THE DESIGN OF HYBRID SYSTEM FOR SMALL HOUSE APPLIANCE

by

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DECLARATION SHEET

I hereby declare that my Final Year Project Thesis is the result of my research work under supervision of PROF.DR. ISMAIL DAUT. All literature sources used for the writing of this thesis have been adequately referenced.

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APPROVAL AND DECLARATION SHEET

This project report titled The Design of Hybrid System for Small House Appliance was prepared and submitted by Ili Azim b Mohd Yusoff (Matrix Number: 081091258) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the Bachelor of Engineering (Electrical System Engineering) in Universiti Malaysia Perlis (UniMAP).

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The Design of Hybrid System for Small House Appliance

ABSTRACT

In recent year the demand for electricity power increase rapidly. Apart from this, there are still having areas that not fully grid connected electricity especially in the rural area. Throughout this matter, certain area had use photovoltaic as electricity source. In Malaysia, not only potential solar energy but also wind energy. The combination of these two sources can produce alternative electrical energy. This project is mainly focused on hybrid of wind and solar energy. The objective of this project is to design a hybrid system for small house appliance usage and develop the battery charger. Since these two sources are not constant, battery is needed as a backup source. Charging and discharging rate of battery is importance to ensure the life time of the battery. At the end of this project a battery charger for hybrid source is successful design. By using this charger controller the efficiency of the system will be increase about 40 % compare to if only use solar battery charge.

ABSTRAK

Sejak kebelakangan tahon ini permintaan terhadap elektrik meningkat mendadak. Tetapi masih ada tempat yang tidak mempunyai kemudahan elektik terutamanya di kawasan pendalaman. Disebabkan pekara ini lah sesetengah tempat mengunakan photovoltad sebagai sumber elektrik. Di Malaysia bukan sahaja tenaga solar bepotensi menjadi sumber penjanaan tenaga tetapi juga udara. Cantuman kedua-dua sumber tenaga ini boleh menghasilkan sumber tenaga altenatif. Projek ini mengfokuskan campuran dua sumber tenaga iaitu udara dan solar. Objektif projek ini ialah untuk membina sistem hybrid yang boleh menjanakan elektrik untuk kegunaan rumah. Memandangkan kedua-dua sumber tenaga tidak tetap, jadi system ini memerlukan sokongan daripada batteri. Kadar cas dan nyah cas bateri adalah penting untuk memastikan jangkahayat bateri itu. Dengan mengunakan charger kontroler kadar cas dan nyah cas dapat di kawal. Mengunakan charger controller ini kadar efisiansi meningkat kepada 40 % berbanding mengunakan solar charger sahaja.

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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

AC	alternating current
DC	direct current
am	ante meridiem
pm	post meridiem
W	watt
A	ampere
Ah	ampere hour
Wh	watt hour
V	volt
PV	photovoltaic
IR	rated current
MW	mega watt
s	second
m	meter

T , DR	temperature and discharge rate factor
EPIA	European Photovoltaic Industry Association

%	percentage
Pw	power in wind
ρ	air density
A	Cross-section area
V	Wind speed
Δt	time
°C	celsius
°F	fahrenheit
Kt	density ratio
Pb	Power extracted by the rotor blade
$\dot{m}$	The mass flow rate of air
Ve	Velocity of the wind
vd	Downwind velocity
hr	hour
kWh	kilo watt hour
yr	year