EIM Stakeholder Meeting

March 13, 2019
9am – 2:30pm
Rates Hearing Room

v2

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.

Agenda

9:00-9:05	• Welcome, Safety Moment, Introductions
9:05 – 9:10	• Topics for Today's Meeting • Review of BPAs EIM Principles and Timeline
9:10 – 9:25	• EIM Process and Venues
9:25- 10:00	• Oversupply Management Protocol
10:00 – 10:15	• Break
10:15 – 11:15	• Settlements
11:15 – 12:15	• Lunch
12:15 – 2:15	• Structured Scenario
2:15 – 2:30	• Next Steps, Q&A

Topics For Today's Meeting

- Review of EIM Stakeholder Topics Discussed to Date
- Timeline Review
- Issues that BPA presented at the July 24th EIM Stakeholder meeting that we will be discussing in more depth at a future meeting.

1. Relationship of EIM to Other Emerging Markets
2. BA Resource Sufficiency
3. EIM Settlements
4. Market Power
5. Treatment of Transmission
6. Generation Participation Model (FCRPS)
7. Governance
8. **Carbon Obligation in EIM**

Issues discussed at previous EIM Stakeholder meetings.

This issue will be discussed at a future meeting.

- Question and Answer Session

Statement of BPA's Principles:

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.

If BPA signs the EIM Implementation Agreement it would authorize BPA to begin spending on EIM implementation projects with the CAISO and signals BPA's intent to join the EIM as long as BPA's EIM principles continue to be met. However, it does not bind BPA to join the EIM.

Timeline Leading up to the ROD

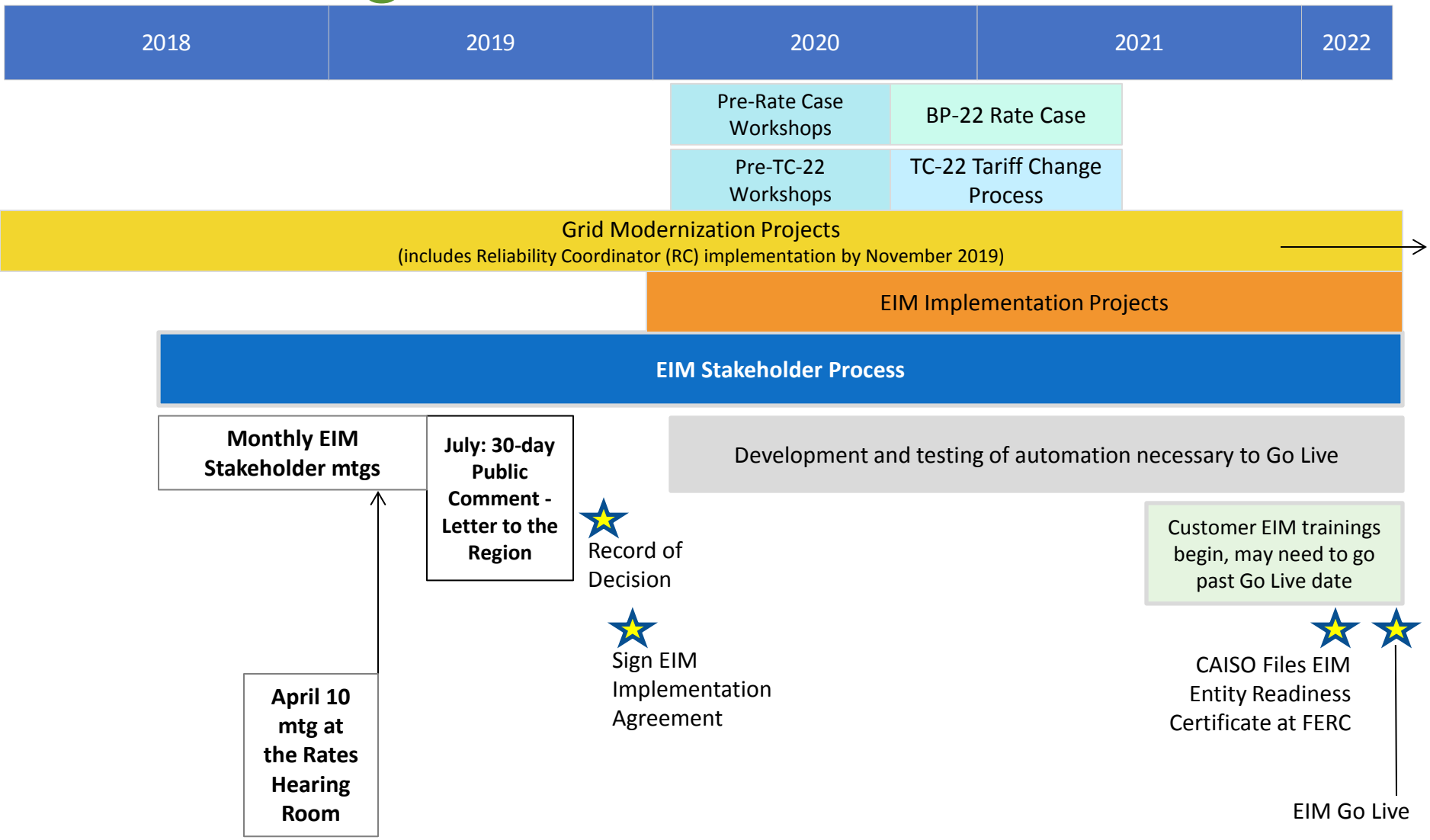
Agendas for previous and future monthly EIM Stakeholder meetings:

July 24	•Grid Modernization Overview, Strategic Plan Connection, Intro to 8 Issues BPA is Reviewing, Initial Cost Benefit Analysis
September 13	•EIM 101
October 11	•Process Plan, Transmission, Generation, Governance
November 14	•Process Plan, Market Power
December 18	•Settlements, Non-Federal Generation Participation
January 16	•Resource Sufficiency, Emerging Markets
February 20	•Base Case Structured Scenario, Market Mitigation
March 13	•EIM Issues and Venues, Oversupply Management Protocol, Settlements, Structured Scenario
April 10	•Carbon in the EIM, Cost Benefit Analysis, Structured Scenario
May 15	**Structured Scenarios:** Discussion of Impacts to Customers
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.

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

BPA's High Level EIM Timeline



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EIM Issues and Venues

- BPA has been tracking EIM issues that will be resolved in future BPA processes or workshops.

- This is an *example* of the EIM issues and venues matrix that will serve as a Roadmap for stakeholders to track the issues through the various BPA forums.
  - This Roadmap will be included in the Letter to the Region in the summer of 2019.

Letter to Region/ Implementation Agreement ROD	TC-22 Tariff Terms & Conditions Case	BP-22 Rate Case	Business Practices	Other
Joining the EIM is consistent with BPA's statutory authority	Explanation of EIM charges codes	Cost Allocation – which rates recover which EIM costs		
Business Case / Cost Benefit Analysis	Dispute Resolution process for EIM charges			

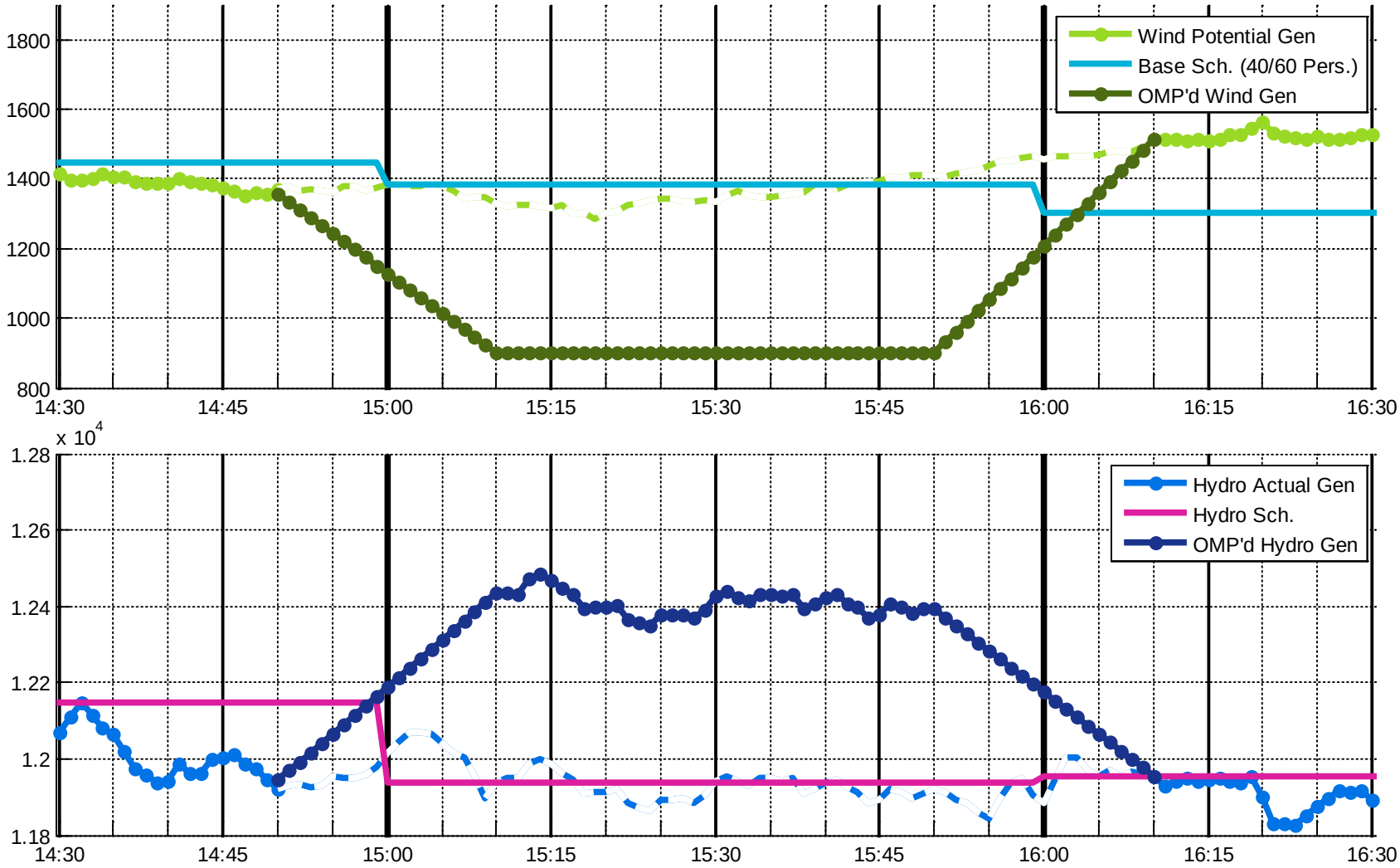
DRAFT Example

Oversupply Management Protocol

Oversupply Management Protocol (OMP)

- During periods of high water, particularly during spring runoff, the Federal hydro system may have more water to be moved through turbines than load. In these extreme cases, OMP may be initiated.
- OMP is a FERC-approved tool that BPA uses to displace and compensate generation in BPA's balancing authority area in order to manage high levels of total dissolved gas (TDG) in the Columbia and Snake Rivers.
- During an OMP event, BPA directs non-Federal generators to move to their minimum generation level. Federal hydro output is increased to fill the generation schedules of the limited generators, allowing for additional water passage through the turbines.
- BPA financially compensates the limited generators for their lost opportunity cost.

