IMPLEMENTATION WORKSHOP
May 26, 2022

INTRODUCTION

Michelle Cathcart

Vice President Transmission Operations

Healthy Vision Month

- May is *Healthy Vision Month*
- Schedule a comprehensive dilated exam to check for common eye problems
  - Best way to find out if you need glasses or contacts, or are in early stages of an eye-related disease

From Center for Disease Control and Prevention (CDC) Vision Health Initiative: https://www.cdc.gov/visionhealth/healthyvisionmonth/index.htm

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Nine ways to protect your vision

1. Get regular comprehensive dilated eye exams.
2. Know your family's eye health history (some eye diseases or conditions are hereditary).
3. Eat right to protect your sight: dark leafy greens or fish high in omega-3 fatty acids.
4. Maintain a healthy weight
5. Wear protective eyewear when playing sports or doing activities at home.
6. Quit smoking or never start.
7. Wear sunglasses that block 99 percent-100 percent of ultraviolet A (UVA) and ultraviolet B (UVB) radiation.
8. Wash your hands before taking out your contacts and cleanse your contact lenses properly.
9. Practice workplace eye safety.

From CDC Vision Health Initiative: https://www.cdc.gov/visionhealth/healthyvisionmonth/index.htm

Agenda

GRID Modernization

Time	Topic	Presenter
1 to 1:10 p.m.	Introductions	Michelle Cathcart
1:10 to 1:20 p.m.	Grid Mod Update	Mark Symonds
1:20 to 1:30	EIM Program Update	Elsa Chang and Mark Symonds
1:35 to 2:15 p.m.	Settlements	Rasa Keanini
	Break	
2:30: 3:30	Settlements (cont'd)	Rasa Keanini
3:30 to 3:35 p.m.	Agency Enterprise Portal (AEP)	Maggie Rhodes
3:35 to 4:00 p.m.	Open question and answer	

Continued Customer Engagement

GRID Modernization

- We will schedule an additional workshop if we need more time for today's material.

- BPA will host a workshop the week of June 20th prior to the release of EIM Settlements Bills around June 25.

- Please submit any questions to gridmod@bpa.gov and we will address them via email, or work with your Account Executive.

GRID MODERNIZATION MOBILIZATION

Mark Symonds

Grid Modernization Director

Grid Modernization Mobilization Status

GRID Modernization

Updated: 05.25.2022

53%

- AGC Modernization
- **Agency Enterprise Portal**
- Agency Metering System Replacement
- Automated Operations Planning & Reliability Assessment
- BPA Network Model
- Customer Billing Center Replacement
- Data Analytics
- EIM Bid & Base Scheduling
- EIM Program Management
- EIM Real Time Operations
- **EIM Settlements Implementation**
- EIM Training Program
- EIM Testing Program
- Federal Data & Generation Dispatch Modernization
- Load & Renewable Forecasting
- Metering Review & Update
- Mission Critical IT – Infrastructure
- Outage Management System
- Price & Dispatch Analysis (PRADA)
- Short Term Available Transfer Capability (ATC)
- Sub-Hourly Scheduling on the DC

30%

- CTA Implementation
- EIM Settlements Scoping
- Energy Trading & Risk Management & MMS Expansion
- Marketing & Settlements System
- Mission Critical IT – Architecture
- Mission Critical IT – Integration
- Mission Critical IT – Service Management
- One BPA Outage
- Outage Tracking System
- Power Services Training
- RAS Automatic Arming
- Reliability Coordinator Decision, Planning & Execution

10%

- Agency Enterprise Portal Phase 2
- AMS MRU Device Event Reporting
- Power Operations Log Replacement
- Mission Critical IT – Re-Platforming

8%

- Concurrent Losses
- Real Time Ops Modernization
- Wildfire Risk Modeling

0%

Identify   **Define**   **Integrate**   **Deliver**   **Complete**

Grid Mod Project Recap

GRID Modernization

- Customer Billing Center (CBC)
  - EIM Allocations functionality went live in the new billing system on May 1

- Agency Metering System (AMS)
  - New metering system is running without any known issues
  - Bonneville accelerated our meter data validation processes for quality meter data to meet the T+7B submission for the initial EIM settlement statement, and the stop gap measure to address possible data quality issues has not been utilized

- Agency Enterprise Portal (AEP)
  - EPP (BPA.gov) portion of the AEP project went live on February 25
  - New Customer Portal (CP) portion went live on April 11

- Outage Management System (OMS)
  - OMS replacement went live on March 8, 2022
  - The team has been working with our vendor to resolve critical bugs and improve system performance, and implement necessary functionality

EIM Go-Live Timeline

GRID Modernization

BPA's EIM Go-Live
May 3, 2022
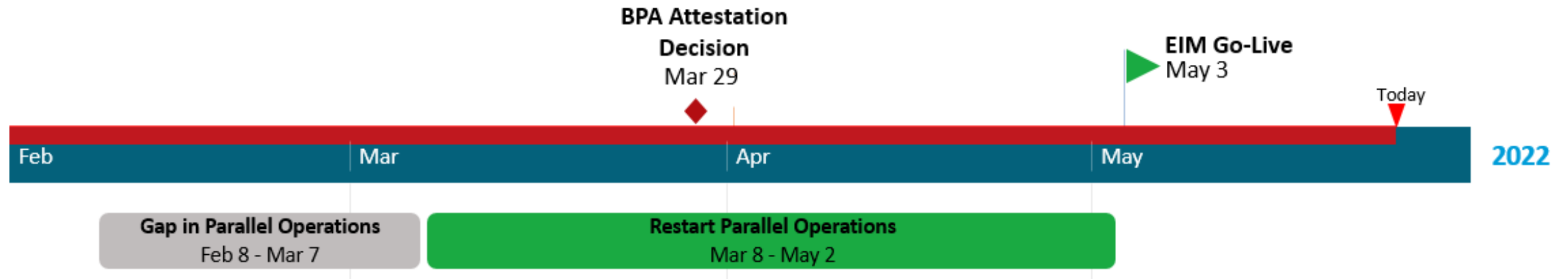
EIM Go-Live

GRID Modernization

- Our cutover to the market was very smooth and is a testament to the countless hours of work BPA staff did to complete grid modernization projects that enabled our participation.

- We also recognize we haven't met all of our customers' expectations prior to EIM go live and are working to improve.

EIM Participation Principles

GRID Modernization

1. Bonneville's participation is consistent with its statutory, regulatory and contractual obligations.

2. Bonneville will maintain reliable delivery of power and transmission to its customers.

3. Bonneville's participation is discretionary and Bonneville retains its ability to effectively exit the market in the event participation is no longer consistent with these principles.

4. Bonneville's participation is consistent with a sound business rationale.

5. Bonneville's participation is consistent with the objectives of Bonneville's Strategic Plan.

6. Bonneville's evaluation of EIM participation includes transparent consideration of the commercial and operational impacts on its products and services.

BPA Contacts for EIM

GRID Modernization

Topic / Question Area	Email and Phone	Email (cc)
EIM Services Bill (EESC)	EESCSettlements@bpa.gov or 503-230-EIM1	gridmod@bpa.gov and Power or Transmission Account Executive
Customer Billing		
Metering	mdm@bpa.gov	
Customer Portal	customerportal@bpa.gov	
BPA Outage Office	Planned outages: bpaoutage@bpa.gov Unplanned: Contact BPA's Generation Dispatcher	
After-hours Outage	Contact BPA's Generation Dispatcher	N/A

EIM PROGRAM UPDATE

Elsa Chang, *EIM Program Manager*
Mark Symonds, *Grid Mod Director*

EIM Progress to Date

GRID Modernization

- While BPA operations in EIM have gone reasonably well in our first three weeks, we have also experienced our first market disruption:
  - Staff was well-prepared for market operations and responded appropriately to system or market events
  - The market disruption experienced on May 8 was due to an external technical issue, and was quickly identified, mitigated and resolved

- Transmission customer donations of transmission for use in EIM have been steadily increasing and we encourage additional donations.

- Passed Resource Sufficiency (RS) tests almost every hour.

- BPA BAA has been both a net purchaser and a net seller on various days in EIM thus far.

May 8th

- The event:
  - BPA's switched the EIM off from approximately 13:50 to 16:10 on Sunday May 8th.
  - EESC identified a third-party certificate expired that caused tags to stop flowing. This resulted in inaccurate base schedules to flow to the market, in turn leading to unusual dispatches as well as high and low prices.
  - Once notified, the certificate expiration was resolved quickly allowing tags to begin flowing again.
  - Issue began approximately 09:30. BPA verified the base schedules that were flowing to the market and BPA fully re-entered EIM at approximately 17:10.

