Long-Term West Texas Export Special Study - Update

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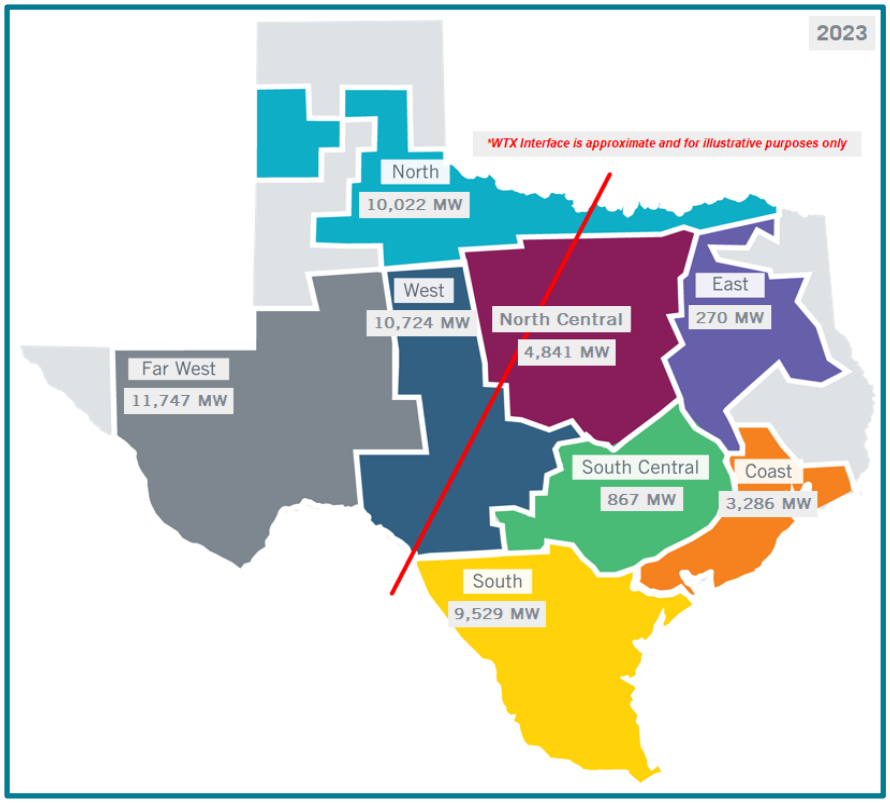
Outline

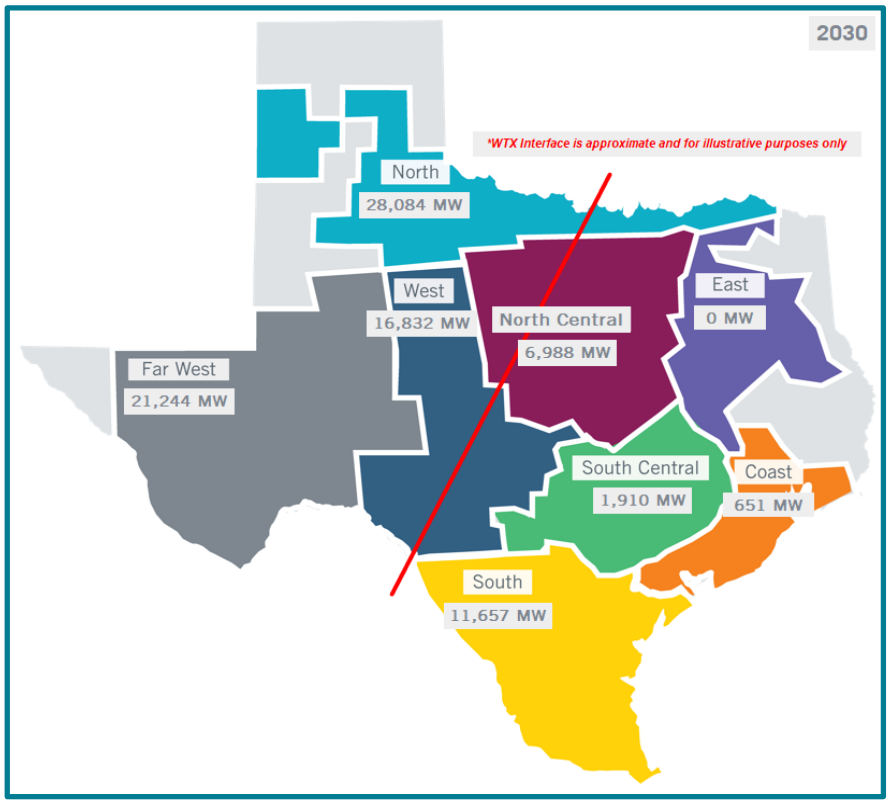
- Progress Update
- Preliminary Results and Observations
- Next Steps

