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Renewable energy project: Project management, challenges and risk

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ABSTRACT

Renewable energy is one of the most popular topics in utilization of the electric energy resources. There are various types of alternative energy, which can be used as electrical energy. However, the suitability of the green energy in a certain country is depending on some criteria such as geographical location, the availability of energy and so on. In order to establish the renewable energy, a well-planned strategy and management must be acquired. The main objective of this paper is to analyse the causal relation of some important criteria of project planning and development of a wind energy project in Malaysia. By using a system dynamic approach, it is found that government policies, investment of renewable energy, energy demand, geographical location and fund management are the most important criteria that need to be considered among others. The diagram of causal relationship with reinforcing and balancing loop shows that the application of renewable energy in Malaysia is promising. In addition, the information of the criteria relationship is further investigated by using the stock flow diagram. From the diagram, the factors that affect project's expenditure could be analysed. This is very important to a developing country where more budgets can be allocated for other facilities, cultures, infrastructure, science, and technology development. By utilise the renewable energy in Malaysia, the carbon dioxide emission can be reduced and contribution to a sustainable and long term alternative energy resources country.

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1. Introduction

Carbon dioxide emission is one of the causes that contributed to the global warming. According to U.S. Energy Information Administration (EIA), the total carbon dioxide emission from the

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energy consumption in the world is 31,780.36 million metric tons in 2010 [1]. The carbon dioxide emission in China is the most in the world follow by North America and United States. Meanwhile, out of 0.6% of the total carbon dioxide emission is coming from Malaysia. In order to reduce the amount of carbon dioxide emission, the alternative ways in generating electricity must be utilised. For instance, China and United States used renewable energy as a part of electricity generation in the country. From the data of EIA, the total renewable-energy electricity generation for China and United States in 2010 is 770.92 billion kW h (or 770.92 TW h) and 427.38 billion kW h, respectively [1,2]. At the same time, Malaysia which located at the equator has used the renewable energy and generated 7.69 billion kW h or equivalent to 6.5% from entire electricity generation in 2010 [3].

Apparently, the electricity generation produces thousand million metric tons of the carbon dioxide. In order to minimise the impact of carbon dioxide towards global climate change, many countries approached renewable energies as the alternative electricity generation system. There are various types of renewable energies can be used. However, the suitability in terms of the availability of renewable energy in that particular country is the

most important criteria. In such circumstances, the feasibility of the renewable energy must be studied before the project can be started.

As the electricity generation by using the coal fire power plant, the carbon dioxide will release due to the burning process and that will contribute to green house effect. Meanwhile, the electricity production by using renewable energy only produces negligible carbon dioxide emission. Carbon dioxide naturally exists during the respiration process of human beings. Plants will absorb the carbon dioxide and release oxygen during photosynthesis. However, with the vast development of technology that contributes to the huge amount of carbon dioxide emission since last decades, the intensity of carbon dioxide in atmosphere increased and caused green house effect. In order to reduce the amount of carbon dioxide in atmosphere, many countries have the awareness on using green energy that only released small amount of green house gas.

Wind power is one of the lowest carbon dioxide emissions in between the renewable energies [4]. The zero carbon dioxide emission from the wind power has been encouraging the power service provider on selecting it for the electric power generation.



Fig. 1. The wind ranking of Malaysia by using Firstlook.

Source: Author's construction based on (<http://www.3tier.com/en/>).

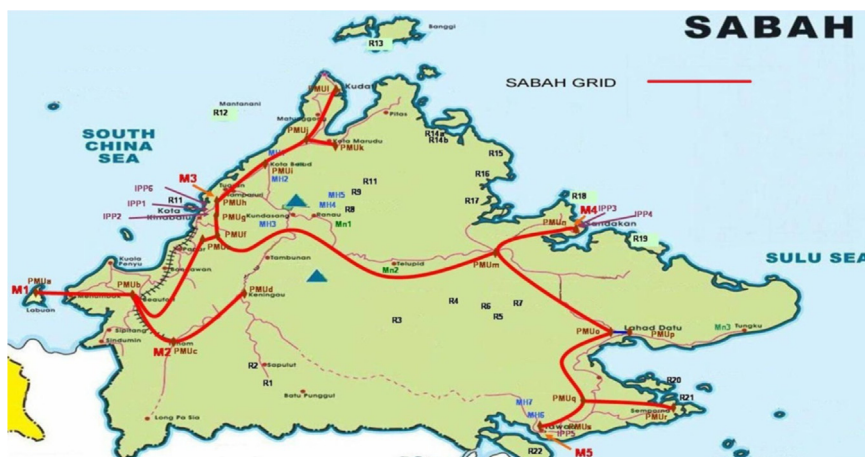


Fig. 2. Sabah grid interconnection map.

Source: Author's construction based on (www.thegreenmechanics.com/).

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