Settlements & Billing

Configuration Guide: Monthly Flexible Ramp Down Uncertainty Award Allocation

CC 7088

Version 5.2

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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

The Flexible Ramping product (FRP) is designed to ensure that there is sufficient ramping capability available in the financially binding five-minute interval to meet the forecasted net load for interval t+5 and cover upwards and downwards forecast error uncertainty.

FRP will help the system to maintain and use dispatchable capacity, as well as provide the market more transparent and less volatile price signals when undergoing forecasted ramp-constrained conditions. It will be procured and dispatched to meet five minute to five minute net forecast (load forecast minus VER forecast) changes plus uncertainty and will be modeled as a ramping capability constraint.

The ISO will financially settle FRP in the fifteen-minute market and the five-minute market, with rescission of payments applied to resources with UIE (uninstructed imbalance energy) or OA (operational adjustment) amounts, positive or negative, which are imposed on reserved FRP capacity awards. Settlement and allocation of FRP costs will happen on a daily basis for forecasted movement portion and uncertainty award portion. At the end of the month, the uncertainty award allocation will be reversed and will be re-allocated based on the month’s net UIE or OA values.

As no economic bids are applied to FRP, FRU/FRD awards will be exempt from grid management charges (GMC). Additionally, dispatchable resources will have their FRP awards and forecasted movement assessments - ignoring rescission settlement - included as part of daily RTM bid cost recovery calculations.

