60 United States. General Accounting Office

# REPORT TO THE CONGRESS

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# An Evaluation Of The National Energy Plan

The President's National Energy Plan combines proposed legislative, administrative, and budgetary actions aimed at solving the Nation's energy problems. The Plan is an important first step toward developing a national energy policy. GAO believes it is a good start.

GAO agrees with many of the Plan's specific initiatives and offers recommendations to improve others.

GAO believes that the Plan, even if approved in its entirety by the Congress, will, in some cases, fall short of its established goals. GAO calls for the Congress to

--adopt a set of National Energy Goals and design a program that meets these goals,

--establish a set of milestones to judge progress in meeting these goals, and

--establish a set of standby initiatives if satisfactory progress is not being made.

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To the President of the Senate and the
Speaker of the House of Representatives

This report, developed at the request of the Chairman, Subcommittee on Energy and Power, House Committee on Interstate and Foreign Commerce, presents our analysis and comment on the President's National Energy Plan. The report is intended to assist the Congress in considering the legislation that the administration has proposed to implement the plan. Consistent with the Chairman's request, the report contains our evaluation of the plan from the perspective of our past and current energy work. We made our review pursuant to the Budget and Accounting Act of 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We believe that the administration has taken an important first step in formulating a National Energy Policy by submitting a comprehensive set of proposals to the Congress. We agree with many of the specific actions that have been proposed. In a number of cases, however, we believe modification of the administration's plan is needed and we are recommending proposed actions.

## National Energy Goals

In our opinion, the plan has one major flaw. As we noted in a letter report dated June 8, 1977, to the Chairman, House Committee on Government Operations, the proposed plan to the Congress is not designed to meet many of the administration's goals without unspecified voluntary actions or further mandatory actions not specifically identified except by example. According to the administration's own estimate, the plan, as proposed, is not strong enough to meet four of the seven established goals.

We have now expanded on our analysis of this point and have, where practicable, quantified the possible results. Our estimate is that the plan, even if approved in its entirety by the Congress, will, in some cases, fall short of its goals by greater amounts than the administration has estimated. One of these areas is the important goal of reducing oil imports.

The administration has established a goal of reducing imports to 6 million barrels of oil a day (MMB/D) by 1985. By the administration's estimate, the proposed plan would reduce imports to 7 MMB/D. To achieve the other 1 MMB/D reduction, the administration is counting on voluntary conservation.

Under the administration's plan, however, most of this reduction would be accomplished not by conservation, but by switching to alternative fuels--primarily coal and nuclear power. It is, therefore, more of a fuel switching program than a conservation program. Further, we believe that the administration's estimate of the supply of alternative fuels is too optimistic to be dependable for national energy planning. To the extent that the supply of these fuels falls significantly short of the administration's estimates, imported oil will have to be increased--unless more conservation is achieved.

On the basis of work that we have underway, we have concluded that the obstacles to coal production which are not dealt with in the plan are such that it appears highly unlikely that U.S. coal production in 1985 will reach 1 billion tons, let alone the administration's goal of 1.2 billion tons with the plan.

We believe also that the administration's supply estimates for natural gas and nuclear power are overstated.

In summary, our work indicates that the administration's estimates for domestic energy supplies are overstated in the following amounts:

| | MMB/D oil equivalent |
|---|---|
| Coal | 2.3 |
| Natural gas | 1.0 |
| Nuclear power | .6 |
| Total | 3.9 |

We believe that the estimate of oil production is possibly overstated. The administration expects its plan to increase oil production by 0.1 MMB/D over what would otherwise be expected in 1985. Our discussion on oil pricing and taxing points out that this may be questionable since producers' revenues and presumably capital available for exploration

and production will be less under the administration's plan than under a continuation of current policy.

The net result of the supply shortages discussed above plus the 1 MMB/D shortfall built into the plan, offset to a degree by higher imports of liquefied natural gas than estimated by the administration, is that oil imports are likely to be 4.3 MMB/D higher than the administration's goal of 6.0 MMB/D. In 1985 this would amount to importing 47 percent of the Nation's oil consumption. We believe this will be the case unless significantly more conservation is achieved than is expected to result from the administration's plan.

Because of the significant policy implications of oil imports reaching that level, our report includes recommendations or suggestions, some of which are listed below, for increasing energy conservation if satisfactory progress is not made in achieving the energy goals.

--Legislate mandatory insulation standards for existing buildings to complement the administration's proposal on new buildings.

--Require that utilities institute peak load pricing and the installation of appropriate metering devices. The cost of the meters would be included in the regular utility bills.

--Require that certain industrial processes achieve a particular level of energy efficiency.

--Consider incentives to encourage scrapping inefficient used cars.

We are also making recommendations which we believe should be enacted at the present time to strengthen the plan:

--Require that the gas-guzzler tax or rebate be visible to the consumer at the point of sale.

--Take steps to expand and improve public transportation.

--Phase out the heating oil rebate and allow higher natural gas prices to be charged to consumers.

--Require leaseholders of Federal energy resources to actively develop them.

Finally, we believe that of equal importance to the specific actions discussed above are the following recommendations that the Congress

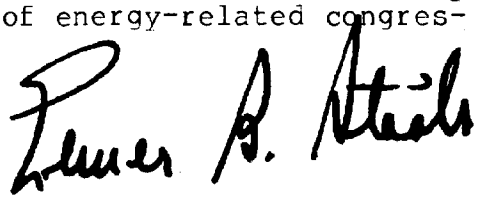
--adopt a set of National Energy Goals and design a program that meets these goals,

--establish a set of milestones upon which to judge progress in meeting these goals, and

--establish a set of standby initiatives, many of which will have to be mandatory, if the milestones indicate that satisfactory progress is not made.

A draft of this report was provided to the Energy Policy and Planning staff in the Executive Office of the President. Their comments are discussed in chapter 9 and are included as appendix II.

Copies of this report are being sent to Mr. James R. Schlesinger, Assistant to the President; the Director, Office of Management and Budget; the Administrators of the Federal Energy Administration and the Energy Research and Development Administration; the Secretary of the Interior; the Chairman, Federal Power Commission; the Chairman, Nuclear Regulatory Commission; and to the Chairmen of energy-related congressional committees.



Comptroller General
of the United States

## D I G E S T

On April 29, 1977, the White House released its National Energy Plan which combines legislative, administrative, and budgetary proposals aimed at solving the Nation's energy crisis. The plan sets out seven National Energy Goals, and outlines a broad program to achieve those goals between now and 1985. It calls for measures ranging from both mandatory and voluntary conservation actions to expanded research on nonconventional energy sources.

In view of the extensive work that GAO has done and is doing in the energy area, the Chairman, House Subcommittee on Energy and Power, requested that GAO analyze the National Energy Plan from GAO's acquired perspective. This report is based on the plan as it was released by the White House; it does not comment on any subsequent congressional actions on the plan. (See p. 1.2.)

### OVERALL CONCLUSIONS

GAO agrees with the basic concepts of the administration's plan, an effort long overdue. The Nation's energy problems are long term in nature. Finding solutions acceptable to all areas of society is difficult and will require political consensus and compromise among competing areas of national concern. While GAO makes recommendations and suggestions for improvements in the administration's plan, it firmly believes that the prompt passage of effective legislation is essential if this country is to deal with energy problems in the remainder of this century.

GAO notes that the administration did not design its plan to achieve the stated goals without unspecified voluntary actions or, if necessary, further mandatory conservation actions. GAO believes that it is incongruous

to ask the Congress to establish a set of National Energy Goals, and then propose a plan that is not expected to achieve them. (See p. 2.1.)

GAO believes that the plan will fall short of meeting some of the goals to an even greater extent than the administration estimates, including that of reducing oil imports to 6 million barrels of oil a day by 1985. The administration acknowledges that the plan will fall short by 1 million barrels a day unless voluntary conservation actions are effective. GAO believes that the plan could fall short by 4.3 million barrels a day because GAO doubts that the plan's 1985 domestic production forecasts for coal, nuclear power, and natural gas can be achieved. This means that, even with the plan, 1985 oil imports would be 10.3 million barrels a day, or 47 percent of oil consumption. To the extent that domestic energy production in these three areas falls short of the goals, oil imports will have to be increased unless further significant conservation is achieved. (See p. 2.3.)

With respect to coal, GAO concludes that there are serious problems in and obstacles to achieving a production level of 1 billion tons by 1985. This is the administration's base case estimate, the amount of coal the administration says would be produced without its plan. With the plan, the administration expects coal production to increase by .2 billion tons over its base case to a total of 1.2 billion tons in 1985. The problems with coal include serious environmental obstacles, enormous capital requirements, and a deficient rail transportation network. These are not dealt with adequately in the plan. (See p. 5.30.)

While the administration has stated that it will use nuclear energy as a last resort, it, nevertheless, expects that in 1985 nuclear energy will be four times the current level. GAO believes that achieving such an increase in 8 years is very doubtful.

It would require that by 1985 all 77 nuclear powerplants now licensed for construction be completed and that all nuclear powerplants would have to operate at an average annual capacity of 69 percent. GAO believes such an achievement to be highly unrealistic. GAO also believes that 1985 natural gas production has been overstated by about 10 percent. (See p. 2.5.)

On the demand side, GAO disagrees with administration estimates of the sectoral composition of energy demand if no further action is taken. This is important since the energy initiatives would address not merely total energy production and demand, but production of individual fuels and demand by individual use sectors. (See p. 2.7.)

Since energy forecasting is, by definition, an inexact science, no accurate estimate can be assured.

However, GAO recommends that the Energy Committees of the Congress, in cooperation with the administration and others who are knowledgeable in energy forecasting, work from a 1985 forecast that is as accurate as possible.

GAO recommends that the Congress

--adopt a set of National Energy Goals,

--establish milestones upon which to judge progress toward meeting the goals, and

--adopt an energy program which is designed to meet the goals. A set of standby initiatives, many of which will have to be mandatory in nature, should also be drawn up for quick implementation in the event that the milestones indicate that satisfactory progress is not being made. (See p. 2.16.)

## SPECIFIC PROGRAMS AND PROBLEMS

GAO's past and current energy work relates to many of the specific proposals in the

administration's plan. GAO agrees with many of the proposals and believes some should be modified. There is one major disagreement.

GAO disagrees with the administration's proposal to drastically reduce funding for the Liquid Metal Fast Breeder Reactor (LMFBR) program and, in particular, its decision to cancel construction of the Clinch River Breeder Reactor. (See p. 2.16 and 6.3.)

CONSERVATION

The President has stated that conservation is one of the cheapest forms of "producing" energy and should be the cornerstone of the Nation's energy policy. Therefore, the administration's plan calls for both legislative and administrative efforts to increase energy conservation in transportation, buildings, appliances, industry, and utilities. (See p. 3.1.)

GAO is concerned that the conservation initiatives in the administration's plan are too modest and that they rely too much on voluntary actions in some areas. GAO's work has shown that, although there is substantial potential for energy conservation, there is (1) not enough public concern with the need for it and (2) a general lack of incentives to promote it.

Based on the administration's estimates, it does not appear that the conservation provisions of the plan will cause much reduction in energy demand. The administration projects that if no action is taken, energy demand will grow by 31 percent between 1976 and 1985, while demand will still grow by 25 percent with the plan fully implemented. This equates to a reduction of roughly 1.9 million barrels of oil each day, or only 4 percent of total demand after 9 years. The major impact of the plan, as proposed, seems to be reducing oil imports by shifting to coal rather than by conserving energy. GAO's analysis of the problems of using more coal leads it to conclude that it is unlikely that the administration will achieve even its base case estimates if it

does not deal with the problems that GAO has identified.

GAO agrees with the concept of a gas guzzler tax and rebate. GAO believes the tax and rebate should be highly visible at the point of sale, e.g., on the mileage label attached to each car. (See p. 3.2.)

GAO supports the proposal to expand the automobile fuel efficiency standards programs. In a prior report, however, GAO concluded that improvements in automobile fuel efficiency largely depend on how well Federal fuel efficiency standards can be balanced with environmental and safety standards. (See p. 3.5.)

While GAO agrees with the concept of a standby gasoline tax, it does not believe the proposed tax would be large enough to significantly reduce gasoline consumption. GAO further urges consideration of the option of using a portion of the taxes collected to expand and improve public transportation. (See p. 3.8.)

GAO supports the concept of a Federal vanpooling program and urges that it be extended also to the private sector. (See p. 3.12.)

GAO recommends that the Congress:

--Assure that the gas guzzler tax and rebate legislation provide that the amount of tax and rebate for specific cars be identified on the mileage rating label and in mileage guide booklets.

--Enact a standby gasoline tax.

--Provide incentives to promote vanpooling in the private sector. (See p. 3.27.)

GAO generally agrees with the proposals to increase energy conservation in buildings and offers recommendations to strengthen the program if the milestones indicate that satisfactory progress is not being made;

for example, establishing mandatory insulation standards for existing buildings.

GAO also recommends that the proposed energy efficiency standards for Federal buildings be adopted as minimum criteria, and that energy audits be used to establish specific criteria for each building. (See p. 3.28.)

GAO generally agrees with the administration's plan for reform of utility rate structures and has recommended similar actions in prior reports. (See p. 3.30.)

OIL AND GAS

To simultaneously encourage oil and natural gas conservation and stimulate new domestic production of both, the administration proposes specific actions covering oil pricing, oil taxes, natural gas pricing, and other measures. (See p. 4.1.)

While the oil pricing initiatives would provide greater production incentives than are now available, GAO found they are no greater than would exist in 1985 with a continuation of current policy. Moreover, the plan will reduce revenues to producers and thereby may reduce capital availability for further exploration and production. By not increasing the financial incentives for additional exploration, the plan fails to come to grips with the problem of increasing domestic crude oil production. (See p. 4.3.)

GAO is also concerned that the rebate procedures for the wellhead taxes may be administratively cumbersome and may result in duplicate payments in some cases. (See p. 4.11.)

GAO believes that the refunds to users of home heating oil work against the plan's overall conservation thrust and engender serious inequities and administrative problems. GAO recommends that the refunds be approved for only a brief period of time and phased out to protect consumers

from a sudden increase in heating bills without continuing the protection indefinitely. (See p. 4.12.)

GAO recommends that the Congress consider alternatives to the oil pricing and taxing proposals, such as:

--Allow the price of newly discovered oil to receive the world price for the actual year in question rather than the 1977 world price plus domestic inflation. Standby authority could be retained in the event world prices increased unreasonably quickly. (See p. 4.15.)

GAO believes that the administration has overestimated natural gas production for 1985 by about 10 percent. To the extent that natural gas production falls short of expectations, the difference will have to be made up through additional imports or additional conservation. (See p. 4.17.)

As is the case with the home-heating oil rebate, GAO believes that keeping natural gas prices to residential users lower than to industrial users is contrary to the principles of conservation and replacement pricing. Since natural gas is sold in long-term contracts, the increased prices will be absorbed slowly so there is no need for temporary protection against steep price increases. (See p. 4.17.)

While GAO generally agrees with the other oil and natural gas measures, it raised the following questions concerning the proposed 1 billion barrel Strategic Petroleum Reserve:

--Is a reserve of this type really needed?

--If so, how will the oil be purchased to fill it?

--What ways other than general tax revenues are available to finance it?

--Can industry stockpiles (about 720 million barrels) be used to offset part of the reserve? (See p. 4.23.)

COAL

The administration proposes four major initiatives to greatly increase coal use, including an oil- and natural gas-users tax, a coal conversion regulatory policy, a strong environmental policy for coal, and an expanded coal research and development program.

The administration expects domestic coal production to reach 1.2 billion tons annually by 1985 with its plan. Without the plan, it estimates that 1985 coal production will reach 1 billion tons. (See p. 5.1.)

GAO sees some disadvantages in the oil- and gas-users tax.

--The natural gas-users tax will result in large regional differences in taxes charged per Btu of gas used.

--Utilities and industries which cannot use coal for environmental or other reasons would still be required to pay the users tax.

GAO believes that the Congress should consider modifications to the users tax which would impose the tax on a Btu basis for natural gas use and allow users who are exempted from the requirement to use coal to also be exempt from the users tax. (See p. 5.7.)

The coal conversion regulatory policy would prohibit industry and utilities from burning natural gas or petroleum in new boilers, with limited environmental and economic exceptions. The proposal to place the burden of proof on the utility or industry to show why conversion to coal is not possible has potential to make the regulatory program less complicated to administer. However, if many companies file exceptions, the administrative burden could be greater under the administration's plan. If the

proposed regulatory program is approved, GAO believes that procedures should be established requiring administrative resolution of the requested exception within a specified time from the date of application for exception. GAO recognizes that judicial delays may still occur. (See p. 5.2.)

GAO believes that coal conversion legislation should include Federal facilities thus allowing the Congress to act on a total coal conversion package. (See p. 5.2.)

GAO supports the administration's goal of expanded coal development without endangering the environment. However, it seems apparent to GAO that the expanded use of coal even to 1 billion tons in 1985 will not take place if all air quality regulations are strictly enforced. In addition, GAO believes that if coal production is increased significantly, further environmental degradation will take place despite the strong pollution control measures in the plan. In the long term, assuming an aggressive and successful coal research and development program, the need for trade-offs may be substantially diminished. (See p. 5.16.)

GAO believes that a plan which calls for an increase in coal use by 1985 to 1.2 billion tons needs a research budget that emphasizes finding solutions to the environmental problems associated with the direct burning of coal. (See p. 5.24.)

GAO recommends that the Congress expand the plan for coal to include actions dealing with

--the need for capital to upgrade large portions of the Nation's railroads, particularly in the eastern States, and to expand existing capabilities;

--the need for resolving uncertainty concerning rights-of-way for slurry pipelines;

--the need for improving labor relations to prevent wildcat strikes and improving miner health and safety conditions, recruitment, and training; and

--the need for greater manpower and equipment productivity. (See p. 5.30.)

NUCLEAR POWER

The administration's plan for nuclear power appears to GAO to have two main objectives. The first involves the so-called "plutonium economy" and consists of several actions aimed at stopping proliferation of nuclear weapons, while the second objective amounts to greatly increasing the use of present generation nuclear powerplants. (See p. 6.1.)

As stated above, GAO disagrees with the administration's proposal to drastically reduce funding for the LMFBR program and, in particular, its decision to cancel the Clinch River Breeder Reactor. GAO sees these actions as reducing the Nation's ability to influence breeder safety and safeguards concerns worldwide.

GAO recommends that the Congress continue the LMFBR program on a schedule which recognizes that it is still a research and development effort, and that the Clinch River project be continued. (See p. 6.3.)

GAO agrees with the decision to defer, at least temporarily, nuclear fuel reprocessing. GAO's recent work indicates that the economic benefits of reprocessing do not now outweigh the proliferation and domestic safeguards concerns. (See p. 6.2.)

The administration made five specific proposals aimed at improving the option of present generation commercial nuclear powerplants. Those proposals are:

--Increased "surprise" inspections and "resident" inspectors at each nuclear site.

--Mandatory reporting of minor mishaps and component failures at powerplant sites.

--Improved powerplant siting criteria.

--Improved powerplant licensing procedures.

--Detailed review of the nuclear waste disposal program. (See p. 6.13.)

GAO generally agrees with all of these proposals and has previously recommended some of these actions. It should be noted, however, that a recent GAO report pointed out numerous problems in attempts to streamline the nuclear powerplant licensing process. In that report, GAO concluded that it was doubtful whether the time frame could be significantly shortened. (See p. 6.16.)

NONCONVENTIONAL ENERGY RESOURCES AND ENERGY RESEARCH AND DEVELOPMENT

The administration's plan emphasizes increased use of solar and geothermal energy applications that have been or are being demonstrated commercially, and increased research and development on other solar and geothermal technologies. (See p. 7.1.)

GAO agrees with promoting solar energy uses, and generally with the administration's proposals. While solar tax credits should encourage middle- and upper-income homeowners and businesses to install solar-heating units, GAO does not think they can help low-income homeowners and small businesses. These latter two groups may need low-interest loans or grants. (See p. 3.21.)

To stimulate geothermal energy development and use, the administration proposes (1) a tax deduction to stimulate geothermal drilling and (2) a streamlining of Federal geothermal leasing and environmental review procedures.

GAO agrees with the proposals to stimulate geothermal energy development and use and has made similar recommendations in previous

reports. GAO believes that, in order to properly manage energy resources on public lands, the Government must establish certain policies and procedures, including

--basing leasing decisions on national energy needs and not primarily on private industry initiative and

--insuring that leaseholders actively attempt to develop the resources. (See p. 7.3.)

GAO also agrees with the administration's plan to increase funding and improve management of research and development efforts on other renewable resources.

MANAGEMENT INFORMATION

The administration's plan proposes a three part energy information program including a Petroleum Production and Reserve Information System, a Petroleum Company Financial Data System, and an Emergency Management Information System. The details of all three systems are still being formulated and the administration does not contemplate that any additional legislation is necessary to put these systems into effect.

GAO believes that certain matters should be considered by the administration when it develops the specifics of the energy information program. These include the need for a complete appraisal of domestic uranium resources and the need for data on the oil and gas potential of certain Outer Continental Shelf areas. Also, GAO believes that the Securities and Exchange Commission and the Federal Energy Administration need to continue to work cooperatively to develop petroleum exploration and production data. (See p. 8.1.)

ADMINISTRATION COMMENTS

In commenting on a draft of this report, the Energy Policy and Planning staff, Executive Office of the President,

expressed concern over possible misinterpretations by readers of this report and stated that there is one crucial matter on which it differs with GAO. GAO believes it is appropriate that the administration wishes to avoid misinterpretation of the report. It was not GAO's intention to establish its own 1985 energy forecast or a revised estimate of what the plan will achieve, but to comment on the plan from the perspective of its past and ongoing work.

The area of crucial difference concerns the necessity of designing a plan to meet its goals. The administration believes that a national plan should not be just a Federal plan but should call for a response from the States and citizens as well. GAO believes that a national energy plan should insure to the maximum extent possible that the response desired from all sectors will be achieved, and not rely so heavily on unspecified voluntary and other actions. (See p. 9.1.)

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## ABBREVIATIONS

| | |
|---|---|
| ERDA | Energy Research and Development Administration |
| ESECA | Energy Supply and Environmental Coordination Act |
| EPA | Environmental Protection Agency |
| FEA | Federal Energy Administration |
| FPC | Federal Power Commission |
| LNG | liquefied natural gas |
| LMFBR | liquid metal fast breeder reactor |
| MFBI | major fuel burning installation |
| MMB/D | million barrels per day |
| NRC | Nuclear Regulatory Commission |
| OCS | Outer Continental Shelf |
| R&D | research and development |
| tcf | trillion cubic feet |

# CHAPTER 1

## INTRODUCTION

On April 20, 1977, the President addressed a Joint Session of Congress and presented the outline of a National Energy Plan containing proposed legislation and other initiatives aimed at solving the Nation's energy crisis. These Presidential initiatives evolved from the rapid changes in the world's energy situation over the past 3 to 4 years.

During these years, the United States has (1) seen growth in the strength of the Organization of Petroleum Exporting Countries, (2) undergone an oil embargo by those countries, (3) seen international oil prices increase by over 400 percent, and (4) come to a more widely accepted realization of the finite nature of conventional energy sources. In that time, the Federal Government has responded to the energy problem with new regulations, new programs, and new legislation.

Unfortunately, the short-term effects of Federal actions have not been what we might have hoped. The Nation is more dependent upon foreign energy today than it was 3 years ago, and commercial development of renewable energy sources is still only a distant expectation. A longer term assessment of these effects is more difficult. Certainly the Federal response has not been disciplined by a clearly enunciated and cohesive national energy policy.

As a first step in developing such a policy, the new administration has prepared a National Energy Plan combining legislative, administrative, and budgetary actions designed to set the Nation on a course toward achieving proposed energy goals.

Energy is a critical national problem for today and the foreseeable future. It has proved to be a particularly difficult problem to analyze because it is so complex and because solving the energy problem requires political consensus about sensitive issues, such as balancing economic and environmental objectives. In such areas, consensus is difficult to achieve.

In view of the extensive work that we have done and are doing in the energy area, the Chairman, Subcommittee on Energy and Power, House Committee on Interstate and Foreign Commerce, requested that we evaluate the President's energy plan by:

--Comparing the administration's energy proposals with the results of work we have already completed.

--To the extent possible, comparing the proposals with any tentative conclusions we have reached in work underway.

--Identifying our planned work that will be completed in time to assist the 95th Congress in evaluating and responding to the proposals.

--Identifying those proposals, if any, which we have not previously addressed and for which no work is currently planned.

The remainder of this report discusses the important elements of the plan and contains a description of our past work, including conclusions and recommendations, and our current and planned work which pertains to the administration's plan. This report relates only to the proposals contained in the plan; it does not comment on any subsequent congressional action on the President's proposals.

The chapter organization of this report reflects the major elements of the plan. Chapter 2 contains an overview of our overall observations, conclusions, and recommendations. The subsequent chapters discuss conservation, oil and gas, coal, nuclear, and other matters. Where appropriate, these chapters include conclusions and recommendations.

# CHAPTER 2

## OVERALL OBSERVATIONS, CONCLUSIONS, AND RECOMMENDATIONS

The National Energy Plan was issued by the White House on April 29, 1977. It contains the details of the proposals made in the President's address to the Joint Session of Congress on April 20. Subsequently, on May 2, H.R. 6831 (S. 1469 and S. 1472), the National Energy Act was introduced. This bill, which would carry out those parts of the plan requiring legislative changes, contains two titles--(1) pricing, regulatory, and other nontax provisions and (2) tax provisions.

The administration has taken a very important first step in developing a national energy policy. It is a good start. Although the results of our past and current work lead us to different recommendations in some areas, we are in agreement with the general thrust of the program and most of the specific initiatives proposed. Our comments and recommendations are explained in detail in the following chapters with the intention of helping the Congress improve upon a program which we believe is moving in the right direction, but unfortunately is not strong enough to meet many of its objectives, including a major reduction in oil imports.

### ADMINISTRATION'S ENERGY GOALS

The plan proposed that the Congress adopt specific national energy goals to be achieved between now and 1985. We commented on these goals in a recent report. 1/

We said that we were in general agreement with the goals, but noted that a fact which had not been clearly recognized was that, on the basis of its own estimates, the administration had not designed its energy plan to achieve all of the stated goals without unspecified voluntary actions or further mandatory actions not specifically identified except by example. The administration's goals and its estimate of what the plan can accomplish are as follows.

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1/Letter report (EMD-77-45, June 8, 1977) to the Chairman, House Committee on Government Operations.

| Administration's proposed energy goals for 1985 | Administration's estimate of what the plan can accomplish through 1985 |
|---|---|
| 1. Reduce total energy growth to below 2 percent/year | Reduction to 2.2 percent (note a) |
| 2. Reduce oil imports below 6 million barrels/day | Reduction to 7 million barrels/day (note a) |
| 3. Reduce gasoline consumption by 10 percent from 1977 levels | Reduction of 10 percent from 1977 levels |
| 4. Increase coal production by at least 400 million tons over 1976 | Increase by 565 million tons |
| 5. Insulate 90 percent of all buildings | Insulate approximately 60 percent (note a) |
| 6. Use solar energy in 2.5 million homes | Use solar energy in 1.3 million homes (note a) |
| 7. Acquire Strategic Oil Reserve of 1 billion barrels of oil | Acquire 1 billion barrels of oil |

a/Four of the seven goals are clearly not intended to be met by the plan, as specified to the Congress.

As stated in our June 8 report, we believe it is incongruous to ask the Congress to establish a set of National Energy Goals and then propose a National Energy Plan that is not expected to achieve them.

In addition, we believe that the gap between the goals and what the plan can accomplish is greater than the above figures indicate for two of the goals. These are the goals of reducing total energy growth to below 2 percent a year and reducing gasoline consumption by 10 percent from current levels.

The administration has calculated the estimated effect of the plan in these areas from a base which is as of the end of 1977 and includes a projected 1977 growth rate for each of the items of 5 percent over 1976. The actual growth rate that will be experienced in 1977 is, of course, unknown at this point but, based on past experience, 5 percent would be on the high side. If 1976 is used as the base, the plan

only reduces the energy growth rate to 2.5 percent a year and gasoline consumption by only 5 percent.

We believe it would be better to establish a goal which is based on the latest actual experience for a full year, i.e., 1976. This eliminates the problem of starting from an estimated base.

The administration is proposing a biannual report to the Congress on progress towards the goals. However, there are no proposed milestones on which to judge the rate of progress. We strongly urge that the Congress require that the administration establish such milestones not only as a basis for evaluation but also as a trigger mechanism for making any necessary adjustments in the plan.

Again, based on the administration's estimates, it does not appear that the conservation provisions of the plan will cause much reduction in energy demand. The administration projects that if no action is taken, energy demand will grow by 31 percent between 1976 and 1985. However, demand would still grow by 25 percent with the plan fully implemented. This equates to a reduction of roughly 1.9 million barrels of oil/day (MMB/D), or only 4 percent of total demand after 9 years. The major impact of the plan, as proposed, seems to be reducing oil imports by shifting to coal rather than by conserving energy.

