Settlements & Billing

Configuration Guide: RUC No Pay Quantity Pre-Calculation

Version 5.18

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# Purpose of Document

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

# Introduction

## Background

As per CAISO Tariff Sections 8.10.7 and 8.10.8, 11.2.2, during the DAM, if the scheduled Demand is less than the CAISO Forecast of CAISO Demand, RUC Capacity is procured to ensure sufficient committed capacity is available and on-line to meet the forecasted CAISO Demand, as well as any forecasted shortfalls of minimum generation requirements.

RUC Availability Bids (above the Minimum Load) may only be submitted if an Energy Bid has also been submitted in the IFM. If a resource is under an RA obligation for a specific amount of capacity pursuant to Section 40 of the CAISO Tariff, the RA Capacity must participate in RUC with a RUC Availability Bid price of $0/MW. If a RUC Availability Bid is not submitted for the RA Capacity, then CAISO inserts a $0/MW proxy Bid per hour for the full amount of the RA Capacity for resources qualified to have a Resource Adequacy obligation. Resource Adequacy Resources that are not qualified for a Resource Adequacy obligation must also submit a $0/MW proxy Bid for the amount of RUC obligation submitted in the DAM up to their Resource Adequacy Capacity. However, SIBR will not validate that resources that are not qualified for a Resource Adequacy obligation submit a $0/MW proxy Bid. If a Resource Adequacy Resource submits a non-zero Bid for RUC Capacity for the portion of the resource obligated to provide RUC at $0/MW, then a capacity charge will rescind the RUC Capacity payment. Non-zero RUC Availability Bids may be submitted for the portion of a resource’s capacity that is not RA Capacity. Capacity not pre-dispatched pursuant to an RMR Contract may also submit non-zero RUC Availability Bids.

The rescission charge for a RUC Award rescinds the RUC Capacity payments to the extent that the resource with a RUC Award does not fulfill the requirements associated with that award. Prior to November, 1, 2009, these quantities were calculated in the Compliance System.

## Description

The RUC No Pay Quantity Pre-calculation calculates the rescission charge, which rescinds RUC Capacity payment for Generating Units and Dynamic System Resources when one of the following occurs: RUC Capacity is availability-limited, undispatchable due to an Outage or Rerate, is undelivered outside of a tolerance band, or ineligible for a RUC Award because it is a Resource Adequacy Resource.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | The rescission charge rescinds RUC Capacity payment for Generating Units and Dynamic System Resources when one of the following occurs:  1) RUC Capacity is availability-limited undispatchable due to an Outage or Rerate  3) Undelivered outside of a tolerance band  4) Ineligible for a RUC Award because it is a Resource Adequacy Resource. |
| 2.0 | The undispatchable RUC rescission calculation applies to availability-limited undispatchable RUC Capacity. Therefore, the calculation considers the RUC Award, the Day-Ahead Spinning Reserve AS Award or Schedule and the Non-Spinning Reserve AS Award or Schedule and maximum ex-post capacity. RUC Capacity, unlike AS capacity, is not required to be unloaded and, therefore, minimum ex-post capacity is not included in equations. |
| 3.0 | CAISO Tariff Section 11.16.If a Generating Unit or Dynamic System Resource is awarded RUC Capacity, the order in which the non-compliance RUC Capacity is apportioned is as follows. For undispatchable RUC Capacity, the non-compliance capacity is first apportioned to Bid-based RUC Capacity, then to any RA RUC Capacity. |
| 4.0 | For each Dispatch Interval in which the total metered output (less Regulation Energy) for a Generating Unit, System Unit or Dynamic System Resource is less than real-time Expected Energy by more than the Tolerance Band and less than the RUC Schedule, the RUC capacity for that Dispatch Interval will be rescinded. |
| 5.0 | Resource Adequacy Resources (RAR) not qualified for a Resource Adequacy obligation (ex: hydro, intermittent resources) must bid in RUC at a $0/MW proxy Bid for capacity up to the Resource Adequacy Capacity as reported in the monthly Supply Plans. There is no SIBR validation to ensure that resources not qualified for a Resource Adequacy obligation offer Resource Adequacy Capacity at a $0/MW proxy Bid. A resource not qualified for a Resource Adequacy obligation that bids non-zero RUC Capacity before committing at least the amount of its Resource Adequacy Capacity at a $0/MW price will have the RUC Capacity payment rescinded. |
| 6.0 | Capacity committed in RUC from an RA Resource has a zero Bid price and does not have a financial RUC rescission consequence when RA RUC becomes undispatchable or undelivered. The action by CAISO is to report the non-compliance to the Local Regulatory Authority and to publish the undispatchable or undelivered RA Capacity MWh amount, although no price is applied. |
| 7.0 | Participating Load resources will not schedule RUC. |
| 8.0 | Resource Adequacy Capacity is not the same thing as RA RUC Capacity. Resource Adequacy Capacity represents the Resource Adequacy Capacity reported in the monthly supply plans. RA RUC Capacity represents the RA RUC Capacity that a Resource schedules on an hourly basis. |
| 9.0 | For Proxy Demand Response resources, demand response energy measurement (DREM) or previously known as performance meter shall be set to zero when the Total Expected Energy (TEE) is zero. |
| 10.0 | 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 |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Spin Non-Spin No Pay Quantity Pre-Calculation |
| MSS Netting Pre-Calculation |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| RUC Net Amount Pre-calculation |
| CC 6824 - No Pay Residual Unit Commitment RUC Settlement |

