Settlements & Billing

Configuration Guide: Residual Unit Commitment (RUC) Reliability Capacity Up Settlement

**CC 8800**

Version 5.0

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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

During the Day Ahead Market, if the scheduled Demand is less than the CAISO Forecast of CAISO Demand, Residual Unit Commitment (RUC) Reliability Capacity Up (RCU) is procured to ensure that enough committed capacity is available and on line to meet the forecasted Demand as well as any forecasted shortfalls of minimum Generation requirements.

RUC RCU Bids may only be submitted if an Energy Bid has also been submitted in the IFM. Resource Adequacy Resources have a Must Offer Obligation for RCU, are optional for RCD and can bid non-zero prices for RCU/RCD.

Resources that have Compliance Recission due to an FMM capacity range that does not support their DA Energy Schedule plus the Reliabiltiy Capacity Up will be charged at a resource specific RCU No-Pay Penalty Price for the undelivered MW quantity.

RUC RCU payments are the product of Awarded RUC RCU capacity and the RUC RCU Price specified for each PNode. Together, RUC RCU settlements and Unavailability No-Pay Settlements are under CC 8800, and RUC RCU Bid Cost Recovery Uplifts under CC 6620 are allocated in two tiers. First, CC TBD DA RUC RCU Tier 1 Allocation is based upon Net Positive Demand Deviation. Next, any remaining costs are allocated pro rata to metered Demand under CC TBD DA RUC RCU Tier 2 Allocation.

## Description

This Charge Code settles with resources for awarded RUC Reliabiltiy Capacity Up on an hourly basis at the RUC RCU Price. Compliance Recission is based on the ability of the resource’s Day Ahead Schedule’s ability to meet the RUC RCU awards. For RA resources the RUC award MW quantity does not include the RA capacity that is not eligible for RUC payments.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | This Charge Code must be computed daily on an hourly basis. |
| 1.1 | The formulas herein adopt the convention that payments made by CAISO to BAs will be negative, while payments received by the CAISO from BAs (charges to BAs) will be positive. (In other words, the signs reflect the flow of money from the point of view of the CAISO.) |
| 1.2 | Actual Scheduling Coordinators (SCs) are referenced by Business Associate ID, and CAISO shall settle with Business Associates (BA) through these IDs. |
| 2.0 | **RCU Settlements**  For each Settlement Period, the resource payment is based on the product of the: (a) Locational RCU Price at the applicable PNode or Aggregated PNode; and (b) MW quantity of the awarded RCU.  The resource price is derived from the applicable PNode or Aggregated Pnode prices. |
| 3.0 | **RCU Unavailability No-Pay Charges**  A resource’s unavailable RCU quantity is the amount, if any, by which the resource’s Day-Ahead Schedule for Supply plus Ancillary Services Awards other than for Regulation Down plus the RCU award that exceeds the resource’s Upper Economic Limit as adjusted by applicable Outages in the FMM. The CAISO charges a resource with an unavailable RCU quantity the product of the unavailable quantity and the resource’s Locational RCU Price. |
| 3.1 | RCU Unavailability charges do not apply to TSRs. |
| 4.0 | **IR and RC Unavailability No-Pay Charges Priority**  Resources that have been awarded both a RC and IR and are not available, or only bid a portion of their combined award, shall have the unavailability charge applied first to RC and then to IR. |
| 5.0 | The **Overlapping RA Capacity for True-Up Settlements Mechanism** is provided below. |
| 5.1 | **RCU Overlapping RA Capacity Amount**  If an RA resource is mapped to one or more LSEs that have their LSE RA True-Up Flag set to Opt-In for a trading day,  Sum over all 15-min within the hour { (15-min RCU Overlapping RA Capacity \* [Hourly RCU Marginal Price/4]) |
| 5.2 | **Hourly RCU Overlapping RA Capacity LSE Amount**  Allocate the hourly RCU Overlapping RA Capacity Amount for that RA resource to the LSEs associated with it pro-rata to their monthly RA showing for LSEs that have Opted-In LSE RA True-Up Flag.  SCs of LSEs that have their LSE RA True-Up Flag opted-in shall be paid Hourly RCU Overlapping RA Capacity LSE Amount for all RA resources that are associated with them. |
| 5.3 | SCs of resources shall be charged the Hourly RCU Overlapping RA Capacity LSE Amount for all LSEs that are associated with the resource. |
| 5.4 | There will be a transition period whereby CAISO will implement the above true-up mechanism and settle with both the LSE and the generator for any RA overlapping capacity with RCU award. |
| 5.5 | During the transitional period, and where the LSE has opted in, load serving entities (LSEs) in agreement with the RA supply resource to have RA capacity shown on the LSE monthly RA plan and procured through the day-ahead market for reliability capacity, the RCU will be settled with both the LSE and the generator owner. |
| 5.6 | RCU RA Overlap capacity settlements do not apply to TSRs since these do not have RA awards nor real-time must offer obligations. |
| 6.0 | For adjustments to the Charge Code that cannot be accomplished by correction of upstream data inputs, recalculation or operator override Pass Through Bill Charge (PTB) logic will be applied. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| CC 8071 – Day Ahead Imbalance Reserve Up Settlement |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| CC TBD – Day Ahead Residual Unit Commitment RCU Tier 1 Allocation |
| Pre-calc – RUC Net Amount |