OMP Mechanics



OMP and EIM Participation

- BPA has discussed OMP with CAISO staff.
- Based on those discussions, it appears that BPA can retain the mechanics of how OMP works while participating in the EIM.
- At this time BPA has not identified the need to change Attachment P.
- BPA will consider other methods of managing over-generation if more effective ways of achieving the goals of OMP are discovered.

EIM Settlements

Goals for Today

- Refresh on key concepts from December 2018 EIM Settlements presentation
- Discuss potential customer impacts from EIM Settlements
- Gauge customer preferences on specific settlements decision
- Provide a high level overview of additional EIM Charge Codes

- *Reminder*: BPA's overarching goal is to educate on processes and impacts regarding **BPA's relationship with the Market Operator** (CAISO) in order to better prepare you for ongoing EIM stakeholder engagement.

- **Disclaimer:** All scoping efforts have been / are being completed under the assumption that BPA will join the Energy Imbalance Market (EIM), although no determination has been made at this time. The remaining slides are reflective of this assumption.

Long-Term EIM Settlements Objectives

- Establish an EIM Settlements function which
  - Supports BPA's Strategic Plan objectives
  - Supports ease of doing business with BPA for our customers
  - Enables transparency of processes and information with BPA's customers
  - Provides high quality (accurate and timely) outputs for our customers

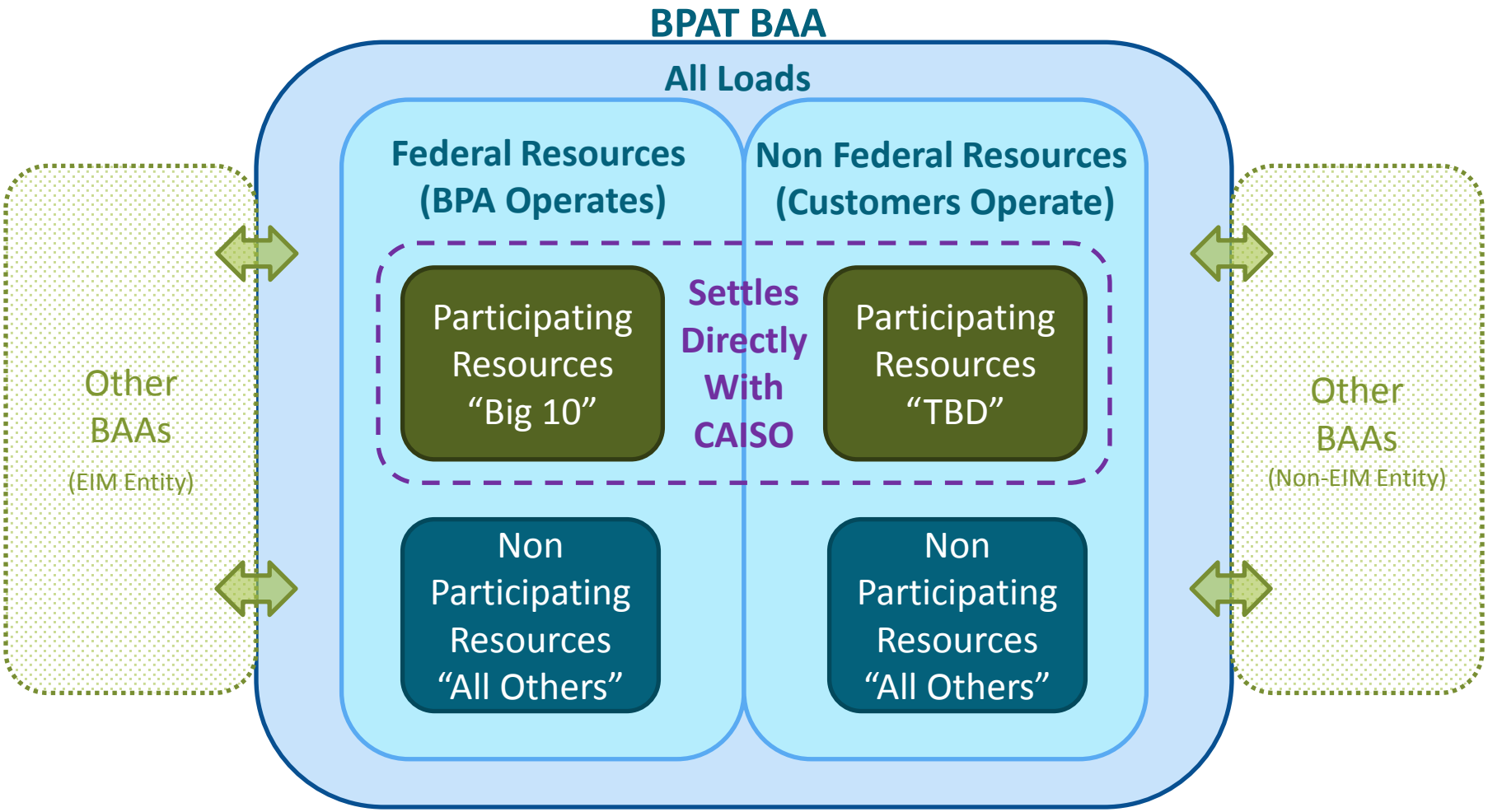
Refresh on Key EIM Settlement Concepts

What are EIM Settlements

- Processes related to, and resulting in, the invoicing of charges and credits for EIM activity.

- CAISO settlement allocations apply to the following:
  - Generating Resources
    - Participating
    - Non-Participating
  - Interchange (CAISO calls it Intertie)
  - Load

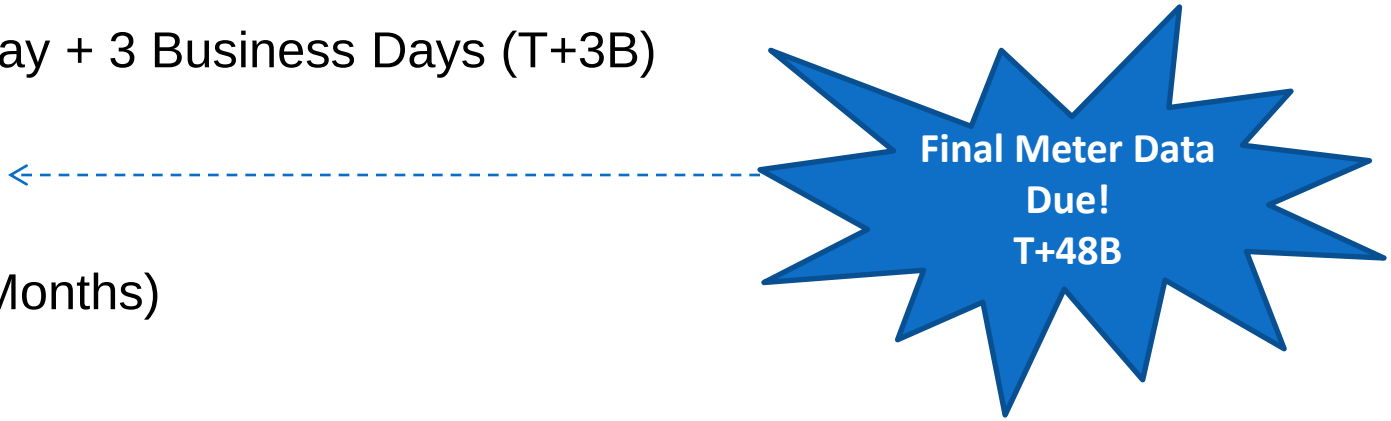
EIM Settlement Interactions



Everything settles with BPAT except Participating Resources

EIM Settlements – CAISO Process

- Settlement statements are published daily by CAISO for at least 3, and up to 7, versions
  - Trade Day + 3 Business Days (T+3B)
  - T+12B
  - T+55B
  - T+9M (Months)
  - T+18M
  - T+33M
  - T+36M



- Settlement statements are included on the Invoice following the statement publish date
  - T+3B & T+12B invoiced weekly by CAISO
  - T+55B → T+36M invoiced monthly by CAISO

EIM Settlements – CAISO Process

- CAISO disputes are based on the Settlement Statement (SS)
  - The time allowed to file is based on the SS published date (not the invoice published date)

Settlement Statement	Dispute Deadline	Disputable Content
T + 3B	Not disputable	Not disputable
T + 12B	T +26B	All content except estimated meter data
T + 55B	T + 77B	All statement content
T + 9M (+ 194B)	T + 10M (+ 216B)	Incremental changes from T + 55B
T + 18M (+ 383B)	T + 19M (+ 405B)	Incremental changes from T + 9M
T + 33M (+ 693B)	T + 34M (+ 715B)	Incremental changes from T + 18M
T + 36M (+ 759B)	Not disputable	Not disputable

CAISO Settlements, Invoicing & Disputes Calendar

Potential Customer Impacts from EIM Settlements

EIM Settlements Data Gathering

- BPA has a large and diverse customer base that is unlike other EIM Entities.

- Therefore, it's difficult to baseline:
  - How much we will pay or receive per month with CAISO
  - How many disputes we should expect to file per month
  - What is the dollar volume of disputes
  - Will the majority of the disputes be on the CAISO invoice issued to BPA on the T+12B, T+55B, etc.

CAISO EIM Settlement Dispute Statistics

- In 2018 – fewer than 150 disputes were filed across all EIM Entity & Participating Resource Scheduling Coordinators and approximately 60% resulted in resettlement
  - Multiple disputes may have been submitted for a single issue.
  - The dollar magnitude of dispute resettlements during 2018 was less than 0.5% of the total gross EIM transactions.

- Common reasons for disputes or data changes
  - Technology
  - Design gap during the policy development or implementation
    - E.g. “missed scenario” in development
  - Pricing updates
  - Meter data changes

EIM Settlements – Customer Impacts

- BPA is a government entity that sets its rates at cost, so any charges or credits received from EIM participation will be allocated to customers in some manner

- Cost allocations will be determined through a BPA Rate (BP) Case.
  - Any associated terms and conditions will be determined through a BPA Terms and Conditions (TC) Case

Customer Preferences Inquiry:

Invoice Timing

Customer Preferences: Invoice Timing

- Based on how CAISO would allocate EIM Charge Codes to BPA as the EIM Entity Scheduling Coordinator, BPA sees two potential scenarios for allocation to our customers.
  - Invoicing on T+12B settlement statement data
  - Invoicing on T+55B settlement statement data

- BPA would like customers to weigh in on their preferences given pros and cons of each option to inform a decision in the future.