ENERGY SUPPLY/DEMAND BALANCES

A more detailed analysis of the administration's plan since our June 8 report and our past and current work lead us to conclude that portions of the plan dealing with domestic energy supply are not likely to achieve the results that have been projected. Unless energy demand is reduced, the level of imported oil is likely to be about 4.3 MMB/D more than the administration's goal of 6.0 MMB/D.

In essence it appears to us that imports could be as high as 10.3 MMB/D--or about 47 percent of oil consumption in 1985. This is outlined as follows.

| | MMB/D oil equivalent |
|---|---|
| --Administration's goal for oil imports in 1985 | 6.0 |
| --Administration's estimate of reduction due to voluntary actions | +1.0 |
| --Our estimate of additional imports required to compensate for lower amounts of domestic production for: | |
| --coal | +2.3 |
| --natural gas | +1.0 |
| --nuclear power | + .6 |
| --Our estimate of reduced oil imports as a result of higher imports of liquefied natural gas | - .6 |
| Total 1985 oil imports | 10.3 |

This estimate assumes that there would be no savings as a result of voluntary public response from which the administration hopes to save 1 MMB/D oil equipment. On the other hand it also assumes that the full conservation goal of 1.9 MMB/D oil equivalent will be achieved.

The administration estimates that oil imports would be 11.5 MMB/D if the plan is not adopted. We did not evaluate that estimate. Our approach was to evaluate whether the administration's goal of 6 MMB/D in oil imports can be achieved, and we have concluded that the domestic supply of energy that would be required to achieve such a reduction is not likely to be realized.

Oil imports will have to compensate for the shortfall in domestic production--unless further conservation is achieved.

The choice that is available to compensate for any loss in domestic production is either more imports or more conservation. This is why we believe that milestones should be established to provide a signal in the event that the Nation is falling short of the goals, and to have stronger, mandatory

conservation actions ready to be implemented if they are needed. It would also help if it were known ahead of time what type of mandatory actions would be implemented if the goals are not being met. The effectiveness of the voluntary measures included in the plan might be enhanced if the specifics of the mandatory actions were known.

Supply

We have serious doubt whether the production levels forecast in the plan for coal, nuclear, and natural gas can be achieved. We have work in progress dealing with the outlook for future coal production which leads us to conclude that there are serious problems and obstacles to achieving a production level of 1 billion tons by 1985. This is the amount of coal the administration says would be produced without the plan. The plan calls for 1.2 billion tons by 1985. If coal production is only 1 billion tons in 1985, this would equate to reduced domestic energy production of about 2.3 MMB/D oil equivalent from the level forecast in the plan.

We discuss these problems in more detail in chapter 5. They include very serious environmental obstacles, involving both mining and use of coal, the need for enormous amounts of capital, a deficient rail transportation network, uncertainty for both slurry pipelines and railroads concerning pending legislation, and labor relations and productivity problems.

Even though the President has stated that he will use nuclear energy "only as a last resort," the nuclear objective is also extremely ambitious and will also be difficult, if not impossible, to achieve. The 1985 production projected in the plan is nearly four times current levels. That this increase can be achieved in 8 years is very doubtful. As of December 1976, there were 62 nuclear plants in operation, and an additional 77 plants had either limited work authorizations or full construction permits from the Nuclear Regulatory Commission. In order to achieve the output in the plan, all 77 plants would have to be licensed and operating by the beginning of 1985 and all nuclear plants would have to operate at an average annual capacity factor 1/ of 69 percent.

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1/Capacity factor is a term used to depict the percent of time that a plant is actually producing electricity. It is defined as the ratio of the amount of electricity produced to the amount that could be produced if the plant operated continuously at full power.

An examination of the nuclear powerplants introduced into commercial operation in the years 1973-76 indicates it is unlikely that nuclear powerplants which did not have construction permits as of December 1976 could be in the commercial grid at the beginning of 1985. As of December 1976, only 66 of the 77 plants had construction permits.

To generate the 762 billion kilowatt hours projected by the administration's analysis for 1985, these 66 plants and all existing plants would have to operate an average annual capacity factor of 77 percent. However, on an annual basis, the capacity factor for nuclear powerplants in the United States has not exceeded 55 percent since 1973. We believe an optimistic upper limit for the average annual capacity factor of all nuclear powerplants in 1985 is about 65 percent. Using this capacity factor, our analysis indicates that the United States could expect to produce the equivalent of 3.2 MMB/D of electric power, which is .6 MMB/D less than is projected in the plan.

We also believe that anticipated natural gas production is overstated by about 10 percent. This is based on an analysis we did last year 1/ on the amount of reserve additions required to achieve a given level of production in 1985 and the historical experience on reserve additions. We concluded that, even with higher prices, the highest amount of natural gas production which one could reasonably expect by 1985 (outside of Alaska) is 15 trillion cubic feet (tcf). The administration's plan anticipates a supply of 17 tcf. The difference of 2 tcf equates to about 1.0 MMB/D.

If coal production is 1 billion tons in 1985, natural gas production is 15 tcf and nuclear power is the equivalent of 3.2 MMB/D (all of which we believe is the maximum one can expect), this would result in an energy supply shortfall of about 3.9 MMB/D oil equivalent over that forecast in the administration's plan which would have to be made up by either additional imports or conservation. This is in addition to the 1.0 MMB/D shortfall already estimated by the administration.

However, as explained further in chapter 4, we believe that the administration has underestimated 1985 imports for liquefied natural gas (LNG) by about half, or about .6 MMB/D

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1/"Implications of Deregulating the Price of Natural Gas," OSP-76-11, Jan. 14, 1976.

oil equivalent. Therefore, unless energy demand is reduced, the level of imported oil is likely to be about 4.3 MMB/D more than the administration's goal of 6.0 MMB/D.

Demand

Although we have not verified the energy demand reductions that are estimated to accrue as part of the plan, we have reservations concerning the administration's estimate on the amount of energy demand in 1985 if no further action is taken--in other words--if the plan is not implemented.

The following discussion of energy demand will be on the basis of the energy actually consumed in each sector. Electrical generation losses are reflected in the electrical sector and not allocated to the consuming sectors, as is done in the administration's plan. We feel that this is necessary for an analysis of demand patterns because the growing amounts of electricity use reflected in the plan (and its related generation losses) create distortions when comparing actual energy consumption patterns in each of the sectors with historical experience.

The administration's energy forecasts are based on a high economic growth scenario for the next 9 years. Gross National Product (GNP) is expected to grow at an annual rate of 4.3 percent from 1976 through 1985 which is comparable to the growth rates that were experienced during the 1960s.

The administration's forecast for energy consumption in the industrial sector reflects the anticipated high economic activity, but it should be noted that the forecasted industrial energy growth rate is higher than that ever experienced over any 9 year period since World War II. Energy consumption in the industrial sector is projected to grow at an annual rate of 4.9 percent without the plan being implemented.

This appears to be excessive when compared with past experience. Between 1960 and 1973, a period of economic growth similar to the administration's forecast (a 4.0-percent GNP growth rate) and a period of decreasing energy prices relative to other prices, industrial energy consumption grew at a rate of about 3.0 percent. We believe that this rate should be considered the upper limit for industrial energy growth over the next 9 years.

The high industrial energy consumption forecast appears, however, to be offset by forecasts which we believe are understated in the residential/commercial and transportation sectors. Between 1960 and 1973 energy growth in the

residential/commercial sector grew at a rate of about 3.6 percent. This was reduced to about 1.5 percent during the 1973-76 period which included a recession, significantly reduced construction of new buildings, and large increases in energy prices. The administration's forecast of a growth rate in the residential/commercial sector of only .6 percent (and zero growth with the plan), with no further action appears questionable, since this is coupled with a period of high economic activity and rising energy prices, but at a slower rate than was experienced over the past 3 years.

Similarly, the growth rate in the transportation sector is quite small when compared with the 1960-73 period which averaged 4.3 percent. The administration is projecting a growth rate of only 1.4 percent with no further action and 1.1 percent with the plan.

As part of the plan, the administration has set a target of reducing gasoline consumption to 6.6 MMB/D in 1985 which is a 10 percent reduction from estimated 1977 levels. Automobiles consume about 70 percent of all gasoline and this is about 50 percent of the total petroleum consumption in the sector. Trucks and vans consume most of the remaining 30 percent of gasoline consumption.

Under current policy, explicit vehicle efficiency standards affect only vehicles under 6,000 pounds, which is primarily automobiles. The plan would extend these standards to light duty trucks up to 10,000 pounds, but no schedule has been determined and it undoubtedly would take several years before the effect on gasoline consumption would be observed.

From 1965 through 1974 total gasoline consumption grew at an annual rate of 3.8 percent, while gasoline consumption by trucks and vans grew by 5.1 percent. The lack of explicit efficiency standards at the present time coupled with a full employment economy indicates that gasoline consumption by trucks will continue to grow. This will make the goal of reducing gasoline consumption to 6.6 MMB/D exceedingly difficult to attain.

For example, if truck and van gasoline consumption grows at historical rates, automobile gasoline consumption in 1985 would have to be reduced to 3.7 MMB/D, which is 28 percent below 1976 levels. Even if the rate of growth in gasoline consumption by trucks and vans is reduced to only 3 percent, automobile consumption would still have to fall by 19 percent below 1976 levels.

One conclusion that flows from the preceding analysis is that, even with lower energy growth rates in the future, the objective of reducing oil imports to 6.0 MMB/D will be exceedingly difficult to meet. This is primarily due to the fact that increased domestic production in the quantities implied by such a goal will be difficult, if not impossible, to achieve.

Oil imports currently constitute about 20 percent of total energy consumption. The administration estimates this would be reduced to 15 percent, with a goal of 13 percent. An issue which should be addressed, however, is whether it is necessary to make such a drastic reduction in imports while pricing natural gas below oil and increasing coal and nuclear production in the amounts called for in the plan. Is there room to import more oil, and preserve our own natural resources, while still limiting our exposure in the event of another embargo? As the 10 month strategic reserve is implemented, this option may appear more attractive. In any case, it may be inevitable.

The purpose of this discussion is not intended as a criticism of the administration's estimates. Energy forecasting is, by definition, an inexact science and no estimate can be assured of accuracy. However, it is important to work with as accurate a picture as possible of what the energy situation is likely to be if no further action is taken because this provides a basis for determining the initiatives necessary to attain certain goals. Any energy initiatives that might be considered would not merely address total energy consumption or production, but would address a particular use sector or a particular energy source. Our analysis raises questions regarding the composition of the administration's supply/demand estimates.

We believe that the Energy Committees of the Congress, working with the administration and others who are knowledgeable in energy forecasting, should work from a forecast which they believe portrays as accurate a picture as possible of what the energy situation is likely to be if no further action is taken. As a second step, a set of National Energy Goals should be adopted, along with appropriate milestones upon which to judge progress. And finally, an energy program should be adopted which is designed to actually meet the goals. A set of standby initiatives could also be drawn up for quick implementation, if the milestones indicate that satisfactory progress is not being made.

## STRATEGY AND SPECIFIC INITIATIVES

### Strategy

The administration's plan sets forth the following energy objectives:

1. Immediate--reduce dependence on foreign oil and vulnerability to supply interruptions.

2. Medium--keep U.S. imports sufficiently low to weather the period when world oil production approaches its capacity.

3. Long term--have renewable and essentially inexhaustible sources of energy for sustained economic growth.

The principal strategies used to meet the immediate- and medium-term objectives are to encourage energy conservation by pricing energy to consumers at its replacement value, in most cases, plus taxes and other incentives. Another part of the strategy is to encourage fuel switching away from oil into coal by a combination of regulation and pricing incentives.

As in the past, we continue to endorse the concept of pricing energy at its replacement value. However, as explained above, we are doubtful that the initiatives designed to generate additional domestic supplies and fuel switching will be as successful as is contemplated.

We would also urge a certain degree of caution with regard to the application of the energy taxes. The stated objective is to conserve energy and reduce oil imports, not to raise revenue. The administration is estimating that the combination of energy taxes and rebates will net the Treasury about $2 billion over the period from 1978 through 1985. However, and of potentially greater significance, is that $8 to $9 billion a year is subject to the degree of public response to the various tax credits and other initiatives involved in the plan. If the administration has underestimated the degree of public response, the annual surplus could be quite large. There are some areas where physical limitation rather than the public's desire to conserve could be the determining factor in limiting the degree of public reponse. Examples are the (1) industry capacity on the insulation program, (2) industry capacity and environmental restrictions with regard to coal conversion, and (3) delays in the nuclear licensing and construction process.

The principal strategy to be employed in meeting the long term objective is to expand the research and development (R&D)

program and to provide other incentives to develop solar, geothermal, and other renewable energy sources. The administration has also announced a policy of not subsidizing existing technology.

We are in general agreement with this strategy and policy. In a report 1/ dealing with the question of Federal assistance for financing commercialization of emerging energy technologies, we recommended that emerging and promising technologies which are not cost effective should receive high priority for R&D assistance but questioned whether commercialization assistance should be given such technologies. The pricing of fuels at replacement value will also assist emerging technologies to be more effective.

## Specific initiatives

While our past work has not addressed all of the administration's specific energy proposals, many of the initiatives are similar to recommendations that we have made in the past or are supported by tentative conclusions that we have reached on the basis of our ongoing work. Some proposals we agree with in concept, but believe that modifications should be made. In a few instances, we disagree with the proposals. The following is a summary of our recommendations on some of the key items in the plan. Details are in the following chapters.

### Initiatives with which we agree

#### Demand-reducing actions

In the conservation area we are in agreement with most of the administration's proposals, such as:

--Mandatory efficiency standards for new buildings. We first proposed such standards in a March 1975 package of alternative energy proposals which was prepared at congressional request.

--Utility conservation service. A key factor will be the extent to which homeowners choose to participate. Preliminary results of our ongoing work on energy conservation indicate that at least two factors have discouraged homeowners from making investments in conservation measures--lack of information on the

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1/"An Evaluation of Proposed Federal Assistance for Financing Commercialization of Emerging Energy Technologies," EMD-76-10, Aug. 24, 1976.

potential dollar savings and an inability to obtain the necessary capital to make improvements. The proposed program should help to eliminate the effects of these factors.

--Tax credits for energy conservation measures. We recommended such measures in our March 1975 package of energy proposals.

--Cogeneration proposals. We believe the administration's proposals should deal effectively with the factors which have been inhibiting further use of cogeneration. Our work in progress on energy conservation has identified the principal inhibiting factors to be declining block rates and reluctance on the part of utilities to provide supplementary service or purchase surplus power.

--Utility rate reform. In our March 1975 package of energy proposals, we recommended that a model rate structure be established based on the concept of peak load pricing and designed to reward the conservation of electricity. The administration's proposal is more forceful in that it would require the adoption of these principles. We endorse this approach.

Utility rate reform is one of the few mandatory features of the plan. There may have to be more if the plan is to be successful. Basically, there are three degrees of conservation activity, starting with the purely voluntary which is predicated on a response to public appeals, awareness, and education. This has been the prevalent form of conservation activity to date. Work which we are completing on past energy conservation actions shows pretty clearly that voluntary actions are difficult to encourage and sustain over a long period of time. The second level of conservation activity is of the market intervention nature which operates through tax and other financial mechanisms. It is this area that most of the administration's proposals are centered. The third level of conservation activity is the mandatory type. There are very few proposals of this nature in the administration's plan, but they may be necessary in order to meet the goals.

Supply-increasing actions

On the supply side, we are in general agreement with the following proposals:

--Improving the operation of present generation nuclear powerplants. While we have previously endorsed many of these actions, we pointed out in a recent report 1/ that, due to numerous problems involved, it was doubtful whether the licensing process could be appreciably shortened.

--Strategic Petroleum Reserve. In March 1975, we first recommended that a stragetic petroleum reserve be established, so we are in agreement with the administration's plan in concept, but we have several unresolved questions regarding Federal Energy Administration's (FEA's) plans to implement the plan. These questions deal with (1) the ownership of the reserve--whether total Government stocks as proposed by FEA are necessary or whether industry stocks can be used, (2) the decision by FEA to purchase all oil on the open market rather than using Federal royalty oil, and (3) whether the reserve should be financed from general tax revenues as proposed, or from user charges, associated with petroleum products. We discuss these questions in more detail in chapter 4.

--Nuclear proliferation. We generally agree with the proposals aimed at stopping the spread of nuclear weapons--except the deferral of the Liquid Metal Fast Breeder Reactor (LMFBR) which will be discussed below. We agree with the decision to defer, at least temporarily, nuclear fuel reprocessing. Our recent work indicates that the economic benefits of reprocessing do not now outweigh the problem of nuclear proliferation and domestic safeguards.

Other proposals with which we agree include:

--expanded coal R&D and

--incentives for the development and use of solar energy.

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1/"Reducing Nuclear Powerplant Leadtimes: Many Obstacles Remain," EMD-77-15, Mar. 2, 1977.

Initiatives with which we agree, but with modification

--Gas guzzler tax and rebate program. We proposed such a program in March of 1975, but one of the differences in the two proposals is the point at which the tax would be applied. In our 1975 proposal, the tax and rebates would be imposed at the point of sale, while with the administration's proposal the tax and rebate is to be imposed on the manufacturer. Our proposal was based on the premise that imposing a tax or rebate at the point of sale would be more visible to the consumer and thus result in increased purchases of more fuel efficient cars. The administration's approach would facilitate management of the program but it might be less effective. An alternative that would continue the features of both proposals would be to impose the tax on the manufacturers and require that the amount of tax or rebate associated with each vehicle be posted on the mileage sticker on each car.

--Gas tax. While we agree with the tax, we believe that consideration should be given to applying a portion of the receipts to expand public transportation opportunities instead of providing full rebates.

--Expanded use of coal. While we agree with this objective, our work in progress on the potential for increased coal use indicates that there are several major problems that are not addressed in the administration's plan. In addition to environmental issues which we have identified in our work as key constraints to expanded coal use, other potential constraints include: the condition of the Nation's railroads, the uncertainty regarding rights-of-way for slurry pipelines, unsatisfactory conditions regarding labor relations, productivity, and miner health and safety. We believe the administration's plan will have to be expanded to address these and other issues, even to achieve the production levels indicated without the plan. This expansion could include providing more financial assistance to railroads, making improvements in mine safety, and increased funding for pollution control research.

Further, we are not convinced that the administration's goal can be achieved without recognizing the need for energy and environmental trade-offs in the near term. It seems apparent that the expanded use of coal will not take place as proposed by the administration if all air quality regulations are strictly enforced. In addition, we believe that if coal use is expanded, further environmental degradation will take place despite the strong pollution control measures proposed in the plan. In the long term, assuming an aggresive and successful coal research and development program, the need for trade-offs may be substantially diminished.

--Oil pricing and taxing. While we agree with the concept of pricing energy at its replacement value and share the administration's concern for windfall profits, the specific actions proposed have several problems. These include: producers' revenues are expected to actually be lower than they would be with continuation of current policy, which may affect the availability of capital for exploration and development; virtually no increase in production is expected; retail prices are expected to increase only slightly; and there will be only a small decrease in demand, yet the inequities and administrative burdens involved in the tax and rebate program are substantial. It may well be however, that the administrative burden will be less than under the present entitlements program. We would urge the careful evaluation of alternative means to accomplish the objectives, such as to set the price of newly discovered oil in accordance with the world price for the year in question rather than 1977.

--Oil and gas users tax. These taxes together with the rebate/investment tax credit proposals would encourage conservation, would be self-financing, and would encourage conversion to coal mainly through the rebate/investment tax credit mechanism. However, the tax has the following disadvantages: (1) the natural gas users tax would result in large regional differentials in taxes charged per Btu of gas used, and (2) some utilities and industries which cannot use coal would still be required to pay the users tax. We believe the Congress should consider modifications to the users tax which would (1) impose a tax per Btu on natural gas use, and (2) allow users which are exempted from coal use also to be exempt from the tax.

Incentives with which we disagree

--Deferral of the LMFBR. The administration's plan and our position differ in degree and purpose. Our position, in essence, is that the LMFBR should be treated as a research and development program, which emphasizes reliability, safety, and economics instead of commercialization; and, which moves the Nation to a point where a decision can be reached on commercial deployment. The Clinch River Breeder Reactor demonstration project is, in our view, a logical step in such a program. The administration's plan is based on the concern that increased plutonium availability will encourage nuclear proliferation. The administration hopes that its decision to terminate the Clinch River project and otherwise reduce and redirect LMFBR R&D funds will encourage other nations to defer their plutonium breeder program and seek alternative methods of meeting their future energy needs.

All of the above issues, as well as comments on virtually all of the specific initiatives included in the administration's plan, are discussed in more detail in the following chapters.

CONCLUSIONS AND RECOMMENDATIONS

In addition to addressing the specific initiatives proposed by the administration, we believe that the Nation's energy policy should be developed in a broader context. We therefore recommend that the Energy Committees of the Congress:

--Work with the administration and others who are knowledgeable in energy forecasting and work from a forecast which they believe portrays as accurate a picture as possible of what the energy situation is likely to be if no further action is taken.

--Adopt a set of National Energy Goals, along with appropriate milestones upon which to judge progress in meeting the goals.

--Adopt an energy program which is designed to meet the goals. A set of standby initiatives, many of which will have to be mandatory in nature, should also be drawn up for quick implementation in the event that the milestones indicate that satisfactory progress is not being made.

# CHAPTER 3

# CONSERVATION

## TRANSPORTATION PROPOSALS

The administration's plan to conserve energy in the transportation sector includes seven major actions:

--A gas-guzzler tax and rebate for fuel-efficient cars.

--Expansion of the auto fuel-efficiency standards programs.

--Increased enforcement of the 55 miles per hour speed limit.

--A standby gasoline tax.

--Fuel-efficiency standards for light trucks.

--Removal of the 10-percent excise tax on intercity buses.

--An aviation and marine fuel tax.

These actions rely heavily on financial incentives and disincentives to reduce automobile gasoline consumption either through consumer purchases of more fuel-efficient cars or through reduced driving. In addition, the proposals for efficiency standards will administratively expand programs previously enacted. The proposal involving the 55 miles per hour speed limit is a restatement of commitment to enforce the speed limit and requires no new action by the Congress.

The administration also included new initiatives by the Federal Government under the Federal Energy Management Program to reduce gasoline consumption. Finally, the administration proposed a Federal vanpool demonstration program.

We have previously taken positions on, or have work in progress related to, many of the administration's proposals for transportation energy conservation, including the gas-guzzler tax and rebate program, the auto fuel-efficiency standards proposals, the 55 miles per hour speed limit, the standby gasoline tax, the tax on aviation and marine fuel, and Federal vehicle acquisitions.

## Gas-guzzler tax for inefficient cars and rebate for fuel-efficient cars

The administration's plan includes an excise tax on less fuel-efficient automobiles and a rebate for new cars which are fuel efficient. These provisions were proposed to help achieve a national goal to reduce gasoline consumption 10-percent below current levels by 1985.

Both the excise tax and the rebate would be based on the existing requirement placed on motor vehicle manufacturers to meet average miles-per-gallon standards for new motor vehicles. The standards were included in the Energy Policy and Conservation Act (EPCA) (Public Law 94-163). According to the plan, the excise tax would be imposed as a graduated tax on new automobiles with fuel-efficiency ratings below the legislated standards. The tax for each automobile would be fixed by statute depending on its miles-per-gallon rating as compared to the standard. The less fuel efficient the automobile, the greater the amount of the tax. Under the proposal, the excise tax would be paid by the manufacturer but would be expected to be passed through to the consumer.

The proposed rebate would be implemented as a graduated rebate for new cars which exceed the miles-per-gallon rating set by the legislated standards. The rebate would be fixed by the Internal Revenue Service in advance of each model year so that rebate payments would be equal to the estimated auto excise tax receipts. The rebate amount would depend on the extent to which the new car miles-per-gallon rating exceeded the standard; the maximum would be paid for electric vehicles. The rebate would be provided to the manufacturer and passed through to the consumer as required in the proposed legislation.

In the past we have supported the concept of excise taxes on inefficient cars and rebates for the purchase of fuel-efficient cars. In March 1975 we developed, in response to a congressional request, a package of alternative energy proposals 1/ which included these measures.

In addition to our ongoing review of Federal efforts to achieve energy conservation, which we plan to complete in the next 2 months, we have found that while automobile-

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1/Alternative Energy Proposals Developed by the General Accounting Office in Response to Congressional Inquiries: Statement of Comptroller General before House Ways and Means Committee on March 17, 1975.

efficiency standards should have a significant impact on reducing the growth of transportation energy use in the longer term, options are available for reducing such energy use in the shorter term. Our preliminary conclusions are that indirect market intervention means, such as excise taxes on the purchase of inefficient cars and rebates for the purchase of efficient cars and/or raising the price of gasoline, could reduce energy use in the transportation sector between now and 1985. In a separate effort which we plan to complete late this year, we intend to further analyze these options in terms of energy savings and other effects between now and 1985 and 2000.

There are three major differences between the administration's plan and our 1975 package of proposals

--the point at which the excise taxes and rebates would be applied,

--the tax and rebate balancing feature of the administration's proposal, and

--the eligibility of electric vehicles for maximum rebates included in the administration's proposal.

In our 1975 package of proposals, the tax and rebates would be imposed at the point of sale while with the administration's proposal, the tax and rebate is to be imposed on the manufacturer. Our proposal was based on the premise that imposing a tax or rebate at the point of sale would be highly visible to the consumer and thus result in increased purchases of more fuel-efficient cars.

We have been advised that the reason for the administration's approach was the limited amount of administrative burden of this approach over others, especially in view of the "balancing" of tax and rebate amounts each year. Although it is not so stipulated in the language of the draft bill as introduced, we have been advised informally by FEA representatives that the regulations for this program would require that the amount of the tax or rebate be identified on the Environmental Protection Agency's (EPA's) mileage-rating label which is required to be placed on all new cars. This is intended to assure that the tax and rebate be passed through as levied on each model car. This would be an important feature of the program by providing some necessary visibility at the point of sale. We believe that language should be included in the legislation which will assure that this feature will be a part of the program.

Under the administration's plan, the total amount of rebate funds provided to manufacturers is intended to equal the total amount of taxes imposed on manufacturers. The amount of rebate applicable to individual automobiles will depend to a great extent on the number of automobiles produced which exceed the mileage standard and the number which do not meet it. Thus, as the number of automobiles produced which exceed the standard increases, the amount of rebate applicable to each automobile would decrease.

Our March 1975 package of proposals did not include a "balancing" feature in our tax and rebate program for the purchase of automobiles. Our intent in proposing the tax and rebate program was to demonstrate the type of financial incentives and disincentives which could be used to encourage the purchase of more fuel-efficient automobiles. However, our proposal provided that the revenue generated from excise taxes would be used in programs to improve the efficiency of automobiles and to expand public transportation opportunities. Unfortunately, public transportation receives very limited mention in the administration's plan. This will be discussed further in the section dealing with the standby gasoline tax.

We would like to point out that there is a trade-off involved concerning the administration's approach to electric vehicles. While widespread use of electric vehicles could significantly reduce the Nation's oil consumption, electric vehicles designed with current technology are generally only as energy efficient as a typical compact car when overall vehicle energy efficiency from primary source to ultimate utilization in the vehicle is considered, including energy losses in power generation and distribution. Thus, any movement to electric cars primarily results in fuel switching, not energy conservation.

A key factor affecting the proposed excise tax and rebate program relates to consumer awareness of the program. Under the administration's proposal, the identification of any tax or rebate amount on the EPA-mileage label attached to each car will presumably serve to make consumers aware. Preliminary results of our review of Federal efforts to convince the public to buy more fuel-efficient cars indicate that new car buyers who were aware of the mileage labels and mileage-guide booklets experienced a 20- to 25-percent increase in gas mileage when replacing their old cars. However, only about half of new car buyers were aware of the mileage labels and only about 7 percent were aware of the mileage guides. Additional efforts, such as paid advertising campaigns and a more timely distribution of mileage guides to prospective new car buyers, could increase the public's awareness of gas mileage information and

encourage consumers to buy more fuel-efficient cars.

In addition, we believe that any excise tax and rebate amounts for new cars should be included in the mileage guide publication so that consumers can compare mileage and tax and rebate information for various car models.

We believe an issue concerning the tax and rebate program's applicability to foreign cars should be considered. According to the plan, rebates would be provided for cars manufactured in foreign countries only after agreements were reached with indiviudal countries. Should rebates ultimately be offered on foreign cars at the same rate as American cars, it is likely that increased purchases of foreign cars would result because of their generally higher efficiency as measured in miles per gallon. On the other hand, should rebates not be offered on foreign cars, the rebate would favor the purchase of generally less energy-efficient American cars over the foreign cars and might result in charges of unfair trading from foreign manufacturers. From an energy conservation standpoint, we would favor extending tax and rebates to all cars without regard to manufacturer.

The administration's plan does not address the used car market. Between 1968 and 1973 purchases of used cars averaged over 62 percent of total automobile purchases on an annual basis. One possible result of the plan might be that consumers desiring to purchase bigger, less fuel-efficient cars may turn to the used car market, or alternatively, keep their less efficient automobiles longer than they might otherwise have done. Should this occur, it could substantially slow down the process of upgrading the average mileage of the Nation's automobile fleet.

