Settlements & Billing

Configuration Guide: Spin and Non-Spin No Pay Quantity Pre-calculation

Version 5.25

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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

According to the CAISO Tariff, when CAISO issues an AS Award in the DAM, HASP, and RTM, an AS capacity payment is made through the DAM, HASP, and RTM Charge Codes specified for each AS in the BPM for Settlements & Billing. These AS charges flow through to Settlements, regardless of resource performance in Real-Time.

The resources issued AS Awards are required to convert that capacity into Energy if dispatched in Real-Time or keep that capacity unloaded and available on their resource for potential Dispatch of Energy in Real-Time. If a resource fails to fulfill the requirements of the AS Award, then that resource is not entitled to its full AS capacity payment. The no pay or payment rescission charges eliminate AS capacity payments to the extent that a resource does not fulfil its. The No Pay amount for Qualified AS self-provision reduces the relevant Scheduling Coordinator’s effective AS self-provision in the AS cost allocation, which is effectively charged back to the Scheduling Coordinator at the relevant AS rate.

## Description

Spin and Non-Spin No Pay Quantity Pre-calculation –– This pre-calculation determines the Spin and Non-Spin rescission no pay quantity in each Settlement Interval for resources that are scheduled for Spinning and Non-Spinning Reserve (Spin and Non-Spin) capacity.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | The CAISO will rescind payments for Ancillary Services capacity that receives an AS Award or Self Provided Schedule of Ancillary Services capacity from a resource with Undispatchable Capacity, Unavailable Capacity, or Undelivered Capacity. |
| 1.1 | In the case that the CAISO calculates a no pay quantity for a resource with awarded and Self-Provided Ancillary Services, the CAISO will apply the no pay billable quantity to the awarded Ancillary Services capacity first, and then to any Self-Provided capacity second. |
| 2.0 | The CAISO calculates a resource’s Spin or Non-Spin no pay billable quantity by evaluating the following no pay sub-categories. Note that more than one no pay category can apply within a Settlement Interval.   * + Availability and ramp limited Undispatchable Capacity   + Undelivered Capacity   + Unavailable Capacity   + Untagged capacity   + Declined instruction   + Unsynchronized capacity   + Resource constraint disqualification   + AS test rescission capacity |
| 3.0 | Undispatchable Capacity is the Real-Time ability of each resource to deliver Energy from Ancillary Services capacity.  The following sub-categories fall under the Undispatchable category of no pay:   * + Availability and ramp limited Undispatchable Capacity   + Resource constraint disqualified capacity   + Untagged capacity   + Unsynchronized capacity   + AS test rescission capacity |
| 3.1 | Availability/ramp limited Undispatchable Capacity is determined by each resource’s maximum operating capability, actual telemetered output, and operational Ramp Rate. |
| 3.1.1 | Availability Limited Capacity occurs when a resource’s capacity is de-rated in real time and a portion of the previous AS award and self provision schedule may not be available in real time for dispatch due to the availability limitation. |
| 3.1.2 | Availability of each ancillary service begins with the maximum ex-post capacity and is allocated to spin and non-spin based on the highest quality ancillary service, and limited by the mininimum ex-post capacity.  The ex-post capacity is the range of dispatchable capacity remaining on the resource after taking into account resource outages or derates, minimum load, self schedule energy, and regulation capacity. The market system may dispatch the resource for optimal energy, spinning reserve energy, or non-spinning reserve energy. |
| 3.1.3 | Ramp limited capacity occurs when the resource’s 10 minute ramp rate capability is unable to deliver the AS award or scheduled. That portion of the AS capacity is not available due to Ramp Rate limitations on the resource. |
| 3.1.4 | The CAISO will use the resource’s market calculated ancillary services (operating reserves) to determine its ramp limited AS capacity. The CAISO will allocate the calculated capacity to each category of AS from lowest quality to highest quality in order to preserve the highest quality AS capacity. |
| 3.1.5 | A resource’s ramp limited non-spin and ramp limited spin capacity shall be the minimum of i) the respective ancillary service schedule less ancillary dispatches, or ii) the allocated ramp limited AS capacity for non-spinning or spinning reserve. |
| 3.1.6 | For the calculation of ramp limited AS capacity, the CAISO determines dispatched AS capacity by the quantity of the resource’s DOT overlapping its non-spinning and spinning reserve availability range. |
| 3.2 | Resource constraint disqualified capacity is Day Ahead Market Ancillary Service Awards or Schedules that are determined prior to the Fifteen Minute Market to be undispatchable due to a resource limitation outage or derate. |
| 3.2.1 | Disqualified capacity that is caused by a transmission outage will be disqualified, but not be counted as capacity subject to no pay. |
| 3.3 | Untagged capacity is the portion of a dynamic system resource’s ancillary service award and schedule that exceeds the tagged capacity. |
| 3.4 | Unsynchronized Capacity applies to resources that do not comply with AS synchronization standards of that service. |
| 3.4.1 | All of a resource’s ancillary capacity shall be considered no pay capacity if it is determined to be unsynchronized. |
| 3.4.2 | A resource shall be unsynchronized if the following conditions are met: the resource has ancillary awards or schedules, the resource is offline, the resource is not synchronized to the ISO grid |
| 3.5.0 | AS test rescission capacity is AS capacity deemed to be not available in real-time due to a resource’s failure of a periodic unannounced AS availability test or performance audit. |
| 3.5.1 | The CAISO will apply no pay rules to AS Test rescission capacity for the duration of the committed period as define dby the CAISO tariff. The AS quantity subject to tno pay is determined as all AS capacity greater than the delivered energy provided duinrg the failed AS availability test or performance audit. |
| 3.5.2 | The committed period is defined as the total of all the hours/days the resource was scheduled by the CAISO to provide Ancillary Service beginning from: (i) the last successful availability test; or (ii) the last time the resource actually provided Energy or reduced Demand as part of the Ancillary Service; whichever results in a shorter committed period. |
| 4.0 | Undeliverable Capacity is the failure to supply all or a portion of Energy from Spinning Reserve or Non-Spinning Reserve capacity in accordance with a Dispatch Instruction.  Settlements shall calculate the undeliverable capacity under the following categories.   * + Undeliverable Capacity   + Declined Instruction Capacity |
| 4.1 | Undeliverable Capacity - If Energy from a resource’s AS Award or Schedule is dispatched, then that resource is responsible for delivering at least 90% of the Expected Energy attributed to that dispatched AS capacity in order to avoid a no pay charge. |
| 4.1.1 | The CAISO calculates Undeliverable Capacity subject to no pay when the undelivered energy from an AS dispatched resource exceeds the 10% tolerance band. |
| 4.1.2 | When a resource’s AS capacity is deemed to be undeliverable, the CAISO calculates the no pay quantity as all AS capacity greater than the delivered energy provided. |
| 4.1.3 | The CAISO will validate and calculate undeliverable capacity only when the resource receives an ADS dispatch instruction for AS capacity. |
| 4.2 | Declined instruction capacity is the portion of a dynamic system resource’s ancillary service award and schedule where the tagged amount for ancillary services is less than the dispatch for Spinning or non-spinning reserves. |
| 5.0 | Unavailable Capacity is the inability of a resource obligated to supply Spinning or Non-Spinning Reserve resulting from a resource’s Uninstructed Imbalance Energy during an applicable Settlement Interval. |
| 5.1 | Unavailable AS capacity occurs when a resource’s metered energy exceeds the total expected energy and where the deficiency prevents the unit from providing Spinning or Non-spinning Reserves. |
| 5.2 | Any calculated unavailable AS capacity is allocated to each of anciallry service from lowest quality to highest quality in order to preserve the highest quality AS capacity. |
| 6.0 | Spin and non-Spin no pay settlement rules shall apply to all resources, including:   * + Generating Units   + Participating Load   + Proxy Demand Response Resources (PDR)   + Non-Generator Resources (NGR)   + MSS External Generation that is internal to the ISO   + Dynamic & Non-Dynamic System Resources |
| 6.1 | Participating loads have the following rules applied for the calculation of no pay. |
| 6.1.1 | Participating loads are not subject to the category of unsynchronized AS capacity. |
| 6.1.2 | The CAISO calculates Undelivered Capacity for a participating load by the portion of meter that exceeds, the expected load schedule less the non-spin dispatch instruction. |
| 6.1.3 | The CAISO calculates Unavailable Capacity for a participating load by the portion of available non-spin capacity that exceeds the participating loads meter. |
| 6.2 | Proxy Demand Response resources have the following rules applied for the calculation of no pay. |
| 6.2.1 | Proxy Demand Response resources are not subject to the category of unsynchronized AS capacity. |
| 6.2.2 | The CAISO will calculate Undelivered Capcity Quantity for Spinning & Non-spinning Reserve provided by Proxy Demand Response resources, if the actual change of the underlying load of a Proxy Demand Response resource is insufficient to meet the issuance of AS Dispatch Instruction. |
| 6.2.3 | The performance meter quantity is the reduction of load by the demand response resource in response to the non-spin dispatch. |
| 6.2.4 | Unavailable capacity for a demand resource is determined by the portion of available non-spin capacity that exceeds the demand resources meter. |
| 6.2.5 | The load shift product for behind the meter (BTM) storage devices follows the PDR participation model and operate under existing PDR policy provisions.While these resources can bid and be dispatched for both load consumption or load curtailment only the load curtailment (ENTITY\_COMPONENT\_SUBTYPE = ‘CURT’) side can provide Spin and Non-Spin and as such is subject to the AS requirements |
| 6.3 | NGRs have the following rules applied for the calculation of no pay. |
| 6.3.1 | Availability limited capacity calculation shall use a NGR’s State of Charge (SOC) level to determine if enough energy is available to support its ancillary service award and schedule. |
| 6.4 | Fast Start Units have the following rules applied for the calculation of no pay. |
| 6.4.1 | Fast start units operating capability range shall be between the unit’s max ex-post capacity and 0. |
| 6.4.2 | Resource constraint disqualified capacity shall not apply to fast start resources that have been dispatched and provided non-spinning reserve energy. |
| 6.5 | Multi-Stage Generators (MSG) have the following rules applied for the calculation of no pay. |
| 6.5.1 | Undispatchable capacity for an MSG unit shall be based on the applicable MSG configuration. |
| 6.5.2 | Unavailable capacity for an MSG unit shall be evaluated based on the generating unit level. |
| 7.0 | Spin and non-spin no pay shall not be applied to resources obligated to provide spinning and non-spinning reserve capacity that are also on AGC control and providing regulation energy. |
| 8.0 | Expected Energy reflects what the market can dispatch; Energy, Spin and Non-Spin. It will not reflect Regulation Energy. If Expected Energy is evaluated against meter then there may be an imbalance if the meter also includes regulation energy  In order to conform to the requirement for the meter value to be in alignment with the dispatch target (Total Expected Energy):  Only in equations where meter is evaluated against Expected Energy will Regulation Energy be subtracted from meter.  Regulation Energy will not be subtracted from meter in all equations. Only in instances directly related to evaluation of the performance of the resource in relation to the market dispatch |
| 9.0 | EDAM Requirements:  EDAM entities have AS Self Provision (QSP) and AS Requirement.  EDAM resources cannot bid in for Ancillary Services  EDAM BAA resources cannot provide Ancillary Service for CISO BAA  EDAM AS Self Provision (QSP) is not assessed No Pay |
| 9.1 | EDAM Requirements:  This PC will receive Ancillary Service Awarded Bid quantities of zero and Ancillary Service Capacity Schedules of non-zero. They will be filtered out in equations. EDAM BAA Ancillary Service Self-provision and requirements are simply information at this point. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Ancillary Services Pre-calculation |
| Real Time Energy Quantity Pre-calculation |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Ancillary Services Pre-calculation |
|  |
| 6710 |
| 6720 |
| 6124 |
| 6224 |
|  |

