Energy Bids

- Participating resource's Energy Bids are due 75 minutes before the operating hour (T-75)
  - Bid curves for Participating Resource dispatchable range made available to the market

- Energy bids cannot be changed after this time

- Use for Capacity and Flex Ramp Sufficiency Tests

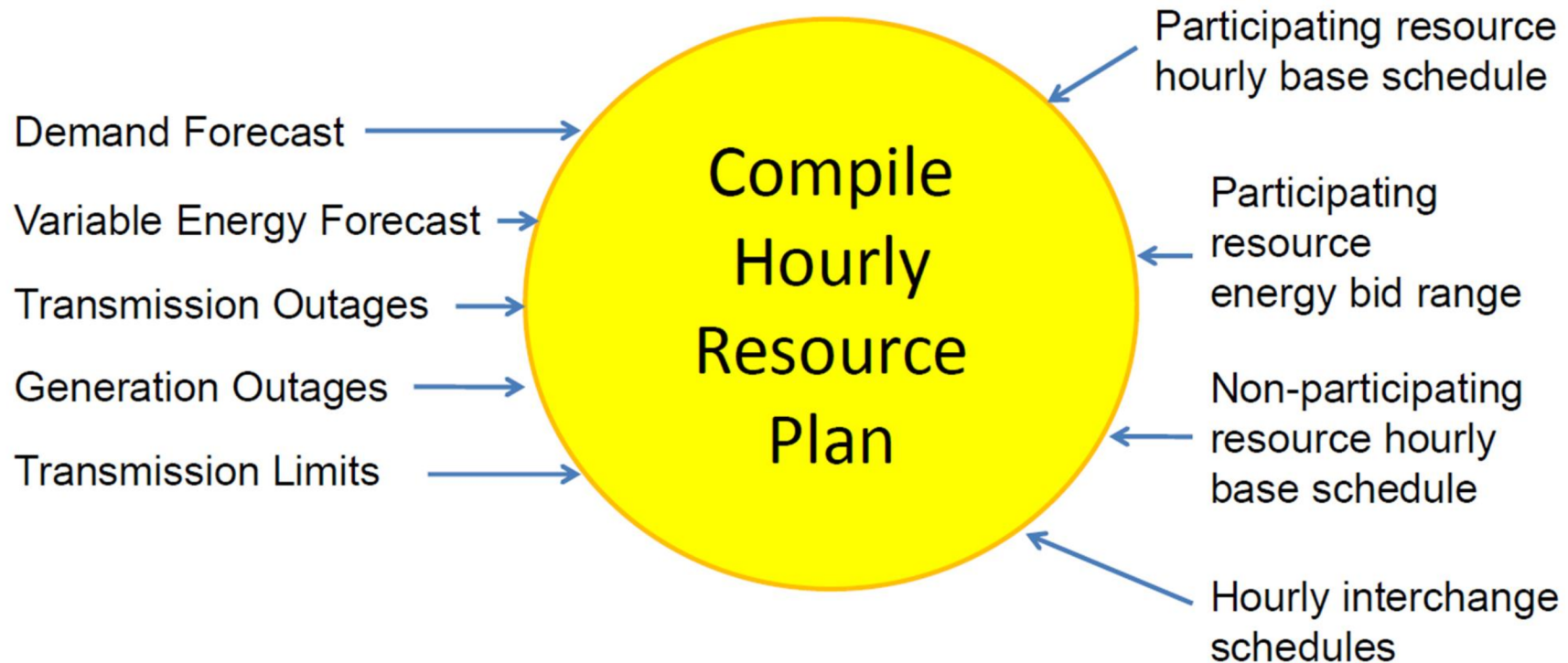# EIM Entity's Resource Plan

EIM Resource Plan

- The EIM Entity submits a resource plan to CAISO every hour, which is evaluated for RS
  - BPA and customers will need systems and processes to collect information (e.g., generation schedules)

- The plan contains the resources the EIM Entity plans to use to serve the EIM BAA's load and uncertainty during the operating hour

- The Resource Plan contains:
  - Base schedules for participating resources (PRs), non-participating resources (NPRs), interchanges, and load

  - Energy bids, which are submitted only by participating resources

  - Ancillary service schedules
    - Reserves to meet NERC/WECC contingency reserve requirements
    - Capacity held for ACS, such as regulation service (sub 5-min)

EIM Resource Plan

An EIM Entity must submit a resource plan to CAISO every hour. The plan is evaluated for resource sufficiency.

Demand Forecast →
Variable Energy Forecast →
Transmission Outages →
Generation Outages →
Transmission Limits →

Compile Hourly Resource Plan

← Participating resource hourly base schedule
← Participating resource energy bid range
← Non-participating resource hourly base schedule
← Hourly interchange schedules

EIM Resource Plan

The resource plan is evaluated for resource sufficiency at T-75, T-55, and T-40, at which point it becomes final. Adjustments to the resource plan are allowed up to T-40.
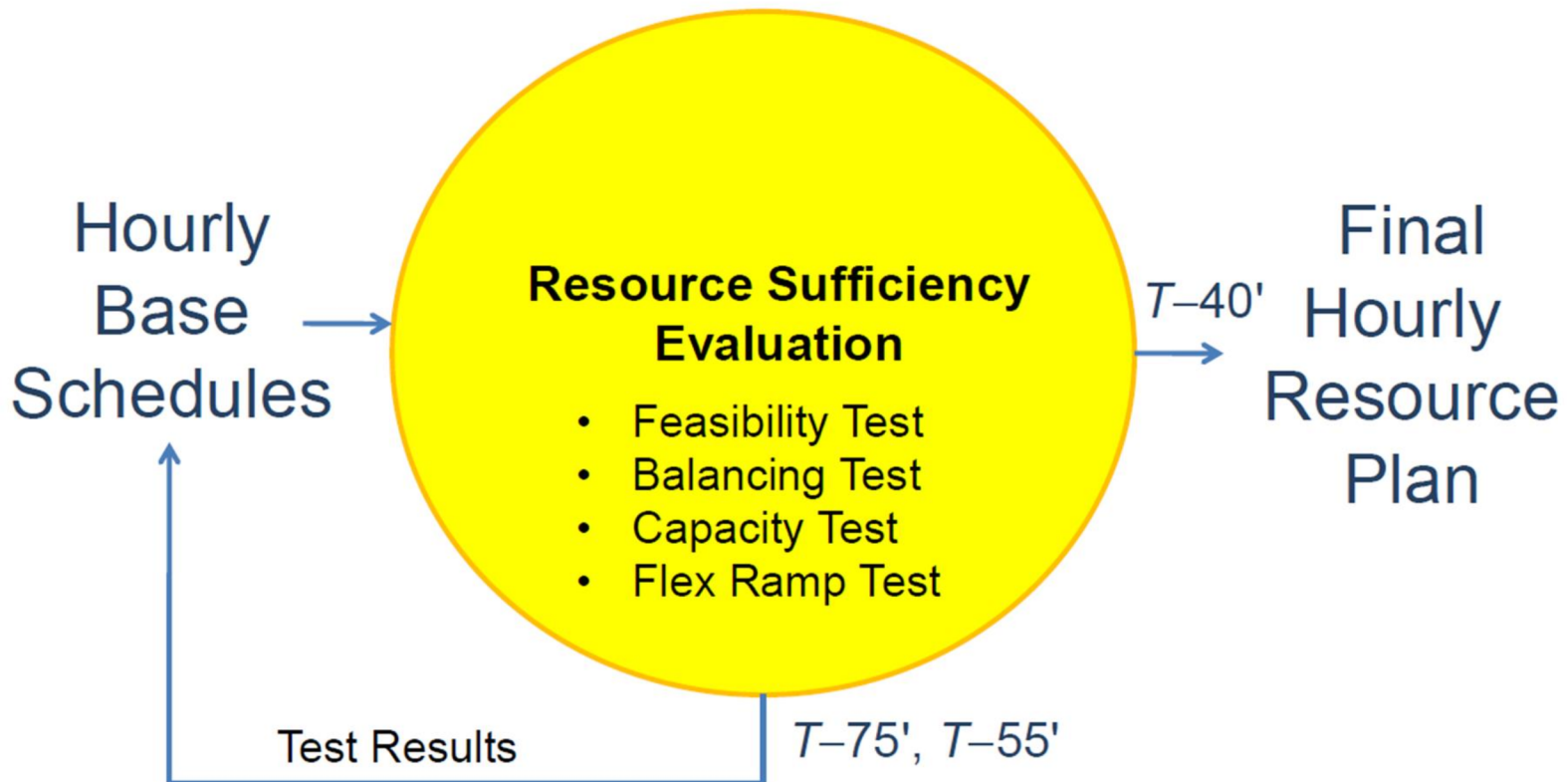
RS Evaluation Timeline

T 75: Base schedules and energy bids due (Resources)

T- 55: Updated base schedules are submitted if necessary (Resources)

T-40: Updated base schedules are submitted if necessary (Entity SC)

EIM Market Participants

T-20: E-tagging deadline (Entity SC)

T

Market 1   Market 2   Market 3   Market 4

X:00   X:15   X:30   X:45   Y:00

T-22.5: 15-minute scheduled awards published

T-37.5: Start of Market 1 optimization

T-45: Results of sufficiency test published

Market Operator

T-60: Results of sufficiency test published (Balanced? Feasible transmission? Sufficient flexible ramping?)

(T = start of the hour)

Resource Sufficiency Tests

EIM Resource Sufficiency Tests

An EIM BAA is evaluated for RS every hour in real-time based on 4 tests, which are performed sequentially:

1. Transmission Feasibility Test
    - Identifies if base schedules are limited by congestion

2. Balancing Test
    - Ensures that the EIM Entity load/resources are balanced going into the hour

3. Bid Range Capacity Test (Capacity Test)
    - Ensures the EIM Entity has bid range to cover expected variability

4. Flexible Ramp Sufficiency Test
    - Ensures the EIM Entity has ramping capability to meet expected variability

Test 1: Transmission Feasibility Test

This test informs the EIM Entity whether its base schedules result in transmission constraint violations within the EIM BAA:

- The test is advisory only—it's not binding

- The test provides the EIM Entity with the opportunity to resolve transmission constraint violations by adjusting base schedules prior to the operating/trading hour

- The EIM will attempt to prevent and/or resolve any transmission constraints through redispatch of participating resources, which may impact LMPs and LAPs and the congestion uplifts

Test 2: Balancing Test

The balancing test evaluates how well the EIM BAA has scheduled to meet the forecasted load

The test compares base schedules with the EIM BAA load forecast to determine whether or not the EIM Entity will be evaluated for over/under scheduling penalties:

- If the EIM Entity utilizes the CAISO's EIM BAA load forecast, it will not be evaluated after-the-fact for over/under scheduling penalties if it schedules to within 1%

- If the EIM Entity balances to an independent EIM BAA load forecast, then the EIM Entity is always evaluated after-the-fact for over/under scheduling penalties

- The Balancing Test never results in limits on EIM Import or Export Transfers
  - Least restrictive of Base EIM Transfer or Optimal transfer at T-7.5

Test 2: Balancing test

If an EIM Entity elects to use the **CAISO's EIM BAA load forecast**, then…

- **Pass**:
    - If the imbalance is within 1%, then the EIM Entity is not evaluated for over/under scheduling penalties

- **Fail**:
    - If the imbalance is greater than 1%, then the EIM Entity is evaluated for over/under scheduling penalties

    - The EIM Entity will be charged for over or under scheduling penalties if the actual load for the hour was not within 5% of the gen and interchange base schedules minus Tx losses
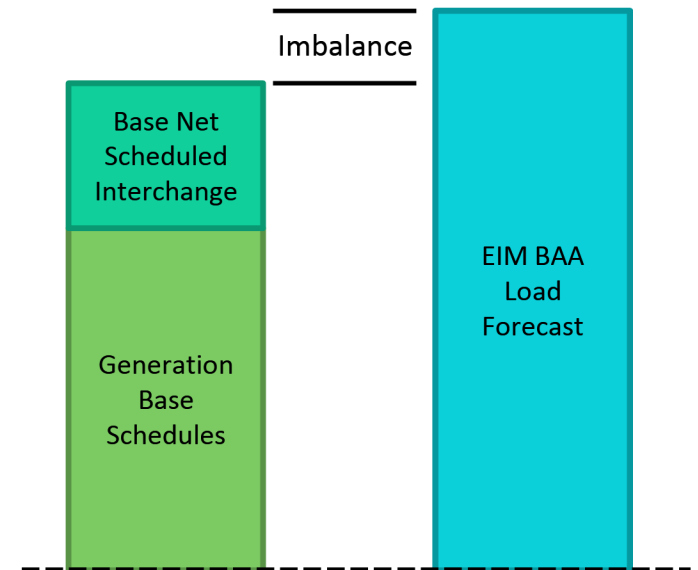
Test 3: Capacity Test

This test evaluates whether there is sufficient upward and downward energy bid capacity from PRs to serve:

- The imbalance between the gen and interchange base schedules and the EIM BAA area load forecast, and the
- Historical up/down interchange deviations

INC

DEC
Base Net Scheduled Interchange

Generation Base Schedules

Historical Interchange Deviation Up

Historical Interchange Deviation Down

EIM BAA Load Forecast
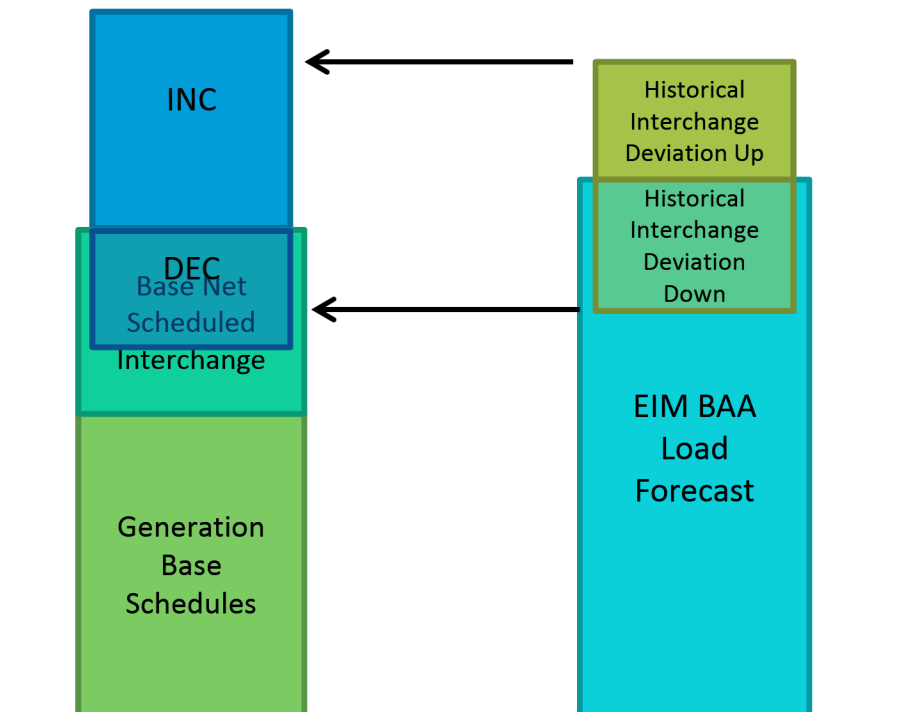
The interchange deviation requirement is a measure of the historical <u>difference</u> between the base scheduled interchange @ T-40 versus the tagged interchange @ T-20

For example, the amount of interchange that was not tagged after T-40.

The interchange deviation requirement varies by hour, but is fixed for the month. It equals the P95 confidence interval of the past 3 months of historical interchange deviations.

Test 3: Capacity Test

- **Pass**:
  - No restrictions are placed on net EIM Import or Export Transfers

  - The EIM Entity proceeds to the Flexible Ramp Sufficiency Test (Test 4)

- **Fail**:
  - If an Entity fails the upward Capacity Test, EIM Import Transfers cannot be increased from Base Transfer or Optimal transfer at T-7.5 for the hour

  - If an Entity fails the downward Capacity test, EIM Export Transfers cannot be increased from Base Transfer or Optimal transfer at T-7.5 for the hour

  - It's possible to fail in both directions

  - The EIM Entity also automatically fails the Flex Ramp Sufficiency Test (Test 4) in the direction failed for the hour

Test 4: Flexible Ramp Sufficiency Test

The Flexible Ramp Sufficiency Test (FRST) ensures that each EIM BAA has sufficient ramp capability and ramp capacity each hour to meet expected intra-hour upward and downward ramping needs

- The EIM BAA must have sufficient ramp capability and upward/downward capacity to meet the 15-min, 30-min, 45-min, and 60-min ramps within the hour

- Requirement is reduced by diversity benefit, limited to the available net import/export capability

- It's possible to pass the Capacity Test and fail the FRST

- Each 15-minute interval is evaluated separately but any failure is enforced for the hour

Test 4:Flexible Ramp Sufficiency Test

- Data used:
  - Initial Participating Resource operating points used as the last FMM for the prior hour (at $T-7.5'$)
    - Advisory solutions from FMM at T-75' and T-55' are used
    - Binding solution from FMM at T-40'
  - Participating Resources energy bids and ramp rates
  - VER and Demand Forecasts at 15' intervals
  - 15' Flexible Ramp Uncertainty up/down requirements
    - Historical Load net VER difference from last Advisory 15-min run versus Binding 5-min market runs within that Hour of the Day
    - Reduced by a prorated EIM diversity benefit
    - Reduced by any credit for net outgoing/incoming EIM transfer at $T-7.5'$
    - Reductions limited by the available net import/export capability

Test 4:Flexible Ramp Sufficiency Test

Max INC Uncertainty

Expected Load

4th 15-MIN
3rd 15-MIN
1st 15-MIN
2nd 15-MIN

Contingency
REG Up
Flex Ramp Range
REG Down
VERs
Net Interchange

Max DEC Uncertainty
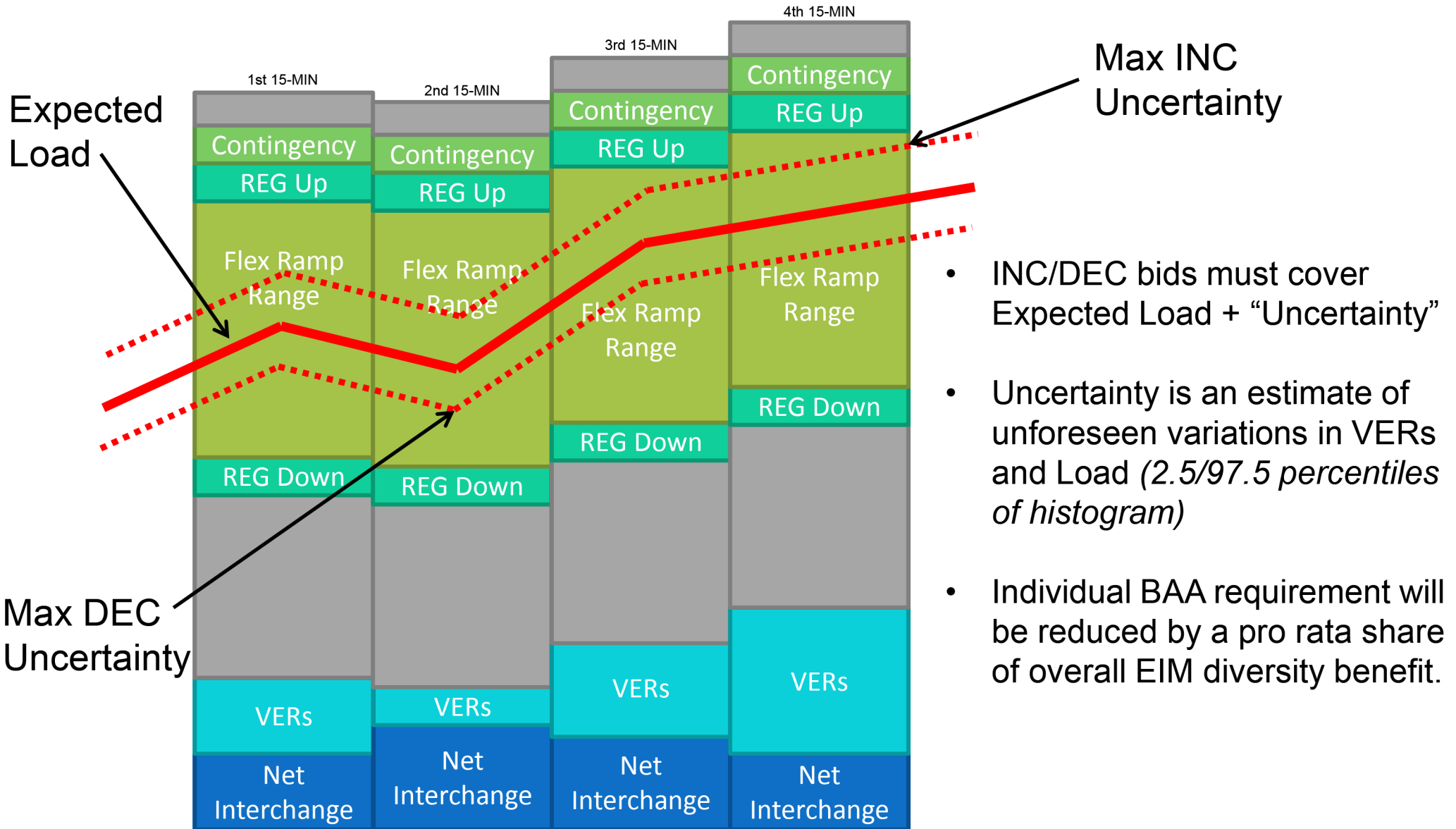
- INC/DEC bids must cover Expected Load + "Uncertainty"

- Uncertainty is an estimate of unforeseen variations in VERs and Load *(2.5/97.5 percentiles of histogram)*

- Individual BAA requirement will be reduced by a pro rata share of overall EIM diversity benefit.

https://www.caiso.com/Documents/BusinessRequirementsSpecification-FlexibleRampingProduct.pdf

Test 4: Flexible Ramp Sufficiency Test

Flex Ramp Up Requirement Example
20MW/Min Ramp Capability
Passes Bid Capacity but Fails Flex Ramp in Interval 1
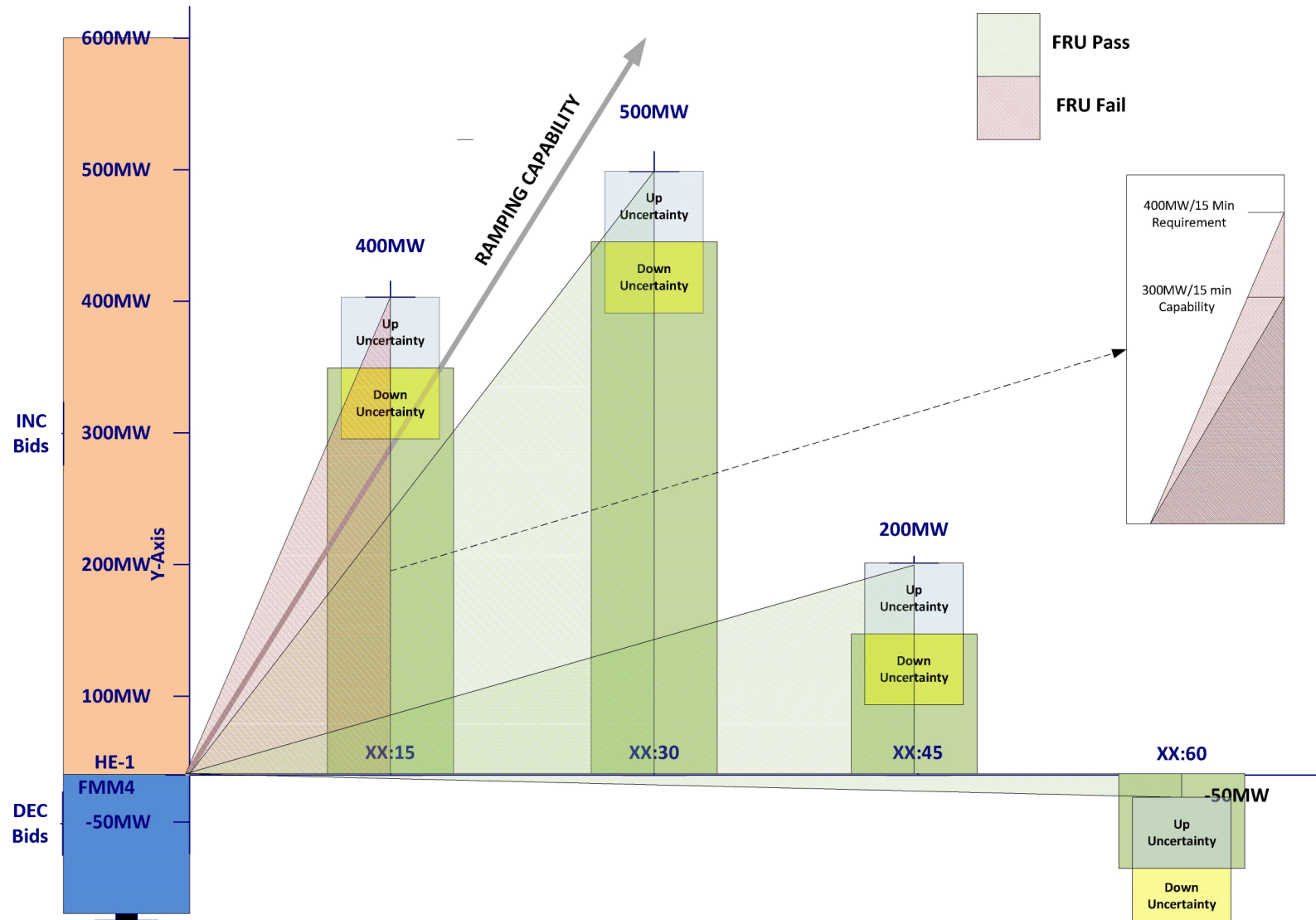
Test 4: Flexible Ramp Sufficiency Test

- **<u>Pass</u>**:
  - No restrictions are placed on EIM Import or Export Transfers

- **<u>Fail</u>**:
  - If an Entity fails the upward sufficiency test, EIM Import Transfers cannot be increased from Base Transfer or Optimal transfer at T-7.5

  - If an Entity fails the downward sufficiency test, EIM Export Transfers cannot be increased from Base Transfer or Optimal transfer at T-7.5

  - It's possible to fail in both directions

Illustrations of RS Evaluation and EIM Transfers

Failing RS in the Up Direction

- When an EIM Entity has insufficient upward capacity to meet the RS requirement, it fails in the up direction

- CAISO will not allow an increase in net EIM Import Transfers for the hour from Base Transfer or Optimal transfer at T-7.5

- This helps to prevent the EIM BAA from leaning on other EIM BAAs

Failing RS in the Down Direction

- When an EIM Entity has insufficient downward capacity to meet the RS requirement, it fails in the down direction

- CAISO will not allow an increase in net EIM Export Transfers for the hour from Base Transfer or Optimal transfer at T-7.5

- This helps to prevent the EIM BAA from leaning on other EIM BAAs

Base and Optimal EIM Transfers

- The <u>base EIM Transfer</u> equals the base net scheduled interchange between an EIM BAA and other EIM BAAs
  - The base EIM Transfer does not include net scheduled interchange with non-EIM BAAs
  - The base EIM Transfer is due at T-40'

- The total base net scheduled interchange for an EIM BAA is the sum of two net scheduled interchanges:
  - 1). the base EIM Transfer and
  - 2). the base net scheduled interchange with non-EIM BAAs

- The <u>optimal EIM transfer</u> is the net interchange (15-min/5-min) between an EIM BAA and other EIM BAAs as determined by CAISO's market models
  - The FMM determines the optimal 15-min EIM Transfer, and the RTD determines the optimal 5-min EIM Transfer

Base and Optimal EIM Transfers

- If the base EIM transfer < 0, then the EIM BAA is scheduled as a net EIM importer within the EIM area for the next operating hour

- If the base EIM transfer > 0, then the EIM BAA is scheduled as a net EIM exporter within the EIM area for the next operating hour

- During the operating hour, the FMM and RTD determine the optimal EIM Transfers (15-min/5-min), which may be above or below the base EIM transfer

Direction of the Base EIM Transfer

- If the base EIM Transfer is <u>negative</u>, then the Entity is scheduled as net EIM importer in the EIM area
  - For example, assume the base EIM Transfer = -150 MW

Net EIM Importer   -150 MW   **0 MW**   Net EIM Exporter
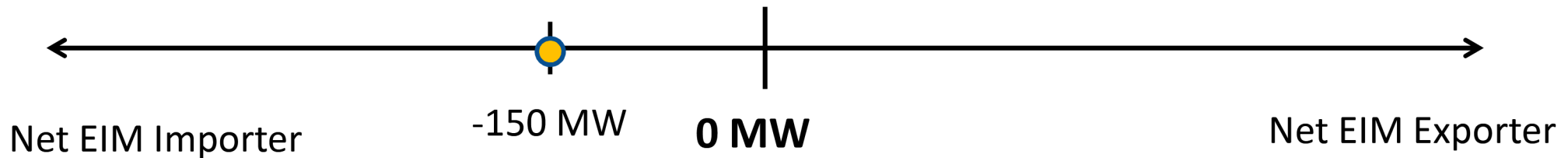
- If the base EIM Transfer is <u>positive</u>, then the Entity is scheduled as a net EIM exporter in the EIM area
  - For example, assume the base EIM Transfer = 150 MW

