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NUCLEAR FUEL CYCLE



NUCLEAR ENERGY

Background

- Nuclear power can substitute for oil and natural gas used to generate electricity, permitting the use of scarce domestic supplies for purposes where no other alternatives exist. Electricity generated in current light water nuclear reactors is economically competitive today in many parts of the country with electricity produced utilizing fossil fuels. This country is now in its 18th year of commercial nuclear power production with 62 plants totaling over 40,000 megawatts (MWe) currently in operation and supplying about 9 percent of our electrical generation. Another 179 plants totaling nearly 200,000 MWe are planned or under construction. Nuclear plants now supply the equivalent of about 1 MMB/D.
- Most planned nuclear power plants or additions in capacity were postponed or cancelled in 1974-1975 due to uncertainty over load growth utility financing difficulties, and siting difficulties.
- Recent escalations in the price of uranium have affected the economics of nuclear power and led to a reassessment of plans by many utilities. In addition, the failure of a major uranium supplier to meet contract requirements has caused a large legal problem.
- Recently nuclear power has faced considerable criticism and uncertainty which could have a drastic effect on its development. Criticism has been directed at various aspects of the regulation of nuclear power as well as at the environmental and other consequences of its use. In particular, arguments over siting decisions, waste disposal, possible sabotage, safety, and reprocessing, as well as the question of the proper Federal role in nuclear development, have become major obstacles to a full commitment to nuclear power.

- The Federal Government has had a major role in nuclear development, since the days of the Manhattan Project during World War II, when the primary objective was to develop a new and powerful weapon. In the post war period, the Atomic Energy Commission was established to maintain civilian control over weapons development and to regulate the use of fissionable nuclear material. In the mid-1950's the "Atoms for Peace" program was established to utilize the technological base established by the military programs for peaceful purposes, and was the beginning of Federal involvement in utilizing nuclear energy for electric power generation. Not only did the government sponsor research to develop power reactors, but it regulated the industry and produced the enriched uranium fuel needed to power the reactors in three facilities which had been built originally for weapons production. The pervasive role of the Federal Government has been attacked by the critics and has led to some of the problems and uncertainties concerning nuclear development which exist today.

- There has been increasing concern over the course of the U.S. non-proliferation policy, with many people fearing misuse of nuclear power by other nations. The United States has participated in about 30 bilateral agreements on nuclear cooperation.

Approaches Tried (Note: This whole section needs inserts on Congressional or Carter proposals)

- Licensing and Regulation. There have been two major issues in the regulatory area involving the responsibilities of the regulatory agency and the efficiency of the licensing process.
 - Concern that an agency responsible for both the regulation and promotion of nuclear power could not perform both functions

efficiently and without bias led to the abolishment of the Atomic Energy Commission in 1974 and the creation of an independent Nuclear Regulatory Commission to license nuclear facilities and protect the health and safety of the public. At the same time the Energy Research and Development Administration was created and charged with the responsibility for nuclear and non-nuclear R&D.

- The Administration asked Congress to enact nuclear licensing legislation to improve the efficiency and timeliness of licensing of nuclear facilities. The licensing and regulatory process have slowed due to changes in environmental impact procedures and safety requirements; however, the NRC has taken steps to reduce regulatory delays. Slippages in nuclear facility construction are of concern because they can result in electricity shortages; need to purchase high cost power from other utility systems; the construction of oil- or gas-fired facilities with shorter lead times to replace deferred nuclear capacity; or higher electricity generating costs due to the large capital expenditures and inflation. The licensing legislation would encourage standardized plant designs and decouple site and safety reviews. The bill received hearings, but was not enacted by the Congress.

- An important aspect of the siting and licensing problem is the definition of Federal and State roles. Nuclear initiatives on the ballot in November in five States were defeated by considerable margins. However, earlier in the year California passed three bills relating to siting, nuclear waste disposal, and spent fuel reprocessing. These bills raise serious legal issues about the role of the Federal Government in regulating nuclear power. Legal research is now underway with respect to this question.

- Uranium Resource Exploration. There has been a dramatic increase in the budget for uranium resource assessment. The United States has sufficient reserves and probable resources of uranium ore to fuel some 300,000 MWe of capacity for 30 years of operation. Less than half that capacity is expected to be in operation by 1985. Whether or not additional nuclear plants can be fueled beyond this 300,000 MWe depends on how successful the industry is in the coming years in finding new uranium resources. Continued exploration and development effort will be required to convert resources into reserves. Higher uranium prices will probably serve as an incentive to continue exploration for resources and the construction of mining and milling facilities to develop these new sources.

- Uranium Enrichment. The Nuclear Fuel Assurance Act proposed by President Ford and defeated barely by the Congress would authorize ERDA to enter into contracts with private firms to finance, build, own, and operate enrichment facilities. It would foster creation of a private, competitive enrichment industry. The bill was defeated primarily because of concern over allowing private companies to take over these operations and general anti-nuclear sentiment.

- Uranium for uses as fuel in light water reactors must be enriched in the fissile isotope U-235 to a concentration of approximately 3 percent by weight. Naturally occurring uranium contains only 0.7 percent U-235 by weight, the rest being U-238. Currently, the United States is the major supplier of foreign enriched fuel. Contracts have been signed for some 300,000 MWe of capacity, of which one-third represents foreign commitments.

-- The Administration also proposed in 1975 legislation to increase the price of uranium enrichment from ERDA's existing plants.

- Reactor Safety. There remains some concern about the safety of nuclear power plants, despite the record of over 200 plant years of operation without a single death from a nuclear accident. The major thrust towards reducing public concern and assuring safety has been massive budget increases for reactor safety research and development.

- Spent Fuel Reprocessing and Plutonium Recycle. Uranium fuel used in current nuclear reactors produces power, slightly enriched uranium, some radioactive waste products, and plutonium which can be chemically separated from the spent fuel. The plutonium can be recycled and used to generate nuclear energy, thereby offsetting the need for additional uranium resources. Nuclear development in the United States has been based on the assumption that reprocessing and plutonium recycling would occur. Several facilities have been built by private industry, but await a final environmental impact statement from the NRC before completion.

-- The major concern in reprocessing is the recovery of plutonium, which is carcinogenic and the key material needed to make nuclear explosives. Once separated in a reprocessing plant, plutonium conceivably could be diverted or seized by terrorists. Several major industrial nations plan to operate reprocessing facilities.

-- In October 1976, President Ford asked ERDA to define a reprocessing and recycle evaluation program, complementing NRC's environmental analysis, and he invited other nations to join in the evaluation. He also encouraged ERDA to change policies

that assumed reprocessing would proceed, to encourage prompt expansion of spent fuel facilities, and investigate alternatives to reprocessing. The President called upon all nations to restrain the transfer of reprocessing technology.

- Nuclear Proliferation. The potential benefits of spent fuel reprocessing and plutonium recycling must be balanced against the danger of nuclear weapons proliferation. Expanded use of nuclear power internationally occurs for a variety of reasons including peaceful and potential military use. The United States has participated in the Nonproliferation Treaty (NPT) and used its market influence to impose restraints. As its share of the reactor market has dropped and without reprocessing services, the United State's leverage on restraints has been reduced. In October 1976, President Ford called for the following measures:
 - He directed the State Department to pursue establishment of a new international regime to provide for storage of civil plutonium and spent reactor fuel. He urged the International Atomic Energy Agency (IAEA) to implement this concept.
 - He urged an upgrading of the IAEA's safeguard functions and an investigation of the possibility of an international convention on physical security.
 - He indicated that the United States would, at a minimum, respond to violations of a safeguard's agreement with an immediate cutoff of supply of nuclear fuel and cooperation.
 - He announced that U.S. nuclear export policy would favor nations adhering to the NPT; foregoing reprocessing or enrichment facilities; or participating in an international storage regime.