## Description

For each Balancing Authority Area (BAA) and Trading Day this charge code configuration shall allocate the charges associated with the total Flexible Ramp Down Uncertainty capacity award settlement amounts that are paid in association with charge code CC 7081 (Daily Flexible Ramp Down Uncertainty Capacity Settlement) to the BAA. The allocation shall be performed in accord with the business rules and attendant allocation criteria stipulated in Business Rules section 3.1 below. The allocation shall be on a monthly basis and result in the resettlement of the daily charges already calculated with charge code CC 7087 (Daily Flexible Ramp Down Uncertainty Award Allocation), with separate monthly allocation amounts determined for the Peak Flexible Ramp Hours and Off-Peak Flexible Ramp Hours of the Trading Month.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
|  | FRU and FRD uncertainty movement payments and charges shall apply daily with monthly resettlement of the FRU and FRD uncertainty movement charges. |
|  | The CAISO will allocate: |
|  | 1. the cost of the Uncertainty Award within each Balancing Authority Area in the EIM Area and within the EIM Area on a daily basis according to resource categories; |
|  | 1. the daily amounts to Scheduling Coordinators. |
|  | 1. Uncertainty awards to the BAA based upon the pass group. Note: For the EIM\_area host control area ID, Settlements shall allocate the costs to the BAAs that pass the sufficiency test based on their categories. For the uncertainty award cost associated with the BAA that did not pass the sufficiency test, those costs will be allocated to the BAA based on its categories and any residual unallocated balance to the metered demand of that BAA, however if metered demand is not available and there are BAA specific costs, those will be allocated to the entity. |
|  | For monthly allocation of costs of Flexible Ramping Uncertaintly Movement procured, the CAISO will resettle the costs of the Uncertainty Awards by — |
|  | 1. reversing the daily allocation; |
|  | 1. assigning the monthly costs of the Uncertainty Awards to Peak Flexible Ramp Hours and Off-Peak Flexible Ramp Hours; |
|  | 1. separately allocating the monthly Peak Flexible Ramp Hours amounts and Off-Peak Flexible Ramp Hours amounts to the resource categories within each Balancing Authority Area in the EIM Area and within the EIM Area, as described below in subsequent business rules; and |
|  | 1. allocating the monthly amounts in each category to Scheduling Coordinators. |
|  | For each interval, the CAISO will calculate the net Uncertainty Movement of each resource as follow: |
|  | 1. for Supply resources other than non-Dynamic System Resources as the difference between the Dispatch Instruction of the binding interval in the next RTD run and the first advisory RTD interval in the current run. |
|  | 1. for non-Dynamic System Resource and export schedule as the difference between the schedule used in the RTD (accounting for ramp) for the binding interval in the next RTD run and the scheduled use for the first advisory interval in the current RTD run. |
|  | The CAISO will determine the total net RTD Uncertainty Movement for each category separately for each Balancing Authority Area in the EIM Area and by EIM Area as follows: |
|  | 1. for the category of Supply resources, which shall not include non-Dynamic System Resources, as the net sum of the five-minute Uncertainty Movement of all the Supply resources in the category; |
|  | 1. for the category of Intertie resources, which shall comprise non-Dynamic System Resources and exports, as the net sum of the five-minute Uncertainty Movement determined of all the non-Dynamic System resources and export schedules; |
|  | 1. for the non-Participating Load category, as the difference between-    1. the CAISO Forecast of CAISO Demand, the CAISO forecast of Balancing Authority Area EIM Demand, or the CAISO forecast of EIM Area EIM Demand, as applicable, of the binding interval in the next RTD run; and    2. the CAISO Forecast of CAISO Demand, the CAISO forecast of Balancing Authority Area EIM Demand, or the CAISO forecast of EIM Area EIM Demand, as applicable, for the first advisory interval in the current RTD run. |
|  | The CAISO will allocate the total upward Uncertainty Award cost to each of the three (3) resource categories based on — |
|  | 1. for upward Uncertainty Award cost, the ratio of such category’s positive Uncertainty Movement to the sum of the positive Uncertainty Movements of all categories with positive Uncertainty Movement for 2. each Balancing Authority Area in the EIM Area that failed their Flex Ramp Up Balancing Test 3. the EIM Area for EIM entities that passed their Flex Ramp Up Balancing Test. |
|  | 1. for downward Uncertainty Award cost, the ratio of such category’s positive Uncertainty Movement to the sum of the negative Uncertainty Movements of all categories with negative Uncertainty Movement for 2. each Balancing Authority Area in the EIM Area that failed their Flex Ramp Up Balancing Test 3. the EIM Area for EIM entities that passed their Flex Ramp Up Balancing Test.. |
|  | The CAISO will allocate the Uncertainty Awards costs of the non-Participating Load category to Scheduling Coordinators as follows: |
|  | 1. for upward Uncertainty Award cost in proportion to the Scheduling Coordinator’s negative non-Participating Load UIE, excluding the non-Participating Load of an MSS that has elected to load-follow according to an MSS Agreement, without netting that UIE across Settlement Intervals, to the total of such negative non-Participating Load UIE, without netting that UIE across Settlement Intervals, in the Balancing Authority Area or EIM Area as applicable; |
|  | The allocated upward Uncertainty Award costs shall signify an increase in the Scheduling Coordinator’s Demand (i.e., more Demand than expected). |
|  | 1. for downward Uncertainty Award cost in proportion to the Scheduling Coordinator’s daily positive non-Participating Load UIE, excluding the non-Participating Load of an MSS that has elected to load-follow according to an MSS Agreement, without netting that UIE across Settlement Intervals, to the total of such positive non-Participating Load UIE, without netting that UIE across Settlement Intervals, in the BAA or EIM Area as applicable. |
|  | The allocated upward Uncertainty Award costs shall signify a decrease in the Scheduling Coordinator’s Demand (i.e., less Demand than expected). |
|  | The CAISO will allocate the Uncertainty Awards costs of the Supply category to Scheduling Coordinators for each resource in the Supply category based on the sum of the resource’s Uncertainty Movement and UIE as follows: |
|  | 1. for upward Uncertainty Award cost in proportion to the Scheduling Coordinator’s negative sum of the resource’s Uncertainty Movement and UIE, without netting that sum across Settlement Intervals, to the total negative sum of all resources’ Uncertainty Movement and UIE, without netting that sum across Settlement Intervals, in the Balancing Authority Area or EIM Area as applicable, except as stipulated in 3) below; |
|  | The allocated upward Uncertainty Award costs shall signify a decrease in the Scheduling Coordinator’s Generation (i.e., less Generation than expected). |
|  | 1. for downward Uncertainty Award cost in proportion to the Scheduling Coordinator’s positive sum of the resource’s Uncertainty Movement and UIE, without netting that sum across Settlement Intervals, to the total positive sum of all resources’ Uncertainty Movement and UIE, without netting that sum across Settlement Intervals, in the BAA or EIM Area as applicable, except as stipulated in 3) below; |
|  | The allocated upward Uncertainty Award costs shall signify an increase in the Scheduling Coordinator’s Generation (i.e., more Generation than expected). |
|  | 1. for the MSS that have elected to load follow pursuant to an MSS Agreement, the CAISO will calculate the positive and negative sums specified above for each Settlement Interval as the sum of MSS non-Participating Load UIE, Supply resources within the MSS UIE, MSS Load Following Energy, MSS Load Following Operational Adjustments, and Uncertainty Movement of resources within the MSS Aggregation. |
|  | The CAISO will allocate the Uncertainty Awards costs of the Intertie category to Scheduling Coordinators for each non-Dynamic System Resource and export based on the sum of the resource’s Uncertainty Movement and Operational Adjustment as follows: |
|  | 1. for upward Uncertainty Award cost in proportion to the magnitude of the Scheduling Coordinator’s negative Operational Adjustment for non-Dynamic System Resources, or positive Operational Adjustment for export resources (where export Energy is considered positive) relative to the sum of magnitude of such Operational Adjustments in the Balancing Authority Area or EIM Area, as applicable, without netting that sum across Settlement Intervals; |
|  | The allocated upward Uncertainty Award costs shall signify a decrease in the Scheduling Coordinator’s import Generation (i.e., imported Energy less than expected) or an increase in the Scheduling Coordinator’s export Generation (i.e., exported Energy more than expected). |
|  | 1. for downward Uncertainty Award cost in in proportion to the magnitude of the Scheduling Coordinator’s positive Operational Adjustment for non-Dynamic System Resources, or magnitude of negative Operational Adjustment for export resources (where export Energy is considered positive) relative to the sum of the magnitude of such Operational Adjustments in the Balancing Authority Area or EIM Area, as applicable, without netting that sum across Settlement Intervals; |
|  | The allocated upward Uncertainty Award costs shall signify an increase in the Scheduling Coordinator’s import Generation (i.e., imported Energy more than expected) or a decrease in the Scheduling Coordinator’s export Generation (i.e., exported Energy less than expected). |
|  | 1. for the purposes of the allocations specified above, the MSS Load Following Operational Adjustment is excluded. |
|  | If the sum of the settlement of Uncertainty Awards and the charges to Scheduling Coordinators for Uncertainty Award costs is nonzero, the CAISO will allocate such amounts to Scheduling Coordinators based on the ratio of its metered CAISO Demand and metered EIM Demand to the total EIM area metered demand. |
|  | For adjustments to the Charge Code that cannot be accomplished by correction of upstream data inputs/recalculation or operator override, Pass Through Bill Charge logic will be applied. |
|  | The categories for the EIM Area Pass Group will be derived as the total quantity of each category for BAAs that belong to the Pass Group. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| CC 7081 Daily Flexible Ramp Down Uncertainty Capacity Settlement |
| CC 7087 Daily Flexible Ramp Down Uncertainty Award Allocation |
| CC 7078 Monthly Flexible Ramp Up Uncertainty Award Allocation |
| Pre-calculation Flexible Ramp Product |

