

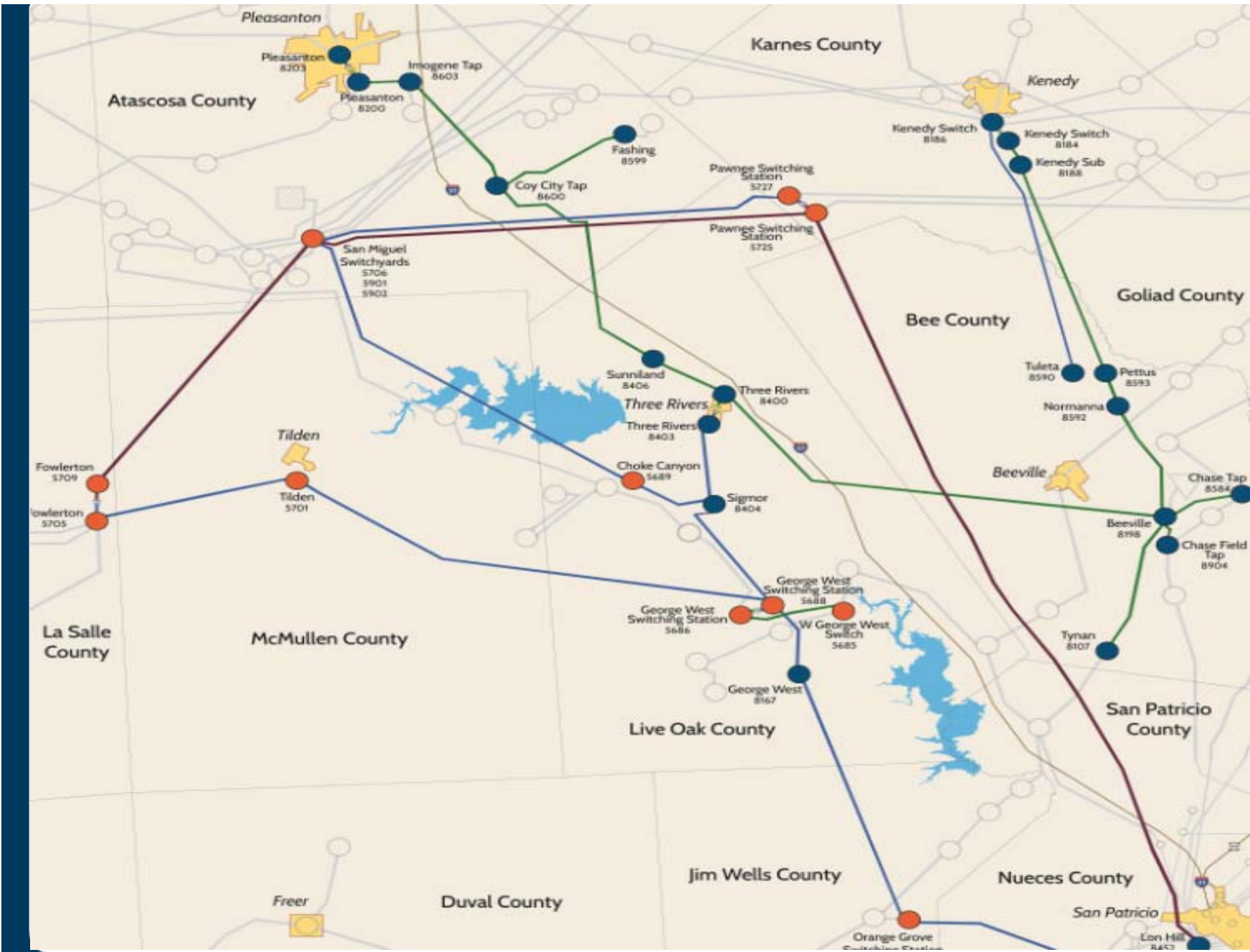


AEPSC Live Oak County Transmission Project – ERCOT Independent Review

RPG Meeting
Sept 15, 2015

Project Background

- The load growth in Live Oak County and Bee County has recently created the need for transmission improvement in this area.
- With the present transmission system, it is difficult to schedule the maintenance even during off-peak seasonal conditions.
- AEP submitted a project for Regional Planning Group review and comment in March 2015



Study Cases

- **Base Cases**

- The 2018 and 2021 reliability summer peak cases of South/South Central from the 2015 RTP
- The 2017 minimum load case built for the 2014 RTP

- **Transmission Changes**

- The 2015 RTP secure cases included a placeholder project in the study area
- The project related to this RPG proposal was removed from the 2015 RTP secure case in order to create a study base case

- **Criteria**

- The reliability criteria used in this independent review is consistent with the RTP study
- NERC TPL-001-4 contingency events (P0, P1, P2-1, P3, P6 and P7) were analyzed for the summer peak cases

Reliability Analysis of the Base Cases

- No issues for N-1 Contingency Analysis
- G-1 N-1 Contingency Analysis (summer peak cases)

