

Energy Imbalance Market (EIM) Settlements



Pacific Power | Rocky Mountain Power | PacifiCorp Energy

Presentation Overview

- 1) Settlement Statement Timeline
- 2) Dispute Timeline
- 3) Settlement Processes
- 4) CAISO EIM Charge Codes
- 5) Purchased Power SAP Account Mapping Reference

Settlements Timeline



Pacific Power | Rocky Mountain Power | PacifiCorp Energy

CAISO Payment Calendar excerpt

- CAISO settlement statements are published daily and invoicing is weekly. The below table shows invoices that will be sent from CAISO for trade date 11/1/2014

| Statement | Statement Publish Date | Invoice Publish Date (Wed) | Payment Due Date (Tue) |
|------------------------------|------------------------|----------------------------|------------------------|
| T+3B Daily Initial | 11/5/2014 | 11/5/2014 | 11/12/2014 |
| T+12B Daily Recalc | 11/18/2014 | 11/19/2014 | 11/25/2014 |
| T+55B Daily Recalc | 1/23/2015 | 2/25/2015 | 3/3/2015 |
| T+9M Daily Rerun (optional) | 8/11/2015 | 9/9/2015 | 9/15/2015 |
| T+18M Daily Rerun (optional) | 5/11/2016 | 6/8/2016 | 6/14/2016 |
| T+35M Daily Rerun (optional) | Oct 2017 | Oct 2017 | Oct 2017 |
| T+36M Daily Rerun (optional) | Nov 2017 | Nov 2017 | Nov 2017 |

Settlements next year in 2017 accounting period

| Accting Month | T+12B | T+55B | T+9M | T+18M | T+35M | T+36M |
|---------------|--------|---------|---------|---------|---------|---------|
| Jan-17 | Jan-17 | Nov-16* | Apr-16* | Jul-15* | | |
| Feb-17 | Feb-17 | Dec-16* | May-16* | Aug-15* | | |
| Mar-17 | Mar-17 | Jan-17 | Jun-16* | Sep-15* | | |
| Apr-17 | Apr-17 | Feb-17 | Jul-16* | Oct-15* | | |
| May-17 | May-17 | Mar-17 | Aug-16* | Nov-15* | | |
| Jun-17 | Jun-17 | Apr-17 | Sep-16* | Dec-15* | | |
| Jul-17 | Jul-17 | May-17 | Oct-16* | Jan-16* | | |
| Aug-17 | Aug-17 | Jun-17 | Nov-16* | Feb-16* | | |
| Sep-17 | Sep-17 | Jul-17 | Dec-16* | Mar-16* | | |
| Oct-17 | Oct-17 | Aug-17 | Jan-17 | Apr-16* | Nov-14* | |
| Nov-17 | Nov-17 | Sep-17 | Feb-17 | May-16* | Dec-14* | Nov-14* |
| Dec-17 | Dec-17 | Oct-17 | Mar-17 | Jun-16* | Jan-15* | Dec-14* |

* Prior Period Adjustments



Dispute Timeline



Pacific Power | Rocky Mountain Power | PacifiCorp Energy

Disputes

- 1) Cannot dispute T+3B statements
- 2) Have 14 business days to dispute T+12B statements but cannot dispute meter data
- 3) Have 22 business days to dispute T+55B statements and can dispute everything on those statements
- 4) Have 22 business days to dispute T+9M, T+18M statements but you can only dispute incremental changes from prior statements.
- 5) Have 5 business days to dispute T+35M statements but you can only dispute incremental changes from prior statements.
- 6) Cannot dispute T+36M statements

Settlement Processes



Pacific Power | Rocky Mountain Power | PacifiCorp Energy

Processes – Daily and Weekly

1) Daily

- 1) Ensure daily loading of CAISO data was successful
 - 1) Review message logs and job scheduling
- 2) Shadow Settlement on T+12B or T+55B
- 3) Disputing as necessary items noted in Shadow settlement
- 4) Determine what disputes should be accrued
- 5) Daily internal reporting

2) Weekly

- 1) Invoicing wire disbursements booking receipts
 - 1) Validate invoice back to settlement statements
- 2) Weekly forecast