Net EIM Importer   **0 MW**   150 MW   Net EIM Exporter

37
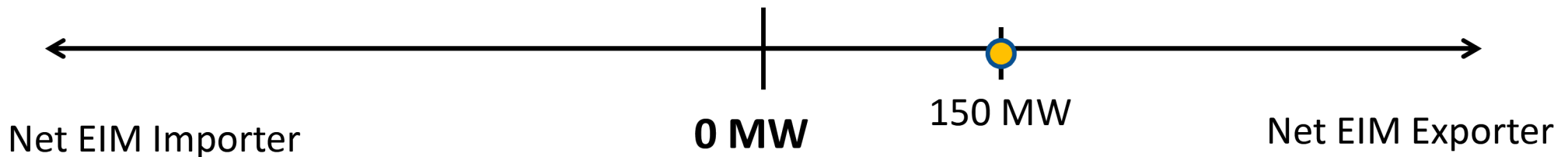
Feasible Range for EIM Transfers

- For the following examples, assume the base EIM Transfer always equals 150 MW, i.e., the EIM BAA is scheduled as a net EIM exporter during the next hour

  ○ The base EIM Transfer for the next hour T is 150 MW

- If the Entity passes the RS evaluation in the up and down direction, then no additional limits are placed on the 15-min/5-min EIM Transfers in hour T—the only limitations are the available Tx capacity and the bid range capacity

Net EIM Import Capability <= EIM Transfers <= Net EIM Export Capability

| Net EIM Importer | 0 MW | 100 MW | 150 MW | 200 MW | Net EIM Exporter |
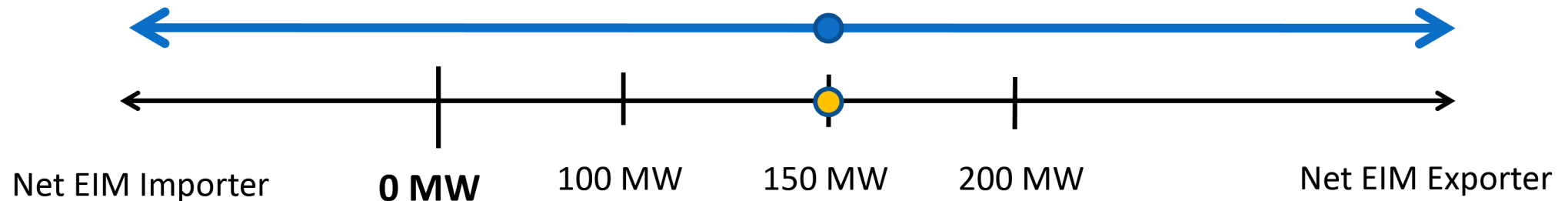
Limit on EIM Transfers if Fail Up

- If the Entity fails RS in the Up direction, then the EIM Transfers in hour T are limited from increasing in the <u>net import</u> direction
  - i.e., limited from moving further to the left on the horizontal axis

- The limit on the EIM Transfers in hour T equals:
  - the least restrictive amount between the optimal EIM Transfer at T-7.5' and the base EIM Transfer for hour T

- EIM Transfer Limit = <u>Min</u>(optimal EIM Transfer at T-7.5', Base EIM Transfer for hour T)

Feasible Range for EIM Transfers if Fail Up

- Assume:
  - 🔴 The optimal EIM Transfer at T-7.5' is 200 MW

  - 🟡 The base EIM Transfer for next hour T is 150 MW

  - 🔵 The EIM Transfer Limit for the next hour equals Min(200 MW, 150 MW) = 150 MW

- The feasible range for the EIM Transfers in hour T includes both the base EIM Transfer and the optimal EIM Transfer at T-7.5'

150 MW <= EIM Transfers <= Net EIM Export Capability

Net EIM Importer   0 MW   100 MW   150 MW   200 MW   Net EIM Exporter
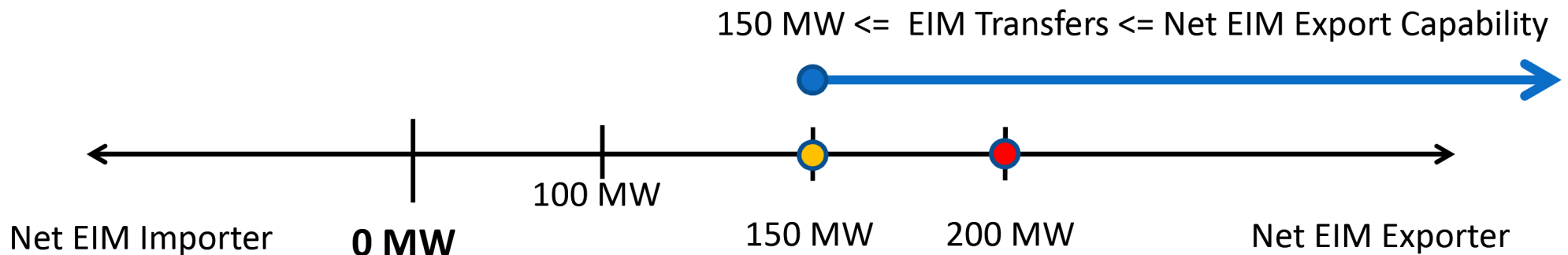
Feasible Range for EIM Transfers if Fail Up

- Assume:
  - 🔴 The optimal EIM Transfer at T-7.5' is 100 MW

  - 🟡 The base EIM Transfer for hour T is 150 MW

  - 🔵 The EIM Transfer Limit for the next hour equals Min(100 MW, 150 MW) = 100 MW

- The feasible range for the EIM Transfers in hour T includes both the base EIM Transfer and the optimal EIM Transfer at T-7.5'

100 MW <= EIM Transfers <= Net EIM Export Capability

Net EIM Import	0 MW	100 MW	150 MW	200 MW	Net EIM Export
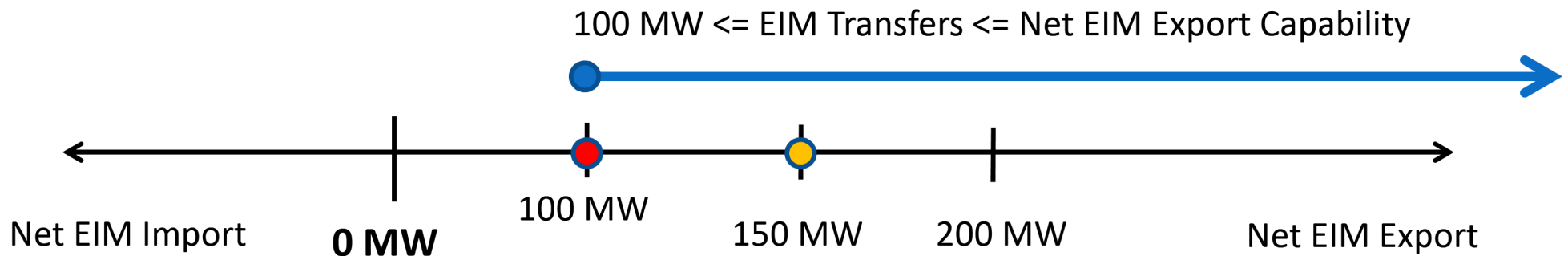
Limit on EIM Transfers if Fail Down

- If the Entity fails RS in the Down direction, then the EIM Transfers during hour T are limited from increasing in the <u>net export</u> direction
  - i.e., limited from moving further to the right on the horizontal axis

- The limit on EIM Transfers in hour T equals:
  - the least restrictive amount between the optimal EIM Transfer at T-7.5' and the base EIM Transfer for hour T

- EIM Transfer Limit = <u>Max</u>(optimal EIM Transfer at T-7.5', Base EIM Transfer for hour T)

Feasible Range for EIM Transfers if Fail Down

- Assume:
  - 🔴 The optimal EIM Transfer at T-7.5' is 200 MW

  - 🟡 The base EIM Transfer for next hour T is 150 MW

  - 🔵 The EIM Transfer Limit for the next hour equals Max(200 MW, 150 MW) = 200 MW

- The feasible range for the EIM Transfers in hour T includes both the base EIM Transfer and the optimal EIM Transfer at T-7.5'

Net EIM Import Capability <= EIM Transfers <= 200 MW

100 MW

Net EIM Importer   0 MW   150 MW   200 MW   Net EIM Exporter

Feasible Range for EIM Transfers if Fail Down

- Assume:
  - 🔴 The optimal EIM Transfer at T-7.5' is 100 MW

  - 🟡 The base EIM Transfer for hour T is 150 MW

  - 🔵 The EIM Transfer Limit for the next hour equals Max(100 MW, 150 MW) = 150 MW

- The feasible range for the EIM Transfers in hour T includes both the base EIM Transfer and the optimal EIM Transfer at T-7.5'

Net EIM Import Capability <= EIM Transfers <= 150 MW

100 MW

Net EIM Importer   0 MW   150 MW   200 MW   Net EIM Exporter

Feasible Range for EIM Transfers if Fail Down and Up

- Assume:
  - 🔴 The optimal EIM Transfer at T-7.5' is 100 MW

  - 🟡 The base EIM Transfer for hour T is 150 MW

  - 🔵 Failed Down: The EIM Transfer limit for the next hour equals Max(100 MW, 150 MW) = 150 MW

  - 🔵 Failed Up: The EIM Transfer limit for the next hour equals Min(100 MW, 150 MW) = 100 MW
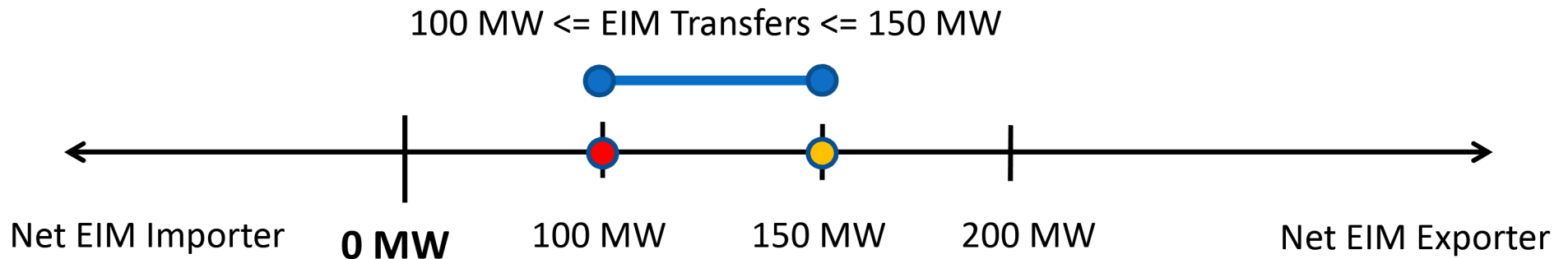
100 MW <= EIM Transfers <= 150 MW

Net EIM Importer   0 MW   100 MW   150 MW   200 MW   Net EIM Exporter

Feasible Range for EIM Transfers if Fail Down and Up

- Assume:
  - 🔴 The optimal EIM Transfer at T-7.5' is 200 MW

  - 🟡 The base EIM Transfer for hour T is 150 MW

  - 🔵 Failed Down: The EIM Transfer Limit for the next hour equals Max(200 MW, 150 MW) = 200 MW

  - 🔵 Failed Up: The EIM Transfer Limit for the next hour equals Min(200 MW, 150 MW) = 150 MW

150 MW <= EIM Transfers <= 200 MW

Net EIM Importer   **0 MW**   100 MW   150 MW   200 MW   Net EIM Exporter

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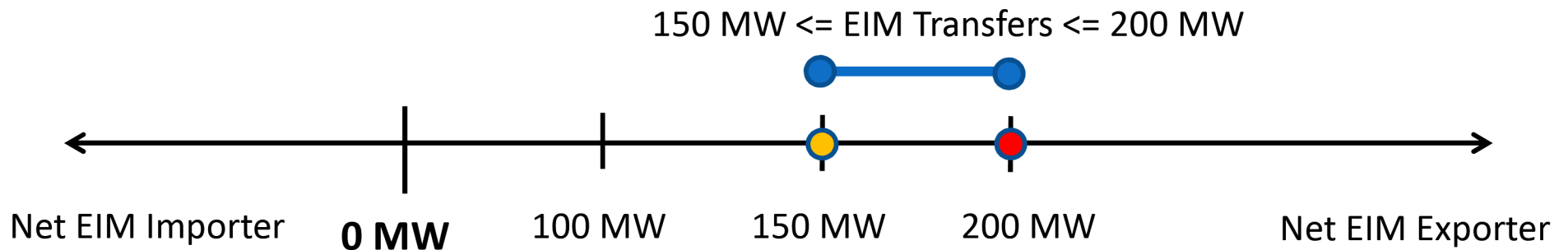
Relationship of EIM to Other Emerging Markets

Relationship of EIM to Other Emerging Markets

- What are these other emerging markets?

- BPA's principles for other emerging markets

- High-level review of specific initiatives:
  - What is happening?
  - If, how and when will other emerging markets impact EIM?
  - What is BPA doing to address possible impacts?

Presentation Assumptions

- Basic familiarity with the EIM and other CAISO markets, such as day-ahead

- Basic familiarity with CAISO initiative process elements

- Review of previous BPA stakeholder materials

What are Other Emerging Markets?

Other Emerging Markets

- CAISO currently bifurcates its markets between day-ahead and real-time, with EIM encompassing the real-time markets

Day-Ahead

> **Integrated Forward Market (IFM)**
>
> **Residual Unit Commitment (RUC)**

Other

> **Hour Ahead Scheduling Protocol (HASP)**

Real-time / EIM

> **Real-time Dispatch (RTD) 5-minute**
>
> **Real-time Pre-Dispatch (RTPD) 15-minute or FMM**
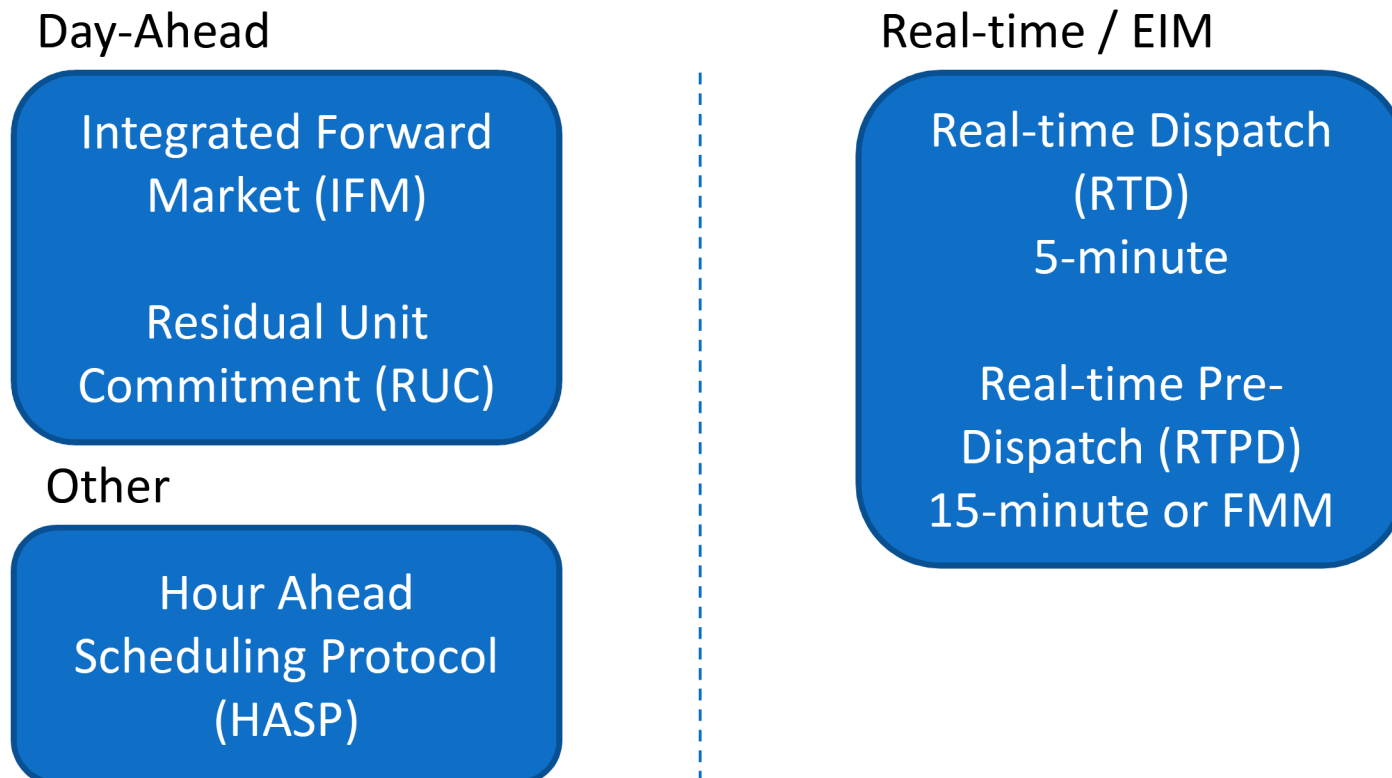
Other Emerging Markets

- CAISO markets prior to real-time:
  - Currently operate at an hourly scheduling granularity
  - Are open to participation from outside the ISO footprint

- BPA actively participates in day-ahead and HASP markets today

- Like EIM, these markets are subject to both possible enhancements and/or expansion through the CAISO initiative processes

- BPA's consideration of whether and how to join the EIM will address whether these enhancements or expansions impact our decision(s) regarding EIM

CAISO Policy Initiative Processes

- CAISO's 2019 Policy Initiatives Roadmap identifies several existing and possible initiatives in this emerging market space:
  - Day-Ahead Market Enhancements (DAME) – Phase 1 (aka DAME 15)
  - DAME – Phase 2 (aka DAME FRP)
  - Expansion of the Day-Ahead Market to EIM (EDAM)

- CAISO could introduce other initiatives in this space

- Latest information is available at:
  http://www.caiso.com/informed/Pages/StakeholderProcesses/AnnualPolicyInitiativesRoadmapProcess.aspx

BPA's Principles for Other Emerging Markets

Statement of BPA's Principles for EIM Process (repeat of slide 5):

1. Participation is consistent with statutory, regulatory, and contractual obligations.

2. Maintain reliable delivery of power and transmission to our customers.

3. Resource participation in the EIM is and always will be voluntary.

4. BPA's decision to participate in the EIM will be based on a sound business rationale.

BPA's Principles for Other Emerging Markets

- EIM principles still apply, plus likely additions:
  - **Governance**: Independent, Representative
  - **Resource Adequacy**: Provides for reliability and equity; Respects existing jurisdictional authorities
  - **Transmission**: Access and utilization are comparable; Adequate compensation; Equitable cost allocation
  - **Market Power Mitigation**: Recognize the opportunity costs of hydro; Apply when there is an opportunity to exercise; Consider voluntary nature of the market
  - **Market Price Formation**: Appropriate compensation for the services provided (e.g. energy, capacity, ancillary services, environmental attributes)

BPA's Application of Principles for Other Emerging Markets

- Criteria for evaluating other emerging markets impact on BPA's decision to join the EIM:
  - Is there an impact on EIM?
  - If so, what is it and how is EIM impacted?
    - Is it mandatory or optional?
    - Is the nature of the impact qualitative? For example:
      - Reliability impact?
      - Additional certainty or uncertainty?
    - Can the impact be quantified? For example:
      - Revenue impact?
      - Cost impact?
  - When are EIM participants impacted?
- How these policy initiatives impact existing business and/or future decision(s) are not within scope of this EIM Implementation Agreement decision process

High-level Review of Specific Initiatives

Day-Ahead Market Enhancements (DAME) – Phase 1 (aka DAME 15)

- Stage:
  - CAISO policy initiative in draft final proposal stage
  - Implementation expected in Fall 2020

- High-level summary:
  - Institutes 15-minute scheduling and 15-minute bidding

- Does it impact EIM?
  - Yes. Base schedules would move to 15-minute granularity, which could impact process and system requirements for EIM. Resource Sufficiency tests move to 15-minute. Scheduling coordinators able to submit unique bids for the 4 15-minute intervals of the operating hour. Hourly block still available at interties and EIM retains support for hourly bid submissions.

- How is BPA involved?
  - BPA has commented in the CAISO's policy initiative process:
  http://www.caiso.com/Documents/BPAComments-Day-AheadMarketEnhancements15-MinuteGranularity-SecondRevisedStrawProposal.pdf

- More information:
  - Second Revised Straw Proposal
  - September 4, 2018 web conference presentation

DAME – Phase 2 (aka DAME FRP)

- Stage:
  - CAISO policy initiative underway and in Issue Paper stage
  - Implementation expected in Fall 2021

- High-level summary:
  - Development of day-ahead Flexible Reserve Product
  - Had considered collapsing and reformulating IFM and RUC

- Does it impact EIM?
  - Unclear. It may impact real-time flexible ramping product.

- How is BPA involved?
  - BPA will be commenting in the CAISO's policy initiative process, but the first comment period was retracted

- More information:
  http://www.caiso.com/informed/Pages/StakeholderProcesses/Day-AheadMarketEnhancements.aspx

Expansion of the Day-Ahead Market to EIM (EDAM)

- Stage:
  - Currently in pre-CAISO policy initiative conceptual phase
  - Kick-off of CAISO policy initiative expected by mid-2019
  - Implementation expected in Fall 2021

- High-level summary:
  - Expands the enhanced day-ahead market to some or all EIM Entity BAAs (ie. with 15-minute granularity and FRP)

- Does it impact EIM?
  - Unclear

- How is BPA involved?
  - As this is in a pre-CAISO policy initiative conceptual phase, BPA is not currently involved.
  - After the CAISO policy initiative begins BPA will become involved

- More information:
  http://www.caiso.com/informed/Pages/StakeholderProcesses/AnnualPolicyInitiativesRoadmapProcess.aspx

Next Steps

Next Steps

- Next meeting scheduled for **Wednesday February 20th** at the Rates Hearing Room.
  - WebEx and Phone participation will be available
  - Agenda and materials will be distributed in advance via Tech Forum

- We welcome feedback on this meeting. Your comments will help shape future EIM Stakeholder Meetings, please email us at techforum@bpa.gov and reference "EIM Stakeholder Meeting" in the subject. Comments are due by January 31st Thursday.

- For more information on BPA's EIM Stakeholder process and meetings please visit:
  https://www.bpa.gov/Projects/Initiatives/EIM/Pages/Energy-Imbalance-Market.aspx

- For more information on BPA's Grid Modernization Initiative please visit:
  https://www.bpa.gov/goto/GridModernization

Question and Answer Session

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Appendix

CAISO Policy Initiative Development Processes

CAISO's Policy Initiative Roadmap Process

Annual policy initiatives roadmap process

The annual roadmap process captures the policy initiatives the ISO will undertake in the following year and their approximate timeframes. The development of the annual roadmap includes updating the Policy Initiatives Catalog. The catalog, updated twice a year, is a comprehensive directory of current, planned and potential policy initiatives that require a stakeholder process.

Source:
http://www.caiso.com/informed/Pages/StakeholderProcesses/AnnualPolicyInitiativesRoadmapProcess.aspx
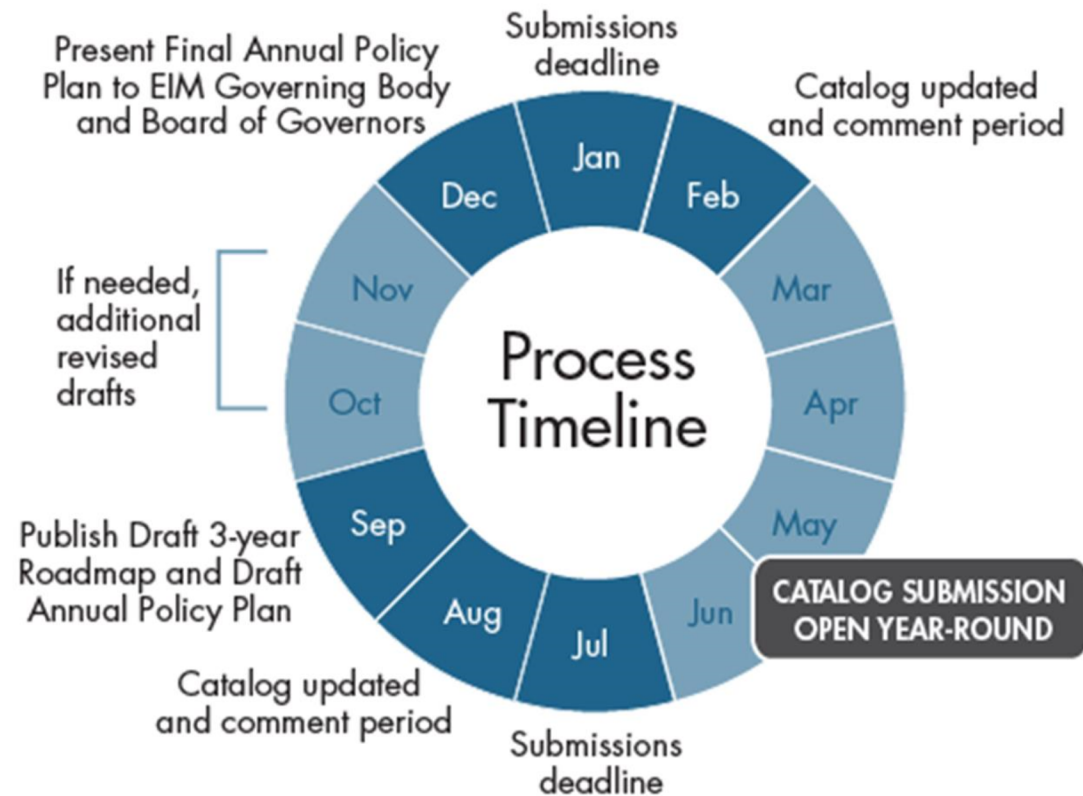
CAISO's 3-year Policy Initiative Roadmap

Proposed Three-year Policy Roadmap of Major Initiatives ◆ = Implementation
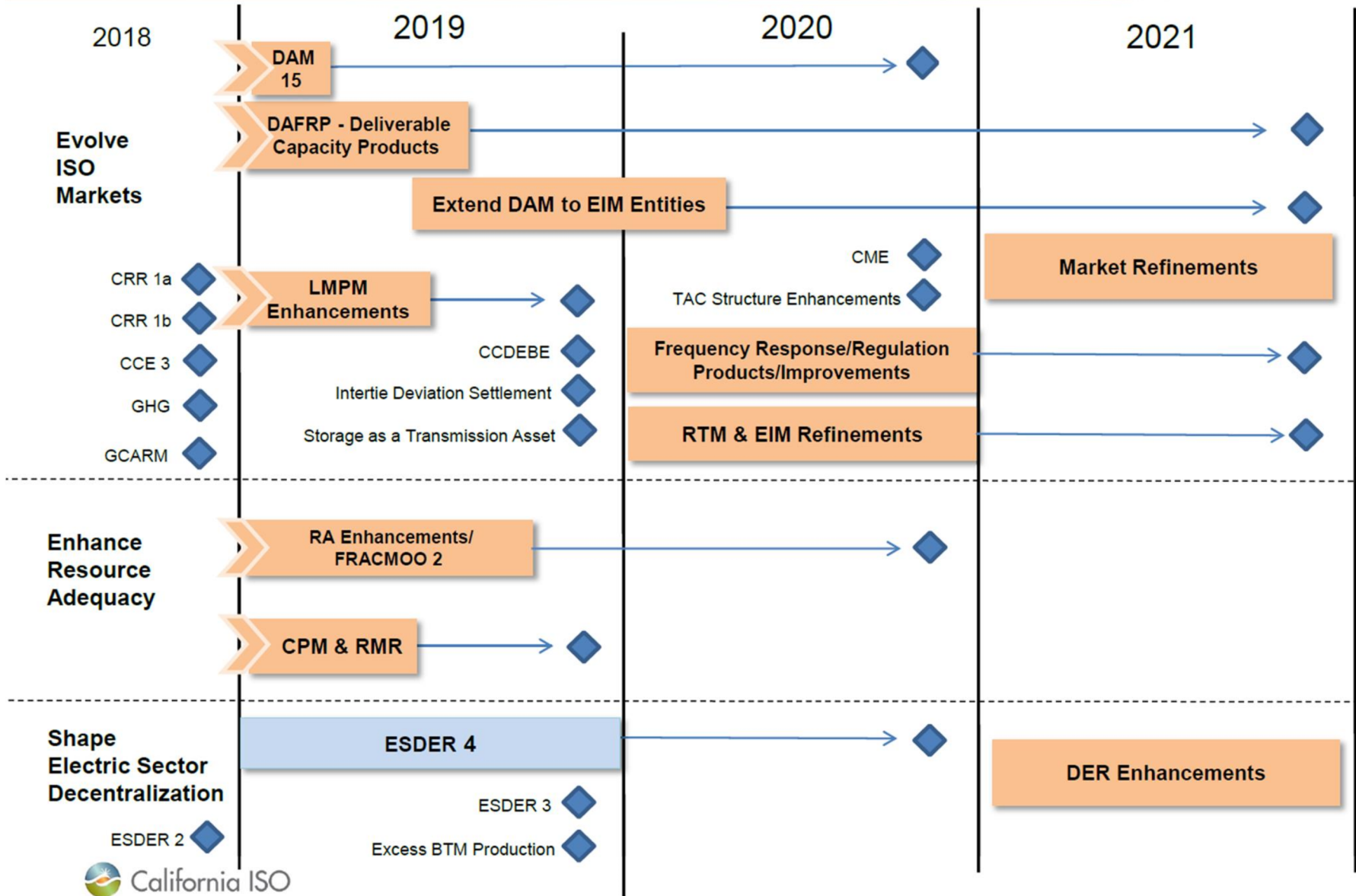
CAISO's 2019 Policy Initiative Roadmap
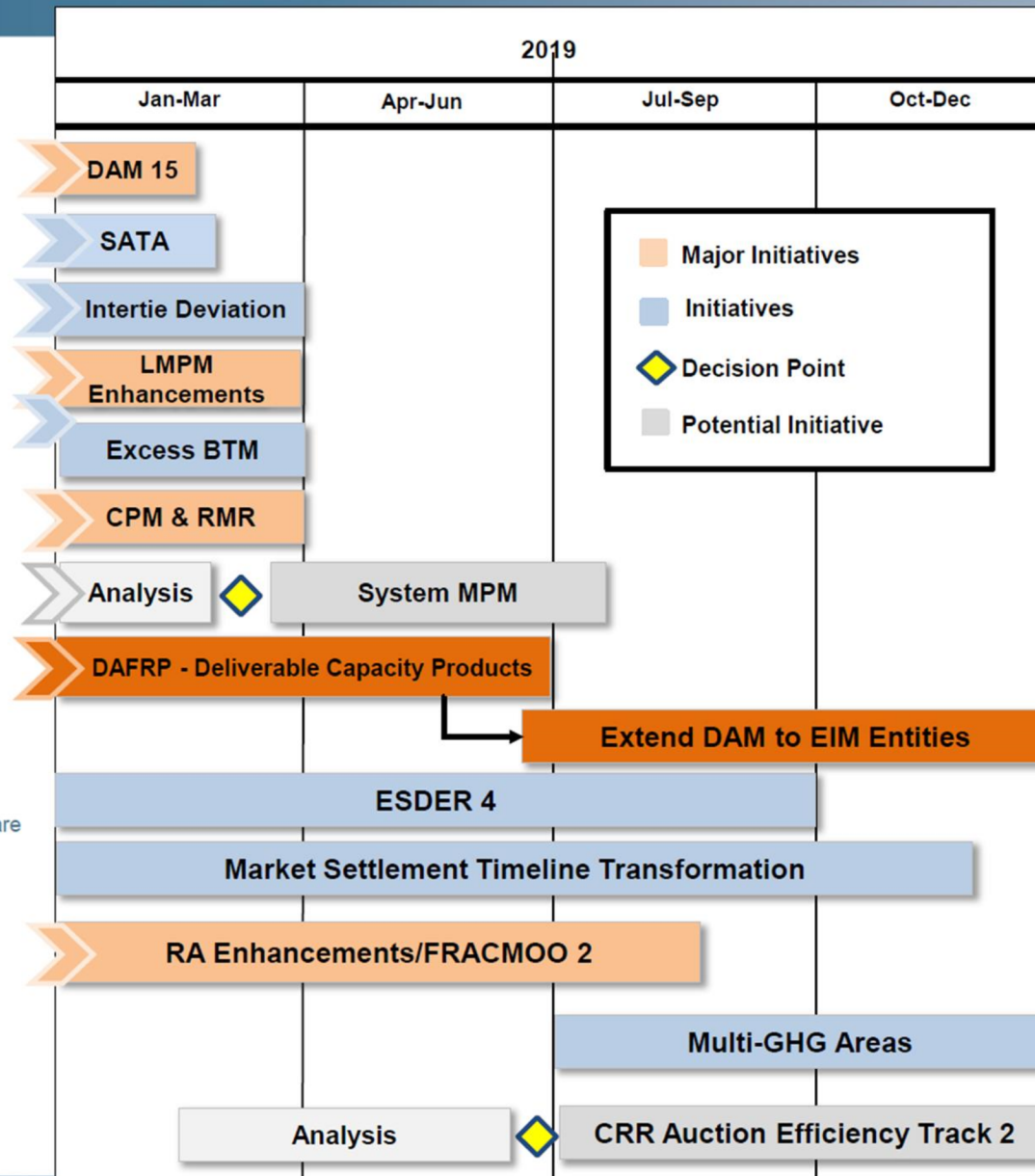
CAISO's Policy Development Process