## Inputs – External Systems

| Row # | Variable Name | Description |
| --- | --- | --- |
| 1 | 5MinuteResourceOperatingReserveQuantity BrtT'uI'Q’M'VL'W'R'F'S'mdhcif | The available Operating Reserve (in MWh) is obtained from the RTM Applications for relevant resources in each Dispatch Interval using the applicable Ramp Rate function, the DOT from the previous Dispatch Interval, and Start-Up Time, if applicable. This available Operating Reserve reflects the incremental 10‑minute capability of a resource. |
| 2 | BA5MResourceLESRStateofChargeQty BrtuT'I'Q’M'VL'W'R'F'S'mdhcif | State of Charge (SOC): The actual stored Energy (MWh) left in the resource. |
| 3 | BA5mResourceChannel4GeneratorMeterQuantity BrtT'uI'Q’M'R'W'F'S'VL'mdhcif | Mapping specifics:   * ‘PDR’ are not mapped * For all other resource types other than ‘DDR’ and ‘LESR’ map only to Channel 4 GEN Measurement Type (in MWh) to eliminate ‘Aux Load’ negative generation scenario’s * For ‘DDR’ and ‘LESR’ net the GEN Measurement Type with LOAD Measurement Type (in MWh)   ‘GEN’, ‘DYN’, and ‘PSUG’ will reflect zero (0) and (+) interval values.  ‘DDR’ and ‘LESR’ will reflect zero (0), (-), and (+) interval values. |
| 4 | PsuedoGenResourceMeterForAssociatedLoadIDQuantity BrtuT'I'Q'M'AA'm'F'R'pPW'QS'd'Nz'Vvw’n'L'mdhcif | The PsuedoGenResourceMeterForAssociatedLoadIDQuantityvariable is the Meter value (in MWh) of its associated Participating Load or a Demand Resource. During channel mapping the sign convention will not be changed to (-) as expected but will remain (+) |
| 5 | BA5MResourceLESRLowerChargeLimitQty BrtuT'I'Q’M'VL'W'R'F'S'mdhcif | Lower Charge Limit (LCL): The lowest stored energy (MWh) that should be maintained in the resource. |
| 6 | BA15minuteResourceRealTimeNonSpinClearedQty BrtT'uI'Q’M'VL'W'R'F'S'mdhc | The Ancillary Service Interval Real Time Non Spin Cleared Quantity (in MW) represents the Total Non Spin schedule for the real time market. In the case there is no buy back of capacity, the Non Spin Cleared Quantity is the sum of DA Non Spin Awarded, DA Non Spin Qualified Self Provision, Incremental Real Time Non Spin Awarded Quantity, and incremental Real Time Non Spin Qualified Self Provision procured (MW). |
| 7 | BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc | The FMM Interval Real Time Spin Cleared Quantity (in MW) represents the Total Spin schedule for the real time market. In the case there is no buy back of capacity, the Spin Cleared Quantity is the sum of DA Spin Awarded, DA Spin Qualified Self Provision, Incremental Real Time Spin Awarded Quantity, and incremental Real Time Spin Qualified Self Provision procured (MW). |
| 8 | 15MinuteRTMNonSpinAwardedBidQuantity BrtT’uI’Q’M’VL’W’R’F’S’mdhc | The incremental Non Spin Awarded Capacity Quantity from the FMM market. (MW)  The removal of the existing variable name is a correction of an obsolete variable name and is not an update associated with DAME EDAM |
| 9 | 15MinuteRTMSpinAwardedBidQuantity BrtT’uI’Q’M’VL’W’R’F’S’mdhc | The incremental Spin Awarded Capacity Quantity from the FMM market. (MW)  The removal of the existing variable name is a correction of an obsolete variable name and is not an update associated with DAME EDAM |
| 10 | BA5MResourceDOTQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdhcif | This variable represents the 5 minute Dispatch Operating Target (in MW)(DOT) for Generators, Participating Load, and Dynamic resources. |
| 11 | DispatchIntervalIIEMinimumLoadEnergy BrtuT'I'Q’M'VL'W'R'F'S'mhcif | The Dispatch Interval Instructed Imbalance Energy Minimum Load Quantity (in MWh) |
| 12 | ResourceNonSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | The Dispatch Interval Instructed Imbalance Energy Non Spin Quantity (in MWh).  Total IIE Non-Spin that was dispatched during this 5 minute interval |
| 13 | DispatchIntervalResidualIIE BrtuT'bI'Q’M'R'W'F'S'VL'mdhcif | The Dispatch Interval Residual Imbalance Energy Quantity (in MWh). |
| 14 | ResourceSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | The Dispatch Interval Instructed Imbalance Energy Spin Quantity (in MWh).  Total IIE Spin that was dispatched during this 5 minute interval |
| 15 | DispatchIntervalTotalExpectedEnergy BrtEuT'I'Q’M'AA’W'R'pF'S'VL'mdhcif | The Dispatch Interval Total Expected Energy Quantity (in MWh). |
| 16 | PsuedoGenResourceDayAheadLoadScheduleForAssociatedLoadIDQuantity BrtuT'I'Q’M'AA'R'pW'F'S'vw’VL'mdh | The Psuedo Gen carries the Day Ahead Load value (in MWh) associated with its Participating Load. During channel mapping the sign convention will not be changed to (-) as expected but will remain (+) |
| 17 | HourlyResourceMasterFileDesignatedFastStartUnitFlag BrtuT’I’Q’M’VL'W'R'F'S'mdh | This variable represents generator resources that meet the CAISO requirements to be defined as a fast start unit. |
| 18 | NoPayTolerancebandForDispatchedDeliveredEnergyFactor | Per Market Notice dated September 1, 2000 a resource must deliver at least 90% of the Energy Dispatched from Ancillary Services. The tolerance factor (10%) is subject to modification to be effective 24 hours after a notice is published on the CAISO Website. |
| 19 | ResourceSynchronizedToCAISOGridFlagBrtuT’I’Q’M’VL'W'R'F'S'mdhcif | Based on minute level PI data on the Unit Connectivity Tag for each resource to determine if the resource was connected (UCON = ON or OFF) for the 5 minute time period.  If the resource has a UCON status that equals OFF for all 5 minutes of a Settlement Interval, then the resource did not pass the connectivity test.  If the UCON status equals ON for any minute of the Settlement Interval then it passes the test. |
| 20 | BAResourceADSSpinDispatchQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | This bill determinant is the ADS Spin dispatch (in MW) that occurred for each 5 minute interval. |
| 21 | BAResourceADSNonSpinDispatchQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | This bill determinant is the ADS Non-Spin dispatch (in MW) that occurred for each 5 minute interval. |
| 22 | BA15mResourceCASTaggedSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc | Hourly Tagged Spin Capacity Quantity. (MW)  Mapped only for Tie Gens. EDAM Resources will not be included |
| 23 | BA15mResourceCASTaggedNonSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc | Hourly Tagged NonSpin Capacity Quantity. (MW)  Mapped only for Tie Gens. EDAM Resources will not be included |
| 24 | BA5minuteResourceCASCheckOutSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | CAS Checkout Spin Capacity. (in MW).  Mapped only for Tie Gens. EDAM Resources will not be included |
| 25 | BA5minuteResourceCASCheckOutNonSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | CAS Checkout Spin Capacity. (in MW).  Mapped only for Tie Gens. EDAM Resources will not be included |
| 26 | BA5MResourcePDRNoPayPerformaceMeterQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdhcif | Dispatch Interval PDR No Pay Performance Meter Quantity (in MWh  This value represents the “Meter Before Meter After” No Pay Performance Meter Quantity which is mapped only for PDR. |
| 27 | HourlyPredispatchFlag BrtQ’mdh | For the purposes of Spin Non-Spin No Pay PC, Tie Gens are defined as HASP AS TG or Real Time AS TG. The Hourly Pre-Dispatch Flag is set to 1 if it is HASP and 0 if it is Real Time |
| 28 | BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | The maximum and minimum ex-post capacity limits (in MW) of a resource reflect the Bid capacity and reported availability and define the operating levels to which the resource is considered dispatchable by CAISO  All intervals for a specific resource will be published. In addition, after T+55, if a resources  Maximum\_ExPost\_Capacity value changes, while all intervals for that resource will be published,only incremental resources will be published – not all resources |
| 29 | BA5minuteResourceMinimumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | The maximum and minimum ex-post capacity limits (in MW) of a resource reflect the Bid capacity and reported availability and define the operating levels to which the resource is considered dispatchable by CAISO |
| 30 | OffAGCStatusCalculationTag BrtQ’F’S’mdhcif | IF the AGC unit status (UAGC status) = OFF for each minute in the Five-Minute Interval and the UAGC Quality State is “Normal” or “Al” for each minute  THEN OFF AGC Status Calculation Tag = 1 (this represents off AGC) ELSE OFF AGC Status Calculation Tag = 0 (this represents on AGC )  “Normal” and “Al” represent valid quality states, all other states indicate invalid quality.  This rule will only return a “1” off AGC flag when the resource is off for all 5 minutes and the quality of the data is valid.  If the resource is on AGC for at least one minute, then the resource will get credit for being on AGC for the entire five minute interval. Also if the quality tags associated with the UAGC tag is not valid for any minute, the resource will get credit for being on AGC for the entire five-minute interval. |
| 31 | BAResourceFMMClearedEnergyQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdhc | The FMM cleared energy quantity (in MW) represents the binding energy schedule from the fifteen minute market. |
| 32 | PTBBAResourceFailedNonSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’ | Pass thru bill determinant entered into system when a resource fails its periodic unannounced non-spin availability test. Shall provide the MWh the resource was able to provide, and the commitment period that the ISO shall calculate AS test Rescission Capacity no pay. |
| 33 | PTBBAResourceFailedSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’ | Pass thru bill determinant entered into system when a resource fails its periodic unannounced spin availability test. Shall provide the MWh the resource was able to provide, and the commitment period that the ISO shall calculate AS test Rescission Capacity no pay. |
| 34 | BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc | Adjusted Regulation Up mileage for resource *r* for each 15-minute interval c of Trading Hour *h* of Trade Month m of Trading Day d*.* (MW) |
| 35 | BA15MinuteResourceAdjustedRegDownMileageQty BrtQ’mdhc | Adjusted Regulation Down mileage for resource r for each 15-minute interval c of Trading Hour h of Trade Month m of Trading Day d. (MW) |
| 36 | DASpinAwardedBidQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdh | Day Ahead Spinning Reserve Awarded Bid capacity for resource r (MW)  The removal of the word ‘Hourly’ is a correction of an obsolete variable name and is not an update associated with DAME EDAM |
| 37 | DASpinQSP BrtT’uI’Q’M’R’W’F’S’Nz’VL'mdh | Day Ahead Spinning Reserve Qualified Self-Provision capacity for resource r, Contract Reference Number N, Contract Type z’. (MW) |
| 38 | DAHourlyNonSpinAwardedBidQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdh | Day Ahead Non-Spinning Reserve Awarded Bid capacity for resource r. (MW) |
| 39 | DANonSpinQSP BrtT’uI’Q’M’R’W’F’S’Nz’VL'mdh | Day Ahead Non-Spinning Reserve Qualified Self-Provision capacity for resource r, Contract Reference Number N, Contract Type z’. (MW) |
| 40 | PTBBAHourlyResourceFailedNonSpinTestDeliveredFactor BrtT’Jul’Q’M’R’W’F’S’Nz’VL’mdh | Pass thru bill determinant entered into system when a resource fails its periodic unannounced non-spin availability test. Shall provide the MWh the resource was able to provide, and the commitment period that the ISO shall calculate AS test Rescission Capacity no pay. |
| 41 | PTBBAHourlyResourceFailedSpinTestDeliveredFactor BrtT’Jul’Q’M’R’W’F’S’Nz’VL’mdh | Pass thru bill determinant entered into system when a resource fails its periodic unannounced spin availability test. Shall provide the MWh the resource was able to provide, and the commitment period that the ISO shall calculate AS test Rescission Capacity no pay. |
| 42 | TotalRTNonSpinQSPBrtT’uI’Q’M’R’W’F’S’Nz’VL'mdhc | Real-Time Non-Spinning Reserve Qualified Self-Provision capacity for resource r, Contract Reference Number N, Contract Type z’. **(MW)** |

