Status Update: Evaluation of Voltage Ride Through Requirements Proposed by ERCOT

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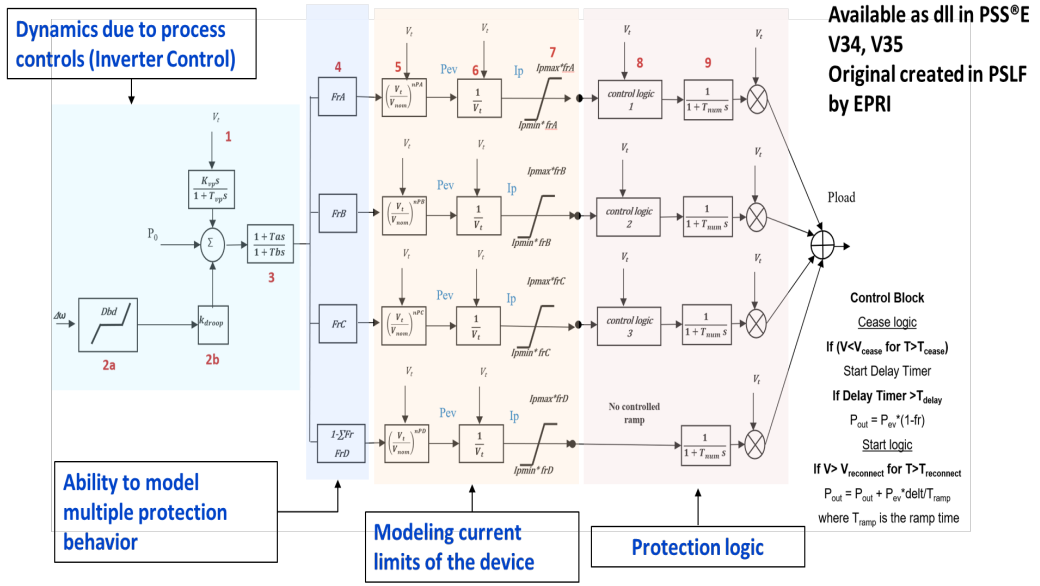
Background and Objectives

- Background
  - As presented at the December 2025 LLWG meeting, ERCOT assessed different voltage thresholds for momentary cessation
    - Lower cessation thresholds (0.5 pu & 0.2 pu) → relatively better frequency response
    - Supports continued current draw during deeper voltage sags
    - Aligns with NOGRR282 proposed requirements
  - Additionally, ERCOT has conducted assessment on LEL reconnection time and would like to share the results in this presentation based on the scope introduced at the September 2025 LLWG

- Objectives
  - Assess system response by varying LEL reconnection times, in support of NOGRR282

Assumption and Methodology

- As presented at the December LLWG, the study base case and area are the same as those used to assess the transmission-upgrade effectiveness in reducing load loss
- Dynamic Model Updates for LELs within the study region
  - Replaced the LEL dynamic models with the enhanced User Defined Model (UDM)*
  - The UDM, which incorporates momentary cessation and reconnection settings with time delay during and after a fault, is considered adequate for assessing the proposed VRT requirements



Source: EPRI presentation at the July LLWG meeting

* The model and associated documentations are available at the NERC LMWG resources website (link)

Assessment of Reconnection Time and Scenario Considered

- Scenarios Evaluated:
  - Scenario 1: Study base case* (~201 GW-s)
  - Scenario 2: Lower system inertia condition (~174 GW-s, About 22 synchronous generators were gneted)
  - Scenario 3: Increased LEL condition (additional total 4 GW at selected critical locations)

  * Note: As presented in the September LLWG meeting, approximately 15.2 GW of LELs assumed in the study base case

- Compared the relative system responses for LEL reconnection times of 1 second and 2 seconds:
  - Frequency settling
  - Trends in rate of change of frequency (RoCoF)
  - Voltage settling
  - Any major load or generator trips during the reconnections