Source:
http://www.caiso.com/informed/Pages/StakeholderProcesses/Default.aspx

Current Scope and Status of Selected Initiatives
DAME – Phase 1

Day-Ahead Market Enhancements (DAME) – Phase 1 (aka DAME 15)

- Current status

Day-Ahead Market Enhancements (DAME) – Phase 1 (aka DAME 15)

- Current scope:
  - CAISO presentation from Sep 4th Web conference encompassing the Second Revised Final Proposal describe the EIM changes included in DAME Phase 1
  - More complete description of the entire initiative can be found in the Second Revised Final Proposal

Day-Ahead Market Enhancements (DAME) – Phase 1 (aka DAME 15)

EIM changes needed to align with ISO day-ahead market

- EIM base schedules are currently hourly consistent with ISO's current day-ahead scheduling granularity

- With DAM enhancements implementation, base schedules will now be submitted with 15-minute granularity

- 15-minute base schedules change from tests from hourly to 15-minute evaluation
  - Resources sufficiency evaluation capacity and balance test
  - Over/under scheduling penalties

Day-Ahead Market Enhancements (DAME) – Phase 1 (aka DAME 15)

Resource sufficiency evaluation ensures EIM entities don't lean on others capacity, flexibility or transmission

- Currently, performed hourly if any test is failed, EIM transfers cannot exceed prior hour's level

- Changes that will be implemented with move to 15-minute base schedules

  - Capacity test by 15-minute interval
  - Balance test by 15-minute interval

- Changes that will be implemented ASAP through BPM change process

  - Flexible ramping test failure freeze by 15-minute interval
  - Flexible ramping test passes if within 1% of requirement

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Source:
http://www.caiso.com/Documents/Presentation-Day-AheadMarketEnhancementsFifteen-MinuteGranularity-Sep42018.pdf

Day-Ahead Market Enhancements (DAME) – Phase 1 (aka DAME 15)

Over / under scheduling penalty will align with 15-minute base schedules

- Determine if penalty should apply each 15-minute interval

- Penalty only applies for 15-minute interval not entire hour

- Under extended DAM, this penalty is no longer applicable because EIM participants can't determine how much imbalance is settled in EIM

Current Scope and Status of Selected Initiatives
DAME – Phase 2

DAME – Phase 2 (aka DAME FRP)

- Current status and scope:
  - Scope in the Spring of 2018 was to:
    - Establish DA FRP product
    - Combine IFM and RUC
  - Nov 30th Working Group meeting made clear IFM and RUC could not be combined and posited two alternatives to reformulate and possibly re-sequence IFM and RUC.
  - Dec 14th the ISO cancelled the Dec 21st comment deadline regarding the Working Group meeting (see market notice)
  - Dec 17th Board meeting and annual policy roadmap continues to highlight moving forward with DA FRP portion of this policy initiative in 2019 and implementation 2021

Current Scope and Status of Selected Initiatives
EDAM

Expansion of the Day-Ahead Market to EIM (EDAM)

Extending DAM to EIM Entities provides additional regional benefits

- Key benefits:
  - Allows EIM participants to benefit from day-ahead market enhancements
  - Day-ahead unit commitment and scheduling across larger footprint improves market efficiency and more effectively integrates renewables

- Key principles:
  - Each balancing authority retains reliability responsibilities
  - States maintain control over integrated resource planning
    - Resource adequacy procurement decisions remain with local regulatory authority
    - Transmission planning and investment decisions remain with each balancing authority and local regulatory authority
  - Voluntary Market, like EIM

California ISO

ISO Public

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Source:
http://www.caiso.com/Documents/2019FinalPolicyInitiativesRoadmap.pdf

Expansion of the Day-Ahead Market to EIM (EDAM)

Scope of stakeholder initiative to extend day-ahead market to EIM Entities

- Transmission provision for Day-Ahead Market
  - Transmission cost recovery

- Day-ahead resource sufficiency evaluation
  - Provide functionality to enable entities to trade capacity for resource sufficiency tests

- Mechanism to distribute congestion revenues

- Full network model enhancements

- Day-ahead GHG attribution for states with carbon cost policies

- Governance to account for larger market scope

California ISO

ISO Public

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EIM Stakeholder Meeting

July 24, 2018

Rates Hearing Room

Agenda

9:00-9:10	• Welcome, Safety Moment, Introductions
9:10 – 9:30	• Strategic Plan and Grid Modernization Overview
9:30 – 9:45	• EIM Overview
9:45 – 11:00	• EIM Initial Cost Benefit Analysis • Issues we are Reviewing • Draft EIM Timeline
11:00 – 11:10	• Next Steps
11:10 – 12:00	• Question and Answer Session

Objectives of Today's Meeting

- How EIM fits into the Grid Modernization effort

- Initial look at costs and benefits of joining the EIM

- Issues BPA is reviewing regarding potentially joining the EIM

- Hear from customers and stakeholders

Strategic Plan and Grid Modernization Overview

Presenter:

Steve Kerns, Business Transformation Office

Grid Modernization Initiative

- 2018-2023 Strategic Plan Released

- Strengthens our ability to manage our commercial business through efficiencies and improved operational capabilities

- Focus on modernizing federal power and transmission system operations

- Grid modernization projects provide independent value to bring systems, processes and skills up to date

Delivering on our public responsibilities through a commercially successful business

BPA 2018–2023 Strategic Plan

www.bpa.gov/StrategicPlan/Pages/Strategic-Plan.aspx

Strategic Goals

#1 STRENGTHEN FINANCIAL HEALTH — Strengthen financial health by meeting objectives for cost management, liquidity, debt utilization, debt capacity and credit ratings.

#2 MODERNIZE ASSETS & SYSTEM OPERATIONS — Modernize assets and system operations to leverage and enable industry change.

#3 PROVIDE COMPETITIVE POWER PRODUCTS & SERVICES — Provide competitive power products and services.

#4 MEET TRANSMISSION CUSTOMER NEEDS EFFICIENTLY & RESPONSIVELY — Meet transmission customer needs efficiently and responsively.

Grid Modernization Initiative

- Reliance on legacy systems and nonstandard commercial practices have led us to be overly conservative in our power and transmission operations, planning and marketing and are costly to maintain.

- Strategic and prioritized investments:
  - support a more reliable, flexible and efficient system,
  - help reduce future costs and
  - create new market opportunities.

Automation

Improved Accuracy

Enhanced Visibility

Grid Modernization
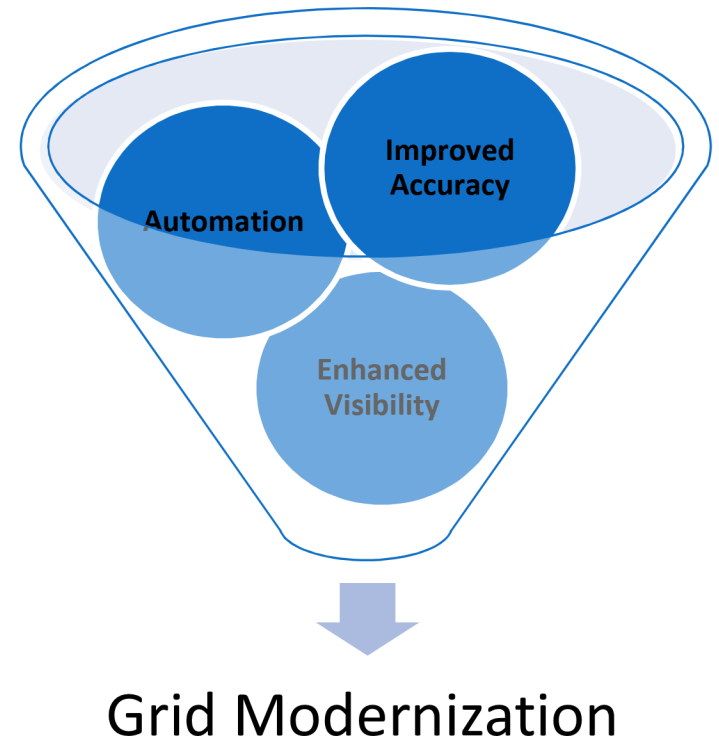
Grid Modernization Initiative

- June 20th's IPR Grid Modernization Workshop provided an overview of the completed, in-flight, and future projects.

- Grid Modernization projects bring value to BPA and its customers independent of the EIM.

- If BPA chooses not to participate in the EIM, then the EIM Implementation projects will not be pursued.

5 Focus Areas
- Operational Modernization
- Commercial Modernization
- EIM Implementation
- Mission Critical IT Improvements
- Improvements to Core Business
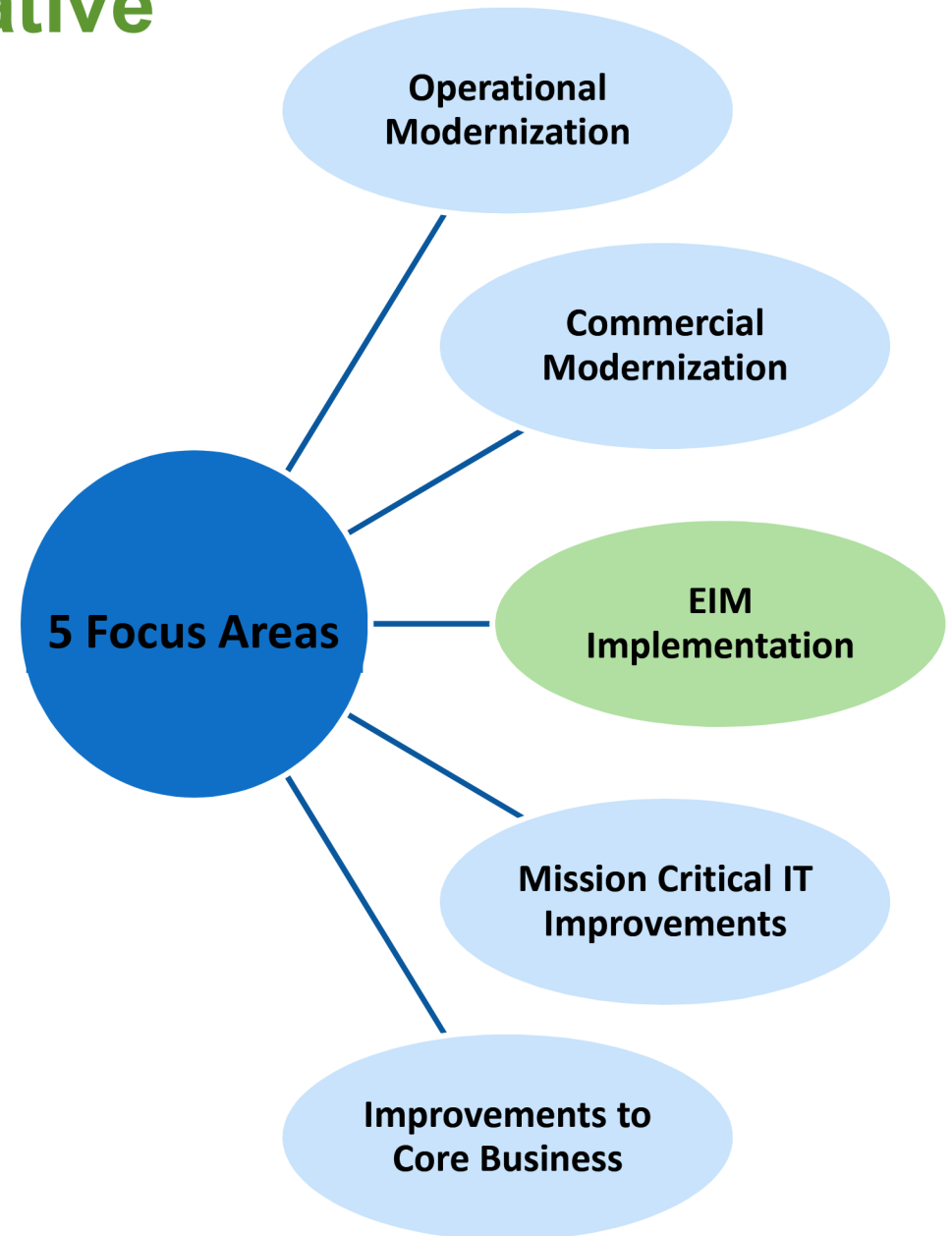
EIM Overview

Presenter:

Todd Kochheiser, Transmission System Operations

EIM Summary

What an EIM IS:	What an EIM is NOT:

What an EIM IS:

- An intra-hour **real-time** energy market to serve load and imbalance across participating Balancing Authorities (EIM Entities) and the CAISO (a.k.a. the EIM Area)

- A tool for centralized 5-minute dispatch of resources that have been **voluntarily** offered to the market (at a price)

- **Economically dispatches** offered resources

- **Security-constrained**, meaning transmission and reliability constraints are not exceeded, improving grid reliability, reducing energy supply cost and enhancing integration of renewable resources

What an EIM is NOT:

- An RTO (with planning, day-ahead markets, BA consolidation)

- A centralized unit commitment tool

- A capacity market

- A replacement for the current contractual bi-lateral business structure

EIM Summary

Without EIM:
Each BA must balance loads and resources within its borders.
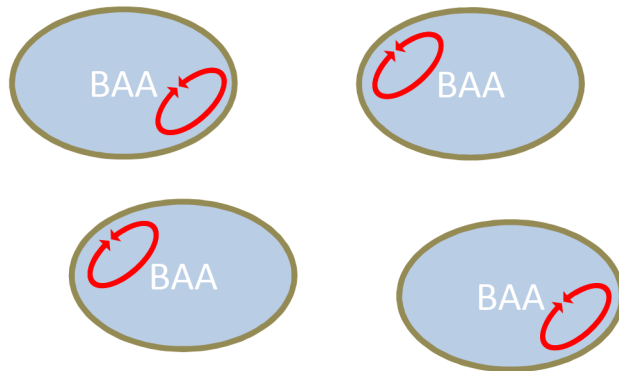
With EIM:
The market dispatches resources across BAAs to balance demand
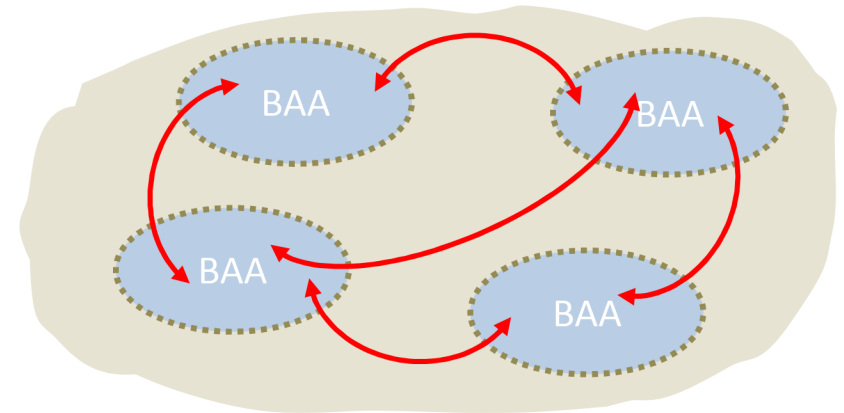
EIM Benefits

- Reduce costs by serving imbalance and load from most economic resources
- Enhances reliability by improving system visibility and responsiveness to planned and unplanned events
- Results in more efficient dispatch of resources within/between BAAs
- Leverages geographical diversity of loads and resources in the market footprint
- Congestion Management

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On-line Resources

- <u>Western EIM Website</u>
- <u>Western EIM online training</u>
  - <u>Introduction to EIM (CBT)</u>
  - <u>How EIM Works (CBT)</u>
  - <u>Base Scheduling (CBT)</u>
  - <u>Metering (CBT)</u>
  - <u>Settlements (CBT)</u>
- <u>EIM Resource Sufficiency</u>
- <u>EIM Business Practice Manual</u>

EIM Initial Cost Benefit Analysis, Issues we are Reviewing, Draft EIM Timeline

Presenters:

Steve Kerns, Business Transformation Office

Eric Federovitch, Power Market Analysis and Pricing

Russ Mantifel, Transmission Marketing and Sales

Opportunities from Market Engagement

- Variable energy resources are increasing in the West creating opportunities to capture valuable flexibility and capacity services that clean hydropower resources can provide.

- Customer transmission use and system operations are undergoing significant changes in response to market developments and new tools are needed to respond optimally.

- Bonneville has discussed lessons learned from Northwest utilities who are evaluating market changes, modernizing their systems to take advantage of opportunities, and that have or are planning on joining the Western EIM.

- Need to find ways to fully realize the value of sub-hourly dispatch, flexible, and carbon-free hydro attributes.

- The pace of evolving markets continue, recent efforts such as day ahead market enhancements highlight the need for active monitoring.

- Bonneville has begun to study and determine *how and under what conditions Bonneville could join the Western EIM*.

Western EIM active and pending participants

Market Operator
- California ISO

EIM entity
- Active participant
- Planned EIM entry 2019
- Planned EIM entry 2020

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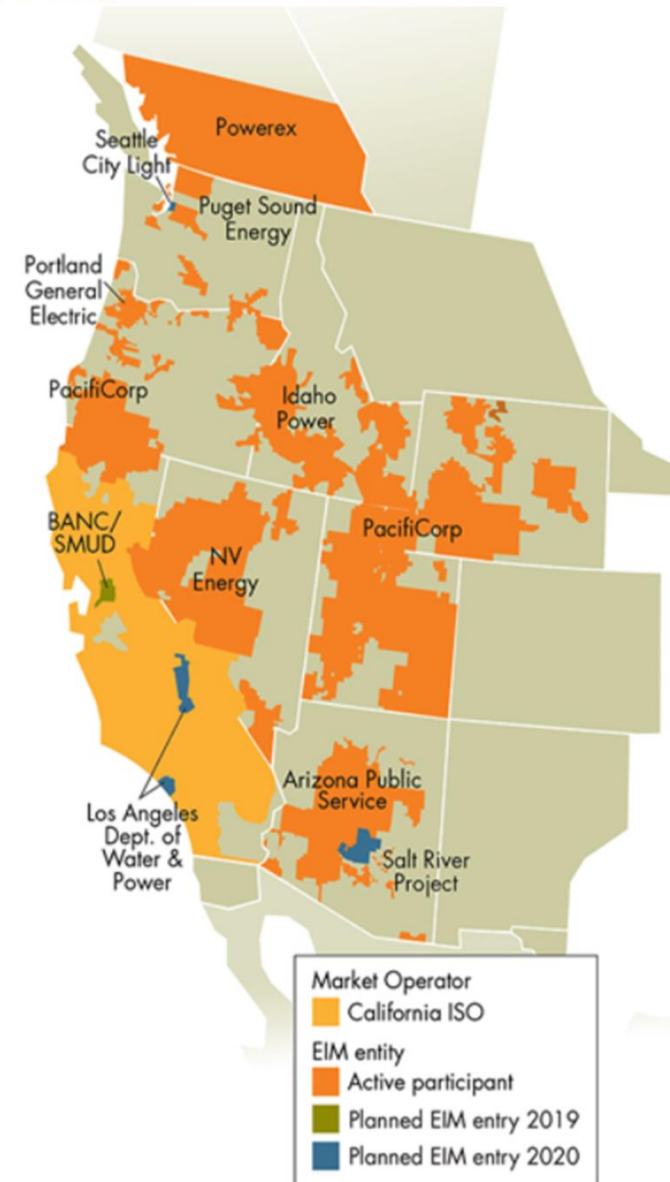
Opportunities from Market Engagement

- As energy and capacity markets change BPA must look to preserve and enhance the value of the Federal power and transmission systems.

- Other utilities in the Pacific Northwest have joined or intend to join the Western EIM.

- BPA has had early success working with the CAISO on the Coordinated Transmission Agreement in 2017
  - https://www.bpa.gov/transmission/CustomerInvolvement/CoordinatedTransmissionAgreement/Pages/default.aspx

- This early success help demonstrate the merit of deeper discussion about BPA's involvement in the EIM.

Transmission Qualitative Benefits

Benefits accessible through EIM membership:

- Congestion management functions that are more economically efficient than present curtailment and bilateral redispatch capabilities.
- Optimized day to day operation of the power system.

Improved Controls:	**Improved State Awareness:**	**Modeling & Coordination:**
• Proactive congestion management • Reactive congestion management • Proactive voltage control	• Increase accuracy and frequency of operational information • Create new visual displays of real-time or near real-time data, allowing operators to better predict operational issues. • Access to CAISO EIM dispatchers tools	• Improved network modeling • Improved outage modelling & coordination • Improved Power & Transmission coordination

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Transmission Qualitative Benefits

Benefits accessible through EIM membership:

- A tool used to delay or avoid transmission expansion investment decisions to address congestion issues.

<table>
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Categories of capital projects that the EIM could help defer or avoid:

- Network Congestion driven projects that could be remediated with security constrained economic dispatch, *for example*:
    - I-5 Corridor Reinforcement

</td>
<td>

Categories of capital projects that are driven by other needs that the EIM would *NOT* be expected to displace:

- Sustain Program projects for safe and reliable operation of existing facilities, *for example:*
    - wood pole replacement or transformers that have reached end of life

- Generation Interconnection, Line & Load Interconnection projects that are driven by requests from customers, *for example*:
    - data center loads

- Load Service Area Reinforcement projects required to mitigate reliability criteria violations, *for example*:
    - Hooper Springs project in SE Idaho

</td>
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</table>

Estimated Initial EIM Scenario Costs

EIM scenario costs were estimated based on Utilicast analysis and input:

- All costs estimates are assumption-driven and subject to change as more becomes known
- Although costs are grouped by business line, actual cost allocation may vary

Scenario Costs ($millions)		Modernize	EIM
Startup Costs			
	Power	-	(5.0)
	Transmission	-	(14.2)
	Power & Transmission	-	(15.1)
	CAISO Administrative	-	(1.1)
	Total Startup Costs	-	**(35.3)**
Annual Ongoing Costs			
	Power Costs	-	(3.2)
	Transmission Costs	-	(2.2)
	CAISO Administrative	-	(0.7)
	Total Annual Costs	-	**(6.1)**

Estimated Initial EIM Scenario Benefits – Power

Power Services' benefits from EIM result from more optimal intra-hour dispatch of the FCRPS:

– Benefits are based on monetizing surplus FCRPS flexibility

– Estimated EIM benefits are netted against traditional load factoring, which is the primary way BPA monetizes surplus flexibility today

– BPA analysis is consistent with that of other regional hydro-centric utilities

Power Services' Scenario Benefits ($millions)		Modernize	EIM
Annual Benefits			
	EIM Market	-	20.1
	Load Factoring	3.6	-
	Total Annual Benefits	3.6	20.1
Annual Net Benefits		3.6	14.0

Annual EIM Net Benefits	10.4

Issues that BPA is Reviewing

1. Market Power

2. Carbon Obligation in EIM

3. Relationship of EIM to Other Emerging Markets

4. BA Resource Sufficiency

5. EIM Settlements

6. Treatment of Transmission

7. Generation Participation Model (FCRPS, IPP)

8. Governance

Next Steps

- External BPA.gov webpages are being developed for BPA's EIM efforts under Initiatives on the "Projects & Initiatives" tab.

- Quarterly meetings, as needed, based on information we have in order to keep stakeholders and customers informed.

- Next meeting scheduled for Thursday October 11th

Question and Answer Session

EIM Stakeholder Meeting

Nov 14, 2018
1:30-4:30pm
Rates Hearing Room

For our WebEx and phone participants:

- We have muted all calls on entry, if you have a question, you will need to unmute by using *6. Then please identify yourself by name and let us know who you represent.

- Please do not put this call on hold OR take other calls while you are dialed into this one.

- If we identify a noisy line, you may be disconnected from the meeting.

Objectives For Today's Meeting

- Review of EIM Stakeholder Topics Discussed to Date

- Process Map

- Timeline Review

- Issues that BPA identified at the July 24th EIM Stakeholder meeting that we will be discussing in more depth **today**:

·**Market Power**
·Treatment of Transmission
·Generation Participation Model (FCRPS, IPP)
·Governance
·**Relationship of EIM to Other Emerging Markets**
·**BA Resource Sufficiency**
·**EIM Settlements**
·**Carbon Obligation in EIM**

Issue we will be discussing today.

Issues discussed at previous EIM Stakeholder meetings.

These issues will be discussed at future meetings.
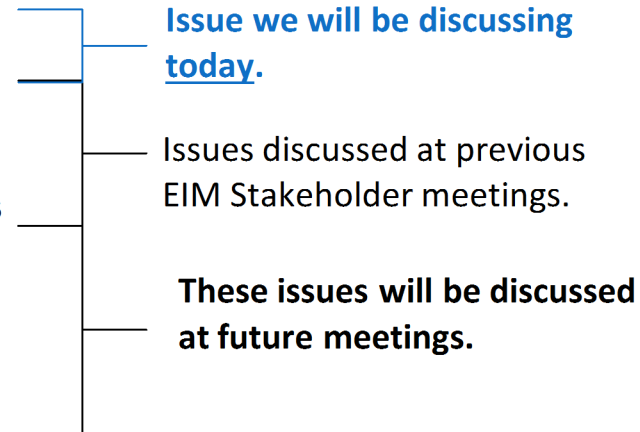
- Question and Answer Session

Statement of BPA's Principles:

- Participation is consistent with statutory, regulatory, and contractual obligations.

- Maintain reliable delivery of power and transmission to our customers.

- Resource participation in the EIM is and always will be voluntary.

- BPA's decision to participate in the EIM will be based on a sound business rationale.

Timeline Leading up to the ROD

Agendas for previous and future monthly EIM Stakeholder meetings:

Month	Agenda
July 24	•Grid Modernization Overview, Connection to Strategic Plan, Intro to the 8 Issues BPA is Reviewing
September 13	•EIM 101
October 11	•Process Plan, Transmission, Generation, Governance
November 14	•Process Plan, Market Power
December 18	•Settlements
January 16	
February 20	
March 13	
April 10	
May 15	
June	
July	•Letter to the Region with a 30 day public comment
August	•BPA drafts Record of Decision (ROD)
September	•Final ROD for signing the EIM Implementation Agreement

These meetings will be full day.