Processes – Monthly

1) Monthly

- 1) EIM Accrual
- 2) T+12B's recorded in ledger (~20th) for most recent month
- 3) T+55B's recorded in ledger (~20th)
- 4) T+9M's recorded in ledger (~8th)
- 5) EIM Entity sub-allocation of costs to Transmission Customers
- 6) EIM Monthly Benefit analysis
- 7) Monthly internal reporting

16 CAISO EIM Participating Resource Charge Codes



Pacific Power | Rocky Mountain Power | PacifiCorp Energy

16 Participating Resource Charge Codes

3 Grid Management Charges (GMC)

- 1) 4564 GMC EIM Transaction Charge (5-min)
 - \$0.18600/MWh for Instructed Imbalance Energy
 - \$0.1341/MWh for Uninstructed Imbalance Energy

- 2) 4515 GMC Bid Transaction Fee (Daily)
 - \$0.005/bid segment-interval

- 3) 4575 Scheduling Coordinator ID Charge (Monthly)
 - \$1,000 per month

16 Participating Resource Charge Codes (Cont'd)

3 Imbalance Energy Charge Codes

- 1) 64600 FMM Instructed Imbalance Energy EIM Settlement (5-min)
- 2) 64700 RT Instructed Imbalance Energy EIM Settlement (5-min)
- 3) 64750 RT Uninstructed Imbalance Energy EIM Settlement (5-min)

16 Participating Resource Charge Codes (Cont'd)

Imbalance Energy Example #1 - Generator being instructed up during positive locational marginal prices (LMP's) with minor uninstructed imbalance energy

| | A | B | C | D | E | F | G |
|----|---|----------|-----------|--------|--------|-----------|-----------|
| 1 | | | | | | Imbalance | |
| 2 | | | Imbalance | FMM | RTD | Energy | |
| 3 | | Schedule | Energy | LMP | LMP | Rec/(Pay) | |
| 4 | | MW | MW | \$/MWh | \$/MWh | \$ | |
| 5 | Base Schedule (T-40) | 100 | | | | | |
| 6 | | | | 10 | \$30 | \$300 | IIE 64600 |
| 7 | Fifteen-Minute Market (FMM) Schedule (T-37.5) | 110 | | | | | |
| 8 | | | | 5 | \$35 | \$175 | IIE 64700 |
| 9 | Real-Time Dispatch (RTD) Schedule (T-7.5) | 115 | | | | | |
| 10 | | | (1) | \$35 | (\$35) | UIE 64750 | |
| 11 | Meter (T+48B) | 114 | | | | | |
| 12 | | | 14 | | | \$440 | |

16 Participating Resource Charge Codes (Cont'd)

Imbalance Energy Example #2 - Generator being instructed down during positive locational marginal prices (LMP's) with minor uninstructed imbalance

| | A | B | C | D | E | F | G | |
|----|---|----------|-----------|--------|--------|-----------|-----------|-----------|
| 1 | | | | | | Imbalance | | |
| 2 | | | Imbalance | FMM | RTD | Energy | | |
| 3 | | Schedule | Energy | LMP | LMP | Rec/(Pay) | | |
| 4 | | MW | MW | \$/MWh | \$/MWh | \$ | | |
| 5 | Base Schedule (T-40) | 100 | | | | | | |
| 6 | | | | (10) | \$30 | | (\$300) | IIE 64600 |
| 7 | Fifteen-Minute Market (FMM) Schedule (T-37.5) | 90 | | | | | | |
| 8 | | | | (5) | | \$35 | (\$175) | IIE 64700 |
| 9 | Real-Time Dispatch (RTD) Schedule (T-7.5) | 85 | | | | | | |
| 10 | | | 1 | | \$35 | \$35 | UIE 64750 | |
| 11 | Meter (T+48B) | 86 | | | | | | |
| 12 | | | (14) | | | (\$440) | | |

16 Participating Resource Charge Codes (Cont'd)

2 GHG Reimbursement & Uplift Charge Codes

- 1) 491 Green House Gas Emission Cost Revenue (5-min)
- 2) 66200 RTM Bid Cost Recovery EIM Settlement (Daily)

