Panhandle and South Texas Stability and System Strength Assessment -- Update

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ERCOT ROS Meeting
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Recap

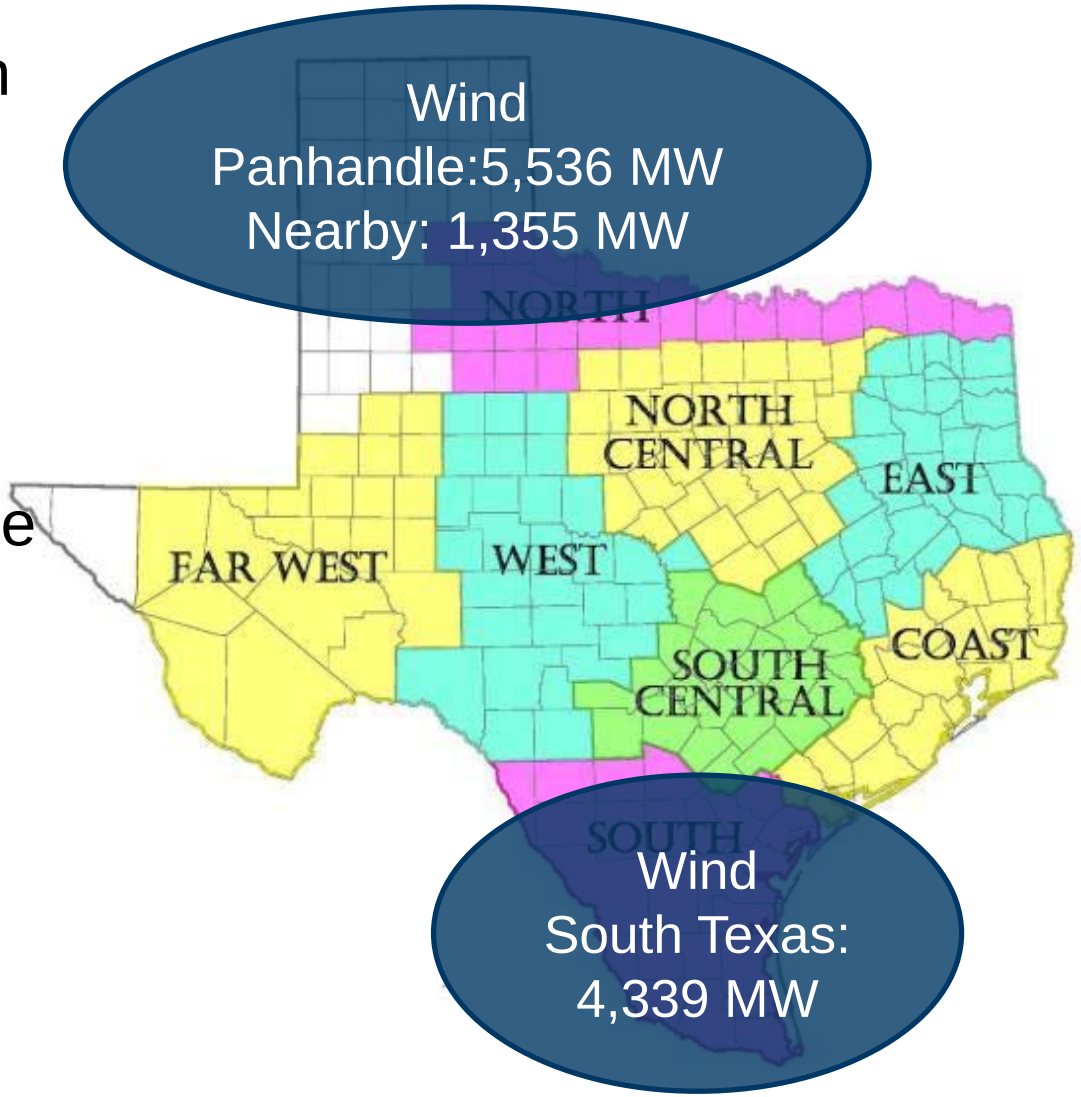
- PSCAD Study
  - Follow up to 2016 Study
  - Verification of continued use of Weighted Short Circuit Ratio (WSCR) in Panhandle
  - Expand to South Texas and examine LP&L effect
- Presented the results in the ROS meeting in March, 2018

  http://www.ercot.com/content/wcm/key_documents_lists/139257/07._PSCAD_Study_Presentation.pptx
- Full report is available at

  http://www.ercot.com/content/wcm/lists/144927/Panhandle_and_South_Texas_Stability_and_System_Strength_Assessment_March....pdf

2018 ERCOT/Electranix PSCAD Study

- Review WSCR metric in Panhandle:
  - 70% (WSCR=1.5) and 100% wind dispatch
  - No synchronous generators
- Evaluate suitability of the WSCR in South Texas
  - 100% wind dispatch
  - No synchronous generators
  - Summer load models
- Impact of Lubbock and Load



