Settlements & Billing

Configuration Guide: IFM Net Amount

**Pre-calculation**

 Version 5.20

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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) 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. Bid Cost recovery for Energy, Imbalance Reserves, Reliability Capacity, 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 CAISO, independent of whether they are CAISO-committed or instead are self-committed.

For purposes of determining BCR eligibility, 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 of 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, Imbalance Reserves, Reliability Capacity, and A/S during a CAISO Commitment Period.

For each resource, the total SUC, MLC, TC, Bid Costs together with the energy, Reliability Capacity, and AS bid costs, and market revenues from RUC, 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 MSS entity that has elected net settlement, all MSS resources collectively, the RUC, and RTM Shortfalls and Surpluses are then netted over all hours of a Trading Day. Net Surpluses from either of the RUC or RTM markets offset any net shortfalls from the RTM or RUC market, respectively, over the entire Trading Day. If the net Trading Day amount is positive (a Shortfall), the Scheduling Coordinator receives a BCR Uplift Payment equal to the net Trading Day amount.

Bid Cost Recovery for resource costs in the IFM, RUC and RTM markets is determined for each Settlement Interval based upon a resource’s performance and delivered energy relative to its Expected Energy. Pre-calculation IFM Net Amount, as described herein, provides the net Shortfall or Surplus for the IFM component of Bid Cost Recovery.

## Description

IFM Net Amount Pre-calculation will perform the calculations necessary to implement the business rules identified in the Business Rules section below.