- After the fact:
  - CAISO's administrative pricing was triggered for 10:45 – 17:30.
  - CAISO tariff provisions require the CAISO to use the last available price (HE11 = $54 FMM, $42 RTD).

EIM Pricing 5.08.2022

GRID Modernization

- EIM prices in the BPA BAA has been corrected to $54 FMM and $42 RTD on May 8th

Just over $1,000 per MWh (upward energy constraint binds at marginally above the $1,000 per MWh CAISO energy bid cap plus losses and congestion).

LMPs are adjusted to the HE11 LMP ($54 FMM, $42RTD)

Blue box represents the approximate timeframe of the price adjustment, starting 10:45 and ending 17:30

Just under -$155 per MWh (downward energy constraint binds at marginally below the -$155 per MWh CAISO energy bid cap plus losses and congestion)

LMPs are adjusted to the HE11 LMP ($54 FMM, $42RTD)

Resource_Name
- ELAP_AVA-APND
- ELAP_AZPS-APND
- ELAP_BANC-APND
- ELAP_BCHA-APND
- ELAP_BPAT-APND
- ELAP_IPCO-APND
- ELAP_LADWP-APND
- ELAP_NEVP-APND
- ELAP_NWMT-APND
- ELAP_PACE-APND
- ELAP_PACW-APND
- ELAP_PGE-APND
- ELAP_PNM-APND
- ELAP_PSEI-APND
- ELAP_SCL-APND
- ELAP_SRP-APND
- ELAP_TIDC-APND
- ELAP_TPWR-APND

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EIM Pricing to Date

GRID Modernization

- EIM pricing since May 3rd in the BPA BAA has been consistent with pricing in other EIM Entity BAAs
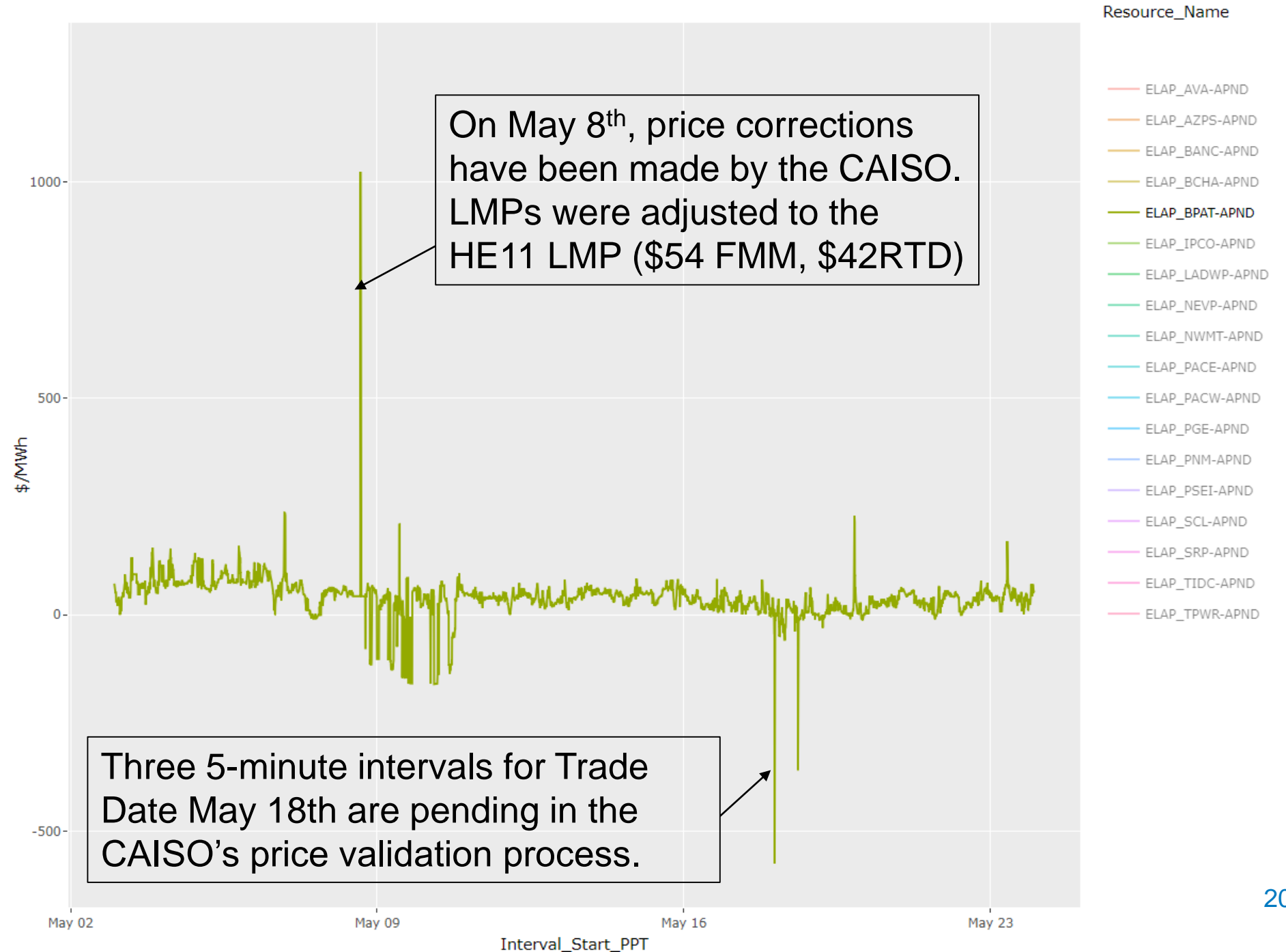

Average 5-minute prices for the BPA BAA are in black.
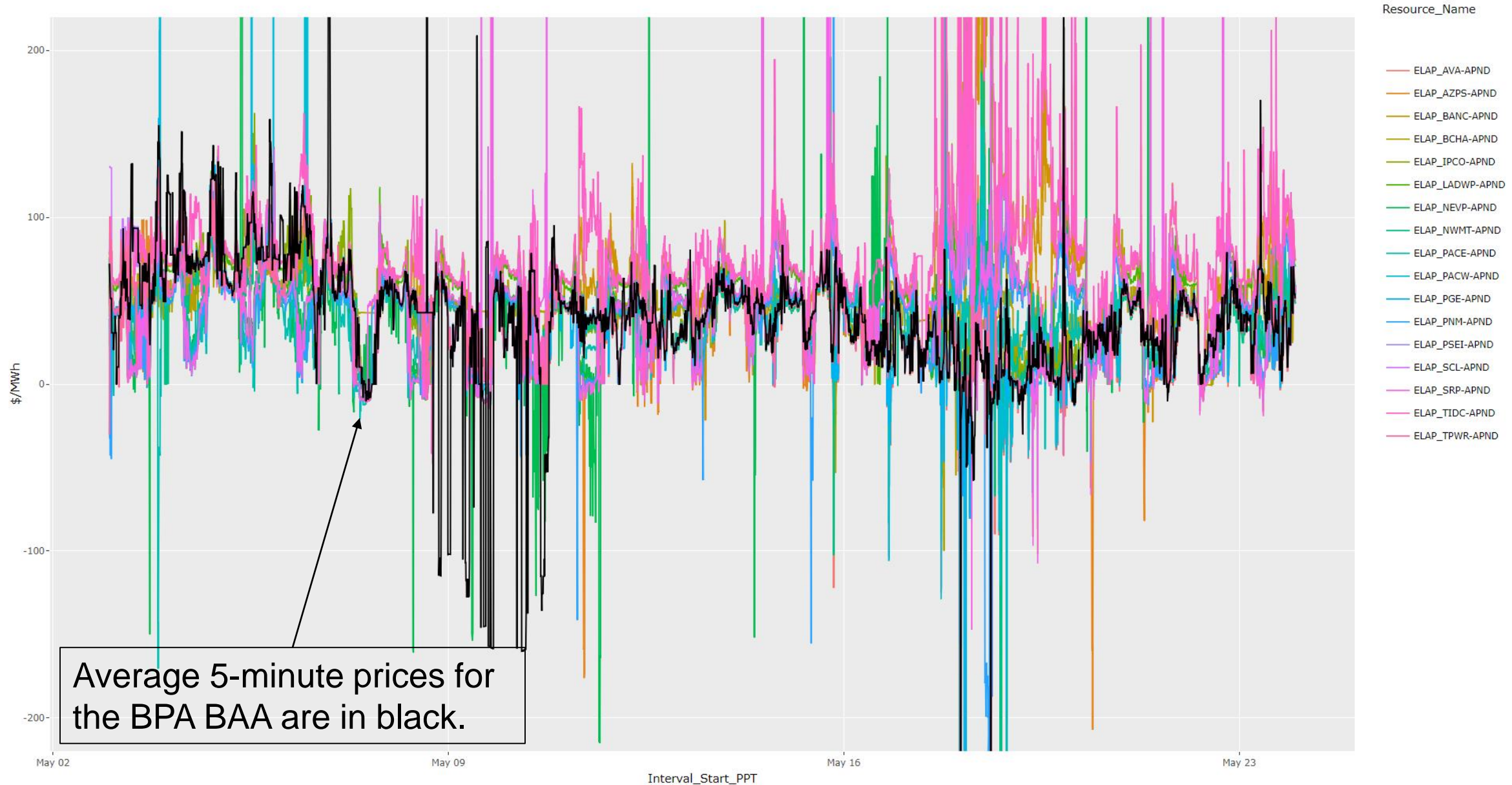
May 18th

