LBL-11154
UC- 11

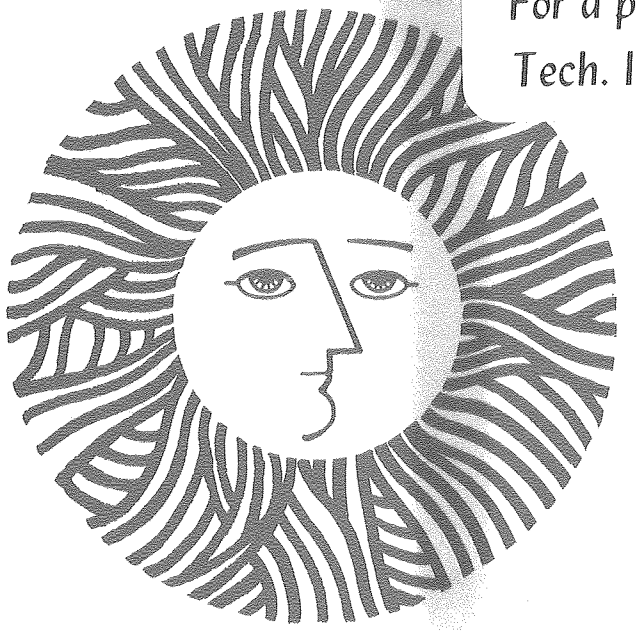
Lawrence Berkeley Laboratory
UNIVERSITY OF CALIFORNIA

ENERGY & ENVIRONMENT DIVISION

ENERGY IN THE PACIFIC COASTAL ZONE DOES D.O.E. HAVE A ROLE?

Ronald L. Ritschard, Kendall F. Haven, and Jennifer Cherniss

September 1980



Prepared for the U.S. Department of Energy under Contract W-7405-ENG-48

DISCLAIMER

LBL-11154

ENERGY IN THE PACIFIC COASTAL ZONE
DOES D.O.E. HAVE A ROLE?

Ronald L. Ritschard
Kendall F. Haven
Jennifer Cherniss

Energy Analysis Program
Energy and Environment Division
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

September 1980

This work was supported by the Assistant Secretary for Environment, Office of Environmental Impacts, Regional Impacts Division of the U.S. Department of Energy under Contract No. W-7405-ENG-48.

CONTENTS

ENERGY IN THE PACIFIC COASTAL ZONE
DOES D.O.E. HAVE A ROLE?*

Ronald L. Ritschard
Kendall F. Haven
Jennifer Cherniss

Energy Analysis Program
Energy and Environment Division
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

September 1980

INTRODUCTION

The coastal regions of the United States are unique, biologically important, and vulnerable to human perturbation. The coastal zones have been and will continue to be important in the industrial development of the nation. Locating energy facilities in coastal zones generates environmental impacts and creates conflicts in the use of our coastal resources.

Since the coastal zone has been recognized by Congress and by the various coastal states as being a geographic region of special concern, a set of state and federal institutions have been created specifically for coastal zone management. With the exception of the outer continental shelf (OCS) oil and gas development, which is administered by the Bureau of Land Management of the Department of the Interior, energy development in the coastal zone is not the primary concern of any single agency. Instead, a number of governmental regulatory agencies at the federal, state, and local levels have been given specific authority for their respective activities in the coastal zone.

---

*This work was supported by the Assistant Secretary for Environment, Office of Environmental Impacts, Regional Impacts Division of the U.S. Department of Energy under Contract No. W-7405-ENG-48.

Although a vast number of agencies are involved in the manangement and regulation of coastal zone, the involvement of each agency tends to have a single purpose. Furthermore, these agencies tend to be regulatory rather than planning in their functions, have limited geographic jurisdictions, and usually evaluate projects on a site-by-site basis.

An understanding of how specific coastal energy projects or regional energy activities relate to the national interest is lacking. Little attention is given to the impact of coastal zone management programs on regional and national energy development goals. As a result, there is no coastal-specific energy policy that considers both the development and implementation of a strong energy program and the attainment of national environmental protection goals. The Department of Energy (DOE) has the responsibility for developing a strong national energy policy to meet present and future needs of the nation. Furthermore, this policy is expected to be consistent with overall national economic, environmental, and social goals.

This paper addresses the energy-related activities in the Pacific Coastal Zone within the context of the absence of a coastal-specific energy policy, as mentioned above. First, the present and projected coastal energy activities are described in order to establish a perspective of the importance of the coastal zone to energy development, transport, and use. Next, the state and federal decision-making processes relevant to coastal energy activities are summarized for the purpose of defining the institutional framework that has been constructed to respond to coastal energy issues. Finally, the functional areas not currently being adequately addressed are identified; and an associate role, which ensures both comprehensive evaluation and sound development of regional coastal energy resources, is defined for the DOE Office of Environment.

ENERGY-RELATED ACTIVITIES IN THE COASTAL ZONE

The Pacific coastal lands and waters have been used for the extraction and transport of energy resources and for the processing and conversion of energy resources since the mid-1800's. The first three oil drilling sites and the first public utility electric generating unit in the region were in the coastal zone. As the region has grown rapidly during the 20th century, so has its dependence on the coastal zone for needed energy supplies. This section describes the present nature of that dependence, comments on its implications for coastal zone management efforts, and qualitatively forecasts regional energy supply dependence on the coastal zone into the near future.

Current Energy Activity

The importance of the coastal zone for marine biological productivity, marine and human habitats, recreation, food supply, and economic activity has been exhaustively documented by countless authors. Nowhere in the United States is this coastal importance more strongly felt than along the Pacific Coast, and nowhere else is the concern for preserving the sensitive coastal environment as strong. The seven largest cities in this five-state region are located along the coast, over 70 percent of the region's population live in coastal counties, and over 60 separate commercial ports actively conduct oceanic commerce along the Pacific Coast. While the obvious dependence of human activity on the coastal zone has been widely recognized and studied, the similar dependence of regional energy supply on the coastal zone has not.

Data characterizing the 1977-1978 energy supply system for the Pacific Region were collected at a county level and separated into those activities and facilities that are located within the coastal zone and those that are not. Results of this segregation are summarized in Table 1. Key information presented in this table includes:

- Approximately 89 percent of the regional non-hydroelectric generating capacity (42 percent of the total capacity) is in the coastal zone. This includes all of the region's fossil fuel plants grreater than 1000 MWe, 15 of the region's 17 largest fossil fuel plants, and three of the region's five nuclear plants.

- 58 percent of all regional oil production is in the coastal zone.

- Over 88 percent of the regional petroleum at some time enters the coastal zone. Over 80 percent of the regional refining capacity is in the coastal zone.

Each of the categories of energy supply listed in Table 1 is made up of a number of separate components that must be located in the coastal zone. Table 2 lists the major components of each coastal supply technology and segregates the components into those that must be sited offshore and those that are sited onshore within the coastal zone. Environmental, land use, and social and economic impacts will arise from each of the system components shown in Table 2. Typical ranges for the land use requirements of the major categories of coastally-sited facilities are listed in Table 3. The region's energy supply activity is not evenly spread along the coastline, but rather is concentrated in relatively few areas. Figures 1 through 4 depict county level electrical generating capacity, crude oil production, total petroleum movement, and refining capacity, respectively, that occur within the coastal zone. These production, transportation, and conversion activities tend to concentrate into pockets in southern California, Contra Costa County in the San Francisco Bay region, two counties along the Columbia River estuary, four counties along Puget Sound, three Alaskan counties, and the county of Honolulu in Hawaii. Thus, 16 of the Pacific region's 63 coastal counties contain the vast majority of current coastal energy activity while the coastlines of the other 46 counties are relatively free of activity. For example, the 1900 offshore wells within the region are located offshore from only eight counties (13 percent of the coastal counties).

Table 1. Dependence of the current western regional supply on the coastal zone.

ELECTRICAL PRODUCTION

State	Coastal Zone Capacity (MWe)	Percent of State Total Capacity	Percent of State Capacity (Excluding Hydro)
California	12,291	61.3	82.9
Oregon	1,933	28.2	90.0
Washington	215.9	1.3	8.9
Alaska	505.9	71.3	94.0
Hawaii	1,621	42.2	78.8
Regional Total	25,566.8	42.2	78.8

PETROLEUM SUPPLY

A. Production (Combined Offshore and Onshore within the C.Z.)

State	Coastal Zone Production (10^6 BBL/yr)	Percent of State Total Production (10^6 BBL/yr)
California	111.8	33.5
Oregon	0	0
Washington	0	0
Alaska	167.0	100
Hawaii	0	0
Regional Total	278.8	58.

