Proxy Buses and Seams

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OVERVIEW

Four important features of proxy buses in LMP pricing systems:

- Proxy bus pricing systems are based upon network models that include the transmission system in adjacent dispatch areas.
- The purpose of modeling changes in net interchange at a proxy bus is to approximate the combined effect of all changes in generation in an adjacent dispatch area that would occur in response to a change in scheduled net interchange.
- The appropriate number of proxy buses depends on the number of separate tie line schedules that are managed by the system operators.
- Defining proxy bus locations in excess of the number of tie line schedules managed by system operators introduces the potential for significant market inefficiency.

NETWORK MODEL

Proxy bus pricing systems are based upon network models that include the transmission system in adjacent dispatch areas.

- A proxy bus in an LMP pricing system is not simply an interface scheduling point modeled as radially connected to the ISO-coordination transmission system.
- The transmission grid models employed by LMP-based pricing systems extend beyond the internal ISO-coordinated transmission grid and model the transmission network, but not the constraints, in adjacent dispatch regions.

CHANGES IN GENERATION

The purpose of modeling changes in net interchange at a proxy bus is to approximate the combined effect of all changes in generation in an adjacent dispatch area that would occur in response to a change in scheduled net interchange.

- The changes in generation in an adjacent dispatch area attributable to a change in scheduled net interchange will vary depending on load conditions, transmission congestion and outages.
- No single representation of these changes in generation can be accurate for all circumstances.
- A fixed proxy bus model therefore at best provides only an approximation of the actual changes in tie line flows that will result from a change in scheduled net interchange.

DISTINCT TIE LINE SCHEDULES

The appropriate number of proxy buses depends on the number of separate tie line schedules that are managed by the system operators.

- Changes in each distinct interchange schedule supported by the dispatch of the system operator will potentially result in a different pattern of tie line flows and therefore should be modeled with a separate proxy bus.
- Multiple interchange schedules that are supported only in aggregate (i.e., the system operator moves generation only to follow the combined schedule) do not require individual proxy buses.

REDUNDANT PROXY BUSES

Defining proxy bus locations in excess of the number of tie line schedules managed by system operators introduces the potential for significant market inefficiency.

- If there are more proxy buses than distinct interchange schedules supported by changes in generation, then some changes in proxy bus schedules will not result in any change in tie line flows.
- This mismatch will cause market participants to schedule transactions that do not result in any change in tie line flows, but exploit differences in proxy bus pricing.
- These inefficiencies will give rise to uplift because day-ahead and hour-ahead schedules will prove infeasible and require redispatch support.

SEAMS ISSUES

If there is a substantial range in the LMP prices calculated for locations in an adjacent dispatch area, then there is a potential for meeting load at lower cost through inter-regional coordination.

- This is a true "seams" issue.
- The potential gains will not be realized by establishing additional proxy buses for flows over the same tie lines.
- Meeting load at lower cost will require dispatch procedures that take account of constraints in adjacent dispatch regions.