- BPA will select a single option for invoicing customers on EIM allocations & resettlements.

Pros of BPA invoicing on the T+12B

- For Customers:
  - If BPA is able to submit final meter data to CAISO by T+8B, this invoice is ~95% cleared
  - Quicker turnaround on cash flow compared to T+55B
    - Invoices with charges or credits could potentially be issued from BPA around the 3rd week following the close of the Trade month
  - Can notify BPA sooner if you have a dispute
    - Resolution more likely by T+55B resettlement versus T+9M resettlement
- For BPA:
  - Quicker turnaround on cash flow (same as above)

Cons of BPA invoicing on the T+12B

- For Customers:
  - BPA often does not have final meter data by T+8B, so the extent that the T+12B invoice would be cleared could vary from month to month.
  - Other EIM Entity updates (meter data, disputes, etc.) can impact revisions across the entire market, so the extent that the T+12B invoice would be cleared is partially out of BPA's control.
  - Guaranteed more resettlements to process compared to invoicing on the T+55B settlements.
  - Additional financial transaction costs
    - Customers would receive credits or be expected to pay on the potentially un-cleared settlements.

- For BPA:
  - Given existing processes and resources, it is likely that BPA would have meter data changes to submit to CAISO between T+8B → T+48B when final meter data is due.
  - Guaranteed more resettlements to invoice compared to invoicing beginning with the T+55B settlements.
  - Additional financial transaction costs
    - BPA would pay or receive payments from customers on the potentially un-cleared settlements.

Pros of BPA invoicing on the T+55B

- For Customers:
  - More accurate initial ("Final") invoice due to timing of final meter data submissions
    - CAISO considers the T+55B settlement their "Final" version (their goal is to have the market cleared by this settlement).
  - Invoicing on the T+55B eliminates the T+12B invoice for processing by customers
    - More efficient
    - Fewer invoices received overall, so fewer resources needed to process
  - Fewer financial transactions than invoicing on the T+12B (fewer associated costs)

- For BPA:
  - Invoicing on the T+55B eliminates the T+12B invoice for processing and preparing by BPA
    - More efficient
    - Fewer invoices issued overall, so fewer resources needed to process
      - Decreasing the number of staff needed to process additional workload has a positive impact on rates (reduces overall costs)
  - Fewer financial transactions than invoicing on the T+12B (fewer associated costs)

Cons of BPA invoicing on the T+55B

- For Customers:
  - If BPA bills off the T+55B and a customer files a dispute with BPA against it, BPA will not be reimbursed by CAISO until T+9M at the earliest.
    - Resettlement can take months given the CAISO's resettlement schedule (refer to slide 20).
  - Delayed initial cash flow
    - Invoice will not be received until approximately 3 months after the close of the trade month.
      - E.g. January 2019 T+55B invoice prepared (by CAISO) late April 2019. BPA could allocate to customers late April or early May.
      - Monthly invoices would be on ~3 month lag from when actual operations occurred.
- For BPA:
  - Delayed initial cash flow
    - Invoice cannot be issued until approximately 3 months after the close of the trade month.

Invoicing Timing – General Considerations

- Generally, the trade-offs can be summarized to cash flow versus processing costs.

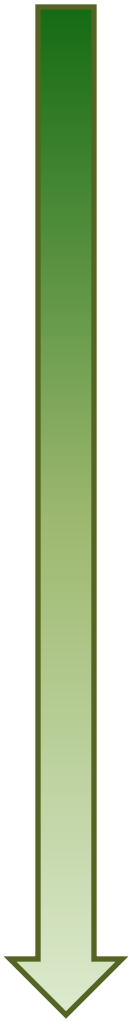
- If BPA invoices on the T+12B settlement, it is not automatic that there will be a dollar difference on the T+55B settlement.

Provide Feedback

- Send any comments or feedback on this topic to techforum@bpa.gov and reference “EIM Invoicing” in the subject line.
  - Provide comments before **Friday April 12th**

Additional EIM Charge Codes

EIM Charge Codes in Time



T-40

6045 Over scheduling and Under Scheduling Settlement
6046 Over scheduling and Under Scheduling Allocation

T-37.5

64600 FMM Instructed Imbalance Energy EIM Settlement (FMM IIE)

T-7.5

64700 Real Time Instructed Imbalance Energy EIM Settlement (RTD IIE)

Trading Hour

7070 Flexible Ramp Forecast Movement Settlement
7071 Daily Flexible Ramp up Uncertainty Capacity Settlement
7081 Daily Flexible Ramp down Uncertainty Capacity Settlement
491 Green House Gas Emission Cost Revenue

Meter/e-Tag Data Submitted

7076 Flexible Ramp Forecast Movement Allocation
7077 Daily Flexible Ramp Up Uncertainty Award Allocation
7078 Monthly Flexible Ramp Up Uncertainty Award Allocation
7087 Daily Flexible Ramp Down Uncertainty Award Allocation
7088 Monthly Flexible Ramp Down Uncertainty Award Allocation
64740 Real Time Unaccounted for Energy EIM Settlement (RTD UFE)
64750 Real Time Uninstructed Imbalance Energy EIM Settlement (RTD UIE)
64770 Real Time Imbalance Energy Offset EIM
67740 Real Time Congestion Offset EIM
69850 Real Time Marginal Losses Offset EIM
66200 Bid Cost Recovery EIM Settlement
66780 Real Time Bid Cost Recovery Allocation EIM

Administrative

4515 GMC Bid Transaction Fee
4564 GMC-EIM Transaction Charge
4575 SMCR -Settlements, Metering, and Client Relations
701 Forecasting Service Fee

EIM Charge Codes – Over & Under Scheduling

- Over & Under Scheduling Charge Codes are meant to incentivize BAAs to provide balanced load, supply, and interchange base schedules.
  - Over & Under Scheduling Settlement (CC 6045)
  - Penalties only apply if load scheduled v. metered actuals ≥ 5%
- If a BAA does not incur Over or Under Scheduling penalties in a single day, they will be allocated a portion of the penalty money collected from any BAAs which did.
  - Over & Under Scheduling Allocation (CC 6046)
  - If no BAA Over or Under Schedules in a single day, then there will be no allocations for that day.

EIM Charge Codes – Flexible Ramp

- Flexible Ramping Charge Codes are meant to ensure there is enough flexible ramping capacity to meet forecasted market demand uncertainty.
- Settles in the RTM (5-min)
  - Settlements & Allocations related to the **Forecasted Movement**
    - CC 7070, 7076 (daily)
  - **Settlements** related to Up & Down Uncertainty **Capacity**
    - CC 7071, 7081 (daily)
  - **Allocations** related to Up & Down Uncertainty **Capacity Awards**
    - CC 7077, 7087 (daily)
    - CC 7078, 7088 (monthly: reversal and resettlement of the daily allocations)

EIM Charge Codes – UFE & Offsets

- Unaccounted for Energy (UFE) ensures all energy in the BAA is accounted for (CC 64740) by comparing supply & demand and adjusting for losses.
- Offset Charge Codes are used to ensure neutrality and are allocated to the EESC (BAA) as charges or credits
  - Real Time **Congestion** Offset (CC 67740)
  - Real Time **Marginal Losses** Offset (CC 69850)
  - Real Time **Imbalance Energy** Offset (CC 64770)

EIM versus BPA Charge Codes

EIM Charge Code…	Can be likened to BPA's…	Because the intent is to …
Imbalance Energy (IIE & UIE)	Energy Imbalance (EI) & Generation Imbalance (GI)	settle for generation and load (energy) imbalances
Over & Under Scheduling	Intentional Deviation (ID) & Persistent Deviation (PD)	prevent entities from leaning on the market (or BAA)
Flexible Ramping	DERBS, VERBS, & RFR	ensure there is enough uncertainty capacity to meet unexpected load changes (or load forecast error)

EIM Settlements Summary

- BPA will continue to scope out the Settlement impacts as an EIM Entity Scheduling Coordinator in order to better understand potential impacts to BPA's customers.
- BPA will continue to engage customers on pertinent updates that arise:
  - Brief on the outcomes of the Invoice Timing customer inquiry (likely in May)
  - Brief on any newly uncovered information which may impact customers
  - Continue to provide settlements outcomes from Structured Scenarios

Lunch Break

Structured Scenario

Structured Scenarios: Overview

- BPA will use structured scenarios, or “table tops”, to walk through EIM mechanics for customers and stakeholders.
- These structured scenarios are intended to provide education and to identify how certain activities would impact EIM operations and settlements.
- These outcomes should help customers and stakeholders begin to understand how BPA’s EIM participation would:
  - Potentially impact their business and operations, and
  - Help them prepare for how EIM issues would be addressed in upcoming Rates and Terms & Conditions Cases.

Structured Scenarios

- Today's scenarios are a simple example of a BAA customer dispatching resources to meet changes in load
- The scenarios address several variations
  - Scenario 2.A: Status quo, Self Supply of Imbalance
  - Scenario 2.B: Non-Participating Resource with *no* Manual Dispatch provided to the market
  - Scenario 2.C: Non-Participating Resource *with* Manual Dispatch provided to the market
  - Scenario 2.D: LSE's Participating Resource dispatches economically
  - Scenario 2.E: LSE Participating Resource and 3rd Party dispatches economically

	Transmission Congestion In Market	Participating Resources	Scheduling	Real-Time Actions
Scenario 1: Base Simple	• None – ETSRs and internal constraints are non-binding	• FCRPS aggregated into three zones	• All base schedules (inter and intrachange) completed by T-40 and flat for the hour	• None
• **Scenario 1.A: Base with Export Reduction**	• "	• "	• All base schedules (inter and intrachange) completed by T-40 with reduction in exports within the hour at XX:10 by 75 MW	• "
• **Scenario 2.A – Status Quo, Self Supply of Imbalance**	• NA	• NA	• NA	• NA
• **Scenario 2.B – Non-Participating with *no* Manual Dispatch**	• "	• "	• All base schedules (inter and intrachange) completed by T-40 and flat for the hour	• LSE dispatch of resource to meet 25MW increase in load
• **Scenario 2.C – Non-Participating Resource *with* Manual Dispatch**	• "	• "	• All base schedules (inter and intrachange) completed by T-40 and flat for the hour	• LSE dispatch of resource to meet 25MW increase in load and EESC signals Manual Dispatch to the MO
• **Scenario 2.D – LSE's Participating Resource dispatches economically**	• "	• FCRPS aggregated into three zones AND LSE resource	• "	• Market economically dispatches LSE PR
• **Scenario 2.E – LSE Participating Resource and 3rd Party dispatches economically**	• "	• FCRPS aggregated into three zones AND LSE resource	• "	• Market economically dispatches 3rd Party resource (specifically, the FCRPS PR in this example)

