

# Tidal Energy : A Review

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## Abstract:

*The demand for power is ever increasing. The power is produced by using turbines at the power stations. The conventional method of electricity generation needs coal. Many countries are facing the problem of power crises. The use of non conventional resources like solar energy, tidal energy is considered as promising alternative. This*

*review aims at summarizing the research carried out on tidal energy.*

## Keywords:

Wind; offshore; resources; energy; cost.

## Introduction

The key to the economic development of the country is industrial growth. The industries need power for their function. Also increase in the living standard of people in many countries is the positive aspect of this growth. This increased living standard in turn gives rise to increase in power demand. This cycle calls for use of non conventional energy resources and optimization of available resources. The optimization of heat exchanger design, reduction in friction are such attempts [1, 2, 3]. Also the use of biofuel is being tried as alternative to conventional fuel [4]. Use of solar energy is being done in order to reduce the demand for conventional energy supply [5, 6]. Process intensification can also save energy in chemical industries [7, 8]. Use of biotechnology for synthesis of various feed stocks also reduces energy consumption [9, 10]. The tidal energy is

attracting the researchers as source of alternate non conventional energy in order to meet power crises. This review presents research carried out on tidal energy and its effects on environment.

## Research on Tidal Energy

The research carried out by Caraiman et.al. dealt with a conversion system concept based on the real time simulation of a hybrid offshore wind and tidal current system[11].They presented a simulation research device composed by two real time emulators:, one for each type of energy: a wind turbine emulator and a tidal turbine emulator. The study was carried by Johnson and pride on status and future opportunities for river, tidal, and ocean current hydrokinetic energy technologies in

Alaska [12]. Their study indicates that, the concept of tidal energy, which was limited upto studies and experiments, is now being practicality and necessity in the ever growing power sector. In the region, many large scale projects are coming up and will be implemented. Frid et.al studied the environmental interactions of tidal and wave energy generation devices [13]. According to them new technological advancements render applicability and adoptability to tidal energy. Even, the costs of traditional energy resources are ever increasing. Bird feeding areas can be affected by tidal barrages. They can also alter habitats. According to them, the problem can be overcome by the provision of new intertidal areas/lagoons which provide feeding grounds during the high water period landward of the barrage. Barr et.al. studied the summertime influences of tidal energy advection on the surface energy balance in a mangrove forest [14]. According to them, for tidal ecosystems, the surface energy balance is complex. Their study was aimed to quantify impacts of tidal flows on energy dynamics within a mangrove ecosystem. They also carried out an intensive 10-day study in a mangrove forest located along the Shark River in the Everglades National Park, FL, USA. According to their results, energy storage and advection associated with tides in a mangrove forest significantly affects the surface energy budget. A review of the current understanding of tidal energy resources in the context of the emerging technology of tidal stream power generation was carried out by Blunden and Bahaj[15].According to them, Analytical and experimental data needs number of parameters, field data. Also velocity profile across the rotor requires scale and field data for comparison. Klymak et.al. carried out research for estimation of tidal energy

loss to turbulence [16].They observed that the diffusivity on seashore was 15 times that in the midwater column. They also observed that approximately 3 to 1.5 GW of energy dissipated near the ridge. According to Ali et.al. renewable energy is the only solution in order to meet up the future crisis[17].They emphasized the need to promote the tidal energy in order to meet the power crises. They discussed the importance of renewable energy with respect to Bangladesh. They concluded that more research is necessary for development of new, efficient, low-cost and environmentally friendly hydraulic energy converters. Studies on tidal energy availability in Minas Passage of the Bay of Fundy were carried out by Karsten et.al. [18].They determined the theoretical maximum power production over a tidal cycle. Numerical simulations of the Bay of Fundy–Gulf of Maine system agreed remarkably well with the theory. An overview of current design practices with respect to tidal energy was presented by Khalid et.al [19].Their study was focused on vertical axis tidal turbine. According to them this method poses less threat to the environment. Also it does not face the same limiting factors associated with tidal barrage schemes.

## Conclusion

Use of nonconventional energy resources is the need of modern civilization and industrialization. Many nonconventional resources are being tried in order to reduce the energy crises. These include solar and tidal energy. Tidal energy is promising alternative in this respect. There is still scope for research in order to find the methodology for tidal energy generation without affecting aquatic life on seashores and minimum environmental impact.

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