A possible further step which could be taken if the goals are not being met would be to provide financial incentives for the purchase of fuel-efficient used cars as well as new cars. One approach could be to extend the tax and rebate program to the used car market on some equitable basis, such as vehicle weight, or an annual Federal excise tax to be collected at the time automobiles are registered in the States.

Automobile fuel-efficiency standards

Under the proposal the Secretary of Transportation is to begin the analytical work necessary to examine how his authority should be used to raise mileage standards above 27.5 miles per gallon for the years beyond 1985. In addition, the Secretary has been directed to promulgate mileage standards for trucks weighing between 6,000 and 10,000 pounds. The general authority for the Secretary of Transportation to

accomplish these directives is contained in the Energy Policy and Conservation Act.

We have raised questions about leaving the responsibility for the automobile fuel-efficiency standards within the Department of Transportation. In our recent report on energy organization 1/, we stated that the proposed Department of Energy should be responsible for setting goals for the automobile fuel-economy standards program with the Secretary of Transportation as an advisor. In our opinion, it is desirable to have energy functions in an agency having energy responsibility, rather than to have them in an agency with no basic energy responsibility. This would insure that energy functions receive proper priority within a single department. The implementation of this program could, however, be carried out by the Department of Transportation.

We have also reviewed Federal efforts to improve the fuel economy of new automobiles. In a letter to the Chairman, Energy Resources Council 2/, we stated that improvements in automobile fuel economy depend largely on how well Federal emission and safety standards can be balanced with fuel-economy standards. We concluded that unless emissions, safety, and fuel-economy standards are assessed together and trade-offs considered, conflicting decisionmaking will likely continue. We recommended that the Council develop and recommend to the Congress a balanced set of automobile standards that address the feasible levels and timing of Federal emissions, safety, and fuel economy standards beyond 1980 which will best meet the total needs of the Nation.

We recently issued a report 3/ concerning the Interstate Commerce Commission's activities in reducing energy use by trucks. We concluded that the Commission's initiatives have been limited because of its traditional regulatory objectives of protecting regulated truckers and making certain that service is adequate. In general, we recommended that actions be taken to resolve the sometimes competing objectives of industry regulation and energy conservation.

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1/"Energy Policy Decisionmaking, Organization, and National Energy Goals," EMD-77-31, Mar. 24, 1977.

2/Letter report (EMD-77-13, Jan. 13, 1977) to the Chairman, Energy Resources Council on automobile fuel efficiency and environmental standards.

3/"Energy Conservation Competes with Regulatory Objectives for Truckers," CED-77-79, July 8, 1977.

## Vigorous enforcement of the 55 miles per hour speed limit

The administration called for the public to observe the 55 miles per hour speed limit and requested State and local governments to vigorously enforce the law. Additionally, it pointed out that the Secretary of Transportation, under existing authority, can withhold highway-trust-fund revenues from States not enforcing the limit.

In our report to the Congress on the 55 miles per hour speed limit 1/, we identified significant problems and issues relating to the enforcement of the speed limit. We found that many drivers are exceeding the maximum speed limit. Although State police have tried to enforce the limit, the large number of speeders have resulted in speeding tickets being issued only in the most blatant violations. Limited money and staff and more pressing problems have precluded any more emphasis on speed enforcement.

We concluded that there are two controversial questions regarding Federal law that need to be resolved before the law can be fully effective: (1) what specific criteria should be developed and used to judge State enforcement efforts? and (2) is the penalty provided by the law, for all practicality, an empty threat?

Establishing Federal enforcement criteria could have an impact on the States' historic role in traffic enforcement. If satisfactory criteria cannot be established without intruding on State prerogatives, the Department of Transportation should take this problem to the Congress, considering the impact that the lack of criteria may have on the practical application of any positive or negative incentives provided by law.

The Federal Aid Highway Amendments of 1974 (Public Law 93-643) gives the Secretary of Transportation authority to withhold approval of all Federal-aid highway construction projects for any State that fails to establish a 55 miles per hour maximum speed limit or fails to certify enforcement of that speed limit. This sanction is the only legal tool the Secretary has to encourage States to establish and enforce a 55 miles per hour speed limit.

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1/"Speed Limit 55: Is It Achievable?" CED-77-27, Feb. 14, 1977.

In our opinion, the sanction is so severe that

--if it were invoked it would impose extreme hardship on the State and be counterproductive to safety,

--the States generally regard it as an empty threat, and

--it interferes with achieving a cooperative State-Federal relationship.

We recommended that the Secretary of Transportation:

--Establish criteria to evaluate if speed reduction efforts taken by the individual States are sufficient or report to the Congress if such criteria cannot be established without intruding on State prerogatives.

--Institute a widespread, positive public information program emphasizing the continuing need for the national speed limit in terms of energy conservation and safety. This program should be a cooperative effort with the individual States.

We recommended that the Congress enact legislation to enable the Secretary of Transportation to implement a program of variable incentives or sanctions that provide each State with maximum flexibility in reducing driver speeds.

Standby gasoline tax

The plan includes a request to authorize a tax on gasoline in the event that specified annual gasoline consumption targets are not met. The gasoline tax would amount to annual increases of 5 cents per gallon of gasoline (up to a maximum total of 50 cents per gallon) if each year's consumption target was exceeded by at least 1 percent. In the event that yearly consumption targets are met, no additional taxes would be imposed and any previous tax which had been imposed would be reduced by 5-cent increments.

The objective of this program is to reduce gasoline consumption to 6.6 million barrels per day by 1985. Gasoline consumption in 1976 amounted to about 7 million barrels per day. The proposal also provides that funds collected from the gasoline tax would be rebated to the public on a per capita basis.

Our March 1975 package of energy proposals prepared at the request of congressional committees also included a gasoline tax. The amount of our proposed tax was 20 cents a gallon to be imposed in increments of 5 cents at 6-month

intervals. At that time we said that the revenue generated from the taxes should be used for programs which would improve the fuel efficiency of automobiles and expand public transportation.

The major differences between the two proposals involve the way in which the gasoline tax would be implemented and the use of revenue generated from the tax. Under the administration's plan, the imposition of the tax would result from failure of the public to voluntarily reach gasoline consumption targets (standby feature) while our proposed tax was to be implemented immediately. We believe that the approach of the administration's proposal has merit because the standby feature offers the public the opportunity to decrease gasoline consumption voluntarily to avoid imposition of the tax. However, we believe that the amount of the administration's proposed tax may not be great enough to result in significant cutbacks in gasoline consumption. But the proposed tax should be reviewed as part of an overall package to alter consumers' auto-use patterns.

Our proposal would have utilized the funds collected from the tax to expand public transportation opportunities instead of providing rebates. While we can understand the basis for rebates in instances where it can be shown that an inequitable burden has been placed upon certain classes of consumers, such as the low income population, we urge consideration of the option of applying a portion of the tax receipts to expand public transportation as we proposed in 1975. This would constitute an investment designed to improve the energy efficiency of the transportation system of the country and would also contribute to alternatives to the automobile for all classes of citizens--including the poor. The immediate returns may not be significant, but it is an investment in the future.

The administration's energy plan states that, in the long run, mass transit by rail and bus must play a major role in reducing transportation energy demand. However, it contains no direct proposals, except for the Federal vanpool program proposals, to improve existing systems and develop new urban mass transit systems or encourage greater use of such systems. Examples of other short-term actions which could be included are increased grants and subsidies to purchase buses or to construct express bus lanes. In addition, Federal funds could be devoted to developing fringe parking areas along existing mass-transit routes and for repair and maintenance of existing transit systems.

We recently issued a report 1/ which addresses this issue. We found that the present Federal funding requirements tended to discourage use of Highway Trust Fund money for mass-transit projects, and recommended changes that the Congress should make to encourage this use.

Another item of similar nature is bike trails. Many people have criticized Americans for not using bicycles for neighborhood errands, such as marketing and traveling between home and school, to the extent that Europeans do. The simple fact is that in most of suburban America, bicycling is dangerous. Our suburbs were built around the automobile and the road network does not permit bicycling. This has started to be corrected in recent years due to the renewed interest in bicycling as recreation.

As a parallel to mass transit, the bicycle should be promoted as an energy-efficient form of personal transit for short trips. An important element of such a program would be to encourage the construction of bike trails alongside of roads and highways as they are constructed or renovated. This would require, in most cases, negligible additional expense, yet it would, over time, develop a usable network of trails for the functional use of the bicycle.

Tax on aviation and marine fuel

The plan would eliminate certain tax preferences given to general aviation fuel and fuel used by motorboats. Aviation fuel used by commercial airlines or farmers and fuel used by commercial fishermen would be exempt from the changes.

The existing Federal excise tax on general aviation fuel would be increased from 7 cents to 11 cents per gallon. The current rebate of one-half of the Federal excise tax on fuel used by motorboats--currently amounting to 2 cents per gallon--would be discontinued, and the additional revenues collected would be transferred to the Land and Water Conservation Fund.

We have not done any work in which these specific issues--taxes on general aviation and motorboat fuel--were considered. While such initiatives are positive steps, in our opinion, they will not significantly affect total transportation energy use since general aviation accounts for only a small part of aviation fuel consumption. However,

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1/"Why Urban Systems Funds Were Seldom Used For Mass Transit," CED-77-49, Mar. 18, 1977.

we expect to complete in late summer a study on commercial aviation fuel conservation which, in our opinion, offers greater energy conservation potential than general aviation and motorboat fuel.

Aviation is the second largest transportation user of energy and as such has an important relationship to energy conservation. In our work, we are considering:

--Whether better regulation by the Civil Aeronautics Board, or deregulation, can achieve higher aviation load factors, and therefore, greater fuel efficiency.

--Whether the Federal Aviation Administration should establish a monitoring and reporting system on the effectiveness of aviation fuel conservation procedures and consider various measures to space aircraft arrivals and decrease congestion and delays at airports.

--What possible action can be taken to reduce the conflict between noise abatement and energy conservation measures.

In a recent report on aviation regulation 1/, we demonstrated that airline efficiency can be substantially improved, and that less regulation probably would result in greater efficiency. We recommended that the Civil Aeronautics Board work to improve airline efficiency through administrative actions, and that the Congress provide the Board with "legislative guidance defining current national objectives," which should clearly include energy conservation.

Federal automobile acquisition proposal

Under the administration's plan, Federal agencies are to alter their auto purchasing practices so that new cars purchased by the Government will, on the average, exceed the average fuel economy standards by at least 2 miles per gallon in 1978 and 4 miles per gallon in 1980 and thereafter.

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1/"Lower Airline Costs Per Passenger Are Possible in the United States and Could Result in Lower Fares," CED-77-34, Feb. 18, 1977.

Our report on energy conservation at Government field installations 1/ included the results of our review of, among other things, Federal efforts to reduce energy use through vehicle acquisitions. We found that purchases of compact and subcompact cars as a percent of total purchases had decreased between 1974 and 1975. We recommended that the General Services Administration enforce more strictly the Government regulations on smaller car acquisitions. In our view, the current proposal should favorably affect the Federal Government's energy use.

Federal vanpooling

The administration's plan proposes a Federal vanpooling program. According to material supporting the legislative proposal, about 6,000 vans would be purchased by the Government and made available for use by Federal employees in areas not served by mass transit. It should be pointed out that the reference to areas not served by mass transit is not included in the legislative proposal. In addition, defining such areas may be difficult.

We have not attempted to assess the specific costs and benefits of the proposed Federal vanpooling program, but we do agree with the program in concept. Some obvious benefits of the program should be

--reduced energy consumption,

--reduced air and noise pollution,

--reduced traffic congestion around government offices and installations, and

--reduced demand for parking facilities.

In addition, the Federal Government would be setting an example for the Nation by establishing such a program.

The proposal does not include any new initiatives in the non-Federal sector. In our opinion, the program could be more effective if it were extended beyond Federal vehicles to provide incentives which would promote vanpooling in the private sector. There are several ways this could be accomplished, such as providing grants or other incentives to participating organizations. While an existing Federal Highway

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1/"Energy Conservation at Government Field Installations--Progress and Problems," LCD-76-229, Aug. 19, 1976.

Administration vanpool demonstration program provides for Federal-aid highway funds to be allocated for vanpool projects, these projects must compete with other types of highway improvements for available funds. A better approach could be within the framework of the State Energy Conservation Program authorized in the Energy Policy and Conservation Act. To be eligible for Federal financial assistance under that program, States must develop, among other things, a program to promote carpooling, vanpooling, and mass transit.

The proposal stipulates that each person operating a van under an authorized Federal vanpooling program "shall maintain the van in good and safe working order." The responsibilities of the van operator are not made clear by this statement. The Congress may wish to clarify this section to indicate whether (1) the operator is financially responsible for the maintenance of the van (including tune-ups, overhauls, replacement parts, etc.) or (2) the operator is merely required to make the van available for maintenance at Government expense. If the former is intended, then a question arises concerning the condition in which the operator is required to keep the van, which would be government property, and what the consequences would be if the van is not properly maintained. If the intention is the latter interpretation, then many operational and logistical questions arise. We suggest that this issue be resolved before final approval of the proposal.

Concerning the insurance aspects of the program, the proposal provides that the Government self-insure against liability which may be imposed due to vanpooling use, but that the operators must obtain insurance for any private use of the vans. An issue for consideration is whether to extend Government insurance coverage to cover the full use of the van including authorized private use as an added incentive to encourage persons to became van operators. In the private sector, the person licensed to use the van is frequently permitted varying degrees of private use and such use is generally covered by the employer's insurance.

The proposal indicates that time spent traveling in vanpooling shall not be considered Federal employment for certain specified purposes. We believe the proposal should be changed to make it clear that time spent in vanpools should not be considered Federal employment for any purpose.

Under the proposal, the costs and expenses of the program, including administrative expenses, incurred by the Government in connection with the program are to be

recovered within 8 years through rider charges. While the direct operating costs of the program will be relatively easy to identify, considerable problems could develop in attempting to define and recover the administrative costs because of the lack of a good basis for determining what these are and the possibility that numerous Federal departments and agencies would be participating in the program.

BUILDING AND INDUSTRY PROPOSALS

Included in the administration's plan are four major proposals in the area of building conservation:

--A national residential energy conservation program for existing buildings.

--A proposal to advance the effective date of mandatory efficiency standards for new buildings.

--A program to reduce energy used in Federal buildings.

--A program to demonstrate the use of solar energy in Federal buildings.

Also the administration proposed an investment tax credit to encourage industry to invest in energy conservation measures and proposed that the current voluntary energy-efficiency improvement targets for major appliances be replaced by mandatory standards.

The residential energy conservation program includes a number of specific actions including tax credits for homeowners who implement conservation and certain renewable resource measures, a program whereby public utilities will provide an energy conservation service, removal of barriers to opening a secondary market for energy conservation loans, increased funding for low income weatherization programs, an administrative proposal to supply labor through the Comprehensive Employment and Training Act for the residential energy conservation program, and a rural home weatherization program including loans. In addition, a tax credit for businesses who invest in energy conservation and certain renewable resource measures and a Federal grants program to assist public and nonprofit schools and hospitals in installing conservation and certain renewable resource measures are also proposed.

The new initiatives in the buildings conservation proposal generally include a mix of financial incentives and volunteerism to achieve energy conservation. In addition, the proposal includes certain provisions which require inhouse

Federal Government actions and one which is intended to remove institutional barriers to residential energy conservation.

In the past, we have analyzed and reported on aspects of certain of these proposals which include tax credits and low interest loans for homeowners who install energy conservation measures, energy performance standards for new buildings, and the industrial investment tax credit. In addition, we have ongoing work which relates to the administration's proposals concerning public utilities providing energy conservation services, low-income weatherization programs, Comprehensive Employment and Training Act labor for residential energy conservation, tax credits for businesses, and Federal inhouse initiatives in Government buildings.

Tax credit proposals

The administration's plan includes three tax credit items in the areas of buildings and industrial conservation. The specific proposals are:

--A tax credit of 25 percent of the first $800 and 15 percent of the next $1,400 spent by homeowners on approved energy conservation measures. In addition, a declining tax credit was proposed for the installation of solar equipment in homes. The amount of the solar tax credit is initially up to a maximum of $2,000 but by 1982 decreases to a maximum of $1,210.

--A 10-percent tax credit for business investments in approved energy conservation measures, including solar equipment.

--A 5 year, 10-percent investment tax credit for industry for investments in approved energy-saving industrial equipment, including solar equipment. This credit would be in addition to the present 10-percent investment tax credit.

We have supported tax credits for persons installing energy conservation measures in homes. Our March 1975 package of energy proposals provided for the development and implementation of a program of tax credits of not less than 50 percent up to $500, and 25 percent in excess of $500 of the cost of installing energy saving measures. As an additional feature, we proposed that persons having income under $12,000 would be able to apply for low-interest loans to cover the entire cost of installing energy saving measures. We also

stated in our report on residential energy conservation 1/, that the Congress might wish to consider such incentives as tax credits and loans to homeowners to encourage retrofitting of existing homes.

Preliminary findings from our review of Federal efforts to achieve energy conservation indicate that commercial building owners and operators have not made investments in energy conservation measures in many cases because of more economically attractive alternative investments. Specifically, we found that an acceptable payback period for investments considered by many building owner/operators ranged from 1 to 3 years. While we have not evaluated whether the proposed 10-percent tax credit is large enough to encourage the installation of conservation measures, it seems to be a realistic incentive which addresses an existing constraint to further energy conservation.

Our March 1975 package of proposals also included an industrial investment tax credit of 10 percent for the installment of equipment which would result in improved energy efficiency. Under our proposal, the tax credit would be available for a 10-year period. In addition, we also proposed that model performance standards be developed for industrial processes in key energy-using industries based on the most efficient technology available. The standards were to include increased energy efficiency in steam generation, heat recuperation, and materials recycling.

More recently, in our review of Federal efforts to achieve energy conservation, we have studied industrial sector energy conservation. Industrial officials contacted during our review indicated that the major barrier to conserving energy has been its low price. Thus, investments in energy-saving measures have not been able to compete with alternative investments. Even with the substantial increases in the price of energy since the oil embargo, most companies visited could not identify significant conservation efforts relative to existing potentials to conserve energy. A combination of the investment tax credit and the oil and gas taxing proposal included in the administration's plan may result in additional efforts by industry to conserve energy by making energy-saving investments more economically attractive. However, should goals and milestones not be met, energy-efficiency standards for major industrial processes and equipment may be necessary. Such standards would help insure that industry is taking

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1/"National Standards Needed For Residential Energy Conservation," RED-75-377, June 20, 1975.

advantage of more energy-efficient equipment and processes.

Three potential problems which could inhibit the attainment of the 1985 goals on insulation and residential solar energy use are whether

--the credits are sufficient to provide the necessary economic incentives for consumers to respond (this is compounded by the sharply rising prices for insulation materials),

--the insulation and solar industries have the capability to meet the goals even if consumers are willing, and

--there will be widespread price gouging and consumer fraud due to the possible high demand/low supply situation on the materials and services for insulation and solar projects.

The Government will have to monitor the situation carefully in all respects. If the tax credits are not sufficient to generate consumer response, a mandatory program should be considered. While the problem with industry capacity may be a difficult one, the Government should be prepared to do what it can if that problem becomes the bottleneck toward meeting the goals. The Federal Trade Commission has already announced its intention to monitor the situation closely for consumer fraud.

Federal buildings

As part of the plan, the President is to direct all Federal agencies to adopt procedures which will reduce energy use per square foot in existing buildings by 20 percent from 1975 levels by 1985 and by 45 percent for new buildings. The program is to be implemented by FEA and the Office of Management and Budget.

In our report on energy conservation at Government field installations (referred to earlier), we concluded that although some efforts had been made to conserve energy in Federal building operations, much more could be done. We pointed out that Federal building operators must explore ways to change operations and modify structures. We recommended, among other things, that FEA, in conjunction with the General Services Administration and other Departments, enforce more stringently the Government's lighting, heating, and air-conditioning standards and make inhouse and external engineering surveys of ways to reduce consumption.

In an ongoing review of the Department of Defense Energy Conservation Investment Program, expected to be complete this

summer, preliminary findings indicate that program management and structure could be improved and that emphasis is being placed on quick cost recovery instead of energy saved per dollar invested.

Based on our past and ongoing reviews of Federal in-house energy conservation efforts, we are in favor of the proposal to improve energy use in Federal buildings. However, we believe that a provision which would generally require that energy audits be performed prior to investments in retrofit measures could increase the effectiveness of the program by helping to assure that retrofit measures undertaken are those which provide the greatest energy savings per dollar invested.

In addition, we believe that the percentage reductions in energy use in Federal buildings by 1985 included in the proposal should be viewed as overall minimum improvements goals. Actual reduction goals for each building should be established based on the results of energy audits. We also believe that the program should be tailored to ensure, to the extent possible, that funding priority for retrofit projects be based on evaluation of all possible projects.

Mandatory efficiency standards for new buildings

The administration's plan provides that the Secretary of Housing and Urban Development advance from 1981 to 1980 the effective date of the mandatory standards required for new residential and commercial buildings. We have continuously supported the implementation of mandatory energy conservation performance standards for new buildings. In both our March 1975 package of energy proposals and our residential energy conservation report we proposed such standards.

We are in favor of advancing the effective date of the standards to the maximum extent possible, but the Department of Housing and Urban Development has advised us that a 1-year advancement is the maximum which can be achieved. However, we believe that a more important part of this program is that the final standards reflect the use of the most efficient materials and products available.

Public utilities energy conservation service

The administration has proposed that State public utility commissions be required to direct utilities to offer their consumers a residential energy conservation service performed by the utility and financed by loans repaid through monthly utility bills. Under this proposal, public utilities would suggest energy conservation measures which could be installed

in customers' homes (including their cost and estimated energy savings), and offer or make arrangements for contractors to install the measures. In addition, public utilities would loan or help obtain a loan to pay for the installation.

In our ongoing review of Federal efforts to achieve energy conservation and our review of the electric utility industry, we are considering the role of utility conservation service programs in increasing the energy efficiency of existing homes. In addition, we are analyzing the impact of such programs on the utility industry's growth and financial position.

Based on our work to date, we are generally in favor of public utility conservation service programs. However, a key factor impacting on the effectiveness of such programs is the extent to which homeowners choose to participate. Preliminary results of our ongoing work indicate that at least two factors have discouraged homeowners from making investments in conservation measures--lack of information on the potential dollar savings and an inability to obtain the necessary capital to make the improvements. The proposed utility conservation service program could go a long way to eliminate the effects of these factors. However, should this program fail to encourage significant participation by homeowners, some type of mandatory action should be considered, such as a requirement that all existing homes be improved within some time period or a requirement that homes meet certain standards before they are sold.

Low income weatherization

As part of its plan, the administration stated that funding for the existing low-income weatherization program will be increased to $130 million for fiscal year 1978 and $200 million for each of fiscal years 1979 and 1980. A related measure is that the Secretary of Labor insure that recipients of funds under the Comprehensive Employment and Training Act (Public Law 93-203) supply labor for the weatherization effort.

We currently have underway two efforts which relate to the above administration proposals: a review of the Community Services Administration's low-income weatherization program and a review of the conservation programs authorized under title IV of the Energy Conservation and Production Act, one of which is an FEA low-income weatherization program. Both of these efforts are expected to be completed during calendar year 1977.

Preliminary results from our review of the Community Services Administration's weatherization program indicate that (1) obtaining labor to install weatherization materials

has been a problem, (2) in some areas the program is not reaching low-income apartment dwellers, and (3) a number of local agencies we visited have experienced various problems in administering the program.

Our review of the FEA weatherization program is in the early stages of monitoring program development. Thus, we have no preliminary findings at this time.

We understand that the funding level increases for low-income weatherization are to be used in the FEA program. Under the FEA program, funds will generally be distributed through States (pursuant to FEA-approved State applications) to Community Action Agencies which will carry out the program. The Community Action Agencies also administer the Community Services Administration's program.

Based on our work, we believe the following issues should be resolved:

--Should both low-income weatherization programs be continued?

--Are Community Action Agencies capable of handling substantial increases in funding for weatherization?

The proposal to insure the availability of Comprehensive Employment and Training Act labor for weatherization could have positive benefits for carrying out the program. However, additional actions may be necessary to provide that skilled supervisors are available to see that weatherization materials are installed properly.

## Grants for public and nonprofit schools and hospitals

The administration proposed a $900 million grant program over 3 years to assist public and nonprofit schools and hospitals in installing energy conservation and certain renewable resource measures. According to the legislative proposal, Federal grants cannot exceed 40 percent of the cost of any project undertaken under this program. The remaining 60 percent of the project cost is to come from sources other than Federal funds. The funding delivery mechanism will be the States which are to submit proposed plans for implementing this program.

The proposal provides that funds appropriated each year for the program are to be shared among the States based on formulas to be developed by FEA. Should certain States not

request their total allocation of funds under the formulas, this money would be reallocated to the other States.

We wish to point out that FEA, under authority authorized under title IV of the Energy Conservation and Production Act, can guarantee obligations of schools and hospitals entered into for the purpose of installing energy conservation and renewable resource measures. This program is, however, discretionary.

Although we have no work underway which specifically addresses the administration's proposal, the results of our review of programs authorized under title IV of the Energy Conservation and Production Act should be useful in deliberations on this proposal. As part of that work, we will determine whether obligation guarantees are an effective tool to encourage energy conservation. In that review, we are also analyzing the effectiveness of State conservation programs and FEA's low-income weatherization program, each of which uses the delivery mechanism of State grants to achieve energy conservation objectives. As part of our work, we plan to assess whether this approach is effective in achieving energy conservation.

Solar energy initiatives for buildings

Initiatives for use of solar energy are closely tied to energy conservation initiatives both in recent legislation and in the administration's plan. Specifically, title IV of the Energy Conservation and Production Act includes three separate initiatives to further the use of solar energy:

--A national energy conservation and renewable-resource demonstration program for existing dwelling units.

--An energy conservation and renewable resource obligation guarantee program.

--A supplemental State energy conservation plan program.

As discussed above, the administration's plan includes tax credits for installing solar equipment in residential, commercial, and industrial buildings and a 3-year program for installing solar equipment in Federal buildings. In addition, the plan urges States to (1) amend their property tax laws to exempt solar installations from assessments, (2) enact legislation protecting access to the sun, and (3) promote consumer education in the solar field. State public utility commissions would be required to

develop guidelines to prevent utilities from discriminating against users of solar energy systems.

In our report on Federal assistance for financing commercialization of emerging energy technologies 1/, we suggested that the Congress continue to encourage the use of solar hot water and space heating. We discussed various Federal financial incentives that are best in certain situations. Regarding solar water and space heating, we said that tax credits appear most appropriate for encouraging middle- and upper-income homeowners and businesses to install solar heating units. We also pointed out that, because of limited financial capability, low-income homeowners and small businesses may need low interest loans or grants. In addition, we said that loan guarantees could assist State, municipal, and nonprofit institutions to obtain the necessary capital to invest in solar heating for their facilities. However, we pointed out that we had not analyzed what magnitude of incentives might encourage wide implementation of solar heating.

We have two ongoing reviews which directly relate to solar energy initiatives: a review of the Energy Conservation and Production Act title IV programs (mentioned earlier) and a review of possible Government actions to encourage the use of solar heating systems. As part of our review of title IV programs, we will be examining the effectiveness of those programs to encourage the installation of solar energy equipment. In the second ongoing study, we are reviewing

--the economic and technical status of various solar heating applications,

--institutional and socioeconomic impediments to widespread solar energy use, and

--the effectiveness of State legislation in encouraging solar energy use.

We expect to discuss the most appropriate actions for commercializing solar energy. This study should be helpful to the Congress in evaluating the uncertainties surrounding widespread solar energy use, and in evaluating the administration's current proposals.

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1/"An Evaluation of Proposed Federal Assistance for Financing Commercialization of Emerging Energy Technologies," EMD-76-10, Aug. 24, 1976.

Existing legislation and the administration's plan raise certain questions regarding initiatives in the solar energy area.

1. Financial incentives for solar equipment installation. Because of their large initial capital costs, solar energy systems will require significant capital outlays by the potential buyer even with the administration's proposed tax credits and other incentives. This means that low-income families and some organizations may still need additional capital to purchase solar energy systems. Thus, if the administration's goals are to be met, additional assistance in the form of grants or low interest, long-term loans may be necessary. In addition, the Congress may wish to consider making the existing discretionary obligation guarantee program a mandated program.

2. Impacts on solar space heating market. Because of the declining percentage used to calculate the allowable tax credit, the proposed incentives will cover a larger portion of a solar water heater's cost than of a combined solar water and space heating system. For example, the allowable tax credit on a $1,600 solar water heater system is $550 or about 34 percent of the cost. The allowable tax credit on a $14,000 combined solar water and space heating system is $2,000 or about 14 percent of the cost. It is quite possible that the emerging industry may focus mainly on the solar water heating market.

