

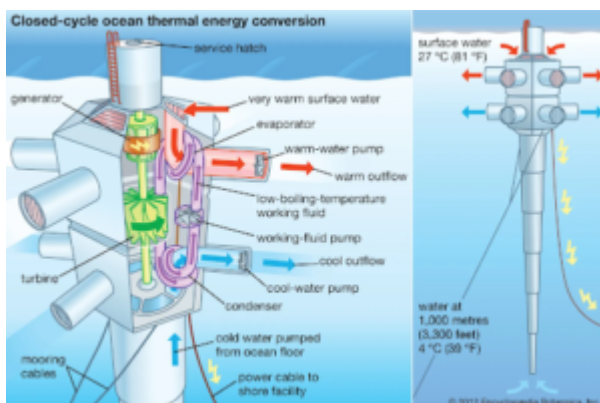
# Ocean Thermal Energy Conversion (OTEC) plant

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**In news**– Recently, the Union Minister of State (Independent Charge) Earth Sciences stated that an Ocean thermal energy conversion plant is coming up in Lakshadweep.

## **About the plant & OTEC technology-**

- **OTEC is a form of energy conversion that makes use of the temperature differential between the warm surface waters of the oceans,** heated by solar radiation, and the deeper cold waters to generate power in a conventional heat engine.
- The **National Institute of Ocean Technology**, an autonomous institute under the Union Ministry of Earth Sciences (MoES) **is establishing OTEC plant with a capacity of 65 kilowatt (kW) in Kavaratti**, the capital of Lakshadweep.
- The **plant will power the one lakh litre per day** low temperature thermal desalination plant, which **converts seawater into potable water.**



- The current OTEC project is being set up to power a desalination plant. The power expected to be generated is under 200 kW.
- India is geographically well-placed to generate ocean

thermal energy, with around 2000 kms of coast length along the South Indian coast, where a temperature difference of above 20oC is available throughout the year.

- **The total OTEC potential around India is estimated as 180,000 MW, considering 40% of gross power for parasitic losses.**
- **The OTEC concept was first proposed in the early 1880s by the French engineer Jacques-Arsène d'Arsonval.**
- His **idea called for a closed-cycle system**, a design that has been adapted for most present-day OTEC pilot plants.
- **Such a system employs a secondary working fluid (a refrigerant) such as ammonia.**
- Heat transferred from the warm surface ocean water causes the working fluid to vaporize through a heat exchanger.
- The vapour then expands under moderate pressures, turning a turbine connected to a generator and thereby producing electricity.
- Cold seawater pumped up from the ocean depths to a second heat exchanger provides a surface cool enough to cause the vapour to condense. The working fluid remains within the closed system, vaporizing and reliquefying continuously.