RINGKASAN

SIMULASI DAN ANALISIS PEMBANGKIT LISTRIK TENAGA HIBRIDA (PLTH) *PHOTOVOLTAIC* TERHUBUNG GENERATOR DIESEL UNTUK BEBAN LISTRIK PADA *BASE TRANSCEIVER STATION* (BTS)

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Kabupaten Cilacap yang menyimpan potensi energi surya yang bisa digunakan sebagai sumber energi pembangkit listrik. Pemanfaatan energi surya sebagai PLTS sangat diminati dan mulai dikembangkan untuk kebutuhan telekomunikasi yaitu dengan menyupalai *Base Transceiver Station* (BTS). *Base Transceiver Station* (BTS) biasanya terletak pada jangkauan yang jauh dari saluran distribusi PLN, sehingga harus menyediakan catu dayanya secara mandiri. PLTS tidak sepenuhnya bisa menyuplai beban listrik *Base Transceiver Station* (BTS) dengan sendiri oleh karena itu perlu digabungkan oleh generator diesel agar sistem bekerja secara optimal. Dari masalah tersebut maka dilakukan penelitian dengan tujuan simulasi perencanaan Pembangkit Listrik Tenaga Hibrida (PLTH) *photovoltaic* terhubung generator diesel untuk beban listrik pada *Base Transceiver Station* (BTS). Dalam penelitian ini telah dilakukan suatu perencanaan Pembangkit Listrik Tenaga Hibrida (PLTH) *photovoltaic* terhubung generator diesel untuk beban listrik pada *Base Transceiver Station* (BTS) menggunakan *software* HOMER. Jumlah beban yang akan disuplai oleh sistem PLTH adalah sebesar 36 kW dari total penggunaan energi listrik per hari. Perencanaan Pembangkit Listrik Tenaga Hibrida (PLTH) *photovoltaic* terhubung generator diesel untuk beban listrik pada *Base Transceiver Station* (BTS) menggunakan *software* HOMER untuk menganalisis tentang total *cost* dan perbandingan kehandalan dalam hal *electrical*. Berdasarkan hasil simulasi Pembangkit Listrik Tenaga Hibrida (PLTH) menghasilkan produksi energi 13.339 kWh/yr yaitu dari *photovoltaic* sebesar 63,2% dan Generator Diesel sebesar 36,8% dengan menggunakan PV 200 Wp sebanyak 32 dan baterai ROCKET SMF N 150 sebanyak 42. Total *Cost* Perencanaan PLTH adalah sebesar Rp. 617.331.395 dengan COE sebesar Rp. 3.814. *Net Present Value* akan bernilai positif pada tahun ke 19. Berdasarkan hasil simulasi Pembangkit Listrik Tenaga Hibrida (PLTH) *photovoltaic* terhubung generator diesel untuk beban listrik pada *Base Transceiver Station* (BTS) tersebut layak untuk diusahakan.

Kata kunci : PLTH, PLTS, Generator Diesel, *Base Transceiver Station*, HOMER

SUMMARY

SIMULATION AND ANALYSIS OF PHOTOVOLTAIC HYBRID POWER PLANT CONNECTING DIESEL GENERATORS FOR ELECTRICAL LOADS IN BASE TRANSCEIVER STATION (BTS)

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Cilacap Regency which stores the potential of solar energy that can be used as an energy source for electricity generation. The use of solar energy as PLTS is very popular and is starting to be developed for telecommunications needs, namely by supplying Base Transceiver Station (BTS). Base Transceiver Station (BTS) is usually located at a distance far from the PLN distribution channel, so it must provide its power supply independently. PLTS cannot fully supply the electricity of the Base Transceiver Station (BTS) on its own because it needs to be combined by a diesel generator so that the system works optimally. From this problem, a study was conducted with the aim of simulating the planning of a photovoltaic Hybrid Power Plant (PLTH) connected to a diesel generator for electrical loads at the Base Transceiver Station (BTS). In this study, a planning for photovoltaic hybrid power plants (PLTH) was connected to diesel generators for electrical loads at the Base Transceiver Station (BTS) using HOMER software. The amount of the load to be supplied by the PLTH system is 36 kW from the total electricity usage per day. Planning of a Hybrid Power Plant (PLTH) connected to a diesel generator for electric loads at the Base Transceiver Station (BTS) will use HOMER software in analyzing total costs and also to compare reliability in electrical terms. Based on the simulation results of the Hybrid Power Plant (PLTH) it produces energy production of 13,339 kWh / yr which is from photovoltaic at 63.2% and Diesel Generators at 36.8% by using PV 200 Wp as much as 32 and ROCKET SMF N 150 batteries by 42. Total Cost Planning PLTH is Rp. 617,331,395 with COE of Rp. 3,814. The Net Present Value will be positive in the year 19. Based on the simulation results of the photovoltaic Hybrid Power Plant (PLTH) connected to a diesel generator for the electric load at the Base Transceiver Station (BTS) it is worth trying.

Words : PLTH, PLTS, Diesel Generator, Base Transceiver Station, HOMER