



# **South Texas Stability Assessment Update**

**Regional Planning Group**

June 15, 2021

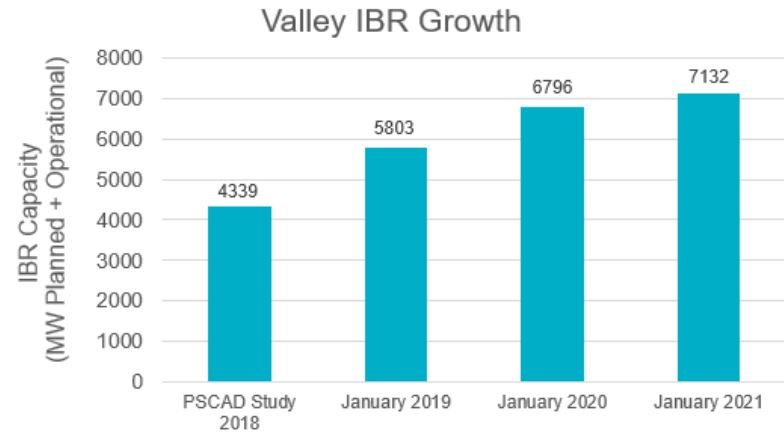
# Recap

- ERCOT started South Texas Stability Assessment to assess the system strength and control stability of South Texas region
  - Primary focus was on export conditions
  - Summer peak (import) scenario was also studied to determine Valley load serving capability
- ERCOT provided an update to RPG in April

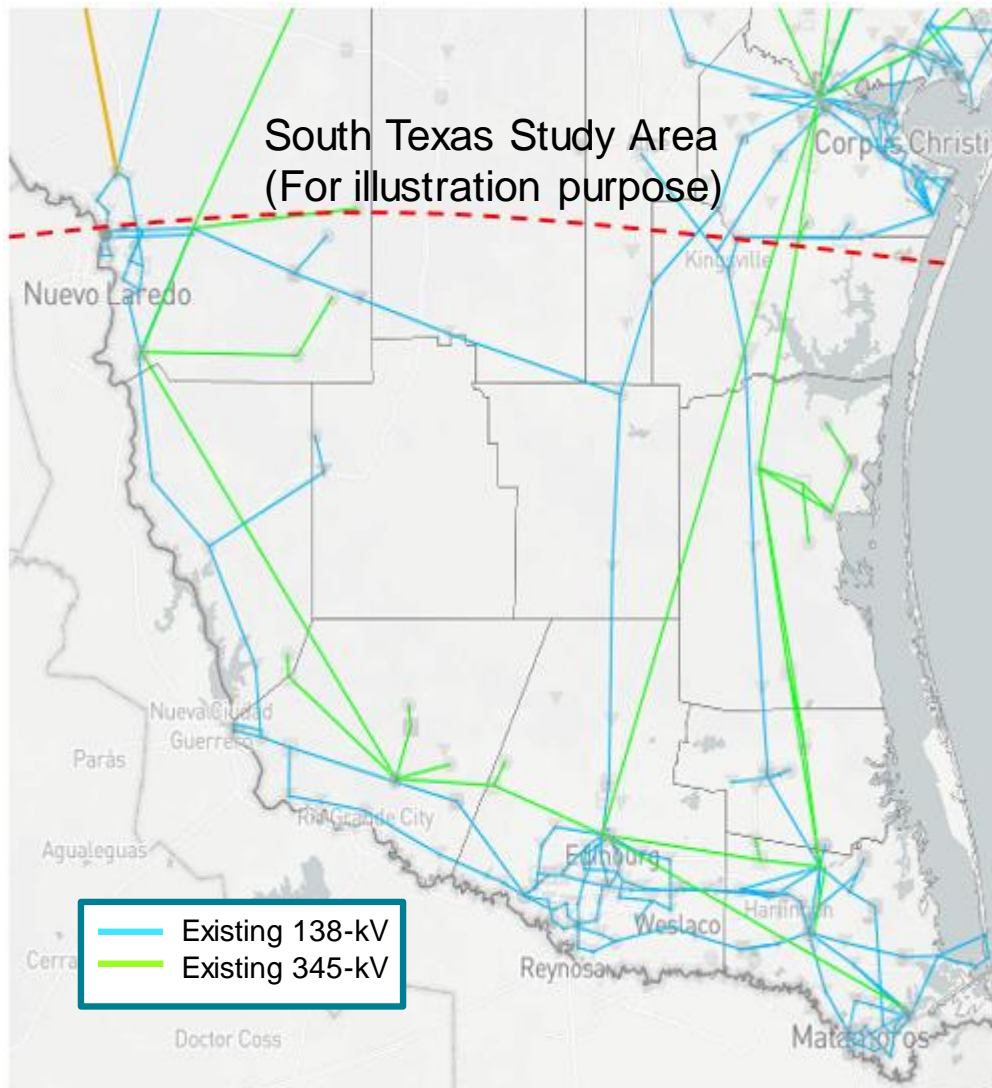
[http://www.ercot.com/content/wcm/key\\_documents\\_lists/213851/South\\_Texas\\_Stability\\_Assessment\\_Update\\_04062021.pdf](http://www.ercot.com/content/wcm/key_documents_lists/213851/South_Texas_Stability_Assessment_Update_04062021.pdf)

