Estimated RT Congestion Residuals and Uplift Charges under Tie Optimization

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Introduction

- We performed simulations to estimate the benefits of two specific proposals to coordinate interchange scheduling between New York and New England.

  ✓ At the January 2011 joint stakeholder conference, we presented estimated annual production cost savings of $12 million for Tie Optimization.

- However, stakeholders raised concerns about the potential for negative congestion residuals and other uplift charges that might arise under Tie Optimization.

- Ideally, positive congestion residuals would be collected when the interface is fully utilized and no uplift would arise from scheduling errors or differences between the day-ahead and real-time markets. However,

  ✓ Negative congestion residuals could arise from differences between day-ahead and real-time transfer limits; and

  ✓ Uplift could arise from errors in predicting the optimal interchange.

- Using the results of our simulations of the Tie Optimization proposal, we have estimated the congestion residuals and other uplift (or "down"-lift) charges that would have accrued. This presentation:

  ✓ Explains how congestion residuals and uplift charges would be determined; and

  ✓ Summarizes our estimates of the congestion residuals and other uplift.

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Settlement under NY/NE Tie Optimization

- The ISOs develop an estimate of the optimal interchange every 15 minutes, and the estimate is used to determine the interface schedule and the Scheduling Price.

  - ✓ The estimated internal LMP (or LBMP) in each ISO is equal to the cost of its estimated marginal resource.

  - ✓ The Scheduling Price is set equal to the mid-point between the estimated internal LBMP in New York and the estimated internal LMP in New England.

  - ✓ The receiving ISO credits the interface settlement account by the interchange adjustment times the Scheduling Price.

  - ✓ The sending ISO debits the interface settlement account by the interchange adjustment times the Scheduling Price.

- When the interface is unconstrained, the resulting congestion residual will be $0 for each ISO.

- When the interface is constrained, the Scheduling Price will differ from the estimated internal LMP (or LBMP) in each ISO.

  - ✓ The congestion residual is equal to the interchange adjustment times the difference between the Scheduling Price and the estimated internal LMP (or LBMP).

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Settlement under NY/NE Tie Optimization – RT Congestion Residuals

- Normally, when the interchange adjustment is constrained by the total transfer limit or interface ramp limit:
  - ✓ Total Congestion Residual = Interchange Adjustment × (estimated internal LMP of receiving ISO – estimated internal LMP of sending ISO).
  - ✓ For example, if the ISOs determine an interchange adjustment of 400 MW towards NE, an estimated internal LMP in NE of $53/MWh, and an estimated internal LBMP in NY of $49/MWh:
    - – Congestion Residual = $1,600/hour = 400 MW * ($53 - $49/MWh)
- However, a negative congestion residual could occur if the interchange adjustment is constrained to go from the high-price region to the low-price region.
  - ✓ This could result from a total transfer limit reduction or an interface ramp limit.
  - ✓ For example, if 900 MW is scheduled towards NE in the day-ahead but the total transfer limit is reduced to 500 MW in real-time, the interchange adjustment will be 400 MW towards NY, leading LMPs in the two markets to be farther apart.
    - – Suppose, an estimated internal LMP in NE of $56/MWh, and an estimated internal LBMP in NY of $48.75/MWh .
    - – Congestion Residual = *negative* $2,900/hour = 400 MW * ($48.75 - $56/MWh)
- Each ISO takes half of the total congestion residual.

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Settlement under NY/NE Tie Optimization – Uplift and "Down"-lift from Forecast Errors

- The ISOs will forecast system conditions imperfectly, so the estimated internal LMPs will usually differ from the actual internal LMPs on each side of the border.

- Revenue imbalances will occur for each ISO since:

  - ✓ Settlement with market participants is based on actual internal LMPs; while

  - ✓ Settlement with the interface settlement account is based on the Scheduling Price.

  - ✓ Hence, Revenue Imbalance of the ISO = Interchange Adjustment toward ISO × (Actual Internal LMP – Scheduling Price) – Congestion Residual if constrained.

- Uplift results from a negative revenue imbalance, which would usually result when the Tie Optimization process overshoots the optimal interchange adjustment.

  - ✓ For example, if the interchange adjustment is 400 MW towards NE, the Scheduling Price is $51/MWh, and its actual internal LMP is $45/MWh:

  - ✓ Revenue imbalance = negative $2,400/hour = 400 MW * ($45 - $51/MWh)

- "Down"-lift results from a positive revenue imbalance, which would usually result when Tie Optimization undershoots the optimal interchange adjustment.

  - ✓ For example, if the actual internal LMP is $55/MWh instead of $45/MWh:

  - ✓ Revenue imbalance = $1,600/hour = 400 MW * ($55 - $51/MWh)

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Settlement under NY/NE Tie Optimization – Estimated RT Congestion Residuals and Uplift Charges

- We calculated the congestion residuals and uplift charges that would have accrued in the Tie Optimization Case.

  ✓ These are summarized in the following table.

  ✓ "Down"-lift is shown as a positive value, while uplift is shown as a negative value.

- Congestion residuals are calculated from periods when total transfer limit constraints were binding in the Tie Optimization (7 percent of the intervals), although the simulations do not explicitly model interface ramp constraints.

  ✓ Hence, interface ramp constraints would lead to additional congestion residuals in the intervals that are not identified as congested.

  ✓ In addition, the simulations limited the interchange adjustment to 500 MW to be conservative, which would tend to reduce congestion in the simulations.

- The annual "Down"-lift estimates are relatively small (<$1 million) as the intervals generating down-lift (i.e., the Tie Optimization undershot) were generally offset by the intervals generating uplift (i.e., the Tie Optimization overshot).

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Settlement under NY/NE Tie Optimization – Estimated RT Congestion Residual and Uplift Charges

	2008	2009	2010	Total
NYISO:				
Congestion Residual ($M)	$0.76	$0.21	$0.18	$1.15
"Down"-lift ($M)	-$0.47	$0.26	$0.46	$0.25
ISO-NE:				
Congestion Residual ($M)	$0.76	$0.21	$0.18	$1.15
"Down"-lift ($M)	$0.62	$0.22	$0.01	$0.85

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