

THE EFFECTIVENESS OF HYBRID ELECTRICAL SYSTEM USAGE LEVEL
AMONG RESIDENTS ON KAPAS ISLAND

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The effectiveness of hybrid electrical system usage level
among resident on Kapas Island.

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KAPAS ISLAND

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Report submitted in fulfillment of the requirement for the degree of Bachelor of
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I declare that this project is the result of my own research except as cited in the references. The research project has not been for any degree and is not concurrently submitted in candidature of any other degree.

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DEDICATION

THIS THESIS IS DEDICATED TO MY PARENTS.

To their endless love, support and encouragement

AKNOWLEDGEMENT

First and foremost, I have to thank my parents for their love and support throughout my life. Thank you both for giving me strength to reach for the stars and chase my dreams. My sisters, little brother, auntie and cousins deserve my wholehearted thanks as well.

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To all my friends, thank you for your understanding and encouragement in my many, many moments of crisis. Your friendship makes my life a wonderful experience. I cannot list all the names here, but you are always on my mind.
Thank you,

ABSTRACT

Since the hybrid electrical system introduced in 2007 on Kapas Island, not much research has been done to determine how the effectiveness of this system to the people on the island. The Main purpose of this study was to identify and examine the effectiveness of this system in solving problems experienced among residents on Remote area. Most islands in Malaysia use the generator and fuel as a major source of electricity. These sources give rise to various problems such as electric source provided is very limited cause difficulties among residents to survive their daily life, as well accompanies such as hotels while the fuel give a water pollution to the remote area. Implementation of hybrid electrical system is one of initiative government to provide better utility in remote area. Furthermore this study developed qualitative method and quantitative to get answers and information for my research objectives. I will be interviewing the agencies involved directly and indirectly, to supply electric on the island, I will also use the questionnaire to be distributed to island residents and tourists who use electric the island directly. Result of this study showed that this system alone did not efficient been used especially on monsoon session which is early October until end of January every year. Even though, this system also give much advantages to solve the problem on provide good utilities among resident on island, since this system implementation, resident did not face water pollution more and get better utilities 24 hours. A utility bill is one of variable that get highest correlation between among resident and hybrid electrical system. This correlation will prove the effectiveness of this system and directly solve the problems faced by residents of the island as the Perhentian Island where the system was carried out in advance and had been effective there. Using the hybrid electrical

system is one of a very efficient way to replace the generator and fuel set as a source of electricity particularly in island

ABSTRAK

Sejak sistem hibrid elektrik diperkenalkan pada tahun 2007 di Pulau Kapas, tidak banyak penyelidikan telah dilakukan untuk menentukan bagaimana keberkesanan sistem ini kepada orang-orang di pulau itu. Tujuan utama kajian ini adalah untuk mengenal pasti dan mengkaji keberkesanan sistem ini dalam menyelesaikan masalah yang dialami di kalangan penduduk di kawasan jauh. Kebanyakan pulau-pulau di Malaysia menggunakan penjana dan bahan api sebagai sumber utama tenaga elektrik. Sumber-sumber ini menimbulkan pelbagai masalah seperti sumber elektrik yang disediakan adalah sangat terhad menyebabkan masalah di kalangan penduduk untuk terus hidup kehidupan harian mereka, serta mengiringi seperti hotel manakala bahan api memberi pencemaran air di kawasan yang jauh. Pelaksanaan sistem elektrik hibrid adalah salah satu inisiatif daripada kerajaan untuk menyediakan utiliti yang lebih baik kepada penduduk di kawasan pedalaman. Tambahan pula kajian ini dibangunkan kaedah kualitatif dan kuantitatif untuk mendapatkan jawapan dan maklumat bagi tujuan penyelidikan saya. Pengkaji akan menemuramah agensi-agensi yang terlibat secara langsung dan tidak langsung, untuk membekalkan elektrik di pulau itu, penyelidik juga akan menggunakan soal selidik untuk diedarkan kepada penduduk pulau dan pelancong yang menggunakan elektrik pulau itu secara langsung. Hasil kajian ini menunjukkan bahawa sistem ini sahaja tidak cekap telah digunakan terutamanya pada sesi tengkujuh yang awal Oktober hingga akhir bulan Januari setiap tahun. Walaupun, sistem ini juga memberi banyak kelebihan untuk menyelesaikan masalah pada menyediakan kemudahan yang baik di kalangan penduduk di pulau, kerana pelaksanaan sistem ini, penduduk tidak menghadapi pencemaran air lebih dan mendapat kemudahan yang lebih baik 24 jam. Bil utiliti adalah salah satu pembolehubah yang mendapatkan korelasi yang tinggi di antara sistem elektrik di kalangan penduduk dan hibrid. Hubungan ini akan membuktikan keberkesanan sistem ini dan secara langsung menyelesaikan masalah-masalah yang dihadapi oleh penduduk di pulau itu sebagai Pulau Perhentian di mana

