

Power stability monitoring based on voltage instability prediction approach through wide area system

Abstract

Nowadays, power systems are being forced to operate closer to its security limit due to current economic growth and the difficulties to upgrade the existing grid infrastructure. With the sudden increment of power demand, voltage instability problem has become a main concern to the power system operator because voltage instability has led or crucially contributed to some major blackouts throughout the world. Hence, methods for early warning and early prevention are required to prevent the power system from a collapse and led to blackout. Real-time voltage instability predictor method is applied on one of the load areas in Tenaga Nasional Berhad (TNB) network in this study. Voltage instability predictor calculation is performed according to the real-time measurement provided by Phasor Measurement Units (PMUs). The voltage instability predictor calculates the power margin and makes comparison to the pre-set margin threshold. Last but not least, the stability condition of the system is based on the comparison between the margin and the pre-set threshold. The main perception is to ensure the margin index always stay positive and suitable early prevention should be implemented when the index is close to zero.