Settlements & Billing

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

**CC 8810**

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 more than the CAISO Forecast of CAISO Demand, Residual Unit Commitment (RUC) Reliability Capacity Down (RCD) is procured to ensure that enough committed capacity can be reduced to meet the forecasted Demand as well as any forecasted surpluses of maximum Generation requirements.

RUC RCD 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 less the Reliabiltiy Capacity Down will be charged at a resource specific RCD No-Pay Penalty Price for the undelivered MW quantity.

RUC RCD payments are the product of Awarded RUC RCD capacity and the RUC RCD Price specified for each PNode. Together, RUC RCD settlements and Unavailability No-Pay Settlements are under CC 8810, and RUC RCD Bid Cost Recovery Uplifts under CC 6620 are allocated in two tiers. First, CC TBD DA RCD Tier 1 Allocation is based upon Net Negative Demand Deviation. Next, any remaining costs are allocated pro rata to metered Demand under CC TBD DA RUC RCD Tier 2 Allocation.

## Description

This Charge Code settles with resources for awarded RUC Reliability Capacity Down on an hourly basis at the RCD Price. Compliance Recission is based on the ability of the resource’s Day Ahead Schedule’s ability to meet the RUC RCD awards. For RA resources the RCD award MW quantity does not include the RA capacity that is not eligible for RCD 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 | **RCD Settlements**  For each Settlement Period, the resource payment is based on the product of the: (a) Locational RCD Price at the applicable PNode or Aggregated PNode; and (b) MW quantity of the awarded RCD.  The resource price is derived from the applicable PNode or Aggregated Pnode prices. |
| 3.0 | **RCD Unavailability No-Pay Charges**  A resource’s unavailable RCD quantity is the amount, if any, by which the resource’s Lower Economic Limit as adjusted by applicable Outages in the FMM exceeds the resource’s Day-Ahead Schedule for Supply minus the Ancillary Services Awards for Regulation Dwon minus the RCD award. The CAISO charges a resource with an unavailable RCD quantity the product of the unavailable quantity and the resource’s Locational RCD Price. |
| 3.1 | RCD 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 | **RCD 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 RCD Overlapping RA Capacity \* [Hourly RCD Marginal Price/4]) |
| 5.2 | **Hourly RCD Overlapping RA Capacity LSE Amount**  Allocate the hourly RCD 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 RCD Overlapping RA Capacity LSE Amount for all RA resources that are associated with them. |
| 5.3 | SCs of resources shall be charged the Hourly RCD 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 RCD 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 RCD will be settled with both the LSE and the generator owner. |
| 5.6 | RCD 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 RUC RCD Tier 1 Allocation |
| Pre-calc – RUC Net Amount |

## Inputs – External Systems

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Description |
| 1 | BAHourlyResRCDAwardedQty BrtuT’I’Q’M’VL’W’R’F’S’mdh | The hourly awarded Reserve Capacity Down MW quantity for each resource for every hour for each trading day.(MW) |
| 2 | BAHourlyResRCDPrc BrtQ’mdh | The RCD Price for Resource ID r, and Trading Hour h. |
| 3 | BA15MResRCDAllocCapRangeQty BrtQ’mdhc | Reserve Capacity Down allocated capacity range (FMM) (MW) |
| 5 | BA15MResRCD\_RAOverlapCapQty BrtQ’mdhc | 15-min RCD Overlapping RA Capacity (MW) |
| 6 | 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 RCD is active, indicated by another global flag. |
| 7 | 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. |
| 8 | BAHourlyTSR\_RCDSchedQty BrtuT’I’Q’M’F’S’L’mdh | The Hourly IFM Reliability Capacity Down Schedule Quantity for each Transfer System Resources for every hour for each trading day. (MW) |
| 9 | BAHourlyTSR\_RCDPrc Brmdh | The Hourly IFM Reliability Capacity Down Price for each Resource for every hour of each trading day. |
| 10 | PTBChargeAdjustmentBAHourlyRUCRCDAmt**BQ’Jmdh** | PTB Charge Adjustment for RCD 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\_LSEShareRate BrtQ’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.

BAHourlyResRCDSettlementAmount BrtQ’F’S’mdh=

BAHourlyResRCDAssessmentAmount BrtQ’F’S’mdh + BAHourlyResRCD\_RAOverlapLSESettlementAmount BrtQ’mdh

BAHourlyResRCDAssessmentAmount BrtQ’F’S’mdh =

BAHourlyResRCDPaymentAmount BrtQ’F’S’mdh + BAHourlyResRCDNoPayAmount BrtQ’mdh+(TransitionalRATrueUpMechanismPeriodFlag d \* (BAHourlyResRCD\_RAOverlapCapAssessmentAmount BrtQ’mdh + BAHourlyResRCD\_RAOverlapLSEShareUnallocAmount BrtQ’mdh))

BAHourlyResRCD\_RAOverlapLSESettlementAmount BrtQ’mdh =

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

BAHourlyResRCDPaymentAmount BrtQ’F’S’mdh=

(-1)\*BAHourlyResRCDAwardedQuantity BrtQ’F’S’mdh\* BAHourlyResRCDPrc BrtQ’mdh

BAHourlyResRCDAwardedQuantity BrtQ’F’S’mdh=

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

BAHourlyResRCDNoPayAmount BrtQ’mdh=

SUM (c) 0.25\*BA15MResRCDNoPayPenaltyPrice BrtQ’mdhc \*BA15MResRCDNoPayQuantity BrtQ’mdhc

BA15MResRCDNoPayQuantity BrtQ’mdhc=

Sum(F’,S’) (-1)\*Min(0,BA15MResRCDAllocCapRangeQty BrtQ’mdhc – INTDUPLICATE(BAHourlyResRCDAwardedQuantity BrtQ’F’S’mdh))

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

BA15MResRCDNoPayPenaltyPrice BrtQ’mdhc=

INTDUPLICATE(BAHourlyResRCDPrc BrtQ’mdh)

Implemenation Note: The hourly price will be duplicated in each of the corresponding 15 minute intervals. Formula will only exist when BA15MResRCDNoPayQuantity BrtQ’mdhc exists.