## Inputs - Predecessor Charge Codes or Pre-calculations

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Predecessor Charge Code/ Pre-calc Configuration |
| 1 | 15MRTSpinResConstraintDisqualifiedQuantity BrtQ’F’S’mdhc | Ancillary Service Pre-calculation |
| 2 | 15MRTNonSpinResConstraintDisqualifiedQuantity BrtQ’F’S’mdhc | Ancillary Service Pre-calculation |
| 3 | BAResourceSettlementIntervalRegulationEnergy BrtuT’I’Q’M’F’S’mdhcif | Real Time Energy Quantity Pre-calculation |

## CAISO Formula

### BAResourceNoPayNonSpinSelfProvisionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MAX (0, (BAResourceNoPayNonSpinBillableQuantityBrtT’uI’Q’M’R’W’F’S’VL'mdhcif ) – BAResourceNoPayNonSpinAwardQuantityBrtT’uI’Q’M’R’W’F’S’VL'mdhcif )

### BAResourceNoPayNonSpinAwardQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif**=*

MIN (BAResourceNoPayNonSpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif,BAResourceDAAndRTNonSpinAwardQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif /12)

### BAResourceNoPayNonSpinBillableQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

Max(BA5MResourceASTestRescissionNonSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhcif, (BAResourcePostMarketNoPayNonSpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif + BAResourceConstraintDisqualifiedNoPayNonSpinQuantity BrtQ’F’S’mdhcif))

### BAResourcePostMarketNoPayNonSpinBillableQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

HourlyPredispatchFlag BrtQ’mdh = 1

THEN

BAResourcePostMarketNoPayNonSpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =

MIN (BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc /4,

(BA15mResourceUntaggedNonSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc /4)+ BA5mResourceDeclinedNonSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif)

ELSE

BAResourcePostMarketNoPayNonSpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = (1-BAResourceAGCFlag BrtQ’F’S’mdhcif) \* (MIN (BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc /4), (BAResourceUndispatchableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif +

BAResourceUndeliveredNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif +BAResourceUnavailableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif +BAResourceUnsynchronizedNonSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif))

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceNoPaySpinSelfProvisionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MAX (0, (BAResourceNoPaySpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif ) – BAResourceNoPaySpinAwardQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)

### BAResourceNoPaySpinAwardQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (BAResourceNoPaySpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif,BAResourceDAAndRTSpinAwardQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif /12)

### BAResourceNoPaySpinBillableQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

Max(BA5MResourceASTestRescissionSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhcif, (BAResourcePostMarketNoPaySpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif + (15MRTSpinResConstraintDisqualifiedQuantity BrtQ’F’S’mdhc / 4)))

### BAResourcePostMarketNoPaySpinBillableQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

HourlyPredispatchFlag BrtQ’mdh = 1

THEN

BAResourcePostMarketNoPaySpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =

MIN (BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc /4,

((BA15mResourceUntaggedSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc /4) + BA5mResourceDeclinedSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif))

ELSE

BAResourcePostMarketNoPaySpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =

(1-BAResourceAGCFlag BrtQ’F’S’mdhcif)\*

(MIN (BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc /4), (BAResourceUndispatchableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif +BAResourceUndeliveredSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif +BAResourceUnavailableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif +BAResourceUnsynchronizedSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif))

Where Bal Authority Area (Q’) = ‘CISO’

### BA5MResourceASTestRescissionSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhcif =

BA15MResourceASTestRescissionSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhc / 4

### BA15MResourceASTestRescissionSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhc = SUM(N,z’)

~~~~

If(BAHourlyResourceFailedSpinTestDeliveredFactor

BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh <>0, Max(0, Max(BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc, (DASpinAwardedBidQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdh + DASpinQSP BrtT’uI’Q’M’R’W’F’S’Nz’VL'mdh)) –

BAHourlyResourceFailedSpinTestDeliveredFactor

BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh)

Else

If(PTBBAResourceFailedSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’ <>0,

Max(0, Max(BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc, (DASpinAwardedBidQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdh + DASpinQSP BrtT’uI’Q’M’R’W’F’S’Nz’VL'mdh)) –

PTBBAResourceFailedSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’)

Else

0

Where Bal Authority Area (Q’) = ‘CISO’

Note: PTBBAResourceFailedSpinTestDeliveredFactor or BAHourlyResourceFailedSpinTestDeliveredFactor will be configured such that the hourly value interval will reflect its associated fifteen minute interval MW value. No frequency conversion will occur.

### BA5MResourceASTestRescissionNonSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhcif =

BA15MResourceASTestRescissionNonSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhc /4

### BA15MResourceASTestRescissionNonSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhc = SUM(N,z’)

~~~~

If(BAHourlyResourceFailedNonSpinTestDeliveredFactor

BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh <>0, Max(0, Max(TotalRTNonSpinQSP BrtT’uI’Q’M’VL'W'R'F'S'mdhc, (DAHourlyNonSpinAwardedBidQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdh + DANonSpinQSP BrtT’uI’Q’M’R’W’F’S’Nz’VL'mdh)) –

BAHourlyResourceFailedNonSpinTestDeliveredFactor

BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh)

Else

If(PTBBAResourceFailedNonSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’ <>0,

Max(0, Max(TotalRTNonSpinQSP BrtT’uI’Q’M’VL'W'R'F'S'mdhc, (DAHourlyNonSpinAwardedBidQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdh + DANonSpinQSP BrtT’uI’Q’M’R’W’F’S’Nz’VL'mdh)) –

PTBBAResourceFailedNonSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’)

Else

0

Where Bal Authority Area (Q’) = ‘CISO’

Note: PTBBAResourceFailedNonSpinTestDeliveredFactor and BAHourlyResourceFailedNonSpinTestDeliveredFactor will be configured such that the hourly value interval will reflect its associated fifteen minute interval MW value. No frequency conversion will occur.

