Reactive Services Issue

DA Reliability and
Reactive Cost
Allocation

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Reactive Services

- Reactive service credits are paid to units for the purpose of maintaining the reactive reliability of the PJM region if such unit is reduced or suspended at the request of PJM and the LMP at the unit's bus is higher than its offered price.

- These reactive service charges are allocated daily to real-time deliveries of energy to load in the transmission zone where the reactive service was provided.

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Reactive Services

- Payments for reactive service are also made to resources if their output is increased at the request of PJM for the purpose of providing reactive services and the offered price is higher than the LMP at the unit's bus. **(Current Issue).**

- A portion of these costs of providing reactive services is paid by real-time deliveries of energy to load in the transmission zone where the service was provided.

- A portion of these costs of providing reactive services is also paid by deviations and real-time load plus exports as balancing operating reserve charges

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Reactive Services Issue

- The issue is that not all the costs of reactive service are allocated consistent with the tariff defined allocation of reactive service costs.

- The current reactive service credit calculation only takes into account the resource incremental offer to determine the make whole payment. It does not consider the no load cost, startup cost nor the entire offer curve.

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Example of Reactive Services Issue

Unit committed at ECO MIN in RT to provide reactive services for 6 hours:

- ECO MAX: 100 MW
- ECO MIN: 75 MW
- Offer: $100/MWh
- Startup Cost: $10,000
- No Load Cost: $1,000 per hour
- RT LMP:

Hour	1	2	3	4	5	6
LMP ($/MWh)	$50	$55	$60	$65	$60	$50

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Example of Reactive Services Issue

The unit receives energy revenues:

This table shows the unit's energy revenues

(RT LMP times RT Output). Unit was not scheduled in DA:

Hour	RT LMP ($/MWh)	Output (MWh)	Energy Revenues
1	$50	75	$3,750
2	$55	75	$4,125
3	$60	75	$4,500
4	$65	75	$4,875
5	$60	75	$4,500
6	$50	75	$3,750
Total		450	$25,500

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Example of Reactive Services Issue

The unit's costs are calculated using the offer on which it was committed:

This table shows the unit's total offer:

Hour	Offer ($/MWh)	Output (MWh)	Energy Offer	No Load Cost	Startup Cost	Total Offer
1	$100	75	$7,500	$1,000	$10,000	$18,500
2	$100	75	$7,500	$1,000	$0	$8,500
3	$100	75	$7,500	$1,000	$0	$8,500
4	$100	75	$7,500	$1,000	$0	$8,500
5	$100	75	$7,500	$1,000	$0	$8,500
6	$100	75	$7,500	$1,000	$0	$8,500
Total		450	$45,000	$6,000	$10,000	$61,000

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Example of Reactive Services Issue

Since the unit operated noneconomic to provide reactive service it receives reactive services credits:

Hour	RT LMP ($/MWh)	Offer ($/MWh)	Output (MWh)	Reactive Services Credit
1	$50	$100	75	$3,750
2	$55	$100	75	$3,375
3	$60	$100	75	$3,000
4	$65	$100	75	$2,625
5	$60	$100	75	$3,000
6	$50	$100	75	$3,750
Total			450	$19,500

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Example of Reactive Services Issue

The unit receives:

- Energy revenues $=$ $25,500
- Reactive services credits $=$ $19,500
- **Total revenues** **$=$** **$45,000**
- **Total offer** **$=$** **$61,000**

The unit's total offer is greater than the revenues it receives. With only these revenues the unit runs at a loss.

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Example of Reactive Services Issue

- Balancing operating reserve rules ensure that units that follow PJM dispatch instructions do not run at a loss.

- Under the current reactive services credit calculation a portion of the unit's costs is not covered, therefore the need for balancing operating reserve credits.

- BOR credits calculation compares total energy revenues and ancillary services (excluding regulation) revenues and total offer.

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Example of Reactive Services Issue

- BOR Credits =   Total Offer *minus*

                    Energy Revenues *minus*

                    Reactive Services Credits

- BOR Credits = \$61,000 - \$25,500 - \$19,500

- BOR Credits = \$16,000

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Example of Reactive Services Issue

- The amount paid as balancing operating reserve credits equals the sum of no load and startup costs.
  - No Load Cost + Startup Costs =
  - 6 hours x $1,000/hour + $10,000 = $16,000

- The reactive services credits paid to the unit are collected from the real-time deliveries of energy to load in the zone, while the BOR credits are collected from Deviations or RT Load + Exports in the RTO, Eastern or Western Regions. Both amounts are part of the unit's costs for providing the reactive service, while its corresponding charges are allocated differently.

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Recommendation

- All costs related to reactive services should be categorized and allocated as reactive services charges. Reactive services credits should be equal to the positive difference between total offer (including no load and startup costs) and energy revenues.

- Reactive services credits should be calculated on segments which include all hours for which unit provides reactive service. Segments should be the higher of hours needed for reactive support and min run time.

- PJM should be required to log units for reactive services during the hours the units were needed for reactive support in order to prevent improper allocation of charges.

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