- May 18th Small Plane Collision Incident causing transmission schedule curtailments (AC down)
  - BPA Power's share was roughly ~700 MW per hour
  - These schedule curtailments resulted in the following on various hours:
    - Dispatch of BPA's Aggregate Participating Resources (APR) in EIM
    - Increased exports from the BPA BAA in EIM,
    - Dispatch of the BPA BAA's Available Balancing Capacity (ABC) in EIM, and
    - Implementation of Operational Control for Balancing Reserves (OCBR)

EIM Pricing to Date

GRID Modernization

- The two notable EIM price excursions in the BPA BAA have been modified (May 8th) or are pending in the CAISO price validation process (May 18th).

On May 8th, price corrections have been made by the CAISO. LMPs were adjusted to the HE11 LMP ($54 FMM, $42RTD)

Three 5-minute intervals for Trade Date May 18th are pending in the CAISO's price validation process.

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Transmission Donation

GRID Modernization

- Additional EIM export (in the case of lower negative prices) and import (in the case of higher positive prices) transmission donations reduce the likelihood and magnitude of future price variations.

- Bonneville encourages Transmission Customers to consider donating transmission to the EIM and appreciates those that already have donated.

- The steps to perform an EIM transmission donation of point-to-point transmission into or out of the BPA BAA are the same.

- These steps are available in Section J – Donation of Transmission Rights by Interchange Rights Holders for EIM Transfers of BPA's Energy Imbalance Market (EIM) Business Practice:

Energy Imbalance Market (EIM) (bpa.gov)

Learning and Improving

GRID Modernization

- We will continue learning more from participating in the EIM and engaging with CAISO in daily market quality calls to get resolution to issues and concerns.

- The EIM Market Operations Team is a cross-agency collaboration that oversees the market participation
  - o bridge the transition from implementation to market operations
  - o review BPA's EIM market performance
  - o triage cross-organization issues
  - o share lessons learned and communicate CAISO related changes
  - o develop strategies to optimization market operations

- We also recognize we haven't met all of our customers' expectations prior to EIM go live and are working to improve.

EIM SETTLEMENTS

Rasa Keanini

EIM Settlements Product Owner

Settlements Agenda

GRID Modernization

- High Level Overview of EIM Settlements
  - EIM Settlements Timeline
  - Sub-allocated Charge Codes
  - EIM Imbalance Charges by Customer Type
  - Charge Codes by Position Type
  - EIM Services Bill Overview
- Sub-allocation Progress
  - Progress To-Date
- Weekly Detailed Data Files
  - High Level
  - Report by Charge Code/Position Type
  - Screenshots of each report
- EIM Services Bill
- Using New Customer Portal to access weekly files and bills

EIM Settlements Timeline

GRID Modernization

Initial statement

Last required statement

T 3B 5B 7B 9B 52B 70B +22B

+22B

Meter data

Disputes due

Market price corrections

+22B

Optional statements

11M 21M 24M

+22B
Disputes due

+22B
Disputes due
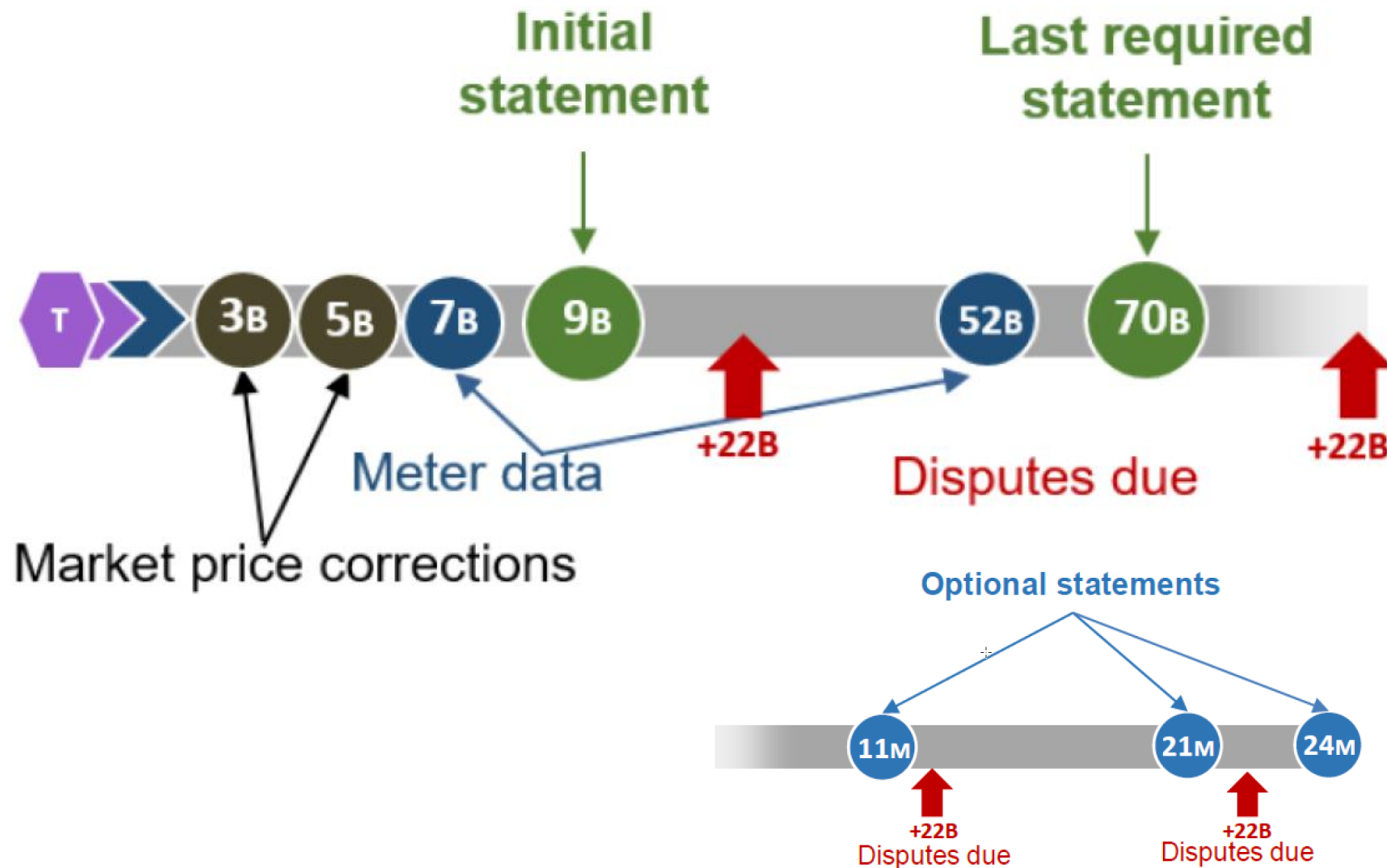
- BPA receives from CAISO
  - Settlement Statements on a daily basis
  - Invoices on a weekly basis
- On a weekly basis, BPA will make detailed data files available via Customer Portal*
- On a monthly basis, BPA will bill Transmission customers (EIM Services Bill) – same process as for Transmission bills

*Detailed data files will ONLY be available via Customer Portal

EIM Imbalance Charges by Customer Type

GRID Modernization

Customer Type	Energy Imbalance Pre-EIM	Generation Imbalance Pre-EIM	EIM Energy Imbalance (EI and GI) 64750, 64600,64700	EIM Interchange* 64600, 64700
Load Following Customer				X
Load Following Customer with Generating Resource		X	X	X
Customer with NPR (Gen)		X	X	X
Customer receiving EI (pre-EIM)	X		X	X
Transmission Customer				X

*Any Transmission Customer who is the tagged **Purchasing Selling Entity** on the interchange tag will receive an EIM Services Bill.

