factor shall be set to one (1);  otherwise, the resource's Day-Ahead Metered Energy Adjustment Factor shall be set to zero (0). |
|  |  |
|  | 1. For Participating Load Pumped-Storage Hydro Unit or Pumping Load resource scheduled by CAISO to pump in the Day-Ahead Market |
|  | Step 1: If the Day-Ahead Pumping Energy is negative and its Expected Energy is negative, then its Day-Ahead Metered Energy Adjustment Factor shall be the minimum of: (A) the number one (1); or (B) the maximum of (i) the number zero (0) and (ii) the ratio of the resource’s Metered Energy and its Expected Energy. Otherwise, the calculation shall proceed to step two. |
|  | Step 2: If the Day-Ahead Pumping Energy is negative and the resource’s Expected Energy is greater than or equal to zero, and its Metered Energy is greater than or equal to zero, then its Day-Ahead Metered Energy Adjustment Factor shall be be set to one (1). Otherwise, its Day-Ahead Metered Energy Adjustment Factor shall be set to zero (0). |
|  |  |
|  | 1. For a Non-Generating Resource |
|  | The metered energy adjustment factor will not apply to non-generator resources. |
|  | The CAISO will implement this in its software by simply setting the metered energy adjustment factor to “1” for all non-generator resources. |
|  |  |
|  | For the purposes of scaling a resource's Real-time Bid Cost Recovery amounts the Real-Time Performance Metric shall be calculated as the minimum of:   1. the number one (1); or 2. the absolute value of the ratio of the resource’s    1. Metered Energy, less the Day-Ahead Scheduled Energy, and less the Regulation Energy, and    2. the total Expected Energy less the Day-Ahead Scheduled Energy. |
|  | If the CAISO issues Real-Time Dispatch to the resource that is incremental to its Day-Ahead Schedule and the resource deviates downward from its Day-Ahead Schedule, the Real-Time Performance Metric will be set to zero (0). |
|  | If the CAISO issues Real-Time Dispatch to the resource that is decremental to its Day-Ahead Schedule and the resource deviates to a level above its Day-Ahead Schedule, the Real-Time Performance Metric will be set to zero (0). |
|  | If the resource’s total Expected Energy is equal to the Day-Ahead Scheduled Energy and if the Metered Energy minus Regulation Energy is equal to the Day-Ahead Scheduled Energy, then the Real-time Performance Metric is set to one (1). |
|  | If the resource’s total Expected Energy is equal to the Day-Ahead Scheduled Energy and if the Metered Energy minus the Regulation Energy is not equal to the Day-Ahead Scheduled Energy, then the Real-time Performance Metric is set to zero (0). |
|  | The Real-time Performance Metric is not applied during the time when a resource is Starting Up, Shutting Down, in an MSG Transition Period crossing over a Forbidden Operating Region, or the time period for which a Dispatch Operating Point correction is performed due to a verbal Dispatch Instruction issued by the CAISO Operator, as long as the resource is in fact in the operational mode instructed by the CAISO. |
|  | The Performance Metric Tolerance Band shall be applied to the Day-Ahead Metered Energy Adjustment Factor and the Real-Time Performance Metric calculations. |
|  | The Performance Metric Tolerance Band shall consist of the Tolerance Band plus an additional ramping tolerance. |
|  | For each Settlement Interval, the ramping tolerance is the difference between   1. the Energy calculated based on the linear curve between two applicable Dispatch Operating Targets; and 2. Expected Energy over the two applicable Dispatch Intervals. |
|  | The Tolerance Band is expressed in terms of Energy (MWh) for Generating Units, System Units and imports from Dynamic System Resources for each Settlement Interval and equals the greater of the absolute value of:   1. five (5) MW divided by the number of Settlement Intervals per Settlement Period or 2. three (3) percent of the relevant Generating Unit’s, Dynamic System Resource’s or System Unit’s maximum output (PMax), as registered in the Master File, divided by the number of Settlement Intervals per Settlement Period. |
|  | The maximum output (PMax) of a Dynamic System Resource will be established by agreement between the CAISO and the Scheduling Coordinator representing the Dynamic System Resource on an individual case basis, taking into account the number and size of the generating resources, or allocated portions of generating resources, that comprise the Dynamic System Resource. *(Fact)* |
|  | If for any given Settlement Interval, the absolute value of the resource’s Metered Energy less its Regulation Energy less the minimum of the Day-Ahead Schedule Energy and Expected Energy, is less than or equal to the Performance Metric Tolerance Band, then the CAISO will not apply the Day-Ahead Metered Energy Adjustment Factor to the IFM Energy Bid Cost or the IFM Market Revenue. |
|  | If for a given Settlement Interval the absolute value of the resource’s Metered Energy, less its Regulation Energy and less its Expected Energy, is less than or equal to the Performance Metric Tolerance Band, then the CAISO will not apply the Real-Time Performance Metric to the calculation of the RTM Energy Bid Cost, RCU/RCD and RTM Minimum Load Cost, or RTM Market Revenue. |
|  | The Persistent Deviation Metric is a threshold measurement used to evaluate a resource’s change in output between Settlement Intervals relative to the changed Dispatch by the CAISO between Settlement Intervals. |
|  | The Persistent Deviation Metric shall be applied by Settlement Interval and shall be applied for the twenty-four five-minute Settlement Intervals that comprise the previous two Trading Hours. |
|  | Thus, the evaluation window is a rolling two hours, incrementing in hourly Settlement Intervals. |
|  | The Persistent Deviation Metric for each Settlement Interval (t) is measured as the ratio of:   1. Metered Energy in the prior Settlement Interval (t-1), less the Metered Energy in the given Settlement Interval (t); and 2. Metered Energy in the prior Settlement Interval (t-1), less the Expected Energy in the given Settlement Interval (t), and less the Regulation Energy in the given Settlement Interval (t). |
|  | The CAISO will modify the BCR calculations and Residual Imbalance Energy payments to address persistent deviations that expand BCR payments beyond what is necessary for purposes of ensuring BCR. |
|  | The CAISO will calculate the Persistent Deviation Metric and evaluate each resource’s response to a CAISO Dispatch in each Settlement Interval relative to the Persistence Deviation Metric Threshold. |
|  | The Persistent Deviation Metric Threshold evaluation will be based on the number of Settlement Intervals flagged within a rolling two-Trading Hour window. |
|  | The CAISO will flag each Settlement Interval pursuant to the following threshold conditions and apply the Persistent Deviation Metric pursuant to a set of rules for evaluating the resource's performance relative to the Performance Deviation Metric Threshold. |
|  | - Case 1 -  The CAISO will flag a Settlement Interval (t):   1. if Expected Energy is greater than Day-Ahead Scheduled Energy in that Settlement Interval (t), the Metered Energy is greater than the Expected Energy in that Settlement Interval (t), and the Metered Energy in the prior Settlement Interval (t-1) is less than the Expected Energy in the given Settlement Interval (t); and 2. if the Metered Energy less, Regulation Energy, less Expected Energy in that Settlement Interval (t) is greater than ten (10) percent of the amount the resource can be Dispatched at full ramp over the Settlement Interval (t) and the Persistent Deviation Metric is greater than one hundred and ten (110) percent. |
|  | - Case 2 -  The CAISO will flag a Settlement Interval (t):   1. if the Expected Energy exceeds the Day-Ahead Schedule Energy in that Settlement Interval (t), and Metered Energy exceeds the Expected Energy in that Settlement Interval (t) and Metered Energy in the prior Settlement Interval (t-1) exceeds the Expected Energy in the given Settlement Interval (t); and 2. if the Metered Energy less the Regulation Energy and less Expected Energy in that Settlement Interval (t) is greater than ten (10) percent of the amount the resource can be Dispatched at full ramp over the Settlement Interval (t) and the Persistent Deviation Metric is less than ninety (90) percent. |
|  | - Case 3 -  The CAISO will flag a Settlement Interval (t):   1. if the Expected Energy is less than the Day-Ahead Schedule Energy, and Metered Energy is less than the Expected Energy in that Settlement Interval (t), and Metered Energy in the prior Settlement Interval (t-1) is less than the Expected Energy in the given Settlement Interval (t); and 2. if the Metered Energy less Regulation Energy less Expected Energy in that Settlement Interval (t) is greater than ten percent (10) of the amount the unit could be Dispatched at full ramp over the Settlement Interval (t) and the Persistent Deviation Metric is less than ninety (90) percent. |
|  | - Case 4 -  The CAISO will flag a Settlement Interval (t):   1. if the Expected Energy is less than the Day-Ahead Schedule Energy, and Metered Energy is less than the Expected Energy in that Settlement Interval (t), and Metered Energy in the prior Settlement Interval (t-1) is greater than the Expected Energy in the given Settlement Interval (t); and 2. if the Metered Energy less Regulation Energy less Expected Energy in that Settlement Interval (t) is greater than (10) percent of the amount the resource can be Dispatched at full ramp over the Settlement Interval (t) and the Persistent Deviation Metric is greater than one hundred and ten (110) percent. |
|  | The CAISO will apply the following rules to evaluate the resource’s performance relative to the Persistent Deviation Metric Threshold and will apply any attendant bid cost basis modification specified with each rule. |
|  | - Rule 1 -  If six (6) or fewer Settlement Intervals out of the previous twenty four (24) Settlement Intervals of the rolling two-Trading Hour persistent deviation evaluation window are flagged as exceeding the Persistent Deviation Metric Threshold, then:   1. the RTM Energy Bid Costs will be based on the applicable Energy Bid price, as mitigated, and 2. Residual Imbalance Energy is settled based on the reference hour Energy Bid. |
|  | - Rule 2 -  If seven (7) or more Settlement Intervals of the previous twenty four (24) Settlement Intervals of the rolling two-Trading Hour persistent deviation evaluation window are flagged as exceeding the Persistent Deviation Metric Threshold, then for all the previous twenty four (24) Settlement Intervals in the two-hour window:   1. the RTM Energy Bid Costs    1. for Optimal Energy above the Day-Ahead Scheduled Energy will be based on the lesser of the applicable Default Energy Bid price, the applicable Energy Bid price, as mitigated, or the applicable FMM or RTD Locational Marginal Price, and    2. for Optimal Energy below the Day-Ahead Scheduled Energy the greater of the applicable Default Energy Bid price, the applicable Energy Bid price, as mitigated, or the applicable FMM or RTD Locational Marginal Price; and 2. the Residual Imbalance Energy Bid Cost    1. for Residual Imbalance Energy above the Day-Ahead Scheduled Energy will be based on the lesser of the applicable Default Energy Bid price, the relevant Energy Bid Price, as mitigated, or the applicable RTD Locational Marginal Price, and    2. for Residual Imbalance Energy below the Day-Ahead Schedule Energy will be based on the greater of the applicable Default Energy Bid price, the relevant Energy Bid Price, or the applicable RTD Locational Marginal Price. |
|  | - Rule 3 -  Once a Settlement Interval is flagged as exceeding the Persistent Deviation Metric Threshold, it remains flagged when it is considered in the subsequent rolling two-Trading Hour evaluation window and its bid basis qualification for that Settlement Interval will not change. |
|  | - Rule 4 -  If a Settlement Interval’s bid basis is determined by the Rule 1 above in a previous evaluation and it has not been flagged, it can be re-determined and flagged pursuant to the additional rules in a subsequent rolling two-Trading Hour evaluation window based on the Persistent Deviation Metric Threshold. |
|  | For the calculation of Real-Time BCR an EIM base schedule that is nonzero shall be treated as a Self-Schedule for which the Resource will not be eligible for recovery of SUC and MLC, in accordance with the treatment of costs during self-commitment intervals. |
|  | For the calculation and application of the Real-Time Performance Metric an EIM base schedule that is nonzero shall be treated as a Day-Ahead Schedule. |
|  | For the calculation and application of the Persistent Deviation Metric an EIM base schedule that is nonzero shall be treated as a Day-Ahead Schedule. |
|  | For calculating the Persistent Deviation Metric and Real-Time Performance Metric, there will be a ramp rate calculated for the JOU Child Resources in the following manner:  the delta of the DOTs from consecutive Settlement Intervals divided the time difference between those Settlement Intervals. |
|  | PTB Charge Adjustment does not apply to the Metered Energy Adjustment Factor Pre-calculation process. (Fact) |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Pre-calc – System Resource Deemed Delivered Energy Quantity |
| Pre-calc – MSS Netting |
| Pre-calc – RT Energy Quantity |
| Pre-calc – Start-up and Minimum Load Cost |
| CC 7070 – Flexible Ramp Forecasted Movement Settlement |
| CC 8800 – Day Ahead RUC Reliability Capacity Up Settlement |
| CC 8810 – Day Ahead RUC Reliability Capacity Down Settlement |
| CC 8071 – Day Ahead Imbalance Reserve Up Settlement |
| CC 8081 – Day Ahead Imbalance Reserve Down Settlement |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Pre-calc – IFM Net Amount |
| Pre-calc – RTM Net Amount |
| Pre-calc – RUC Net Amount |
| Pre-calc – Start-Up and Minimum Load Cost |
| CC 6482 – RT Excess Cost for Instructed Energy Settlement |
| CC 6488 – Exceptional Dispatch Uplift Settlement |

