

COMPARATIVE STUDY OF THE EFFICIENCY OF STORAGE BATTERIES (INDIAN AND CHINESE TECHNOLOGY) USED FOR SOLAR SECURITY LIGHTING APPLICATION IN ANAMBRA STATE, NIGERIA

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ABSTRACT

Presently in Nigeria, most of the power generated is produced using fossil fuels and hydropower. These not only emit enormous carbon dioxide into the environment but will eventually run out. In order to make the development of electricity in the nation less harmful and sustainable, there is a need for the better source of substitute clean energy and solar energy technology is one of the fastest growing forces in the world. All effort is geared toward making the world green. Because of this sustainable source of energy is intermittent in nature, there is a need for the storage device to balance the load demand. The photovoltaic system directly converts the solar energy into electrical energy which is stored in batteries for use at night times when there is no sunlight. Hence there is a need for better the choice of storage batteries to save cost and promote the use of this sustainable renewable source of energy in the country. In order to choose the right storage battery, we want to compare the Chinese and Indian technologies in Nigerian markets. This thesis undertakes a comparative study of two commonly available storage batteries that are used in Nigerian stand-alone solar PV systems. The batteries considered were the Indian battery technology with specification Luminous, Deep cycle sealed maintenance free batteries solar application, Lum 12V 100Ah 20hr and 3DGP161433 and Chinese technology with specification Sun-Test std gel battery, 12V-100Ah, 010716w, Cycle use 14.4-15.0V, Standby use; 13.5-13.8V and Initial current: less than 30A was used to power 2 stand-alone security lights at the Faculty of Physical Sciences, Nnamdi Azikiwe University, Awka. The technical assessment was based on measuring their voltages, current and determining their efficiencies for a period of two months. From the graphical analysis, we obtained the average efficiency of Indian battery as 97.7% and Chinese battery as 91.6%. The efficiency of Chinese battery which was lower than the expected 95% from literature leads to the frequent discharge of the Chinese battery before day breaks hence does not lasts for a two day autonomy when subjected to the same climate and weather condition as the Indian battery, the thesis concludes that Indian battery seems to be the optimal solution for stand-alone PV system in Nigeria.

KEYWORDS: *Harmful and Sustainable, Climate and Weather Condition, to Prevent Large and Possibly Damaging Voltage Fluctuations*