## Inputs - External Systems

| Row # | Variable Name | Description | |
| --- | --- | --- | --- |
|  | BAResourceDispatchIntervalDAEnergyAllocationQuantity BrtbT'uI'Q’M'VL'W'R'F'S'mdhcif | Dispatch Interval Day Ahead Energy | |
|  | MaxOperMW  BrtF'S'md | Maximum Operating MW.  Mapped to the single interval value that exists in the Master File for the whole day | |
|  | GeneratorToleranceBandPercent | Generator Tolerance Band Percent | |
|  | GeneratorToleranceBandMW | Generator Tolerance Band MW | |
|  | DASpinQSP BrtT’uI’M’R’W’F’S’Nz’VL’mdh | Day Ahead Spin Qualified Self Provision | |
|  | DANonSpinQSP BrtT’uI’M’R’W’F’S’Nz’VL’mdh | Day Ahead Non Spin Qualified Self Provision | |
|  | DARegUpQSP BrtT’uI’M’R’W’F’S’Nz’VL’mdh | Day Ahead Reg Up Qualified Self Provision | |
|  | DispatchIntervalTotalExpectedEnergy BrtEuT'I'Q’M'AA’W'R'pF'S'QVL'mdhcif | Dispatch Interval Total Expected Energy | |
|  | HourlyResourceMasterFileDesignatedFastStartUnitFlag BrtuT'I'M'VL'W'R'F'S'mdh | Hourly Resource Master File Designated Fast Start Unit Flag | |
|  | MinOperMW BrtF'S'md | Minimum Operating Mega Watt. Mapped to the single interval value that exists in the Master File for the whole day | |
|  | ResourceRUCCapacityTotalIncludingDayAheadSchedule BrtT’uI’M’R’W’F’S’VL’mdh | Resource RUC Capacity Total Including Day Ahead Schedule. | |
|  | BAResourceHourlyRUCAwardedBidCapacity BrtuT'I'M'VL'W'R'F'S'mdh | Hourly RUC Awarded Bid Capacity. | |
|  | BusinessAssociateResourceHourlySumOfRUCBidAndRUCResourceAdequacyCapacityQuantity BrtuT'I'M'VL'W'R'F'S'mdh | Hourly Sum of RUC Award and RUC Resource Adequacy Capacity Quantity | |
|  | BusinessAssociateRSRCResourceAdequacyCapacityQuantity BrtuT'I'M'VL'W'R'F'S'mdh | Resource Adequacy Capacity is not the same thing as RA RUC Capacity. Resource Adequacy Capacity represents the Resource Adequacy Capacity reported in the monthly supply plans including replacement RA capacity and plus all RA CPM designations. RA RUC Capacity represents the RA RUC Capacity that a Resource schedules on an hourly basis. | |
|  | BAResourceFlexResourceAdequacyCapacityQuantity BrtuT’I’M’VL’W’R’F’S’mdh | Flexible Resource Adequacy Capacity reported in the monthly supply plan pus any flexible CPM designation. | |
|  | DispatchIntervalIIEMinimumLoadEnergy BrtuT'I'Q’M'VL'W'R'F'S'mdhcif | Dispatch Interval Instructed Imbalance Instructed Energy Minimum Load Energy. | |
|  | BAResourceChannel4GeneratorMeterQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif | Channel 4 Generator Meter Quantity. | |
|  | BAResEntityDispatchIntervalPerformanceMeteredQuantity BrtuT’I’Q’M’AA’m’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif | Metered quantity (in MWh) of proxy demand response resources  Note: This will be nullified or set to zero if the total expected energy for the interval is zero, or a very small number close to zero. | |
|  | HourlyPredispatchFlag Brtmdh | | For TGs (dynamic resources), theHourly Pre-Dispatch Flag is set to 0. Non-Dynamic resources scheduled in hourly blocks will be designated 1. Utilized in order to ensure that non-dynamic (=1) resources are not assessed RUC rescission quantities |
|  | BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’M’VL’W’R’F’S’mdhcif | | The maximum and minimum ex-post capacity limits of a resource reflect the Bid capacity and reported availability and define the operating levels to which the resource is considered dispatchable by CAISO. Note that maximum/minimum ex-post are capacity (MW) quantities and not Energy (MWh) quantities. |
|  | DARegUpAwardedBidQuantity BrtuT’I’M’VL’W’R’F’S’mdh | | Day Ahead Regulation Up Awarded Bid capacity for resource r. (MW) |
|  | TotalRTRegUpQSP BrtT’uI’M’R’W’F’S’Nz’VL'mdhc | | Real-Time Regulation Up Qualified Self-Provision capacity for resource r, Contract Reference Number N, Contract Type z’. (MW). |
|  | 15MinuteRTMRegUpAwardedBidQuantityBrtuT’I’M’VL’W’R’F’S’mdhc | | Real-Time Regulation Up Awarded Bid capacity for resource r **(MW).** |
|  | DANonSpinAwardedBidQuantity BrtuT’I’M’VL’W’R’F’S’mdh | | Day Ahead Non-Spinning Reserve Awarded Bid capacity for resource r. **(MW)** |
|  | DAHourlySpinAwardedBidQuantity BrtuT’I’M’VL’W’R’F’S’mdh | | Day Ahead Spinning Reserve Awarded Bid capacity for resource r **(MW)** |
|  | DispatchIntervalFMMMinimumLoadEnergy BrtuT'I'Q’M'R'W'F'S'VL'mdhcif | | FMM Dispatch Interval Instructed Imbalance Instructed Energy Minimum Load Energy. |