2.A – Status quo, Self Supply of Imbalance

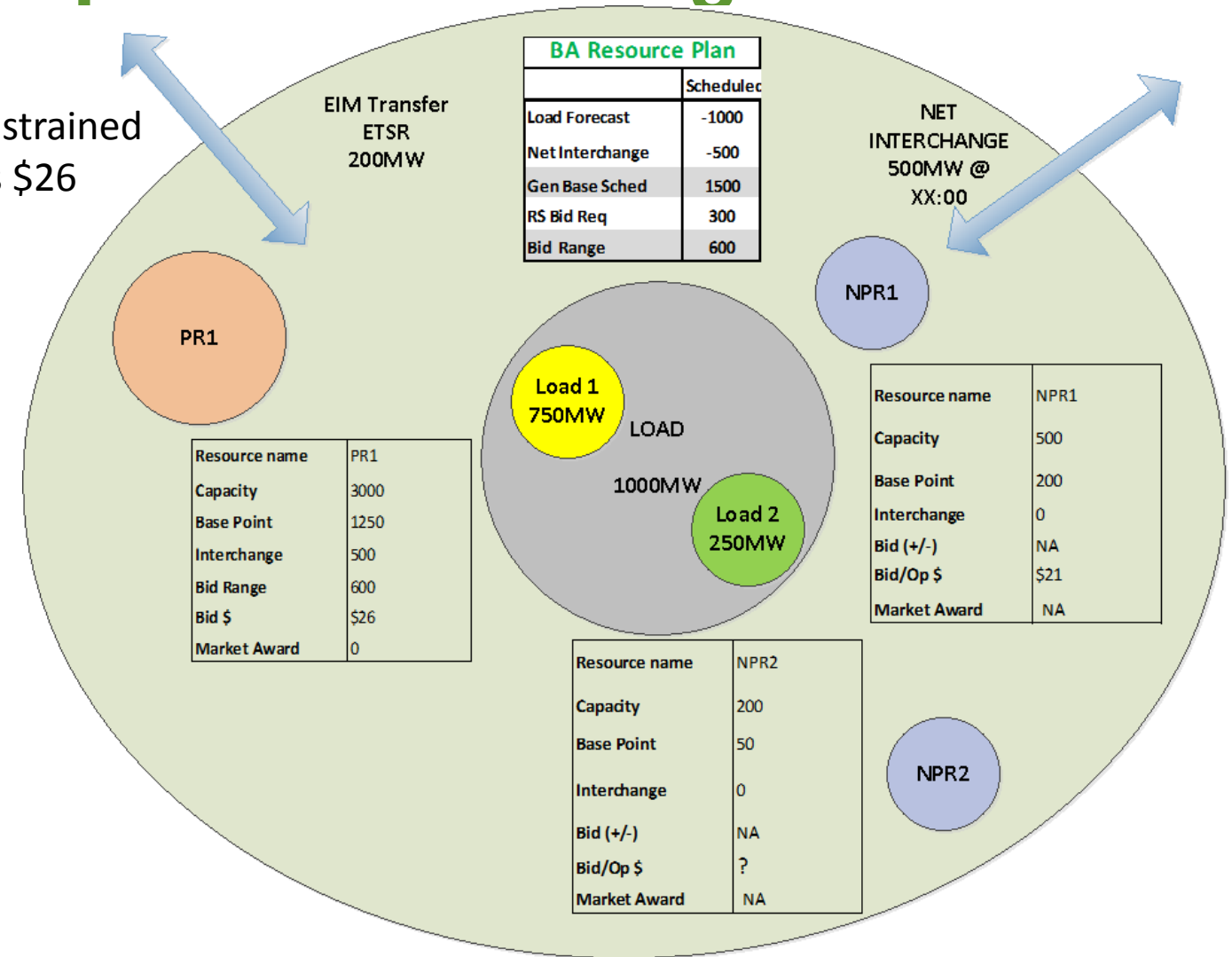
LSE generation responds to meet change in load

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 265
						X							Total Imb
Load - Gen	0	0	5	15	15	0	0	0	0	0	0	0	3

2.B – Non-Participating/No Manual Dispatch – Entering OH

Unconstrained
LMP is $26



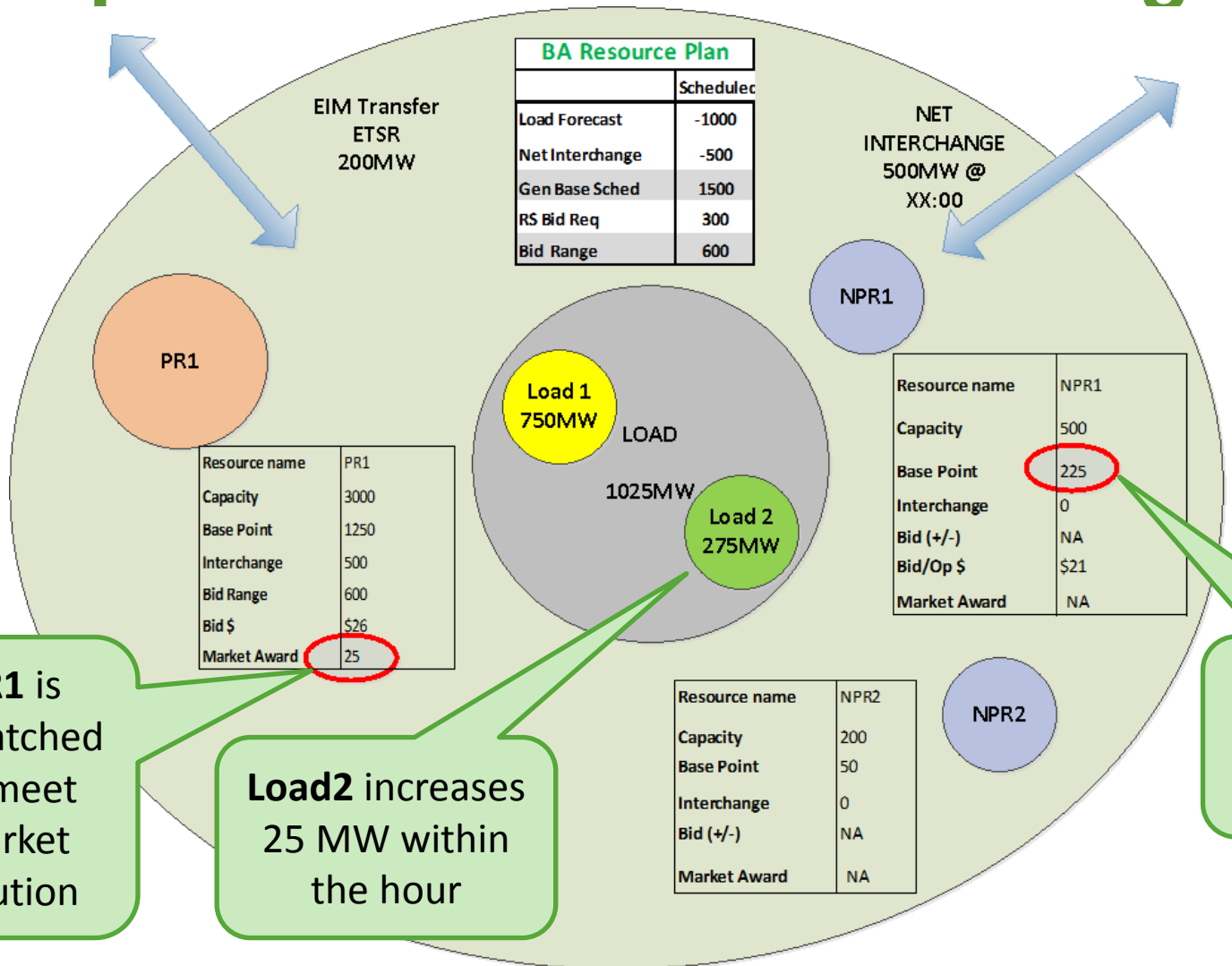
BA Resource Plan	Scheduled
Load Forecast	-1000
Net Interchange	-500
Gen Base Sched	1500
RS Bid Req	300
Bid Range	600

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

Resource name	NPR1
Capacity	500
Base Point	200
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

