Settlements and Billing

Configuration Guide: Real Time Price

Pre-calculation

Version 5.19

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# Purpose of Document

The purpose of this document is to capture the business and functional requirements for the MRTU Settlements and Billing Real-Time Price Pre-calculation.

# 

# Introduction

## Background

Locational Marginal Prices will be used in principle to settle Energy transactions. Price Locations and Aggregated Price Locations are defined on collections of network nodes. A LMP will be calculated for each Price Location and each Aggregated Price Location.

The CAISO calculates and accounts for Imbalance Energy for each Dispatch Interval and settles Imbalance Energy for each Settlement Interval for each resource within the Energy Imbalance Market Control Area and all System Resources Dispatched in Real-Time.

* IIE – instructed imbalance energy
  + FMM Instructed Imbalance Energy Settlement (CC 6460)
  + EIM BAA FMM Instructed Imbalance Energy Settlement (CC 64600)
  + RTD Instructed Imbalance Energy Settlement (CC 6470)
  + EIM BAA RTD Instructed Imbalance Energy Settlement (CC 64700)
* UIE – Uninstructed Imbalance Energy
  + Real Time Uninstructed Imbalance Energy Settlement (CC 6475)
  + EIM BAA Real Time Uninstructed Imbalance Energy Settlement (CC 64750)
* UFE – Unaccounted for Energy
  + Real Time Unaccounted for Energy Settlement (CC 6474)
  + EIM BAA Real Time Unaccounted for Energy Settlement (CC 64740)
* GHG - Greenhouse Gas Emission Cost Revenue (CC 491)

To the extent that the sum of the Settlement Amounts for IIE, UIE, and UFE does not equal zero within the CAISO Balancing Authority Area, the CAISO will assess Charges or make Payments in Real Time Imbalance Energy Offset (CC 6477) for the resulting differences to all Scheduling Coordinators based on a pro rata share of their Measured Demand for the relevant Settlement Interval. To the extent that the sum of the Settlement Amounts for IIE, UIE, UFE, and GHG does not equal zero within the EIM Balancing Authority Area, the CAISO will assess Charges or make Payments in EIM BAA Real Time Imbalance Energy Offset (CC 6477EIM)for the resulting differences to EIM Entity Scheduling Coordinator ID, respectively.

In the Real-Time Market, the negative and positive Congestion Charges associated with a valid post-Day-Ahead TOR and ETC schedule change (including changes submitted to the Hour-Ahead Scheduling Process and changes submitted closer to Real-Time where allowed by the contract) will be reversed in CC 6788 RTM Congestion Credit Settlement. Because Congestion Charges are implicitly collected by the CAISO in the Real-Time settlement and there are no holders of rights to receive Real-Time Congestion revenues, all charges for Real-Time Congestion will be accumulated in special and separate Balancing Authority Area neutrality accounts. The CAISO Real-Time Congestion Charges less Virtual Bid Adjustment shall be distributed back to non-ETC Control Area metered Demand and exports in Real Time Congestion Offset (CC 6774). The EIM Balancing Authority Area Real-Time Congestion Charges shall be distributed to the applicable EIM Entity Scheduling Coordinator in EIM BAA Real Time Congestion Offset (CC 67740).

## Description

The Real-Time Price Pre-calculation calculates the following Real-Time Market settlement prices:

* Settlement Interval Resource-Specific Real-Time LMP
* Settlement Interval Real Time MSS Price, Settlement Interval Real Time MSS MCL, and Settlement Interval Real Time MSS MCC, for Net Settlement
* Settlement Interval Penalty Location Real-Time LMP
* Hourly Real Time Pnode LMP
* Settlement Interval Real Time Pnode MCC
* Hourly Real Time UFE LMP and MCC
* MSS Penalty Settlement Interval Real Time LMP
* FMM Interval MSS Price, FMM Interval MSS MCL Price, and FMM Interval MSS MCC for Net Settlement

The Settlement Interval Resource-Specific Real-Time LMP is used in Real Time Instructed Imbalance Energy Settlement (CC 6470), and EIM RTD Instructed Imbalance Energy Settlement (CC 64700).

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The Hourly Real-Time LMP shall be calculated as the simple average of the Dispatch Interval RTD Pnode LMPs of the applicable trading hour. The Hourly Real-Time LMP is used to calculate the Load Uninstructed Imbalance Energy Neutrality Settlement Amount in CC 6475.

The Hourly UFE UDC LMP shall be calculated as the average of Hourly RTM LAP LMP Price of the Aggregated Pricing Nodes associated with a specific UDC. The Hourly UFE UDC LMP shall be used in the settlement of Unaccounted for Energy (CC 6474) and Unaccounted for Energy EIM Settlement (CC 64740).

The Hourly UFE UDC MCC shall be calculated as the average of Hourly RTM LAP MCC Price of the Aggregated Pricing Nodes associated with a specific UDC. The Hourly UFE UDC MCC shall be used to account for Unaccounted for Energy in the Real Time Congestion Offset Pre-Calculation.

The Settlement Interval Real-Time MSS Price shall be calculated for those MSS Operators that have elected net settlement. If the MSS internal metered Demand exceeds the MSS internal metered Generation, the Real-Time Settlement Interval MSS Price is the Hourly Real-Time LAP Price for the MSS LAP. However, if MSS internal metered Generation exceeds MSS internal metered Demand, the Settlement Interval Real Time MSS Price is the simple average of the Dispatch Interval Net Generation MSS Price, which is a weighted average of the Dispatch Interval Real-Time LMPs for all applicable PNodes within the relevant MSS; where the weighting factors are the Metered Energy of all Generation at the corresponding PNodes.

The Settlement Interval Real-Time MSS MCC shall be calculated for those MSS Operators that have elected net settlement. If the MSS internal metered Demand exceeds the MSS internal metered Generation, the Real-Time Settlement Interval MSS MCC Price is Hourly Real-Time LAP MCC Price for the MSS LAP. However, if MSS internal metered Generation exceeds MSS internal metered Demand, the Real-Time Settlement Interval MSS MCC Prices is the simple average of the weighted average of the Real-Time LMPs for all applicable PNodes within the relevant MSS; where the weighting factors for computing the weighted average are the Metered Energy of all Generation at the corresponding PNodes

The Settlement Interval Real-Time MSS MCL shall be calculated for those MSS Operators that have elected net settlement. If the MSS internal metered Demand exceeds the MSS internal metered Generation, the Real-Time Settlement Interval MSS MCL Price is Hourly Real-Time LAP MCL Price for the MSS LAP. However, if MSS internal metered Generation exceeds MSS internal metered Demand, the Real-Time Settlement Interval MSS MCL Prices is the simple average of the weighted average of the Real-Time MCLs for all applicable PNodes within the relevant MSS; where the weighting factors for computing the weighted average are the Metered Energy of all Generation at the corresponding PNodes.

The MSS Penalty Settlement Interval Real-Time LMP shall be calculated for each MSS resource that has elected gross or net settlement and load following. The MSS Penalty Settlement Interval Real-Time LMP shall be calculated for each Settlement Interval that a Resource has an Instructed Imbalance Energy quantity as the specific-IIE simple average of the individual Dispatch Intervals LMPs. The MSS Penalty Settlement Interval Real-Time LMP is used in the calculation of CC1407 MSS Positive Deviation Penalty.