For each Settlement Interval, this pre-calculation will generate the IFM Bid Costs, IFM market revenue, and the IFM Net Amount as the net difference between IFM costs and IFM revenue for various Bid Cost Recovery Eligible Resources (for example, Generating Units, Pumped-Storage Units, Proxy Demand Resources and resource specific System Resources without a Circular Schedule). The IFM Net Amount is subsequently used as an input for CC 6630 – IFM Bid Cost Recovery Settlement and pre-calculation Bid Cost Recovery Sequential Netting.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
|  | This Pre-calc is a daily computation generating results on a Settlement Interval basis. |
|  | For purposes of determining the IFM Unrecovered Bid Cost Uplift Payments and the purposes of allocating Net IFM Bid Cost Uplift, the CAISO shall calculate the IFM Bid Cost Shortfall or the IFM Bid Cost Surplus as the algebraic difference between the IFM Bid Cost and the IFM Market Revenues for each Settlement Interval, subject to the application of the Day-Ahead Metered Adjustment Factor and the Real-time Performance Metric rules defined herein. |
|  | In any Settlement Interval a resource is eligible for Bid Cost Recovery payments pursuant to the rules described in the subsections of Tariff Sections 11.8 and 11.17. |
|  | The IFM Bid Costs shall be calculated pursuant to Tariff Section 11.8.2.1 and the IFM Market Revenues shall be calculated pursuant to Tariff Section 11.8.2.2. |
|  | In order to be eligible for Bid Cost Recovery, Non-Dynamic Resource-Specific System Resources must provide to the CAISO SCADA data by telemetry to the CAISO’s EMS, demonstrating that they have performed in accordance with their CAISO commitments. |
|  | Scheduling Coordinators for Non-Generator Resources are not eligible to recover Start-Up Costs, Minimum Load Costs, Pumping Costs, Pump Shut-Down Costs, or Transition Costs but are eligible to recover Energy Bid Costs, RUC Availability Payments and Ancillary Service Bid Costs. *(Fact)* |
|  | For each Settlement Interval, the CAISO shall calculate IFM Bid Cost for each Bid Cost Recovery Eligible Resource as the algebraic sum of the IFM Start-Up Cost, IFM Transition Cost, IFM Minimum Load Cost, IFM Pump Shut-Down Cost, IFM Energy Bid Cost, IFM Pumping Cost, IFM AS Bid Cost and IFM Imbalance Reserves Bid Cost. |
|  | For Multi-Stage Generating Resources the CAISO will determine the applicable Commitment Period (IFM, RUC or RTM) and select the applicable Start-Up Cost, Minimum Load Cost, and Transition Cost in any given Settlement Interval. *(Fact)* |
|  | For Multi-Stage Generating Resources, the incremental IFM Start-Up, Minimum Load, and Transition Costs to provide Energy Scheduled in the Day-Ahead Schedule or awarded RUC or Ancillary Service capacity for an MSG Configuration other than the self-scheduled MSG Configuration are determined by the IFM. *(Fact)* |
|  | For any Settlement Interval, the IFM Energy Bid Cost for Bid Cost Recovery Eligible Resources, except Participating Loads, shall be the integral of the relevant Energy Bid (Bid price in $/MWh) submitted to the IFM, if any, from the higher of the registered Bid Cost Recovery Eligible Resource’s Minimum Load and the Day-Ahead Total Self-Schedule up to the relevant MWh scheduled in the Day-Ahead Schedule, divided by the number of Settlement Intervals (6) in a Trading Hour. |
|  | The IFM Energy Bid Cost calculations are subject to the application of the Day-Ahead Metered Energy Adjustment Factor and the Persistent Deviation Metric. |
|  | If a Bid Cost Recovery Eligible Resource is committed by the CAISO in the Day-Ahead and receives a Day-Ahead Schedule and subsequently is decommitted by the CAISO in the Real-Time Market, the IFM Energy Bid Costs are subject to the Real-Time Performance Metric. |
|  | If a Multi-Stage Generating Resource is committed by the CAISO and receives a Day-Ahead Schedule and subsequently is committed by the CAISO to a lower MSG Configuration where its Minimum Load capacity as registered in the Master File in the Real-Time Market is lower than the CAISO IFM Commitment Period MSG Configuration’s Minimum Load as registered in the Master File, the resource’s IFM Energy Bid Costs are subject to the Real-Time Performance Metric. |
|  | For Multi-Stage Generating (MSG) Resources, Energy Bid Costs (determined under IFM Net Amount Pre-calculation, RUC Net Amount Pre-calculation, and RTM Net Amount Pre-calculation) shall be calculated at the Generating Unit or Dynamic Resource-Specific System Resource level. |
|  | For any Settlement Interval, the IFM AS Bid Cost shall be the product of the IFM AS Award from each accepted IFM AS Bid and the relevant AS Bid Price, divided by the number of Settlement Intervals in a Trading Hour. |
|  | The CAISO will determine and calculate IFM AS Bid Cost for a Multi-Stage Generating Resource at the Generating Unit or Dynamic Resource-Specific System Resource level. |
|  | The IFM AS Bid Cost shall also include Mileage Bid Costs. |
|  | For any Settlement Interval, the IFM Mileage Bid Cost shall be the product of 1. Instructed Mileage associated with a Day Ahead Regulation capacity award, with the AS Mileage Bid, as adjusted for performance accuracy, and
2. the relevant Mileage Bid price, divided by the number of Settlement Intervals in a Trading Hour.
 |
|  | The CAISO will determine and calculate IFM Mileage Bid Cost for a Multi-Stage Generating Resource at the Generating Unit or Dynamic Resource-Specific System Resource level. |
|  | Resources supplying Mileage from contracted or self-provided Regulation in the Day-Ahead Market are paid a Mileage clearing price for each MW of Instructed Mileage during the Settlement Period. |
|  | If a resource is awarded incremental Regulation in the Real-Time Market, the Instructed Mileage shall be divided between the Day Ahead Market and Real Time Market, in proportion to the Day-Ahead and Real-Time Regulation Capacity awards. |
|  | Instructed Mileage associated with a Day-Ahead Market award will be paid the Day-Ahead Mileage clearing price. |
|  | The CAISO will adjust a resource’s Mileage payments based on the accuracy of the resource’s response to CAISO EMS signals. |
|  | To determine this accuracy adjustment, the CAISO will sum a resource’s Automatic Generation Control set points for each four (4) second Regulation interval every fifteen (15) minutes and then sum the total deviations from the Automatic Generation Control set point for each four (4) second regulation interval during that fifteen (15) minute period. *(Fact)* |
|  | The CAISO will divide the sum of the resource’s Automatic Generation Control set points less the sum of the resource’s total deviations by the sum of the resource’s Automatic Generation Control set points. *(Fact)* |
|  | The CAISO will apply the resulting percentage to the resource’s Regulation performance payments as an accuracy adjustment. |
|  |  |
|  | The CAISO will calculate a Bid Cost Recovery Eligible Resource’s IFM Market Revenue used for purposes of calculating its IFM Bid Cost Shortfalls and IFM Bid Cost Surpluses, and for purposes of allocating the Bid Cost Uplift. |
|  | The IFM Market Revenue calculations for both CAISO IFM Commitment Periods and Self-Committed Periods will be subject to the Day-Ahead Metered Energy Adjustment Factor. |
|  | For any Settlement Interval in a CAISO IFM Commitment Period the IFM Market Revenue for a Bid Cost Recovery Eligible Resource is the algebraic sum of the four (4) revenue products specified below. |
|  | 1. the product of (a) the delivered MWh in the relevant Day-Ahead Schedule above the higher of the total day-ahead self-schedules and the Minimum Load submitted to the IFM in that Trading Hour, and (b) the relevant IFM LMP, divided by the number of Settlement Intervals in a Trading Hour.
 |
|  | For Pumped-Storage Hydro Units and Participating Load operating in the pumping mode or serving Load, the scheduled or delivered DA Energy shall be negative. |
|  | 1. the product of the IFM AS Award from each accepted IFM AS Bid and the relevant Resource-Specific ASMP, divided by the number of Settlement Intervals in a Trading Hour.
 |
|  | 1. the product of the IRU award (as reduced by the unavailable IRU quantity calculated per Section 11.2.1.8.1) and the Locational IRU Price.
 |
|  | 1. the product of the IRD award (as reduced by the unavailable IRD quantity calculated per Section 11.2.1.8.2) and the Locational IRD Price.
 |
|  | In the case of a Multi-Stage Generating Resource, the CAISO will calculate the market revenue at the Generating Unit or Dynamic Resource-Specific System Resource level.  |
|  | For any Settlement Interval in a IFM Self-Commitment Period the IFM Market Revenue for a Bid Cost Recovery Eligible Resource is the algebraic sum of the following two (2) revenue components: |
|  | 1. the product of the MWh above the greater of Minimum Load and Self-Scheduled Energy, in the relevant Day-Ahead Schedule in that Trading Hour and the relevant IFM LMP, divided by the number of Settlement Intervals in a Trading Hour; and
 |
|  | 1. the product of the IFM AS Award from each accepted IFM AS Bid and the relevant Resource-Specific ASMP, divided by the number of Settlement Intervals in a Trading Hour.
 |
|  | The IFM Bid Cost Recovery for MSS Operators differs based on whether the MSS Operator has elected gross or net Settlement. |
|  | For an MSS Operator that has elected gross Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the IFM Bid Cost and the IFM Market Revenue are calculated similarly to non-MSS resources on an individual resource basis. |
|  | For an MSS Operator that has elected net Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the Energy bid costs and revenues for IFM Bid Cost Recovery is settled at the MSS level. |
|  | The IFM Bid Cost and IFM Market Revenue of each MSS will be, respectively, the total of the IFM Bid Costs and IFM Market Revenues over all BCR Eligible Resources within the MSS where each BCR Eligible Resource’s IFM Market Revenues for its Energy shall be calculated at the relevant IFM MSS Price. |
|  | The IFM MSS Price is defined as either (1) the IFM LAP price for the MSS when the MSS scheduled internal Demand exceeds the MSS scheduled internal Supply; or (2) the weighted average of the IFM LMPs for all applicable PNodes within the relevant MSS when MSS scheduled internal Supply exceeds MSS scheduled internal Demand where weighting factors for computing the weighted average are based on the scheduled Supply at the corresponding PNodes. *(Fact)* |
|  | The CAISO shall charge Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement an amount equal to the product of the net MSS Demand in the Day-Ahead Schedule and the IFM MSS Price. |
|  | The net MSS Demand is the quantity of MSS Demand that exceeds MSS Generation for the applicable MSS. |
|  | The CAISO shall pay Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement an amount equal to the product of the net MSS Supply in the Day-Ahead Schedule and the weighted average price of all IFM LMPs for all applicable PNodes within the relevant MSS. |
|  | The net MSS Supply is the quantity of MSS Generation that exceeds the MSS Demand for the applicable MSS. |
|  | The weights used to compute the weighted average LMPs shall be equal to MSS Generation scheduled in the Day-Ahead Schedule. |
|  | The IFM Bid Cost Shortfalls and Surpluses for Energy and AS are first calculated separately for the MSS for each Trading Hour of the Trading Day with qualified Start-Up Cost and qualified Minimum Load Cost included in the IFM Bid Cost Shortfalls and Surpluses for Energy calculation. |
|  | The MSS’s overall IFM Bid Cost Shortfall or Surplus is then calculated as the algebraic sum of the IFM Bid Cost Shortfall or Surplus for Energy and the IFM Bid Cost Shortfall or Surplus for AS for each Trading Hour. |
|  | The IFM Unrecovered Bid Cost Uplift will be modified by application of the Day-Ahead Metered Energy Adjustment Factor. |
|  | The CAISO will adjust for each Bid Cost Recovery Eligible Resource the IFM Energy Bid Cost and IFM Market Revenue calculations by multiplying the Day-Ahead Metered Energy Adjustment Factor with the amounts derived as specified in Tariff Sections 11.8.2.1.5 and 11.8.2.2, respectively. |
|  | The CAISO will apply the Real-Time Performance Metric to the IFM Energy Bid Costs, IFM Minimum Load Costs, IFM Pumping Costs and IFM Market Revenue, as described in Tariff Section 11.8.4.4. |
|  | The CAISO will apply the Day-Ahead Metered Energy Adjustment Factor to the IFM Pumping Bid Costs in the same manner in which the CAISO applies the Day-ahead Metered Energy Adjustment Factor to the IFM Energy Bid Costs. |
|  | In all cases, regardless of the rules specified below, the application of the Day-Ahead Metered Energy Adjustment Factor shall never increase a Bid Cost Recovery Eligible Resource’s Unrecovered Bid Cost Uplift Payments. |
|  | In the event that the CAISO discovers that there has been an increase in the Unrecovered Bid Cost Uplift Payment due to the application of the Day-Ahead Metered Energy Adjustment Factor, the CAISO will adjust the payment to recover the overpayment in a subsequent billing cycle, as permissible. |
|  | If the IFM Energy Bid Costs and the IFM Market Revenues for the amounts of Day-Ahead Scheduled Energy above the Bid Cost Recovery Eligible Resource’s Minimum Load are greater than or equal to zero (0), the CAISO will apply the Day-Ahead Metered Energy Adjustment Factor to the IFM Energy Bid Costs, but not the IFM Market Revenue. |
|  | If the IFM Energy Bid Costs are greater than or equal to zero (0) and the IFM Market Revenues are negative, the CAISO will apply the Day-Ahead Metered Energy Adjustment Factor to both the IFM Energy Bid Costs and corresponding IFM Market Revenues. |
|  | If the IFM Energy Bid Costs are negative and IFM Market Revenues are greater or equal to zero, the CAISO will not apply the Day-Ahead Metered Energy Adjustment Factor to IFM Energy Bid Cost or IFM Market Revenue calculations. |
|  | If the IFM Energy Bid Costs and the IFM Market Revenues are both negative, the CAISO will apply the Day-Ahead Metered Energy Adjustment Factor to the IFM Market Revenues, but it will not apply it to the IFM Energy Bid Costs. |
|  | 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 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 the conditions in Tariff Section 11.8.2.1.2 (c) or Tariff Section 11.8.2.1.2(d) apply, the CAISO will adjust the IFM Minimum Load Cost, IFM Energy Bid Cost and IFM Market Revenue calculations by multiplying the Real-Time Performance Metric with those amounts for the applicable Settlement Interval. |
|  | The CAISO will apply the Real-time Performance Metric to the IFM Pumping Bid Costs in the same manner in which the CAISO applies the Real-time Performance Metric to the IFM Energy Bid Costs. |
|  | In all cases, regardless of the rules specified herein, the application of the Real-Time Performance Metric shall never increase a BCR Eligible Resource’s Unrecovered Bid Cost Uplift payments. |
|  | In the event that the CAISO discovers that such there has been an increase in the Unrecovered Bid Cost Uplift payment, the ISO will adjust the payment to recover the overpayment, in a subsequent billing cycle as permissible. |
|  | If the IFM Energy Bid Cost plus the IFM Minimum Load Cost and the IFM Market Revenues are greater than or equal to zero (0), the CAISO will apply the Real-Time Performance Metric instead of Day-Ahead Energy Adjustment Factor to the IFM Minimum Load Costs and IFM Energy Bid Costs, and not the IFM Market Revenues. |
|  | If the IFM Energy Bid Costs plus the IFM Minimum Load Cost are greater than or equal to zero (0) and the IFM Market Revenues are negative, the ISO will apply the Real-Time Performance Metric instead of the Day-ahead Metered Energy Adjustment Factor to the IFM Minimum Load Costs and IFM Energy Bid Costs, and the IFM Market Revenues. |
|  | If the IFM Energy Bid Costs plus the IFM Minimum Load Costs and the IFM Market Revenues are negative, the CAISO will apply the Real-Time Performance Metric instead of the Day-Ahead Metered Energy Adjustment Factor to the IFM Market Revenues but not the IFM Minimum Load Costs and IFM Energy Bid Costs.  |
|  | If the IFM Energy Bid Costs plus the IFM Minimum Load Costs and the IFM Market Revenues are negative, the CAISO will apply the Real-Time Performance Metric instead of the Day-Ahead Metered Energy Adjustment Factor to the IFM Market Revenues but not the IFM Minimum Load Costs and IFM Energy Bid Costs. |
|  | Bid Cost Recovery (BCR) Eligible Resources are those resources eligible to participate in the Bid Cost Recovery as specified in Tariff Section 11.8 (Bid Cost Recovery). They include Generating Units, System Units, System Resources with RTM Economic Bids, Participating Loads, Reliability Demand Response Resources, and Proxy Demand Resources and, for purposes of scheduling and operating the Real-Time Market only, EIM Resources. (Fact) |
|  | A System Resource that has a Schedule that results from Bids submitted in violation of Section Tariff 30.5.5 (Scheduling Sourcing/Sinking in Same Balancing Authority Area) shall not be a Bid Cost Recovery Eligible Resource for any Settlement Interval that occurs during the time period covered by the Schedule that results from Bids submitted in violation of Section Tariff 30.5.5. |
|  | For RMR resources subject to new Tariff, variable energy cost opportunity cost adders shall reduce bid cost per MWh assessed under bid cost recovery. |
|  | For RMR resources subject to new Tariff, market revenues in excess of qualified costs shall be subject to a true up. This excess revenue will be subtracted from capacity payments. The qualified cost is the bid cost less variable energy costs opportunity cost adder. |
|  | For a resource that is exempt from wholesale charges in an interval, that resource shall also be ineligible for Bid Cost Recovery in that interval. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Pre-calc – Start-Up and Minimum Load Cost  |
| Pre-calc – Metered Energy Adjustment Factor |
| Pre-calc – RT Energy Quantity |
| Pre-calc – RT Price |
| CC 6011 – Day Ahead Energy, Congestion, Loss Settlement |
| CC 6100 – Day Ahead Spinning Reserve Capacity Settlement |
| CC 6200 – Day Ahead Non Spinning Reserve Capacity Settlement |
| CC 6500 – Day Ahead Regulation Up Capacity Settlement |
| CC 6600 – Day Ahead Regulation Down Capacity Settlement |
| CC 7251 – Regulation Up Mileage Settlement |
| CC 7261 – Regulation Down Mileage Settlement |
| CC 8071 - Day Ahead Imbalance Reserve Up Settlement |
| CC 8081 - Day Ahead Imbalance Reserve Down Settlement |
| CC 8310 – Day Ahead Greenhouse Gas Emission Cost Revenue |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Pre-calc – RTM Net Amount |
| Pre-calc – RUC Net Amount |
| CC 6630 – IFM Bid Cost Recovery Settlement  |
| Pre-calc – Bid Cost Recovery Sequential Netting |
| CC 7020 – Daily RMR Capacity Payment |

