RTO West Losses Methodology

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This document has not been approved or reviewed by anyone.

MDWG-1 Losses

Purpose – Recommend a loss methodology to be used during the operations of RTO West. The RTO West Independent Board, will have the authority to change any methodology established at this time.

Time Frame – Recommendation for losses is required before the time the state fillings are in October/November 2002.

Stage 2 Filing

The March 29,2002 filing said that losses would be handled, but did not specify the methodology. The filing did provide the following,

1. All schedules would be accepted
2. Schedules would be based on POR and POD (on RTO West transmission system)
3. Day ahead market
4. Real time dispatch by RTO West operators
5. Self-provide and Self-tracking options
6. Settlement to follow

Other RTO /ISO Handling of Losses

A review of other RTO and ISO loss methodology being proposed or used in other regions may prevent us from reinventing the wheel. Differences in congestion management and general market design may also invalidate use of their loss methodology. The areas of most interest are those that RTO West will be direct hourly interaction and those that have similar congestion management.

WestConnect

WestConnect is planning to use loss factors by zone. Attached is the full description of their plan.

Cal ISO

Highlights from previous Papers

The previous papers on losses included some good points on a loss methodology and evaluation. Many of the previous assumptions changed when RTO West changed the congestion management proposal.

Evaluation Criteria (**Carl Imparato, 5/9/00)**

1. Send signals for efficient grid use (both for daily dispatch decisions and generation siting decisions). This criterion generally requires that the loss allocation methodology recognize the incremental effects of schedules that increase total losses and schedules that decrease total losses (including offering credits for beneficial schedules which reduce total losses). Use of average losses is generally at odds with this criterion, as there is no good way of recognizing the incremental beneficial effects of counter-schedules under an average losses methodology.

2. Commercial viability. Reasonable simplicity in understanding, administering and using the methodology, and in calculating and predicting the applicable loss factors. This criterion generally argues against node-specific loss factors, loss factors that vary from hour to hour, and after-the fact calculation of loss factors.

3. Reasonable fidelity. Loss responsibilities that are allocated to SCs should recognize that transmission losses vary by time of day, time of year and location.

4. Transitivity. In order to avoid gaming of the RTO loss model, losses from A-to-C should equal losses from A-to-B plus losses from B-to-C. Otherwise, groups of SCs can shift their loss responsibilities onto other SCs by simply altering the way they schedule their loads, resources and inter-SC trades. [1]

5. Consistency with the RTO transmission access and scheduling model. It is also very important to recognize that the RTO will not/should not use a "contract path" model for transmission access. Under the transmission access model, SCs would not schedule individual transactions (e.g., 100 MW from node i to 100 MW of load at node j, and 50 MW from node k to 50 MW of load at node m). Rather, SCs would submit their

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[1] From studying the various zone-to-zone alternatives that have been proposed around the country, it appears that two general rules emerge:

(1) It is not possible to have transitivity hold when an "average losses" approach is used. Rather, an incremental loss approach of some type - one which recognizes the direction of the transaction - must be used. And since the grid efficiency attribute also requires recognition of the direction of the transaction, this would appear to make the use of "average losses" approaches very undesirable.

(2) Zone-to-zone incremental loss matrices which respect the transitivity requirement can be developed if they rely on linearized power flow analyses. However, as soon as we try to add terms on the diagonal of the matrix (to reflect the fact that SCs whose generators and loads are in the same loss region should also be allocated some share of loss responsibility), the transitivity requirement is violated.

generation schedules (100 MW at node i and 50 MW at node k) and their load schedules (100 MW at node j and 50 MW at node m), plus suitable transmission rights and suitable adjustments for losses (as well as imports, exports and inter-SC trades).

Objective

Recover or assign actual losses.

Discussion Points

1. Losses are not congestion management, but congestion management affects losses.
2. Losses are affected by every schedule.
3. Loss methodology should allow smooth operation of the Wholesale energy market.
4. Loss recovery should reflect the losses on the system, on peak, off peak, monthly.
5. A loss for each schedule is very complicated.
6. Compare one system average loss vs. a zone loss factor.
7. The cost of the losses is a factor of the bid base generation increased each hour.
8. A method that only uses POR and POD is consistent with the congestion management design.
9. Use of GPS on Each location and direct distances would add some level of distance albeit not electrical which changes with every line trip.
10. Total system losses are more variable with system load than the season.

Options

Average-distance option

Actual RTO West transmission losses should be known hourly based on accumulator readings and should be recovered. Every schedule will have a POR and POD on RTO West transmission system, a MW quantity and valid time and dates. Real time metering is expected at all POR and POD but meter accuracy is too low. Allocation of losses to each schedule is very complicated and not considered practical for the real time operation

so this proposal is to use the system average losses, total schedule, and the total distance scheduled. The strength in this option is the predictable loss component for schedule coordinators, even with new generators and loads. The weakness of this option is that all schedules pay for losses even if the schedule lowers losses and the distance calculation is not a system impedance match.

1) Scheduling Coordinators (SC) are responsible for the losses of every schedule submitted to RTO West.

2) Each schedule is assigned an imbalance energy requirement based on the expected system average loss for the hour and the physical distance between the POR and POD from GPS data.

3) Each Scheduling Coordinator is expected provide the imbalance energy for losses hourly as well as real time regulation to maintain frequency based on the percent of total system load.

4) Average losses per MW/mile to be tracked by RTO West and calculated from the total losses, total MW scheduled, and the total miles for each hour.

5) Settlement of differences between Imbalance Energy allocated and used (more or less) would be adjusted for system regulation.

6) System average losses could follow real losses by one week for each hour.

Frequency Regulation

Frequency is the primary indicator for how much generation is required to account for losses. This option assigns a regulating requirement (MW/Hz) to every Scheduling Coordinator based on total schedules and then evaluates the result in the settlement process. The distance adjustment is also possible with this option in the calculation of the assignment (MW/MI/Hz).

Loss Zones

This method establishes zones where a common loss factor can be used. Often generation and load zones can be created. The zones could match existing control areas or other areas where loss factors are already in place. See the West Connect loss methodology for an example.

Real Time Losses

Real time losses could be prorated to each schedule in real time.

RTO dispatch

The RTO West dispatcher could dispatch imbalance energy contracts from the scheduling coordinators for losses and try to lessen congestion generation.