Chapter 7
Sea Waves Energy

7.1 Generalities

If at the end of the nineteenth century the most widespread energy used – the electricity – had an auxiliary and insignificant role in the global energy balance, then in 1930 about 300 billion kWh of electricity were produced in the world, and in 2004 this figure reached 21,000 billion kWh [1]. The material and the spiritual level of mankind are directly dependent on the amount of the available energy. The stringent laws of the nature state that useful energy can be obtained only by converting it from other forms. The World energy structure analysis shows that 4 out of 5 kW are obtained, in principle, using the same method by which the primitive man heated himself, that is by burning fuel, or by using its chemical energy converted into electricity at power plants. Of course, fuel combustion methods have become much more perfect.

But the largest energy reserves are stored in the oceans – a large area of water currents continuously moving and covering about 71% of the planet's surface. The Planet Ocean has a huge energy potential that can be employed to produce electricity. The main sources of the ocean energy considered, at least in the current technical level, refer to: tides, currents, waves, temperature differences of the seawater layers. The first mathematically documented explanation of the tidal forces was done in 1687 by Isaac Newton in his work *"Philosophiae Naturalis Principia Mathematica"*. Tides occur regularly in certain coastal areas of the planet at amplitudes reaching sometimes 14–18 m, resulting in slow oscillations of the sea water level (Fig. 7.1). The principle of using the tidal energy at tidal power plants, by the way the only source presently used from all above mentioned, envisages the arrangement of dammed pools in order to make possible the capture of water energy, triggered by these oscillations, both at tide rise (during flow) and at tide fall (during ebb). The use of the World's sea and ocean energy is still behind the use of the wind and other renewable energy sources. Certain opinions identify a gap of about two decades. Perhaps, the coming years will witness the emergence

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