**Lubbock Power & Light (LP&L) Load Integration Study – Scope Document**

**Introduction**

Lubbock Power & Light (LP&L) is contemplating connecting to the ERCOT Grid as early as 2019 (<http://www.lpandl.com/energy-services/2019/> ). The PUCT has instructed ERCOT to study the impact of integrating LP&L into the ERCOT Grid.

**Objective**

The objective of this LP&L load integration study is to identify transmission facilities that will be required to integrate the LP&L load and transmission network into the ERCOT Grid and satisfy ERCOT and NERC Transmission Planning reliability standards in the most efficient way possible.

**Assumptions**

* + LP&L will be connected to the ERCOT Grid by Summer 2021 (consistent with the LP&L study)
  + Expected 2021 Summer Peak conditions represent worst-case steady-state conditions for the year of initial interconnection but should also be tested for high and zero wind scenarios
  + The Study Region will include LP&L, Panhandle, West, Far-West and North Zones

**Study Case**

Steady-State Basecase will be constructed from: 15RTP\_2021\_SUM1\_WFW\_07172015

* Transmission projects expected to be in-service within the Study Region by 2021 will be added to the case
* North weather zone loads will be scaled up to the higher of the SSWG or ERCOT 90th percentile forecast per the 2015 RTP scope
* Generator additions that meet Planning Guide Section 6.9 criteria at the time of the study will be added to the case
* Load outside of Study Region will be scaled down as necessary to balance any load-generator imbalance

The final 2020 UPLAN model from the 2015 RTP will be used for the economic analysis.

Dynamic study basecase will be constructed from the most recent approved DWG 2021 Summer Peak case prepared by DWG in May, 2015 and DWG 2018 High Wind Low Load case prepared by DWG in September, 2015.

* Transmission projects expected to be in-service within the Study Region by 2021 will be added to the case
* Generators additions that meet Section 6.9 criteria at the time of the study with proposed interconnection points within the Panhandle or West or Far-West Zones will be added to the case.

**Data Requirement**

ERCOT would request the following data from LP&L:

* Detailed Load Flow models of LP&L transmission system representing 2021 Sumer Peak and Minimum load Conditions
* LP&L substation names and bus numbers for desired LP&L disconnect points with the Eastern Interconnection
* At a minimum the LP&L grid represented in the EI cases from LP&L should be consistent with the following ERCOT SSWG Procedural Manual (<http://www.ercot.com/content/committees/board/tac/ros/sswg/keydocs/2014/SSWG_Procedure_Manual.ROS_Approved_October_30_2014.doc> ):
  + - Bus numbering should not conflict with Appendix A
    - Area numbering should not conflict with Appendix A
    - Zone numbering should not conflict with Appendix A
    - Bus Voltage Limits set consistent with Section 4.1.7
    - Branch Ratings set consistent with Section 4.4.1.4
    - Generation Unit ID Prefix should be consistent with Appendix D
* Data Dictionary providing bus numbers with detailed bus names
* Contingency files in PSS/E \*.con format, or preferably PowerWorld AUX file format, to model P1 through P7 contingencies involving multiple load flow elements, including but not limited to Breaker-to-Breaker contingencies and Common Structure contingencies
  + - These files should contain comments that identify the type of contingency being modeled P1 through P7
    - These files should match the load flow case being provided to ERCOT with no errors or unlinked elements
* The latest maps showing the layout of existing, and if possible proposed, LP&L transmission facilities
* Piecewise linear unit cost data for generators internal to LP&L
* Short-circuits models/data to match the 2021 Summer Peak load flow case
* A dynamic model for the LP&L system shall be provided consistent with the requirements of the DWG Procedure Manual: <http://www.ercot.com/content/committees/board/tac/ros/dwg/keydocs/2014/DWG_Procedure_Manual_Revision_9.ROS_Approved_October30_2014.doc>
* Dynamic Load Models (if used) in PTI format for both peak and minimum load conditions.
* Dynamic contingency files including fault clearing times in PTI format
* Under voltage load shed model (if used) in PTI format
* Under frequency load shed model (if used) in PTI format
* Any user defined model (non-standard PSS/e models) should include but not limit to:
  + - Library or objective file that is compatible in PSS/e V33
    - Sufficient documents for the user defined models
* Any LP&L transmission planning criteria requirements that are outside the NERC & ERCOT planning criteria
* Copy of the LP&L Planning guide
* Data necessary to conduct subsynchronous resonance frequency scan analysis for LP&L units

**Contingencies and Criteria**

Reliability Analysis: TPL-001-4 and ERCOT Planning Criteria (<http://www.ercot.com/content/wcm/current_guides/53526/04_050115.doc>):

* P0
* P1 and P7
* P3: G-1 + P1\*/P7 (G-1 worst case only)
* P6: X-1 + P1/P7 (X-1 is 345 kV Auto outages)
* P2, P4, and P5

Criteria:

* Thermal and voltage Criteria will be consistent with 2015 RTP assumptions

**Study Procedure**

The selection of tie options to be tested will be informed by, but not limited to, the findings of the PWR Solutions study.

Step 1 - Steady-State Analysis

Identify Potential solutions

* Iterate on these steps until no pertinent violations are present:
  + Model potential interconnection configuration.
  + Set N-1 SCOPF dispatch
  + Run contingencies to identify unresolved reliability violations

Step 2 - Dynamic stability analysis

Dynamic stability analysis will be performed based on the identified potential transmission solutions in the steady state analysis. The stability analysis will assess the impact of the identified transmission solutions to both LP&L and nearby ERCOT regions (including Panhandle) following NERC TPL and ERCOT Planning Criteria. Additional generator dispatch scenario may be studied, like high wind output, since LP&L will connect to the ERCOT region with high penetration of renewable generation resources

Step 3 – Economic Analysis

Economic analysis will be performed to compare interconnection alternatives from a congestion standpoint. Included in this will be an analysis of the effect on the ERCOT Panhandle export limit – from a voltage stability and system strength perspective. Benefits will be quantified in terms of production cost savings.

**Other Studies**

Additional studies may be needed to identify optimal configuration to integrate LP&L into the ERCOT grid, these studies include but not be limited to:

* Power Transfer Capability
* Long-Term analysis (including potential integration of additional LP&L Load)
* Cost-Benefit analysis for the recommended options accounting for avoided costs for future upgrades deemed not required by virtue of the LP&L integration, if any

**Deliverables**

This study will conclude with a report documenting key findings, detailed study assumptions and methodology, discussion of each identified transmission solutions. The report will identify a preferred option to interconnect LP&L into ERCOT based on compliance with NERC TPL, ERCOT and LP&L Planning Criteria as well as estimated capital and production costs.