## Inputs - Predecessor Charge Codes or Pre-calculations

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Predecessor Charge Code/ Pre-calc Configuration |
| 1 | PDRHasZeroTEEFlag **Brtmdhcif** | MSS Netting Pre-Calculation |
| 2 | BAResourceSettlementIntervalRegulationEnergyConversion BrtuT’I’M’F’S’mdhcif | Spin Non-Spin No Pay Quantity Pre-Calculation |

## CAISO Formula

### BA5mRSRCResourceAdequacyRUCNoPayCapacityRescissionQuantity

BA5mRSRCResourceAdequacyRUCNoPayCapacityRescissionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif

= max ( 0, max( BA5mResourceUndispatchableResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif, BA5mResourceUndeliveredResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif ))

### BA5mResourceRUCNoPayBidCapacityRescissionQuantity

IF

HourlyPredispatchFlag Brtmdh =1

THEN

BA5mResourceRUCNoPayBidCapacityRescissionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif = 0

ELSE

BA5mResourceRUCNoPayBidCapacityRescissionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =

max (0, max (BA5mResourceUnDispatchableRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif + BA5mResourceIneligibleRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif , BA5mResourceRUCBidUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif ))

### BA5mResourceUndeliveredResourceAdequacyRUCCapacityQuantity

IF

HourlyPredispatchFlag Brtmdh =1

THEN

BA5mResourceUndeliveredResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif = 0

ELSE

BA5mResourceUndeliveredResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif= max (0, min (BAHourlyRsrcResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh, (BA5mResourceRUCUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif–BA5mResourceRUCBidUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif)))

### BA5mResourceUndispatchableResourceAdequacyRUCCapacityQuantity

IF

HourlyPredispatchFlag Brtmdh =1

THEN

BA5mResourceUndispatchableResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif = 0

