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Alternative Energy Facility Siting Policies for Urban Coastal Areas:

Executive Summary of Findings and Policy Recommendations

November 1980

Prepared for:

U.S. Department of Energy

Assistant Secretary for Environment

Office of Environmental Assessments

Regulatory Analysis Division

Washington, D.C. 20585

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Findings and Policy Recommendations

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GLOSSARY

A-95	Review and coordination of Federal and Federally assisted programs
BTU	British Thermal Units
DOC	U.S. Department of Commerce
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
EDA	Economic Development Authority (within the U.S. DOC)
EEA	Energy and Environmental Analysis, Inc.
FERC	Federal Energy Regulatory Commission
HMDC	Hackensack Meadowlands Development Commission
HUD	U.S. Department of Housing and Urban Development
LNG	Liquefied Natural Gas
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanic and Atmospheric Administration
NJDEP	New Jersey Department of Environmental Protection
NRC	Nuclear Regulatory Commission
OCZM	Office of Coastal Zone Management
OCS	Outer Continental Shelf
RPC	Research and Planning Consultants, Inc.
RCRA	Resource Conservation and Recovery Act
SIP	State Implementation Plan
TSCA	Toxic Substances Control Act
TCP	Transportation Control Plan
208	Section 208 of the Clean Water Act, pertaining to areawide wastewater management.
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency

FOREWORD

The Office of Environment is responsible for providing policy guidance to the Department of Energy regarding compliance with environmental laws. One area of the Department's concern involves the policies for siting and permitting of energy facilities. To develop further knowledge about this topic, the Office of Environment initiated an analysis by Princeton University's Center for Energy and Environmental Studies of siting issues in the coastal zone, one of the nation's most critical natural resource areas and one which is often the target for energy development proposals. The nation's coastal areas offer accessibility to a variety of transportation systems, such as major port facilities, inland waterways, rail lines, pipelines, and highways; many coastal areas are also near to markets for refined and processed energy products. Princeton's analysis addressed the changing perceptions of citizens toward energy development in the coastal zone, emphasizing urban communities where access to the waterfront and revitalization of waterfront property are of keen interest to the citizens.

The findings of this analysis are based on an examination of energy development along New Jersey's urban waterfront and along the Texas-Louisiana Gulf Coast, and on redevelopment efforts in Seattle, San Francisco, Boston, and elsewhere. The case studies demonstrate the significance of local attitudes and regional cooperation in the siting process. In highly urbanized areas, air quality has become a predominant concern among citizen groups and an influential factor in development of alternative energy facility siting strategies, such as consideration of inland siting connected by pipeline to a smaller coastal facility. The study addresses the economic impact of the permitting process on the desirability of energy facility investments, and the possible effects of the location selected for the facility on the permitting process and investment economics. The economic analysis demonstrates the importance of viewing energy facility investments in a broad perspective that includes the positive or negative impacts of various alternative siting patterns on the permitting process.

Siting of coastal energy facilities varies from region to region. To those who are affected by energy development and those who are affected by the vagaries of the permit process, a unique opportunity and challenge exists in urban coastal locations. However, energy facility siting in the Gulf Coast -- in both rural and urban locations -- occurs in an atmosphere described by corporate representatives as one in which state and local regulatory laws and policies are administered in a "reasonable" manner.

A number of conclusions have been drawn from these studies regarding Federal, state, local and corporate policies: regulatory, permitting, licensing, environmental assessment, and site selection. These conclusions are summarized in the first volume of this series of USDOE research reports: Alternative Energy Facility Siting Policies for Urban Coastal Areas: Executive Summary of Findings and Policy Recommendations (DOE/EV/01528-T1), November 1980). The overall results of the analysis have also been published as Refining the Waterfront: Alternative Energy Facility Siting Policies for Urban Coastal Areas, David Morell and Grace Singer, eds. (Cambridge, Mass.: Oelgeschlager, Gunn and Hain, Publishers, Inc., 1980). Details of the analysis are available from my office.

Dissemination of information to those who may find it useful in the important decisions made in our decentralized form of government has been considered an integral part of this effort from its inception. Thus, a city mayor or planning agency deciding the future of an urban waterfront should be able to research results from that perspective. State coastal or energy agencies will be interested in the identification of general urban coastal issues in energy facility siting. Decisionmakers at the Federal level, with their overview of urban coastal and energy issues from the national perspective, should find particular value in the discussion of intergovernmental pressures on the decisionmaking process. The discussion of economics from the perspective of energy corporations should be of special interest to those making industry's investment decisions. Environmental and citizen groups who must interact with the political system, in public hearings for example, may want to focus on the interrelationship between urban and other environmental problems. In an effort to convey significant results of this research to leaders and active members of these specific groups, three special reports have been prepared, each a separately edited version of the overall executive summary: Energy Facility Siting and the Urban Coastal Zone: Policy Alternatives from the Perspective of Local Government Officials (DOE/EV/ 05128-T2, December 1980); Energy Facility Siting and the Urban Coastal Zone: Policy Alternatives from the Perspective of Citizen and Environmental Groups (DOE/EV/ 05128-T3, December, 1980); Energy Facility Siting and the Urban Coastal Zone: Policy Alternatives from the Energy Companies' Perspective (DOE/EV/ 05128-T4, December 1980). Finally, a case study of urban revitalization has been prepared: Development and Regulation of the Urban Waterfront: Boston, San Francisco and Seattle (DOE/EV/ 05128-T5, December, 1980). These reports fulfill a necessary and vital function in the discussion of coastal energy facility siting, presenting valuable reference material and insights. The reports should prove useful to planners, officials, citizens, energy developers, and others whose communities are affected by development and management decisions regarding their coastal areas.

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SUMMARY OF POLICY RECOMMENDATIONS

Overall national policy is needed in order to achieve three basic goals: greater energy self-sufficiency; urban revitalization; protection of fragile rural coastlines.

Energy facility siting decisions must be made within the framework of national policy and state and regional plans, so that government initiative can be established. The Department of Energy should take the lead, acting with other relevant agencies.

Coastal zone and other government regulations should enforce a distinct preference for inland—as opposed to coastal—siting and permitting of new energy facilities. Only truly coastal-dependent operations should be allowed to locate at the water's edge.

To allow maximum public participation, local permit approval should take place first, or at least simultaneously with state and Federal permit approval. A clearly structured sequence of decisionmaking is preferable to centralization of authority by a single agency.

To avoid costly delays, special attention needs to be paid to reform of the Federal review process.

Energy facility siting in urban coastal areas must be integrated with plans for urban revitalization. This will involve the Departments of Energy, Housing and Urban Development, Commerce, Interior, Transportation, and others. Such programs could include incentive grants for urban waterfront redevelopment.

Siting policy must distinguish among facility types and community characteristics, so that overall principles are sensitive to individual factors.

Innovative siting (for example, inland siting with a pipeline to the coast, or offshore unloading ports) should receive greater government and corporate attention. Alternate site plans could be required as a supplement to more traditional proposals.

Government should adopt procedures to lessen permitting or mid-construction delays, both of which are costly to industry. Savings could more than compensate for greater facility cost due to more stringent pollution abatement or alternate site requirements. Industry should seek out such opportunities.

Deepwater ports should be considered as an alternative to onshore siting, especially in densely developed metropolitan regions. Environmental impacts, however, should receive close scrutiny.

Unless more than compensatory pollution abatement can be achieved, additional polluting facilities should not be located in areas where environmental standards have not been met. In many urban coastal areas, air quality is a dominant constraint; emission offset procedures must be used carefully to ensure environmental sensitivity.

To foster state and regional planning of energy facilities, systems of tax sharing across local boundaries should be encouraged.

Any new energy facilities in urban areas should be labor intensive, have low levels of pollution, and be compatible with other land uses, including waterfront renewal. Appropriate scale is essential to avoid domination of the urban landscape by energy facilities, and to maintain citizen access to the waterfront.

Clustering of energy facilities may be preferable in rural areas, but should be avoided in the urban setting because of already dense development, population, and pollution.

Buffer zones around major energy facilities should be ensured by explicit government policy.

Where safety issues are the dominant concern (for example, liquified natural gas, nuclear, toxic or carcinogenic products), remote siting with adequate, defined buffer zones should be enforced by government regulation.

The Environmental Protection Agency's regulations to protect environmentally-sensitive areas under the Resource Conservation and Recovery Act (RCRA) should be integrated into the early stages of the energy facility siting process.

U.S. Army Corps of Engineers' priorities for dredging deepwater channels should be related more closely to Federal and state energy siting strategies.

Alternate energy technologies, such as cogeneration, should be encouraged by national policy, especially in urban areas where the existing industrial infrastructure is conducive to their development and where such energy sources may attract needed economic development.

INTRODUCTION

Energy and environmental policy constantly confront conflicting goals in pursuit of an amorphous national interest. Urgent policy decisions must be made in the face of incomplete data and competitive demands from powerful interest groups. Nowhere are these dilemmas more apparent than at the confluence of energy facility siting, coastal zone management, and urban development. Alone, each of these three policy areas poses difficult choices between growth, equity, and environmental preservation. When an energy facility is proposed for an urban waterfront that is the scene of revitalization, the pressures become intense.

Along the coast, rural and urban interests are often in conflict. The Coastal Zone Management Act of 1972 and most state coastal laws have been framed with a distinct emphasis on preservation of rural and recreational areas. Their principal objective is to protect fragile wetlands, unspoiled beaches, and sand dunes from the effects of residential and commercial development and from the impacts of new energy and industrial facilities. Although some mention of the urban coast can be found in most of these statutes, their main impact has been to shift siting of facilities with major environmental impacts away from the rural coast, and thus presumably into urban areas. Urban revitalization groups, on the other hand, have resisted introduction of such facilities along city waterfronts as incompatible with the human uses they envision for the future. Those seeking sites for energy facilities thus find themselves whipsawed from one area to the other.

