Reserves Settlements

EPFSTF

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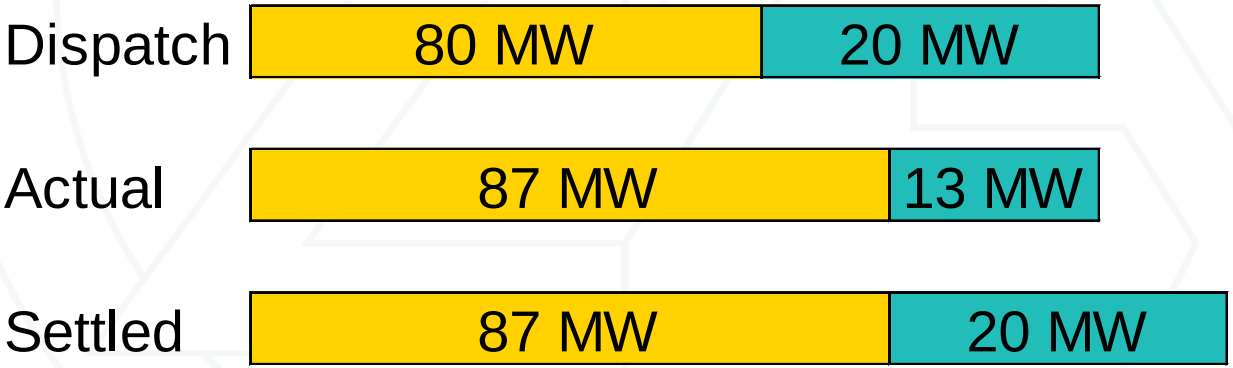
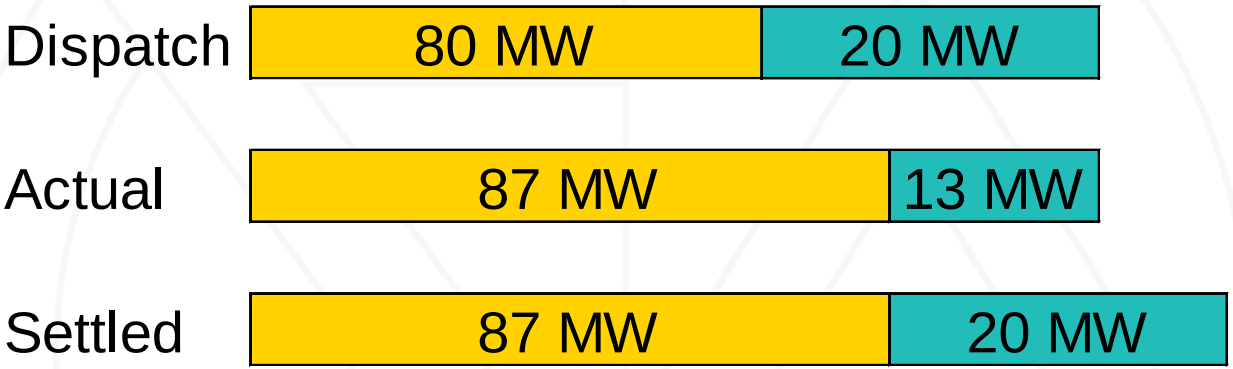
Double Payment Issue

- **Real-time energy is settled at the metered output.**
- **Reserves are settled at the dispatch output.**
- **A resource could receive compensation for energy and reserves beyond the resource's actual capability.**



Double Payment Issue



- **Resource receives payment for 107 MW when its capability is only 100 MW.**
- **Deviation is only 7 MW, or 7 / 80 = 8.75 percent, so PJM deems the resource to be following dispatch.**