The Settlement Interval Real–Time LAP prices shall be calculated as the simple average of the Dispatch Interval LAP LMPs within the specific Default or Custom LAP. . The Settlement Interval Real–Time LAP price is used in the calculation of CC 2407 MSS Negative Deviation Penalty.

The Normalized Day Ahead Load Distribution Factor (LDF) will be calculated for each LAP based on System wide Day Ahead Load Distribution Factors. The Normalized Real Time Load Distribution Factor will be calculated for each LAP based on System wide Real Time Load Distribution Factors. These LDFs will be utilized in calculating the Neutrality Adjustment Amounts for Charge Code 6475 and Charge Code 6774.

The FMM Interval MSS Price shall be calculated for those MSS Operators that have elected net settlement. If the MSS internal metered Demand exceeds the MSS internal metered Generation, the FMM Interval MSS Price is the Hourly Real-Time Market LAP Price for the MSS LAP. However, if MSS internal metered Generation exceeds MSS internal metered Demand, the FMM Interval MSS Price is the simple average of the FMM Interval Net Generation MSS Price, which is a weighted average of the FMM Interval Real-Time LMPs for all applicable PNodes within the relevant MSS; where the weighting factors are the Metered Energy of all Generation at the corresponding PNodes.

The FMM Interval MSS MCC Price shall be calculated for those MSS Operators that have elected net settlement. If the MSS internal metered Demand exceeds the MSS internal metered Generation, the FMM Interval MSS MCC Price is the Hourly Real-Time Market LAP MCC Price for the MSS LAP. However, if MSS internal metered Generation exceeds MSS internal metered Demand, the FMM Interval MSS MCC Price is the simple average of the FMM Interval Net Generation MSS MCC Price, which is a weighted average of the FMM Interval Real-Time MCC LMPs for all applicable PNodes within the relevant MSS; where the weighting factors are the Metered Energy of all Generation at the corresponding PNodes.

The FMM Interval MSS MCL Price shall be calculated for those MSS Operators that have elected net settlement. If the MSS internal metered Demand exceeds the MSS internal metered Generation, the FMM Interval MSS MCL Price is the Hourly Real-Time Market LAP MCL Price for the MSS LAP. However, if MSS internal metered Generation exceeds MSS internal metered Demand, the FMM Interval MSS MCL Price is the simple average of the FMM Interval Net Generation MSS MCL Price, which is a weighted average of the FMM Interval Real-Time MCL LMPs for all applicable PNodes within the relevant MSS; where the weighting factors are the Metered Energy of all Generation at the corresponding PNodes.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | A Resource-Specific Settlement Interval LMP shall be calculated for each resource in each Settlement Interval. |
| 1.1 | The Resource-Specific Settlement Interval LMP shall be computed for the following resource types:   * Generating Units * MSS Operator that elect Gross settlement * Dynamic System Resources * Curtailable Demand * Pumping Load (Pseudo Generator) |
| 1.2 | If Resource Specific Dispatch Interval LMP is not available in a given interval, the relevant pnode or aggregated pnode price will be utilized in the calculation of Resource Specific Settlement Interval RTD Price. |
| 1.3 | If Resource Specific FMM LMP is not available in a given FMM interval, the relevant pnode or aggregated pnode price will be utilized in the calculation of Resource Specific FMM LMP Price. |
| 4.0 | Real Time Load Distribution Factors are provided by SMDM on a system-wide basis and not by Custom or Default LAP. |
| 4.1 | In order to determine Real Time Load Distribution Factors by Custom or Default LAP, RT LDFs are normalized per LAP and the normalized sum of LDFs for each LAP shall equal 1. |
| 4.2 | Real Time Load Distribution Factors are assumed to be the same for the entire hour. |
| 4.3 | Real Time Load Distribution Factors are always positive (0-1). |
| 5.0 | The Settlement Interval Real Time MSS Price is the Settlement Interval Real-Time LAP price for the MSS LAP if the MSS internal metered Demand exceeds the MSS internal measured Generation. |
| 5.1 | The Settlement Interval Real-Time MSS Price for the MSS LAP if MSS internal metered Generation exceeds MSS internal metered Demand shall be the weighted average of the Real-Time LMPs for all applicable PNodes, PODs, or AGENs within the relevant MSS; where the weighting factors for computing the weighted average are the Metered Energy of all Generation at the corresponding PNodes. |
| 7.0 | A MSS Penalty Settlement Interval LMP shall be calculated for each generating resource for each Settlement Interval, irrespective of whether the resource has an Instructed Imbalance Energy (IIE). |
| 8.0 | The MSS Penalty Settlement Interval LMP shall be computed for the following resource types:   * MSS Operator that elect Gross Settlement and Load Following * MSS Operators that elect net Settlement and Load Following |
| 9.0 | The MSS Penalty Settlement Interval LMP shall be calculated as the IIE weighted average of the individual Dispatch Interval LMPs for the MSS generating resource for the Settlement Interval. |
| 10.0 | The Settlement Interval Real-Time LAP Price shall be calculated for each non-MSS and MSS Operator (gross or net election) |
| 10.1 | The Settlement Interval Real Time LAP LMP Price shall be calculated as the simple average of the Dispatch Interval LMPs within the specific Default or Custom LAP.. |
| 11.0 | The Settlement Interval Real-Time MSS MCC Price is the Real-Time LAP MCC price for the MSS LAP if the MSS internal metered Demand exceeds the MSS internal metered Generation. |
| 11.1 | The Settlement Interval Real-Time MSS MCC Price for the MSS LAP if MSS internal measured Generation exceeds MSS internal Measured Demand shall be the weighted average of the Real-Time MCC for all applicable PNodes, PODs, or AGENs within the relevant MSS; where the weighting factors for computing the weighted average are the Metered Energy of all Generation at the corresponding PNodes. |
| 12.0 | In order to determine Day Ahead Load Distribution Factors by Custom or Default LAP, DA LDFs are normalized per LAP and the normalized sum of LDFs for each LAP shall equal 1. |
| 12.1 | Day Ahead Load Distribution Factors are assumed to be the same for the entire hour. |
| 12.2 | Day Ahead Load Distribution Factors are always positive (0-1). |
| 13.0 | The Hourly UFE UDC LMP shall be calculated as the average of Hourly RTM LAP LMP Price of the Aggregated Pricing Nodes associated with a specific UDC. |
| 14.0 | The Hourly UFE UDC MCC shall be calculated as the average of Hourly RTM LAP LMP Price of the Aggregated Pricing Nodes associated with a specific UDC. |
| 15.0 | The Hourly Real-Time LMP shall be calculated as the simple average of the Dispatch Interval RTD PNode LMPs of the applicable trading hour. |
| 16.0 | The FMM Interval Real Time MSS Price is the Hourly Interval Real-Time Market LAP price for the MSS LAP if the MSS internal metered Demand exceeds the MSS internal measured Generation. |
| 16.1 | The FMM Interval MSS Price for the MSS LAP if MSS internal metered Generation exceeds MSS internal metered Demand shall be the weighted average of the FMM Interval LMPs for all applicable Pnodes, PODs, or AGENs within the relevant MSS; where the weighting factors for computing the weighted average are the Metered Energy of all Generation at the corresponding Pnodes. |
| 17.0 | The FMM Interval Real Time MSS Price is the Hourly Real-Time Market LAP price for the MSS LAP if the MSS internal metered Demand exceeds the MSS internal measured Generation. |
| 17.1 | The FMM Interval Real-Time MSS Price for the MSS LAP if MSS internal metered Generation exceeds MSS internal metered Demand shall be the weighted average of the FMM Interval LMPs for all applicable PNodes, PODs, or AGENs within the relevant MSS; where the weighting factors for computing the weighted average are the Metered Energy of all Generation at the corresponding PNodes. |
| 18.0 | RMR related calculations will be provided in this precalculation. This calculations include FMM and RTD bid cost for exceptional dispatch less variable energy cost opportunity cost adder on a per MWh basis. Further, values that reduce the aforementioned amounts by the FMM and RTD LMP respectively, for specific settlement intervals, will also be calculated. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Real-Time Energy Quantity Pre-calculation |
| MSS Netting Pre-calculation |
| CC 6011 - Day Ahead Energy, Congestion, Loss Settlement |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Real Time Instructed Imbalance Energy Settlement (CC 6470) |
| Real Time Uninstructed Imbalance Energy Settlement (CC 6475) |
| Real Time Unaccounted for Energy Settlement (CC 6474) |
| Negative Uninstructed Deviation Penalty (CC 4470) |
| Positive Uninstructed Deviation Penalty (CC 4480) |
| Real Time Congestion Offset (CC 6774) |
| IFM Net Amount Precalculation |
| RTM Net Amount Precalculation |
| Real Time Excess Cost for Instructed Energy Settlement (CC 6482) |
| Exceptional Dispatch Uplift Settlement (CC 6488) |
| MSS Positive Deviation Penalty (CC 1407) |
| MSS Negative Deviation Penalty (CC 2407) |
| Transmission Loss Obligation Charge for Real Time Schedules under a Control Agreement (CC 6976) |
| Intermittent Resource Net Deviation Settlement (CC 711) |
| FMM Instructed Imbalance Energy Settlement (CC 6460) |
| EIM BAA FMM Instructed Imbalance Energy Settlement (CC 64600) |
| EIM BAA RTD Instructed Imbalance Energy Settlement (CC 64700) |
| EIM BAA Real Time Uninstructed Imbalance Energy Settlement (CC 64750) |
| EIM BAA Real Time Unaccounted for Energy Settlement (CC 64740) |
| Greenhouse Gas Emission Cost Revenue (CC 491) |
| CRR Hourly Settlement (CC 6700) |

