



Long-Term System Assessment Transmission Analysis Summary

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Purpose of ERCOT Long-Term Studies

To Inform Near-Term Planning with Potential Solutions that Meet Long-Range System Needs

- Intent is not to select new circuits to recommend
- Rather, the intent is to provide a selection of alternatives through scenario analysis that can be considered when developing solutions for near-term congestion or reliability needs
- To meet the NERC TPL Requirements for development of 10-year transmission plan

2010 Long-Term System Assessment

- A 10-year analysis of potential transmission system needs.
- Scenario analysis was used to evaluate potential impacts of new generation on system needs.
- Part of a three-year effort, partially funded by the Department of Energy, to improve the long-term analysis process for the ERCOT interconnection.
- Final report was completed on 12/30/2010 and is available at:

<http://www.ercot.com/content/news/presentations/2011/ERCOT%20010%20Long%20Term%20System%20Assessment.pdf>

2010 Long-Term System Assessment - Input

- Starting transmission topology was an interim case from the 2010 Five-Year Plan.
- Load shapes were adjusted to reflect expected 2020 peaks and energy by weather zone based on current ERCOT Long-Range Load Forecast.
- A network simplification tool was used to remove the lower voltage circuits (69-kV) from the transmission topology, and to reduce the impact of urban 138-kV congestion on model results.

Topology Simplification

- Bus count reduced 6,000 → 3,000 (approx)
- Line count reduced 7,500 → 3,900 (approx)
- Flows on 138-kV and 345-kV bulk transmission network mostly unchanged.
- Simplified case has similar N-1 behavior (branch loading and voltages) as full case.

Transmission Needs Analysis - Process

- **Part 1: Peak-load AC Contingency analysis and voltage stability analysis**
 - Analysis was conducted by zone. Generation was added outside of target zone to compensate for load growth.
- **Part 2: Economic Project analysis using four scenarios**
 1. Business as Usual (continuation of current market and regulatory conditions)
 2. Low natural gas price (future generation expansion is predominantly gas-fired)
 3. High natural gas price (future generation consists of coal and wind generation)
 4. High renewables (new generation consists of wind, solar, geothermal and biomass)
 - Generation in each scenario was added in likely locations. No thermal generation was added in non-attainment zones. Economic transmission projects were identified.

Transmission Needs Analysis - Results

- Part 1: Peak-load AC Contingency analysis and voltage stability analysis
 - Additional transmission capacity needs were identified in the Houston area and in Dallas/Ft. Worth area (particularly north and west of DFW)
 - Dynamic reactive equipment may reduce or delay the need for new transmission capacity into the Houston area
- Part 2: Economic Project analysis using four scenarios
 - Few additional economic projects were identified
 - Projects with economic benefits were dependent on specific generation development

LTSA Lessons Learned

- LTSA is part of a larger 3-year project to improve ERCOT's long-term planning capabilities.
- Process improvements identified as part of the LTSA are being applied to the continuing long-term analysis.
 - Topology simplification tool is being improved to better reflect potential upgradeability of 138-kV circuits
 - 10-year planning horizon may be too short to identify significant system needs. Future analyses are being extended to include 20 years of load growth
 - Project identification process is being reevaluated. The possibility of identifying economically beneficial projects as a first step is being explored.
 - Generation expansion and generation siting processes are being significantly improved

Long-Term Study Next Steps

- Scenarios for further analysis are being developed (see next presentation)
- Currently under development for further analysis:
 - Updated base transmission topology derived from most recent Steady-State Working Group case update
 - Generic unit generation database
 - 20-year load forecast by county
- When initial scenario conditions are finalized, generation expansion analysis and transmission needs analysis will begin (by early March).
- An interim report is due to the Department of Energy in June, 2011.

Questions?

