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DRAFT
CONFIDENTIAL

MEMORANDUM

DATE: August 11, 2004

TO: Robert Thompson

FROM: Scott M. Harvey

RE: Reserve Optimization Cost Savings

The calculation of the historical difference in reserve shadow prices between eastern and western New York places an upper bound on the potential production cost savings from using western reserves to meet the eastern reserve requirement in the bid load dispatch of SCUC -- $53,400 in the case of spinning reserves over the most recent 12-month period,[1] and $109,900 in the case of 10-minute reserves.[2]

These figures are upper bounds on the cost savings in the SCUC dispatch and the actual cost savings would be less for two reasons. First, the upper bound calculation assumes a flat supply curve for spinning and 10-minute reserves in both the East and the West, as illustrated in Figure 1. If the supply curves were flat, the potential production cost savings would be the entire Region A.

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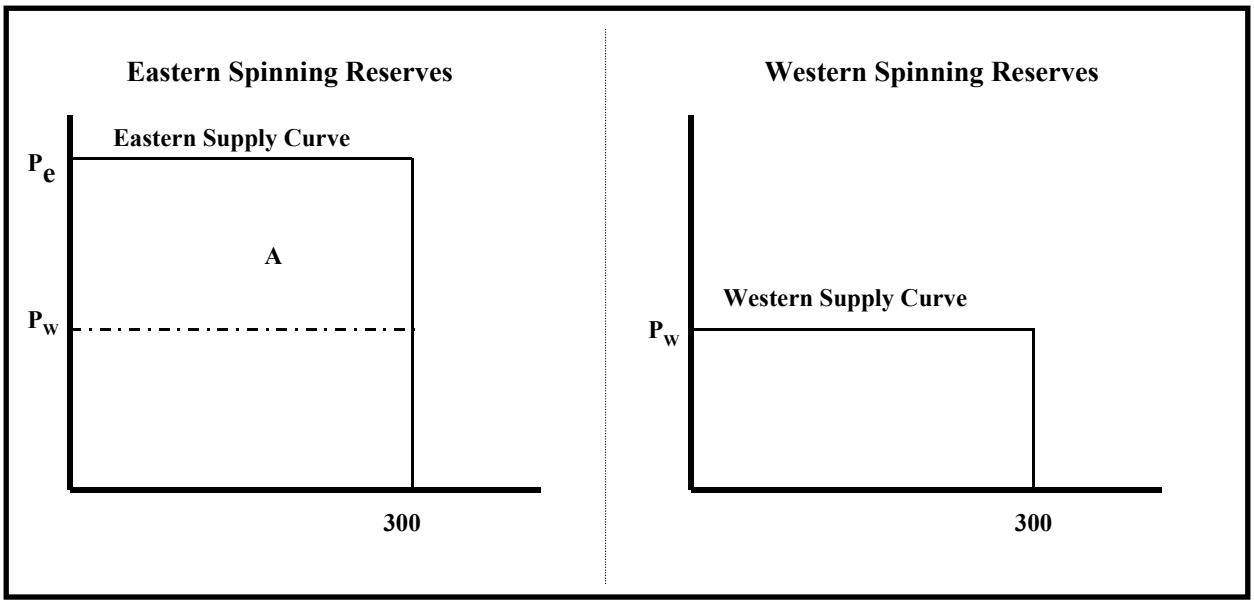
[1] $178/MWyear * 300 MW, August 2003-July 2004; the figure for the prior 12-month period was $155,763 (300 * 519).

[2] $157/MWyear * 700 MW, August 2003-July 2004; the figure for the prior 12-month period was $363,447 (700 * 519).

