

What devices are used for OTEC energy?

There are three potential types of OTEC power plants, open-cycle, closed-cycle and hybrid systems. Open-cycle OTEC systems, illustrated in Figure 2a, exploit the fact that water boils at temperatures below its normal boiling point when it is under lower than normal pressures. Open-cycle systems convert warm surface waters into steam in a partial vacuum, and then use this steam to drive a turbine connected to an electrical generator. Cold water piped up from deep below the ocean's surface condenses the steam. Unlike the initial ocean water, the condensed steam desalinated (free of salt) and may be used for drinking or irrigation.

Closed-cycle OTEC systems use warm surface waters passed through a heat exchanger to boil a working fluid, such as ammonia or a chlorofluorocarbon, which has a low boiling point. The vapour given off is passed through a turbine/generator producing electricity. Cold deep ocean water is then used to condense the working fluid and it is returned to the heat exchanger to repeat the cycle. Alcan Aluminum of Canada is working with a consortium of companies to build a pilot 500 kilowatt closed-cycle OTEC facility at Keahole Point, Hawaii. Hybrid OTEC systems produce both electricity, with a closed-cycle system, and fresh water, with an open-cycle system.

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