- Nuclear Waste Management. In addition to dramatic budget increases for waste management, the President asked ERDA to demonstrate all components of waste management technology by 1978 and to have a complete repository for such wastes in operation. He also urged international discussions on the possibility of establishing centrally located, multi-nationally controlled nuclear waste repositories.
- Nuclear wastes are highly radioactive and must be isolated from the environment for centuries. The principal problem is confining the radioactivity, not finding enough storage space (total volume through 2000 will be about 70 cubic feet). The technology has been demonstrated at a small scale and most experts believe deep underground storage is the most practical method.

Remaining Problems/Possible Initiatives

- Despite the votes on nuclear referenda this year and a recent public opinion survey showing that most Americans favor nuclear power, strong opposition to its expansion remains.
- Almost all the legislative and administrative proposals cited above have yet to be enacted or implemented.
- Major decisions will be needed on the following subjects:
 - Extent of nuclear power use in the United States
 - Federal/State roles in regulating nuclear power
 - Enrichment
 - Reprocessing
 - Proliferation
 - Waste Repository

-- Breeder Reactor

-- Fusion

Recommendations

ENERGY FINANCING



ENERGY FINANCING

Background

- Over the past few decades, energy investments have accounted for about 25-30 percent of total fixed business investment in plant and equipment. Projections indicate that this trend is likely to continue in the next ten years, with expected energy investments of almost \$600 billion (in 1975 dollars) amounting to about 30 percent of fixed business investment.
- The total expected energy investment, while enormous, is expected to be manageable in the aggregate. Nevertheless, specific sectors, such as electric utilities, may find it difficult to raise capital.
- The Federal Government now has specific authority to implement a number of energy financing programs, with minimum Federal exposure of at least \$5 billion. These include:
 - Coal loan guarantees;
 - Conservation obligation loan guarantees;
 - Geothermal loan guarantees;
 - Nuclear power damage liability program to reduce risks to vendor, utilities, etc., and permit financing at lower rates;
 - Weatherization grants;
 - Energy conservation and renewable resource demonstrations;
 - Coastal zone impact aid;
 - Coal impact loan program to States for Federal coal development;
 - REA loan financing for electricity related items;
 - Liquefied natural gas tanker subsidies and mortgage guarantees.

- A number of Federal mechanisms could be used to encourage investment in needed energy projects, including:
 - income tax credits, penalties and refunds;
 - excise taxes (see Section 2 on tax options);
 - guaranteed or subsidized loans;
 - Federal grants;
 - Federal ownership;
 - price supports;
 - government market purchase guarantees.
- The issue to be resolved is whether the existing market mechanisms, in the absence of government intervention, will channel necessary investments to meet our evolving national goals for conservation and energy resource development.

Approaches Tried

- During the past two years, the Administration has submitted several financing proposals to the Congress to facilitate and expedite the construction and operation of a wide variety of energy facilities. These proposals had several objectives:
 - to expedite commercial development of emerging energy resources and conservation technologies which are deemed economic and environmentally sound;
 - to provide financing to overcome key bottlenecks to the orderly development;
 - to provide economic assistance to localities impacted by Federal energy resource development activities;
 - to provide financing assistance to those segments of the economy which must make significant capital expenditures to satisfy Federal regulations on fuel mix and environmental control of energy use;

- Among the financing proposals were the following:
 - Synthetic Fuels Commercialization. A Federally sponsored Synthetic Fuels Commercialization Demonstration Program was first proposed to the Congress in January of 1975 and subsequently submitted as part of the ERDA budget. As negotiated with the Congress, but voted down by one vote in the House, it would have provided \$2 billion of Federal assistance (primarily loan guarantees?) to commercial facilities for synthetic gas, coal liquefaction, and oil shale production.
 - Energy Independence Authority (EIA). On October 10, 1975, the President forwarded legislation to the Congress to establish an independent government financing authority with financial resources of \$100 billion to provide loans, loan guarantees, and other assistance for the development of private sector energy projects which would not be financed without government help. The projects that could be assisted would be at the commercial stage (not R&D) and could include conservation and transportation facilities, as well as resource development proposals. The EIA would also expedite the regulatory process at the Federal level for projects deemed critical for energy development by establishing the FEA as the coordinator of a streamlined permit process for all new facilities requiring Federal licensing.
 - Nuclear Fuel Assurance Act. In May 1975, the Administration submitted to Congress legislation to, in part, authorize ERDA to negotiate cooperative agreements providing government temporary financing, technological and contractual assurances to private ventures wishing to finance, build, own and operate uranium enrichment plants.
 - Electric Utilities Construction Incentive Act. Proposed in June 1975, this legislation would accelerate the construction of electric power generating facilities by increasing the investment tax credit to 12 percent for all electric utility facilities except those that are oil or gas-fired; extend until 1981 rapid amortization

of pollution control equipment, and apply rapid amortization to converting or replacing oil-fired generating facilities; allow depreciation of construction expenses for other than oil or gas fired facilities prior to the completion of the project if such expenses are included in the rate base; and allow deferral of taxes on dividends, if they are reinvested in the utility.

- Federal Energy Impact Assistance Act. This legislation was proposed in February 1976 and authorizes up to \$1 billion for loans, loan guarantees, and planning grants for States and local communities for energy-related public facilities and infrastructure prior to construction. The Congress addressed part of this question in the Coastal Zone Management Act (July 1976). This Act provides \$1.2 billion of loans and grants to coastal States over the next ten years for construction of public facilities to reduce the impacts of offshore fossile fuel development and production, but ignores in land resource development (i.e., coal and synthetic fuels).
- Residential Insulation Tax Credit. This proposal was submitted to Congress by the Administration in January 1975. It allows homeowners a tax credit of 15 percent of the first \$1,000 invested in residential materials and installation over a three year period (maximum of \$150 tax saving). The bill has passed both Houses at various times but was deleted twice in conference.
- Weatherization Program. The Administration proposed and Congress adopted (in the ECPA) a three year, \$200 million weatherization grant program for the insulation of homes of low-income, elderly, and handicapped persons, and Native Americans.
- The Congress adopted several energy financing proposals that were not proposed by the Administration. These include:
 - Coal Loan Guarantee Program. The EPCA and ECPA have authority for \$750 million of loan guarantees to small coal producers for opening new coal mines or re-opening existing underground mines.

- Amendments to Mineral Leasing Act. The Congress overrode a Presidential veto and enacted amendments to the Mineral Leasing Act which increase the State share of royalties from Federal leases from 37 to 50 percent.
- Conservation Obligation Guarantee Program. The ECPA authorizes up to \$2 billion in obligation loan guarantees for conservation investments by industry, small business and non-profit institutions, provided conservation investments would pay off and applicants satisfy a test that credit is unavailable elsewhere.
- State Conservation Grant Program. The EPCA and ECPA provide a total of \$255 million in grants to States (over three years) to assist in the development and implementation of energy conservation programs.
- Energy Conservation and Renewable Demonstration Program. The ECPA provides \$200 million to the Department of Housing and Urban Development (HUD) to undertake a national demonstration program to test the feasibility and effectiveness of various forms of financial assistance for encouraging conservation measures. FEA is authorized to establish a demonstration program to test various mechanisms (grants, low interest loans, interest subsidies, etc.) for encouraging energy conservation improvements or use of renewable resources, such as solar heating or cooling, in existing residential buildings.
- Congress also considered a number of other financing measures, including additional tax credits for household insulation, solar heating, heat pump replacements for resistance heat, and investment tax credits to businesses for insulation, solar energy, waste conversion, coal mining, and oil shale development.
- As indicated above, a number of proposals did not succeed in the 94th Congress. Although the synthetic fuels commercialization program came close to passing and may have been defeated because the House was running out of time, it failed for a number of the same reasons that stymied the Energy Independence Authority. These include:

- Widespread opposition to Federal financing aid for large energy companies (particularly oil companies), despite the risky nature of commercializing new technologies.
- Reluctance on the part of traditional supporters of the market approach to subsidize development of technologies that may be uneconomic.
- The size of resources that would have to be committed may be more than the public at large believes necessary and seems like a large amount during a time when the government is trying to reduce budget deficits.
- The assistance programs like synthetic fuels and EIA cover a broad range of projects and may be harder to accept or explain than would be more specific project assistance.
- Some environmental groups were concerned about supporting projects which may have adverse environmental impacts.
- Some of these bills, and particularly the synthetic fuels bill, were referred to several Congressional Committees, losing time and interest in the process.