## Inputs – External Systems

| Input Req ID | Variable Name | Description |
| --- | --- | --- |
|  | DispatchIntervalRTDLMP BrtuT’I’M’R’AA’Qpmdhcif | Represents the Dispatch Interval RTD Locational Marginal Price (LMP) for Resource r. ($/MWh) |
|  | DispatchIntervalRTDNodeLMP AA’Qpmdhcif | The Dispatch Interval RTD Locational Marginal Price (LMP) for Aggregated Pricing Node and Pricing Node (Pnode) p. ($/MWh) |
|  | NodalRTLDF uM’AA’pmdh | Nodal Real-Time Load Distribution Factor (LDF) per custom or default LAP per Pricing node as provided by SMDM (Supplementary Market Data Management) where UDC Index u, MSS Subgroup M’, Apnode A and Apnode Type A’ are mapped to the Master File. |
|  | DispatchIntervalRTDLAPPrice uM’AA’mdhcif | Dispatch Interval RTD LAP Locational Marginal Price (LMP) for Aggregate Pricing Node, A. ($/MWh)  Where Aggregated Pricing Node Type A’ = ‘DEFAULT’ or ‘CUSTOM’ |
|  | HourlyNodalDayAheadLDF uM’AA’pmdh | Hourly Nodal Day Ahead LDF per Pnode p provided by SMDM where Apnode A and Apnode Type A’ are mapped to the Master File. |
|  | UFEUDCDefaultPriceFlag uM’AA’ | UFE UDC Default Price Flag that indicates the Settlement Interval Locational Marginal Price (identified by Aggregated Pricing Node ID **A** having Aggregated Pricing Node Type **A’**) calculated for each utility Service Area (UDC Index **u**) MSS Subgroup **M’** for which UFE is calculated separately.  The price is intended to be applied to the UFE Quantity to determine the UFE Amount. |
|  | FMMIntervalLAPLMPPrice uM'AA'mdhc | The FMM Interval Locational Marginal Price (LMP) for Aggregated Pricing Node A'. ($/MWh)Where Aggregated Pricing Node Type A' = 'DEFAULT' or 'CUSTOM' |
|  | FMMIntervalLAPMCCPrice uQM’AA’mdhc | The FMM Interval Marginal Cost of Congestion (MCC) for Aggregated Pricing Node A’. ($/MWh)  Where Aggregated Pricing Node Type A’ = ‘DEFAULT’ or ‘CUSTOM’ |
|  | FMMIntervalPnodeLMP AA’Qpmdhc | The FMM Interval Locational Marginal Price (LMP) for Pricing Node (Pnode) p. ($/MWh) |
|  | FMMLMP BrtuM’mdhc | FMM LMP associated with resource ($/MWh) |
|  | UFEBAAUDCDefaultMCCFlag uQ’M’AA’ | UFE Balancing Authority Area UDC Default Flag that indicates the Settlement Interval Locational Marginal Price calculated for each utility Service Area (UDC Index **u**) MSS Subgroup **M’** for which UFE is calculated.  The price is intended to be applied to the UFE Quantity to determine the UFE MCC Amount. |
|  | FMMIntervalBAAMCCPrice Q’AA’Qpmdhc | FMM Interval Marginal Cost Of Congestion Price for Balancing Authority Area Q’ |
|  | DispatchIntervalBAAMCCPrice M’Q’AA’Qpmdhcif | Dispatch Interval Marginal Cost Of Congestion Price for Balancing Authority Area Q’ |
|  | DispatchIntervalRTDNodeMCL AA’pQmdhcif | The Dispatch Interval RTD Marginal Cost of Losses Price (MCL) for Aggregated Pricing Node A or Pricing Node (Pnode) p. ($/MWh) |
|  | FMMIntervalPnodeMCL AA’pQmdhc | The FMM Interval Marginal Cost of Losses (MCL) for Apnode A or Pricing Node (Pnode) p. ($/MWh) |
|  | HourlyRTMLAPPrice AA’mdh | Hourly Real Time Market LAP Price for Apnode A’. |
|  | HourlyRTMLAPMCLPrice AA’mdh | Hourly Real Time Market LAP Marginal Cost of Losses (MCL) for Apnode A. |
|  | HourlyRTMLAPMCCPrice Q'AA’mdh | Hourly Real Time Market LAP Marginal Cost of Congestion (MCC) for Apnode A. |
|  | VEC\_OCAdderPrc BrtYmd | Variable energy cost opportunity cost adder. Currently, applicable for RMR resources only. |
|  | ExceptionalDispatchIIE BrtuT’ObI’AA’Q’M’R’W’F’S’VL’Pmdhcif | RTD IIE (in MWh) produced or consumed by a resource in response to a manual Exceptional Dispatch instruction. |
|  | FMMExceptionalDispatchIIE BrtuT’ObI’Q’M’AA’R’W’F’S’VL’Pmdhcif | FMM IIE (in MWh) produced or consumed by a resource in response to a manual Exceptional Dispatch instruction. |
|  | ExceptionalDispatchIIEPrice BrtObmdhcif | The 5-minute RTD price for exceptional dispatch type O for bid segment “b” for Business Associate B, and resource r.  One of the ff: (1) Bid, (2) the Default Energy Bid, (3) negotiated price, or (4) calculated price. |
|  | FMMExceptionalDispatchIIEPrice BrtObmdhcif | The 5-minute FMM price for exceptional dispatch type O for bid segment “b” for Business Associate B, and resource r.  One of the ff: (1) Bid, (2) the Default Energy Bid, (3) negotiated price, or (4) calculated price. |