Overview of Study Results

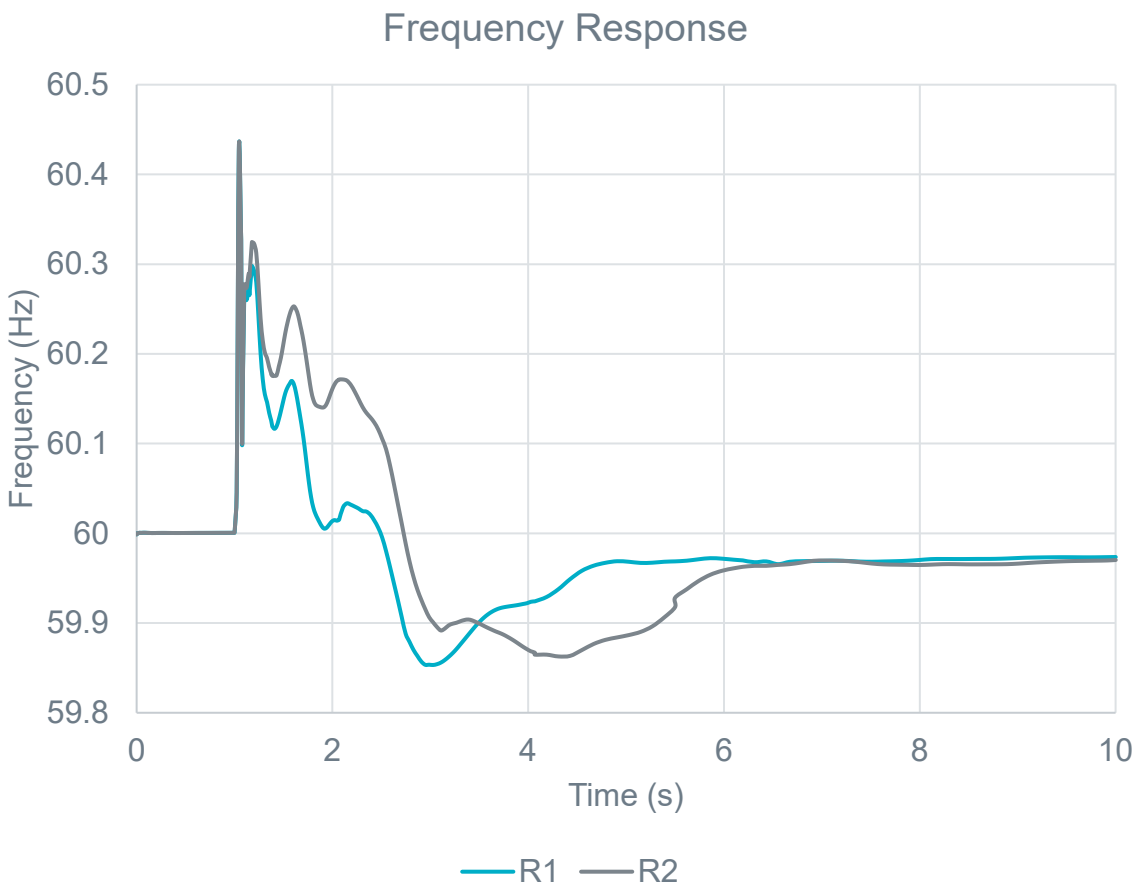
	Scenario 1 (Study Base Case)		Scenario 2 (Lower Inertia)		Scenario 3 (Higher LEL)	
Reconnection Time	**R1***	**R2****	**R1**	**R2**	**R1**	**R2**
Frequency Settling	Better	**Better**	Better	**Better**	Good	**Good**
RoCoF Trends	Good	**Better**	Good	**Better**	Good	**Better**
Voltage Settling	Good	**Good**	Good	**Good**	Good	**Good**