16 Participating Resource Charge Codes (Cont'd)

8 Flexible Ramping Product Charge Codes (new as of 11/1/2016)

- 7070 Flexible Ramp Forecasted Movement Settlement (5-min)
- 7076 Flexible Ramp Forecast Movement Allocation (5-min)
- 7071 Flexible Ramp Up Uncertainty Capacity Settlement (5-min)
- 7081 Flexible Ramp Down Uncertainty Capacity Settlement (5-min)
- 7087 Daily Flexible Ramp Down Uncertainty Award Allocation (Daily)
- 7088 Monthly Flexible Ramp Down Uncertainty Award Allocation (Monthly)
- 7077 Daily Flexible Ramp Up Uncertainty Award Allocation (Daily)
- 7078 Monthly Flexible Ramp Up Uncertainty Award Allocation (Monthly)

34 EIM Entity Charge Codes

- 1) 4564 GMC EIM Transaction Charge
- 2) 4989 Daily Rounding Adjustment
- 3) 4575 Scheduling Coordinator ID Charge
- 4) 6460 FMM Instructed Imbalance Energy
- 5) 64600 FMM Instructed Imbalance Energy EIM Settlement
- 6) 6470 Real Time Instructed Imbalance Energy Settlement
- 7) 64700 RT Instructed Imbalance Energy EIM Settlement
- 8) 64750 RT Uninstructed Imbalance Energy EIM Settlement
- 9) 6045 Over and Under Scheduling EIM Settlement
- 10) 6046 Over and Under Scheduling EIM Allocation
- 11) 6090 Ancillary Service Upward Neutrality Allocation
- 12) 6194 Spinning Reserve Obligation Settlement
- 13) 6196 Spinning Reserve Neutrality Allocation

34 EIM Entity Charge Codes (Cont'd)

- 14) 6294 Non-Spinning Reserve Obligation Settlement
- 15) 6296 Non-Spinning Reserve Neutrality Allocation
- 16) 6477 Real Time Imbalance Energy Offset
- 17) 64770 Real Time Imbalance Energy Offset EIM
- 18) 6774 Real Time Congestion Offset
- 19) 67740 Real Time Congestion Offset EIM
- 20) 6480 Excess Cost Neutrality Allocation
- 21) 6486 Real Time Excess Cost for Instructed Energy Allocation
- 22) 6985 Real Time Marginal Losses Offset
- 23) 69850 - Real Time Marginal Losses Offset EIM
- 24) 64740 - Real-Time Unaccounted for EIM Energy Settlement

34 EIM Entity Charge Codes (Cont'd)

- 25) 6947 IFM Marginal Losses Surplus Credit Allocation
- 26) 7056 Flexible Ramp Cost Allocation
- 27) 7070 Flexible Ramp Forecasted Movement Settlement)
- 28) 7076 Flexible Ramp Forecast Movement Allocation
- 29) 7087 Daily Flexible Ramp Down Uncertainty Award Allocation
- 30) 7088 Monthly Flexible Ramp Down Uncertainty Award Allocation
- 31) 7077 Daily Flexible Ramp Up Uncertainty Award Allocation
- 32) 7078 Monthly Flexible Ramp Up Uncertainty Award Allocation
- 33) 6678 Real Time Bid Cost Recovery Allocation
- 34) 66780 - Real Time Bid Cost Recovery EIM Allocation

Details of charge code 64740 UFE

- 64740 - Real-Time Unaccounted for EIM Energy Settlement
 - ▶ (1) **Calculation.** The CAISO will calculate Unaccounted For Energy for each EIM Entity Balancing Authority Area as the difference between metered demand and the sum of the metered supply and the metered values at the interties, adjusted for losses.
 - ▶ (2) **Settlement.** The CAISO will settle Unaccounted For Energy at the hourly real-time Load Aggregation Point price.

Charge Codes – UFE (cont.)

- In the below example the loads submitted to CAISO by the EIM Entity were considered too low (assumed 4% loss factor) based on what CAISO expected of transmission losses (2%) so load is added and billed

| | Description | Source | | (MWh) |
|---|---|----------------------|---|----------|
| 1 | Generation net energy delivered | Meter read | + | 100 |
| 2 | Interchange Import | E-tags | + | 100 |
| 3 | Interchange Export | E-tags | - | (100) |
| 4 | Load | Gen + Imp – Exp - TL | - | (96) |
| 5 | Transmission Losses | CAISO Model | - | (2) |
| 6 | UFE | Calculated by CAISO | = | 2 |
| 7 | Multiply by LAP LMP | | | \$30/MWh |
| 8 | EIM Entity pays CAISO for an additional 2 MW of load that CAISO believes the EIM entity should have metered | | | \$60 |