COASTAL ZONE CONFLICTS AND URBAN OPPORTUNITIES

Most of the world's large cities are located on navigable bodies of water. In Europe, waterfront areas were incorporated into the fabric of city life before industrialization; use of the water's edge as an amenity was never entirely displaced by industry. In contrast, industrial development in American cities focused on the urban waterfront from the beginning because of the relatively low cost of water transportation and the proximity of metropolitan markets. Most urban waterfront areas were occupied by railroad tracks, piers, warehouses, multistory industrial buildings, and similar facilities. As a result, the American public's access to waterfront amenities has been quite limited.

The coastal zone is growing faster in population than the rest of the country. Already, about 85 million Americans live in coastal counties: 37 million on the Atlantic Coast, 8 million on the Gulf Coast, 21 million on the Pacific Coast, and 19 million along the Great Lakes. [1] Seven of the ten largest cities in the United States are located in these coastal areas. Forty percent of America's industrial capacity is on or near the coast, with sixty percent of oil refining capacity located in only four coastal states: California, Louisiana, New Jersey, and Texas. [2]

In the years after World War II, several new factors combined to accelerate the deterioration of many once-valuable U.S. urban coastal areas. [3] The truck replaced the train as the principal form of transportation, thus influencing the siting of new industrial facilities. New plants were located along interstate highways, especially metropolitan area beltways, rather than on the waterfront with its railroad lines. Sprawl suburbanization based on the automobile shifted consumer demand centers to outlying areas. Shipping practices altered from use of traditional piers to new container ports on the fringe of old harbor areas. Security in older waterfront areas became unreliable, enhancing companies' preference to locate in suburban industrial parks.

As a result, the older port areas were left behind, with unused railroad yards, rotting piers, abandoned industrial buildings, and vacant land. Although this land still had great intrinsic value, by the late 1960's much of it was underutilized pending new decisions by American society as to desired land use patterns in the urban coastal zone. [4] Energy companies proposed to locate many of their new facilities here: onshore service bases, pipeline terminals, and similar facilities required for offshore oil and gas development; refineries; oil storage depots; petrochemical plants. [5]

Economic pressures for coastal development have been intensified by the belief of many Federal planners and corporate executives that such projects are in the national interest. The necessity to reduce American dependence on imported oil accelerates demands to increase domestic exploration and production. Despite the discouraging results to date in the Baltimore Canyon off the shores of the mid-Atlantic states, especially for crude oil, further drilling on the Outer Continental Shelf seems certain. The U.S. Department of Energy's (USDOE) expressed concern for the national interest was an important factor in two siting cases in the late 1970's; the Sohio Terminal in Long Beach, California, designed to bring Alaskan oil ashore; and an oil refinery in Portsmouth, Virginia. Overall, in the 1970's siting of energy facilities became one of the most hotly contested land use and coastal planning issues.

Unfortunately for planners, decisionmakers and the overall political system, urban siting of energy facilities was not to be accomplished easily, whatever the wishes of energy company managers. Instead, new agendas began to compete. Indeed, rural

coastline preservation strategies posed the overall siting dilemma with increasing clarity. For while major industrial and energy facilities were compatible with existing land uses in many urban coastal areas, and jobs and tax payments made them attractive to urban politicians, air quality constraints, citizen opposition, and emergence of local urban waterfront revitalization movements made the siting process increasingly difficult.

Government policies now give priority to cities in the creation of jobs and larger tax bases. National urban policy calls for diverting Federal funds from urban-fringe development to rehabilitation of facilities within the cities. Federal jobs are to be located in cities where feasible; and the policy gives government procurement priority to goods and services produced in urban areas. [6]

At the same time, various citizens' groups are opposing industrial development on the urban coast. Different kinds of energy facilities emit widely varying kinds of pollutants. [7] In some cases, such as nuclear power plants or liquified natural gas (LNG) facilities, the main concern is not with continuous emissions, but with the possibility of an accident. [8] Although urban leaders are under intense pressure to improve employment and tax revenues in their districts, our case studies show that many are becoming increasingly discriminating about energy facilities as their relative job and tax potentials become clear. Facilities such as storage tank farms that provide very few jobs per acre of land, especially in prime areas like the waterfront, are no longer automatically accepted as net economic assets.

Citizens' concerns about land use are related primarily to urban revitalization and the emerging realization that waterfronts can provide beauty and breathing space not otherwise available in the old cities. A park on the water is effectively larger than its land acreage alone because the water itself adds space by opening the vista and allowing the breeze to flow freely. Efforts in Baltimore, Boston, Chicago, Detroit, New Haven, Philadelphia, San Francisco, and Seattle are especially noteworthy. Several of these cases are discussed in more detail in the Volume V of this series. In many of these areas, the perceptible move away from waterfront use for industrial production and toward diversified consumer amenity use, including housing and commerce, conflicts with the pressures for urban siting of major new energy facilities.

THE NEW JERSEY AND GULF COAST EXPERIENCE: A COMPARATIVE ANALYSIS

Conflict over urban coastal siting of energy facilities has been particularly intense in Hudson County, New Jersey, only 2000 yards across the Hudson River from New York City. Faced with strong citizen opposition, five oil-related facilities proposed by energy companies were rejected here between 1972 and 1976 (see Table 1). This area is ideal for observing the dynamics of urban coastal energy facility siting. All of the pressures for and against development occur here: access to large metropolitan markets, proximity to labor concentrations, good road and rail transportation, well-dredged harbors, exploration for offshore oil and gas, on the one hand, and heavily polluted air and water and a strong revitalization movement, on the other. An in-depth study of the ensuing conflicts was therefore undertaken, with special attention to emergence of the citizens' movement that finally blocked the energy projects. [9]

The principal issues are best illustrated in the 1974 proposal to locate a \$20 million deepwater terminal with 242 six-story tanks to accommodate storage and shipment of four million barrels of fuel oil and chemicals, some of them toxic, carcinogenic, and volatile. This facility, to have been the largest such terminal on the East Coast, was to have been located on the end of a man-made peninsula protruding into the Hudson River on the Jersey City waterfront. In spite of strong initial support from the city's mayor and advocacy by the New Jersey Department of Environmental Protection (NJDEP), after vigorous opposition by citizens the proposal was rejected in 1976.

Table 1

Company	Type	Location	Acres	Number of Tanks	Storage Date of Final Capacity Rejection	
Steuber Company, Inc.	Deepwater terminal for storage of bulk fuel oil and chemicals	Jersey City and Bayonne	40	242	4 million barrels	1976
Metropolitan Company	Terminal for storage of bulk fuel oil	Jersey City	30	18	3 million barrels	1976
Cosmopolitan Terminal	Deepwater terminal for storage of bulk fuel oil	Hoboken and Weehawken	55	16	3.8 million barrels	1975
JOC Oil, Inc.	Oil refinery and facility for storage of bulk petroleum products	Jersey City	80	20	100,000 barrels	1974
Super Marine, Inc.	Desulfurization facility and storage terminal	Hoboken and Weehawken	55	Uncertain	Uncertain	1972

Proposed Energy Facilities Rejected in the Jersey City Area

In an area with heavy industrialization and a severe shortage of open space, many citizens wanted new uses of the waterfront to be primarily for amenity and recreational activities. Physical access to the waterfront had been blocked for many years by a complex of railroad lines. Now that these railroads were no longer operating, the citizen activists saw an opportunity to change their area. An important first step was taken in this direction in the early 1970's with the proposal for the 800-acre Liberty State Park in Jersey City, the first section of which opened on the waterfront directly behind the Statue of Liberty and Ellis Island in June 1976. Citizens feared that the proposed new petrochemical operation would give the industry a "foot-in-the-door" toward eventual domination of the waterfront, undoing the impetus provided by Liberty State Park.

A second concern was the terminal's pollution and safety hazard. The facility would have contained a number of dangerous chemicals and emitted 100 tons of hydrocarbons annually. NJDEP backed the urban siting proposal primarily as a means of keeping such facilities away from the cleaner (that is, rural coastal) areas of the state. The agency worked with the company on an emission offset scheme almost a year before this policy was officially enunciated by the U.S. Environmental Protection Agency (USEPA). [10] The company planned to add pollution abatement equipment to facilities it rented some ten miles from the new terminal site, thereby achieving a theoretical two percent net reduction in hydrocarbon emissions. Opponents contrasted this offset approach with the Federal government's mandate to reduce hydrocarbon emissions in their area by 68 percent. [11] They felt that generation of 100 tons of additional pollutants in their own air quality "non-attainment" area (a reference to non-attainment of National Ambient Air Quality Standards, NAAQS) would be harmful even if 102 tons were reduced some distance away.

The opponents were also concerned about the toxic and carcinogenic nature of several of the chemicals to be stored at the terminal (benzene, among others). At a 1975 public hearing on the facility, for example, one of the citizen activists summed up his frustration:

"New Jersey, especially the northeastern corner, is already drowning in oil. We are carrying far, far more than our share of this polluting industry. The amount of storing and refining that our small state is presently doing is comparable in volume to what the huge states of California, Texas and Louisiana are doing.... Are we second or third class people here condemned to have, see, smell, breathe, and slush through nothing but oil and its products?" [12]

The third major area of opposition was based on economic concerns. Like most petrochemical facilities, this one had a low employment rate, providing at most 80 jobs on 40 prime waterfront acres. In view of the area's 1976 unemployment rate of 14 percent, this ratio of 2 jobs per acre conflicted with the goals of Hudson County planners to make employment generation a major criterion in siting new industrial facilities. The planners were using 25 to 30 jobs per acre as a minimum standard for their densely populated county. Moreover, the opponents felt that the facility's pollution and safety hazards would scare away other more labor-intensive commerce. Similarly, the taxes to be generated by the terminal were not seen as a meaningful incentive. The city offers tax abatement for five to ten years for industries which settle in officially designated "blighted" areas. Under this formula, the company would have paid a maximum of \$800,000 in annual taxes, a relatively small amount for a city which now collects \$68 million. [13] Thus in Jersey City, whose official motto is "Everything for Industry", and in Hudson County generally by the 1970's, perceptions of what was good for the public were beginning to diverge from the old fiscal planning approach.