ELSE

BA5mResourceUndispatchableResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif=

max (0, min (BAHourlyRsrcResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh **,** (BA5mResourceUnDispatchableRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif–BA5mResourceUnDispatchableRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif)))

### BA5mResourceIneligibleRUCBidCapacityQuantity

BA5mResourceIneligibleRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif=

min (BAResourceHourlyRUCAwardedBidCapacity BrtuT'I'M'VL'W'R'F'S'mdh –BA5mResourceUnDispatchableRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif, max (0,max(BusinessAssociateRSRCResourceAdequacyCapacityQuantity BrtuT'I'M'VL'W'R'F'S'mdh, BAResourceFlexResourceAdequacyCapacityQuantity BrtuT’I’M’VL’W’R’F’S’mdh) -BAHourlyResourceDayAheadCommittedCapQuantity BrtT’uI’M’R’W’F’S’VL'mdh ))

Where Resource Type IN (ITIE, GEN)

### BAHourlyResourceDayAheadCommittedCapQuantity

BAHourlyResourceDayAheadCommittedCapQuantity BrtT’uI’M’R’W’F’S’VL'mdh=

max (0,DayAheadScheduleConversionQuantityBrtT’uI’M’R’W’F’S’VL'mdhcif, BASettlementIntervalCAISOResourceIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif + BASettlementIntervalCAISOResourceFMMIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif,BAHourlyResourcePminForMasterFileDesignatedFastStartUnitsWhereRARUCCapacityGreaterThanZeroQuantity BrtT’uI’M’R’W’F’S’VL'mdh) +ResourceDayAheadSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh+ResourceDayAheadNonSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh+ResourceDayAheadRegulationUpTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh+BAHourlyRsrcResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh

Where Resource Type IN (ITIE, GEN)

### BAHourlyResourcePminForMasterFileDesignatedFastStartUnitsWhereRARUCCapacityGreaterThanZeroQuantity

IF

BAHourlyRsrcResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh> 0

THEN

BAHourlyResourcePminForMasterFileDesignatedFastStartUnitsWhereRARUCCapacityGreaterThanZeroQuantity BrtT’uI’M’R’W’F’S’VL'mdh =INTDUPLICATE [MinOperMW BrtF'S'md]

ELSE

BAHourlyResourcePminForMasterFileDesignatedFastStartUnitsWhereRARUCCapacityGreaterThanZeroQuantity BrtT’uI’M’R’W’F’S’VL'mdh = 0)

**Developmental Note**: HourlyResourceMasterFileDesignatedFastStartUnitFlag BrtuT'I'M'VL'W'R'F'S'mdhalsoexists as an input to this calculation in order to build the matrix and ensure that only resources designated as ‘Fast Start’ appear on the output.

### BA5mResourceRUCBidUndeliveredCapacityQuantity

BA5mResourceRUCBidUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =

min (BAResourceHourlyRUCAwardedBidCapacityBrtuT'I'M'VL'W'R'F'S'mdh ,BA5mResourceRUCUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif)

Where Resource Type IN (ITIE, GEN)

### BA5mResourceRUCUndeliveredCapacityQuantity

IF

(((BA5mResourceChannel4GenerationMeterForRUCNoPayQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif - BAResourceSettlementIntervalRegulationEnergyConversion BrtuT’I’M’F’S’mdhcif) +BASettlementResourceRUCToleranceBandQuantity BrtF’S’mdhcif <SettlementIntervalTotalExpectedEnergyQuantity BrtuT'I'M'VL'W'R'F'S'mdhcif)

AND

(BA5mResourceChannel4GenerationMeterForRUCNoPayQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif< ResourceRUCCapacityTotalIncludingDayAheadSchedule BrtT’uI’M’R’W’F’S’VL’mdh)

THEN

BA5mResourceRUCUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =BusinessAssociateResourceHourlySumOfRUCBidAndRUCResourceAdequacyCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh

ELSE

BA5mResourceRUCUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif = 0)

Where Resource Type IN (ITIE, GEN)

#### BA5mResourceChannel4GenerationMeterForRUCNoPayQuantity

IF

Entity Component SubType =’PDR’ for BA5mResourcePerformanceMeterConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif

OR

Entity Component SubType =’CURT’ for BA5mResourcePerformanceMeterConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif

THEN

BA5mResourceChannel4GenerationMeterForRUCNoPayQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif = BA5mResourcePerformanceMeterConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif

ELSE

BA5mResourceChannel4GenerationMeterForRUCNoPayQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif = BASettlementIntervalCAISOResourceChannel4GeneratorMeterQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif

Where Resource Type IN (ITIE, GEN)

* + - 1. BASettlementResourceRUCToleranceBandQuantity

BASettlementResourceRUCToleranceBandQuantity BrtF’S’mdhcif =

BAHourlyResourceRUCToleranceBandQuantity / 12 BrtF’S’mdh

### BA5mResourcePerformanceMeterConversionQuantity

BA5mResourcePerformanceMeterConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =

 ( 1-PDRHasZeroTEEFlag Brtmdhcif)\*BAResEntityDispatchIntervalPerformanceMeteredQuantity BrtuT’I’Q’M’AA’m’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif

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

### BAHourlyResourceRUCToleranceBandQuantity

IF

MaxOperMW BrtF'S'md <0,

THEN

BAHourlyResourceRUCToleranceBandQuantity BrtF’S’mdh= max (GeneratorToleranceBandMW, GeneratorToleranceBandPercent\* INTDUPLICATE [ABS(MinOperMW BrtF'S'md])

ELSE

BAHourlyResourceRUCToleranceBandQuantity BrtF’S’mdh= max (GeneratorToleranceBandMW, GeneratorToleranceBandPercent\* INTDUPLICATE [MaxOperMW BrtF'S'md])

**Developmental note:** When the RUC Tolerance Band Quantity evaluates to the relevant Min or Max Operating MW value multiplied against the Generator Tolerance Band Percent, always use the maximum possible delivered amount from that resource in absolute terms.

### BA5mResourceUnDispatchableRUCBidCapacityQuantity

BA5mResourceUnDispatchableRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =

min (BAResourceHourlyRUCAwardedBidCapacity BrtT’uI’M’R’W’F’S’VL'mdh , BA5mResourceUnDispatchableRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif )

Where Resource Type IN (ITIE, GEN)

### BA5mResourceUnDispatchableRUCCapacityQuantity

BA5mResourceUnDispatchableRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =

max (0, BusinessAssociateResourceHourlySumOfRUCBidAndRUCResourceAdequacyCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh - BA5mResourceDispatchableRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif )

Where Resource Type IN (ITIE, GEN)

### BA5minEnergyEquivalentQuantity

IF

(IFATTRIBUTE(BusinessAssociateResourceHourlySumOfRUCBidAndRUCResourceAdequacyCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh, ENTITY\_COMPONENT\_SUBTYPE,NREM)

THEN

BA5minEnergyEquivalentQuantity BrtT'uI'M'R'W'F'S'VL'mdhcif =DayAheadScheduleConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif

ELSE

BA5minEnergyEquivalentQuantity BrtT'uI'M'R'W'F'S'VL'mdhcif =

max (DayAheadScheduleConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif , BASettlementIntervalCAISOResourceIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif+ BASettlementIntervalCAISOResourceFMMIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif )

Where Resource Type IN (ITIE,GEN)

**Developmental note:** BusinessAssociateResourceHourlySumOfRUCBidAndRUCResourceAdequacyCapacityQuantityBrtT’uI’M’R’W’F’S’VL'mdh will be utilized such that only resources with RUC Capacity appear on the output

### BA5mResourceDispatchableRUCCapacityQuantity

BA5mResourceDispatchableRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =

min (BusinessAssociateResourceHourlySumOfRUCBidAndRUCResourceAdequacyCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh , max (0, BA5minuteResourceMaximumExPostCapacityQuantity BrtuT’I’M’VL’W’R’F’S’mdhcif /12 – BA5minEnergyEquivalentQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif) - ResourceDayAheadSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh –

ResourceDayAheadNonSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh +(ResourceRealTimeRegUpSumOfBidAnd QualifiedSelfProvisionScheduledQuantity

BrtT’uI’M’R’W’F’S’VL'mdhcif /12)))

Where Resource Type IN (ITIE, GEN)

