

Project Description

Located in Haskell County, the Horse Creek Wind project consists of one hundred (100) GE 2.3-116 wind turbines, each rated at 2,300 kW for a total wind project size of 230 MW. The project point of interconnection (POI) is the 345 kV Smoky Hill substation.

Need

Electric Power Engineers, Inc. (EPE) performed a Sub-Synchronous Oscillations (SSO) study to evaluate the performance of the Horse Creek wind project and determine its vulnerability to SSO within the Electric Reliability Council of Texas (ERCOT) utility grid. The Horse Creek wind project becomes radially connected to series capacitor banks under N-1 contingency conditions.

In accordance with the needs of this project, EPE performed a frequency scan screening study and a detailed EMT study in PSCAD™/EMTDCTM to identify any risk for SSO. The frequency scan screening study shortlisted the cases that become radially or near radially connected to the series compensated transmission lines. Based on the results of the screening study, select cases were subject for further investigations via the detailed EMT study. These contingency conditions were considered under various switched shunts sensitivities and several series capacitor banks sensitivities.



Results

EPE's sectionalizing study for Rockett Substation indicated several instances where devices were either improperly coordinated or unable to interrupt the fault current. Additionally, per RUS guidelines, re-closers were added on single-phase taps whose steady-state current exceeded 20 amperes. EPE left as many existing sectionalizing devices (i.e., re-closers and fuses) where possible, but for the best coordination, it was recommended that certain existing devices be replaced to match EPE's suggested devices. Furthermore, the settings for the re-closers located inside the substation were carefully evaluated, and a request was submitted to NCEC's wholesale power supplier to make changes to the settings.