Petrochemical facilities have also been opposed in other parts of the country, especially in New England -- where oil refineries have been unable to receive a single approval. Several New England states mandate local referenda prior to further consideration of proposed oil refineries. In 1978-1979, Portsmouth, Virginia, was the scene of a controversy over siting an oil refinery. [14] In California in 1977, the Dow Chemical Company was denied a large proposed installation; the company then chose to expand existing facilities in Illinois, Louisiana, and Texas. In 1978, Dow applied for permits for a \$30 million chemical transshipment terminal on the Delaware River in Bordentown, New Jersey. This terminal would have generated 50 permanent jobs on 50 acres of prime waterfront land, a ratio of only one job per acre. Public concern about the toxic chemicals to be stored and shipped on the Delaware and about the possible contamination of several municipalities' water supplies, as well as a series of petrochemical facility accidents, caused Bordentown officials -- originally strong supporters of the terminal -- to pass an ordinance banning tank farms from their community.

The energy facility siting experience on the Texas-Louisiana Gulf Coast provides a good contrast with the East Coast situation. On the Gulf, energy development took place gradually, over decades. From the beginning, oil and gas were an integral part of the area's basic industrial profile. [15] Thus, communities here did not experience the shock of sudden change that new OCS development areas anticipate, even those like New Jersey where refineries and petrochemical processing facilities have been firmly established for several decades. The energy industry on the Gulf Coast has been largely unopposed and unexamined by the area's residents. Oil and gas development and associated petrochemical facilities are seen as a natural and indispensable aspect of life, accepted--at least to date--with very little question.

Many parallels exist between New Jersey and the Gulf Coast, however. Along with California, these are the largest oil refining areas in the nation. New Jersey has five of the mid-Atlantic's ten oil refineries, accounting for 34 percent of the refining capacity on the East Coast, or about 4 percent nationally. [16] (The other five refineries are all upwind from New Jersey, four in Pennsylvania and one in Delaware.) The Gulf Coast is a very large energy producing area, with extensive offshore oil development and 82 refineries accounting for almost 40 percent of total U.S. capacity. [17] The Texas Gulf Coast has the greatest concentration of chemical plants in the country, producing 80 percent of the nation's synthetic rubber, 60 percent of the sulfur, and more than 40 percent of every basic petrochemical. As of 1978, 58 petrochemical plants were operating in the Texas coastal zone; at least 10 additional plants were proposed or under construction. [18] Texas also had 81 operational natural gas processing facilities [19] (in contrast with New Jersey, where none exist). As in Texas, petrochemicals are New Jersey's largest industry, a \$10 billion dollar giant; the next largest industries are agriculture and tourism, each generating about \$3 billion.

Perhaps the major difference in the two case study areas is the political climate -- specifically, the degree of acceptance of energy development. On the East Coast, proposals to site new energy facilities have met a wall of resistance; on the Gulf Coast, the opposite attitude prevails. Here new industry still is perceived as desirable, even if it adds to air and water pollution and does not generate many jobs or taxes by itself. An exception is the public opposition to siting of grain elevators in the Louisiana parish (county) of the case study. This is a reaction to the hazard of explosion. The immediacy of a safety hazard appears to have a more dramatic impact on public awareness than does the daily occurrence of pollution levels to which people have become accustomed. The Gulf Coast case study included analyses of the siting chronology of two energy facilities: an oil refinery in the New Orleans area, [20] and an ethylene chemical plant outside of Corpus Christi. [21] In contrast to the New Jersey situation, there was virtually no citizen opposition in either of these Gulf Coast cases. [22]

In the Texas siting case, the chemical plant is located just outside the city limits in an industrial zone free of higher city taxes. This site is five miles inland, with the facility using a pipeline to transport its crude oil and its products to and from the urban harbor. One of the company's major considerations in selecting this site was the ability to obtain local, state, and Federal permits with little if any anticipated opposition; in contrast, energy companies have continued to propose new facilities in New Jersey, even in the face of citizen opposition. In the Louisiana case, the company dropped several alternative sites from further consideration for various reasons, including anticipated opposition from environmental groups, especially in one locale in South Carolina. Both Gulf Coast locations were outside of large population centers, and away from residential areas: "out of sight, out of mind." Some of the differences in attitude found in the New Jersey and Gulf Coast cases can, no doubt, be attributed to the differing densities of population and industry in the two regions: New Jersey has dense development and growing pressures for urban revitalization, while the Gulf Coast still has much open space.

A notable difference was found between the permitting procedures in Louisiana and Texas. In Louisiana, Federal agencies administer Federal statutes; state agencies rely on their role in commenting on Federal actions, rather than using direct state permit authority. In Texas, state agencies have assumed responsibility for administering many Federal statutes. One reason for this difference can be seen in the comparative size of the Texas Air Control Board, with 400 employees, and the Louisiana

The area chosen as the site of the refinery in Louisiana had actively used a public relations campaign to encourage energy facilities to locate there. Prevailing policy in this parish is to encourage development along the Mississippi River and constrain siting outside of this corridor, thereby keeping industrialization away from ecologically sensitive wetlands. Political support for this policy comes from citizens who fish and hunt in the wetlands. According to Louisiana state law, a company must obtain a parish permit before it can seek state and Federal approval. In New Jersey, by contrast, one of the siting issues involved conflict over the timing of local and state approval, with some state decisionmakers proposing to preempt local authority.

Attitudes toward Federal intervention in energy facility siting provide another significant difference between the East Coast and the Gulf Coast. On the East Coast there is fear that the Federal government will force the siting of unwanted facilities; as, for example, in the Portsmouth, Virginia oil refinery case, in which the U.S. DOE and the Army Corps of Engineers urged approval. The attitude in Louisiana and Texas, by contrast, is that Federal environmental and price regulations may constrain further energy development which is desired by local decisionmakers.

The case study locales in New Jersey and the Gulf Coast share a major and disturbing characteristic: both have among the highest cancer mortality rates in the nation. A recent study by the University of Texas Cancer Center in Houston showed that death rates from lung cancer in Texas, particularly in the industrialized Houston area, had grown dramatically during the 1970's, reaching what some officials were calling "epidemic levels". [24] Meanwhile, New Jersey was being increasingly perceived as "cancer alley", and controls on carcinogenic chemicals were being studied by NJDEP.

PRINCIPAL FINDINGS AND POLICY RECOMMENDATIONS

Alternative Siting Strategies for the Urban Coastal Zone

If balanced pursuit of coastal zone protection, urban development, and energy facility siting is to be accomplished, the fundamental siting initiative must be wrested in large measure from the energy companies and placed instead in the hands of government decisionmakers at local, state, and Federal levels. Based on an overall energy policy, government should take the initiative in need determination, site planning, and site selection.

To date, government initiative is the exception to the pattern of corporate site selection followed by government permit review through the permit process. Maryland's power plant siting program and California's efforts to designate LNG sites stand out as exceptions in this regard.

The case study findings indicate that energy companies are not fully responsive to local and state concerns. Whether regulated utilities (electricity and gas) or private corporations (oil and coal), energy companies cannot be expected always to select sites consistent with society's interest. Their own criteria for efficiency, cost minimization, and profit maximization seldom correlate perfectly with optimal siting, as defined in statewide plans, for example. Too many environmental, social, and economic externalities apply. Given the enormous impact of major energy facilities, government siting initiatives seem essential, preferably on a statewide or regional basis but at a minimum with respect to the urban coastal zone.

In some cases, clearly defined siting criteria can give government an appropriate anticipatory role, yet one short of assuming complete responsibility for designating specific sites. In other cases, actual site designation may be necessary.

In general, only water-dependent energy facilities should be located at the water's edge. All others should be located at a reasonable distance inland, removed from the immediate coastal land-water interface. Government coastal zone and other regulations should enforce such a preference for inland siting.

This policy is designed to protect valuable ecosystems in the coastal zone, reserving them for amenity, recreational, and residential use where feasible. Too often in the past, energy facilities have been located on rural or urban waterfronts simply because of traditional inertia—"that's the way we have always sited such facilities"—or to achieve modest economic advantages to the firm from choosing a waterfront location. Now, however, available technologies—deepwater ports for unloading at an offshore location, pipelines for transfer of crude oil, natural gas, petroleum products, or other liquids from a coastal transfer station to an inland site for processing and storage—offer opportunities for environmentally and

socially preferable inland, remote siting of needed energy facilities, without an undue economic penalty to the energy company or the broader economy. Economic analysis indicates that the cost differential between locating a new oil refinery at an inland rather than a coastal site would be relatively small. This includes the cost of using a pipeline to deliver the crude oil from a coastal unloading facility to an inland urban or rural refinery. [25]

Incorporating a deepwater port might reduce environmental opposition to an oil refinery proposal. If the refinery were located in a rural area some three to five miles inland from the coast (or at least inland from the area immediately affecting the coastal zone). Use of an offshore unloading facility could reduce harbor congestion and lessen the chance of coastal oil spills. Use of a products pipeline would reduce the probability of damaging product spills; and the inland rural location would pose fewer land use conflicts. [26]

However, two possible secondary impacts of a deepwater port deserve attention. By allowing use of very large crude carrier oil tankers, the offshore port could reduce the probability of oil spills but increase the consequences should an accident occur to one of the huge ships. Second, existence of a deepwater port might stimulate other energy facilities to locate in this proximity, thereby threatening air quality or other values in the coastal or inland area.

Agencies of Federal and state government already have available a wide range of planning and regulatory mechanisms to encourage inland siting: coastal zone management plans and regulations, air quality controls, "208" and other water planning programs, plans under the Resource Conservation and Recovery Act and the Toxic Substances Control Act (TSCA), wetlands statutes, and riparian laws. Coordinated use of such controls in support of inland siting could contribute markedly to environmental protection and urban waterfront development, while ensuring that all energy facilities actually needed by American society are indeed constructed, and in a timely manner.

