

RPG Meeting

June 17, 2014

Agenda

- Antitrust Admonition
- Miscellaneous Updates
- Load Forecast Website Overview
- 2014 LTSA Update

Miscellaneous Updates

- ERCOT is partnering with Pacific Northwest National Labs on a dynamic contingency analysis tool.
 - Looking at how to deal with a large number of contingencies in a dynamic study.
 - ERCOT is not funding the project, but is providing some real world analysis.
- ERCOT planning and operations are working jointly on a West-North stability study.
 - More generation has interconnected in the west.
 - Not all series capacitors are in service in west Texas.
 - Tentatively aiming to have results in September.
 - Q&A: Is operations currently modeling a West-North limit?
 - Yes.
 - Q&A: What tools are being used for the study?
 - PSS/E, TSAT, and VSAT.
- There were questions regarding Chairman Nelson's memo and the ERCOT independent review of the synchronous condenser project.
 - ERCOT will continue to move forward with the stability portion of the study and will evaluate economics with respect to any decisions made by the commission when finished.
 - Q&A: Will new cases be published?
 - No, but the cases will be updated.
 - Q&A: What is the timeframe for this study?
 - Starting in the next week or two. Preliminary results are anticipated by next month's RPG meeting.
- PLWG will discuss generation deliverability and begin discussion on Board directive to look at ERCOT planning procedures.

Load Forecast Website Overview

- Access at <http://www.ercot.com/gridinfo/load/forecast/index.html>
- Graphs show forecasted summer peak demand and annual energy forecast for the next ten years.
- There is a link to the long-term load forecast document that is produced every year.
- *ERCOT Peak Demand Scenarios* opens up an Excel file that shows ERCOT's forecasted summer peak load distribution based on using historical weather. It also includes the official forecast for ERCOT coincident peak (50/50).
- Differences between ERCOT non-coincident peak forecasts by weather zone and settlement data exist for several reasons.
 - 15min data vs. hourly data.
 - DC ties are treated differently between settlement and operations.
 - Storage is treated differently between settlement and operations.
- [90th Percentile Summer Non-Coincident Peak by Weather Zone](#) will be updated in the next month to project out to 2024.
- Q&A: With the new large DC ties coming, how can the settlement method and operations method of treating DC ties be reconciled?
 - Changes would be required to the existing Protocols. This would need to be discussed at market meetings (COPS?).
- Q&A: What are DC tie flows netted against?
 - Settlements treat all DC tie inflows as generation. Operations nets the inflows and outflows by individual tie.
- Q&A: Are the forecast numbers based upon settlements or operations?
 - Mainly settlements and some on operations. ERCOT load forecasting is working with ERCOT resource adequacy to develop a tool to express settlement data in a way that is consistent with operations. That tool will be used to go back and correct historical load values for consistency.
- Q&A: How has PUN load been considered in the forecast?
 - It is not included in the forecast. The load forecast only includes load that ERCOT serves. That load is added as an incremental change in some transmission studies.
- Premise counts for industrial, commercial, and residential customers by weather zone are available.
- Average use per premise by weather zone is available.
- Historical and forecasted energy and coincident peak is available by weather zone for the old forecast methodology. This will be done for the new forecast methodology once the tool reconciling settlement and operations data is complete.
- The new methodology uses actual weather data for the last twelve years and averages them. As such, it is not possible to give the temperature at the time of peak. The official peak forecast is an average of peak demands taking weather into account.
- The forecast is now a normal load forecast, rather than a normal weather forecast.
- Q&A: Are the loads used 15min settlement data or averaged on the hour?

- They are integrated on the hour.
- Q&A: 15min data is averaged into hourly data. What is a reasonable variation of load that may have to be served instantaneously?
 - Variation for weather is available on the webpage. ERCOT will head towards incremental updates based on other uncertainties.
- Any suggestions can be sent to Calvin.

2014 LTSA Update: Load Distribution Methodology

- Intended to reflect differences in how load is distributed from scenario to scenario.
- Information from the state demographer indicates that higher growth is expected along the I-35 corridor, especially in the “ring counties.”
- Scenario-specific load forecasts are provided by weather zone.
- The load growth for counties within their respective weather zones are expected to vary between scenarios. This variation can be modeled using scenario-specific, county-level growth rates to adjust distribution factors.
- Q&A: How were the scenario-specific load forecasts created?
 - High Economic Growth: 1.5 % was added on top of growth rates from Current Trends for the Coast, North Central, and South Central weather zones.
 - Stringent Environmental Regulations:
 - Created using solar profiles, thresholds of solar DG, and adding it to the forecast.
 - EE increased by 3.3%.
- Q&A: Last LTSA Calvin gave county wide load forecast. Why don’t we have a similar forecast this time around?
 - We have county-level premise data, but did not have the time to do a county-level forecast. Next LTSA, we should be able to provide this. During the last LTSA, county-level forecasts were never generated. Distribution factors were used.
- For Current Trends:
 - Compound annual growth rate (CAGR) values were calculated for each county using the 2015 and 2020 SSWG DSB cases.
 - The loads from the final 2018 case from the 2013 RTP were grown to 2024 and 2029 levels using county CAGR values.
 - Distribution factors were calculated for 2024 and 2029 by normalizing each load value relative to the total load for its weather zone.
 - Self-served loads were not changed.
- Comment: Banking on the growth rates for 6 years from SSWG cases to last for 20 years may not be accurate.
 - ERCOT response: The rates are used on a relative basis rather than an absolute basis. The rates are used as a means to capture distribution factors.
- Q&A: How do you handle saturation?
 - The data from the state demographer did not seem to show saturation.