## Inputs - Predecessor Charge Codes or Pre-calculations

| Input Req ID | Variable Name | Predecessor Charge Code/ Pre-calc Configuration |
| --- | --- | --- |
| 1 | BASettlementIntervalMSSDemandQuantity\_MSSNetting BuT’I’M’AA’W’VL’mdhcif | MSS Netting  Note: Load is Negative |
| 2 | BASettlementIntervalResEntityEIMAreaMeteredGenerationQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif | MSS Netting  Note: Generation is Positive |
| 3 | BASettlementIntervalMSSGenerationQuantity\_MSSNetting BuT’I’M’AA’W’VL’mdhcif | MSS Netting  Note: Generation is Positive |
| 4 | BAResEntitySettlementIntervalOMARChannel1LoadQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhif | MSS Netting Pre-calculation |
| 5 | BAResourceBAARTMeterQuantity BrtQ’T’uI’M’AA’R’F’S’Qpmdhcif | Real Time Energy – Pre Calc |
| 6 | BASettlementIntervalResEIMEntityMeterLoadQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif | MSS Netting Pre-calculation |
| 7 | SettlementIntervalRealTimeEnergyDifference BrtuT’I’Q’M’F’S’mdhcif | Real Time Energy – Pre Calc |
| 8 | SettlementIntervalTotalFMMPart1Qty BrtuT’I’Q’M’F’S’mdhcif | Real Time Energy – Pre Calc |
| 9 | BA5MResourceTotalFMMManualDispatchEnergyQuantity BrtuT’I’Q’M’F’S’mdhcif | Real Time Energy – Pre Calc |
| 10 | SettlementIntervalTotalExceptionalIIE BrtuT’I’Q’M’F’S’mdhcif | Real Time Energy – Pre Calc |
| 11 | HourlyDAEnergyResourceLMP rtmdh | CC 6011 - Day Ahead Energy, Congestion, Loss Settlement |

## CAISO Formula

### SettlementIntervalRealTimeLMP

SettlementIntervalRealTimeLMP BrtuM’mdhcif = Sum over (T’, I’) SettlementIntervalRTDLMPPrice BrtuT’I’M’mdhcif

Where T’ <> MSS or T’ = MSS and I’ = Gross

### SettlementIntervalRTDLMPPrice

IF

SettlementIntervalRTDLMP BrtuT’I’M’mdhcif = 0

THEN

SettlementIntervalRTDLMPPriceBrtuT’I’M’mdhcif= Sum over (Q’, F’, S’) SettlementIntervalRealTimeSUB\_LMP BruT’I’M’mdhcif

ELSE

SettlementIntervalRTDLMPPrice BrtuT’I’M’mdhcif = Sum over (Q’, F’, S’) SettlementIntervalRTDLMP BrtuT’I’M’mdhcif

Note: SettlementIntervalRealTimeEnergyDifference BrtuT’I’Q’M’F’S’mdhcif will be selected as the business driver

### SettlementIntervalRTDLMP BrtuT’I’M’mdhcif

SettlementIntervalRTDLMP BrtuT’I’M’mdhcif = Sum over(R, A, A’, p, Q) Average (DispatchIntervalRTDLMP BrtuT’I’M’R’AA’Qpmdhcif )

### SettlementIntervalRealTimeSUB\_LMP BruT’I’M’mdhcif = Sum over (t, A, A’, R’, p, Q) Average (DispatchIntervalRTDNodeLMP *AA’Qpmdhcif)*

Note: Where BAResourceRTMeterLMPQuantity BrtT’uI’M’AA’R’Qpmdhcif exists and APN Type does not equal ‘Custom’ or “Default’

### FMMIntervalLMPPrice

IF

FMMLMP BrtuM’mdhc = 0 or NULL

THEN

FMMIntervalLMPPrice BrtuM’mdhc= Sum over (Q’, T’, I’, F’, S’) FMMIntervalSUB\_LMP BruM’mdhc

ELSE

FMMIntervalLMPPrice BrtuM’mdhc = Sum over (Q’, T’, I’, F’, S’) FMMLMP BrtuM’mdhc

Note: Where SettlementIntervalTotalFMMPart1QtyBrtuT’I’Q’M’F’S’mdhcif, BA5MResourceTotalFMMManualDispatchEnergyQuantity BrtuT’I’Q’M’F’S’mdhcif, or SettlementIntervalTotalExceptionalIIE BrtuT’I’Q’M’F’S’mdhcif exists

### FMMIntervalSUB\_LMP

#### FMMIntervalSUB\_LMP BruM’mdhc = Sum over (t, T’, I’, A, A’, R’, Q, p, i, f) Average(FMMIntervalPnodeLMP AA’Qpmdhc )

Note: Where BAResourceRTMeterLMPQuantity BrtT’uI’M’AA’R’Qpmdhcif exists and Aggregated Node does not equal ‘Custom’ or “Default’

### BAResourceRTMeterLMPQuantity

BAResourceRTMeterLMPQuantity BrtT’uI’M’AA’R’Qpmdhcif = Sum over (Q’, F’, S’) BAResourceBAARTMeterQuantity BrtQ’T’uI’M’AA’R’F’S’Qpmdhcif

### SettlementIntervalRealTimeMSSPrice uM’mdhcif

IF

SettlementIntervalMSSLoadDemandQuantityuM’AA’mdhcif < 0

THEN

### SettlementIntervalRealTimeMSSPrice uM’mdhcif =Sum over (A, A’)

### SettlementIntervalDemandCustomLAPPrice AA’mdhcif

ELSE

### SettlementIntervalRealTimeMSSPrice uM’mdhcif = Sum over (A, A’) SettlementIntervalGenerationCustomLAPPrice M’mdhcif

### SettlementIntervalDemandCustomLAPPrice *AA’mdhcif* = INTDUPLICATE (HourlyRTMLAPPrice AA’mdh *)*

Where Apnode Type (A’) = Custom LAP

### SettlementIntervalMSSLoadDemandMCCQuantity

SettlementIntervalMSSLoadDemandMCCQuantity uQ'M’AA’mdhcif = SettlementIntervalMSSLoadDemandQuantity uM’AA’mdhcif \* UFEBAAUDCDefaultMCCFlag uQ’M’AA*’*

### SettlementIntervalMSSLoadDemandQuantity *uM’AA’mdhcif* = Sum over (B, T’, I’, W’, V, L’) *Min (0, (*BASettlementIntervalMSSDemandQuantity\_MSSNetting BuT’I’M’AA’W’VL’mdhcif + BASettlementIntervalMSSGenerationQuantity\_MSSNetting BuT’I’M’AA’W’VL’mdhcif ))

##### Where Entity\_type (T’) = ‘MSS’ and MSS Gross or Net (I’) = ‘NET’

### SettlementIntervalGenerationCustomLAPPrice M’mdhcif =

### (SettlementIntervalMSSNetGenerationRTPriceAmount M’mdhcif / CustomLAPTotalSettlementIntervalMeteredCAISOGenerationQuantity M’mdhcif )

