



Houston Import Project – ERCOT update

RPG Meeting
October 22, 2013

Study Assumption

- ERCOT is conducting the Independent Review of the need to increase the import capability into the Houston area
- Study Area:
 - The primary focus is the system in the Coast weather zone and in the East weather zone electrically close to Houston metropolitan area
- Study Case:
 - 2018 SE summer peak case from the 2013 Regional Transmission Plan (based on the 2013 SSWG Dataset B)
 - Three new projects from the RTP are modeled in the Houston area:
 - Project to loop Roans Prairie-King into Rothwood 345 kV substation
 - Project to upgrade the system in the Katy area, which includes
 - » a new second 345/138 kV transformer at Zenith
 - » A new 138 kV line from Zenith to Franz and reconfiguration of existing 138 kV lines in the Katy area
 - Project to upgrade the Dickinson-League City 138 kV line

Study Assumption

- Total Load in Coast Weather Zone in the 2018 SE case
 - ~ 26,355 MW (CNP load = ~ 22800 MW)
 - The load is identical to the SSWG case load in the Coastal weather zone

- Status of future generators in the study case
 - Online:
 - Deer Park Energy G6 @184 MW, Channel Energy GT3 @ 183.5 MW,
 - Deepwater Energy @ 20 MW,
 - Offline:
 - New W.A. Parish unit (89 MW), Pondera King (1300 MW), Cobisa (814 MW)

- Contingencies and criteria of reliability analysis
 - All contingencies consistent with Planning Guides Section 4.1.1.2 and criteria consistent with 2013 RTP
 - For G-1+N-1, the following generator outage are tested to identify the worst G-1 condition:
 - South Texas U1 (1378 MW),
 - Cedar Bayou N2 (749 MW),
 - Frontier G4 (374 MW),
 - Gibbons Creek L1 (470 MW)

Study Assumption

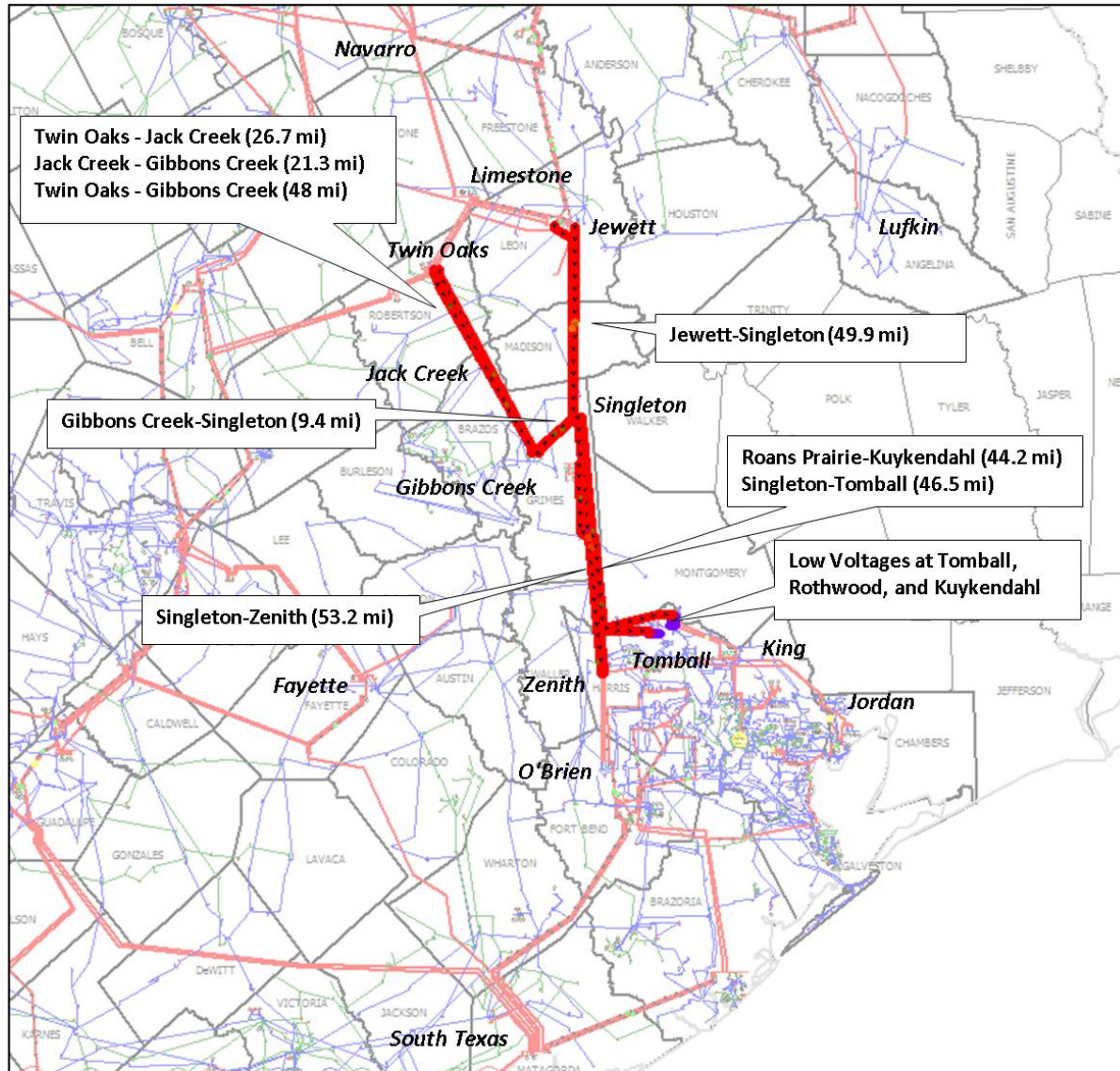
- Assumption for transfer capability analysis
 - Load-to-Load Scaling:
 - Increase the load in Coast Weather Zone, while decrease load in North, North Central, West and Far West Weather Zones
 - Decreasing the loads in North, North Central, West and Far West Weather zones is reasonable because
 - » They are geographically & electrically far from the Coast Weather zone
 - » Historical data in the table below indicates the loads in the weather zones do not experience peaks load at the same time as the Coast weather zone