B. Refining Capacity

State	Number of Coastal Refineries	Percent of State Total	C.Z. Refinery Cap. (10^6 BBL/yr)	Percent of State Total Cap.
California	19	46.3	653.6	75.4
Oregon	1	100.0	5.1	100.0
Washington	8	100.0	139.7	100.0
Alaska	4	100.0	34.9	100.0
Hawaii	2	100.0	38.8	100.0
Regional Total	34	61.8	872.1	80.4

C. Petroleum Movements

State	C.Z. Crude Oil Movement (10^6 BBL/yr)	Percent of State Total Crude Oil Movemt.	C.Z. Total Oil (10^6BBL/Yr Movemt.)
California	542.1	78.4	977.8
Oregon	5.1	100	42.9
Washington	116.7	100	175.9
Alaska	251.9	100	289.7
Hawaii	35.1	100	66.3
Regional Total	950.9	86.4	1,552.6

NATURAL GAS PRODUCTION

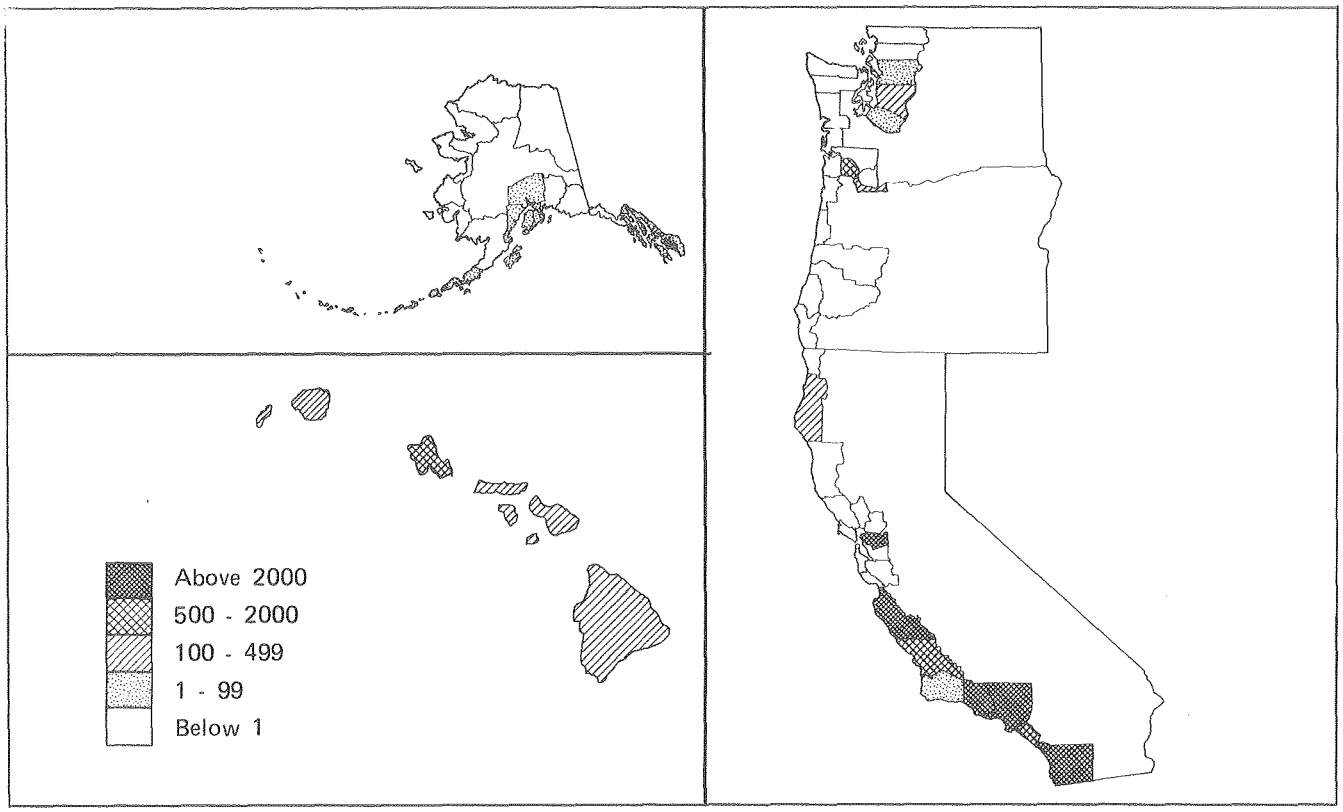
State	C.Z. Gas Production (10^9 ft^3/Yr.)	Percent of State Total
California	41.6	26.7
Oregon	0	0
Washington	0	0
Alaska	101.6	100
Hawaii	0	0
Regional Total	143.2	55.6

Table 2. Dependence of energy supply technologies on the coastal zone.

Energy Supply Activity	Off-Shore Requirements	On-Shore Requirements
Off-shore Production (Pipeline)	Platform sites Gas treatment plant Pipeline to shore (oil & gas)	Platform fabrication yard Pipeline terminal & pumping plant Storage facilities Port storage facility Port support facility
Off-shore Oil/gas Production (Tanker)	Platform site Tanker loading bouy site On-site oil storage Gas treatment plant Gas pipeline to shore Tanker traffic lanes	Platform fabrication yard Tanker terminal Port storage facility Port support facility
On-shore Oil/gas Production		Well sites Pipelines Storage facility
Oil/Gas Processing	Tanker traffic lanes Barge traffic lanes Off-shore terminals/ lightering sites	Pipelines Refinery Storage facilities Crude/product tanker terminals Product barge terminals
LNG	Off-shore terminal (if selected over on-shore terminal) Pipeline to shroe Tanker traffic lanes	Regasification plant Tanker terminal Pipeline interties Storage facilities
Electric Power Plants	Tanker/ barge lanes for waterborne fuel delivery and waterborne waste removal	Plant site Fuel delivery (waterborne): tanker/barge terminals Fuel delivery (rail): rail routes & terminals Fuel delivery (pipe): pipelines On-site fuel storage Transmission lines Ash removal/disposal system
New Technologies		
a. OTEC	Plant site Transmission line	Platform fabrication yard Port support facility Cable intertie
b. Marine Biomass	Farm site Harvest ship transit routes	Port support facility Farm fabrication plant Terminal for harvest ship Conversion plant Pipelines for gas supply
c. Wave energy	Plant site Maintenance ship travel Cable to shore	Fabrication plant Support base
d. Wind energy	None	Coastal plant sites Transmission lines

Table 3. Typical land use requirements for coastal energy facilities.

Facility Type	Typical Land Use (Acres)
Platform fabrication yard	800-2,000
Pipeline terminal and pumping station	3-20
Oil storage facility	100-1,000
Oil tanker terminal	1-3 (offshore and transfer mooring system)
	100-600 (dock side terminal)
Onshore well head	0.02-0.08 per well
Refinery	800-3,500
Fossil fuel power plant	600-2,000
Nuclear power plant	500-1,000



XBL 813-381

Figure 1. 1978 Coastal Zone electrical generating capacity, MWe.