### SettlementIntervalMSSNetGenerationRTPriceAmount M’mdhcif = Sum over (A, A’, p, Q) (PNodeSettlementIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhcif \* DispatchIntervalRTDNodeLMP AA’Qpmdhcif*)*

### SettlementIntervalRealTimeMSSMCLPrice M’mdhcif

Sum over (u)

(IF

SettlementIntervalMSSLoadDemandQuantityuM’AA’mdhcif < 0

THEN

### SettlementIntervalRealTimeMSSMCLPrice M’mdhcif = Sum over (A, A’)

### SettlementIntervalDemandCustomLAPMCLPrice AA’mdhcif

ELSE

### SettlementIntervalRealTimeMSSMCLPrice M’mdhcif = Sum over (A, A’) SettlementIntervalGenerationCustomLAPMCLPrice M’mdhcif

)

### SettlementIntervalDemandCustomLAPMCLPrice AA’mdhcif = INTDUPLICATE (HourlyRTMLAPMCLPrice AA’mdh *)*

Where Apnode Type (A’) = Custom LAP

### SettlementIntervalGenerationCustomLAPMCLPrice M’mdhcif =

### (SettlementIntervalMSSNetGenerationRTMCLAmount M’mdhcif / CustomLAPTotalSettlementIntervalMeteredCAISOGenerationQuantity M’mdhcif )

### SettlementIntervalMSSNetGenerationRTMCLAmount M’mdhcif = Sum over (A, A’, p, Q) (PNodeSettlementIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhcif \* DispatchIntervalRTDNodeMCL *AA’pQmdhcif)*

### Where Entity\_type (T’) = ‘MSS’ and MSS Election (I’) = ‘NET’

##### PNodeSettlementIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhcif = Sum over (B, r, t, u, T’, I’, Q’, R’, P, W’, d’, N, z’, V, v, H, n’, L’, F’, S’) BASettlementIntervalResEntityEIMAreaMeteredGenerationQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif

### CustomLAPTotalSettlementIntervalMeteredCAISOGenerationQuantity M’mdhcif = Sum over (A, A’, p, Q) PNodeSettlementIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhcif

### PnodeHrlyUDCNormalizedRTLDFFactor uM’AA’pmdh = NodalRTLDF *uM’AA’pmdh* / UDCTotalPnodeHourlyRTLDF *umdh*

### 

### UDCTotalPnodeHourlyRTLDF umdh = Sum over (M, A, A’, p) NodalRTLDF uM’AA’pmdh

### HourlyRealTimeLMPpmdh =

AVERAGE (A, A’, Q) (HourlyRealTimeLMPFilteredAA’Qpmdh )

### HourlyRealTimeLMPFilteredAA’Qpmdh = Sum over (c, i, f)

DispatchIntervalRTDNodeLMP AA’Qpmdhcif

Where Apnode Type (A’) <> ‘POD’, ‘AGEN’, DASP’, ‘CASP’, ‘ASR’

### HourlyRealTimeMCL pmdh

HourlyRealTimeMCLpmdh *=*

AVERAGE cf Sum over (A, A’, Q) (HourlyRealTimeMCLFilteredAA’Qpmdh)

### HourlyRealTimeMCLFilteredAA’Qpmdh = Sum over (c, i, f) DispatchIntervalRTDNodeMCL AA’Qpmdhcif

Where Apnode Type (A’) <> ‘POD’, ‘AGEN’, DASP’, ‘CASP’, ‘ASR’

### SettlementIntervalRealTimeBAAMCC M’Q’pmdhcif

SettlementIntervalRealTimeBAAMCC M’Q’pmdhcif *=* AVERAGE (A, A’, Q) (DispatchIntervalBAAMCCPrice M’Q’AA’Qpmdhcif)

Where: Apnode type is not equal to ‘POD’, ‘AGEN’, DASP’, ‘CASP’, or ‘ASR’

### SettlementIntervalRealTimePNodeMCC M’pmdhcif

### SettlementIntervalRealTimePNodeMCC M’pmdhcif *=* Sum over (Q’) (SettlementIntervalRealTimeBAAMCCM’Q’pmdhcif )

### SettlementIntervalRealTimeMSSMCC Q’M’mdhcif

Sum over (u)

(IF

SettlementIntervalMSSLoadDemandMCCQuantity uQ'M’AA’mdhcif

< 0

0

THEN

### SettlementIntervalRealTimeMSSMCC Q’M’mdhcif= Sum over (A, A’) SettlementIntervalDemandCustomLAPMCC uQ’M’AA’mdhcif

ELSE

### SettlementIntervalRealTimeMSSMCC Q’M’mdhcif= Sum over (A, A’) SettlementIntervalGenerationCustomLAPMCC Q’M’mdhcif

)

### SettlementIntervalDemandCustomLAPMCC

SettlementIntervalDemandCustomLAPMCC Q’AA’mdhcif = INTDUPLICATE (HourlyRTMLAPMCCPrice Q’AA’mdh )

Where Apnode Type (A’) = Custom LAP

### SettlementIntervalGenerationCustomLAPMCC

### SettlementIntervalGenerationCustomLAPMCC Q’M’mdhcif = (SettlementIntervalMSSNetGenerationRTMCCAmount Q’M’mdhcif / CustomLAPTotalSettlementIntervalMeteredCAISOGenerationQuantity M’mdhcif )

### SettlementIntervalMSSNetGenerationRTMCCAmount Q’M’mdhcif = Sum over (A, A’, Q, p) (PNodeSettlementIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhcif \* DispatchIntervalBAAMCCPrice M’Q’AA’Qpmdhcif

HourlyUFEUDCMCC umdh

HourlyUFEUDCMCC uQ’mdh = Sum over (M’, A, A’) ( HourlyRTMLAPMCCPrice Q’AA’mdh \* UFEBAAUDCDefaultMCCFlag uQ’M’AA’ )

HourlyUFEUDCMCL umdh

HourlyUFEUDCMCL umdh = Sum over (M’, A, A’) (HourlyRTMLAPMCLPrice AA’mdh \* UFEUDCDefaultPriceFlag uM’AA’)

HourlyUFEUDCLMP umdh

HourlyUFEUDCLMP umdh = Sum over (M’, A, A’) (HourlyRTMLAPPrice AA’mdh \* UFEUDCDefaultPriceFlag uM’AA’)

### SettlementIntervalRealTimeLAPPrice AA’mdhcif = Average (u, M’) (DispatchIntervalRTDLAPPrice uM’AA’mdhcif )

Where Apnode Type (A’) = Default LAP

### MSSPenaltySettlementIntervalRealTimeLMP

MSSPenaltySettlementIntervalRealTimeLMPBrtM’mdhcif= Sum over (u, T’, I’)

SettlementIntervalRTDLMPPrice BrtuT’I’M’mdhcif

Where T’ = MSS and Resource type (t) = Generator

### NormalizedDAPnodeLDF

HourlyDANodalLDF uM’AA’pmdh = HourlyNodalDayAheadLDF uM’AA’pmdh / Sum over (u, M’, p) HourlyNodalDayAheadLDF uM’AA’pmdh

### NormalizedRTPnodeLDF

HourlyRTNodalLDF uM’AA’pmdh = NodalRTLDF uM’AA’pmdh / Sum over (u, M’, p) NodalRTLDF uM’AA’pmdh

