

ANALISIS PENGARUH PENGGUNAAN BANK KAPASITOR TERHADAP RUGI-RUGI DISTRIBUSI PADA SISTEM PLTMH GUNUNG SAWUR 2 LUMAJANG

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ABSTRAK

Penelitian ini menganalisis pengaruh penggunaan Bank kapasitor terhadap rugi-rugi distribusi pada sistem pembangkit mikrohidro Gunung Sawur. Studi ini dilakukan untuk mengevaluasi efektivitas bank kapasitor dalam meningkatkan efisiensi sistem distribusi listrik dengan mengurangi rugi-rugi daya reaktif. Proses analisis dimulai dengan pengumpulan parameter dasar sistem, termasuk karakteristik generator, jenis kabel, dan beban, yang diperoleh dari spesifikasi teknis serta pengukuran langsung di lapangan. Data yang diperoleh digunakan dalam perhitungan manual untuk menentukan parameter kunci seperti daya keluaran, efisiensi, dan kestabilan system kemudian diimplementasikan dalam perangkat lunak ETAP guna melakukan simulasi kelistrikan yang mencakup analisis aliran daya, kestabilan sistem, dan berbagai skenario operasional dengan serta tanpa penggunaan Bank kapasitor. Dari hasil analisis regulasi tegangan 8 dari 10 rumah melebihi batas SPLN sebesar 5,8% presentase terkecil hingga 16,7% presentase terbesar.

Kata kunci: Bank kapasitor, rugi-rugi distribusi, *power factor*, ETAP, Hasil

ANALYSIS OF THE EFFECT OF CAPACITOR BANK USAGE ON DISTRIBUTION LOSSES IN THE GUNUNG SAWUR 2 MICRO-HYDRO POWER PLANT SYSTEM, LUMAJANG

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ABSTRACT

This study analyzes the effect of capacitor bank usage on distribution losses in the Gunung Sawur micro-hydro power plant system. The research was conducted to evaluate the effectiveness of capacitor banks in improving the efficiency of the electrical distribution system by reducing reactive power losses. The analysis process began with the collection of basic system parameters, including generator characteristics, cable types, and loads, obtained from technical specifications as well as direct field measurements. The collected data were used in manual calculations to determine key parameters such as output power, efficiency, and system stability, which were then implemented in ETAP software to perform electrical simulations. These simulations included power flow analysis, system stability, and various operational scenarios both with and without the use of capacitor banks. From the results of the voltage regulation analysis, 8 out of 10 houses exceeded the SPLN limit, ranging from the smallest percentage of 5.8% to the largest percentage of 16.7%

Keywords: capacitor bank, distribution losses, power factor, ETAP, results