

DESIGN AND SIMULATION OF A 17 KWH STANDALONE SOLAR POWER SYSTEM FOR A RURAL HEALTH CENTRE IN KEBBI

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ABSTRACT

A standalone solar power system of 17 kWh for a rural health centre in Kebbi has been designed and simulated. HOMER was used to perform the simulation and optimization procedure using the solar radiation data, clinic load profile, sensitivity variable and other design variables which served as input parameters. Kebbi lies on latitude 12°27'14" N and longitude 4°11'51" E, and altitude of 225 m. The solar resource data used were obtained from the NASA Surface meteorology and Solar Energy/HOMER Data for a ten year period (2005 – 2014). The least economical system is the generator-battery configuration with a total initial cost, net present cost, and electricity cost of US\$ 11,613, US\$62,746, and US\$0.765, respectively. The optimal system is made of 40PV modules of 200 W, 20 solar batteries of 12 V, 205 Ah and a converter of 3 kW.