

I. INTRODUCTION AND FINDINGS

OTEC is a proposed system for extracting useful energy from the solar heat stored in vast surface waters of tropical and semi-tropical oceans. OTEC systems aim to utilize the temperature difference between warm surface and cold, deep ocean water to power turbines and produce electricity. Some designs would use electricity for at-sea production of energy intensive products such as ammonia. The federal Department of Energy is sponsoring a major effort to develop the OTEC system as a future source of energy.

Much additional work has been done on OTEC since OTA's original report was issued. There have been a number of specific technical achievements and the funding level for the program has grown from about \$15 million annually to a current annual spending pace of \$40 million. Since the OTEC program was established in the Energy Research and Development Administration five years ago, the Federal government has invested over \$100 million in it. In addition, a number of important technical projects have been privately funded.

The DOE is weighing data and awaiting results from additional tests before making a key decision on whether to support the first large pilot plant. Some critics of the DOE approach believe it is overly cautious and that enough information is now available to justify an immediate decision to build several pilot plants. Other critics feel that other energy technologies are more meritorious~

MAJOR FINDINGS

The principal findings which can be summarized from this OTA analysis

of current OTEC technology are:

1. The technology base for OTEC has improved over the past two years, and has consequently lowered the technical risk involved in constructing a moderate-sized (10-40 megawatt) pilot plant. It has not, however, developed to the point where the costs of large commercial plants can be accurately estimated.
2. The most significant technical accomplishments which have occurred over the past two years are the small scale (10 kilowatt) demonstration of system feasibility of Mini-OTEC (a barge-mounted test plant) and the improvements in several aspects of heat exchanger performance through laboratory and sea tests.
3. Very little has been done recently to evaluate the potential ocean thermal energy resources available for major OTEC commercialization; the present DOE development strategy does not adequately consider the future resource availability.
4. The OTEC program within DOE has grown in size and scope over the past two years and many competent technical groups have been involved in recent OTEC work. However, it is not certain that the project team could adequately respond to a major acceleration effort which would entail pilot plant construction prior to FY 82.