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THE ADOPTION OF SOLAR ENERGY USAGE AMONGST HOME OWNERS TO  
ENHANCE THE SOLAR PANEL (PHOTOVOLTAIC) HOME SYSTEM IN  
MALACCA

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## DECLARATION

I hereby declare that the report has been prepared by my own self except the summaries and citations that I have been clarify the resource.

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## **DEDICATION**

I would like to dedicate this work to my dearly loved parents, who have shown me various supports such as moral and financial support, encouraged me and taught me that even the largest task can be accomplished if it is done one step at a time. It is also dedicated to my friends, who have encouraged and support me throughout completing this work.

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## ABSTRACT

Nowadays, the usage of the non-renewable energy had been depleting, and forecasters believed that the non-renewable energy such as the fossil fuel will end in a few more decades. Renewable energy such as solar had been adopted rapidly in this era to overcome this problem. Government in Malaysia had declared all kinds of policies to encourage people to adopt solar. However, researcher had found out that most of the people in Malacca state did not adopt solar panel in their home. Therefore, the researcher aimed to study the factor that can affect the solar panel adoption, and also to find out the extent of the factors impact on the solar adoption among the Malacca users. The researcher adopted the five factors (financial factor, environmental factor, technical factor, institutional factor, and social factor) studied by Adachi (2009) and Eronini (2014). Survey is carried out in this research to study the relationship between the five factors and the solar panel adoption by distributing questionnaires. 50 respondents have responded to the questionnaire. The results have been analyzed using Pearson's Correlation to study the extent of the factors impact on the solar panel adoption, and using Linear Regression Analysis to study the factor that can affect the solar panel adoption. Through the results generated from SPSS, four out of five factors (financial factor, environmental factor, institutional factor, and social factor) have shown significant relationship with the solar panel adoption, and the social factor has shown the most critical factor that impact on the solar panel adoption. As a conclusion, the social factor plays an important role in affecting the solar panel adoption, in which the perceptiveness of people in Malacca towards solar panel was easily being affected by others.

## **ABSTRAK**

*Pada masa kini, penggunaan tenaga yang tidak boleh diperbaharui telah semakin berkurang, dan peramal percaya bahawa tenaga yang tidak boleh diperbaharui seperti bahan api fosil akan pupus dalam beberapa dekad yang datang. Oleh itu, tenaga boleh diperbaharui seperti solar telah diterima dengan pesat dalam era ini untuk mengatasi masalah ini. Kerajaan Malaysia juga telah mengisytiharkan pelbagai jenis dasar untuk menggalakkan orang ramai untuk menggunakan solar. Walau bagaimanapun, penyelidik mendapati bahawa sebahagian besar rakyat di negeri Melaka tidak menggunakan panel solar di rumah mereka. Oleh itu, penyelidik bertujuan untuk mengkaji faktor yang boleh memberi kesan kepada penggunaan panel solar, dan juga untuk mengetahui sejauh mana faktor-faktor memberi kesan kepada penggunaan solar di kalangan pengguna Melaka. Penyelidik menerima pakai lima faktor (faktor kewangan, faktor persekitaran, faktor teknikal, faktor institusi, dan faktor sosial) yang dikaji oleh Adachi (2009) dan Eronini (2014). Kajian ini dijalankan dengan mengedarkan soal selidik untuk mengkaji hubungan antara lima faktor dan penggunaan panel solar. 50 responden telah menjawab soal selidik tersebut. Keputusan telah dianalisis dengan menggunakan korelasi Pearson untuk mengkaji sejauh mana faktor-faktor memberi kesan kepada penggunaan panel solar, dan menggunakan Linear Regresi Analisis untuk mengkaji faktor yang boleh memberi kesan kepada penggunaan panel solar. Melalui keputusan yang dijana daripada SPSS, empat daripada lima faktor (faktor kewangan, faktor persekitaran, faktor institusi, dan faktor sosial) telah menunjukkan hubungan yang signifikan, dan faktor sosial telah ditunjukkan sebagai faktor yang paling kritikal untuk memberi kesan kepada penggunaan panel solar. Kesimpulannya, faktor sosial memainkan peranan penting dalam mempengaruhi penggunaan panel solar, di mana persepsi orang di Melaka ke arah penggunaan panel solar mudah dipengaruhi oleh orang lain.*



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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Nowadays, the environmental quality had become the most concerned issue in the world. The usage of fossil fuels had been blamed for warming up the climate, in which when coal, oil and gases are burnt, they release harmful gases which trap heat in the atmosphere and causes global warming (Abdeen, 2012). Apart from that, the usages of fossil fuels are depleting, in which the oil deposits known predicted to be gone by the year 2052. However, there are alternatives to reduce the usage of the fossil fuels, by using renewable resources. The commonly known renewable resources are wind, solar energy, hydropower, biomass and also geothermal energy. The renewable energies cannot replace the common energies in the near future, but they can enhance the range of energies exploited at the mean time (Abdelhamid et al., 2012). However, a study by Shell company predicted that the solar energy would be the most common energy resources in the near future. According to The United Nations Framework Convention on Climate Change (2009), the sunlight is not only exhaustible, it is also completely non-polluting. In

the researcher's opinion, the solar energy is the most suitable renewable energy to be used in Malacca, Malaysia since Malaysia is a tropical country with accessible sunlight whole year long.