## Inputs – External Systems

| Row # | Variable Name | Description |
| --- | --- | --- |
|  | ZeroTolerance | Standing data. The input is a constant that represents the tolerance of the zero test used for the Metered Energy Adjustment Factor calculation. The input’s initially programmed value = 0.0000000009.  Note:  Actual implementation of the Metered Energy Adjustment Factor (MEAF) calculations is influenced by a a product limitation whereby the software engine utilizes numbers within its cache that may have a precision beyond 9 decimal places. A number may appear to be zero as it is written to and read from the database, yet the number utilized within the cache during the calculation may appear as a very small, non-zero number. The ZeroTolerance input is used to check whether the value of a given BD = 0 within the tolerance specified by the ZeroTolerance input. The zero test is performed in a MEAF ratio’s calculation for which the BD is used as a divisor, in order to provide the correct mathematical results when the BD’s value is considered infinitesimal. |
|  | DispatchIntervalDAMinimumLoadEnergy BrtuT’I’M’VL’W’R’F’S’mdhcif | DA Minimum Load Energy (in MWh) for a given resource and Dispatch Interval. |
|  | DispatchIntervalTotalExpectedEnergy BrtEuT’I’Q’M’AA’W’R’pF’S’VL’mdhcif | Dispatch Interval Energy (in MWh) that corresponds to the Energy under the DOP for a given resource and Dispatch Interval.  The Energy quantity can be either a positive or negative value. |
|  | DAPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif | The Day Ahead Pumping Energy (in MWh) from a Pumped-Storage Unit or Participating Load for a specified Dispatch Interval. |
|  | DispatchIntervalFMMPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif | The FMM IIE Energy from a Participating Load Pumped-Storage Unit or Pumping Load consumed or produced during pumping operation. |
|  | DispatchIntervalRTPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif | The RTD IIE Energy from a Participating Load Pumped-Storage Unit or Pumping Load consumed or produced during pumping operation. |
|  | DALoadSchedule BrtuT’I’Q’M’AA’R’pW’F’S’vVL’mdh | DA Load Schedule (in MWh) for a given resource and Trading Hour.  The input is represented as a negative value. |
|  | BAResBaseLoadSchedule BrtuT’I’Q’M’AA’R’W’F’S’VL’pmdh | The final Base Schedule (in MW) for Load resources in a given EIM Balancing Authority Area. |
|  | DAScheduleEnergyQuantity BrtQ’uT’I’M’VL’W’R’F’S’mdhcif | DA Energy Schedule (in MWh) that corresponds to the flat hourly Day-Ahead Schedule (DAS). It is composed of Day-Ahead Minimum Load Energy, Day-Ahead Self-Scheduled Energy, and Day-Ahead Bid for a given resource and Dispatch Interval. |
|  | BAResBaseScheduleEnergyBrtuT’I’Q’M’R’W’F’S’VL’mdhcif | The final Base Schedule (in MWh) for generation, import, and export resources in an EIM Balancing Authority Area. |
|  | BAResourceDispatchIntervalRMREnergy BrtuT’I’M’F’S’mdhcif | RMR Energy quantity (in MWh) for a given resource and Dispatch Interval. |
|  | BADispatchIntervalResourceTransitionFlag BrtuT’I’M’F’S’mdhcif | Flag (as a 0/1 Boolean value) that indicates for a given Dispatch Interval whether (1) or not (0) a specified resource is expected (as part of an instructed operation) to be in a startup, shutdown, or MSG transition period, or a period in which it is crossing over a Forbidden Operating Region, or the time period for which a Dispatch Operating Point correction is performed due to a verbal Dispatch Instruction issued by the CAISO Operator, as long as the resource is in fact in the operational mode instructed by the CAISO. |
|  | BADispatchIntervalResourcePMToleranceBandRampingQty BrtuT’I’M’F’S’mdhcif | Ramping tolerance (in MWh) measured as the Expected Energy Dispatch Operating Point (DOP) less the Expected Energy Dispatch Operating Target (DOT) over a 5-minute Dispatch Interval for a given resource. The input is intended to be added to the Tolerance Band as ramping tolerance in the configured calculation of the Performance Metric Tolerance Band (as specified in the “CAISO Formula” section herein). |
|  | InspectionWindowDeviationCountThreshold md | A count (as an integer value) that serves as the lthreshold for the number of Settlement Intervals over a 2- hour adjacent window where in the interval a resource can exceed the Performance Metric Tolerance Band without having its bid cost basis mitigated as a consequence of persistent deviation. The count is stored in the Settlements system as resident “factor” data. The currently specified count threshold value = 6. |
|  | VERFLAG Brtmd | Variable Energy Resource Flag for Resource r. A value of “1” indicates a certified Variable Energy Resource (VER), while a “0” value indicates that the resource is not certified as a VER. |
|  | GenerationInfiniteRampRateFactor md | The input represents the infinite ramp rate for Generation. Its value shall be the constant “9999”. A VER is presumed to have infinite ramp rate, whereby the resource is deemed capable of instaneously correcting its output for a change in its hourly Energy forecast from one FMM Interval to the next. |
|  | BAHourlyResRTMEnergyBidQty BrtuQ’bAA’pF’S’mdh | The input represents the hourly Real Time Market Energy Bid Quantity (in MW) by Business Associate and resource ID. |
|  | BADailyResourceFiveMinuteDynamicRampRateQuantity Brmd | The 5-minute ramping Energy capability (in MWh) for a specified resource. This is 5/24 times the magnitude of Masterfile ramp rate (say RR), the latter provided in MW/min.  The MWh energy generated in 5-minutes is the area of a triangle covered by ramping from zero (origin or starting point) to a height of 5 times RR since it can ramp RR for each minute (this is 5\*RR in MW). The base will be 5-minutes (or 1/12 hour, after conversion to hour).  Area of triangle is (1/2)\*base\*height= (1/2)\*(1/12 hour)\*(5\*RR MW) = (5/24)\*RR in MWh.  So this energy is 5/24 the magnitude of ramp rate (RR) registered in Masterfile. |
|  | BASettlementIntervalResourceAlternateDynamicRampRateQty Brmdhcif | Calculated per settlement interval, as delta dispatch operating target (DOT) in MW (TTEE, total target expected energy) divided by (delta time in minutes) between previous and current settlements intervals.  Initially applicable to JOU child resources. |

