



# **Panhandle Project ERCOT Review**

**ERCOT System Planning**

*October 20, 2015*

*ERCOT Regional Planning Group Meeting*



# Outline

---

- Background
- Study Update
- Conclusion

# Background

---

- RPG proposal
  - April 14, 2014: DATC Phoenix Project
  - September 28, 2015: Sharyland Panhandle Loop Project
- PUCT Open Meeting on September 24, 2015
  - A second 345-kV circuit on the Alibates-AJ Swope-Windmill-Ogallala-Tule Canyon transmission line (AAWOTC Line) is under the CREZ Order or PURA §39.904(g)

# Panhandle Wind Generation Development Overview

Status <sup>(1)</sup>	Generation Capacity (MW)	Cumulative Capacity (MW)
Operational	1711	1711
Planned (PG 6.9) <sup>(2)</sup>	2593	<b><u>4304</u></b>

- (1). Based on GINR (Generator Interconnection Request) data as of September 9, 2015
- (2). PG 6.9: Planning Guide 6.9 Modeling Requirement (Interconnection Agreement and Collateral for Transmission Equipment)

# Study Assumptions

---

- Panhandle wind generation output is proportionally dispatched with respect to its capacity to meet the reliability criteria.
- Apply 90% of the identified transfer capability in the Panhandle in the economic analysis to account for operational application of the limit.
- Have all series capacitors, except for Rocky Mound series capacitors, in service in the study.

# Study Criteria

- Reliability Criteria:
  - ERCOT Planning Guide;
  - NERC Standard TPL-001-4; and
  - Panhandle System Strength: Weighted Short Circuit Ratio (WSCR) is equal to or above 1.5.
- Economic criteria:
  - The annual production cost savings of a transmission project must be greater than or equal to the first year annual revenue requirement for the transmission project. The first year annual revenue requirement for a transmission project is assumed to be 15% of the estimated capital cost of the project.

# Study Scenario

Scenario	Panhandle Wind Generation Capacity (MW)	Transmission Options	
		Second Circuit on the Alibates-AJ Swope-Windmill-Ogallala-Tule Canyon 345 kV line	Synchronous Condenser(s)
0 (Base Case)	4304	No	No
1	4304	Yes	No
2	4304	Yes	Yes

# Study Results

#	Panhandle Wind Capacity (MW)	Transmission Options	Upgrade Cost Assumption (M\$)	Panhandle Wind Maximum Output (MW)(1)	Panhandle Wind Operation Limit (MW) (2)	Annual Production Cost Savings/Capital Cost	Pass Economic Criteria?
0	4,304	N/A	0	3,012	2,711	N/A	N/A
1	4,304	PH Second Circuit	80	3,233	2,910	21% (3)	Yes
2	4,304	PH Second Circuit + SC at Alibates and Tule Canyon (5)	64.25 (SCs only)	3,702	3,332	34% (4)	Yes

(1) Determined by WSCR = 1.5, which is the most binding constraint

(2) 90% of maximum output identified in (1)

(3) Compared to scenario 0

(4) Compared to scenario 1

(5) Each synchronous condenser modeled in the simulation is 150 MVA providing 1050A short circuit current to the 345 kV system. Dynamic simulations indicate that locating synchronous condensers at Alibates and Tule Canyon provide better performance with respect to voltage support and transient response than other Panhandle locations such as Gray, Windmill and Cottonwood.



# ERCOT Recommendation

- ERCOT plans to recommend transmissions upgrades below that meet the ERCOT Protocol economic criteria
  - Synchronous condensers at Alibates and Tule Canyon
    - Each synchronous condenser modeled in this study is based on a generic assumption of a 150 MVA capacity providing 1,050 Ampere (A) of three-phase fault current to the 345 kV system.
- A second 345-kV circuit on the Alibates-AJ Swope-Windmill-Ogallala-Tule Canyon transmission line (AAWOTC Line) is under the CREZ order
  - The study results indicate the second circuit on the AAWOTC line also meet the ERCOT Planning Guide economic criteria.
- The cost estimate is \$145 million

# Next Step

---

- ERCOT will review the comments submitted for the Sharyland Panhandle Loop project.
- ERCOT will finalize the independent review for both RPG projects.
  - DATC Phoenix Project and Sharyland Panhandle Loop Project
- ERCOT plans to present the independent review results to TAC on November 19, 2015.