Remaining Problems

- It seems apparent that some needed energy investments may not occur due to market uncertainties, potential risks, or national interests being different from individual company concerns. There are several questions that still must be addressed:
 - Will the marketplace efficiently allocate resources when world oil prices are imposed by a cartel, and domestic oil, gas and electricity prices are regulated?
 - Will market forces adequately advance commercialization of the evolving energy technologies and conservation when the prices of conventional energy commodities are controlled?
 - Is there an emerging chronic capital shortage which will constrain energy policy?
 - Is there sufficient venture capital available at reasonable rates to permit timely commercialization of evolving technologies?

- Is the tax system or other Federal financial measures the "appropriate" mechanism to achieve these energy policy goals?
- Would Federal financial intervention favor certain geographic regions or socio-economic classes over others?

Possible Initiatives

- Establishment of a Federal government financing authority. Under this approach, a government energy financing authority would be established as part of a Federal energy reorganization, to implement any existing and new financing programs authorized by the Congress (could include synfuels, inland impact assistance, uranium enrichment, etc.) for energy resource development and conservation activities. This authority would function as part of a single energy agency.
- Such a comprehensive mechanism would be advantageous for controlling Federal financial commitments in a coordinated fashion, assessing impacts and distortions upon the capital markets and other segments of the economy, coordinating with other ongoing Federal and State fiscal and monetary actions, and providing appropriate budgetary treatment for these obligations. However, since Congress disapproved of the concept of an Energy Independence Authority for many of the reasons cited above, the likelihood of Congressional approval of such a proposal is not high.
- Propose specific financing Authorities. A set of specific financing proposals (with or without a proposal for a government financing authority) could be proposed. The possible areas of Federal financial assistance include:
 - Conservation. Since conservation measures in the residential and commercial sectors are often limited by front end costs even when life cycle benefits are evident, federal programs to either subsidize loans or grant partial tax credits for retrofitting or the purchasing of new energy conservation devices should be examined.

- Synthetic fuels. Synthetic oil, gas produced from coal, and oil from shale have been demonstrated in pilot operations, but initial production facilities have not been demonstrated to be economic. Since oil and natural gas reserves are being depleted, but coal and shale reserves are abundant, consideration should be given to guaranteed loans and price supports to accelerate development of a commercial synthetics industry.
- Coal. Environmental costs and uncertainties are a key bottleneck to increased utilization of our vast coal reserves. Guaranteed loans could be provided for the installation of flue gas desulfurization equipment, fluidized bed, and/or coal cleaning equipment.
- Solid Waste. Guaranteed or direct loans for the development of private, cooperative, and municipal ventures to generate electricity, steam, and/or otherwise displace scarce energy resources from the energy in solid waste should be examined.
- Natural Gas. Following a comprehensive review of the necessity of and alternatives for Federal financing as mandated by the Alaska Natural Gas Transportation Act, there may be a need for Federal financial assistance or regulatory changes.
- Inland Impact Assistance. If it appears that vitally needed energy projects (powerplants, coal development, synfuels plants and oil shale development) are being delayed because of potential, adverse localized social and economic impacts, a new proposal for inland state impact aid should be considered to mitigate such impacts.
- Government Purchase Program. The government can play a major role in fostering the commercialization of evolving energy resources, environmental control devices, and conservation technologies by establishing a market for specific products through initial, high volume government purchases. A government purchase program could be implemented based on an open bid for the product meeting certain performance and cost criteria established at a level so that subsequent production would be expected to be commercially competitive. This program could be targeted to the specific areas outlined above (i.e., solar

energy, energy from solid wastes, energy efficient devices, high and low Btu gas from coal, oil from coal and shale, and advanced flue gas desulfurization, coal cleaning and/or fluidized bed combustion of coal).

- The government could consume these products by itself and/or lease or sell them to the private sector. The capital outlays for such a program could be many billion dollars.

Recommendations

ENERGY R&D
PRIORITIES



R&D PRIORITIES

Background

- The fuel sources to meet our Nation's energy requirements have changed considerably over the last hundred years. Advances in technology, the development of new fuel sources, and economics have seen coal replace wood, and oil and natural gas subsequently replace coal as our predominant sources.
- The impacts of environmental concerns, the oil embargo, higher fuel prices and heightened energy awareness have forced an abrupt re-evaluation of American energy policies, with concomitant implications for future energy consumption patterns. Environmental groups have raised serious questions about the ability of the environment to withstand continued growth. The embargo has forced policy-makers to examine the issue of dependence on foreign sources for commodities, such as oil, which are basic to the economy. Higher energy prices have served as an incentive to conserve and have stimulated the search for technological solutions. The realization that there are geological limitations to resource supplies -- and that we may be pressing these limits -- has inspired a search for alternatives.
- In the long-run, given oil and natural gas reserve estimates, the Nation must face the question how the economy will make a transition from reliance on these finite sources to other, more abundant, resources. In fact, of course, the whole world will ultimately have to make such a transition as supplies of oil and gas are depleted. The timing of this transition is uncertain, and depends on domestic supply availability; demand; import goals; environmental factors; and technology development.

Approaches Tried

- Reorganization. Prior to the 1973 oil embargo, the responsibility for formulating and executing Federal energy R&D policy was fragmented among a wide variety of Federal agencies. However, the Energy Reorganization Act of 1974 led to formation of the Energy Research and Development Administration (ERDA). The major objective of

this legislation was the creation of a comprehensive, independent energy research and development agency which would play the leading Federal role in the balanced and speedy development of various energy production technologies.

- Another purpose of the Act was to separate the nuclear research and development functions of the Atomic Energy Commission from the regulatory functions of that agency. This Act abolished the Atomic Energy Commission (AEC) and divided its functions between ERDA and the Nuclear Regulatory Commission (NRC).
- Research and Development Acts. Other major legislative mandates have since been given to ERDA in the following additional acts:
 - The Federal Nonnuclear Research and Development Act of 1974, which provides the major guidance to the ERDA Administrator as to the principles, authorities and duties to be carried out with respect to R&D in energy technologies other than nuclear power.
 - The Solar Heating and Cooling Demonstration Act and the Solar Energy Research, Development and Demonstration Act of 1974, which authorizes an expanded geothermal R&D program and provides loan guarantees for geothermal projects.
 - The Electric Vehicle Research Act (wrong name?), which authorizes additional funds for R&D in electric cars and requires Federal purchases.
- Expanded Budgets. Federal funding for energy R&D had already begun to increase prior to the embargo (from \$382.4 million in FY 70 to \$642.3 million in FY 73). In FY 73, 74 percent of the Federal energy R&D budget was devoted to nuclear fission and fusion R&D; 15 percent to coal resource development; 6 percent was expended on control technologies; and the remainder was devoted to a variety of other projects including solar, petroleum and other technologies.
 - Following the embargo, an even more dramatic series of increases in Federal R&D expenditures has occurred. Budget authority has been raised to \$3.4 billion in FY 77 and the emphasis has been changed. Nuclear fission and fusion R&D now amount to 50 percent of the total budget;

fossil R&D at 17 percent; environmental research and basic energy sciences at 20 percent; conservation and solar energy at 9 percent; others at 4 percent.