## Inputs – External Systems

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Description |
| 1 | BAHourlyResRCUAwardedQty BrtuT’I’Q’M’VL’W’R’F’S’mdh | The hourly awarded Reserve Capacity Up MW quantity for each resource for every hour for each trading day. |
| 2 | BAHourlyResRCUPrc BrtQ’mdh | The RCU Price for Resource ID r, and Trading Hour h. |
| 3 | BA15MResRCUAllocCapRangeQty BrtQ’mdhc | Reserve Capacity Up allocated capacity range (FMM) (MW) |
| 4 | BA15MResRCU\_RAOverlapCapQty BrtQ’mdhc | 15-min RCU Overlapping RA Capacity (MW) |
| 5 | RATrueUpMechanismOptInFlag BrtQ’t’’m | A flag with a value of 1 when the LSE (BA ID B) has opted into the RA true-up mechanism. This can only be applicable during the period where the true up mechanism for RA overlapped capacity with RCU is active, indicated by another global flag. |
| 6 | TransitionalRATrueUpMechanismPeriodFlag d | Transition period flag for the RA overlap capacity LSE true-up mechanism. This has a value of 1 during the period, 0 otherwise. A value of 1 means true-up settlement with opted in LSEs is active. |
| 7 | BAHourlyTSR\_RCUSchedQty BrtuT’I’Q’M’F’S’L’mdh | The Hourly IFM Reliability Capacity Up Schedule Quantity for each Transfer System Resources for every hour for each trading day. (MW) |
| 8 | BAHourlyTSR\_RCUPrc Brmdh | The Hourly IFM Reliability Capacity Up Price for each Resource for every hour of each trading day. |
| 9 | PTBChargeAdjustmentBAHourlyRUCRCUAmt BQ’Jmdh | PTB Charge Adjustment for RCU Availability Settlement Amount by Business Associate B, BAA Q’, PTB ID J, and Trading Hour h. |

## Inputs - Predecessor Charge Codes or Pre-calculations

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Predecessor Charge Code/  Pre-calc Configuration |
| 1 | BADailyResRA\_LSEShareRateBrtQ’t’’md | CC 8071 – Day Ahead Imbalance Reserve Up Settlement |

## CAISO Formula

The daily settlement of Intertie Deviations for each Business Associate by Trading Day is derived according to the formulation below.

**Note:** The following calculation is listed starting with the final charge calculation and progressively detailing the intermediate calculations and Settlement input.