Table Tops: Discussion of Impacts to Customers

Topics to be Discussed at the monthly EIM Stakeholder mtgs:
- Resource Sufficiency
- Non-Fed Generation Participation
- Power Products Generation Inputs BP-22
- Cost Benefit Analysis
- Market Mitigation
- Settlements
- Transmission
- Impacts of Emerging Markets
- Carbon Issues
- Governance

Signing of the EIM Implementation Agreement authorizes BPA to begin spending on EIM implementation projects with the CAISO but does not bind BPA to join the EIM.

Previous EIM Stakeholder Meeting Materials are available here: www.bpa.gov/goto/EIM

EIM Table Top Exercises

The EIM Table Top exercises planned for Spring 2019 will describe the process and impact to customer classes if BPA becomes an EIM entity:

- BPA and stakeholders will walk through a "Day and Hour in the Life" of BPA as an EIM Entity and are for our BAA and transmission customers
- Our goal is to identify how common customer and BAA behavior will result in EIM Entity/Market Operator charges and operations
- We will NOT be able to identify how charges will be allocated to customers, but we do believe the workshops will help inform pre rate-case workshops and possible rate designs
- BPA will develop "structure scenarios" that we will walk through in these workshops

BPA encourages customers to provide input on the Table Top structured scenarios.

If there is a scenario that your utility would like BPA to explore that is a <u>realistic scenario and is expected to be a common occurrence</u> (monthly at least) then please send your prioritized scenarios to Tech Forum at techforum@bpa.gov and reference "EIM Prioritized Scenarios" in the subject line due by <u>December 14th</u>.

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For more information on the EIM process: https://www.westerneim.com/

EIM Table Tops

Possible Table Top scenario inputs:

- Variable Energy Resource ("VER") scheduling and forecasting activity
- Intra-hour schedule changes
- Slice or other power product "late-breaking" changes
- EIM Transfer/ETSR Interchange Rights Holder "donations"
- Loads with non-participating resources
  - VER and DER
- Loads with EIM Participating Resources
  - VER and DER
- Other?

High Level Process Map

- **This high-level visual represents the general steps in the process of BPA joining the EIM.**

- **BPA can choose to not join the EIM at anytime in the process.**

- **BPA will engage customers and stakeholders throughout the process.**

Pre-Implementation Agreement Process	Draft Implementation Agreement + Regional Letter	Implementation Agreement + ROD	BPA-CAISO Project Plan	EIM Entity Agreement

Tariff & Rate Development + RODs	System Development and Testing	Market Simulation	FERC Readiness Certificate	Go Live!
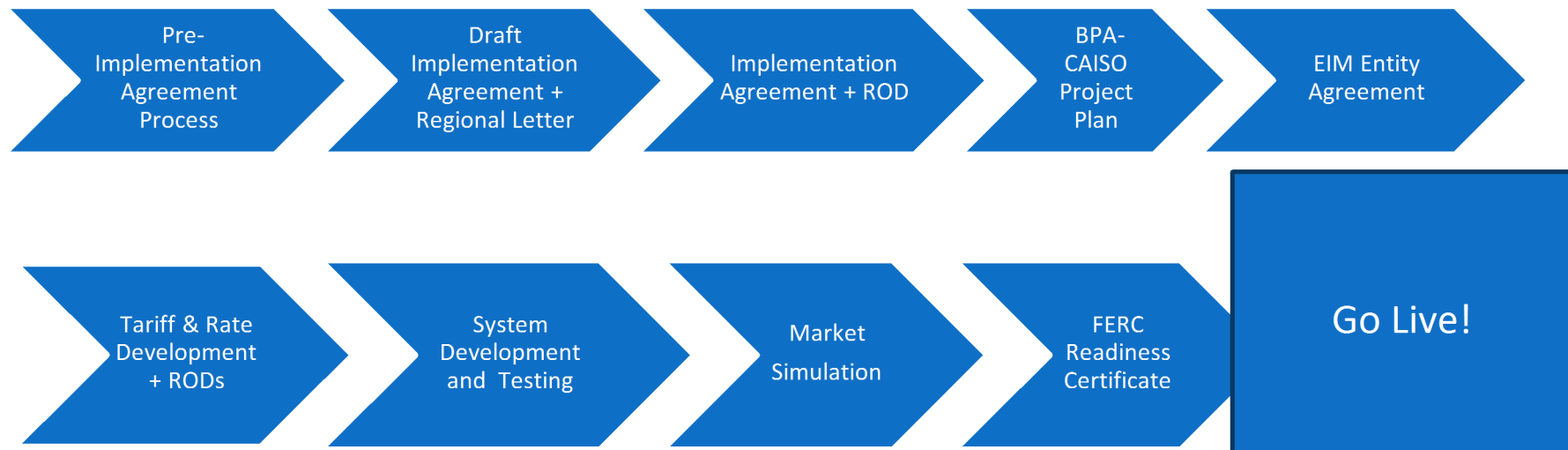
BPA's High Level EIM Timeline

2018	2019	2020	2021	2022

Pre-Rate Case Workshops | **BP-22 Rate Case**

Pre-TC-22 Workshops | **TC-22 Tariff Change Process**

Grid Modernization Projects
(includes Reliability Coordinator (RC) implementation by November 2019)

EIM Implementation Projects

EIM Stakeholder Process

Monthly EIM Stakeholder mtgs

July: 30-day Public Comment - Letter to the Region

Development and testing of automation necessary to Go Live

Record of Decision

Sign EIM Implementation Agreement

Dec 18 mtg at the Rates Hearing Room 9am - noon

Customer EIM trainings begin, may need to go past Go Live date

CAISO Files EIM Entity Readiness Certificate at FERC

EIM Go Live

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Previous EIM Stakeholder Meeting Materials are available here: www.bpa.gov/goto/EIM

EIM Process Map: 5 Steps to Joining

The CAISO has identified five steps to joining the EIM:*

	Step	What it is	Where this fits into BPAs process
1	Perform Cost Benefit Analysis	• A key step in deciding to participate as an EIM Entity.	• BPA performed an initial cost benefit analysis and presented it at the July 24th mtg. • An updated cost benefit analysis will be developed in preparation for the letter to the region in July 2019.
2	Negotiate and Execute Implementation Agreement	• Sets forth the terms and conditions between the CAISO and EIM Entity to *prepare* for EIM participation. • Contains a high-level project schedule with milestones and funding schedule.	• Summer/early fall of 2019. • Letter to region at end of July 2019 with 30-day comment period. • Execution at the end of September 2019.

*For more information on the EIM process: https://www.westerneim.com.

EIM Process Map: 5 Steps to Joining

The CAISO has identified five steps to joining the EIM:*

	Step	What it is	Where this fits into BPAs process
3	Train for EIM	• Training to develop core competencies of BPA staff responsible for implementing the EIM into BPA's day-to-day business. • Training for BPA's customers. *The CAISO provides both computer-based and instructor led training. Much of the computer-based training for the EIM is already publicly available at www.westerneim.com.*	• BPA is prioritizing EIM training for its employees and customers. • BPA provided a "EIM 101" training in September 2018 for its customers. • More operationally-oriented, CAISO-led training will start to occur in 2021 as the systems and automation are developed and tested so that BPA and BPA's customers can participate in the EIM.
4	Establish Operating Procedures	• Develop operating procedures prior to implementation to ensure operational readiness.	• 6-9 months before Go-Live

*For more information on the EIM process: https://www.westerneim.com.

EIM Process Map: 5 Steps to Joining

The CAISO has identified five steps to joining the EIM:*

		What it is	Where this fits into BPAs process
5	Complete the Implementation Process	The implementation process includes six tracks, which may run in parallel. · Develop a detailed project schedule outlining all the steps leading to the market simulation, parallel operations and full participation; · Establish agreements and identify scheduling coordinator and participating resources; · Integrate with the ISO full network model; · Modify impacted systems, perform system integration, and complete security and functional testing of all impacted systems and processes; · Implement metering; and · Certify readiness, conduct parallel operations and transition to binding EIM.	• Begins once BPA signs the Implementation Agreement in September of 2019, should it choose to do so, and continue until the EIM is fully implemented. • BPA is currently planning on completing this process by April of 2022, but this date will not be firmed up until the Implementation Agreement is signed.

*For more information on the EIM process: https://www.westerneim.com.

EIM Process Map: Agreements

Agreement	Description
Implementation Agreement	Initial agreement with the CAISO; establishes a project and funding schedule for work necessary to join the EIM; filed with FERC; terminates once EIM entity moves to production (live) state. Funding level based on EIM Entity's portion of total load in the western interconnection. (For BPA, approximately $1.9 million.) For more information, see https://www.westerneim.com/Pages/About/default.aspx#ImplementationDocuments
EIM Entity Agreement	The enabling agreement that allows a balancing authority to participate in the EIM as an EIM entity; filed with FERC; sets forth the terms and conditions of an EIM Entity's participation, including a commitment to abide by the CAISO's Tariff (particularly, Section 29), modify it's own tariff, and provide for transmission in EIM. For more information see: http://www.caiso.com/Documents/AppendixB17_EIMEntityAgreement_Asof_Jul01_2014.pdf.
EIM Participating Resource Agreement	The enabling agreement that allows a resource to participate in the EIM; filed with FERC; sets forth the terms and conditions of resource participation, including a commitment the resource's owner/operator to abide by the CAISO's Tariff (particularly, Section 29); provides for registration of the resource in the CAISO's master file; allows direct financial settlement between the resource and the CAISO. For more information, see http://www.caiso.com/Documents/AppendixB19_EIMParticipatingResourceAgreement_Asof_Jul01_2014.pdf.

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EIM Process Map: Agreements Continued

Agreement	Description
EIM Entity Scheduling Coordinator Agreement	Sets forth the terms and conditions regarding base schedule submission and adjustments as well as financial settlements; also includes a commitment by the EIM Entity to abide by the CAISO's Tariff (particularly, Section 29); filed with FERC. For more information, see http://www.caiso.com/Documents/AppendixB18_EIMEntitySchedulingCoordinatorAgreement_Asof_Jul01_2014.pdf.
EIM Participating Resource Scheduling Coordinator Agreement	Sets forth the terms and conditions regarding resource bid submission as well as financial settlements; includes a commitment to abide by the CAISO's Tariff (particularly, Section 29); filed with FERC. For more information, see http://www.caiso.com/Documents/AppendixB20_EIMParticipatingResource_SchedulingCoordinatorAgreement_Asof_Jul01_2014.pdf.
EIM Meter Service Agreement	Sets forth the terms and conditions regarding the administration of revenue quality data meters to account for imbalance; includes a commitment to abide by the CAISO's Tariff (particularly, Section 10); filed with FERC. For more information, see http://www.caiso.com/Documents/AppendixB7_MeterServiceAgreement_SCs_Asof_Jun12_2013.pdf.

EIM Implementation Process: Six Milestones*

Project Scope and Milestones	Completion Criteria
Detailed Project Management Plan – Develop and initiate a project management plan describing specific tasks, delivery dates, team members, meeting requirements, and a process for approving changes to the plan.	Approval of project plan and schedule by BPA and the CAISO management.
Milestone 1 – This milestone is complete when the Implementation Agreement is been made effective via FERC order accepting the agreement.	FERC order.
Full Network Model Expansion – Full Network Model expansion for BPA and EMS/SCADA, including proof of concept of export/import of EMS data; complete model into the CAISO test environment; complete validation for all SCADA points from BPA; testing of the new market model; and validation of the outage and state estimator applications.	Successful export of BPA network model and import of that model into the CAISO full network model.
Milestone 2 – This milestone is completed upon modeling BPA into the CAISO full network model through the EMS which will be deployed into a non-production test environment using the CAISO's network and resource modeling process.	Validation of network model with no issues and promotion of network model to non-production test environment.

*www.westerneim.com/Documents/EIMEntityImplementationProjectPlan.pdf

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EIM Implementation Process: Six Milestones*

Project Scope and Milestones	Completion Criteria
System Implementation Program Improvements – System requirements and software design, the execution of necessary software vendor contracts, technical interface specifications and configuration guides, and other related activities.	BPA software and interfaces are ready to connect to a non-production test system.
Milestone 3 – CAISO to promote market network model including BPA area to non-production system, and allow BPA to connect and exchange data in advance of market simulation. This triggers the start of joint integration testing and functional testing by BPA and the CAISO.	CAISO network model, market model and master file are available in test environment to enable BPA entity integration testing.
Construction, Testing and Training in Preparation for Market Simulation – This task includes IT infrastructure upgrades, security testing, training simulators, and functional testing.	BPA and the CAISO systems ready for structure market simulation.
Milestone 4 – The EIM market simulation will allow BPA and the CAISO to conduct specific market scenarios in a test environment prior to the production deployment to ensure that all system interfaces are functioning as expected and to produce simulated market results. To complete this milestone, the commencement of EIM simulation will signal that BPA and the CAISO have independently completed EIM system design, development and testing.	BPA access to the CAISO MAP-stage environment with all relevant EIM system interfaces for the purpose of market simulation.

*www.westerneim.com/Documents/EIMEntityImplementationProjectPlan.pdf

EIM Implementation Process: Six Milestones*

Project Scope and Milestones	Completion Criteria
Activate Parallel Operations – The CAISO will activate a parallel operation environment to practice production grade systems integration as well as market processes and operating procedures in anticipation of the impending BPA activation as an EIM Entity and to confirm compliance with the EIM readiness criteria set forth in the CAISO tariff.	Successful export of BPA network model and import of that model into the CAISO full network model.
Milestone 5 – Start of parallel operations	Successful start of parallel operations in the CAISO stage environment
System Deployment and Go Live – Implementing the project and going live will include resource registration, operating procedures and updates, execution of service agreements, completion of BPA's tariff and processes, applicable board approvals, the filing and acceptance of service agreements and any CAISO tariff changes with FERC, and completion and filing of a readiness criteria certification in accordance with the CAISO tariff.	Readiness criteria achieved.
Milestone 6 – This milestone is complete upon the first production BPA EIM trade date.	Completion of first financially binding operating date.

*www.westerneim.com/Documents/EIMEntityImplementationProjectPlan.pdf

CAISO EIM Payment Milestones and Agreements
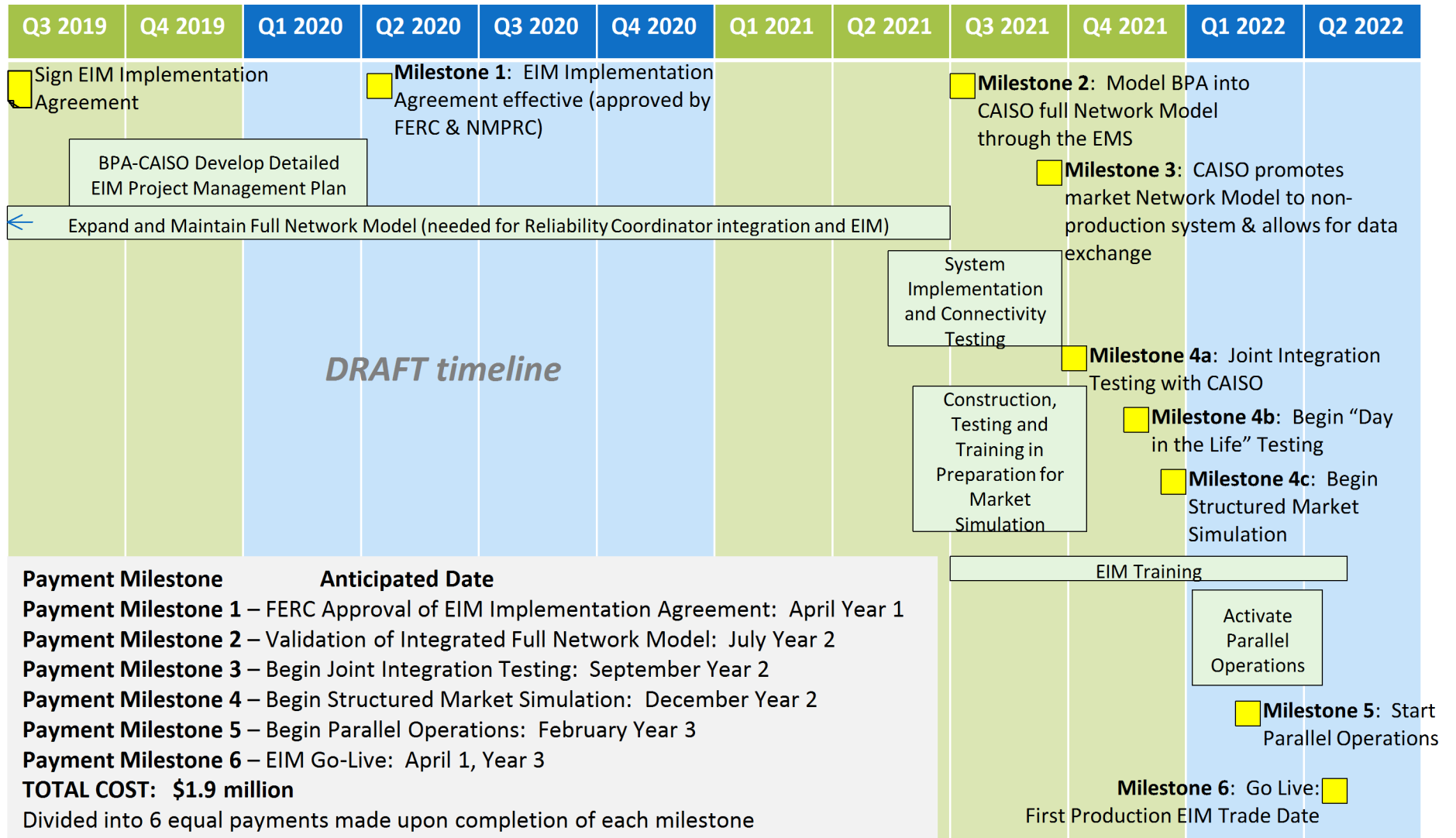
Local Market Power Mitigation

CAISO Market Oversight

The CAISO Department of Market Monitoring (DMM) is responsible for prote cting consumers and market participants by identifying and reporting:

- Market design flaws

- Potential market rule violations

- Market power abuses

The CAISO is responsible for implementing DMM policies, both administering market power tests and performing market power mitigation

California ISO

	Board of Governors	

Market Monitoring	DMM Oversight Committee	Stephen Berberich President & Chief Executive Officer	Audit Committee

| Keith Casey, Ph.D. Vice President, Market & Infrastructure Development | Mark Rothleder Vice President, Market Quality & Renewable Integration | Petar Ristanovic Vice President, Technology | Eric Schmitt Vice President, Operations | Ryan Seghesio Vice President, Chief Financial Officer & Treasurer | Stacey Crowley Vice President, Regional & Federal Affairs | Thomas Doughty Vice President, Customer & State Affairs | Roger Collanton Vice President, General Counsel, CCO & Corporate Secretary | Jodi Ziemathis Vice President, Human Resources |

Local Market Power Mitigation

When there is a binding constraint, how is local market power determined ?

- Pivotal Supplier Test
  - If supply is insufficient to meet demand with the supply of any individual supplier removed, then this supplier is pivotal
- Residual Supply Index
  - The residual supply index is the ratio of supply from non-pivotal suppliers to demand
  - A residual supply index less than 1.0 indicates an uncompetitive level of supply
- Oligopoly
  - Consider degree to which 2 or 3 suppliers are jointly pivotal

If determined to have market power, a market participant may have its CA ISO bid prices mitigated to a Default Energy Bid (DEB)

- The final mitigated price is the higher of the DEB or the competitive LMP

Default Energy Bids

The CAISO currently employs 3 options for calculating a participant's, or resource's, DEB

- Variable Cost Option
  - Based on heat rate, fuel price, GHG costs, etc.
- Locational Marginal Price (LMP) Option
  - Based on lowest 25th percentile of LMPs at which resource was dispatched in the last 90 days
- Negotiated Rate Option
  - Formula negotiated between the resource's scheduling coordinator and CAISO/DMM

BPA requires an option that adequately reflects the opportunity costs of use limited hydro resources (ULHR)

- Opportunity cost is influenced by:
  - Non-power obligations of hydro resources
  - Expected value of energy in future periods
  - Physical system characteristics (storage, flow limitations, hydrological topology, generating capability)
  - Risk preference of hydro operator
  - Uncertainty of future fuel supply

There are 2 potential negative consequences when CAISO mitigates bids under the existing construct

- Unintended Dispatch/Uneconomic Outcomes (see slides 27-29)
- Overriding project owners' operational and financial risk preferences (see appendix slides 34-35)

Recent Developments: LMPM & DEBs

The CAISO is working through its stakeholder process to address concerns raised by NW parties

Areas of conceptual agreement currently proposed

o **Mitigate for the right time interval** Mitigation should only apply to the interval when market power has been determined (not balance of the hour)

o **Mitigate the right quantity** Avoid economic transactions that are driven by mitigation (mitigation should not result in flow reversal)

o A DEB should **reflect the opportunity cost** nature of hydro. Subject to; expected value of energy in future periods, includes markets outside of the CAISO, and physical system characteristics

Areas of continued discussion

o Distinguishing between the potential versus exercise of market power (impact test)

o Specific parameters that determine opportunity cost

Principles & Potential Outcomes

Principles

○ Formulaic DEB must reflect the opportunity value of use limited hydro resources(ULHR)

○ Only a ULHR owner/operator can determine if a formulaic DEB adequately reflects opportunity value

○ Right size and right timing of bid mitigation

○ Avoid unintended dispatch

Potential Outcomes

Minimum Requirement ———————————→ Exhaustive

Develop tools that avoid unintended dispatch

Mitigate for the right quantity

Mitigate for the right time interval

Reflect opportunity cost (bids RARELY mitigated)

Reflect opportunity cost (bids NEVER mitigated)

Incorporate an impact test

Comprehensive DMM Reform
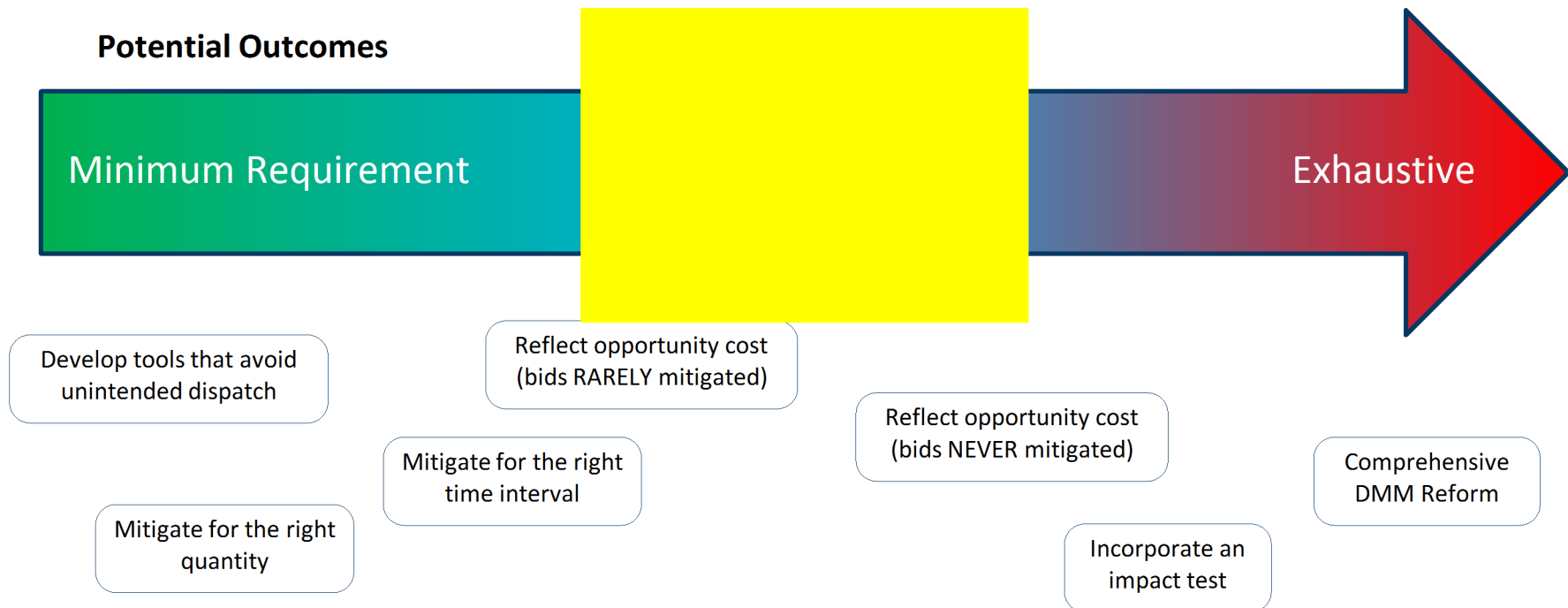
BPA Engagement Plan

- *BPA is actively participating in the existing stakeholder process*
- *BPA will delay EIM Go Live until LMPM/DEB issues are satisfactorily resolved*

The current trend of the CAISO stakeholder process indicates that certain issues are resolvable, and BPA is targeting its focus accordingly

Topic	Focus Level*	Rationale
Current Proposed ISO Revisions		Potentially significant impacts
Develop Tools to Avoid Unintended Dispatch		Generally limited to BA logistics, with IPP implications
Determination of Default Energy Bid		NW expertise of hydro opportunity cost, significant impacts with potential to resolve most issues

*Balances: areas of BPA's expertise, current resources, likelihood of success

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Unintended Dispatch due to Mitigation

- Mitigation could negatively impact FCRPS dispatch during cold snap conditions.
- An example of potential changes to GCL's dispatch is below.
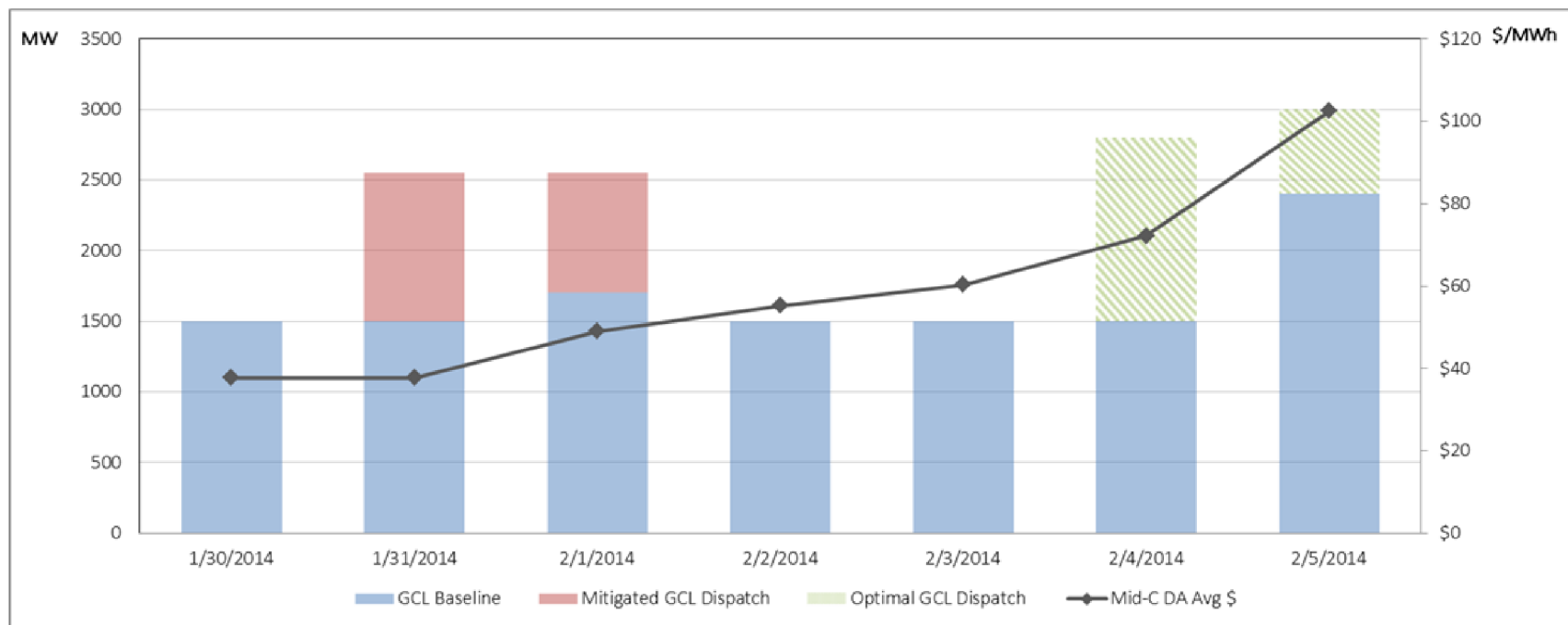
BPA Focus Area on DEB

- In the CAISO's ongoing policy initiative process, CAISO's current proposal for use-limited resource default energy bid takes the form:

$$DEB_d = \max\{Index_{l,d}, Index_{l,m+1}, \ldots, Index_{l,m+n}\} * (1 + \propto)$$

- Day-ahead on-peak index captures short-term opportunity cost on HLH
- Monthly on-peak indices capture long-term opportunity cost on HLH
  - Monthly indices applied as a function of resource storage horizon
- Multiplier ($\propto$) acknowledges:
  - Intraday price variation
  - Within-month price variation around the average that is indicated by the index
  - Risk preferences of the bidder
- Other considerations raised
- Within-month index
- Multiple locations
- Location-specific multipliers
- Minimum adder to maximum index

BPA Focus Area on DEB

- For a resource with short-term storage: $DEB_d = \max\{Index_{l,d}, Index_{l,m+1}\} * (1 + \propto)$

BPA's <u>current</u> opportunity cost is based on view of <u>future</u> prices

With an index multiplier that is <u>too low</u>, the resulting <u>DEB does not capture this view of future prices</u> and could prematurely deplete energy
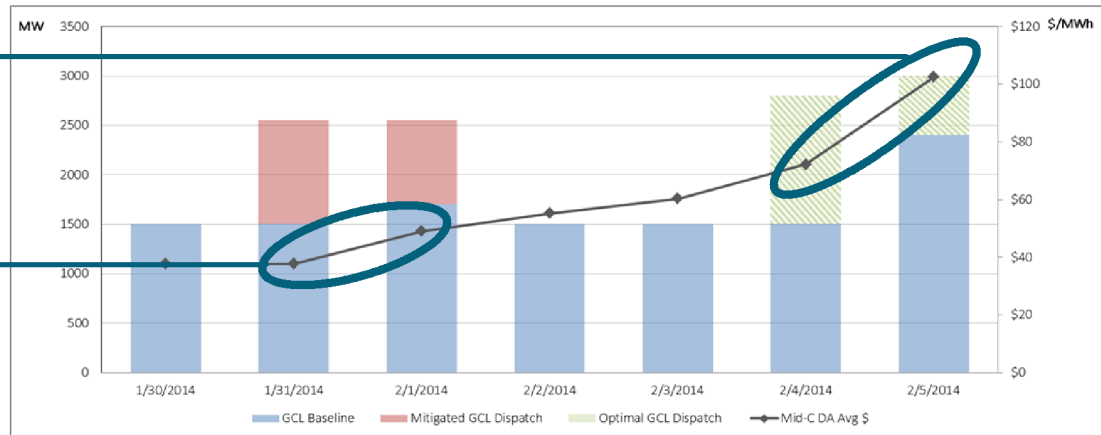
The likelihood of premature energy depletion is reduced when the DEB accommodates views of future prices. This can be accomplished within the proposed construct by:
- Increasing the multiplier
- Increasing the number of forward indices (*location, months forward, etc.*)

BPA intends to balance its view of an appropriate DEB taking into account mitigation frequency, quantity of MW subject to mitigation, and interests of end-use customers.