- Research Strategies. As required under its enabling legislation, ERDA prepared an annual R&D Plan in 1975 and 1976. The plans have set forth a set of R&D goals, strategies for achieving these goals, and methods for choosing between strategies. In its most-recent plan, ERDA assigned highest priority to energy conservation technologies, along with direct use of coal, enhanced oil and gas recovery, synthetic fuels, and nuclear supply technologies.
 - Greater emphasis was given to commercialization of near-term technologies (including a new short-term planning category) and to closely coordinating technology development with socioeconomic and environmental factors.
 - Primary responsibility for developing and commercializing conservation technologies was considered to rest with the private sector, although ERDA funding was also increased in this area.
 - The report argued that national priorities for energy RD&D are not the same as priorities for the allocation of Federal funds for energy RD&D, either because the RD&D function can better be achieved by the private sector; or the objective can better be achieved by some means other than RD&D; or the funding is not sufficiently high in priority compared to other demand for Federal funds.

Remaining Problems

- Despite considerable change in emphasis there is still criticism of the Federal energy R&D effort. Some claim that ERDA is not going far enough in promoting conservations, near-term technologies, or nonelectric technologies; that its basic research programs regarding fossil, solar, geothermal, end-use conservation, heat transfer, thermodynamics, and combustion processes are weak; and for not investigating alternative RD&D budget strategies at different levels of funding.

- There are basic questions remaining with respect to the degree of emphasis on electricity and particularly on nuclear power, as well as the emphasis on conservation. These questions are at the heart of the nation's long-term fuels policy (as discussed in Section 2) and at the root of many environmental concerns.
- Clearly with a rapidly growing R&D budget, many difficult choices did not have to be made. As some of the new programs mature from the research phase to development and demonstration, they will require a further increase in the R&D budget relative to the Federal budget or a greater scrutiny of on-going programs. Trade-offs will have to be made on the allocation of funds between energy R&D and other government programs and careful analysis will be required of on-going R&D efforts. The latter may result in a change in strategies.
- There are still organizational overlaps in some areas, particularly with respect to conservation.
- It is not yet clear what will happen if the combination of energy policies and R&D fail to bring our longer-term energy situation into a proper balance.

Possible Initiatives

- Further Definition of Priorities. The most recent ERDA plan pointed out that although all national energy technology goals must be pursued together, "this does not mean that every conceivable technology approach can or should be pursued with equal vigor or at all." ERDA and the Congress must address how limited resources would be used and where priorities ought to lie. They should consider the following questions:
 - Should the Federal energy R&D program emphasize projects with near-term, mid-term, or long-term payoffs? For example, should R&D be stressed?
 - Should research be spread across many areas to provide greater flexibility or concentrate in a few areas? Concentration involves evaluating the risks that development strategies may fail, e.g., public rejection of nuclear power, recognition of a catastrophic CO₂ problem, coal production retarded by environmental problems, or technology to guarantee

access to nuclear fusion and solar power is not available.

-- What should be the government's involvement in the following major technologies:

- breeder reactor
 - solar electric
 - uranium enrichment
 - synthetic fuels
 - conservation
- Improved cost-benefit analysis. There probably needs to be more analysis of the relationship between Federal expenditure and achievements; the value of increased flexibility; and the socio-environmental costs of new technologies.

Recommendations





INTERNATIONAL CONSIDERATIONS

THE VALUE OF ENERGY INDEPENDENCE

Background

- The Arab oil embargo of 1973 and the accompanying price rise focussed public attention on energy policy and gave impetus to first attempts at long-range comprehensive energy planning. Early statements by the Administration announced the goal of energy independence, a concept that was left undefined but was intended to reduce imports to levels at which the effects of an embargo would be very small; however, it was popularly understood to mean zero imports.
- Early emphasis was placed on the supply security aspects of the U.S. energy position. Security of supply is desirable to provide maximum flexibility in foreign policy and preserve our economic and national security. It can be achieved largely through the implementation of the Strategic Reserve Plan, if imports stay at acceptable levels. However, if imports rise to about 10 MMB/D or more, the ability of the strategic reserve to maintain economic well-being diminishes.
- Another area in which energy independence may prove valuable, is with respect to price security. The economies of the United States and other consuming nations cannot adjust easily to continued, sharp rises in the price of oil. If a reduction in dependence upon OPEC can reduce the threat of such price hikes, the nation's interests can be saved.
- The United States and other consuming nations have begun, in the International Energy Agency (IEA), a program of reducing our mutual dependence upon imported oil. This effort is in recognition of a growing concern that U.S. energy independence alone is not sufficient, and that energy interdependence exists.

- Calculating the costs and benefits of energy independence is very difficult. Assumptions must be made regarding the likelihood, magnitude, duration, and frequency of embargoes; the ability to influence pricing decisions; the probability of success in reducing imports; the value of added flexibility in foreign policy; the ability to lower costs of new technologies by accelerating implementation; etc., in order to calculate the benefits of independence. Similarly, the costs of independence must be calculated, including direct energy development or conservation costs, and costs of environmental impacts, must be tailored into the analysis.
- However, analysis done to date indicates that the reduction of imports through cost-effective supply and conservation actions, and the adoption of standby measures, is in the interest of this nation.

Approaches Tried

- The Administration has taken the position that energy independence, that is, reduced vulnerability to arbitrary disruptions of supply or price hikes, is both desirable and achievable in the next decade.
- Energy independence is considered achievable by 1985 unless geological projections are greatly inaccurate or institutional factors delay development. Analysis shows that the United States would have imported about 12 MMB/D in 1985 if no action had been taken after the 1973 embargo. Legislation passed and signed prior to November 1976 could result in an import level of 7-7.5 MMB/D by 1985, if programs are implemented fully and no negative energy actions are taken. Such measures as natural gas deregulation,

insulation tax credits, accelerated OCS leasing schedules and synthetic fuels commercialization could reduce the 1985 import level to about 4 MMB/D. That level, coupled with an ability to offset any future embargo with stored petroleum reserves and emergency standby measures, represents an acceptable import level.

- Two factors disturb the cautious optimism of this perception of the U.S. energy future:
 - The ability to sustain an energy independent posture in the post-1985 decade may be doubtful. Current projections show the U.S. oil and gas reserve base declining in this period. Thus, independence may prove difficult to maintain, unless U.S. consumption patterns can be changed and greater reliance on coal, nuclear power, and renewable resources occurs.
 - With an understanding of the position of other consuming nations, the United States cannot ignore OPEC, even if independence is achieved. Japan and most of our Western European allies will remain heavily dependent on OPEC oil because they lack the resource base to become self-sufficient. The United States has strong political and economic ties with the other industrialized nations and therefore will be involved with OPEC price and supply decisions, even if peripherally, in the foreseeable future.

Remaining Problems

- The desirability, achievability, and sustainability energy independence is a dynamic issue and the subject of some disagreement. It is apparent that the issue must be addressed by the new Administration. Some will argue that reducing imports is a desirable goal, but more debate is likely to occur over whether the goal is worth the costs it imposes and sacrifices it may mean.

Possible Initiatives

- Reassessment of Goals. Energy goals are not set independently of economic and environmental goals and should be periodically reassessed. Such a reassessment should probably occur in the next year. Consideration should be given to a national debate, through public hearings or energy forums, on this issue.

- Congressional Involvement in Reduced Dependency Objectives. The U.S. government and the IEA are analyzing the feasibility of establishing import dependence targets at specific levels for the IEA as a whole and individual nations within the IEA. Consideration should be given as to the extent, timing, and forum for involving the Congress in decisions as to the specific targets and degree of commitment towards achieving those levels.

- Sustaining Energy Independence. The critical period from 1985-1990 could become a focal point for energy planning. The transition from declining fossil fuels to alternate sources may be the determining factor in the ability to sustain energy independence, if it is achieved. Considerable attention should probably be focused now on planning for this period.