A Transmission Customer may fit into more than one of the rows above.

64750: Uninstructed Imbalance Energy

GRID Modernization

You will get this if there is a difference between metered and base schedule.

A. Imbalance Charges – Tariff Schedules 4E And 9E

1. Energy Imbalance Service (Schedule 4E) (EIM)

64750 A Transmission Customer shall be charged or paid for EI Service measured as the deviation of the Transmission Customer's metered load compared to the load component of the Transmission Customer Base Schedule (as determined pursuant to Section 4.2.4 of Attachment Q of the BPA Tariff) settled as UIE for the period of the deviation at the applicable Load Aggregation Point (LAP) price where the load is located as determined by the MO under Section 29.11(b)(3)(C) of the MO Tariff.

Transmission Customers taking EI Service shall be subject to the Persistent Deviation Penalty Charge for UIE pursuant to GRSP II.L.2.

2. Generation Imbalance Service (Schedule 9E) (EIM)

(1) GI – Uninstructed Imbalance Energy Charges/Credits

(A) UIE/RTD (Metered Gen - Scheduled Output at RTD)

64750 A Transmission Customer shall be charged or paid for GI Service measured as the deviation of the Transmission Customer's metered generation compared to the Manual Dispatch amount, the EIM Available Balancing Capacity dispatch amount, or the scheduled output of a resource incorporated by the MO in RTD, settled as UIE for the period of the deviation at the applicable PNode RTD price where the generator is located, as determined by the MO under Section 29.11(b)(3)(B) of the MO Tariff.

Transmission Customers taking GI Service shall be subject to the Persistent Deviation Penalty Charge for UIE pursuant to GRSP II.L.1.

64600: Instructed Imbalance Energy - FMM **GRID** Modernization

You will get this if there is a change to tags after the T-57 tagging deadline.

(2) **GI – Instructed Imbalance Energy Charges/Credits**

(A) **FMM-IIE (Scheduled Output at FMM - TCBS)**

64600 A Transmission Customer shall be charged or paid for GI Service measured as the deviation of the Manual Dispatch amount, the EIM Available Balancing Capacity dispatch amount, or the scheduled output of a resource incorporated by the MO in the FMM (FMM Schedule), compared to the resource component of the Transmission Customer Base Schedule, settled as IIE for the period of the deviation at the applicable PNode FMM price where the generator is located, as determined by the MO under Section 29.11(b)(1)(A)(ii) of the MO Tariff; or

1. **Interchange Imbalance**

Interchange Imbalance is assessed when deviations occur between the Interchange portion of a Transmission Customer's Base Schedule and the schedule value at the applicable Fifteen-Minute Market (FMM) or Real-Time Dispatch (RTD) market interval. Transmission Customers with Interchange Imbalance shall be assessed IIE at either the FMM Locational Marginal Price (LMP), the RTD LMP, or both, depending upon when the changes to the Transmission Customer's Interchange are incorporated by the MO into the applicable EIM market run. Interchange Imbalance shall be calculated as follows:

a. **Calculation of Interchange Imbalance – FMM-IIE**

64600 A Transmission Customer shall be charged or paid for Interchange Imbalance measured as the deviation of the Interchange portion of the Transmission Customer's Base Schedule compared to the Interchange schedule incorporated by the MO in the FMM (FMM Schedule). Such imbalance shall be settled as FMM-IIE for the period of the deviation at the applicable PNode FMM price where the Interchange is located, as determined by the MO under Section 29.11(b)(1)(A)(ii) of the MO Tariff.

64700: Instructed Imbalance Energy - RTD

GRID Modernization

You will get this if there is a change to tags after the T-57 tagging deadline.

(B)   RTD-IIE (Scheduled Output at RTD –FMM)

64700   A Transmission Customer shall be charged or paid for GI Service measured as the deviation of the Manual Dispatch amount, the EIM Available Balancing Capacity dispatch amount, or the scheduled output of a resource incorporated by the MO in RTD, compared to the FMM Schedule, as IIE for the period of the deviation at the applicable PNode RTD price where

b.   Calculation of Interchange Imbalance – RTD-IIE

64700   A Transmission Customer shall be charged or paid for Interchange Imbalance measured as the deviation of the FMM Schedule compared to the Interchange schedule incorporated by the MO in the RTD. Such imbalance shall be settled as RTD-IIE for the period of the deviation at the applicable PNode RTD price where the Interchange is located, as determined by the MO under Section 29.11(b)(2)(A)(ii) of the MO Tariff.

6045: Over/Under Scheduling Charge

GRID Modernization

You will get this if BPA fails the Balancing Test and you contributed to the failure.

This will always be a charge.

C. **Charges For Under-Scheduling or Over-Scheduling Load**

1. **Under-Scheduling Load**

    6045   Any charges to the BPA EIM entity pursuant to Section 29.11(d)(1) of the MO Tariff for underscheduling load shall be assigned to the Transmission Customers subject to Schedule 4 based on each Transmission Customer's respective under-scheduling imbalance ratio share, which is the ratio of the Transmission Customer's under-scheduled load imbalance amount relative to all other Transmission Customers' under-scheduled load imbalance amounts who have under-scheduled load for the Operating Hour, expressed as a percentage.

2. **Over-Scheduling Load**

    6045   Any charges to the BPA EIM entity pursuant to Section 29.11(d)(2) of the MO Tariff for overscheduling load shall be assigned to the Transmission Customers subject to Schedule 4 based on each Transmission Customer's respective over-scheduling imbalance ratio share, which is the ratio of the Transmission Customer's over-scheduled load imbalance amount relative to all other Transmission Customers' over-scheduled load imbalance amounts who have over-scheduled load for the Operating Hour, expressed as a percentage.

6046: Over/Under Scheduling Allocation

GRID Modernization

You will get this if BPA does not fail the Balancing Test and your daily average absolute Uninstructed Imbalance Energy is less than 5% or 2MW (whichever is greater).

This will always be a credit.

3. **Distribution Of Under-Scheduling Or Over-Scheduling Proceeds**

6046

Any payment to the BPA EIM Entity pursuant to Section 29.11(d)(3) of the MO Tariff shall be distributed to Transmission Customers on the basis of EIM Metered Demand whose daily average absolute Schedule 4E UIE is less than 5 percent or 2 MW (whichever is greater) of its daily average schedule. For those Transmission Customers that qualify to receive proceeds, the proceeds shall be allocated based on a ratio of each Transmission Customer's daily average EIM Metered Demand relative to aggregate daily average EIM Metered Demand of all other Transmission Customers who are eligible to receive proceeds for that day.

Uplift and Neutrality Codes

You will get this if you have measured demand.

13. **EIM Measured Demand**

   Includes (1) EIM Metered Demand, plus (2) e-Tagged export volumes from the BPA BAA (excluding EIM Transfers).

14. **EIM Metered Demand**

   Metered load volumes in BPA's BAA.

D. **EIM Neutrality And Uplift Charges And Credits**

   1. **EIM BAA Real-Time Market Neutrality (Real-Time Imbalance Energy Offset EIM)**

   64770

   Any charges to the BPA EIM entity pursuant to Section 29.11(e)(3) of the MO Tariff for EIM BAA real-time market neutrality shall be sub-allocated to Transmission Customers on the basis of EIM Measured Demand.

Uplift and Neutrality Codes

GRID Modernization

> You will get this if you have measured demand.

13. **EIM Measured Demand**

Includes (1) EIM Metered Demand, plus (2) e-Tagged export volumes from the BPA BAA (excluding EIM Transfers).

14. **EIM Metered Demand**

Metered load volumes in BPA's BAA.

2. **EIM Entity BAA Real-Time Congestion Offset**

67740 Any charges to the BPA EIM entity pursuant to Section 29.11(e)(2) of the MO Tariff for the EIM real-time congestion offset shall be allocated to Transmission Customers on the basis of EIM Measured Demand.

Uplift and Neutrality Codes

GRID Modernization

You will get this if you have measured demand.

13. **EIM Measured Demand**

Includes (1) EIM Metered Demand, plus (2) e-Tagged export volumes from the BPA BAA (excluding EIM Transfers).

14. **EIM Metered Demand**

Metered load volumes in BPA's BAA.