In considering the suitability of locales for siting energy facilities — particularly in complex urban communities with competing needs and land use patterns — it is essential to disaggregate both facility types and community characteristics. Enormous differences exist in the impacts of energy facilities. A gas-processing plant is not a tank farm, and an offshore oil and gas support base is not a power plant. Similarly, cities present highly diverse needs and opportunities. Jersey City is very different from San Francisco. Thus while generalized concepts of energy facility siting in the urban coastal zone certainly are useful as guiding principles, sensitivity to the differing features, plans, and requirements of a community and of proposed facilities are essential planning tools, especially in urban locales already under great environmental and economic stress.

Examples of this phenomenon abound in the New Jersey case study, for example. Because of its heavily industrial nature and the absence of a distinctive aesthetic setting, Perth Amboy could well be a reasonable site for a major storage terminal (air quality concerns aside) or large Outer Continental Shelf support base. [27] In contrast, such facilities would be fundamentally unacceptable in Jersey City, with its view of New York City's skyline and the Statue of Liberty and its new 800-acre state park on the waterfront. A smaller environmentally benign service base that did not become a dominant feature in conflict with amenity use on the Hudson River waterfront might be acceptable in Jersey City, however, especially if this facility were to provide a significant number of new jobs in this area of high unemployment.

Compatibility of new facilities with existing and planned land uses in urban waterfront areas is essential if nascent revitalization efforts are to succeed. If any new energy facilities are indeed introduced into such areas, their scale, design, and adjacent land use patterns become crucial so that they do not come to dominate the urban coastal landscape.

The Providence, Rhode Island, waterfront on Narragansett Bay offers one example of balanced, mixed use of an urban waterfront. This area includes the Narragansett power plant, an oil storage terminal with about 25 tanks visible from the water, a small marina for pleasure boats, a linear waterfront park of about 50 acres, and a highly prestigious residential area of larger, older homes only two or three blocks from the waterfront. All of these facilities are of a generally compatible scale, so that the industrial and energy development does not dominate the landscape. As a result, the area's overall land use pattern accommodates a range of different uses needed by the broader community. Similar situations exist on the Toronto waterfront and along much of San Francisco Bay.

In contrast, the 242-tank petrochemical storage complex proposed for the Jersey City waterfront, examined in the New Jersey case study, was an affront in terms of scale, visual impact, pollution volume, and land use compatibility. As a result, citizen opposition to this facility was intense, and it was ultimately successful. In retrospect, at least, the facility's proponents had been insensitive to local realities to

have expected otherwise. [28]

The type and scale of energy facility was a dominant consideration for several of the eleven Northeastern cities surveyed on waterfront planning issues. [29]

The existence today of energy facilities along the urban waterfront in many cities is an insufficient reason to intensify the pattern of development. Such facilities should be restricted to sites that clearly require immediate urban proximity and that contribute to sizable employment creation. Tax payments alone are insufficient justification for introducing additional incompatible land uses into the urban waterfront, often now the nucleus of citywide revitalization efforts.

In order to contribute to solving the serious problem of unemployment in many urban areas, any energy facilities approved for waterfront siting should meet specific tests of employment generation. A minimum figure for jobs per acre could be established for certain areas, so that a labor-intensive offshore oil service base might be acceptable but a fuel shortage installation would not. The proposed New Jersey facilities with 80 jobs on 40 prime acres, and 50 jobs on 50 acres, are illustrative of the problem.

Where explicit community efforts at urban waterfront revitalization are underway—as in Jersey City, Baltimore, Boston, Philadelphia, San Francisco, [30] and similar locations—extraordinary justification must exist to override a normal presumption against approving new energy facilities on the waterfront.

Commercial, residential and even light industrial development along the waterfront are often the principal positive signs in a rather bleak overall urban situation. In place of vacant lots, rotting piers, and decrepit warehouses, waterfront restaurants, boutiques, artist shops, and high-rise apartment buildings are now springing up on some waterfronts. Such development is bringing some of the middle class back into center cities from the suburbs, and is offering at least the potential for a growing multiplier effect on redevelopment of adjacent neighborhoods. Incompatible new land uses, such as major energy facilities, could upset this development impetus. Any new energy facilities approved for such locations must be compatible with existing or proposed recreational uses of the urban waterfront. This could require storage tanks to be bermed and landscaped, for example; and imaginative painting schemes for energy facilities could be considered using colors compatible with the local environment. Obviously, such facilities would have to meet all applicable air, water, and noise regulations.

Clustered siting of energy facilities in new areas offers a preferred technique to balance society's needs for new or additional technological capacity with the equally important objectives of coastal zone preservation and environmental protection. In general, sites for such energy clusters can be found on the outer fringe of metropolitan areas (as in the Texas site near Corpus Christi), thereby achieving market proximity while avoiding both the urban waterfront and rural areas of special environmental sensitivity. Further clustering in urban coastal areas is to be avoided.

Energy companies tend to resist the clustering concept, primarily because it implies a greater degree of land use and siting control by government agencies and a shift of siting initiative from private to governmental hands. In some cases, pollution concentrations from a single complex may threaten air or water quality. Nevertheless, the overall advantages of the cluster in alleviating pressures on areas of greater environmental value make this approach worthy of detailed scrutiny. Moreover, labor, infrastructure cost, and other economic advantages may accrue through clustering of several energy (and related petrochemical) facilities at the same site. [31]

Sites for potential energy clusters could be selected in advance of their need, perhaps by the states as part of a national energy facility siting effort. This could accelerate the overall permit review and siting process, although difficult issues of ensuring adequate public participation require careful resolution. Maryland's power plant siting program is suggestive of the kind of approach that could be useful for other types of energy facilities as well, [32] especially in states where environmental values in urban and rural coastal regions are in jeopardy.

Conscious government planning and regulatory action can ensure creation of sizeable buffer zones around major energy facilities, and especially around energy clusters, thereby separating conflicting land uses and keeping noxious but necessary facilities at arm's length from the society they are designed to serve.

A buffer zone concept is gaining increasing attention for areas surrounding nuclear power plants. In New Jersey, a ban on extensive residential development for four to six miles around the state's operating reactors was in force for three years under the state's coastal zone management statute. California's law on siting of liquified natural gas (LNG) facilities includes provisions for enforcement of specific land use controls in an extensive surrounding area. Even in the absence of governmental requirements, a number of private energy companies typically include buffer zones around their new facilities; this was done in the Corpus Christi plant analyzed in the Texas case study. [33] Characteristics of buffer zones may vary from one type of energy facility to another, and they may involve restrictions on some or all of the following: residential housing at selected densities, industrial facilities, commercial complexes, or highway access. Inclusion of buffer zones in any broader energy facility siting strategy makes rural (or at least urban fringe) siting imperative. Creation of a reasonable buffer zone would simply be impossible around a tank farm in Jersey City, an oil refinery in Long Beach, California, or an LNG terminal in Boston or New York harbor.

Where safety issues are the dominant concern, as with LNG terminals and facilities for storage or processing of certain toxic or carcinogenic materials, strict prohibitions against urban siting appear warranted. For such energy facilities, remote siting and enforcement of defined buffer zones are imperative.

Safety issues are a dominant concern of citizens. Lengthy, essentially unproductive delays in the permit approval process can be anticipated every time a dangerous facility is proposed for urban coastal siting. Such proposals constitute a "no-win" situation for the energy companies, government agencies, citizen or environmental groups, and the public at large. The continuing controversies over LNG facility siting in Boston Harbor; Staten Island, New York; on the Delaware River in New Jersey; and along the California coast are illustrative in this regard. The California Coastal Commission's analysis of several alternate sites for an LNG terminal provides a good working model for dealing with the safety issue. [34]

Unless more than compensatory pollution abatement can be achieved through techniques like the US Environmental Protection Agency's (EPA) emission offset regulations, additional polluting energy facilities should not be located in areas where environmental standards have not been met.

In many urban coastal areas, attainment of national ambient air quality standards poses particularly difficult siting constraints. This is one of the principal environmental issues in the rural-urban siting confrontation. In the attempt to escape from damaging fragile rural coastlines, energy facilities have been proposed for urban waterfronts where air quality—especially for hydrocarbons and photochemical oxidant—fails to meet the national standards: Long Beach, California; Jersey City, New Jersey; Portsmouth, Virginia; and so on. [35]

EPA's emission offset policy should be applied cautiously in urban coastal areas, especially with respect to new energy facilities.

This regulatory concept has the potential to allow balanced achievement of several national objectives: air quality attainment, energy development, improved use of critical coastal resources, and growth within depressed urban areas. Used as "creative maneuvering", however, the emission offset concept may cause delay in attaining standards, as mandated by the Clean Air Act Amendments of 1977. The proposed use of emission offset to allow construction of a petrochemical facility on New Jersey's urban waterfront, in which an overall two percent reduction was calculated through changes to be made to a terminal leased some distance away, [36] illustrates such a possibility.

Those proposing to construct major energy facilities in coastal locations, particularly on the urban waterfront, should be required to supplement their traditional siting proposal with an innovative alternative (inland siting with a pipeline to the coast; an offshore unloading facility).

This requirement could be enforced through state coastal zone management plans or energy facility siting regulations. The national coastal zone management program and the USDOE could encourage states to adopt this siting procedure. California already requires utilities proposing to construct a plant in its coastal zone to propose an inland alternative as well, so that both can be assessed for their environmental and

other impacts during the permit review process. Other proposed coastal energy facilities, in California and elsewhere, could be brought under the same type of scrutiny.

New urban waterfront development should include provision for public access to the water's edge. Federal coastal zone management regulations should give added emphasis to this policy.

Too often in the past, urban waterfront development has walled off the public from the shore, in the very areas where dense populations require access to such recreational amenities. [37] The railroads did this along most of northern New Jersey's Hudson River shoreline, for example. Popular demand for waterfront access is evident in the numbers of people, particularly in warm weather, who jump the fences and illegally cross the tracks to reach the water's edge.