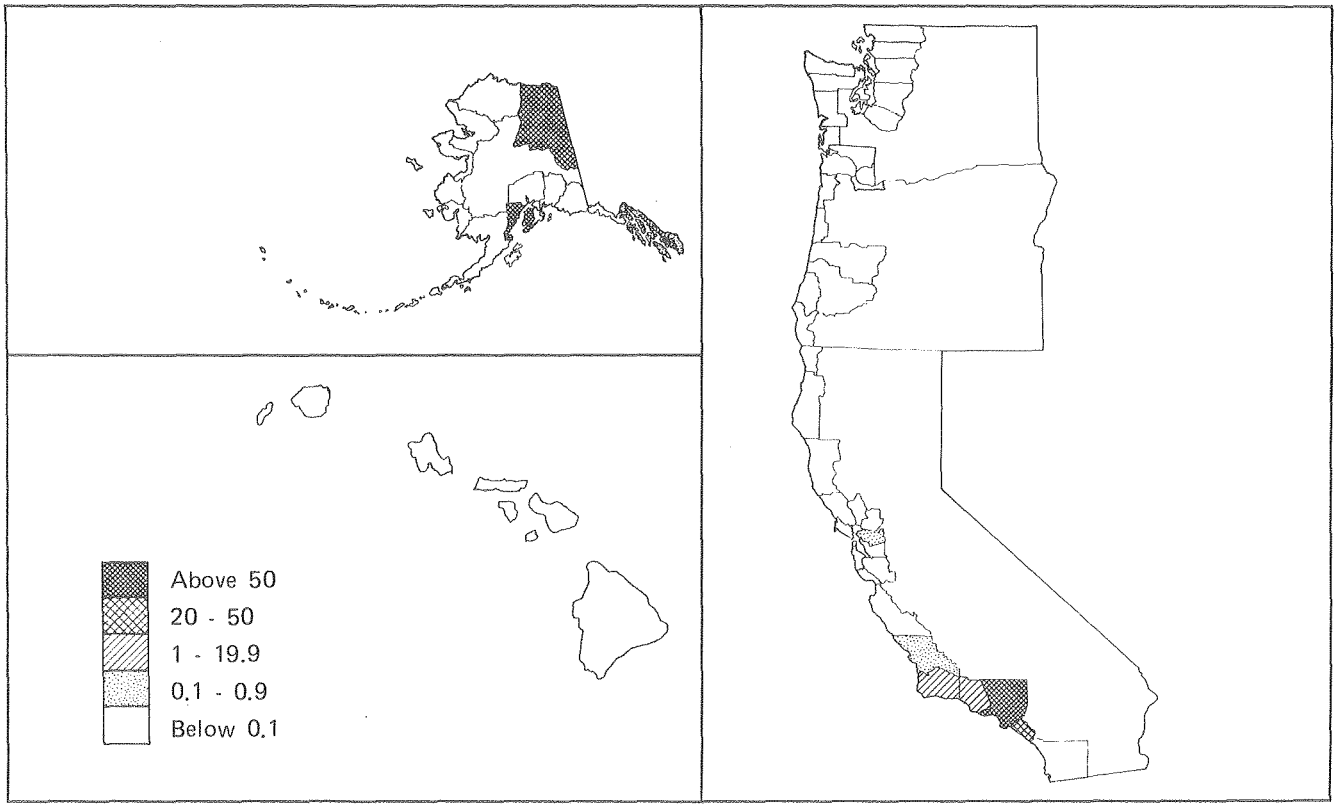


Figure 2. 1977-78 Coastal Zone annual oil production, 10 E + 06 bbl per year.

XBL 813-383

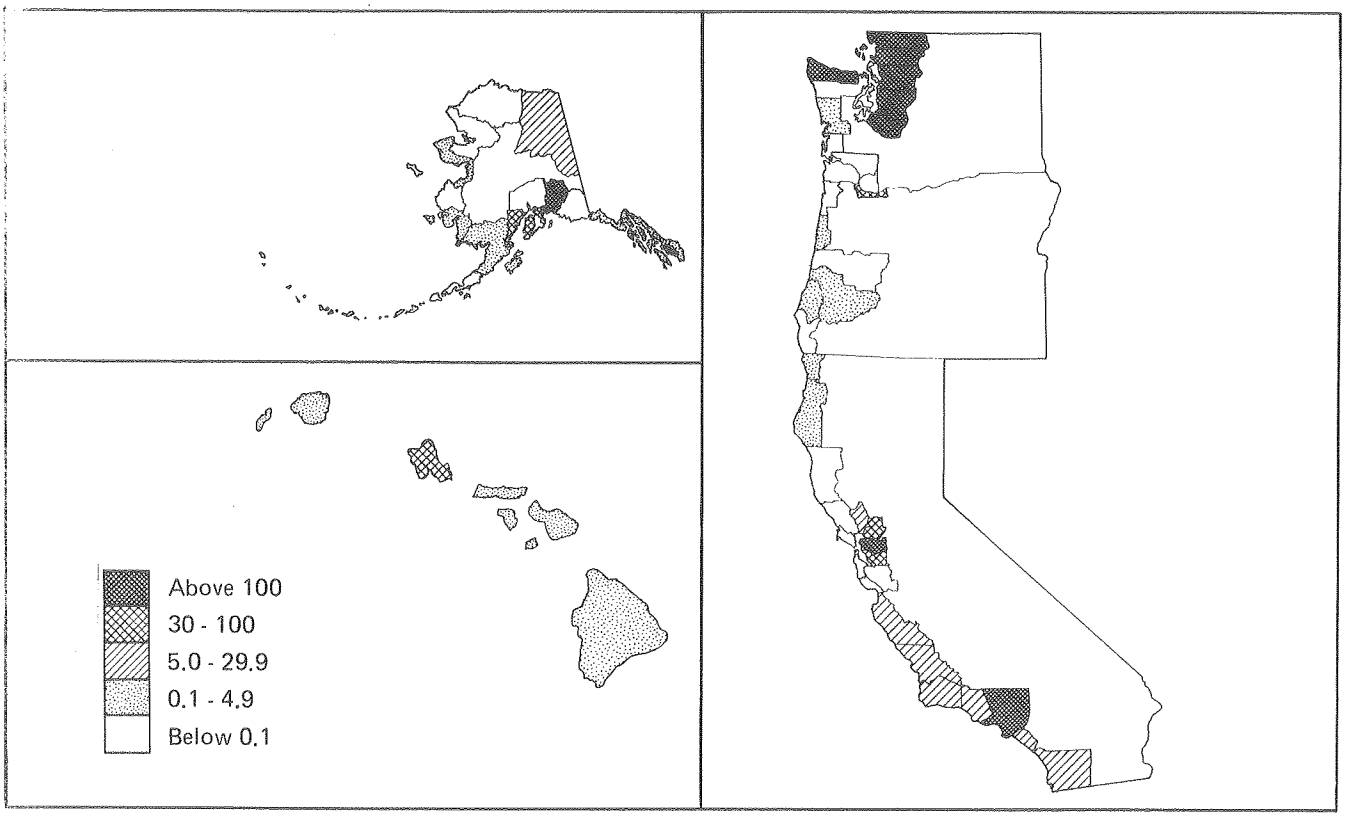


Figure 3. 1977-78 Coastal Zone total petroleum movement, 10 E + 06 bbl. XBL 813-382