## Inputs - Predecessor Charge Codes or Pre-calculations

| Row # | Variable Name | Predecessor Charge Code/  Pre-calc Configuration |
| --- | --- | --- |
|  | DAPumpingEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif | RT Energy Quantity Pre-calculation |
|  | SettlementIntervalRegulationEnergy BrtuT’I’M’F’S’mdhcif | RT Energy Quantity Pre-calculation |
|  | SettlementIntervalTotalExceptionalIIE BrtuT’I’Q’M’F’S’mdhcif | RT Energy Quantity Pre-calculation |
|  | BASettlementIntervalResEntityMeteredQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif | MSS Netting Pre-calculation |
|  | BASettlementIntervalResEIMEntityMeterLoadQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif | MSS Netting Pre-calculation  Demand is represented as a negative value. |
|  | BAResEntityDispatchIntervalMeteredCAISODemandQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif | MSS Netting Pre-calculation  Demand is represented as a negative value. |
|  | SettlementIntervalDeemedDeliveredInterchangeEnergyQuantity BrtEuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’OVvHn’L’mdhcif | System Resource Deemed Delivered Energy Quantity Pre-calculation  Imports are represented as positive numbers while Exports are represented as negative numbers. |
|  | ToleranceBand BrtF’S’mdchif | Start-Up and Minimum Load Cost Pre-calculation |
|  | BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif | Start-Up and Minimum Load Cost Pre-calculation |
|  | JOUChildResourceFlag rmd | Start-Up and Minimum Load Cost Pre-calculation |
|  | BA5mResFMMFlexRampForecastedMovementAssessmentAmount BrtQ’uT’I’M’L’F’S’mdhcif | CC 7070 - Flexible Ramp Forecasted Movement Settlement |
|  | BA5mResRTDFlexRampForecastedMovementAssessmentAmount BrtQ’uT’I’M’L’F’S’mdhcif | CC 7070 - Flexible Ramp Forecasted Movement Settlement |
|  | BAHourlyResIRUAssessmentAmountBrtQ’M’F’S’L’mdh | CC 8071 – Day Ahead Imbalance Reserve Up Settlement |
|  | BAHourlyResIRUAssessmentAmountBrtQ’M’F’S’L’mdh | CC 8081 – Day Ahead Imbalance Reserve Down Settlement |
|  | BAHourlyResRCUAssessmentAmount BrtQ’F’S’mdh | CC 8800 – Day Ahead RUC Reliability Capacity Up Settlement |
|  | BAHourlyResRCDAssessmentAmount BrtQ’F’S’mdh | CC 8810 – Day Ahead RUC Reliability Capacity Down Settlement |

## CAISO Formula

**Day-Ahead (DA) Metered Energy Adjustment Factor (MEAF)**

Day Ahead Meter Adjustment Factor per Dispatch Interval f:

DAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif =

IF

Entity Component Type (F’) In (LESR, DDR)

THEN

1

ELSE

Min(1,

BASettlementIntervalResourceGenerationDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif + BASettlementIntervalResourceNegativeEnergyDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif )

END IF

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

Steps from Tariff Section 11.8.2.5.1 for the DA MEAF calculation are sequentially referenced below to associate each step with its associated configuration.

**For Generation Unit or resource Specific System Resource scheduled by CAISO in the Day-Ahead Market**

**Step 1**

BASettlementIntervalResourceGenerationDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif =

IF

(BASettlementIntervalResourceExpectedDAEnergyAboveMinimumLoad BrtuT’I’M’F’S’mdhcif >= 0 ) And (BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif > 0 )

THEN *(since the resource’s DA Scheduled Energy is >= DA MLE)*

BASettlementIntervalResourceGenerationDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif = DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif

ELSE *( where arriving here means*  Effective Day-Ahead Scheduled Energy *<0 or* Effective Day-Ahead Scheduled Energy *< DA Minimum Load Energy. Proceed to step 6 to continue processing .)*

BASettlementIntervalResourceGenerationDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif = DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif

WHERE EXISTS

DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif , DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif

END IF

DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif =

**Step 2**

IF

( (BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif <  
BASettlementIntervalResourceDAMinimumLoadEnergy BrtuT’I’M’F’S’mdhcif – ToleranceBand BrtF’S’mdchif )

Or

(BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif <= 0 ) )

THEN *(in which case the resource is deemed to be not On)*

DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif = 0

**Step 3**

ELSE *(in which case the resource is deemed to be On)*

IF

(BASettlementIntervalResourceDAOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif = 0 )

THEN

DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif = 1

**Step 4**

ELSE

DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif = DAMeteredEnergyAdjustmentFactorGenerationPerformanceRatioBrtuT’I’M’F’S’mdhcif

END IF

END IF

WHERE Resource Type (t) In {GEN, ITIE}

And

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

DAMeteredEnergyAdjustmentFactorGenerationPerformanceRatioBrtuT’I’M’F’S’mdhcif =

IF

(ABS(BASettlementIntervalResourceExpectedDAEnergyAboveMinimumLoad BrtuT’I’M’F’S’mdhcif) <= ZeroTolerance )

THEN

DAMeteredEnergyAdjustmentFactorGenerationPerformanceRatioBrtuT’I’M’F’S’mdhcif = 1

**Step 5**

ELSE

DAMeteredEnergyAdjustmentFactorGenerationPerformanceRatioBrtuT’I’M’F’S’mdhcif =

MIN (1,

MAX(0, BAResourceDA\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif /

BASettlementIntervalResourceExpectedDAEnergyAboveMinimumLoad BrtuT’I’M’F’S’mdhcif) )

END IF

WHERE Resource Type (t) In {GEN, ITIE}

And

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif =

**Step 6**

IF

(

BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif > 0

And

BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif < BASettlementIntervalResourceDAMinimumLoadEnergy BrtuT’I’M’F’S’mdhcif

)

THEN

DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif = 1

**Step 7**

ELSE

IF

(

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif > 0

And

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif <= 0

And

SettlementIntervalMeteredQuantityForMeteredAdjFactor BrtuT’I’M’F’S’mdhcif <= 0

)

THEN

DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif = 1

ELSE

DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif = 0

END IF

END IF

WHERE Resource Type (t) In {GEN, ITIE}

And

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

**For Participating Load Pumped-Storage Hydro Unit or Pumping Load resource scheduled by CAISO to pump in the Day-Ahead Market**

**Step 1**

BASettlementIntervalResourceNegativeEnergyDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif =

IF

(BASettlementIntervalEntityResourceDAPumpingEnergyFiltered BrtuT’I’M’F’S’mdhcif < 0 And

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif < 0)

THEN *(for the case of a pump or pumped storage device with DA Pumping Energy and negative Expected Energy)*

BASettlementIntervalResourceNegativeEnergyDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif =   
MIN(1, MAX(0, SettlementIntervalMeteredQuantityForMeteredAdjFactor BrtuT’I’M’F’S’mdhcif/ TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif ) )

**Step 2**

ELSE *(for the case of a BCR-Eligible Resource with DA Pumping Energy and non-negative RT Expected Energy)*

IF

(BASettlementIntervalEntityResourceDAPumpingEnergyFiltered BrtuT’I’M’F’S’mdhcif < 0 And

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif >= 0

And

SettlementIntervalMeteredQuantityForMeteredAdjFactor BrtuT’I’M’F’S’mdhcif >= 0 )

THEN

BASettlementIntervalResourceNegativeEnergyDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif = 1

ELSE *(for the case where Metered Energy < 0)*

BASettlementIntervalResourceNegativeEnergyDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif = 0

END IF

END IF

WHERE EXISTS

BASettlementIntervalEntityResourceDAPumpingEnergyFiltered BrtuT’I’M’F’S’mdhcif

**\* End of Tariff Steps for DA MEAF \***

BASettlementIntervalResourceExpectedDAEnergyAboveMinimumLoad BrtuT’I’M’F’S’mdhcif =  
BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif –

BASettlementIntervalResourceDAMinimumLoadEnergy BrtuT’I’M’F’S’mdhcif

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

BASettlementIntervalResourceDAMinimumLoadEnergy BrtuT’I’M’F’S’mdhcif=

Sum over (V, L’, W’, R’)

DispatchIntervalDAMinimumLoadEnergy BrtuT’I’M’VL’W’R’F’S’mdhcif

BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif =  
 MIN(TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif, TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif)

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif =

Sum over (Q’) BAASettlementIntervalResourceTotalExpectedEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif

BAASettlementIntervalResourceTypeExpectedNonWheelEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif+ BAASettlementIntervalResourceTotalPumpingExpectedEnergy BrtuT’I’Q’M’F’S’mdhcif

BAASettlementIntervalResourceTotalPumpingExpectedEnergy BrtuT’I’Q’M’F’S’mdhcif =

Sum over (V, L’, W’, R’)