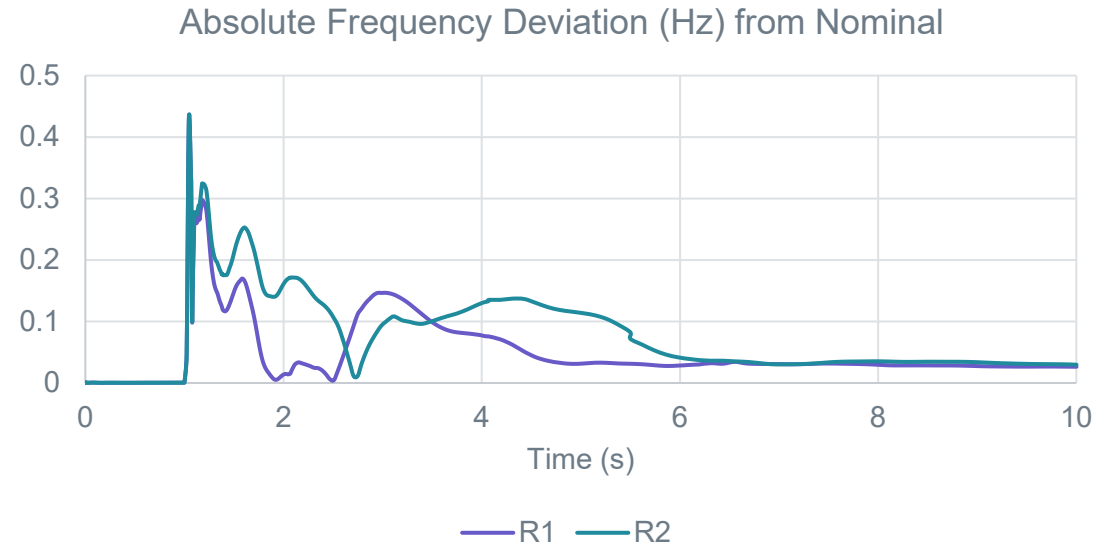
* R1: LEL Reconnection within 1 second

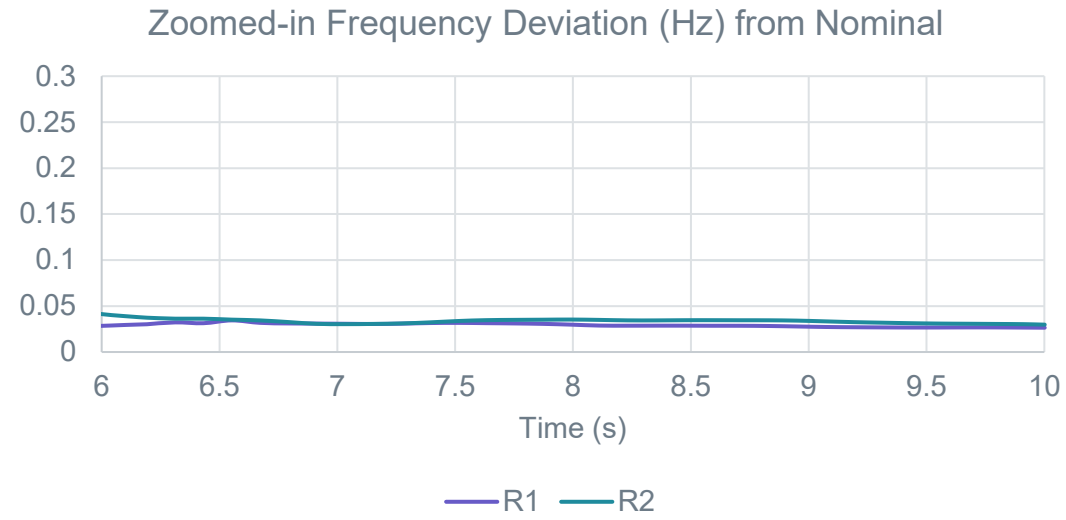
** R2: LEL Reconnection within 2 seconds