BAHourlyResRCUSettlementAmount BrtQ’F’S’mdh=

BAHourlyResRCUAssessmentAmount BrtQ’F’S’mdh + BAHourlyResRCU\_RAOverlapLSESettlementAmount BrtQ’mdh

BAHourlyResRCUAssessmentAmount BrtQ’F’S’mdh =

BAHourlyResRCUPaymentAmount BrtQ’F’S’mdh + BAHourlyResRCUNoPayAmount BrtQ’mdh+(TransitionalRATrueUpMechanismPeriodFlag d \* (BAHourlyResRCU\_RAOverlapCapAssessmentAmount BrtQ’mdh + BAHourlyResRCU\_RAOverlapLSEShareUnallocAmount BrtQ’mdh))

BAHourlyResRCU\_RAOverlapLSESettlementAmount BrtQ’mdh =

Sum ( t’’)TransitionalRATrueUpMechanismPeriodFlag d \* BAHourlyResRCU\_RAOverlapLSEShareAmount BrtQ’t’’mdh

BAHourlyResRCUPaymentAmount BrtQ’F’S’mdh=

(-1)\*BAHourlyResRCUAwardedQuantity BrtQ’F’S’mdh\* BAHourlyResRCUPrc BrtQ’mdh

BAHourlyResRCUAwardedQuantity BrtQ’F’S’mdh=

Sum (u,T’,I’,M’,V,L’,W’,R’) BAHourlyResRCUAwardedQty BrtuT’I’Q’M’VL’W’R’F’S’mdh

BAHourlyResRCUNoPayAmount BrtQ’mdh=

Sum(c) 0.25\*BA15MResRCUNoPayPenaltyPrice BrtQ’mdhc \*BA15MResRCUNoPayQuantity BrtQ’mdhc

BA15MResRCUNoPayQuantity BrtQ’mdhc=

Sum(F’,S’) (-1)\*Min(0,BA15MResRCUAllocCapRangeQty BrtQ’mdhc – INTDUPLICATE(BAHourlyResRCUAwardedQuantity BrtQ’F’S’mdh))

Implementation Note: The hourly awarded quantity will be duplicated in each of the corresponding 15 minute intervals.

BA15MResRCUNoPayPenaltyPrice BrtQ’mdhc=

INTDUPLICATE(BAHourlyResRCUPrc BrtQ’mdh)

Implementation Note: The hourly price will be duplicated in each of the corresponding 4 15 minute intervals. Formula will only exist when BA15MResRCUNoPayQuantity BrtQ’mdhcexists.

BAHourlyResRCU\_RAOverlapCapAssessmentAmount BrtQ’mdh  =

Sum(c) 0.25\*BA15MResRCU\_RAOverlapCapQty BrtQ’mdhc \*BAHourlyResRCUPrc BrtQ’mdh

HourlyResRCU\_RAOverlapCapAssessmentAmount rmdh =

Sum (B,t,Q’) BAHourlyResRCU\_RAOverlapCapAssessmentAmount BrtQ’mdh

**Calculations for LSE:**

BAHourlyResRCU\_RAOverlapLSEToBeAllocatedAmount BrtQ’t’’mdh =

INTDUPLICATE(BADailyResRA\_LSEShareRate BrtQ’t’’md )\* HourlyResRCU\_RAOverlapCapAssessmentAmount rmdh

Implementation note: Daily inputs to be duplicated to hourly interval.

BAHourlyResRCU\_RAOverlapLSEShareAmount BrtQ’t’’mdh =

(-1)\*INTDUPLICATE(RATrueUpMechanismOptInFlag BrtQ’t’’m )\* BAHourlyResRCU\_RAOverlapLSEToBeAllocatedAmount BrtQ’t’’mdh

HourlyResRCU\_RAOverlapLSEToBeAllocatedAmount rtQ’t’’mdh =

Sum (B) BAHourlyResRCU\_RAOverlapLSEToBeAllocatedAmount BrtQ’t’’mdh

Note:This data will be provided to the supply resource BA\_ID, which had the RCU award. Reporting only for informational purposes.

HourlyResRCU\_RAOverlapLSEAllocatedShareAmount rtQ’t’’mdh =

Sum (B) BAHourlyResRCU\_RAOverlapLSEShareAmount BrtQ’t’’mdh

Note:This data will be provided to the supply resource BA\_ID, which had the RCU award

HourlyResRCU\_RAOverlapTotalAllocatedShareAmount rtQ’mdh =

Sum (t’’) HourlyResRCU\_RAOverlapLSEAllocatedShareAmount rtQ’t’’mdh

Note:This data will be provided to the supply resource BA\_ID, which had the RCU award