## Successor Charge Codes

| Charge Code/ Pre-calc Name | |
| --- | --- |
| CC 4999 Monthly Rounding Adjustment Allocation |

## Inputs - External Systems

| Row # | Variable Name | Description |
| --- | --- | --- |
|  | BADayGenOnlyBAAFlag BQ'md | Flag indicating a Gen-Only BAA with 1. |
|  | ZeroDivisorTolerance | Tolerance for dividing by zero. Initially set at 0.00001. |
|  | PTBBAAMonthFRDUncertaintyAllocationAmount BJm | PTB charge adjustment for FRD Uncertainty Allocation (in $) |

## Inputs - Predecessor Charge Codes or Pre-calculations

|  |  |  |
| --- | --- | --- |
| Row # | Variable Name | Predecessor Charge Code/  Pre-calc Configuration |
|  | BAAMonthOffPeakHourFRUncertaintyCostAmount Q’Q’’km | PC - Flexible Ramp Product |
|  | BAAMonthOffPeakConstraintCatFRUMQuantity Q’Q’’a’’km | PC - Flexible Ramp Product |
|  | BAMonthOffPeakResourceBAAFRUAQuantity BrtF’S’Q’Q’’a’’km | PC - Flexible Ramp Product |
|  | BAAMonthPeakHourFRUncertaintyCostAmount Q’Q’’km | PC - Flexible Ramp Product |
|  | BAAMonthOffPeakHourFRUncertaintyCostAmount Q’Q’’km | PC - Flexible Ramp Product |
|  | BAAMonthPeakConstraintCatFRUMQuantity Q’Q’’a’’km | PC - Flexible Ramp Product |
|  | BAMonthPeakResourceBAAFRUAQuantity BrtF’S’Q’Q’’a’’km | PC - Flexible Ramp Product |
|  | BAMonthOffPeakBAASpecFRMDQuantityBQ’km | PC - Flexible Ramp Product |
|  | BAAMonthOffPeakBAASpecFRMDQuantityQ’km | PC - Flexible Ramp Product |
|  | BAMonthPeakBAASpecFRMDQuantityBQ’km | PC - Flexible Ramp Product |
|  | BAAMonthPeakBAASpecFRMDQuantityQ’km | PC - Flexible Ramp Product |
|  | ConstraintMonthPeakFRMDQuantityQ’’km | PC - Flexible Ramp Product |
|  | ConstraintMonthOffPeakFRMDQuantityQ’’km | PC - Flexible Ramp Product |
|  | BADailyCompleteFRUncertaintyAllocationAmount BQ’kmd | PC - Flexible Ramp Product |

## CAISO Formula

The CAISO formula for Monthly Flexible Ramp Down Uncertainty charge allocation by BA ID (B) is as follows:

BAMonthlyCompleteFRDUncertaintyAllocationAmount BQ’m =

Sum (k) {BAMonthlyCompleteFRUncertaintyAllocationAmount BQ’km }

Where Indicated Direction (k) = ‘DN’