3. State government initiatives. The plan provides for a joint Federal/State program of standards development, certification, training, and information gathering and dissemination. As an alternative the Congress may wish to strengthen the existing supplemental State energy conservation plan program which requires that States, before receiving Federal financial assistance, develop procedures for carrying out a continuing public education effort to increase public awareness of (1) the benefits of solar equipment and (2) information and other assistance which may be available to plan, finance, and install renewable resource measures. Some of these activities could be critical to developing a large solar market. Some States are more aggressive than others in encouraging solar energy. A few have even enacted their own solar incentives program. To prevent piecemeal legislation and programs on the State level,

some form of Federal financial assistance may be necessary, and as a minimum, Federal guidelines would be required.

Appliance proposal

The administration has proposed that the current voluntary energy-efficiency-improvement targets for certain major applicances be replaced by mandatory minimum standards. Specifically, the proposal provides that mandatory energy-efficiency standards are to be developed for refrigerators and refrigerator-freezers, freezers, water heaters, room air-conditioners, kitchen ranges and ovens, central air conditioners, and furnaces.

We are generally in favor of major-appliance-efficiency standards. However, similar to the automobile-efficiency standards, their impact on energy consumption will not likely be realized in the shorter term because consumers will generally not replace existing appliances until their useful life is over. But it is important that such actions are taken now to help assure that energy savings will be realized in the future.

UTILITY RATE REFORM

The adminstration's plan on utility rate reform consists of the following five elements:

--Elimination of promotional, declining, and other electric rates not reflecting cost incidence.

--Encouragement of the use of energy during nonpeak hours by requiring utilities to offer offpeak rates to customers willing to pay metering costs and offer interruptible service rates to all customers.

--Prohibition of master metering on new structures.

--A requirement that utilities eliminate declining block rates to natural gas users and implement Federal Power Commission-prescribed rules concerning master metering, summer-winter rate differentials, and interruptible rates.

--Authorization for FPC to order interconnections and power pooling between utilities (including nonjurisdictional utilities) and require "wheeling" service by utilities.

In our March 1975 package of energy proposals developed at the request of congressional committees, we proposed the establishment of a model rate structure by FEA and FPC based on the concept of peak-load pricing and designed to reward the conservation of electricity. The two agencies would work together to encourage State regulatory agencies and public and private utilities to use the principles embodied in the model rate structure. The administration's plan would be more forceful in that it would require the adoption of these principles.

We are currently working on an assessment of the issues concerning the Nation's future electrical requirements which will discuss the subject of rate reform in more detail. In support of the proposal to eliminate master metering, we note that, in a study dealing with the Defense Department family housing program, we found that families living in metered offpost housing used 20- to 40-percent less electricity than those living in nonmetered onpost housing.

The requirement that customers must buy their own meters to obtain offpeak rates may be an inhibiting factor unless this is coupled closely with the proposed utility residential energy conservation service discussed earlier. This is an important part of the entire residential conservation program. The public must understand the value of the energy conservation potential and how it can be realized before features such as offpeak meters will be widely used. If the volunteer program is not successful, the Government may have to require the installation of meters in homes by the utilities, which could then pass the costs through to the consumers.

## COGENERATION OF ELECTRICITY AND PROCESS STEAM

The legislative proposals for stimulating additional cogeneration of electricity and process steam include the following provisions:

--A 10-percent tax credit in addition to the existing 10-percent investment tax credit would be provided for the purchase of cogeneration equipment. Investing companies could be exempted from the requirement to convert from gas and oil if the exemption is necessary to stimulate cogeneration.

--Industries using cogeneration would be entitled to intertie with utilities' transmission facilities to buy and sell power.

--FPC would be required to establish procedures to assure that rates for the sale and purchase of electric power between cogenerators and utility companies do not discriminate against the cogenerators.

--Industrial cogenerators may be exempted from Federal and State public utility regulations.

We have, as part of our ongoing conservation review, looked at the potential energy savings of increased use of cogeneration systems. Our preliminary findings are in agreement with the administration's position that additional industrial cogeneration can be a means of saving energy by reducing the quantities of heat now being wasted. We have found, furthermore, that there are a number of constraints that are presently inhibiting the further development of cogeneration, such as declining block rates making cogeneration uneconomic and utilities being reluctant to provide steady or supplementary service. Our preliminary findings also indicate that dealing with these constraints will require action by the Federal Government and State utility commissions. With minor exceptions, the administration's legislative proposals, if enacted, will effectively remove or overcome these contraints.

There is a trade-off involved, however, regarding the provision that industries which purchase cogeneration equipment would be exempted from the requirement to convert from oil and gas. This, of course, is in the interests of overall energy conservation, but is counter to the major thrust of the energy program which is to switch industry from oil and gas to coal.

## CONCLUSIONS AND RECOMMENDATIONS

As the President has stated, conservation is one of the cheapest forms of "producing" energy and should be the cornerstone of our energy policy. However, we are concerned that the conservation initiatives in the administration's overall plan may be too modest and rely too much on voluntary actions. As we pointed out on page 2.2, the administration projects that if no action is taken, energy demand will grow by 31 percent between 1976 and 1985 ,while demand would still grow by 25 percent with the proposed plan fully implemented. This equates to a reduction of only 4 percent of total demand after 9 years. Our work in energy conservation has generally shown that there is

--not enough public concern with the need to conserve energy because in the public view there have been, until this winter, adequate energy supplies;

--a general lack of financial incentives and/or disincentives to encourage and influence adoption and application of conservation actions; and

--not enough energy being conserved, although substantial potential exists in the industrial, transportation, commercial, and residential sectors.

Transportation

In the area of transportation conservation, the administration's plan relies heavily on indirect market intervention mechanisms (financial incentives and disincentives) to reduce automobile gasoline consumption either through consumer purchases of more fuel-efficient cars or through reduced driving. We have specific comments on certain administrative transportation proposals, which we believe could strengthen the total program.

The gas-guzzler tax and rebate program's ultimate success, in our opinion, will depend to a large degree on consumers' awareness of the program, i.e., its visibility. To help assure adequate visibility, we believe that that legislation should provide that the amount of tax or rebate be identified on the EPA-mileage rating label which is required to be placed on all new cars. In addition, we believe that tax and rebate information for each model of car should be included in the mileage guide booklets so that consumers can compare mileage and rebate information for various models. Should established goals for reducing automobile energy consumption not be met, a further step which could be taken would be to extend a tax and rebate-type program to the used car market.

We favor the passage of a standby gasoline tax, although the amount of the tax as proposed by the administration may not be great enough to result in significant cutbacks in gasoline consumption. We believe, however, that the bulk of any receipts collected from such a tax should be devoted to programs to expand high-payoff, short-term impact, public transportation opportunities such as the development of fringe-parking facilities and express bus lanes. The administration's plan, as proposed, contains few programs to expand such public transportation opportunities.

We favor the passage of a Federal vanpooling program. Such a program would provide obvious benefits, such as reduced energy consumption and reduced traffic congestion around Government facilities. We believe that the vanpooling proprosal should be strengthened and extended beyond Federal vehicles by providing incentives which would promote vanpooling in the private sector.

Concerning the transportation energy conservation proposals, we recommend that the Congress:

--Assure that the gas-guzzler tax and rebate legislation provide that the amount of tax and rebate for specific cars be identified on the EPA-mileage rating label and in the mileage guide booklets.

--Enact a standby gasoline tax.

--Consider devoting funds collected from energy use taxes to expand public transportation opportunities.

--Provide incentives to promote vanpooling in the private sector.

Buildings and industry

The administration's plan in the areas of buildings and industry conservation generally includes a mix of financial incentives and volunteerism. While we are in agreement with the general thrust of these proposals, we believe that further actions are likely to be needed to meet the administration's energy conservation goals.

We are generally in favor of tax credits for residential, commercial, and industrial consumers to encourage the installation of energy conservation and renewable resource measures, although we have not evaluated whether the specific tax credits proposed will provide ample incentive. However, in our view the tax credit proposals do not distinguish between investments to improve energy efficiency and investments which would be made under normal conditions; e.g., replacement of wornout equipment. We believe an attempt should be made to clarify this situation either through additional language in the legislation or in the development of regulations to implement the legislation.

Should the tax credit proposals fail to encourage significant conservation actions by consumers, we believe mandatory actions would be an appropriate further step. Such actions could take the form of energy-efficiency standards for major industrial processes and equipment and mandatory weatherization of residences and buildings.

We are in favor of the proposal to reduce energy consumption in Federal buildings. While the percentage energy-consumption-reduction targets included in the legislation are useful as

ultimate goals, we believe that energy audits should generally be required prior to investments in retrofit measures. Energy audits would help to assure that retrofit measures undertaken are those which provide the greatest energy savings per dollar invested and would provide a basis for funding projects on a priority basis.

We are generally in favor of public utility conservation service programs. Such a program makes available to homeowners pertinent information concerning energy savings opportunities and can also assist homeowners in obtaining needed financing.

We support the inclusion of solar energy initiatives in the buildings area. Such initiatives should be closely monitored, however, because of the uncertainties surrounding widespread solar energy use. A number of issues need to be considered in developing the specifics of the solar energy initiatives:

--The type and extent of financial assistance which may be needed to encourage solar equipment installation particularly by low-income persons and small businesses.

--The impact of the structure of the proposed tax credits which now seem to favor the installation of solar hot water heaters over space heating equipment.

--The role States should play in promoting the use of solar energy.

We are in favor of energy-efficiency standards for major appliances.

Based on our analysis of the administration's buildings and industry energy-conservation proposals, we recommend that the Congress:

--Assure that the tax credits are only available for demonstrable improvements in energy efficiency.

--Provide that energy audits generally be performed in Federal buildings to identify energy saving investments which provide the greatest savings per dollar invested.

## Utility rate reform and cooperation initiatives

We support the administration's plan to eliminate promotional electric rates and encourage the use of peak-load pricing and eliminate master metering. However, the requirement that customers buy their own meters to obtain offpeak rates may inhibit this effort. Should the public fail to respond, it may become necessary to require the installation of meters in homes and provide subsidies to accomplish it.

We agree with the administration's proposal that industrial cogeneration can save energy by reducing the loss of heat through industrial processes. In addition, we believe the proposal will effectively remove existing barriers to increased use of cogeneration.

# CHAPTER 4

# OIL AND GAS

## OIL PRICING AND TAXING

The thrust of the administration's plan for oil pricing and taxing is to raise the price paid by consumers to the world price to discourage consumption of oil and to increase the viability of alternative fuels. However, the oil industry would be allowed to capture little of the increase. The difference between world prices and prices to producers would generally be returned to the populace on a per capita basis.

Most oil discovered before April 20, 1977--so-called "old" and "new" oil--will remain under controls. To provide long-range incentives to develop new sources, the plan says oil discovered after that date--so-called "newly discovered" oil--will qualify for a higher price, but still controlled, price if it is

--discovered onshore (including Alaskan oil) on or after April 20, 1977, and

--produced from a well more than 2.5 miles from an existing onshore well or

--produced from a well more than 1,000 feet deeper than any existing well within a radius of 2.5 miles;

--discovered offshore on Federal leases granted on or after April 20, 1977; or

--produced offshore from old leases which had been abandoned and are subject to releasing by the Government.

The plan leaves stripper, shale, and Naval Petroleum Reserve oil free from price controls. FEA was acting to remove existing controls from new tertiary production when the plan was proposed. Producers will be permitted the same revenues for Alaskan oil as for comparable production in the lower 48 States: already discovered oil will be allowed up to $11.28 a barrel and newly discovered oil will be allowed up to $13.50 a barrel. (See pp. 4.20 through 4.22 for a more detailed discussion of Alaskan oil.)

To encourage conservation, an "equalization" tax will be applied at the wellhead to most domestic crude oil production. The purpose of the tax is to equalize the difference between

the controlled price received by the producer and the world price. The tax would initially be applied to "old" oil in three stages (at the beginning of 1978, 1979, and 1980) to raise current prices paid by consumers to the 1977 world price plus domestic inflation. The tax would be applied to "new" oil at one time--at the beginning of 1980. Thereafter, the tax would be increased with the world price. However, if the world price rises significantly faster than the rate of domestic inflation, authority would exist to limit increases in the tax.

The administration projects that world oil prices will rise at the same rate as domestic inflation. Hence, no tax would be collected on newly discovered oil.

The equalization tax will not be applied to the categories of oil whose price is not controlled. In addition, the tax will not be applied to Alaskan oil because of the large costs of transporting this oil to the continental United States. According to the administration, this exemption will increase the producers' return on such oil and encourage additional exploration.

In the short run, net revenues from the equalization tax would be returned to consumers on a per capita basis. The administration has indicated that, in the longer run, this rebate would be reconsidered as a part of general tax reform.

According to the administration, sufficient authority exists to implement the oil-pricing provisions administratively. However, the equalization tax is part of the proposed National Energy Act.

We have not done much work concerning domestic crude oil-pricing policy. The majority of our previous work dealt with FEA's compliance and enforcement effort and its administration of various pricing and allocation programs.

In several instances, beginning with testimony in March 1975, we have recognized the need for higher energy prices, both to promote energy conservation and to establish the viability of alternate fuels, and we continue to support this view. In the March 1975 testimony before the House Ways and Means Committee, we recognized that the domestic crude oil price-control program should be modified to create sufficient incentives for producing all oil that can be recovered economically through secondary and tertiary recovery techniques.

In an August 1976 report 1/ we stated that there is a need for the price of domestic oil and gas to reflect clearly the cost of finding and developing new energy supplies. We also said that, to make tertiary recovery economical, consideration should be given to removing price controls from domestic crude oil produced by tertiary techniques. We reiterated these views in March 1977 2/.

In addition we recently began one assignment which relates to the plan's production provisions and two assignments which relate to consumption. First, we are examining Federal pricing and taxing provisions which affect domestic crude oil production and evaluating current and prospective policies. This assignment has just started and should be completed in about a year. A second job relates to the proposed equalization tax's effect on equalizing the cost of crude oil among refiners. The effect of the tax is similar to FEA's crude oil entitlements program, established in November 1974. We are reviewing the entitlements program's effectiveness in equalizing crude oil costs without creating market distortions and will compare it with the proposed equalization tax in that respect. This job should be completed in early 1978. The third job relates to the equalization tax's purpose of reducing consumption. We plan to examine selected combinations of conservation actions, including certain crude oil pricing and taxing options, which could reduce the growth of future demand for energy. We anticipate a report in late 1977.

Effect on prices to producers

The administration's plan includes changes in the methods for computing prices producers will receive for every category except tertiary, Naval Petroleum Reserve, shale, and stripper oil. However, by 1985 prices under the plan would be the same as under existing policy for all but four categories--old, new, already discovered Alaskan, and natural gas liquids.

The table on page 4.4 compares existing policy with the plan for each category, in terms of approximate prices per

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1/"An Evaluation of Proposed Federal Assistance for Financing Commercialization of Emerging Energy Technologies," EMD-76-10, Aug. 24, 1976.

2/"Energy Policy Decisionmaking, Organization, and National Energy Goals," EMD-77-31, Mar. 24, 1977.

barrel in 1985. These prices are expressed in 1977 dollars to discount the effects of inflation.

This table incorporates the following assumptions which are either explicit or implicit in the plan.

1. Domestic inflation will be 5.5 percent a year.

2. World oil prices will rise by 5.5 percent a year.

3. The weighted average or "composite" of prices of controlled oil under existing policy will rise by 10 percent a year, up to the world price. Because of the changing mix of lower priced old oil and higher priced new oil, prices of these two categories of oil will rise at 2.5 percent in 1977 dollars, slightly less than the real rate of increase for the composite.

4. Natural gas liquids are priced at the composite price of domestic oil.

5. Independent of the plan, the administration is implementing regulations to allow new tertiary production to command the world price.

Maximum Allowable Prices to Producers in 1985, by Category, under Existing Policy and Administration Plan

| Category | Existing policy | Administration plan | Increase or decrease (-) |
|---|---|---|---|
| | ----------(in 1977 dollars)---------- | | |
| Old | $ 6.40 | $ 5.25 | -$1.15 |
| New | 13.50 | 11.28 | -2.22 |
| Newly discovered | 13.50 | 13.50 | - |
| Tertiary | 13.50 | 13.50 | - |
| Stripper | 13.50 | 13.50 | - |
| Naval Petroleum Reserves | 13.50 | 13.50 | - |
| Alaskan (note a) | 13.50 | 11.28 | -2.22 |
| Natural gas liquids | 10.37 | 8.50 | -1.87 |
| Shale | 13.50 | 13.50 | - |

a/Net revenues to producers will be reduced by the large costs of transporting Alaskan oil to the continental United States. (See p. 4.21.)

As shown, by 1985 the plan will result in lower prices for old, new, already discovered Alaskan, and natural gas liquids and no change in other categories.

The result of these changes is that no category of oil will command a higher price under the plan than under existing policy. Hence, there is no additional financial motive for producers to increase their exploration and development activities. Moreover, according to an administration estimate, lower prices for most of the oil to be produced between now and 1985 will cut producers' revenues by 1985 by almost $13 billion (in 1977 dollars), relative to a continuation of existing policy.

This, in turn, will presumably reduce their profits and ability to attract new capital to finance additional exploration. Therefore, the plan not only keeps incentives for new production at current levels, but potentially reduces producers' financial ability to increase their efforts to produce more oil.

The definition of "newly discovered" oil in terms of distance from existing wells has been attacked as lacking a proper geologic basis. Critics state that the 2.5 mile/1,000 foot criterion is neither necessary nor sufficient to define new discoveries. They note that many, if not most, new-field oil discoveries in recent years were less than 2.5 miles from existing production. 1/ The administration is now examining the implications of changing this criterion.

Some critics of the administration's criteria have suggested conferring the "newly discovered" price on all oil brought into production after a given date regardless of distance from existing production. We believe that suggestion may be inefficient in terms of creating incentives for new exploration. According to the administration, exploration risks generally increase with distance from existing wells; indeed, they said that most recent discoveries have been within 2 miles of an existing well. Therefore, they said the higher price for newly discovered oil is designed to

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1/For example, see statements of Senators Johnston and Schmitt in hearings on "Economic Impact of President Carter's Energy Program" before the Committee on Energy and Natural Resources, United States Senate, 95th Congress, 1st Session, May 3, 1977. Also see June 20, 1977, memorandum by LaRue, Moore, and Schafer, Petroleum Consultants.

compensate oil companies for the greater risks involved in exploring areas which are not close to known oil fields.

Effect on production

The administration estimates that the plan will result in a small production increase relative to existing policy --from 10.4 MMB/D to 10.5 MMB/D. 1/ The detailed administration estimates below show that there is essentially no change in crude oil or shale oil, but that an increase in natural gas liquids accounts for the overall increase.

Oil Production in 1985, by Category, under Existing Policy and Administration Plan

| Category | Existing policy | Administration plan | Increase |
|---|---|---|---|
| | (in MMB/D) | | |
| Total | 10.4 | a/10.5 | a/.1 |
| Crude oil | 9.2 | 9.2 | (b) |
| Old | 2.0 | 2.0 | - |
| New | 1.9 | 1.9 | - |
| Newly discovered | 1.9 | 1.9 | (b) |
| Tertiary | .5 | .5 | - |
| Stripper | 1.1 | 1.1 | - |
| Naval Petroleum Reserves | .2 | .2 | - |
| Alaskan | 1.6 | 1.6 | - |
| Natural gas liquids | 1.2 | 1.3 | .1 |
| Shale oil | (b) | (b) | - |

a/Although the plan shows a 1985 total of 10.6 MMB/D, the actual sum of the components rounds to 10.5 MMB/D. The increase rounds to 0.1 MMB/D.

b/Less than 0.051 MMB/D

1/Although the plan shows a 1985 total of 10.6 MMB/D, the sum of the components rounds to 10.5 MMB/D.

Because crude oil prices in 1985 under the plan are no higher than under existing policy for newly discovered oil, it is not surprising that the administration expects no increase in supply, except for natural gas liquids. Although the price of natural gas liquids will be $1.87 a barrel lower in 1977 dollars (about 18 percent) under the plan, production is expected to increase. This may be because natural gas liquids are largely a joint product with natural gas production and processing, and reflects the higher expected production of natural gas liquids under the plan than under a continuation of existing policy.

However, the administration estimates no less production of old, new, and already discovered Alaskan oil by 1985 even though prices for these categories will be lower under the plan than under existing policy:

--Old oil prices will be about $1.15 lower in 1977 dollars (about 18 percent less than under existing policy).

--New oil prices, including already discovered Alaskan oil, will be about $2.22 lower in 1977 dollars (about 16 percent less).

It is possible that lower prices for old, new, and already discovered Alaskan oil will reduce production in those categories. Reasons advanced in support of this argument are that (1) in cases of recently discovered "new" oil, development investments may be discouraged or distorted; (2) otherwise profitable secondary recovery operations may be precluded; and (3) maintenance decisions may be distorted because, with stripper wells exempt from controls, operators with old wells may deliberately allow them to sink into stripper status by failing to repair equipment and make other necessary outlays. (Because stripper oil is allowed the world price, revenues from 10 barrels of stripper oil in 1985, for example, will equal those of 26 barrels of old oil.)

Although we are not in a position to gauge the precise response of production in the old, new, and already discovered Alaskan oil categories to lower prices, it seems reasonable that there may be some effect. If so, the plan could result in less production than under a continuation of existing policy.

Effect on prices to consumers

The stated purpose of the crude oil equalization tax is to "raise the price of oil to its true replacement cost, and thereby encourage conservation." The equalization tax

will raise the average price of domestic crude oil in 1985 substantially above current prices and somewhat above estimated 1985 prices under existing policy.

The average price at which all domestic crude oil was purchased in January 1977 was $8.50 a barrel. Under existing policy, the comparable figure for 1985 (in 1977 dollars) would be $11.87. Under the administration plan, the comparable figure for 1985 (in 1977 dollars) would be $13.50. Thus, under the plan the average would be almost 60-percent higher than the current rate and 14-percent higher than under existing policy.

However, this 14-percent increase in crude oil prices will not be fully reflected in the prices paid by consumers for the following reasons. First, imports--priced by the world market--comprise a substantial proportion of oil consumed in this country. Imports constituted about 43 percent of use in 1976, and over 50 percent in early 1977. The markedly higher price of imports raises the average cost of all oil used here. Refiners' acquisition cost of crude petroleum in 1976--the wellhead price plus transportation, storage, and loss--averaged $10.89, reflecting the addition of imports at $13.48 a barrel to domestic production at $8.84 a barrel. The administration estimates that imports in 1985 will constitute 40 percent of consumption with the plan and slightly over one-half under existing policy.

Moreover, because much domestic production will be priced at world levels by 1985, according to the administration's assumptions, the equalization tax would have no effect on these categories. Included here are newly discovered, tertiary, stripper, Naval Petroleum Reserves, and shale oil, which will comprise more than one-third of estimated 1985 production.

Third, households and other ultimate consumers purchase refined products, not crude oil. Refined product prices reflect not only the price of crude oil but also refining, transportation, and other costs. Because these other costs will presumably not rise by as large a proportion as will crude oil prices because of the equalization tax, the prices of refined products will not rise by as large a proportion as will crude oil prices.

Finally, there is a worldwide market for refined products and the prices that domestic refiners can charge will be constrained to some extent by world prices. According to administration data, world prices plus transportation charges

to this country in early 1977 were generally only 1- to 3-cents a gallon higher than domestic prices--about 4- to 7-percent higher depending on the product. Because of the availability of supplies in the world market at little more than current domestic prices, refiners in this country will be limited to some extent in the amount of the equalization tax they can pass through to ultimate consumers. The administration estimates that refiners will absorb one-third of the tax. (This will increase their costs and lower their profits and income taxes, and is the Treasury's justification for retaining a portion of revenues from the equalization tax, as discussed on pages 4.9 through 4.11.)

The administration estimates that, because of these reasons, the plan will raise refined product prices in 1985 by only 2 percent above levels under a continuation of existing policy.

Effect on consumption

The administration estimates that total oil consumption in 1985 will be 4.6 MMB/D lower with the plan than without it. Detailed data shows that most of the reduction--3.8 MMB/D--is due to the combined effect of the crude oil equalization tax, oil and natural gas-users tax, natural gas-pricing policies, and related policies. These reinforce each other to shift demand for petroleum to other fuels--0.8 MMB/D for natural gas and nuclear and 3.0 MMB/D for coal.

By itself, the equalization tax is estimated to reduce 1985 consumption by only 0.2 MMB/D relative to existing policy. But this small reduction is not surprising in light of the the small increase in prices caused by the equalization tax.

Amount of equalization tax revenue to be refunded

Revenues collected under the equalization tax will be refunded to individuals after three deductions:

--Refund of equalization tax paid by residential users of heating oil.

--Estimated reductions in refiners' income taxes. The Treasury Department estimates that refiners will pass through to consumers only two-thirds of the equalization tax they have paid and will absorb one-third. Accordingly, refiners' costs will be increased, their profits reduced, and their income tax payments lowered.

--Reimbursement of State administrative costs. The act proposes to pay States 75 cents for each check they issue to certain groups of refund recipients, which will be deducted from gross revenues. However, according to the administration, Federal agencies will incur most of the expenses involved in administering the refunds and will absorb these costs from existing budgets. The administration said no estimate of Federal agencies' costs was available.

Treasury has estimated these amounts for each year through 1985 and intends to reduce the amount available for refunds to individuals accordingly. Except for deductions for State administrative expenses (estimated at $10 million to $15 million a year), data for gross collections, deductions, and net revenues is shown below for 1980 and 1985.

| | 1980 | 1985 (note a) |
|---|---|---|
| | -----(billions)------- | |
| Estimated gross collections | $11.9 | $12.0 |
| Less refunds to residential users of heating oil | -.7 | -.8 |
| Less reduced refiners' income taxes | -1.7 | -1.8 |
| Amount available for refunds to individuals | $ 9.5 | $ 9.3 |

a/Does not add because of rounding.

A family of four would receive a refund of about $171 in 1980 and $158 in 1985, according to our estimates based on administration data.

(Problems associated with refunds to users of home heating oil are discussed on pp. 4.12 through 4.14.)

The administration estimates that refiners will absorb one-third of the equalization tax because of the pressure of world markets. This estimate was derived from the price difference between domestic and foreign refined products and other factors. Administration officials said that the accuracy of the estimate will be verified each year on the basis of actual experience and that, if too much or too little is deducted in 1 year, a correction will be made the next year to the amount deducted before per capita payments are made.

This deduction represents a substantial sum of money --an average of almost $1.6 billion each year between 1978 and 1985. For a family of four, this deduction represents almost $30 a year. Because of the substantial sums involved and the importance of judgmental and variable factors in the Treasury's estimates, the Congress should take particular note of this deduction and the administration's procedures for assuring that any amounts deducted from per capita payments and retained by the Government are adequately justified.

Methods for refunding equalization tax revenues

Net revenues collected from the equalization tax will be refunded through three means:

--Workers with regular jobs will get their refunds in increments throughout the year through reduced withholding of Federal taxes.

--Persons who receive income-transfer payments under Social Security, Supplemental Security Income, railroad retirement, and Aid to Families with Dependent Children will receive their payments through an annual check from the Treasury or a State.

--Other persons may apply to a designated State agency for an annual payment.

This method is inequitable because income-transfer recipients and unemployed persons will receive payments only once a year, while regular workers will receive a partial refund with each paycheck. Moreover, the amount of the refund will presumably constitute a larger proportion of their disposable income. For example, a welfare family of four and the family of an average worker would both receive a total refund of about $171 in 1980. Although this amount would presumably be more significant to the welfare family, they will have to wait until the end of the year before receiving any of the refund, while the working family will get back about $14 a month. The administration said this may be inequitable, but it is not feasible to provide more frequent refunds to such persons.

Although the plan prescribes a different payment method for each of the three groups, these groups are not distinct. These overlaps include

--Aid to Families with Dependent Children and Social Security recipients who work and

--Social Security recipients who also receive Supplemental Security Income.

According to the administration, the income tax system will be used as a "net" to insure that all persons filing a tax return receive the proper refund by granting an additional credit if too little was paid during the year or by recapturing overpayments. The administration estimates that about 82 percent of the populace is covered by an income tax return and will, therefore, fall into this category.

However, this final checkpoint is not available for the other 18 percent--income-transfer recipients and other applicants who file no income tax return. The administration said that an unduplicated list of Social Security, Supplemental Security Income, and railroad retirement recipients (these programs are all federally administered) can be checked against Treasury's list of taxpayers to detect duplicate payments. We were also told that Aid to Families with Dependent Children recipients and persons who apply will be asked to certify that they have not otherwise received a refund.

Our past reviews of eligibility and administrative controls in such transfer programs as Supplemental Security Income and Aid to Families with Dependent Children have revealed management weaknesses which, if not corrected, could interfere with the Government's efforts to assure that all persons receive the proper payment.

Price reductions to users of home heating oil

In addition to per capita payments to all citizens, part of the revenues collected from the equalization tax will be refunded to home heating oil distributors provided they certify that heating oil prices to the consumer had been reduced. The purpose of these price reductions is to prevent a rise in heating oil prices because of imposition of the tax. However, under this proposal consumers will be paying less for heating oil and, consequently, will be less likely to conserve heating oil than if the price reflected the world price of imports. This provision is a conscious attempt to subsidize one class of users and to reduce the conservation impact of the program.

