

- Use locational reserves or set aside transmission capacity to support A/S. Experience in the NYISO indicates that using locational reserves is a better choice. We should verify that with someone at the NYISO. Using locational reserves appears to be a more modular approach that will eliminate the need to consider what transmission has to set aside for A/S when calculating available capacity (to support FTO auctions).
- Use “simultaneous co-optimized A/S and redispatch markets” or allow sequential markets to exist. Although more technically demanding for the RTO, the use of a simultaneous co-optimized approach for these markets assure that market clearing prices for the various A/S components are rational (absent the effects from the abuse of locational market power). An example of an irrational market result that has occurred in sequential markets that we would want to avoid would be if the price for a higher quality service (e.g. regulation) is less than the price for a lower quality service (e.g. spinning reserves). The assumption that co-optimized markets will be used also implies that multi-part bids must be used. One caution with respect to the use of a co-optimized A/S and redispatch market is that functioning co-optimization markets are for A/S and Energy markets (read including unit commitment as in a tight power pool). The RTO West proposal does not have a full energy market; it is limited to a redispatch market. We will need to consider what affect this may have on the workability of co-optimized markets.
- Second order design elements that need to be pinned down include:
  - Payment to bidders. This could be pay as bid or payment of a clearing price. The working assumption for RTO West in stage 2 has largely been that the clearing price would set the payment to winning bids.
  - How to determine winning bids (bid selection function). This could be based on minimizing total (social) cost or minimizing bid prices. This also ties into what the solution function is for determining nodal prices (is it based on the least cost for serving load or the least cost to provide redispatch?). We need to do some exploration in this area (translation - I don't have a strong opinion as to what's the best approach to take).

References:

- Market-Based Pricing of Ancillary Services: Market Design Choices, Consequences and Outcomes. A presentation by Andrew P. Hartshorn and Matthew D. Kunkle for the EUCI Ancillary Services Conference in Denver, CO. April 12, 2002
- Design of Ancillary Service Markets. A technical paper by Shmuel Oren, UC Berkeley, January 2001 ([http://certs.lbl.gov/pdf/Hawaii\\_01.pdf](http://certs.lbl.gov/pdf/Hawaii_01.pdf))
- Miscellaneous references. NYISO technical bulletin on locational reserves ([http://www.nyiso.com/services/documents/techbulletins/pdf/tb\\_80.pdf](http://www.nyiso.com/services/documents/techbulletins/pdf/tb_80.pdf)). NYISO Tariff attachment B on LBMP calculations ([http://www.nyiso.com/services/documents/filings/pdf/services\\_tariff/att\\_c.pdf](http://www.nyiso.com/services/documents/filings/pdf/services_tariff/att_c.pdf)).