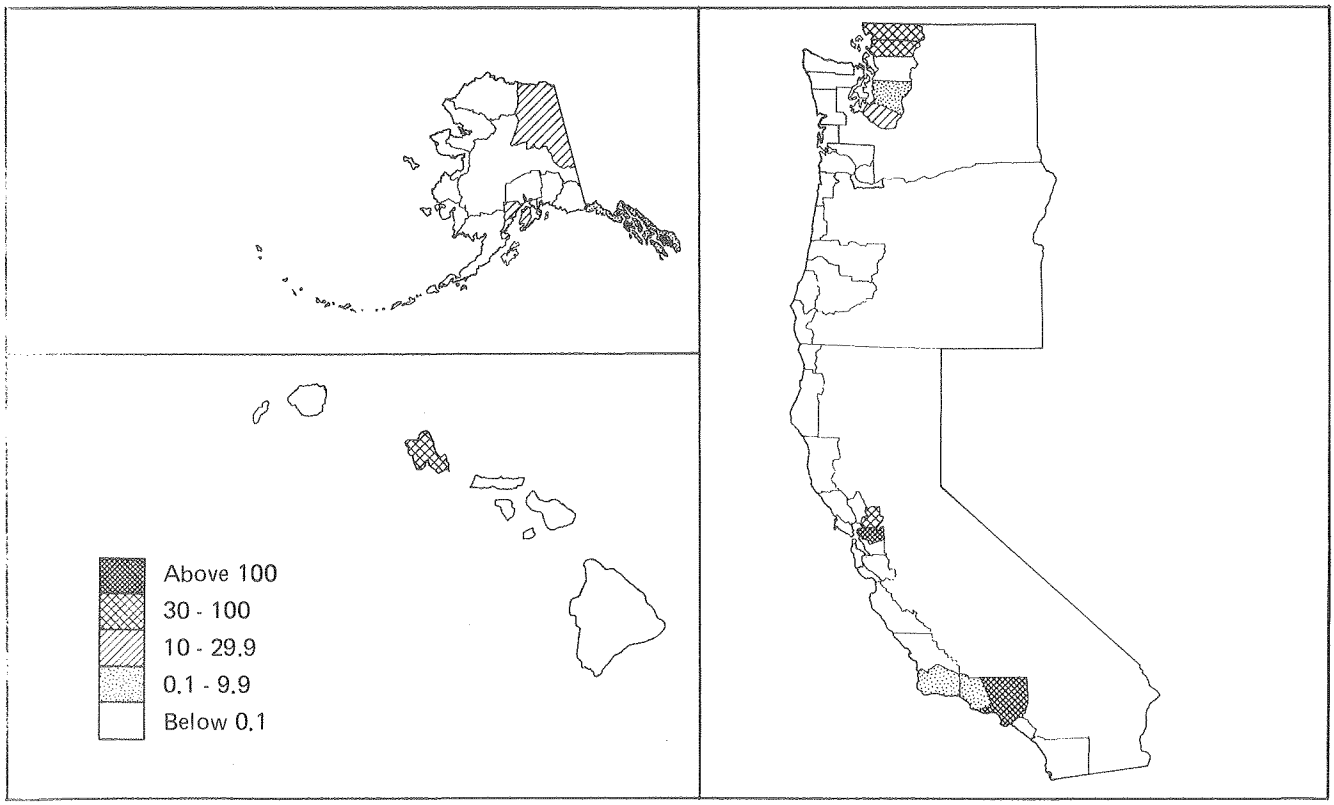


Figure 4. 1978 Coastal Zone total refinery capacity, 10 E + 06 bbl. XBL 813-384

Future Energy Activity

In addition to current regional energy dependency on the coastal zone, planned energy supply developments also are concentrated in coastal areas. Six major electrical expansions are planned for the California coastline (additional units at San Onofre nuclear station, activation of Diablo Canyon nuclear station, reactivation of Humboldt nuclear station, a 1500 MWe coal-fired plant, and the expansion of the Pittsburg plant). Only three inland sites are actively being considered. In Washington, two nuclear stations (WNP-3 and 5) will be sited in the coastal zone. The Boardman coal plant (Oregon) and several other approved plant sites in Washington are inland. No large single developments are anticipated in either Alaska or Hawaii in the near future.

Planned regional oil field development emphasizes OCS development in California and Alaskan waters. Anticipated refinery expansion in Washington, California, and Alaska are predominately in the coastal zone. More importantly, increases in the Alaskan crude oil production rate will significantly increase regional coastal petroleum activity by increasing crude movement, refinery runs and capacity factors for regional coastal refineries, coastal refinery capacity expansions, and the shipment of refinery products through coastal storage facilities and to end use ports. 1976-1978 data show that an average of 2.64 barrels of crude and refined products will be moved through the coastal zone for each additional barrel of crude oil introduced into the regional flow. Thus, for example, increases of 100 million barrels per year of Alaskan crude oil will produce an increased movement of petroleum related products of over 264 million barrels per year through the region's coastal zones. Conversely, an average increased gasoline demand within the region of one gallon will generate the movement of a total of 5.53 gallons of crude and

refined products through the coastal zone. Therefore, a forecasted regional demand increase of ten million gallons of gasoline per year by 1985 will increase total shipment through the coastal zone by 1.32 million barrels per year. In addition to coastal expansions of existing supply technologies, a variety of emerging technologies are scheduled to be sited in the Pacific coastal zone. Figure 5 depicts new technology facilities to be sited in coastal areas.

Existing Regional Energy Supply Issues

The regional energy supply system and proposed expansions have generated a variety of specific coastal issues. These are grouped into five general categories:

- Concentrated versus dispersed Coastal Siting of Energy Facilities. Although existing energy facilities are mainly concentrated in energy intensive pockets, proposed development of emerging technologies would be dispersed more evenly along the coast. There is no regional consensus that it is more desirable to concentrate the impacts of energy development into a few areas, thus producing greater degradation in these areas, than to disperse the development and affect a larger area at a lower level. Until a clear state or regional direction has emerged, there will be a strong reluctance to approve movement along either path.
- Coastal Siting of "New" Technologies. A large portion of the proposed expansion of the regional energy supply involves new technologies, e.g., OTEC, kelp farms, wave energy, enhanced oil recovery techniques, or large scale wind complexes. Great concern exists that unidentified impacts of these systems will seriously deteriorate the quality of the coastal zone and its uses and will far outweigh the value of the systems as an energy resource. A major regional issue is whether

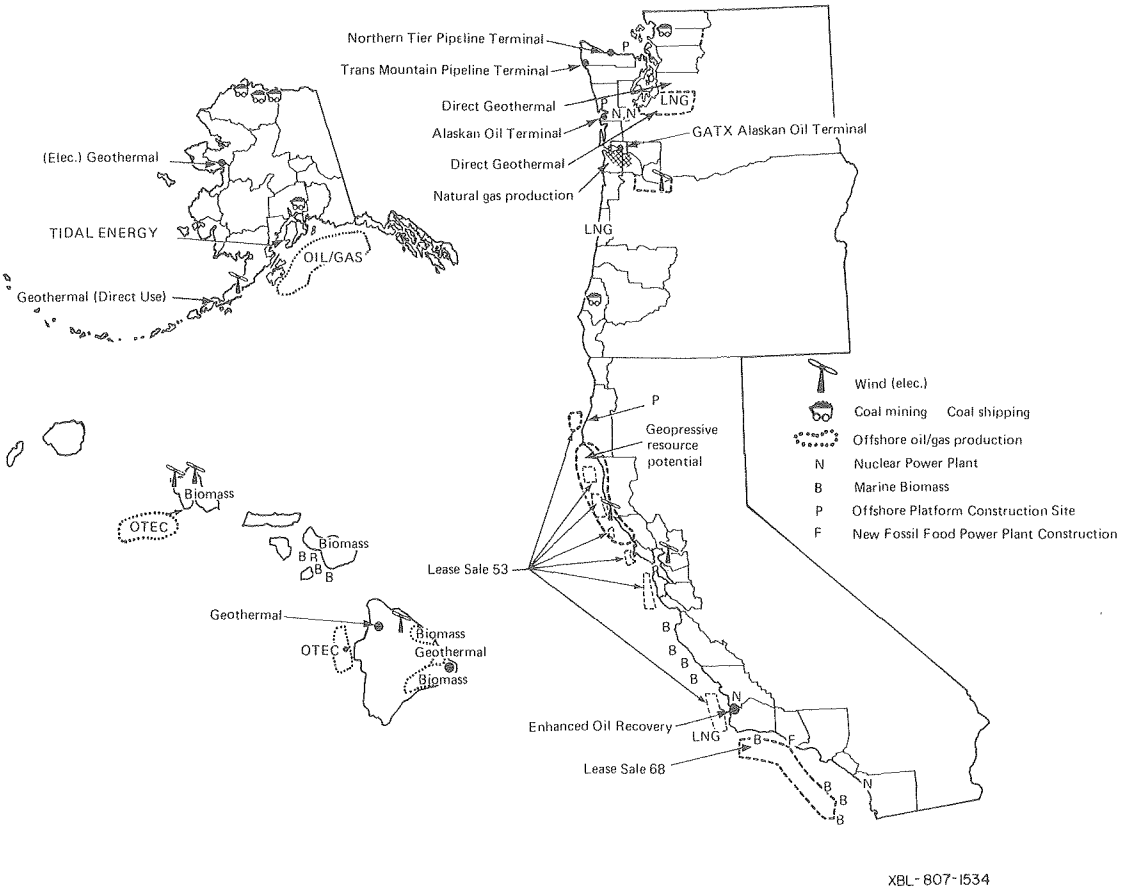


Figure 5. Coastal Zone emerging technology siting patterns and known new construction.

to accelerate development and deployment of new technologies to reduce dependence on foreign energy sources or to delay development until these technologies are refined so that their impacts can be lessened.

- Conversion to Coal. Coal is a relatively new fuel for the West Coast. Existing plans call for the development of two major coal-fired power plants in the California coastal zone and development of coal resources in the Alaska and Oregon coastal zones. The impacts of, problems with, desirability of, and control needed for the use of this new fuel source in the Pacific Coastal zone have not been completely identified.

