

CASE STUDY

System-Wide Sub-Synchronous Oscillation Study

BACKGROUND

South Texas Electric Cooperative (STEC) is a cutting-edge Generation and Transmission Cooperative and a leader in providing a diverse portfolio of affordable energy, a reliable power delivery system, and services customized to the needs of the members. STEC recognizes the critical importance of ensuring the stability and reliability of the transmission network, particularly as renewable energy integration and grid expansion introduce new complexities.

CHALLENGE

The addition of a 345 kV second transmission line between two substations has the potential to impact Subsynchronous Oscillation (SSO) dynamics, posing risks of SSR that could lead to equipment damage, operational instability, or disruptions in service. STEC aims to evaluate and mitigate SSR risks associated with a new transmission line, ensuring that its integration into the grid does not compromise system performance.

SOLUTION

To overcome these challenges, EPE performed a system wide SSO vulnerability study to evaluate the risk of SSR for the addition of a 345 kV second transmission line between two substations as part of a Regional Planning Group (RPG) Tier 4 project. EPE completed a system wide frequency scan and detailed Electromagnetic Transient (EMT) study evaluating 25 renewable projects that are within the designated ERCOT SSR criteria to evaluate any changes to SSR risk due to the transmission line addition.

EPE developed a wide area EMT model to represent the area surrounding the new transmission line including the nearby generators. In addition, to adding numerous generators to a single EMT case, some models were outdated and operate at different time steps and were not initializing in the case properly.

EPE worked with the developer to ensure the models used for the study were updated to ensure accurate models were used for the system wide study. Additionally, EPE used parallel processing tools to allow for models with different time steps to be added to the case and simulated accordingly. Upon completing the study, EPE identified three projects with oscillatory modes and tripping due to the event. These scenarios and projects were shared with STEC and ERCOT for them to review further to determine next course of action for further studies as the tripping and oscillations were not SSR related.

CLIENT



TYPE

Cooperative (Co-op)

SECTOR

Transmission Utilities

ISO

ERCOT

LINE OF BUSINESS

Transmission Planning - Utilities

SERVICES PROVIDED

- System-wide SSO Study
- Electromagnetic Transient (EMT) Study

LOCATION

Texas

COMPLETED DATES

2022 - 2023

REFERENCE

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