Results of Reconnection Time Test: Study Base Case

- Scenario 1: Study Base Case

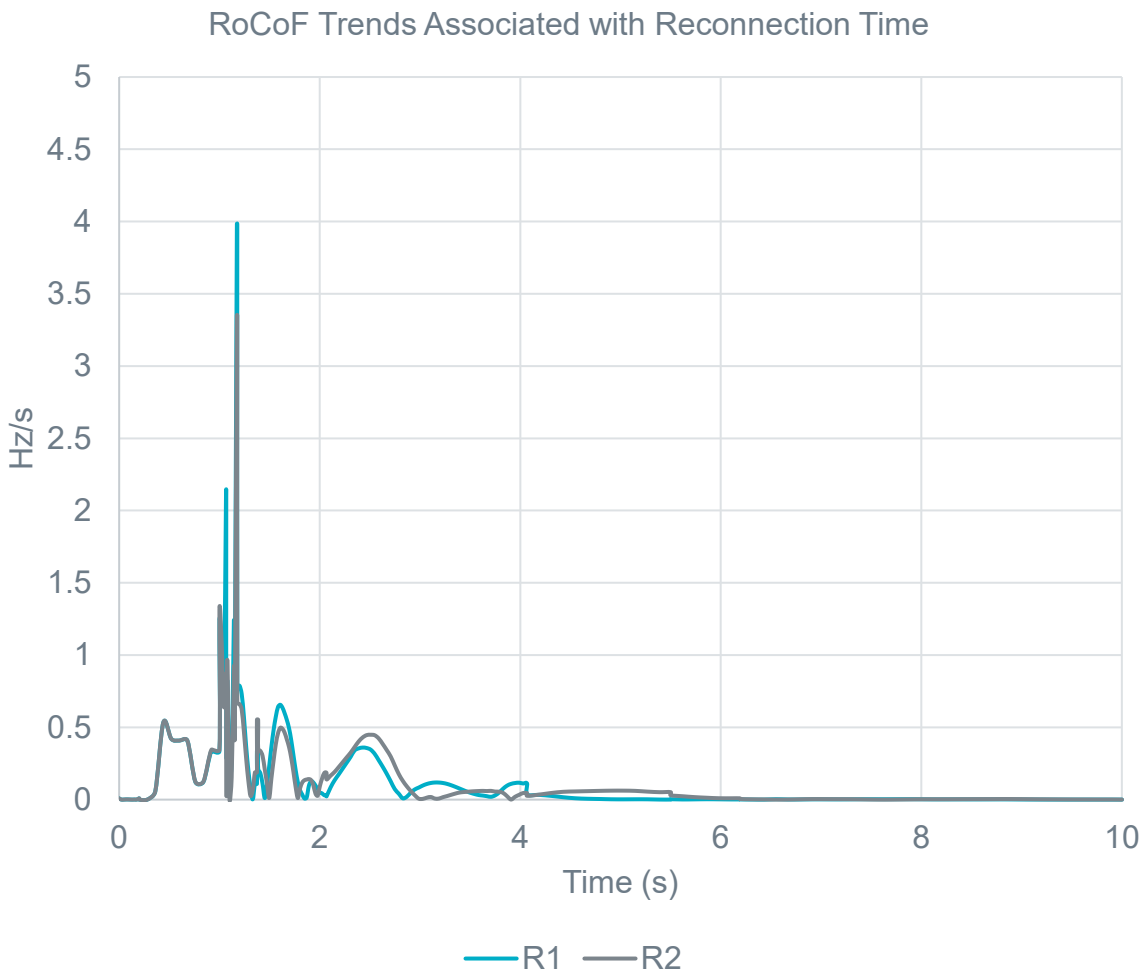


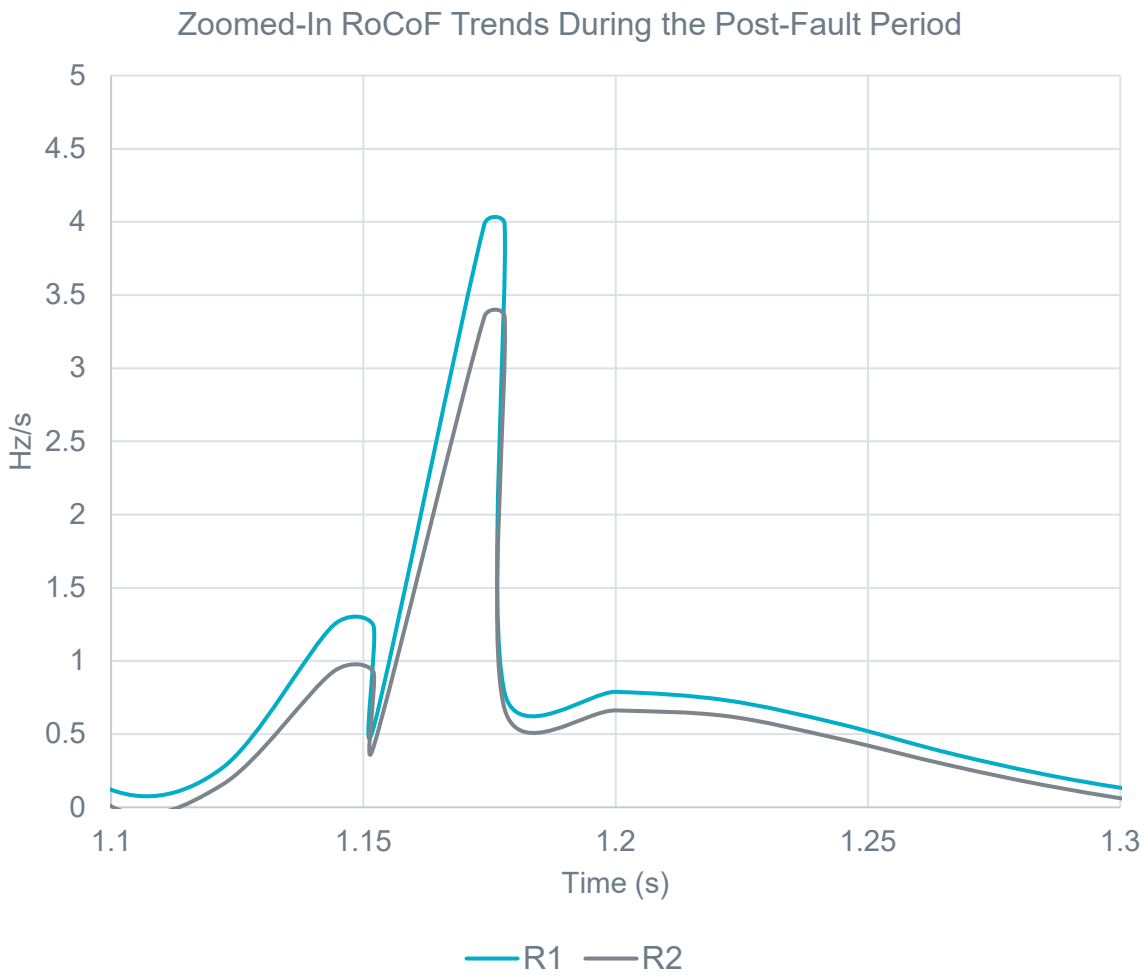




Results of Reconnection Time Test: Study Base Case (Continued)