## Inputs – External Systems

| Row | Variable Name | Description |
| --- | --- | --- |
|  | PTB\_BAHourlyResourceCircularScheduleFlag BrtF’S’Jmdh | Flag input (1/ Blank) that indicates whether or not a system resource has a circular schedule for a given Trading Hour. The input = 1 to indicate a circular schedule and is blank otherwise (when a resource does not have a circular schedule). |
|  | DAMinimumLoadQuantity BrtuT’I’M’VL’W’R’F’S’mdhcif | Day Ahead Minimum Load Quantity (provided by MQS) for a given resource and Settlement Interval.  |
|  | DAAwardedRegUpBidCapacityBrtQ’uT’I’M’VL’W’R’F’S’mdh | Day Ahead Regulation Up Awarded Bid Capacity (in MW) for a given resource and Trading Hour.  |
|  | DAAwardedRegDownBidCapacityBrtQ’uT’I’M’VL’W’R’F’S’mdh | Day Ahead Regulation Down Awarded Bid Capacity (in MW) for a given resource and Trading Hour. |
|  | DAEnergyBidPrice BrtuT’bI’M’VL’W’R’F’S’mdhcif | Day Ahead Energy Bid Price (in $/MWh) for a given resource and Settlement Interval.  |
|  | BAHourlyResourceDayAheadLMP Brtmdh | Day Ahead Locational Marginal Price (in $/MWh) for a given resource and Trading Hour. Prices for Resource-Specific System Resources (Tie Generators) shall be mapped to Resource-Specific Day Ahead LMP. Prices for Non-Dynamic System Resource shall be mapped to Day Ahead Intertie LMP. |
|  | DAScheduleEnergyAllocationQuantityBrtuT’bI’Q’M’VL’W’R’F’S’mdhcif | The Day Ahead Expected Energy Allocation Schedule quantity (in MWh), inclusive of Minimum Load, Self-schedule, and awarded bid Energy for a given resource and Settlement Interval.  |
|  | DASelfSchedule BrtuT’I’M’VL’W’R’F’S’mdhcif | The Self Schedule energy quantity (in MWh) of the Day Ahead Schedule above Minimum Load for a given resource and Settlement Interval.  |
|  | DAPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif | The Day Ahead Pumping Energy (in MWh) scheduled for a given Balancing Authority Area, Pumped Storage Unit or Participating Load resource, and Settlement Interval. |
|  | DALoadSchedule BrtuT’I’Q’M’AA’R’pW’F’S’vVL’mdh | DA Load Schedule (in MW) for a given resource and Trading Hour. The input presents data for non-participating load resource IDs of a Balancing Authority Area. All input values are negative.  |
|  | DABidAwardEnergyQuantityBrtuT’I’M’VL’W’R’F’S’mdhcif | The Day Ahead Awarded Expected Energy Bid quantity (in MWh) above Minimum Load and Self Schedule for a given resource and Settlement Interval. |
|  | SettlementIntervalIFMCAISOCommitPeriod BrtF’S’mdhcif | A flag (as a Boolean value – 0/1) that indicates for a given resource and Settlement Interval whether or not the resource was committed ON by CAISO in IFM. ON = 1, OFF or Self-Committed = 0 |
|  | IFMPumpingCostFlag BrtuT’I’M’F’S’mdhcif | A flag (as a Boolean value – 0/1) that indicates for a given resource and Settlement Interval whether or not IFM Pumping Costs are qualified for cost compensation.Qualified = 1, Not qualified = 0.  |
|  | CAISOHourlyDARegUpMileagePrice mdh | Provides the IFM Regulation Up Mileage marginal price (in $/MWh) for a given resource and Trading Hour. |
|  | BA15MinuteResourceRegUpPerformanceAccuracyPercentage BrtQ’mdhc | Provides the performance accuracy factor (as a decimal number between 0 and 1) of the Regulation Up Mileage for a given resource and FMM Interval. |
|  | BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc | Adjusted Regulation Up Mileage (in MWh) that has incorporated any necessary under-response adjustment per resource per 15-minute interval. The input is provided for a given resource and FMM Interval. |
|  | DARegUpQSPBrtQ’uT’I’M’VL’W’R’F’S’Nz’mdh | IFM Regulation Up AS qualified self-provided capacity (in MW) for a given resource and Trading Hour. |
|  | RegUpCapacitySchedule BrtQ’uT’I’M’VL’W’R’F’S’mdhc | Final RTPD Cleared Regulation Up Capacity (in MW) for a given resource and FMM Interval. The input includes both any economic award and any qualified self-provision (QSP) Reg Up AS that together represent the amount of Regulation Up capacity that the resource is expected to deliver in real-time. |
|  | BAHourlyResourceDARegUpMileageBidPrice BrtQ’mdh | Day-ahead Regulation Up Mileage Bid Price (in $/MWh) for a given resource and Trading Hour. |
|  | CAISOHourlyDARegDownMileagePrice mdh | Provides the IFM Regulation Up Mileage marginal price (in $/MWh) for a given resource and Trading Hour. |
|  | BA15MinuteResourceRegDownPerformanceAccuracyPercentage BrtQ’mdhc | Provides the performance accuracy factor (as a decimal number between 0 and 1) of the Regulation Down Mileage for a given resource and FMM Interval. |
|  | BA15MinuteResourceAdjustedRegDownMileageQty BrtQ’mdhc | Adjusted Regulation Down Mileage (in MWh) that has incorporated any necessary under-response adjustment per resource per 15-minute interval. The input is provided for a given resource and FMM Interval. |
|  | DARegDownQSPBrtQ’uT’I’M’VL’W’R’F’S’Nz’mdh | IFM Regulation Down AS qualified self-provided capacity (in MW) for a given resource and Trading Hour. |
|  | RegDownCapacitySchedule BrtQ’uT’I’M’VL’W’R’F’S’mdhc | Final RTPD Cleared Regulation Down Capacity (in MW) for a given resource and FMM Interval. The input includes both any economic award and any qualified self-provision (QSP) Reg Down AS that together represent the amount of Regulation Down capacity that the resource is expected to deliver in real-time. |
|  | BAHourlyResourceDARegDownMileageBidPrice BrtQ’mdh | Day-ahead Regulation Down Mileage Bid Price (in $/MWh) for a given resource and Trading Hour. |
|  | RMRResFlag rm | Identifies a resource is an RMR subject to new Tariff and RAAIM assessment. |
|  | BAHourlyResIRUSchedQty BrtuT'I'Q'M'F'S'L'mdh | The Hourly IFM Imbalance Reserve Up Schedule Quantity for each Resource for every hour for each trading day. |
|  | BAHourlyResIRDSchedQty BrtuT'I'Q'M'F'S'L'mdh | The Hourly IFM Imbalance Reserve Down Schedule Quantity for each Resource for every hour for each trading day. |
|  | BAHourlyResIRUPrc BrtQ’mdh | The Hourly IFM Imbalance Reserve Up Price for each Resource for every hour of each trading day. This is the same as the Locational IRU Price. |
|  | BAHourlyResIRUBidPrc Brmdh | The Hourly IFM Imbalance Reserve Down Bid Price for each Resource for every hour of each trading day. |
|  | BAHourlyResIRDPrc BrtQ’mdh | The Hourly IFM Imbalance Reserve Down Price for each Resource for every hour of each trading day. This is the same as the Locational IRD Price. |
|  | BAHourlyResIRDBidPrc Brmdh | The Hourly IFM Imbalance Reserve Down Bid Price for each Resource for every hour of each trading day. |