Branch	Loading in 2018	Loading in 2021
San Miguel – Choke Canyon 138 kV	107%	113%
Choke Canyon – Sigmor 138 kV	103%	109%
Normanna - Pettus 69 kV	100%	103%
Normanna - Beeville 69 kV	99%	103%

- N-1-1 Contingency Analysis (2017 minimum load case)

Branch	Worst Contingency Loading
Pleasant – Imogene Tap 69 kV	102%
Coy City – Imogene Tap 69 kV	102%

Bus Name	Bus Voltage
Choke Canyon 138 kV	0.88
Three Rivers 138 kV	0.88
Sigmor 138 kV	0.88

Project Option 1

- **Option 1 Upgrades**
 - Construct a new three breaker ring bus, 345/138 kV Substation on the existing 345 kV line from Pawnee to Lon Hill
 - Install an autotransformer at the new 345/138 kV Substation
 - Construct approximately 15 miles of new 138 kV transmission line from the new Substation to the existing Three Rivers Station
 - Rebuild the Pettus - Normanna – Beeville 69 kV line
 - Upgrade the Sigmor – George West 138 kV line

- **Total cost estimate: \$76.6 million**

Project Option 2

- **Option 2 Upgrades**
 - Construct approximately 22 miles of new 138 kV transmission line from the existing Pawnee Station to the existing Three Rivers Station
 - Rebuild the Pettus - Normanna – Beeville 69 kV line
 - Upgrade the Sigmor – George West 138 kV line

- **Total cost estimate: \$63.5 million**

Project Option 3

- **Option 3 Upgrades (AEP proposed option to address the maintenance outage issue in the area)**
 - Construct approximately 24 miles of new 138 kV transmission line from the existing Tuleta Station to the existing Three Rivers Station

- **Total cost estimate: \$32.9 million**

Project Option 3-1

- **Option 3-1 Upgrades**

- Construct approximately 24 miles of new 138 kV transmission line from the existing Tuleta Station to the existing Three Rivers Station
- Rebuild the Pettus - Normanna – Beeville 69 kV line
- Upgrade the Sigmor – George West 138 kV line

- **Total cost estimate: \$65.2 million**

Project Option 4

- **Option 4 Upgrades**

- Construct a new 138 kV Beeville Substation near to the existing Beeville 69 kV Station
- Install a new 138/69 kV autotransformer at the new Beeville 138 kV Station
- Construct a new 138/69 kV double circuit transmission line from Tuleta to Beeville. Attempt to utilize existing Right of Way of the Pettus – Normanna – Beeville 69 kV transmission line where possible
- Using existing Right of Way where possible, rebuild and convert the existing Beeville – Three Rivers 69 kV transmission line to 138 kV

- **Total cost estimate: \$74.5 million**

Project Options Evaluation

- All five options will provide another 138 kV source to the Three Rivers 138 kV Station
- All options resolve the N-1-1 reliability issues in 2017 minimum load case
- N-1 contingency analysis results

Monitored Element	Option 1		Option 2		Option 3		Option 3-1		Option 4	
	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021
Pawnee 345/138 kV transformer	-	-	101%	102%	-	-	-	-	-	-

- G-1 N-1 contingency analysis results

Monitored Element	Option 1		Option 2		Option 3		Option 3-1		Option 4	
	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021
Pawnee 345/138 kV transformer	-	-	101%	105%	-	-	-	-	-	-
Sigmor – George West 138 kV	-	-	-	-	100%	107%	-	-	-	-
Normanna – Pettus 69 kV	-	-	-	-	93%	98%	-	-	-	-
Normanna – Beeville 69 kV	-	-	-	-	92%	97%	-	-	-	-

Project Options Evaluation

- Option 1, Option 3-1 and Option 4 resolve all the reliability issues
- Option 1 has the highest cost estimate (\$76.6 million) followed by Option 4 (\$74.5 million) and Option 3-1 (\$65.2 million)
- Option 4 provides more benefit compared to other two options:
 - This option would utilize the existing Right of Way compared to Option 3-1 which would require ~ 24 miles of new ROW
 - It would be an improvement to the weak 69 kV system in that area.

ERCOT Recommendation

- ERCOT recommends Option 4 as the preferred option to meet the reliability need in the area
 - Construct a new 138 kV Beeville Substation near to the existing Beeville 69 kV Station
 - Install a new 138/69 kV autotransformer at the new Beeville 138 kV Station
 - Construct a new 138/69 kV double circuit transmission line from Tuleta to Beeville. Attempt to utilize existing Right of Way of the Pettus – Normanna – Beeville 69 kV transmission line where possible
 - Using existing Right of Way where possible, rebuild and convert the existing Beeville – Three Rivers 69 kV transmission line to 138 kV
- The cost estimate is \$74.5 million

Next Steps

- ERCOT is reclassifying this project as a Tier 1 project due to the scope change
- ERCOT will present the project recommendation to TAC on Sept 24th and to ERCOT Board of Directors on Oct. 13th

