Value of Flexibility in MISO Dispatch and Pricing

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Overview

Flexible fossil units are experiencing scheduling and pricing challenges as more renewable resources are being integrated

Extended Locational Marginal Pricing (ELMP) Phase I helped to reflect the value of quick start units in pricing
- ELMP Phase II will broaden this benefit to include more quick start units

MISO recognizes the increasing critical value of flexibility and is evaluating additional solutions that will aid in addressing the challenges

Flexible Fossil units face scheduling and pricing challenges as more renewables are integrated

Background: In the future, Flexible Fossil Units may operate at a reduced marginal cost. They may be committed or dispatched for flexibility more often than for energy.

Challenges

Scheduling

- How to avoid unnecessary cycling of base load units during the day-ahead commitment process?

- How is flexibility managed during real time dispatch?

Pricing

- When a unit is committed for flexibility, how are startup and no load costs reflected?

- When units are dispatched up and down to follow net load, how are wear-and-tear costs reflected?

Price formation has been a focus for MISO over the past decade – ELMP Phase I was implemented and works as expected

- ELMP Phase I was implemented March 1, 2015

Deficiencies of **LMP** and Lumpiness in Wholesale Electric Markets

Fast Start Resources*

- Certain online Fast Start Resource cannot set price
- Offline Fast Start Resources are not considered

Demand Response

Demand Response cannot set Price

Uplift Payments

Inability to fully price costs results in uplift

- Allow online Fast Start Resources to set prices, including their commitment costs
- Include offline Fast Start Resources in price setting

Allow Emergency Demand Response to set prices

More costs reflected in price reduces uplift

Effectiveness of **ELMP** to reflect the true cost to meet demand

Note: Fast Start Resource is currently defined as a resource that can be started within 10 minutes of being notified and that has a minimum run time of one hour or less, e.g., a block-loaded CT.

ELMP Phase II is planned to achieve even broader benefits

- ELMP Phase II: planned implementation in 2017

Staged Implementation Strategy ---> Broader Benefits

Phase I
- A conservative implementation strategy leads to modest benefits as expected
- Results are in line with design objectives and validate in practice the ELMP theory

Phase II
- Expand the pricing of online Fast Start Resources to more peaking resources
- Continue to leverage offline Fast Start pricing for more accurate prices during shortage or violations

The capability of ELMP to price Emergency Demand Response has recently been leveraged in the Pricing design under Emergency conditions

MISO recognizes the value of flexibility and has already taken several steps to enhance the market to address the issue

Performance based regulation mileage compensation

- Implemented under FERC Order 755 (2012)

- Regulation mileage offer in addition to regulation capacity offer

- Regulation mileage Market Clearing Price to compensate for actual movement for regulation

Ramp Capability Product (2016)

- Value the ability of dispatchable resources to respond to future upward and downward changes in demand within *ramp capability response time (currently set at 10 min.)* after a given dispatch

ELMP (2015 and onward)

- Reflect the cost of committing flexible quick start resources into prices

MISO

Further market enhancements are being evaluated to recognize flexibility from commitment to dispatch and pricing

Market roadmap project: "Introducing multi-day financial commitment"	Future ramp product development	Full ELMP
• Cycling of Base load units under current DA commitment	• Possibility of incorporating mileage offer into ramp capability product to explicitly value the cost of movement • Extending to longer response time	• Reflect startup and no-load cost into prices, including resources committed for flexibility

Thank You.