The Economics of Energy Facility Siting

Delays that may be encountered in obtaining the necessary permits under existing regulatory conditions appear to have a significant impact on corporate evaluations of potential energy facility investments. In order to avoid such permitting delays, or reduce their length and seriousness, an energy facility sponsor may be willing to accept sizable increases in capital or operating costs, or both. [38] Changes in government regulatory procedures that encouraged or even just allowed such a tradeoff between greater facility cost and lessened permitting delay might receive substantial support from the energy industry.

Based on case studies of 16 oil refineries proposed in recent years for East Coast sites, but either rejected in the permitting process or abandoned by their corporate sponsors after lengthy delays, and on in-depth interviews with decisionmakers at four oil companies, sizable costs indeed appear to be associated with regulatory delays. On the basis of the net present value (NPV) calculations used by most of the companies to assess their investment decisions, a firm proposing to build a refinery producing 200,000 barrels a day would be willing to invest \$100 million of additional capital, or to assume incremental operating costs of \$18 million for 20 years, in order to avoid a five-year permitting delay. [39]

These additional costs could be applied to selection of an environmentally preferred but more expensive site: one inland from the coast, for example. An offshore unloading facility might be installed as well. Alternatively, they could cover the expense of installing and operating more sophisticated pollution abatement equipment. Similarly, the value of reduced permitting delays could be applied to the purchase of an extensive land area that would provide a buffer zone around an especially dangerous energy facility (e.g., an LNG terminal).

Midconstruction delays are far more costly to the firm than are permitting delays prior to commencement of construction. As a result, governmental actions to lessen the chance of such interventions once a facility has received its necessary permits and actual construction has begun could conceivably be balanced against major additional siting costs or pollution abatement improvements by the firm.

For a typical oil refinery, a one-year delay after construction has begun can have a greater impact on the profitability of the investment than would a permit review process that lasted 10 years prior to commencement of construction. This enormous difference results from the fact that capital is actually tied up in a project once it has reached the construction stage. External financing has been arranged; equipment has been purchased and brought to the site; and labor force commitments have been made. In contrast, expenditures are modest and commitments flexible while final permit approval is still pending. Actual corporate expenditures while the permit process is underway (perhaps \$5 to \$10 million), though a large sum of money, represent a very small percentage of the total capital costs of a major energy facility like an oil refinery (today perhaps \$650 million). [40]

Because of their overwhelming impact, midconstruction delays deserve special attention in any reform of the permitting process. Proposals that would increase the probability of such delays would, in the end, not contribute to energy development; proposals to make such interventions less likely could contribute to energy development (and perhaps to environmental protection at the same time).

As just noted, midconstruction delays can have a devastating financial impact, far greater than permitting delays. If government regulatory procedures could be altered to lessen the likelihood of such delays, major siting or pollution abatement concessions could be exacted from the energy companies in exchange. Proposals such as "one-stop permitting", while perhaps decreasing the time required for permit issuance, should be viewed with extreme caution if they provide added opportunity for opponents to challenge the project in the courts at a later date, thereby causing a midconstruction delay. Recent interpretations of the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA) could result in this situation.

Rapid inflation causes difficulties for long-range corporate investment decisions on facilities of the scale of an oil refinery. In this situation, permitting delays can have a much larger impact on the investment's desirability.

Even a modest increase in the inflation rate will have a large impact on the investment's NPV; this is true whenever capital costs are rising more rapidly than anticipated revenues. In this case, government actions to lessen the likelihood of permit delays become particularly crucial. [41]

In addition to the implications of permitting delays, the regulatory process increases the investment's uncertainty. Perhaps after months or even years of study and argument, the siting proposal will be rejected, or abandoned by the company as unworthy of further attention. However, this issue pales in comparison to the costs of midconstruction delay once commitments have actually been made. Thus changes in the regulatory process should focus more on midconstruction interventions than on early announcement of permit approval.

If the project is cancelled or rejected during the permitting process, the company loses the money it has invested up to that point (\$5 to \$10 million for an oil refinery). This sum must be viewed in the context of the entire project (\$650 million). For a facility of this scale, which when operating will have annual cash flows of close to a billion dollars, even a slight variation in expected product prices would overwhelm the initial risk of permitting rejection.

It is crucial that the energy corporations' overall investment evaluations of new facilities include the probable impacts of various siting alternatives on the length and uncertainty of the permitting process. Federal guidelines and informational activities could encourage adoption of such new siting evaluation techniques by energy companies.

The economic calculus for assessing the profitability of an investment in an oil refinery, or another major energy facility, will be affected by assumptions about the permitting process. Adoption by energy corporations of analytical techniques to compare permit process changes with higher site costs could allow balanced pursuit of otherwise contradictory national goals.

One alternative siting strategy calls for maximum feasible location of energy facilities away from the water's edge. Economic analysis indicates that the cost differential between coastal and inland locations for a new oil refinery would be relatively small, even when a pipeline is used to deliver the crude oil from a coastal unloading facility to the inland refinery.

Two inland refinery locations were selected for comparison with the coastal-urban base case: an inland-urban site and an inland-rural site. Basically, the economic disadvantage of locating a refinery inland occurs from the added transportation costs of shipping the crude oil from the coast to the refinery. In addition, many other potential capital and operating cost differentials exist between inland and coastal sites. These distinctions, however, are very site-specific and do not lend themselves to a general analysis. For example, the capital cost differential between a coastal-urban and an inland-rural refinery site would depend on such site-specific factors as: labor costs, labor productivity, equipment freight costs, availability of construction equipment, local taxes, and land costs. Based on modeling calculations, analysis showed that the additional crude oil and product transportation costs associated with the two types of inland sites had only a moderate impact on the economic desirability of the refinery investment.

Use of a deepwater port for offshore unloading of crude oil, in combination with an inland refinery location and a products pipeline for distribution of the lighter refinery products, appears to have distinct environmental advantages at modest economic costs. If reasonable increases in the probability of a successful permitting process are attributed to use of a deepwater port, the economic viability of such an offshore unloading and transfer facility improves greatly.

Incorporating a deepwater port could significantly reduce environmental opposition to an oil refinery proposal, especially if the refinery were located in a rural area three to five miles or more inland from the coast. Use of an offshore unloading facility could reduce harbor congestion and lessen the chance of coastal oil spills; use of a products pipeline would reduce the probability of damaging product spills; and the inland, rural location would pose fewer land use conflicts. Using NPV calculations, the additional costs of including a deepwater port in the refinery proposal would be preferable to a permitting delay of three to five years.

However, two possible "secondary" impacts of a deepwater port deserve attention. By allowing use of very large crude oil tankers, the offshore port could reduce the statistical probability of oil spills but increase the consequences should an accident occur to one of the huge ships. Second, existence of a deepwater port might stimulate other energy facilities to locate in its proximity, thereby threatening air quality or other coastal values in the area.

Governmental Institutions and Public Participation in Energy Facility Siting

A viable energy facility siting process requires effective procedures for authoritative participation by Federal, state, and local levels of government, and by the public. A balance of efficiency, equity, and participation must be devised. Often this will involve a structured sequence of decisionmaking by various levels of government, in turn, rather than centralization of authority in the hands of a single government agency. This generally applicable principle is of special importance along the urban coastal zone, where competing land use pressures and citizen interest run so high.

Too often in the past, and continuing today, siting reform proposals have emphasized administrative efficiency at the expense of equity and citizen participation. Proposals for Federal preemption over states' rights, for state override of municipal home rule, for technological decisions by experts, and for similar authoritative actions all threaten traditional political values in the American Federal system of governance. Formal public hearings and public comment on environmental impact statements constitute an inadequate approach to effective popular participation. As a result, the legitimacy of the overall decisionmaking process has been increasingly called into question.

Energy facility siting plans and strategies clearly are required at national, state, and regional levels. Energy, environmental, coastal zone, and economic development agencies all must be involved. These plans and studies alone are not enough, however. Authority must exist to allow resistance to siting by smaller levels of government to be overridden in the interest of the broader state or national polity. Yet exercise of this authority must be balanced and constrained; it cannot justify exclusion from the decisionmaking process of the public and its legally constituted units of government at local and state levels. An external override of a formal local decision, when required, is far different from a total shift of authority to a centralized agency, whatever provisions are made for public hearings. The political burden of proof regarding the necessity for a major new energy facility in a specific locale where it is not

wanted—must rest with the agency desiring to exercise such positive authority.

Some experts assert that "public participation can be even more effective in a coordinated one-stop (permitting) process. Such a process provides a clear focus for public comment and eliminates redundant hearings." [42] Although one-stop systems mean that concerned members of the public would not have to prepare for multiple hearings and technical review sessions, in many respects under a centralized system the citizens would lose their most potent tool: political pressure on elected local officials. [43]

Local authority over energy facility siting decisions increasingly is being constrained by external interventions based on Federal and state legislation. Tensions over the balance of authority and over effective public participation threaten the legitimacy of the facility siting process.

Most of the oil refineries planned but not constructed on the East Coast in the last decade were blocked by citizen groups or local governments. Local communities were often the last to know about these siting plans and were informed only when their formal action was required. This occurred only "after substantial corporate commitment had been made to the location in prior consultation with state and Federal officials." [44] This was a particularly virulent issue in Durham, New Hampshire, when local citizens learned of secret plans to build an oil refinery in their town.

In recognition of this lack of early involvement by the local unit of government and its citizens, who are most directly affected by an energy facility, several states in New England, including New Hampshire, now have laws calling for local referenda prior to siting of oil refineries. [45] Louisiana law mandates local permit approval (when appropriate) prior to state and Federal authorization. In the New Jersey case study, citizens forced their involvement in the energy facility decision process via public hearings and by various other means. This was, however, primarily at the end of the process to get around unresponsive governmental mechanisms, and it did not include early citizen involvement. The citizens' official role in public hearings, sometimes with inadequate notice, occurred late in the planning process. Citizens in Hudson County were ultimately effective in dealing with the local political process, as mayors, city council members, and other local authority figures eventually responded to political pressures. Proposed changes to the siting process designed to centralize authority in state administrative agencies or at the Federal level would remove this critical basis for citizen participation.