sistem telah dijalankan terlebih dahulu dan ternyata berkesan di sana. Menggunakan sistem elektrik hibrid adalah salah satu cara yang amat berkesan untuk menggantikan penjana dan set minyak sebagai sumber tenaga elektrik terutama di pulau.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

World primary energy demand is projected in the reference scenario to expand by almost 60% from 2002 to 2030, an average annual increase of 1.7% per year. Demand will reach 16.5 billion tons of oil equivalents (toe) compared to 10.3 billion toes in 2002. The projected rate of growth is, nevertheless, slower than over the past three decades, when demand grew by 2% per year. On the other hand, fossil fuels will continue to dominate global energy use. They will account for around 85% of the increase in world primary demand over 2002–2030. And their share in total demand will increase slightly, from 80% in 2002 to 82% in 2030. The share of renewable energy sources will remain flat, at around 14%, while that of nuclear power will drop from 7% to 5% (Bilenet al., 2008).

Technology is the dominant force in the world today. Accordingly, the demand for energy to power the various devices that make the world run more smoothly and efficiently has increased at an astonishing rate; world population growth and the modernization of developing nations have strained the availability of some energy resources even further. It has been estimated that 80% of global energy comes from fossil fuels such as coal, oil, and natural gas.

These limited commodities may soon be depleted if this pattern of usage continues. In addition to scarcity, pollution and other compelling factors suggest that fossil fuels are less than ideal energy sources. (Adopted by Taxis legislature)

The situation in Malaysia is no different. The government has also given serious attention in the need to find and utilize renewable resources to add to the energy supply mix. Apart from the apparent issues discussed, the country is also looking for ways to diversify the current energy resource. Although the implementation is going to be a long and tedious process, it is a worthwhile project to undertake in the long run.

Government is also planning to do a lot of awareness regarding the renewable energy and Malaysia Government is further pursued in the 9th Malaysia Plan (2006–2010) which has also set a target of 5% RE in the country's energy mix. Coming to this alternative energy it is beneficial for people (Mohamed and Lee, 2006; Saidur *et al.*, 2010).

1.2 Research objectives

The aim of this study is mainly to determine the effectiveness of hybrid electrical system usage level on the Kapas Island in Malaysia. The objective of this study is as follows:

- i. To identify the effectiveness of the hybrid electrical system usage level in among residents on the island;
- ii. To determine which of the energy level is dominantly and effectively used on the island; and
- iii. To make recommendations on how to improve the usage level of the hybrid electrical system among residents on the island.

1.3 Research Question

For this study, several research questions that have been developed with regards to the problem statements occurred. These research questions are as follow:

- i. How effective, the implementation of hybrid electrical to rural resident system in Kapas Island?
- ii. What is the level of usage of electric that been produced as a proper energy to the rural resident in the island?

1.4 Statement of the Problem

The Main problem on the island is when the electrical supply of the city of difficulty to the island, most of the island using a generator and fuel to supply electric to all residents on the island, but electric provides insufficient and very limited and causes water pollution. Supplied electricity supply causes less comfort tourists coming. In addition to an inadequate supply of electric generators this could also cause of pollution in the island as electricity is currently using supplied by generator sets diesel as fuel.