# Recap

- Significant growth of Inverter-based Resources (IBRs) in South Texas region
- Preliminary results of Valley load serving capability were presented to RPG in April 2021
  - Follow up with revised load model
- ERCOT has been working on analysis for export scenario



# South Texas Export PSCAD Study



- DWG 2023 HWLL case was used
  - Valley load was 918 MW
  - Railroad DC tie was off
- Most South Texas region, including Valley area, is modeled in PSCAD:
  - More than 500 buses
  - 38 IBR projects (~6750 MW)
  - 37 CPU threads
  - Parallel computations

# PSCAD Export Scenario

- South export conditions were studied
  - with no synchronous generation in the study area
  - with all synchronous generation in the study area in service
- Started with 80% IBR dispatch scenario
- N-1 analysis are completed

# Preliminary Observations – Export Scenarios

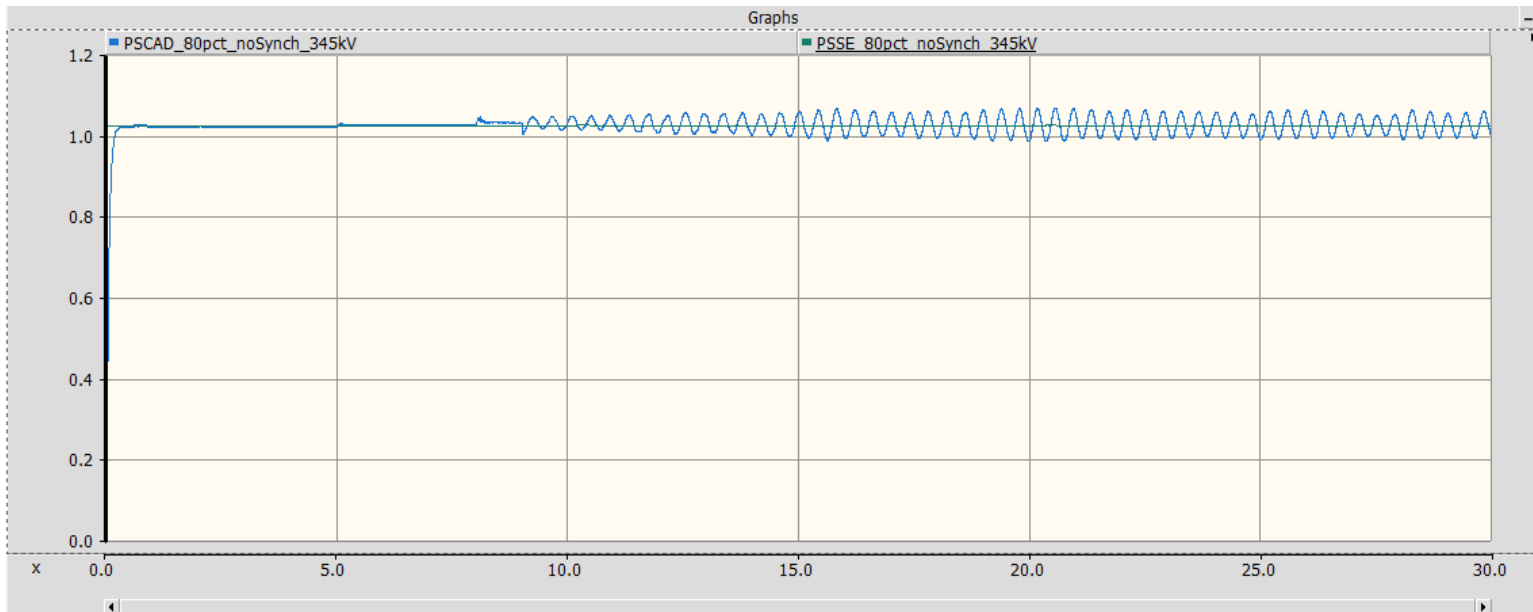
#	IBR Dispatch	Synchronous Generators	PSS/E	PSCAD	PSCAD Notes
1	80%	All Offline	Unstable <sup>1</sup>	Unstable	~2.5 Hz oscillation without faults
2	70%	All Offline	Unstable <sup>2</sup>	Stable	
3	60%	All Offline	Stable	Stable	
4	80%	Online at Pmin	Unstable <sup>1</sup>	Unstable	Voltage instability, multiple cycling of VRTs
5	70%	Online at Pmin	Unstable <sup>2</sup>	Stable	
6	60%	Online at Pmin	Stable	Stable	