Rule Preventing Double Payment

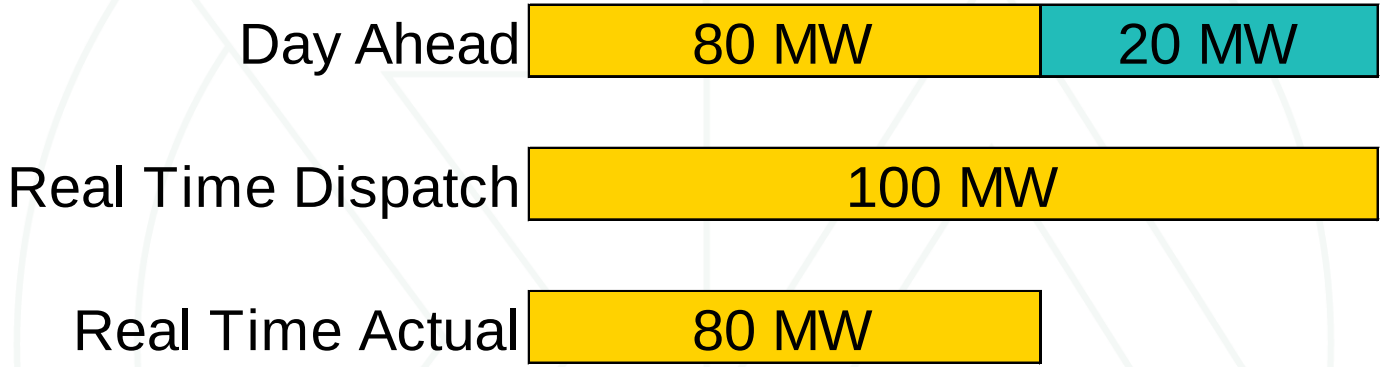
- **The IMM proposes a new settlement rule that a resource cannot receive payment for reserve MW in excess of its applicable economic maximum output limit for the dispatch interval.**
- **PJM would pay the full value for metered energy produced, but would cap the settlement of reserve MW so that payment does not exceed the resource's stated capability.**

$$\boldsymbol{Metered\ Energy\ MW + Reserve\ MW \leq Eco.Max.}$$

Balancing Reserve Uplift Payment

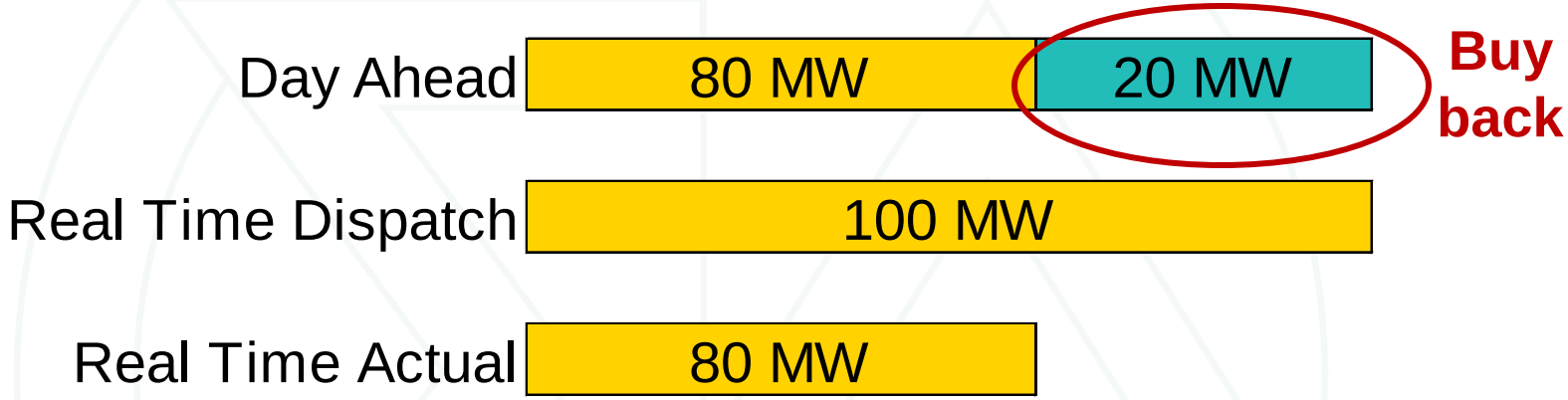
- **PJM claims that market incentives for dispatch following require uplift for negative balancing reserve payments for each reserve product for every five minute interval.**
- **Market incentives do not require such payment.**
- **Reserves are compensated based on dispatch, not performance.**
- **PJM takes back the reserve position based on dispatch instructions whether or not the resource follows dispatch.**

Balancing Reserve Uplift Payment



- **When the resource follows its day ahead dispatch it must buy back its DA reserve position and receives no balancing energy compensation.**