Recommendations



THE OIL MARKET - STRATEGY TOWARD OPEC

Background

- The oil embargo of 1973 and the subsequent price rises precipitated a number of oil market and cartel studies. Many analyses indicated that the oil cartel would eventually collapse because of market forces; e.g., alternate sources of energy and reduced oil demand because of higher prices, in combination, would reduce the demand for cartel-produced oil to a point which would cause the demise of the cartel in the absence of a stringent pro-rationing scheme. It now appears that this expectation is incorrect.
- While demand growth has slowed since the embargo, it is now increasing again as world economies adjust. In fact the major OECD nations will consume about 32 MMB/D of oil this year, as compared to 31 MMB/D in 1973. Consumption would be even higher, but for the economic recession in 1974-75.
- Alternate supplies have not developed as quickly as was anticipated and have become more expensive to produce than originally expected. Non-economic factors have also affected commercially viable technologies, i.e., environmental uncertainty over coal and nuclear energy.
- The cartel has proved quite stable in the face of a soft market. Furthermore, elaborate models of world energy markets which allow interfuel substitution have indicated that the cartel faces an expanding market over the next decade. The size of this market may be difficult to meet with present OPEC capacity, but is very unlikely to force formal pro-rationing on the cartel. OPEC's ability to raise prices may diminish in the late 1970's and early 1980's as North Sea and Alaskan production approach full capacity, but this should prove only a temporary break in the trend toward growing OPEC market strength.
- The practical implication of this analysis is that the maintenance of the real price of oil will not be very difficult for OPEC and price increases are not economically infeasible. Even with optimistic estimates of new finds in Mexico, North Sea production, and conservation programs, these results change

only in magnitude, not in direction, and point to continuing OPEC domination of the oil market, barring major political changes.

- Current political assessments of cartel cohesion show no reason to project political divisiveness among members as a reason for their failing to exercise this monopoly power. The OPEC members are diverse; some are conservative, others are more liberal. However, neither political tensions between some members of OPEC, nor the recession-induced drop in total OPEC production (to 27.2 MMB/D in 1975, a reduction of 17% from 1973) seriously shook the cohesiveness of the cartel.
- Economically, the OPEC nations fall roughly into two groups: those with large reserves, high earnings and small populations (e.g., Saudi Arabia), and those with large populations, smaller revenues, and the need to finance massive development out of oil earnings (e.g., Iran, Indonesia). Most analysts observe the maxim that the revenue needs of the large population members must be satisfied by cartel pricing/production decisions for the cartel to survive. Even with this constraint, no serious market threat to cartel viability appears likely in the next decade.
- This analysis of the oil market situation is accepted in principle by most international energy analysts. However, the degree of price flexibility which OPEC has, the implications of the situation for U.S. domestic energy policy, and the policy options which ought to be pursued in countering the cartel have been matters of disagreement.

Approaches Tried

- There has been considerable review of the effects of higher oil prices on the U. S. economy. The U. S. recovery from the recession has proceeded steadily despite higher oil prices. Increasing prices cause some energy conservation measures to occur without government intervention and may stimulate domestic production. Higher prices also make alternate sources (oil shale, etc.) more economically attractive. However, higher oil prices affect consumers and regions disproportionately and cause economic shock and unemployment.

- Although the U. S. has some ability to withstand higher prices, other consuming nations may not be able to absorb such increases. In particular, England, Italy, and the developing countries, have more serious economic problems and considerable dependence upon foreign oil.

- Since production costs range from \$.25 to \$1.50/ bbl in most OPEC countries, the remainder of the oil price is economic rent to producer nations. Why this rent should be transferred to producer nations, even if some countries can afford it, is a source of some debate. Most U. S. policy-makers have advocated price containment as a major tenet of U. S. strategy toward the cartel, but viable policy options to attain this goal have been difficult to formulate. It is not clear whether the U. S. has any reasonable options which will allow it to achieve completely the objectives of supply, security and price containment. Nevertheless, several policies have been pursued over the last 3 years:
 - Consumer Cooperation. The U. S. was the generating force behind the formation of the International Energy Agency. The IEA has attempted to be a force to counter producers, but the energy needs of some of its members are such that it does not offer a market-balancing mechanism. It does, however, provide a framework for energy policy coordination among the western industrialized petroleum consuming nations and thus avoids competitive bidding situations which might exacerbate price increases in a tight market. Although the IEA is not a cartel-busting mechanism, it has several significant accomplishments to its credit.
 - The IEA work on conservation evaluation and publication of Energy Conservation in the International Energy Agency represents major progress in the field of energy conservation.
 - The IEA has served as a conduit for the exchange of ideas on energy policy at a time when most IEA nations had only formative energy policies, and in research on alternate sources and conservation.

- An emergency sharing program has been developed and tested.
- The long term cooperative agreement has provided understanding and is proceeding on an objective setting process for reducing dependence upon imported oil.
- Supply Actions. Stockpiling is an effective protection against embargo, and the U. S. is in the process of putting a large petroleum stockpile in place. The amount of oil which can be justified for a cost-effective storage program depends ultimately on the perception of the likelihood of embargo, its probable magnitude and duration, and U. S. dependency. The FEA reserve plan has recommended storage of 500 million barrels for 1982 with the provision that more storage should be considered if U. S. imports were projected to be significantly above 7 MMB/D by 1985.
- Price Actions. Discussion in the first part of this section pointed out that no market action taken by consumers can have a dramatic effect on the price flexibility of the cartel. However, political or psychological actions may have some effect on the motivation of cartel member nations. The U. S. has jawboned actively against OPEC Price increases, arguing that precipitous price increases generate public fears of inflation and thus can have an adverse effect on Western economies; such effects can be shown to impact negatively the economies of the developing world and OPEC nations who may have large holdings of Western financial assets; and that there is no economic justification for further price increases.
- Political Actions. The primary political area of disagreement between the U. S. and OPEC nations centers on a Middle East settlement. U. S. foreign policy vis-a-vis the Middle East transcends purely energy interests, but the two are closely inter-connected. Certainly U. S. foreign policy decisions should be evaluated for their impact on energy, along with other factors.

Remaining Problems

- There are a number of key issues with respect to our relationship to OPEC that need to be evaluated:
 - The extent to which the IEA can be an effective body in reducing the market for OPEC oil to a level which strengthens the bargaining position of member nations.
 - The value of continuing the North-South dialogue in a formal mechanism, such as has been the case in the Conference on International Economic Cooperation (CIEC).
 - The desirability of maintaining current domestic and foreign policies to counteract the threat of supply or price disruption.
 - A thorough review of the oil price issue, including desirability and possibilities of lowering prices, and the merits of price indexation.
 - The extent that alternate fuel development can affect the balance of power in the world energy market.
 - The long-term availability of adequate supplies of oil to meet world needs.

Possible Initiatives

- Although efforts to destroy the cartel and return to the days of \$3 oil are destined to frustration, policy initiatives may be able to contain and balance cartel market power. Actions in the following areas could be considered:
 - Tariffs are a traditional means of discouraging unwanted imports or protecting domestic industry. In the case of petroleum, where domestic supplies are somewhat inelastic, the basic use of a tariff would be to reduce demand through price effects. The Administration imposed an oil import fee briefly, but it was met with negative Congressional and public reaction and court suits. However, a very high tariff would serve to diminish the size of the U. S. market available to OPEC members and could be rebated to U. S. taxpayers to relieve their general tax burden. A tariff

so structured would tend to encourage movement of the economy away from a petroleum base while softening the impact on consumers through tax rebates. However, it is important to realize that a tariff on oil imports has uneven regional effect and particularly impacts the New England area.

- A quota provision was contained in the House-passed H. S. 6860, but did not survive Senate action. A quota, used in conjunction with allocations to prevent spot shortages and price controls to prevent windfall profits to domestic producers, can provide an upper limit on U. S. import dependency. A quota would also be a strong signal to the cartel about the intention of the U. S. to move away from dependency on imported oil. However, design and administration of a quota is difficult, and it preserves U. S. government intervention and regulation of the marketplace.