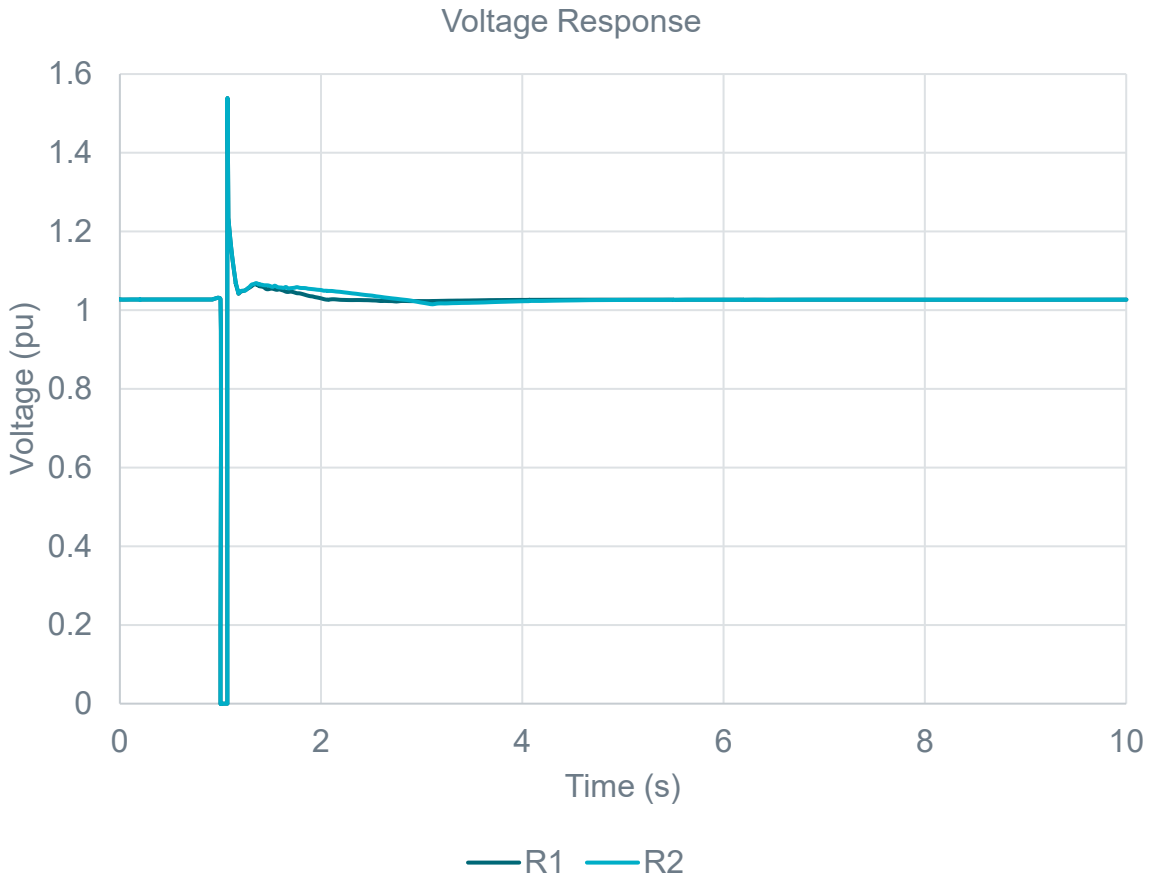
- Scenario 1: Study Base Case

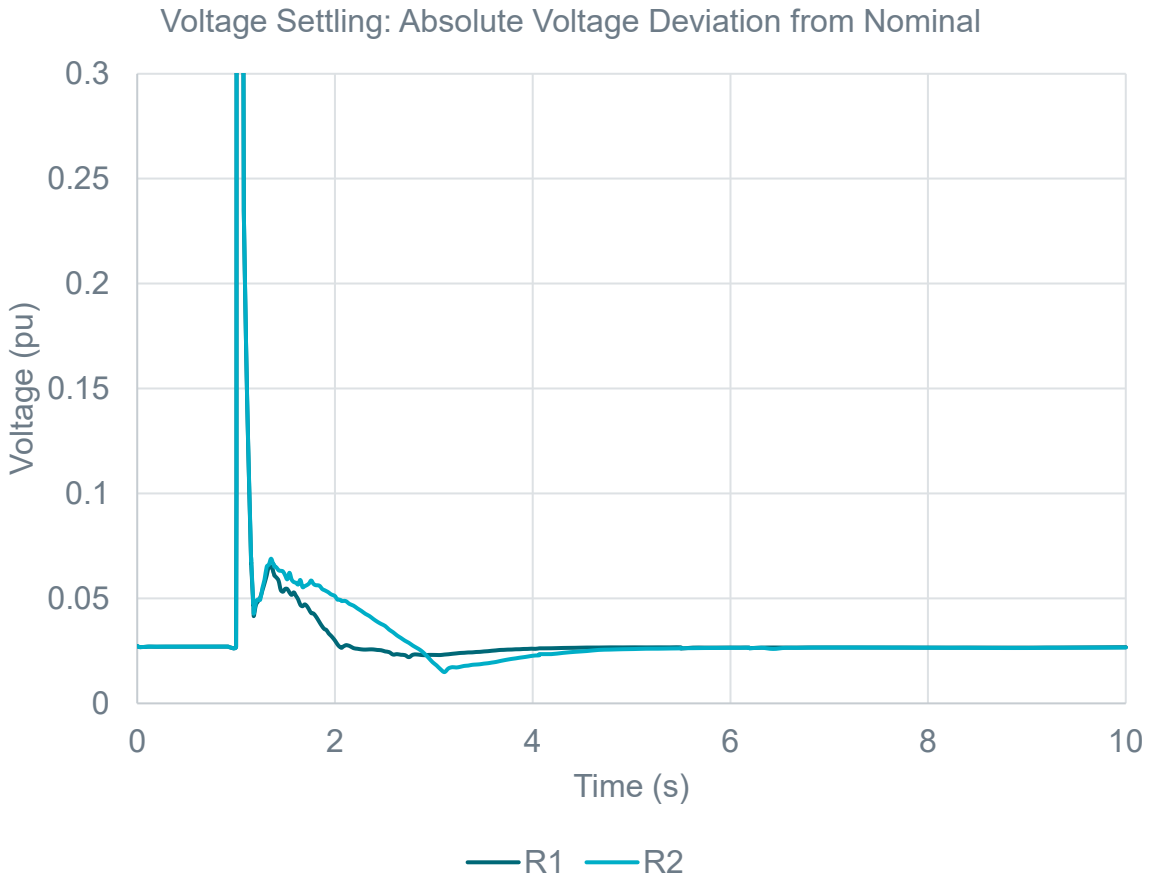




Results of Reconnection Time Test: Study Base Case (Continued)

- Scenario 1: Study Base Case





Key Findings

- ERCOT conducted a study for the planning horizon to evaluate the system response under multiple scenarios with varying LEL reconnection times during the post-fault recovery period

- Across the scenario evaluated, the results indicate better system performance when LELs were reconnected within 2 seconds after voltage recovery

Questions?

