

A Brief Note on Tidal Energy

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DESCRIPTION

Our earth surface is having 71 percentage of ocean and remaining 29 percentage is land and other landforms. The total length of the world coastline is about 1.16 Million Kilometers. Canada is having longest coastline in the world is about 243,000 Kilometers.

We have different types of renewable energy resources one of those is tidal energy. In this tidal energy the energy in the tidal is converted into mechanical energy by using turbines and mechanical energy is converted into electrical energy by using generator. At the coastline tides are continuously raise and fall, these tides have gravitational energy to rotate a mini turbines and the power produced by using this tides is called tidal power. But the tidal energy is not so widely used, it has potential for future to produce electrical energy from tidal energy. Tides are predictable and continue than the sun and wind, there are 2 high tides and 2 low tides every single day. The prediction of tides is possible with the periodic attraction of gravitational forces between earth and moon, it help engineers to make designs as per requirement.

Tidal power production is in generally four ways they are tidal streams, tidal barrages, dynamic tidal power and tidal lagoons. The density of water is more than air, in the tidal stream generators the power turbines are placed same as wind energy where the water flow with some velocity. These stream generators are placed either horizontally or vertically and it can be submerged or open type. But compared to wind energy the efficiency is high because of high density of water. In these streams kinetic energy is converted into electrical energy. In tidal barrages the water is stored at some hydraulic head, this difference in hydraulic head creates potential energy. This potential energy is converted into mechanical energy while turning turbine. The dynamic tidal energy process is a theoretical technology that will work on interaction between kinetic and potential energy in tidal flows. Tidal lagoons are similar to barrages but partly enclosed with barriers. In this process tidal turbines with generators are placed at the entrance of the lagoons.

The equipment and technology involved in production of tidal energy is high expensive as compared with other renewable energy systems, but it can withstand to up to 120 years. The technology required high capital investment, maintenance and repairing is challenging. And the produced power is need to transfer long distance. Powerful tides happen only 10-12 hours in normal days. These are the reasons behind not to increase in tidal power production [1].

The first tidal power production is opened in 1966 at La Rance in France with the capacity of 240 Megawatts. The largest tidal power production installation is located in South Korea with 254 Megawatts in 2011 at Sihwa Lake. In North America first tidal power project started in 1984 with the capacity of 20 Megawatts at Bay of Fundy. In Scotland largest tidal power project in currently under construction with 398 Megawatts target is named as MeyGen.

The tidal power production process is affect marine life, rotating turbine blades may accidentally kill marine life. And acoustic output produced by the tidal energy equipment will affect the marine mammals, because the amplitude and frequency of the sound generated in the water is more. Metal parts of the energy device and generators will be damaged with saltwater and maintenance also difficult under seawater. Surrounding marine life will be effected with the leakage of lubricants [2].

The total production of tidal power is 3000 Gigawatts as compared to other renewable energy systems this is low. Environmental concerns raised in tidal energy are the reasons for this output. One of the major advantage in this system is there is no release of harmful or toxic gases and no waste is produced. There is a need to develop the technology of hydrokinetic tidal energy conversion with less effect on marine life. And more researches are necessary on these processes [3]. Largest organization in energy system is International Energy Agency (IEA) reports on energy production and consumption says that production of fossils is 80% and half of the production from China, United States and Arab States of the Persian Gulf. IEA says that the exportation of these fossils is more from Gulf States and Russia. The demand in China and European countries is high. The solar and wind energy production increase

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rate is 20% per year. Using fossil fuels causes to increase in Carbon dioxide emissions, as per recent year calculations CO₂ emission was 38 Giga tons. So, it is the time to change from conventional energies to non-conventional energies.

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