Administering the proposed heating oil price reduction program will be a cumbersome task both for the fuel oil distributors and the Government. According to the administration, if the equalization tax is implemented, the increase in heating oil prices will range from 3 cents to 4.5 cents a gallon in 1980. Distributors will be required to reduce their residential heating oil prices by this amount under the proposed price reduction program. The Government will have a difficult time auditing the distributors to ascertain whether prices were actually reduced for consumers by this amount. It will be difficult to determine whether distributors' records accurately reflect the amount of heating oil sold to residential users. Since it is impracticable to collect data on a customer-by-customer basis, the administration would probably have to rely on complaints by individual consumers and spot checks to verify that prices were reduced by the proper amount.

In computing price reductions for residential users of heating oil, according to administration officials, it is impossible to determine, on a consumer-by-consumer basis, the actual amount of imported heating oil used. However, in order to avoid subsidizing the imported heating oil market, the administration would have to require distributors to determine the total percentages of domestic and imported heating oil they sold. The distributors would then provide partial price reductions to their residential customers based on the percentage of total domestic heating oil they sold. (Customers whose distributors use only imported oil would not receive reductions.)

The proposed program is burdensome for the distributors because they are required to make reductions in heating oil prices before a refund is received from the Government. They may be justified in claiming that residential fuel oil prices should be reduced by less than the full amount specified by the administration to account for lost interest and increased costs to administer the price reductions. Interest will be lost since the distributors will not be reimbursed until the end of the quarter or, in some cases, the end of the taxable year.

The proposed program could be inequitable to the extent consumers use electric power generated from petroleum products. If they use petroleum generated electricity, they will be bearing part of the burden of the equalization tax but--unlike users of home heating oil--will not be receiving any reduction in their energy costs. In turn, they will have more of an incentive to conserve than would residential heating oil users.

In summary, we believe this program is inconsistent with the stated conservation policy of the plan in that price reductions to residential heating oil users will likely result in less conservation in this sector of the heating oil market. Users of home heating oil may deserve some protection from the equalization tax on that product because heating oil respresents a very significant expenditure in certain parts of this country. Yet protecting them indefinitely from higher prices is contrary to the objective of encouraging conservation. Therefore, it would seem reasonable to phase out the heating oil refund over a period of time--say 3 to 5 years. This would eliminate the inconsistency between this provision and the rest of the plan but would do so gradually and allow home owners a reasonable opportunity to adjust.

A note on assumptions

The foregoing analysis and the conclusions that follow have been based on the administration's assumptions about increases in world oil prices, the rate of domestic inflation, production by category, price increases under existing policy, and so forth.

It should be noted that some of the results are highly sensitive to changes in the assumptions. For example:

--World oil prices may rise faster than domestic inflation. If so, equalization tax revenues will be higher and demand for oil might be reduced more, relative to a continuation of existing policy. Moreover, prices for stripper, tertiary, and shale oil will be higher than under existing policy and production might be higher.

--If the rate of domestic inflation were to exceed 5.5 percent a year, the gap between the administration plan and a continuation of existing policy --in terms of prices to producers for old and new oil--would be smaller. This is because under current policy prices to producers, in real terms, are reduced as the rate of inflation increases; but under the administration's plan, prices to producers are tied to the rate of inflation and there would be no increase in real terms over current levels. If this were to occur, any tendency for production of already discovered oil to decline faster under the plan than under existing policy would be reduced.

--Even in the absence of the plan, existing policies might not be continued intact through 1985. Existing legislative price control authority expires in 1981 and subsequent legislation might have limited increases in the composite price to less than 10 percent. If allowable prices rose at a lower rate than projected by the administration, the apparent revenue loss to producers would be less, and any adverse effect on production of already discovered oil would be decreased. On the other hand, prices to consumers would also be lower, and the plan's effect on prices would be greater.

Conclusions

Because oil constitutes so large a share of this country's energy use, oil pricing and taxing provisions are essential elements of a comprehensive energy policy. The pricing provisions of the administration plan create incentives for additional exploration and development which are greater than those now available. However, the plan's incentives are not greater than those which would be available if existing policy were continued through 1985. Hence, the administration forecasts virtually no change in domestic production relative to a continuation of existing policy.

Also, the plan will reduce revenues to producers for most oil already discovered and may adversely affect oil companies' financial ability to support additional exploration. By not increasing the financial incentives for additional exploration and by reducing companies' financial strength, the plan fails to come to grips with the problem of increasing domestic crude oil production.

While we recognize the administration's reluctance to confer windfall profits on the oil industry by increasing their revenues for already discovered and developed oil, we believe that means should be sought to increase domestic supply. Although we have not studied in detail alternative pricing schemes, we urge the careful evaluation of alternative methods to achieve the objectives. One of these might be to tie the price of newly discovered oil to the world price for the actual year in question, rather than to the 1977 world price plus domestic inflation. A fundamental tenet of the plan is pricing in terms of replacement cost, but the plan's method of pricing newly discovered oil may result in prices to the industry which do not fully reflect the replacement cost. For example, if the world price should rise by 7.5 percent a year between 1978 and 1985, while domestic inflation is 5.5 percent, as assumed by the administration, the price for newly discovered oil in 1985 would be $13.50 a barrel, while the world price would be about $15.80

(both in 1977 dollars). We are not suggesting, however, that the price of newly discovered oil be decontrolled completely. Just as authority would exist to limit the amount of the equalization tax if world prices rose significantly faster than domestic inflation, so too could there be standby authority to limit newly discovered oil prices for the same reason.

Although allowing new tertiary production to command the world price should increase the private sector's efforts to perfect enhanced recovery techniques, the plan is silent on a more direct Federal role in crude oil research and development. Accordingly, we reiterate our previous recommendation that the Government reassess annually the Federal role and level of effort in enhanced oil and gas recovery research and development in light of increased oil and gas prices and industry's willingness to promote new technology. 1/

The plan says little about increased production from Federal property. This is especially important because a substantial proportion of existing oil resources are located on Federal property: the Outer Continental Shelf, Naval Petroleum Reserves, Alaska, and so forth. Accordingly, we reiterate our previous recommendation that the Government develop an overall exploration plan for OCS areas and itself finance stratigraphic test drilling for oil and natural gas in areas where information is needed to complete the plan and private industry does not plan to drill. 2/

We support the concept of the crude oil equalization tax because it is important that consumers pay replacement costs for all oil consumed. It has a psychological significance which is independent of its specific effects on prices and consumption. By assuring that consumers pay replacement costs, the equalization tax also provides the underpinning for other policies, such as the oil and natural gas users tax and natural gas pricing, which--in conjunction with the equalization tax--shift a substantial amount of energy use from petroleum to coal and natural gas. Finally, by raising prices to reflect replacement costs, the tax increases the range of alternative technologies and fuels which are economically viable.

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1/"Improvements Needed in the Federal Enhanced Oil and Gas Recovery Research, Development, and Demonstration Program," EMD-77-3, Jan. 28, 1977.

2/"Domestic Energy Resource and Reserve Estimates--Uses, Limitations, and Needed Data," EMD-77-6, Mar. 17, 1977.

Although we support the equalization tax concept, we have reservations about its administration, especially the amount of tax revenues which will not be refunded and the methods for disbursing payments to the general populace. In light of the small increase in refined product prices which is attributable to the equalization tax, the importance of these refunds is reduced.

Finally, we believe that the refund to users of home heating oil is ill-advised. Not only does it work against the plan's overall conservation thrust, but it engenders serious inequities and administrative problems. If such a heating oil refund is enacted, we believe that it should be phased out over a relatively short period of time--to protect consumers from a sudden increase in heating bills without continuing this protection indefinitely.

NATURAL GAS PRICING

The legislative proposals on natural gas are as follows.

--The intra-interstate distinction would disappear for new gas and all new gas sold anywhere in the United States would be subject to a price limitation of the British thermal unit equivalent of the average refiner acquisition cost (before the equalization tax) of domestic crude oil; this is expected to be about $1.75 per thousand cubic feet in 1978.

--New gas is defined the same way as newly discovered oil, i.e., discovered onshore after April 20, 1977, and more than 2.5 miles from an existing well or more than 1,000 feet deeper than an existing well, or discovered offshore on leases granted after April 20, 1977.

--Currently flowing gas would have a guaranteed price certainty with inflationary adjustments.

--Specific categories of high cost natural gas, such as geopressurized brine and that found in very deep locations, could have a higher incentive price.

--Interstate gas freed from existing contracts would have a maximum price of $1.42 per thousand cubic feet plus inflation factor; intrastate gas freed from existing contracts qualifies for new gas prices ($1.75 per thousand cubic feet by 1978).

--The higher gas prices authorized in the plan would be allocated to industrial and utility users first.

Residential and small commercial customers would be the last to experience price increases.

--Synthetic natural gas facilities and companies selling in the interstate market would be covered by the Natural Gas Act.

In our report on the implications of deregulating the price of natural gas 1/, we concluded that due to physical limitations it was unlikely that higher prices for natural gas, even under total deregulation, would result in increased gas supplies over current levels at least through 1985.

Our analysis identified a broad consensus among analysts of natural gas production regarding the amount of reserves which would have to be discovered to attain a particular production level by 1985. For example, if no additional natural gas reserves were discovered between 1976 and 1985, domestic production outside of Alaska would fall to about 8 trillion cubic feet (tcf) (4.0 MMB/D of oil equivalent). To bring production up to a level of 15 tcf (7.5 MMB/D of oil equivalent) would require the discovery of an average of 12 tcf a year of additional reserves over that 10-year period.

Because of experience in natural gas reserve additions since 1969, half of a 12 tcf average annual reserve addition would have to result from the discovery of new fields. Over any extended period since 1945, new field discoveries have never exceeded 6 tcf a year. Therefore, we concluded that annual reserve additions of 12 tcf a year would be a maximum amount one could reasonably count on attaining over the next 10 years. This would exclude gas from sources such as devonian shale or geopressured zones. Our report indicated that it was unlikely that there would be significant production from such sources by 1985, and we have seen no evidence since then to alter that conclusion.

The 1985 production levels estimated by the administration with and without the plan's initiatives would require sustained reserve additions which, we believe, are unreasonably high based on historical experience. The estimated production levels would require reserve additions without the plan and with the plan of 16 tcf/year and 20 tcf/year, respectively. On the basis of our previous report, we would

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1/"Implications of Deregulating the Price of Natural Gas," OSP-76-11, Jan. 14, 1976.

conclude such reserve additions and resulting production to be too high to be used for planning purposes. Specifically, we would conclude that the estimate of domestic natural gas production with the plan is overstated by a minimum of 2 tcf/year (1 MMB/D of oil equivalent), which is a little over 10 percent. It is possible that up to 2 tcf of additional gas might be available by 1985 if currently planned high-Btu coal gasification plants and the Alaskan North Slope gas pipeline are constructed. However, it appears that by 1985 most of the planned gasification facilities will not be in operation, and the administration's plan indicates that it is not planning on receiving gas from Alaska by 1985. Thus, it is doubtful that the 2 tcf overestimate of natural gas supplies could be balanced by gas from other sources. To the extent that production falls short, the difference would have to be made up by additional imports of oil or natural gas or increased conservation.

We also are concerned about the feature of the administration's plan which would maintain low prices for the residential sector by allocating the full price increase to the industrial sector. We believe this to be contrary to the conservation principles in the plan and it certainly works at cross-purpose to the goal of insulating American homes. We believe strongly that this feature should be reconsidered.

Finally, one of the objectives of the administration's natural gas program is to achieve a better balance between the interstate and intrastate markets. Here again we believe the administration has been too optimistic. The current distribution of supplies between these two markets is about 60-percent interstate and 40-percent intrastate. Background figures provided to us indicate that the administration is forecasting that the entire increased production that the plan is expected to generate (which as explained above is probably already too high) will go to the interstate market. With price parity between the two markets, it is difficult to understand how all this production would go to the one. It should also be noted that additional interstate supplies do not necessarily mean that the new supplies will move from the major producing States to the consuming States. There are many interstate customers that are within the producing States who could share in any increased interstate supplies. We are not taking issue with this feature. We believe the merging of the two markets with the objective of balancing supplies to be commendable. We are merely cautioning those who are anticipating large quantities of additional supplies in the North and East as a result of this action.

## OTHER OIL AND GAS ACTIONS

### Alaskan crude oil

Alaskan crude oil from already developed fields will be treated as "new" oil and priced at $11.28 a barrel, adjusted for subsequent inflation. New discoveries of Alaskan crude oil will be priced by 1980 at the "newly discovered" price of $13.50 a barrel plus adjustments for inflation. Until the entitlements program is fully eliminated by the proposed crude oil equalization tax in 1980, Alaskan crude oil will be treated as uncontrolled oil for purposes of the entitlements program. Alaskan crude oil will be exempted from the equalization tax in order to encourage increased production.

While we have not done any work to date with respect to the pricing of Alaskan crude oil, we are currently examining the costs to construct the Alaskan pipeline and lessons that can be learned to minimize a recurrence of cost overruns in constructing a gas pipeline. We anticipate a final product in late 1977.

We plan to initiate an assignment relating to Federal and State efforts to identify and market energy and mineral resources in Alaska. In this assignment, we intend to identify the amount of energy and mineral resources in Alaska, problems associated with their extraction and marketing, potential environmental and socioeconomic impacts, and the extent of Federal and State activity to assure timely development of these resources. We anticipate a final product in late 1978.

It is not clear how Alaskan oil would have been treated between now and 1985 in the absence of the administration plan. However, as noted above, if it is assumed that the price for newly discovered Alaskan oil would have been the same as for comparable oil from the lower 48 States, the plan confers on already discovered Alaskan oil a 1985 price ($11.28 in 1977 dollars) which is less than it might be under a continuation of existing policy ($13.50 in 1977 dollars).

Exemption of Alaskan oil from the equalization tax, according to the administration, is designed to counterbalance the large costs of transporting Alaskan oil to the continental United States. The following table shows how wellhead prices to producers would be determined under the plan for existing discoveries with and without the tax and for new discoveries. These figures apply to years after 1980 when the equalization tax would be fully in effect.

| | Existing discoveries | | New discoveries |
|---|---|---|---|
| | With tax | Without tax | |
| | ---------(in 1977 dollars)---------- | | |
| Refiners would be willing to pay up to the world price of | $13.50 | $13.50 | $13.50 |
| Less transportation | -5.50 | -5.50 | -5.50 |
| Less equalization tax | -2.22 | [illegible] | [illegible] |
| Wellhead price to producers | $ 5.78 | $ 8.00 | $ 8.00 |
| Maximum allowable wellhead price | $11.28 | $11.28 | $13.50 |

Note: This example does not include minor differentials between the actual price of Alaskan oil and other oil due to quality differences and transportation other than through the Alaskan pipeline. The transportation charge shown is the approximate midpoint between the $6 tariffs filed by the oil companies and the $5 acceptable range announced by the Interstate Commerce Commission.

Thus, exempting existing discoveries from the equalization tax will raise the wellhead price by $2.22, to $8.00 a barrel in 1977 dollars. However, this will also be the wellhead price of new discoveries. Only if world prices were $16.78 or more (in 1977 dollars) would the wellhead price of new discoveries be greater than that of existing discoveries.

Exempting existing discoveries from the tax was intended to increase producers' profits and provide more capital to finance future exploration. However, as shown in the above table, the exemption also raises producers' per barrel revenues from existing discoveries to the level they would receive from new discoveries. Therefore, producers' per barrel revenues will be higher for new discoveries than for already discovered oil in the lower 48 States but not in Alaska.

Treatment of Alaskan oil as foreign oil for purposes of the entitlements program will increase producers' revenues because purchasers of such oil will not also be required to purchase entitlements. Even though the entitlements program will be replaced by the crude oil equalization tax by 1980, this benefit for Alaskan oil will continue because such oil will be exempt from the tax.

There are environmental hazards relating to existing and potential exploration, production, and transportation of Alaskan crude oil. The administration should have assurance that steps are taken to minimize damage to the environment which may be caused by the production and transportation of the crude oil produced. Besides identifying other problems relating to the extraction and marketing of Alaskan energy and mineral resources, our planned study should help identify current and potential environmental problems with respect to producing Alaskan crude oil.

Elk Hills production

Legislation will be sought to limit production from Elk Hills Naval Petroleum Reserve to a ready reserve level at least until the West-to-East transportation system for moving the Alaskan oil surplus is in place or until California refiners have completed a major refinery retrofit program to enable more Alaskan oil to be used on the West Coast.

Elk Hills is one of three Naval petroleum reserves. There is a fourth petroleum reserve in Alaska which is under the auspices of the Interior Department. We have issued two reports 1/ 2/ on these reserves in which we identified a need for reliable resource estimates and clear statements of how the reserves will be used.

In March 17, 1975, testimony before the House Ways and Means Committee, we advocated developing two of the Naval reserves (including Elk Hills) as part of a national emergency energy reserve and recommended that the reserve in Alaska be fully explored for eventual commercial leasing if the exploration results warrant it. Subsequently, the Naval Petroleum Reserves Production Act of 1976 provided that oil from Elk Hills and two other reserves be produced and sold on the open market.

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1/"Followup Review of the Naval Petroleum Reserve," LCD-75-321, July 29, 1975.

2/"Management of and Plans for the Naval Petroleum Reserve," LCD-76-313, May 14, 1976.

However, as pointed out in our report on markets for Alaskan oil 1/, several documents have estimated that excess Alaskan crude oil on the West Coast could range from 300,000 to 800,000 barrels a day in 1978. Production from Elk Hills would add to such a surplus. If such an oil surplus were to occur on the West Coast and there were no practical way to transport the oil east, then we would concur that production from Elk Hills should be limited.

Shale oil

The administration's plan is to allow shale oil producers to receive the world price of oil because of the high risks and costs involved in shale oil development.

In our report dealing with Federal assistance for financing of the commercialization of emerging energy technologies 2/, we concluded that, at the present time, synthetic fuels production--including shale oil--while technically feasible with first generation technologies, is not cost effective. We recommended that such technologies receive a high priority for Government R&D to develop more advanced and efficient technologies.

We are currently reviewing the Energy Research and Development Administration's (ERDA's) Fossil Energy Demonstration Program, including the direction of ERDA's management of shale oil development efforts. This report is expected to be issued in late 1977.

While we would not disagree with the administration's proposal (since shale oil is not expected by many estimates to be competitive with the current world price of oil), it is highly unlikely that any increased production will occur as a result of the proposal.

Oil stockpile

The administration calls for the expansion of the Strategic Petroleum Reserve from the one-half billion barrels outlined in FEA's December 15, 1976, Strategic Petroleum Reserve

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1/"Survey of Publications on Exploration, Development, and Delivery of Alaskan Oil to Market," EMD-77-11, Jan. 14, 1977.

2/See footnote 1/ on p. 4.3.

Plan to 1 billion barrels. Under the assumption that the reserve is designed to supply about 3.3 MMB/D, a 1 billion barrel reserve would last at least 10 months. The administration's plan states that the reason for the expansion is to have the reserve large enough to impose substantial revenue losses on countries imposing an embargo, and to enable the United States to deal with the consequences of any supply interruption.

We first supported the concept of national petroleum reserves in March 1975 in testimony before the House Ways and Means Committee, and have been monitoring the development of the Strategic Petroleum Reserve since early 1976. In a February 1977 report 1/ on the subject, we discussed questions in three key areas concerning FEA's December 1976 Stategic Petroleum Reserve Plan which we believe need further analysis.

--Is a Strategic Petroleum Reserve of the type outlined in FEA's plan needed?

--If so, how will the oil be purchased to fill it?

--What ways other than general tax revenues are available to finance a Strategic Petroleum Reserve?

These questions were again discussed in a June 1977 joint letter we wrote with FEA to the Chairman, House Subcommittee on Energy and Power, which stated both our position and FEA's position on the issues.

FEA's plan calls for the creation of a new centralized, Government-owned and controlled reserve. Our report stated that we believe use of existing industry crude oil and product stocks for the reserve was not given sufficient consideration by FEA. As reported to the International Energy Agency, U.S. industries maintain stocks equivalent to 120 days of imports (about 720 million barrels of oil). We believe that to the extent the industry stockpile could be used, the need for a Government-owned reserve would be reduced.

In the June 1977 letter, FEA agreed that a thorough analysis of the implications of using industry inventories as a partial substitute for Government-owned stocks is needed. FEA stated that they are now undertaking a major study to try to obtain a better understanding regarding the ability to

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1/"Issues Needing Attention in Developing the Strategic Petroleum Reserve," EMD-77-20, Feb. 16, 1977.

draw down these inventories. They further stated that if the analysis indicates that substantial industry inventories are available in offsetting an interruption, it will be reflected in future recommendations or amendments to the reserve plan.

FEA's plan stated that they will acquire the oil to fill the reserve on the open market at near the national average composite price. FEA ruled out the purchase of royalty oil 1/ produced from Outer Continental Shelf and onshore Federal leases primarily because it believes it would have an adverse financial impact on small refiners now relying on access to royalty oil. In our February 1977 report, we stated that as long as price controls remain in effect, royalty oil could be purchased for the reserve at significantly less than the national average composite price and, thus, at significant program savings. We also stated that royalty oil could be acquired with little or no adverse financial impact on refiners on the basis that the entitlements program generally equalizes the price of oil among refiners.

The administration's plan calls for a continuation of price controls. It phases out the entitlements program but phases in a crude oil equalization tax which will virtually accomplish the same objectives as the entitlements program. As a result of the equalization tax, if royalty oil were used for the reserve, the total price to be paid by refiners will still be equal and, therefore, little or no adverse financial impact would result to small refiners currently receiving royalty oil.

FEA's plan ruled out use of Naval petroleum reserve oil from Elk Hills because it believes it would be more expensive than the national average composite price during price controls and would also offer no price advantage under decontrol since it is sold competitively without price controls and is located a great distance from the expected Strategic Reserve locations. In our February report we acknowledged that, under price controls, Elk Hills oil will be more expensive, but that this would not be the case under decontrol because the cost of West Coast crude has traditionally been below the average domestic decontrolled price.

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1/Oil produced under Federal leases for which the producers pay royalties to the Government.

In the June letter, FEA stated that they continue to believe that the use of royalty oil will have an adverse financial impact on small refiners, and that Elk Hills oil is being considered for the reserve and will be used if it is found to be competitive with oil from other sources. In any event, FEA has contracted with the Defense Fuel Supply Center to assist it in procuring oil for the reserve on the open market and has amended its entitlements program in order that this oil can be purchased at near the national average composite price. Delivery of the first 2 million barrels will begin in July 1977, according to FEA's June plan amendment.

FEA's plan did not explicitly state how the reserve will be financed; however, it implied that the reserve will be funded from general revenues. We believe that consideration should be given to having those who will benefit directly from the reserve bear its cost. In our view this can be accomplished through imposition of a user fee, such as a tariff on imported oil or an excise tax on gasoline. FEA has stated that they are analyzing various options for funding the reserve and indicated this fact again in the June letter. However, to date, all funding has come from general revenues.

Our ongoing work concerning the Strategic Petroleum Reserve includes (1) a review of the cost and feasibility of salt cavern storage, which is the primary type of storage chosen by FEA for the reserve, (2) a survey of FEA's planning for transporting the oil to the reserve, and (3) a review of FEA's justification for the size of the reserve. We intend to initiate assignments concerning the extent to which industry inventories could be used to satisfy the requirements of the reserve, and the need for a regional petroleum reserve as part of the Strategic Petroleum Reserve.

Liquefied natural gas (LNG)

The administration's plan proposes that the Energy Resources Council's guidelines to limit LNG imports to 2 tcf/year be replaced by a more flexible policy that will provide for a case-by-case analysis of each project. Strict siting criteria would foreclose the location of future tanker docks in densely populated areas.

In a report 1/ issued October 1975, we addressed the role of imported LNG in the U.S. energy picture. The report discussed some of the limitations of LNG imports that must be dealt with, such as the potential capital costs; the balance of payments outflow; and the similarity of political, economic, and security risks associated with oil imports.

We have three studies in progress which address aspects of LNG imports. The first is an examination of the need for and available options concerning a national policy on LNG imports. The second assesses the potential dangers associated with transporting and storing LNG, liquefied petroleum gas, and naphtha and reviews Government planning and regulatory roles to protect the public. The third is a case study of the effects on project costs of delays in approving LNG shipments from Indonesia to the United States.

While we agree with maintaining a flexible posture, we nevertheless believe there is a need for a policy which recognizes the potential dangers of LNG imports, in terms of safety and exposure to import disruptions as well as other problems. Although we are not in a position to recommend that LNG imports should be limited to a particular amount, we believe the issue of whether there should be such a policy warrants further study by the Congress and the executive branch. Our ongoing study will assist in this regard.

The administration is forecasting that LNG imports will decrease if the plan is implemented from 1.2 tcf without the plan to 0.6 tcf in 1985. This is based on the assumption that the market intervention and regulatory features of the plan will limit natural gas demand in the industrial sector and the supply thus "freed up" will be consumed in the residential sector, thereby obviating the need for increased LNG imports. There appears to be an assumption that natural gas will be demand limited in 1985, which is difficult to understand given its high value from a handling and environmental standpoint, coupled with the fact that the administration would keep the price of natural gas below the price of other fuels.

We believe that the estimate of LNG imports of 0.6 tcf in 1985 is unrealistically low in the absence of further Government initiatives, such as import quotas for natural gas. In 1976, imports were about 0.5 tcf, and current industry proposals already total more than 1.2 tcf.

Synthetic natural gas (manufactured from petroleum feedstocks)

The administration's plan states that the Nation's synthetic natural gas policy is unsatisfactory because it favors the allocation of naphtha and other synthetic natural

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12/"Natural Gas Shortages: The Role of Imported Liquefied Natural Gas," ID-76-14, Oct. 17, 1975.

gas feedstocks to the petrochemical industry, and effectively precludes their use by gas utilities. Such a policy discourages the construction of synthetic natural gas plants.

During the 1976-77 winter, 13 synthetic natural gas plants were in operation. These plants provided the additional margin of natural gas supply that kept residential users in several areas of the Nation from being curtailed during the coldest months of the winter.

The administration's plan will establish a Federal task force to identify those areas of the country where a limited number of additional synthetic natural gas plants should be built to help meet the critical peakload needs of natural gas users over the next 5 to 7 years. The plan would give those plants approved by the task force priority for petroleum feedstocks.

We have a study in progress on the availability and use of alternative fuels to alleviate natural gas shortages. Based upon the information obtained during our study, it appears that additional synthetic natural gas plants would be built if natural gas utilities were assured of feedstock to operate the plants. However, it not clear whether the quantities of feedstock needed to operate any additional plants can be diverted without creating shortages in either the petrochemical or gasoline markets.

Gas development

The administration's plan states that efforts to develop gas from devonian shale and geopressured zones will be expanded. In a recent report 1/, we pointed out that as much as 500 to 600 tcf of gas, which is not commercially producible with current extraction technology, may be locked in the devonian shale formations of Appalachia. ERDA is conducting research aimed at developing and demonstrating enhanced (advanced) recovery techniques to recover this gas. We reported, however, that because of the slow pace of ERDA's enhanced gas recovery demonstration schedule and

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1/See footnote 1/ on p. 4.16.

the lack of fundamental recovery technology, it is likely that enhanced gas recovery technologies would not make a considerable contribution to the national gas supply before the late 1980s.

The administration states that a number of wells will be drilled and advanced recovery will be tested to evaluate the technology and economic viability of eastern devonian shale deposits. At the time of our report, a few of ERDA's enhanced gas recovery tests had been completed; however, the results had been disappointing because little additional gas had been produced.

Although industry and Government experts estimate that as much as 500 to 600 tcf of natural gas may exist in the devonian shale, these estimates are highly speculative. Until recently, little attention had been paid to the potential devonian shale resources.

Historically, low wellhead prices for gas have provided little incentive for developing enhanced gas recovery technology. Therefore, more research is needed for natural gas recovery processes.

The administration's policy recognizes the importance of price in developing new gas supplies by authorizing the establishment of higher incentive pricing levels for specific categories of high cost gas. At the present time, however, good estimates are not available as to what price will be required to extract currently noncommercial devonian shale gas. Undoubtedly, the price will be high. Resolving the economic uncertainties of enhanced gas recovery technology depends upon a better understanding of the resource characteristics and enhanced gas recovery technology. Because the eventual resolution of these critical factors is highly uncertain, the contribution that gas from devonian shale can make is also uncertain.

The administration's plan also calls for Federal research and development programs on gas from geopressured zones to be greatly accelerated in hope of adding significantly to the Nation's near- and mid-term gas supply. Under the plan, ERDA would assess the dissolved gas potential in the geopressured zones along the coast of the Gulf of Mexico. The proposed research program is designed to provide a reliable assessment of this resource and to help resolve corrosion and other problems associated with it. Significant environmental and institutional barriers to extensive development of the geopressured resource will also be examined.