BAMonthlyCompleteFRUncertaintyAllocationAmount BQ’km =

(-1)\*BAMonthlyTotalDailyFRUncertaintyAllocationAmount BQ’km + BAMonthAllHourCompleteFRUncertaintyAllocationAmount BQ’km

BAMonthlyTotalDailyFRUncertaintyAllocationAmount BQ’km =

Sum (d) BADailyCompleteFRUncertaintyAllocationAmount BQ’kmd

BAMonthAllHourCompleteFRUncertaintyAllocationAmount BQ’km =

BAMonthOffPeakBAAFRUMAllocatedAmount BQ’km +

BAMonthOffPeakConstraintFRMDAllocatedUncertaintyAmount BQ’km +

BAMonthOffPeakBAASpecFRMDAllocatedUncertaintyAmount BQ’km +

BAMonthPeakBAAFRUMAllocatedAmount BQ’km +

BAMonthPeakConstraintFRMDAllocatedUncertaintyAmount BQ’km +

BAMonthPeakBAASpecFRMDAllocatedUncertaintyAmount BQ’km

**Note: The formulas in each section below are presented top-down by groupings of OffPeak first, then Peak.**

1. **Distribution of Uncertainty Awards Costs to Categories and Constraint IDs**

BAAMonthOffPeakConstraintCatFRUMDistributionAmount Q’Q’’a’’km =

BAAMonthOffPeakConstraintCatToAllCatFRUMRatio Q’Q’’a’’km \*

BAAMonthOffPeakHourFRUncertaintyCostAmount Q’Q’’km

BAAMonthOffPeakConstraintCatToAllCatFRUMRatio Q’Q’’a’’km =

BAAMonthOffPeakConstraintCatFRUMQuantity Q’Q’’a’’km \*

{IF Q’’ {attribute of BAAMonthOffPeakConstraintCatFRUMQuantity Q’Q’’a’’km } <> ‘BAA’

THEN

{IF Abs(ConstraintMonthOffPeakAllCatFRUMQuantity Q’’km ) <= ZeroDivisorTolerance

THEN 0 ELSE (1/ConstraintMonthOffPeakAllCatFRUMQuantity Q’’km) END IF}

ELSE

{IF Abs(BAASpecMonthOffPeakAllCatFRUMQuantity Q’Q’’km) <= ZeroDivisorTolerance

THEN 0 ELSE (1/ BAASpecMonthOffPeakAllCatFRUMQuantity Q’Q’’km) END IF}

END IF}

BAASpecMonthOffPeakAllCatFRUMQuantity Q’Q’’km =

Sum (a’’) BAAMonthOffPeakConstraintCatFRUMQuantity Q’Q’’a’’km

Where Q’’ = ‘BAA’

ConstraintMonthOffPeakAllCatFRUMQuantity Q’’km =

Sum (a’’) ConstraintMonthOffPeakCatFRUMQuantity Q’’a’’km

ConstraintMonthOffPeakCatFRUMQuantity Q’’a’’km =

Sum(Q’) BAAMonthOffPeakConstraintCatFRUMQuantity Q’Q’’a’’km

Where Q’’ <> ‘BAA’

BAAMonthPeakConstraintCatFRUMDistributionAmount Q’Q’’a’’km =

BAAMonthPeakHourFRUncertaintyCostAmount Q’Q’’km \* BAAMonthPeakConstraintCatToAllCatFRUMRatio Q’Q’’a’’km

BAAMonthPeakConstraintCatToAllCatFRUMRatio Q’Q’’a’’km =

BAAMonthPeakConstraintCatFRUMQuantity Q’Q’’a’’km \*

{IF Q’’ {attribute of BAAMonthPeakConstraintCatFRUMQuantity Q’Q’’a’’km } <> ‘BAA’

THEN

{IF Abs(ConstraintMonthPeakAllCatFRUMQuantity Q’’km ) <= ZeroDivisorTolerance

THEN 0 ELSE (1/ConstraintMonthPeakAllCatFRUMQuantity Q’’km) END IF}

ELSE

{IF Abs(BAASpecMonthPeakAllCatFRUMQuantity Q’Q’’km) <= ZeroDivisorTolerance

THEN 0 ELSE (1/ BAASpecMonthPeakAllCatFRUMQuantity Q’Q’’km) END IF}

END IF}

BAASpecMonthPeakAllCatFRUMQuantity Q’Q’’km =

Sum (a’’) BAAMonthPeakConstraintCatFRUMQuantity Q’Q’’a’’km

Where Q’’ = ‘BAA’

ConstraintMonthPeakAllCatFRUMQuantity Q’’km =

Sum (a’’) ConstraintMonthPeakCatFRUMQuantity Q’’a’’km

ConstraintMonthPeakCatFRUMQuantity Q’’a’’km =

Sum(Q’) BAAMonthPeakConstraintCatFRUMQuantity Q’Q’’a’’km

Where Q’’ <> ‘BAA’