BAASettlementIntervalResourceExpectedNonWheelEnergyFiltered BruT’I’Q’M’F’mdhcif

WHERE EXISTS

TotalPumpingExpectedEnergyForMEAF BrtuT’I’Q’M’VL’W’R’F’S’mdhcif

Sum over (t, S’) BAASettlementIntervalResourceTypeExpectedNonWheelEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif

Sum over (V, L’, W’, R’) TotalExpectedNonWheelEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif

TotalExpectedNonWheelEnergyBrtuT’I’Q’M’VL’W’R’F’S’mdhcif =

Sum over (E, A, A’, p) DispatchIntervalTotalExpectedEnergy BrtEuT’I’Q’M’AA’W’R’pF’S’VL’mdhcif

Where

E <> ‘WHEEL’

TotalPumpingExpectedEnergyForMEAF BrtuT’I’Q’M’VL’W’R’F’S’mdhcif =

DAPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif + DispatchIntervalFMMPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif +

DispatchIntervalRTPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif =

TotalDayAheadExpectedPMPPLoadEnergy BrtuT’I’M’F’S’mdhcif+ TotalDayAheadExpectedNonLoadOrNonPMPPLoadEnergy BrtuT’I’M’F’S’mdhcif

TotalDayAheadExpectedPMPPLoadEnergy BrtuT’I’M’F’S’mdhcif =

Sum over (A, A’, p, W’, v, V, L’, R’)

(DALoadSchedule BrtuT’I’Q’M’AA’R’pW’F’S’vVL’mdh+ BAResBaseLoadSchedule BrtuT’I’Q’M’AA’R’W’F’S’VL’pmdh) / N

Where N = total number of Dispatch Intervals per Trading Hour

And Where

Component Type F’ = PMPP

TotalDayAheadExpectedNonLoadOrNonPMPPLoadEnergy BrtuT’I’M’F’S’mdhcif =

SettlementIntervalDAScheduleEnergyFiltered BrtuT’I’M’F’S’mdhcif +

BASettlementIntervalEntityResourceDAPumpingEnergyFiltered BrtuT’I’M’F’S’mdhcif

BASettlementIntervalEntityResourceDAPumpingEnergyFiltered BrtuT’I’M’F’S’mdhcif =

Sum over (Q’)

DAPumpingEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif

SettlementIntervalDAScheduleEnergyFiltered BrtuT’I’M’F’S’mdhcif =

Sum over (Q’, V, L’, W’, R’)

(DAScheduleEnergyQuantity BrtQ’uT’I’M’VL’W’R’F’S’mdhcif +

BAResBaseScheduleEnergyBrtuT’I’Q’M’R’W’F’S’VL’mdhcif )

WHERE EXISTS

TotalExpectedNonWheelEnergyBrtuT’I’Q’M’VL’W’R’F’S’mdhcif

BAResourceDA\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif=

BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceDAMinimumLoadEnergy BrtuT’I’M’F’S’mdhcif

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif=

SettlementIntervalMeteredQuantityForMeteredAdjFactor BrtuT’I’M’F’S’mdhcif –

SettlementIntervalRegulationEnergy BrtuT’I’M’F’S’mdhcif

WHERE EXISTS

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif

SettlementIntervalMeteredQuantityForMeteredAdjFactor BrtuT’I’M’F’S’mdhcif =

Sum over (Q’)

BAASettlementIntervalResourceMeteredQuantityForMeteredAdjFactor BrtuT’I’Q’M’F’S’mdhcif

BAASettlementIntervalResourceMeteredQuantityForMeteredAdjFactor BrtuT’I’Q’M’F’S’mdhcif

= Sum over (A, A’, R’, p, W’, Q, d’, n’, N, z’, H, v, P, V, L’)

(BASettlementIntervalResEntityMeteredQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif +

BAResEntityDispatchIntervalMeteredCAISODemandQuantity

BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif + BASettlementIntervalResEIMEntityMeterLoadQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif

+ SettlementIntervalDeemedDeliveredInterchangeEnergyQuantityFilteredBrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif )

**Note:**

In the preceding equation for Metered Energy Quantity per Settlement Interval,

for any given resource in a Settlement Interval, all but one of the added components in the equation should be 0:

SettlementIntervalDeemedDeliveredInterchangeEnergyQuantityFilteredBrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif =

Sum over (E, O)

SettlementIntervalDeemedDeliveredInterchangeEnergyQuantityBrtEuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’OVvHn’L’mdhcif

**Non-RMR Energy Ratio**

The equation for Non-RMR Energy Ratio per Dispatch Interval f:

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif=

IF BAResourceDispatchIntervalRMREnergy BrtuT’I’M’F’S’mdhcif<> 0

THEN

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif = Max(0,(TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif –

BAResourceDispatchIntervalRMREnergy BrtuT’I’M’F’S’mdhcif) /

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif)

ELSE

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif= 1

END IF

**Real-Time Performance Metric**

The equation for RT Performance Metric per Dispatch Interval f:

BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif =

IF

BASettlementIntervalResourceRTOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif = 0

Or

BADispatchIntervalResourceTransitionFlag BrtuT’I’M’F’S’mdhcif = 1

THEN

BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif = 1

ELSE

BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif = BASettlementIntervalResourceRT\_PMWithoutRTPerformanceToleranceBandBrtuT’I’M’F’S’mdhcif

END IF

WHERE EXISTS

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif

BASettlementIntervalResourceRT\_PMWithoutRTPerformanceToleranceBandBrtuT’I’M’F’S’mdhcif =

(BASettlementIntervalResourceRTPerformanceMetric\_Test1Flag BrtuT’I’M’F’S’mdhcif \*

(1 - BASettlementIntervalResourceRTPerformanceMetric\_Test2Flag BrtuT’I’M’F’S’mdhcif ))

+

((1 - BASettlementIntervalResourceRTPerformanceMetric\_Test1Flag BrtuT’I’M’F’S’mdhcif ) \*   
(1 - BASettlementIntervalResourceRTPerformanceMetric\_Test2Flag BrtuT’I’M’F’S’mdhcif ) \* BASettlementIntervalResourceRTPerformanceMetric\_Test3Ratio BrtuT’I’M’F’S’mdhcif )

BASettlementIntervalResourceRTPerformanceMetric\_Test1Flag BrtuT’I’M’F’S’mdhcif =

IF

(( ABS(BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif) <= ZeroTolerance)

AND

ABS(BAResourceRT\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif) <= ZeroTolerance )

THEN

BASettlementIntervalResourceRTPerformanceMetric\_Test1Flag BrtuT’I’M’F’S’mdhcif = 1

ELSE

BASettlementIntervalResourceRTPerformanceMetric\_Test1Flag BrtuT’I’M’F’S’mdhcif = 0

END IF

BASettlementIntervalResourceRTPerformanceMetric\_Test2Flag BrtuT’I’M’F’S’mdhcif =

IF

(

( ABS(BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif) <= ZeroTolerance)

AND

( ABS(BAResourceRT\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif) > ZeroTolerance)

)

THEN

BASettlementIntervalResourceRTPerformanceMetric\_Test2Flag BrtuT’I’M’F’S’mdhcif = 1

ELSE

BASettlementIntervalResourceRTPerformanceMetric\_Test2Flag BrtuT’I’M’F’S’mdhcif = 0

END IF

BASettlementIntervalResourceRTPerformanceMetric\_Test3Ratio BrtuT’I’M’F’S’mdhcif =

IF

(

( ABS(BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif) > ZeroTolerance)

And

(BAResourceRT\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif \* BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif > 0 )

)

THEN

BASettlementIntervalResourceRTPerformanceMetric\_Test3RatioBrtuT’I’M’F’S’mdhcif=

MIN [ 1, BAResourceRT\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif /

BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif ) ]

ELSE

BASettlementIntervalResourceRTPerformanceMetric\_Test3Ratio BrtuT’I’M’F’S’mdhcif = 0

END IF

WHERE EXISTS

BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif

BAResourceRT\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif=

BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif –

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

WHERE EXISTS

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif

BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif=

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif –

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

WHERE EXISTS

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif

**Out of Tolerance Band Flag for Day-Ahead MEAF Application**

The equation for the DA Out of Tolerance Band flag per Settlement Interval:

BASettlementIntervalResourceDAOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif =

IF

ABS(BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif ) > BASettlementIntervalResourcePMToleranceBand BrtuT’I’M’F’S’mdhcif

THEN

BASettlementIntervalResourceDAOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif =  
1

ELSE

BADispatchResourceDAOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif =  
0

END IF

WHERE EXISTS

TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

**Out of Tolerance Band Flag for RT Performance Metric Application**

The equation for the RT Tolerance Band flag per Settlement Interval:

BASettlementIntervalResourceRTOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif =

IF

ABS(BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif –

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif ) > BASettlementIntervalResourcePMToleranceBand BrtuT’I’M’F’S’mdhcif

THEN

BASettlementIntervalResourceRTOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif =  
1

ELSE

BASettlementIntervalResourceRTOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif =  
0

END IF

WHERE EXISTS

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif

**Performance Metric (PM) Tolerance Band**

The equation for the PM Tolerance Band per Settlement Interval:

BASettlementIntervalResourcePMToleranceBand BrtuT’I’M’F’S’mdhcif =

ToleranceBand BrtF’S’mdhcif   
+ ABS(BADispatchIntervalResourcePMToleranceBandRampingQty ) BrtuT’I’M’F’S’mdhcif