Path Forward

- BPA seeks a LMPM framework that ensures that mitigation is applied to an appropriate quantity and only for the time interval that market power is de termined

- BPA seeks a methodology for determining the multiplier that is:
  - Empirically based
  - Reproducible
  - Updated on regular, mutually-agreeable cadence
  - Reflective of the opportunity cost of ULHR

- Success looks probable with some combination of the following options:
  - Current NW inspired CAISO efforts are moving in the right direction
  - Bilateral negotiations with DMM
  - Possible Reference Price Adjustment
  - Develop tools that avoid unintended dispatch

Next Steps

- Next meeting scheduled for **Tuesday December 18th** at the Rates Hearing Room in the morning, 9-noon.
    - WebEx and Phone participation will be available
    - Agenda and materials will be distributed in advance via Tech Forum

- We welcome feedback on this meeting. Your comments will help shape future EIM Stakeholder Meetings, please email us at techforum@bpa.gov and reference "EIM Stakeholder Meeting" in the subject. Comments are due by November 28th .

- For more information on BPA's EIM Stakeholder process and meetings please visit:
    https://www.bpa.gov/Projects/Initiatives/EIM/Pages/Energy-Imbalance-Market.aspx

Question and Answer Session

Appendix

System Dispatch/Bids are Risk Informed

Short-Term Planning Problem: Streamflow & Price Uncertainty
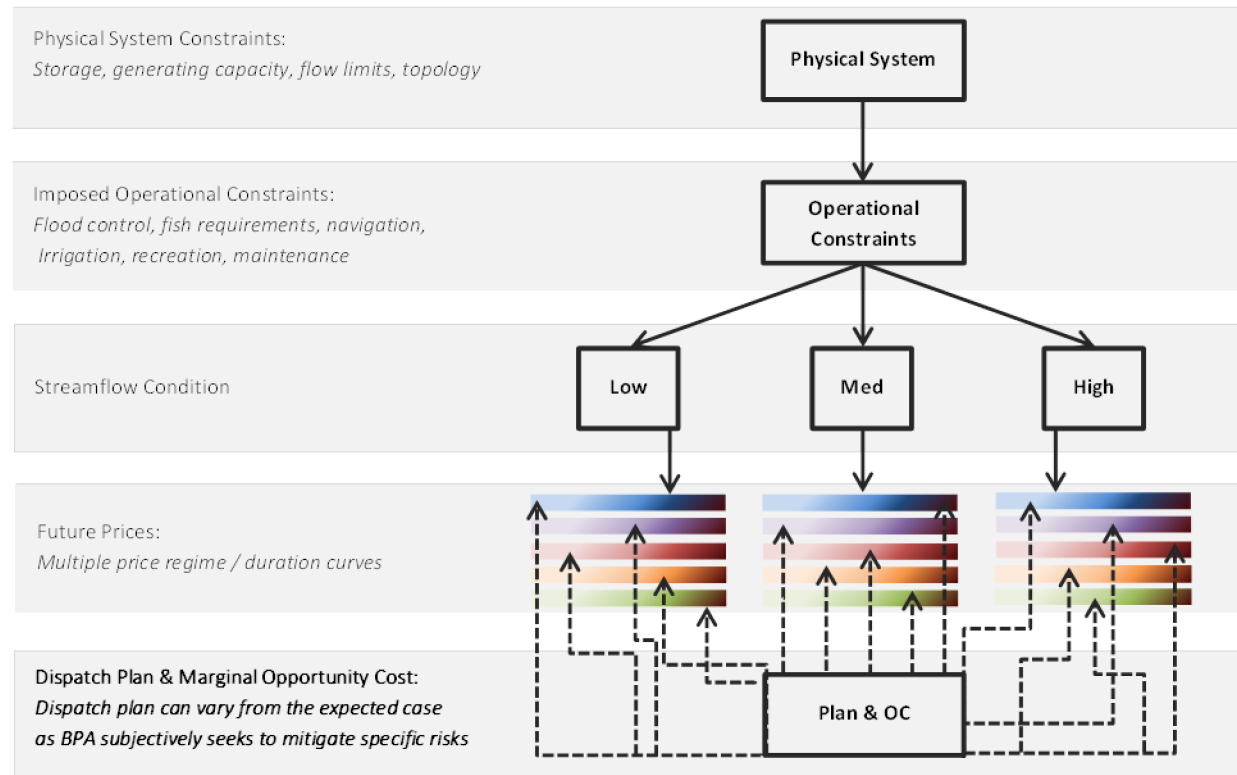
Uncertainty necessitates reliance on a variety of SMEs and proprietary models when determining an optimal dispatch plan, with acceptable operational and economic risk

Additional Complications

Interdependencies of streamflow and operational constraints

- Future operational constraints are often influenced by realized streamflow or changes to streamflow forecasts

Feedback relationships between unforeseen/unintended deviations from the optimal plan

- Future operations or future operational constraints may be influenced by unforeseen deviations from the optimal operating plan

Multiple variables determine actual prices

- Actual prices are often influenced by fundamental market conditions, not determined exogenously

Correlation in marketing position across the region

- The prevalence of hydro-based generation in the region means that market participants often have positively correlated marketing positions, exacerbating the impact of streamflow uncertainty on marginal opportunity cost

NW bilateral trading market

- In contrast to an organized market which incentivizes bidding at opportunity cost, the NW bilateral market does not
- Price formation in bilateral trading is significantly influenced by:
  - The perception of market fundamentals
  - Counterparties' opportunity cost
  - An extended (2-3 hour) trading window
  - Market timeline disalignment
  - A variety of other factors

			Interval	1	2	3	4	5	6	7	8	9	10	11	12
Hourly Base Schedule - GEN	1500		FMM Market Runs	-37.5	-22.5	-7.5	7.5								
Updated Based Schedule - GEN	1475		RTD Market Runs	-7.5	-2.5	2.5	7.5	12.5	17.5	22.5	27.5	32.5	37.5	42.5	47.5
Time of Update	-20														

Bonneville — Resource Plan

	Scheduled
Load Forecast	1000
Net Interchange	500
Gen Base Sched	1500
RS Bid Req	600
Bid (+/-)	600
Resource name	APR
Capacity	3000
Base Point	0
Interchange	0
Bid Range	600
LMP	
Resource name	ANPR
Capacity	10000
Base Point	1500
Interchange	500
Bid (+/-)	NA
LMP	

Code	Item	1	2	3	4	5	6	7	8	9	10	11	12	÷	
	NPR1														
	Base	200												÷ 4	
		-													
	FMM RTUC	200			200			200			200			÷ 12	
		x													
	FMM LMP	$25			$27			$30			$35				
		=													
64600	**FMM IIE**	$0			$0			$0			$0				
		-													
	RTD (5 min)	200	200	200	200	200	200	200	200	200	200	200	200		
		-													
	Metered Actuals	200	200	200	200	200	200	200	200	200	200	200	200		
		x													
	RTD LMP	$22	$22	$22	$25	$25	$25	$25	$25	$25	$25	$25	$25		
		=													
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
	NPR2														
	Base	50												÷ 4	
		-													
	FMM RTUC	50			50			50			50			÷ 12	
		x													
	FMM LMP	$25			$27			$30			$35				
		=													
64600	**FMM IIE**	$0			$0			$0			$0				
		-													
	RTD (5 min)	50	50	50	50	50	50	50	50	50	50	50	50		
		-													
	Metered Actuals	50	50	50	50	50	50	50	50	50	50	50	50		
		x													
	RTD LMP	$22	$22	$22	$25	$25	$25	$25	$25	$25	$25	$25	$25		
		=													
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
	PR1														
	Base	1250												÷ 4	
		-													
	FMM RTUC	1250			1250			1250			1250			÷ 12	
		x													
	FMM LMP	$22			$22			$23			$25				
		=													
64600	**FMM IIE**	$0			$0			$0			$0				$0
		-													
	RTD (5 min)	1250	1250	1250	1250	1175	1175	1175	1175	1175	1175	1175	1175		
		-													
	Metered Actuals	1250	1250	1225	1200	1175	1175	1175	1175	1175	1175	1175	1175		

update for a change at T-0 (top of t

What has ran? FMM-1 (37.5), FMM

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid (+/-)	300

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	0
Bid Range	600
LMP	

Resource name	NPR1
Capacity	500
Base Point	200
Interchange	0
Bid (+/-)	NA
LMP	

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
LMP	

Code	Label	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12			
		X														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25			
		=														
64700	RTD IIE	$0	$0	$0	$0	$156	$156	$156	$156	$156	$156	$156	$156			$1,250
64750	RTD UIE	$0	$0	$52.08	$104	$0	$0	$0	$0	$0	$0	$0	$0			$156 / $1,406
	Base	Interchange 500													÷ 4	
		-														
	FMM RTUC	500			500			500			500				÷ 12	
		X														
	FMM LMP	$25			$27			$30			$35					
64600	FMM IIE	$0			$0			$0			$0					$0
		-														
	RTD (5 min)	500	500	500	500	425	425	425	425	425	425	425	425			
		-														
	Metered Actuals	500	500	500	500	425	425	425	425	425	425	425	425			($149)
		X														
	RTD LMP	$22	$22	$22	$25	$25	$25	$25	$25	$25	$25	$25	$25		x (-1)	
		=														
64700	RTD IIE	$0	$0	$0	$0	($156)	($156)	($156)	($156)	($156)	($156)	($156)	($156)			($1,250)
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0			
	Hourly Load	Load 1000														
	Submitted	994														
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000		÷ 12	
		-														
	5 min Load "Metered	994	994	994	994	994	994	994	994	994	994	994	994			This should
		X														
	LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		x (-1)	the LAP sho
		=														
	RTD UIE	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)			($149) / ($1,399)

$1,406		
1		

what do you want the interchange

be a calculation (sum Net Gen - sur

uld be the weighted hourly average

STATUS QUO

Load		250	250	255	265	275	275	275	275	275	275	275	275	Total Load			
														268			
		-															
Gen		250	250	250	250	260	275	275	275	275	275	275	275	Total Gen	schedule	inc ops	inc op cost
														265	250	15.41666667	$323.75
		X												Total Imb			
Load - Gen		0	0	5	15	15	0	0	0	0	0	0	0	3			

Mid C	$26			EI MW	3		Inc Ops	15.41666667				Imbalance Price	$26
Gen $	$21			EI $	$76		Inc Ops $	$323.75		Total $	$400	Imbalance Cost	$76
												Net BA Cost	$76
													Rate
												Imbalance Price	26
												Imbalance Cost	

NPR1

		1	2	3	4	5	6	7	8	9	10	11	12			
	Base	200												÷ 4	18440
															6000
	-														12440
	FMM RTUC	200			200			200			200			÷ 12	1036.6666666
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			$0				
	RTD (5 min)	200	200	200	200	200	200	200	200	200	200	200	200		
	-														
	Metered Actuals	200	200	200	220	225	225	225	225	225	225	225	225		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
	=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	($42)	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($52)		($458)
	LAP contribution														

NPR2

		1	2	3	4	5	6	7	8	9	10	11	12		
	Base	50												÷ 4	
	-														
	FMM RTUC	50			50			50			50			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			$0				
	RTD (5 min)	50	50	50	50	50	50	50	50	50	50	50	50		
	-														
	Metered Actuals	50	50	50	50	50	50	50	50	50	50	50	50		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
	=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0

PR1

		1	2	3	4	5	6	7	8	9	10	11	12		
	Base	1250												÷ 4	
	-														
	FMM RTUC	1250			1250			1250			1250			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			$0				$0
	RTD (5 min)	1250	1250	1250	1250	1275	1275	1275	1275	1275	1275	1275	1275		
	-														
	Metered Actuals	1250	1250	1250	1270	1275	1275	1275	1275	1275	1275	1275	1275		

update for a chang
What has ran? FM
7

3A Resource Plan

Load Forecast

Net Interchange

Gen Base Sched

RS Bid Req

Bid (+/-)

Resource name

Capacity

Base Point

Interchange

Bid Range

Bid $

Market Award

Resource name

Capacity

Base Point

Interchange

Bid (+/-)

Bid/Op $

Market Award

Resource name
Capacity
Base Point
Interchange
Bid (+/-)
Bid/Op $
Market Award

Code	Label		1	2	3	4	5	6	7	8	9	10	11	12		Summary
		X														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25			$25
		=														
64700	RTD IIE	$0	$0	$0	$0	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($52)			($417)
64750	RTD UIE	$0	$0	$0	($42)	$0	$0	$0	$0	$0	$0	$0	$0			($42) ($458)
	FMM LAP Contribution	0			0			0			0 $0						#DIV/0!
	RTD LAP Contribution	0 $0	0 $0	0 $0	0 $0	25 $625	25 $625	25 $625	25 $625	25 $625	25 $625	25 $625	25 $625			200 $25
	Base	**Interchange** 500														÷ 4
		-														
	FMM RTUC	500			500			500			500				÷ 12	
		x														
	FMM LMP	$25			$25			$25			$25					
		=														
64600	FMM IIE	$0			$0			$0			$0					$0
		-														
	RTD (5 min)	500	500	500	500	500	500	500	500	500	500	500	500			
		-														
	Metered Actuals	500	500	500	500	500	500	500	500	500	500	500	500			
		x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		x (-1)	
		=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0			$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0			
	Hourly Load	**Load** 1000														
	Submitted	1037														
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000		÷ 12	$917
		-														
	5 min Load "Metered	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037			the LAP shoul...
		X														
	LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		x (-1)	
		=														**Total Load**
	RTD UIE	$76	$76	$76	$76	$76	$76	$76	$76	$76	$76	$76	$76			$912
																what's thro...

($458)

1

what do you want

I be the weighted

Total BA Gen
($458)

ving things off are

		NPR1							
	Base	200							
		-							
	FMM RTUC	200			200		200		
		x							
	FMM LMP	$25			$25		$25		
		=							
64600	**FMM IIE**	$0			$0		$0		
		-							
	RTD (5 min)	200	200	200	200	225	225	225	225
		-							
	Metered Actuals	200	200	200	220	225	225	225	225
		x							
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25
		=							
64700	**RTD IIE**	$0	$0	$0	$0	($52)	($52)	($52)	($52)
64750	**RTD UIE**	$0	$0	$0	($42)	$0	$0	$0	$0
	LAP contribution								
		NPR2							
	Base	50							
		-							
	FMM RTUC	50			50		50		
		x							
	FMM LMP	$25			$25		$25		
		=							
64600	**FMM IIE**	$0			$0		$0		
		-							
	RTD (5 min)	50	50	50	50	50	50	50	50
		-							
	Metered Actuals	50	50	50	50	50	50	50	50
		x							
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25
		=							
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0
		PR1							
	Base	1250							
		-							
	FMM RTUC	1250			1250		1250		
		x							
	FMM LMP	$25			$25		$25		
		=							
64600	**FMM IIE**	$0			$0		$0		
		-							
	RTD (5 min)	1250	1250	1250	1250	1250	1250	1250	1250
		-							
	Metered Actuals	1250	1250	1250	1250	1250	1250	1250	1250

				÷ 4	18220	
					6000	update for a chang
					12220	What has ran? FM
	200			÷ 12	1018.33333333	
	$25					
	$0					
						BA Resource Plan
225	225	225	225			
						Load Forecast
						Net Interchange
225	225	225	225			Gen Base Sched
						RS Bid Req
						Bid (+/-)
$25	$25	$25	$25			
($52)	($52)	($52)	($52)		($417)	Capacity
						Base Point
$0	$0	$0	$0		($42)	Interchange
						Bid Range
						Market Award
				÷ 4		Resource name
						Capacity
						Base Point
	50			÷ 12		Interchange
						Bid (+/-)
						Market Award
	$25					
						Resource name
	$0					Capacity
50	50	50	50			Base Point
						Interchange
						Bid (+/-)
50	50	50	50			Market Award
$25	$25	$25	$25			
$0	$0	$0	$0		$0	
$0	$0	$0	$0		$0	
				÷ 4		
	1250			÷ 12		
	$25					
	$0				$0	
1250	1250	1250	1250			
1250	1250	1250	1250			

Code	Item	Value							
		X							
	RTD LMP	$25		$25	$25	$25	$25	$25	$25	$25
		=							
64700	**RTD IIE**	$0		$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0		$0	$0	$0	$0	$0	$0	$0
	FMM LAP Contribution	0			0		0		
		0		0	0	0	0	0	0	0
	RTD LAP Contribution	$0		$0	$0	$0	$0	$0	$0	$0
		Interchange							
	Base	500							
		-							
	FMM RTUC	500			500		500		
		X							
	FMM LMP	$25			$25		$25		
		=							
64600	**FMM IIE**	$0			$0		$0		
		-							
	RTD (5 min)	500		500	500	500	500	500	500	500
		-							
	Metered Actuals	500		500	500	500	500	500	500	500
		X							
	RTD LMP	$25		$25	$25	$25	$25	$25	$25	$25
		=							
64700	**RTD IIE**	$0		$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0		$0	$0	$0	$0	$0	$0	$0
		Load							
	Hourly Load	1000							
	Submitted	1018							
	5-min Load	1000		1000	1000	1000	1000	1000	1000	1000
		-							
	5 min Load "Metered	1018		1018	1018	1018	1018	1018	1018	1018
		X							
	LAP	$25		$25	$25	$25	$25	$25	$25	$25
		=							
	RTD UIE	$38		$38	$38	$38	$38	$38	$38	$38

**what's throwing things off are the LMPs of the FMMs and the NPR 2

$25	$25	$25	$25		$25	
$0	$0	$0	$0		$0	
$0	$0	$0	$0		$0	
					$0	$0
	0					
	$0			#DIV/0!		
0	0	0	0	0		1
$0	$0	$0	$0	#DIV/0!		
				÷ 4		
	500			÷ 12		
	$25					
	$0				$0	
500	500	500	500			
500	500	500	500		what do you want	
$25	$25	$25	$25	x (-1)		
$0	$0	$0	$0		$0	
$0	$0	$0	$0			
					$458	
1000	1000	1000	1000	÷ 12		
1018	1018	1018	1018		the LAP should be the weighted	
$25	$25	$25	$25	x (-1)		
$38	$38	$38	$38		Total Load	Total BA Gen
					$456	($458)
		From 2a (2b) scenario			Total Load	Total BA Gen
					$893	($385)
					What results	
					& the reason	

Code		PR2								
	Base	200								
		-								
	FMM RTUC	200			200		200			
		x								
	FMM LMP	$21			$21		$21			
		=								
64600	FMM IIE	$0			$0		$0			
		-								
	RTD (5 min)	200	200	200	200	225	225	225	225	225
		-								
	Metered Actuals	200	200	200	220	225	225	225	225	225
		x								
	RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21
		=								
64700	RTD IIE	$0	$0	$0	$0	($44)	($44)	($44)	($44)	($44)
64750	RTD UIE	$0	$0	$0	($35.00)	$0	$0	$0	$0	$0
	LAP contribution									
		NPR1								
	Base	50								
		-								
	FMM RTUC	50			50		50			
		x								
	FMM LMP	$21			$21		$21			
64600	FMM IIE	$0			$0		$0			
	RTD (5 min)	50	50	50	50	50	50	50	50	50
	Metered Actuals	50	50	50	50	50	50	50	50	50
	RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
		PR1								
	Base	1250								
		-								
	FMM RTUC	1250			1250		1250			
		x								
	FMM LMP	$21			$21		$21			
64600	FMM IIE	$0			$0		$0			
		-								
	RTD (5 min)	1250	1250	1250	1250	1250	1250	1250	1250	1250
		-								
	Metered Actuals	1250	1250	1250	1250	1250	1250	1250	1250	1250

A	B	C	D	E
			÷ 4	
				update for a chang
				What has ran? FM
200			÷ 12	
$21				**What is happening**
$0				
225	225	225		**BA Resource Plan**
				Load Forecast
225	225	225		Net Interchange
				Gen Base Sched
				RS Bid Req
$21	$21	$21		Bid Range
($44)	($44)	($44)		Resource name
				Capacity
$0	$0	$0		Base Point
				Interchange
				Bid Range
				Market Award
				Resource name
			÷ 4	Capacity
				Base Point
				Interchange
50			÷ 12	Bid (+/-)
				Market Award
$21				Resource name
$0				Capacity
				Base Point
50	50	50		Interchange
				Bid (+/-)
50	50	50		Market Award
$21	$21	$21		
$0	$0	$0		
$0	$0	$0		
			÷ 4	
1250			÷ 12	
$21				
$0				
1250	1250	1250		
1250	1250	1250		

code	label	main								
		X								
	RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21
		=								
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Interchange								
	Base	500								
		-								
	FMM RTUC	500			500			500		
		X								
	FMM LMP	$21			$21			$21		
		=								
64600	FMM IIE	$0			$0			$0		
		-								
	RTD (5 min)	500	500	500	500	500	500	500	500	500
		-								
	Metered Actuals	500	500	500	500	500	500	500	500	500
		X								
	RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21
		=								
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Load								
	Hourly Load	1000								
	Submitted	1018								
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000
		-								
	5 min Load "Metered	1018	1018	1018	1018	1018	1018	1018	1018	1018
		X								
	LAP	$21	$21	$21	$21	$21	$21	$21	$21	$21
		=								
	RTD UIE	$32	$32	$32	$32	$32	$32	$32	$32	$32

**what's throwing things off are the LMPs of the FMMs and the NPR 2

$21	$21	$21			
$0	$0	$0			
$0	$0	$0			
			÷ 4		
500			÷ 12		
$21					
$0					
500	500	500			
500	500	500			what do you want
$21	$21	$21	x (-1)		
$0	$0	$0			
$0	$0	$0			
1000	1000	1000	÷ 12		
1018	1018	1018			
					the LAP should be the weighted
$21	$21	$21	x (-1)		
$32	$32	$32		Total Load $384	Total BA Gen ($387)
		From 2a (2b) scenario		Total Load $893	Total BA Gen ($385)
				What results	
				& the reason	

PR2

Code	Item									
	Base	200								
		-								
	FMM RTUC	200			200			200		
		x								
	FMM LMP	$20			$20			$20		
		=								
64600	**FMM IIE**	$0			$0			$0		
		-								
	RTD (5 min)	200	200	200	200	200	200	200	200	200
		-								
	Metered Actuals	200	200	200	200	200	200	200	200	200
		x								
	RTD LMP	$20	$20	$20	$20	$20	$20	$20	$20	$20
		=								
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0.00	$0	$0	$0	$0	$0
	LAP contribution									

NPR1

Code	Item									
	Base	50								
		-								
	FMM RTUC	50			50			50		
		x								
	FMM LMP	$20			$20			$20		
		=								
64600	**FMM IIE**	$0			$0			$0		
		-								
	RTD (5 min)	50	50	50	50	50	50	50	50	50
		-								
	Metered Actuals	50	50	50	50	50	50	50	50	50
		x								
	RTD LMP	$20	$20	$20	$20	$20	$20	$20	$20	$20
		=								
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0

PR1

Code	Item									
	Base	1250								
		-								
	FMM RTUC	1250			1250			1250		
		x								
	FMM LMP	$20			$20			$20		
		=								
64600	**FMM IIE**	$0			$0			$0		
		-								
	RTD (5 min)	1250	1250	1250	1250	1275	1275	1275	1275	1275
		-								
	Metered Actuals	1250	1250	1250	1270	1275	1275	1275	1275	1275

			÷ 4				
					update for a change at T-0 (top of the trade hour)		
					What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1		
200			÷ 12				
$20					**What is happening here? Is a LSE PR(2) being dispatched mid ma**		
$0							
200	200	200			**BA Resource Plan**		
						Scheduled	
					Load Forecast	-1000	
200	200	200			Net Interchange	-500	
					Gen Base Sched	1500	
					RS Bid Req	300	
$20	$20	$20			Bid Range	650	
$0	$0	$0			Resource name	PR1	
					Capacity	3000	
$0	$0	$0			Base Point	1250	
					Interchange	0	
					Bid Range	600	
					Market Award	0	
					Resource name	PR2	
			÷ 4		Capacity	500	
					Base Point	200	
					Interchange	0	
50			÷ 12		Bid (+/-)	50	
					Market Award	25	
$20					Resource name	NPR2	
$0					Capacity	200	
					Base Point	50	
50	50	50			Interchange	0	
					Bid (+/-)	NA	
					Market Award	NA	
50	50	50					
$20	$20	$20					
$0	$0	$0					
$0	$0	$0					
			÷ 4				
1250			÷ 12				
$20							
$0							
1275	1275	1275					
1275	1275	1275					

Code	Label	Main		C1	C2	C3	C4	C5	C6	C7	C8
		X									
	RTD LMP	$20		$20	$20	$20	$20	$20	$20	$20	$20
		=									
64700	RTD IIE	$0		$0	$0	$0	($42)	($42)	($42)	($42)	($42)
64750	RTD UIE	$0		$0	$0	($33)	$0	$0	$0	$0	$0
		Interchange									
	Base	500									
		-									
	FMM RTUC	500				500			500		
		X									
	FMM LMP	$21				$21			$21		
		=									
64600	FMM IIE	$0				$0			$0		
		-									
	RTD (5 min)	500		500	500	500	500	500	500	500	500
		-									
	Metered Actuals	500		500	500	500	500	500	500	500	500
		X									
	RTD LMP	$21		$21	$21	$21	$21	$21	$21	$21	$21
		=									
64700	RTD IIE	$0		$0	$0	$0	$0	$0	$0	$0	$0
64750	RTD UIE	$0		$0	$0	$0	$0	$0	$0	$0	$0
		Load									
	Hourly Load	1000									
	Submitted	1018									
	5-min Load	1000		1000	1000	1000	1000	1000	1000	1000	1000
		-									
	5 min Load "Metered	1018		1018	1018	1018	1018	1018	1018	1018	1018
		X									
	LAP	$20		$20	$20	$20	$20	$20	$20	$20	$20
		=									
	RTD UIE	$31		$31	$31	$31	$31	$31	$31	$31	$31

**what's throwing things off are the LMPs of the FMMs and the NPR 2

$20	$20	$20					
($42)	($42)	($42)					
$0	$0	$0					
			÷ 4				
500			÷ 12				
$21							
$0							
500	500	500					
500	500	500		what do you want the interchange metered actuals to be? They			
$21	$21	$21	x (-1)				
$0	$0	$0					
$0	$0	$0					
1000	1000	1000	÷ 12				
1018	1018	1018					
$20	$20	$20	x (-1)	the LAP should be the weighted hourly average of the LMPs at the Pnodes abo			

			Total Load	Total BA Gen	Net Leaving	Net Net	
$31	$31	$31	$369	($372)	($372)	($3)	

	From 2a (2b) scenario	Total Load	Total BA Gen	Total PR Gen	Net Leaving	Net Net
		$893	($385)	($458)	($385)	$50

What results

& the reason

Total Load	Total BA Gen	Net Leaving	Net Net
$477	($477)	$0	$0

NPR1 (Slice)

	1	2	3	4	5	6	7	8	9	10	11	12		
Base	175												÷ 4	17548
														6000
-														11548
FMM RTUC	175			165			165			165			÷ 12	962.33333333
x														
FMM LMP	$25			$25			$25			$25				
=														
FMM IIE (64600)	$0			$63			$63			$63				
-														
RTD (5 min)	165	165	165	165	165	165	165	165	165	165	165	165		
-														
Metered Actuals	165	165	165	165	165	165	165	165	165	165	165	165		
x														
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
=														
RTD IIE (64700)	$21	$21	$21	$0	$0	$0	$0	$0	$0	$0	$0	$0		$63
RTD UIE (64750)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
LAP contribution														