Even though the solar energy is suitable in Malaysia, however there is a problem in which the solar technologies are still not fully adopted in Malacca. Therefore, the researcher conducted this research in order to find the factors that can affect the solar panel adoption.

## **1.2 Problem Statement/ Research Questions**

According to Johari et al.(2012), Malaysia was still highly dependent on non-renewable source such as fossil fuels and natural gases. Gas and coal was estimated to contribute 92% of the sources of electricity generation whereas hydro and oil would contribute 7% and 1%, respectively by the year 2010(International Energy Agency, 2010 as cited in Johari et al.,2012). Since Malaysia is a tropical country with accessible solar energy, people in Malacca should have fully utilized the solar power to enhance the usage of renewable energy. From the researcher's observation, people in Malacca do not have much awareness to the solar technologies, in fact only a few are utilizing it.

Further research questions have to be developed to understand the current situation of the adoption of solar panel located in Malacca. To enhance the awareness and the adoption of the solar panel, the only way to do so is to find out the factors that could affect the adoption decision.

Hence, the researcher developed two research questions as below:

- 1) What are the factors that can affect the solar panel adoption in Malacca?
- 2) To what extent do the factors impact on solar panel adoption among Malacca users?

The researcher aimed to know the factors that could affect the adoption decision of solar panel among the adopters in Malacca with the weather that is suitable to exploit the usage of solar technologies. Lastly, the researcher aimed to know to what extent the factors impact the solar panel adoption among the solar users in Malacca.

### **1.3 Research Objectives**

There are two research objectives being constructed in order to answer the research questions:

- 1) To identify the factors that can affect the solar panel adoption in Malacca.
- 2) To find out what is the extent do the factors impact on solar panel adoption among Malacca users.

### **1.4 Scope, Limitation and Key Assumption of the Study**

This section will discuss the scope, limitation, and key assumptions of the study.

### **1.4.1 Scope**

Malacca is a state in Malaysia which is currently still adopting the solar technologies to enhance sustainable feature. In this research, the scope has been limited to study the solar housing that are available in Malacca only, but not in other state in Malaysia. Besides that, the study of solar technologies in other related field, for example the exploitation of solar technologies in farming, industry etc. in Malacca will not be studied in this research.

### **1.4.2 Limitations**

In this research, there are certain limits that may cause the limitation of this study, or towards the finding of the researcher. The limits are:

- i) This study is only limited on the solar panel housing. Therefore, the findings of the researcher will only cover on the perspective of the owner of houses with solar panel, but not on perspective of whole solar energy usage
- ii) The researcher would assume that the respondents will answer the questionnaire honestly without giving any false answers

### **1.4.3 Key Assumptions of the Study**

The key assumption in this study is that the researcher assumes that the respondent will answer the question honestly, providing the answer in his or her very first intend. This is because if the respondent has lengthy time to think for his or her answers, the answers may be affected by secondary sources during the answering period. For example, the respondent may answer the question according to the answers from he or she had been heard, but not his or her own idea.

### **1.5 Importance of the Study**

This study aimed to make awareness to the adoption of solar panel among the residents. Therefore, the contribution of this study is to help entrepreneurs or agents of solar technologies gain awareness towards the residents, and also help them to study the trend or factors of adoption in solar technologies, thus penetrate through the solar technologies market in Malacca. Besides that, the awareness of solar technologies adoption towards the resident would probably increase the usage of solar panel housing, thus further move our steps towards achieving the aim of ‘Green State’ in Malacca.

Not only that, the depletion of non-renewable energy had become one of the most concerned issues in Malaysia. This study would indirectly help to encourage more people to adopt solar panel, thus solving the problem of using sources that are depleting and start to use renewable energy.

## 1.6 Summary

The development of a few Malaysian policies such as the 8<sup>th</sup> Malaysian Plan, and also the subsidies and incentives such as the Feed-in Tariff (Fayaz et al,2011) had been played as a major roles in encouraging the people in Malaysia. However, the researcher observed that the adoption rate of solar panel in Malaysia has been in a slow pace, especially in Malacca. The research had been carried out with two research questions and two research objectives, in which the researcher aimed to identify the factors that affect the solar panel adoption in Malacca, and to find out what is the extent do the factors impact on the solar panel adoption among Malacca users. Limitations had been found out, and proper steps can be implemented to achieve into a better findings. This study can be useful across the country, as it may help to act as a secondary data to help achieving better market penetration of solar panel into Malacca.