### FMMIntervalMSSPrice uM’mdhc

IF

FMMIntervalMSSLoadDemandQuantityuM’AA’mdhc < 0

THEN

### FMMIntervalMSSPrice uM’mdhc = Sum over (A, A’) FMMIntervalDemandLAPPrice AA’mdhc

ELSE

### FMMIntervalMSSPrice uM’mdhc = Sum over (A, A’)FMMIntervalGenerationLAPPrice M’mdhc

### FMMIntervalDemandLAPPrice AA’mdhc = INTDUPLICATE (HourlyRTMLAPPrice AA’mdh )

### FMMIntervalGenerationLAPPrice M’mdhc =

### (FMMIntervalMSSNetGenerationRTPriceAmount M’mdhc / CustomLAPTotalFMMIntervalMeteredCAISOGenerationQuantity M’mdhc )

### FMMIntervalMSSNetGenerationRTPriceAmount M’mdhc = Sum over (A, A’, p, Q) (PNodeFMMIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhc \* FMMIntervalPnodeLMP AA’Qpmdhc*)*

### FMMIntervalMSSMCCPrice Q’M’mdhcif

Sum over (u)

(IF

FMMIntervalMSSLoadDemandMCCQuantity uQ’M’AA’mdhc < 0

THEN

### FMMIntervalMSSMCCPrice Q’M’mdhcif = Sum over (A, A’) FMMIntervalDemandLAPMCCPrice Q’AA’mdhc

ELSE

### FMMIntervalMSSMCCPrice Q’M’mdhc = Sum over (A, A’) FMMIntervalGenerationLAPMCCPrice Q’M’mdhc

)

### FMMIntervalDemandLAPMCCPrice Q’AA’mdhc = INTDUPLICATE (HourlyRTMLAPMCCPrice Q’AA’mdh )

Where Apnode Type (A’) = Custom LAP

### FMMIntervalGenerationLAPMCCPrice Q’M’mdhc =

### (FMMIntervalMSSNetGenerationRTMCCAmount Q’M’mdhc / CustomLAPTotalFMMIntervalMeteredCAISOGenerationQuantity M’mdhc )

### FMMIntervalMSSNetGenerationRTMCCAmount Q’M’mdhc = Sum over (A, A’, p, Q) (PNodeFMMIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhc \* FMMIntervalBAAMCCPrice Q’AA’Q*pmdhc)*

### FMMIntervalMSSMCLPrice M’mdhc

Sum over (u)

(IF

FMMIntervalMSSLoadDemandQuantityuM’AA’mdhc < 0

THEN

### FMMIntervalMSSMCLPrice M’mdhc = Sum over (A, A’) FMMIntervalDemandLAPMCLPrice AA’mdhc

ELSE

### FMMIntervalMSSMCLPrice M’mdhc = Sum over (A, A’) FMMIntervalGenerationLAPMCLPrice M’mdhc

### )

### FMMIntervalDemandLAPMCLPrice AA’mdhc = INTDUPLICATE (HourlyRTMLAPMCLPrice AA’mdh )

### FMMIntervalGenerationLAPMCLPrice M’mdhc =

### (FMMIntervalMSSNetGenerationRTMCLAmount M’mdhc / CustomLAPTotalFMMIntervalMeteredCAISOGenerationQuantity M’mdhc )

### FMMIntervalMSSNetGenerationRTMCLAmount M’mdhc = Sum over (A, A’, p, Q) (PNodeFMMIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhc \* FMMIntervalPnodeMCL AA’*pQmdhc)*

BAFMMIntervalResourceImportHASPReversalPrice BAFMMIntervalResourceImportHASPReversalPrice BrtuT’I’M’F’S’mdhc =sum over (Q’) max (HourlyDAEnergyResourceLMP rtmdh – FMMIntervalLMPPrice BrtuM’mdhc, 0)

Note: BAHourlyResourceImportHASPReversalMW BrtuQ’T’I’M’F’S’mdh is the business driver. Hourly value will be replicated in each of the relevant 15-minute intervals.

BAFMMIntervalResourceExportHASPReversalPrice BrtuQ’T’I’M’F’S’mdhc = sum over (Q’) Max (FMMIntervalLMPPrice **BrtuM’mdhc** – HourlyDAEnergyResourceLMP rtmdh, 0)

Note: BAHourlyResourceExportHASPReversalMW BrtuQ’T’I’M’F’S’mdh is the business driver. Hourly value will be replicated in each of the relevant 15-minute intervals.

### CustomLAPTotalFMMIntervalMeteredCAISOGenerationQuantity

##### CustomLAPTotalFMMIntervalMeteredCAISOGenerationQuantity M’mdhc = Sum over (A, A’, p)PNodeFMMIntervalMeteredCAISOGenerationQuantity M’AA’pmdhc

### PNodeFMMIntervalMeteredCAISOGenerationQuantity

PNodeFMMIntervalMeteredCAISOGenerationQuantity M’AA’pmdhc = Sum over (i, f) PNodeSettlementIntervalMeteredCAISOGenerationQuantity M’AA’pmdhcif

### FMMIntervalMSSLoadDemandMCCQuantity

### FMMIntervalMSSLoadDemandMCCQuantity uQ’M’AA’mdhc = UFEBAAUDCDefaultMCCFlag uQ’M’AA’ \*FMMIntervalMSSLoadDemandQuantity uM’AA’mdhc

### FMMIntervalMSSLoadDemandQuantity uM’AA’mdhc

FMMIntervalMSSLoadDemandQuantity uM’AA’mdhc =

Sum over (B, T’, I’, W’, V, L’) Min (0, (BASettlementIntervalMSSDemandQuantity\_MSSNetting BuT’I’M’AA’W’VL’mdhcif + BASettlementIntervalMSSGenerationQuantity\_MSSNetting BuT’I’M’AA’W’VL’mdhcif ))

### HourlyAverageFMMLMPPrice

### HourlyAverageFMMLMPPrice AA’mdh = Average (u, M’, c) FMMIntervalLAPLMPPrice uM’AA’mdhc

### HourlyAverageBAAFMMMCCPrice Q’AA’mdh

### HourlyAverageBAAFMMMCCPrice Q’AA’mdh = Average (u, M’, c) FMMIntervalLAPMCCPrice uQ’M’AA’mdhc

### HourlyLAPMeterQuantity

HourlyLAPMeterQuantity AA’mdh = Sum over (B, r, t, u, T’, I’ Q’, M’, R’, W’, F’, p, P, S’, d’, N, z’, V, v, H, n’, L’, c, i, f)

(BAResEntitySettlementIntervalOMARChannel1LoadQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif + BASettlementIntervalResEIMEntityMeterLoadQuantity BrtuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’VvHn’L’mdhcif )

Where Apnode Type (A’) = Custom LAP or Default LAP

RMR Related Calculations:

### VEC\_OCAdderPrice Brtmdhcif

= Average over (Y) VEC\_OCAdderPrc BrtYmd

Note: This currently only applies to RMR resources subject to the new Tariff.

### FMMExceptionalDispatchIIELessVECPrice BrtObmdhcif

*=* FMMExceptionalDispatchIIEPrice BrtObmdhcif - VEC\_OCAdderPrice Brtmdhcif

### RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif

*=* ExceptionalDispatchIIEPrice BrtObmdhcif - VEC\_OCAdderPrice Brtmdhcif

### FMMExceptionalDispatchIIECostAboveLMPPrice BrtObmdhcif

*=* Average over (u, T’, I’, Q’, M’, A, A’,R, W’, F’, S’, V, L’, P)

{FMMExceptionalDispatchIIELessVECPrice BrtObmdhcif - FMMIntervalLMPPrice BrtuM'mdhc}

Where FMMExceptionalDispatchIIEBrtuT’ObI’Q’M’AA’R’W’F’S’VL’Pmdhcif exists.