<sup>1</sup> Voltage collapse/ Oscillations

<sup>2</sup> Oscillations/ VRT cycling

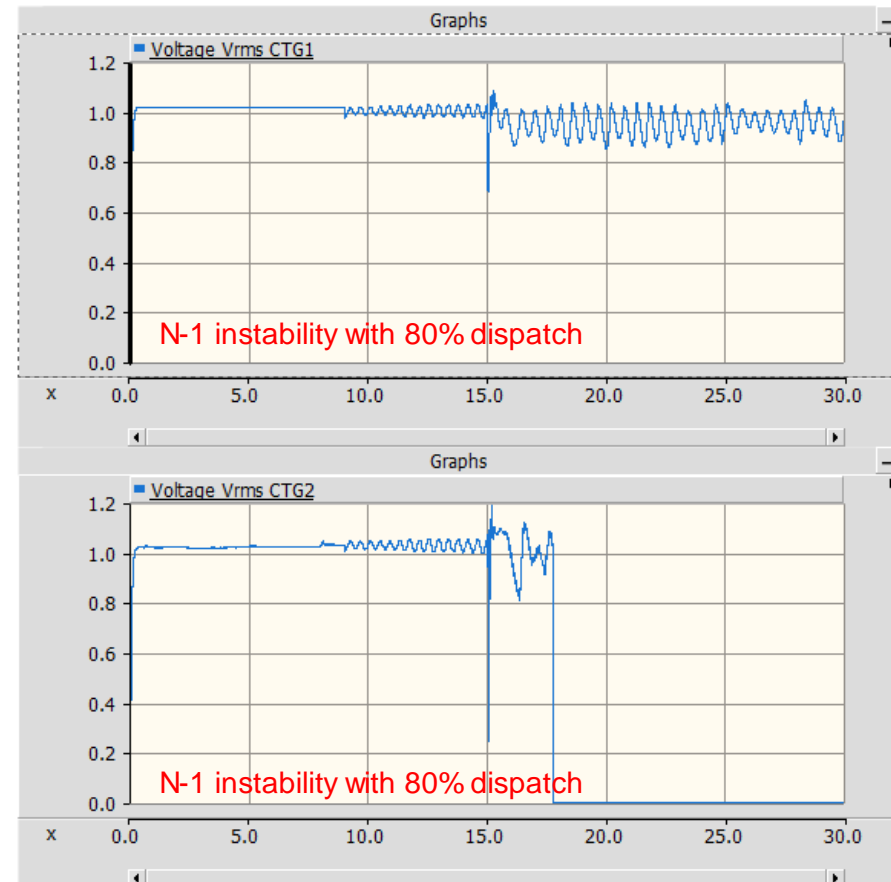
# No Synchronous Generation Export Scenario

- Potential weak grid issues were observed at the system conditions that
  - have no online synchronous generators
  - IBR dispatch at or above 80%
  - ~2.5 Hz oscillation without fault