2.B – Non-Participating/No Manual Dispatch – Within Hour Change

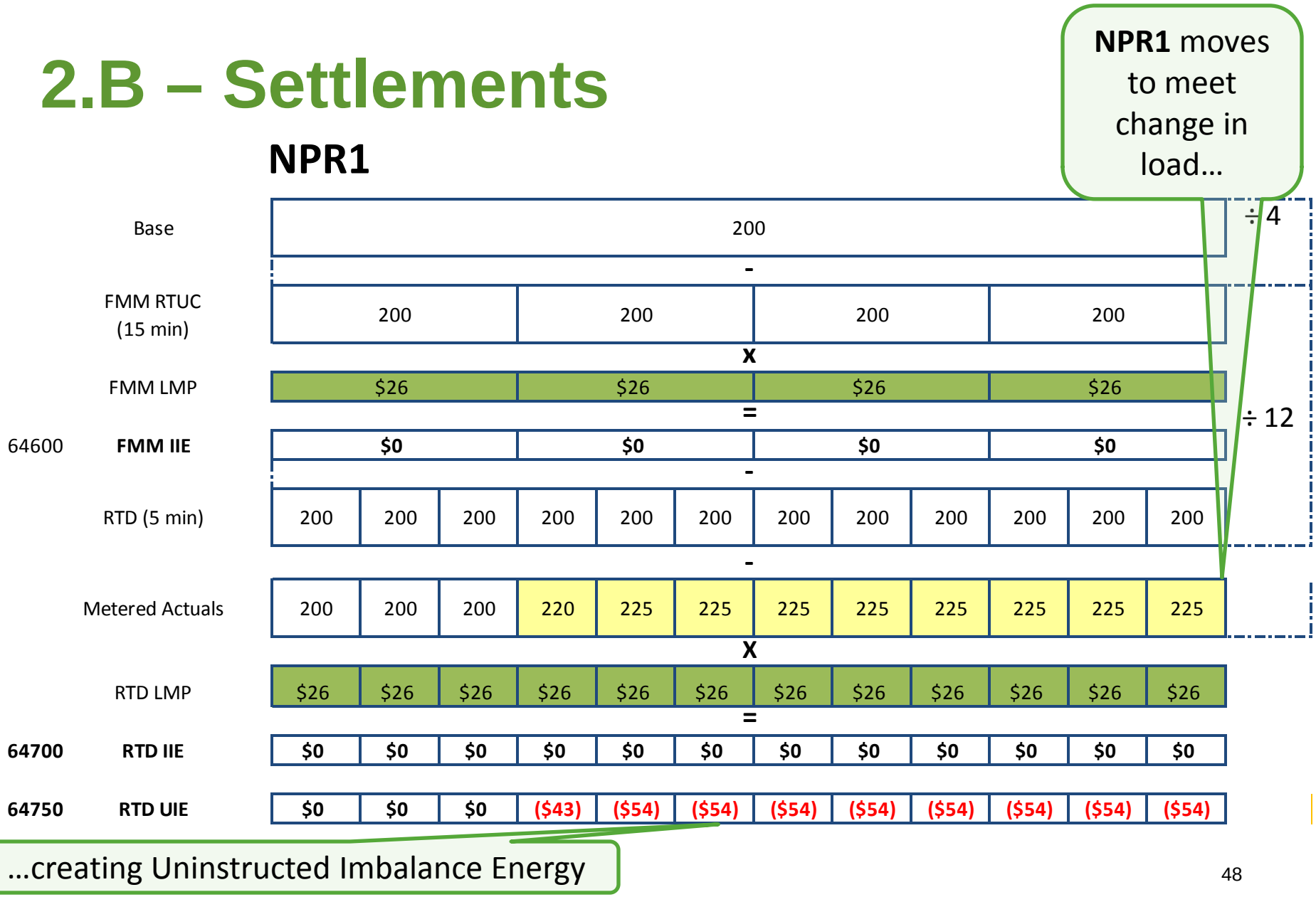


PR1 is dispatched to meet market solution

Load2 increases 25 MW within the hour

NPR1 responds to meet the change in **Load2**

2.B – Settlements



2.B – Settlements Continued

PR1 dispatched to meet market solution…

…because Market Operator was not informed of NPR1's deviation from its Base Schedule

PR1

	Base	1250											÷ 4
		-											
	FMM RTUC (15 min)	1250			1250			1250			1250		
		x											
	FMM LMP	$26			$26			$26			$26		
		=											÷ 12
64500	**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	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26
		=											
64700	**RTD IIE**	**$0**	**$0**	**$0**	**$0**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**
64750	**RTD UIE**	**$0**	**$0**	**$0**	**($43)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

2.B – Settlements Continued

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 "Metered Actuals"	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	1037	
	X												
LAP	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	x (-1)
	=												
RTD UIE	**$79**	**$79**	**$79**	**$79**	**$79**	**$79**	**$79**	**$79**	**$79**	**$79**	**$79**	**$79**	

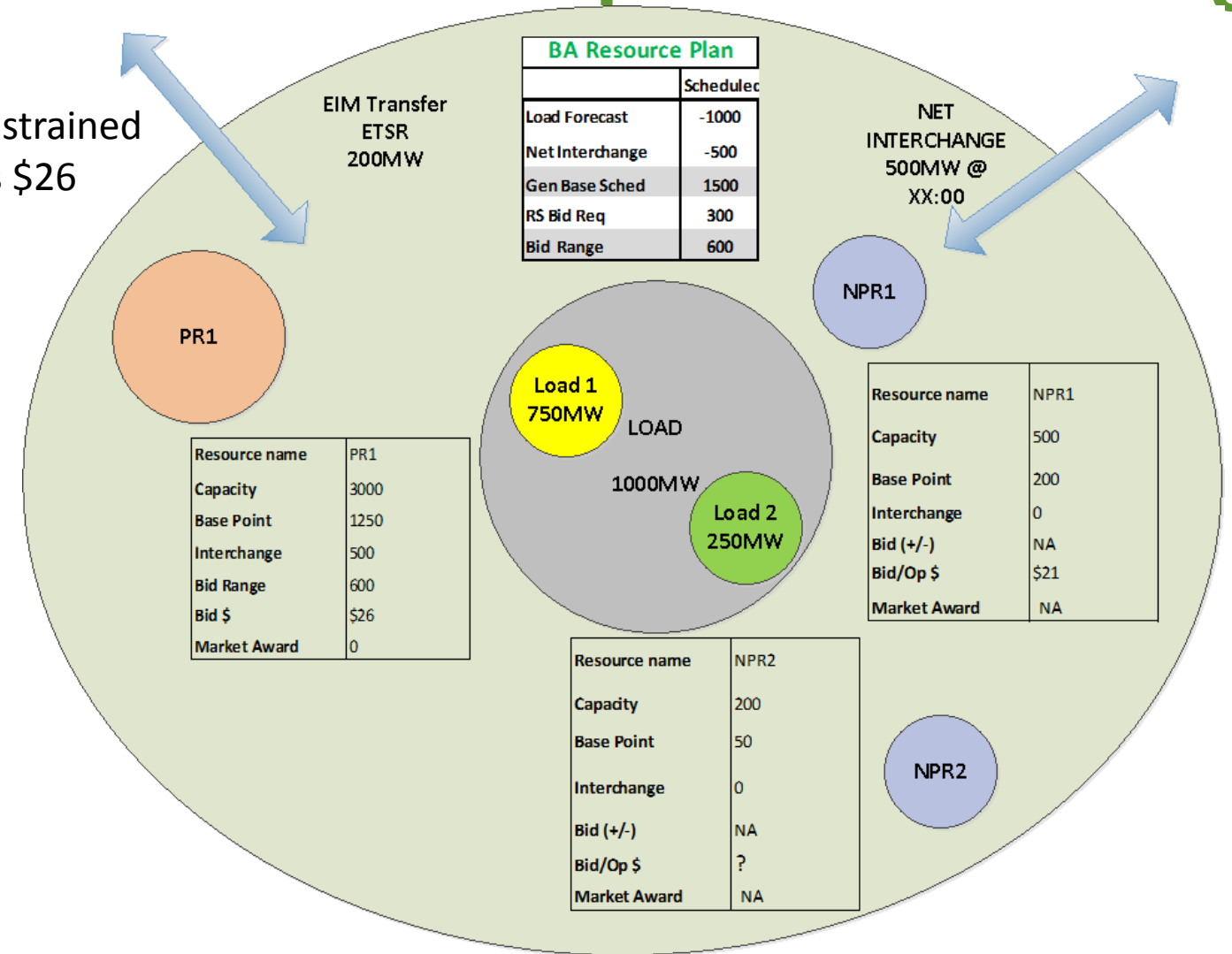
2.B – Conclusion

- The BAA ends up having two resources *each* move 25 MW for the *single* 25 MW increase in load
- The BAA collects imbalance for **both** dispatches
- NPR1 "spent" $385 (using same $21 per MWh Bid/Op cost) to respond to its change in load
- LSE will incur a portion of the costs in each of the columns below:

Total Load	Total BA Gen	Total PR Gen	Net Leaving	Net Net
$953	($477)	($477)	($477)	$0

2.C – Non-Participating Resource With Manual Dispatch – Entering OH

Unconstrained
LMP is $26



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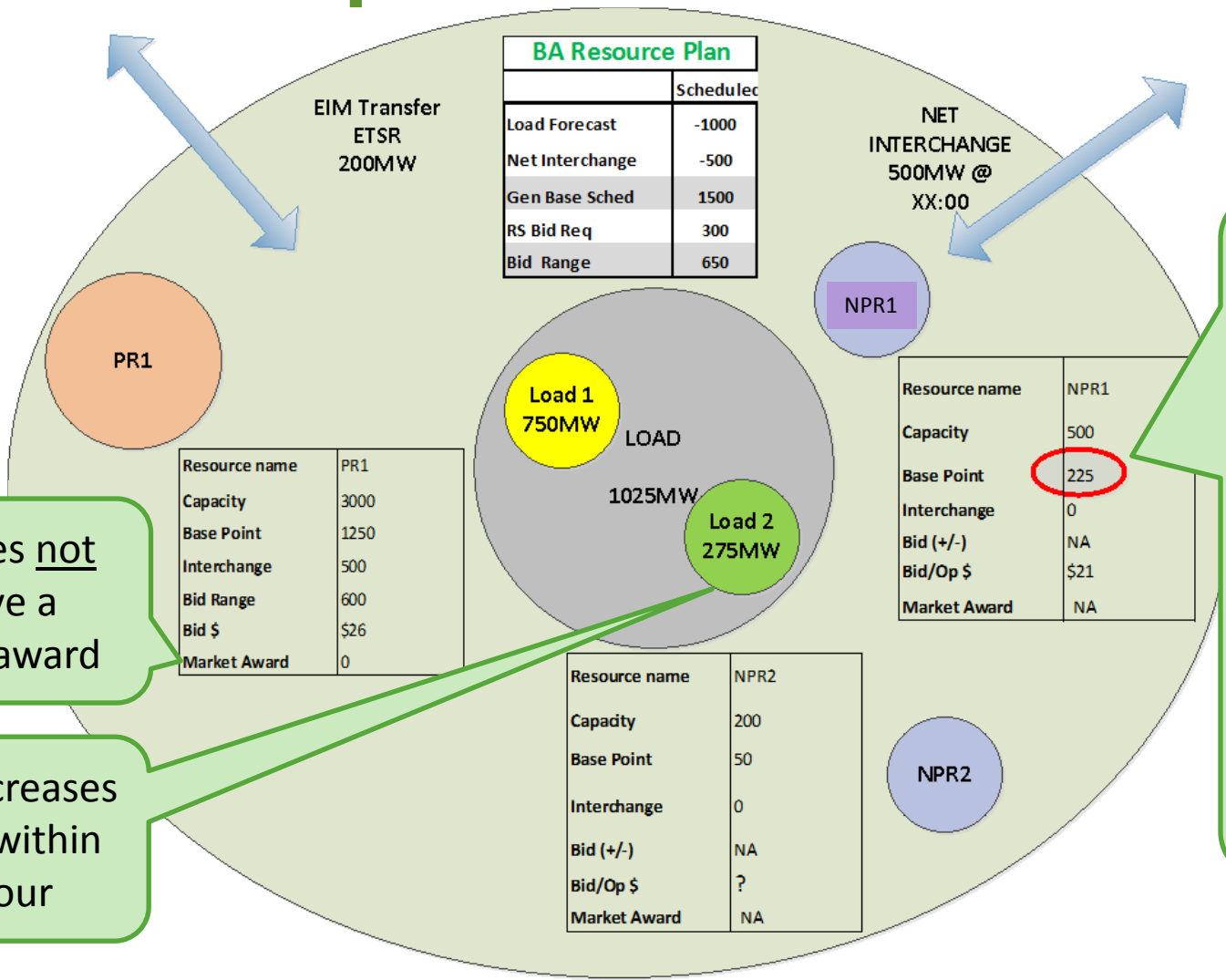
Bid $	$26
Market Award	0