Most Federal programs do not appear to offer sufficient basis for local governments and citizens to participate in planning, management, and decisionmaking. Although "208" formally calls for such participation, results have been less than adequate. Problems are even more evident in various air quality programs (although recent institutional changes are encouraging in this regard). State decisions on energy facility siting, coastal zone management, and exercise of riparian lands authority formally rely on public hearings for public and municipal participation, often with desultory results. Many of the proposals for "one-stop shopping" on energy facility siting decisions need close scrutiny from this perspective.

Local permit approval should be considered first, or at least simultaneously with state and Federal agency approval, in order to ascertain local sentiment and preclude lengthy state and Federal procedures that may be unnecessary.

Results of the permitting process vary greatly between local governments, on the one hand, and Federal regulatory requirements, on the other. In general, acquisition of local siting approval has been the most difficult hurdle. Local governments tend to act fairly rapidly on permit requests (usually within a year), [46] but they may decide to reject the facility. In contrast, the Federal review process has a much greater risk of delay (the Federal permitting process for refineries typically has lasted from five to eight years), but the risk of outright rejection of a Federal permit is significantly less than the risks associated with local siting approval. To the degree that delay rather than uncertainty is the primary cause of additional costs for energy facility investors, therefore, special attention needs to be paid to reform of the Federal review process and to improved coordination between local, state, and Federal review processes.

Approval of Federal permits frequently has been received because environmental laws and regulations stipulate certain emission levels or pollution control technologies, which the proposed refineries have been able to meet, albeit sometimes at a high cost. The major Federal hurdle has been the US Army Corps of Engineers dredge and fill permit. Rather than having set standards to meet, issuance of this permit depends on balancing the public and private need for the facility against a host of environmental considerations. The subjective assessment of national energy needs versus environmental concerns required of this permit makes its issuance uncertain in each case. The implications of this problem for facility sponsors and for environmental quality are compounded since decision on this permit comes at the end of the

Federal review process. Outright Federal denial of the permit is unlikely, since by that point so much money has been spent and great corporate ego and interest group pressure have been amassed in favor of the project's construction; further delay often ensues at this final permit stage, however.

Total Federal override (preemption) on energy facility siting will not be tolerable politically in our decentralized Federal system, even in an era of continuing energy crises.

Legal authority for Federal preemption already exists for natural gas facilities and nuclear power plants. The Federal Energy Regulatory Commission (FERC) and the Nuclear Regulatory Commission (NRC) have the statutory power to override state and local wishes where they determine that the national interest so requires. Though this Federal preemptive power has not yet been applied explicitly to a nuclear power plant siting controversy, it was upheld for radiation standards in the case of Northern States Power Co. v. Minnesota. For natural gas siting, the judicial ruling in the case of Transcontinental Pipeline Co. v. Hackensack Meadowlands Development Commission was a definitive statement of Federal preemptive siting authority.

These Federal authorities must be used with caution, however. Case study research and other evidence indicate that the American political system has a low tolerance for exercise of such positive siting authority. From the Gulf Coast to New Jersey, and from Maine to California, citizens and local governments argue for their right to determine their own energy destiny; or at least to have a major role in doing so. Ceding all energy siting powers to a preemptive Federal establishment would run directly counter to this philosophy.

Federal Regulatory and Planning Efforts in Urban Coastal Regions

Specific Federal planning programs should address urban coastal siting issues as a unique challenge within the larger urban revitalization and land use framework. In the absence of coherent Federal action, planning for better development of these vital areas will remain sporadic and uncoordinated. The Office of Coastal Zone Management (OCZM) in the US Department of Commerce should assume primary responsibility for this effort, effecting coordination as required with other relevant Federal agencies.

To date, urban coastal issues have not received much attention from the Federal government. In fact, this issue is conspicuously absent in many plans, programs, and environmental impact statements. Urban areas are either ignored, or it is assumed that energy facilities could easily be accommodated there. For example, the original environmental impact statement for offshore oil and gas leasing off the mid-Atlantic coast paid little note to urban issues. Both the opportunities and potential problems for coastal cities in New Jersey, Delaware, New York, and Rhode Island were neglected, with most attention paid to potential impacts on rural areas. New Jersey's Coastal Area Facility Review Act (CAFRA), as another example, specifically excludes the state's urban coastal areas. Only the rural coastline is incorporated under this regulatory and planning mechanism.

Beginning in 1978, OCZM began to show greater interest in urban waterfront issues. This was a good beginning; but much more remains to be accomplished in the way of a Federal approach to urban coastal zone management.

Statewide facility siting plans are essential to achieving an effective balance of societal objectives along the urban waterfront and to ensure implementation of optimal siting strategies within that state. These plans should encompass all types of energy (including petrochemical) facilities. In larger states such as California or Texas, a statewide plan may be sufficient; in smaller states like New Jersey or Rhode Island, state formulations must be supplemented by explicit interstate planning. The USDOE and the OCZM should implement special programs to encourage states to develop comprehensive siting plans, with emphasis on the urban coast. Federal funding of such a planning effort appears warranted.

These plans need to incorporate statewide objectives for energy development, environmental protection, and urban revitalization within the multitude of regulatory constraints on urban coastal siting. Existing planning efforts in water and air quality, coastal zone management, urban redevelopment, and local zoning and land use regulation all must be taken in account. Use of renewable energy resources and alternate energy technologies deserve special attention for their statewide siting implications.

Plans, once developed, should be made available to the public and various affected agencies of government for their early review and open comment. Although overall site planning should consider all types of energy facilities, specific siting policies should be sensitive to the vital differences between them. Each major type of energy facility has its own intrinsic siting parameters.

Innovative Federal incentive grants from the Department of Housing and Urban Development or the Commerce Department's Economic Development Administration could stimulate further urban waterfront redevelopment. Such grant programs should be an integral component of a larger national urban development policy.

The traditional role of the Federal government in urban coastal communities has been to support physical improvements in port and harbor operations. [47] More than 50 Federal agencies have ownership and regulatory interests in some aspect of the coastal zone. Very few Federal programs, however, are focused directly on developing urban waterfronts, despite the evident fact that these areas can be the nucleus of citywide urban renewal efforts because of available land in these unique and now underused areas.

Regional planning for new energy facilities is essential to incorporate environmental suitability and fair share considerations into the decisionmaking process. In some areas, county governments may be the best vehicle for such supramunicipal planning; in others, alternative institutional structures will have to be devised (both intrastate and interstate).

Preferable locations often can be determined only on a regional basis; certainly implementation of the energy cluster concept will require a regional perspective. Nine of eleven cities surveyed on the question of regional land use authority were open-minded or in favor of such a mechanism. [48] It is notable that in Jersey City, the largest municipality in Hudson County and the scene of three of the five energy controversies, antipathy toward regionalism was expressed. This reflects the powerful role such a large city already plays in regional affairs and the fear of losing veto power over unwanted development represented in the thwarted energy proposals.

The fair share concept deserves special attention from the perspective of regional planning. [49] Certain municipalities, regions, and even entire states may already have their fair share of energy facilities. Environmental quality constraints and pressures to devise alternative land use patterns mitigate against further reliance on these areas for storage, processing, or generation of energy in its various forms. Whatever the intrinsic merits of this conceptual argument, on which reasonable people can -and do- differ, two implications are clear. First, citizens in an area of intensive energy (or industrial) development see the concept of fair share as a strong motivating force, especially when alternative patterns of development have been initiated. Second, adopting a regional rather than a local perspective provides a better basis for an objective evaluation of how much is enough.

Regional approaches to siting, while justified on their own, typically encounter resistance from local governments jealous of their fiscal and land use prerogatives. Home rule is an historical tradition in many states (though not all); therefore, the allocation of tax accruals from a new ratable provides the financial justification for strenuous intermunicipal competition.

Systems of tax sharing across municipal boundaries in an urban coastal region may be essential to achieving a balanced strategy of energy facility siting, coastal zone management, and urban development. The Department of Energy and the Office of Coastal Zone Management could play a role in devising model statutes for regional sharing of the tax benefits of new energy facilities (sharing of coastal energy impact funds deserves special attention).

Pursuit of tax ratables by each municipality, competing with all the others, contributes to fragmentation of planning, leaves siting initiatives primarily in the hands of the private energy companies (which can play off one municipal competitor against another), and reinforces the tendency to emphasize a proposed facility's fiscal benefits rather than its environmental or social costs to the individual community, let alone to the broader region. Revenue sharing may be essential to foster regional planning since there is little incentive for localities to surrender their planning and development prerogatives without a stake in new growth in the region. HMDC gives an example of procedures for tax sharing from new ratables; Minnesota's Twin Cities Regional Council is another example.

Availability of a deep channel obviously is vital to successful operation of many major facilities. Dredging of such channels normally is the responsibility of the US Army Corps of Engineers. Because of the difficulty and duration involved in getting the Corps to dredge in other areas, corporate site planners often opt to locate their new facilities in areas where channels already exist, despite other detrimental features of the site. Realignment of Corps' priorities to accord more closely with Federal and state energy siting strategies, while not an easy task, could contribute to a better overall siting patterns.

It would make sense to balance the additional costs of dredging in new areas (or of siting the facility at an offshore location) against the detrimental effects of locating the facility along the urban waterfront, where channel depth may already be adequate. Corporate decisionmakers cannot be expected to take such externalities into account in their site selection processes; instead, state and national interests must be balanced by the appropriate level of government. [50]

EPA's "208" areawide water quality planning program could contribute far more than it has to date to improved planning for energy facility siting in urban coastal areas.

One of the most innovative features of the concept is the requirement that all EPA permits and grants be consistent with a "208" plan, once it is formally approved by the EPA administrator. Since permits are required for all major energy facilities under the National Pollutant Discharge Elimination System and under state implementation plans for air quality, "208" planning could effectively designate areas where energy facilities are to be either prohibited or encouraged. And in distinction to most plans, such designations would be authoritatively binding.