1. **Allocation to SCs of Uncertainty Cost by Distributed Categories (Cat for Load, Intertie, and Supply)**

BAMonthOffPeakBAAFRUMAllocatedAmount BQ’km =

Sum (Q’’) BAMonthOffPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km

BAMonthOffPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km =

Sum (r, t, F’, S’, a’’) BAMonthOffPeakResourceBAAFRUMAllocatedAmount BrtF’S’Q’Q’’a’’km

BAMonthOffPeakResourceBAAFRUMAllocatedAmount BrtF’S’Q’Q’’a’’km =

BAAMonthOffPeakConstraintCatFRUMDistributionAmount Q’Q’’a’’km \*BAMonthOffPeakResourceBAAFRUAQuantity BrtF’S’Q’Q’’a’’km \* BAAMonthOffPeakConstraintCatFRUARatio Q’Q’’a’’km

BAAMonthOffPeakConstraintCatFRUARatio Q’Q’’a’’km =

[IF Q’’ {attribute of BAAMonthOffPeakConstraintCatFRUAQuantity Q’Q’’a’’km } <> ‘BAA’

THEN

{IF Abs(ConstraintMonthOffPeakCatFRUAQuantity Q’’a’’km ) <= ZeroDivisorTolerance

THEN 0 ELSE (1/ConstraintMonthOffPeakCatFRUAQuantity Q’’a’’km) END IF}

ELSE

{IF Abs(BAAMonthOffPeakConstraintCatFRUAQuantity Q’Q’’a’’km) <= ZeroDivisorTolerance

THEN 0 ELSE (1/BAAMonthOffPeakConstraintCatFRUAQuantity Q’Q’’a’’km) END IF}

END IF]

ConstraintMonthOffPeakCatFRUAQuantity Q’’a’’km =

Sum(Q’) BAAMonthOffPeakConstraintCatFRUAQuantity Q’Q’’a’’km

Where Q’’ <> ‘BAA’

BAAMonthOffPeakConstraintCatFRUAQuantity Q’Q’’a’’km =

Sum(B, r, t, F’, S’) BAMonthOffPeakResourceBAAFRUAQuantity BrtF’S’Q’Q’’a’’km

BAMonthPeakBAAFRUMAllocatedAmount BQ’km =

Sum (Q’’) BAMonthPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km

BAMonthPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km =

Sum (r, t, F’, S’, a’’) BAMonthPeakResourceBAAFRUMAllocatedAmount BrtF’S’Q’Q’’a’’km

BAMonthPeakResourceBAAFRUMAllocatedAmount BrtF’S’Q’Q’’a’’km =

BAAMonthPeakConstraintCatFRUMDistributionAmount Q’Q’’a’’km \*BAMonthPeakResourceBAAFRUAQuantity BrtF’S’Q’Q’’a’’km \* BAAMonthPeakConstraintCatFRUARatio Q’Q’’a’’km

BAAMonthPeakConstraintCatFRUARatio Q’Q’’a’’km =

[IF Q’’ {attribute of BAAMonthPeakConstraintCatFRUAQuantity Q’Q’’a’’km } <> ‘BAA’

THEN

{IF Abs(ConstraintMonthPeakCatFRUAQuantity Q’’a’’km ) <= ZeroDivisorTolerance

THEN (1/ConstraintMonthPeakCatFRUAQuantity Q’’a’’km) ELSE 0 END IF}

ELSE

{IF Abs(BAAMonthPeakConstraintCatFRUAQuantity Q’Q’’a’’km) <= ZeroDivisorTolerance

THEN 0 ELSE (1/BAAMonthPeakConstraintCatFRUAQuantity Q’Q’’a’’km) END IF}

END IF]

ConstraintMonthPeakCatFRUAQuantity Q’’a’’km =

Sum(Q’) BAAMonthPeakConstraintCatFRUAQuantity Q’Q’’a’’km

Where Q’’ <> ‘BAA’

BAAMonthPeakConstraintCatFRUAQuantity Q’Q’’a’’km =

Sum(B, r, t, F’, S’) BAMonthPeakResourceBAAFRUAQuantity BrtF’S’Q’Q’’a’’km

1. **Allocation to SCs for Uncertainty Awards Cost Offset**

BAMonthOffPeakConstraintFRMDAllocatedUncertaintyAmount BQ’km =

Sum (Q’’) (BAMonthOffPeakBAAConstraintFRMDQuantityBQ’Q’’km / ConstraintMonthOffPeakFRMDQuantityQ’’km) \* ConstraintMonthOffPeakFRUMNeutralityAmount Q’’km

Where Q’’ <> “BAA”