PSCAD Study Key Takeaways (1/2)

- PSCAD studies are complex
- PSCAD studies are needed to accurately capture inverter dynamics in grid with low system strength
- Panhandle
  - WSCR = 1.5 (limit) may be relaxed (with more study)
    - Better models and controller tuning compared to 2016 study
  - New wind resources are being built right outside of Panhandle interface making the line defining the Panhandle “blurry”
  - WSCR works for now but may not work in the future
  - Potentially no Panhandle stability limit with LP&L with all planned (meeting PG 6.9) wind generation (with more study)

PSCAD Study Key Takeaways (2/2)

- South Texas
  - WSCR limit not recommended for South Texas
  - Model data quality and availability is poor for South Texas plants and devices
  - Transmission dynamic device controllers need to be carefully tuned
  - Potential for South Texas export stability limit if no synchronous generators are online

Next Steps

- PSCAD model improvement with actual settings and required features (e.g. plant level voltage control, inner loop voltage control, PLL)
- Update models and perform PSCAD analysis: Panhandle and South Texas
- Develop performance guideline and/or requirements
- Monitoring and event validation
- Participate in industry/R&D activities
- ERCOT workshops?

Next Step – PSCAD model improvement with actual settings and required features

- Implement ERCOT Dynamic Model Task Force (DMTF) PSCAD model guideline in the RARF and GINR process
- Communicate with REs, developers, and vendors about the need of PSCAD models and provide PSCAD model guideline
- Request REs to submit PSCAD model update in the RARF
- Develop a process to review and maintain PSCAD models

Next Step – Update models and perform PSCAD analysis (1/2)

- Panhandle: (Tentative: 05/2018-02/2019)
  - Revise the existing Panhandle WSCR threshold
  - Evaluate the impact of increasing generation along but outside the existing Panhandle interface
  - Evaluate the impact of Lubbock integration
    - Interface, Panhandle export capability, and WSCR applicability

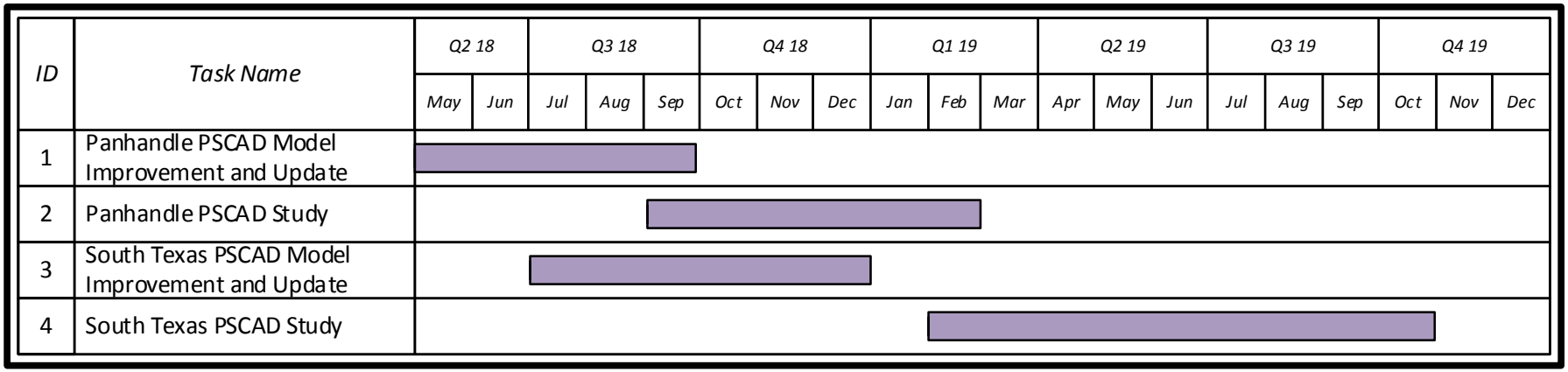
Next Step – Update models and perform PSCAD analysis (2/2)

- South Texas: (Tentative: 07/2018-10/2019)
  - Re-evaluate South Texas region with updated model
  - Evaluate South Texas export capability
  - Evaluate the impact of synchronous generators and dynamic reactive devices

Nest Steps –

- Performance guideline and/or requirements:
  - Voltage coordination
  - Plant level voltage control performance
- Monitoring and event validation
- Participate in industry/R&D activities to learn, develop, and adapt best practices to effectively identify and manage the stability constraints

Tentative Study Schedule



ID	Task Name	Q2 18		Q3 18			Q4 18			Q1 19			Q2 19			Q3 19			Q4 19		
		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Panhandle PSCAD Model Improvement and Update																				
2	Panhandle PSCAD Study																				
3	South Texas PSCAD Model Improvement and Update																				
4	South Texas PSCAD Study																				

Stakeholder Comments Also Welcomed Through:
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