## Inputs - Predecessor Charge Codes or Pre-calculations

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Predecessor Charge Code/ Pre-calc Configuration |
|  | BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif | Pre-calc – Metered Energy Adjustment Factor |
|  | DAMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif | Pre-calc – Metered Energy Adjustment Factor |
|  | TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif | Pre-calc – Metered Energy Adjustment Factor |
|  | ResourceToBAAMapFactor BruT’I’Q’M’F’md | Pre-calc – Metered Energy Adjustment Factor |
|  | MSSToBAAMapFactor BT’I’Q’M’md | Pre-calc – Metered Energy Adjustment Factor |
|  | BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif | Pre-calc – Metered Energy Adjustment Factor |
|  | AvailableIFMMLC BrtuT’I’M’F’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | IFMMLC\_PMinOperMW BrtF’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | RTMMLC\_PMinOperMW BrtF’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | EligibleIFMSUC BrtuT’I’M’F’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | AvailableIFMPumpingCost BrtuT’I’M’F’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | EligibleIFMSDC BrtuT’I’M’F’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | EligibleIFMTCBrtuT’I’M’F’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | MLC\_PMinRealTimeOnFlag BrtF’S’mdhcif | Pre-calc – Start-Up and Minimum Load Cost |
|  | VEC\_OCAdderPrice Brtmdhcif | Pre-calc – Real Time Price |
|  | MSSNetHourlyDAEnergyResourceLMP Brtmdh  | CC 6011 – Day Ahead Energy, Congestion, Loss Settlement |
|  | DASpinSettlementAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6100 – Day Ahead Spinning Reserve Capacity Settlement |
|  | DASpinBidCostAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6100 – Day Ahead Spinning Reserve Capacity Settlement |
|  | DANonSpinBidCostAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6200 – Day Ahead Non Spinning Reserve Capacity Settlement |
|  | DANonSpinSettlementAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6200 – Day Ahead Non Spinning Reserve Capacity Settlement |
|  | DARegUpBidCostAmount BrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6500 – Day Ahead Regulation Up Capacity Settlement |
|  | DARegUpSettlementAmount BrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6500 – Day Ahead Regulation Up Capacity Settlement |
|  | DARegDownBidCostAmount BrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6600 – Day Ahead Regulation Down Capacity Settlement |
|  | DARegDownSettlementAmount BrtQ’uT’I’M’VL’W’R’F’S’mdh | CC 6600 – Day Ahead Regulation Down Capacity Settlement |
|  | BA15MinuteResourceHigherDAOrRTRegUpSchedule BrtQ’mdhc | CC 7251 – Regulation Up Mileage SettlementThe maximum value (in MW) of the DA and RT Reg Up AS Schedules. The input amounts to the DA Reg Up Schedule plus any additional positive-valued incremental RT Reg Up AS in association with a given Business Associate and FMM Interval. |
|  | BA15MinuteResourceHigherDAOrRTRegDownSchedule BrtQ’mdhc | CC 7261 – Regulation Down Mileage SettlementThe maximum value (in MW) of the DA and RT Reg Down AS Schedules. The input amounts to the DA Reg Down Schedule plus any additional positive-valued incremental RT Reg Down AS in association with a given Business Associate and FMM Interval. |
|  | BA15MinuteResourceDARegUpMileagePayment BrtQ’mdhc | CC 7251 – Regulation Up Mileage SettlementDay-Ahead Market portion of Regulation Up AS mileage settlement amount (in $) in association with a given Business Associate and FMM Interval. |
|  | BA15MinuteResourceDARegDownMileagePayment BrtQ’mdhc | CC 7261 – Regulation Down Mileage SettlementDay-Ahead Market portion of Regulation Down AS mileage settlement amount (in $) in association with a given Business Associate and FMM Interval. |
|  | ResourceWholesaleExemptionFlag rmdhcif | Pre-calc Real Time Energy Quantity |
|  | BAHourlyResIRU\_NonComplianceQuantityBrtmdh | CC 8071 – Day Ahead Imbalance Reserve Up Settlement |
|  | BAHourlyResIRD\_NonComplianceQuantityBrtmdh | CC 8081 – Day Ahead Imbalance Reserve Down Settlement |
|  | BAResourceEDAMIFMNetGHGAmount BrQ’F’mdh | CC 8310 – Day Ahead Greenhouse Gas Emission Cost Revenue |

## CAISO Formula

 For Non-MSS entities and MSS entities with Gross Settlement Election

IFMNetAmount BrQ’uT’I’M’F’mdhcif=

(( 1 – INTDUPLICATE(BAHourlyResourceCircularScheduleFlag BrF’mdh )) \*(1 - ResourceWholesaleExemptionFlag *rmdhcif*) \*( BAResourceEDAMIFMNetGHGAmount BrQ’F’mdh + IFMBidCostAmount BruT’I’M’F’mdhcif – IFMRevenueAmount BruT’I’M’F’mdhcif ) )

Where ResourceToBAAMapFactor BruT’I’Q’M’F’md exists

#### Where BAHourlyResourceCircularScheduleFlag BrF’mdh =

 Sum over (t, S’, J) {PTB\_BAHourlyResourceCircularScheduleFlag BrtF’S’Jmdh

#### Where IFMBidCostAmount BruT’I’M’F’mdhcif =

Sum over (t, S’) {NonMSSIFMBidCostAmount BrtuT’I’M’F’S’mdhcif +

GrossMSSIFMBidCostAmount BrtuT’I’M’F’S’mdhcif }

#### Where Entity Type T’ <> MSS

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

(EligibleIFMSUC BrtuT’I’M’F’S’mdhcif +

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

EligibleIFMSDC BrtuT’I’M’F’S’mdhcif +

EligibleIFMTCBrtuT’I’M’F’S’mdhcif +

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

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

BASettlementIntervalReslFMIRBidCostAmount BrtuT’I’M’F’S’mdhcif

)

#### Where Entity Type T’ = MSS And MSS Energy Settlement Election I’ = Gross)

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

(EligibleIFMSUC BrtuT’I’M’F’S’mdhcif +

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

EligibleIFMSDC BrtuT’I’M’F’S’mdhcif +

EligibleIFMTCBrtuT’I’M’F’S’mdhcif +

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

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

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

#### Where IFMRevenueAmount BruT’I’M’F’mdhcif =

 Sum over (t, S’) {NonMSSIFMRevenueAmount BrtuT’I’M’F’S’mdhcif

+ GrossMSSIFMRevenueAmount BrtuT’I’M’F’S’mdhcif }

#### Where Entity Type T’ <> MSS

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

 BAResourceSettlementIntervalIFMASRevenueAmount BrtuT’I’M’F’S’mdhcif

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

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

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

#### Entity Type T’ = MSS And MSS Energy Settlement Election I’ = Gross

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

 BAResourceSettlementIntervalIFMASRevenueAmount BrtuT’I’M’F’S’mdhcif

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

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

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

#### Where MSS Energy Settlement Election I’ <> ‘NET’

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

IF

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif = 0
Or
IFMMLC\_PMinOperMW BrtF’S’mdhcif > RTMMLC\_PMinOperMW BrtF’S’mdhcif

THEN

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

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif \* BASettlementIntervalResourceRTPerfMetricMarketRevenueAmount BrtuT’I’M’F’S’mdhcif

ELSE

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

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif \* ( (AvailableIFMMLRevenueAmountBrtuT’I’M’F’S’mdhcif \* MLC\_PMinRealTimeOnFlag BrtF’S’mdhcif ) +
IFMDAEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif )

END IF

Where Exists

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

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

IF

AvailableIFMMarketRevenueAmount BrtuT’I’M’F’S’mdhcif < 0

THEN

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

AvailableIFMMarketRevenueAmount BrtuT’I’M’F’S’mdhcif \* BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif

ELSE

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

AvailableIFMMarketRevenueAmount BrtuT’I’M’F’S’mdhcif

END IF

Where MSS Energy Settlement Election I’ <> ‘NET’

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

AvailableIFMPumpingEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif
+ AvailableIFMMLRevenueAmountBrtuT’I’M’F’S’mdhcif
+ IFMDAEnergyRevenueAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif

#### IFMDAEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif =

IF

IFMDAEnergyRevenueAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif + AvailableIFMPumpingEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif < 0

THEN

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

DAMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif \* (IFMDAEnergyRevenueAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif + AvailableIFMPumpingEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif )

ELSE

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

IFMDAEnergyRevenueAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif + AvailableIFMPumpingEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif

END IF

Where MSS Energy Settlement Election I’ <> ‘NET’ And (Resource Type t In (GEN or ITIE) )

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

( DABidAwardEnergyQuantity BrtuT’I’M’VL’W’R’F’S’mdhcif \* BAHourlyResourceDayAheadLMP Brtmdh )

#### Where MSS Energy Settlement Election I’ <> ‘NET’

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

( BASettlementIntervalEntityResourceDAPumpingEnergy BrtuT’I’M’VL’W’R’F’S’mdhcif \*

BAHourlyResourceDayAheadLMP Brtmdh \*

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

#####  Where

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

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

Note:

Input CT DAPumpingEnergy BrtuT’I’Q’M’VL’W’R’F’S’mdhcif is assumed to exist only for cases “where Entity Component Type F’ In (PMPP, PMPST)”

Where MSS Energy Settlement Election I’ <> ‘NET’

AvailableIFMMLRevenueAmountBrtuT’I’M’F’S’mdhcif =

( DAMinimumLoadQuantity BrtuT’I’M’VL’W’R’F’S’mdhcif \*

BAHourlyResourceDayAheadLMP Brtmdh \*

SettlementIntervalIFMCAISOCommitPeriod BrtF’S’mdhcif )

Note:

Input CT DAMinimumLoadQuantity BrtuT’I’M’VL’W’R’F’S’mdhcif is assumed to exist only for cases “where Resource Type t In (GEN, ITIE)”

