PRELIMINARY STUDY ON THE SUITABILITY OF THE INSTALLATION OF WIND SOLAR HYBRID OFF-GRID ENERGY SYSTEM IN PENINSULAR MALAYSIA

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ABSTRACT There were varies of renewable energy technologies available in market but these two types namely solar and wind have attracted more attention as wind and solar renewable energy systems can be set up as autonomous or stand-alone. Wind-solar hybrid system is the complementarily between the solar energy and the wind energy which one of the energy sources would offset shortfall of the other and produce significantly to meet the energy demand. Wind Solar Hybrid off-grid Energy System counted as a best hybrid model which compensate each other while create the expectation outcomes. The perceptions of the renewable energy authorities in Malaysia were interviewed and weather data been collected in order to detect the suitable location for implementation of this system. Based on the analysis of the findings, we found out that Wind Solar Hybrid off-grid Energy System consider having the potential possibility suitable installation in Peninsular Malaysia. Mersing, Johor had been identified as high potential condition to install this type of energy system. However, there were some barrier requirement such as size of land and capability of wind energy that need to be consider before installing the Wind Solar Hybrid off-grid Energy System. Awareness of hybrid energy system has been discover and attract attention by those energy department under government of Malaysia through this research.

Keywords: Sustainable Energy, Wind Energy, Solar Energy, Hybrid Energy, Peninsular Malaysia.

1. INTRODUCTION

Society go across the world live under large demand of electrical energy which the world energy demand will increase by 56% from 2010 to 2040 [1]. Therefore, global authorities are placing significant conviction about technologies system of renewable energy for major component strategy to deal with depletion energy resources and reducing energy related environmental problems, particularly CO2 emissions [2]. There are a variety of renewable energy technologies available in market but two of them namely solar and wind have attracted more attention as wind and solar renewable energy systems can be set up as autonomous or stand-alone.

Wind-solar hybrid system is the complementarily between the solar energy and the wind energy which one of the energy sources would offset shortfall of the other and produce significantly meet the energy demand [3]. Research done by Mann & Teilmann [4], discovered that wind solar hybrid off-grid energy system counted as a best hybrid model which grid connected state and compensate each other while create the expectation outcomes.

In 2012, SIRIM has successfully installed a preliminary demo of wind solar hybrid energy system at the tip of Borneo [5]. This experiment shown that Malaysia had strong wind and solar energy to be harnessed at the tip of Borneo. Besides, this demonstration has encouraged increase of interest. Therefore, this study aimed to determine the suitable location on the Peninsular Malaysia and roughly estimate the installation cost of wind solar hybrid off-grid system.

2. RESEARCH METHODOLOGY

By executing pilot study is to test the data's solid in first stage and obtaining more expert data and assessment from the general population who are in this line and expert. All the weather data on the solar and wind in the Peninsular Malaysia been collected from the Malaysia Meteorology Department. In order to gain a rigid weather data, an observation to the several potential sites been done.

3. FINDINGS AND DISCUSSION

Sustainable Energy Development Authority (SEDA) had been listed Wind Solar Hybrid off-grid Energy System as one of the important contribution in renewable energy sector in Malaysia. With high penetration of solar energy, this system can be run. However, due to the unconsistency of the wind energy especially in Peninsular Malaysia, this project is still under research.

After analysis all weather data and information given and recommend from Malaysia Metrological Department and supplier of Wind Solar Hybrid off-grid Energy System, Mersing is a potential location for installation of Wind Solar Hybrid off-grid Energy System. Although Mersing encounter has a relatively low solar radiation received while evaluate with others cities but one of the manufacture of Wind Solar Hybrid off-grid Energy System declared the battery provided can be fully charged as long as there is 8 hours of sunshine per day

Based by data of solar penetration, Mersing been listed as one of the top five which receiving the highest solar energy in a year (Figure 1). Not only that, Mersing also as one of the highest receiving of strong wind due to the location near to Malacca Straits. According to the wind speed data given by Malaysia Metrological Department which taken from 2 meters above ground shown that Malaysia has under goes strong wind speed in the early and end parts of year. By referring to the Figure 2, the tabulation data of wind speed in Mersing 2.87 ms-1 every year.

City	Average Temperature (°C)	Average Irradiation (kWh/m²/d)
Kota Bharu	27.1	5.22
Kuala Terengganu	27.3	5.41
Langkawi	28	5.06
Mersing	26.5	4.54
Miri	27	4.94

Figure 1. Solar penetration Data

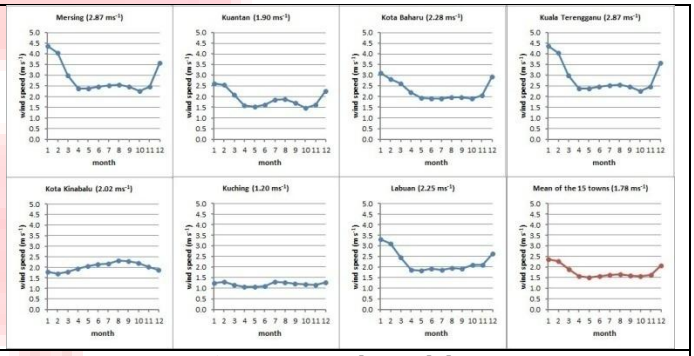

Figure 2. Wind speed data

4. CONCLUSION

Wind Solar Hybrid off-grid Energy System consider having the potential possibility suitable install in Mersing, Johor which has the high potential condition to install the energy system. However, there was some barrier requirement for example location, capability of wind energy and costing of system need to be achieve and consider before install a Wind Solar Hybrid off-grid Energy System in Malaysia.

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