Balancing Reserve Uplift Payment



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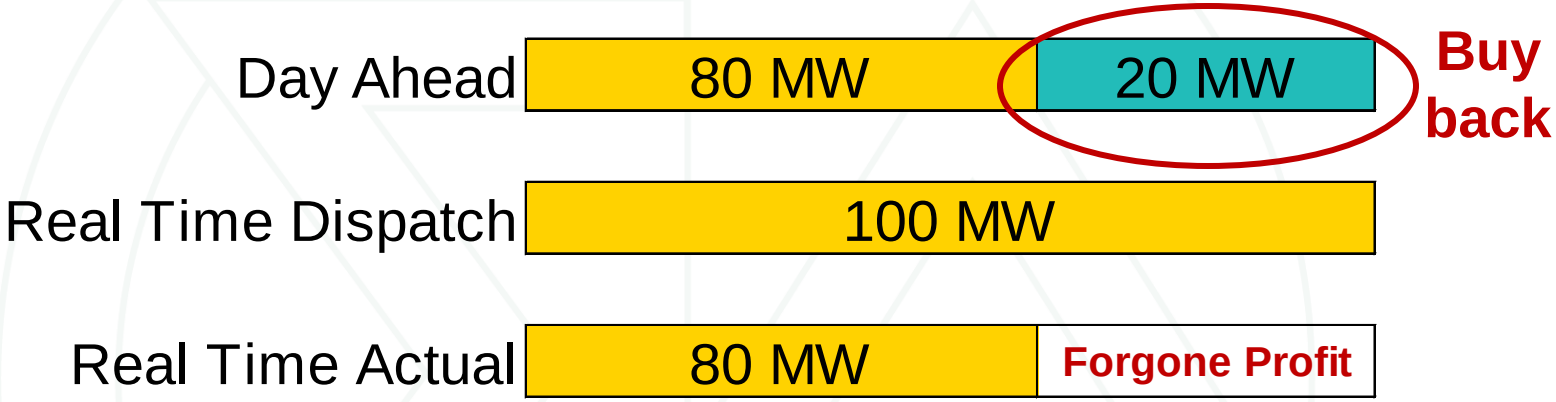

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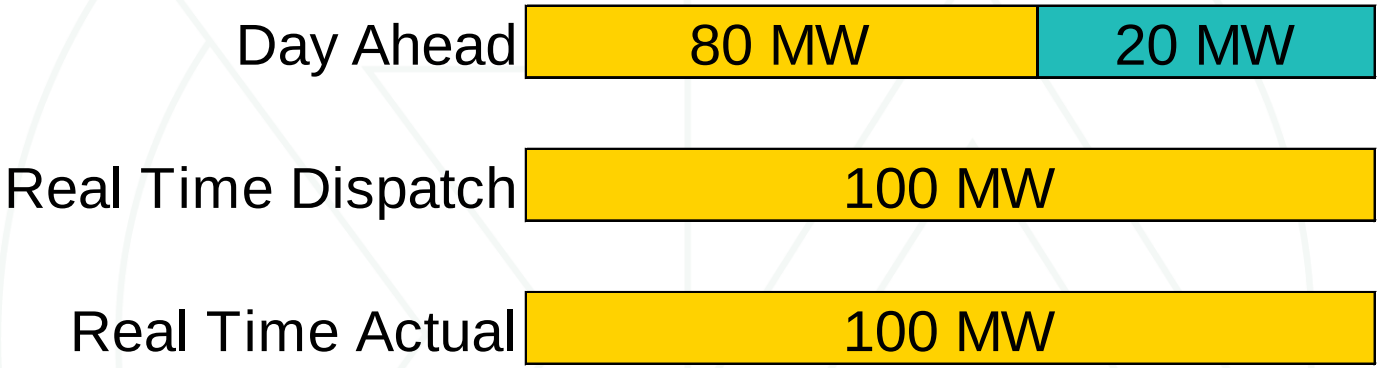
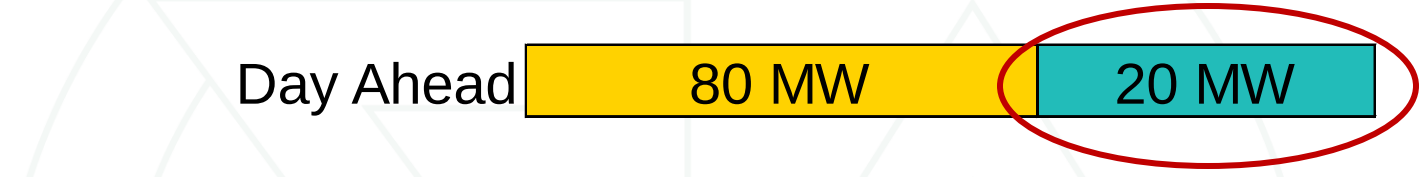
Balancing Reserve Uplift Payment



- **When the resource follows its real time dispatch, it must buy back its DA reserve position, which is offset by balancing energy revenues.**

Balancing Reserve Uplift Payment



Higher Energy Revenues

- **When the resource follows its real time dispatch, it must buy back its DA reserve position, which is offset by balancing energy revenues.**