EPA's regulations to protect environmentally sensitive areas under the Resource Conservation and Recovery Act [51] should be integrated into the early stages of planning new energy facilities.

EPA's site selection requirements under RCRA will affect many new energy facilities. Such requirements provide that a facility can locate in a wetland, a 500-year floodplain, [52] or a recharge zone of a sole source aquifer only if it can be proven that the facility's design, operation, and maintenance can prevent endangering these areas. Given the large percentage of energy facilities located in coastal areas, [53] it is essential that public health and ecosystems be protected through implementation of these RCRA regulations. The external costs to society of non-compliance must be weighed in any discussion of the costs of compliance.

Alternative Energy Technologies and the Urban Coastal Zone

Alternative energy technologies examined in this research effort [54] - cogeneration, total energy systems, low-BTU gasification, and fuel cells - raise a variety of new siting considerations. To a large extent, the rationale for traditional siting strategies appears to become irrelevant with respect to these technologies.

Various siting techniques - inland, coastal, offshore, clustered, dispersed, and so on - apply primarily to an existing set of energy facilities. Because of their size, scale, water requirements, air pollution, and other characteristics, power generation plants, refineries, gas-processing facilities and attendant storage facilities have been the subject of locational disputes, and thus the targets for strategies designed to reduce their impacts on the landscape. For the alternate technologies, new considerations arise. How many industrial cogeneration facilities of what capacity are needed to preclude construction of a central station power plant, for example? What percentage of baseload electricity cogenerated at decentralized urban sites would be sufficient to assure an appropriate level of system reliability? Will the utilities own and operate industrial cogeneration facilities that provide electricity for the grid as well as onsite power? Or should industry be the owner and operator? Since more fuel is actually burned at the cogenerating plant than in a normal industry because steam and electricity are simultaneously being produced, are there appropriate environmental offset measures to mediate any potential increases in hydrocarbons or other emissions from this fossil fuel use in urban locations? Siting considerations are quite different from traditional energy facilities. Cogeneration takes place at existing industrial plants; that is where this new generating capacity would be located. Thus, the need to site new plants solely for the purpose of producing electricity would be reduced if cogeneration technologies were adopted.

Some alternative energy technologies provide the opportunity to reduce siting tensions in urban areas by incorporating development and energy systems in tandem efforts at the same location.

Fuel cells can be used at the scale of a typical central power plant. More interesting, however, is the possibility of developing housing or an industrial park in tandem with a fuel cell energy system. Here suitable sites must be selected. In the total energy system concept, again, the decision is not how to site the energy plant appropriately but where to locate a development that will house the self-contained energy system.

Although many opportunities exist to reduce siting tensions through use of alternative energy systems, one obstacle appears to confound the plant siting issue: the absence of an electrification policy. A national policy should be developed to take into account the various technological options available for electricity generation. In contrast, national policy should recognize that equivalent technological options are not available in the processing and handling of fossil fuels, thereby requiring different siting strategies.

There is no apparent technological alternative to a refinery or a natural gas processing facility, an LNG plant, or a synthetic fuels facility. All these facilities are large in scale and capital-intensive. Some may require coastal locations to achieve economies that are no longer necessarily achieved by large scale electrical generation. Here technological alternatives on a smaller scale are applicable, especially in urban locations. In addition, none of these fossil fuel options brings the United States closer to reliance on a renewable resource base.

Regional energy policies may be needed to take into account explicit regional characteristics such as the availability of process steam as well as the variables of environmental quality, economic condition, and overall development patterns. Because of the uneven geographic distribution of industrial steam production throughout the United States, regional policies for cogeneration may be especially important.

Any combined cycle system that produces process steam and electricity simultaneously can achieve fuel efficiency that cannot be achieved at separate plants for production of steam and electricity. However, large chemical plants, paper plants, refineries, steel plants, and other steam producers that provide the best opportunity to cogenerate are absent in many states and subregions. Thus any changes made in utility regulation to encourage cogeneration may have little meaning or produce an undesirable result in areas where little or no industrial steam capacity exists.

Use of the total energy system concept may contribute to redevelopment in urban centers.

Through this concept, redevelopment opportunities in urban centers become a reality as sites for job-producing centers and housing are found. The energy plant itself becomes a supplemental consideration to the overall impact of locating the industrial park or housing units in a particular urban area. Energy becomes directly linked to the building structure and type of development or process it services. Investment in housing and industrial development can more easily address life-cycle costing concepts necessary to produce the economies that will make the urban environment more attractive.

IN CONCLUSION

Growing concerns over pollution and safety hazards, along with the emergence of urban waterfront revitalization movements in several cities throughout the country, have caused people to begin to think of the water's edge as a very special place ecologically and psychologically, not simply as another piece of city real estate. Historically, man has sought the water as a soothing place for recreational use, a strong need in today's setting with its frenetic pace. However, our waterways have also been used traditionally for commerce and industry, as evidenced by the location of almost every major city on navigable water. Thus conflict is inevitable, and new policies and approaches are required if society is to achieve its competing objectives.

Our nation's energy facility siting strategies could support, rather than contradict, the exciting redevelopment efforts now underway on a number of urban waterfronts. These incipient rays of optimism in a cloud of urban despair warrant such support. Recommendations presented in this report, based on research into this policy question, have been designed to alter the existing situation whereby proposed new energy facilities directly contradict urban coastal revitalization.

It is inconceivable that the U.S. does not have enough geographic space to accommodate necessary new energy facilities without effacing development initiatives on the urban waterfront, and also without endangering fragile rural coastlines. Yet while we have the land, do we have the political will and the institutional flexibility necessary to accomplish an effective balance among these potentially contradictory values? This remains to be seen. Surely traditional patterns of decisionmaking, with siting initiatives monopolized by the energy companies and externalities displaced onto others in pursuit of narrowly defined least-cost solutions, leave much to be desired. Alternative siting strategies are essential, especially for the urban coast.

In particular, the Federal government needs to develop an overall energy facility siting policy, national in scope yet sensitive to special needs and opportunities in different locales. This will involve an overall strategy, itself grounded in a national energy policy on fuels, prices, and goals. Piecemeal changes to permitting, licensing, and environmental assessment procedures, by themselves, are inadequate. Based on this research effort, government initiatives seem required, rather than the reactive stance evident today. Federal policy should not be made in a vacuum, nor overnight as a response to the latest crisis.

As with any decisions on controversial issues, adoption of alternative energy facility siting strategies would imply discrete costs and benefits for various key interest groups, as well as for society as a whole. Who would be the principal winners and losers associated with the approach suggested here?

The energy companies, especially the oil firms, would feel constrained by these policies: their siting options limited (new facilities shifted away from the urban waterfront, for example), their costs (to use alternate sites) possibly higher, and their decisionmakers responsive to new governmental siting initiatives. The companies would see themselves losing power and autonomy, and their verbal and political resistance could be enormous. On the other hand, the companies could gain if government agencies adopted the changes recommended for the permit process. Reduction or elimination of major processing delays and the introduction of procedures to limit mid-construction interventions could improve the intrinsic profitability of their energy investments.

The interests of environmental and citizen groups would, in general, be favored by adoption of these siting policies and procedures. Their pursuit of urban waterfront redevelopment goals would be enhanced, without sacrificing preservation of the rural shore. However, procedures to limit opportunities for midconstruction interventions might be seen as antithetical, given the extent to which these groups have relied in the past on litigation and judicial injunction. Groups with a particular concern for the offshore environment, like the American Littoral Society and the Cousteau Society, might be upset at the prospect of using deepwater ports to service inland facilities.

Organized labor, especially in the construction trades, would seem to be a beneficiary of the permit system modifications being suggested. Unions with particular access to urban coastal locations, however, might be disadvantaged by inland siting.

If sequential decisionmaking procedures were adopted, as proposed, local and state government agencies need not be threatened by the possibility of state and Federal siting preemption. Opportunity for initial decisionmaking by local governments should ensure that vertical shifts in authority will not be overwhelming, even though final external override power would be introduced.

Society as a whole should be a clear net beneficiary of these alternate siting strategies, which have been designed to effect a balance among various social objectives.

Conflicting values in our society are articulated by different institutions and individuals. This is natural. Some argue passionately for preservation of remote, pristine rural areas; others advance, with equal fervor, the need to redevelop urban centers. Beaches and dunes along the shore require protection; but so do inland wetlands and forests. Economic improvement is essential, especially in an era of apparently unstoppable inflation. Politicians and government policy makers clamor incessantly for investments and jobs in depressed urban areas. However, improved environmental quality may well be a prerequisite to economic revitalization of such communities. If environmental degradation continues to characterize urban areas, desired redevelopment may well not emerge. Thus these goals, so often seen as contradictory, are instead inherently intertwined. Neither can be accomplished by sacrificing the other.

Alternative energy facility siting approaches can contribute to such urban redevelopment. Indeed, a clear national strategy toward siting of such high impact activities is imperative. This strategy should designate appropriate land uses for urban and rural areas, and for coastal and inland regions. Clear roles need to be defined for local, state and Federal governments. Public participation is essential to ensure a legitimate decisionmaking system. Since industry traditionally has not been responsive, the fundamental locus of initiative for planning new sites needs to be shifted from the energy companies to government at various levels. In this way the wide range of relevant externalities can be taken into account.

The broader conceptual and institutional issues raised in this discussion of energy facility siting result from the complexity and importance of the many concerns affected by decisions to site such facilities. A comprehensive siting strategy must make three critical national priorities compatible rather than contradictory:

- greater energy self-sufficiency
- urban revitalization
- protection of fragile rural coastlines.

An energy facility siting strategy must incorporate all three of these social goals. Yet this alone is not sufficient, for what is really required is the creation of a system of governance adequate to meet the challenges of the last decades of the twentieth century. Focus on a single problem like energy facility siting simply points toward this broader political imperative.