NPR 2(Wind)

	1	2	3	4	5	6	7	8	9	10	11	12		
Base	50												÷ 4	
-														
FMM RTUC	50			50			50			30			÷ 12	
x														
FMM LMP	$25			$25			$25			$25				
=														
FMM IIE (64600)	$0			$0			$0			$125				
-														
RTD (5 min)	50	50	45	40	40	35	35	30	30	30	30	30		
-														
Metered Actuals	45	40	40	35	35	30	30	30	30	30	30	30		
x														
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
=														
RTD IIE (64700)	$0	$0	$10	$21	$21	$31	$31	$42	$42	$0	$0	$0		$198
RTD UIE (64750)	$10	$21	$10	$10	$10	$10	$10	$0	$0	$0	$0	$0		$83

NPR 3 (Purchase)

	1	2	3	4	5	6	7	8	9	10	11	12		
Base	25												÷ 4	
-														
FMM RTUC	25			35			35			35			÷ 12	
x														
FMM LMP	$25			$25			$25			$25				
=														
FMM IIE (64600)	$0			($63)			($63)			($63)				
-														
RTD (5 min)	35	35	35	35	35	35	35	35	35	35	35	35		
-														
Metered Actuals	35	35	35	35	35	35	35	35	35	35	35	35		

update for a chang
What has ran? FM

3A Resource Plan

Load Forecast
Net Interchange
Gen Base Sched
RS Bid Req
Bid (+/-)

Resource name
Capacity
Base Point
Interchange
Bid Range
Bid $
Market Award

Resource name

Capacity

Base Point
Interchange
Bid (+/-)
Bid/Op $
Market Award

Resource name
Capacity
Base Point
Interchange
Bid (+/-)
Bid/Op $
Market Award

Resource name
Capacity
Base Point
Interchange
Bid (+/-)
Bid/Op $
Market Award

Resource name
Capacity

		1	2	3	4	5	6	7	8	9	10	11	12		
		X													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
64700	**RTD IIE**	($21)	($21)	($21)	$0	$0	$0	$0	$0	$0	$0	$0	$0		($63)
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
		PR1													
	Base	1250												÷ 4	
		-													
	FMM RTUC	1250			1250			1250			1270			÷ 12	
		x													
	FMM LMP	$25			$25			$25			$25				
		=													
64600	**FMM IIE**	$0			$0			$0			($125)				($125)
		-													
	RTD (5 min)	1250	1250	1255	1260	1260	1265	1265	1270	1270	1270	1270	1270		
		-													
	Metered Actuals	1250	1252	1257	1260	1262	1265	1267	1270	1270	1270	1270	1270		
		X													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		$25
		=													
64700	**RTD IIE**	$0	$0	($10)	($21)	($21)	($31)	($31)	($42)	($42)	($42)	($42)	($42)		($323)
64750	**RTD UIE**	$0	($4)	($4)	$0	($4)	$0	($4)	$0	$0	$0	$0	$0		($17) ($465)
	FMM LAP Contribution	0			0			0			20 $500			$25	
	RTD LAP Contribution	0	0	5	10	10	15	15	20	20	0	0	0	95	
		$0	$0	$125	$250	$250	$375	$375	$500	$500	$0	$0	$0	$25	
		Interchange													
	Base	500												÷ 4	
		-													
	FMM RTUC	500			500			500			500			÷ 12	
		x													
	FMM LMP	$25			$25			$25			$25				
		=													
64600	**FMM IIE**	$0			$0			$0			$0				$0
		-													
	RTD (5 min)	500	500	500	500	500	500	500	500	500	500	500	500		
		-													
	Metered Actuals	500	500	500	500	500	500	500	500	500	500	500	500		
		X													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
		=													
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
		Load													
	Hourly Load	1000													
	Submitted	997													
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	÷ 12	($67)
		-													
	5 min Load "Metered	997	997	997	997	997	997	997	997	997	997	997	997		the LAP should
		X													
	LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
		=												**Total Load**	
	RTD UIE	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	$912	

Base Point
Interchange
Bid (+/-)
Bid/Op $
Market Award

($340)

1

what do you want

l be the weighted

Total BA Gen
$0

													**what's throw

ving things off are

NPR1 (Slice)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12			
Base	175													÷ 4	
-															
FMM RTUC	175			165			165			165			÷ 12		
x															
FMM LMP	$25			$25			$25			$25					
=															
64600 **FMM IIE**	$0			$63			$63			$63					$188
-															
RTD (5 min)	165	165	165	165	165	165	165	165	165	165	165	165			
-															
Metered Actuals	165	165	165	165	165	165	165	165	165	165	165	165			
x															
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25			
=															
64700 RTD IIE	$21	$21	$21	$0	$0	$0	$0	$0	$0	$0	$0	$0			$63
64750 RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0			$0
LAP contribution															

NPR 2(Wind)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12			
Base	50													÷ 4	
-															
FMM RTUC	50			50			50			30			÷ 12		
x															
FMM LMP	$25			$25			$25			$25					
=															
64600 **FMM IIE**	$0			$0			$0			$125					$125
-															
RTD (5 min)	50	50	45	40	40	35	35	30	30	30	30	30			
-															
Metered Actuals	45	40	40	35	35	30	30	30	30	30	30	30			
x															
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25			
=															
64700 RTD IIE	$0	$0	$10	$21	$21	$31	$31	$42	$42	$0	$0	$0			$198
64750 RTD UIE	$10	$21	$10	$10	$10	$10	$10	$0	$0	$0	$0	$0			$83

NPR 3 (Purchase)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12			
Base	50													÷ 4	
-															
FMM RTUC	50			60			60			60			÷ 12		
x															
FMM LMP	$25			$25			$25			$25					
=															
64600 **FMM IIE**	$0			($63)			($63)			($63)					($188)
-															
RTD (5 min)	60	60	60	60	60	60	60	60	60	60	60	60			
-															
Metered Actuals	60	60	60	60	60	60	60	60	60	60	60	60			
x															
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25			

17548							
6300	update for a change at T-0 (top of the trade hour)						
11248	What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)						
937.33333333							
$250		**LSE**		**PR**		**Load**	
BA Resource Plan		NPR 1 IIE	$250	IIE	($323)	UIE	($67)
	Scheduled	NPR 1 UIE	$0	UIE	($17)		
Load Forecast	-1000	NPR 2 IIE	$323				
Net Interchange	-500	NPR 2 UIE	$83				
Gen Base Sched	1500	NPR 3 IIE	($250)				
RS Bid Req	300	NPR 3 UIE	$0				
Bid (+/-)	300	Total	$406	Total	($340)	Total	($67)
			f				
Resource name	PR1						
Capacity	3000						
Base Point	1250						
Interchange	500						
Bid Range	600						
Bid $	$26						
Market Award	25						
Resource name	NPR1 (Slice)						
Capacity	500						
Base Point	175						
Interchange	0						
Bid (+/-)	NA						
Bid/Op $	$0						
Market Award	NA						
$406							
Resource name	NPR2 (Wind)						
Capacity	200						
Base Point	50						
Interchange	0						
Bid (+/-)	NA						
Bid/Op $	?						
Market Award	NA						
Resource name	NPR3 (Purch)						
Capacity	500						
Base Point	50						
Interchange	0						
Bid (+/-)	NA						
Bid/Op $	$0						
Market Award	NA						
($250)							
Resource name	NPR2						
Capacity	200						
Base Point	50						
Interchange	0						

Code	Label	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	Op	Notes
	=														
64700	RTD IIE	($21)	($21)	($21)	$0	$0	$0	$0	$0	$0	$0	$0	$0		($63)
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
	PR1														
	Base	1250												÷ 4	
	-														
	FMM RTUC	1250			1250			1250			1270			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			($125)				($125)
	-														
	RTD (5 min)	1250	1250	1255	1260	1260	1265	1265	1270	1270	1270	1270	1270		
	-														
	Metered Actuals	1250	1252	1257	1260	1262	1265	1267	1270	1270	1270	1270	1270		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
	=														
64700	RTD IIE	$0	$0	($10)	($21)	($21)	($31)	($31)	($42)	($42)	$0	$0	$0		($198)
64750	RTD UIE	$0	($4)	($4)	$0	($4)	$0	($4)	$0	$0	$0	$0	$0		($17)
	FMM LAP Contribution	0			0			0			20				$25
											$500				
		0	0	5	10	10	15	15	20	20	0	0	0	95	$25
	RTD LAP Contribution	$0	$0	$125	$250	$250	$375	$375	$500	$500	$0	$0	$0		
	Interchange														
	Base	525												÷ 4	
	-														
	FMM RTUC	525			525			525			525			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			$0				$0
	-														
	RTD (5 min)	525	525	525	525	525	525	525	525	525	525	525	525		
	-														
	Metered Actuals	525	525	525	525	525	525	525	525	525	525	525	525		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
	=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
	Load														
	Hourly Load	1000													
	Submitted	997													
															($67)
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	÷ 12	
	-														
	5 min Load "Metered	997	997	997	997	997	997	997	997	997	997	997	997		
	x														the LAP shoul
	LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
	=														Total Load
	RTD UIE	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)		$912
															($67)
															**what's throw

Bid (+/-)	NA							
Bid/Op $	?							
Market Award	NA							
($250)								
($340)								
($215)								
($340)								
1								
					sum(FMM			

what do you want the interchange metered actuals to be? They are needed to calc the load "metered actuals", but we can hid

I be the weighted hourly average of the LMPs at the Pnodes above (was $48). See formula (not sure if it's entirely correct).

Total BA Gen	Net Leaving	Net Net
$0	$0	$912
66.66666667		
ving things off are the LMPs of the FMMs and the NPR 2		

				Pr										
LSE Imbalance				IIE										
NPR 1 IIE				UIDE										
NPR 1 UIE														
NPR 2 IIE														
NPR 2 UIE														
NPR 3 IIE														
NPR 3 UIE														

			Interval	1	2	3	4	5	6	7	8	9	10	11	12
Hourly Base Schedule - GEN	1500		FMM Market Runs	-37.5	-22.5	-7.5	7.5								
Updated Based Schedule - GEN	1475		RTD Market Runs	-7.5	-2.5	2.5	7.5	12.5	17.5	22.5	27.5	32.5	37.5	42.5	47.5
Time of Update	-20														

Bonneville

	Resource Plan
	Scheduled
Load Forecast	1000
Net Interchange	500
Gen Base Sched	1500
RS Bid Req	600
Bid (+/-)	600
Resource name	APR
Capacity	3000
Base Point	0
Interchange	0
Bid Range	600
LMP	
Resource name	ANPR
Capacity	10000
Base Point	1500
Interchange	500
Bid (+/-)	NA
LMP	

Code	Item													Note	Note2
	NPR1														
	Base	200												÷ 4	
	-														
	FMM RTUC	200			200			200			200			÷ 12	
	x														
	FMM LMP	$25			$27			$30			$35				
	=														
64600	FMM IIE	$0			$0			$0			$0				
	-														
	RTD (5 min)	200	200	200	200	200	200	200	200	200	200	200	200		
	-														
	Metered Actuals	200	200	200	200	200	200	200	200	200	200	200	200		
	x														
	RTD LMP	$22	$22	$22	$25	$25	$25	$25	$25	$25	$25	$25	$25		
	=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
	NPR2														
	Base	50												÷ 4	
	-														
	FMM RTUC	50			50			50			50			÷ 12	
	x														
	FMM LMP	$25			$27			$30			$35				
	=														
64600	FMM IIE	$0			$0			$0			$0				
	-														
	RTD (5 min)	50	50	50	50	50	50	50	50	50	50	50	50		
	-														
	Metered Actuals	50	50	50	50	50	50	50	50	50	50	50	50		
	x														
	RTD LMP	$22	$22	$22	$25	$25	$25	$25	$25	$25	$25	$25	$25		
	=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
	PR1														
	Base	1250												÷ 4	
	-														
	FMM RTUC	1250			1250			1250			1250			÷ 12	
	x														
	FMM LMP	$22			$22			$23			$25				
	=														
64600	FMM IIE	$0			$0			$0			$0				$0
	-														
	RTD (5 min)	1250	1250	1250	1250	1175	1175	1175	1175	1175	1175	1175	1175		
	-														
	Metered Actuals	1250	1250	1225	1200	1175	1175	1175	1175	1175	1175	1175	1175		

update for a change at T-0 (top of t

What has ran? FMM-1 (37.5), FMM

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid (+/-)	300

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	0
Bid Range	600
LMP	

Resource name	NPR1
Capacity	500
Base Point	200
Interchange	0
Bid (+/-)	NA
LMP	

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
LMP	

		x													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
		=													
64700	RTD IIE	$0	$0	$0	$0	$156	$156	$156	$156	$156	$156	$156	$156		$1,250
64750	RTD UIE	$0	$0	$52.08	$104	$0	$0	$0	$0	$0	$0	$0	$0		$156
															$1,406
		Interchange													
	Base	500												÷ 4	
		-													
	FMM RTUC	500			500			500			500			÷ 12	
		x													
	FMM LMP	$25			$27			$30			$35				
		=													
64600	FMM IIE	$0			$0			$0			$0				$0
		-													
	RTD (5 min)	500	500	500	500	425	425	425	425	425	425	425	425		
		-													
	Metered Actuals	500	500	500	500	425	425	425	425	425	425	425	425		($149)
		x													
	RTD LMP	$22	$22	$22	$25	$25	$25	$25	$25	$25	$25	$25	$25	**x (-1)**	
		=													
64700	RTD IIE	$0	$0	$0	$0	($156)	($156)	($156)	($156)	($156)	($156)	($156)	($156)		($1,250)
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
		Load													
	Hourly Load	1000													
	Submitted	994													
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	÷ 12	
		-													
	5 min Load "Metered	994	994	994	994	994	994	994	994	994	994	994	994		
		x													This should
	LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	**x (-1)**	the LAP sho
		=													
	RTD UIE	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)	($12)		($149)
															($1,399)

$1,406		
1		

what do you want the interchang

be a calculation (sum Net Gen - su

uld be the weighted hourly averag

STATUS QUO

															schedule	inc ops	inc op cost
Load		250	250	255	265	275	275	275	275	275	275	275	275	Total Load			
														268			
	-																
Gen		250	250	250	250	260	275	275	275	275	275	275	275	Total Gen	schedule	inc ops	inc op cost
														265	250	15.41666667	$323.75
	X													Total Imb			
Load - Gen		0	0	5	15	15	0	0	0	0	0	0	0	3			

Mid C	$26			EI MW	3		Inc Ops	15.41666667			Imbalance Price	$26
Gen $	$21			EI $	$76		Inc Ops $	$323.75	Total $	$400	Imbalance Cost	$76
											Net BA Cost	$76
												Rate
											Imbalance Price	26
											Imbalance Cost	

NPR1

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		
	Base	200												÷ 4	18440
															6000
		-													12440
	FMM RTUC	200			200			200			200			÷ 12	1036.6666666
		x													
	FMM LMP	$25			$25			$25			$25				
		=													
64600	FMM IIE	$0			$0			$0			$0				
		-													
	RTD (5 min)	200	200	200	200	200	200	200	200	200	200	200	200		
		-													
	Metered Actuals	200	200	200	220	225	225	225	225	225	225	225	225		
		x													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
		=													
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	($42)	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($52)		($458)
	LAP contribution														

NPR2

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		
	Base	50												÷ 4	
		-													
	FMM RTUC	50			50			50			50			÷ 12	
		x													
	FMM LMP	$25			$25			$25			$25				
		=													
64600	FMM IIE	$0			$0			$0			$0				
		-													
	RTD (5 min)	50	50	50	50	50	50	50	50	50	50	50	50		
		-													
	Metered Actuals	50	50	50	50	50	50	50	50	50	50	50	50		
		x													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
		=													
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0

PR1

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		
	Base	1250												÷ 4	
		-													
	FMM RTUC	1250			1250			1250			1250			÷ 12	
		x													
	FMM LMP	$25			$25			$25			$25				
		=													
64600	FMM IIE	$0			$0			$0			$0				$0
		-													
	RTD (5 min)	1250	1250	1250	1250	1275	1275	1275	1275	1275	1275	1275	1275		
		-													
	Metered Actuals	1250	1250	1250	1270	1275	1275	1275	1275	1275	1275	1275	1275		

update for a chang
What has ran? FM
7

3A Resource Plan

Load Forecast
Net Interchange
Gen Base Sched
RS Bid Req
Bid (+/-)

Resource name
Capacity
Base Point
Interchange
Bid Range
Bid $
Market Award

Resource name

Capacity

Base Point
Interchange
Bid (+/-)
Bid/Op $

Market Award

Resource name
Capacity
Base Point
Interchange
Bid (+/-)
Bid/Op $
Market Award

Code	Label														Summary
		X													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		$25
		=													
64700	RTD IIE	$0	$0	$0	$0	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($52)		($417)
64750	RTD UIE	$0	$0	$0	($42)	$0	$0	$0	$0	$0	$0	$0	$0		($42)
															($458)
	FMM LAP Contribution	0			0			0				0			
												$0			
															#DIV/0!
		0	0	0	0	25	25	25	25	25	25	25	25		200
	RTD LAP Contribution	$0	$0	$0	$0	$625	$625	$625	$625	$625	$625	$625	$625		$25
	Base	**Interchange**													
		500													÷ 4
		-													
	FMM RTUC	500			500			500			500			÷ 12	
		X													
	FMM LMP	$25			$25			$25			$25				
		=													
64600	FMM IIE	$0			$0			$0			$0				$0
		-													
	RTD (5 min)	500	500	500	500	500	500	500	500	500	500	500	500		
		-													
	Metered Actuals	500	500	500	500	500	500	500	500	500	500	500	500		
		X													
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
		=													
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
		Load													
	Hourly Load	1000													
	Submitted	1037													
															$917
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	÷ 12	
		-													
	5 min Load "Metered	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037		the LAP should
		X													
	LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
		=													**Total Load**
	RTD UIE	$76	$76	$76	$76	$76	$76	$76	$76	$76	$76	$76	$76		$912
															**what's thro

($458)

1

what do you want

be the weighted

Total BA Gen
($458)

ving things off are

Code		NPR1							
	Base	200							
		-							
	FMM RTUC	200			200		200		
		x							
	FMM LMP	$25			$25		$25		
		=							
64600	FMM IIE	$0			$0		$0		
		-							
	RTD (5 min)	200	200	200	200	225	225	225	225
		-							
	Metered Actuals	200	200	200	220	225	225	225	225
		x							
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25
		=							
64700	RTD IIE	$0	$0	$0	$0	($52)	($52)	($52)	($52)
64750	RTD UIE	$0	$0	$0	($42)	$0	$0	$0	$0
	LAP contribution								

Code		NPR2							
	Base	50							
		-							
	FMM RTUC	50			50		50		
		x							
	FMM LMP	$25			$25		$25		
		=							
64600	FMM IIE	$0			$0		$0		
		-							
	RTD (5 min)	50	50	50	50	50	50	50	50
		-							
	Metered Actuals	50	50	50	50	50	50	50	50
		x							
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25
		=							
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0

Code		PR1							
	Base	1250							
		-							
	FMM RTUC	1250			1250		1250		
		x							
	FMM LMP	$25			$25		$25		
		=							
64600	FMM IIE	$0			$0		$0		
		-							
	RTD (5 min)	1250	1250	1250	1250	1250	1250	1250	1250
		-							
	Metered Actuals	1250	1250	1250	1250	1250	1250	1250	1250

				÷		
				÷ 4	18220	
					6000	update for a chang
					12220	What has ran? FM
	200			÷ 12	1018.33333333	
	$25					
	$0					
						BA Resource Plan
225	225	225	225			
						Load Forecast
						Net Interchange
225	225	225	225			Gen Base Sched
						RS Bid Req
						Bid (+/-)
$25	$25	$25	$25			
($52)	($52)	($52)	($52)		($417)	Capacity
						Base Point
$0	$0	$0	$0		($42)	Interchange
						Bid Range
						Market Award
				÷ 4		Resource name
						Capacity
						Base Point
	50			÷ 12		Interchange
						Bid (+/-)
	$25					Market Award
						Resource name
	$0					Capacity
						Base Point
50	50	50	50			Interchange
						Bid (+/-)
50	50	50	50			Market Award
$25	$25	$25	$25			
$0	$0	$0	$0		$0	
$0	$0	$0	$0		$0	
				÷ 4		
	1250			÷ 12		
	$25					
	$0				$0	
1250	1250	1250	1250			
1250	1250	1250	1250			

Code	Label	Value							
		X							
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25
		=							
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0
	FMM LAP Contribution	0			0		0		
	RTD LAP Contribution	0	0	0	0	0	0	0	0
		$0	$0	$0	$0	$0	$0	$0	$0
		Interchange							
	Base	500							
		-							
	FMM RTUC	500			500		500		
		X							
	FMM LMP	$25			$25		$25		
		=							
64600	**FMM IIE**	$0			$0		$0		
		-							
	RTD (5 min)	500	500	500	500	500	500	500	500
		-							
	Metered Actuals	500	500	500	500	500	500	500	500
		X							
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25
		=							
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0
		Load							
	Hourly Load	1000							
	Submitted	1018							
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000
		-							
	5 min Load "Metered	1018	1018	1018	1018	1018	1018	1018	1018
		X							
	LAP	$25	$25	$25	$25	$25	$25	$25	$25
		=							
	RTD UIE	$38	$38	$38	$38	$38	$38	$38	$38

**what's throwing things off are the LMPs of the FMMs and the NPR 2

$25	$25	$25	$25			$25	
$0	$0	$0	$0			$0	
$0	$0	$0	$0			$0	
						$0	$0
	0						
	$0				#DIV/0!		
0	0	0	0			0	1
$0	$0	$0	$0			#DIV/0!	
					÷ 4		
	500			÷ 12			
	$25						
	$0					$0	
500	500	500	500				
500	500	500	500				what do you want
$25	$25	$25	$25		x (-1)		
$0	$0	$0	$0			$0	
$0	$0	$0	$0				
						$458	
1000	1000	1000	1000		÷ 12		
1018	1018	1018	1018				
							the LAP should be the weighted
$25	$25	$25	$25		x (-1)		
$38	$38	$38	$38			Total Load	Total BA Gen
						$456	($458)
		From 2a (2b) scenario				Total Load	Total BA Gen
						$893	($385)
						What results	
						& the reason	

Code	Item	Value	1	2	3	4	5	6	7	8
	PR2									
	Base	200								
		-								
	FMM RTUC	200			200			200		
		x								
	FMM LMP	$21			$21			$21		
		=								
64600	**FMM IIE**	$0			$0			$0		
		-								
	RTD (5 min)	200	200	200	200	225	225	225	225	225
		-								
	Metered Actuals	200	200	200	220	225	225	225	225	225
		x								
	RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21
		=								
64700	**RTD IIE**	$0	$0	$0	$0	($44)	($44)	($44)	($44)	($44)
64750	**RTD UIE**	$0	$0	$0	($35.00)	$0	$0	$0	$0	$0
	LAP contribution									
	NPR1									
	Base	50								
		-								
	FMM RTUC	50			50			50		
		x								
	FMM LMP	$21			$21			$21		
		=								
64600	**FMM IIE**	$0			$0			$0		
		-								
	RTD (5 min)	50	50	50	50	50	50	50	50	50
		-								
	Metered Actuals	50	50	50	50	50	50	50	50	50
		x								
	RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21
		=								
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0
	PR1									
	Base	1250								
		-								
	FMM RTUC	1250			1250			1250		
		x								
	FMM LMP	$21			$21			$21		
		=								
64600	**FMM IIE**	$0			$0			$0		
		-								
	RTD (5 min)	1250	1250	1250	1250	1250	1250	1250	1250	1250
		-								
	Metered Actuals	1250	1250	1250	1250	1250	1250	1250	1250	1250

			÷ 4		
					update for a chang
					What has ran? FM
200			÷ 12		
$21					**What is happenin**
$0					
225	225	225			**BA Resource Plan**
					Load Forecast
225	225	225			**Net Interchange**
					Gen Base Sched
					RS Bid Req
$21	$21	$21			**Bid Range**
($44)	($44)	($44)			**Resource name**
					Capacity
$0	$0	$0			**Base Point**
					Interchange
					Bid Range
					Market Award
					Resource name
			÷ 4		**Capacity**
					Base Point
					Interchange
50			÷ 12		**Bid (+/-)**
					Market Award
$21					**Resource name**
$0					**Capacity**
					Base Point
50	50	50			**Interchange**
					Bid (+/-)
					Market Award
50	50	50			
$21	$21	$21			**Resource name**
$0	$0	$0			
$0	$0	$0			
			÷ 4		
1250			÷ 12		
$21					
$0					
1250	1250	1250			
1250	1250	1250			

		X									
	RTD LMP	$21		$21	$21	$21	$21	$21	$21	$21	$21
		=									
64700	**RTD IIE**	$0		$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0		$0	$0	$0	$0	$0	$0	$0	$0
		Interchange									
	Base	500									
		-									
	FMM RTUC	500			500			500			
		X									
	FMM LMP	$21			$21			$21			
		=									
64600	**FMM IIE**	$0			$0			$0			
		-									
	RTD (5 min)	500		500	500	500	500	500	500	500	500
		-									
	Metered Actuals	500		500	500	500	500	500	500	500	500
		X									
	RTD LMP	$21		$21	$21	$21	$21	$21	$21	$21	$21
		=									
64700	**RTD IIE**	$0		$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0		$0	$0	$0	$0	$0	$0	$0	$0
		Load									
	Hourly Load	1000									
	Submitted	1018									
	5-min Load	1000		1000	1000	1000	1000	1000	1000	1000	1000
		-									
	5 min Load "Metered	1018		1018	1018	1018	1018	1018	1018	1018	1018
		X									
	LAP	$21		$21	$21	$21	$21	$21	$21	$21	$21
		=									
	RTD UIE	$32		$32	$32	$32	$32	$32	$32	$32	$32

**what's throwing things off are the LMPs of the FMMs and the NPR 2

$21	$21	$21				
$0	$0	$0				
$0	$0	$0				
				÷ 4		
500			÷ 12			
$21						
$0						
500	500	500				
500	500	500			what do you want
$21	$21	$21		x (-1)		
$0	$0	$0				
$0	$0	$0				
1000	1000	1000		÷ 12		
1018	1018	1018				
				the LAP should be the weighted
$21	$21	$21		x (-1)		
$32	$32	$32			Total Load $384	Total BA Gen ($387)
	From 2a (2b) scenario			Total Load $893	Total BA Gen ($385)
				What results	
				& the reason	

PR2

Acct	Item									
	Base	200								
		-								
	FMM RTUC	200			200		200			
		x								
	FMM LMP	$20			$20		$20			
		=								
64600	**FMM IIE**	$0			$0		$0			
		-								
	RTD (5 min)	200	200	200	200	200	200	200	200	200
		-								
	Metered Actuals	200	200	200	200	200	200	200	200	200
		x								
	RTD LMP	$20	$20	$20	$20	$20	$20	$20	$20	$20
		=								
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0.00	$0	$0	$0	$0	$0
	LAP contribution									

NPR1

Acct	Item									
	Base	50								
		-								
	FMM RTUC	50			50		50			
		x								
	FMM LMP	$20			$20		$20			
		=								
64600	**FMM IIE**	$0			$0		$0			
		-								
	RTD (5 min)	50	50	50	50	50	50	50	50	50
		-								
	Metered Actuals	50	50	50	50	50	50	50	50	50
		x								
	RTD LMP	$20	$20	$20	$20	$20	$20	$20	$20	$20
		=								
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0

PR1

Acct	Item									
	Base	1250								
		-								
	FMM RTUC	1250			1250		1250			
		x								
	FMM LMP	$20			$20		$20			
		=								
64600	**FMM IIE**	$0			$0		$0			
		-								
	RTD (5 min)	1250	1250	1250	1250	1275	1275	1275	1275	1275
		-								
	Metered Actuals	1250	1250	1250	1270	1275	1275	1275	1275	1275

			÷ 4				
					update for a change at T-0 (top of the trade hour)		
					What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1		
200			÷ 12				
$20					**What is happening here? Is a LSE PR(2) being dispatched mid ma**		
$0							
200	200	200			**BA Resource Plan**		
						Scheduled	
					Load Forecast	-1000	
200	200	200			Net Interchange	-500	
					Gen Base Sched	1500	
					RS Bid Req	300	
$20	$20	$20			Bid Range	650	
$0	$0	$0			Resource name	PR1	
					Capacity	3000	
$0	$0	$0			Base Point	1250	
					Interchange	0	
					Bid Range	600	
					Market Award	0	
					Resource name	PR2	
			÷ 4		Capacity	500	
					Base Point	200	
					Interchange	0	
50			÷ 12		Bid (+/-)	50	
					Market Award	25	
$20					Resource name	NPR2	
$0					Capacity	200	
					Base Point	50	
50	50	50			Interchange	0	
					Bid (+/-)	NA	
					Market Award	NA	
50	50	50					
$20	$20	$20					
$0	$0	$0					
$0	$0	$0					
			÷ 4				
1250			÷ 12				
$20							
$0							
1275	1275	1275					
1275	1275	1275					