Average % of peak load of each weather zone during the top ten hourly peak load conditions at the Coast Weather Zone							
Year	East	South	South Central	Far West	West	North	North Central
2011	97.46%	98.21%	96.38%	93.75%	83.70%	67.86%	93.37%
2012	96.32%	95.58%	96.08%	93.23%	92.93%	78.55%	85.56%
2013	76.77%	98.62%	97.42%	95.81%	78.23%	90.88%	88.81%

Preliminary Result of the 2018 Base Case

- Results from AC power flow analysis:
 - Singleton-Zenith 345 kV lines are overloaded under N-1:
 - Worst contingency: Singleton-Tomball & Roans Prairie-Bobville
 - Other contingencies: Combination of Singleton-Tomball & Singleton-Roans Prairie/Bobville-King 345 kV lines
 - More severe system problems under G-1+N-1
 - Worst G-1: the outage of South Texas U1 (1375 MW)
 - Under system intact condition, overload of Singleton-Zenith 345 kV lines by 7%
 - CBY G2 G-1 (749 MW), which TSPs studied, is less severe than STP G-1
 - Under all four of the generator outages G-1+N-1 conditions studied, the Singleton-Zenith, Jewett-Singleton, and Jack Creek-Twin Oak 345 kV lines were overloaded
 - Singleton-Tomball and Gibbons Creek-Twin Oaks are overloaded under N-1 when STP U1 is offline
 - Gibbons Creek-Singleton is overloaded under N-1 when STP U1 or CBY G2 is offline
 - Voltage below 90% around Bobville, Rothwood, Tomball, and Kuykendahl under N-1+STP G-1
 - Voltage below 90% at Tomball under N-1+CBY G-1

Map of System Problems



(The Worst G-1 Condition = South Texas U1, 1375 MW)

