# Chapter I

# INTRODUCTION

## BACKGROUND

About half of all Americans live and work within 50 miles of a coastline—along the Atlantic or Pacific Oceans, the Gulf of Mexico, or the Great Lakes. According to a Senate Commerce Committee study, that figure may grow to 80 percent of the **total population** by the turn of the century. With any such concentration of people in less than 10 percent of the Nation's land area will come intense development and competition for land for housing, industry, commerce, energy facilities, resort communities, and transportation networks.

The consequences of 25 years of accelerated dredging, filling, and construction in coastal areas are not understood at this time, So far, the growth of population in the coastal areas has proceeded with little research into the long-range implications of increased activities in those areas. It is known that marshes, estuaries, and tidal flats along the coasts of the United States are crucial to sustaining marine life, directly or indirectly. It is not known how much more development and what kinds of development can take place in coastal areas before the complex relationships between land and sea and between human life and marine life may be irreversibly disrupted. In fact, it is only since the enactment of the Coastal Zone Management Act of 1972, the principal legislation dealing with problems of the coastal zone, that these questions have been addressed in an organized fashion. (The relationship of coastal zone management and offshore energy systems is discussed in chapter IV.)

This assessment is an attempt to add to the understanding of the effects of coastal development by focusing on three energy systems which have been proposed for the waters off New Jersey and Delaware.

The objective of the study has been to trace the likely consequences of three energy systems for the ocean environment, the coastal environment, and the economics and patterns of life in both States during the next two decades.

The three systems are:

1. Oil and natural gas development on the Mid-Atlantic Outer Continental Shelf;
2. Installation of a deepwater port to accommodate supertankers in the Mid-Atlantic area; and
3. Construction of at least two floating nuclear powerplants.

The study was requested by Senator Ernest F. Hollings, chairman of the National Ocean Policy Study and sponsor of the Coastal Zone Management Act. The request was approved by the Technology Assessment Board on July 23, 1974

This report has been prepared by the Oceans Program of OTA with the assistance of an advisory panel of 11 members from industry, Government, and academia, who have reviewed draft material for each section of the report and met periodically to comment on the course of the study and to provide guidance to the staff. The Advisory Panel provided advice and critique throughout the assessment, but does not necessarily approve, disapprove, or endorse the report, for which OTA assumes full responsibility.

The Technology Assessment Board approves the release of this report, which identifies a range of viewpoints on a significant issue facing the U.S. Congress. The views expressed in this report are not necessarily those of the Board nor of individual members thereof.

## OFFICE OF TECHNOLOGY ASSESSMENT

The Office of Technology Assessment (OTA) was created in 1972 as an advisory arm of Congress. OTA'S basic function is to help legislative policy makers anticipate and plan for the consequences of technological changes and to examine the many ways, expected and unexpected, in which technology affects people's lives. The assessment of technology calls for exploration of the physical, biological, economic, social, and political impacts which can result from applications of scientific knowledge. OTA provides Congress with independent and timely information about the potential effects—both beneficial and harmful-of technological applications.

Requests for studies are made by chairmen of standing committees of the House of Representatives or Senate; by the Technology Assessment Board, the governing body of OTA; or by the Director of OTA in consultation with the Board.

The Technology Assessment Board is composed of six members of the House, six members of the Senate, and the OTA Director, who is a non-voting member.

OTA currently has underway studies in eight general areas-energy, food, health, materials, oceans, transportation, international trade, and policies and priorities for research and development programs.

## STUDY AREA AND APPROACH

This study concentrated on proposed developments off the coast of New Jersey and Delaware for several reasons, one being that plans to deploy energy facilities off the coasts of those States are actual rather than hypothetical proposals.

The Department of the Interior accepted bids in August 1976 for leases on 154 tracts on the Outer Continental Shelf off the New Jersey and Delaware coasts and it

was expected that oil companies could begin exploratory drilling within 6 months after the sale of leases.

In the summer of 1976, the Nuclear Regulatory Commission (NRC) was well along in its technical evaluation of, and hearings on, proposals to moor two floating nuclear powerplants inside a breakwater off the New Jersey coast.

Plans to build a deepwater port in the area have been in suspension since the early 1970's, when changes in the world oil situation reduced the economic incentives for such a port. But the Delaware Bay area would be a logical candidate for siting a deepwater port if future changes in the oil distribution system revived interest in a port.

