

INVESTIGATION OF THE POTENTIAL HARNESSING TIDAL ENERGY IN MALAYSIA

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ABSTRACT

Tidal energy has been recognized as one of the promising technologies for future electricity generation for its predictability as compared to solar and wind energy, yet traditionally it has been renowned as a technology that's relatively needed detail analysis for availability sites identification and cost. This paper presents an analysis of potential harnessing tidal energy for a country that has low tidal ranges like Malaysia. Tides Table Malaysia 2014 published by National Hydrographic Centre Malaysia has been used in identifying potential sites for harnessing tidal energy in Malaysia. The data are tabulated in monthly and the most potential site for harness tidal energy is presented in hourly versus the height of water for every each of coastal area in Malaysia for better comparison with the results shown.

Keywords - Renewable Energy, Tidal Energy

INTRODUCTION

In the past few decades, there has been a constant global increase in the demand for energy. According to the projections of the International Energy Agency (IEA) [1], the global energy demand has risen by about 40% since 1990, and a 53% increase is expected by 2030. Due to the high demand of electricity throughout the country, various energy sources needed to meet its energy consumption. Therefore, the renewable energy sources were verified to accommodate the demand of electricity.

The majority of the global energy demand is still highly depends on fossil fuels. Therefore, it will contributed to the emission of greenhouse gases, including carbon dioxide, and it is one of the causes of global warming to the world [2]. Consequently, fossil fuels comprise 93% of Malaysia's electricity generation and account for 36% of the country's 2010 Greenhouse Gas (GHG) emissions [3]. Not only that, the price of fossil fuels is also increasing day by day and this will lead to declining state revenues.

One of renewable energy that contributed to the energy sources is ocean energy. Lee *et. al* and Seng *et. al* [4] agree that the potential and commercial viability of harnessing ocean energy in Malaysia were not study thoroughly. Therefore, this paper provides a general view on the potential of harnessing tidal energy in Malaysia. Almost 75% from the earth is water and it is conceivable that tides based on this pollution free source of energy would be very cost-effective for generating electricity.

TIDAL ENERGY

Tidal energy [5] is derived from the gravitational force of attraction that operated between a molecule on the earth and the moon and between a molecule of the earth and the sun. Tidal energy exploits the natural rise and fall of coastal tidal waters caused mainly due to interaction of gravitational fields of the sun and the moon [6]. The effect of the moon and the sun is shown in Figure-1. This is because of the revolution of the earth; the lumps of tides are constantly in front of the position on earth directly under the moon. The gravitational compel between this allotment of water and moon creates a torque that decelerates the pivot of earth. Then again, this power serves to quicken the orbital development of moon around earth. As a result, without

other impedance, the rotational time of earth will at last be equivalent to the orbital time of moon.

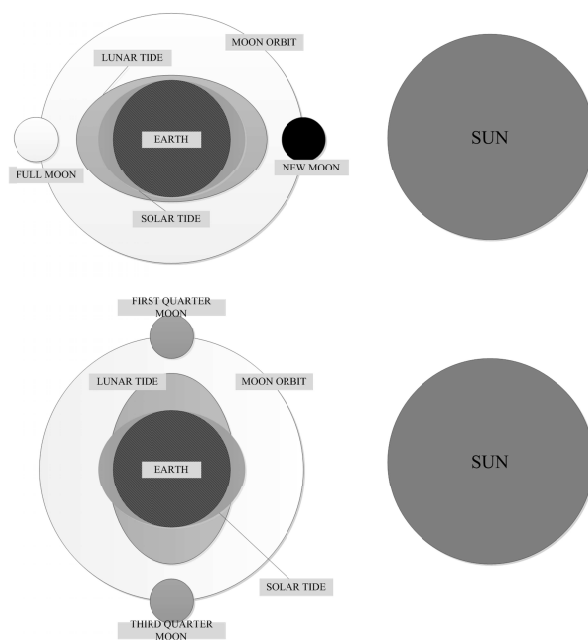


Figure-1. The Effect of the Moon and the Sun on Tidal Range

Tidal energy is the one of renewable energy sources and it is defined as a clean energy. The tidal energy also is more predictability other than other renewable energy sources. This is because it is able to produce energy twice a day for every day of the year [7]. Furthermore, tidal energy system also has a potential to generate large amounts of electricity. The usage of tidal vitality, which will inexorably lessen the tidal flows, exploits the rakish element vitality of earth in the comparative way. Notwithstanding, the procedure of tidal quickening is to a great degree moderate, and the phenomena of tides can be required to last until the vaporization of the sea on earth billions of years later [6]. Subsequently, the tidal energy can be delegated renewable energy. Ocean energy has been classified into three types