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LIFE CYCLE ASSESSMENT OF
STAND-ALONE PHOTOVOLTAIC (SAPV) SYSTEM

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ABSTRACT

Solar energy is considered to be the most promising alternative source of energy and become the most popular of renewable sources being exploited in effort to reduce usage of non-renewable source as well as the issues contributed by non-renewable energy such as greenhouse gases. However, as the initial cost to build the stand-alone photovoltaic (SAPV) system is high and hence causes them hard to penetrate the market wider. Therefore this paper presents a study on life cycle assessment (LCA) of stand-alone photovoltaic (SAPV) system. The LCA has been carried out to evaluate overall performance of the photovoltaic (PV) system in order to promote it as very important source of energy for future. The performances are in terms of economic, carbon dioxide (CO₂) emission, energy pay-back time (EPBT) and levelized cost of energy (LCOE). For economic and LCOE analysis purposes HOMER simulation software has been applied. The HOMER software compute the economics of the SAPV system by mean net present cost (NPC) technique. In HOMER simulation software some data are required such as data of solar resource, load demand and ambient temperature. Those data have been taken from the actual data provided by PV system locating at Sekolah Kebangsaan (SK) Kalabakan Tawau in Sabah, Malaysia. The EPBT and CO₂ emission of the system are calculated manually through the mathematical formulation.

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