- OCS Development. Development initiated by lease sales 35 and 48 and the upcoming lease sales 53, 68 and 73 along the California coast has raised issues in the areas of local participation in energy planning, federal consistency with state coastal plans, entry into frontier areas, fisheries protection, and onshore impacts. Each of these issues will require resolution before these and planned future lease sales are completed.

- Petroleum Supply System. A recent survey in a northern California county indicated that concern with the impacts of routine and accidental oil releases ranks second only to fishery protection in local importance on a series of coastally-related issues. This sentiment is generally felt along the entire coastline. Thus, the acceptability of expanded petroleum activity in the coastal zone is a major regional issue, both expansion to meet increased regional demands and for export to other regions, e.g., the Northern Tier Pipeline.

- Cumulative Impacts of Energy Activity. Impact assessments associated with the permitting and licensing process are limited to a site-specific analysis of the facility being licensed. However, energy development in the Pacific Coastal Zone will involve the extensive expansion of some technologies at a number of sites as well as the development of a wide variety of technologies within the coastal zone. There is, therefore, a strong desire to assess energy facilities, not in isolation, but rather in the greater context of probable overall development and regional need. A major issue is the identification of an appropriate institutional level and implementing authority for such an integrated approach. Rather than adding another layer of authority, the integrated assessment should be derived from the existing system.

DECISION-MAKING IN THE COASTAL ZONE

The specific definition of the coastal zone varies somewhat as a function of the purpose and authority behind the definition. The coastal zone, for the most part, extends from mean high-tide point seaward to the outer limit of the U.S. territorial sea (3 miles). The zone continues inland from the shoreline only to the extent necessary to control shorelines, a distance varying from state to state and even within individual states. For example, in California the landward boundary varies between one thousand feet and five miles. On the other hand, in Hawaii the coastal zone is defined along ecosystem management lines and includes most of each island.

Even though the states participating in the Coastal Zone Management Program have created distinctly different coastal zones, there are certain common elements in each state's plan:

- Coastal zone authority extends inland from high-tide point for a substantial distance and, in all cases, will impact all energy facilities located on or near the coast;

- Regulatory authority for coastal facilities is vested in state and local coastal agencies; and
- Coastal agencies have broad regulatory authority that can be and has been used to control activity lying outside the coastal zone if even one element of the overall system lies within the zone.

This section outlines the decision-making structure that has been created at state and federal levels to protect the valuable coastal environment while at the same time providing for the development of the economically important coastal resources. Emphasis is given to the states' energy facility planning and siting processes and to the federal coastal zone management legislation, although there are numerous other state and federal acts and policies that affect energy development in the coastal zone, e.g., Outer Continental Shelf Act, Clean Air Act, etc.

Federal Level Institutional Framework

Congress passed the Coastal Zone Management Act (CZMA) of 1972, based on the documented environmental importance of the coastal zone and the public's concern about this area. The act established the Coastal Zone Management Program, administered by the Office of Coastal Zone Management (OCZM) of the Department of Commerce, and gave the states federal aid to first prepare and then to administer programs that "preserve, protect, develop and, where possible, restore coastal resources." Under the 1976 CZMA amendments, state programs are required to include, among other things, a planning process for identifying energy facilities likely to be located in or significantly affecting the coastal zone and for anticipating and managing the impacts from these facilities.

Several other provisions of the amended act provide states with tools for strengthening existing programs and for ensuring that future energy activity in the coastal zones will protect valuable social, economic, and environmental

resources. One of the most controversial sections of the CZMA (Section 306) requires that state programs provide for adequate consideration of the "national interest" involved in planning for and in the siting of energy facilities, which are necessary to meet requirements that are other than local in nature.

In return, Section 307 of CZMA states that federal actions must be consistent, wherever feasible, with approved state coastal plans. Many states are now concerned, however, about the fact that a federal agency is its own judge about whether agency action affecting the coastal zone complies with Section 307. Furthermore, neither the 1972 law nor the 1976 amendments provides an administrative mechanism for halting federal activities while a state appeals a consistency decision. A state may ask the federal agency to informally negotiate the assignment with the help of OCZM; and, if no agreement is reached, voluntary mediation before the Secretary of Commerce may be sought. The only other option available to a state is litigation. Many states are asking for an option, other than going to court, that will give them a greater voice in the outcome.

Probably the most important amendment to the CZMA is Section 308, which creates the Coastal Energy Impact Program (CEIP). The CEIP is designed to help states minimize the social, economic, and environmental disruptions that result from new or expanded coastal energy activities, especially oil and gas exploration and development on the outer continental shelf. By helping states to plan and develop needed new public facilities and services while preventing or reducing "unavoidable" losses of environmental or recreational resources, the program is intended to balance the need for more energy resources with the need to preserve coastal areas for the myriad of other

valuable functions they perform. Because the CEIP is a relatively new program and its use varies from state to state, there is no guarantee that CEIP will restore or enhance the coastal environment.

The Department of Energy,as estabished by the 1977 Department of Energy Organization Act, is to develop and maintain energy supplies to meet present and future energy needs while restoring, protecting, and enhancing environmental quality and assuring public health and safety. Although at times these roles seem inconsistent, DOE has explicit responsibilities "to assure incorporation of national environmental protection goals in formulating and implementing energy programs."

Responsibility for DOE energy development in the coastal zone was given to the Office of Leasing Policy Development, Assistant Secretary for Resource Applications. This office was selected because of its prior experience and interest in coastal zone activities, such as the Strategic Petroleum Reserve Program, potential location of commercial demonstration facilities, and certain regulatory authorities related to the OCS program.

DOE's primary avenue for presenting its interests is by making recommendations to the OCZM and to the states. DOE has had substantial influence on the administration of federal consistency, the Coastal Energy Impact Program, and the development and approval of state coastal programs, including consideration of the national interest.

DOE has not explicitly formulated a specific energy policy for the coastal zone because the CZMA assigned state planning agencies the primary role in coastal management. These state agencies, however, are required to consider the "national interest" when administering policies and to address issues of "greater than local concern" in their plans. Approval of state coastal programs brings federal consistency into force. State level approvals

also generate local government coastal programs (LCP). New energy-related provisions may be added to approved programs through an annual review process. Therefore, the most effective action for DOE to pursue is to work more directly with the states in their coastal program development and program administration, following approval.

In summary, the passage of the CZMA (1972) and its amendments (1976) provides an institutional framework for the protection of the coastal environment and the development of coastal energy resources. Under the auspices of the CZMA, the states are encouraged to exercise their full authority over the land and waters of the coastal zone by developing a plan for coastal zone-related energy activities. Federal approval of a state's management plan constitutes recognition that the plan provides adequate consideration of the national interest involved in siting facilities, while federal actions in turn must be consistent with the state approved plans. DOE's role, though the Assistant Secretary for Resource Application, is to review energy-related activities in the coastal zone and to present federal interest by making recommendations to OCZM and to the states. However, DOE has not formulated an energy policy that relates specifically to coastal areas. Finally, state and local participation in the planning process is encouraged through another program, the CEIP. Each state in the Pacific Coast region has developed its own response to federal coastal management legislation. This has created another layer of authority involving more laws, agencies, and jurisdictions, many with conflicting mandates, objectives and constituencies.

State Level Institutional Framework

In reviewing the institutional framework given below, it should be noted that states in the Pacific Coast Region are well ahead of other coastal states in planning for energy facility siting and evaluation. There are several important areas, however, that are not being adequately addressed because they are outside the jurisdiction of individual state plans. These omissions are identified in this section and provide the basis for developing a better federal-state interaction by DOE.

Alaska. The state of Alaska Coastal Management Program (ACMP) was approved in 1977 when the Alaska legislature enacted the Alaska Coastal Management Act. The Alaska Coastal Policy Council (ACPC), the primary management agency, develops and reviews procedures, guidelines, definitions, and regulations for coastal management, and reviews and approves district coastal management programs. District plans will be implemented in accordance with the state comprehensive use plan developed by the ACPC. Not all of Alaska is under jurisdiction of district zoning, and appropriate state agencies must develop local coastal policies for these unorganized areas.

Local and state agencies identify and pre-screen sites suitable for energy development. This inventory and designation is done independently of any specific request for facility siting.