### BAHourlyResourceFailedNonSpinTestDeliveredFactor

BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh = SUM(J)~~~~PTBBAHourlyResourceFailedNonSpinTestDeliveredFactor

BrtT’Jul’Q’M’R’W’F’S’Nz’VL’mdh

Where Bal Authority Area (Q’) = ‘CISO’

### BAHourlyResourceFailedSpinTestDeliveredFactor

BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh = SUM(J)~~~~ PTBBAHourlyResourceFailedSpinTestDeliveredFactor

BrtT’Jul’Q’M’R’W’F’S’Nz’VL’mdh

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceConstraintDisqualifiedNoPayNonSpinQuantity *BrtQ’F’S’mdhcif =*

IF

BAResourceMasterFileDesignatedFastStartUnitMinLoadFlag BrtQ’F’S’mdhcif = 1

THEN

BAResourceConstraintDisqualifiedNoPayNonSpinQuantity BrtQ’F’S’mdhcif = 0

ELSE

BAResourceConstraintDisqualifiedNoPayNonSpinQuantity BrtQ’F’S’mdhcif =

15MRTNonSpinResConstraintDisqualifiedQuantity BrtQ’F’S’mdhc / 4

### BAResourceMasterFileDesignatedFastStartUnitMinLoadFlag BrtQ’F’S’mdhcif =

sum(T’,u,I’,M’,R’,W’,V,L’)

IF

HourlyResourceMasterFileDesignatedFastStartUnitFlag BrtuT’I’Q’M’VL'W'R'F'S'mdh = 1

AND

(DispatchIntervalIIEMinimumLoadEnergy BrtuT'I'Q’M'VL'W'R'F'S'mhcif + DispatchIntervalFMMMinimumLoadEnergy BrtuT'I'Q’M'R'W'F'S'VL'mdhcif) >0

THEN

BAResourceMasterFileDesignatedFastStartUnitMinLoadFlag BrtQ’F’S’mdhcif = 1

ELSE

BAResourceMasterFileDesignatedFastStartUnitMinLoadFlag BrtQ’F’S’mdhcif = 0

Where Bal Authority Area (Q’) = ‘CISO’

### BASettlementIntervalCAISOResourceIIEMLEQuantity *BrtuT’I’Q’M’VL’W’R’F’S’mdhcif =*

DispatchIntervalIIEMinimumLoadEnergy BrtuT'I'Q’M'VL'W'R'F'S'mhcif

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceAGCFlag *BrtQ’F’S’mdhcif*

IF

BAResourceonAGCTag BrtQ’F’S’mdhcif = 1

AND

ABS(BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc ) + ABS(BA15MinuteResourceAdjustedRegDownMileageQty BrtQ’mdhc)<> 0

THEN

BAResourceAGCFlag BrtQ’F’S’mdhcif = 1

ELSE

BAResourceAGCFlag BrtQ’F’S’mdhcif = 0

### BAResourceonAGCTag *BrtQ’F’S’mdhcif* =

IF

OffAGCStatusCalculationTag BrtQ’F’S’mdhcif < 1

THEN

BAResourceonAGCTag BrtQ’F’S’mdhcif = 1

ELSE

BAResourceonAGCTag BrtQ’F’S’mdhcif = 0

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceUnavailableSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (BAResourceAvailableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif, (BAResourceUnavailableAncillaryServicesCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif -BAResourceUnavailableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)

### BAResourceUnavailableNonSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (BAResourceAvailableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif , BAResourceUnavailableAncillaryServicesCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)

### BAResourceUndeliveredNonSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif**=*

BAResourceADSDispatchNonSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif \* BAResourceUndeliveredNonSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif \* Max(0, (((BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc /4) - BAResourceUndispatchableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif) - (ResourceIIENonSpinConversionQuantity BrtT'uI'Q'M'R'W'F'S'VL'mdhcif - BAResourceUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)))

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceADSDispatchNonSpinFlag *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif =*

IF BAResourceADSNonSpinDispatchQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif <> 0

THEN

BAResourceADSDispatchNonSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif = 1

ELSE

BAResourceADSDispatchNonSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif = 0

Where Bal Authority Area (Q’) = ‘CISO’

### *BAResourceUndeliveredNonSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

BAResourceUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif > (NoPayTolerancebandForDispatchedDeliveredEnergyFactor \* ResourceIIENonSpinConversionQuantity BrtT'uI'Q'M'R'W'F'S'VL'mdhcif)

THEN

BAResourceUndeliveredNonSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = 1

ELSE

BAResourceUndeliveredNonSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = 0

### BAResourceUndeliveredSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

BAResourceADSDispatchSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif \* BAResourceUndeliveredSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif \* Max(0, (((BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc /4) - BAResourceUndispatchableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif) – (ResourceSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif - BAResourceUndeliveredSpinIIEQuantityBrtT’uI’Q’M’R’W’F’S’VL'mdhcif)))

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceADSDispatchSpinFlag *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif =*

IF

BAResourceADSSpinDispatchQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif <> 0

THEN

BAResourceADSDispatchSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif = 1

ELSE

BAResourceADSDispatchSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif = 0

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceUndeliveredSpinComplianceFlag *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

BAResourceUndeliveredSpinIIEQuantityBrtT’uI’Q’M’R’W’F’S’VL'mdhcif > (NoPayTolerancebandForDispatchedDeliveredEnergyFactor \* ResourceSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif)

THEN

BAResourceUndeliveredSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = 1

ELSE

BAResourceUndeliveredSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = 0

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceUnsynchronizedNonSpinReserveBillableQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

IF

HourlyResourceMasterFileDesignatedFastStartUnitFlag BrtuT’I’Q’M’VL'W'R'F'S'mdh <> 1

THEN

IF

((BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc \*3) > 0

AND ResourceSynchronizedToCAISOGridFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif = 0

AND BAResourceChannel4GenMeterQuantity BrtuT’I’Q’M’R’W’F’S’VL'mdhcif = 0)

THEN

BAResourceUnsynchronizedNonSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc / 4

ELSE

BAResourceUnsynchronizedNonSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = 0

ELSE

BAResourceUnsynchronizedNonSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = 0

Where Entity Component Subtype (S’) =(‘IG’ or ‘EG’ or ‘NREM’) and Bal Authority Area (Q’) = ‘CISO’

### BAResourceUnsynchronizedSpinReserveBillableQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

IF

(BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc \* 3 > 0

AND ResourceSynchronizedToCAISOGridFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif = 0

AND BAResourceChannel4GenMeterQuantity BrtuT’I’Q’M’R’W’F’S’VL'mdhcif = 0 )

THEN

BAResourceUnsynchronizedSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc /4

ELSE

BAResourceUnsynchronizedSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = 0

Where Entity Component Subtype (S’) =(‘IG’ or ‘EG’ or ‘NREM’) and Bal Authority Area (Q’) = ‘CISO’

### BAResourceChannel4GenMeterQuantity *BrtuT’I’Q’M’R’W’F’S’VL'mdhcif =*

BA5mResourceChannel4GeneratorMeterQuantity BrtT'uI'Q’M'R'W'F'S'VL'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’ and Entity Component Subtype (S’) <> (‘PSUG’, ‘PDR’, ‘CURT’)

### BAResourceUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* *=* BAResourceGeneratorUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* +BAResourcePDRUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif*+BAResourcePSUGUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif*

### BAResourceGeneratorUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

### *MAX(0, (*BAResourceChannel4GenMeterQuantity *BrtuT’I’Q’M’R’W’F’S’VL'mdhcif -* BAResourceSettlementIntervalRegulationEnergyConversion *BrtuT’I’Q’M’F’S’mdhcif*)

–

MAX (DispatchIntervalTotalExpectedEnergyConversion BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, (BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif /12) – BAResourceAvailableASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif))

Where Entity Component Subtype (S’) <> (‘PDR’,’PSUG’,’CURT’) and Bal Authority Area (Q’) = ‘CISO’

### BAResourcePDRUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* *=*

MAX (0, MIN ((((BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc \* 3) + (BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc \* 3)) /12) – ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif – ResourceSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, BAResourceAvailableASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif) – PsuedoGenResourceMeterFromAssociatedLoadIDConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)

Where Entity Component Subtype (S’) = (‘PDR’, ‘CURT’) and Bal Authority Area (Q’) = ‘CISO’

### BAResourcePSUGUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* *= MAX (0, MIN (MIN(*PsuedoGenResourceDayAheadLoadScheduleFromAssociatedLoadIDConversionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdh, ((*BA15minuteResourceRealTimeSpinClearedQty *BrtT'uI'Q’M'VL'W'R'F'S'mdhc* \* 3) *+ (*BA15minuteResourceRealTimeNonSpinClearedQty *BrtT’uI’Q’M’VL'W'R'F'S'mdhc* \* 3)*) /12)* – ResourceIIENonSpinConversionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* – ResourceSpinIIEQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, BAResourceAvailableASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)* – PsuedoGenResourceMeterFromAssociatedLoadIDConversionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)*