NOTES AND REFERENCES

- [1] Based on 1972 data from a National Oceanic and Atmospheric Administration list of coastal states and counties. The coastal zone is defined in various ways ranging from hundreds of feet to 100 miles. County statistics were used because of their availability and their use as a basis for coastal planning.
- [2] 94th Congress, Energy Facility Siting in Coastal Areas, Committee Report #60-762-0 (Washington, D.C.; U.S. Government Printing Office, December 1975), pp. 1,2.
- [3] For a discussion of and statistics on socioeconomic factors in New Jersey's urban coastal zone, see Mildred Goldberger, "Socio-economic Factors in the Urban Coastal Zone: New Jersey as a Case Study" (Princeton, NJ: Princeton University, Center for Environmental Studies), Working Paper #44, February 1979.
- [4] See David Morell and Grace Singer, "The Urban Coastal Zone: Challenge of Redevelopment", in Coastal Zone '78 (published proceedings of conference in San Francisco, March 1978) (New York American Society of Civil Engineers, Vol. I, 1978), pp. 66-80.
- [5] Many power plants have been proposed for coastal locations in order to gain access to cooling water. It is estimated that some 100 new fossil fuel and nuclear power plants will be built in U.S. coastal areas by 1990. (Interview with Daniel Hoydysh, Program Analysis Officer, Coastal Energy Impact Program, Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, April 3, 1979). Most of these new coastal power plants are to be built in rural rather than urban locations.
- [6] Community impact is to be analyzed by Federal agencies before seeking new funding or proposing new legislation. Federal agencies will be required to conduct "an analysis of the impact of their major policies and programs on urban and regional areas." (Land Use Planning Reports, Business Publishers, Inc., July 17, 1978, p. 225).
- [7] See David Morell and Grace Singer, Refining the Waterfront: Alternative Energy Facility Siting Policies for Urban Coastal Areas (Cambridge, MA: Oelgeschlager, Gunn & Hain, Publishers, Inc., 1980), pp. 312-315, for a summary of the land requirements, environmental impacts, and direct employment associated with selected energy facilities.
- [8] The accident at the Three Mile Island nuclear power plant in Pennsylvania on March 28, 1979, seems certain to reinforce this element of citizen concern.
- [9] See Grace Singer, "People and Petrochemicals: Siting Controversies on the Urban Waterfront", in Morell and Singer, Refining the Waterfront, pp. 19-63.
- [10] See Barry Merchant, "EPA's Emission Offset Policy and Energy Facility Siting", in Morell and Singer, Refining the Waterfront, p. 99-114.
- [11] See Thomas Ash, "Air Quality and Urban Waterfront Development: A Review of Government Regulations and Attitudes", in Morell and Singer, Refining the Waterfront, p. 81-98.
- [12] Singer, "People and Petrochemicals", p. 38.
- [13] See Goldberger, "Socioeconomic Factors," for further tax data.
- [14] Merchant, "EPA's Emission Offset Policy", pp. 101-104, 111-112.
- [15] See Research and Planning Consultants, Inc., "Energy Facility Siting on the Gulf Coast: A Policy Perspective", in Morell and Singer, Refining the Waterfront, pp. 165-179; also see Research and Planning Consultants, Inc., "Siting Industrial Facilities on the Texas Coast" (Austin TX: RPC, 1978).
- [16] Interview with Roy Young, Refining Associate, American Petroleum Institute (Washington, DC), May 22, 1979.
- [17] Ibid.
- [18] Research and Planning Consultants, Inc., "Energy Facility Siting on the Gulf Coast", p. 177.
- [19] Information provided by Leah Pagan, RPC, Austin, TX; March 16, 1978.
- [20] Research and Planning Consultants, Inc., "Case Study of a Refinery Sited in Louisiana", in Morell and Singer, Refining the Waterfront, pp. 117-142.
- [21] Research and Planning Consultants, Inc., "Case Study of a Petrochemical Plant Sited in Texas", in Morell and Singer, Refining the Waterfront, pp. 143-164.

- [22] While citizen opposition was not a factor in the two Gulf Coast cases studied, a recent example of citizen action against siting of petrochemical plants -- apparently the first on the Gulf Coast -- exists on Galveston Bay in Texas. Here the Galveston Bay Conservation and Preservation Association has successfully thwarted the B.F. Goodrich Company's plans to build a large chemical plant near residential development along the bay. This organization is now in the midst of court proceedings to halt further construction of a multi-million dollar petrochemical plant of the American Hoechst Company. The environmental group is working with local officials and another organization, People for Parks, of nearby Houston. In this regard, these citizens have much in common with those in Hudson County, where the creation of Liberty State Park on the Hudson River became the focal point of a land use alternative to further heavy industrialization, including petrochemical development.
- [23] Interview with Carl Edmund, Chief, Air Enforcement Branch, U.S. Environmental Protection Agency, Region 6, Dallas, TX, June 22, 1979.
- [24] "Lung Cancer Deaths in Texas Rise to 'Epidemic' Level, Study Finds," New York Times, November 8, 1978.
- [25] See Energy and Environmental Analysis, Inc., "Locational Dimensions: The Economics of Coastal vs. Inland and Urban vs. Rural Siting," in Morell and Singer, Refining the Waterfront, pp. 233-256.
- [26] Ibid.
- [27] Perth Amboy, in the New York-New Jersey Port Authority district, was suggested as a possible location for an Outer Continental Shelf (OCS) oil and gas service base in Rutgers University, Onshore Support Bases for U.S. Oil and Gas Development: Implications for New Jersey (New Brunswick, NJ: Rutgers University, Center for Coastal and Marine Studies, September 1977), p. 183.
- [28] Singer, "People and Petrochemicals".
- [29] See Peter Denitz, "The Urban Waterfront: Planning Perspectives and Energy Facility Siting", in Morell and Singer, Refining the Waterfront, pp. 65-79.
- [30] See Virginia Farrell, Development and Regulation of the Urban Waterfront: Boston, San Francisco and Seattle (Washington, DC: US Department of Energy, DOE/EV/05128-T5, December 1980).
- [31] See Peter M. Meier, David Morell and Philip F. Palmedo, "Political Implications of Clustered Nuclear Siting", Energy Systems and Policy 3 (1):17-36 (Spring 1979).
- [32] See David Morell and Grace Singer, State Legislatures and Energy Policy in the Northeast: Energy Facility Siting and Legislative Action (Upton, NY: Brookhaven National Laboratory, BNL 50679, June 1977), pp. 79-108.
- [33] Research and Planning Consultants, "Case Study of a Petrochemical Plant Sited in Texas."
- [34] The issue of possible Federal preemptive jurisdiction over all Liquefied Natural Gas siting decisions was explored in hearings during 1979; written briefs are available from the Federal Energy Regulatory Commission.
- [35] Merchant, "EPA's Emission Offset Policy and Energy Facility Siting".
- [36] See Singer, "People and Petrochemicals".
- [37] Ibid.
- [38] See Energy and Environmental Analysis, Inc., "Impacts of Permitting Delays on Investment Desirability", in Morell and Singer, Refining the Waterfront, pp. 211-231 and "The Economics of Permitting: An Approach", pp. 183-210.
- [39] Ibid., pp. 215-219.
- [40] Ibid., p. 222.
- [41] The case of Sohio, which abandoned plans to site a major Alaskan oil terminal at Long Beach, CA, in March, 1979, after a five-year regulatory procedure, is one example of recent siting complications where government and the private sector have been in conflict.
- [42] Letter to David Morell from Robert W. Knecht, Assistant Administrator, National Oceanic and Atmospheric Administration, May 11, 1979, commenting on an earlier version of this report.
- [43] See Singer, "People and Petrochemicals".

- [44] Robert Warren, "A Local Perspective in National Energy Policy", Paper prepared for the Conference on "The Urban Coast and Energy Alternatives", Princeton University, May 18-19, 1978, p. 2.
- [45] Morell and Singer, State Legislatures and Energy Policy in the Northeast.
- [46] The Sears Island power plant case is a notable exception, though here the delays were caused by the state (the Maine Public Utility Commission's delay in convening a public hearing) rather than by a local government.
- [47] Mitchell L. Moss, "The Challenge of Urban Waterfront Revitalization," Paper prepared for the Conference on "The Urban Coast and Energy Alternatives", Princeton University, May 18-19, 1978, p. 5.
- [48] Denitz, "The Urban Waterfront".
- [49] The fair share concept is admittedly very controversial; some experts consider it unacceptable as an approach to facility siting.
- [50] We recognize that this recommendation may be politically impractical, and that there is a preference to use existing channels to avoid environmental impacts of further dredging. Nevertheless, a balance between different kinds of environmental (and other) impacts should be considered during the siting approval process.
- [51] US Environmental Protection Agency, "Hazardous Waste Management System," Federal Register, Vol. 45, No. 98, Book 2 (May 19, 1980), pp. 33063-33285.
- [52] This use of a 500-year floodplain may change when EPA promulgates siting regulations under Phase II of its RCRA activities.
- [53] An estimated 64 percent of existing power plants are located in floodplains, a percentage predicted to increase to 76 percent by 1985 since power plants and other major fuel burning installations depend on water for cooling. John F. O'Leary, Deputy Secretary, U.S. Department of Energy, letter of comment and attachments on EPA's proposed Hazardous Waste Guidelines and Regulations published on December 18, 1978, to Douglas C. Costle, Administrator, EPA, March 16, 1979, p. 8.
- [54] See Linda Kirschner, "Alternative Energy Technologies and the Urban Coastal Zone" in Morell and Singer, Refining the Waterfront, pp. 259-283.

Appendix A
REFINING THE WATERFRONT:
ALTERNATIVE ENERGY FACILITY SITING POLICIES
FOR URBAN COASTAL AREAS

Edited by David Morell and Grace Singer

(Cambridge, MA: Oelgeschlager, Gunn & Hain, Publishers, Inc., 1980)

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