The methane in the geopressured zones is believed to be large on the basis of geological information obtained from petroleum operations. Nevertheless, because of technological problems associated with resource exploration and assessment, energy extraction and utilization, the potential environmental effects, and economic uncertainties concerning reservoir producibility and longevity, geopressured zones have not to date attracted much commercial activity. The administratation's proposal to accelerate research and development programs on gas from geopressured zones is consistent with our conclusions in prior reports that additional research and development is needed to develop geopressure resources.

Outer Continental Shelf

The administration's plan supports the amendments now being considered by the Congress to amend the Outer Continental Shelf (OCS) Lands Act which would provide additional authority to ensure that OCS development is consistent with national energy policies, particularly by providing for a flexible leasing program using bidding systems that enhance competition, assure a fair return to the public, and promote full employment of OCS resources.

We issued two major reports 1/ 2/ during the 94th Congress dealing with various aspects of the Department of the Interior's efforts to develop OCS resources. These reports were directed largely at difficulties in achieving the previous administration's leasing objectives. We concluded that (1) the acreage leasing goals were unrealistic and did not consider national energy goals and plans, (2) shortages of materials, equipment, manpower, and capital can limit the timing of OCS production, and (3) a Government-directed exploring program is essential because information on reserves is inadequate and hinders proper tract selection and valuation.

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1/"Outlook for Federal Goals to Accelerate Leasing of Oil and Gas Resources on the OCS," RED-75-343, Mar. 19, 1975.

2/"OCS Oil and Gas Development--Improvements Needed in Determining Where to Lease and at What Dollar Value," RED-75-359, June 30, 1975.

In a recent report to the 95th Congress 1/ on OCS Sale 35 in California, we noted that the Interior's policy of leasing OCS resources as quickly as possible resulted in selecting and valuing lands for lease without having adequate data on the potential OCS resources. Of the 231 tracts offered for lease in this sale

--55 percent were in water depths exceeding present technological capabilities to produce from platforms;

--22 percent were selected solely to meet an acreage goal, even though the Interior believed that these tracts had little resource development potential; and

--91 percent were rated "D" by the Geological Survey. A "D" rating means inadequate data exists for determining resource potential. In later evaluations of these tracts, the presale values assigned by the Interior indicated that it believed that 85 percent of the tracts contained either no resources or insufficient resources to make the tracts economically attractive.

We recommended that the Interior (1) direct an exploration program to provide a systematic plan for appraising and selecting OCS tracts, (2) encourage private industry to explore areas identified in the plan, and (3) take necessary actions, including public financing, to obtain needed data on land not explored by industry. In addition, the Interior should limit lease offers to those tracts on which sufficient data has been collected. In a related report 2/, we recommended that the Interior, as part of developing a systematic appraisal plan, evaluate its policy of restricting onstructure exploratory drilling.

Proposed legislation (S. 9 and H.R. 1614) has been introduced into the 95th Congress which would direct the Secretary of the Interior to conduct a survey program of OCS oil and gas resources. In March 1977 we testified before the House Select Committee on OCS and the Senate Energy and

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1/"Outer Continental Shelf Sale #35--Problems In Selecting and Evaluating Land to Lease," EMD-77-19, Mar. 7, 1977.

2/"Department of Interior Should Conduct a Cost Benefit Analysis of a Systematic Exploration Program and a Study of Its On-Structure Exploratory Drilling Policy," EMD-77-29, Mar. 7. 1977.

Natural Resources Committee on this legislation. We testified that such legislation would alleviate problems discussed in our Sale 35 report, specifically Section 208 which would provide for an OCS leasing program that will identify size, timing, and location of leasing to meet national goals and to insure receipt of fair market value for the oil and gas owned by the Federal Government.

OCS development has brought considerable oppostion from coastal States and other private interests resulting in some delays in lease sales. There are many environmental and socioeconomic questions yet to be answered, and in our view, these issues have not received adequate consideration in the past. Spills have occurred, and less consideration seems to be given to the long-term impact of lease decisions on marine life and on the socioeconomics of a particular area. The impact on nearby cities can be significant and land-use becomes a consideration because of onshore activities that accompany offshore development. One recent sale on the East Coast, for example, was canceled by a court 1/ primarily for environmental reasons. In another recent study 2/, we concluded that the Interior Department used inadequate data to select and evaluate lands for leasing.

In two ongoing studies we are currently reviewing (1) the conflicts among various groups--Federal, State, local, and industry--on OCS development and the need for environmental data and (2) the problems associated with existing OCS pipelines and their implications for the frontier OCS areas. We plan to begin a study of the usefulness of baseline and monitoring programs for protecting the environment and managing the OCS leasing program.

In addition, in response to questions raised by Committee members during our testimony on energy reorganization before the Senate Committee on Government Affairs, we further elaborated on the suggested division of responsibility between the Secretary of the Interior and the new Secretary of Energy regarding the leasing of public lands for the development of energy resources. In essence, we stated that

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1/Natural Resources Defense Council vs. The Secretary of the Interior; re Sale #40; Civil No. 76-6-1229; U.S. District court, Eastern District of New York (1976).

2/"Outer Continental Shelf Sale #40--Inadequate Data Used to Select and Evaluate Lands to Lease," EMD-77-51, June 28, 1977.

all responsibility and personnel engaged in the leasing of energy resources on public lands should be transferred to the new Department of Energy and that the Secretary of the Interior should be given the responsibility for making the determination, with respect to specific areas, of whether leasing for energy resource development was the highest and best use of public lands.

We suggested that the Secretary of Energy provide to the Secretary of the Interior complete information on planned leasing schedules and specific tracts to be leased within a scheduled area. We stated that the Secretary of the Interior should have up to 120 days from receipt of the information to complete his evaluation. We believe that the basis for the Secretary of the Interior's decision should be made public and his decision should be final. The Secretary of Energy, however, should be authorized to refer the issue in question to the President for final resolution at his discretion.

Our reasons are as follows:

--The energy mineral leasing function is essentially energy related and, as such, should be included in the Department of Energy. This will allow the management of this function to be more closely integrated with overall energy policy and goals. The importance of such an interface is underlined by the fact that the public lands are estimated to contain most of our remaining domestic oil, natural gas, and coal supplies.

--The Secretary of the Interior would be in a stronger position to examine specific leasing decisions of the Department of Energy from an environmental/multiple-use perspective. We believe that the Interior Secretary can better emphasize the environmental/multiple-use consideration with the leasing function removed from his area of responsibility since the predominant mission of the Interior will be environmental/multiple use and the Secretary can more fully raise these issues without conflict with collateral energy management responsibilities.

--The Secretary of the Interior would be far less susceptible to direct pressures of the energy industry, thereby creating a better system of checks and balances energy and competing interests. Such independent checks are essential in view of the broad powers authorized for the Department of Energy.

--The visibility of the decisionmaking process would be much greater. Issues would be raised to cabinet level, rather than at lower levels in the Department of the Interior, which has traditionally been the case.

Gasoline decontrol

The administration has found that there is no longer a shortage of crude oil and refined petroleum products, with the exception of propane. In many ways, the supply side of the market has returned to near the pre-embargo levels which prevailed in 1972. Therefore, the following products have been exempted from the pricing and allocation regulations:

--Residual fuel oil on June 1, 1976.

--Middle distillates, which include home heating oil, on July 1, 1976.

--Naphtha, gas oils, greases, lubricants, certain petroleum feedstocks, and other speciality products on September 1, 1976.

--Naphtha base jet fuel on October 1, 1976.

In January 1977, the previous administration forwarded to the Congress a proposal to exempt gasoline from price controls. However, the proposal was withdrawn by the present administration before the 15-day congressional disapproval period had elapsed.

At the end of the peak driving season in the fall, the administration plans to propose to the Congress that gasoline be exempted from price and allocation controls. If the Congress does not disapprove the proposal within 15 days of continuous session, the proposal becomes effective. The administration reserves the right to reimpose controls on gasoline if it deems that reimposition is necessary to preserve an economically sound and competitive gasoline market.

To maintain competition in the gasoline marketplace, administration officials said they would support legislation similar to the "dealer day in court" bill, H.R. 130, that would protect service station dealers from arbitrary cancellation of their leases by major oil suppliers. Such legislation is not part of the proposed National Energy Act.

The administration is currently devising a monitoring system whereby price and allocation controls could be

reimposed if gasoline prices rose above a predetermined "trigger" level. As soon as the mechanics of the system have been finalized, the system will be published in the Federal Register for public comment and public hearings will be held.

We have not performed any work specifically on this subject. However, we are currently examining FEA's system for monitoring heating oil prices--which were decontrolled on July 1, 1976. FEA collects heating oil price information from a survey of 600 firms and compares it to an index price, which is FEA's best estimate of what heating oil prices would have been had they remained under price controls. If the average of the survey prices exceeds the index price, FEA holds hearings to decide what actions need to be taken to bring the price level down to the index level. Our final report, to be issued in late summer 1977, may be useful to the Congress and the administration in deciding whether to adopt a gasoline monitoring system similar to the one currently used for heating oil. Our findings with respect to the heating oil monitoring system could aid in the establishment of a more effective gasoline monitoring system.

There are contrasting viewpoints with respect to the effects of gasoline decontrol. One view is that the demand for gasoline is relatively price inelastic and that the price of gasoline could rise significantly if decontrolled. Estimates of the increase to the base price resulting from decontrol range from 3 to 7 cents per gallon. Since it appears that profits from crude oil production will not be rising as quickly in the future as in the past, oil companies may have a greater interest in increasing the profit margin at the retail level.

Another viewpoint is that gasoline prices have not reached the maximum allowable level under price controls, due to competitive pressure. Industry officials state that under controls, they have surpluses of gasoline and have set prices on the basis of market forces. They contend that exemption from regulations will not result in inequitable gasoline prices for any class of users.

We support the decontrol of gasoline prices on a trial basis. However, we believe gasoline prices should be monitored closely to insure that there are no unjustified price increases. We also support the administration's authority to reimpose price controls in the event of unreasonable price increases.

## Transportation study

The President will create a commission to study the Nation's energy transportation needs and to make recommendations to him by the end of this year. With increased supplies of OCS oil and gas, as well as anticipated increases in coal production, the Nation needs to reassess its energy transportation system.

We briefed the National Transportation Policy Study Commission on November 19, 1976, and presented alternatives for their consideration on study plans and organizational structures. The Commission, established by the Federal Aid Highway Act of 1976, is charged with a study of the Nation's transportation needs and policies in order to recommend appropriate transportation policies for the United States.

We have issued a report 1/ on the cost of two major oil spills. A barge which sank in the Chesapeake Bay in February 1976 was estimated to cost $1.3 million and the Argo Merchant which sank off Massachusetts in December 1976 was estimated at $5.2 million. These are short-term costs; long-term effects will not be known for some time.

We are also reviewing the safety of oil shipping and transfer operations on the Delaware Bay and the Coast Guard's preparedness for cleanup and containment of oil spills. Respectively, these reports are expected to be issued August 1977 and May 1978.

The President's proposed commission to study the Nation's energy transportation needs may duplicate part of the purpose and charter of the National Transportation Policy Study Commission. Although we have no objection to studying energy transportation needs separately from other transportation needs, both studies should be carefully coordinated to insure balanced analyses of needs according to priorities.

## CONCLUSIONS AND RECOMMENDATIONS

### Oil pricing and taxing

Because oil constitutes so large a share of this country's energy use, oil pricing and taxing provisions are essential elements of a comprehensive energy policy.

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1/"Total Costs Resulting from Two Major Oil Spills," CED-77-71, June 1, 1977.

While the pricing initiatives in the administration's plan provide greater production incentives than now available, they are no greater than would exist in 1985 with a continuation of current policy. Moreover, the plan will reduce revenues to producers and thereby may reduce capital availability for further exploration and production. Not surprisingly in view of the above, the administration estimates that the plan will result in virtually no increase in oil production. By not increasing the financial incentives for additional exploration, the plan fails to come to grips with the problem of increasing domestic crude oil production.

The effect of the plan is also expected to be quite small on consumer prices and demand over current policy. Petroleum product prices are expected to average only 2-percent higher under the plan than they would be if current policy were extended through 1985. We are also concerned that the rebate procedures for the wellhead taxes may be administratively cumbersome and may result in duplicate payments in some cases. There is no question that there are inequities in the sense that those who are supported by public assistance will receive the refund only once a year while those who are employed will have lower withholding throughout the year.

We support the concept of pricing oil at its replacement value and we share a concern for windfall profits. However, the proposed program has several shortcomings which should be overcome if possible. While we have not studied the effects of all alternatives, we urge the careful evaluation of alternative methods of achieving the objectives. One of these might be to allow newly discovered oil to receive the world price for the actual year in question rather than the 1977 world price plus domestic inflation. Standby authority could be retained in the event world prices increased unreasonably quickly.

We believe that the refund to users of home heating oil works against the plan's overall conservation thrust and it engenders serious inequities and administrative problems. We recommend, therefore, that it be approved for only a brief period of time and phased out to protect consumers from a sudden increase in heating bills without continuing the protection indefinitely.

Natural gas

We believe that the administration has overestimated the amount of natural gas that will be produced in 1985 by about 1.5 to 2.0 tcf--about 10 percent. This conclusion is based on an analysis of the amount of reserve additions that are

required to sustain a given level of production and the experience that has been observed with regard to reserve additions over the past 30 years. To the extent that natural gas production falls short of expectations, the difference will have to be made up by either more oil or natural gas imports or additional conservation.

As is the case with the home heating oil rebate, we believe the plan to keep the prices of natural gas to residential users lower than to the industrial sector is contrary to the principles of conservation and replacement pricing. We do not recommend such a policy. Since natural gas is sold in long-term contracts, the increased prices will be absorbed slowly, so there is no need for temporary protection against precipitous price increases.

Liquified natural gas

We believe that the administration has understated the amount of LNG that will be imported under its plan. The plan is to remove all limitations on LNG imports and to review each case on a case-by-case basis. Imports are estimated to remain virtually constant at 0.5 to 0.6 tcf through 1985. This is apparently under the assumption that natural gas will be demand limited by 1985 and the additional imports will not be required.

We believe this to be unlikely. First, natural gas is a desirable commodity relative to other fuels due to handling and environmental reasons. Second, as noted above, we expect that domestic production has been overestimated and to some extent the difference may be made up by additional LNG imports. Finally, new projects already contemplated, if implemented, total well over 1.2 tcf per year.

# CHAPTER 5

## COAL

The administration's plan states that, even with vigorous conservation, America's demand for energy will continue to grow. During the remainder of this century, the Nation will have to rely mainly on conventional sources of energy to meet its demand. The administration's plan relies heavily on its regulatory, economic, environmental, and research and development policies to stimulate expanded use of coal to help fill the growing gap created by (1) rising demand and (2) relatively stable or declining production of oil and gas.

The administration estimates that the plan would increase the use of coal in 1985 to 1.2 billion tons. Without the plan, the administration estimates that coal production will reach 1 billion tons in 1985. This amounts to increases of 565 and 365 million tons above the 1976 level of coal production with and without the plan, respectively. In our ongoing review on U.S. coal development, we discuss the implications of reaching coal production levels of about 1 billion tons by 1985, the level the administration estimates the Nation will achieve without its plan. We plan to issue the report in August 1977. Our work indicates that there are many problems which will need resolution to increase U.S. coal production and use to the administration's base case estimates, the level projected that the Nation will achieve without the plan. These problems include, among other things, the need for

--capital to upgrade large portions of the Nation's railroads, particularly in the eastern States, together with the need to expand existing capabilities;

--congressional resolution of uncertainty concerning the issue of rights-of-way for slurry pipelines;

--improved labor relations to prevent disruptions due to wildcat strikes, together with the need for improved miner health and safety conditions, recruitment, and training;

--greater manpower and equipment productivity;

--accelerated Federal research to determine the health and environmental effects of burning greater amounts of coal; and

--less costly and more reliable technology to control air pollution from coal burning facilities.

For the most part, these problems constrain the current and potential demand for coal. Our work on coal leads us to agree with the administration that coal is not mainly supply constrained. Barring strikes and the like, the coal industry is capable of increasing production to the administration's base case estimates of 1 billion tons in 1985 and conceivably to 1.2 billion tons in 1985, the level the administration estimates it will achieve with the plan. However, unless the above problems are dealt with by the administration, coal production and use will not increase as projected in its base case.

The administration estimates that coal production and use will increase 200 million tons by 1985 as a result of the plan, which corresponds to 2.3 MMB/D of oil equivalent in oil and gas savings. We believe the problems we have listed could also affect the coal production increases and resulting oil and gas savings estimated for the plan.

The administration's plan recognizes the need for

--a regulatory program to require coal use by utilities and large industries, with allowances for exceptions;

--an oil- and gas-users tax and rebate/investment tax credit system to provide an economic stimulus to convert to coal;

--an environmental policy for coal to achieve its energy goals without endangering the public health or degrading the environment; and

--a research program for coal conversion, mining, and pollution control technology.

Although the administration's plan recognizes and deals with some of the constraints to increased coal production, it has omitted actions to deal with transportation, productivity, and other constraints that we have identified as potentially hindering the achievement of 1 billion tons of coal production in 1985. We believe the administration's plan for coal should be expanded considerably to deal with the problems we have identified if it hopes to achieve even the levels it indicates can be achieved without the plan.

## COAL CONVERSION REGULATORY POLICY

This policy would prohibit industry--Major Fuel Burning Installations (MFBIs)--and utilities from burning natural gas or petroleum in new boilers, with limited environmental and economic exceptions. Existing facilities with coal-burning

capability could be prohibited from burning petroleum or gas and, with limited exceptions, no utility would be permitted to burn natural gas after 1990. The burden of proof would be on the utility or industry to show why it cannot construct coal-fired facilities instead of gas- or oil-fired facilities.

Utilities burning coal would be required to obtain a permit to shift to petroleum or gas. Utilities burning gas would also be required to obtain a permit to shift to petroleum. MFBIs are not required to obtain permits to shift to petroleum or gas.

The failures of the current coal conversion program are discussed in our ongoing review on U.S. coal development. Our tentative conclusions are that present and prospective circumstances do not make a shift to substantially greater reliance on coal inevitable. Over the next decade or so, changes of greater significance will need to occur if more coal is to be used for electric power generation. Among other things, changes are needed in pollution control technology and costs and transportation costs and flexibility.

The current coal conversion program, which the administration's plan would amend, has not lived up to the expectations principally due to the difficulty and cost of burning coal in compliance with clean air standards. Other problems, such as administrative problems, have also contributed to the failure of the current coal conversion program. The administration's plan attempts to address the cost difficulties through an oil and gas users tax and a rebate/investment tax credit system. Environmental problems are recognized in the proposed coal conversion program by providing for exceptions on environmental grounds. Administrative problems are addressed by transferring the burden of proof to potential converters.

## Comparison of administration's plan, S. 977, and current coal conversion program

The administration's plan would replace FEA's existing coal conversion program, authorized by the Energy Supply and Environmental Coordination Act of 1974 (Public Law 93-319, June 22, 1974)(ESECA). Another coal conversion bill, S. 977, is also designed to replace the current ESECA program.

Both the administration's plan and S. 977 would modify the current program by requiring the utility or industry to show why a new facility cannot be constructed to use coal. A major difference between the two proposals is that the administration's plan calls for a prohibition of natural gas in existing powerplants by 1990, whereas S. 977 would ban

natural gas or petroleum used by existing powerplants and MFBIs in 1979. Both proposals allow for exceptions and exemptions based on environmental, economic, and other grounds. It is obvious that a greater number of applications for exception or exemption would be filed under a 1979 ban on natural gas use than a 1990 ban on its use by utilities. This can be attributed, in part, to the assumption that there will be more gas-burning powerplants with a remaining economic life of 20 years or more in 1979 than in 1990.

S. 977 requires that Federal facilities comply with the requirements and prohibitions of the bill, whereas the administration's plan does not. FEA's analysis indicated that a substantial proportion of the larger Federal combustors (mainly within the Department of Defense) were designed to burn coal but were burning oil or gas. We believe that the Federal Government should set an example for the Nation by converting its large facilities to coal. The administration plans to convert its facilities to coal by Executive Order. We believe that coal conversion legislation should include Federal facilities, thus allowing the Congress to act on a total coal conversion package.

Burden of proof

The administration's plan contains provisions which would appear to make the coal conversion program less complicated to administer than the existing ESECA program. The major provision has to do with burden of proof. For example, FEA must now demonstrate that an existing or new powerplant can burn coal in a practicable, environmentally acceptable manner before it can order the company to do so. "Practicable" does not necessarily mean economic advantage to the utility. We were told that this has been a long and expensive process for FEA.

The administration's plan would prohibit new powerplants from burning oil and gas and put the burden of proof on them to either comply or prove to FEA why they are unable to comply. This prohibition is not expected to affect utilities much because a decreasing number of new oil- or gas-fired plants is planned. Its potential effect on industry, however, could be significant because few new industrial boilers are being planned with coal burning capability. For existing powerplants and MFBIs, FEA will issue rules which designate categories or individual installation with coal burning capability. The burden of proof is then on those designated to show why an exemption or exception should be granted.

Utilities

As of June 30, 1977, 142 of the 143 utilities ordered by FEA to construct coal-fired generators were planning to burn coal anyway. The administration's plan would automatically include future powerplant construction and eliminate the need for FEA to spend time and money issuing orders to utilities already planning to burn coal. According to the administration, the provision covering future powerplant construction is needed, to avoid utilities which are planning to construct coal-fired or nuclear plants from changing these plans to gas- or oil-fired plants at some later time. As to ultimate savings in oil and gas because of utilities constructing coal-fired generators, however, the question of regulatory requirements may be somewhat academic since the trend is already away from oil and gas. This trend is evident in powerplant construction data reported to the FPC. For 1977, 28 oil- and 12 gas-fired plants are expected to come on line. In 1985, 6 oil- and no gas-fired plants are projected. 1/

MFBIs

To date, FEA has accomplished little in this area, and industry has not constructed coal-fired units with the same frequency as utilities. Under the current ESECA program, FEA must prove that it is feasible (in terms of coal supply reliability, economic factors, and other considerations) for any MFBI to use coal. The administration's plan generally would put the burden of proof on the MFBIs and would probably result in more MFBIs burning coal than would otherwise have been the case. The administration's plan would also allow FEA to prohibit oil and gas use in certain other facilities. The current ESECA program excludes these facilities.

Thus, the administration's plan would probably be more effective and easier to administer than the ESECA program, with respect to new MFBIs.

Exceptions and exemptions

The administration's plan generally provides the same classes of exemptions and exceptions to avoid switching to

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1/Proposed Generating Capacity Additions by Fossil Fuel Type for the Period 1976-1985, as Reported April 1, 1976, in Response to FPC Docket R-362, Order 383-3, Bureau of Power, Federal Power Commission, pp. 6, 22.

coal as does the current ESECA program. These classes include

--financial feasibility;

--adequate and reliable supply of coal;

--physical factors (such as coal transportation);

--environmental factors; and

--reliability of service for utilities.

Despite the plan's provisions which appear to ban burning of natural gas, every provision carries at least one opportunity for an exception or exemption. For example, the prohibition of gas for use in existing utility boilers by 1990 is not as stringent as it might sound. There are several provisions whereby a powerplant can continue to burn gas after 1990, such as for peaking purposes. 1/

The financial feasibility provisions, in the administration's plan and the current ESECA program, differ because the administration's plan has added an oil and gas users tax to be imposed on utilities and industry together with a rebate/investment tax credit system. The incorporation of these taxes/rebates is designed to make the conversion to coal more financially attractive.

Under the administration's plan, the affected companies would either comply or file for an exemption or exception based on the above-mentioned grounds. According to the administration, it will be easier administratively for FEA to evaluate applications submitted by the companies for exceptions and exemptions than to have to prepare, on a case-by-case basis, original evaluations. Unlike the current ESECA program, where FEA controls its administrative workload, under the administration's plan, FEA would not control the number of exceptions filed at any one time. If a large number of exceptions is filed, FEA could end up with a greater administrative burden than under the current ESECA program. The administration's plan would be more expensive for the affected companies deciding to go through the exception process.

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1/Electricity generated to meet peak or high demand.

The administration believes that most companies will comply rather than spend the time and money to file an exception. However, an administration official said that a company wishing to delay converting to coal can generally count on a lengthy litigation before an exception is finally denied.

Thus, the litigation process can be viewed as a considerable ally to a company wishing to delay and possibly avoid conversion. In order to avoid the potential for the exception process becoming a delaying mechanism, we believe that procedures should be established requiring administrative resolution of the proposed exception within a specified time from the date of application for exception. However, we recognize that judicial delays may still occur.

Administrative burden

As previously discussed, the plan's provisions could lessen the coal conversion program's burden on FEA. However, other provisions could add to FEA's burden. The plan requires that existing powerplants, in certain circumstances, obtain FEA approval to change their fuel mix, i.e., from burning gas to burning oil, or burning gas in greater proportion than was burned during a specified base period. FEA should make decisions on utilities' submissions on a fairly rapid basis, so as to enable the utilities to negotiate advantageously for fuel supplies, and avoid reliability of service problems that might arise if FEA is slow in ruling on utility requests.

OIL- AND GAS-USERS TAX

A major part of the administration's plan is to encourage the substitution of coal for oil and gas used by existing and prospective industrial and utility consumers. Specifically, the administration estimates that substitution of coal for oil accounts for about 53 percent of the total oil import reduction goal (4.5 million barrels per day) for 1985; conservation incentives account for the remaining 47 percent of the import reduction goal.

To foster this substitution, the administration has proposed a special tax on industrial and utility consumption of natural gas and oil. The objective of this users tax is to make natural gas and oil more expensive, relative to the cost of coal. In this way, the higher prices for oil primarily, and gas to a lesser extent, would serve as an incentive to cut back oil and gas consumption as well as an incentive to substitute coal, the cheaper fuel, for oil and gas, the more expensive fuels.

In addition to the users tax, the administration has also proposed incentives to encourage accelerated investment in coal conversion facilities by industry and utility consumers of oil and natural gas. A rebate of the users tax is proposed for industrial and utility oil and gas users who invest in coal conversion equipment. Industrial users of oil and gas, however, are eligible for either the rebate or an additional 10-percent business-energy tax credit for outlays to convert to coal.

Further, as an incentive to encourage accelerated conversions, the administration has also proposed a carry-forward provision to permit industry (and utilities in later years) to accumulate credits to be used later to reduce the user taxes paid.

Although utilities and industries are both taxed on their oil and gas use, the amount of the tax and the year of initiation are different for the two groups of users. Industries would be taxed on their use of oil and gas starting in 1979, whereas utilities would not be taxed until 1983. According to the administration's plan, the later starting date for the tax on utilities' use of oil and gas reflects the longer lead-time required by utilities to convert to coal.

In addition to the differentiation depending on whether the user is a utility or an MFBI, tax levels per million Btus are different depending on whether oil or natural gas is used. The tax on natural gas is designed to keep its price below the price of distillate oil. According to the administration, this should discourage a conversion from natural gas to oil.

The users tax is structured so that in any calendar year a company using over 500 billion Btus of oil and gas would be taxed.1/ Between 500 and 1,500 billion Btus, the proportion taxed would rise as the amount of oil and gas used increased. Any company or utility using more than 1,500 Btus of oil and gas would be taxed on all use of those fuels. According to administration officials, small users of oil and gas are not being taxed because it is not economically feasible for them to use coal.

The following table provides information on the taxes per million Btus for utilities and MFBIs.

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1/Certain uses would be exempt from the taxes, including fertilizer manufacturing, farming, aircraft, rail and water transportation uses, and certain limited manufacturing, refining, and reprocessing uses. Gasoline and diesel fuel would also be exempt.

Users Tax for Utilities and MFBIs (note a)

| Year | Petroleum | | Natural gas (note b) | |
|---|---|---|---|---|
| | Utility tax | MFBI tax | Amount subtracted for utility users | Amount subtracted for MFBI users |
| | (million Btus) | | | |
| 1979 | - | $0.15 | - | $1.05 |
| 1980 | - | 0.30 | - | 0.40 |
| 1981 | - | 0.30 | - | 0.35 |
| 1982 | - | 0.35 | - | 0.25 |
| 1983 | $0.25 | 0.40 | $0.50 | 0.20 |
| 1984 | 0.25 | 0.45 | 0.50 | 0.15 |
| 1985 | 0.25 | 0.50 | 0.50 | - |
| 1986 | 0.25 | 0.50 | 0.25 | - |
| 1987 | 0.25 | 0.50 | 0.25 | - |
| 1988 | 0.25 | 0.50 | - | - |
| After 1988 | 0.25 | 0.50 | - | - |

a/Subject to adjustments for inflation.

b/Tax is the difference between user's cost of gas and an amount in the table subtracted from the target price of distillate.

We have not completed nor do we have any ongoing work addressing the tax mechanism as a lever to promote interfuel substitution in the utility and industrial sector. However, in the fall of 1977, we plan to initiate an examination of the effect of U.S. tax policies on the development of energy supplies. Our work on coal, however, does allow us to comment on the relative importance of utilities' capital and fuel costs which the users tax and rebate/investment tax credit system would modify.