Resource name	NPR1
Capacity	500
Base Point	200
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

2.C – Non-Participating Resource w/ Manual Dispatch – w/in Hour Change



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	500
Bid Range	600
Bid $	$26
Market Award	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 does <u>not</u> receive a market award

Load2 increases 25 MW within the hour

LSE dispatches **NPR1** to meet 25MW increase in **Load2** and EESC signals Manual Dispatch to the Market Operator

2.C – Settlements

NPR1 moves to meet change in load…

…creating (mostly) Instructed Imbalance Energy

NPR1

	Base	200										÷ 4
		-										
	FMM RTUC (15 min)	200			200			200			200	
		x										
	FMM LMP	$26			$26			$26			$26	
		=										÷ 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	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26
		=										
64700	**RTD IIE**	**$0**	**$0**	**$0**	**$0**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**	**($54)**
64750	**RTD UIE**	**$0**	**$0**	**$0**	**($43)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

2.C – Settlements Continued

PR1 is <u>not</u> dispatched in the market solution…

…because a Manual Dispatch was submitted to the Market Operator for **NPR1**'s deviation from its Base Schedule

PR1

	Base	1250											÷ 4
		-											
	FMM RTUC (15 min)	1250			1250			1250			1250		
		x											
	FMM LMP	$26			$26			$26			$26		÷ 12
64600	**FMM IIE**	= **$0**			**$0**			**$0**			**$0**		
		-											
	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	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26
		=											
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**

2.C – Settlements Continued

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	÷ 12
	-												
5 min Load "Metered Actuals"	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	
	X												
LAP	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	**x (-1)**
	=												
RTD UIE	**$40**	**$40**	**$40**	**$40**	**$40**	**$40**	**$40**	**$40**	**$40**	**$40**	**$40**	**$40**	

2.C – Conclusion

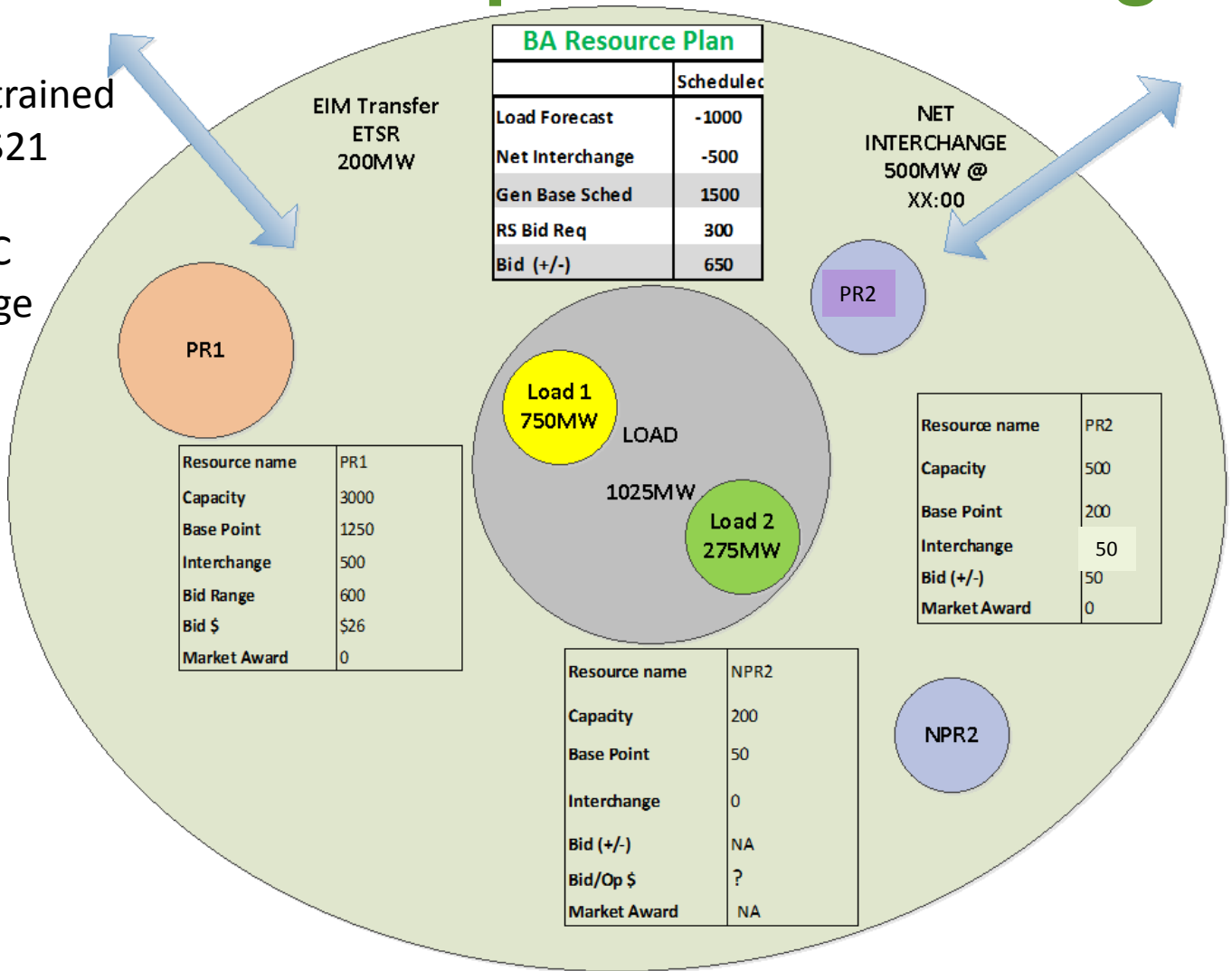
- Only **NPR1** was dispatched because the EESC communicated a Manual Dispatch to the MO
- This was a more efficient dispatch
- NPR1 "spent" $385 (using same $21 per MWh Bid/Op cost) to respond to its change in load
- LSE will incur a portion of the costs (now lower than 2.B) in each of the columns below:

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

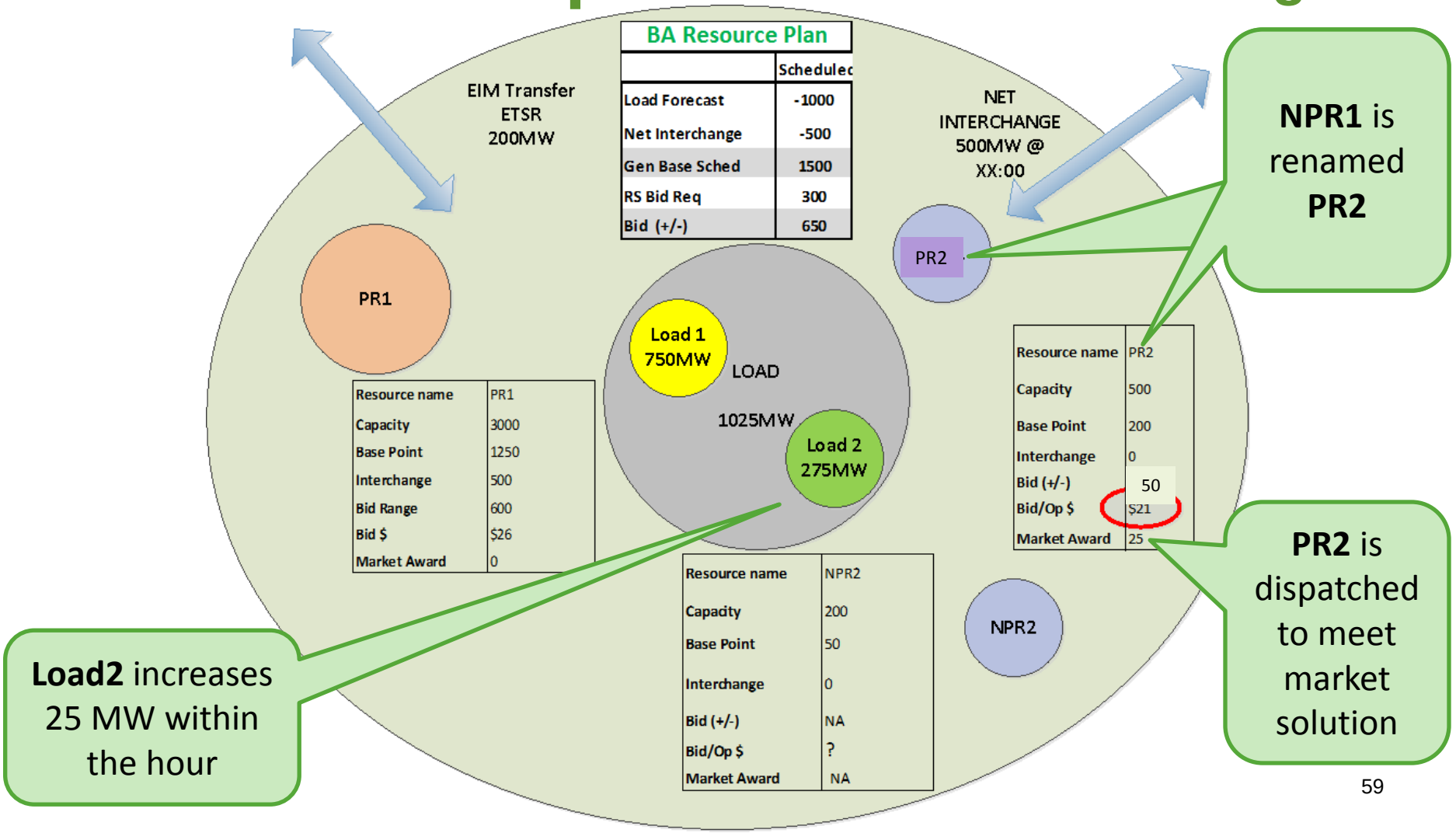
2.D – LSE Participating Resource Economic Dispatch – Entering OH