### ResourceRealTimeRegUpSumOfBidAndQualifiedSelfProvisionScheduledQuantity

ResourceRealTimeRegUpSumOfBidAndQualifiedSelfProvisionScheduledQuantityBrtT’uI’M’R’W’F’S’VL'mdhcif =

max(0,((ResourceTotalRealTimeRegUpQualifiedSelfProvisionConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif) -(( ResourceDayAheadRegulationUpQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh \*12)+( DARegUpAwardedBidQuantity BrtuT’I’M’VL’W’R’F’S’mdh \*12))) +(15MinuteRTMRegUpAwardedBidQuantityBrtuT’I’M’VL’W’R’F’S’mdhc \*3))

Where Resource Type IN (ITIE, GEN)

### ResourceTotalRealTimeRegUpQualifiedSelfProvisionConversionQuantity

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

TotalRTRegUpQSP BrtT’uI’M’R’W’F’S’Nz’VL’mdhc \*3

Where Resource Type IN (ITIE, GEN)

### BAHourlyRsrcResourceAdequacyRUCCapacityQuantity

BAHourlyRsrcResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh =

BusinessAssociateResourceHourlySumOfRUCBidAndRUCResourceAdequacyCapacityQuantity BrtuT'I'M'VL'W'R'F'S'mdh –BAResourceHourlyRUCAwardedBidCapacity BrtuT'I'M'VL'W'R'F'S'mdh

Where Resource Type IN (ITIE, GEN)

### ResourceDayAheadRegulationUpTotalQualifiedSelfProvisionAndAwardQuantity

ResourceDayAheadRegulationUpTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh=

ResourceDayAheadRegulationUpQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh +DARegUpAwardedBidQuantity BrtuT’I’M’VL’W’R’F’S’mdh

Where Resource Type IN (ITIE, GEN)

### ResourceDayAheadNonSpinTotalQualifiedSelfProvisionAndAwardQuantity

ResourceDayAheadNonSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh=

ResourceDayAheadNonSpinQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh+DANonSpinAwardedBidQuantity BrtuT’I’M’VL’W’R’F’S’mdh

Where Resource Type IN (ITIE, GEN)

### ResourceDayAheadSpinTotalQualifiedSelfProvisionAndAwardQuantity

ResourceDayAheadSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh= ResourceDayAheadSpinQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh +DAHourlySpinAwardedBidQuantity BrtuT’I’M’VL’W’R’F’S’mdh

Where Resource Type IN (ITIE, GEN)

### ResourceDayAheadRegulationUpQualifiedSelfProvisionQuantity

ResourceDayAheadRegulationUpQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh=  DARegUpQSP BrtT’uI’M’R’W’F’S’Nz’VL’mdh

Where Resource Type IN (ITIE, GEN)

### ResourceDayAheadNonSpinQualifiedSelfProvisionQuantity

ResourceDayAheadNonSpinQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh=

 DANonSpinQSP BrtT’uI’M’R’W’F’S’Nz’VL’mdh

Where Resource Type IN (ITIE, GEN)

### ResourceDayAheadSpinQualifiedSelfProvisionQuantity

ResourceDayAheadSpinQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh=

 DASpinQSPBrtT’uI’M’R’W’F’S’Nz’VL’mdh

Where Resource Type IN (ITIE, GEN)

### DayAheadScheduleConversionQuantity

DayAheadScheduleConversionQuantityBrtT’uI’M’R’W’F’S’VL'mdhcif= BAResourceDispatchIntervalDAEnergyAllocationQuantity BrtbT'uI'Q’M'VL'W'R'F'S'mdhcif

Where Resource Type IN (ITIE, GEN) AND Balancing Authority Area (Q’) =’CISO’

### SettlementIntervalTotalExpectedEnergyQuantity

SettlementIntervalTotalExpectedEnergyQuantity BrtuT'I'M'VL'W'R'F'S'mdhcif=DispatchIntervalTotalExpectedEnergy BrtEuT'I'Q’M'AA’W'R'pF'S'QVL'mdhcif

Where Resource Type IN (ITIE, GEN) AND Balancing Authority Area (Q’) =’CISO’

### BASettlementIntervalCAISOResourceIIEMinLoadEnergy

BASettlementIntervalCAISOResourceIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif =

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

Where Resource Type IN (ITIE, GEN) AND Balancing Authority Area (Q’) =’CISO’

### BASettlementIntervalCAISOResourceChannel4GeneratorMeterQuantity

BASettlementIntervalCAISOResourceChannel4GeneratorMeterQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif =

BAResourceChannel4GeneratorMeterQuantity BrtT’uI’Q’M’R’W’F’S’VL'mdhcif

Where Resource Type IN (ITIE, GEN) AND Balancing Authority Area (Q’) =’CISO’

### BASettlementIntervalCAISOResourceFMMIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif

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

**Where Resource Type IN (ITIE, GEN) AND Balancing Authority Area (Q’) =’CISO’**

## Outputs

| Output ID | Name | Description |
| --- | --- | --- |
| 1 | SettlementIntervalTotalExpectedEnergyQuantity BrtuT'I'M'VL'W'R'F'S'mdhcif | Settlement Interval Total Expected Energy Quantity |
| 2 | DayAheadScheduleConversionQuantityBrtT’uI’M’R’W’F’S’VL'mdhcif | Day Ahead Schedule Conversion Quantity  Exists to sum over BID\_SEGMENT\_NUMBER (b’) attribute |
| 3 | ResourceDayAheadSpinQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Resource Day Ahead Spin Qualified Self Provision Quantity. Exists to sum over contract related attributes |
| 4 | ResourceDayAheadNonSpinQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Resource Day Ahead Non Spin Qualified Self Provision Quantity.  Exists to sum over Contract related attributes |
| 5 | ResourceDayAheadRegulationUpQualifiedSelfProvisionQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Resource Day Ahead Regulation Up Qualified Self Provision Quantity.  Exists to sum over Contract related attributes |
| 6 | ResourceDayAheadSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Resource Day Ahead Spin Total Qualified Self Provision and Award Quantity.  Exists to sum DA Spin Award and QSP in order to derive Total DA Spin capacity |
| 7 | ResourceDayAheadNonSpinTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Resource Day Ahead Non Spin Total Qualified Self Provision and Award Quantity.  Exists to sum DA Non-Spin Award and QSP in order to derive Total DA Non-Spin capacity |
| 8 | ResourceDayAheadRegulationUpTotalQualifiedSelfProvisionAndAwardQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Resource Day Ahead Regulation Up Total Qualified Self Provision and Award Quantity.  Exists to sum DA Regup Award and QSP in order to derive Total DA Regup capacity |
| 9 | BAHourlyRsrcResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Hourly Resource Adequacy RUC Capacity.  Exists to calculate RA RUC Capacity (RUC Award + RA RUC) - RUC Award |
| 10 | ResourceTotalRealTimeRegUpQualifiedSelfProvisionConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Each 15m carries capacity (MW) value so each 5m output is multiplied by 3 in formula in order that each 5m output retains its associated 15m capacity (MW) value |
| 11 | ResourceRealTimeRegUpSumOfBidAndQualifiedSelfProvisionScheduledQuantity  BrtT’uI’M’R’W’F’S’VL'mdhcif | Each 5min interval reflects a capacity (MW) value  ResourceTotalRealTimeRegUpQualifiedSelfProvisionConversionQuantity reflects the sum of RT Incremental QSP, DA Award, and DA QSP. DA Award and DA QSP are subtracted from this value. The result is then summed with RT Award in order to derive ‘Real Time Regulation Up Schedule’  The max function is utilized during the calculation as RUC participation is only for Incremental increases in Reg up. We don’t want to consider AS buy backs, which is when the incremental RT AS is negative. Max function will capture only true incremental Reg Up.  Max Ex Post Capacity includes total Regulation Up Capacity and we only need to subtract out the RT incremental Reg Up. |
| 12 | BA5mResourceDispatchableRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource Dispatchable RUC Capacity Quantity.  ‘Dispatchable RUC Capacity’ |
| 13 | BA5mResourceUnDispatchableRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource Un Dispatchable RUC Capacity Quantity.  ‘Undispatchable RUC Capacity’ |
| 14 | BA5mResourceUnDispatchableRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Undispatchable RUC Bid Capacity |
| 15 | BAHourlyResourceRUCToleranceBandQuantity BrtF’S’mdh | Hourly Resource RUC Tolerance Band Quantity.  Indirectly used as input to ‘Undelivered RUC Capacity’ |
| 16 | BA5mResourcePerformanceMeterConversionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Performance Meter Quantity. |
| 17 | BA5mResourceChannel4GenerationMeterForRUCNoPayQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource Channel 4 Generation Meter Quantity for RUC No Pay.  PDR generators in RUC No Pay: their Channel 4 meter data equivalent is reflected in the bill determinant BAResEntityDispatchIntervalPerformanceMeteredQuantity BrtuT’I’Q’M’AA’m’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif |
| 18 | BA5mResourceRUCUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource RUC Undelivered Capacity Quantity. |
| 19 | BA5mResourceRUCBidUndeliveredCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource RUC Bid Undelivered Capacity Quantity. |
| 20 | BAHourlyResourcePminForMasterFileDesignatedFastStartUnitsWhereRARUCCapacityGreaterThanZeroQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Hourly Resource Pmin for Master File Designated Fast Start Units Where Resource Adequacy RUC Capacity Greater than Zero Quantity. |
| 21 | BA5mResourceIneligibleRUCBidCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource Ineligible RUC Bid Capacity. |
| 22 | BA5mResourceUndispatchableResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource Undispatchable Resource Adequacy RUC Capacity Quantity.  Hourly pre-dispatch flag is utilized in order to ensure that non-dynamic system (=1) resources are not assessed RUC rescission quantities |
| 23 | BA5mResourceUndeliveredResourceAdequacyRUCCapacityQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource Undelivered Resource Adequacy RUC Capacity Quantity.  Hourly pre-dispatch flag is utilized in order to ensure that non-dynamic system (=1) resources are not assessed RUC rescission quantities |
| 24 | BA5mResourceRUCNoPayBidCapacityRescissionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource RUC No Pay Bid Capacity Rescission Quantity.  Hourly pre-dispatch flag is utilized in order to ensure that non-dynamic system (=1) resources are not assessed RUC rescission quantities |
| 25 | BA5mRSRCResourceAdequacyRUCNoPayCapacityRescissionQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Five Minute Resource Adequacy RUC No Pay Capacity Recission Quantity. |
| 26 | BAHourlyResourceDayAheadCommittedCapQuantity BrtT’uI’M’R’W’F’S’VL'mdh | Hourly Resource Day Ahead Commited Capacity Quantity |
| 27 | BA5minEnergyEquivalentQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | Energy Equivalent Quantity |
| 28 | BASettlementResourceRUCToleranceBandQuantity BrtF’S’mdhcif | Resource RUC Tolerance Band Quantity |
| 29 | BASettlementIntervalCAISOResourceIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif | CAISO resource specific Instructed Imbalance Instructed Energy Minimum Load Energy |
| 30 | BASettlementIntervalCAISOResourceChannel4GeneratorMeterQuantity BrtT’uI’M’R’W’F’S’VL'mdhcif | CAISO resource specific Channel 4 Generator Meter Quantity |
| 32 | BASettlementIntervalCAISOResourceFMMIIEMinLoadEnergy BrtuT'I'M'VL'W'R'F'S'mdhcif | CAISO resource specific FMM Instructed Imbalance Energy Minimum Load Energy |