Table 1.1: The government initiative of produce renewable energy in Malaysia 2012

No.	State in Malaysia	Technology Implementation	Year Implementation
1.	Sipadan Island	Solar system	2009
2.	Perhentian Island	Solar, wind and generator	2007
4.	Kapas Island	Solar system	2007
5.	Layang-layang Island	Solar system, wind	2003

(Sources: government references, 2012)

Government takes much initiative to provide a good utility facility on the remote area, lack of previous research causes government spend much time and money to implement this renewable energy technology without knowing expertly about their effectiveness causes this study came out. Table shows that the residents highly dependence on hybrid electrical system to getting better utility facility in the island. However, still lacks of study and research is undertaken to find out the effectiveness of technology as references to government.

1.5 Scope of the study

The research focuses hybrid electrical system at Kapas Island and lodger at the inn or hotels available in the island. The study also focuses on kapas island has launched the use of electrical hybrid electrical system in 2007 with the cooperation of the successful Marang TNB seen in several sub-island in Malaysia that has been using this system as Perhentian Island, Layang-Layang Island and thoroughly Island available in Sabah. The researcher distributes questionnaire to respondent for identify effectiveness of hybrid electrical level usage among resident on remote area. The researcher focuses on respondent was that resident who lives in in Kapas Island, this is because the resident who fully get effect from implementation of this system. The researcher also uses instructed interview to government employee that responsible for implementation of this system.

1.6 Limitation of the study

The researcher has only 4 months to complete the research. Furthermore the researcher has limited time to complete the research within a specified period. In term of federal constraint that lead the researcher to focus only the Kapas Island and the finding of this study it's only reflect to case of Kapas Island only. Beside that the respondent is only from the island people who recite in the island.

1.7 Importance of the Study

Better utilities is the most important problem in this island, pollution causes fuel will destroyed the environment of island. Either no research study going been done, this study can be as a references to government agencies for improvement references on the type of solar system to be implemented. References are to other researcher to do on other aspect of the researcher regard to solar system.

1.8 Summary

This hybrid electrical system is very important as an initiative to solve the problem that faces resident on remote area.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Defining the concept of energy is not mutually conclusive and each discipline might employ the very definition of energy which best suits its concerns. Physics.about.com (2010) defines energy as follows: “Energy is the capacity of a physical system to perform work. Energy exists in several forms such as heat, kinetic or mechanical energy, light, potential energy, electrical, or other forms. According to the law of conservation of energy, the total energy of a system remains constant, though energy may transform into another form.”

(<http://physics.about.com/od/glossary/g/energy.htm>, 2010).

Furthermore, the important of energy saving implies that energy conversation and focus on renewable sources of energy should be home of choice in the developing countries like Malaysia which is considered as a prime user of energy should be involved In the issue and is expected to be sensitive to the changes in the area of energy. (Pig ram, 2000).

Solar power or solar energy is the technology of gaining operational energy from the light of the sun. Solar energy has been used in many technologies for centuries, where there is a lack of other energy Suppliers, such as in isolated locations and in space. (ENVIS centre, 2008).

Solar system of solar energy systems as follows Photo biologic Systems, Chemical Systems, Photovoltaic systems, Thermal Systems and active & Passive Systems. (Raoufirad, 1985).

Malaysian government introduce this initiatives energy sources because of their benefits itself, first, is this energy sources give full benefit to all resident on the island cause of the efficient energy supplier itself. In Malaysia, this energy also become as a remote area. Solar energy is considered one the most appropriate and useful renewable, clean, modern energy sources for tourism industry which could be achieved through variety of forms including “Photo biologic Systems, Chemical Systems, Photovoltaic systems, Thermal Systems, and Active & Passive Systems” (Raoufirad , 1985:10).

A lot of such systems could be appropriately applicable in the hotel industry: photovoltaic systems can employ in the lightening systems of the hotels, while hot water solar systems whether active or passive could be used in the design of the new hotels or assembled on the old ones to capture the energy coming from the sun rays and turn them to the safe and sound energy used in the hotels and all the resident in that island.