Progress Update

Tasks	Description	Status	Comments
1	Study Case Developments	In Progress	Steady State Cases (Complete) Economic Cases (Complete) Dynamic Cases (In Progress)
2	Year 2030 Simulation and Improvement Identification	In Progress	
3	Year 2023 Simulation and Improvement Identification	In Progress	
4	Roadmap Development	In Progress	
5	Reports	Not Started	

Overview of IBR Capacity in the Study Cases





Scenarios	Wind Capacity	Solar Capacity	Battery Capacity	System Load in the Reliability Case
2023(1)	~37 GW	~15.5 GW	~1.3 GW	~42 GW
2030(2)	~60 GW	~27.7 GW	~1.9 GW	~48 GW

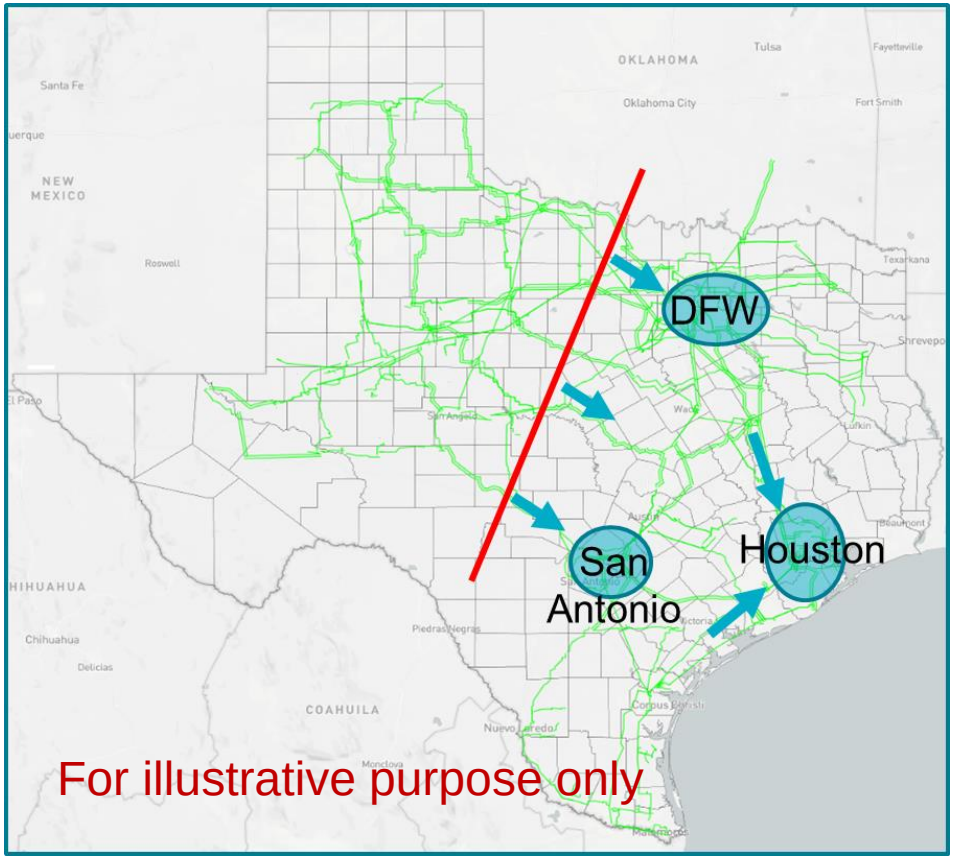
(1). Include planned projects met Planning Guide 6.9(1) by 12/31/2020