3. **EIM Entity Real-time Marginal Cost of Losses Offset**

69850 Any charges to the BPA EIM entity pursuant to Section 29.11(e)(4) of the MO Tariff for real-time marginal cost of losses offset shall be sub-allocated to Transmission Customers on the basis of EIM Measured Demand.

Uplift and Neutrality Codes

GRID Modernization

You will get this if you have measured demand.

13. **EIM Measured Demand**

Includes (1) EIM Metered Demand, plus (2) e-Tagged export volumes from the BPA BAA (excluding EIM Transfers).

14. **EIM Metered Demand**

Metered load volumes in BPA's BAA.

4. **EIM Neutrality Settlement (Real-Time System Imbalance Energy Offset)**

6478   Any charges to the BPA EIM Entity pursuant to Section 29.11(e)(5) of the MO Tariff for EIM neutrality settlement shall be sub-allocated as follows:

Description	Allocation
Neutrality Adjustment (monthly and daily)	EIM Measured Demand
Rounding Adjustment (monthly and daily)	EIM Measured Demand

Policy Decisions - Workshops

GRID Modernization

Energy Imbalance Market - Bonneville Power Administration (bpa.gov)

EIM Workshops

2022	+
2021	+
2020	–

Oct. 28, 2020

Meeting slide deck

- EIM Implementation Roadmap
- Overview of EIM-specific grid modernization projects
- Grid modernization portfolio impact
- Future topics

NEW: EIM Interchange

GRID Modernization

Example 1: Transmission Customers who do not export or import will not be subject to EIM Interchange.

Example 2: Transmission Customers who have BPA Power as the Purchasing Selling Entity on their export/import tags will not be subject to EIM Interchange.

EIM Imbalance Charges by Customer Type

GRID Modernization

Customer Type	Energy Imbalance Pre-EIM	Generation Imbalance Pre-EIM	EIM Energy Imbalance (EI and GI) 64750, 64600,64700	EIM Interchange* 64600, 64700
Load Following Customer				X
Load Following Customer with Generating Resource		X	X	X
Customer with NPR (Gen)		X	X	X
Customer receiving EI (pre-EIM)	X		X	X
Transmission Customer				X

*Any Transmission Customer who is the tagged **Purchasing Selling Entity** on the interchange tag will receive an EIM Services Bill.

A Transmission Customer may fit into more than one of the rows above.

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Charge Code by Position Type

GRID Modernization

Charge Code	Generating Resource	Load	Interchange
Over/Under Scheduling Charge and Allocation 6045, 6046		X	
Uplift and Neutrality Charges 6478, 64770, 67740, 69850		X	X
Uninstructed Imbalance Energy 64750	X	X	
Instructed Imbalance Energy – FMM 64600	X		X
Instructed Imbalance Energy - RTD 64700	X		X

EIM Services Bills will:

GRID Modernization

- Be issued monthly (around the 25th of the month).

- Be completely separate from other BPA bills.

- Include Energy Imbalance associated with EIM Charge Codes.

- Include Intentional Deviation and Persistent Deviation (these penalties will no longer be on the Transmission bill).

- Be distributed from BPA's billing department like Power and Transmission bills.

- Include contact information for any EIM-S related questions.

- Follow the same initial starting point for bill disputes – customers will contact their Transmission Account Executives to file a bill dispute.

Sub-Allocation Progress

GRID Modernization

- Sub-allocation calculations for EIM Charge Codes are working as expected.
  - Issue with tag timing – impacts Interchange primarily
    - Impacts ability to match CAISO for 64600 and 64700
  - Software defects with interfacing leading to issues with tags
- Intentional Deviation and Persistent Deviation are working as expected.

High Level: Weekly Detailed Data Files

GRID Modernization

- Customers may access their weekly zip files via Customer Portal

- The zip file will include multiple Excel files with at least a week's worth of data in each Excel file
  - First week will be one week of data
  - Second week will include both week 1 and week 2 data
  - Final zip file for the month will include Excel files with a month's worth of data to allow for comparison against EIM Services Bills
  - Intended purpose is to give customers advance information in the event a dispute with CAISO is needed

- Zip file naming convention: XXXXX_CustNam_TDYYYYMMDD_Version (e.g., Initial, Recalc, etc.)

High Level: Weekly Detailed Data Files

GRID Modernization

- Format only versions, shared in advance of this workshop, may only have one date or non-consecutive dates; actual weekly detailed data files will have consecutive dates

- Excel files are not one to one with charge codes
  - Example: Other EIM Charges Excel file includes four charge codes

- Excel file naming convention: XXXXX_CustNam_(GRName)_ReportName_CreationDate_Time_TDYYYYMMDD_Version Days

- Level of granularity of data varies
  - 5 min, hourly, daily – depending on report

- If a charge does not apply (e.g., Persistent Deviation), the excel file will not be created and will not be included in the zip file

Report Name by Charge Code/Position Type   GRID Modernization

Charge Code	Generating Resource	Load	Interchange
Over/Under Scheduling Charge 6045		XXXXX_CustNam_OverUnderSchedChargeCC6045	
Over/Under Scheduling Allocation 6046		XXXXX_CustNam_OverUnderSchedAllocCC6046	
Uplift and Neutrality Charges 6478, 64770,67740, 69850		XXXXX_CustNam_OtherEIMCharges	XXXXX_CustNam_OtherEIMCharges
Uninstructed Imbalance Energy 64750	XXXXX_CustNam_GR_GenResourceImbalanceCC64750_64600_64700	XXXXX_CustNam_LoadUIECC64750	
Instructed Imbalance Energy – FMM 64600	XXXXX_CustNam_GR_GenResourceImbalanceCC64750_64600_64700		XXXXX_IntertieImbalanceCC64600_64700
Instructed Imbalance Energy - RTD 64700	XXXXX_CustNam_GR_GenResourceImbalanceCC64750_64600_64700		XXXXX_IntertieImbalanceCC64600_64700

Load Uninstructed Imbalance Energy: 64750

GRID Modernization

Trade Date	Hour Ending	Real-Time Uninstructed Imbalance Energy Settlement (EIM 64750) for Load				
		Base Schedule - Tag	Meter Read	Imbalance Quantity	Price	Customer Real-Time UIE Settlement Allocation
		PriBaseScheduleQty	PriMeterQty	AllocUIEQty	HourlyRTMLAPPrice	AllocEIMSettIntUIESettlementAmt
				(D - C) * -1		(E * F) * -1
		MW	MW	MW	$	$
12/28/2021	1					
12/28/2021	2					
12/28/2021	3					
12/28/2021	4					
12/28/2021	5					
12/28/2021	6					
12/28/2021	7					
12/28/2021	8					
12/28/2021	9					
12/28/2021	10					
12/28/2021	11					
12/28/2021	12					
12/28/2021	13					
12/28/2021	14					
12/28/2021	15					
12/28/2021	16					
12/28/2021	17					
12/28/2021	18					
12/28/2021	19					
12/28/2021	20					
12/28/2021	21					
12/28/2021	22					
12/28/2021	23					
12/28/2021	24					

Strived for standard formatting:

- EIM Charge Codes typically included in Excel file name
- Key information separated out in column headers
- Ordering strategy to more easily follow calculation logic
- Final allocations shown in furthest right column or goldenrod colored column (some Excel files may have more than one column for final allocation)

Other EIM Charges: 6478, 69850, 64770, 67740

GRID Modernization

Trade Date	Hour Ending	Interval	Customer Measured Demand Ratio					CAISO Charge (EIM CC 67740) BA EIM Real-Time Congestion Offset	Customer EIM Real-Time Congestion Offset Allocation
			Export ATF Tag Quantity	Meter Read	Customer Load	BA Load	Customer Share		
			PriExportATFTagQty	PriMeterQty	CustomerMeasuredDemand	TotalMeasuredDemand	Alloc5mMeasuredDemandRatio	EIMEntitySCRTCongestionOffsetAlloc	AllocEIMEntityRTCongestionOffsetAlloc
			MWh	MWh	D+E MWh	MWh	F/G Ratio	$	H*I $
12/28/2021	1	00:00							
12/28/2021	1	00:05							
12/28/2021	1	00:10							
12/28/2021	1	00:15							
12/28/2021	1	00:20							
12/28/2021	1	00:25							
12/28/2021	1	00:30							
12/28/2021	1	00:35							
12/28/2021	1	00:40							
12/28/2021	1	00:45							
12/28/2021	1	00:50							
12/28/2021	1	00:55							

- Uplift/Neutrality Codes are based on proportion of customer load to overall Balancing Authority (BA) Load
- Customer Load is measured demand = metered demand + exports
- Sub-allocation value is based on BPA allocation*Customer Share