WHERE EXISTS

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif

**Exceptional Dispatch Metered Energy Adjustment Factor**

The equation for the Exceptional Dispatch Metered Energy Adjustment Factor per Dispatch Interval f:

ExceptionalDispatchMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif =

IF BASettlementIntervalEntityResourceTotalExceptionalIIE BrtuT’I’M’F’S’mdhcif <> 0

THEN

ExceptionalDispatchMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif =   
MAX (0,

MIN (1,

( SettlementIntervalMeteredQuantityForMeteredAdjFactor BrtuT’I’M’F’S’mdhcif – (TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif – BASettlementIntervalEntityResourceTotalExceptionalIIE BrtuT’I’M’F’S’mdhcif ) ) / BASettlementIntervalEntityResourceTotalExceptionalIIE BrtuT’I’M’F’S’mdhcif ) )

ELSE

ExceptionalDispatchMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif = 0

END IF

BASettlementIntervalEntityResourceTotalExceptionalIIE BrtuT’I’M’F’S’mdhcif =

Sum over (Q’) SettlementIntervalTotalExceptionalIIE BrtuT’I’Q’M’F’S’mdhcif

**Determination of Persistent Deviation with 2-Hour Inspection Windows**

The Persistent Deviation Flag for Trading Hour h:

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

MAX(BAHourlyResourceFirstInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh, BAHourlyResourceSecondInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh )

The persistent deviation flag for the 1st 2-hour inspection window of Settlement Interval:

BAHourlyResourceFirstInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh =

IF

PersistentDeviationMetricFirstInspectionWindowFlagCount BrtuT’I’M’F’S’mdh > InspectionWindowDeviationCountThreshold md

THEN

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

ELSE

BAHourlyResourceFirstInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh = 0

END IF

The persistent deviation flag for the 2nd 2-hour inspection window of Settlement Interval:

BAHourlyResourceSecondInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh =

IF

PersistentDeviationMetricSecondInspectionWindowFlagCount BrtuT’I’M’F’S’mdh > InspectionWindowDeviationCountThreshold md

THEN

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

ELSE

BAHourlyResourceSecondInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh = 0

END IF

PersistentDeviationMetricFirstInspectionWindowFlagCount BrtuT’I’M’F’S’mdh =

PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh + PersistentDeviationMetricPriorTradingHourFlagCount BrtuT’I’M’F’S’mdh

PersistentDeviationMetricSecondInspectionWindowFlagCount BrtuT’I’M’F’S’mdh =

PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh + PersistentDeviationMetricNextTradingHourFlagCount BrtuT’I’M’F’S’mdh

PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh = Sum over (c, i, f) PersistentDeviationMetricFlag BrtuT’I’M’F’S’mdhcif

PersistentDeviationMetricPriorTradingHourFlagCount BrtuT’I’M’F’S’mdh =

PersistentDeviationMetricPriorTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh

PersistentDeviationMetricPriorTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh =

View\_PersistentDeviationMetricPriorTradingHourFlagCount BrtuT’I’M’F’S’mdh

**Notes:**

1. Variable PersistentDeviationMetricPriorTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh is the output of view View\_PersistentDeviationMetricPriorTradingHourFlagCount (that is run during the configuration’s execution). The view provides the output of variable PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh for the adjoining prior Trading Hour, including cases where the adjoining prior Trading Hour resides in the prior Trading Day.
2. Variable PersistentDeviationMetricPriorTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh is not reportable in XML-based settlement statement files.

PersistentDeviationMetricNextTradingHourFlagCount BrtuT’I’M’F’S’mdh =

PersistentDeviationMetricNextTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh

PersistentDeviationMetricNextTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh =

View\_PersistentDeviationMetricNextTradingHourFlagCount BrtuT’I’M’F’S’mdh+1

**Notes:**

1. Variable PersistentDeviationMetricNextTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh is the output of view View\_PersistentDeviationMetricNextTradingHourFlagCount (that is run during the configuration’s execution). The view provides the output of variable PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh for the adjoining next Trading Hour, including cases where the adjoining next Trading Hour resides in the next Trading Day.
2. Variable PersistentDeviationMetricNextTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh is not reportable in XML-based settlement statement files.

**Persistent Deviation Metric**

The equation for the Persistent Deviation Flag per Settlement Interval:

PersistentDeviationMetricFlag BrtuT’I’M’F’S’mdhcif =

MAX(PersistentDeviationCase1FlagBrtuT’I’M’F’S’mdhcif,  
PersistentDeviationCase2FlagBrtuT’I’M’F’S’mdhcif,  
PersistentDeviationCase3FlagBrtuT’I’M’F’S’mdhcif,  
PersistentDeviationCase4FlagBrtuT’I’M’F’S’mdhcif )

*Persistent Deviation Case 1*

The equation for the Persistent Deviation Case 1 Flag per Settlement Interval:

PersistentDeviationCase1Flag BrtuT’I’M’F’S’mdhcif =

IF

BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif >   
TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif > BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif < BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalGenResourceDeviation BrtuT’I’M’F’S’mdhcif > 0.1 \*

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif

And

(

(

PersistentDeviationMetric BrtuT’I’M’F’S’mdhcif > 1.1000

And

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) > ZeroTolerance

)

Or

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) <= ZeroTolerance

)

THEN

PersistentDeviationCase1Flag BrtuT’I’M’F’S’mdhcif = 1

ELSE

PersistentDeviationCase1Flag BrtuT’I’M’F’S’mdhcif = 0

END IF

*Persistent Deviation Case 2*

The equation for the Persistent Deviation Case 2 Flag per Settlement Interval:

PersistentDeviationCase2Flag BrtuT’I’M’F’S’mdhcif=

IF

BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif > TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif > BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif > BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalGenResourceDeviation BrtuT’I’M’F’S’mdhcif > 0.1 \*

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif

And

(

(

PersistentDeviationMetric BrtuT’I’M’F’S’mdhcif < 0.9000

And

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) > ZeroTolerance

)

Or

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) <= ZeroTolerance

)

THEN

PersistentDeviationCase2Flag BrtuT’I’M’F’S’mdhcif= 1

ELSE

PersistentDeviationCase2Flag BrtuT’I’M’F’S’mdhcif= 0

END IF

*Persistent Deviation Case 3*

The equation for the Persistent Deviation Case 3 Flag per Settlement Interval:

PersistentDeviationCase3Flag BrtuT’I’M’F’S’mdhcif =

IF

BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif <   
TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif < BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif < BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalGenResourceDeviation BrtuT’I’M’F’S’mdhcif > 0.1 \*

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif

And

(

(  
PersistentDeviationMetric BrtuT’I’M’F’S’mdhcif < 0.9000

And

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) > ZeroTolerance

)

Or

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) <= ZeroTolerance

)

THEN

PersistentDeviationCase3Flag BrtuT’I’M’F’S’mdhcif = 1

ELSE

PersistentDeviationCase3Flag BrtuT’I’M’F’S’mdhcif = 0

END IF

*Persistent Deviation Case 4*

The equation for the Persistent Deviation Case 4 Flag per Settlement Interval:

PersistentDeviationCase4Flag BrtuT’I’M’F’S’mdhcif =

IF

BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif <   
TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif < BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif > BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

And

BASettlementIntervalGenResourceDeviation BrtuT’I’M’F’S’mdhcif > 0.1 \*

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif

And

(

(

PersistentDeviationMetric BrtuT’I’M’F’S’mdhcif > 1.1000

And

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) > ZeroTolerance

)

Or

ABS(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif ) <= ZeroTolerance

)

THEN

PersistentDeviationCase4Flag BrtuT’I’M’F’S’mdhcif = 1

ELSE

PersistentDeviationCase4Flag BrtuT’I’M’F’S’mdhcif = 0

END IF

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif =

IF JOUChildResourceFlag rmd = 1

THEN

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif =

BASettlementIntervalResourceAlternateDynamicRampRateQty Brmdhcif

ELSE

(

IF

VERFLAG Brtmd = 1

THEN

IF

BASettlementIntervalResourceRTMEnergyBidQuantity Brtmdhcif <> 0

THEN

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif =

BADailyResourceFiveMinuteDynamicRampRateQuantity Brmd

ELSE

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif = GenerationInfiniteRampRateFactor md

END IF

ELSE

BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif =   
BADailyResourceFiveMinuteDynamicRampRateQuantity Brmd

END IF

)

END IF

WHERE EXISTS

BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

BASettlementIntervalResourceRTMEnergyBidQuantity Brtmdhcif =

Sum over (u, Q’, b, A, A’, p, F’, S’) BAHourlyResRTMEnergyBidQty BrtuQ’bAA’pF’S’mdh

**Implementation Note:**

The above-indicated change is linked to the RSI initiative that has effective date of TD 11/1/2016.

*Persistent Deviation Equation*

The equation for the Persistent Deviation Metric per Settlement Interval:

PersistentDeviationMetric BrtuT’I’M’F’S’mdhcif =

(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif) /   
(BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif – BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif )

BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif =

(TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif + SettlementIntervalRegulationEnergy BrtuT’I’M’F’S’mdhcif )

BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif =

BASettlementIntervalResourcePriorIntervalGenMeterValue\_V BrtuT’I’M’F’S’mdhcif

BASettlementIntervalResourcePriorIntervalGenMeterValue\_V BrtuT’I’M’F’S’mdhcif =

View\_BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif -1

Where

f-1 represents the prior in-sequence Settlement Interval relative to the specified Settlement Interval f.

