The Needs of Ocean Wave Energy Research in Sri-Lanka

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Abstract

Energy crisis is one of the most critical dilemma facing Sri-Lanka. Long power cuts few years ago affected all sectors of the country's economy and the life style of its people. The main conventional source of electricity in Sri Lanka is hydropower and its economical potential has already been tapped. The discussion on the location of the proposed coal power plant has been continuing for more than fifteen years. Therefore, the government has implemented the utilization of diesel/gas power plants, which has had an immense negative impact the country's economy. According to the Ceylon Electricity Board, by the year 2020 over 75% of the total electricity demand, which is estimated, to be 30 Twh/Year has to be covered by the non-hydro resources. This figure has to be increased in four (4) times if the country expects NIC status. Available alternative energy sources could play a significant role to fill the break.

The ocean consists of an enormous energy potential. This potential exists in various ways; Currents, waves, temperature difference, Salinity difference etc,. The total power released only by waves breaking along the world's coastlines has been estimated to be 2-3 million megawatts, equivalent to several thousand large power plants. In Sri-Lanka there are three possible ways to generate electricity from Ocean; waves, Ocean thermal energy conversion (OTEC) and Solar pond system. Among these ocean surface wave is the most simple and promising method.

The wave heights around Sri-Lanka are 0.8 – 3.5m and the period around 9- 14 seconds. The calculations show that the average potential of wave energy per linear meter is around 10 kw/hrs. It's total potential throughout the whole coastal line is around 2000 mw. This equals to country's present total demand. From most appropriate zone (high energy zone) from Dondra head to Palatupana can be converted 200 mw, which equivalent to the capacity of the biggest hydro power plant in Sri-Lanka "Victoria"

Among hundreds of wave energy harnessing devices Oscillation Water Column plant (OWC) is most suitable type for the Country. Cost benefit analysis illustrates the specific cost of the 1MW OWC plant would be around 5.7 Rs/kwh and thus the OWC is a competitive bidder among other alternative and non-conventional power sources accepted by Ceylon Electricity Board (CEB). All these factors indicate that research to utilize wave energy for power generation in Sri-Lanka should proceed immediately.