Over/Under Scheduling Charge: 6045

GRID Modernization

Trade Date	Hour Ending	EIM Resource Sufficiency Test (T– 40)	Imbalance Quantity	Customer Over and Under Scheduling Ratio						Over and Under Scheduling Ch	
				Customer Overscheduling Quantity	BA Overscheduling Quantity	Overscheduling Ratio	Customer Underscheduling Quantity	BA Underscheduling Quantity	Underscheduling Ratio	CAISO Charge (EIM CC 6045) BA Over Scheduling Charge	Customer Over Scheduling Charge Allocation
		BalancingTestResults	AllocUIEQty	CustomerOverSchedulingQty	BAOverschedulingQty	AllocOverSchedulingRatio	CustomerUnderSchedulingQty	BAUnderschedulingQty	AllocUnderSchedulingRatio	BAHourlyLAPOverSchedulingAmount	AllocBAHourlyLAPOverSchedulingAmount
				Max(D, 0)		E / F	Min(D, 0)		H / I		G * K
		Pass/Fail	MW	MW	MW	Ratio	MW	MW	Ratio	$	$
01/11/2022	1										
01/11/2022	2										
01/11/2022	3										
01/11/2022	4										
01/11/2022	5										
01/11/2022	6										
01/11/2022	7										
01/11/2022	8										
01/11/2022	9										
01/11/2022	10										
01/11/2022	11										
01/11/2022	12										
01/11/2022	13										
01/11/2022	14										
01/11/2022	15										
01/11/2022	16										
01/11/2022	17										
01/11/2022	18										
01/11/2022	19										

- Always a charge
- Occurs if BPA fails Balancing Test by more than a defined threshold
  - Customers who over/under scheduled in same direction will share a portion of the charge

Over/Under Scheduling Allocation: 6046

GRID Modernization

Trade Date	OUS Allocation Eligibility					
	Average Transmission Customer Base Schedule	Percent Threshold	MW Threshold	Maximum Allowable Schedule Variance	Average Imbalance Quantity	OUS Allocation Eligibility Flag
	AllocDailyAvgTxCustomerBaseScheduleQty	OUSAllocationPercentThreshold	OUSAllocationQuantityThreshold	AllocDailyOUSAverageScheduleQty	AllocDailyAverageImbalanceQty	AllocOUSAllocationEligibilityFlag
	MW	%	MW	Max(B * C, D) MW	Average(ABS(AllocUIEQty)) MW	IF (E > F) THEN 1, ELSE 0 1,0
12/28/2021						
01/06/2022						
01/13/2022						
01/18/2022						
01/20/2022						
01/25/2022						

- Always a credit
- Based on metered demand
- Data is on a daily basis (if BPA did not fail the Balancing Test, they are entitled to share in the allocation)
- Compares maximum allowable schedule variance against average daily imbalance quantity to determine eligibility

Generating Resources: Inputs

GRID Modernization

	Resource	Trade Date	Hour Ending	Interval	Exemption Flags					
					Oversupply Management Protocol Exempt Flag	Contingency Reserve Delivery Flag	Contingency Reserves with Negative FMM Prices Flag	Combined Flag for OMP and Contingency Reserve Delivery with Negative FMM Prices	Contingency Reserves with Negative RTD Prices Flag	Combined Flag for OMP and Contingency Reserve Delivery with Negative RTD Prices
					OversupplyMgmtProtocolExemptFlg	PriContingencyReserveDeliveryFlg	ontingencyReserveDeliveryNegFmmLmpF	CompoundFmmEventFlg	ContingencyReserveDeliveryNegRtdLmpFlg	CompoundRtdEventFlg
							IF (F = 1 AND T < 0) THEN 1, ELSE 0	IF (E = 1 OR G = 1) THEN 1, ELSE 0	IF (F = 1 AND Q < 0) THEN 1, ELSE 0	IF (E = 1 OR I = 1) THEN 1, ELSE 0
					1,0	1,0	1,0	1,0	1,0	1,0
7		01/04/2022	1	00:00						
8		01/04/2022	1	00:05						
9		01/04/2022	1	00:10						
10		01/04/2022	1	00:15						
11		01/04/2022	1	00:20						
12		01/04/2022	1	00:25						
13		01/04/2022	1	00:30						
14		01/04/2022	1	00:35						
15		01/04/2022	1	00:40						
16		01/04/2022	1	00:45						
17		01/04/2022	1	00:50						
18		01/04/2022	1	00:55						

Exemption Flags; applies to UIE (64750) and IIE (64600 and 64700)

UIE Qty	Uninstructed Imbalance Energy Quantity					
Meter Read	Real-Time Expected Energy	Fifteen Minute Expected Energy	Standard Ramping Energy	Base Schedule - Tag	Uninstructed Imbalance Quantity
PriMeterQty	PriRtdExpectedEnergyQty	PriFMMExpectedEnergyQty	PriStandardRampingEnergy	PriBaseScheduleQty	AllocUIEQty
MWh	MWh	MWh	MWh	MWh	K - L - M - N - O MWh

Generating Resources: Outputs for Uninstructed and Instructed Imbalance Energy: 64750- UIE, 64600 – Fifteen Minute IIE, 64700 – Real-Time IIE

NPR Real-Time Uninstructed Imbalance Energy (EIM CC 64750), FMM Instructed Imbalance Energy (EIM CC 64600), and Real-Time Instructed Imbalance Energy (EIM CC 64700) Amounts							
Real-Time Price	Customer RTD UIE Amount Allocation	FMM Instructed Imbalance Quantity	Fifteen Minute Price	Customer FMM IIE Amount Allocation	RTD Instructed Imbalance Quantity	Real-Time Price	Customer RTD IIE Amount Allocation
DispatchIntervalRTDLMP	AllocEIMSettIntUIESettleAmt	AllocFMMIIEQty	FMMIntervalLMPPrice	AllocEIMSettFMMIIEAmt	AllocRTDIIEQty	DispatchIntervalRTDLMP	AllocEIMSettIIEAmt
	IF J = 1 THEN 0, ELSE –1 * (P * Q)	M		IF H = 1 THEN 0, ELSE –1 * (S * T)	L		IF J = 1 THEN 0, ELSE –1 * (V * W)
$/MWh	$	MWh	$/MWh	$	MWh	$/MWh	$

- Yellow columns indicate final allocations
- Formulas reference column letters

Interchange – IIE FMM (64600) & IIE RTD (64700)

GRID Modernization

				FMM Instructed Imbalance Energy (EIM CC 64600) and Real-Time Instructed Imbalance Energy (EIM CC 64700) Amounts							
				Base Schedule - Tag	FMM Dispatch Quantity	FMM Instructed Imbalance Quantity	Fifteen Minute Price	Customer FMM IIE Amount Allocation	ATF Tag Quantity	RTD Instructed Imbalance Quantity	Real-Time Price	Customer RTD IIE Amount Allocation
Position Name	Trade Date	Hour Ending	Interval	PriBaseTagQty	PriFmmTagQty	AllocFmmIIEQty	FMMIntervalLMPPrice	AllocEIMSettFMMIIEAmt	PriATFTagQty	AllocRtdIIEQty	DispatchIntervalRTDLMP	AllocEIMSettIIEAmt
						(F - E) / 12		-1 * (G * H)		(J - F) / 12		-1 * (K * L)
				MW	MW	MWh	$/MWh	$	MW	MWh	$/MWh	$
	01/06/2022	1	00:00									
	01/06/2022	1	00:05									
	01/06/2022	1	00:10									
	01/06/2022	1	00:15									
	01/06/2022	1	00:20									
	01/06/2022	1	00:25									
	01/06/2022	1	00:30									
	01/06/2022	1	00:35									
	01/06/2022	1	00:40									
	01/06/2022	1	00:45									
	01/06/2022	1	00:50									
	01/06/2022	1	00:55									

Intertie Tag Details

GRID Modernization

- Provides mapping for tags

- Each row is a separate intertie/Etag name

- Intervals in this report are 5 min (288 intervals for the day)

Intentional Deviation Hourly Summary: (Charge Code 15) Variable Energy Resources (VERs) only