**Notes:**

1. Variable BASettlementIntervalResourcePriorIntervalGenMeterValue\_V BrtuT’I’M’F’S’mdhcif is the output of view View\_BASettlementIntervalResourceGenMeterValue (that is run during the configuration’s execution). The view provides the output of variable BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif for the adjoining prior Settlement Interval, including cases where the adjoining prior Settlement Interval resides in the prior Trading Day.
2. Variable BASettlementIntervalResourcePriorIntervalGenMeterValue\_V BrtuT’I’M’F’S’mdhcif is not reportable in XML-based settlement statement files.

The equation for the resource deviation per Settlement Interval:

BASettlementIntervalGenResourceDeviation BrtuT’I’M’F’S’mdhcif =

ABS(BASettlementIntervalResourceMeteredGenerationVariation BrtuT’I’M’F’S’mdhcif )

The equation for the metered Generation variation per Settlement Interval:

BASettlementIntervalResourceMeteredGenerationVariation BrtuT’I’M’F’S’mdhcif =

BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif –

BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif

**Business Associate ID (B) and Balancing Authority Area (Q’) Mapping Flags**

The equation for the BA ID and BAA mapping flag by resource per Trading Day:

ResourceToBAAMapFactor BruT’I’Q’M’F’md =

EntityResourceToBAAMapFactor BruT’I’Q’M’F’md

Where

Energy Settlement Type (I’) <> ‘Net’

EntityResourceToBAAMapFactor BruT’I’Q’M’F’md =

MIN(1, EntityResourceToBAAMapCount BruT’I’Q’M’F’md )

EntityResourceToBAAMapCount BruT’I’Q’M’F’md =

Sum over (t, S’, L’, h, c, i, f)

( 0 \* ( BAASettlementIntervalResourceTotalExpectedEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif   
+ BAASettlementIntervalResourceMeteredQuantityForMeteredAdjFactor BrtuT’I’Q’M’F’S’mdhcif + BA5mResFMMFlexRampForecastedMovementAssessmentAmount BrtQ’uT’I’M’L’F’S’mdhcif + BA5mResRTDFlexRampForecastedMovementAssessmentAmount BrtQ’uT’I’M’L’F’S’mdhcif +

BAHourlyResIRUAssessmentAmountBrtQ’M’F’S’L’mdh +

BAHourlyResIRDAssessmentAmountBrtQ’M’F’S’L’mdh +

BAHourlyResRCUAssessmentAmount BrtQ’F’S’mdh +

BAHourlyResRCDAssessmentAmount BrtQ’F’S’mdh  
) + 1 )

Where Resource Type (t) <> ‘ETIE’

MSSToBAAMapFactor BT’I’Q’M’md =

MIN(1, MSSToBAAMapCount BT’I’Q’M’md )

MSSToBAAMapCount BT’I’Q’M’md =

Sum over (r, u, F’)

( 0 \* EntityResourceToBAAMapCount BruT’I’Q’M’F’md + 1 )

Where

Energy Settlement Type (I’) = ‘Net’