BAHourlyResRCD\_RAOverlapCapAssessmentAmount BrtQ’mdh  =

Sum (c) 0.25\*BA15MResRCD\_RAOverlapCapQty BrtQ’mdhc \* BAHourlyResRCDPrc BrtQ’mdh

HourlyResRCD\_RAOverlapCapAssessmentAmount rmdh =

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

**Calculations for LSE:**

BAHourlyResRCD\_RAOverlapLSEToBeAllocatedAmount BrtQ’t’’mdh =

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

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

BAHourlyResRCD\_RAOverlapLSEShareAmount BrtQ’t’’mdh =

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

HourlyResRCD\_RAOverlapLSEToBeAllocatedAmount rtQ’t’’mdh =

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

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

HourlyResRCD\_RAOverlapLSEAllocatedShareAmount rtQ’t’’mdh =

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

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

HourlyResRCD\_RAOverlapTotalAllocatedShareAmount rtQ’mdh =

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

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

BAHourlyResRCD\_RAOverlapLSEShareUnallocAmount BrtQ’mdh =

(-1)\*BAHourlyResRCD\_RAOverlapCapAssessmentAmount BrtQ’mdh + HourlyResRCD\_RAOverlapTotalAllocatedShareAmount rtQ’mdh

**Calculations for TSRs:**

BAHourlyTSR\_RCDSettlementAmount BrtQ’F’S’mdh =

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

## Outputs

| Row # | Name | Description |
| --- | --- | --- |
|  | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
| 1 | BAHourlyResRCDSettlementAmount BrtQ’F’S’mdh | Settlement period amount for this charge code. No pay charge, has been factored in, if any.  This charge type also settles with the LSE or CPE as the BA\_ID for its RA overlap share for IRU award for the resource.  It also includes settlement of positive net Reliability Capacity Down quantities for TSRs. |
| 2 | BAHourlyResRCDAssessmentAmount BrtQ’F’S’mdh | Assessment of RCD per settlement period for resources excluding TSRs. No-Pay charge, if any, has been factored in. |
| 3 | BAHourlyResRCD\_RAOverlapLSESettlementAmount BrtQ’mdh | This charge type includes the settlement with the LSE or CPE as the BA\_ID for its RA overlap share for RCD award for the resource. |
| 4 | BAHourlyResRCDPaymentAmount BrtQ’F’S’mdh | Hourly payment for RCD awards (prior to no pay assessment). |
| 5 | BAHourlyResRCDAwardedQuantity BrtQ’F’S’mdh | RCD award, with only the needed attributes in this charge code. |
| 6 | BAHourlyResRCDNoPayAmount BrtQ’mdh | No pay amount per hour due to unavailable RCD award |
| 7 | BA15MResRCDNoPayQuantity BrtQ’mdhc | Computed unavailable RCD award, subject to no pay charges. |
| 8 | BA15MResRCDNoPayPenaltyPrice BrtQ’mdhc | No pay price for unavailable RCD award |
| 9 | BAHourlyResRCD\_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 RCD resource settlement, depending on option selected by LSE(s) for an RA resource. |
| 10 | HourlyResRCD\_RAOverlapCapAssessmentAmount rmdh | Intermediate calc, dropping the BA\_ID attribute for the resource. |
| 11 | BAHourlyResRCD\_RAOverlapLSEToBeAllocatedAmount BrtQ’t’’mdh | Potential RA overlap allocation to LSE\_ID. Still subject to opt in. Info provided to BA\_ID. |
| 12 | BAHourlyResRCD\_RAOverlapLSEShareAmount BrtQ’t’’mdh | Transitional RA true-up settlement with opted in LSE for an RA resource with RCD award. |
| 13 | HourlyResRCD\_RAOverlapLSEToBeAllocatedAmount rtQ’t’’mdh | Potential RA overlap allocation to LSE\_ID. Still subject to opt in. Info only provided to resource SC. |
| 14 | HourlyResRCD\_RAOverlapLSEAllocatedShareAmount rtQ’t’’mdh | Transitional RA true-up settlement with opted in LSE for an RA resource with RCD award. Info only provided to resource SC. |
| 15 | HourlyResRCD\_RAOverlapTotalAllocatedShareAmount rtQ’mdh | Total settlement with LSEs for the RA resource. |
| 16 | BAHourlyResRCD\_RAOverlapLSEShareUnallocAmount BrtQ’mdh | Unallocated amount (no remaining LSEs to true-up with) that goes back to the original SC with RCD award. |
| 17 | BAHourlyTSR\_RCDSettlementAmount BrtQ’F’S’mdh | Settlement amount of positive net Reliability Capacity Down 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 Down Settlement | 5.0 | 5/1/26 | Open | Configuration Edits |