Where Entity Component Subtype (S’) = ‘PSUG’ and Bal Authority Area (Q’) = ‘CISO’

### BAResourceAvailableASCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

BAResourceAvailableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif + BAResourceAvailableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif

### BAResourceAvailableSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

Max(0,( BA15minuteResourceRealTimeSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc,/4) - BAResourceUndispatchableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif - BAResourceDeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceAvailableNonSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

Max(0,( BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc/4) - BAResourceUndispatchableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif - BAResourceDeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceDeliveredNonSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* *=*

ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif – BAResourceUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif

### BAResourceDeliveredSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

ResourceSpinIIEQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdhcif – BAResourceUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceUndeliveredNonSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

BAResourcePSUGUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif + BAResourceGenUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif + BAResourcePDRUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif

### BAResourcePSUGUndeliveredNonSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (ResourceIIENonSpinConversionQuantity BrtT'uI'Q'M'R'W'F'S'VL'mdhcif , MAX (0, PsuedoGenResourceMeterFromAssociatedLoadIDConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif – (PsuedoGenResourceDayAheadLoadScheduleFromAssociatedLoadIDConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdh – ResourceIIENonSpinConversionQuantity BrtT'uI'Q'M'R'W'F'S'VL'mdhcif – ResourceSpinIIEQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdhcif )))

Where Entity Component Subtype (S’) = ‘PSUG’ and Bal Authority Area (Q’) = ‘CISO’

### BAResourceGenUndeliveredNonSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif, MAX (0, DispatchIntervalTotalExpectedEnergyConversion BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceUndeliveredResidualIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif – BAResourceUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif – (BAResourceChannel4GenMeterQuantity BrtuT’I’Q’M’R’W’F’S’VL'mdhcif- BAResourceSettlementIntervalRegulationEnergyConversion BrtuT’I’Q’M’F’S’mdhcif)))

Where Entity Component Subtype (S’) <> (‘PSUG’, ‘CURT’, ‘PDR’)

### BAResourcePDRUndeliveredNonSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif, Max(0,ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif – MAX (0, BA5MCAISOResPDRNoPayPerformaceMeterQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif )))

Where Entity Component Subtype (S’) = (‘PDR’,’CURT’)

### BAResourceUndeliveredSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

BAResourceGenUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif + BAResourcePSUGUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif + BAResourcePDRUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif

### BAResourcePSUGUndeliveredSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

MIN (ResourceSpinIIEQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdhcif,

MAX (0, PsuedoGenResourceMeterFromAssociatedLoadIDConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif – (PsuedoGenResourceDayAheadLoadScheduleFromAssociatedLoadIDConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdh – ResourceSpinIIEQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdhcif)))

Where Entity Component Subtype (S’) = ‘PSUG’ and Bal Authority Area (Q’) = ‘CISO’

### BAResourceGenUndeliveredSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

MIN (ResourceSpinIIEQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdhcif,

MAX (0, DispatchIntervalTotalExpectedEnergyConversion BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceUndeliveredResidualIEQuantity BrtT'uI'Q’M'R'W'F'S'VL'mdhcif – (BAResourceChannel4GenMeterQuantity BrtuT’I’Q’M’R’W’F’S’VL'mdhcif - BAResourceSettlementIntervalRegulationEnergyConversion BrtuT’I’Q’M’F’S’mdhcif)))

Where Entity Component Subtype (S’) <> (‘PSUG’, ‘CURT’, ‘PDR’) and Bal Authority Area (Q’) = ‘CISO’

### BAResourcePDRUndeliveredSpinIIEQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

MIN (ResourceSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif,

MAX (0, ResourceSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BA5MCAISOResPDRNoPayPerformaceMeterQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif))

Where Entity Component Subtype (S’) = (‘PDR’, ‘CURT’) and Bal Authority Area (Q’) = ‘CISO’

### BAResourceUndeliveredResidualIEQuantity BrtT'uI'Q’M'R'W'F'S'VL'mdhcif =

MAX(0, MIN (BAResourceResidualIEConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif, (DispatchIntervalTotalExpectedEnergyConversion BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – (BAResourceChannel4GenMeterQuantity BrtuT’I’Q’M’R’W’F’S’VL'mdhcif - BAResourceSettlementIntervalRegulationEnergyConversion BrtuT’I’Q’M’F’S’mdhcif))))

Where Entity Component Subtype (S’) <> (‘PSUG’, ‘PDR’, ‘CURT’) and Bal Authority Area (Q’) = ‘CISO’

### BAResourceUndispatchableSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

(BA15minuteResourceRealTimeSpinClearedQty BrtT'uI'Q’M'VL'W'R'F'S'mdhc \* 3, - BAResourceDispatchedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif - BAResourceRampLimitedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif) /12

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceUndispatchableNonSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

((BA15minuteResourceRealTimeNonSpinClearedQty BrtT'uI'Q’M'VL'W'R'F'S'mdhc \* 3) - BAResourceDispatchedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif - BAresourceRampLimitedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif) /12

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceRampLimitedSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (BAResourceAvailabilityLimitedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif - BAResourceDispatchedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif, BAResourceRampLimitedASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif - BAresourceRampLimitedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif)

Where Entity Component Subtype (S’) <> ‘REM’

### BAResourceRampLimitedNonSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (BAResourceAvailabilityLimitedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif - BAResourceDispatchedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif, BAResourceRampLimitedASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif

Where Entity Component Subtype (S’) <> ‘REM’

### BAResourceRampLimitedASCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

Entity Component Subtype (S’) is ‘LESR’

THEN

BAResourceRampLimitedASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =

MIN (5MinuteResourceOperatingReserveQuantity BrtT'uI'Q’M'VL'W'R'F'S'mdhcif , BA5minuteResourceAvailableStoredEnergyCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif , BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif - BAResourceNonSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif)

ELSE

BAResourceRampLimitedASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =

MIN (5MinuteResourceOperatingReserveQuantity BrtT'uI'Q’M'VL'W'R'F'S'mdhcif , BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif - BAResourceNonSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif)

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceDispatchedSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

MIN (BAResourceAvailabilityLimitedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif,

MAX (0, BA5MResDOTQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif))

Where Entity Component Subtype (S’) <> ‘REM’

### BAResourceDispatchedNonSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

ENTITY\_COMPONENT\_SUBTYPE = ’PSUG’

THEN

BAResourceDispatchedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = BA5MResDOTQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif

ELSE

BAResourceDispatchedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif = MIN(BAResourceAvailabilityLimitedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif, MAX (0, BA5MResDOTQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceNonSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif))

Where Entity Component Subtype (S’) <> ‘REM’

### BAResourceAvailabilityLimitedSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’

### BA5MResDOTQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif =*

BA5MResourceDOTQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceSpinLowerLimitQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif =*

MAX((BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – (BA15minuteResourceRealTimeSpinClearedQty BrtT'uI'Q’M'VL'W'R'F'S'mdhc \* 3)), BA5minuteResourceMinimumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, Min(BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, BACAISOResFMMClearedEnergyQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif))

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceNonSpinLowerLimitQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif =*

IF

HourlyResourceMasterFileDesignatedFastStartUnitFlag BrtuT’I’Q’M’VL'W'R'F'S'mdh <> 1

THEN

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

MAX((BAResourceSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – (BA15minuteResourceRealTimeNonSpinClearedQty BrtT'uI'Q’M'VL'W'R'F'S'mdhc \* 3)), BA5minuteResourceMinimumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, Min(BACAISOResFMMClearedEnergyQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif) )

ELSE

IF

DispatchIntervalTotalExpectedEnergyConversion BrtuT’I’Q’M’VL'W'R'F'S'mdhcif > 0

THEN

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

MAX((BAResourceSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – (BA15minuteResourceRealTimeNonSpinClearedQty BrtT'uI'Q’M'VL'W'R'F'S'mdhc \* 3)), BA5minuteResourceMinimumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, Min(BACAISOResFMMClearedEnergyQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif) )

ELSE

BAResourceNonSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif = 0

Where Bal Authority Area (Q’) = ‘CISO’

### FMMMinimumLoadConversionQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif* =

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

Where Bal Authority Area (Q’) = ‘CISO’

### BACAISOResFMMClearedEnergyQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif =

BAResourceFMMClearedEnergyQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdhc

Where Bal Authority Area (Q’) = ‘CISO’

Note: Formula will be configured such that each five minute interval will reflect its associated fifteen minute interval MW value. No frequency conversion will occur.

### BA5minuteResourceAvailableStoredEnergyCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* =

MAX (0, (BA5MResourceLESRStateofChargeQty BrtuT'I'Q’M'VL'W'R'F'S'mdhcif \* 12 –

BA5MResourceLESRLowerChargeLimitQty BrtuT'I'Q’M'VL'W'R'F'S'mdhcif \* 12))

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceAvailabilityLimitedNonSpinCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

HourlyResourceMasterFileDesignatedFastStartUnitFlag BrtuT’I’Q’M’VL'W'R'F'S'mdh <> 1

THEN

BAResourceAvailabilityLimitedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =

BAResourceSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceNonSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif

ELSE

BAResourceAvailabilityLimitedNonSpinCapacityQuantityBrtT’uI’Q’M’R’W’F’S’VL'mdhcif =

MIN (BAResourceSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif – BAResourceNonSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif

, BA15minuteResourceRealTimeNonSpinClearedQty BrtT'uI'Q’M'VL'W'R'F'S'mdhc \* 3)

Where Bal Authority Area (Q’) = ‘CISO’

### BAResourceDAAndRTNonSpinAwardQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

(BAResourceDayAheadAwardNonSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif + BAResourceRealTimeHourlyAwardNonSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif)

Where Bal Authority Area (Q’) = ‘CISO’

Note: The input bill determinant updates are not associated with DAME EDAM. They exist in order to align the ICG with the existing design template formula

### BAResourceDAAndRTSpinAwardQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

( BAResourceDayAheadAwardSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif + BAResourceRealTimeHourlyAwardSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif )

Where Bal Authority Area (Q’) = ‘CISO’

Note: The input bill determinant updates are not associated with DAME EDAM. They exist in order to align the ICG with the existing design template formula

### BAResourceResidualIEConversionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

sum(b) DispatchIntervalResidualIIE BrtuT'bI'Q’M'R'W'F'S'VL'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’

### ResourceIIENonSpinConversionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif =*

IF

(BASettlementIntervalCAISOResourceIIEMLEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif \*12 <= BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc \*3

AND BASettlementIntervalCAISOResourceIIEMLEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif >0)

THEN

ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif= BASettlementIntervalCAISOResourceIIEMLEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif + ResourceNonSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif

ELSE

ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif= ResourceNonSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’

### BA15mResourceUntaggedNonSpinQuantity *BrtQ’F’S’mdhc* = SUM(u,T’,I’,M’,V,L’,W’,R’)

~~~~

IF

HourlyPredispatchFlag BrtQ’mdh = 1

THEN

BA15mResourceUntaggedNonSpinQuantity BrtQ’F’S’mdhc = BA15mResourceUntaggedNonSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc

ELSE

BA15mResourceUntaggedNonSpinQuantity BrtQ’F’S’mdhc =0)

### BA15mResourceUntaggedSpinQuantity *BrtQ’F’S’mdhc* = SUM(u,T’,I’,M’,V,L’,W’,R’)

~~~~ If(HourlyPredispatchFlag BrtQ’mdh = 1, BA15mResourceUntaggedSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc,0)

### BA5mResourceDeclinedNonSpinCapacityQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif* =

MAX (0,MIN(ResourceNonSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, BA15mResourceCASTaggedNonSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc / 4) – (BA5minuteResourceCASCheckOutNonSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif /12))

Where Resource Type (t) = ‘ITIE’ and Entity Component Type (F’) = (‘TG’) AND Bal Authority Area (Q’) = ‘CISO’

### BA15mResourceUntaggedNonSpinCapacityHourlyPreDispatchedTieGenQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhc* =

MAX (0,BA15minuteResourceRealTimeNonSpinClearedQty BrtT’uI’Q’M’VL'W'R'F'S'mdhc – BA15mResourceCASTaggedNonSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc)

Where Resource Type (t) = ‘ITIE’ and Entity Component Type (F’) = (‘TG’) and Bal Authority Area (Q’) = ‘CISO’

### BA5mResourceDeclinedSpinCapacityQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif* =

MAX(0,min(ResourceSpinIIEQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif, BA15mResourceCASTaggedSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc / 4) – (BA5minuteResourceCASCheckOutSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif /12))

Where Resource Type (t) = ‘ITIE’ and Entity Component Type (F’)= (‘TG’) and Bal Authority Area (Q’) = ‘CISO’

### BA15mResourceUntaggedSpinCapacityHourlyPreDispatchedTieGenQuantity *BrtuT’I’Q’M’VL'W'R'F'S'mdhc* =

max (0,( BA15minuteResourceRealTimeSpinClearedQty BrtuT’I’Q’M’VL'W'R'F'S'mdhc – BA15mResourceCASTaggedSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc ))

Where Resource Type (t) = 'ITIE' and Entity Component Type (F’) = ('TG') and Bal Authority Area (Q’) = ‘CISO’

### PsuedoGenResourceDayAheadLoadScheduleFromAssociatedLoadIDConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdh = sum(A,A’,p,w’,v)

PsuedoGenResourceDayAheadLoadScheduleForAssociatedLoadIDQuantity BrtuT'I'Q’M'AA'R'pW'F'S'vw’VL'mdh

Where Bal Authority Area (Q’) = ‘CISO’

### PsuedoGenResourceMeterFromAssociatedLoadIDConversionQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* = sum(A,A’,m’p,Q,d’,n’,N,z’,w’,v,P)

PsuedoGenResourceMeterForAssociatedLoadIDQuantity BrtuT'I'Q'M'AA'm'F'R'pPW'QS'd'Nz'Vvw’n'L'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’

### *BA5MCAISOResPDRNoPayPerformaceMeterQuantity* *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif =*

BA5MResourcePDRNoPayPerformaceMeterQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’

### DispatchIntervalTotalExpectedEnergyConversion *BrtuT’I’Q’M’VL'W'R'F'S'mdhcif* = sum(E,A,A’,p)

DispatchIntervalTotalExpectedEnergy BrtEuT'I'Q’M'AA’W'R'pF'S'VL'mdhcif

Where Bal Authority Area (Q’) = ‘CISO’ and Entity Component Subtype (S’) <> (‘PSUG’, ‘PDR’, ‘CURT’)

### BAResourceSettlementIntervalRegulationEnergyConversion *BrtuT’I’Q’M’F’S’mdhcif*

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

Where Bal Authority Area (Q’) = ‘CISO

The four formula’s below are not associated with the DAME EDAM updates but are existing formula’s that for some reason were not placed on the ICG during previous updates

### BAResourceRealTimeHourlyAwardNonSpinBidQuantity *BrtT'uI'Q’M'R'W'F'S'VL'mdhif* = INTDUPLICATE(15MinuteRTMNonSpinAwardedBidQuantity *BrtT'uI'Q’M'VL'W'R'F'S'mdhc*)

### BAResourceRealTimeHourlyAwardSpinBidQuantity *BrtT'uI'Q’M'R'W'F'S'VL'mdhif* = INTDUPLICATE(15MinuteRTMSpinAwardedBidQuantity *BrtT’uI’Q’M’VL’W’R’F’S’mdhc*)

### BAResourceDayAheadAwardNonSpinBidQuantity *BrtT'uI'Q’M'R'W'F'S'VL'mdhif* =

INTDUPLICATE(DAHourlyNonSpinAwardedBidQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdh)

### BAResourceDayAheadAwardSpinBidQuantity *BrtT'uI'Q’M'R'W'F'S'VL'mddhif* =

INTDUPLICATE (DASpinAwardedBidQuantity BrtuT'I'Q’M'VL'W'R'F'S'mdh)

