

Design and Implementation of a 5 kVA Solar Photovoltaic System for the Electronics Laboratory in Covenant University

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[Emmanuel Mbaya](#); [Koto Omiloli](#); [Kingsley Anagor](#); [Kennedy Ekong](#); [Emuesiri Esisio](#); [Oghorchukwuyem Obiazi](#); [Olisaemeka Isife](#); [Joachim Notcker](#); [Ayokunle Awelewa](#); [Isaac Samuel](#)

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Abstract: The Electronics Laboratory is a learning facility that students and faculty can utilize for research and learning activities. The motivation for this project is to make available a backup power system to be used in moments of a power outage, especially during laboratory sessions. Solar energy is chosen because the aggregate solar energy incident on the earth's surface exceeds by far amount the required estimated energy needs of the world's population. The site location, Ogun State, Nigeria, has an average of about six hours of sunshine per day. In addition, solar energy represents a clean source of energy. In this work, a 5 kVA solar photovoltaic system has been installed. It can supply energy of 18060 Wh/day. It was implemented as a backup power supply to the Electronics Laboratory. It can run for 01:30 hours at full load when not being charged. The initial cost of carrying out a solar project is quite high. However, the support cost dwindles significantly throughout an extensive period compared to when available power is solely reliant on utility. [View less](#)

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I. Introduction

Solar energy is electricity generated by the sun's rays. The total amount of solar energy on the planet far outnumbers the world's current and forecast energy needs. The quantity of sunlight that reaches the earth in an hour and a half is enough to fuel the world's energy consumption for a year [1]. The sun is indeed the earth's major source of endless free energy.

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