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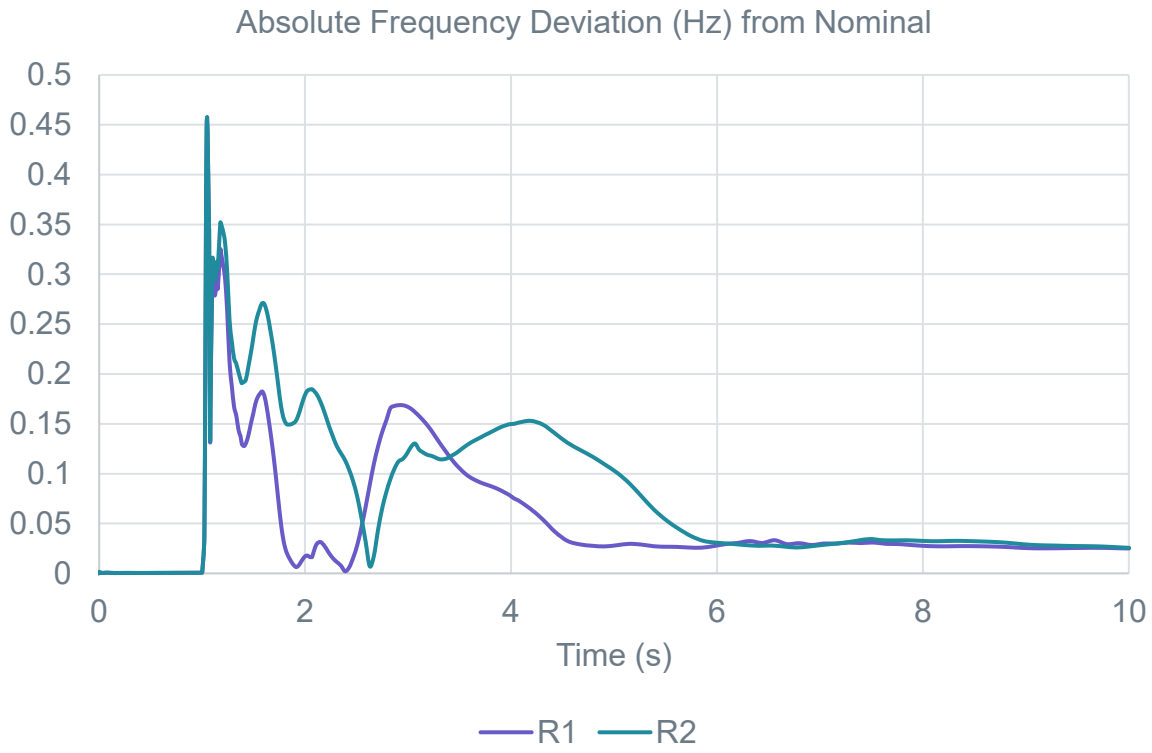
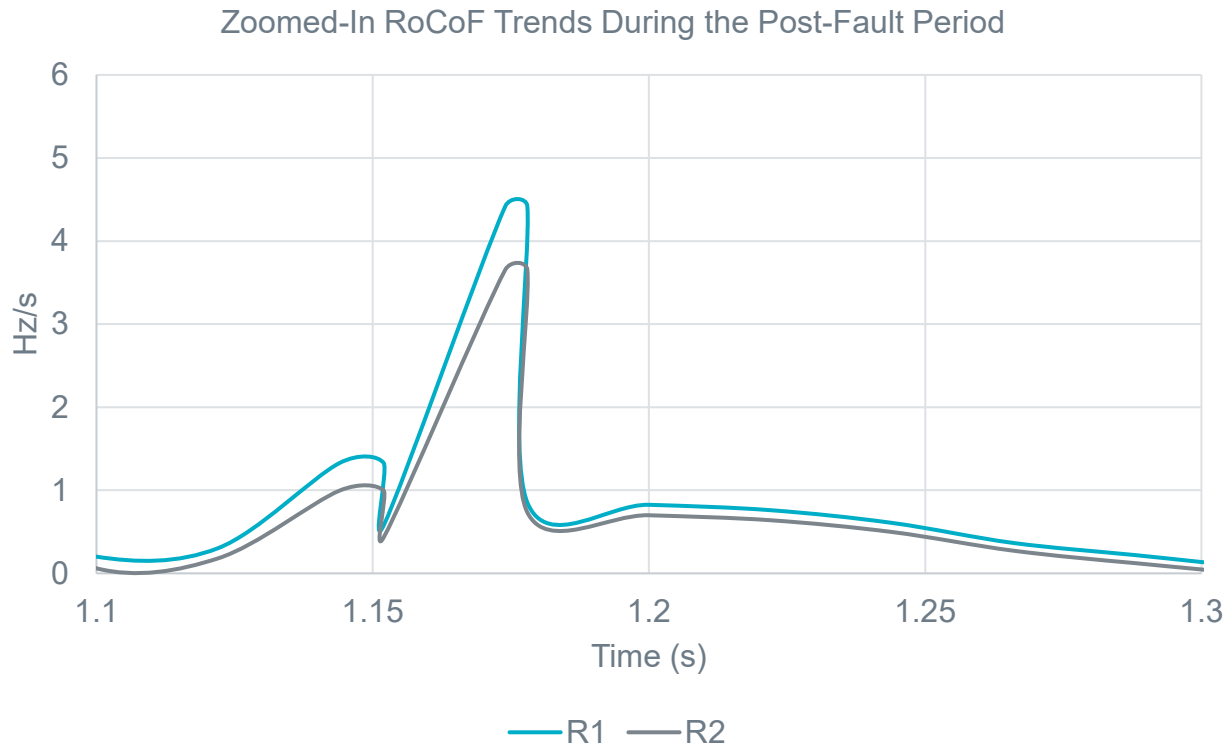
Appendix - Results of Reconnection Time Test: Lower System Inertia Case