## Outputs

| Output ID | Name | Description |
| --- | --- | --- |
| 1 | ResourceIIENonSpinConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | IIE Non-Spin that was dispatched during this 5 minute interval  Since MRTU, Market Quality Systems (MQS) categorizes the Expected Energy for capacity below Pmin as Market Service Type of ‘Day Ahead Capacity’. Energy above Pmin is categorized as ‘Non-Spinning Reserve’.  IIE ML is not derived for the NGR resources ‘DDR’ and ‘LESR’ . For that reason their IIE Non-Spin quantity is fully represented by the 5 minute IIE Non-Spin quantity.  For resources where the IIE\_ML is equal to zero, the IIE Non-Spin quantity is fully represented by the 5 minute IIE Non-Spin quantity.  For resources where IIE ML is greater than zero, the IIE Non-Spin quantity is derived by summing IIE\_ML and 5 minute IIE Non-Spin quantities.  Note: IIE ML, where it is derived, is never a negative value |
| 2 | PsuedoGenResourceDayAheadLoadScheduleFromAssociatedLoadIDConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdh | Exists to sum over attributes as otherwise it will conflict with existing business driver. This BD will only ever exist for PSUG. |
| 3 | PsuedoGenResourceMeterFromAssociatedLoadIDConversionQuantity  BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | Exists to sum over attributes as otherwise it will conflict with existing business driver |
| 4 | BAResourceResidualIEConversionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Residual IE’  Exists to sum over attributes as otherwise it will conflict with existing business driver in subsequent calculation |
| 5 | BAResourceDAAndRTSpinAwardQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Bid Awarded Spin Capacity’  This bill determinant represents the Non Spin Awards from Day Ahead and Fifteen Minute market. |
| 6 | BAResourceDAAndRTNonSpinAwardQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Bid Awarded Non-Spin Capacity’  This bill determinant represents the Non Spin Awards from Day Ahead and Fifteen Minute market. |
| 7 | BAResourceAvailabilityLimitedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Availability-Limited Non-Spin Capacity’  How much Non Spin capacity is available on the resource after applying any resource outages.  If the unit is a fast start unit, the resource’s available capacity is between zero and the lower spin limit. |
| 8 | BAResourceAvailabilityLimitedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Availability-Limited Spin Capacity’  How much Spin capacity is available on the resource after applying any resource outages. |
| 9 | BAResourceDispatchedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Dispatched Non-Spin Capacity’  This bill determinant represents the dispatched Non Spin Capacity by calculating the quantity of the DOT that is above the lower Non Spin limit. Howevver, if the unit is a participating load, its Dispatched Non Spin Capacity is equal to the DOT. |
| 10 | BAResourceDispatchedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Dispatched Spin Capacity’  This bill determinant represents the dispatched Spin Capacity by calculating the quantity of the DOT is above the lower Spin limit. |
| 11 | BAresourceRampLimitedNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Ramp-Limited Non-Spin Capacity’  Each 10 minute output carries Capacity (MW) values  This bill determinant represents how much Non Spin capacity is available on the resource with the Ramp Rate limitation  Once the dispatched Spinning and Non-Spinning Reserve are calculated, the amount of Spinning and Non-Spinning Reserve that was not dispatched (in MW) is calculated and compared to the Ramp Rate capability of the unit in the Settlement Interval, which is represented by the available Operating Reserve. Available Operating Reserve reflects the incremental 10-minute capability of a resource. |
| 12 | BAResourceRampLimitedSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Ramp-Limited Spin Capacity’  This bill determinant represents how much AS capacity is available on the resource with the Ramp Rate limitation  Once the dispatched Spinning and Non-Spinning Reserve are calculated, the amount of Spinning and Non-Spinning Reserve that was not dispatched (in MW) is calculated and compared to the Ramp Rate capability of the unit in the Settlement Interval, which is represented by the available Operating Reserve. Available Operating Reserve reflects the incremental 10-minute capability of a resource. |
| 13 | BAResourceUndispatchableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undispatchable Non-Spin Capacity’  This bill determinant represents the amount of Non Spin Capacity that the CAISO is unable to dispatch. It is the difference between the resource’s Non Spin schedule, and Dispatched and ramp limited capacity. |
| 14 | BAResourceUndispatchableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undispatchable Spin Capacity’  This bill determinant represents the amount of Spin Capacity that the CAISO is unable to dispatch. It is the difference between the resource’s Spin schedule, and Dispatched and ramp limited capacity. |
| 15 | BAResourceRampLimitedASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents the amount of total operating reserves that the resource can provide due to ramping limitations. For LESR resources, the amount can be further reduced due to lack of available energy tored in the resource. |
| 16 | BAResourceUndeliveredResidualIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Residual IE’ |
| 17 | BAResourceSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | The Lower Spin Limit represents the lower boundary that spinning capacity is reserved on the resource taking into consideration outages. It is also the Upper Limit for Non Spin reserved capacity. |
| 18 | BAResourceNonSpinLowerLimitQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | The Lower Non Spin Limit represents the lower boundary that non spinning capacity is reserved on the resource taking into consideration outages. |
| 19 | BAResourceUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Spin IIE’  This bill determinant represents the Spin Capacity that was dispatched but was not delivered. |
| 20 | BAResourcePSUGUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Spin IIE’  This bill determinant represents the Spin Capacity that was dispatched but was not delivered.  PSUG specific. |
| 21 | BAResourceGenUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Spin IIE’  This bill determinant represents the Spin Capacity that was dispatched but was not delivered.  Gen specific. |
| 22 | BAResourcePDRUndeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Spin IIE’  This bill determinant represents the Spin Capacity that was dispatched but was not delivered.  PDR specific. |
| 23 | BAResourceUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Non-Spin IIE’  This bill determinant represents the Non Spin Capacity that was dispatched but was not delivered. |
| 24 | BAResourcePSUGUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Non-Spin IIE’  This bill determinant represents the Non Spin Capacity that was dispatched but was not delivered.  PSUG specific. |
| 25 | BAResourceGenUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Non-Spin IIE’  This bill determinant represents the Non Spin Capacity that was dispatched but was not delivered.  Gen specific. |
| 26 | BAResourcePDRUndeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Non-Spin IIE’  This bill determinant represents the Non Spin Capacity that was dispatched but was not delivered.  PDR specific. |
| 27 | BAResourceDeliveredSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Delivered Spin IIE’  IIE Spin Quantity - Undelivered Spin IIE Quantity |
| 28 | BAResourceDeliveredNonSpinIIEQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | Delivered Non-Spin IIE  IIE Non Spin Quantity - Undelivered Non Spin IIE Quantity |
| 29 | BAResourceUnavailableAncillaryServicesCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This formula consolidates the three different equations for Unavailable Ancillary Services Quantity. |
| 30 | BAResourceUndeliveredSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Spin Capacity’  If Energy from a Generating Unit or Dynamic System Resource is dispatched, then that resource is responsible for delivering at least 90% of the Expected Energy attributed to that dispatched AS capacity in order to retain full AS capacity payment. If the energy delivered from the dispatched AS capacity is not within the tolerance factor, 10% of the Expected Energy attributed to the dispatched AS capacity, the payment for the remaining Dispatchable AS Capacity is rescinded.  RTM dispatches resources based on telemetry data and may create a Spin or Non-Spin Instructed Energy quantity without explicitly dispatching Spin or Non-Spin Energy in ADS. In the case that the resource does not receive an explicit dispatch for operating reserves, Undelivered No pay charges shall not be assessed. |
| 31 | BAResourceUnsynchronizedSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Unsynchronized Spinning Reserve Billable Quantity’  Generating Units receive a No Pay charge if the resource has a Spinning Reserve AS Award or Schedule in the RT when the Generating Unit is not already on-line, or “spinning” in Real-Time.  Formula filters by ENTITY\_COMPONENT\_SUBTYPE (S’) = ‘IG’ or ‘EG’ or ‘NREM’ in the formula in order to include only Internal Generation, Non-Generator Resources, and MSS External Generation that are internal to the ISO |
| 32 | BAResourceUnsynchronizedNonSpinReserveBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Unsynchronized Non-Spinning Reserve Billable Quantity’  Generating Units receive a No Pay charge if the Generating Unit has a Non-Spinning Reserve AS Award or Schedule in the RT, but is not certified to provide Non-Spinning Reserve from off-line position (i.e., the Generating Unit is not certified for Real-Time Non-Spinning Reserve), is not “spinning” in Real-Time, and has no generation meter.  Fast start units are allowed to be offline and are not subject Unsynchronized Non Spin No Pay.  Formula filters by ENTITY\_COMPONENT\_SUBTYPE (S’) = ‘IG’ or ‘EG’ or ‘NREM’ in the formula in order to include only Internal Generation, Non-Generator Resources and MSS External Generation that are internal to the ISO |
| 33 | BAResourceUndeliveredNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Undelivered Non-Spin Capacity’  This bill determinant represents the undelivered non spin capacity of resources. |
| 34 | BAResourceUnavailableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Unavailable Non-Spin Capacity’  Unavailable Capacity is allocated to each of the AS services from lowest quality to highest quality in order to preserve the highest quality AS capacity for CAISO |
| 35 | BAResourceUnavailableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | ‘Unavailable Spin Capacity’  Unavailable Capacity is allocated to each of the AS services from lowest quality to highest quality in order to preserve the highest quality AS capacity for CAISO  The lower of  Unavailable AS capacity minus Unavailable Non-Spin Capacity  Max of 0 OR Dispatchable Spin Capacity –Delivered Spin IIE |
| 36 | BA15MResourceASTestRescissionNonSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhc | This bill determinant represents Non Spin capacity subject to No Pay associated with a failed Ancillary Service compliance test. |
| 37 | BA5MResourceASTestRescissionNonSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhcif | Represents the conversion of the 15 minute hourly MW value to a 5 min MWh value |
| 38 | BA15MResourceASTestRescissionSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhcif | This bill determinant represents Spin capacity subject to No Pay associated with a failed Ancillary Service compliance test. |
| 39 | BA5MResourceASTestRescissionSpinQuantity BrtT’uI’Q’M’R’W’F’S’VL’mdhcif | Represents the conversion of the 15 minute hourly MW value to a 5 min MWh value |
| 40 | BAResourcePostMarketNoPaySpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents a resource’s No Pay Spin Capacity.  Resource with regulation and are on CAISO AGC control, are exempt from Spin No Pay Capacity. However, this exemption does not apply to disqualified capacity where buy back was performed due to a resource constraint. |
| 41 | BAResourceNoPaySpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents a resource’s total No Pay Spin Capacity. |
| 42 | BAResourceNoPaySpinAwardQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents the portion of a resource’s Spin Award bid associated to No Pay Spin Capacity. |
| 43 | BAResourceNoPaySpinSelfProvisionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents the portion of a resource’s Spin self-provision bid associated to No Pay Spin Capacity. |
| 44 | BAResourcePostMarketNoPayNonSpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents a resource’s No Pay Non Spin Capacity.  Resource with regulation and are on CAISO AGC control, are exempt from Non Spin No Pay Capacity. However, this exemption does not apply to disqualified capacity where buy back was performed due to a resource constraint. |
| 45 | BAResourceNoPayNonSpinBillableQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents a resource’s total No Pay Non Spin Capacity. |
| 46 | BAResourceNoPayNonSpinAwardQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents the portion of a resource’s Non Spin Award bid associated to No Pay Non Spin Capacity. |
| 47 | BAResourceNoPayNonSpinSelfProvisionQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents the portion of a resource’s Non Spin self-provision bid associated to No Pay Non Spin Capacity. |
| 48 | BA15mResourceUntaggedSpinQuantity BrtQ’F’S’mdhc | Only if the Hourly Pre-dispatched Flag is set to 1 (1= HASP TG) calculate the formula. Else the formula evaluates to 0  Derived for CC 6710 DA CONG AS Spin Reserve Import Settlement |
| 49 | BA15mResourceUntaggedNonSpinQuantity BrtQ’F’S’mdhc | Only if the Hourly Pre-dispatched Flag is set to 1 (1= HASP TG) calculate the formula. Else the formula evaluates to 0  Derived for CC 6720 DA CONG AS Non-Spin Reserve Import Settlement |
| 50 | BA5minuteResourceAvailableStoredEnergyCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | For an LESR unit, the Available stored energy capacity that can be provided at 5-minute interval. |
| 51 | DispatchIntervalTotalExpectedEnergyConversion BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | When a pump storage resource is dispatch for pumping instead of generation the related total expected energy will be negative. Positive TEE will be created when the resource is dispatched for generation.  This charge type exists to sum over attribute E (ENERGY\_TYPE) |
| 52 | BAResourceConstraintDisqualifiedNoPayNonSpinQuantity BrtQ’F’S’mdhcif | This bill determinant (in MWh) represents Disqualified Non-Spin capacity between DA and RT when a resource is constrained. |
| 53 | BAResourceADSDispatchSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | This bill determinant represents if the resource received a dispatch for Spin Capacity from the CAISO ADS system.  Where:  1 = the resource was dispatched  0 = the resource was not dispatched. |
| 54 | BAResourceADSDispatchNonSpinFlag BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | This bill determinant represents if the resource received a dispatch for Non Spin Capacity from the CAISO ADS system.  Where:  1 = the resource was dispatched  0 = the resource was not dispatched. |
| 55 | BAResourceUndeliveredSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents if the resource failed to deliver 90% of its dispatch of Spin Capacity.  Where:  1 = The resource delivered less than the tolerance,  0= The resource delivered more than the tolerance. |
| 56 | BAResourceUndeliveredNonSpinComplianceFlag BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents if the resource failed to deliver 90% of its dispatch of Non Spin Capacity.  Where:  1 = The resource delivered less than the tolerance,  0= The resource delivered more than the tolerance. |
| 57 | BAResourceAvailableSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents the Spin capacity available to dispatch after subtracting undispatchable and delivered energy from the resources spin schedule. |
| 58 | BAResourceAvailableNonSpinCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | This bill determinant represents the Non Spin capacity available to dispatch after subtracting undispatchable and delivered energy from the resources non spin schedule. |
| 59 | BA15mResourceUntaggedSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc | This bill determinant represents an intertie’s Spin Capacity that was not tagged in RT. |
| 60 | BA15mResourceUntaggedNonSpinCapacityHourlyPreDispatchedTieGenQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhc | This bill determinant represents an intertie’s Non Spin Capacity that was not tagged in RT. |
| 61 | BAResourceAGCFlag BrtQ’F’S’mdhcif | This bill determinant represents if the resource is subject to No Pay quantities. Where:  0 = The resource is not on AGC and is subject to No Pay.  1 = The resource is on AGC, and shall be exempt from No Pay rescission. |
| 62 | BAResourceonAGCTag BrtQ’F’S’mdhcif | This bill determinant represents if a unit that is certified for regulation has a schedule and on CAISO AGC control. Please note that resources that are not certified to provide regulation capacity shall not have this tag created. |
| 63 | BA5mResourceDeclinedSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | Settlement Interval Declined Hourly Pre-Dispatch Spin Capacity. This bill determinant represents the quantity of Spin Capacity not tagged by a TG resource dispatched for Spinning energy. |
| 64 | BA5mResourceDeclinedNonSpinCapacityQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | Settlement Interval Declined Hourly Pre-Dispatch NonSpin Capacity. This bill determinant represents the quantity of Spin Capacity not tagged by a TG resource dispatched for Non-Spinning energy. |
| 65 | BAResourceChannel4GenMeterQuantity BrtuT’I’Q’M’R’W’F’S’VL'mdhcif | Resource’s metered generation. |
| 66 | BA5MResDOTQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | Resource’s dispatch operating target. |
| 67 | BAResourceMasterFileDesignatedFastStartUnitMinLoadFlag BrtQ’F’S’mdhcif | Flag indicating if a fast start unit has been dispatched for energy. |
| 68 | BASettlementIntervalCAISOResourceIIEMLEQuantity BrtuT’I’Q’M’VL’W’R’F’S’mdhcif | CAISO Resource’s instructed imbalance minimum load energy quantity. |
| 69 | BA5MCAISOResPDRNoPayPerformaceMeterQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | CAISO PDR Resource No Pay meter quantity. |
| 70 | FMMMinimumLoadConversionQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | FMM Minimum Load Quantity with attribute Q’ being summed over. |
| 71 | BACAISOResFMMClearedEnergyQuantity BrtuT’I’Q’M’VL'W'R'F'S'mdhcif | CAISO Resource FMM Cleared Energy Schedule. (in MW) |
| 72 | BAResourceAvailableASCapacityQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | Sum of available spin and non-spin capacity. |
| 73 | BAHourlyResourceFailedNonSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh | Resource failed its periodic unannounced non-spin availability test. Input reflects the MWh the resource was able to provide, and the commitment period that the ISO shall calculate AS test Rescission Capacity no pay. |
| 74 | BAHourlyResourceFailedSpinTestDeliveredFactor BrtT’ul’Q’M’R’W’F’S’Nz’VL’mdh | Resource failed its periodic unannounced spin availability test. Input reflects the MWh the resource was able to provide, and the commitment period that the ISO shall calculate AS test Rescission Capacity no pay. |
| 75 | BAResourcePDRUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* | ‘Unavailable AS Capacity’  After accounting for the amount of AS capacity that is undispatchable, a Unit must retain unloaded capacity on the resource for the portion of AS capacity that is dispatchable. If the resource deviates into that dispatchable AS capacity, then that AS capacity is unavailable to CAISO  This formulation is specific to PDR resources |
| 76 | BAResourceGeneratorUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* | Unavailable AS Capacity’  After accounting for the amount of AS capacity that is undispatchable, a Unit must retain unloaded capacity on the resource for the portion of AS capacity that is dispatchable. If the resource deviates into that dispatchable AS capacity, then that AS capacity is unavailable to CAISO  This formulation is specific to Generator resources |
| 77 | BAResourcePSUGUnavailableAncillaryServicesCapacityQuantity *BrtT’uI’Q’M’R’W’F’S’VL'mdhcif* | ‘Unavailable AS Capacity’  After accounting for the amount of AS capacity that is undispatchable, a Unit must retain unloaded capacity on the resource for the portion of AS capacity that is dispatchable. If the resource deviates into that dispatchable AS capacity, then that AS capacity is unavailable to CAISO  This formulation exclusive to PSUG resources  Explanation for scenario where a PSUG’s Associated Load DA schedule could be lower than the Cleared AS Awards – If a PSUG does not turn on their pumps then the Associated Load DA schedule could be lower than the Cleared AS Awards and in that case it allows clawback |
| 78 | BAResourceSettlementIntervalRegulationEnergyConversion *BrtuT’I’Q’M’F’S’mdhcif* | This exists in order to sum over attributes which would otherwise conflict with existing business drivers in subsequent equations in both Spin Non-Spin No Pay Quantity PC and RUC No Pay Quantity PC,  The Settlement Interval Regulation Energy was calculated as:  Minimum of Settlement Interval Regulation Up Capacity and Settlement Interval Energy Difference calculated above, if the Settlement Interval Energy Difference is greater or equal to zero  Maximum of negative of Settlement Interval Regulation Down Capacity and Settlement Interval Energy Difference calculated above, if the Settlement Interval Energy Difference is less than zero  A positive interval value reflects Regulation Up and a negative interval value reflect Regulation Down |
| 79 | BAResourceRealTimeHourlyAwardNonSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif | The formula ensures that each set of three 5m attributes on the output will all reflect their associated 15m input  This update is not associated with the DAME EDAM updates but is an existing formula that for some reason was not placed on the ICG during previous updates |
| 80 | BAResourceRealTimeHourlyAwardSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif | The formula ensures that each set of three 5m attributes on the output will all reflect their associated 15m input  This update is not associated with the DAME EDAM updates but is an existing formula that for some reason was not placed on the ICG during previous updates |
| 81 | BAResourceDayAheadAwardNonSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif | The formula ensures that each set of twelve 5m attributes on the output will all reflect their associated Hourly input  This update is not associated with the DAME EDAM updates but is an existing formula that for some reason was not placed on the ICG during previous updates |
| 82 | BAResourceDayAheadAwardSpinBidQuantity BrtT'uI'Q’M'R'W'F'S'VL'dhif | The formula ensures that each set of twelve 5m attributes on the output will all reflect their associated Hourly input  This update is not associated with the DAME EDAM updates but is an existing formula that for some reason was not placed on the ICG during previous updates |

