Wave-Powered Desalinator

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The lack of drinking water in the near future is one of the key problems that appeared before humanity in 21st century. Therefore, the best way to obtain fresh drinking water is desalination of sea water. Most of methods are very energy-consuming. I became interested if wave energy can be used for effective work of desalination equipment. The purpose of my research was to find possible engineering solution to this problem.My converter consists of frame with working chambers and drive starf. Originality of my conception is construction of working chambers and location of valves. When maximum of a wave passes the device, the valve closes and empty chamber moves up due to the Archimedes' principle. When the minimum of a wave is in, filled chamber moves down by the gravity force. The imbalance of the system rotates the whole installation. The rotation is passed on a high-pressure pump. Due to pressure from salt water on a membrane filter manufactures some amount of drinking water. Remaining salt water is accumulated in the water tower and used to produce electricity on a hydro-turbine. In laboratory and field tests I made and successfully tested different experimental modules, including test on the river Dnieper in real-life conditions. Preliminary assessment of construction cost with conversion rate 1.5 m3/day is in range $15,000 in serial production. And also I can create more than 0,5MWh electricity per month in comfortable form. Payback (compared with diesel generator) is 1year! As a result, the tests and preliminary calculations show that proposed device can be effectively used in coastal, island and other territory to obtain sufficient amounts of fresh water and electricity. And thanks to the modular design of the plant capacity can be increased up to several MW.

Awards Won:

Third Award of $1,000