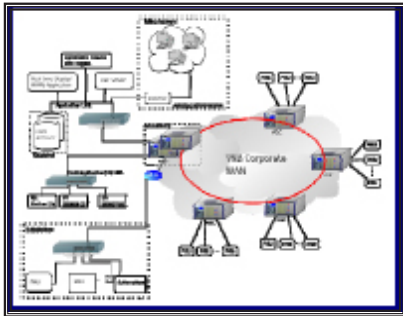


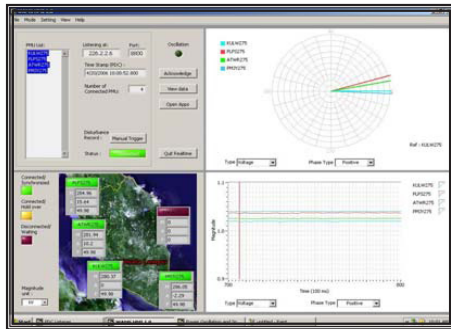


R&D Fund Project

Evaluation and Development of Wide Area Measurement System [WAMS] for TNB Transmission Network



Overview of future Wide Area system architecture



Real time display of data captured from 275kV substations PLPS, ATWR, KULW & PMJY

Project Overview

Wide Area Measurement System is the foundation of various technologies under self-healing grid, which is one of the initiatives mentioned in TNB 20-years strategic initiatives and TNBT 5-years business plan to ensure the resilience of the grid system. The system is fully developed in-house by TNBR and TNBT, where the WAMS system is able to communicate and gather data from several types and makes of Phasor Measurement Units installed at 5 TNB 275kV substations: PLPS, ATWR, KULW, PMJY & PAKA.

Deliverables

The system consists of Phasor Data Concentrator, PMU simulator, HMI display, 7-days historical synchronized phasor data recording, disturbance recording with automatic and manual triggering facilities, OPC-DA and OPCXML-DA interface for third party application access, Web Portal for WAMS management & power oscillation monitoring, alarms and recording. Among the useful applications are :- (1.) Wide Area Human Machine Interface which provide real-time power angle difference between two areas which give system operator the visualization and feel of system strength and power flow. (2.) Power Oscillation Monitoring & Analysis that provide the dynamic characteristics of inter-area oscillation, with information on oscillation frequency and damping coefficient, increasing the knowledge of operator regarding the dynamic behavior of the grid. (3.) Data archives and wide area disturbance records, where the captured data are compared to simulation study results for model tuning for more accurate compared to the real system.

Benefits

1. Improved wide area power system viewing would result in an increase in transmission line reliability.
2. As a benchmarking to the existing power system study for better and more accurate system planning.
3. As a foundation for future wide area system implementation.
4. Improved knowledge on wide area measurement, monitoring, control and protection system and technologies.