

UNIVERSITI TEKNOLOGI MARA

**SIZING ALGORITHM FOR
STAND-ALONE AC COUPLED HYBRID PV-
DIESEL POWER SYSTEM UNDER MALAYSIAN
CLIMATE**

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Thesis submitted in fulfillment
of the requirements for the degree of
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I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledge as referenced work. This topic has not been submitted to any other academic institution or non-institution for any other degree or qualification.

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ABSTRACT

The sizing algorithm for AC Coupled Hybrid PV-Diesel power system based on Malaysia climate is presented. The proposed algorithm is able to size the main components in the PV hybrid system to meet with the set target of energy contribution ratio. The rated powers of the components to be defined are PV array, grid-tie inverter, bi-directional inverter, battery storage and genset. This study recommends some modification to the current design practice. This algorithm provides guideline for PV system integrator to design effectively the size of components and system configuration to match the system and load requirement with geographical condition. The concept of the proposed algorithm is balancing the annual average renewable energy generation and demand. In this study, the photovoltaic (PV) to genset ratio is introduced by considering the hybrid system energy contribution: 70% from PV and 30% from genset. The system economic aspect is not considered in this study. The result of the proposed algorithm is compared and validates with the system data from actual installed PV hybrid system in Sabah based on performance indices specified in Malaysian Standard MS IEC 61724: 2010. The performance indices are used part of the proposed algorithm as a predictive analytical tool for algorithm development. Based on the case study, the proposed method shows good results.

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