(2). Based on the 2020 Long Term System Assessment Y2030 Current Trends scenario

Scope and Focus

- Identify potential improvements to increase WTX export capability

- Focus on long term (Y2030) system needs first and potential improvements for 2023 that would also align with 2030 long term needs



Voltage Stability Challenges and Needs

- Both voltage support and angle separation are primary issues for unsolved power flow (i.e., voltage instability)
- Voltage support: adding reactive support can increase transfer capability, but:
  - Limited effectiveness (less than 1 MW increase per MVAR)
  - Increase the operational risk to have voltage instability occur near nominal voltage
- Large angle separation can also limit the transfer capability
  - In general, angle separation of a long AC transmission circuit exceeding 35° could reach the maximum transfer capability
- New transmission path(s) is needed to address the fundamental issue:

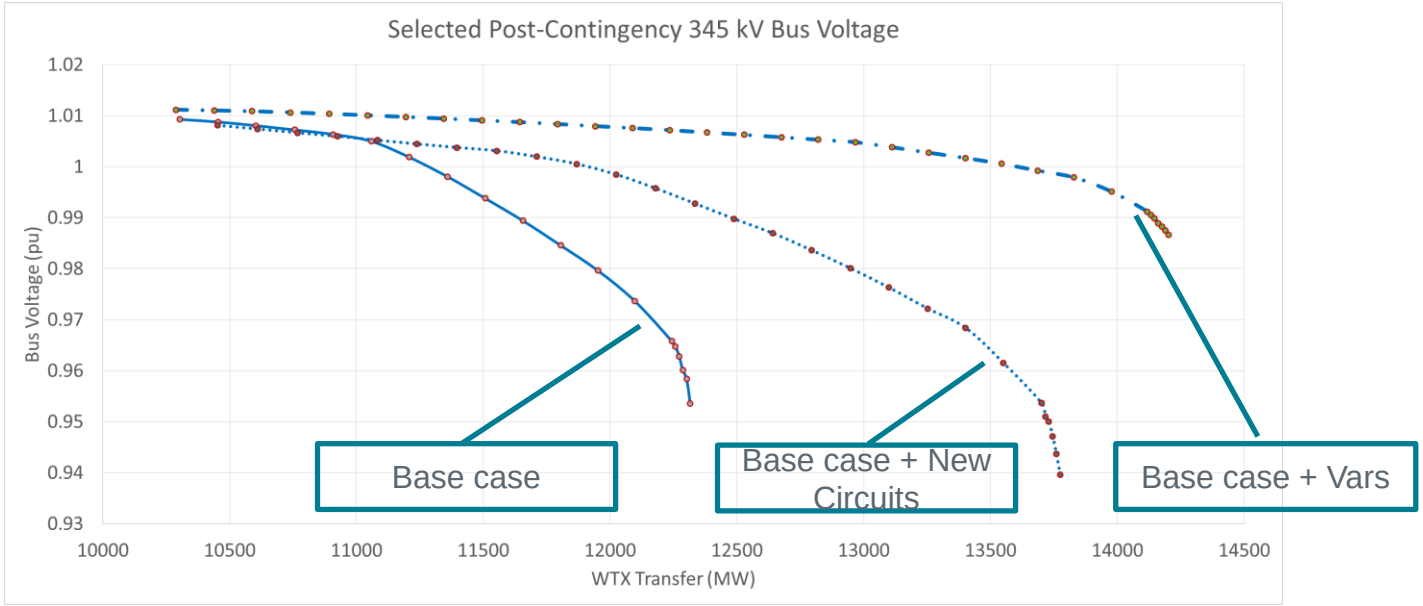
$$P = \frac{V_S V_R \sin \delta}{X_L}$$

V: bus voltage
X_L: circuit impedance
δ: angle separation

Preliminary VSAT Y2023 Results

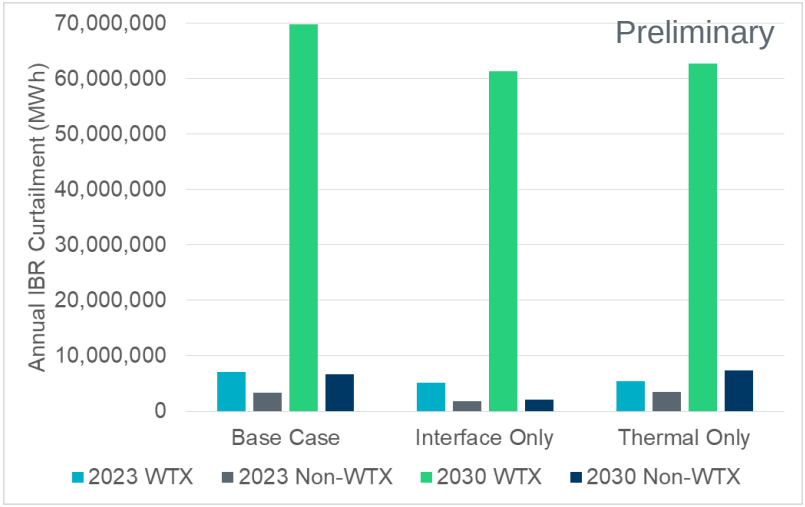
