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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

FERC 755 requires RTOs and ISOs to compensate frequency regulation resources based on the actual service provided, including a capacity payment that includes the marginal unit’s opportunity costs and a payment for performance that reflects the quantity of frequency regulation service provided by a resource when the resource accurately follows a control signal. The CAISO has developed a mileage payment to compensate resources providing Regulation Up for their performance in response to control signal.

## Description

This charge code settles the quantity of frequency Regulation Up service provided by a resource when the resource is accurately following a control signal by CAISO. The service shall be monitored and converted into instructed mileage of regulation up service by CAISO systems. The instructed mileage is then paid using a mileage clearing price. The payments are also adjusted for performance accuracy.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | Resources supplying Mileage from contracted or self-provided Regulation Up in either the Day-Ahead Market or Real-time Market are paid a Mileage clearing price for each MW of Instructed Mileage during a Settlement Period. |
| 1.1 | The Settlement Period for this Charge Code shall be a 15-minute interval of each Trading Hour. |
| 1.2 | This Charge Code shall provide an output on a daily basis. |
| 2.0 | If a resource is awarded incremental Regulation in the Real-Time Market, the Instructed Mileage shall be divided between the Day Ahead Market and Real Time Market, in proportion to the Day-Ahead and Real-Time Regulation Capacity awards. |
| 2.0.1 | The Regulation awards considered here shall include awards resulting from economic bids and qualified self-provision. |
| 2.1 | Instructed Mileage associated with a Day-Ahead Market award will be paid the Day-Ahead Mileage clearing price. |
| 2.2 | Instructed Mileage associated with a Real-Time Market award will be paid the Real-Time Mileage clearing price. |
| 2.3 | The CAISO will adjust a resource’s Mileage payments based on the accuracy of the resource’s response to CAISO EMS signals, as described in the CAISO Tariff. To determine this accuracy adjustment, the CAISO will sum a resource’s Automatic Generation Control set points for each four (4) second Regulation interval every fifteen (15) minutes and then sum the total deviations from the Automatic Generation Control set point for each four (4) second regulation interval during that fifteen (15) minute period. The CAISO will divide the sum of the resource’s Automatic Generation Control set points less the sum of the resource’s total deviations by the sum of the resource’s Automatic Generation Control set points. The CAISO will apply the resulting percentage to the resource’s Regulation performance payments. |
| 3.0 | For adjustments to the Charge Code that cannot be accomplished by correction of upstream data inputs, recalculation or operator override Pass Through Bill Charge logic will be applied. |
| 4.0 | EDAM Requirements:  EDAM entities have AS Self Provision (QSP) and AS Requirement.  EDAM resources cannot bid in for Ancillary Services  EDAM BAA resources cannot provide Ancillary Service for CISO BAA  EDAM AS Self Provision (QSP) is not assessed No Pay |
| 4.1 | EDAM Requirements:  EDAM resources will receive Ancillary Service Awarded Bid quantities of zero and Ancillary Service Capacity Schedules of non-zero. They will be filtered out in equations. EDAM BAA Ancillary Service Self-provision and requirements are simply information at this point. |

## Predecessor Charge Codes

| Charge Code/ Pre-Calc Name |
| --- |
| < None > |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| CC 7256 – Regulation Up Mileage Cost Allocation |
| IFM Net Amount Pre-calculation |
| RTM Net Amount Pre-calculation |

## Inputs - External Systems

| Row # | Variable Name | Description |
| --- | --- | --- |
| 1 | CAISOHourlyDARegUpMileagePrice mdh | Day-ahead Regulation Up mileage marginal price for Trading Hour *h*  of Trade Month m of Trading Day d*.* ($/MW) |
| 2 | CAISO15MinuteRTRegUpMileagePrice mdhc | Real-time Regulation Up mileage marginal price for each 15-minute interval c of Trading Hour *h* of Trade Month m of Trading Day d*.* ($/MW) |
| 3 | BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc | Adjusted Regulation Up mileage for resource *r* for each 15-minute interval c of Trading Hour *h* of Trade Month m of Trading Day d*.* (MW) |
| 4 | BA15MinuteResourceRegUpPerformanceAccuracyPercentage BrtQ’mdhc | Regulation Performance Accuracy for Regulation Up for resource *r* for each 15-minute interval c of Trading Hour *h* of Trade Month m of Trading Day d*.* |
| 5 | BAHourlyResourceDARegUpCapacitySchedule BrtuT’I’Q’M’VL’W’R’F’S’mdh | Day-ahead Regulation Up capacity award including finally qualified self-provision and market award for resource r in Trading Hour h. (MW) |
| 6 | RegUpCapacitySchedule BrtuT’I’Q’M’VL’W’R’F’S’mdhc | Final RTPD Cleared Regulation Up MW. Includes awards based on economic bids and qualified self-provision. This is the amount of Regulation Up the resource is expected to deliver in real-time. Includes both award and QSP, if any. (MW) |
| 7 | PTBRegUpMileageSettlementAmt BQ’Jmdh | Pass Through Bill (PTB) amount for this Charge Code to be settled with Business Associate B, identified by PTB ID J, for Trading Hour h of Trade Month m of Trading Day d. ($) |

## Inputs - Predecessor Charge Codes or Pre-calculations

| Row # | Variable Name | Predecessor Charge Code/ Pre-calc Configuration / Description |
| --- | --- | --- |
|  | < None > |  |

