Regional Planning Group Meeting
April 21, 2015

Misc. Updates (Billo)

- Organizational changes: RTP & LTSA, previously one group, now two groups divided by regions—Sandeep is SE region supervisor and Sun Wook is NW region supervisor. Prabhu promoted to manager of transmission and interconnection studies. RPG contact list has been updated on web page.
- Upcoming stakeholder meetings: PLWG tomorrow, 1. Take up PGRR 43, continue discussions on PGRR 42, CDR vs. Planning databases whitepaper for the afternoon part of the meeting. Focus on white paper is on conclusions and recommendations for ROS.
- PGDTF meeting Monday, discussing roles on who is going to perform what analysis. Affects not only Transmission providers and planning folks, but also impacts generation owners as well. What data is required to run the studies.
- PUC open meetings (last two) Panhandle discussion. The last open meeting asked ERCOT to do additional analysis on Panhandle. Expect to come to next RPG meeting with scope of analysis.
- Fred: ERCOT sent out two data requests in April. The first data request is for the SSR frequency scan tests as we presented in the SSR workshop on March 13. The second data request is for the Panhandle detail study.
    - Discussion on alternative to PSCAD—vendor can use input to output black box model. Is that still available as an option and has that been made clear in the data request?
        - In the data request, ERCOT already specified the features that are required to be included in the model. Black box model may be acceptable if the required features are included in the provided model.

2015 West Texas Study (Gnanam)

- Activity since presentation in January.
- Objective: identify transmission need in West Texas area for 2 reasons:
- Load forecast side, West Texas oil and gas industry provided latest forecast for the load growth in area (was due in Jan). Since Feb, ERCOT has been working on base cases for 2017 and 2019. Updated load forecast data system topology—slides
- 2017 base case: applied load projections and tables provide summary of load increase compared to the start case (2017 RTP start case). Approx. 1350 MW total increase in west and far west.
    - On west, some numbers are negative. When you look at 2014 RTP base case, we picked the higher-of load for the west zone.. Information has been updated, such that some numbers have gone down. Negative numbers are not very significant.
- 2019 start case—total increase of 1800 MW. Total far west load has increased significantly.
- Contours of where load has increased.
- Timeline: preliminary reliability analysis in June, followed by economic and sensitivity in August. Final report by end of third quarter 2015.

- ERCOT retaining of consultants: still getting RFP out. Working with wires companies and oil and gas companies to improve load submission process so we don't have to go through ad hoc procedure, it'll become part of regular annual data load request. This will be going parallel to the ongoing WTS study.
- Q: Publishing cases 2017 and 2020?
    - A: Not at this time, may contain confidential data. We'll figure out how to share at a later point in time.
- Q: Did load forecasting side take close review of loads provided for the 2017 year? Did Calvin get a chance to review that closely?
    - A: One of West Texas study topics is to get a consultant on board to look at load projections and see how they compare. Look at forecast and give us some feedback.
    - A: Calvin is aware and looking at it as well.
- Q: Load increases over and above current west Texas load forecasts in use today?
    - A: That's correct, but part of load was already considered in previous west Texas study, but these are significantly higher than what we studied back in 2013.
- Comment: History doesn't really help this situation b/c these guys are one-off POI kind of things. One example, previous 2014 RTP cases didn't have 150 MW of new POIs. Those come in and it's not the standard historical way of projecting. We have not seen much of a slow-down in west Texas. Loads are still up, still getting requests. Local area study, did reach out to industry and got a refresh on data.

Loss of Load Probability Analysis with Transmission Constraints (Jin)

- Purpose is to give example of what a probabilistic study looks like and hopefully helpful to ongoing discussion about probabilistic modeling in transmission planning.
- Study fulfills NERC requirement to perform probabilistic risk assessment as a supplement to the annual LTRA. The main outcome is to derive reliability metrics such as EUE and LOLH. Study years are 2016 and 2018. One thing to point out is this study is not to determine a target or planning reserve margin.
- General assumptions for input data: loads and generation resources are based on 2014 CDR report.
- Transmission constraints were modeled in study. ERCOT divided into three zones, gray bubbles. Separated Valley and Houston from rest of ERCOT b/c of limited import capability. Modeled external regions—MISO and Mexico—external regions and ERCOT may not peak at the same time so ERCOT may get external assistance during peak hours. Total import capability is 1090 MW.
- Uncertainties included in study include weather, economic growth, and generation availability.
- Results posted for 2016 and 2018 at ERCOT aggregate level and each of the three zones.

- Q: On transmission limits between regions. Are all symmetric, in both directions same limit?
    - Yes.
- Seems a little questionable on how that really works.

    - This is more of a conceptual project. Not sure if model has capability of making it different for each direction. Even if the model is capable of making it different, if it's constrained it's the import of Valley and Houston, the transfer limits of Valley and Houston export shouldn't have high impact on results.

- Q: Correct that you only have 3 transmission constraints in model? So all other areas of the study you assume you can deliver the power, is that a correct assumption?
    - A: Transportation model, no physics in study.

- Q: so even though you have those constraints, the unserved energy outside of Houston is higher in 2018 so that must be b/c of generation issues since you don't have any transmission issues within the model?
    - A: Detailed results show that unserved energy and loss of load hours not from transmission constraint, more system-wide shortage of capacity. Reported on zonal level so Houston has less.

Comment: On unserved energy, that's a volumetric measure so one reason why Houston unserved energy is lower is smaller region than other. So if look at Valley expected unserved, Valley is smaller.

- Q: Do you have results for ERCOT-wide without the transmission constraints, by modeling transfer limits into Houston, into the Valley, what are the impacts of those limitations?
    - A: Yes. The results of the scenario without the transmission constraints are very similar to those of the scenario with the transmission constraints. This also indicates the zonal transmission constraints have minimal impacts on EUE and LOLH.