- Adding reactive devices alone could further raise the voltage level where voltage instability could occur and is not considered a viable option to improve the WTX transfer capability

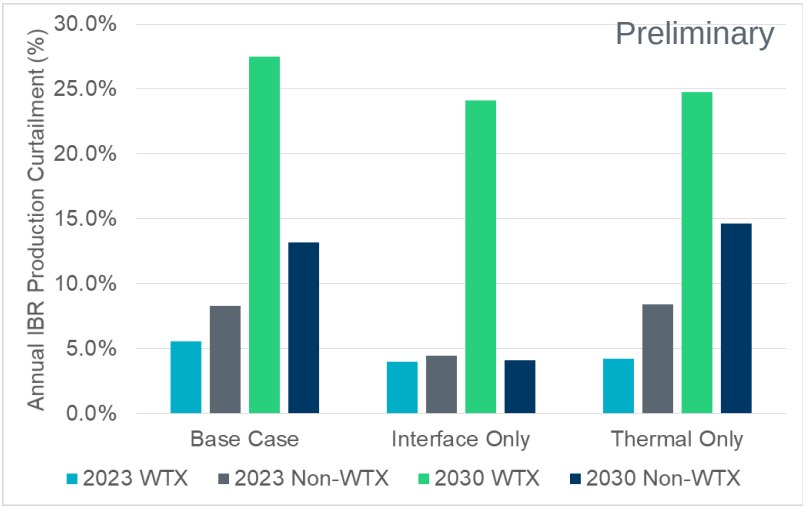
Scenario	New Reactive Support	WTX Transfer Limit	Line Angles on the Major 345-kV Circuits (Pre-Contingency)
Base Case	No	~12 GW	30°~35°
Base Case	~3.6 GVAr	~14 GW	30°~35°



Preliminary Economic Tests

- Both stability and thermal constraints can affect the WTX power transfer
  - Projects that address stability limitations may not be the best to address thermal limits
- Further IBR development in West Texas (as modeled in the 2030 case) significantly increase the congestion in WTX
- ERCOT has not yet identified specific new transmission circuits that meet the economic planning criteria in the 2023 case





Base Case: thermal and WTX stability limits are enforced
Interface Only: only WTX stability limit is enforced
Thermal Only: only thermal limits are enforced

Next Steps

- Evaluate the impact of wire and non-wire transmission options
- Short-list options for roadmap and potential near-term improvement options
- Current plan: to complete the analysis in June and present the final results and reports in July