

# 11. The OTEC Program

Within the DOE Office of Solar Technology, OTEC is one of five major systems development projects.<sup>2</sup> In 1978 when OTA published its OTEC assessment the DOE Program was just beginning to reach its present level of attention. The 1978 OTA report described the work leading up to this major Department of Energy program, and analyzed the status of the technology, the economic projections, and the government funding plans.

That report presented three options of future federal funding for consideration ranging from a no funding approach to a "systems development funding" approach which would entail annual costs of several hundreds of millions of dollars. The present Department of Energy program appears to be patterned after a middle-range approach which OTA described as an "R&D funding" approach.

Since 1978 much additional research work has been done on OTEC through this approach. A number of specific technical achievements have been recorded and **DOE program** funding has increased to almost \$40 million annually; it is planned to remain at about that level through FY 81.

The past and future federal funding by major category is shown in a budget breakdown in Table 1. It can be seen from the budget breakdown that the DOE is switching emphasis from technology development to hardware testing. In fact, the OTEC-1 test platform which is scheduled to go to sea this June is currently using about one half of the program funds.<sup>3</sup>

Table 2 shows the DOE OTEC-1 schedule and the schedule for an OTEC Pilot Plant. DOE has assumed that enough information will be available by the beginning of FY 82 to make a decision on whether to proceed with a 10-40

MW pilot plant. Such a plant would require a major increase in funding for construction, testing and evaluation.

DOE also has plans to fund studies of competing pilot power plant designs. Recent construction cost estimates for a 40MW pilot plant range between 150 and \$300 million and the number of pilot plants which could or should be built is a matter of considerable debate. The proposed legislation which is now before Congress (S-1830 and HR 5796) suggests an accelerated program which would include construction of one or more plants to attain a goal of 100 megawatts by 1986 and 500 megawatts by 1989. The Congressional Budget Office estimates that such an accelerated program would cost \$1 billion over the next five years.<sup>4</sup>

The DOE program strategy is to concentrate on the US island market potential for early OTEC pilot and demonstration plants but not to make a decision on the first or subsequent pilot plants until more test results are in. Bennett Miller of DOE, testifying before the House Science and Technology Committee in February 1980, stated that if results from OTEC-1 and other tests are encouraging and a decision is made to build an OTEC pilot plant, it is anticipated that detailed design and construction can be started in FY 1982 and completed in FY 1985. This pilot plant is planned to be of a scale sufficient to demonstrate the performance and reliability of both the total system as well as the individual components and to provide enough information for a decision to build a commercial size facility.<sup>5,6</sup>

While the strategy of building initial systems for island markets is considered logical by many, the pace of the program has been criticized by several of the private companies and researchers who have been involved in OTEC development over the past years. Some also claim that the plant ship

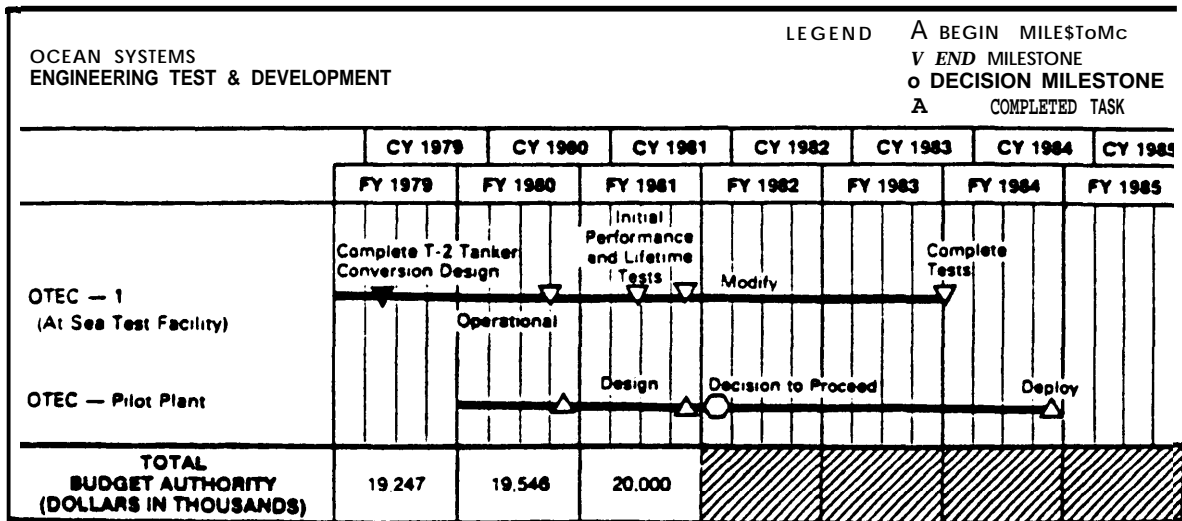
TABLE 1

OTEC Funding Summary By Category (\$ in Millions)								
Category	Fiscal Year					Projected		Total 7 Years
	'75	'76	'77	'78	'79	'80	'81	
Management	0.1	2.1	2.1	2.5	3.7	4.7	4.5	19.7
Planning	1.6	2.7	1.2	1.6	3.0	3.0	2.9	16.0
Advanced Research -	1.2	3.5	4.5	5.0	1.0	1.0	1.0	17.2
Technology Develop -		0.3	3.4	10.9	11.6	9.4	8.2	43.8
Mostly Testing (OTEC-1) -			3.3	9.0	19.2	19.5	20.0	71.0
Total	2.9	8.6	14.5	29.0	38.5	37.6	36.6	167.7
Cum. Total	2.9	11.5	26.0	55.0	93.5	31.1	67.7	

Source: U.S. Department of Energy, Ocean Energy Systems  
 Program Summaries for FY 77, 78 and 79 and  
 Solar Energy Program Summary Document for FY 81.

TABLE 2

Milestones and funding of OTEC Testing Program -



Source: U. S. Department of Energy, Solar Energy Program  
Summary Document FY 1981.

option to develop an OTEC system which could be located in the tropical oceans to produce ammonia or other energy intensive products has not been adequately considered in the strategy.<sup>7</sup>

Whether the program could or should be accelerated and what the appropriate level of government involvement might be are the subjects addressed by pending legislation. The pending legislation includes two types of bills both of which have been introduced in the House and Senate. The first type (S 1830 and HR 5796) requires the Department of Energy to prepare a comprehensive plan leading to OTEC commercialization demonstration goals. The second type (HR 6154 and S 2492) provides a licensing system for OTEC and financial incentives for commercial and demonstration facilities. The technical risks involved in a decision to accelerate the program are described in section IV of this paper. It appears, however, that whether a pilot plant is built next year or the year after will be determined more by policy direction and management capability of the Department of Energy than by technical considerations.<sup>8</sup>

The OTA review of past DOE funding and development work indicates that the number of focused technical accomplishments is modest compared to the money spent. However, the work has helped to build an institutional capacity consisting of a number of experienced technical groups. The DOE staff is located in several field offices as well as in Washington headquarters. Several systems contractors also provide management support to each of the DOE offices. The groups now involved in OTEC work are large and diversified, include many competent technicians and some major private companies with relevant experience. They are also spread over many locations which makes it difficult to coordinate the diverse pieces of work.

In their multiyear program plan, DOE has projected that, even with an accelerated effort, large budget additions would not be needed before FY 82.

Given the present DOE management system, it does not appear likely that OTEC pilot plant construction could be initiated much earlier than the FY 82 date now planned.