Intisari

Berdasarkan data Rencana Usaha Penyediaan Tenaga Listrik (RUPTL) PT. PLN (Persero) 2015-2024, rencana penambahan kapasitas pembangkit sebesar 38,5 GW dilakukan oleh pihak PT. PLN (Persero) dan pihak swasta. Penyediaan tenaga listrik yang dilakukan oleh pihak swasta dilakukan melalui tiga skema: Pemanfaatan Bersama Jaringan Transmisi (PBJT), *captive power*, dan *excess power*. Oleh karena itu, kajian terkait kontingensi pada implementasi PBJT perlu dilakukan. Dampak PBJT terhadap kontingensi N-1 saluran didiskusikan pada penelitian ini.

Simulasi dilakukan pada sistem transmisi Jawa-Bali 150 kV dan 500 kV. Skenario dilakukan pada saat kondisi kontingensi tanpa PBJT yang dibandingkan dengan kondisi kontingensi saat PBJT dilakukan. Perubahan variabel-variabel seperti tegangan, daya aktif, daya reaktif, rugi-rugi saluran, dan pembebanan saluran diinvestigasi lebih lanjut dalam penelitian ini.

Hasil simulasi numeris menunjukkan kenaikan tegangan, daya aktif, daya raktif, rugi-rugi saluran, dan pembebanan saluran di sekitar area PBJT dilakukan pada saat kontingensi N-1 saluran terjadi. Hal ini menunjukkan bahwa PBJT memberikan dampak buruk bagi sistem saat kontingensi N-1 saluran terjadi.

Kata kunci : kontingensi N-1, PBJT, tegangan, pembebanan saluran, daya aktif

Abstract

According to RUPTL PT. PLN (Persero) 2015-2024, increasing the generating capacity of 38.5 GW conducted by the PT . PLN (Persero) and third parties. Electric power supply is carried out by third parties through three schemes: power wheeling, captive power, and excess power. Therefore, a study related to the implementation of power wheeling in contingency condition needs to be done The effects of power wheeling to transmission N-1 contingency are discussed in this paper.

Simulations is performed on the transmission system of Jawa-Bali 150 kV and 500 kV. Scenario is applied when the contingency conditions without power wheeling compared with the contingency conditions while power wheeling is implemented. Changes in the variables of voltage, active power, reactive power, transmission losses, and transmission loading factor are investigated in this research.

Numerical simulation give the ascension of voltage, real power, reactive power, transmission losses, and loading factor around power wheeling area during transmission N-1 contingency while power wheeling is implemented. It is investigated that power wheeling provide bad effect to the system while transmission N-1 contingency is occured.

Keywords : *N-1 contingency, power wheeling, voltage, loading factor, active power*