### RTDExceptionalDispatchIIECostAboveLMPPrice BrtObmdhcif

*=* Average over (u, T’, I’, Q’, M’, A, A’,R, W’, F’, S’, V, L’, P)

{ RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif - SettlementIntervalRTDLMPPrice BrtuT’I’M’mdhcif }

Where ExceptionalDispatchIIE BrtuT’ObI’AA’Q’M’R’W’F’S’VL’Pmdhcif exists.

## Outputs

| . Output Req ID | Name | Description |
| --- | --- | --- |
|  | In addition, all inputs are required to be accessible for review by analysts and report on Settlement statements. |  |
|  | SettlementIntervalRealTimeLMPBrtuM’mdhcif | Resource-Specific Settlement Interval RTD Locational Marginal Price (LMP) for Resource r. ($/MWh) |
|  | SettlementIntervalRealTimeMSSPriceuM’mdhcif | Settlement Interval Real Time Net MSS Price by UDC Index u, and MSS Subgroup M’. |
|  | SettlementIntervalDemandCustomLAPPrice AA’mdhcif | Settlement Interval Demand LAP where Apnode Type A’ = “Custom” ($/MWh) |
|  | SettlementIntervalMSSLoadDemandQuantity uM’AA’mdhcif | Settlement Interval MSS Load Demand Quantity represents the metered Demand for UDC Index u, and MSS Subgroup M’. (MWh) |
|  | SettlementIntervalGenerationCustomLAPPrice M’mdhcif | Settlement Interval Generation Custom LAP Price for MSS Subgroup M’. ($/MWh) |
|  | SettlementIntervalRealTimeMSSMCC Q'M’mdhcif | Settlement Interval Real-Time MSS MCC by MSS Subgroup M’. ($/MWh) |
|  | SettlementIntervalDemandCustomLAPMCC uQ'M’AA’mdhcif | Settlement Interval Demand LAP MCC Price for UDC Index u and MSS Subgroup M’.  Where Apnode Type A’ = “Custom” ($/MWh) |
|  | SettlementIntervalGenerationCustomLAPMCC Q'M’mdhcif | Settlement Interval Generation Custom LAP MCC for MSS Subgroup M’. ($/MWh) |
|  | SettlementIntervalRealTimeLAPPriceAA’mdhcif | Settlement Interval Real-Time LAP Price by Apnode A, Apnode Type A’, and Trading Hour h, and Settlement Interval i. ($/MWh) |
|  | PNodeSettlementIntervalMeteredCAISOGenerationQuantity M’AA’Qmdphcif | Five-minute metered Generation that is attributable to MSS Subgroup M’ and Pnode p (MWh) |
|  | CustomLAPTotalSettlementIntervalMeteredCAISOGenerationQuantity M’mdhcif | Five-minute metered Generation that is attributable to MSS Subgroup M’.  MSS Subgroup M’ equals NET, Aggregated Pricing Node Type A’ equals Custom LAP. |
|  | UDCTotalPnodeHourlyRTLDF umdh | Hourly Nodal Real Time LDF by UDC Index u, and Trading Hour h. |
|  | SettlementIntervalRealTimePNodeMCC M’pmdhcif | Settlement Interval Real Time Pnode MCC price for Pricing Node (PNode) p. |
|  | HourlyRealTimeLMPpmdh | Hourly Real-Time LMP for Pnode p ($/MWh) |
|  | HourlyDANodalLDF uM’AA’pmdh | Hourly DA Nodal Load Distribution Factor normalized to Lap by UDC Index u and MSS Subgroup M’. |
|  | HourlyRTNodalLDF uM’AA’pmdh | Hourly RT Nodal Load Distribution Factor normalized to Lap by UDC Index u and MSS Subgroup M’. |
|  | BAResourceRTMeterLMPQuantity BrtT’uI’M’AA’R’Qpmdhcif | Real Time Meter LMP Quantity for resource r. |
|  | SettlementIntervalRealTimeSUB\_LMP BruT’I’M’mdhcif | Settlement Interval Real Time Substitution LMP Price for resource r.  These prices are only applicable when meter quantity is measured and a Resource Specific price is not available. These price are based upon the relevant Apnode or Pnode associated with a resource r. |
|  | HourlyUFEUDCMCC uQ'mdh | Hourly UFE UDC MCC price for UDC Index u. |
|  | HourlyUFEUDCLMP umdh | Hourly UFE UDC LMP price for UDC Index u. |
|  | SettlementIntervalMSSNetGenerationRTPriceAmount M’mdhcif | Settlement Interval Real Time MSS Net Generation Amount for Location Marginal Price.  This amount is used to calculate the MSS Net LMP Price for Metered SubSystem who have elected Net Settlement and are ‘Net Supplying’. |
|  | SettlementIntervalMSSNetGenerationRTMCCAmount Q'M’mdhcif | Settlement Interval Real Time MSS Net Generation Marginal Cost of Congestion for MSS Subgroup M’.  This amount is used to calculate the MSS Net LMP Price for Metered SubSystem who have elected Net Settlement and are ‘Net Supplying’. |
|  | PnodeHrlyUDCNormalizedRTLDFFactor uM’AA’pmdh | Pnode Hourly Normalized Real Time Load Distribution Factor for UDC Index u. |
|  | FMMIntervalMSSPrice uM’mdhc | FMM Interval Net MSS Price by UDC Index u, and MSS Subgroup M’. |
|  | FMMIntervalDemandLAPPrice uM’AA’mdhc | FMM Interval Demand LAP Price for UDC and MSS Subgroup M’.  Where Apnode Type A’ = “Custom” ($/MWh) |
|  | FMMIntervalGenerationLAPPrice M’mdhc | FMM Interval Generation Custom LAP Price for MSS Subgroup M’. ($/MWh) |
|  | FMMIntervalMSSNetGenerationRTPriceAmount M’mdhc | FMM Interval Real Time MSS Net Generation Amount for Margin Cost Amount for UDC index.  This amount is used to calculate the MSS Net LMP Price for Metered SubSystem who have elected Net Settlement and are ‘Net Supplying’. |
|  | FMMIntervalMSSMCCPrice Q’M’mdhc | FMM Interval Net MSS MCC Price by MSS Subgroup M’. |
|  | FMMIntervalDemandLAPMCCPrice uM’AA’mdhc | FMM Interval Demand LAP MCC Price for UDC and MSS Subgroup M’.  Where Apnode Type A’ = “Custom” ($/MWh) |
|  | FMMIntervalGenerationLAPMCCPrice M’mdhc | FMM Interval Generation Custom LAP MCC Price for MSS Subgroup M’. ($/MWh) |
|  | FMMIntervalMSSNetGenerationRTMCCAmount uM’mdhc | FMM Interval Real Time MSS Net Generation Amount for Margin Cost Amount for UDC index.  This amount is used to calculate the MSS Net LMP Price for Metered SubSystem who have elected Net Settlement and are ‘Net Supplying’. |
|  | CustomLAPTotalFMMIntervalMeteredCAISOGenerationQuantity M’mdhc | Fifteen-minute metered Generation that is attributable to MSS Subgroup M’.  MSS Subgroup M’ equals NET, Aggregated Pricing Node Type A’ equals Custom LAP. |
|  | PNodeFMMIntervalMeteredCAISOGenerationQuantity M’AA’Qpmdhc | Fifteen-minute metered Generation that is attributable MSS Subgroup M’ and Pnode p, Aggregated Pricing Node A, Aggregated Pricing Node Type A’, for Price\_Node\_ID p, for Dispatch Interval f of Settlement Interval i, Trading Hour h, Trading Day d and Trading Month m.. (MWh) |
|  | FMMIntervalMSSLoadDemandQuantity uM’AA’pmdhc | FMM Interval MSS Load Demand Quantity represents the metered Demand for UDC Index u, and MSS Subgroup M’. (MWh) |
|  | SettlementIntervalRTDLMPPrice BrtuT’I’M’mdhcif | The Settlement Interval RTD Locational Marginal Price for Resource r. ($/MWh) |
|  | HourlyLAPMeterQuantity AA’mdh | Hourly LAP Meter Quantity by APnode ID A’ |
|  | SettlementIntervalRealTimeMSSMCLPrice M’mdhcif | Settlement Interval Real-Time MSS MCL by MSS Subgroup M’. ($/MWh) |
|  | SettlementIntervalDemandCustomLAPMCLPrice AA’mdhcif | Settlement Interval Demand LAP MCL Price for UDC Index u and MSS Subgroup M’.  Where Apnode Type A’ = “Custom” ($/MWh) |
|  | SettlementIntervalGenerationCustomLAPMCLPrice M’mdhcif | Settlement Interval Generation Custom LAP MCL for MSS Subgroup M’. ($/MWh) |
|  | SettlementIntervalMSSNetGenerationRTMCLAmount M’mdhcif | Settlement Interval Real Time MSS Net Generation Amount for Marginal Cost of Losses Price. |
|  | FMMIntervalMSSMCLPrice M’mdhc | FMM Interval Real-Time MSS MCL by MSS Subgroup M’. ($/MWh) |
|  | FMMIntervalDemandLAPMCLPrice AA’mdhc | FMM Interval Demand LAP MCL Price for UDC Index u and MSS Subgroup M’.  Where Apnode Type A’ = “Custom” ($/MWh) |
|  | FMMIntervalGenerationLAPMCLPrice M’mdhc | FMM Interval Generation Custom LAP MCL for MSS Subgroup M’. ($/MWh) |
|  | FMMIntervalMSSNetGenerationRTMCLAmount uM’mdhc | FMM Interval Real Time MSS Net Generation Amount for Marginal Cost of Losses Price for UDC index. |
|  | HourlyUFEUDCMCL umdh | Hourly UFE UDC MCL price for UDC Index u. |
|  | HourlyRealTimeMCLpmdh | Hourly Real-Time MCL for Pnode p ($/MWh) |
|  | SettlementIntervalMSSLoadDemandMCCQuantity uQ'M’AA’mdhcif | Settlement Interval MSS Load Demand MCC Quantity represents the metered Demand for UDC Index u, and MSS Subgroup M’. (MWh) |
|  | FMMIntervalMSSLoadDemandMCCQuantity uQ'M’AA’mdhcif | FMM Interval MSS Load Demand MCC Quantity represents the metered Demand for UDC Index u, and MSS Subgroup M’. (MWh) |
|  | SettlementIntervalRealTimeBAAMCCQ’pmdhcif | Settlement Interval Average BAA Marginal Cost of Congestion for Pricing Node p |
|  | FMMIntervalSUB\_LMP BruM’mdhc | FMM Interval Substitution LMP Price for resource r.  These prices are only applicable when meter quantity is measured and a Resource Specific price is not available. These price are based upon the relevant Apnode or Pnode associated with a resource r. |
|  | FMMIntervalLMPPrice BrtuM’mdhc | The FMM Interval Locational Marginal Price for Resource r. ($/MWh) |
|  | BAFMMIntervalResourceImportHASPReversalPrice BrtuQ’T’I’M’F’S’mdhc | The price basis for the FMM reversal settlement rule. This is resource of type t = “ITIE”. (MW) |
|  | BAFMMIntervalResourceExportHASPReversalPrice BrtuT’I’M’F’S’mdhc | The price basis for the HASP reversal settlement rule. This is for a resource of type t = “ETIE”. (MW) |
|  | SettlementIntervalRTDLMP BrtuT’I’M’mdhcif | The Settlement Interval RTD Average Locational Marginal Price for Resource r. ($/MWh) |
|  | HourlyRealTimeLMPFilteredAA’Qpmdh | Hourly RT LMP filtered |
|  | HourlyRealTimeMCLFilteredAA’Qpmdh | Hourly Real-Time MCL excluding POD, AGEN, CASP, ASR |
|  | HourlyAverageBAAFMMMCCPrice Q’AA’mdh | Hourly Simple Average FMM MCC Price by APnode ID A’ and Balancing Authority Area Q’ |
|  | HourlyAverageFMMLMPPrice AA'mdh | Hourly Simple Average FMM LMP Price by APnode ID A’ |
|  | VEC\_OCAdderPrice Brtmdhcif | Variable energy cost opportunity cost adder. |
|  | FMMExceptionalDispatchIIELessVECPrice BrtObmdhcif | FMM ED Price reduced by variable energy cost. VEC reduction is only applicable to RMR resources subject to new Tariff. |
|  | RTDExceptionalDispatchIIELessVECPrice BrtObmdhcif | RTD ED Price reduced by variable energy cost. VEC reduction is only applicable to RMR resources subject to new Tariff. |
|  | FMMExceptionalDispatchIIECostAboveLMPPrice BrtObmdhcif | FMMExceptionalDispatchIIELessVECPrice less FMM LMP |
|  | RTDExceptionalDispatchIIECostAboveLMPPrice BrtObmdhcif | RTDExceptionalDispatchIIELessVECPrice less RTD LMP |