In addition, New Jersey and Delaware share some characteristics with other coastal States. Both depend on expanded industrial activity to create new jobs and sustain economic growth. Expanded industry means expanded energy resources and both States depend on other regions of the United States or on foreign suppliers for all of their oil and natural gas. Both States also depend heavily on tourist income which, in turn, depends on the attractiveness of beach areas which would be vulnerable to damage from accidents during the operation of any of the three energy systems.

Finally, planning for the offshore energy systems has been proceeding faster than planning for effective management of coastal areas under the Coastal Zone Management Act.

Because many States share these characteristics to some degree, the findings of this study can be applied to other States if adjustments for differing conditions and levels of resources are made that might be anticipated in other areas.

The study area is described in more detail in chapter IV.

The study approach was basically the same for each energy system. A foundation of data was developed to provide a framework for analyzing issues for congressional consideration.

The first step in assessing each system involved a detailed examination of each technology and how it most likely would be deployed. This phase of the study considered only those technologies and systems in their most likely configurations in waters off New Jersey and Delaware and drew largely on published reports. The reports were supplemented by analysis in areas where published data did not provide enough detailed information for full development of issues and options.

The next step in the study was to identify and evaluate the probable impacts of the energy systems on the ocean and coastal environments either as a result of routine operations or as a result of malfunctions which experience with similar technology in other areas has shown are likely to occur. In the case of floating nuclear powerplants, which have not been installed anywhere, the projections of impact were based on land-based nuclear-plant experience adjusted to reflect operation in an ocean environment.

Finally, the study produced estimates of the effect that each energy system

would have on New Jersey and Delaware. These included changes in employment in the region, in the cost and reliability of energy supply, the impact on air and water quality, on road and rail networks, on land that would be diverted from other possible uses to support the proposed systems, and on general patterns of life within each State.

## SELECTION OF ISSUES

In the course of the study, areas of possible conflict emerged between technology and the environment or among institutions that would share responsibility for the systems. Potential or actual conflicts which appeared to be amenable to policy consideration by Congress or by State governments or private groups were identified. These conflicts are discussed in chapter 111 as issues with options for congressional consideration. In most cases, the issues evolved from analysis of the likely consequences of deployment of a technology under existing legal and institutional frameworks and comparison of those consequences with changes in law or custom.

The nature of the issues differs from system to system.

In the case of oil and natural gas development, the major issues are concerned less with individual technology than with the system as a whole and particularly with the institutional framework in which the system operates. In the case of deepwater ports and floating nuclear powerplants, the issues stem largely from the technology, from questions about its reliability, and from avenues that offer promise of reducing risk by changing design or by more careful analysis of risks inherent in the technology.

The changing events that are natural with technologies in active planning required flexibility in the execution of this assessment. Pertinent new or revised information became available to the study team at every stage. Some of the analysis required for the overall assessment had timely congressional utility and was published in special documents or released in draft form by the Technology Assessment Board.

These publications include the following reports:

- Oil Transportation by Tankers: An Analysis of Marine Pollution and Safety Measures.
- An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf.
- An Analysis of the Department of the Interior's Proposed Acceleration of Development of Oil and Gas on the Outer Continental Shelf.
- Coastal Effects of Offshore Energy Development: Oil and Gas Systems.

These documents and drafts were of particular help to congressional committees responsible for developing amendments to the Coastal Zone Management Act and amendments to the Outer Continental Shelf Lands Act of 1953.

## DATA SOURCES

Basic data used in the study have been subjected to critical analysis by the OTA staff to develop projections of development patterns and impacts.

The estimates of resources in the Baltimore Canyon Trough which were used to project impacts were drawn from U.S. Geological Survey estimates. During the course of the study, U.S. Geological Survey changed its estimate of resources from 8 billion barrels of oil to 1.8 billion barrels and the study was modified to reflect the reduction.

Resource projections are discussed along with the history, current status, and possible future development of each technology in chapter IV. Alternatives to these technologies, based on projections of energy supply and demand, also are discussed in chapter IV.

## PUBLIC PARTICIPATION

To broaden the information base for this study and to make certain that public attitudes toward the three energy systems were taken fully into account, OTA conducted a public participation program as part of the assessment.

Workshops were held in New Jersey and informal meetings with groups of private citizens as well as representatives of interest groups were held in Delaware to explore citizen attitudes. About 15,000 brochures explaining the technology assessment process and asking for views on all three technologies were distributed in both States. About 1,000 persons responded to a questionnaire that was included in the brochure and an analysis of the responses is included as an integral part of this report in chapter V.

CHAPTER II

# Major Findings and Summary