Unconstrained LMP is $21

Only INC Bid Range offered



2.D – LSE Participating Resource Economic Dispatch – w/in Hour Change



2.D – Settlements

PR2 is dispatched in the market solution…

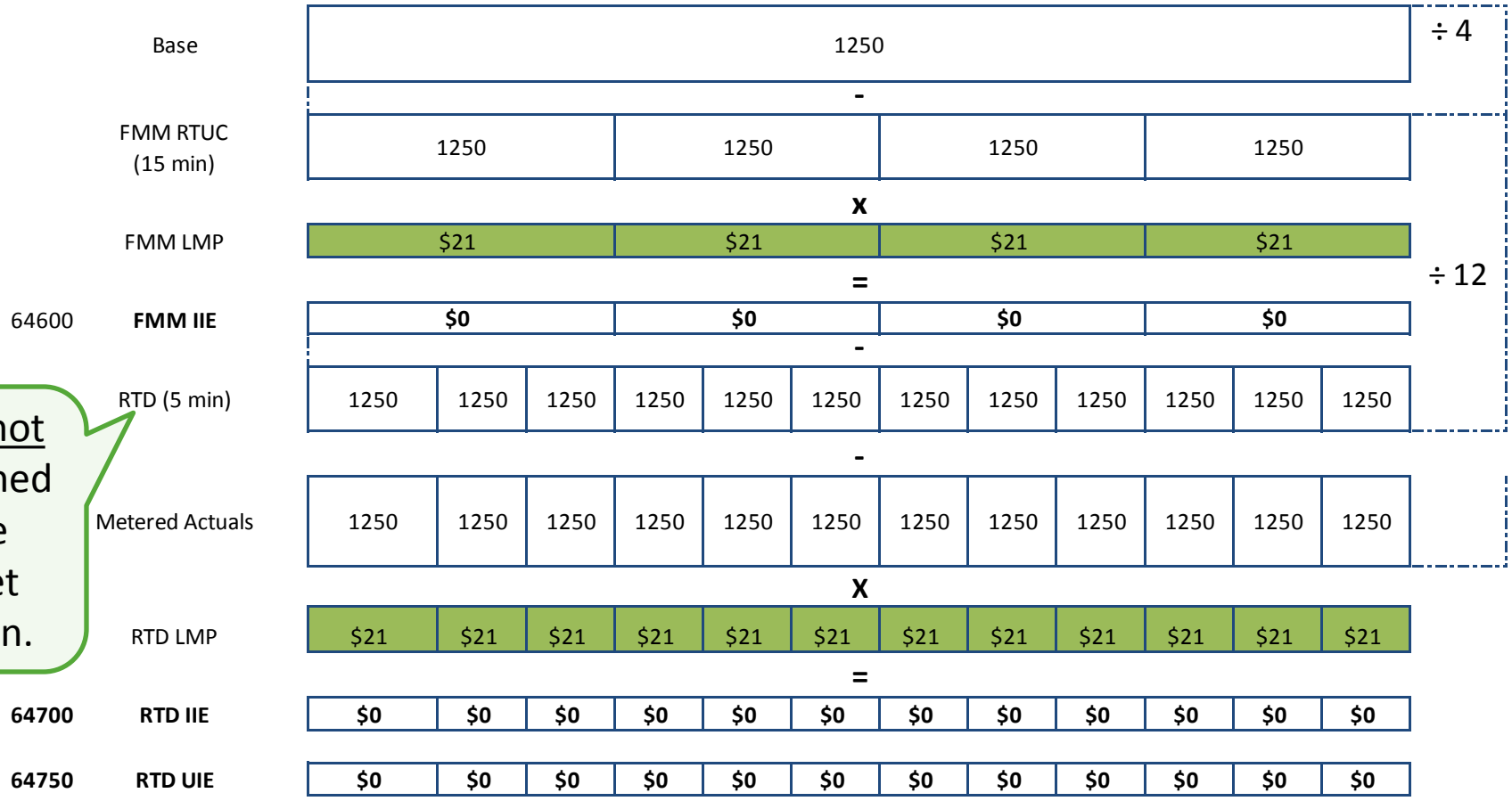
…because it was the least cost participating resource

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)**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

2.D – Settlements Continued

PR1



PR1 is <u>not</u> dispatched in the market solution.

2.D – Settlements Continued

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	÷ 12
	-												
5 min Load "Metered Actuals"	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	
	X												
LAP	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	**x (-1)**
	=												
RTD UIE	**$32**	**$32**	**$32**	**$32**	**$32**	**$32**	**$32**	**$32**	**$32**	**$32**	**$32**	**$32**	

2.D – Conclusions

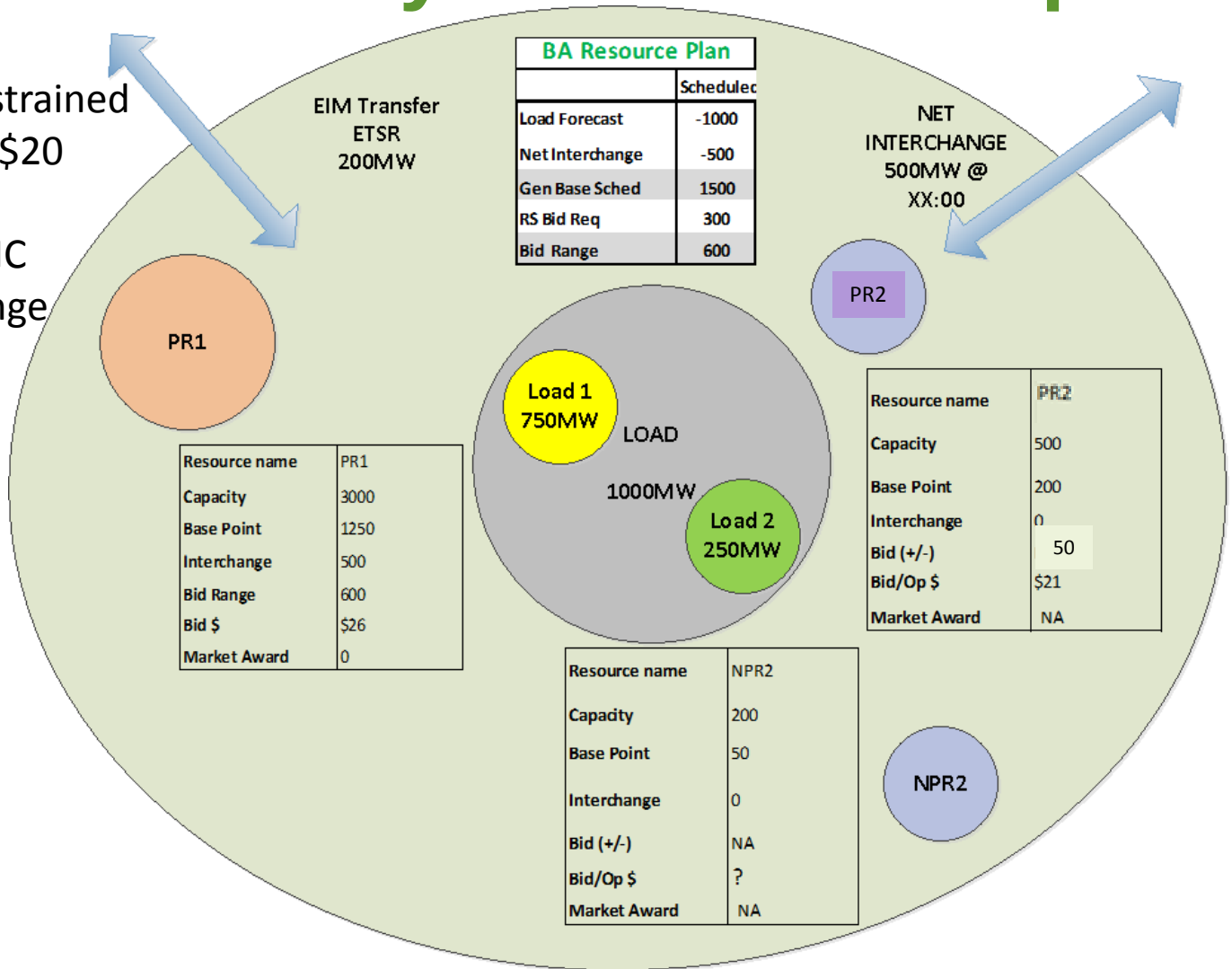
- Same efficient dispatch
- Price for imbalance set by **PR2**, which was lower than PR1
- NPR1 “spent” $385 (using same $21 per MWh Bid/Op cost) to respond to its change in load
- LSE will incur a portion of the costs (now lower than 2.C) in each of the columns below:

Total Load	Total BA Gen	Total PR Gen	Net Leaving	Net Net
$385	($385)	$0	($385)	$0

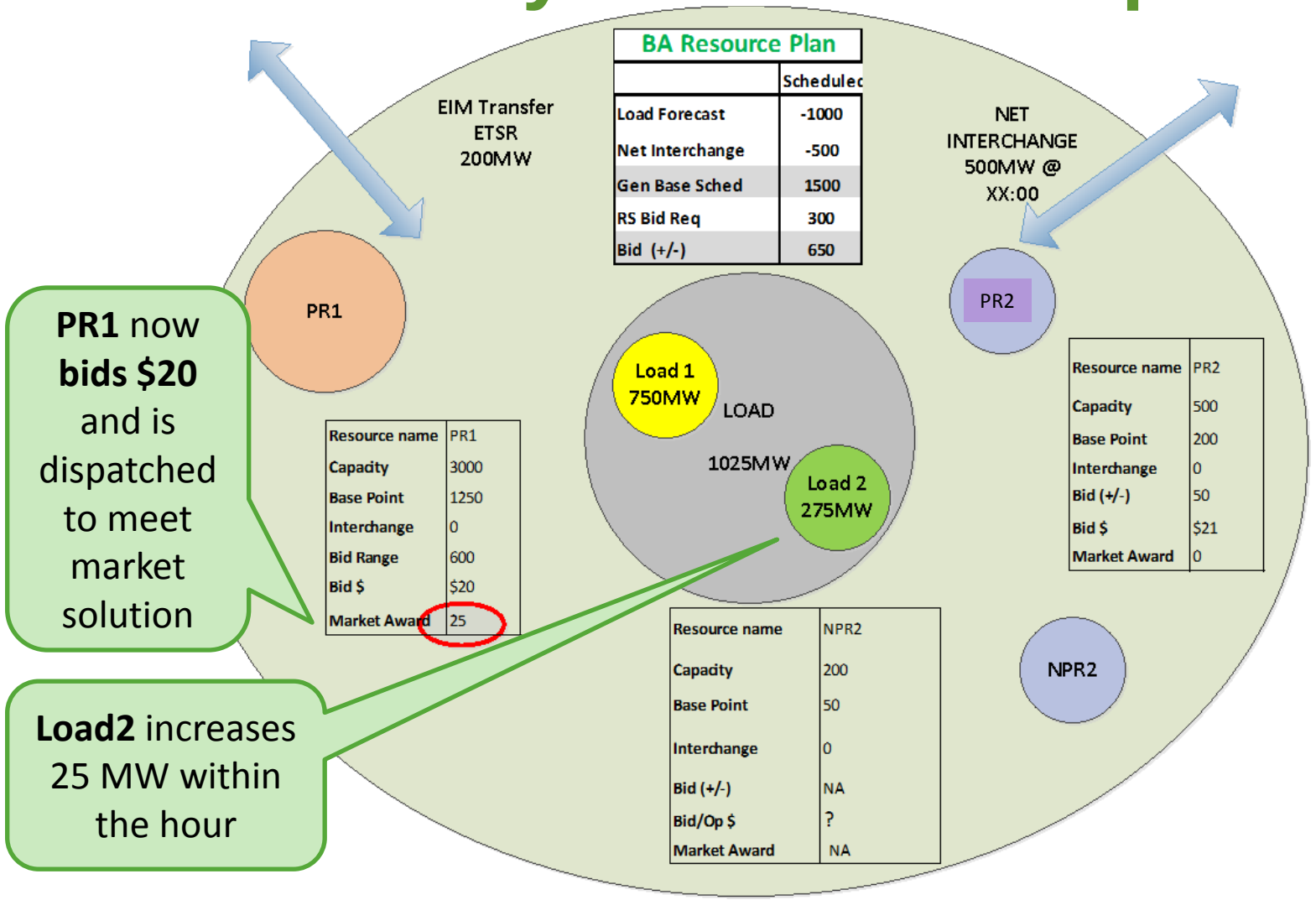
2.E – LSE Participating Resource and 3rd Party Economic Dispatch