BAHourlyResRCU\_RAOverlapLSEShareUnallocAmount BrtQ’mdh =

(-1)\*(BAHourlyResRCU\_RAOverlapCapAssessmentAmount BrtQ’mdh + HourlyResRCU\_RAOverlapTotalAllocatedShareAmount rtQ’mdh )

**Calculation for TSRs:**

BAHourlyTSR\_RCUSettlementAmount BrtQ’F’S’mdh =

Sum (u,T’,I’,M’,L’) BAHourlyTSR\_RCUSchedQty BrtuT’I’Q’M’F’S’L’mdh \* BAHourlyTSR\_RCUPrc Brmdh

## Outputs

| Row # | Name | Description |
| --- | --- | --- |
|  | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
| 1 | BAHourlyResRCUSettlementAmount BrtQ’F’S’mdh | Settlement period amount for this charge code. No pay charge, has been factored in, if any.  It also includes settlement of positive net Reliability Capacity Up quantities for TSRs. |
| 2 | BAHourlyResRCUAssessmentAmount BrtQ’F’S’mdh | Assessment of RCU per settlement period for resources excluding TSRs. No-Pay charge, if any, has been factored in. |
| 3 | BAHourlyResRCU\_RAOverlapLSESettlementAmount BrtQ’mdh | This charge type includes the settlement with the LSE or CPE as the BA\_ID for its RA overlap share for RCU award for the resource. |
| 4 | BAHourlyResRCUPaymentAmount BrtQ’F’S’mdh | Hourly payment for RCU awards (prior to no pay assessment). |
| 5 | BAHourlyResRCUAwardedQuantity BrtQ’F’S’mdh | RCU award, with only the needed attributes in this charge code. |
| 6 | BAHourlyResRCUNoPayAmount BrtQ’mdh | No pay amount per hour due to unavailable RCU award |
| 7 | BA15MResRCUNoPayQuantity BrtQ’mdhc | Computed unavailable RCU award, subject to no pay charges. |
| 8 | BA15MResRCUNoPayPenaltyPrice BrtQ’mdhc | No pay price for unavailable RCU award |
| 9 | BAHourlyResRCU\_RAOverlapCapAssessmentAmount BrtQ’mdh | RA overlap capacity assessment subject to settlement with opted in LSE for transitional RA true-up. All or portion of this amount will be taken out from supplying RCU resource settlement, depending on option selected by LSE(s) for an RA resource. |
| 10 | HourlyResRCU\_RAOverlapCapAssessmentAmount rmdh | Intermediate calc, dropping the BA\_ID attribute for the resource. |
| 11 | BAHourlyResRCU\_RAOverlapLSEToBeAllocatedAmount BrtQ’t’’mdh | Potential RA overlap allocation to LSE\_ID. Still subject to opt in. Info provided to BA\_ID. |
| 12 | BAHourlyResRCU\_RAOverlapLSEShareAmount BrtQ’t’’mdh | Transitional RA true-up settlement with opted in LSE for an RA resource with RCU award. |
| 13 | HourlyResRCU\_RAOverlapLSEToBeAllocatedAmount rtQ’t’’mdh | Potential RA overlap allocation to LSE\_ID. Still subject to opt in. Info only provided to resource SC. |
| 14 | HourlyResRCU\_RAOverlapLSEAllocatedShareAmount rtQ’t’’mdh | Transitional RA true-up settlement with opted in LSE for an RA resource with RCU award. Info only provided to resource SC. |
| 15 | HourlyResRCU\_RAOverlapTotalAllocatedShareAmount rtQ’mdh | Total settlement with LSEs for the RA resource. |
| 16 | BAHourlyResRCU\_RAOverlapLSEShareUnallocAmount BrtQ’mdh | Unallocated amount (no remaining LSEs to true-up with) that goes back to the original SC with RCU award. |
| 17 | BAHourlyTSR\_RCUSettlementAmount BrtQ’F’S’mdh | Settlement amount of positive net Reliability Capacity Up quantities for TSRs. |

# Charge Code Effective Dates

| Charge Code/  Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| Residual Unit Commitment (RUC) Reliability Capacity Up Settlement | 5.0 | 5/1/26 | Open | Configuration Edits |