BAMonthOffPeakBAASpecFRMDAllocatedUncertaintyAmount BQ’km =

BAAMonthOffPeakBAASpecFRUMNeutralityAmount Q’km \*

[IF BADayGenOnlyBAAFlag BQ'md = 1

THEN BADayGenOnlyBAAFlag BQ'md

ELSE

(BAMonthOffPeakBAASpecFRMDQuantity BQ’km / BAAMonthOffPeakBAASpecFRMDQuantity Q’km) \*

END IF]

BAAMonthOffPeakBAASpecFRUMNeutralityAmount Q’km =

BAASpecMonthOffPeakFRUMCostAmount Q’’km –

BAASpecMonthOffPeakFRUMAllocatedAmount Q’km

ConstraintMonthOffPeakFRUMNeutralityAmount Q’’km =

ConstraintMonthOffPeakFRUMCostAmount Q’’km - ConstraintMonthOffPeakFRUMAllocatedAmount Q’’km

ConstraintMonthOffPeakFRUMCostAmount Q’’km =

Sum (Q’) BAAMonthOffPeakHourFRUncertaintyCostAmount Q’Q’’km

Where Q’’ <> “BAA”

ConstraintMonthOffPeakFRUMAllocatedAmount Q’’km =

Sum (B, Q’) BAMonthOffPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km

Where Q’’ <> “BAA”

BAASpecMonthOffPeakFRUMCostAmount Q’km =

Sum (Q’’) BAAMonthOffPeakHourFRUncertaintyCostAmount Q’Q’’km

Where Q’’ = “BAA”

BAASpecMonthOffPeakFRUMAllocatedAmount Q’km =

Sum (B, Q’’) BAMonthOffPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km

Where Q’’ = “BAA”

BAMonthPeakConstraintFRMDAllocatedUncertaintyAmount BQ’km =

Sum (Q’’) (BAMonthPeakBAAConstraintFRMDQuantityBQ’Q’’km / ConstraintMonthPeakFRMDQuantityQ’’km) \* ConstraintMonthPeakFRUMNeutralityAmount Q’’km

Where Q’’ <> “BAA”

BAMonthPeakBAASpecFRMDAllocatedUncertaintyAmount BQ’km =

BAAMonthPeakBAASpecFRUMNeutralityAmount Q’km \*

[IF BADayGenOnlyBAAFlag BQ'md = 1

THEN 1

ELSE

(BAMonthPeakBAASpecFRMDQuantity BQ’km / BAAMonthPeakBAASpecFRMDQuantity Q’km)

END IF]

BAAMonthPeakBAASpecFRUMNeutralityAmount Q’km =

BAASpecMonthPeakFRUMCostAmount Q’km –

BAASpecMonthPeakFRUMAllocatedAmount Q’km

ConstraintMonthPeakFRUMNeutralityAmount Q’’km =

ConstraintMonthPeakFRUMCostAmount Q’’km - ConstraintMonthPeakFRUMAllocatedAmount Q’’km

ConstraintMonthPeakFRUMCostAmount Q’’km =

Sum (Q’) BAAMonthPeakHourFRUncertaintyCostAmount Q’Q’’km

Where Q’’ <> “BAA”

ConstraintMonthPeakFRUMAllocatedAmount Q’’km =

Sum (B, Q’) BAMonthPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km

Where Q’’ <> “BAA”

BAASpecMonthPeakFRUMCostAmount Q’km =

Sum (Q’’) BAAMonthPeakHourFRUncertaintyCostAmount Q’Q’’km

Where Q’’ = “BAA”

BAASpecMonthPeakFRUMAllocatedAmount Q’km =

Sum (B, Q’’) BAMonthPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km

Where Q’’ = “BAA”