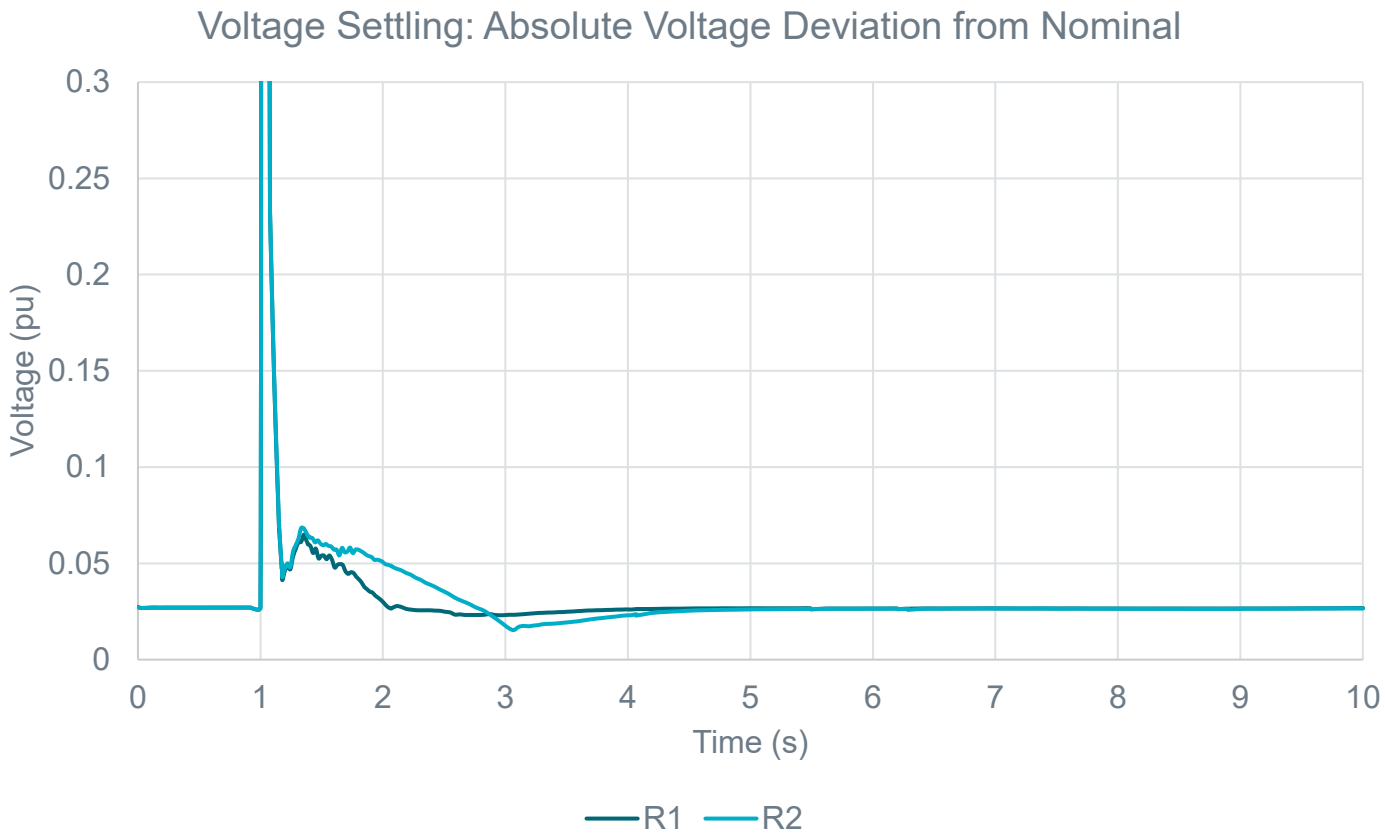
- Scenario 2: Lower System Inertia Case





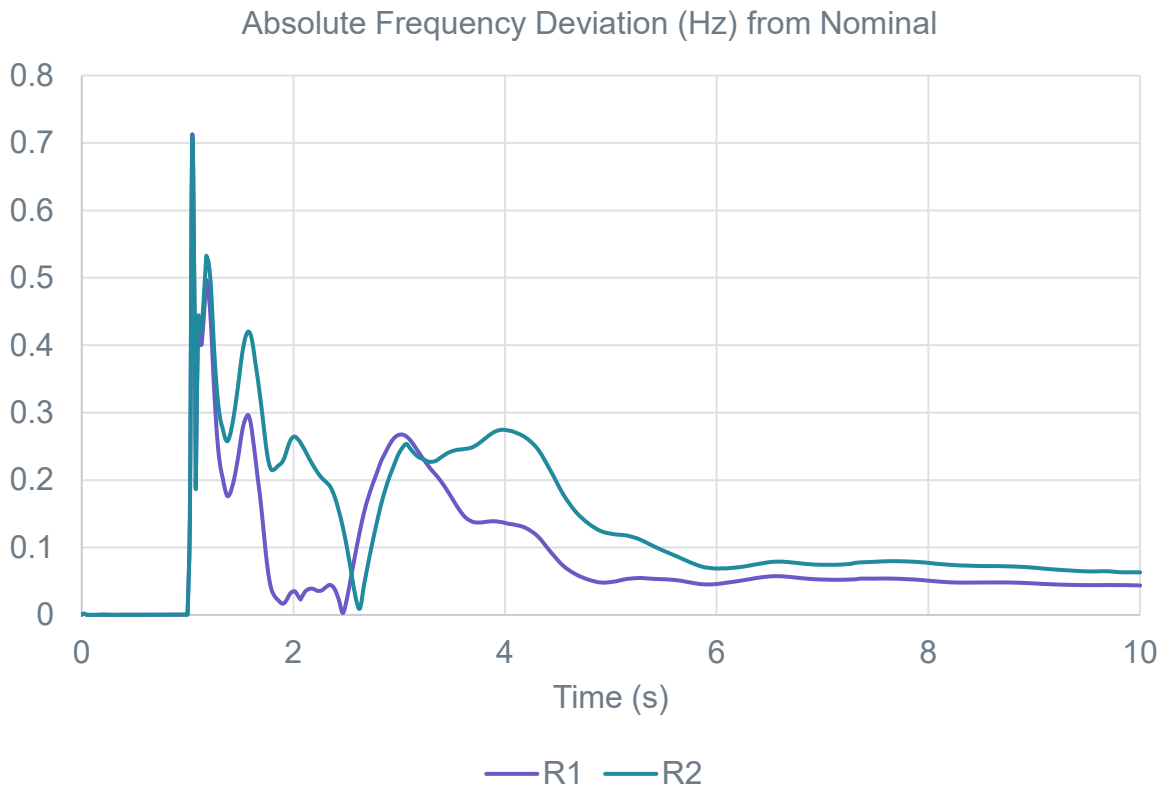
Appendix - Results of Reconnection Time Test: Lower System Inertia Case

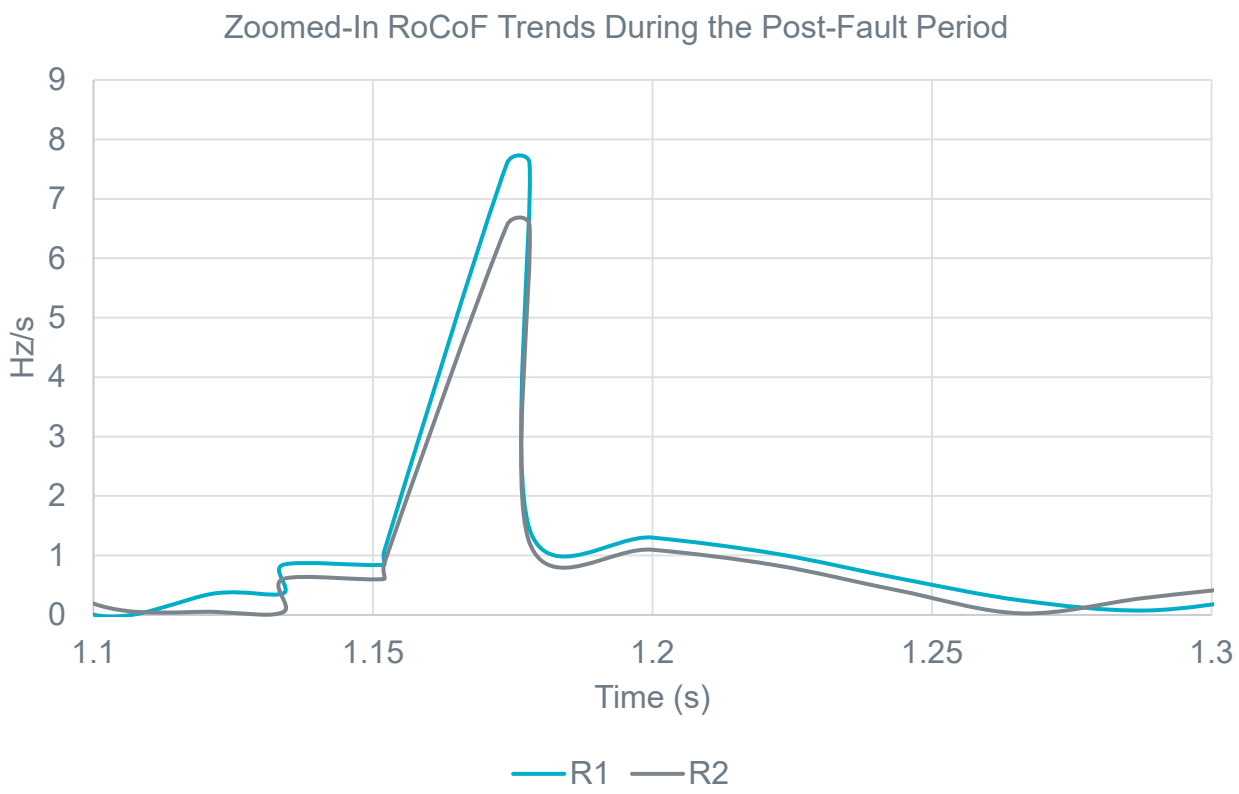
- Scenario 2: Lower System Inertia Case



Appendix - Results of Reconnection Time Test: Higher LEL Case

- Scenario 3: Higher LEL Case





Appendix - Results of Reconnection Time Test: Higher LEL Case

- Scenario 3: Higher LEL Case