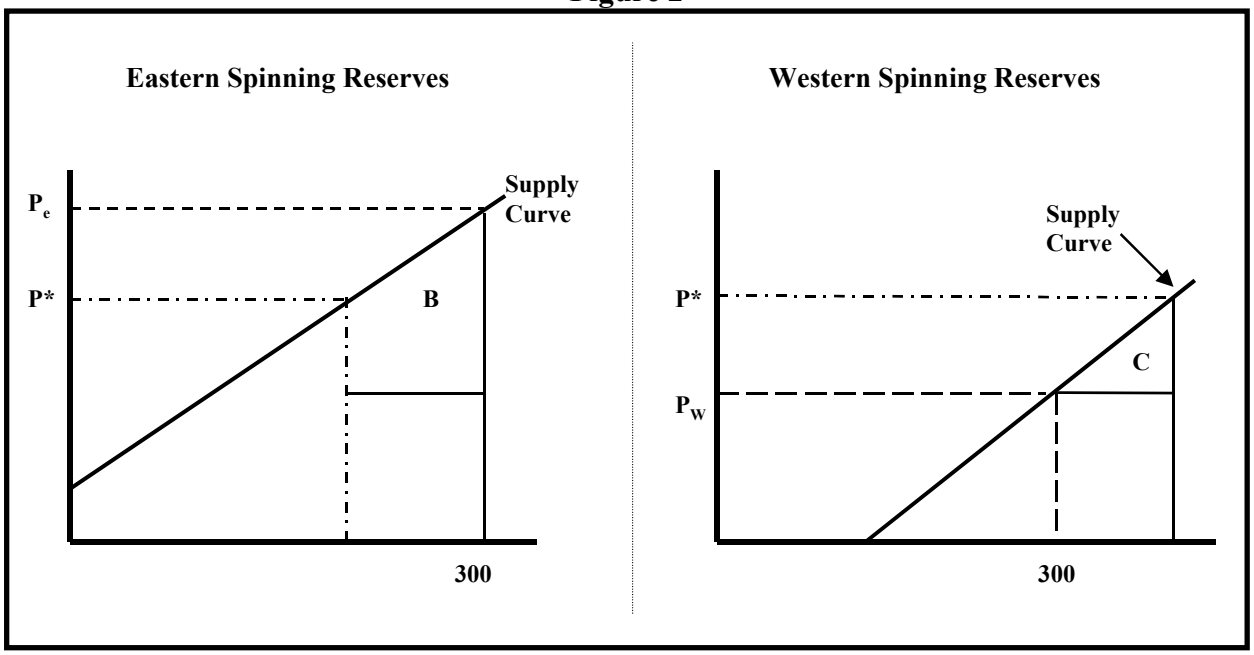
Figure 1



This assumption maximizes the potential cost savings but is invalid in practice. Thus, the shadow price of eastern spin in SCUC is the cost of the last MW of spinning reserves scheduled. We know from NYISO bidding data that the inframarginal reserve MW are lower cost than the marginal MW as illustrated in Figure 2, so the benefits of replacing eastern reserves with western reserves would decrease as more and more eastern reserves were replaced.

Similarly, the shadow price of western reserves in SCUC is also the cost of the marginal MW of reserves and this cost would rise as more and more MW of reserves are shifted from East to West. This is also illustrated in Figure 2.

Figure 2



In the example, the price of reserves in both regions would be P* and the potential production cost savings would be Region B minus Region C, which could be much, much smaller than Region A in Figure 1.

The second reason the difference in reserve shadow prices provides only an upper bound on the potential reduction in production costs from providing additional reserves from western generation is that when the price of energy in the East exceeds the price of energy in the West, the difference in reserve shadow prices can be positive, yet shifting reserves to the west could increase production costs if the western generation that would provide reserves is still cheaper than the eastern generation that would be dispatched up. Given the small apparent value implied by the upper bound provided by the difference in reserve shadow prices, we have not undertaken the more complex calculations required to calculate the actual change in production costs.[3]

The shadow price based benefit calculation places an upper bound on the production cost savings from relaxing the reserve constraint in the dispatch step of SCUC but does not necessarily reflect the benefits of relaxing the constraint in the unit commitment step.

[3] Data on the difference is reserves shadow prices is relatively easy to extract from SCUC and could be routinely monitored by the NYISO. If this upper bound on the production costs savings were to rise, the NYISO could implement a routine in the price verification process to begin calculating a more exact measure of the potential benefits of greater reliance on western reserves.

If western units were committed to displace in-city units providing reserves that then would be committed anyway in the LRR pass, relaxing the reserve constraint in the UC might actually raise production costs and uplift, so accounting for unit commitment costs could further reduce the production cost benefits.

Alternatively, if greater use of reserves on western units avoided the need to commit eastern units outside the city in SCUC, the reduction in production costs could be greater than implied by the shadow price calculation.

Changing the modeling of reserves in the SCUC commitment process would be more complex from an implementation standpoint than simply changing it in the dispatch step. Given the interaction with the LRR commitment, it would likely be difficult to implement improvements in reserve optimization in the unit commitment process without first improving optimization in the LRR unit commitment process. These same factors make it very difficult to study the historical cost impact of changes in reserve optimization in unit commitment without rerunning SCUC for most days studied which has not been undertaken.