

C-03 Bundala as a suitable site for an ocean wave power plant

T K D Tennakoon

(Oceanography Div, NARA, Crow Island, Colombo 15)

The ocean is a reliable alternative energy source to generate electricity. Waves, tidal difference, temperature difference, Salinity gradient, in the ocean could be used to generate electricity. Waves and temperature difference are the most suitable methods to generate electricity in Sri Lanka. A project to select suitable

sites for on Ocean wave power plant in Southern and South-Eastern coastal belts of Sri Lanka, was commenced.

Selection and investigation of suitable sites, calculation of wave energy potential and recommendations of a site for the wave power plant were the main objectives of the project. Coastline of Bundala saltern was one of the selected locations for investigation.

The survey was conducted for a period of 1½ years from February, 1994. Parameters such as Wave period & height, wind velocities beach profile changes, sea bottom morphology, tidal variations and current patterns were measured using self recording gauges as well as visually during the monthly visits. The results were analyzed using universal integral equations. The result shows that the average wave period and height were in the range of 0.7-3.8m and 5-14sec. Average wind data was received from the local authorities.

Using the following equation average monthly wave power per linear meter, was calculated:

$$N = 0.125 \rho g h^2 t$$

(N- wave power per linear meter, ρ - water density, h- wave height, t-wave period).

The results shows the total wave power of Bundala area is around 8-44kW/m. Normally between 30-40%, from this could generate electricity through the wave power plant; about 3-14 kW/m could be achieved from waves. Covering of 10m wave length could build a plant with average capacity of 50kW.

1. Bundala is one of the best areas to build a wave power plant in the South-Eastern coastal belt.
2. The surveyed area does not have large scale erosion and accumulation.
3. The wave characteristics of the subjected area depends on the monsoon but compared to other places strong waves are noticed during the whole year.
4. The wave heights and periods were in the range of 0.7-3.8m and 5-14 sec.

5. The generating capacity of waves in the Bundala area is about 3-14 kW/m depending on wave pattern.

The Oscillating water column or floating salter duck type wave power plants could be recommended for Bundala.

Financial assistance from NARESA is acknowledged.