## 

## Outputs

| Output Req ID | Name | Description |
| --- | --- | --- |
|  | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
|  | DAMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif | An output (as a real number between 0 and 1, inclusive) that presents the Day-Ahead Metered Energy Adjustment Factor (DA MEAF) for a Bid Cost Recovery (BCR) Eligible Resource. |
|  | BASettlementIntervalResourceGenerationDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif | An output (as a real number between 0 and 1, inclusive) that presents the DA MEAF for a resource type of ‘GEN’ or ‘ITIE’. The output’s value depends upon whether or not the DA Expected Energy is >= DA MLE.  When the DA Expected Energy minus MLE >= 0, then the output reflects output DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif; otherwise it reflects output DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif. |
|  | DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergy BrtuT’I’M’F’S’mdhcif | An output (as a real number between 0 and 1, inclusive) that presents the DA MEAF for cases where the DA Expected Energy is >= DA MLE and the resource type is either ‘GEN’ or ‘ITIE’.  If the DA Out of Tolerance Band flag output (BASettlementIntervalResourceDAOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif) = 1, then the DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif output reflects the output DAMeteredEnergyAdjustmentFactorGenerationPerformanceRatioBrtuT’I’M’F’S’mdhcif for a given resource and Settlement Interval. Otherwise, the output DAMeteredEnergyAdjustmentFactorAtOrAbovePminExpectedEnergyBrtuT’I’M’F’S’mdhcif is forced to 1 when the DA Out of Tolerance Band flag output (BASettlementIntervalResourceDAOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif) = 0, and is forced to 0 when the resource is deemed to be not On. |
|  | DAMeteredEnergyAdjustmentFactorGenerationPerformanceRatioBrtuT’I’M’F’S’mdhcif | Provides the IFM Metered Energy Adjustment Factor value that is applied to expected DA Energy that exceeds a resource’s Pmin limit and is outside of the PM Tolerance Band. The output’s value is a real number between 0 and 1, inclusive, for the ratio of metered DA energy to expected DA energy for a given Settlement Interval and resource of resource type ‘GEN’ or ‘ITIE’. |
|  | DAMeteredEnergyAdjustmentFactorForSubPminExpectedEnergy BrtuT’I’M’F’S’mdhcif | Provides for a given resource and Settlement Interval the IFM Metered Energy Adjustment Factor value for cases where the DA Scheduled Energy is less than the resource’s Pmin limit. The output’s value is equal to 0 or 1. |
|  | BASettlementIntervalResourceNegativeEnergyDAMeteredEnergyAdjustmentFactorBrtuT’I’M’F’S’mdhcif | Provides the IFM Metered Energy Adjustment Factor value for a Participating Load Pumped-Storage Hydro Unit or Pumping Load Device with negative Day-Ahead Scheduled Energy in the specified Settlement Interval. The output’s value is in the range of 0 and 1, inclusive. |
|  | BASettlementIntervalResourceExpectedDAEnergyAboveMinimumLoad BrtuT’I’M’F’S’mdhcif | The value (in MWh) of output BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy reduced by the DA Minimum Load Energy for a given resource and Settlement Interval. |
|  | BASettlementIntervalResourceDAMinimumLoadEnergy BrtuT’I’M’F’S’mdhcif | IFM Minimum Load Energy (in MWh) provided for a given resource and Settlement Interval. |
|  | BASettlementIntervalResourceMinimumDA\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif | DA Expected Energy (in MWh) with which a resource’s metered Energy is compared by means of the ratio of the metered Energy to the DA Expected Energy in the DA MEAF calculation for IFM BCR. The output is provided for a given resource and Settlement Interval. |
|  | TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif | Dispatched Energy (in MWh) that corresponds to the Energy under the DOP for a given resource and Settlement Interval, where the resource is not associated with WHEEL Energy. |
|  | BAASettlementIntervalResourceTotalExpectedEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif | Dispatched Energy (in MWh) that corresponds to the Energy under the DOP for a given Balancing Authority Area, resource and Settlement Interval, where the resource is not associated with WHEEL Energy. |
|  | BAASettlementIntervalResourceTotalPumpingExpectedEnergy BrtuT’I’Q’M’F’S’mdhcif | Dispatched Energy (in MWh) that corresponds to the Energy under the DOP for a given Balancing Authority Area, pumped storage device resource and Settlement Interval, where the resource is not associated with WHEEL Energy and has pumping Energy associated with the Settlement Interval. |
|  | BAASettlementIntervalResourceExpectedNonWheelEnergyFiltered BruT’I’Q’M’F’mdhcif | Dispatched Energy (in MWh) that corresponds to the Energy under the DOP for a given Balancing Authority Area, resource and Settlement Interval, where the resource is neither a System Resource that provides WHEEL Energy nor a pump Load. |
|  | BAASettlementIntervalResourceTypeExpectedNonWheelEnergyFiltered BrtuT’I’Q’M’F’S’mdhcif | Dispatched Energy (in MWh) that corresponds to the Energy under the DOP for a given Balancing Authority Area, resource, resource type and Settlement Interval, where the resource is neither a System Resource that provides WHEEL Energy nor a pump Load. |
|  | TotalExpectedNonWheelEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif | Dispatched Energy (in MWh) that corresponds to the Energy under the DOP for a given Balancing Authority Area, resource and Settlement Interval, where the resource is neither a System Resource that provides WHEEL Energy nor a pump Load. |
|  | TotalPumpingExpectedEnergyForMEAF BrtuT’I’Q’M’VL’W’R’F’S’mdhcif | Summation of Day Ahead and Real Time Pumping Energy quantities (in MWh) for a given Balancing Authority Area, resource and Settlement Interval. |
|  | TotalDayAheadExpectedEnergy BrtuT’I’M’F’S’mdhcif | Sum of Total DA Energy (in MWh) that corresponds to the flat hourly Day-Ahead Schedule (DAS) including Day-Ahead Minimum Load Energy, Day-Ahead Self-Scheduled Energy, Day-Ahead Bid Awarded Energy and DA Pumping Energy for a given resource and Settlement Interval. |
|  | TotalDayAheadExpectedPMPPLoadEnergy BrtuT’I’M’F’S’mdhcif | Sum of Total DA Pumping Energy (in MWh) for a given pump resource and Settlement Interval, where F’ = ‘PMPP’. |
|  | TotalDayAheadExpectedNonLoadOrNonPMPPLoadEnergy BrtuT’I’M’F’S’mdhcif | Sum of Total DA Energy (in MWh), excluding DA Pumping Energy, that corresponds to the flat hourly Day-Ahead Schedule (DAS) including Day-Ahead Minimum Load Energy, Day-Ahead Self-Scheduled Energy, and Day-Ahead Bid Awarded Energy for a given resource and Settlement Interval. |
|  | BASettlementIntervalEntityResourceDAPumpingEnergyFiltered BrtuT’I’M’F’S’mdhcif | DA Pumping Energy (in MWh), for a given Pumped-Storage Hydro Unit Or Pumping Load resource, and Settlement Interval. |
|  | SettlementIntervalDAScheduleEnergyFiltered BrtuT’I’M’F’S’mdhcif | DA Energy Schedule (in MWh) that corresponds to the flat hourly Day-Ahead Schedule (DAS). It is composed of Day-Ahead Minimum Load Energy, Day-Ahead Self-Scheduled Energy, and Day-Ahead Bid Awarded Energy for a given resource and Settlement Interval. |
|  | BAResourceDA\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif | Metered Energy (in MWh) with which a resource’s DA Expected Energy is compared by means of the ratio of the metered Energy to the DA Expected Energy in the Adjusted DA MEAF calculation for IFM BCR. The output is provided for a given resource and Settlement Interval. |
|  | BAResourceMeteredEnergyLessRegulationEnergy BrtuT’I’M’F’S’mdhcif | Metered Energy Less Regulation Energy (in MWh) for a given resource and Settlement Interval. |
|  | SettlementIntervalMeteredQuantityForMeteredAdjFactor BrtuT’I’M’F’S’mdhcif | Metered Quantity (in MWh) for a given resource and Settlement Interval. |
|  | BAASettlementIntervalResourceMeteredQuantityForMeteredAdjFactor BrtuT’I’Q’M’F’S’mdhcif | Metered Quantity (in MWh) for a given Balancing Authority Area, resource and Settlement Interval. |
|  | SettlementIntervalDeemedDeliveredInterchangeEnergyQuantityFiltered BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif | Filtered System Resource Deemed Delivered Energy Quantity (in MWh) for a given resource and Settlement Interval, whereby ‘Filtered’ refers to the elimination of the attributes Energy Type E and Exceptional Dispatch Type O. |
|  | BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif | The ratio (as a real number between 0 and 1) of Expected Energy minus the expected RMR Energy component over the Expected Energy. The output provides the ratio of Non-RMR Expected Energy to overall Expected Energy for a given resource and Settlement Interval. |
|  | BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif | The ratio (as a real number between 0 and 1) of the RT metered energy to the RT expected energy as used in the RT Performance Metric (PM) calculation for a given resource and Settlement Interval. The ratio is forced to 1 when the RT Out of Tolerance Band flag output (BASettlementIntervalResourceRTOutOfToleranceBandFlag BrtuT’I’M’F’S’mdchif) = 0 or the resource transition flag input (BADispatchIntervalResourceTransitionFlag BrtuT’I’M’F’S’mdhcif) = 1; otherwise the output represents the RT PM as presented by output BASettlementIntervalResourceRT\_PMWithoutRTPerformanceToleranceBandBrtuT’I’M’F’S’mdhcif. |
|  | BASettlementIntervalResourceRT\_PMWithoutRTPerformanceToleranceBandBrtuT’I’M’F’S’mdhcif | Real Time (RT) Performance Metric without PM Tolerance Band consideration. The output provides a value between 0 and 1 for the ratio of metered RT energy to expected RT energy for a given resource and Settlement Interval. |
|  | BASettlementIntervalResourceRTPerformanceMetric\_Test1Flag BrtuT’I’M’F’S’mdhcif | Flag (as a Boolean 0/1 output) that indicates both the RT metered energy and RT expected energy used for determining the RT Performance Metric both = 0. The output is provided for a given resource and Settlement Interval. |
|  | BASettlementIntervalResourceRTPerformanceMetric\_Test2Flag BrtuT’I’M’F’S’mdhcif | Flag (as a Boolean 0/1 output) that indicates for the RT Performance Metric calculation for a given resource and Settlement Interval that the RT metered energy <> 0 and the RT expected energy = 0. |
|  | BASettlementIntervalResourceRTPerformanceMetric\_Test3Ratio BrtuT’I’M’F’S’mdhcif | The ratio (as a real number between 0 and 1) of the RT metered energy to the RT expected energy as used in the RT Performance Metric calculation for a given resource and Settlement Interval. The ratio is calculated for the case where RT expected energy <> 0 and the RT metered Energy and RT expected energy are of the same algebraic sign (+/-); otherwise (for cases where the prior condition is not true) the ratio is forced to 0. |
|  | BAResourceRT\_BCRMeteredEnergy BrtuT’I’M’F’S’mdhcif | Metered Energy (in MWh) with which a resource’s RT Expected Energy is compared by means of the ratio of the metered Energy to the RT Expected Energy in the RT Performance Metric calculation for a given resource and Settlement Interval. |
|  | BAResourceRT\_BCRExpectedEnergy BrtuT’I’M’F’S’mdhcif | Output that presents the RT BCR expected energy (in MWh) for a given resource and Settlement Interval as the difference between its total expected energy and the sum of the resource’s Day-Ahead expected energy and Real-Time self-scheduled energy. | |
|  | BASettlementIntervalResourceDAOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif | Flag (as a Boolean 0/1 output) that indicates for a given resource and Settlement Interval whether the resource’s metered Energy has failed or passed the Tolerance Band test with respect to DA energy.  1 = Failed; 0 = Passed | |
|  | BASettlementIntervalResourceRTOutOfToleranceBandFlag BrtuT’I’M’F’S’mdhcif | Flag (as a Boolean 0/1 output) that indicates a given resource has failed the Tolerance Band test with RT energy for a specified Settlement Interval. | |
|  | BASettlementIntervalResourcePMToleranceBand BrtuT’I’M’F’S’mdhcif | The Performance Metric Tolerance Band (in MWh) for a given resource and Settlement Interval. | |
|  | ExceptionalDispatchMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif | Exceptional Dispatch Metered Energy Adjustment Factor (having a value between 0 and 1) for a given resource and Settlement Interval.  This adjustment factor applies to Exceptional Dispatch energy, and is computed as metered energy minus expected non-Exceptional Dispatch Energy, the latter difference divided by the expected Exceptional Dispatch energy. | |
|  | BASettlementIntervalEntityResourceTotalExceptionalIIE BrtuT’I’M’F’S’mdhcif | Exceptional Dispatch Instructed Imbalance Energy (in MWh) associated with a given resource and Settlement Interval. | |
|  | BAHourlyResourcePersistentDeviationFlag BrtuT’I’M’F’S’mdh | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates whether (= 1) or not (0) a given resource has exceeded the deviation threshold count limit (initially set at 6) for deviant Settlement Intervals over the specified current Trading Hour and immediately neighboring (adjoining) Trading Hours, where the adjoining Trading Hours are each tested for deviation in tandem with.the current Trading Hour. | |
|  | BAHourlyResourceFirstInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates whether (= 1) or not (0) a given resource has exceeded the deviation threshold count limit (initially set at 6) for deviant Settlement Intervals over the specified current Trading Hour and immediately preceding Trading Hour, where the adjoining Trading Hour is tested for deviation in tandem with.the current Trading Hour. | |
|  | BAHourlyResourceSecondInspectionWindowDeviationFlag BrtuT’I’M’F’S’mdh | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates whether (= 1) or not (0) a given resource has exceeded the deviation threshold count limit (initially set at 6) for deviant Settlement Intervals over the specified current Trading Hour and immediately following Trading Hour, where the adjoining Trading Hour is tested for deviation in tandem with.the current Trading Hour. | |
|  | PersistentDeviationMetricFirstInspectionWindowFlagCount BrtuT’I’M’F’S’mdh | Count (as an integer value) of the number of times that a given resource has satisfied a Persistent Deviation Metric for deviant Settlement Intervals in the specified current Trading Hour and immediately preceding Trading Hour, where the adjoining Trading Hour is tested for deviation in tandem with.the current Trading Hour. | |
|  | PersistentDeviationMetricSecondInspectionWindowFlagCount BrtuT’I’M’F’S’mdh | Count (as an integer value) of the number of times that a given resource has satisfied a Persistent Deviation Metric for deviant Settlement Intervals in the specified current Trading Hour and immediately following Trading Hour, where the adjoining Trading Hour is tested for deviation in tandem with.the current Trading Hour. | |
|  | PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh | Count (as an integer value) of the number of times that a given resource has satisfied a Persistent Deviation Metric in the specified current Trading Hour. | |
|  | PersistentDeviationMetricPriorTradingHourFlagCount BrtuT’I’M’F’S’mdh | Count (as an integer value) of the number of times that a given resource has satisfied a Persistent Deviation Metric in the Trading Hour that immediately precedes the specified current Trading Hour. | |
|  | PersistentDeviationMetricPriorTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh | A count (as an integer value) of the number of Settlement Intervals where a given resource has satisfied a Persistent Deviation Metric in the Trading Hour immediately preceding the specified current Trading Hour. The output reflects the results of a query output that is only temporarily stored in the Settlements System and is then transferred to charge type PersistentDeviationMetricPriorTradingHourFlagCount BrtuT’I’M’F’S’mdh.  This output variable has the same value as the PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh output, but shifted by an hour interval backward in time so as to provide for the current interval calculations the prior interval’s PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh value. | |
|  | PersistentDeviationMetricNextTradingHourFlagCount BrtuT’I’M’F’S’mdh | Count (as an integer value) of the number of times that a given resource has satisfied a Persistent Deviation Metric in the Trading Hour that immediately follows the specified current Trading Hour. | |
|  | PersistentDeviationMetricNextTradingHourFlagCount\_V BrtuT’I’M’F’S’mdh | A count (as an integer value) of the number of Settlement Intervals where a given resource has satisfied a Persistent Deviation Metric in the Trading Hour immediately following the specified current Trading Hour. The output reflects the results of a query output that is only temporarily stored in the Settlements System and is then transferred to charge type PersistentDeviationMetricNextTradingHourFlagCount BrtuT’I’M’F’S’mdh.  This output variable has the same value as the PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh output, but shifted by an hour interval forward in time so as to provide for the current interval calculations the next interval’s PersistentDeviationMetricCurrentTradingHourFlagCount BrtuT’I’M’F’S’mdh value. | |
|  | PersistentDeviationMetricFlag BrtuT’I’M’F’S’mdhcif | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates for a given resource and Settlement Interval whether (= 1) or not (0) the resource has met one of four persistent deviation metrics (as indicated by the next 4 outputs below) for the Settlement Interval to be considered “bad” and to be counted toward the establishment of persistent deviation. | |
|  | PersistentDeviationCase1Flag BrtuT’I’M’F’S’mdhcif | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates for a given resource and Settlement Interval whether (= 1) or not (0) the resource has met all of the following conditions:   1. The Expected Energy plus Regulation Energy > DA Expected Energy; 2. The resource’s metered Energy > the Expected Energy plus Regulation Energy; 3. The resource’s metered Energy for the immediately preceding Settlement Interval < the Expected Energy plus Regulation Energy; 4. The resource’s deviation Energy > 0.1 \* | resource’s capable ramping Energy for the Settlement Interval |; and 5. If the denominator of the Persistent Deviation Metric <> 0 and the Persistent Deviation Metric > 1.1 or the denominator of the Persistent Deviation Metric = 0. | |
|  | PersistentDeviationCase2Flag BrtuT’I’M’F’S’mdhcif | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates for a given resource and Settlement Interval whether (= 1) or not (0) the resource has met all of the following conditions:   1. The Expected Energy plus Regulation Energy > DA Expected Energy; 2. The resource’s metered Energy > the Expected Energy plus Regulation Energy; 3. The resource’s metered Energy for the immediately preceding Settlement Interval > the Expected Energy plus Regulation Energy; 4. The resource’s deviation Energy > 0.1 \* | resource’s capable ramping Energy for the Settlement Interval |; and 5. If the denominator of the Persistent Deviation Metric <> 0 and theThe Persistent Deviation Metric < 0.9 or the denominator of the Persistent Deviation Metric = 0. | |
|  | PersistentDeviationCase3Flag BrtuT’I’M’F’S’mdhcif | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates for a given resource and Settlement Interval whether (= 1) or not (0) the resource has met all of the following conditions:   1. The Expected Energy plus Regulation Energy < DA Expected Energy; 2. The resource’s metered Energy < the Expected Energy plus Regulation Energy; 3. The resource’s metered Energy for the immediately preceding Settlement Interval < the Expected Energy plus Regulation Energy; 4. The resource’s deviation Energy > 0.1 \* | resource’s capable ramping Energy for the Settlement Interval |; and 5. If the denominator of the Persistent Deviation Metric <> 0 and the Persistent Deviation Metric < 0.9 or the denominator of the Persistent Deviation Metric = 0. | |
|  | PersistentDeviationCase4Flag BrtuT’I’M’F’S’mdhcif | Persistent Deviation Flag (as a Boolean 0/1 value) that indicates for a given resource and Settlement Interval whether (= 1) or not (0) the resource has met all of the following conditions:   1. The Expected Energy plus Regulation Energy < DA Expected Energy; 2. The resource’s metered Energy < the Expected Energy plus Regulation Energy; 3. The resource’s metered Energy for the immediately preceding Settlement Interval > the Expected Energy plus Regulation Energy; 4. The resource’s deviation Energy > 0.1 \* | resource’s capable ramping Energy for the Settlement Interval |; and 5. If the denominator of the Persistent Deviation Metric <> 0 and the Persistent Deviation Metric > 1.1 or the denominator of the Persistent Deviation Metric = 0. | |
|  | BASettlementIntervalResourceRampingCapabilityQuantity BrtuT’I’M’F’S’mdhcif | The magnitude (as a positive MWh value) by which a given resource’s Generation is capable of changing over the specified Settlement Interval. | |
|  | BASettlementIntervalResourceRTMEnergyBidQuantity Brtmdhcif | The ouput represents the settlement interval Real Time Market Energy Bid Quantity (in MWh) by Business Associate and resource ID. | |
|  | PersistentDeviationMetric BrtuT’I’M’F’S’mdhcif | Persistent Deviation Metric (as a real number) that represents for a given resource and Settlement Interval the ratio of   1. the resource’s metered Energy for the immediately preceding Settlement Interval minus the resource’s metered Energy for the current Settlement Interval, divided by 2. the resource’s metered Energy for the immediately preceding Settlement Interval minus the sum of the resource’s Expected Energy and Regulation Energy. | |
|  | BASettlementIntervalResourceEEPlusRegulationEnergy BrtuT’I’M’F’S’mdhcif | The Expected Energy plus Regulation Energy (in MWh) for a given resource and Settlement Interval. | |
|  | BASettlementIntervalResourcePriorIntervalGenMeterValue BrtuT’I’M’F’S’mdhcif | Metered Generation quantity (in MWh) in the prior Settlement Interval for a given resource and current Settlement Interval. | |
|  | BASettlementIntervalResourcePriorIntervalGenMeterValue\_V BrtuT’I’M’F’S’mdhcif | Metered Generation quantity (in MWh) in the prior Settlement Interval for a given resource and current Settlement Interval. The output reflects the results of a query output that is only temporarily stored in the Settlements System and is then transferred to charge type BASettlementIntervalResourcePriorIntervalGenMeterValue BrtF’S’mdhcif.  The output has the same value as BASettlementIntervalResourceGenMeterValue BrtuT’I’M’F’S’mdhcif, but shifted backward in time by one Settlement Interval so as to provide for the current interval the previous interval’s value. | |
|  | BASettlementIntervalGenResourceDeviation BrtuT’I’M’F’S’mdhcif | The Deviation Energy (in MWh) for a given resource and Settlement Interval, that equals the quantity | the resource’s metered Energy for the current Settlement Interval – the sum of the resource’s Expected Energy and Regulation Energy |. | |
|  | BASettlementIntervalResourceMeteredGenerationVariation BrtuT’I’M’F’S’mdhcif | The Energy variation (in MWh) for a given resource and Settlement Interval, calculated as the resource’s metered Energy for the current Settlement Interval – the sum of the resource’s Expected Energy and Regulation Energy. | |
|  | ResourceToBAAMapFactor BruT’I’Q’M’F’md | A binary output (0/1) that, when = 1, relates the Balancing Authority Area (BAA) of a given resource to the BAA’s associated Business Associate (Scheduling Coordinator ID), where the resource does not belong to a MSS that settles via net-settlement. | |
|  | EntityResourceToBAAMapFactor BruT’I’Q’M’F’md | A binary output (0/1) that, when = 1, relates the Balancing Authority Area (BAA) of a given resource to the BAA’s associated Business Associate (Scheduling Coordinator ID). | |
|  | EntityResourceToBAAMapCount BruT’I’Q’M’F’md | An intermediate count used in the calculation of output EntityResourceToBAAMapFactor BruT’I’Q’M’F’md. The output represents the count of resource types associated with a resource in a given Balancing Authority Area. | |
|  | MSSToBAAMapFactor BT’I’Q’M’md | A binary output (0/1) that, when = 1, relates a Balancing Authority Area (BAA) to its associated Business Associate (Scheduling Coordinator ID) for a given net-settled MSS entity with the BAA. | |
|  | MSSToBAAMapCount BT’I’Q’M’md | An intermediate count used in the calculation of output MSSToBAAMapFactor BT’I’Q’M’md. The output represents the count of resources and corresponding Entity Component Types associated with a net-settled MSS entity in a given Balancing Authority Area. | |