#### EligibleIFMBidCostAmount BrtuT’I’M’F’S’mdhcif =

IF

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif = 0
Or
IFMMLC\_PMinOperMW BrtF’S’mdhcif > RTMMLC\_PMinOperMW BrtF’S’mdhcif

THEN

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

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif \* BASettlementIntervalResourceRTPerfMetricIFMBidCostAmount BrtuT’I’M’F’S’mdhcif

ELSE

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

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif \* ( (AvailableIFMMLC BrtuT’I’M’F’S’mdhcif \* MLC\_PMinRealTimeOnFlag BrtF’S’mdhcif )
+ IFMEnergyBidCostAmount BrtuT’I’M’F’S’mdhcif )

END IF

Where Exists

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

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

IF

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

THEN

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

AvailableIFMBidCostAmount BrtuT’I’M’F’S’mdhcif \* BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif

ELSE

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

AvailableIFMBidCostAmount BrtuT’I’M’F’S’mdhcif

END IF

Where

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

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

AvailableIFMPumpingCost BrtuT’I’M’F’S’mdhcif +
IFMEnergyBidCostAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif

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

IF

IFMEnergyBidCostAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif + AvailableIFMPumpingCost BrtuT’I’M’F’S’mdhcif >= 0

THEN

IFMEnergyBidCostAmount BrtuT’I’M’F’S’mdhcif = DAMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif \* (IFMEnergyBidCostAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif + AvailableIFMPumpingCost BrtuT’I’M’F’S’mdhcif )

ELSE

IFMEnergyBidCostAmount BrtuT’I’M’F’S’mdhcif = IFMEnergyBidCostAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif + AvailableIFMPumpingCost BrtuT’I’M’F’S’mdhcif

END IF

Where Resource Type t In (GEN or ITIE)

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

DAScheduleEnergyAllocationQuantityBrtuT’bI’Q’M’VL’W’R’F’S’mdhcif \* [

If (DAEnergyBidPrice BrtuT’bI’M’VL’W’R’F’S’mdhcif = 0, Then

0

Else

(DAEnergyBidPrice BrtuT’bI’M’VL’W’R’F’S’mdhcif - VEC\_OCAdderPrice Brtmdhcif)

]

**Note:**

For Minimum Load DA Energy and Self-scheduled DA Energy, DAEnergyBidPrice BrtuT’bI’M’VL’W’R’F’S’mdhcif is expected to equal 0 in the above formula.

**MSS Net Settlement**

### For MSS entities with Net Settlement election:

IFMMSSNetBCRAmount BQ’T’I’M’mdhcif =

IFMMSSNetEnergyBidCostAmount BT’I’M’mdhcif +

IFMMSSNetASBidCostAmount BT’I’M’mdhcif +

IFMMSSNetRegMileageBidCostAmount BT’I’M’mdhcif +

IFMMSSNetIRBidCostAmount BT’I’M’mdhcif

Where MSSToBAAMapFactor BT’I’Q’M’md exists

#### Where Entity Type T’ = MSS and MSS Energy Settlement Election I’ = Net

IFMMSSNetASBidCostAmount BT’I’M’mdhcif =

** ( BAResourceSettlementIntervalIFMASBidCostAmount BrtuT’I’M’F’S’mdhcif –

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

##### Where IFMMSSNetEnergyBidCostAmount BT’I’M’mdhcif =

IFMMSSEnergyBidCostAmount BT’I’M’mdhcif–

IFMMSSEnergyRevenueAmount BT’I’M’mdhcif

##### Where IFMMSSEnergyBidCostAmount BT’I’M’mdhcif=

(1 - ResourceWholesaleExemptionFlag *rmdhcif*)\*(IFMResourceMSSEnergyBidCostAmount BrtuT’I’M’F’S’mdhcif)

##### Where Entity Type T’ = MSS and MSS Energy Settlement Election I’ = Net

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

EligibleIFMSUC BrtuT’I’M’F’S’mdhcif +
EligibleIFMTC BrtuT’I’M’F’S’mdhcif +
EligibleIFMBidCostAmount BrtuT’I’M’F’S’mdhcif +
EligibleIFMSDC BrtuT’I’M’F’S’mdhcif

##### Where IFMMSSEnergyRevenueAmount BT’I’M’mdhcif =

(1 - ResourceWholesaleExemptionFlag *rmdhcif*)\*(BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif \* IFMMSSExpectedEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif)

Where Exists

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

##### Where IFMMSSExpectedEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif =

IF

TotalExpectedEnergyFiltered BrtuT’I’M’F’S’mdhcif = 0
Or
IFMMLC\_PMinOperMW BrtF’S’mdhcif > RTMMLC\_PMinOperMW BrtF’S’mdhcif

THEN

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

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

ELSE

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

 ( ( BASettlementIntervalResourceNetMSSAvailableIFMMinLoadEnergyRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif \* MLC\_PMinRealTimeOnFlag BrtF’S’mdhcif )
+ BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif )

END IF

Where

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

IF

BADispIntResNetMSSAvailableIFMMarketRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif < 0

THEN

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

BADispIntResNetMSSAvailableIFMMarketRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif \*
BASettlementIntervalResourceRTPerformanceMetric BrtuT’I’M’F’S’mdhcif

ELSE

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

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

END IF

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

BASettlementIntervalResourceNetMSSAvailableIFMMinLoadEnergyRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif
+ BASettlementIntervalResourceNetMSSAvailableDAPumpingRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif
+ BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithoutMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif

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

IF

BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithoutMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif
+ BASettlementIntervalResourceNetMSSAvailableDAPumpingRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif < 0

THEN

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

(BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithoutMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif + BASettlementIntervalResourceNetMSSAvailableDAPumpingRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif ) \* DAMeteredEnergyAdjustmentFactor BrtuT’I’M’F’S’mdhcif

ELSE

BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif = BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithoutMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif + BASettlementIntervalResourceNetMSSAvailableDAPumpingRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif

END IF

Where Entity Type T’ = MSS And MSS Energy Settlement Election I’ = Net And Resource Type t = GEN

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

DABidAwardEnergyQuantityBrtuT’I’M’VL’W’R’F’S’mdhcif \* MSSNetHourlyDAEnergyResourceLMP **Brtmdh**

**Note:**

The same hourly price value of Charge Type MSSNetHourlyDAEnergyResourceLMP Brtmdh applies to and is used as the 5-minute DA LMP for each Settlement Interval of the Trading Hour.

Where Entity Type T’ = MSS and Energy Settlement Type I’ = Net And Resource Type t = GEN

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

DAMinimumLoadQuantity BrtuT’I’M’VL’W’R’F’S’mdhcif \*

SettlementIntervalIFMCAISOCommitPeriod BrtF’S’mdhcif \*
MSSNetHourlyDAEnergyResourceLMP Brtmdh

**Note:**

The same hourly price value of Charge Type MSSNetHourlyDAEnergyResourceLMP Brtmdh applies to and is used as the 5-minute DA LMP for each Settlement Interval of the Trading Hour

Where Entity Type T’ = MSS and MSS Energy Settlement Election I’ = Net And Entity Component Type F’ In { PMPP, PMPST }

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

BASettlementIntervalEntityResourceDAPumpingEnergy BrtuT’I’M’VL’W’R’F’S’mdhcif \*

MSSNetHourlyDAEnergyResourceLMP Brtmdh \*

IFMPumpingCostFlag BrtuT’I’M’F’S’mdhcif

**Note:**

The same hourly price value of Charge Type MSSNetHourlyDAEnergyResourceLMP Brtmdh applies to and is used as the 5-minute DA LMP for each Settlement Interval of the Trading Hour

Where Entity Type T’ = MSS and MSS Energy Settlement Election I’ = Net And Resource Type t = GEN

IFMMSSNetRegMileageBidCostAmount BT’I’M’mdhcif =

 (IFMRegMileageBidCostAmount BrtuT’I’M’F’S’mdhcif –

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

Where Entity Type T’ = MSS and MSS Energy Settlement Election I’ = Net And Resource Type t = GEN

IFMMSSNetIRBidCostAmount BT’I’M’mdhcif =

Sum over (r, t, u, F’, S’)

{BASettlementIntervalReslFMIRBidCostAmount BrtuT’I’M’F’S’mdhcif –

BASettlementIntervalResIFMIRRevenueAmount BrtuT’I’M’F’S’mdhcif }

### BAResourceSettlementIntervalIFMASRevenueAmount BrtuT’I’M’F’S’mdhcif =

Sum (Q’, V, L’, W’, R’) ( (-1/12) \* (DASpinSettlementAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh  +

DANonSpinSettlementAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh +

DARegUpSettlementAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh +

DARegDownSettlementAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh ) )

Where Q’ = ‘CISO’

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

Sum (Q’, V, L’, W’, R’) ( (-1/12) \* (DASpinBidCostAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh +

DANonSpinBidCostAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh +

DARegUpBidCostAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh  +

DARegDownBidCostAmountBrtQ’uT’I’M’VL’W’R’F’S’mdh ) )

Where Q’ = ‘CISO’

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

BAHourlyResIFMIRRevenueAmount BrtuT’I’M’F’S’mdh

Implementation Note: Automatic frequency occurs here.

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

BAHourlyReslFMIRBidCostAmount BrtuT’I’M’F’S’mdh

 Implementation Note: Automatic frequency conversion occurs here.

