

The 3 Types of Ocean Thermal Energy Conversion

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Ocean Thermal Energy Conversion (OTEC) was first conceived by French engineer Jacques D'Arsonval in 1881. OTEC is a potential alternative energy source that needs to be funded and explored much more than it is presently. As a matter of fact, at the time of this writing the Natural Energy Laboratory of Hawaii is home to the only operating experimental OTEC plant on the face of the earth.

The biggest hurdle to get over with OTEC implementation on a wide and practically useful scale is cost. It's difficult to get the costs down to a reasonable level because of the processes presently utilized to drive OTEC. Ocean thermal energy would be very clean burning and not add pollutants into the air. However, this is a difficult task to accomplish at the present time with our current technologies, because of the possibility of OTEC plants disrupting and perhaps damaging the local environment.

There are three types of OTEC.

"Closed Cycle OTEC" uses a low-boiling point liquid such as, for example, propane to act as an intermediate fluid. The OTEC plant pumps the warm sea water into the reaction chamber and boils the intermediate fluid. This results in the intermediate fluid's vapor pushing the turbine of the engine, which thus generates electricity. The vapor is then cooled down by putting in cold sea water.

"Open Cycle OTEC" is not that different from closed cycling, except in the Open Cycle there is no intermediate fluid. The sea water itself is the driver of the turbine engine in this OTEC format. Warm sea water found on the surface of the ocean is turned into a low-pressure vapor under the constraint of a vacuum. The low-pressure vapor is released in a focused area and it has the power to drive the turbine. To cool down the vapor and create desalinated water for human consumption, the deeper ocean's cold waters are added to the vapor after it has generated sufficient electricity.

"Hybrid Cycle OTEC" is really just a theory for the time being. The theory describes the way we could make fully utilize the natural thermal energy of the ocean's waters. There are actually two sub-theories to the theory of Hybrid Cycling. The first involves using a closed cycling to generate electricity. This electricity is in turn used to create the vacuum environment needed for open cycling. The second component is the integration of two open cyclings such that twice the amount of desalinated, potable water is created than with just one open cycle.

In addition to being used for producing electricity, a closed cycle OTEC plant can be utilized for treating chemicals. OTEC plants, both open cycling and close cycling kinds, are also able to be utilized for pumping up cold deep sea water, which can then be used for refrigeration and air conditioning. Furthermore, during the moderation period when the sea water is surrounding the plant, the enclosed area can be used for mariculture and

aquaculture projects such as fish farming. There is clearly quite an array of products and services that we could derive from this alternative energy source.