



Innovative Wave – Power Concept

Physicists have found a new way to focus water waves that could be useful for wave-energy applications. If their discovery is proven to work in practice, it could largely contribute to the evolution of economically competitive and environmentally sustainable wave power technology that could increase the share of ocean energy in global energy production.

Although the wave power technology is relatively new and currently not economically competitive with more mature technologies such as wind energy, its potential should be taken in consideration for achieving the ambitious EU mandatory target of increasing the share of energy from renewable sources to 20 % by 2020.

According to the World Energy Council, wave power could eventually supply 15% of current global energy demand. The question is how to efficiently control the flow of ocean waves for clean power generation? A very recent discovery might be at the bases of a possible solution to this question.

Physicists at Hong Kong University have recently demonstrated that some fundamental optic principals may be applied to the ocean waves. They used computer simulations to describe the propagation of waves through a sort of a wave-focusing lens made of a lense-shaped range of vertical cylinders anchored under the water.

Their results showed that by varying the size and spacing of the cylinders, they were able to control the dynamics of the water waves across the cylinders, in much the same way that mirrors and glass lenses control the light.

If this device proves to work in practice, even the waves with wavelengths of hundreds of meters would be refracted by a few tens of meters of wave lens, into a single point where their mechanical power could be transformed into electrical power by a single energy converter. In this way, most of the wave power would be efficiently used for electricity generation.

The next step is to pass from theory to practice and to evaluate the actual effectiveness of water-wave lenses through a series of demonstration projects. Furthermore, economical competitiveness and environmental sustainability of wave-lenses and associated wave power converters also need to be evaluated.

In any event, advances in ocean energy research and technology represent the bases for increasing the use of waves for clean power generation. Indeed, the waves are known to contain the highest amounts of energy among the renewable energy sources. Therefore, the “blue energy” contained in ocean waves has the potential of significantly increasing the share of green energies in global energy production.

Sources: Ball P. (2005) “Wave energy gets to the point”, Nature on-line

Hu X. & Chan C.T. (2005) “Refraction of Water Waves by Periodic Cylinder Arrays”, Phys. Rev. Lett. 95, 154501

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