



Ocean Thermal Energy Conversion (OTEC) Environmental Impacts

The environmental impact studies from the 1980s concluded that the risks of OTEC would likely be acceptable, however; further environmental assessments and research are needed to address the following potential issues:

Potential Impacts:

1. Withdrawal and Discharge Water:

A 100 MW facility would use 10-20 billion gallons per day of warm surface water and cold water from a depth of approximately 3300 feet (1000 meters). The impacts of discharging this large volume of water in the ocean needs to be better studied. The water discharged from OTEC facilities will be cooler, denser and more nutrient rich due to the composition of the deep cold water being different from the receiving waters. Nutrient rich water (with nitrogen and phosphorus) would likely be discharged at a depth where the ambient water is warmer and oligotrophic (nutrient poor). The resulting indirect and cumulative impacts to marine biota and the dynamics of the marine ecosystem from these displacements are not fully understood.

2. Impingement and Entrainment:

Screens are needed for both the warm and cold water intake systems to prevent debris and larger species from entering an OTEC facility. Impingement may occur where organisms become trapped against the intake screen. Smaller organisms which pass through the intake screen may be entrained through the system. Both could be lethal to the organisms.

3. Biocide Treatments:

The warm water that is used in the OTEC facility would need to be treated with a biocide (e.g., chlorine) to maintain the efficiency of the heat exchangers in the OTEC facility. The amount of biocide needed will likely be less than the maximum discharge allowed under the Clean Water Act.

4. Other Potential Impacts:

The electromagnetic field of the cable bringing the electricity to the shore may impact navigation and other behaviors of marine organisms. The platform presence may cause organism attraction or avoidance, and its mooring lines may cause entanglements. The noise generated from an OTEC facility may also impact marine mammals.

Addressing Impacts:

These potential impacts will be considered in the development of new regulations for licensing OTEC facilities, and in the Environmental Impact Statement (EIS) that must be developed for those regulations. In addition, these impacts will be considered in the review of individual applications which will require their own EIS. Those reviews will consider not only the direct, indirect and cumulative impacts of OTEC but also how those impacts may offset other impacts such as those associated with fossil fuels.

Past Reports

- OTEC Final Environmental Impact Statement (1981) -- The document considers the reasonably foreseeable environmental consequences inherent to commercial OTEC development under the legal regime established by the OTEC Act of 1980. Regulatory alternatives for mitigating adverse environmental impacts associated with construction, deployment and operation of commercial OTEC plants are evaluated. The report is available at: <http://coastalmanagement.noaa.gov/programs/media/otec1981feis.pdf>.
- The Potential Impact of OTEC on Fisheries (1986) -- The NOAA Technical Report addresses the potential positive and negative impacts of OTEC on fisheries, focusing on pumping large volumes of warm surface water and deep cold water and its subsequent discharge on biota. The report is available at: <http://coastalmanagement.noaa.gov/programs/media/otec1986fishimpact.pdf>.