

OCEAN ENERGY FAQ'S



1. What is ocean renewable energy or marine renewable energy?

Answer: Ocean renewable energy or marine renewable energy are terms used to describe all forms of renewable energy derived from the sea including wave energy, tidal energy, ocean current energy, salinity gradient energy and ocean thermal gradient energy.

2. What is wave energy?

Answer: Wave energy describes energy generated from the power of waves near their surface. Several different types of wave energy conversion devices extract power from motion of waves. These include single point absorbers. The power take off device within these systems converts the motion of the waves into electrical energy.

Wave power can also be captured through oscillating water columns, which trap waves in a column and change the air pressure in the upper portion which drives a turbine. Wave power can also be captured through an overtopping device, which traps waves in a floating pool, which is then released through turbines to generate power

3. What is the expected potential of Wave energy in India?

Answer: India is expected to have 40,000 MW of Wave energy potential.

4. What is tidal energy or tidal stream energy?

Answer: The tidal cycle occurs every 12 hours due to the gravitational force of the moon. The difference in water height from low tide and high tide is potential energy. Similar to traditional hydropower generated from dams, tidal water can be captured in a barrage across an estuary during high tide and forced through a hydro-turbine during low tide. To capture sufficient power from the tidal energy potential, the height of high tide must be at least five meters (16 feet) greater than low tide. There are only approximately 20 locations on earth with tides this high and India is one of them. The Gulf of Cambay and the Gulf of Kutch in Gujarat on the west coast have the maximum tidal range of 11m and 8m with average tidal range of 6.77m and 5.23m respectively.

5. What is the expected potential of Tidal energy in India?

Answer: India is expected to have 9,000 MW of Tidal energy potential.

6. What is Current Energy?

Answer: Marine current is ocean water moving in one direction. This ocean current is known as the Gulf Stream. Tides also create currents that flow in two directions. Kinetic energy can be captured from the Gulf Stream and other tidal currents with submerged turbines that are very similar in appearance to miniature wind turbines. As with wind turbines, the constant movement of the marine current moves the rotor blades to generate electric power.

7. What is OTEC?

Answer: Ocean thermal energy conversion, or OTEC, uses ocean temperature differences from the surface to depths lower than 1,000 meters, to extract energy. A temperature difference of only 20°C can yield usable energy. Research focuses on two types of OTEC technologies to extract thermal energy and convert it to electric power: closed cycle and open cycle. In the closed cycle method, a working fluid, such as ammonia, is pumped through a heat exchanger and vaporized. This vaporized steam runs a turbine. The cold water found at the depths of the ocean condenses the vapor back to a fluid where it returns to the heat exchanger. In the open cycle system, the warm surface water is pressurized in a vacuum chamber and converted to steam to run the turbine. The steam is then condensed using cold ocean water from lower depths.

8. What is the expected Potential of OTEC in India?

Answer: OTEC has a potential installed capacity of 180,000 MW in India.

9. How does OTEC compare to other base load power sources?

Answer: Due to its high (94 percent) capacity factor, OTEC's consistent power source is best compared to other baseload (firm) power generators such as oil, coal, nuclear, integrated gasification combined cycle (IGCC), and gas/oil combined cycle. Although OTEC has a higher initial capital cost, its "free" fuel and very low operating expenses make it attractive over the plant's life.

10. How does OTEC compare to other renewable technologies?

Answer: OTEC is fueled by an infinite supply of solar energy stored in the ocean's top layer. Even after the sun goes down, OTEC can tap the stored solar energy and generate power 24 hours a day, 365 days a year. Energy supplies from renewable sources such as solar and wind, are not consistent and predictable. Geothermal energy is very site specific, and biomass renewable energy consumes precious agricultural resources.

11. What emissions are associated with OTEC?

Answer: There are no emissions associated with OTEC. Therefore, OTI's OTEC power plants will not impact air quality.