Trade Date	Hour Ending	Intentional Deviation Event			Imbalance Performance Exemption			
		ATF Tag Quantity	Intentional Deviation Measurement Value Quantity	Intentional Deviation Event Flag	Schedule Accuracy Exemption Flag	Generation Unit in Test Mode Flag	Oversupply Management Protocol Exemption Flag	Intentional Deviation Penalty Exemption Flag
		PriATFTagQty	PriIntlDevMeasurementValueQty	IntlDevEventFlg	ScheduleAccuracyExemptFlg	PriGenerationUnitInTestModeFlg	OversupplyMgmtProtocolExemptFlg	PriIntlDevExemptFlg
		MW	MW	IF ABS(D - C) < 1 THEN 0, ELSE 1 1,0	1,0	1,0	1,0	1,0
01/04/2022	1							
01/04/2022	2							
01/04/2022	3							
01/04/2022	4							
01/04/2022	5							
01/04/2022	6							
01/04/2022	7							
01/04/2022	8							
01/04/2022	9							
01/04/2022	10							
01/04/2022	11							
01/04/2022	12							
01/04/2022	13							
01/04/2022	14							
01/04/2022	15							
01/04/2022	16							
01/04/2022	17							
01/04/2022	18							
01/04/2022	19							
01/04/2022	20							
01/04/2022	21							
01/04/2022	22							
01/04/2022	23							
01/04/2022	24							

Intentional Deviation 5min Summary: (Charge Code 15) Variable Energy Resources (VERs) only

			Intentional Deviation Five Minute Details				
Trade Date	**Hour Ending**	**Interval**	**Station Control Error**	**Meter Read**	**ATF Tag Quantity**	**Economic Dispatch Flag**	**Intentional Deviation Measurement Value Error Quantity**
			StationControlErrorQty	PriMeterQty	PriATFTagQty	EconomicDispatchFlg	IntDevMeasurementValueErrQty
			MWh	MWh	MWh	1,0	MWh
01/04/2022	1	00:00					
01/04/2022	1	00:05					
01/04/2022	1	00:10					
01/04/2022	1	00:15					
01/04/2022	1	00:20					
01/04/2022	1	00:25					
01/04/2022	1	00:30					
01/04/2022	1	00:35					
01/04/2022	1	00:40					
01/04/2022	1	00:45					
01/04/2022	1	00:50					
01/04/2022	1	00:55					

Persistent Deviation – DERBs and Load (Charge Code 20)

GRID Modernization

Trade Date	Hour Ending	Hourly Integrated ATF Tag Quantity	Imbalance Quantity	Persistent Deviation Penalty				
				Tier 1 Negative Deviation Flag	Tier 2 Negative Deviation Flag	Tier 3 Negative Deviation Flag	Tier 4 Negative Deviation Flag	Negative Deviation
		AfterTheFactSchedule	AllocUIEHourlyQty	Tier1NegativeDevHour	Tier2NegativeDevHour	Tier3NegativeDevHour	Tier4NegativeDevHour	NegativeDev
				For Tier X: IF (I > (C * TierXDevPercent)) & (I > TierXDevQty) THEN 1, ELSE 0				Max(D, 0) * (1 - R)
		MW	MWh	1,0	1,0	1,0	1,0	MWh
01/04/2022	1							
01/04/2022	2							
01/04/2022	3							
01/04/2022	4							
01/04/2022	5							
01/04/2022	6							
01/04/2022	7							
01/04/2022	8							
01/04/2022	9							
01/04/2022	10							
01/04/2022	11							
01/04/2022	12							
01/04/2022	13							
01/04/2022	14							
01/04/2022	15							
01/04/2022	16							
01/04/2022	17							
01/04/2022	18							
01/04/2022	19							

Persistent Deviation – DERBs and Load (Charge Code 20)

GRID Modernization

Trade Date	Hour Ending	Tier 1 Positive Deviation Flag	Tier 2 Positive Deviation Flag	Tier 3 Positive Deviation Flag	Tier 4 Positive Deviation Flag	Positive Deviation	Exemption Flags			Negative Deviation Exemption
							Generation Unit In Test Mode (90 days)	Oversupply Management Protocol Exemption Flag	Waiver Exemption	
		Tier1PositiveDevHour	Tier2PositiveDevHour	Tier3PositiveDevHour	Tier4PositiveDevHour	PositiveDev	PriGenerationUnitInTestModeFlag	OversupplyMgmtProtocolExemptFlag	PriPersistentDevExemptFlag	NegDevPenaltyExemption
		For Tier X: IF (N < (-1 * C * TierXDevPercent)) & (N < -1 * TierXDevQty)) THEN 1, ELSE 0				Min(D, 0) * (1 - S)				IF (O + P + Q) > 0 THEN 1, ELSE 0
		1,0	1,0	1,0	1,0	MWh	1,0	1,0	1,0	1,0
01/04/2022	1									
01/04/2022	2									
01/04/2022	3									
01/04/2022	4									
01/04/2022	5									
01/04/2022	6									
01/04/2022	7									
01/04/2022	8									
01/04/2022	9									

Persistent Deviation – DERBs and Load (Charge Code 20)

GRID Modernization

Trade Date	Hour Ending	Hourly LMP or LAP Price	Positive Deviation Penalty Price						
			Max RTD LMP or RTD LAP	Positive Deviation Penalty Percent	Positive Deviation Penalty Percent Applied to Max Price	Positive Deviation Penalty Default Price	3rd Party Positive Deviation Penalty Percent	3rd Party Positive Deviation Penalty Price	3rd Party Positive Deviation Penalty Default Price
		RTDLMP_LAP_Price	PosDevRangeMaxPrice	PriNprPositiveDevPenaltyPct	NprPositivePenaltyPctMaxPrc	PriNprPositiveDevPenaltyDefPrc	Pri3PrPositiveDevPenaltyPct	3PrPositiveDevPenaltyPrc	Pri3PrPositiveDevPenaltyDefPrc
		$/MWh	$	%	$V * U$ $/MWh	$/MWh	%	$Max(Y * U, AA - U)$ $	$/MWh
01/04/2022	1								
01/04/2022	2								
01/04/2022	3								
01/04/2022	4								
01/04/2022	5								
01/04/2022	6								
01/04/2022	7								
01/04/2022	8								
01/04/2022	9								
01/04/2022	10								
01/04/2022	11								

Persistent Deviation – DERBs and Load (Charge Code 20)

GRID Modernization

		Persistent Deviation Penalty						Persistent Deviation Charge
Trade Date	**Hour Ending**	**Hourly Integrated UIE Allocation Settlement Amount**	**Negative Deviation Penalty Period**	**Negative Deviation Penalty Amount**	**Total Positive Deviation Penalty Amount**	**Positive Deviation Penalty Period**	**Positive Deviation Penalty Amount**	**Persistent Deviation Charge**
		AllocEIMSettIntUIESettleHourlyAmt	NegativeDevPenaltyPeriod	NegativeDevPenaltyAmt	TotalPositiveDevPenaltyAmt	PositiveDevPenaltyPeriod	PositiveDevPenaltyAmt	PersistentDevPenaltyAmt
				$Min(0, [AC * AD]) * -1$	$(N * AB) * AG * -1$		$AF - (AC * AG)$	$(AD * AE) + (AG * AH)$
		$	1,0	$	$	1,0	$	$
01/04/2022	1							
01/04/2022	2							
01/04/2022	3							
01/04/2022	4							
01/04/2022	5							
01/04/2022	6							
01/04/2022	7							
01/04/2022	8							
01/04/2022	9							
01/04/2022	10							
01/04/2022	11							
01/04/2022	12							
01/04/2022	13							
01/04/2022	14							
01/04/2022	15							

Intrachange – Energy Imbalance Reassignment: (Charge Code 25)

GRID Modernization

Position Name	Trade Date	Hour Ending	Intrachange Instructed Imbalance Energy Reassignment				Customer Imbalance Reassignment Amount
			T-57 Snapshot - Tag	ATF Tag Quantity	Imbalance Quantity	Real-Time Price	
			PriImbReassignBaseScheduleTagQty	PriImbReassignATFTagQty	IntraImbReassignmentQty	AvgIntrachangeLMP	AllocIntraImbReassignmentAmt
					E - D	Avg RTD LMP of Source Generator	F * G
			MW	MW	MW	$/MWh	$
	01/04/2022	1					
	01/04/2022	2					
	01/04/2022	3					
	01/04/2022	4					
	01/04/2022	5					
	01/04/2022	6					
	01/04/2022	7					
	01/04/2022	8					
	01/04/2022	9					
	01/04/2022	10					
	01/04/2022	11					
	01/04/2022	12					
	01/04/2022	13					
	01/04/2022	14					
	01/04/2022	15					
	01/04/2022	16					
	01/04/2022	17					
	01/04/2022	18					
	01/04/2022	19					
	01/04/2022	20					
	01/04/2022	21					
	01/04/2022	22					
	01/04/2022	23					
	01/04/2022	24					