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

Sum over (Q’, L’ ) {

([BAHourlyResIRUSchedQty BrtuT'I'Q'M'F'S'L'mdh - BAHourlyResIRU\_NonComplianceQuantityBrtmdh ] \* BAHourlyResIRUPrc BrtQ’mdh ) +

([BAHourlyResIRDSchedQty BrtuT'I'Q'M'F'S'L'mdh - BAHourlyResIRD\_NonComplianceQuantityBrtmdh ] \* BAHourlyResIRDPrc BrtQ’mdh )

 }

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

Sum over (Q’, L’ ) {

([BAHourlyResIRUSchedQty BrtuT'I'Q'M'F'S'L'mdh - BAHourlyResIRU\_NonComplianceQuantityBrtmdh ]\*BAHourlyResIRUBidPrc Brmdh)+

([BAHourlyResIRDSchedQty BrtuT'I'Q'M'F'S'L'mdh - BAHourlyResIRD\_NonComplianceQuantityBrtmdh ]\*BAHourlyResIRDBidPrc Brmdh )

 }

**IFM Regulation Mileage Bid Cost**

Where IFMRegMileageBidCostAmount BrtuT’I’M’F’S’mdhcif =

Sum (Q’) IFMRegUpMileageBidCostAmount BrtQ’uT’I’M’F’S’mdhcif + IFMRegDownMileageBidCostAmount BrtQ’uT’I’M’F’S’mdhcif

Where Q’ = ‘CISO’

**IFM Regulation Up Mileage Bid Cost**

Where IFMRegUpMileageBidCostAmount BrtQ’uT’I’M’F’S’mdhcif =

(1/3) \* (BA15MinResourceIFMRegUpMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc + BA15MinResourceIFMRegUpMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc )

**IFM Regulation Up Mileage Self-Provided Bid Cost**

#### Where BA15MinResourceIFMRegUpMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc =

IF BA15MinResourceRegUpCapacity BrtQ’uT’I’M’F’S’mdhc <> 0

THEN

BA15MinResourceIFMRegUpMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc =
(CAISOHourlyDARegUpMileagePrice mdh \* BA15MinuteResourceRegUpPerformanceAccuracyPercentage BrtQ’mdhc \* BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc \* (BA15MinResourceIFMRegUpQSPCapacity BrtQ’uT’I’M’F’S’mdhc / BA15MinuteResourceHigherDAOrRTRegUpSchedule BrtQ’mdhc ) )

ELSE

BA15MinResourceIFMRegUpMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc = 0

END IF

Where Exists

BA15MinResourceIFMRegUpQSPCapacity BrtQ’uT’I’M’F’S’mdhc

**Note:**

In design the hourly quantity CAISOHourlyDARegUpMileagePrice mdh must be duplicated for each 15-minute interval.

#### Where BA15MinResourceIFMRegUpQSPCapacity BrtQ’uT’I’M’F’S’mdhc =

DARegUpQSPBrtQ’uT’I’M’VL’W’R’F’S’Nz’mdh

Where

Resource Type t = GEN or ITIE

**Note:**

In design the hourly quantity DARegUpQSPBrtQ’uT’I’M’VL’W’R’F’S’Nz’mdh must be duplicated for each 15-minute interval.

#### Where BA15MinResourceRegUpCapacity BrtQ’uT’I’M’F’S’mdhc =

 RegUpCapacitySchedule BrtQ’uT’I’M’VL’W’R’F’S’mdhc

**IFM Regulation Up Mileage Awarded Bid Cost**

#### Where BA15MinResourceIFMRegUpMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc =

IF BA15MinResourceRegUpCapacity BrtQ’uT’I’M’F’S’mdhc <> 0

THEN

BA15MinResourceIFMRegUpMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc =
(BAHourlyResourceDARegUpMileageBidPrice BrtQ’mdh \* BA15MinuteResourceRegUpPerformanceAccuracyPercentage BrtQ’mdhc \* BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc \* (BA15MinResourceIFMRegUpAwardedBidCapacity BrtQ’uT’I’M’F’S’mdhc / BA15MinuteResourceHigherDAOrRTRegUpSchedule BrtQ’mdhc ) )

ELSE

BA15MinResourceIFMRegUpMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc = 0

END IF

Where Exists

BA15MinResourceIFMRegUpAwardedBidCapacity BrtQ’uT’I’M’F’S’mdhc

**Note:**

In design the hourly quantity BAHourlyResourceDARegUpMileageBidPrice BrtQ’mdh must be duplicated for each 15-minute interval.

#### BA15MinResourceIFMRegUpAwardedBidCapacityBrtQ’uT’I’M’F’S’mdhc =

DAAwardedRegUpBidCapacityBrtQ’uT’I’M’VL’W’R’F’S’mdh

Where

Resource Type t = GEN or ITIE

**Note:**

In design the hourly quantity DAAwardedRegUpBidCapacityBrtQ’uT’I’M’VL’W’R’F’S’mdh must be duplicated for each 15-minute interval.

**IFM Regulation Down Mileage Bid Cost**

Where IFMRegDownMileageBidCostAmount BrtQ’uT’I’M’F’S’mdhcif =

(1/3) \* (BA15MinResourceIFMRegDownMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc + BA15MinResourceIFMRegDownMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc )

**IFM Regulation Down Mileage Self-Provided Bid Cost**

#### Where BA15MinResourceIFMRegDownMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc =

IF BA15MinResourceRegDownCapacity BrtQ’uT’I’M’F’S’mdhc <> 0

THEN

BA15MinResourceIFMRegDownMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc =
(CAISOHourlyDARegDownMileagePrice mdh \* BA15MinuteResourceRegDownPerformanceAccuracyPercentage BrtQ’mdhc \* BA15MinuteResourceAdjustedRegDownMileageQty BrtQ’mdhc \* (BA15MinResourceIFMRegDownQSPCapacity BrtQ’uT’I’M’F’S’mdhc / BA15MinuteResourceHigherDAOrRTRegDownSchedule BrtQ’mdhc ) )

ELSE

BA15MinResourceIFMRegDownMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc = 0

END IF

Where Exists

BA15MinResourceIFMRegDownQSPCapacity BrtQ’uT’I’M’F’S’mdhc

**Note:**

In design the hourly quantity CAISOHourlyDARegDownMileagePrice mdh must be duplicated for each 15-minute interval.

#### Where BA15MinResourceIFMRegDownQSPCapacity BrtQ’uT’I’M’F’S’mdhc =

DARegDownQSPBrtQ’uT’I’M’VL’W’R’F’S’Nz’mdh

Where

Resource Type t = GEN or ITIE

**Note:**

In design the hourly quantity DARegDownQSPBrtQ’uT’I’M’VL’W’R’F’S’Nz’mdh must be duplicated for each 15-minute interval.

#### Where BA15MinResourceRegDownCapacity BrtQ’uT’I’M’F’S’mdhc =

RegDownCapacitySchedule BrtQ’uT’I’M’VL’W’R’F’S’mdhc

**IFM Regulation Down Mileage Awarded Bid Cost**

#### BA15MinResourceIFMRegDownMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc =

(IF BA15MinResourceRegDownCapacity BrtQ’uT’I’M’F’S’mdhc <> 0

THEN

(BAHourlyResourceDARegDownMileageBidPrice BrtQ’mdh\* BA15MinuteResourceRegDownPerformanceAccuracyPercentage BrtQ’mdhc \* BA15MinuteResourceAdjustedRegDownMileageQty BrtQ’mdhc \* (BA15MinResourceIFMRegDownAwardedBidCapacity BrtQ’uT’I’M’F’S’mdhc / BA15MinuteResourceHigherDAOrRTRegDownSchedule BrtQ’mdhc ) )

ELSE

0

END IF )

Where Exists

BA15MinResourceIFMRegDownAwardedBidCapacity BrtQ’uT’I’M’F’S’mdhc

**Note:**

In design the hourly quantity BAHourlyResourceDARegDownMileageBidPrice BrtQ’mdh must be duplicated for each 15-minute interval.

#### BA15MinResourceIFMRegDownAwardedBidCapacityBrtQ’uT’I’M’F’S’mdhc =

 DAAwardedRegDownBidCapacityBrtQ’uT’I’M’VL’W’R’F’S’mdh

Where

Resource Type t = GEN or ITIE

**Note:**

In design the hourly quantity DAAwardedRegDownBidCapacityBrtQ’uT’I’M’VL’W’R’F’S’mdh must be duplicated for each 15-minute interval.

**IFM Regulation Mileage Revenue**

Where IFMRegMileageRevenueAmount BrtuT’I’M’F’S’mdhcif =

Sum (Q’) IFMRegUpMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhcif + IFMRegDownMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhcif

 Where Q’ = ‘CISO’

**IFM Regulation Up Mileage Revenue**

Where IFMRegUpMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhcif =

(1/3) \* BA15MinResourceIFMRegUpMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhc

#### Where BA15MinResourceIFMRegUpMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhc =

(-1) \* BA15MinuteResourceDARegUpMileagePayment BrtQ’mdhc
Where Exists

BA15MinResourceRegUpCapacity BrtQ’uT’I’M’F’S’mdhc

**IFM Regulation Down Mileage Revenue**

Where IFMRegDownMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhcif =

(1/3) \* BA15MinResourceIFMRegDownMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhc

#### Where BA15MinResourceIFMRegDownMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhc =

(-1) \* BA15MinuteResourceDARegDownMileagePayment BrtQ’mdhc
Where Exists

BA15MinResourceRegDownCapacity BrtQ’uT’I’M’F’S’mdhc

**RMR Related Calculations:**

### RMR excess revenue calculations:

#### NonMSSRMRIFMNetCostAmount Brmdhcif =

Average over (Q’, u, T’, I’, M’, F’) (-1) \* IFMNetAmount BrQ’uT’I’M’F’mdhcif

Implementation note: This intermediate calculation will not be reportable. Only the variable, RMRDayIFMExcessRevAmount rmd , defined below, will be reportable.

