

Analisis tekno ekonomi penerapan pembangkit listrik tenaga surya skala besar di sistem ketenagalistrikan bangka = Techno economic analysis application of large scale solar power plant at bangka electricity system

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Abstrak

[ABSTRAK

Biaya pokok produksi (BPP) di sistem ketenagalistrikan Bangka cukup tinggi dikarenakan sebagian besar pembangkitnya menggunakan PLTD. Salah satu solusi untuk menekan BPP sekaligus mengurangi emisi karbon dari sektor pembangkit listrik adalah dengan menggantikan jam operasi PLTD dengan PLTS. Penelitian ini bertujuan untuk menganalisis tekno ekonomi penggantian jam operasional PLTD dengan PLTS. Kapasitas PLTS dibatasi 20% dari beban puncak sistem di Bangka guna menjaga stabilitas sistem. Berdasarkan data potensi energi matahari, biaya-biaya pengembangan sistem PLTS dan konsumsi bahan bakar PLTD pada sistem Bangka didapat hasil COE PLTS sebesar Rp. 2.305,11/kWh, dan biaya bahan bakar PLTD sebesar Rp. 2.390,88/kWh. Harga energi PLTS lebih kecil dari biaya bahan bakar PLTD. Dengan penerapan PLTS sebagai menggantikan operasi PLTD guna mengurangi konsumsi bahan bakar maka dalam satu tahun terjadi penghematan sebesar Rp. 3.075.543.012 per tahun. Sehingga secara ekonomis penerapan PLTS sebagai pengganti jam operasional PLTD layak diterapkan pada sistem ketenagalistrikan Bangka.

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ABSTRACT

Electricity production cost of Bangka electrical system is considerably high as the system's mainly operates Diesel Power Plants. A possible solution to decrease the production cost and hence reducing the system's carbon emission is to replace operating hours of the Diesel power plants with Solar power plant (PV). This research intends to analyse techno-economic of this replacement. The total capacity of PV shall not exceed 20% of Bangka electrical system's peak load in order to maintain system's stability. Based on the solar energy potential, solar power system costs and fuel consumption of diesel in Bangka, cost of energy for PV is Rp 2,301.11/kWh, while for cost of diesel fuel is Rp 2,390.88/kWh. It is clear that cost of generation from PV is cheaper than that of Diesel fuel. Substituting Diesel power plant with Solar power plant in Bangka electrical system might save as much as Rp. 3,075,543,012 yearly. Therefore, it is feasible to replace Diesel power plants with solar power plants in Bangka electrical system; Electricity production cost of Bangka electrical system is considerably high as the system's mainly operates Diesel Power Plants. A possible solution to decrease the production cost and hence reducing the system's carbon emission is to replace operating hours of the Diesel power plants with Solar power plant (PV). This research intends to analyse techno-economic of this replacement. The total capacity of PV shall not exceed 20% of Bangka electrical system's peak load in order to maintain system's stability. Based on the solar energy potential, solar power system costs and fuel consumption of diesel in Bangka, cost of energy for PV is Rp 2,301.11/kWh, while for cost of diesel fuel is Rp 2,390.88/kWh. It is clear that cost of generation from PV is cheaper than that of Diesel fuel. Substituting Diesel power plant with Solar power plant in Bangka electrical system might save as much as Rp. 3,075,543,012 yearly. Therefore, it is feasible to replace Diesel power plants with solar

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