- Q: I didn't hear any discussion on how resources external to ERCOT were utilized as part of this study. What assumptions were made about the availability of resources outside of ERCOT?
    - A: Public available data, don't have the best forecast.

- Q: Is the concept for the proposal to divide ERCOT into zones or to simplify answer you're bringing today and the example could include different zones within ERCOT?
    - A: Used a three-zone structure because Valley and Houston have limited import capability. Model can take in different zonal structures.

- Q: Was the price responsive demand that was included allocated all the way across ERCOT, or zonally?
    - A: Mainly in Houston and Other zone. Not exactly sure how it is distributed in zones.

- Q: The diagram shows ERCOT connected to SPP in 810 and MISO in 5180. Were all units in MISO and SPP modeled with forced outage rates and loads or were single units modeled?
    - A: I'll need to check with the consultant on how it was modeled.

- Q: Where does this fit in procedurally, interested in having discussion. Some results counter-intuitive.
    - A: Maybe PLWG. Intelligent way to uncertainties around gen outages and load forecasts, incorporate into transmission planning. Today just throwing this out as "is this something we should pursue?". Thanks for feedback and questions, give us direction on where to do additional homework. Then maybe take to PLWG. Seems more like a transmission planning issue, possibly SAWG. Early in thought process right now.

- Q: Why use this model vs. other methods?
    - A: Reliability analysis doesn't take into account the probability that gen in Valley is going to be out. We take a unit out and then run analysis based on that. Same as Houston, DFW, wherever. Run that out with 90th percentile load and it's very deterministic. This is looking at more probabilistic standpoint. What is the probability that you'll have more than one unit out. Forecast will be low, have hot weather, look at economic aspect of load forecast, etc. Give additional information than strictly running deterministic.

- Q: Do you see this concept fitting in in terms of evaluating relative benefit of options or establishing some criteria upon which you would trigger a specific type of recommendation or a study to develop a recommendation?
    - A: Could be both. If you look at PJM and have criteria for load centers. If loss of load probability reaches certain threshold then they say have to build new import line into wherever. Open to discussion later on down road. Could be either/or on that, not really sold on anything right now.

- Q: How transfer analysis, with two limitations, same under N-1 or did one have full trans cap and the other had partial?
    - A: Everything in service, performed N-1.

- Q: Last bubble on slide
    - A: STP in service in case, the bubble model for Houston, STP is inside Houston, but when we did Houston import limit study, made a boundary for Houston, STP was outside of Houston. Subtract STP amount from Houston import limit based on AC transfer limit. =last bubble describes adjustments made for two methods used.

- Q: Should you decide to pursue methodology further, can it predict results 2018, go back and compare to what actually happened. Is that a possibility?
    - A: This study is to fulfill NERC requirements. We haven't looked at anything outside of years 2016 and 2018. Interesting comment.

ERCOT: We'll take the comments and feedback from today, go back and talk internally, and figure out what next steps are to move forward.

2015 RTP Scope Update (Kang)

- Cascading analysis definition: Series of events that involves sequential loss of system elements as a result of initial system disturbance.
- Designed power system to prevent that from happening. To minimize impact and reduce risk, ERCOT is required to study cascading analysis in the NERC reliability standard.
- Finding critical events that cause system cascading leading to system wide service interruption is one of the goals of the cascading analysis
- Next steps: get comments and feedback from stakeholders, etc.

- Q: Where'd you get 6% loss of total system load?
    - A: If you take a look at ERCOT SOL and IROL methodology, there is a section about Loss of Load Threshold Guideline. Basically, it describes that loss of load 1% of total system load corresponds to 1% change in system frequency. Based on that, 6% load loss results in hitting the system frequency limits, i,e, 0.6 Hz frequency deviation from 60 Hz.

- Q: Is subsynchronous resonance a part of what you look at?
    - A: That would be part of dynamic study and this is purely based on the steady state system definition.

- Q: When do you need feedback?
    - A: In the next week or two.

- Sensitivity analysis: study 2016 and 2020 summer peak, 2018-off peak cases
    - Stressed conditions
- Sensitivity analysis 1: reduction in reactive power capability limit of generators to understand whether future system has adequate reactive power reserve.
- Sens. Analysis 2: high-wind, low-load conditions

- Q: Steady state analysis only, and unit commitment, what units will you assume are online and available for dispatch?
    - A: Based on NERC standard we are required to consider maintenance outages. That info of known outage is typically available up to 6 month or 1 year (the year 2016). Since we're using the year 2018 case for the HWLL sensitivity analysis, we assume all generation available for dispatch.

- Q: 90% of max was somewhat based on historic levels, aggressive assumption across the board.
    - A: If you look at SSWG manual, the way they built the HWLL is that they look at historical data from the latest Wind integration report for past years and determine wind generation level based on the process defined in the manual.

- Q: Will HWLL be an ERCOT-wide case or split?
    - A: ERCOT-wide, one case.

Please provide feedback and comments in next two weeks. Send Sun Wook or Jeff an email. Sun Wook will send an email to request the feedback and comments.

2016 LTSA kickoff (Borkar)

- [Posted initial start cases for RTP last week.]
- Conducting LTSA since 2006, mandated by Texas legislature and provides good feedback for our analysis.
- Scenario based approach
- Start with scenario development (July)
    - Load forecasting (EOY)
    - Generation expansion (July 2016)
    - Transmission analysis (November 2016)

- Q: Have you gone back and looked at comments and incorporated them into upcoming process?
    - A: We're hoping to learn from last year's process. We did look at all comments we received. Starting while things are fresh and improving. Idea is to learn from last year and not reinvent.

- Q: Are comments from last year's LTSA posted.
    - A: No, they're not. The final report is posted.