## CAISO Formula

### BA15MinuteResourceRegUpMileageSettlement BrtQ’mdhc =

BA15MinuteResourceDARegUpMileagePayment BrtQ’mdhc + BA15MinuteResourceRTRegUpMileagePayment BrtQ’mdhc

### BA15MinuteResourceDARegUpMileagePayment BrtQ’mdhc =

(-1)\*BA15MinuteResourceDARegUpMileageQuantity BrtQ’mdhc \* CAISOHourlyDARegUpMileagePrice mdh \* BA15MinuteResourceRegUpPerformanceAccuracyPercentage BrtQ’mdhc

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

### BA15MinuteResourceRTRegUpMileagePayment BrtQ’mdhc =

(-1)\*BA15MinuteResourceRTRegUpMileageQuantity BrtQ’mdhc \* CAISO15MinuteRTRegUpMileagePrice mdhc \* BA15MinuteResourceRegUpPerformanceAccuracyPercentage BrtQ’mdhc

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

### BA15MinuteResourceHigherDAOrRTRegUpSchedule BrtQ’mdhc =

Sum (u,T’,I’,M’,V,L’,W’,R’,F’,S’) Max(BAHourlyResourceDARegUpCapacitySchedule BrtuT’I’Q’M’VL’W’R’F’S’mdh , RegUpCapacitySchedule BrtuT’I’Q’M’VL’W’R’F’S’mdhc )

Note: BAHourlyResourceDARegUpCapacitySchedule will be replicated in each of the 4 15-minute intervals for this calculation in configuration output file.

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

### BA15MinuteResourceDARegUpMileageQuantity BrtQ’mdhc =

Sum (u,T’,I’,M’,V,L’,W’,R’,F’,S’) (BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc \* (BAHourlyResourceDARegUpCapacitySchedule BrtuT’I’Q’M’VL’W’R’F’S’mdh / BA15MinuteResourceHigherDAOrRTRegUpSchedule BrtQ’mdhc))

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

Note: BAHourlyResourceDARegUpCapacitySchedule will be replicated in each of the 4 15-minute intervals for this calculation in configuration output file.

### BA15MinuteResourceRTRegUpMileageQuantity BrtQ’mdhc =

BA15MinuteResourceAdjustedRegUpMileageQty BrtQ’mdhc - BA15MinuteResourceDARegUpMileageQuantity BrtQ’mdhc

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

### BAHourlyResourceTotalRegUpMileagePayment BrtQ’mdh =

 BA15MinuteResourceRegUpMileageSettlement BrtQ’mdhc

### CAISOHourlyTotalRegUpMileagePayment mdh = sum(B,r,t,Q’)

BAHourlyResourceTotalRegUpMileagePayment BrtQ’mdh

Note: The above charge type shall be provided as a reporting hierarchy and is not separately configured in the configuration output file.

## Outputs

| Output Req ID | Name | Description |
| --- | --- | --- |
| 1 | In addition to any outputs listed below, all inputs shall be included as outputs. | All inputs |
| 2 | BA15MinuteResourceRegUpMileageSettlement BrtQ’mdhc | Settlement for instructed mileage of regulation up, adjusted for accuracy. This is for resource r, resource type t, Business Associate B, for 15-minute interval c of trading hour h of Trade Month m of Trading Day d. |
| 3 | BA15MinuteResourceDARegUpMileagePayment BrtQ’mdhc | Day-ahead market portion of regulation up mileage settlement. This is for resource r, resource type t, Business Associate B, for 15-minute interval c of trading hour h of Trade Month m of Trading Day d. |
| 4 | BA15MinuteResourceRTRegUpMileagePayment BrtQ’mdhc | Real-time market portion of regulation up mileage settlement. This is for resource r, resource type t, Business Associate B, for 15-minute interval c of trading hour h of Trade Month m of Trading Day d. |
| 5 | BA15MinuteResourceHigherDAOrRTRegUpSchedule BrtQ’mdhc | The higher value between the DA or RT Reg Up Schedule. Used to ignore decrement in RT compared to DA. This is for resource r, resource type t, Business Associate B, for 15-minute interval c of trading hour h of Trade Month m of Trading Day d. |
| 6 | BA15MinuteResourceDARegUpMileageQuantity BrtQ’mdhc | Day-ahead market portion of regulation up mileage quantity. This is for resource r, resource type t, Business Associate B, for 15-minute interval c of trading hour h of Trade Month m of Trading Day d. |
| 7 | BA15MinuteResourceRTRegUpMileageQuantity BrtQ’mdhc | Real-time market portion of regulation up mileage quantity. This is for resource r, resource type t, Business Associate B, for 15-minute interval c of trading hour h of Trade Month m of Trading Day d. |
| 8 | BAHourlyResourceTotalRegUpMileagePayment BrtQ’mdh | Total hourly payments for instructed mileage of regulation up. This is for resource r, resource type t, Business Associate B, for trading hour h of Trade Month m of Trading Day d. |
| 9 | CAISOHourlyTotalRegUpMileagePayment mdh | CAISO Hourly total payment for instructed mileage of regulation up for trading hour h of Trade Month m of Trading Day d. |

# Charge Code Effective Date

| Charge Code/  Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| CC 7251 - Regulation Up Mileage Settlement | 5.0 | 06/01/13 | 6/30/15 | Documentation Edits and Configuration Impacted |
| CC 7251 - Regulation Up Mileage Settlement | 5.1 | 7/1/15 | TBD | Configuration Impacted |
| CC 7251 - Regulation Up Mileage Settlement | 5.2 | TBD | Open | Configuration Impacted |