# Charge Code Effective Dates

| Charge Code/  Pre-calc Name | Document  Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| CG PC RUC No Pay Quantity | 5.0 | 02/01/2010 | 1/31/10 | Configuration Impacted |
| CG PC RUC No Pay Quantity | 5.1 | 02/01/2010 | 01/31/2010 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.2 | 02/01/2010 | 07/31/2010 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.3 | 08/01/2010 | Open | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.4 | 9/16/2010 | 03/31/2012 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.5 | 04/01/2012 | 09/30/2012 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.6 | 10/1/2012 | 11/30/12 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.7 | 12/1/2012 | 04/30/2014 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.8 | 05/01/2014 | 4/30/2014 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.9 | 10/01/2014 | 9/30/2014 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.10 | 1/1/15 | 12/31/2014 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.11 | 7/1/15 | 6/30/2015 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.12 | 5/1/2014 | 9/30/2014 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.13 | 10/1/2014 | 12/31/2014 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.14 | 1/1/2015 | 6/30/2015 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.15 | 7/1/15 | 10/31/18 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.16 | 11/1/18 | TBD | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.17 | TBD | 11/30/2022 | Configuration and documentation Impacted |
| CG PC RUC No Pay Quantity | 5.18 | 12/1/2022 | ~~Open4~~/30/2026 | Configuration Impacted |