Reserve Uplift Calculation

- **Current Reserve LOC Uplift:**
  - **LOC Uplift = MW x (RT LMP – Offer) – Reserves MW x MCP**
- **PJM Proposed Reserve LOC Uplift**
  - **LOC Uplift = MW x (RT LMP – Offer) – (DA Reserves MW x DA MCP + Balancing Reserves MW x RT MCP)**

- **Unlike status quo, converting reserves to energy results in negative balancing reserve position.**
- **Resources will be charged (buy back) when not fulfilling their DA reserve position.**

Reserve Uplift Calculation

- **When RT Reserves MW < DA Reserves MW**
  - **And RT MCP < DA MCP, revenues increase.**
  - **And RT MCP > DA MCP, revenues decrease.**
- **PJM is concerned about net losses when RT Reserves MW < DA Reserves MW and RT MCP > DA MCP.**
- **In order to correctly determine net losses, PJM must include the net revenues of the reserves that were converted to energy produced.**

Reserve Uplift Calculation

- **Under status quo, PJM makes resources whole every five minutes for reserve market lost opportunity costs.**
  - Resources keep the profits, get made whole for losses.
  - Should apply only to inflexible resources committed in the hourly ASO process.
- **PJM's proposal exacerbates the current overcompensation and expands it to all resources with day ahead positions.**

Example

Interval	DA Energy	DA Reserves	RT Energy	RT Reserves	Bal Energy	Bal Reserves
	MW	MW	MW	MW	MW	MW
1	80	20	80	20	0	0
2	80	20	80	20	0	0
3	80	20	80	20	0	0
4	80	20	80	20	0	0
5	80	20	100	0	20	-20
6	80	20	100	0	20	-20
7	80	20	100	0	20	-20
8	80	20	100	0	20	-20
9	80	20	80	20	0	0
10	80	20	80	20	0	0
11	80	20	80	20	0	0
12	80	20	80	20	0	0

Example

Interval	Offer	DA LMP	DA RMCP	RT LMP	RT RMCP
	$/MWh	$/MWh	$/MW	$/MWh	$/MW
1	$100	$100	$10	$100	$10
2	$100	$100	$10	$100	$10
3	$100	$100	$10	$100	$10
4	$100	$100	$10	$100	$10
5	$100	$100	$10	$120	$80
6	$100	$100	$10	$120	$80
7	$100	$100	$10	$120	$80
8	$100	$100	$10	$120	$80
9	$100	$100	$10	$100	$10
10	$100	$100	$10	$100	$10
11	$100	$100	$10	$100	$10
12	$100	$100	$10	$100	$10

Example

Interval	DA Energy Value $	DA Reserves Value $	Bal Energy $	Bal Reserves $	RT Cost $	Net Profit $	Reserve Cost $	Reserve Uplift (Interval) $	Reserve Uplift (Hourly) $
1	$667	$17	$0	$0	$667	$17	$0	$0	($17)
2	$667	$17	$0	$0	$667	$17	$0	$0	($17)
3	$667	$17	$0	$0	$667	$17	$0	$0	($17)
4	$667	$17	$0	$0	$667	$17	$0	$0	($17)
5	$667	$17	$200	($133)	$833	($83)	$0	$117	$117
6	$667	$17	$200	($133)	$833	($83)	$0	$117	$117
7	$667	$17	$200	($133)	$833	($83)	$0	$117	$117
8	$667	$17	$200	($133)	$833	($83)	$0	$117	$117
9	$667	$17	$0	$0	$667	$17	$0	$0	($17)
10	$667	$17	$0	$0	$667	$17	$0	$0	($17)
11	$667	$17	$0	$0	$667	$17	$0	$0	($17)
12	$667	$17	$0	$0	$667	$17	$0	$0	($17)
Total	$8,000	$200	$800	($533)	$8,667	($200)	$0	$467	$333

Example

Line Items	Interval Uplift	Hourly Uplift	All Inclusive Uplift (Energy+Reserves)
DA Energy	$8,000	$8,000	$8,000
DA Reserves	$200	$200	$200
Balancing Energy	$800	$800	$800
Balancing Reserves	($533)	($533)	($533)
Reserves Uplift	$467	$333	NA
Energy Uplift	$0	$0	$200
Offer	($8,667)	($8,667)	($8,667)
Net Profit	$267	$133	$0

One Energy and Reserves Uplift Payment

- **PJM should create one uplift calculation that prevents resources that follow dispatch from operating at a loss without creating overcompensation.**
- **The calculation should include costs and revenues in all short term markets (energy, regulation, reserves).**
- **Incorporating reserves in the existing Balancing Operating Reserve Credit accomplishes this.**

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