	Main	C1	C2	C3	C4	C5	C6	C7	C8
	X								
RTD LMP	$20	$20	$20	$20	$20	$20	$20	$20	$20
	=								
64700 RTD IIE	$0	$0	$0	$0	($42)	($42)	($42)	($42)	($42)
64750 RTD UIE	$0	$0	$0	($33)	$0	$0	$0	$0	$0
	Interchange								
Base	500								
	-								
FMM RTUC	500			500			500		
	X								
FMM LMP	$21			$21			$21		
	=								
64600 FMM IIE	$0			$0			$0		
	-								
RTD (5 min)	500	500	500	500	500	500	500	500	500
	-								
Metered Actuals	500	500	500	500	500	500	500	500	500
	X								
RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21
	=								
64700 RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750 RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Load								
Hourly Load	1000								
Submitted	1018								
5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000
	-								
5 min Load "Metered	1018	1018	1018	1018	1018	1018	1018	1018	1018
	X								
LAP	$20	$20	$20	$20	$20	$20	$20	$20	$20
	=								
RTD UIE	$31	$31	$31	$31	$31	$31	$31	$31	$31

**what's throwing things off are the LMPs of the FMMs and the NPR 2

$20	$20	$20					
($42)	($42)	($42)					
$0	$0	$0					

÷ 4

500			÷ 12

$21			
$0			
500	500	500	
500	500	500	what do you want the interchange metered actuals to be? They

$21	$21	$21	x (-1)
$0	$0	$0	
$0	$0	$0	

1000	1000	1000	÷ 12
1018	1018	1018	the LAP should be the weighted hourly average of the LMPs at the Pnodes abo
$20	$20	$20	x (-1)

$31	$31	$31		Total Load $369	Total BA Gen ($372)	Net Leaving ($372)	Net Net ($3)

	From 2a (2b) scenario		Total Load $893	Total BA Gen ($385)	Total PR Gen ($458)	Net Leaving ($385)	Net Net $50
			What results				
			& the reason				
			Total Load $477	Total BA Gen ($477)	Net Leaving $0	Net Net $0	

NPR1 (Slice)

	1	2	3	4	5	6	7	8	9	10	11	12		
Base	175												÷ 4	17548
														6000
-														11548
FMM RTUC	175			165			165			165			÷ 12	962.33333333
X														
FMM LMP	$25			$25			$25			$25				
=														
FMM IIE (64600)	$0			$63			$63			$63				
-														
RTD (5 min)	165	165	165	165	165	165	165	165	165	165	165	165		
-														
Metered Actuals	165	165	165	165	165	165	165	165	165	165	165	165		
X														
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
=														
RTD IIE (64700)	$21	$21	$21	$0	$0	$0	$0	$0	$0	$0	$0	$0		$63
RTD UIE (64750)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
LAP contribution														

NPR 2(Wind)

	1	2	3	4	5	6	7	8	9	10	11	12		
Base	50												÷ 4	
-														
FMM RTUC	50			50			50			30			÷ 12	
X														
FMM LMP	$25			$25			$25			$25				
=														
FMM IIE (64600)	$0			$0			$0			$125				
-														
RTD (5 min)	50	50	45	40	40	35	35	30	30	30	30	30		
-														
Metered Actuals	45	40	40	35	35	30	30	30	30	30	30	30		
X														
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
=														
RTD IIE (64700)	$0	$0	$10	$21	$21	$31	$31	$42	$42	$0	$0	$0		$198
RTD UIE (64750)	$10	$21	$10	$10	$10	$10	$10	$0	$0	$0	$0	$0		$83

NPR 3 (Purchase)

	1	2	3	4	5	6	7	8	9	10	11	12		
Base	25												÷ 4	
-														
FMM RTUC	25			35			35			35			÷ 12	
X														
FMM LMP	$25			$25			$25			$25				
=														
FMM IIE (64600)	$0			($63)			($63)			($63)				
-														
RTD (5 min)	35	35	35	35	35	35	35	35	35	35	35	35		
-														
Metered Actuals	35	35	35	35	35	35	35	35	35	35	35	35		
X														

update for a change at T-0

What has ran? FMM-1 (37

BA Resource Plan

Load Forecast

Net Interchange

Gen Base Sched

RS Bid Req

Bid (+/-)

Resource name

Capacity

Base Point

Interchange

Bid Range

Bid $

Market Award

Resource name

Capacity

Base Point

Interchange

Bid (+/-)

Bid/Op $

Market Award

Resource name

Capacity

Base Point

Interchange

Bid (+/-)

Bid/Op $

Market Award

Resource name

Capacity

Base Point

Interchange

Bid (+/-)

Bid/Op $

Market Award

Resource name

Capacity

Base Point

Code	Row	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		Notes
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
	=														
64700	RTD IIE	($21)	($21)	($21)	$0	$0	$0	$0	$0	$0	$0	$0	$0		($63)
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
	PR1														
	Base	1250												÷ 4	
	-														
	FMM RTUC	1250			1250			1250			1270			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			($125)				($125)
	-														
	RTD (5 min)	1250	1250	1255	1260	1260	1265	1265	1270	1270	1270	1270	1270		
	-														
	Metered Actuals	1250	1252	1257	1260	1262	1265	1267	1270	1270	1270	1270	1270		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		$25
	=														
64700	RTD IIE	$0	$0	($10)	($21)	($21)	($31)	($31)	($42)	($42)	($42)	($42)	($42)		($323)
64750	RTD UIE	$0	($4)	($4)	$0	($4)	$0	($4)	$0	$0	$0	$0	$0		($17) ($465)
	FMM LAP Contribution	0			0			0			20 $500			$25	
	RTD LAP Contribution	0	0	5	10	10	15	15	20	20	0	0	0	95 $25	
		$0	$0	$125	$250	$250	$375	$375	$500	$500	$0	$0	$0		
	Interchange														
	Base	500												÷ 4	
	-														
	FMM RTUC	500			500			500			500			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			$0				$0
	-														
	RTD (5 min)	500	500	500	500	500	500	500	500	500	500	500	500		
	-														
	Metered Actuals	500	500	500	500	500	500	500	500	500	500	500	500		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
	=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
	Load														
	Hourly Load	1000													
	Submitted	997													
	5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	÷ 12	($67)
	-														
	5 min Load "Metered	997	997	997	997	997	997	997	997	997	997	997	997		the LAP should
	x														
	LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
	=													Total Load	
	RTD UIE	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	$912	

Interchange
Bid (+/-)
Bid/Op $
Market Award
($340)
1
what do you want the int
I be the weighted hourly a
Total BA Gen
$0

													**what's throu

ving things off are the LMP

NPR1 (Slice)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		
Base	175												÷ 4	
-														
FMM RTUC	175			165			165			165			÷ 12	
x														
FMM LMP	$25			$25			$25			$25				
=														
64600 **FMM IIE**	$0			$63			$63			$63				$188
-														
RTD (5 min)	165	165	165	165	165	165	165	165	165	165	165	165		
-														
Metered Actuals	165	165	165	165	165	165	165	165	165	165	165	165		
x														
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
=														
64700 **RTD IIE**	$21	$21	$21	$0	$0	$0	$0	$0	$0	$0	$0	$0		$63
64750 **RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0

LAP contribution

NPR 2(Wind)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		
Base	50												÷ 4	
-														
FMM RTUC	50			50			50			30			÷ 12	
x														
FMM LMP	$25			$25			$25			$25				
=														
64600 **FMM IIE**	$0			$0			$0			$125				$125
-														
RTD (5 min)	50	50	45	40	40	35	35	30	30	30	30	30		
-														
Metered Actuals	45	40	40	35	35	30	30	30	30	30	30	30		
x														
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
=														
64700 **RTD IIE**	$0	$0	$10	$21	$21	$31	$31	$42	$42	$0	$0	$0		$198
64750 **RTD UIE**	$10	$21	$10	$10	$10	$10	$10	$0	$0	$0	$0	$0		$83

NPR 3 (Purchase)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		
Base	50												÷ 4	
-														
FMM RTUC	50			60			60			60			÷ 12	
x														
FMM LMP	$25			$25			$25			$25				
=														
64600 **FMM IIE**	$0			($63)			($63)			($63)				($188)
-														
RTD (5 min)	60	60	60	60	60	60	60	60	60	60	60	60		
-														
Metered Actuals	60	60	60	60	60	60	60	60	60	60	60	60		
x														
RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		

17548								
6300	update for a change at T-0 (top of the trade hour)							
11248	What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)							
937.33333333								
$250			LSE		PR		Load	
BA Resource Plan			NPR 1 IIE	$250	IIE	($323)	UIE	($67)
	Scheduled		NPR 1 UIE	$0	UIE	($17)		
Load Forecast	-1000		NPR 2 IIE	$323				
Net Interchange	-525		NPR 2 UIE	$83				
Gen Base Sched	1525		NPR 3 IIE	($250)				
RS Bid Req	300		NPR 3 UIE	$0				
Bid (+/-)	600		Total	$406	Total	($340)	Total	($67)
				f				
Resource name	PR1							
Capacity	3000							
Base Point	1250							
Interchange	500							
Bid Range	600							
Bid $	$25							
Market Award	25							
Resource name	NPR1 (Slice)							
Capacity	500							
Base Point	175							
Interchange	0							
Bid (+/-)	NA							
Bid/Op $	$0							
Market Award	NA							
$406								
Resource name	NPR2 (Wind)							
Capacity	200							
Base Point	50							
Interchange	0							
Bid (+/-)	NA							
Bid/Op $	?							
Market Award	NA							
Resource name	NPR3 (Purch)							
Capacity	500							
Base Point	60							
Interchange	0							
Bid (+/-)	NA							
Bid/Op $	$0							
Market Award	NA							
($250)								
Resource name	NPR2							
Capacity	200							
Base Point	50							
Interchange	0							

Code	Item	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		Total
	=														
64700	RTD IIE	($21)	($21)	($21)	$0	$0	$0	$0	$0	$0	$0	$0	$0		($63)
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0

PR1

Code	Item	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		Total
	Base	1250												÷ 4	
	-														
	FMM RTUC	1250			1250			1250			1270			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			($125)				($125)
	-														
	RTD (5 min)	1250	1250	1255	1260	1260	1265	1265	1270	1270	1270	1270	1270		
	-														
	Metered Actuals	1250	1252	1257	1260	1262	1265	1267	1270	1270	1270	1270	1270		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25		
	=														
64700	RTD IIE	$0	$0	($10)	($21)	($21)	($31)	($31)	($42)	($42)	$0	$0	$0		($198)
64750	RTD UIE	$0	($4)	($4)	$0	($4)	$0	($4)	$0	$0	$0	$0	$0		($17)
	FMM LAP Contribution	0			0			0			20				$25
											$500				
	RTD LAP Contribution	0	0	5	10	10	15	15	20	20	0	0	0	95	
		$0	$0	$125	$250	$250	$375	$375	$500	$500	$0	$0	$0	$25	

Interchange

Code	Item	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		Total
	Base	525												÷ 4	
	-														
	FMM RTUC	525			525			525			525			÷ 12	
	x														
	FMM LMP	$25			$25			$25			$25				
	=														
64600	FMM IIE	$0			$0			$0			$0				$0
	-														
	RTD (5 min)	525	525	525	525	525	525	525	525	525	525	525	525		
	-														
	Metered Actuals	525	525	525	525	525	525	525	525	525	525	525	525		
	x														
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
	=														
64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		

Load

Item	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		Note
Hourly Load	1000													
Submitted	997													
5-min Load	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	÷ 12	($67)
-														
5 min Load "Metered	997	997	997	997	997	997	997	997	997	997	997	997		
x														the LAP shoul...
LAP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)	
=														Total Load
RTD UIE	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)		$912
														($67)

**what's throu...

Bid (+/-)	NA							
Bid/Op $	?							
Market Award	NA							
($250)								
($340)								
($215)								
($340)								
1								
					sum(FMM			
what do you want the interchange metered actuals to be? They are needed to calc the load "metered actuals", but we can hide								
l be the weighted hourly average of the LMPs at the Pnodes above (was $48). See formula (not sure if it's entirely correct).								
Total BA Gen	**Net Leaving**	**Net Net**						
$0	$0	$912						
66.66666667								
ving things off are the LMPs of the FMMs and the NPR 2								

	LSE Imbalance			Pr										
	NPR 1 IIE			IIE										
	NPR 1 UIE			UIDE										
	NPR 2 IIE													
	NPR 2 UIE													
	NPR 3 IIE													
	NPR 3 UIE													

Zone	Plant	BA Responses				EIM GDFs		
		INC	DEC	CR		INC	DEC	CR
Upper Columbia	GCL	50%	40%	50%		67%	57%	71%
	CHJ	25%	30%	20%		33%	43%	29%
Upper Snake	LMN	1%	1%	1%		20%	20%	20%
	LGS	2%	2%	2%		40%	40%	40%
	LWG	2%	2%	2%		40%	40%	40%
	IHR	0%	0%	0%		0%	0%	0%
Lower Columbia	MCN	0%	0%	0%		0%	0%	0%
	JDA	10%	10%	15%		50%	40%	60%
	TDA	10%	15%	10%		50%	60%	40%
	BON	0%	0%	0%		0%	0%	0%

	EIM GDFs if only one set allowed per zone
	If Only one GDF for inc/dec/cr, assume we would use INC + CR)
	69%
	31%
	20%
	40%
	40%
	0%
	0%
	56%
	44%
	0%

Hourly Base Schedule - GEN	1500
Updated Based Schedule - GEN	1475
Time of Update	-20

Bonneville	Resource Plan
	Scheduled
Load Forecast	1000
Net Interchange	500
Gen Base Sched	1500
RS Bid Req	600
Bid (+/-)	600

Resource name	APR
Capacity	3000
Base Point	0
Interchange	0
Bid Range	600
LMP	

Resource name	ANPR
Capacity	10000
Base Point	1500
Interchange	500
Bid (+/-)	NA
LMP	

Interval	1	2	3	4	5	6	7	8	9	10	11	12
FMM Market Runs	-37.5	-22.5	-7.5	7.5								
RTD Market Runs	-7.5	-2.5	2.5	7.5	12.5	17.5	22.5	27.5	32.5	37.5	42.5	47.5

NPR1

| Base | 200 | ÷ 4 |

-

| FMM RTUC (15 min) | 200 | 200 | 200 | 200 |

x

| FMM LMP | $25 | $27 | $30 | $35 |

=

| 64600 | **FMM IIE** | $0 | $0 | $0 | $0 | ÷ 12 |

-

| RTD (5 min) | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

-

| Metered Actuals | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

X

| RTD LMP | $22 | $22 | $22 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 |

=

| 64700 | **RTD IIE** | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

| 64750 | **RTD UIE** | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid (+/-)	300

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	0
Bid Range	600
LMP	

NPR2

| Base | 50 | ÷ 4 |

-

| FMM RTUC (15 min) | 50 | 50 | 50 | 50 |

x

| FMM LMP | $25 | $27 | $30 | $35 |

=

| 64600 | **FMM IIE** | $0 | $0 | $0 | $0 | ÷ 12 |

-

| RTD (5 min) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

-

| Metered Actuals | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

X

| RTD LMP | $22 | $22 | $22 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 |

=

| 64700 | **RTD IIE** | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

| 64750 | **RTD UIE** | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

Resource name	NPR1
Capacity	500
Base Point	200
Interchange	0
Bid (+/-)	NA
LMP	

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
LMP	

PR1

Base	1250											÷ 4

−

FMM RTUC (15 min)	1250			1250			1250			1250		

x

FMM LMP	$22			$22			$23			$25			÷ 12

=

64600	**FMM IIE**	$0			$0			$0			$0			$0

−

RTD (5 min)	1250	1250	1250	1250	1175	1175	1175	1175	1175	1175	1175	1175

−

Metered Actuals	1250	1250	1225	1200	1175	1175	1175	1175	1175	1175	1175	1175

x

RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

=

64700	**RTD IIE**	$0	$0	$0	$0	$156	$156	$156	$156	$156	$156	$156	$156	$1,250

64750	**RTD UIE**	$0	$0	$52.08	$104	$0	$0	$0	$0	$0	$0	$0	$0	$156

$1,406 $1,406
1

Interchange

Base	500												÷ 4

−

FMM RTUC (15 min)	500			500			500			500		

x

FMM LMP	$25			$27			$30			$35			÷ 12

=

64600	**FMM IIE**	$0			$0			$0			$0			$0

−

RTD (5 min)	500	500	500	500	425	425	425	425	425	425	425	425

−

Metered Actuals	500	500	500	500	425	425	425	425	425	425	425	425

($149) **what do you want the interchange metered actuals to be? They are needed to**

x

RTD LMP	$22	$22	$22	$25	$25	$25	$25	$25	$25	$25	$25	$25	x (-1)

=

64700	**RTD IIE**	$0	$0	$0	$0	($156)	($156)	($156)	($156)	($156)	($156)	($156)	($156)	($1,250)

STATUS QUO

Load

250	250	255	265	275	275	275	275	275	275	275	275	Total Load
												268

-

Gen

250	250	250	250	260	275	275	275	275	275	275	275	Total Gen	schedule	inc ops	inc op cost
												265	250	15.41666667	$323.75

X

												Total Imb

Load - Gen

0	0	5	15	15	0	0	0	0	0	0	0	3

Mid C	$26
Gen $	$21

EI MW	3
EI $	$76

Inc Ops	15.41667
Inc Ops $	$323.75

Total $	$400

Imbalance Price	$26	Gen Ops Price	$21
Imbalance Cost	$76	Gen Ops Cost	$324
Net BA Cost	$76	Net Cust Cost	$400

	Rate	Total
Imbalance Price	26	
Imbalance Cost		

NPR1

Base	200				÷ 4

FMM RTUC (15 min)	200	200	200	200

x

FMM LMP	$25	$25	$25	$25

= ÷ 12

64600	**FMM IIE**	$0	$0	$0	$0

RTD (5 min)	200	200	200	200	200	200	200	200	200	200	200	200

-

Metered Actuals	200	200	200	220	225	225	225	225	225	225	225	225

X

RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

=

64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

64750	**RTD UIE**	$0	$0	$0	($42)	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($458)

LAP contribution

18440
  6000 update for a change at T-0 (top of the trade hour)
12440 What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)
1036.66667

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid (+/-)	300

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	500
Bid Range	600
Bid $	$26
Market Award	25

NPR2

Base	50				÷ 4

FMM RTUC (15 min)	50	50	50	50

x

FMM LMP	$25	$25	$25	$25

= ÷ 12

64600	**FMM IIE**	$0	$0	$0	$0

RTD (5 min)	50	50	50	50	50	50	50	50	50	50	50	50

-

Metered Actuals	50	50	50	50	50	50	50	50	50	50	50	50

X

RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

=

64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

64750	**RTD UIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Resource name	NPR1
Capacity	500
Base Point	225
Interchange	0
Bid (+/-)	NA
Bid/Op $	$21
Market Award	NA

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Bid/Op $	?
Market Award	NA

PR1

Base	1250				÷ 4

FMM RTUC (15 min)	1250	1250	1250	1250

x

FMM LMP	$25	$25	$25	$25

						=						÷ 12	
64600	**FMM IIE**	$0			$0			$0			$0		$0
	RTD (5 min)	1250	1250	1250	1250	1275	1275	1275	1275	1275	1275	1275	1275
	-												
	Metered Actuals	1250	1250	1250	1270	1275	1275	1275	1275	1275	1275	1275	1275
	X												
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25 → $25
	=												
64700	**RTD IIE**	$0	$0	$0	$0	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($52) → ($417)
64750	RTD UIE	$0	$0	$0	($42)	$0	$0	$0	$0	$0	$0	$0	$0 → ($42) ($458) ($458)

FMM LAP Contribution: 0   0   0   0 $0   #DIV/0!

0	0	0	0	25	25	25	25	25	25	25	25	200	1

RTD LAP Contribution: $0 $0 $0 $0 $625 $625 $625 $625 $625 $625 $625 $625 $25

sum(FMM LMP * FMM demand forecast deviation used at T-40 for each interval) +

Interchange

	Base	500											÷ 4
	-												
	FMM RTUC (15 min)	500			500			500			500		
	x												
	FMM LMP	$25			$25			$25			$25		÷ 12
	=												
64600	**FMM IIE**	$0			$0			$0			$0		$0
	RTD (5 min)	500	500	500	500	500	500	500	500	500	500	500	500
	-												
	Metered Actuals	500	500	500	500	500	500	500	500	500	500	500	500
	X												
	RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25 x (-1)
	=												
64700	**RTD IIE**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0 → $0

what do you want the interchange metered actuals to be? They are needed to calc the load "metered actuals", but we can hide them

Load

	Hourly Load Base Schedule	1000											
	Submitted Hourly Load Value	1037											
	5-min Load Base Schedule	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	-												÷ 12
	5 min Load	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037

$917

| "Metered Actuals" | 1037 | 1037 | 1037 | 1037 | 1037 | 1037 | 1037 | 1037 | 1037 | 1037 | 1037 | 1037 | | the LAP should be the weighted hourly average of the LMPs at the Pnodes above (was $48). See formula (not sure if it's entirely correct). |

X

| LAP | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | **x (-1)** |

=

| RTD UIE | $76 | $76 | $76 | $76 | $76 | $76 | $76 | $76 | $76 | $76 | $76 | $76 |

Total Load	Total BA Gen	Net Leaving	Net Net
$912	($458)	($458)	($5)

**what's throwing things off are the LMPs of the FMMs and the NPR 2

n if you want to show they aren't needed for the IIE settlement on interchange

NPR1

Base	200				÷ 4

FMM RTUC (15 min)	200	200	200	200

-

FMM LMP	$25	$25	$25	$25

x

64600	FMM IIE	$0	$0	$0	$0	÷ 12

=

RTD (5 min)	200	200	200	200	225	225	225	225	225	225	225	225

-

Metered Actuals	200	200	200	220	225	225	225	225	225	225	225	225

x

RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

=

64700	RTD IIE	$0	$0	$0	$0	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($52)	($417)

64750	RTD UIE	$0	$0	$0	($42)	$0	$0	$0	$0	$0	$0	$0	$0	($42)

LAP contribution

Top right notes:

18220
6000 update for a change at T-0 (top of the trade hour)
12220 What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)
1018.33333

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid (+/-)	300

	PR1
Capacity	3000
Base Point	1250
Interchange	500
Bid Range	600
Market Award	0

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	500
Bid Range	600
Bid $	$26
Market Award	0

NPR2

Base	50				÷ 4

FMM RTUC (15 min)	50	50	50	50

-

FMM LMP	$25	$25	$25	$25

x

64600	FMM IIE	$0	$0	$0	$0	÷ 12

=

RTD (5 min)	50	50	50	50	50	50	50	50	50	50	50	50

-

Metered Actuals	50	50	50	50	50	50	50	50	50	50	50	50

x

RTD LMP	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

=

64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Resource name	NPR1
Capacity	500
Base Point	200
Interchange	0
Bid (+/-)	NA
Market Award	NA

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Market Award	NA

Resource name	PR2
Capacity	500
Base Point	200
Interchange	0
Bid (+/-)	NA
Bid/Op $	$21
Market Award	25

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Bid/Op $	?
Market Award	NA

PR1

Base	1250				÷ 4

FMM RTUC (15 min)	1250	1250	1250	1250

-

FMM LMP	$25	$25	$25	$25

x

64600	FMM IIE	$0	$0	$0	$0	÷ 12	$0

=

RTD (5 min)							-						
RTD (5 min)	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	

RTD (5 min) — 1250 (×12)

-

Metered Actuals — 1250 (×12)

X

RTD LMP — $25 (×12) | $25

=

64700 RTD IIE — $0 (×12) | $0

64750 RTD UIE — $0 (×12) | $0 / $0 ... $0

FMM LAP Contribution — 0 ... 0 ... 0 ... 0 / $0 #DIV/0!

0 0 0 0 0 0 0 0 0 0 0 0   0   1

RTD LAP Contribution — $0 (×12) #DIV/0!

sum(FMM LMP * FMM demand forecast
deviation used at T-40 for each interval) +

Interchange

Base — 500   ÷ 4

-

FMM RTUC (15 min) — 500 | 500 | 500 | 500

x

FMM LMP — $25 | $25 | $25 | $25   ÷ 12

=

64600 FMM IIE — $0 | $0 | $0 | $0 $0

-

RTD (5 min) — 500 (×12)

-

Metered Actuals — 500 (×12)

what do you want the interchange metered actuals to be? They are needed to calc the load "metered actuals", but we can hide them if y[...]

X

RTD LMP — $25 (×12)   x (-1)

=

64700 RTD IIE — $0 (×12) $0

Load

Hourly Load Base Schedule — 1000

Submitted Hourly Load Value — 1018

$458

5-min Load Base Schedule — 1000 (×12)

-

5 min Load "Metered Actuals" — 1018 (×12)   ÷ 12

X

LAP — $25 (×12)   x (-1)

the LAP should be the weighted hourly average of the LMPs at the Pnodes above (was $48). See formula (not sure if it's entirely correct).

												=

Total Load	Total BA Gen	Net Leaving	Net Net
$456	($458)	($458)	($2)

RTD UIE	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38

**what's throwing things off are the LMPs of the FMMs and the NPR 2   From 2a (2b) scenario

Total Load	Total BA Gen	Net Leaving	Net Net
$893	($385)	($385)	$50

What results from communicating the manual dispatch to the market operator is that load is now only charged half the amount of imbalance energy compared to not communicating it because the PR was not dispatched to try to meet the 25 MW INC in load in addition to the NPR INCing to meet the load.

The "Net net" amount is $12 higher due to not having the difference between the $458 payment to PR1 that is no longer occuring at the $25 LMP rate (compared to the NPR $21 LMP rate) and the additional $447 charge (double charge for the INC) to load that is no longer occuring. This "Net Net" amount would likely show up in the different offset charge codes to the EESC.

& the reason you would do the manual dispatch in this case to the NPR is because the LMP is more economical than the LMP at the PR to meet the additional demand

ou want to show they aren't needed for the IIE settlement on interchange

PR2

Base	200	÷ 4

−

FMM RTUC (15 min)	200	200	200	200

x

FMM LMP	$21	$21	$21	$21	÷ 12

=

64600	FMM IIE	$0	$0	$0	$0

−

RTD (5 min)	200	200	200	200	225	225	225	225	225	225	225	225

−

Metered Actuals	200	200	200	220	225	225	225	225	225	225	225	225

x

RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21

=

64700	RTD IIE	$0	$0	$0	$0	($44)	($44)	($44)	($44)	($44)	($44)	($44)	($44)

64750	RTD UIE	$0	$0	$0	($35.00)	$0	$0	$0	$0	$0	$0	$0	$0

LAP contribution

NPR1

Base	50	÷ 4

−

FMM RTUC (15 min)	50	50	50	50

x

FMM LMP	$21	$21	$21	$21	÷ 12

=

64600	FMM IIE	$0	$0	$0	$0

−

RTD (5 min)	50	50	50	50	50	50	50	50	50	50	50	50

−

Metered Actuals	50	50	50	50	50	50	50	50	50	50	50	50

x

RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21

=

64700	RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

64750	RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

PR1

Base	1250	÷ 4

−

FMM RTUC (15 min)	1250	1250	1250	1250

x

FMM LMP	$21	$21	$21	$21	÷ 12

=

64600	FMM IIE	$0	$0	$0	$0

−

---

update for a change at T-0 (top of the trade hour)
What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)

What is happening here? Is a LSE PR(2) being dispatched mid market run to meet INC load?

BA Resource Plan	
	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid Range	650

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	0
Bid Range	600
Market Award	0

Resource name	PR2
Capacity	500
Base Point	200
Interchange	0
Bid (+/-)	50
Market Award	25

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Market Award	NA

RTD (5 min)

RTD (5 min)	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
						-						
Metered Actuals	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
						X						
RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21
						=						
64700 RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
64750 RTD UIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

sum(FMM LMP * FMM demand forecast deviation used at T-40 for each interval) +

Interchange

Base	500	÷ 4

-

FMM RTUC (15 min)	500	500	500	500
			X	
FMM LMP	$21	$21	$21	$21
			=	
64600 FMM IIE	$0	$0	$0	$0

÷ 12

-

RTD (5 min)	500	500	500	500	500	500	500	500	500	500	500	500
						-						
Metered Actuals	500	500	500	500	500	500	500	500	500	500	500	500
						X						
RTD LMP	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	x (-1)
						=						
64700 RTD IIE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

what do you want the interchange metered actuals to be? They are needed to calc the load "metered actuals", but we can hide them if you wan

Load

Hourly Load Base Schedule	1000

Submitted Hourly Load Value	1018

5-min Load Base Schedule	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
						-						
5 min Load "Metered Actuals"	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018
						X						
LAP	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	$21	x (-1)
						=						
RTD UIE	$32	$32	$32	$32	$32	$32	$32	$32	$32	$32	$32	$32

÷ 12

the LAP should be the weighted hourly average of the LMPs at the Pnodes above (was $48). See formula (not sure if it's entirely correct).

Total Load	Total BA Gen	Net Leaving	Net Net
$384	($387)	($387)	($3)

**what's throwing things off are the LMPs of the FMMs and the NPR 2

From 2a (2b) scenario

Total Load	Total BA Gen	Total PR Ge	Net Leaving	Net Net
$893	($385)	($458)	($385)	$50

What results from communicating the manual dispatch to the market operator is
that load is now only charged half the amount of imbalance energy compared to
not communicating it because the PR was not dispatched to try to meet the 25
MW INC in load in addition to the NPR INCing to meet the load.
The "Net net" amount is $12 higher due to not having the difference between
the $458 payment to PR1 that is no longer occuring at the $25 LMP rate
(compared to the NPR $21 LMP rate) and the additional $447 charge (double
charge for the INC) to load that is no longer occuring.
This "Net Net" amount would likely show up in the different offset charge codes
to the EESC.

