

Potential of solar energy in Kota Kinabalu, Sabah: an estimate using a photovoltaic system model

Abstract

Solar energy is becoming popular as an alternative renewable energy to conventional energy source, particularly in the tropics, where duration and intensity of solar radiation are longer. This study is to assess the potential of solar energy generated from solar for Kota Kinabalu, a rapidly developing city in the State of Sabah, Malaysia. A year data of solar radiation was obtained using pyranometer, which was located at Universiti Malaysia Sabah (6.0367° N, 116.1186° E). It was concluded that the annual average solar radiation received in Kota Kinabalu was 182 W/m². In estimating the potential energy generated from solar for Kota Kinabalu city area, a photovoltaic (PV) system model was used. The results showed that, Kota Kinabalu is estimated to produce 29,794 kWh/m² of electricity from the solar radiation received in a year. This is equivalent to 0.014 MW of electricity produced just by using one solar panel. Considering the power demand in Sabah by 2020 is 1,331 MW, this model showed that the solar energy can contribute around 4% of energy for power demand, with 1 MW capacity of the PV system. 1 MW of PV system installation will require about 0.0018% from total area of the city. This assessment could suggest that, exploration for solar power energy as an alternative source of renewable energy in the city can be optimised and designed to attain significant higher percentage of contribution to the energy demand in the state.