INTISARI

PLTB merupakan salah satu pembangkit yang ramah lingkungan. PLTB juga dapat menjadi solusi untuk pernasalahan energi listrik menggantikan energi fosil seperti batubara. Disamping itu pemerintah menargetkan suplai listrik sebesar 35.000 MW dalam kurun waktu 5 tahun yang ditandai dengan pembangunan PLTB di Pantai Samas, Bantul, DIY. Proyek pembangunan PLTB harus membutuhkan perencanaan pada beberapa aspek, salah satunya yaitu pengaruh yang ditimbulkan di gardu induk sekitarnya.

Penelitian ini bertujuan untuk mengetahui bagaimana pengaruh pembangunan PLTB Samas 50 MW terhadap tegangan di gardu induk Bantul 150 kV serta rugi-rugi daya pada sistem jaringan listrik bus Bantul 150 kV terhadap kecepatan angin.

Pengaruh Penambahan PLTB disimulasikan menggunakan beberapa parameter antara lain data kecepatan angin wilayah selatan pulau Jawa, kapasitas dan kurva daya generator serta data aliran daya pada sistem 150 kV di sekitar gardu induk Bantul. Simulasi model dilakukan dengan ETAP 12.6.

Hasil penelitian menunjukkan bahwa ketika kecepatan angin 12 m/s terjadi kenaikan tegangan bus Bantul 150 kV. Saat beban rendah terjadi kenaikan sebesar 0,189% dan saat beban puncak sebesar 0,185%. Rugi-rugi daya turun seiring bertambahnya kecepatan angin. Pada kecepatan angin 12 m/s, rugi-rugi daya ketika beban rendah turun sebesar 23,52% atau 724,4 kW sedangkan saat beban puncak rugi-rugi daya turun 24,88% atau sebesar 941 kW.

Kata kunci : Pembangkit listrik Tenaga Bayu (PLTB), Tegangan, Daya Aktif, Daya Reaktif, Rugi-rugi Daya, *Squirrel Cage Induction Generator* (SCIG), ETAP.

ABSTRACT

Wind power station is one of the power plants that are environmentally friendly. Wind power can also be a solution to problem electrical energy replacing fossil fuels such as coal. Besides, the government is targeting the electricity supply of 35,000 MW in the next 5 years which marked the construction of wind power station in Samas Beach, Bantul. Wind power development should requires planning in several aspects, one of which is the effect that the substation in the vicinity.

This research aims to determine the effect of the construction of a wind power Samas 50 MW to the voltage in Bantul 150 kV substations. Then, to determine the output power SCIG and losses on the electrical grid system bus Bantul 150 kV versus the wind speed.

The effect of adding PLTB was simulated using several parameters include wind speed data southern region of the island of Java, the capacity and the power curve power generator as well as the data flow around Bantul in the substation. Simulation model was done by ETAP 12.6.

The results showed that when the wind speed is 12 m/s, it will increase the voltage in Bantul 150 kV substations. When the load is low, an increased of voltage 0.189% and at peak load of 0.185%. Power loss was decreased with increasing wind speed. At a wind speed of 12 m/s, power losses at the low load decreased by 23.52% or 724.4 kW, while peak load the power losses decreased by 24.88% or 941 kW.

Key word *: Wind power station, Voltage, Active Power, Reactive Power, Power Losses, Squirrel Cage Induction Generator (SCIG), ETAP.*