## Outputs

| Row # | Name | Description |
| --- | --- | --- |
| -- | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
|  | BAMonthlyCompleteFRUUncertaintyAllocationAmount BQ’m | FRU Uncertainty Award Allocation Amount assessed monthly to a BA |
|  | BAMonthlyCompleteFRUncertaintyAllocationAmount BQ’km | FlexRamp Uncertainty Allocation Amount assessed monthly to a BA |
|  | BAMonthlyTotalDailyFRUncertaintyAllocationAmount BQ’km | The montly total of daily FlexRamp Uncertainty Allocation Amounts assessed to a BA |
|  | BAMonthAllHourCompleteFRUncertaintyAllocationAmount BQ’km | The montly total off-peak and on-peak hours FlexRamp Uncertainty Allocation Amounts assessed to a BA. |
|  | BAAMonthOffPeakConstraintCatFRUMDistributionAmount Q’Q’’a’’km | FlexRamp distribution of Uncertaint Award cost by resource category movement per BAA, constraint ID, and separated by direction. |
|  | BAAMonthOffPeakConstraintCatToAllCatFRUMRatio Q’Q’’a’’km | Ratio of BAA uncertainty resource category movement to all resource categories, and for the BAA either to itself (when Q’’ = ‘BAA’) or across all BAAs of the same constraint ID except ‘BAA’) by Trading Month’s off-peak hours. |
|  | BAASpecMonthOffPeakAllCatFRUMQuantity Q’Q’’km | FlexRamp uncertainty movement by BAA across all resource categories where constraint ID = ‘BAA’. Total quantity by Trading Month’s off-peak hours. |
|  | ConstraintMonthOffPeakAllCatFRUMQuantity Q’’km | FlexRamp uncertainty movement by BAA across all resource categories where constraint ID <> ‘BAA’. Total quantity across all BAAs belonging to that constraint ID by Trading Month’s off-peak hours. |
|  | ConstraintMonthOffPeakCatFRUMQuantity Q’’a’’km | FlexRamp uncertainty movement by BAA by resource category where constraint ID <> ‘BAA’. Total quantity across all BAAs belonging to that constraint ID by Trading Month’s off-peak hours. |
|  | BAAMonthPeakConstraintCatFRUMDistributionAmount Q’Q’’a’’km | Distribution of FlexRamp uncertainty settlement costs per resource category uncertainty movement by BAA and constraint ID by Trading Month’s peak hours. |
|  | BAAMonthPeakConstraintCatToAllCatFRUMRatio Q’Q’’a’’km | FlexRamp Ratio of BAA uncertainty resource category movement to all resource categories, and for the BAA either to itself (when Q’’ = ‘BAA’) or across all BAAs of the same constraint ID except ‘BAA’) by Trading Month’s peak hours. |
|  | BAASpecMonthPeakAllCatFRUMQuantity Q’Q’’km | FlexRamp uncertainty movement by BAA across all resource categories where constraint ID = ‘BAA’. Total quantity by Trading Month’s peak hours. |
|  | ConstraintMonthPeakAllCatFRUMQuantity Q’’km | FlexRamp uncertainty movement by BAA across all resource categories where constraint ID <> ‘BAA’. Total quantity across all BAAs belonging to that constraint ID by Trading Month’s peak hours. |
|  | ConstraintMonthPeakCatFRUMQuantity Q’’a’’km | FlexRamp uncertainty movement by BAA by resource category where constraint ID <> ‘BAA’. Total quantity across all BAAs belonging to that constraint ID by Trading Month’s peak hours. |
|  | BAMonthOffPeakBAAFRUMAllocatedAmount BQ’km | Monthly off-peak hours total allocation of FlexRamp uncertainty award costs per BA and BAA. |
|  | BAMonthOffPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km | Monthly off-peak hours total allocation of FlexRamp uncertainty award costs per BA, BAA, and constraint ID. |
|  | BAMonthOffPeakResourceBAAFRUMAllocatedAmount BrtF’S’Q’Q’’a’’km | Monthly off-peak hours total allocation of FlexRamp uncertainty award costs per resource, resource category, BA, BAA, and constraint ID. |
|  | BAAMonthOffPeakConstraintCatFRUARatio Q’Q’’a’’km | FlexRamp Ratio of BAA’s total resource level uncertainty allocation quantities by resource category, and for the BAA either to itself (when Q’’ = ‘BAA’) or across all BAAs of the same constraint ID except ‘BAA’) by Trading Month’s off-peak hours. |
|  | ConstraintMonthOffPeakCatFRUAQuantity Q’’a’’km | FlexRamp uncertainty allocation quantities from base resource level values aggregated at constraint ID level where constraint ID <> ‘BAA’, and is provided per resource category and as total by Trading Month’s off-peak hours. |
|  | BAAMonthOffPeakConstraintCatFRUAQuantity Q’Q’’a’’km | FlexRamp uncertainty allocation quantities from base resource level values aggregated at BAA and constraint ID level where constraint ID <> ‘BAA’, and is provided per resource category and as total by Trading Month’s off-peak hours. |
|  | BAMonthPeakBAAFRUMAllocatedAmount BQ’km | Monthly peak hours total allocation of FlexRamp uncertainty award costs per BA and BAA. |
|  | BAMonthPeakBAAConstraintFRUMAllocatedAmount BQ’Q’’km | Monthly peak hours total allocation of FlexRamp uncertainty award costs per BA, BAA, and constraint ID. |