Unconstrained LMP is $20

Only INC Bid Range offered



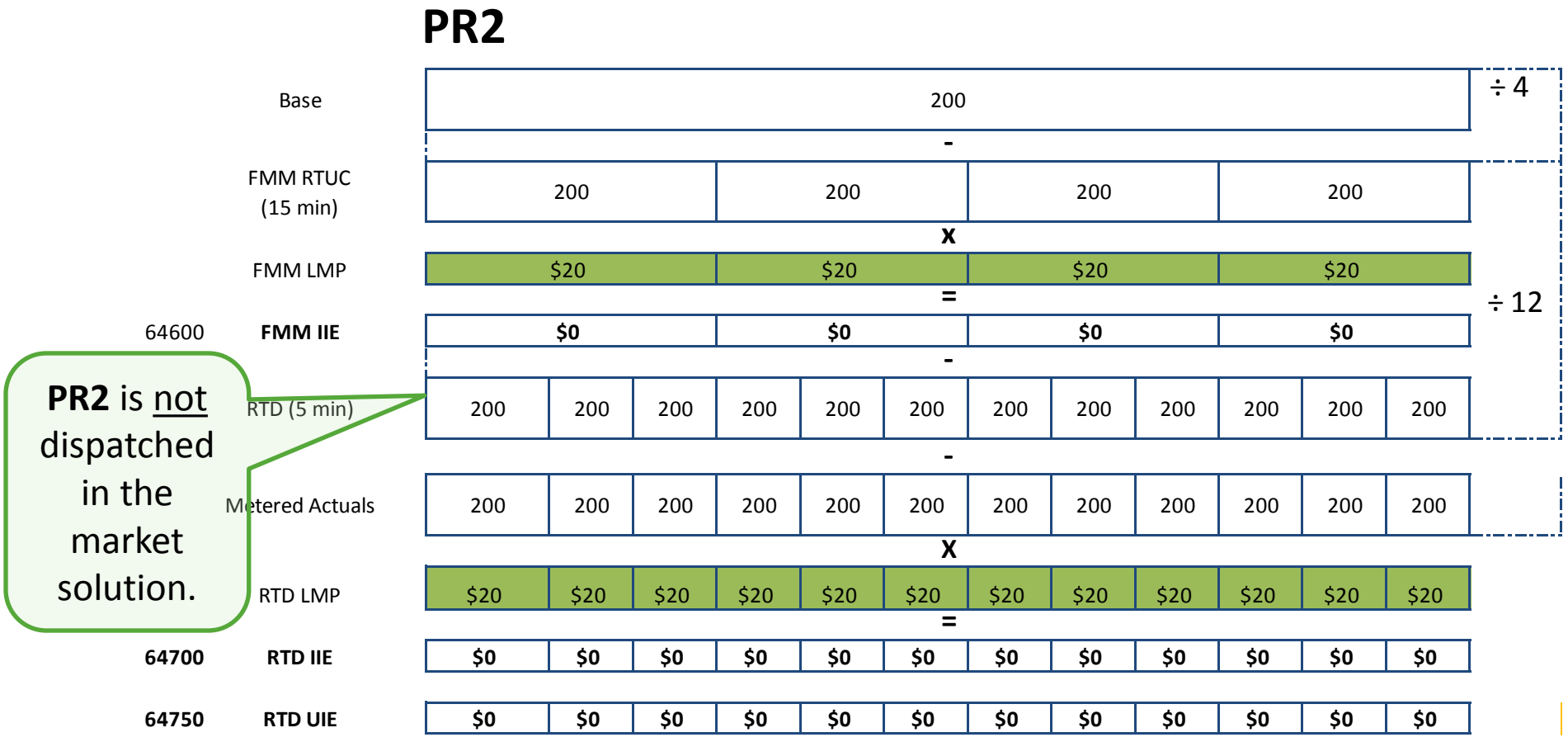
2.E – LSE Participating Resource and 3rd Party Economic Dispatch



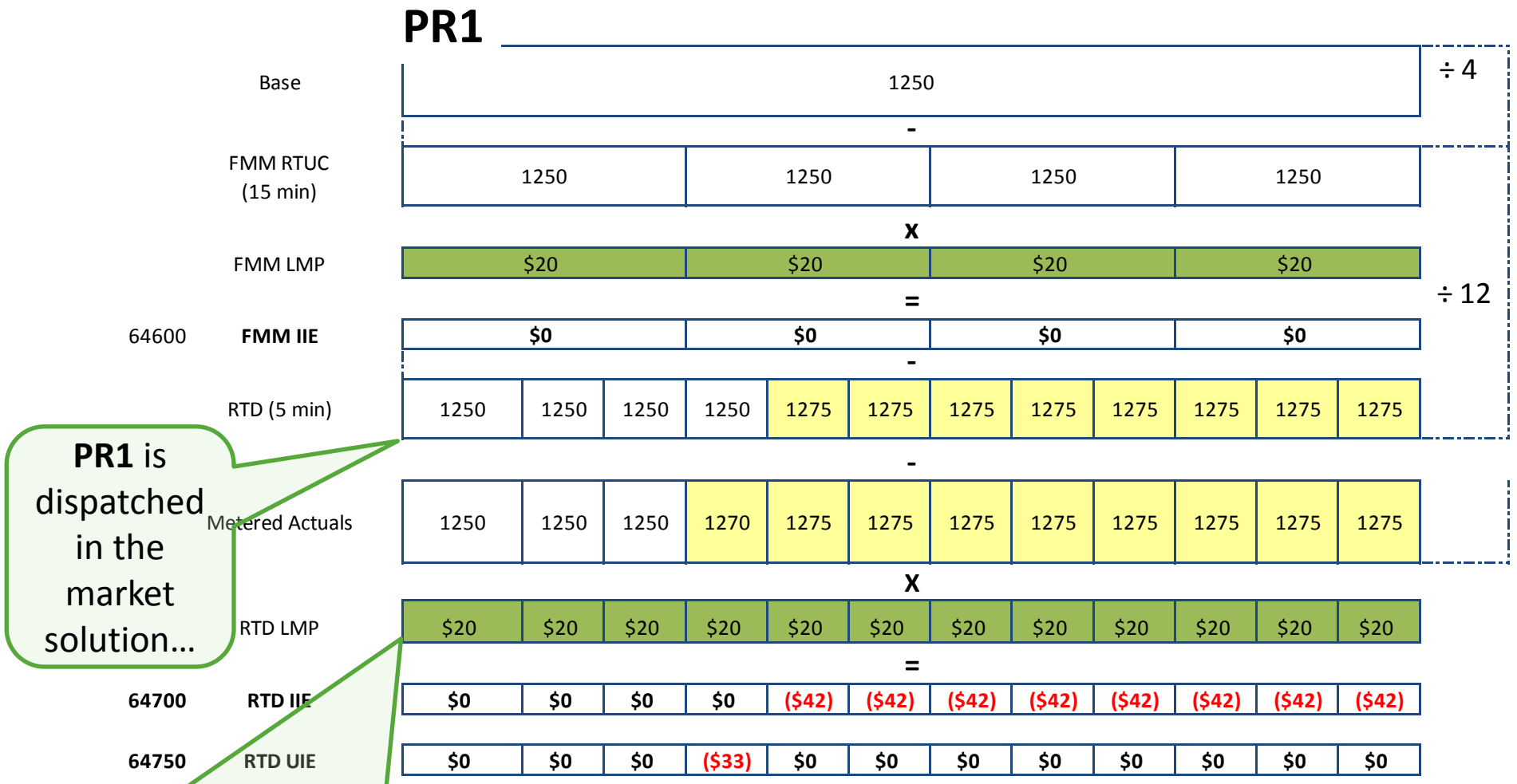
PR1 now **bids $20** and is dispatched to meet market solution

Load2 increases 25 MW within the hour

2.E – Settlements



2.E – Settlements Continued



PR1 is dispatched in the market solution…

…because it was the least cost participating resource

2.E – Settlements Continued

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	÷ 12
	-												
5 min Load "Metered Actuals"	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	1018	
	X												
LAP	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	**x (-1)**
	=												
RTD UIE	**$31**	**$31**	**$31**	**$31**	**$31**	**$31**	**$31**	**$31**	**$31**	**$31**	**$31**	**$31**	

2.E – Conclusions

- More efficient dispatch
- Price for imbalance set by **PR1**, which was lower than PR2
- LSE saves cost of dispatching its own resource
- LSE will incur a portion of the costs (now lower than 2.D) in each of the columns below:

Total Load	Total BA Gen	Total PR Gen	Net Leaving	Net Net
$367	$0	($367)	$0	$0

Net Conclusions

- This is a progression of increasingly efficient scenarios:
  - 2.E provides a more efficient dispatch than any of these scenarios
  - 2.E provides the lowest cost to serve **Load2** in these scenarios
- Market solutions are more robust in 2.C, 2.D and 2.E
  - 2.B illustrates two generators being moved for the same load
- There are more scenarios beyond 2.E that would continue to be increasingly efficient:
  - PR1 and/or PR2 could INC to support exports to other EIM Entities which would lower LMPs and LAPs
  - If DEC range were offered on one or both resources, PR1 and/or PR2 would be dispatched to fuel “swap”

Future Structured Scenarios

Scheduled for April and May will include:

- Slice Customers
- VERs (participating / non-participating)

Next Steps

Next Steps

- Next meeting scheduled for **Wednesday April 10th** at the Rates Hearing Room. This will be an all-day meeting to discuss our next structured scenario.
  - 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 April 24th Wednesday.

- 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