Preliminary Study Result – Transfer Capability Analysis

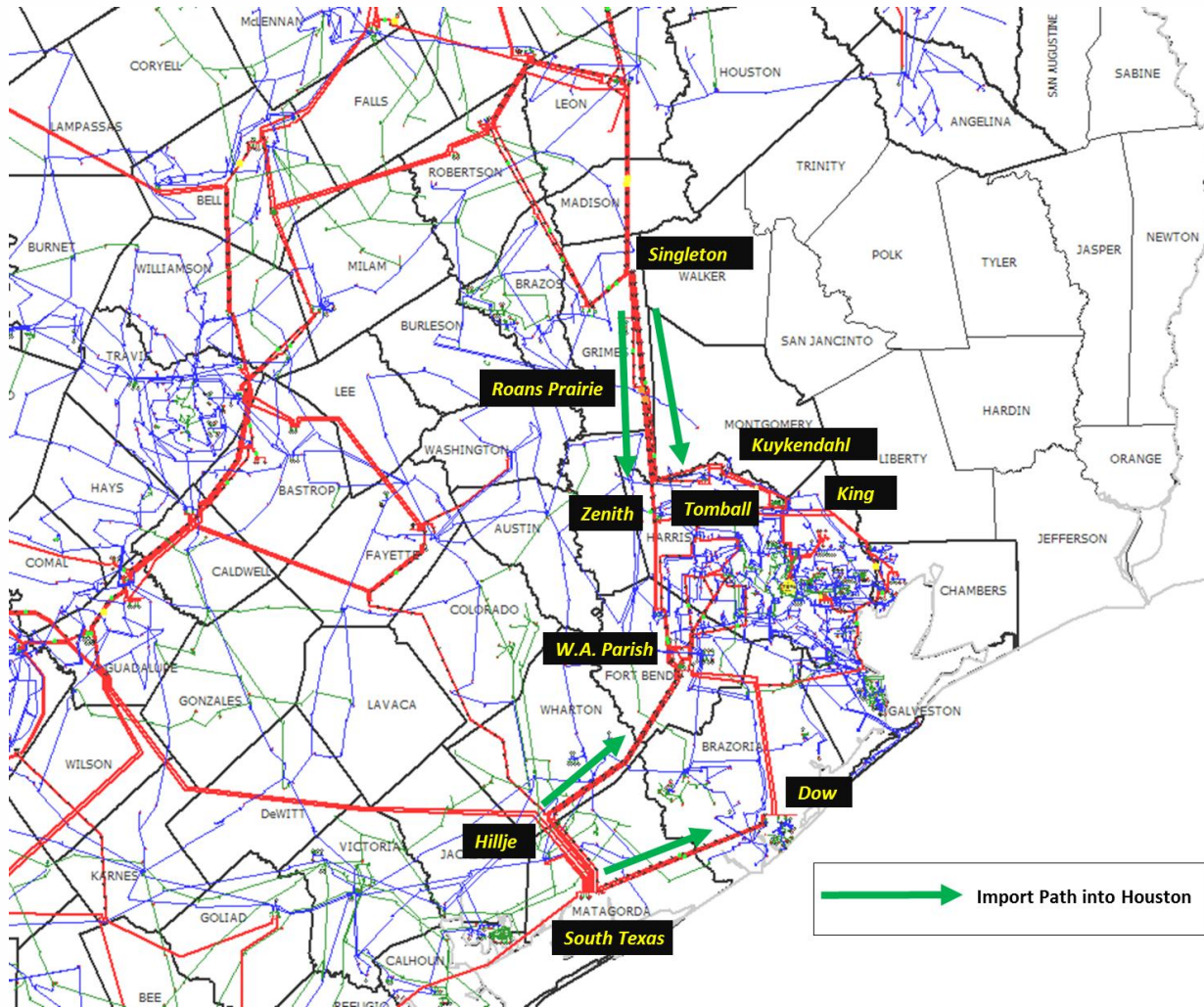
- Transfer Capability Analysis:

- Thermal overload is more limiting than Voltage stability
- About 45 contingencies out of 450 (300 kV and above in Coast, East and South Central) were identified as key contingencies. These 45 contingencies will be tested to evaluate project options.

Case	Limit Due to Thermal Overload			Pre-contingency Flow on Interface at Thermal Limit		
	Limiting Contingency	Limiting element	Total Load in Coast zone at Thermal Overload (MW)	North-to-Houston (MW)	South-to-Houston (MW)	Total (MW)
2018	Singleton-Tomball + Roans Prairie-Bobville, Singleton-Tomball + Bobville-King	Singleton-Zenith 345 kV lines	26355	3799.0	2417.9	6216.9

Case	Limit due to Voltage Collapse		Pre-contingency Flow on Interface at Voltage Collapse		
	Limiting Contingency	Total Load in Coast zone at Voltage Collapse (MW)	North-to-Houston (MW)	South-to-Houston (MW)	Total (MW)
2018	Loss of Several ERCOT N-1 Contingencies	27775	4649.7	2880.2	7529.9

Map of Import Path into Houston



North to Houston Interface:

- Singleton-Zenith 98
- Singleton-Zenith 99
- Roans Prairie-King
- Singleton-Tomball

South to Houston Interface

- Hillje-WA Parish 64
- Hillje-WA Parish 72
- South Texas-WA Parish
- South Texas-Dow 18
- South Texas-Dow 27



Next Steps

- Several transmission options will be identified and studied to address the Thermal overloads and Voltage issues
 - Screening will include:
 - AC power flow analyses under N-1 and G-1+N-1
 - The options that resolve the thermal and voltage issues will be selected for additional analysis
- Detailed analysis for the selected options
 - AC Import Capability Analyses
 - Impact of Category C and D contingencies
 - Other Sensitivity analyses
 - additional projects may be needed for reliability over the next X years
 - Project cost comparison
 - Economic/Congestion Analysis

Questions?