2.2 Renewable energy

Renewable energy sources occur in nature which is regenerative or inexhaustible like solar energy, wind energy, hydropower, geothermal, biomass, tidal and wave energy. Most these alternative sources are the manifestation of solar energy as shown in Figure 2.1. (Kothari et.al, 2008:14).

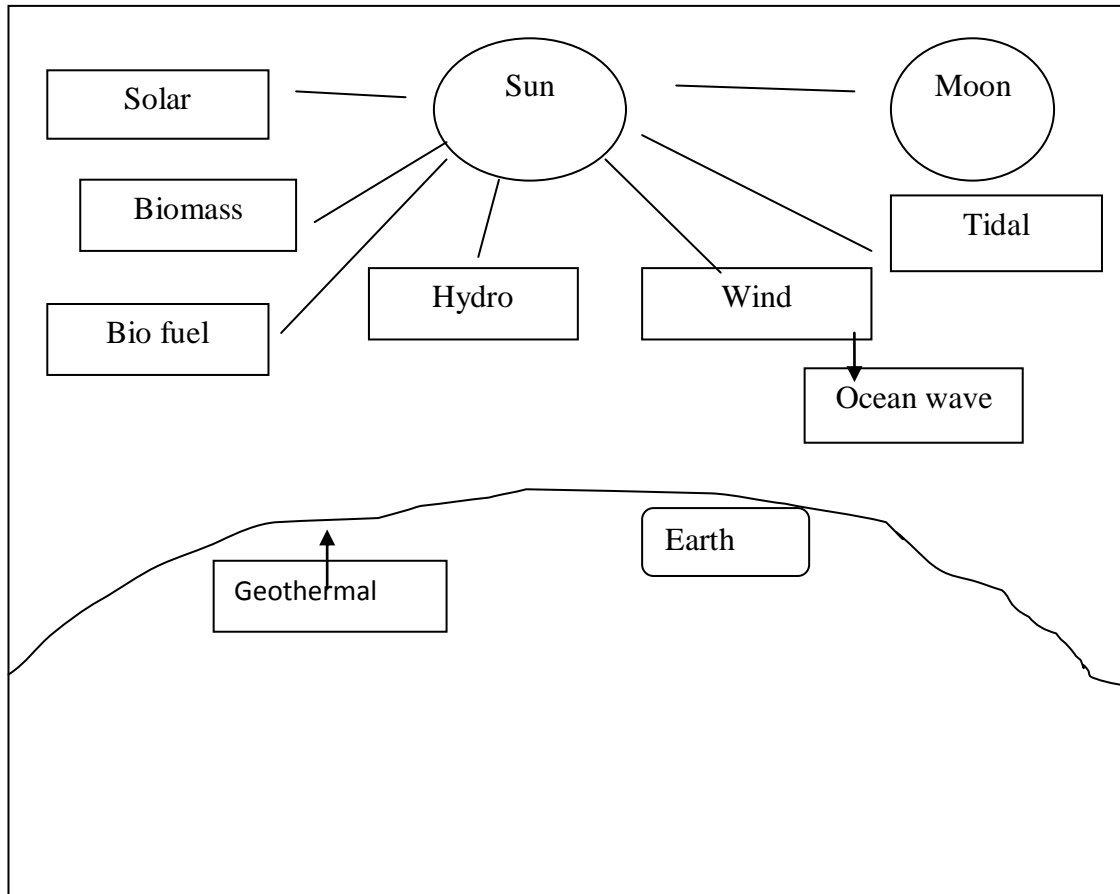


Figure 2.1: Renewable sources of energy

Temperature differences in the oceans and the energy of the tides. A renewable energy technology produces power, heat or mechanical energy by converting those resources either to electricity or to motive power. The policy maker concerns with development of the national grid system will focus on those resources that have established themselves commercially and are cost effective for in-grid application. Such commercial technologies include hydroelectric power, solar energy, fuels derived from biomass, wind energy and geothermal energy.