# No Synchronous Generation Export Scenario

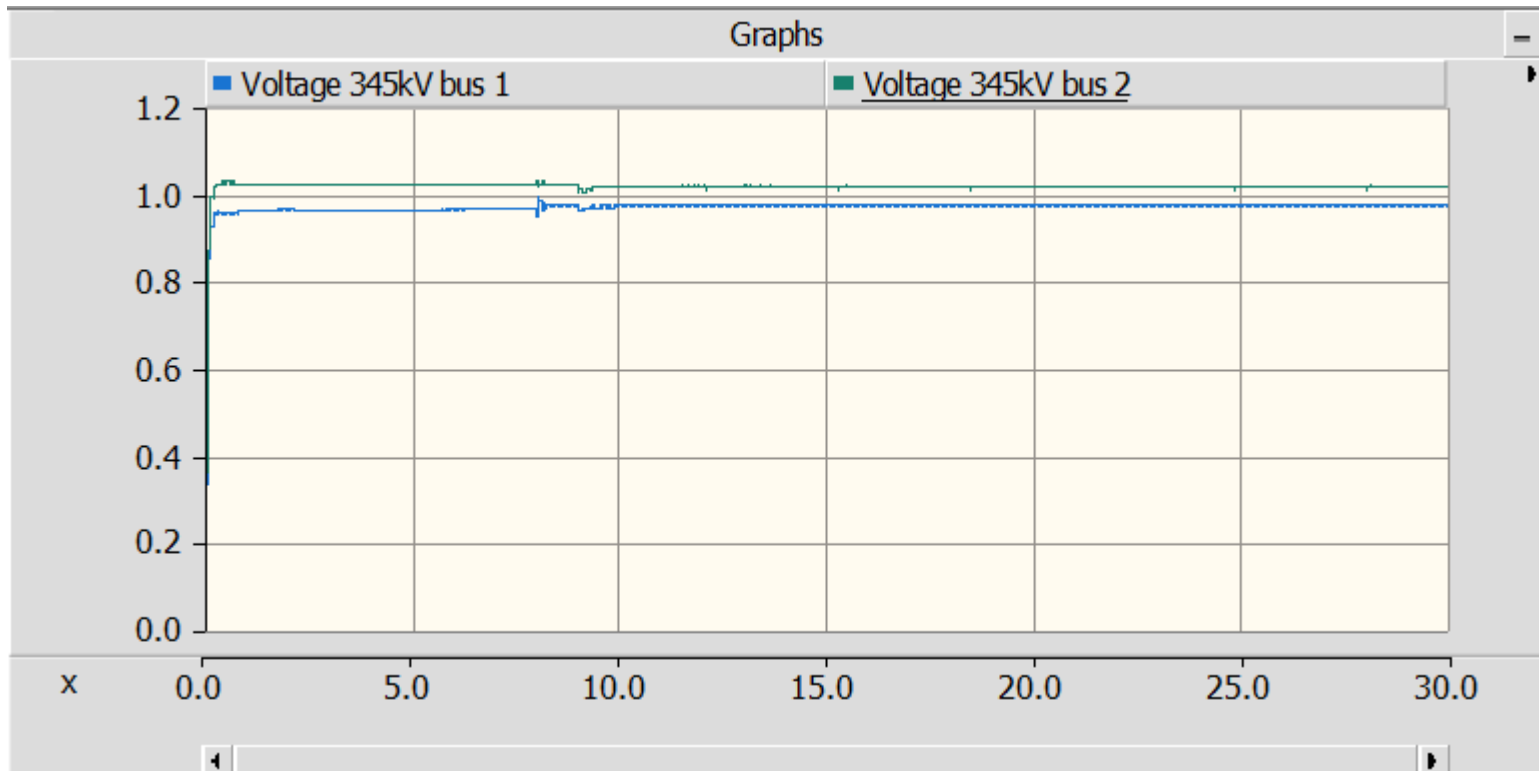
- N-1 contingencies were also unstable for 80% dispatch scenario with no synchronous generation
- Reducing IBR dispatch to 70% resolves the oscillations and no instability was observed