Special task forces under the Division of Policy Development and Planning currently evaluate major facilities on a case-by-case basis. Permits must be obtained by prospective developers from the many environmental and resources agencies. An optional "master permit application", submitted by developers, enables permit requests from 40 concerned state authorities to be considered in one request. This application is processed by the Department of Environmental Conservation.

Coastal energy development provides a major economic interest for Alaska. Formal coastal energy facility siting procedures are being developed in the context of siting issues that were and still are major concerns in the state. Assessment of site suitability is weighted heavily toward incorporation of new developments into existing land and resource use patterns. Contrary to the other states considered here, Alaskan emphasis is on locating sites capable of and suitable and available for development, rather than designating areas worthy of protection. Because of this, environmental protection may have had secondary consideration rather than an equally balanced priority.

California. Of the state actions considered here, California's Coastal Plan (CCP) contains the most explicit and in-depth findings regarding energy facilities. The plan consists of recommendations from the 1976 California Coastal Zone Conservation Act. Portions of the CCP recognize and explore numerous possibilities for use of the coast's energy resources, and the expected consequences of such use. The legislation further declares that "notwithstanding the fact that energy facilities and coastal dependent developments . . . may have significant effect on coastal resources, it may be necessary to locate such developments in the coastal zone in order to ensure that inland as well as coastal resources are preserved and that orderly economic development proceeds within the state."

The original California Coastal Zone Conservation Commissions, which developed the CCP, have been replaced by the California Coastal Commission (CCC), and six regional commissions. The 1976 Coastal Act outlined criteria to be met by energy facilities proposed for the coastal zone. As the primary coastal management agency, the CCC has permitting authority for such developments. The CCC is therefore the interpreter of policies in the Coastal Act, maintaining the "orderly economic development" encouraged by the act.

Six regional commissions exist as temporary agencies to coordinate the development of local coastal plans mandated by the CCP. The regional commissions are scheduled to go out of existence in 1981, when the local coastal plans (LCP's) are to be certified. As part of the LCP certification process, the state and regional coastal commissions approve conformity with state coastal policy. The LCP's must provide zoning and regulations for energy facilities that adequately address state coastal energy policy. The goal here is to produce LCP comprehensive enough to confront the state Coastal Commission only with very limited appeals from proposed developments.

The California Coastal Commission is composed of 12 voting members. One representative is appointed by the governor, two by the state senate, and two by the speaker of the assembly. The secretary of the State Resources Agency, the secretary of the Business and Transportation Agency, and the State Lands Commission chairman serve as non-voting representatives.

There are three exceptions to the California Coastal Commission's energy facility siting authority: liquified natural gas (LNG) terminals, thermal power plants, and facilities within the jurisdiction of the Bay Area Conservation and Development Commission (BCDC).

A 1978 amendment to the Coastal Act gave the State Public Utilities Commission (PUC) authority to assure that LNG terminals comply with the CCP terminals. The Coastal Commission retains the responsibility for proposing feasible coastal sites for terminals, but the PUC makes the final decision.

The Warren-Alquist Act (1969) gave the California State Energy Conservation and Development Commission (CEC) responsibility for siting thermal power plants. The 1976 Coastal Act confirmed CEC's domain in the coastal zone. A 1978 CCC report, required by the 1976 Coastal Act, designated coastal zone areas where construction of an electric power plant would prevent achievement

of the objectives of the California Coastal Act of 1976. Areas which were "nondesignated" in that report may be revised every two years. In making the revisions, the CCC will consider the policy recommendations of the Energy Commission. The CCC has contracted with the CEC, using CEIP funds, to analyze the effect of the "designations" on new power plant siting. The Energy Commission recently completed an assessment of all constraints to expansion of the existing 29 coastal power plant sites.

The third exception to the CCC's energy siting power are major facilities within management area assigned to BCDC, essentially the San Francisco Bay Area. When the CCP was adopted, the BCDC was designated to retain the management role within its own boundaries. All energy facilities in this jurisdiction, except thermal power plants, must meet criteria imposed by BCDC; relationship with CEC, in regard to power plants, is analogous to the CCC's.

California state energy policy recognizes that: (1) population centers at or near the coast will require increased energy facilities in the future; and (2) development of energy resources will cause environmental and economic impacts that will affect the coast and the state beyond known local effects. The coastal plan encourages "orderly, balanced development" as well as conservation of resources. It promotes developments insofar as they are "unique" to the coastal zone, for example, expansion of characteristic coastal communities or agriculture. As with the other coastal plans, California seeks a "balance" of conflicting goals. The 1975 CCP version of coastal policy was a comprehensive document, sensitive both to California's natural resources and economic interests. In regard to energy facilities, approximations were made for future demands, and safety and impact concerns were described for each type of facility. However, since 1975, the CCC has

approved all applications for energy development under the coastal act and federal consistency except one, Chevron's proposal to drill within six miles of Anacapa Island. Thus far, energy needs have been largely interpreted as being "in the national interest." The U.S. Department of Energy was identified by a CCC energy program contact as the federal agency to provide primary expression and interpretation of national interest.

Originally, the 1972 California Coastal Act, like the federal CZMA, provided recognition that the public would be adversely affected by further uncoordinated coastal development. Without the ability to consider specific long-term development intentions - as proposed by the energy industries, federal agencies, and other state agencies - careful planning cannot be accomplished by CCC. The act provides broad interpretation of state priorities specifically related to overall development and the environment. For example, "adverse effects," listed in Chapter 3 of the Act, provide exemption to environmental protection considerations without regard to long-term combined development, which can have a more adverse impact.

Hawaii. Hawaii's Coastal Zone Management Program (HCZMP) was established by the Hawaii Coastal Zone Management Act of 1977. The Department of Planning and Economic Development (DPED) was designated as the state agency for program implementation.

Under the act, counties are required to change existing shoreline special management areas (SMA) to ensure consistency with the provisions of the act. Once amended SMA's are approved, they become the permanent inland boundaries for the state's program. The county-level SMA permit system is the primary mechanism for use control. Hawaii's program in energy planning and development may be unique among coastal states because of the state's interest in shifting from fossil fuel-based facilities toward indigenous

renewable energy resources, e.g., biomass, direct solar radiation, geothermal, ocean thermal energy conversion, and wind. Since the coastal zone management area in Hawaii covers all of the islands except the forest reserves, regular requirements for energy siting permits apply. These requirements reflect a host of specific state and county land and water use criteria.

SMA permits, which are issued by the various counties, are required to construct facilities or develop energy resources in the SMA portion of the coastal zone. For energy related activities in shore waters up to three miles offshore, the following additional permits may be required:

- Permit for activities in state waters from the Department of Land and Natural Resources
- Approval from the Department of Transportation, which has the power to establish and maintain "energy corridors" through the coastal zone.

In addition, the HCZMP incorporates federal air and water pollution requirements, which are overriding. Air and water pollution control programs are administered by the Department of Health and are entirely state responsibilities.

In conclusion, energy related activities in Hawaii's coastal zone are sited on the basis of their general conformance with existing land uses, minimization of environmental impacts, effects on other coastal resources, and control of pollution impacts. Further, these activities are subject to adequate consideration of coastal resource uses of regional benefit and national interest, as prescribed in the federal CZMA. Hawaii's basic approach is to assure the implementation of a myriad of federal, state, and local regulations applying to coastal zone management in order to protect a fragile, complex, and extremely valuable resource system.

Oregon. The primary agency for coastal zone management in Oregon is the Department of Land Conservation and Development (DLCD). Oregon's coastal zone plan is the Oregon State Coastal Management Program (OCMP). The OCMP designates coordination of responsible state agencies to meet DLCD's statewide planning goals in the coastal zone. OCMP establishes coastal-specific planning goals and guidelines for comprehensive land-use plans to be developed by each city or county. The program also provides for citizen participation in preparing, adopting, and revising comprehensive plans.

1978 amendments to the OCMP deal specifically with energy facility siting, explaining procedures implicitly defined in the original OCMP. Under this state plan, most energy facility siting or expansion, with the exception of most gas and oil-related development, must obtain site certification from the Energy Facility Siting Council (EFSC) of the State Department of Energy. Gas and oil developers must apply to affected state agencies and permit authorities, all of whose permit criteria ultimately adhere to the statewide planning goals.

