CRE criteria refinement:
CRE fitness (regression) test result

May 28, 2009
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1. Introduction
2. CRE fitness test method
3. CRE fitness test sample
4. CRE fitness test result (Individual, Distribution)
5. Result comparison
6. Conclusion
Correlation of CRE is not a new measure, already defined in Protocol

7.2.3 Determining Closely Related Elements (CREs)

For each year, ERCOT staff shall identify potential CREs using, at a minimum, the following process:

1. Determine the Zonal Average Shift Factor for a particular CSC (Xz) for each Zone (z).

2. Determine the zonal average Shift Factor for the candidate CRE (Yz) for each Zone z using the same generation weighting as in (1) but ignoring Boundary Generation Resource buses that would cluster into a different Congestion Zone with respect to the CRE.

3. Determine positive “a” applying least-square curve fitting to the following equation:
   \[ Y_z = a \times X_z + b_z \] for all Zones z.

4. Using “a” from (3), determine the maximum absolute value of b_z.

5. Also determine the total capacity (MW) of Boundary Generation Resources that would cluster into a different Congestion Zone.

6. If the maximum absolute value of b_z is less than a threshold set by the appropriate TAC subcommittee, not to exceed 0.2, and the total capacity of Boundary Generation Resources that would cluster into a different Congestion Zone is less than 1,500 MW, then the element is a CRE for the particular CSC.

Is 0.2 threshold a reasonable one? Then why? Never challenged before?
Data set: Most recent 2009 Fall Steady state case

Analysis tool:
- Luminant’s analysis template (reviewed by CMWG)
- PowerWorld – power flow analysis for calculating generation shift factor

Approach
- Selecting and testing good samples & bad samples for West to North CRE
- Good samples (Current CREs) & Bad samples (Local lines not relevant to West to North CSC)
- Reviewing the analysis result to see if the current threshold can filter out bad samples
- Recommending a better threshold if any
- 12 Good Samples: Current CREs (in Blue)
- 13 Bad Samples: Local lines (in Pink)
  - DFW local lines (138 kV & 345 kV)
  - South local lines (138 kV)
  - Different directional lines (138 kV)
The current threshold of 0.2 is too generous!
Recommendation: reasonable threshold is 0.05
Aggregation of Luminant’s test results in April and May at CMWG/CRE meeting (Sample set includes all the lines considered for all zones)

Recommended CRE threshold (0.05)

Current CRE threshold (0.2)

Well fitted group

Current CRE threshold plays no role

Max Bi (CRE Fitness Measure) for sample lines

Recommendation: reasonable threshold is 0.05
• The current threshold cannot filter out clearly bad examples

- As an example, if we follow the current threshold, ERCOT might manage DFW area local congestion by zonal bid stacks

• We recommend a reasonable threshold of 0.05 found by the test