Administration officials have stated that they expect two-thirds of the projected savings in industrial use of oil and gas under the plan to result from the imposition of the oil-and-gas users tax and rebate/investment tax credit system; only one-third of the savings is expected to come from the revised ESECA program. For utilities, almost all the oil and gas savings are projected to result from the users tax and rebate/investment tax credit system.

The administration stated that the rebate is a much stronger incentive than the users tax to get utilities off oil and gas. This agrees with our work on coal development. In our coal review, we note that the fuel costs to utilities generally are a smaller consideration compared with the capital costs required for coal conversion or construction of a new plant. Further, utilities' increased fuel costs are passed through directly to consumers, whereas increased capital costs are subject to review and regulatory lag.

The American Boiler Manufacturers Association, in its statement on H.R. 6831, the National Energy Act, said

> "The natural gas shortage will continue to force the use of alternative fuels whose selection will be governed primarily by availability and equipment costs. For example, a recent survey of 300 large industrial steam users showed two-thirds more concerned with reliability of fuel supply than with [fuel] cost." 1/

Our review on coal development indicates that industrial coal-fired boilers cost 2 to 4 times as much as an oil- or gas-fired boiler. Further, the capital costs to convert to coal

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1/Written Statement on (H.R. 6831) National Energy Act, "Title I--Conversion to Coal and Other Fuels," for the House Subcommittee on Energy and Power, Committee on Interstate and Foreign Commerce, American Boiler Manufacturers Association, May 27, 1977, p. 2.

from an existing gas-fired plant without coal burning capability are almost as high as the cost of a new coal-fired plant. Although the capital costs to convert from gas to petroleum are much smaller, administration officials indicate that the oil users tax, which keeps oil more expensive than natural gas per million Btus, and the requirements that utilities obtain a permit to convert from natural gas to petroleum are adequate incentives to curb a massive conversion from gas to oil. They also believe the users taxes and rebate/investment tax credit system are adequate to stimulate conversion from both gas and oil to coal.

The administration's plan would first increase oil and gas fuel costs through the tax mechanism and then lower capital costs of coal use by the rebate/investment tax credit system. We will discuss trends in fuel costs first. Coal prices have been considerably lower than oil prices per million Btus. For example, in 1973 coal cost utilities 52.7 cents per million Btus compared to 104.4 cents for the same amount of oil that year. In November 1976 the differential was about the same, 81.6 versus 193.9 cents per million Btus, respectively. In our study of coal development, we find such a cost comparison can be misleading, particularly when user costs associated with environmental control, handling, and storage costs are taken into account. For example, it is estimated that when costs of adapting to prospective environmental requirements are taken into account, true costs of coal use per million Btus may be increased by as much as 28 to 49 percent. Even when the users tax on oil is added to the delivered price of petroleum, the interfuel price advantage of coal may be overstated.

A recent study by the Congressional Budget Office indicates that, in real terms, the users tax will increase oil prices to industrial users by 12.9 percent by 1980 and 21.5 percent in 1985 over what prices would have been without the tax. 1/ When compared with the increase in the cost of coal due to environmental requirements, the tax by itself may have a weak impact in promoting a greater use of coal in the industrial sector. However, the rebate/investment tax credit system is expected to provide the main economic stimulus for coal use.

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1/Congressional Budget Office, President Carter's Energy Proposal: A Perspective, (Washington: USGPO, June 1977), p. 23

The proposed investment tax credit and rebate on the oil- and gas-users tax for investment in coal conversion equipment would lower conversion costs, making economically feasible some conversions which otherwise might not have occurred with only the users tax. According to the administration, the rebate can amount to a 52 percent investment tax credit which when added to the existing 10 percent investment tax credit would bring a total tax credit for allowable investments to 62 percent. These estimates are based on the assumption that coal-related investments do not exceed the cumulative users taxes paid.

The administration estimates that its coal conversion goal requires 10 percent of existing industrial facilities to convert from oil and gas to coal. This may be achievable. The administration also now estimates that 37 percent of new industrial facilities would use coal by 1985.

The administration estimates that, with the conversions of existing and prospective facilities, industrial boiler use of nearly 300 million tons 1/ of coal could occur by 1985, which is a growth rate of 15 percent per year over the 1975 level. This estimate is about 200 million tons greater than what would occur without the plan. Of this increase, about 20 million tons is due to conversion of existing facilities and about 180 million tons would result from the substitution of coal for oil and gas at new facilities. Although we did not assess this aspect of the administration's coal conversion estimate, we do recognize difficulties in achieving this goal because of environmental costs, land-use restrictions, and other factors identified in our review of U.S. coal development.

The Congressional Budget Office also recognizes problems which can affect the administration's estimates of coal conversions, although the Congressional Budget Office estimate that 33 percent of new industrial facilities might use coal does not differ greatly from the administration's revised estimate of 37 percent. The report said various problems exist which may affect the administration estimates. These include the (1) exemption of user taxes on small facilities, (2) facilities already planned or under construction which may not be able to convert to coal, (3) difficulty in meeting environmental

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1/This estimate does not include reduction in coal consumption (22 million tons) due to conservation associated with other parts of the plan.

standards, (4) difficulty in transporting coal to newly constructed facilities, and (5) stretching out of construction of new facilities beyond 1985 to gain optimal benefits from tax incentives. 1/

Regional impact of taxes

On the whole, the substitution effect of the oil- and gas users tax depends on regional responsiveness. The regions to be affected most by the users tax may be California and the Southwest. In these regions, oil and gas consumption account for a large proportion of the electricity generated. Utilities in these regions currently derive about 82 percent and 87 percent, respectively, of their electricity from oil and gas. Although overall industrial data is not available, data is available for Texas. In the Southwest area, Texas will be particularly affected because it consumes more than four times as much natural gas for electricity as any other State. Texas' total tax liability in 1980 (exclusive of tax rebates) will account for 37 percent of the national total oil and gas users tax on industry. 2/

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1/Ibid., p. 46.

2/Calculated from data presented by the Secretary of the Treasury in testimony before the House Committee on Ways and Means, May 16, 1977; and State of Texas, Office of State-Federal Relations, Carter's National Energy Plan, April 25, 1977, p. 7.

Estimated Costs for Conversion of Existing Utility and Industrial Boilers From Natural Gas and Fuel Oil to Coal

| Region | Application | Capital cost impact (1975 dollars) Combustion unit | Control equipment | Total cost |
|---|---|---|---|---|
| | | (billions) | | |
| Nation | Utility | 50-70 | 10-20 | 60-90 |
| | Industrial | 130-200 | 20-50 | 150-250 |
| | Total | 180-270 | 40-70 | 210-340 |
| Texas | Utility | 10-15 | 3-4 | 13-19 |
| | Industrial | 30-50 | 7-13 | 37-63 |
| | Total | 40-55 | 10-15 | 50-70 |

Source: Preliminary Assessment of the President's National Energy Plan, University of Texas at Austin, p. 287.

This table shows the massive capital outlays that utilities and industries in Texas must make to convert to coal in comparison with those in the Nation. It also shows the amount of increase in capital costs that pollution control equipment will comprise.

The administration's proposed regulatory coal conversion program can grant exceptions or exemptions from its requirements to use coal. Although a utility or an MFBI might obtain a temporary or general exemption from FEA, that company would still be subject to the oil- and gas-users tax if more than 500 billion Btus of oil and gas were used in the tax year. Questions have been raised about the fairness of imposing an oil- and gas-users tax on a company which has demonstrated that it cannot use coal either temporarily or on a general basis. According to the administration, the oil- and gas-users tax is designed to encourage greater conservation of oil and gas in addition to encouraging greater coal use. We understand that the administration's crude oil equalization tax and increased natural gas prices are also designed to encourage greater conservation of these fuels (see chapter 4).

The gas-users tax will tend to diminish regional differentials in the price of gas, not to mention the impact of the new gas pricing policy proposed by the administration. Industrial gas price increases in 1980 and 1985 under the plan have been estimated by the American Gas Association. 1/ Substantial increases are indicated for regions where gas prices have been historically low, because of location close to gas producing areas, such as the southern United States. Such increases could stimulate substantial conservation of natural gas in the area's industrial use of gas as a boiler fuel. On the other hand, the tax would have little impact in New England where gas is currently higher priced because of transmission costs, but where substantial fuel conservation efforts have been undertaken because of higher prices.

In our study of U.S. coal development, we indicate that nearly all use of gas as a utility boiler fuel occurs in the South Central States 2/, which account for nearly 90 percent of total U.S. gas production. In this area, gas reliance had been reduced to 87 percent by 1975, and a further 40-percent reduction by 1985 was already scheduled. In fact, by 1983 the base load generating capacity in this area is expected to be completely coal and nuclear. It is reasonable to question whether it is, in fact, feasible to accelerate utility coal conversion in this region beyond what has already been planned. However, there may be potential to accelerate industrial coal conversion in this region.

In summary, the oil- and gas-users tax and rebate/investment tax credit system have the following advantages:

--It would encourage conversion to coal mainly by decreasing the capital costs through the rebate/investment tax credit mechanism.

--It is self-financing. The oil- and gas-users tax revenues will more than offset the expected outlays for rebates or investment tax credits.

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1/George H. Lawrence, President, American Gas Association, testimony before House Committee on Ways and Means on tax provisions of H.R. 6831 (National Energy Act), May 24, 1977.

2/Defined as Arkansas, Kansas, Louisiana, Oklahoma, and Texas.

--It encourages conservation of oil and natural gas.

However, the users tax and rebate/investment tax credit system have the following disadvantages:

--The natural gas users tax will result in large regional differentials in taxes charged per Btu of gas used. A higher tax per Btu would generally be imposed on areas of the Nation closest to gas producing regions and would have a greater effect on capital acquisition for conversion in those regions.

--Utilities and industries which cannot use coal for environmental or other reasons would still be required to pay the users tax.

To overcome some of the disadvantages of the currently proposed system, we believe that the Congress should consider modifications to the users tax which would

--impose a tax per Btu on natural gas use, and

--allow users which are exempted from the requirement to use coal also to be exempted from the oil- and gas-users tax.

ENVIRONMENTAL POLICY FOR COAL

The administration proposes to increase the use of coal under a "* * * strong, but consistent and certain, environmental policy * * *." The policy (1) requires installation of the best available control technology on all new coal plants, (2) would protect clean air areas from further significant deterioration, (3) encourages States to classify lands to be protected from significant deterioration within 3 years of enactment of the Clean Air Act Amendments, (4) requires Governors to give notice of intent to change classification of a land area within 120 days after an application is made to construct a new energy facility in that area, and (5) requires States to complete the land reclassification within 1 year.

In addition, the administration requests that the Congress not adopt a new nonattainment policy 1/ until EPA's study of its offset policy 2/ has been completed. Other studies which will be initiated are committee studies of (1) the health effects and environmental constraints on mining and construction of new coal-burning facilities and (2) carbon dioxide buildup from coal and other fuels. Finally, the administration supports uniform national strip mine legislation which would fully protect the Nation's land.

We support the administration's goal of expanded coal development without endangering the public health or degrading the environment. However, in the near term, we are not convinced that the goal can be achieved without recognizing the need for trade-offs between energy needs and public health and other environmental needs. In the long term, assuming an aggressive and successful coal research and development program, the need for trade-offs may be substantially diminished.

Best available control technology

The administration's plan proposes that the best available control technology be used by all new coal burning facilities. This proposal also appears in both the Senate and House proposed Clean Air Act Amendments. Best available conrol technology is presently defined by the EPA as a flue gas desulfurization unit (scrubber) to control sulfur dioxide and an electrostatic precipitator to control particulates. In our ongoing review on U.S. coal development, we assess environmental problems as a key constraint to future coal production increases. Also, the cost and adequacy of current control technology are discussed. Further, the emission levels of increased coal consumption with and without controls are estimated. For example, in our work on coal development, we estimate that, without controls, over 30 million tons of sulfur oxides would be emitted from coal burning in 1985 if we produce about 1 billion tons; approximately 3 million tons of sulfur oxides would be emitted if controls are used. On the other hand, if controls are used, about 230 million tons of solids,

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1/A policy for areas which exceed primary ambient air quality standards.

2/A policy which allows new growth in an area which violates primary ambient air quality standards as long as a greater amount of pollution in the area can be "traded off" against the new source.

some of which is sludge, could result in 1985; about 80 million tons of solids will result if no controls are used. Thus, pollution problems will occur in the near term, regardless of the controls employed. Judgments must be made concerning the levels of pollution and the risks associated with each form.

The advantages and disadvantages of requiring best available control technology and allowing intermittent controls are covered in our review. In addition, our ongoing review evaluating national air and water pollution control goals and strategies includes looking at the issues of intermittent controls and the reliability of scrubbers. This report report should be available this fall.

In addition to sulfur dioxide and particulate emissions, there are a number of other pollutants emitted from coal burning. These include nitrogen oxides and a variety of toxic trace elements which, in sufficient quantity, can cause adverse environmental and health effects. EPA currently regulates sulfur oxide, nitrogen oxide, and particulate emissions.

Trace elements from coal, including mercury, lead, arsenic, and zinc, are not separately regulated. (Some may be controlled during regulation of particulates.) The long-term health and environmental effects of trace elements have not been well defined. Coal plants also discharge about 900 times more radioactivity than oil plants of equivalent size and design. Using best available control technology will not assure that trace elements and radioactive emissions will be controlled.

Significant deterioration

The administration's plan aims to protect clean air areas from further significant deterioration and encourages States to classify their lands to prevent significant deterioration of air quality in pristine areas. New coal burning installations wishing to locate in a clean air area will undergo a review to determine if the proposed new plant will violate the air quality increment permitted for the region. The extent to which new coal-burning facilities may be prohibited from siting either in relatively pristine areas or in nonattainment areas is unknown at this time. The administration estimates that 25 percent of the "population" will not be able to use coal as a result of environmental constraints. This figure is preliminary and is being refined by EPA. The constraints are considered "environmental" in the largest sense, and include land availability, water resource availability, and environmental protection regulations. It is unclear whether 25 percent of the population refers to new or converting facilities, or both, and whether the 25 percent figure is

derived largely from air quality constraints, or from other physical or environmental factors. How much of a constraint environmental requirements are to future coal development is subject to debate. We have identified it as a key constraint in our work. The administration should define its estimates clearly. If States and Indian tribes reclassify a significant portion of their lands as clean air areas to prevent significant deterioration, administration proposals for increased coal use will likely fall short of its goal.

The administration's plan requires Governors to give notice of intent to change an area's air quality classification within 120 days after an application is made to construct a new source in the area, and to require the State to complete the reclassification within 1 year. The plan would eliminate some of the uncertainties that industry and utilities face in planning new coal facilities. However, States' rights issues may be debated, conceivably in the courts, if these proposals are enacted.

Nonattainment policy

The national primary air quality standards were required under the Clean Air Act (42 U.S.C. 1857) to be achieved by 1975 in nearly all parts of the country. (A few areas were granted extensions until 1977.) Many urban areas and some rural sections of the country have not yet achieved the standards for one or more of the regulated air pollutants. These areas are considered nonattainment for those pollutants.

According to an FEA official, a strict interpretation of the existing Clean Air Act would prevent the siting of all new air pollution-emitting facilities in areas of the country that have not yet achieved the standards. Once the existing nonattainment areas come into compliance with the standards, new facilities can be sited, as long as the additional pollutants from the new facilities do not interfere with the maintenance of the standards. The problem is significant because it could limit the possibilities for siting new coal-fired facilities in nonattainment areas for sulfur oxides, nitrogen oxides, or particulates.

However, the EPA offset policy, announced December 21, 1976, sets forth the conditions under which new facilities, such as coal-burning plants, could be allowed in nonattainment areas while conforming to the requirements of the Clean Air Act. This policy deviates from a strict interpretation of the Clean Air Act by allowing the new sources to be located in a nonattainment area as long as the emissions contributed by the new source are more than offset by a reduction in emissions from existing facilities in the area. Under the offset policy

for new coal-burning facilities to locate in nonattainment areas, emissions offsets would have to be found for the facilities' sulfur dioxide and/or particulate emissions.

This means that in half the air quality control regions of the country, a new coal-burning facility could be required to find offsets for particulates. EPA is currently looking closely at these areas to see whether, in some, there is a major offender which is causing the whole region to violate the particulates standard. New coal plants wishing to locate in nonattainment regions for particulates would be carefully reviewed by EPA to see if, in the immediate area to be affected by the plant, an emissions offset will be needed.

Sulfur-dioxide emissions from a new coal-burning facility would be subject to the emissions offset policy. Because there are relatively few areas which are in nonattainment status for sulfur dioxide, it appears unlikely that the current national sulfur dioxide standard, in itself, will constrain the siting of new coal powerplants.

FEA maintains a list of how many potential coal converters are in nonattainment areas. Out of 18 facilities which could be issued orders prohibiting the use of gas or oil in the near future, 1 is in a sulfur oxides nonattainment area, and 7 are in nonattainment areas for particulates. Presently, plants being issued prohibition orders under ESECA are exempt from EPA emissions offset rules. However, this could change if (1) individual States adopt emissions offset policies for converting plants or (2) the EPA policy expands to include coal converters.

A State can have an implementation plan which considers converting facilities in the same class as new sources. Tennessee and Oklahoma are two such States. A converting plant may be subject to stricter regulations, and possibly to finding offsets in these States. A State can also set stricter new source regulations than those of the Federal Government to achieve the national primary and secondary ambient air quality standards.

Elements of uncertainty surround what the (1) States will do in terms of tightening their regulations and (2) final forms of both Federal and State emissions offset rules will be. The administration has called for a review of EPA's current emissions offset policy. Uncertainty will exist until that policy is in final form.

In summary, it seems apparent that the expanded use of coal, even to the administration's base case level of 1 billion tons, will not take place if all current and proposed air

quality policies are strictly enforced. In addition, we believe that further environmental degradation will take place despite the strong pollution control measures proposed in the plan because many pollutants emitted from coal burning are not regulated and cannot be controlled even using the best available control technology.

Study of health effects

The administration's plan indicates that its energy goals can be achieved without endangering the public health or degrading the environment. The plan concedes, however, that some uncertainty will continue over the environmental effects of an increasing number of coal-burning plants. A special committee is to be appointed to study the health and environmental effects of increased coal use. In its final environmental impact statement on the coal conversion program, 1/ FEA estimated that emissions of sulfur oxides, particulates, and nitrogen oxides will increase as a result of the conversion program. Certain unregulated pollutants will also increase as emissions into both air and water. These increases will take place even with the application of pollution control technology. Furthermore, it is unlikely that all coal-burning installations will adhere to the air quality regulations, as evidenced by the fact that currently half of all coal consumed for powerplant use is not in compliance with existing standards. Hence, the increase in air emissions from many more planned coal-burning facilities could be highly significant, from a health point of view.

There is evidence that particulates, in combination with sulfur dioxide, increase the incidence of chronic bronchitis and emphysema, and chronic bronchitis-related deaths. Populations exposed to particulates and sulfur dioxide show impairment in pulmonary function, an increased frequency of upper and lower respiratory tract diseases in children, and death rates above normal.

Sulfur dioxide itself can cause acute or chronic leaf injury to vegetation that may impede the chlorophyll-making mechanism. In addition, corrosion rates of various metals, and deterioration of other materials, such as marble and fabrics, are accelerated in the presence of sulfur dioxide.

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1/Coal Conversion Program, Final Revised Environmental Impact Statement, Federal Energy Administration, May 1977, Vol. I, pp. IV-110, 119, 128.

Powerplants and other MFBIs emit nitrogen oxides when burning coal. Nitrogen dioxide exerts its primary toxic effects on the lungs. Acute respiratory diseases, increased susceptibility to infection, and structural changes in lung tissue have all been observed in laboratory studies of nitrogen dioxide effects.

The administration has prepared an analysis of the air pollution impact of the National Energy Plan. 2/ The conclusions reached are that increasing coal production by 200 million tons under the plan does not increase the total levels of particulates, sulfur dioxides, and nitrogen oxides in 1985 because any air pollution increases from coal production increases are offset by the conservation proposals in the plan. The administration does recognize that there are significant differences at the regional level, however, which reflect a higher probability for site specific problems.

We support the study of the health and environmental effects of increased coal use proposed in the plan and urge that it receive high priority. Its results are needed now. The study should illuminate the health and environmental consequences of coal use so that the energy benefit to be gained can be weighed against the health and environmental effects. The study should (1) inventory all pollutants emitted during coal combustion (not just regulated pollutants), (2) find out where these pollutants are deposited once they are released (whether they enter the food chain or are inhaled directly from the air), (3) determine in what regions of the country the various pollutants pose a greater or lesser hazard, and (4) determine the human health, animal, and vegetation effects of burning larger amounts of coal.

Carbon dioxide buildup

The administration proposes a study of carbon dioxide buildup from burning coal and other fuels. We support the administration's proposed study. In our work on coal, we cover the possible "greenhouse" effect which may be created from increasing amounts of carbon dioxide released from combustion of fossil fuels. If this theory is correct, it is possible that the Earth's temperature could be increased and its ecosystem altered. Knowledge of the long-term effects of

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2/Air Pollution Impacts of the Oil and Gas Replacement Program in the Utility and Industrial Sectors, Executive Office of the President, Energy Policy and Planning, and the Environmental Protection Agency, June 20, 1977.

coal development is needed before irreversible effects are experienced.

Strip mine legislation

The administration states that it supports tough, uniform national strip mine legislation to protect land and water quality against unwarranted damage resulting from inadequate reclamation of strip mined areas. The 95th Congress is expected to pass such legislation in 1977.

The current bills under consideration (H.R. 2 and S. 7) would declare certain coal reserves off limits to strip mining because of the potential adverse environmental effect during and after mining operations. These restrictions are on alluvial valley floors 1/, steep slopes, and Federal coal lands where ownership of surface and mineral rights is divided. Both bills restrict strip mining in the three areas, but differ in specific definition of those areas.

Similar legislation has been debated prior to consideration of H.R. 2 and S. 7. Over the past several years, the Congress has debated and, in 1975, passed legislation setting strip mining standards. On May 20, 1975, this legislation was vetoed by President Ford on the basis that (1) coal production would be unnecessarily reduced, (2) greater unemployment would result, (3) the Nation would be more dependent on foreign oil, and (4) consumers would pay higher electric bills. We issued a report 2/ evaluating the support for the veto and concluded that the estimates of reduced coal production were speculative. Further, any questions about production loss figures affect the other factors. The production loss served as the basis for computing employment loss figures, increased oil imports, and increased electric utility bills. Many of the problems we identified resulted from insufficient information on coal productivity.

In our current work on coal development, we identify two issues concerning H.R. 2 and S. 7. The first issue relates

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1/Alluvial valley floors consist of unconsolidated deposits formed by streams or channels where ground water levels are high enough to permit irrigation which is vital to the viability of farming and ranching operations.

2/"Evaluation of the Analysis Supporting President Ford's Veto of H.R. 25, The Surface Mining Control and Reclamation Act of 1975," EMD-77-37, Apr. 15, 1977.

to the amount of reserves which might be restricted from mining; the second issue concerns whether States or the Federal Government should primarily determine mining and reclamation standards. Although steps are being taken to obtain better data on U.S. coal reserves, significantly more reliable data is needed now.

Concerning the second issue, H.R. 2 would make the States primarily responsible for developing, issuing, and enforcing mining and reclamation regulations which are at least consistent with federally established minimum standards.

Proponents of uniform Federal strip mine legislation contend that it will provide more technically sound reclamation and better protection of the environment than a system of individual State laws. Some States are disinclined to impose tough reclamation standards because they believe that this puts local business at a competitive disadvantage. It is also argued that Federal legislation will be more consistently enforced and subject to less political pressure.

Opponents of uniform Federal strip mine legislation contend that uniform Federal standards do not allow for diverse reclamation practices in diverse environments. States' rights issues are also involved in the opposition to uniform Federal mining standards.

Generally, States want to control the rate of coal development through their own laws--including the level of reclamation required. Thirty-four States currently have some form of reclamation law varying in degrees of sophistication and stringency. The coal industry in general views the contemplated legislation as an example of a policy which raises doubts whether coal will be mined as planned.

These issues will need to be resolved soon if there is any hope of reaching coal production levels of 1.2 billion tons in 1985. The unresolved issues and uncertainties surrounding strip mine legislation, added to the air quality issues discussed previously, lead us to question whether the administration's plan can achieve its goal.

## COAL RESEARCH

To deal with the problems that will accompany the planned increase in coal production, the administration is calling for a major expansion of the Federal coal research program. The primary emphasis, according to the administration, will be on resolving environmental problems and increasing the use of synthetic fuels from coal.

Coal--environmental research

To meet the environmental requirements more effectively and economically, the administration calls for expanded research on:

1. Methods to meet air pollution standards, including flue gas desulfurization systems (scrubbers). These would be methods of removing undesirable emissions after the coal is burned, but before the smoke is released to the atmosphere.

2. Fluidized-bed combustion systems. These involve burning coal in combination with a fluidized material, such as limestone, ash, or dolomite. This permits the coal to be burned at a lower temperature, which reduces undesirable emissions.

3. Coal cleaning systems. These are methods of washing or treating coal before it is burned to reduce harmful emissions.

4. Coal mining technology. This research is aimed, among other things, at minimizing the environmental impact of mining the coal rather than the impact of burning it. The objectives of the research program are to improve present surface and underground mining and environmental practices, automate present systems, and develop and demonstrate new mining systems that substantially improve production and productivity.

In our review of U.S. coal development, we cover the status of many Federal coal research and development programs which are currently divided among EPA, ERDA, and the Bureau of Mines. The proposed energy agency reorganization would not entirely eliminate the need for coordination among agencies because the environmental aspects of coal research will probably be performed outside the proposed Department of Energy.

Our review indicates that, prior to the administration's plan, the Bureau of Mines estimated a budget of $84.5 million for its mining technology program in fiscal year 1976, and a total of $632.3 million for fiscal years 1976 through 1981. ERDA estimated a total of $4.1 billion for its coal research and development program between fiscal years 1975 and 1981, the greatest portion of which was planned for coal conversion projects. In contrast, the estimated fiscal year 1976 environmental control technology research program budget for EPA, ERDA, and the Bureau of Mines combined was only $52.6 million.

(This does not include health and environmental effects research.)

Previous research budgets did not give as much attention to the very real environmental problems associated with the direct burning of coal, as compared to the problems associated with synthetic fuel development. The administration's plan calls for a major increase between now and 1985 in the direct burning of coal. Environmental problems need research answers now to overcome one of the key constraints to increasing coal use. The administration's coal research program calls for greater emphasis on environmental research.

The administration provided us with fiscal years 1976 and 1978 coal research budget estimates under the administration's plan as follows:

| | FY 1976 budget authority | Administration's plan--FY 78 budget authority |
|---|---|---|
| | (millions) | |
| ERDA--coal conversion, and utilization | $362 | $539 |
| Bureau of Mines--mining research | 86 | 90 (note a) |
| EPA--environmental research | 101 | 96 (note b) |
| | $549 | $725 |

a/Does not include budget amendment pending in Congress.

b/Does not include budget amendment proposal being evaluated within the administration.

Proposed budget amendments in various stages of review have not been approved for the Bureau of Mines or EPA coal research programs. The administration's approved fiscal year 1978 budget for environmental research shows a slight decrease in authority from fiscal year 1976, while the ERDA synthetic-fuels-from-coal and fluidized-bed combustion research programs show substantial increases from the fiscal year 1976 level. We believe that a plan which calls for an increase in coal

use between now and 1985 needs a research budget which emphasizes finding solutions to the environmental problems associated with the direct burning of coal.

We are currently reviewing ERDA's Fossil Energy Demonstration Program, including its plans for constructing and operating demonstration plants using fluidized-bed combustion systems. We will determine the status of the various technologies being researched and developed.

We also plan to begin a review of issues and problems affecting research and development efforts to increase the use of coal as an energy source, and determine how effectively ERDA is addressing these issues and problems in its program.

Coal--synthetic fuels

The administration's plan seeks to increase the use of synthetic fuels from coal as substitutes for natural gas and petroleum products. This involves expanding research on various coal liquefaction and gasification technologies.

Coal liquefaction is the process of converting coal into a liquid fuel. There are several liquefaction methods. The two methods that appear to be closest to commercialization and that are specifically mentioned in the National Energy Plan are "solvent refined coal" and "synthetic crude oil."

The solvent refined coal process reduces the sulfur and ash content of coal by liquefying it and removing the undesirable materials so the coal can be burned directly as a liquid. Through the synthetic crude oil process, coal is converted into synthetic crude oil and then can be processed and upgraded into gasoline, fuel oil, or other fuels.

The administration plans to pursue active research, development, and demonstration programs for both of these technologies. It has requested budget authority for fiscal year 1978 to design a commercial-size demonstration solvent refined coal plant. It also is providing some of the funding for a synthetic crude oil pilot plant, which is currently under construction.

In coal gasification processes, coal is fed into a high-temperature vessel (gasifier) into which steam and either air or oxygen is injected. Chemical reactions occur and produce a mixture of gases, including methane, the main constituent of natural gas. The gases are then cooled, and undesirable elements, such as carbon dioxide and sulfur, are removed.