& the reason you would do the manual dispatch in this case to the NPR is because the
LMP is more economical than the LMP at the PR to meet the additional demand

t to show they aren't needed for the IIE settlement on interchange

PR2

| Base | 200 | ÷ 4 |

-

| FMM RTUC (15 min) | 200 | 200 | 200 | 200 |

x

| FMM LMP | $20 | $20 | $20 | $20 |

= ÷ 12

| 64600 | **FMM IIE** | $0 | $0 | $0 | $0 |

-

| RTD (5 min) | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

-

| Metered Actuals | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

X

| RTD LMP | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 |

=

| 64700 | RTD IIE | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

| 64750 | RTD UIE | $0 | $0 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

LAP contribution

NPR1

| Base | 50 | ÷ 4 |

-

| FMM RTUC (15 min) | 50 | 50 | 50 | 50 |

x

| FMM LMP | $20 | $20 | $20 | $20 |

= ÷ 12

| 64600 | **FMM IIE** | $0 | $0 | $0 | $0 |

-

| RTD (5 min) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

-

| Metered Actuals | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

X

| RTD LMP | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 |

=

| 64700 | RTD IIE | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

| 64750 | RTD UIE | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

PR1

| Base | 1250 | ÷ 4 |

-

| FMM RTUC (15 min) | 1250 | 1250 | 1250 | 1250 |

x

| FMM LMP | $20 | $20 | $20 | $20 |

= ÷ 12

| 64600 | **FMM IIE** | $0 | $0 | $0 | $0 |

-

| RTD (5 min) | 1250 | 1250 | 1250 | 1250 | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 |

-

| Metered Actuals | 1250 | 1250 | 1250 | 1270 | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 |

X

| RTD LMP | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 | $20 |

=

| 64700 | RTD IIE | $0 | $0 | $0 | $0 | ($42) | ($42) | ($42) | ($42) | ($42) | ($42) | ($42) | ($42) |

---

update for a change at T-0 (top of the trade hour)
What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)

What is happening here? Is a LSE PR(2) being dispatched mid market run to meet INC load?

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid Range	650

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	0
Bid Range	600
Market Award	0

Resource name	PR2
Capacity	500
Base Point	200
Interchange	0
Bid (+/-)	50
Market Award	25

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Market Award	NA

NPR1 (Slice)

17548
6000 update for a change at T-0 (top of the trade hour)
11548 What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)
962.333333

				÷4
Base	175			

FMM RTUC (15 min)	175	165	165	165

x

FMM LMP	$25	$25	$25	$25

=

64600 FMM IIE

	$0	$63	$63	$63	÷12

-

RTD (5 min):
165	165	165	165	165	165	165	165	165	165	165	165

-

Metered Actuals:
165	165	165	165	165	165	165	165	165	165	165	165

x

RTD LMP:
$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

=

64700 RTD IIE:
$21	$21	$21	$0	$0	$0	$0	$0	$0	$0	$0	$0	$63

64750 RTD UIE:
$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

LAP contribution

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid (+/-)	300

LSE		PR		Load	
NPR 1 IIE	$250	IIE	($448)	UIE	($67)
NPR 1 UIE	$0	UIE	($17)		
NPR 2 IIE	$323				
NPR 2 UIE	$83				
NPR 3 IIE	($250)				
NPR 3 UIE	$0				
Total	$406	Total	($465)	Total	($67)

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	500
Bid Range	600
Bid $	$26
Market Award	25

NPR 2(Wind)

				÷4
Base	50			

FMM RTUC (15 min)	50	50	50	30

x

FMM LMP	$25	$25	$25	$25

=

64600 FMM IIE:
	$0	$0	$0	$125	÷12

-

RTD (5 min):
50	50	45	40	40	35	35	30	30	30	30	30

-

Metered Actuals:
45	40	40	35	35	30	30	30	30	30	30	30

x

RTD LMP:
$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

=

64700 RTD IIE:
$0	$0	$10	$21	$21	$31	$31	$42	$42	$0	$0	$0	$198

64750 RTD UIE:
$10	$21	$10	$10	$10	$10	$10	$0	$0	$0	$0	$0	$83

Resource name	NPR1 (Slice)
Capacity	500
Base Point	175
Interchange	0
Bid (+/-)	NA
Bid/Op $	$0
Market Award	NA

Resource name	NPR2 (Wind)
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Bid/Op $	?
Market Award	NA

NPR 3 (Purchase)

				÷4
Base	25			

FMM RTUC (15 min)	25	35	35	35

x

Resource name	NPR3 (Purch)
Capacity	500
Base Point	25
Interchange	0
Bid (+/-)	NA
Bid/Op $	$0

FMM LMP | $25 | $25 | $25 | $25 | ÷ 12

Market Award | NA

=

64600 FMM IIE | $0 | ($63) | ($63) | ($63)

-

RTD (5 min): 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35

-

Metered Actuals: 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35

Resource name	NPR2
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Bid/Op $	?
Market Award	NA

X

RTD LMP: $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25

=

64700 RTD IIE: ($21) | ($21) | ($21) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0   ($63)

64750 RTD UIE: $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 $0

PR1

Base | 1250 | ÷ 4

-

FMM RTUC (15 min) | 1250 | 1250 | 1250 | 1270

x

FMM LMP | $25 | $25 | $25 | $25 | ÷ 12

=

64600 FMM IIE | $0 | $0 | $0 | ($125)   ($125)

-

RTD (5 min): 1250 | 1250 | 1255 | 1260 | 1260 | 1265 | 1265 | 1270 | 1270 | 1270 | 1270 | 1270

-

Metered Actuals: 1250 | 1252 | 1257 | 1260 | 1262 | 1265 | 1267 | 1270 | 1270 | 1270 | 1270 | 1270

X

RTD LMP: $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 $25

=

64700 RTD IIE: $0 | $0 | ($10) | ($21) | ($21) | ($31) | ($31) | ($42) | ($42) | ($42) | ($42) | ($42)   ($323)

64750 RTD UIE: $0 | ($4) | ($4) | $0 | ($4) | $0 | ($4) | $0 | $0 | $0 | $0 | $0   ($17)

($465)   ($340)

FMM LAP Contribution: 0 | 0 | 0 | 20
$500 $25

0 | 0 | 5 | 10 | 10 | 15 | 15 | 20 | 20 | 0 | 0 | 0   95   1

RTD LAP Contribution: $0 | $0 | $125 | $250 | $250 | $375 | $375 | $500 | $500 | $0 | $0 | $0 $25   sum(FMM

Interchange

Base | 500 | ÷ 4

-

FMM RTUC (15 min) | 500 | 500 | 500 | 500

x

FMM LMP | $25 | $25 | $25 | $25 | ÷ 12

=

| 64600 | FMM IIE | $0 | | | $0 | | | $0 | | | $0 | | | | $0 |

64600 FMM IIE

$0	$0	$0	$0

−

RTD (5 min)

500	500	500	500	500	500	500	500	500	500	500	500

−

Metered Actuals

500	500	500	500	500	500	500	500	500	500	500	500

what do you want the interchange metered actuals to be? They are needed to calc the load "metered actuals", but we can hi...

X

RTD LMP

$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

x (-1)

=

64700 RTD IIE

$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

$0

Load

Hourly Load Base Schedule

1000

Submitted Hourly Load Value

997

($67)

5-min Load Base Schedule

1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

÷ 12

−

5 min Load "Metered Actuals"

997	997	997	997	997	997	997	997	997	997	997	997

the LAP should be the weighted hourly average of the LMPs at the Pnodes above (was $48). See formula (not sure if it's entirely correct).

X

LAP

$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25	$25

x (-1)

=

RTD UIE

($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)	($6)

Total Load	Total BA Gen	Net Leaving	Net Net
$912	$0	$0	$912

**what's throwing things off are the LMPs of the FMMs and the NPR 2

de them if you want to show they aren't needed for the IIE settlement on interchange

NPR1 (Slice)

Row					
Base	175				÷ 4
FMM RTUC (15 min)	175	165	165	165	
FMM LMP	$25	$25	$25	$25	
64600 FMM IIE	$0	$63	$63	$63	÷ 12 $188 $250

RTD (5 min): 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165

Metered Actuals: 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165 | 165

RTD LMP: $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25

64700 RTD IIE: $21 | $21 | $21 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 — $63

64750 RTD UIE: $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 — $0

LAP contribution

17548
6300 update for a change at T-0 (top of the trade hour)
11248 What has ran? FMM-1 (37.5), FMM-2 (22.5), FMM-3 (7.5); RTD 1 (7.5); RTD-2 (2.5)
937.3333333

BA Resource Plan

	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid (+/-)	300

LSE		PR		Load	
NPR 1 IIE	$250	IIE	($323)	UIE	($67)
NPR 1 UIE	$0	UIE	($17)		
NPR 2 IIE	$323				
NPR 2 UIE	$83				
NPR 3 IIE	($250)				
NPR 3 UIE	$0				
Total	$406	Total	($340)	Total	($67)

f

Resource name	PR1
Capacity	3000
Base Point	1250
Interchange	500
Bid Range	600
Bid $	$26
Market Award	25

Resource name	NPR1 (Slice)
Capacity	500
Base Point	175
Interchange	0
Bid (+/-)	NA
Bid/Op $	$0
Market Award	NA

NPR 2(Wind)

Row					
Base	50				÷ 4
FMM RTUC (15 min)	50	50	50	30	
FMM LMP	$25	$25	$25	$25	
64600 FMM IIE	$0	$0	$0	$125	÷ 12 $125

RTD (5 min): 50 | 50 | 45 | 40 | 40 | 35 | 35 | 30 | 30 | 30 | 30 | 30

Metered Actuals: 45 | 40 | 40 | 35 | 35 | 30 | 30 | 30 | 30 | 30 | 30 | 30

RTD LMP: $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25 | $25

64700 RTD IIE: $0 | $0 | $10 | $21 | $21 | $31 | $31 | $42 | $42 | $0 | $0 | $0 — $198

64750 RTD UIE: $10 | $21 | $10 | $10 | $10 | $10 | $10 | $0 | $0 | $0 | $0 | $0 — $83

$406

Resource name	NPR2 (Wind)
Capacity	200
Base Point	50
Interchange	0
Bid (+/-)	NA
Bid/Op $	?
Market Award	NA

NPR 3 (Purchase)

Row					
Base	50				÷ 4
FMM RTUC (15 min)	50	60	60	60	
FMM LMP	$25	$25	$25	$25	
64600 FMM IIE	$0	($63)	($63)	($63)	÷ 12 ($188)

Resource name	NPR3 (Purch)
Capacity	500
Base Point	50
Interchange	0
Bid (+/-)	NA
Bid/Op $	$0
Market Award	NA

(b)(5)

(b)(5)

(b)(5)

From: Angelidis, George
Sent: Wed Feb 28 14:41:48 2018
To: Kochheiser,Todd W (BPA) - TOI-DITT-2
Cc: Xie, June
Subject: [EXTERNAL] RE: APR, NGR, ANPR, GR, GDFs, etc...
Importance: Normal

Microsoft Exchange Server;converted from html;
Todd:
Would I have documentation for that? Why yes, of course! I copy June to send you a link for the external EIM Winter Enhancements BRS after it is revised to include the requirements for Overlapping Resource Aggregation (ORA) validation. Until then, look at this public presentation:
 http://www.caiso.com/Documents/PowerexPresentation-PowerexEIMImplementationAgreementOverview.pdf
Regards

--

George
From: Kochheiser,Todd W (BPA) - TOI-DITT-2 [mailto:twkochheiser@bpa.gov]
Sent: Tuesday, February 27, 2018 10:48 AM
To: Angelidis, George
Subject: [EXTERNAL] APR, NGR, ANPR, GR, GDFs, etc...

Hi George,
I was trying to accurately describe the PWX participation model and the differences between all the acronyms that get thrown around (APR, NGR, GR, ANPR, GDFs, etc.). I was wondering if you had any high-level conceptual documentation that might be useful. I think I understand it all, but I want to make sure my description is accurate.
Thanks,
Todd
Bonneville Power Administration | Transmission Operations
5411 NE Hwy 99 | TOK-DITT2 | Vancouver, WA 98663
Direct: (360) 418-8752 | **twkochheiser@bpa.gov**
****
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From:	Messemer,Clarisse M (BPA) - PGST-5
Sent:	Friday, March 16, 2018 5:07 PM
To:	Truong,Mai N (BPA) - PGST-5
Cc:	Haraguchi,Kelii H (BPA) - PTM-5; Mantifel,Russell (BPA) - TS-DITT-2; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject:	FW: FCRPS Participation ADF Recommendation

(b)(5)

From: Sanford,Chris T (BPA) - TOR-DITT-1
Sent: Friday, March 16, 2018 9:23 AM
To: Kerns,Steven R (BPA) - PGS-5; Simpson,Troy D (BPA) - TOI-DITT-2; Kochheiser,Todd W (BPA) - TOI-DITT-2; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

(b)(5)

From: Kerns,Steven R (BPA) - PGS-5
Sent: Friday, March 16, 2018 8:20 AM
To: Simpson,Troy D (BPA) - TOI-DITT-2; Kochheiser,Todd W (BPA) - TOI-DITT-2; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

(b)(5)

From: Simpson,Troy D (BPA) - TOI-DITT-2
Sent: Friday, March 16, 2018 8:06 AM
To: Kerns,Steven R (BPA) - PGS-5; Kochheiser,Todd W (BPA) - TOI-DITT-2; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

(b)(5)

From: Kerns,Steven R (BPA) - PGS-5
Sent: Friday, March 16, 2018 8:01 AM
To: Kochheiser,Todd W (BPA) - TOI-DITT-2; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2; Simpson,Troy D (BPA) - TOI-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

(b)(5)

From: Kochheiser,Todd W (BPA) - TOI-DITT-2
Sent: Wednesday, March 14, 2018 3:27 PM
To: Kerns,Steven R (BPA) - PGS-5; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2; Simpson,Troy D (BPA) - TOI-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

(b)(5)

From: Kerns,Steven R (BPA) - PGS-5
Sent: Wednesday, March 14, 2018 1:18 PM
To: Sanford,Chris T (BPA) - TOR-DITT-1; Kochheiser,Todd W (BPA) - TOI-DITT-2; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: FCRPS Participation ADF Recommendation
Importance: High

(b)(5)

From: Symonds,Mark C (BPA) - BD-3
Sent: Thu Mar 01 14:58:49 2018
To: Simpson,Mark C (BPA) - PGSD-5; Hawkins,Robert E (BPA) - PGSD-5; Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF
Importance: Normal

(b)(5)

(b)(5)

From: Simpson,Mark C (BPA) - PGSD-5
Sent: Thursday, March 01, 2018 2:22 PM
To: Hawkins,Robert E (BPA) - PGSD-5; Symonds,Mark C (BPA) - BD-3; Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

(b)(5)

From: Hawkins,Robert E (BPA) - PGSD-5
Sent: Thursday, March 01, 2018 12:16 PM
To: Symonds,Mark C (BPA) - BD-3; Simpson,Mark C (BPA) - PGSD-5; Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

(b)(5)

From: Symonds,Mark C (BPA) - BD-3
Sent: Thursday, March 01, 2018 11:53 AM
To: Hawkins,Robert E (BPA) - PGSD-5; Simpson,Mark C (BPA) - PGSD-5; Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

(b)(5)

From: Hawkins,Robert E (BPA) - PGSD-5
Sent: Thursday, March 01, 2018 9:04 AM
To: Simpson,Mark C (BPA) - PGSD-5; Symonds,Mark C (BPA) - BD-3; Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

From: Simpson,Mark C (BPA) - PGSD-5
Sent: Thursday, March 01, 2018 8:18 AM
To: Symonds,Mark C (BPA) - BD-3; Messemer,Clarisse M (BPA) - PGST-5; Hawkins,Robert E (BPA) - PGSD-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

From: Symonds,Mark C (BPA) - BD-3
Sent: Wednesday, February 28, 2018 9:01 AM
To: Messemer,Clarisse M (BPA) - PGST-5; Hawkins,Robert E (BPA) - PGSD-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Simpson,Mark C (BPA) - PGSD-5; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

From: Messemer,Clarisse M (BPA) - PGST-5
Sent: Tuesday, February 27, 2018 5:07 PM
To: Hawkins,Robert E (BPA) - PGSD-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Simpson,Mark C (BPA) - PGSD-5; Symonds,Mark C (BPA) - BD-3; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

From: Hawkins,Robert E (BPA) - PGSD-5
Sent: Tuesday, February 27, 2018 3:52 PM
To: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Simpson,Mark C (BPA) - PGSD-5; Symonds,Mark C (BPA) - BD-3; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: RE: APR alternatives for ADF

(b)(5)

From: Messemer,Clarisse M (BPA) - PGST-5
Sent: Tuesday, February 27, 2018 1:03 PM
To: Truong,Mai N (BPA) - PGST-5; Polsky,Cynthia H (BPA) - PGST-5; Pellicori,Damon A (BPA) - PGST-5; Chang,Elsa (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Simpson,Mark C (BPA) - PGSD-5; Hawkins,Robert E (BPA) - PGSD-5; Symonds,Mark C (BPA) - BD-3; Kochheiser,Todd W (BPA) - TOI-DITT-2
Subject: FW: APR alternatives for ADF

(b)(5)

From: Kerns,Steven R (BPA) - PGS-5
Sent: Tuesday, February 27, 2018 8:00 AM
To: Simpson,Mark C (BPA) - PGSD-5; Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Van Calcar, Pamela M (BPA) - PGSP-5
Subject: RE: APR alternatives for ADF

(b)(5)

From: Simpson,Mark C (BPA) - PGSD-5
Sent: Sunday, February 25, 2018 10:57 AM
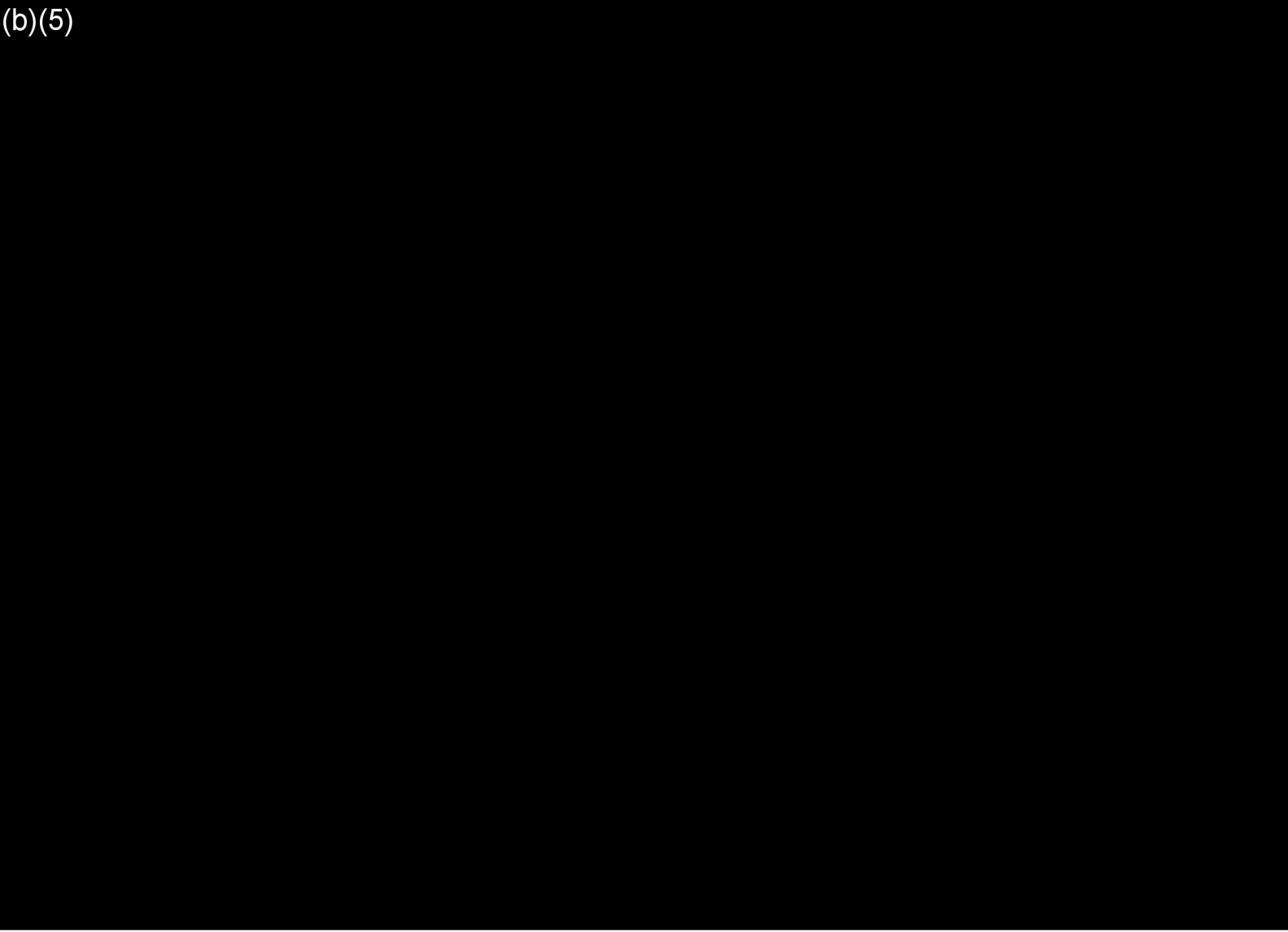
To: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5; Kerns,Steven R (BPA) - PGS-5
Cc: Siewert,Christopher W (BPA) - PGSD-5
Subject: RE: APR alternatives for ADF

(b)(5)

From: Messemer,Clarisse M (BPA) - PGST-5
Sent: Friday, February 23, 2018 6:03 PM
To: Truong,Mai N (BPA) - PGST-5; Kerns,Steven R (BPA) - PGS-5
Cc: Siewert,Christopher W (BPA) - PGSD-5; Simpson,Mark C (BPA) - PGSD-5
Subject: RE: APR alternatives for ADF

(b)(5)

From: Truong,Mai N (BPA) - PGST-5
Sent: Friday, February 23, 2018 11:36 AM
To: Kerns,Steven R (BPA) - PGS-5
Cc: Messemer,Clarisse M (BPA) - PGST-5

(b)(5)

From: Messemer,Clarisse M (BPA) - PGST-5
Sent: Fri Mar 16 17:04:28 2018
To: Sanford,Chris T (BPA) - TOR-DITT-1
Cc: Truong,Mai N (BPA) - PGST-5; Kerns,Steven R (BPA) - PGS-5; Kochheiser,Todd W (BPA) - TOI-DITT-2;
Mantifel,Russell (BPA) - TS-DITT-2
Subject: RE: FCRPS Participation ADF Recommendation
Importance: Normal
Attachments: ADF- Federal Resource Participation; image001.jpg; image002.jpg; image003.jpg;
image004.jpg; image005.jpg; image006.jpg

Microsoft Exchange Server:converted from html;

(b)(5)

From: Sanford,Chris T (BPA) - TOR-DITT-1
Sent: Friday, March 16, 2018 9:23 AM
To: Kerns,Steven R (BPA) - PGS-5; Simpson,Troy D (BPA) - TOI-DITT-2; Kochheiser,Todd W (BPA) - TOI-DITT-2; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

(b)(5)

From: Kerns,Steven R (BPA) - PGS-5
Sent: Friday, March 16, 2018 8:20 AM
To: Simpson,Troy D (BPA) - TOI-DITT-2; Kochheiser,Todd W (BPA) - TOI-DITT-2; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

(b)(5)

From: Simpson,Troy D (BPA) - TOI-DITT-2
Sent: Friday, March 16, 2018 8:06 AM
To: Kerns,Steven R (BPA) - PGS-5; Kochheiser,Todd W (BPA) - TOI-DITT-2; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

From: Kerns,Steven R (BPA) - PGS-5
Sent: Friday, March 16, 2018 8:01 AM
To: Kochheiser,Todd W (BPA) - TOI-DITT-2; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2; Simpson,Troy D (BPA) - TOI-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

From: Kochheiser,Todd W (BPA) - TOI-DITT-2
Sent: Wednesday, March 14, 2018 3:27 PM
To: Kerns,Steven R (BPA) - PGS-5; Sanford,Chris T (BPA) - TOR-DITT-1; Mantifel,Russell (BPA) - TS-DITT-2; Simpson,Troy D (BPA) - TOI-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: RE: FCRPS Participation ADF Recommendation

From: Kerns,Steven R (BPA) - PGS-5
Sent: Wednesday, March 14, 2018 1:18 PM
To: Sanford,Chris T (BPA) - TOR-DITT-1; Kochheiser,Todd W (BPA) - TOI-DITT-2; Mantifel,Russell (BPA) - TS-DITT-2
Cc: Messemer,Clarisse M (BPA) - PGST-5; Truong,Mai N (BPA) - PGST-5
Subject: FCRPS Participation ADF Recommendation
Importance: High

From: Messemer,Clarisse M (BPA) - PGST-5

Sent: Fri Mar 16 15:20:44 2018

To: Miller,Todd E (BPA) - LP-7; Davis,Thomas E (BPA) - LT-7; Lut,Agnes (BPA) - BE-3; Bentz,Roger E (BPA) - BE-3; Symonds,Mark C (BPA) - BD-3
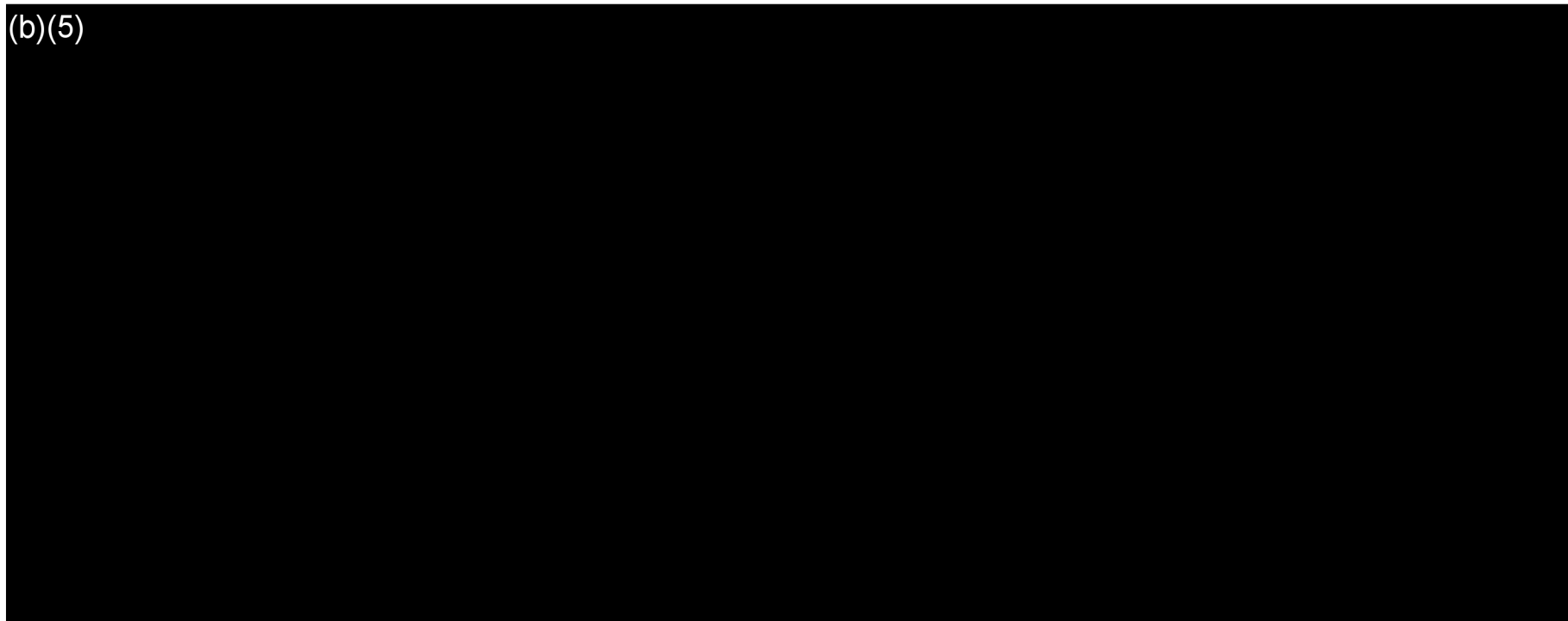
Cc: Connolly,Kieran P (BPA) - PG-5; Manary,Michelle L (BPA) - TS-DITT-2; Cathcart,Michelle M (BPA) - TO-DITT-2; Cooper,Suzanne B (BPA) - PT-5
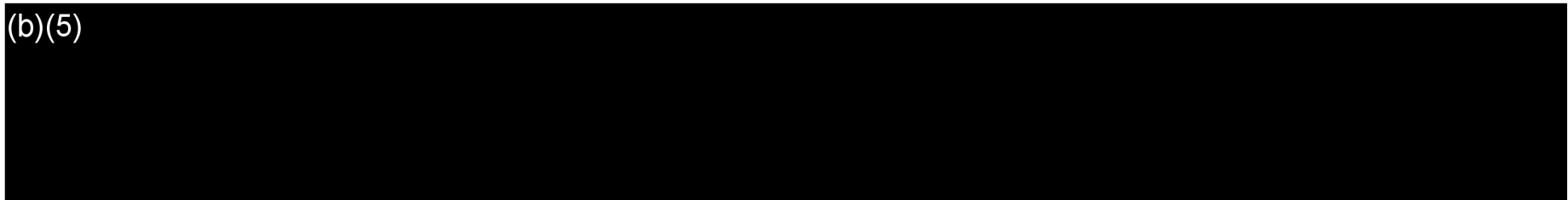
Subject: ADF- Federal Resource Participation

Importance: Normal

Attachments: Pages from 2018.01.24 Proposal For Grid Modernization and EIM Participat....pdf

(b)(5)

(b)(5)

2

Hold For Summary

(b)(5)

(b)(5)