- New Oil Production outside OPEC effectively increases the number of producers at the cartel-set price and heightens problems of market control. Whether or not the new producers join the cartel, room must be made in the market, leading to potential stress within the group. Since U. S. companies own a large share of necessary oil and gas exploration equipment and technology, the U. S. could encourage incremental production through use of selective tax credits. Such a policy should not be pursued under the assumption that it would produce a firm large enough to break the cartel, but rather on the assumption that over time it would provide a continuing challenge to consolidation of market power. Encouragement of oil and gas development could be achieved through the following actions, singly in combination:
 - Export-Import Bank financing of energy production equipment, especially to developing countries. The impact of possible domestic equipment shortages on this policy would need to be assessed.

- The Overseas Private Investment Corporation could provide expanded protection for energy investors in the form of insurance against expropriation.
 - The U. S. could continue active support of new international institutions such as the International Energy Institute, or an Energy Financing Facility in the World Bank to encourage energy exploration and development in developing countries. Such structures might provide the means for developing countries to expand energy production without entering agreements with the international energy companies which may be unpopular politically.
 - Foreign direct assistance to U. S. allies could aid energy development goals with either cash outlays, equipment gifts or technical assistance packages.
- The use of counter-embargo has been mentioned as a means of countering OPEC price and embargo threats. Counter-embargoes of food or capital goods would be difficult to manage and probably should be viewed as an extreme measure. The U. S. exported \$3.4 billion worth of food to OPEC in 1975, but only 11 percent of that amount went to the Middle East. Most U. S. food exports go to Latin America, and a food embargo to this area might be counter-productive politically. Capital goods embargoes are also possible, since OPEC nations are consumers of U. S. technology. There are other suppliers of capital goods, however, (i.e., Japan, Germany, England, France) who are highly dependent on OPEC oil and may not join such an embargo, thus reducing its impact. Additionally, the action would have to take place over a long period of time to affect OPEC seriously, and could not be easily lifted and reimposed.
- Long-term bilateral supply contracts with producer nations could be used to insure against arbitrary price or supply action. Enforcement of such contracts would be difficult, and they are probably not sensible except in the context of additional development or other political agreements. However, the possibility of a U. S.- Mexico contract is worth exploring. Any bilateral move would run counter

to our announced cooperative approach to energy matters (i.e., IEA), and thus the possibility of multi-party contracts (perhaps through a forum such as CIEC) would have to be explored coincidentally.

- Agreement to index oil prices could possibly provide price stability, which may have economic and financial planning benefits for the Western nations. However, preliminary analysis indicates that any indexing agreement would be exceedingly complex to design (i.e., decisions about base period, basket of goods to be indexed, etc., all have numerous political and economic implications). Enforcement provisions of an indexing agreement might also prove problematical.

- IEA consideration of reduced dependency objectives over the next several months presents an opportunity to take a strong policy position on reduction of oil imports. Congressional agreement on a 1985 goal (e.g., through a Joint Resolution) would strengthen the position of the U. S. in the IEA. The U. S. could, within the IEA, push for group objectives, national objectives, and national commitments to policies necessary to achieve national goals.

Recommendations

Multinational Companies
(and divestiture)



THE MULTINATIONAL ENERGY COMPANIES

Background

- The relationship of the major international oil companies to the U. S. government and to U. S. energy policy objectives is a matter of obvious public concern. Perceptions about the companies' role in the embargo and price actions of the last three years have generated much discussion, and the structure of these companies has become a domestic political issue in the United States. The public opinion of the major oil companies has affected many energy policy decisions, including the crude oil pricing debate. There are several key issues that have been raised concerning these companies, that involve Federal interest:
 - Divestiture
 - Relationship of oil companies to producing and consuming governments and oversight of oil company negotiations with foreign governments.
 - Financial reporting requirements
- The international oil market structure is exceedingly complex. The position of the majors vis-a-vis the producer nations has undergone substantial evolution which is still in process. There are presently four major organizational blocs within the world market:
 - The majors. Exxon, Mobil, Texaco, Gulf, Standard Oil of California, British Petroleum and Royal Dutch Shell (Compagnie Francaise des Petroles (CFP) is sometimes included) have historically held large concessions in producing areas. They are fully integrated downstream. Their 1975 liftings were 25 MMB/D worldwide.
 - The independents. These companies emerged in the 1950's. They are partially or fully integrated and are characteristically U. S. independent marketers seeking foreign crude for domestic refineries.
 - The consumer national oil companies. These companies developed in France and Italy as governments sought to serve national interest by controlling crude oil supplies to protected domestic markets. Other European national oil

companies have emerged as the North Sea has been developed.

- The producer national oil companies. All OPEC nations, except Gabon, have national oil companies (NOC's) which have entered the production phase through nationalization. They determine concessionaire fees and lifting.
- The control of the world petroleum market has shifted perceptibly in the last three years from the majors to the producer nation governments. Production control has passed from the hands of the majors to the producer NOC's through a series of nationalizations, Aramco being the latest. In the Aramco negotiations, the volume of crude which will be allotted to the Aramco members, the amount of their service fee, the compensation paid for assets and other provisions have been subject for discussion for over a year.
- OPEC governments have also sought to move downstream in the market. They have bought tankers at depressed prices to move into the transportation phase of the industry, but currently own only about 3 million deadweight tons (DWT), or enough tonnage to move about 4% of government owned crude oil. OPEC could have a fleet of 20-30 million DWT by 1980 (enough to move 5-8 MMB/D). A tanker capability of this size is thought to be of enough significance to be taken into account in future U. S. contingency planning.
- Plans for expanded refinery capacity and petrochemical ventures in OPEC nations have also been announced, but lack of indigenous technical personnel constrains this downstream movement, so that it should not impact the industry markedly in the near or mid-term. Movements into product markets at least in the U. S. have been met with resistance.
- Although the petroleum industry is composed of thousands of firms, the economic power wielded by the major companies has been a source of controversy since the early part of this century. The "majors" conduct operations that are truly global in scope and often include diverse activities that have little to do with petroleum or are only tangentially related. These firms (and most of

their slightly smaller competitors) share a common characteristic: their corporate structures are vertically integrated; that is, each company operates in more than one of the functional activities necessary to produce, transport, refine and market petroleum products.

- The actual form of corporate organization used to operate in the various functional areas varies widely: some companies use different intracorporate divisions; others use wholly - or partially-owned subsidiaries; others use joint ventures for particular projects. While the arrangement of a company's internal organization components may have significant tax or corporate law implications, it has little bearing on the ability of a company to function as a vertically-integrated entity.

- A second characteristic of many of these firms is that their activities have branched into areas removed from oil and gas. Leaving aside general investments in non-energy sectors of the economy, many of the 18 largest firms control extensive coal and uranium reserves and play a significant role in the development of alternative energy sources. This characteristic, referred to as horizontal integration, is also becoming controversial since it is feared that the inherent possibility for conflicts of interest (favoring or retarding the development of alternate energy resources in relation to oil or gas) may be exercised.

Approaches Considered to Deal with Issue

- Divestiture legislation. Numerous bills were introduced to require one form or another of vertical or horizontal divestiture. The principal bill on vertical divestiture is S. 2387, which was favorably reported out of the Senate Judiciary Committee in June, but never scheduled for floor action before the 94th Congress ended. S. 2387 requires that petroleum companies meeting certain size criteria (which, in practice, means the largest 18 companies) divest themselves of certain prohibited assets within five years from enactment:

- Companies engaged in production could not also engage in transportation by pipeline or refining/marketing.
- Companies in transportation would restrict activities to that field.
- Marketing or refining operations acquired in the past could continue to function together, but a refiner could not acquire additional marketing assets, nor could a marketing company further integrate backwards into refining.
- S. 2387 permits companies to design their own divestiture plans, setting forth the method and sequence of divestiture in conformity to Federal Trade Commission guidelines. Final plans would be submitted to the FTC for approval and divestiture would be completed within five years.
- Another vertical divestiture bill was offered by Senator Mathias during Committee consideration of S. 2387, and may be considered next year. The Mathias Substitute provides that:
 - Integrated companies would have to treat discrete functional activities separately for accounting purposes (e.g., cost and revenue allocation, pricing, and capital spending).
 - While legal divestiture and accompanying problems would be avoided, companies would be required to conduct each operation as though it were conducted independently, and could not subsidize some operations with the profits made in others or grant discriminatory preferences to affiliated activities.
 - Extensive proprietary data would be gathered by the FTC and SEC and made public.
- The principal horizontal divestiture bill is S. 489. While the Congress concentrated last year on vertical divestiture, it is likely that horizontal divestiture will receive greater consideration in the next session. The principal features of S. 489 are indicated below:

- Three years after enactment, any petroleum or natural gas firm, irrespective of size, would have to dispose of assets in nuclear, coal, solar or geothermal energy.
- There is no provision for a direct government role in the divestiture process other than gathering certain types of data.
- The debate on vertical divestiture is well publicized. The companies that would be affected made a concerted effort in the media to stop the legislation, calling it "dismemberment." Proponents of divestiture presented two major contentions: that divestiture, by increasing competition, would lower prices; and that the oil companies helped support OPEC by prorating production, a condition which would end if domestic refiners had an independent incentive to seek the lowest priced sources of supply.
- The Energy Resources Council (ERC) interagency subcommittee on divestiture produced a report which showed no evidence that vertical divestiture would achieve its proponent's goals. The ERC raised the following points:
 - The real question to be considered was whether mass reorganization of the corporate structure of the petroleum industry was likely to contribute to the attainment of national energy policy objectives.
 - The resulting confusion of the transitional period, whether it might last only five years as proponents claimed or several decades as the industry claimed, would delay the investments necessary to develop domestic resources.
 - The standard indices of market concentration and competitiveness showed no evidence of excessive concentration.
 - The Administration indicated that any individual problems of industry corporate structure were better handled by existing anti-trust laws, rather than made the subject of an experiment during a crucial period in our energy future. Further, divestiture could have international implications, and effects on capital markets.

- With respect to horizontal divestiture, the lack of attention has been accompanied by a lack of formal position-taking on the question. Proponents of such legislation contend that companies with a direct financial interest in protecting existing investments in oil and gas resources have an incentive to prevent competing energy resources from being developed rapidly. Opponents claim that the U. S. energy situation demand so many new sources of supply that the market for oil would not be largely diminished. Further, given the magnitude of the financial resources necessary to develop alternate energy supplies, it seems unlikely that they will be developed in the near future if the oil companies are excluded. It is also possible that if all oil companies were forced to dispose of their alternate energy assets simultaneously, the lack of a sufficient number of eligible buyers could further retard the growth of coal, nuclear, and solar energy alternatives.

- Monitoring Oil Company Negotiations. In November 1976, the FEA published a request for comment on increased monitoring of oil company negotiations. The negotiations between producer countries and the IOC's governing lifting and pricing of oil are traditionally a matter of private, commercial concern. The government interest in increasing monitoring of these negotiations has come about because of their impact upon supply security; the price level of imported oil; and possible long-term lifting or downstream obligations. Such reporting could extend to agreements covering substantial volumes of oil or novel arrangements. This monitoring would be undertaken to determine if the public interest were being served. While such monitoring could provide useful information, it is not clear how the information would be used, whether full protection of proprietary data could be assured; and what impact Federal knowledge of such negotiations would have on the negotiations themselves.

- Government Oil and Gas Corporation. At various times, the Congress has considered possible legislation establishing a Federal Oil and Gas Corporation. Depending upon the specific proposal, these corporations could develop resources on Federal lands; buy and sell oil and gas; and negotiate directly with foreign governments. Arguments raised in favor of these proposals include the desirability of better "protecting the public interest" and providing greater credibility to our energy problem. A contrasting

viewpoint is that the Federal government never manages such programs very well (the Post Office and railroads are usually cited); that it is likely to disrupt a smoothly running system; and that the government's credibility is not much different from that of the industry.

- Boycott Legislation. There was an intensive effort in the 94th Congress to enact legislation with stringent penalties for participating in a boycott against Israel. Obviously, the oil companies, which have a heavy trade with Arab nations, would be affected by such legislation. The extent of the impact was hotly debated, as well as the desirability of the proposal; and it is likely to surface again in the 95th Congress.

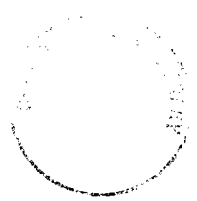
Possible Initiatives

- Oversight of the oil companies. New administrative or legislative options for expanded oversight of IOC's might be considered, in order to provide the data and experience necessary for designing an optimal policy toward the multinationals. This oversight could include authority for reviewing major contract negotiations prior to signing. As indicated above, protection of proprietary information is a major problem area for pre-agreement filing, as well as questions of the desirable role of the government in such negotiations.
 - On the basis of experience with expanded oversight, direct U. S. government participation in negotiations might be proposed. Initiatives in this direction would represent a substantial "hands on" posture of the government with regard to private industry.
- Government purchasing authority. The logistical function of the majors could be supplanted by a government entity to negotiate directly with OPEC governments for all U. S. supplies of petroleum products. Such a structure could be used in conjunction with absolute quotas, country quotas, or differential import fees to achieve supply objectives. However, direct government purchases could involve substantial administrative problems (such as matching crude types with refinery needs) and considerable interference with the oil market system.

- Divestiture. Continued analysis of the divestiture issue is necessary. The basic argument for or against divestiture should be based on whether there is any evidence suggesting that positive benefits would result and that the possible adverse impacts are outweighed by such benefits.

- Financial Reporting. Under the EPCA, the FEA is required to consult with the SEC to determine the extent to which major changes in accounting practices are contemplated by the SEC. A financial reporting system may have to be developed in conjunction with the law.

Recommendations



Protecting Against the
Effects of Embargoes



PROTECTING AGAINST THE EFFECT OF EMBARGOES

Background

- In response to the effects of the 1973 oil embargo, the U.S. government (as well as many other petroleum consuming nations) realized the over-whelming necessity of protecting itself against the potentially serious impacts of a future embargo. The last embargo caused considerable loss in Gross National Produce and may have added 500,000 people to the unemployment rolls.
- An embargo management strategy has been prepared which outlines the steps the Federal Government will take to mitigate the effects of an embargo. In the event of another supply interruption, the government would act to increase available energy sources, constrain demand and distribute available supplies as equitably as possible.

Approaches Tried

- Strategic Petroleum Reserve (SPR). In January 1975, the President asked Congress for authority to build a strategic petroleum reserve of up to a billion barrels. In the Energy Policy and Conservation Act (EPCA) the SPR was authorized, with a requirement that at least 150 million barrels be in storage by the end of 1978. The strategic petroleum reserve will consist mainly of crude oil storage in Gulf Coast salt domes designed to provide drawdown capability of approximately 500 million barrels by 1982. Planning for a strategic reserve is necessarily insuring against an unknown event. The sensitivity of the SRP plan to variations in type of embargo, level of existing imports upon commencement of an embargo, and degree of oil sharing required by the IEA must be considered. The key issues with respect to the SPR are the following:
 - Whether to provide for a regional petroleum reserve in, or readily accessible to, any region heavily dependent upon product imports (mainly the East Coast).

- The size of reserve (can be up to one billion barrels).
- Location of the reserve and types of storage facilities.
- Desirability of requiring an industrial petroleum reserve.
- Method and acquisition cost of obtaining oil for the SPR.
- Type of crude stored.
- International Energy Program (IEP). By agreement among 19 consumer nations in the International Energy Agency, a program has been established for managing the international allocation of oil during supply interruptions. Under the provisions of the IEP, a member nation experiencing an overall shortfall of 7 to 12 percent of demand can call upon other IEA members to redirect supplies to meet the shortage. Whether a given nation would have a right to additional supply (or an obligation), depends on an allocation formula which factors in magnitude of embargo, targeted countries, assumed conservation actions, etc.
 - The IEP allocation system was tested in November, 1976. Three scenarios were used in interactive embargo simulations with the IEA secretariat, the Industry Supply Advisory Group (ISAG), and over 30 participating oil companies. The test runs showed that the system works in procedural and mechanical terms.
- Allocation. The program for allocating petroleum products was used during the last embargo to distribute available product supplies equitably. This program is currently being phased-out; however, standby allocation authority exists until September 30, 1981 to reimpose allocation controls on those products already decontrolled. Both allocation and price controls probably would be immediately reimposed on all products in the event of another supply interruption.