#### Where Entity Type T’ = MSS and Energy Settlement Type I’ = Net

#### MSSNetRMRIFMNetCostAmount Brmdhcif =

Average over (t, u, T’, I’, M’, F’, S’)

(-1)\*{

(IFMResourceMSSEnergyBidCostAmount BrtuT’I’M’F’S’mdhcif –

BASettlementIntervalResouceNonRMREnergyRatio BrtuT’I’M’F’S’mdhcif \* IFMMSSExpectedEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif)

+ ( BAResourceSettlementIntervalIFMASBidCostAmount BrtuT’I’M’F’S’mdhcif –

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

+ (IFMRegMileageBidCostAmount BrtuT’I’M’F’S’mdhcif –

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

}

Implementation note: This intermediate calculation will not be reportable. Only the variable, RMRDayIFMExcessRevAmount rmd , defined below, will be reportable.

#### RMRDayIFMNetCostAmount rmd =

Sum over (B, h, c, i, f) (NonMSSRMRIFMNetCostAmount Brmdhcif + MSSNetRMRIFMNetCostAmount Brmdhcif )

Implementation note: This intermediate calculation will not be reportable. Only the variable, RMRDayIFMExcessRevAmount rmd , defined below, will be reportable.

#### RMRDayIFMExcessRevAmount rmd =

Max(0, RMRDayIFMNetCostAmount rmd)

 where RMRResFlag rm exists.

 Note: This will be reportable.