# Charge Codes Effective Dates

| Charge Code/  Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| Real-Time Price Pre-calculation | 5.0 | 04/01/09 | 03/31/09 | Documentation Edits Only |
| Real-Time Price Pre-calculation | 5.1 | 4/01/09 | 11/13/09 | Documentation and Configuration Changes |
| Real-Time Price Pre-calculation | 5.2 | 11/14/09 | 4/30/13 | Documentation and Configuration Changes |
| Real-Time Price Pre-calculation | 5.2a | 05/01/13 | 4/30/14 | Documentation Edits Only |
| Real-Time Price Pre-Calculation | 5.3 | 5/1/14 | 4/30/14 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.4 | 5/1/14 | 4/30/14 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.5 | 10/1/14 | 5/30/14 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.6 | 5/1/14 | 4/30/14 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.7 | 10/1/14 | 9/30/14 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.8 | 11/1/14 | 10/31/14 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.9 | 11/4/15 | 11/3/15 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.10 | 5/1/14 | 9/30/14 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.11 | 10/1/14 | 11/3/15 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.12 | 11/4/15 | 11/3/15 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.13 | 12/1/15 | 11/30/15 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.14 | 11/4/15 | 11/30/15 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.15 | 12/1/15 | 3/31/17 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.15a | 4/1/17 | 4/3/18 | Documentation Only |
| Real-Time Price Pre-Calculation | 5.16 | 4/4/18 | 10/31/18 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.17 | 11/1/18 | 12/31/19 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.18 | 1/1/20 | 4/30/26 | Configuration Changes |
| Real-Time Price Pre-Calculation | 5.19 | 5/1/26 | Open | Configuration Changes |