- Rationing. If the United States is unable to constrain demand and utilize the SPR to reduce sufficiently the impacts of an embargo, it may have to resort to rationing of available supplies. Rationing has been a particularly controversial subject since it is an extremely expensive program (over \$2 billion to implement) and administratively burdensome. A rationing plan for both gasoline and diesel fuel, nevertheless, has been designed and will be submitted to Congress.
- Emergency Conservation. After price and allocation controls would be reimposed, a public awareness and voluntary conservation campaign would be undertaken to stress the severity of the shortage. A wide range of emergency conservation measures have been identified, and these could give the equivalent of over 1 MMB/D if implemented immediately with full compliance. These measures range in scope from reducing thermostats to shortening the national work week. Should it prove necessary, the President would select for implementation, one or more of the mandatory conservation measures (such as commuter parking management and car pooling incentives; heating, cooling and hot water restrictions; weekend gasoline and diesel fuel sales restrictions; restrictions on illuminated advertising; etc.) which would have already been approved by Congress in accordance with the requirements of the EPCA.
- Refinery Output Adjustments. By adjusting the types of products produced from domestic refinery runs, it is possible to increase or decrease the availability of particular products. The ability to do this, however, is constrained by the structure of many refineries. Most are geared to produce given yields with only a narrow range for variation to accommodate fluctuations in seasonal demand.
- Coal Conversion. There is limited potential to further shift oil usage to coal during an embargo situation. It is possible to require

emergency drawdown of existing industrial inventories, but such action could result in spot domestic coal shortages. If such a policy were implemented, about 95,000 barrels of oil per day could be redirected in the system temporarily.

Remaining Problems

- Although three years have elapsed since the last embargo, the United States has no means in place of adequately protecting itself from the effects of another embargo. The major cause is the absence of real alternatives until the early Strategic Petroleum Reserve becomes operational by 1979. Even then, our reserves would only accommodate a total loss of imports for about 25-30 days. Even with programs to distribute better the shortage, several important industries would be severely hurt and the disruptions caused during the last embargo (e.g., lines at gas stations, increased unemployment, reductions in disposable income) could recur.
- There are also major problems that would arise in implementing the programs. Under the EPCA, Congress must approve the mandatory conservation plans and the rationing plan before implementation. Before any decision to implement a coercive program can be made, it is necessary to have a very good estimate of the total duration of the embargo. As presently conceived, rationing would not even be considered until it was clear that the embargo would last long enough to justify the expense and burden of so complex a program. But there is an element of circularity involved. Those who institute the embargo and can control its duration and magnitude are not likely to announce in advance how long it will last. Rather, they will probably keep the embargo in place until the underlying objectives are accomplished or until the threat of retaliation becomes too great.

- Even if U.S. planners knew the intended duration of an embargo, the built in lead-times required to get Congressional approval and start up a new program mean that there is always a lag between the need for one type of program and the implementation of that program. In effect, programs could become operational only after the situation they were designed to address had deteriorated to the point where a more stringent program was required.
- There is also a possibility that we are preparing for the wrong type of embargo. Some observers expect the next OPEC political action to take the form of very steep short-term price increases. This would neutralize the effectiveness of the International Energy Program and provide a strong incentive for other OPEC members who did not participate in the last embargo to go along with the action or face loss of revenues. Western governments might have to impose allocation and demand restraint measures, even though no shortage of physical product existed, in order to avoid enormous deficits in current trade accounts.

Possible Initiatives

- Government-wide Management Strategy. Since it is imperative for the United States to adequately plan for another embargo, it may be worthwhile to require the preparation of such a strategy, fully integrating energy management options with monetary, fiscal and other policies that would be effected by a supply interruption or steep price increase. The government strategy could encompass the problems raised above and consider what to do if an embargo occurs in the near-term.

Recommendations

FEDERAL ENERGY
ORGANIZATION



FEDERAL ENERGY ORGANIZATION

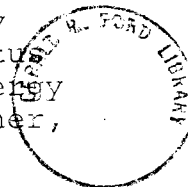
Background

- Energy organizational issues have been a matter of attention within the Executive Branch and the Congress for some time:
 - Prior to the 1973 oil embargo, President Nixon had proposed creation of a Department of Energy and Natural Resources (DENR) and division of the Atomic Energy Commission (AEC) in a research agency and a regulatory agency. A small Energy Policy Office had been established in the Executive Office of the President.
 - In December 1973, during the embargo, the President established the Federal Energy Office (FEO) in the Executive Office of the President and transferred to it the petroleum price and allocation authorities of the Cost of Living Council and energy functions of some other agencies, principally the Interior and Treasury Departments.
 - In June 1974, the Federal Energy Administration (FEA) was created by law and in October 1974, the Energy Research and Development Administration (ERDA), Nuclear Regulatory Commission (NRC), and policy-coordinating Energy Resources Council (ERC) were established in the Energy Reorganization Act.
 - The Energy Conservation and Production Act (ECPA), which extended the FEA until December 1977, requires that the President submit to the Congress a reorganization plan for energy and natural resources by December 31, 1976.
- Among the problems still considered to exist are the following:

- The existing agencies are a mixture of permanent entities (e.g., Department of Interior (DOI) and ERDA) and temporary agencies (e.g., FEA and ERC).
- Energy functions remain scattered in a number of diverse agencies often leading to overlapping responsibilities and sometimes to gaps in authority.
- Policy coordination is supposed to occur through the ERC, but it is an organization with no staff.
- Regulatory functions, such as those carried out by the Federal Power Commission (FPC) and NRC are now independent (and should be), but should be responsive to overall policy direction.
- Energy is a vital problem, needing a clearly designated spokesman who perhaps should have Cabinet status.

Possible Initiatives

- The President must submit a reorganization plan to the Congress and Congress, as well as the new Administration, has indicated a desire to review the issue. There are a wide variety of alternative approaches that can be considered, including:
 - Department of Energy and Natural Resources (DENR). This could include such agencies as Interior, FEA, ERDA, possibly FPC, National Oceanic and Atmospheric Administration (NOAA), etc. The DENR would consolidate most energy functions and bring together competing interests. But it would be a very large organization with such a broad span of control, that key areas could be delegated to lower status and there could be a domination of energy over land management decisions. Further,



its creation would affect a large number of Congressional Committees.

- Department of Energy (DOE). This agency could include FEA, ERDA, possibly FPC, the Rural Electrification Administration (REA), and some energy functions of Interior, although not its land management and geologic functions. The DOE would be a distinctly energy agency and would guide energy policy; however, it would still require close coordination with DOI and some of its possible components would be controversial.
- Energy Agency. An energy agency would simply combine FEA and ERDA. This would be the easiest organizational change to effect, but would retain many of the current problems cited above.
- Retain Present System. Under this alternative, the current organizational alignment would be retained, but some changes would be made to improve the system (e.g. strengthening ERC; creating a permanent FEA; etc.)
- A number of key organizational questions remain to be resolved, even within the broad structure of the proposals listed above. These include whether any of the following agencies or functions should be made a part of the new energy organization:
 - FPC
 - NRC
 - REA
 - ERC
 - Naval Petroleum Reserves
 - NOAA
 - Tennessee Valley Authority (TVA) and other power producing authorities

There are obvious advantages to inclusion of these agencies for the sake of completeness, broad coverage, and policy responsiveness. Disadvantages include domination of the regulatory functions by a policy-making body and too great a span of control.

- The energy organizational issue cannot be divorced from other government reorganization questions, including proposals for a Department of Oceans or a cabinet level environment and land management agency.

Recommendations