|  | BAMonthPeakResourceBAAFRUMAllocatedAmount BrtF’S’Q’Q’’a’’km | Monthly peak hours total allocation of FlexRamp uncertainty award costs per resource, resource category, BA, BAA, and constraint ID. |
|  | BAAMonthPeakConstraintCatFRUARatio Q’Q’’a’’km | FlexRamp Ratio of BAA’s total resource level uncertainty allocation quantities by resource category, and for the BAA either to itself (when Q’’ = ‘BAA’) or across all BAAs of the same constraint ID except ‘BAA’) by Trading Month’s peak hours. |
|  | ConstraintMonthPeakCatFRUAQuantity Q’’a’’km | FlexRamp uncertainty allocation quantities from base resource level values aggregated at constraint ID level where constraint ID <> ‘BAA’, and is provided per resource category and as total by Trading Month’s peak hours. |
|  | BAAMonthPeakConstraintCatFRUAQuantity Q’Q’’a’’km | FlexRamp uncertainty allocation quantities from base resource level values aggregated at BAA and constraint ID level where constraint ID <> ‘BAA’, and is provided per resource category and as total by Trading Month’s peak hours. |
|  | BAMonthOffPeakConstraintFRMDAllocatedUncertaintyAmount BQ’km | BA allocation of uncertainty awards costs for FlexRamp by Trading Month’s off-peak hours. |
|  | BAMonthOffPeakBAASpecFRMDAllocatedUncertaintyAmount BQ’km | BA allocation of neutrality for difference of uncertainty awards costs and charges for FlexRamp by Trading Month’s off-peak hours. |
|  | BAAMonthOffPeakBAASpecFRUMNeutralityAmount Q’km | Any neutrality amount from FlexRamp uncertainty awards costs not fully allocated through charges, and is provided by constraint ID (when equal to ‘BAA’) as total for a Trading Month’s off-peak hours. |
|  | ConstraintMonthOffPeakFRUMNeutralityAmount Q’’km | Any neutrality amount from FlexRamp uncertainty awards costs not fully allocated through charges, and is provided by constraint ID (when not equal to ‘BAA’) as total for a Trading Month’s off-peak hours. |
|  | ConstraintMonthOffPeakFRUMCostAmount Q’’km | FlexRamp uncertainty awards costs by constraint ID (when not equal to ‘BAA’) as total for a Trading Month’s off-peak hours. |
|  | ConstraintMonthOffPeakFRUMAllocatedAmount Q’’km | FlexRamp uncertainty movement allocation charges by constraint ID (when not equal to ‘BAA’) as total for a Trading Month’s off-peak hours. |
|  | BAASpecMonthOffPeakFRUMCostAmount Q’km | FlexRamp uncertainty awards costs by BAA as total for a Trading Month’s off-peak hours, specific to the BAA. |
|  | BAASpecMonthOffPeakFRUMAllocatedAmount Q’km | FlexRamp uncertainty movement allocation charges by BAA as total for a Trading Month’s off-peak hours, specific to the BAA. |
|  | BAMonthPeakConstraintFRMDAllocatedUncertaintyAmount BQ’km | BA neutrality allocation from nonzero difference of FlexRamp uncertainty award costs and its allocation charges from peak hours of the Trading Month. |
|  | BAMonthPeakBAASpecFRMDAllocatedUncertaintyAmount BQ’km | BA allocation of neutrality for difference of uncertainty awards costs and charges for FlexRamp by Trading Month’s peak hours. |
|  | BAAMonthPeakBAASpecFRUMNeutralityAmount Q’km | Any neutrality amount from FlexRamp uncertainty awards costs not fully allocated through charges, and is provided by constraint ID (when equal to ‘BAA’) as total for a Trading Month’s peak hours. |
|  | ConstraintMonthPeakFRUMNeutralityAmount Q’’km | Any neutrality amount from FlexRamp uncertainty awards costs not fully allocated through charges, and is provided by constraint ID (when not equal to ‘BAA’) as total for a Trading Month’s peak hours. |
|  | ConstraintMonthPeakFRUMCostAmount Q’’km | FlexRamp uncertainty awards costs by constraint ID (when not equal to ‘BAA’) as total for a Trading Month’s peak hours. |
|  | ConstraintMonthPeakFRUMAllocatedAmount Q’’km | FlexRamp uncertainty movement allocation charges by constraint ID (when not equal to ‘BAA’) as total for a Trading Month’s peak hours. |
|  | BAASpecMonthPeakFRUMCostAmount Q’km | FlexRamp uncertainty awards costs by BAA as total for a Trading Month’s peak hours |
|  | BAASpecMonthPeakFRUMAllocatedAmount Q’km | FlexRamp uncertainty movement allocation charges by BAA as total for a Trading Month’s peak hours |

# Charge Code Effective Dates

| Charge Code/  Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| CC 7088 Monthly Flexible Ramp Down Uncertainty Award Allocation | 5.0 | 11/1/2016 | 10/31/2022 | Initial Implementation |
| CC 7088 Monthly Flexible Ramp Down Uncertainty Award Allocation | 5.1 | 11/1/2022 | 4/30/26 | Configuration Impacted |
| CC 7088 Monthly Flexible Ramp Down Uncertainty Award Allocation | 5.2 | 5/1/2026 | Open | Configuration Impacted |