- Comment: The problem with using growth rates is that Rockwall County is a small county with a high growth rate and may top out if this rate is modeled.
 - ERCOT response: This does not mean that the load for Rockwall County would necessarily grow to a large number. It will simply get a larger share of the North Central load as time goes on. As an example, it may only change from a 1.49% share of North Central load to a 1.54% share of North Central load.
- ERCOT will post county level load data for scenarios on POI for stakeholder comments.
- Accelerated growth rates and increased activity in dry gas basins is expected for the High Economic Growth scenario.
- Growth rates similar to Current Trends and dampened growth in the oil and gas industry are expected for the Stringent Environmental Regulations scenario.
- CAGR values can be adjusted to reflect expected load distribution in other scenarios. Stakeholder feedback on how to adjust these values for different scenarios is welcome.
- Calvin can present more information on the load forecasts at the next RPG meeting.

2014 LTSA Update: Scenario Results

- The Stringent Environmental scenario is based on Current Trends with several modifications.
 - Load forecast adjusted for increased EE and 2400 MW of solar DG by 2029.
 - Natural gas forecast increased by \$1.50/mmBtu in each year.
 - Costs for SO₂, NO_x, and CO₂ were added.
 - ERCOT exceeds GHG goals under CO₂ prices. A study will be done to determine how to exactly meet GHG goals.
 - PTC and ITC were added to wind and solar expansion.
 - DR increased an additional 3% per year.
 - DC ties were increased by 3000 MW.
- Q&A: Scenario description for Stringent Environmental had PTC and ITC reducing over time. Is that how it was modeled?
 - The PTC remained constant and the ITC was reduced to 10% starting in 2018. ERCOT staff will check their notes from the scenario development workshops to verify that the correct intent is modeled.
- Results for Stringent Environmental:
 - Two nuclear units were added.
 - There is a significant reduction in coal capacity.
 - There is a significant reduction in emissions relative to current trends.
- Q&A: Why does the reserve margin behave as it does for Stringent Environmental?
 - There is a lot of solar build and 100% of solar capacity is considered for the reserve margin.
- The High Economic Growth scenario is based on Current Trends with the following modifications:
 - The load forecast is higher.
 - The capital cost of CT and CC was increased by 25%.

- Solar cost decreased by 5% per year.
- A medium assumption for LNG exports was included.
- Natural gas price increased by \$1.50/mmBtu in each year.
- A 13.75% reserve margin target was included for the transmission study years (2024 and 2029).
- Q&A: Why isn't the reserve margin modeled in every year?
 - UPLAN's method of meeting a reserve margin is very simple and would collapse the market if applied in all years.
- Comment: I don't think that the commission would allow us to turn a reserve margin on and off. If the assumption doesn't work, perhaps we need to turn it off.
 - Discussion of tools and model behavior ensued.
- Comment: The report should include a disclaimer about how this scenario was tweaked.
 - ERCOT response: We can do that.
- Q&A: What are fixed retirements based on?
 - Plant age of 55 years for coal, 25 years for wind, and 50 years for gas.
- Q&A: Was the ITC 10% starting in 2018 true for all scenarios?
 - No, it was only for the Stringent Environmental Regulations scenario.
- Q&A: Why did the ITC start in 2018?
 - Because it is the first year for our planning cases.
- Results for High Economic Growth:
 - Reserve margin increases throughout the planning period.
 - Retirements are similar to Current Trends.
 - Average LMP is higher due to higher natural gas price.
 - Emissions are higher than current trends due to higher load.
- Q&A: Why is the high reserve margin in 2029 economical?
 - There is a lot of solar build and 100% of solar capacity is counted towards the reserve margin.
- Q&A: Are the solar numbers residential DG or utility scale?
 - Utility scale.
- Q&A: Can you explain the assumptions for residential and industrial DG?
 - The numbers are incremental, not cumulative.
- In the Stringent Environmental scenario, the 2400 MW of solar DG is on top of the utility scale solar built by the model.
- Q&A: Why were the capital costs for CT and CC increased for high economic growth?
 - The additional cost was suggested by Brattle. Comments on this can be sent to Doug or Julie.
- Comment: Having the costs for CT and CC increase while solar costs decrease seems inconsistent.
 - ERCOT response: The description for the High Economic Growth scenario states that technological growth in renewables will be more rapid.
- Q&A: Is the cost increase for CT and CC a single cost increase or incremental over the study period?

- The cost is 25% higher than Current Trends on a year-by-year basis.
- Q&A: Do the DC ties allow imports as well as exports?
 - Yes.
- Q&A: Will the KERMIT model be run for any of these scenarios?
 - ERCOT doesn't see the need to do so for the Current Trends or High Economic Growth scenarios, but is evaluating whether or not to do so for Stringent Environmental and other scenarios.
- Q&A: How was the price for DC tie imports set?
 - Outside areas are considered as CC only. If the ERCOT price is higher than the CC price, ERCOT will import.
- Q&A: Why isn't a mix of generation being considered for areas outside of ERCOT?
 - We think that any imports would be due to CC. Any generation portfolio for outside areas would be an assumption and would complicate the model.
- Q&A: What is the economic retirement metric?
 - The generator must cover 100% of its marginal costs.
- Q&A: Is DG considered negative load or generation?
 - Negative load.
- Comment: ITC should be included in all scenarios.
- Q&A: What makes up the "Other" category?
 - Geothermal, biomass, and hydro.
- The High Efficiency / DG, High NG Price, and Global Recession scenarios will be done next.

Wrap-up

- RTP update:
 - N-1 analysis is nearly complete.
 - ERCOT planning has met with several TSPs to discuss overloads.
 - Plan to move on to G-1 N-1 stage next.
 - Will have a more complete update for the next RPG meeting.