# Charge Code Effective Date

| Charge Code/  Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| Metered Energy Adjustment Factor Pre-calculation | 5.0 | 04/01/09 | 03/31/09 | Documentation Edits Only |
| Metered Energy Adjustment Factor Pre-calculation | 5.1 | 04/01/09 | 08/31/09 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.2 | 02/01/10 | 01/31/10 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.3 | 02/01/10 | 01/31/10 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.4 | 08/01/10 | 07/31/10 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.5 | 09/01/09 | 09/15/10 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.6 | 09/16/10 | 04/30/14 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.7 | 05/01/14 | 04/30/14 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.8 | 10/01/14 | 09/30/14 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.9 | 05/01/14 | 09/30/14 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.10 | 10/01/14 | 09/30/14 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.11 | 05/01/14 | 09/30/14 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.12 | 10/01/14 | 11/3/15 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.13 | 11/4/15 | 09/30/16 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.14 | 10/01/16 | 12/31/16 | Documentation Edits and Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.14a | 1/01/17 | 5/02/22 | Documentation Edits Only |
| Metered Energy Adjustment Factor Pre-calculation | 5.15 | 5/03/22 | 4/30/26 | Configuration Impacted |
| Metered Energy Adjustment Factor Pre-calculation | 5.16 | 5/1/26 | Open | Configuration Impacted |