EIM Services Bill

GRID Modernization

EIM SERVICES BILL

Customer Name:	Customer Name	Bill Period:	2022-02
Bill ID:	FEB22-EIM01-XXXXX	Period Ending:	February 28, 2022
Issue Date:	March 3, 2022		

INITIAL: 2021-12

Charge Code	Description	Current Amount	Previous Amount	Net Amount
6045	Prior 2112 Over/Under Sched Settle	$53.25	$0.00	$53.25
6046	Prior 2112 Over/Under Sched Alloc	$0.00	$0.00	$0.00
64600	Prior 2112 FMM IIE EIM Settlement	$352.64	$0.00	$352.64
64700	Prior 2112 RT IIE EIM Settlement	$0.00	$0.00	$0.00
64750	Prior 2112 RT UIE EIM Settlement	($2,500,047.70)	$0.00	($2,500,047.70)
64770	Prior 2112 RT Imb Energy Offset EIM	$582,167.75	$0.00	$582,167.75
6478	Prior 2112 RT Sys Imb Energy Offset	$4,823.75	$0.00	$4,823.75
67740	Prior 2112 RT Congestion Offset	$1,060,005.74	$0.00	$1,060,005.74
69850	Prior 2112 RT Marg Losses Offset	$0.00	$0.00	$0.00

INITIAL: 2021-11

| Charge Code	Description	Current Amount	Previous Amount	Net Amount
6046	Prior 2111 Over/Under Sched Alloc	$0.00	$0.00	$0.00
64750	Prior 2111 RT UIE EIM Settlement	$0.00	$0.00	$0.00
64770	Prior 2111 RT Imb Energy Offset EIM	$0.00	$0.00	$0.00
6478	Prior 2111 RT Sys Imb Energy Offset	$0.00	$0.00	$0.00
67740	Prior 2111 RT Congestion Offset	$0.00	$0.00	$0.00
69850	Prior 2111 RT Marg Losses Offset	$0.00	$0.00	$0.00

What do you need to do?

GRID Modernization

- Review detailed data files on a timely basis
  - If you identify a discrepancy and want BPA to dispute with CAISO, email EESCSettlements@bpa.gov ASAP **(don't wait for your bill!)**
  - If you identify a discrepancy in how BPA sub-allocated to you, contact EESC Settlements Team EESCSettlements@bpa.gov

- Review EIM Services Bill
  - If you have questions, contact EESCSettlements@bpa.gov
  - If you have a dispute, contact your Transmission Account Executive to start the dispute process

AGENCY ENTERPRISE PORTAL (AEP)

Maggie Rhodes

CP Product Owner

EIM on Customer Portal

EIM Services Bills will be located here

Weekly Detailed Data Files will be located here
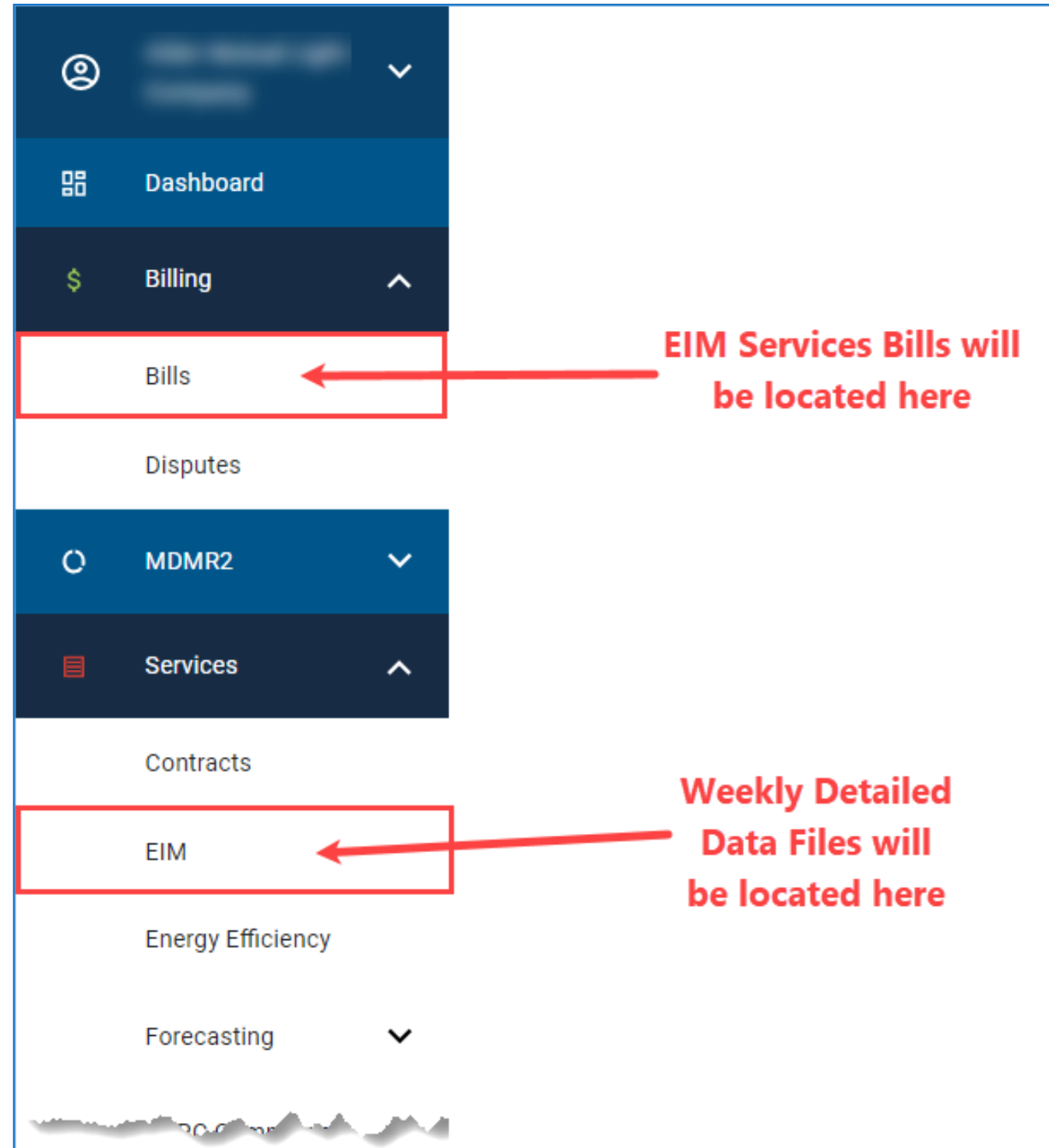
What is being posted

GRID Modernization

EIM Services Bills

- Bills will be posted similarly to how BPA posts Power and Transmission Bills today on Customer Portal

Detailed Data Files

- Detailed Data Files will be posted weekly as zip files, containing multiple excel files with at least one week's worth of data

- **Reminder – Customers must register for access to Customer Portal in order to view Detailed Data files**

Agreements and Legacy System Status

GRID Modernization

- Customers will be required to sign new CP Agreements
  - Please reach out to your Account Executive or customerportal@bpa.gov to do so

- Legacy Customer Portal (CP) only available for historical data
  - Legacy CP will <u>not</u> be updated
    (no user changes, no live data feeds, no metering reports, etc.)
  - Legacy CP will be retired in calendar year 2022

GRID Modernization

Questions?

Contact: customerportal@bpa.gov

OPEN QUESTIONS AND ANSWERS

COMMENTS

Please send your feedback to
techforum@bpa.gov

by Friday, June 10, 2022

Thank you for participating in today's workshop.

For more information,
visit www.bpa.gov/goto/eim.

APPENDIX

List of Acronyms

GRID Modernization

Acronym		Acronym	
BAA	Balancing Authority Area	**ID**	Intentional Deviation
CAISO	California Independent System Operator	**IIE**	Instructed Imbalance Energy
CP	Customer Portal	**LMP**	Locational Marginal Price
DERs	Dispatchable Energy Resources	**MO**	Market Operator
EESC	EIM Entity Scheduling Coordinator	**PD**	Persistent Deviation
EI	Energy Imbalance	**Pnode**	Price Node
EIM	Energy Imbalance Market	**RTD**	Real-Time Dispatch
FMM	Fifteen Minute Market	**UIE**	Uninstructed Imbalance Energy
GI	Generation Imbalance	**VERs**	Variable Energy Resource
GRSP	General Rate Schedule Provision		