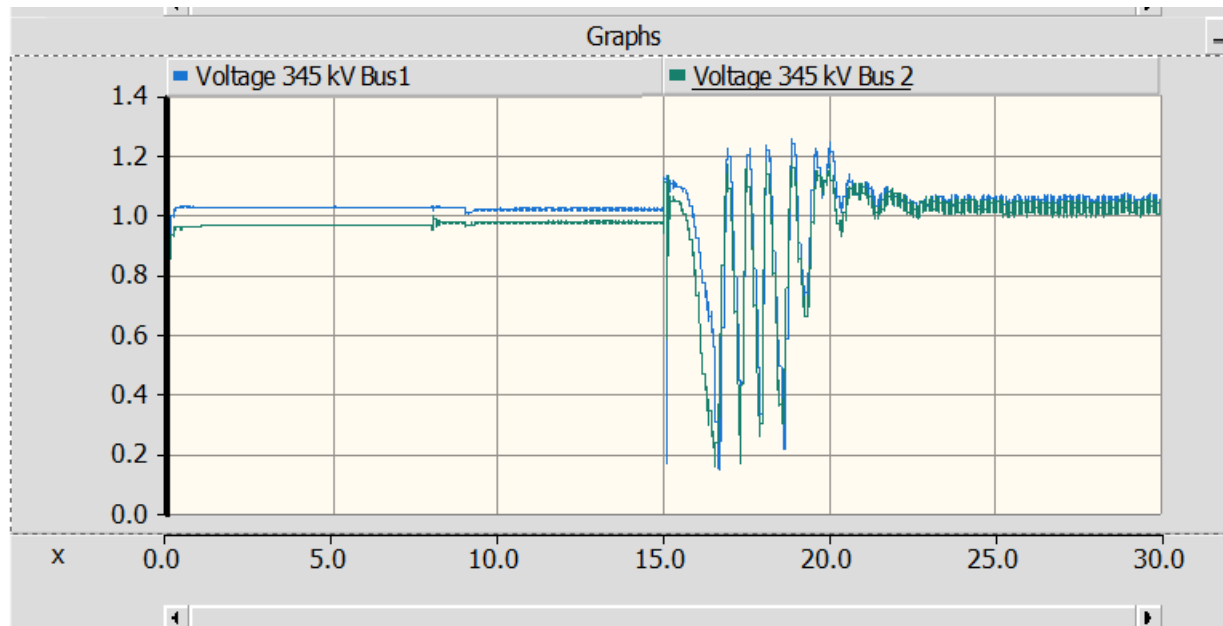
# With Synchronous Generation Export Scenario

- With synchronous generation online, no oscillations were observed in the Basecase for 80% IBR dispatch scenario



# With Synchronous Generation Export Scenario

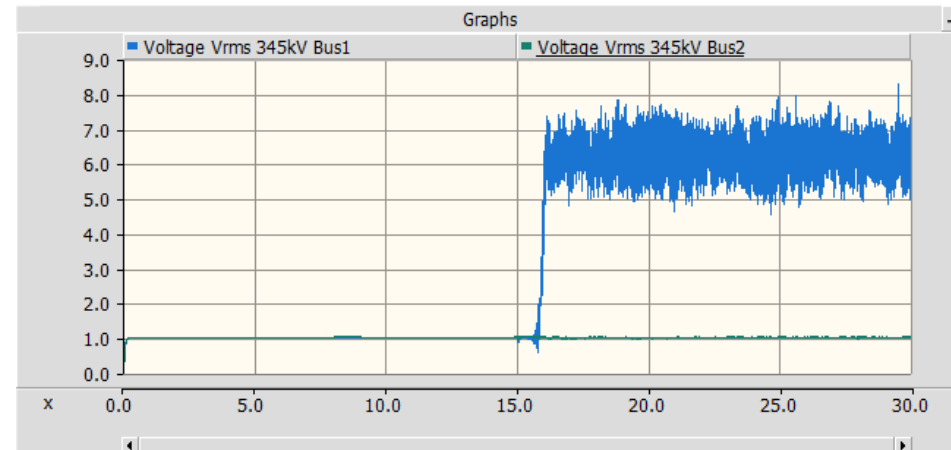
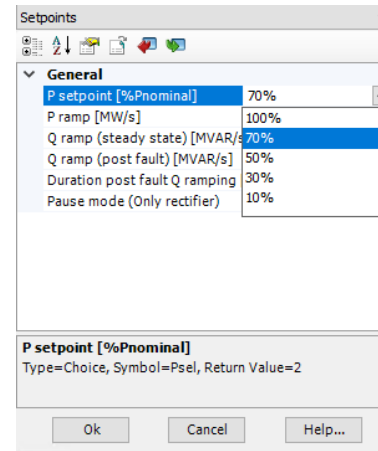
- Several N-1 contingencies show unstable oscillatory response for 80% IBR dispatch
- Several IBRs also tripped



- Acceptable response was observed with 70% IBR dispatch

# Notable Model Challenges

- PSCAD crashing and initialization issues
- Models with hard-coded dispatch options
- Suspicious responses
- Informed the REs/vendors. Require REs/vendors to help address the modeling issues



## Next Steps

- ERCOT plans to complete the PSS/e and PSCAD studies in July.
- Then, ERCOT plans to continue the South Texas stability assessments, including the system improvements and impact on the congestion and generation curtailment.