The EFSC is composed of seven members, appointed by the governor and subject to senate confirmation. Members can have no direct pecuniary interest in corporations, utilities, or related manufacturers wishing to site energy facilities in the state; but no other specific requirements are given. It therefore cannot be assumed that members are thoroughly knowledgeable about impacts of energy technologies or environmental complications of combined and sustained uses. The EFSC conducts investigations and research relating to site selection and designates suitable and unsuitable areas for siting. The council conducts hearings on specific site certification applications and issues a decision for or against an applicant's site certification, according to standards defined in Oregon Administrative Rules (OAR 345-75-025) and any

additional pertinent standards as described in the EFSC Administrative Rules. These standards include consideration of impact. The EFSC decision is subject to appeal by any intervenor with demonstrated interest, including federal agencies. Also, the governor may veto an approved certification but cannot approve an application denied by the council. State agencies that issue permits, licenses, or certifications are still responsible for upholding and enforcing standards within their jurisdictions, but only within the conditions of the EFSC approved siting agreement.

National interest was incorporated in the development of the OCMP by open and repeated exchange with federal agencies having an interest in the coastal zone. In order to contribute in this sense, the federal agency must therefore acknowledge an interest in the coastal zone. The OCMP amendments describe four pathways for national interest consideration:

(1) the coordination of demand projections on the part of the state and federal energy agencies;

(2) the opportunity of federal agencies to act as intervenors in the EFSC review process;

(3) the opportunity of federal agencies and others to present testimony during hearings; and

(4) the articulation of considerations of national interest in review of both state and federal permits required for facility siting.

In order to represent its national interest, the U.S. Department of Energy would effectively participate through any of the first three of these pathways [DOE is not a regulatory agency and does not issue permits as in category (4)].

According to the OCMP, "Continued participation by these federal agencies (including DOE) will be necessary for the adequate development and administration of coordinated comprehensive plans." This requirement was reiterated to the authors by an official of DLCD who expressed a need on the part of state planners to have input from national energy planners.

During preparation of local comprehensive plans, conflicts between statewide planning goal requirements and the interests of other agencies are predicted. The OCMP directs local governments to resolve these with full participation by affected state and federal agencies on the basis of: (1) identified local needs; (2) information developed by the inventories; and (3) expressions of regional, state, and national interest.

Washington. Washington State's response to the CZMA was the Shoreline Management Act (SMA) which established a mandate for the completion of local land-use plans by coastal cities and counties. The Washington State Coastal Zone Management Program (WSCZMP) translates SMA parameters into a policy statement regarding the content and preparation of these local management plans (LMP). Once approved, these LMPs are not simply considered local use forecasts but become state law. The Washington State Department of Ecology administers the state coastal management program. Washington's coastal zone energy facility siting policy is expressly defined in the February 1979 amendments to the WSCZMP. The siting of most energy facilities is managed by an Energy Facility Site Evaluation Council (EFSEC); exceptions are hydroelectric generating facilities, platform fabrication yards, storage depots, and crew and supply stations. Siting for these facilities is managed by authority of the SMA, through a variety of affected agencies.

The EFSEC is an administrative body of state agency representatives whose purpose is "the identification of a state position with respect to each proposed (energy facility) site." The state, through this council, seeks to balance increasing energy demands with the desire for "minimal adverse effects on the environment, ecology of the land and its wildlife, and the ecology of state waters and their wildlife."

Evaluation of the extent to which a site application achieves this balance is based on:

(1) assurance of operation safeguards "at least as stringent as the criteria established by the federal government;"
(2) capacity to "preserve and protect the quality of the environment . . .;"
(3) capacity to "provide abundant energy at a reasonable cost."

The emphasis in WCZMP is on local plans. However, the zoning or ordinances generated by these local plans ultimately have minimal impact on energy facility siting. The foundation of EFSEC's authority in the decision-making process is the EFSEC complete preemptive power certification has over all laws and regulations of any state or substate agency.

The council does take existing rules into consideration during the evaluation proceedings. If, after public hearing, the council determines an applicant has demonstrated inability to comply with local ordinances and zoning and the council still approves a preemption request, the draft certification agreement must include "conditions . . . which give due consideration to state or local governmental or community interests affected" by the facility.

The council is composed of one voting member designated from each of 14 state agencies; a voting governor who acts as the appointed chairman; a voting representative from the legislative authority of any affected city or county; and a non-voting member from any affected port district. The member agencies whose primary concern might directly involve environmental protection in conflict with development in the coastal zone are the Departments of Ecology, Fisheries, Game, Natural Resources, and Parks and Recreation.

An agency member is not required to advocate a doctrinaire position of the agency he represents; each member serves independently from any policy position of his home agency; and he provides expertise in his agency's area

of interest when evaluating site applications. Ideally, the council evaluates proposals based on transactions at the hearings, much as a juror at a jury trial arrives at a decision based on evidence presented. Therefore, state agencies do not express their interests through their individual representatives but, instead, present their interests in public hearings before EFSEC and an EFSEC-appointed Counsel for the Environment.

At least two hearings are held for each site application; others may be held if the Site Evaluation Council feels they are needed. The first, held in the county affected by the site under consideration, determines compatibility of the proposed facility with existing local legislation. After such determination, local regulations cannot be changed during the evaluation process.

The second public hearing, which provides the main opportunity for expression of concerns by other than local interests, is the contested case hearing. This hearing takes place after preliminary application evaluation by EFSEC. Any federal, state, or local agency or any private party may express its interests pertaining to the site under consideration. It is this step that provides the greatest opportunity for input. By this stage, however, planning for the development is far advanced, and major Environmental Impact Report considerations may already have been implemented without benefit of completed hearings.

The EFSEC appoints a Counsel for the Environment, whose role is to represent the public and its interests in protecting the quality of the environment. This appointment does not prevent other parties from making their interests known directly at the public case hearing. This appointed attorney could serve as a key contact for providing the EFSEC with expertise on impacts of any technologies in question.

After EFSEC makes its decision of rejection or approval, a draft is submitted to the state governor. Unlike the other states, Washington's governor has the ultimate power to approve, reject or return the application to the EFSEC for specific reconsiderations. Despite the EFSEC evaluation, the "rejections of an application for certification by the governor shall be final." The applicant, however, may reapply with a new proposal.

The Shoreline Management Act lists guidelines for consideration of land use plans. Each plan, in order of priority, must:

1) Recognize and protect the statewide interest over local interest;
2) Preserve the natural character of the shoreline;
3) Result in long-term over short-term benefit;
4) Protect the resources and ecology of the shoreline;
5) Increase public access to publicly owned areas of the shoreline;
6) Increase recreational opportunities for the public along the shoreline;
7) Provide for any other element, as defined in RCW 90.58.100, deemed appropriate or necessary.

These priority guidelines are to be recognized by: (1) EFSEC, when preempting existing regulations; and (2) federal agencies striving to meet federal consistency requirements.

It is significant to note that EFSEC does not consider its role an evaluation of need for a given facility. A siting application is not a request for permission to install a particular type of development. When an application is submitted, approval is sought for the specific location, given the fact that the development will take place. Energy use projections are proposed by the State Energy Department, but such projections are not definitive or binding in the planning process. It is EFSEC's task to see

that the siting application contains conditions that will meet each agency's demands, as far as possible, within the limits of the siting decision. By the time an application comes before the Site Evaluation Council, environmental concern, coastal or otherwise, has already been reduced by substantial compromise.

Conclusions. The passage of the CZMA (1972) and its 1976 amendments created an institutional framework at the federal level that deals with the management of coastal zone energy development. States, in turn, have responded to the federal legislation by developing state coastal management programs.

A common factor in the programs of all states of the Pacific region (Alaska, California, Hawaii, Oregon, and Washington) is that no single management agency has responsibility over all energy development and support facilities. Furthermore, the energy facility site evaluation process differs from state to state. In Oregon and Washington, sites are evaluated and certified by a politically appointed energy facility siting council; in Alaska, site-by-site evaluations are conducted by a special task force after the local and state agencies have identified and pre-screened the sites. In California, the state coastal management agency, the CCC, indirectly affects siting in the state coastal zone by the determination of areas that are "non-designated" for energy purposes.