Purchased Power SAP Account Mapping Reference Material



Pacific Power | Rocky Mountain Power | PacifiCorp Energy

FERC Account 555 SAP Mapping

| Charge Code | Acct # | SAP Acct Title |
|-------------|--------|---|
| 6460, 64600 | 508001 | EIM Exp - FMM IIE: CAISO to Pac |
| 6470, 64700 | 508011 | EIM Exp - RTD IIE: CAISO to Pac |
| 491 | 508015 | EIM Exp - GHG Em Cost Rev: CAISO to Pac |
| 64750 | 508021 | EIM Exp - UIE (Load): CAISO to Pac |
| 64750 | 508031 | EIM Exp - UIE (Gen): CAISO to Pac |
| 4989 | 508041 | EIM Exp - Daily Rounding Adj: w/CAISO |
| 6045 | 508051 | EIM Exp - O/U Sched Charge: w/CAISO |
| 6046 | 508053 | EIM Exp - O/U Sched Alloc: w/CAISO |
| 6090 | 508061 | EIM Exp-Ancil Svc Upw Neutral: w/CAISO |
| 6194 | 508062 | EIM Exp-Spinning Reserve Oblig: w/CAISO |
| 6196 | 508063 | EIM Exp-Spin Reserve Neutral: w/CAISO |
| 6294 | 508064 | EIM Exp-Non-Spin Reserve Oblig: w/CAISO |

FERC Account 555 SAP Mapping (Cont'd)

| Charge Code | Acct # | SAP Acct Title |
|-------------|--------|---|
| 6296 | 508065 | EIM Exp-Non-Spin Reserve Neut: w/CAISO |
| 6480, 6486 | 508066 | EIM Exp - Excess Cost Neutral: w/CAISO |
| 6678, 66200 | 508071 | EIM Exp - RT Bid Cost Recovery: w/CAISO |
| 6947 | 508081 | EIM Exp-IFM Loss Surplus Credit w/CAISO |
| 7056 | 508091 | EIM Exp - Flexible Ramp Cost: w/CAISO |
| 7050 | 508095 | EIM Exp-Flex RampUp Cap Pay: w/CAISO |
| 7024 | 508096 | EIM Exp-Flex RampUp Cap No Pay: w/CAISO |
| 64740 | 508101 | EIM Exp-RT Unaccounted Energy: w/CAISO |
| 6477, 64770 | 508111 | EIM Exp-RT Imb Energy Offset: w/CAISO |
| 66780 | 508121 | EIM Exp-RT BCR EIM Alloc: CAISO to Pac |
| 66200 | 508125 | EIM Exp-RTM BCR EIM Set: CAISO to Pac |
| 6774, 67740 | 508131 | EIM Exp-RT Congestion OS: CAISO to Pac |
| 6985, 69850 | 508141 | EIM Exp-RT Marginal Loss: CAISO to Pac |

Contra-Accounts used for Sub-Allocations of CAISO charges to Transmission Customers

| Charge Code | Acct # | SAP Acct Title |
|-------------|--------|---|
| 6460, 64600 | 508002 | EIM Exp - FMM Assess: Pac to TC |
| 6460, 64600 | 508003 | EIM Exp - FMM Assess: Pac Trans to C&T |
| 6470, 64700 | 508012 | EIM Exp - RTD Assess: Pac to TC |
| 6470, 64700 | 508013 | EIM Exp - RTD Assess: Pac Trans to C&T |
| 64750 | 508022 | EIM Exp - UIE (Load): Pac to TC |
| 64750 | 508023 | EIM Exp - UIE (Load): Pac Trans to C&T |
| 64750 | 508032 | EIM Exp - UIE (Gen): Pac to TC |
| 64750 | 508033 | EIM Exp - UIE (Gen): Pac Trans to C&T |
| 6045 | 508052 | EIM Exp-O/U Sched Chrg: Pac to TC |
| 7056 | 508092 | EIM Exp - Flexible Ramp Cost: PAC to TC |
| 6477, 64770 | 508112 | EIM Exp-RT Imb Energy Offset: Pac to TC |
| 66780 | 508122 | EIM Exp-RT BCR EIM Alloc: Pac to TC |
| 6774, 67740 | 508132 | EIM Exp-RT Congestion OS: Pac to TC |