##

## Outputs

|  |  |  |
| --- | --- | --- |
| Output Req ID | Name | Description |
|  | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
|  | IFMNetAmount BrQ’uT’I’M’F’mdhcif | The net difference (in $) of IFM Bid Costs and IFM Market Revenue for a given resource and Settlement Interval. |
|  | BAHourlyResourceCircularScheduleFlag BrF’mdh | Flag input output (as a boolean value 0/1) that indicates whether (1) or not (0) there is a circular schedule for the specified resource and Trading Hour. The input = 1 to indicate a circular schedule and is blank otherwise (when a resource does not have a circular schedule). |
|  | IFMBidCostAmount BruT’I’M’F’mdhcif | The Total IFM Bid Costs (in $) including eligible SUC, MLC, TC, A/S Bid Costs, and Energy Bid Costs for a given resource and Settlement Interval. |
|  | NonMSSIFMBidCostAmount BrtuT’I’M’F’S’mdhcif | The Total IFM Bid Costs (in $) including eligible SUC, MLC, TC, A/S Bid Costs, and Energy Bid Costs for a given resource of a non-MSS entity and Settlement Interval. |
|  | GrossMSSIFMBidCostAmount BrtuT’I’M’F’S’mdhcif | The Total IFM Bid Costs (in $) including eligible SUC, MLC, TC, A/S Bid Costs, and Energy Bid Costs for a given resource of a MSS entity and Settlement Interval. |
|  | IFMRevenueAmount BruT’I’M’F’mdhcif | The Total IFM Revenues (in $) as the summation of A/S Revenues and Energy Revenues for a given resource and Settlement Interval. |
|  | NonMSSIFMRevenueAmount BrtuT’I’M’F’S’mdhcif | The Total IFM Revenues (in $) as the summation of A/S Revenues and Energy Revenues for a given Settlement Interval and resource of a non-MSS entity. |
|  | GrossMSSIFMRevenueAmount BrtuT’I’M’F’S’mdhcif | The Total IFM Revenues (in $) as the summation of A/S Revenues and Energy Revenues for a given Settlement Interval and resource of a MSS entity that has selected the gross-settlement option. |
|  | IFMMarketRevenueAmount BrtuT’I’M’F’S’mdhcif | Sum (in $) of IFM Market Revenue after any required application of the PMin Tolerance Band flag, DA MEAF or the RT Performance Metric, for a given Settlement Interval and resource not associated with a net-settled MSS. |
|  | BASettlementIntervalResourceRTPerfMetricMarketRevenueAmount BrtuT’I’M’F’S’mdhcif | The sum (in $) of IFM Pumping Energy Revenue, IFM Minimum Load Energy Revenue and DA Energy Revenue after any application of the RT Performance Metric, for a given Settlement Interval and resource not associated with a net-settled MSS. |
|  | AvailableIFMMarketRevenueAmount BrtuT’I’M’F’S’mdhcif | The sum (in $) of IFM Pumping Energy Revenue, IFM Minimum Load Energy and Revenue and DA Energy Revenue prior to application of either the PMin Tolerance Band flag or the RT Performance Metric, for a given Settlement Interval and resource not associated with a net-settled MSS. |
|  | IFMDAEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif | IFM Energy Revenue (in $) for (a) awarded Day Ahead Energy (above Minimum Load and Day Ahead Self-Scheduled Energy) and (b) DA Pumping Energy, in association with a given Settlement Interval and resource not associated with a net-settled MSS.  |
|  | IFMDAEnergyRevenueAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif | IFM Energy Revenue (in $) for awarded Day Ahead Energy above Minimum Load and Day Ahead Self-Scheduled Energy prior to application of the DA MEAF, for a given Settlement Interval and resource not associated with a net-settled MSS.  |
|  | AvailableIFMPumpingEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif | The IFM Revenue (in $) prior to application of either the PMin Tolerance Band flag or the RT Performance Metric, for a given Settlement Interval and resource that is a pump. |
|  | BASettlementIntervalEntityResourceDAPumpingEnergy BrtuT’I’M’VL’W’R’F’S’mdhcif | The Day Ahead Pumping Energy (in MWh) scheduled for a given Pumped Storage Unit or Participating Load resource, and Settlement Interval. |
|  | AvailableIFMMLRevenueAmountBrtuT’I’M’F’S’mdhcif | The IFM ML Revenue (in $) and IFM Minimum Load Revenue prior to application of either the PMin Tolerance Band flag or the RT Performance Metric, for a given Settlement Interval and resource not associated with a net-settled MSS. |
|  | EligibleIFMBidCostAmount BrtuT’I’M’F’S’mdhcif | The sum (in $) of eligible IFM Pumping Energy Cost, IFM Minimum Load Energy Cost and IFM Energy Bid Cost after any required application of the PMin Tolerance Band flag, DA MEAF or the RT Performance Metric, for a given resource and Settlement Interval. |
|  | BASettlementIntervalResourceRTPerfMetricIFMBidCostAmount BrtuT’I’M’F’S’mdhcif | The sum (in $) of IFM Pumping Energy Cost, IFM Minimum Load Energy Cost and IFM Energy Bid Cost after any application of the RT Performance Metric, for a given resource and Settlement Interval. |
|  | AvailableIFMBidCostAmount BrtuT’I’M’F’S’mdhcif | The sum (in $) of IFM Pumping Energy Cost, IFM Minimum Load Energy Cost and IFM Energy Bid Cost prior to application of the PMin Tolerance Band flag or the RT Performance Metric, for a given resource and Settlement Interval. |
|  | IFMEnergyBidCostAmount BrtuT’I’M’F’S’mdhcif | Energy Bid Costs (in $) calculated as the Day Ahead Energy multiplied by the relevant Energy Bid Price and adjusted, as applicable, for the portion of Day Ahead Schedule that is not delivered based upon meter data for a given resource and Settlement Interval.  |
|  | IFMEnergyBidCostAmountWithoutMEAF BrtuT’I’M’F’S’mdhcif | Energy Bid Costs (in $), prior to any applicable DA MEAF application, calculated as the Day Ahead Energy multiplied by the relevant Energy Bid Price for a given resource and Settlement Interval.  |
|  | IFMMSSNetBCRAmount BQ’T’I’M’mdhcif | The net difference (in $) of the combined IFM Energy Bid Costs, IFM AS Costs, IFM Market Revenue with respect to IFM AS Revenue, for a given Settlement Interval and MSS entity. |
|  | IFMMSSNetASBidCostAmount BT’I’M’mdhcif | The net difference (in $) between IFM AS Bid Costs and IFM AS Market Revenue, for a given Settlement Interval and MSS entity that has elected net Settlement. |
|  | IFMMSSNetEnergyBidCostAmount BT’I’M’mdhcif | The net difference (in $) between IFM Energy Bid Costs and IFM Market Revenue, for a given Settlement Interval and MSS entity that has elected net Settlement. |
|  | IFMMSSEnergyBidCostAmount BT’I’M’mdhcif  | Total IFM MSS Bid Cost (in $) for a given Settlement Interval and MSS entity that has elected net Settlement.  |
|  | IFMResourceMSSEnergyBidCostAmount BrtuT’I’M’F’S’mdhcif | IFM MSS Bid Cost (in $) for a given Settlement Interval and resource of an MSS entity that has elected net Settlement. |
|  | IFMMSSEnergyRevenueAmount BT’I’M’mdhcif | Total IFM Energy Revenue (in $), as adjusted to exclude all RMR Energy and Wheel Energy, for a given Settlement Interval and MSS entity that has elected net Settlement, after any required application of the PMin Tolerance Band flag, pump-on flag, DA MEAF or the RT Performance Metric. |
|  | IFMMSSExpectedEnergyRevenueAmount BrtuT’I’M’F’S’mdhcif | Total IFM Energy Revenue (in $) for a given Settlement Interval and resource of a MSS entity that has elected net Settlement, calculated after adjusting the revenue amount by any required application of the PMin Tolerance Band flag, DA MEAF or the RT Performance Metric. |
|  | BADispIntervalResNetMSSRTPerfMetricAvailableIFMMarketRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif | The sum (in $) of IFM Pumping Energy Revenue, IFM Minimum Load Energy Revenue and IFM DA Bid-awarded Energy Revenue for a resource of a net-settled MSS after any required application of the RT Performance Metric, for a given Settlement Interval and MSS entity that has elected net Settlement. |
|  | BADispIntResNetMSSAvailableIFMMarketRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif | The sum (in $) of IFM Pumping Energy Revenue, IFM Minimum Load Energy Revenue and IFM DA Bid-awarded Energy Revenue for a resource of a net-settled MSS prior to any required application of the RT Performance Metric, for a given Settlement Interval and MSS entity that has elected net Settlement. |
|  | BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif | IFM DA Bid-awarded Energy Revenue and DA Pumping Energy Revenue (in $) after any required application of the DA MEAF, for a given Settlement Interval and Generating Unit of an MSS entity that has elected net Settlement. |
|  | BASettlementIntervalResourceNetMSSDAGenEnergyBidRevenueAmountWithoutMEAF BrtuT’I’M’VL’W’R’F’S’mdhcif | IFM DA Bid-awarded Energy Revenue (in $) without application of the DA MEAF or Real-time Performance Metric, for a given Settlement Interval and Generating Unit of an MSS entity that has elected net Settlement. The output is calculated as the resource’s eligible DA Awarded Energy of the MSS Generation-supplying resources multiplied by the weighted average MSS LMP. |
|  | BASettlementIntervalResourceNetMSSAvailableIFMMinLoadEnergyRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif | IFM Minimum Load Energy Revenue (in $) attributable to a CAISO-committed Generating Unit for a given Settlement Interval and Generating Unit of an MSS entity that has elected net Settlement. The output is calculated as the IFM Minimum Load Energy multiplied by the weighted average MSS LMP.  |
|  | BASettlementIntervalResourceNetMSSAvailableDAPumpingRevenueAmount BrtuT’I’M’VL’W’R’F’S’mdhcif | IFM DA Bid-awarded Pumping Energy Revenue (in $) for a given Settlement Interval and Pumped-Storage Hydro Unit of an MSS entity that has elected net Settlement. The output is calculated as the eligible DA Awarded Energy multiplied by the weighted average MSS LMP. |
|  | IFMMSSNetRegMileageBidCostAmount BT’I’M’mdhcif | For a given net-settled MSS entity and Settlement Interval the output reflects the IFM Regulation Mileage Bid Cost amount minus the IFM Regulation Mileage Revenue amount (in $).  |
|  | IFMMSSNetIRBidCostAmount BT’I’M’mdhcif | Imbalance Reserve Bid Cost amount minus Imbalance Reserve Revenue amount for net-settled MSS entity per settlement interval. |
|  | BAResourceSettlementIntervalIFMASRevenueAmount BrtuT’I’M’F’S’mdhcif  | Summation (in $) of A/S Revenues divided by the number of Settlement Intervals in a Trading Hour for a given resource and Settlement Interval. The A/S Revenues being summed are determined by multiplying each A/S Capacity award by the relevant resource specific ASMP.  |
|  | BAResourceSettlementIntervalIFMASBidCostAmount BrtuT’I’M’F’S’mdhcif | Summation (in $) of A/S Bid Costs divided by the number of Settlement Intervals in a Trading Hour for a given resource and Settlement Interval. The A/S Bid Costs being summed are determined by multiplying each A/S Capacity award by its associated A/S Bid Price.  |
|  | BASettlementIntervalResIFMIRRevenueAmount BrtuT’I’M’F’S’mdhcif | Imbalance Reserve revenue amount by settlement interval. |
|  | BASettlementIntervalReslFMIRBidCostAmount BrtuT’I’M’F’S’mdhcif | Imbalance Reserve bid cost amount by settlement interval. |
|  | BAHourlyResIFMIRRevenueAmount BrtuT’I’M’F’S’mdh | Imbalance Reserve revenue amount by Trading Hour. |
|  | BAHourlyReslFMIRBidCostAmount BrtuT’I’M’F’S’mdh | Imbalance Reserve bid cost amount by Trading Hour. |
|  | IFMRegMileageBidCostAmount BrtuT’I’M’F’S’mdhcif | IFM Regulation Mileage Bid Cost amount (in $) for a given resource and Settlement Interval.  |
|  | IFMRegUpMileageBidCostAmount BrtuT’I’M’F’S’mdhcif | IFM Regulation Up Mileage Bid Cost amount (in $) for a given resource and Settlement Interval. |
|  | BA15MinResourceIFMRegUpMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Up Mileage self-provided Bid Cost amount (in $) for a given resource and FMM Interval. |
|  | BA15MinResourceIFMRegUpQSPCapacity BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Up AS qualified self-provided capacity (in MW) for a given resource and FMM Interval. |
|  | BA15MinResourceRegUpCapacity BrtQ’uT’I’M’F’S’mdhc | Regulation Up capacity (in MW) total over the IFM and Real-Time markets for a given resource and FMM Interval. |
|  | BA15MinResourceIFMRegUpMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Up Mileage awarded Bid Cost amount (in $) for a given resource and FMM Interval. |
|  | BA15MinResourceIFMRegUpAwardedBidCapacityBrtQ’uT’I’M’F’S’mdhc | IFM Regulation Up awarded Bid capacity (in MW) for a given resource and FMM Interval. |
|  | IFMRegDownMileageBidCostAmount BrtuT’I’M’F’S’mdhcif | IFM Regulation Down Mileage Bid Cost amount (in $) for a given resource and Settlement Interval. |
|  | BA15MinResourceIFMRegDownMileageSelfProvidedBidCostAmount BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Down Mileage self-provided Bid Cost amount (in $) for a given resource and FMM Interval. |
|  | BA15MinResourceIFMRegDownQSPCapacity BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Down AS qualified self-provided capacity (in MW) for a given resource and FMM Interval. |
|  | BA15MinResourceRegDownCapacity BrtQ’uT’I’M’F’S’mdhc | Regulation Down capacity (in MW) total over the IFM and Real-Time markets for a given resource and FMM Interval. |
|  | BA15MinResourceIFMRegDownMileageAwardedBidCostAmount BrtQ’uT’I’M’F’S’mdhc | Regulation Down mileage awarded Bid Cost amount (in $) for a given resource and FMM Interval. |
|  | BA15MinResourceIFMRegDownAwardedBidCapacity BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Down AS awarded bid capacity (in MW) for a given resource and FMM Interval. |
|  | IFMRegMileageRevenueAmount BrtuT’I’M’F’S’mdhcif | IFM Regulation Mileage revenue amount (in $) for a given resource and Settlement Interval.  |
|  | IFMRegUpMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhcif | IFM Regulation Up Mileage revenue amount (in $) for a given resource and Settlement Interval.  |
|  | BA15MinResourceIFMRegUpMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Up Mileage revenue amount (in $) for a given resource and FMM Interval. |
|  | IFMRegDownMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhcif | IFM Regulation Down Mileage revenue amount (in $) for a given resource and Settlement Interval.  |
|  | BA15MinResourceIFMRegDownMileageRevenueAmount BrtQ’uT’I’M’F’S’mdhc | IFM Regulation Down Mileage revenue amount (in $) for a given resource and FMM Interval. |
|  | NonMSSRMRIFMNetCostAmount Brmdhcif | RMR net cost (revenues minus costs) for a non-MSS net resource per settlement interval.Note: This intermediate calculation will not be reportable. |
|  | MSSNetRMRIFMNetCostAmount Brmdhcif | RMR net cost (revenues minus costs) for an MSS net resource per settlement intervalNote: This intermediate calculation will not be reportable. |
|  | RMRDayIFMNetCostAmount rmd | RMR net cost (revenues minus costs) per Trading DayNote: This intermediate calculation will not be reportable. |
|  | RMRDayIFMExcessRevAmount rmd | RMR net cost (revenues minus costs) per Trading Day. Captures any excess revenues compared to costs, when this value is positive.Note: This final calculation variable will be reportable. |

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# Charge Code Effective Dates

| Charge Code/Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| Pre-Calc IFM Net Amount | 5.8 | 04/01/09 | 03/25/11 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.9 | 03/26/11 | 06/22/11 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.10 | 06/23/11 | 01/31/13 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.11 | 02/01/13 | 05/31/13 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.12 | 05/01/13 | 4/30/14 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.13 | 05/01/14 | 09/30/14 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.14 | 10/01/14 | 06/30/15 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.15 | 07/01/15 | 09/30/16 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.16 | 10/01/16 | 12/31/16 | Documentation Edits and Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.16a | 01/01/17 | 3/31/18 | Documentation Edits Only |
| Pre-Calc IFM Net Amount | 5.17 | 4/1/18 | 12/31/19 | Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.18 | 1/1/20 | 9/30/20 | Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.19 | 10/1/20 | 4/30/26 | Configuration Impacted |
| Pre-Calc IFM Net Amount | 5.20 | 5/1/26 | Open | Configuration Impacted |