# Charge Code Effective Dates

| Charge Code/  Pre-calc Name | Document  Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| CG PC Spin and Non-Spin No Pay Quantity | 5.0 | 02/01/10 | 03/31/10 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.1 | 04/01/10 | 01/31/10 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.2 | 02/01/10 | 07/31/10 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.3 | 08/01/10 | 1/31/10 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.4 | 02/01/2010 | 06/30/2012 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.5 | 07/01/2012 | 09/30/2012 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.6 | 10/01/2012 | 11/30/12 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.7 | 12/01/2012 | 06/30/2013 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.8 | 07/01/2013 | 10/31/2013 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.9 | 11/1/2013 | 4/30/2014 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.10 | 5/1/2014 | 4/30/14 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.11 | 10/01/14 | 9/30/14 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.12 | 5/1/2014 | 9/30/14 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.13 | 10/1/14 | 9/30/14 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.14 | 4/1/15 | 3/30/15 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.15 | 7/1/15 | 6/30/15 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.16 | 5/1/2014 | 9/30/14 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.17 | 10/1/2014 | 3/31/2015 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.18 | 4/1/2015 | 6/30/2015 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.19 | 7/1/2015 | 4/30/2019 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.20 | 5/1/2019 | 4/30/2019 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.20a | 5/1/2019 | 11/12/2019 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.21 | 11/13/2019 | 9/30/2020 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.22 | 10/1/2020 | 9/30/2020 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.22.1 | 10/1/2020 | 9/30/2020 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.22.1a | 10/1/2020 | 11/30/2022 | Documentation Edits Only |
| CG PC Spin and Non-Spin No Pay Quantity | 5.23 | 12/1/2022 | 6/30/2023 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.24 | 7/1/2023 | 4/30/2026 | Configuration Impacted |
| CG PC Spin and Non-Spin No Pay Quantity | 5.25 | 5/1/2026 | Open | Configuration Impacted |