Another more basic element in the state coastal management plans and in the federal coastal legislation itself is the failure of the guidelines and policies for coastal management to enumerate priorities of desired land uses. "Protect develop" is the standard, self-contradictory policy, and a "balance" is the undefineable goal. The original impetus for coastal zone legislation was protection of the unique, valuable, and limited environment

from unlimited resource consumption. In practice, particularly when energy facilities are being considered, the actual decision between a "minimized" or "necessary" impact and uncontrolled development is made on a case-by-case basis, subject to the immediate pressures of developers. Every step of the process for determining environmental impact and weighing it against real public need is subject to political and commercial influences of transitory and uncontrolled nature.

Under the provisions of the federal CZMA, state and local agencies are responsible for coastal planning, implementing energy development in the coastal zone, and bearing the environmental and socioeconomic impacts inherent to a particular energy activity. Accurate prediction of environmental impacts and the mitigation of these impacts, as required by law, demands a coordinated, multi-regional energy planning and coastal resource management process. Within the given institutional framework, however, state actions are either restricted to limited-range goals and site-by-site determinations or are not always fully coordinated with proposed federal energy plans. Furthermore, many states work in isolation from coastal management activities of surrounding areas.

Therefore, an active accessible federal-state liasion is necessary for the purpose of keeping state and local governments abreast of proposed energy activities in the coastal zone and of the potential environmental consequences of such activities. Further, this mechanism should address itself to a planning effort that is regional in nature--the Pacific Coast region, for example.

DOE'S ROLE IN COASTAL ZONE ENERGY ACTIVITIES

The responsibility for DOE's environmental conscience has been assigned to the Office of Environment under the Assistant Secretary for the Environment (ASEV). This office supports both ecological research related to energy technologies and assessments of the differential environmental impacts of various energy policies and legislation. These assessments provide early warning of possible environmental constraints to energy development.

From our analysis of the interactions between federal, state, and local energy interests in the coastal zone, two major roles are proposed for ASEV: (1) analysis of impacts and policies related both to specific issues and to long-term integrative activities; and (2) transfer of information from the federal level to regional, state and local agencies that are responsible for coastal planning (through CZMA), for implementing the energy development, and for bearing the environmental impacts inherent to a particular technology. Each of these roles will be expanded and examined below.

Analysis of Impacts and Policies

The analysis of environmental impacts of various energy technologies and of proposed policies is an activity already assumed by ASEV. The emphasis in the current assessments, however, is on analysis of national scenarios that apply to the various federal regions. These scenarios contain a mix of energy supply technologies projected over different time periods, e.g., 1985, 2000.

One of the proposed new roles for ASEV would be to identify specific energy technologies and programs that may cause either short or long-term degradation to the coastal environment. An evaluation of the specific issues related to these technologies could then follow. Table 2 summarizes energy activities that may interact with or be located in the coastal zone. It is apparent from this table than emphasis should be placed on oil and natural

gas resources that underlie both the state submerged lands and the federal OCS, on liquified natural gas (LNG) facilities, and on several "new" technologies, including OTEC, wave energy, marine biomass, and coastally-sited wind conversions systems. ASEV should be interested in these technologies in order to identify and help alleviate the ecological impacts. Emphasis, however, should be given to new technologies where states are likely to have little environmental impact information.

Another important new role for ASEV is related to long-term integrative analyses in the coastal zone. Coastal areas are important to energy development because they offer navigational access, unlimited water supplies, resource availability, and proximity to urban markets. No agency or research organization is currently investigating all energy-related activities within a wide geographic area of the coastal zone, such as the Pacific Coast region. Instead, most studies are conducted either at county or federal region level. ASEV would receive a more accurate and useful picture of potential environmental impacts of coastally-related energy technologies if the assessment were made in a geographic region corresponding more closely to coastal zone activities. For example, OCS Lease Sale #53, proposed for offshore the north and central California coastline, offers an opportunity to assess both offshore and onshore impacts within the context of other energy-related and economic activities. Furthermore, it is important that ASEV become aware of the relationship between state and local agencies responsible for coastal energy planning to gain a better understanding of the impact of coastal zone management programs on technology development.

Information Transfer

Information transfer between the appropriate levels of government and between the scientific community and decision-makers is an important item that requires continual attention. For the purposes of assessing energy activities in the coastal zone, three areas are proposed for the Office of Environment.

First, the translation of federal energy supply plans and policies for the regional, state, or local level is necessary. DOE is recognized by states in the Pacific Coast region as the federal agency that provides primary expression and interpretation of the national interest. DOE does have national interest in planning for adequate, reliable, electric power supply, but the decisions to approve or reject a particular coastal site usually are not matters of national interest.

The need exists for coordination of supply and demand projections of federal and state agencies. The accurate prediction of environmental impacts and the mitigation of these impacts, as required by law, demands a fully-coordinated energy planning system. ASEV could act as a source of information for such a system if a viable coastal assessment program were intiated and supported.

Second, ASEV should evaluate the obstacles of the various state coastal plans on energy development and facility siting. Further, it could identify potential obstacles related to other federal agencies and laws. Within the given institutional processes of the coastal management plans, states are locked into state-specific goals and site-by-site determinations. ASEV would be better prepared to address the possible environmental and institutional constraints to energy development in coastal areas if it assumed this role. ASEV could then establish liaison with state and local agencies involved with

coastal zone energy planning in order to define the clarify "national interest" in energy programs that are dependent on the coastal zone and to provide technical assistance regarding specific technologies and their associated impacts. In some cases (Oregon, for example), ASEV could provide testimony during the state energy planning process.

Finally, ASEV should function as a clearinghouse for energy and environmental data concerning the coastal zone. State and local coastal planning agencies require up-to-date information on existing and emerging technologies advance planning for possible consequences, including both the opportunities and the impacts of a given energy scenario. Although most coastal management agencies have information relating to their own state, a centralized data source for coastally-dependent technologies could be beneficial. The Office of Environment, with its environmental policy and institutional expertise, is in a position to prepare and maintain a data base that outlines the cumulative impacts (economic, environmental, and institutional) of the various coastally-dependent technologies. The emphasis should be placed on information that allows the federal decision-maker to respond to specific appopriate situations. This information could also be used by state and local planning groups before specific siting decisions are made.

The success of a coordinated national energy program, as mandated by the Department of Energy Organization Act of 1977, will depend, in some measure, on the success of DOE in assisting the coastal states in dealing with the role that the coastal states in dealing with the role that the coastal zone will play in our nation's energy future. In this effort, ASEV can play a critical part.

SUMMARY

The coastal zone has been recognized by Congress and the various coastal states as having special importance to the economic and environmental well being of the nation. However, there is no coastal-specific energy policy that considers both the development and implementation of a strong energy program and the attainment of the national environmental protection goals.

Present and projected energy-related activities in the Pacific Coastal Region--Alaska, California, Hawaii, Oregon and Washington--are within the context of existing federal and state coastal management programs. Regional energy supply issues in the coastal zone include: concentrated and dispersed facility siting, conversion to coal-fired power plants, outer contintental shelf development, petroleum supply systems, siting of new technologies, and the cumulative impacts of energy activity.

The decision-making framework that has been created at state and federal levels to protect the economic and environmental value of coastal resources is characterized. The major federal legislation is the Coastal Zone Management Act (1972) and its 1976 amendments. This act established the federal level program than encourages the states to develop a planning process for coastal zone-related energy activities. State and local agencies must be considered when federal energy plans are proposed because these agencies are responsible for coastal planning, for implementing energy development in coastal zone, and for bearing the environmental and socioeconomic impacts inherent in a particular energy activity.

An analysis of the inter-relationships between federal, state and local energy interests in the coastal zone indicates that two major roles are available to the U.S. Department of Energy's (DOE) Office of Environment. The proposed roles include: the analysis of the environmental impacts of various energy technologies and of proposed policies and the transfer of information from the federal level to regional, state and local agencies that are responsible for coastal energy planning.

Within the first category, several new functions are proposed, including the identification of specific energy technologies and programs that may cause environmental impacts and the integrated assessment of all energy-related activities within a wide geographic area of the coastal zone, e.g., the Pacific Coast. Information transfer includes the following proposed roles; translate federal energy supply plans and policies for the regional, state, and local levels; establish liaison with state and local agencies in order to define and clarify "national interest"; and act as a clearinghouse for energy and environmental data pertinent to the coastal zone.

The success of a national energy program that deals with the development of coastal energy resources while protecting the coastal environment will require better coordination between the federal, state and local agencies involved. The authors feel that Assistant Secretary for the Environment can play a critical part in this effort.