The raw gas produced at this point is referred to as low-Btu (low heat value) gas if produced with air, and medium-Btu (medium heat value) gas if produced with oxygen. This gas cannot be economically transported over long distances by pipeline. However, it is valuable as fuel for gas-burning powerplants and industrial plants, provided they are located near the gasification plant.

Low- and medium-Btu gas can be upgraded to a high-Btu gas through a chemical reaction called methanation. High-Btu synthetic gas is a direct substitute for natural gas and can be transmitted in existing pipeline networks.

The administration is proceeding with demonstration projects to develop commercial-scale, low-Btu gasification techniques. For example, large gasification projects at a Minnesota ore plant and a Pennsylvania zinc smelter have been selected for Government and industry cost-sharing demonstrations. The administration also proposes an active research, development, and demonstration program on advanced technologies to obtain high-Btu gas from coal.

The administration underscores the point that the basic Federal role in coal liquefaction and gasification is research, development, and demonstration of new technologies. The administration plans to avoid subsidizing existing technologies, although it states that circumstances may merit an occasional exception to that policy. The plan does not indicate what those circumstances might be.

We have issued several reports addressing various aspects of coal research and development. In a 1975 report 1/, we identified potential problems in such areas as mining technology, manpower, transportation, and environment that must be solved before coal's potential can be realized. These problems tie in directly to insuring adequate supplies of coal to feed synthetic fuels plants.

During 1976, we issued two reports 2/ 3/ that addressed obstacles in the Federal programs to demonstrate commercialization

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1/"Federal Coal Research--Status and Problems to Be Resolved," RED-75-322, Feb. 18, 1975.

2/"Status and Obstacles to Commercialization of Coal Liquefaction and Gasification," RED-76-81, May 5, 1976.

3/"An Evaluation of Proposed Federal Assistance for Financing Commercialization of Emerging Energy Technologies," EMD-76-10, Aug. 24, 1976.

of synthetic fuels from coal. We concluded that processes which produce synthetic fuels are commercially available but are not competitive with conventional oil and gas when discounted to present price equivalents.

We recommended that loan guarantees for commercial development of synthetic fuels not be provided at that time. Instead, we suggested that full priority be directed to developing improved synthetic fuels technologies. When commercialization does become a prime objective, consideration should be given to approaches other than loan guarantees for gaining the interest of private industry.

In the August 1976 report, we also discussed criteria for making the right choices among energy technologies. We said that three factors should be considered:

--The contribution that each technology can make in meeting the Nation's energy needs within a specified time frame either through reducing demand or increasing energy supply.

--The total cost of commercializing the technology, including plant construction, alleviating adverse socioeconomic impacts, and price supports or further subsidies which may be required.

--The price at which energy produced by the technology would have to be sold and the means by which the price would be assimilated by our economic system.

We also said that the decision to (1) use Federal incentives to assist in commercializing energy technologies and (2) determine which incentives would be most appropriate requires interrelated analysis of at least three factors:

--The technology's state of development. Is the technology developed to the extent that it can be deployed on a broad basis?

--The technology's economic feasibility. Will the energy produced be economically competitive with other energy sources?

--The target group whose actions will be influenced. Are they large industrial firms or diverse and widely dispersed groups, such as homeowners? Interrelated analysis of these factors should precede the decision to choose the most appropriate financing mechanism or other Government activity to stimulate a particular energy technology.

In the National Energy Plan, the administration apparently is abandoning ERDA's past production goal of 1 million barrels of synthetic fuels per day by 1985. That goal, or any goal approaching that magnitude, was highly unrealistic. The plan's lack of production goals would seem to recognize the actual status of synthetic fuels.

## CONCLUSIONS AND RECOMMENDATIONS

We support the administration's goal of expanding coal development without endangering the environment. However, in the near term, we are not convinced that the goal can be achieved without recognizing the need for energy and environmental trade-offs. In the long term, assuming an aggressive and successful coal research and development program, the need for trade-offs may be substantially diminished.

It appears highly unlikely that U.S. coal production will reach 1 billion tons in 1985, the level the administration believes it can achieve without the plan, let alone its goal of 1.2 billion tons with the plan. In addition to the administration's need to recognize the necessity for energy and environmental trade-offs, we believe that actions should also be included in the plan to deal with transportation, productivity, and other constraints we have identified in our work on coal if 1 billion tons are to be produced in 1985.

Accordingly, we recommend that the Congress expand the plan for coal to include actions dealing with the following problems

--the need for capital to upgrade large portions of the Nation's railroads, particularly in the eastern States and to expand existing capabilities;

--the need for congressional resolution of uncertainty concerning rights-of-way for slurry pipelines;

--the need for improved labor relations to prevent disruptions due to wildcat strikes, together with the need for improved miner health and safety conditions, recruitment, and training;

--the need for greater manpower and equipment productivity;

--the need for accelerated Federal research to determine the health and environmental effects of burning greater amounts of coal; and

--the need for less costly and more reliable technology to control air pollution from coal burning facilities.

The administration's plan for coal is based on these key policies: (1) a coal conversion regulatory policy, (2) an oil- and gas-users tax with a rebate/investment tax credit system, (3) an environmental policy, and (4) a research and development policy. Based on our past and ongoing work on coal, we evaluated each policy.

We believe that a coal conversion policy calling for a ban of natural gas use by utilities and MFBIs in 1979 is too soon. Numerous legitimate exceptions would probably be filed which would unnecessarily increase FEA's administrative burden. However, a policy calling for a ban of natural gas use in existing powerplants by 1990 may allow more leadtime for replacement of natural gas than is necessary. For example, Arkansas, Kansas, Louisiana, Oklahoma, and Texas, which account for nearly 90 percent of total U.S. gas production, expect base load electric generating capacity to be completely coal and nuclear by 1983. In order to provide a basis for reasonable judgment on the proper time frame for a ban of natural gas use by utilities and MFBIs, FEA should provide an analysis of alternative time frames for the prohibition of natural gas use by utilities and MFBIs. The analysis should include information by category and location of user on the current amount of natural gas use; the age of the natural gas-fired facilities and estimated remaining economic life; plans and time frames for replacement of natural gas; and technological, environmental, land-use, and other potential constraints to the replacement of natural gas for those users without plans for conversion.

This information should assist in the determination of optimal time frames for such a prohibition, together with a better knowledge of the number of applications for exception or exemption which can be expected by FEA.

We believe the Federal Government should set an example for utilities and MFBIs by converting its large facilities to coal. The administration plans to convert its facilities to coal through Executive Order. We believe that coal conversion legislation should include Federal facilities, thus allowing the Congress to act on a total coal conversion package.

The administration's plan to reduce the ineffectiveness of the current conversion program by shifting the burden of proof to utilities and MFBIs to show why they are unable to comply, has potential to make the program less complicated to administer. However, if many companies resist complying and file exceptions, FEA may end up with a greater administrative

burden than before. This further underscores the need for an analysis of the optimal time frames for conversion. In addition, a company wishing to delay converting to coal can generally count on a lengthy litigation before a denial of an exception is upheld. To avoid the potential for the exception process becoming a delaying mechanism, we believe that procedures should be established by FEA requiring administrative resolution of the proposed exception within a specified time from the date of application for exception. However, we recognize that judicial delays may still occur.

The Congress has chosen through ESECA to provide a regulatory mechanism to cause a shift from oil and gas use by utilities and MFBIs to alternative fuels. The ESECA program has not lived up to expectations. To strengthen the program, we recommend that legislation amending ESECA

--insure that time frames for the prohibition of natural gas use by utilities and MFBIs be based on thorough analysis optimizing technical and economic feasibility with the extent of exceptions to be expected under that time frame; and

--include a requirement that the Federal Government set an example in converting to coal.

To provide a basis for reasonable judgment on the proper time frame for a ban of natural gas use by utilities and MFBIs, we recommend that the Administrator, FEA, provide an analysis of alternative time frames which includes information by category and location of users on

--the current amount of natural gas use,

--the age of the natural gas-fired facilities and estimated remaining economic life,

--plans and time frames for replacement of natural gas, and

--technological, environmental, land-use, and other potential constraints to the replacement of natural gas for those users without plans for conversion.

Although the oil- and gas-users tax and rebate/investment tax credit system have advantages which we have discussed, they also have the following disadvantages.

--The natural gas users tax will result in large regional differences in taxes charged per Btu of gas used.

--Utilities and industries which cannot use coal for environmental or other reasons would still be required to pay the users tax.

To overcome some of the disadvantages of the currently proposed system, we believe that the Congress should consider modifications to the users tax which would

--impose a tax per Btu on natural gas use, and

--allow users which are exempted from the requirements to use coal also to be exempted from the oil- and gas-users tax.

As stated previously, the administration's plan should recognize and deal with the environmental and energy trade-offs needed to increase coal production or protect the environment in the near term. It seems apparent that the expanded use of coal even to the administration's base case level of 1 billion tons will not take place as proposed by the administration if all air quality regulations are strictly enforced. In addition, we believe that if coal production is increased significantly, further environmental degradation will take place despite the strong pollution control measures proposed in the plan because many pollutants emitted from coal burning are not regulated and cannot be controlled even using the best available control technology. Unresolved issues and uncertainties also surround proposed strip mine legislation. The larger uncertainties and issues on air quality, together with strip mine issues, lead us to question whether the administration's goal for coal can be achieved by 1985 or, for that matter, 1 billion tons by 1985.

We support the administration's proposed study of the health and environmental effects of increased coal use and urge that it receive high priority. Its results are now needed.

The administration's plan calls for a major expansion of the Federal coal research program. The primary emphasis, according to the administration, will be on resolving environmental problems and increasing the use of synthetic fuels from coal. However, the administration's approved fiscal year 1978 budget for environmental research shows a slight decrease in authority from fiscal year 1976, while the synthetic-fuels-from-coal and fluidized-bed combustion research programs show substantial increases from the fiscal year 1976 level. We believe that a plan which calls for an increase in coal use between now and 1985 needs a research budget which emphasizes finding solutions to the environmental problems associated with the direct burning of coal.

The administration apparently is abandoning ERDA's past production goal of 1 million barrels of synthetic fuels per day by 1985. That goal was highly unrealistic. The plan's lack of production goals would seem to recognize the actual status of synthetic fuels.

We generally agree with the administration's intention not to subsidize existing synthetic fuels technologies. However, the administration apparently perceives some possible need for exceptions to this latter policy, but does not specify the circumstances that might warrant an exception. We recommend that the administration clarify this policy by specifying those circumstances that may warrant Government subsidies for existing synthetic fuels technologies.

# CHAPTER 6

## NUCLEAR POWER

The administration's plan for nuclear power 1/ has two main objectives. The first involves the so-called "plutonium economy" and consists of several actions aimed at preventing further spread (proliferation) of nuclear weapons. The second objective is to increase the use of present generation nuclear powerplants as a "last resort" to help solve the Nation's energy problems.

### PLUTONIUM ECONOMY

Currently, there are only two materials, one natural and one manmade, that are used to make nuclear bombs and are produced in large quantities. Uranium is the natural substance, but it first must be subjected to a very complex and expensive process called "enrichment." During this process, the uranium's content of a certain isotope is greatly increased. The manmade substance is plutonium which is created in reactors (e.g., commercial nuclear powerplants) during the nuclear fission chain reaction. However, before the plutonium can be used, it must be extracted from the used reactor fuel elements through a procedure called "reprocessing."

Simply stated, if you want to make a nuclear bomb, you must have either the enrichment or reprocessing capability, or be able to get one of the materials from someone who does have these capabilities. Conversely, if you want to control nuclear weapons proliferation, you must

--control the enrichment and reprocessing technologies and

--provide adequate safeguards for enriched uranium and plutonium.

The specific antiproliferation actions the administration plans to take are discussed below.

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1/This refers to the nuclear fission process used in present commercial nuclear powerplants and in breeder reactors. Nuclear fusion, an unproven but potentially significant source of nuclear power, is discussed in ch. 7.

Defer nuclear fuel reprocessing

The administration has decided to defer indefinitely commercial reprocessing of spent nuclear fuel in this country. This action will keep down the risk of plutonium's being diverted or stolen, at least in this country, and is intended to serve as an example proving to other nations that the United States is totally committed to nonproliferation.

The United States presently has no commercial reprocessing plants in operation. In fact, a small commercial reprocessing plant in France is the only one operating in the world today. A number of countries, including the United States, have reprocessing capabilities for their military nuclear weapons programs; however, these facilities are not addressed by the administration's National Energy Plan.

We have not previously addressed the question of whether or not to defer reprocessing. However, we are currently reviewing U.S. nuclear nonproliferation policy. Later this year, we expect to issue a report in which we will discuss the issues and alternatives in establishing a U.S. nuclear reprocessing capability. Our review initially focused on the previous administration's October 1976 decision to defer commercial reprocessing for a 3-year period. Because it appeared that too many questions surrounded the benefits and costs of reprocessing, we tentatively concluded that the previous administration's decision was appropriate and that no sizeable amount of Federal funding should be devoted to demonstrate reprocessing until technical alternatives were explored further.

From an international nonproliferation standpoint, it is difficult to gauge what impact the administration's decision will have. Alone, the decision cannot be expected to reduce the risk of proliferation because it only affects the use of plutonium in this country. The decision can only be considered as a signal to other nations of our commitment to nonproliferation goals. If other countries do not follow suit and defer their reprocessing plans, then the proliferation threat will not be reduced. It is only a first step which must be followed by stronger nuclear export controls by all nuclear nations.

The administration's actions on reprocessing and on the breeder reactor (see p. 6.3) are viewed by the U.S. nuclear industry as detrimental to the Nation's future energy posture and ill conceived as antiproliferation measures.

On the environmental side, the administration's decision avoids some problems but creates new ones. The biggest problem is what to do with the spent nuclear fuel if it is not reprocessed.

The only commercial reprocessing plant ever operated in the United States stopped operations in 1972. Since that time, spent fuel from commercial nuclear powerplants has been kept in temporary storage, either at the powerplant sites or at commercial storage facilities. The sites generally have fixed capacity, and only one commercial facility is currently accepting fuel for storage. The problem became so critical that 14 of the 63 operating nuclear powerplants in the United States obtained permission to increase their onsite storage capability. Another 22 powerplants have indicated that they will also seek such permission.

If nuclear fuel reprocessing is never permitted, the spent fuel may ultimately have to be disposed of as nuclear wastes. Spent fuel would be classified as high-level radioactive waste and would pose new disposal problems (see p. 6.18).

There are other environmental and socioeconomic implications associated with the administration's decision, including:

--An increase in the use of finite uranium supplies.

--Increases in the number of uranium mines, mills, and enrichment plants.

Commercial nuclear powerplants use only about 2 percent of the uranium energy in the fuel elements. Reprocessing can recover some of the remaining energy. If a decision is made to dispose of spent fuel as waste material, that additional energy may be lost forever. Although the economic benefits of reprocessing are not certain today, they could become significant if uranium prices continue to escalate.

Defer LMFBR commitment

Under the two previous administrations, the LMFBR was this country's highest priority and its most expensive energy research and development program, costing about $3 billion through fiscal year 1976. However, the new administration proposes to reverse that priority by deferring any further U.S. commitment to advanced nuclear technologies that use plutonium as a fuel. This action is taken in concert with several others, all designed to prevent further proliferation of nuclear weapons.

The administration's plan includes canceling construction of the first large-scale LMFBR demonstration plant, the Clinch River Breeder Reactor. However, the systems design work (roughly 60 percent of total design work) would be completed for the demonstration plant, and a base level research and development program would be continued. For fiscal year 1978, the current administration has requested an LMFBR budget authorization of $483 million, as compared to $855 million requested by the previous administration.

The LMFBR is the principal advanced nuclear reactor concept being developed by the United States and other industrially advanced nations. It will actually create (breed) more fuel than it uses, and has been considered the likely vehicle for assuring that nuclear fission will be a reliable energy source through the 21st century and beyond. However, the fuel that the LMFBR breeds is plutonium, one of the more lethal substances ever created by man. Plutonium can be used to make nuclear bombs and is a highly radioactive substance that requires extreme care in handling. In addition, plutonium remains radioactive for thousands of years, thus posing long-term storage or disposal problems.

In spite of the problems that would accompany the breeder reactor, many countries view it as an important, even vital, energy option, particularly those countries with scarce domestic resources of coal, oil, uranium, and natural gas.

Over the past 3 years, we have issued 10 reports addressing various aspects of the LMFBR program. Three of the reports provided broad analyses of the LMFBR's problems, potential, and prospects for commercialization.

In one report 1/, we stated that the United States clearly should not abandon the nuclear fission option at this time, nor should it abandon the LMFBR research and development effort. However, we concluded that there has been premature concern and emphasis on commercializing the LMFBR. The Nation is billions of dollars and many years away from demonstrating that commercial LMFBR's can be operated reliably, economically, and safely. We also concluded that the most logical course of action is to pursue the LMFBR as a research and development

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1/"The Liquid Metal Fast Breeder Reactor: Promises and Uncertainties," OSP-76-1, July 31, 1975.

effort, and that a decision on commercialization does not need to be made for perhaps 7 to 10 years.

In a followup report 1/ we discussed some of the issues involved in commercializing the LMFBR. We concluded that

--LMFBR commercialization by the mid-1990s is feasible if basic safety, safeguards, and environmental uncertainties are resolved. This can be achieved, however, only through an integrated approach to developing four required technologies (reactor, fuel fabrication, plutonium reprocessing, and radioactive waste disposal).

--1990 may be the earliest time by which licensability and routine performance can be demonstrated for all four required technologies.

--Because of the time required for developing fuel cycle technologies, the year 2000 is the most likely time for commercializing the LMFBR. Four to six commercial LMFBRs could be operating by then.

--Additional funding for the LMFBR program is not likely to speed up commercialization. However, by developing program plans faster and increasing resource commitments, the three supporting fuel cycle technologies could be ready 1 or 2 years earlier.

The administration's plan and our position differ in degree and purpose. Our position, in essence, is that the LMFBR should be treated as a research and development program, which emphasizes reliability, safety, and economics instead of commercialization; and, which moves the Nation to a point where a decision can be reached on commercial deployment. The Clinch River Breeder Reactor demonstration project is, in our view, a logical step in such a program. The administration's plan is based on the concern that increased plutonium availability will encourage nuclear proliferation. The administration hopes that its decision to terminate the Clinch River project and otherwise reduce and redirect LMFBR R&D funds will encourage other nations to defer their plutonium breeder programs and seek alternative methods of meeting their future energy needs.

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1/"Considerations for Commercializing the Liquid Metal Fast Breeder Reactor," EMD-77-5, Nov. 29, 1976.

From a nonproliferation standpoint, it is uncertain whether the administration's decision will have much impact. Britain, France, West Germany (in cooperation with Belgium and the Netherlands), the Soviet Union, and Japan have been conducting extensive fast breeder reactor research and development programs for years. With the possible exception of the Soviet Union and Britain, which have relatively large amounts of natural energy resources, these countries see an urgent need for LMFBRs. Their programs are independent of the U.S. effort and appear likely to continue regardless of what this Nation decides to do about its LMFBR program. We believe that continuing the LMFBR research and development program enhances this Nation's ability to affect nonproliferation discussions in the crucial years ahead.

We restated our position in a recent report 1/ and we further concluded that the most important technological disadvantage in slowing the present program is that we run the risk of not knowing enough about the LMFBR to make intelligent decisions on it in the near future. This problem occurs in the face of other nations' pursuit of fast breeder technology. This course runs the risk that foreign manufacturers will likely continue to advance the breeder, thereby reaching the market place first and diluting U.S. ability to influence safety and other features of breeders worldwide.

In terms of economics, slowing the program now could mean much higher research and development costs later if the United States ultimately decides to go with the LMFBR.

For example, we recently reported 2/ that ERDA officials estimated the additional costs that would be incurred if ERDA terminated the Clinch River demonstration plant on or about July 26, 1977, and then resumed work on December 1, 1977--just 4 months later. ERDA provided the following cost and schedule information using three assumptions:

1. Assuming the licensing process could begin where it was stopped, project costs would increase by about $346 million and plant operation would be delayed between 1 and 1-1/2 years. However, restarting the project where it was

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1/Letter report (EMD-77-50, June 14, 1977) to the Chairman, House Committee on Science and Technology.

2/Letter report (B-115398, June 23, 1977) to the Vice Chairman, Joint Committee on Atomic Energy.

terminated in the licensing process probably would require legislation to circumvent some of the normal licensing processes.

2. Assuming the licensing process would have to begin with a new application, project costs would increase by about $546 million and plant operation would be delayed over 3 years. Neither this assumption nor the first account for the apparently distinct possibility that ERDA may be required by the Nuclear Regulatory Commission (NRC) to locate the plant at a different site if projected plant operation is delayed. In fact, the Deputy Director, Division of Site Safety and Environmental Analysis, NRC, told us that if the project is delayed for 2 years or more, it would be very difficult, if not impossible, for the NRC staff to conclude that it is cost beneficial to locate the demonstration reactor at the Clinch River site. This cost/benefit determination is required by the National Environmental Policy Act of 1969 (42 U.S.C. 4321), and there are alternate sites available that are more environmentally acceptable than Clinch River.

3. Assuming the plant would have to be relocated, project costs would increase by about $1.1 to $1.3 billion and plant operation would be delayed 5 to 6 years.

Although we did not evaluate ERDA's estimates in detail, we believe they provide a reasonable indication of potential cost growth and schedule slippages that might occur if the project were terminated on July 26, 1977, and the Congress decided to restart it at a later date. By comparison, if ERDA delayed terminating the project until December 1, 1977, by honoring ongoing contracts but not entering into additional contracts not essential to ongoing work, the estimated costs would be increased by about $61 million.

Based on the information set out above, it would seem that terminating the project prior to congressional deliberations could make restarting it so costly as to outweigh its benefit. Thus, if it is successful in promptly implementing its present plan, the executive branch may well have made a major policy decision unilaterally through administrative procedures which should have been made through the legislative process. The documentation we have examined discloses no intention on the part of the executive branch to complete an LMFBR demonstration plant at Clinch River in the future.

## Increase research on alternatives to the LMFBR

The administration proposes to redirect funds from the deferred LMFBR program into expanded research on alternative

breeder reactors, fuels, and advanced converter reactors, with emphasis on safety and nonproliferation.

We have not previously done any detailed analyses of advanced nuclear fission technologies that are not based on plutonium. However, we are beginning a review of the potential and status of alternative nuclear fission concepts. This review, which was requested by the Joint Economic Committee, will also address possible alternatives to the LMFBR which appear attractive from an economic and nonproliferation point of view.

In a prior report on the LMFBR 1/, we briefly discussed alternative reactor concepts being studied by ERDA, but did not discuss their proliferation potential. Those alternative reactors are discussed below.

Breeder reactors

Of the alternative breeders, the light water breeder reactor is probably the most advanced. This reactor could combine the well-developed technology currently used in commercial nuclear powerplants with increased fuel efficiency by retrofitting existing commercial plants. One drawback to this reactor is that its breeding capability (creating new fuel) is much slower than the LMFBR. ERDA's Division of Naval Reactors is preparing a light water breeder reactor demonstration project at a small Government-owned facility, and expects to begin operations in fiscal year 1977.

The molten salt breeder reactor appears to offer several distinct advantages and disadvantages. It uses fluid fuel which would avoid many of the problems in fabricating, handling, and reprocessing solid fuel elements. Deterring factors include a marginal breeding capability and serious structural materials problems. In addition, this reactor requires considerable research and development.

The gas-cooled fast breeder reactor is claimed to have a higher breeding ratio than the LMFBR; however, it is in a relatively early stage of development.

Advanced converter (non-breeder) concepts

The heavy water moderated and cooled reactor was developed in Canada. This reactor technology, sometimes called

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1/See footnote 1/on p. 6.4.

CANDU, has not attracted much interest in this country and the Government is not currently supporting any research and development on it.

There is currently one high temperature gas-cooled reactor operating in the United States. Others had been ordered, but subsequently canceled, and the future of this type of reactor in the United States is very uncertain.

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The administration's plan does not specify which LMFBR alternatives will be pursued. In any case, nearly all known alternatives are in early stages of research and development and are not likely to be commercially available for many years, if ever.

The Congress and other decisionmakers should recognize that all present alternatives to the plutonium-uranium fuel cycle have some potential for diversion of weapons grade materials. The issues involved are numerous, complex, and controversial. In addition to nonproliferation goals, technical, economic, environmental, timing, and other factors must be determined before decisions can be made on the relative advantages and disadvantages of the various alternatives. Our efforts in reviewing these alternatives will keep pace with the Government's efforts in developing them.

Increase uranium enrichment capability

The uranium used to fuel nuclear powerplants goes through essentially the same enrichment processes as the uranium used in nuclear weapons. The powerplant fuel cannot be used in weapons because it is not enriched to a high enough level; however, the processes are the same.

Excluding the Soviet Union and Peoples Republic of China (figures are not available), there are presently seven uranium enrichment plants in the world--three of the largest are in the United States.

The administration is proposing several actions aimed at convincing other nations that the United States is able and willing to supply their enriched uranium needs. By so doing, the administration hopes to get those countries to defer any plans to develop their own enrichment capability, thereby controlling proliferation of nuclear weapons.

The specific actions the administration is proposing are:

--Reopening the order books for enrichment services contracts.

--Enacting legislation to guarantee enrichment services to any country that agrees to comply with our nonproliferation objectives and is willing to accept certain conditions.

--Expanding U.S. enrichment capacity by building a gas centrifuge enrichment plant (instead of a previously proposed addition to a gaseous diffusion plant).

ERDA controls all U.S. enrichment plants and, in addition to reopening the order books, is considering allowing utilities to reduce or delay their enrichment services contracts. ERDA is reviewing utilities' comments on contract changes, and is evaluating the impact of alternative policies on enrichment plant operations. It expects these actions to meet the need for better distribution of enriching capabilities and to permit better planning for additional enrichment plants.

Over the past 2 years, we have issued a number of reports addressing aspects of the uranium enrichment and nuclear proliferation issues. We expect to issue another report later this year that will address ERDA's policies for planning future enrichment plants. In addition, we are currently reviewing ERDA's uranium enrichment pricing policies.

From an economic standpoint, reopening the order books to foreign countries might improve the United States' balance of payments position. As part of our ongoing study of ERDA's enrichment pricing policies, we are reviewing the effect of exporting enrichment services at several different prices and will discuss the pros and cons of changing the price.

The administration's plan to guarantee enrichment services raises two major issues:

--Other countries may view our antiproliferation conditions as being overly restrictive and either turn to other nuclear suppliers with less stringent export conditions or develop their own enrichment and reprocessing technologies.

--A blanket commitment to provide enrichment services requires that the United States have ample enrichment capacity which, in turn, requires decisions on when additional plants will be built, by whom, and the technology to be used.

Actions such as reopening the order books and guaranteeing enrichment services may affect the need for additional plants. To improve planning for those plants, we expect to recommend (in a report to be issued later this year) that appropriate executive agencies review the advantages and disadvantages of maintaining a large share of the foreign market and consider specific foreign market goals for planning purposes. Those agencies should include ERDA, NRC, and the Departments of State and Commerce.

Once the desirable market share is established, the Congress must decide how the additional enrichment will be provided. In a 1975 report 1/ we concluded that ERDA should continue encouraging private industry's development of advanced enrichment technologies, such as gas centrifuge, and we recognized that some equitable, risk-sharing Government assistance may be required to create a private uranium enrichment industry.

The last Congress did not pass a proposal for Federal assistance to private enrichers and directed ERDA to build additional enrichment facilities at Portsmouth, Ohio.

ERDA decided to build an add-on to the existing Portsmouth facility using the proven gaseous diffusion enrichment technology. This decision was based primarily on ERDA's demand projections which showed a need for the additional capacity by the 1980s. Gaseous diffusion was selected because it was a proven technology, and ERDA said that the more advanced technologies (i.e., gas centrifuge and laser isotope separation) were not ready for commercial-size plants.

The current administration, however, has canceled the gaseous diffusion add-on and plans to build at least one gas centrifuge plant at Portsmouth. ERDA officials now say that enrichment demand has slipped, allowing time to develop the gas centrifuge technology. In addition, operating a gas centrifuge plant takes less than 7 percent of the energy required to operate a gaseous diffusion plant of equal capacity. The plant is expected to be completed in fiscal year 1988. If ERDA's revised demand estimates and its assessment of the centrifuge technology are accurate, the Government could reap significant economic and technological benefits from this decision. However, if the estimates are wrong, the Government's

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1/"Evaluation of the Administration's Proposal for Government Assistance to Private Uranium Enrichment Groups," RED-76-36, Oct. 31, 1975.

ability as a reliable supplier and our nuclear nonproliferation objectives may be hindered. We are currently reviewing the entire centrifuge program and the basis for this decision.

Centrifuge plants can be built in small increments, so a plant capacity equivalent to the previously proposed gaseous diffusion plant could be built in four separate components. ERDA will own all four units and operate the first one, and is considering allowing private contractors to operate the other three.

Improve uranium resources assessment program

In order to resolve uncertainties about domestic uranium resources, the administration proposes to modify ERDA's National Uranium Resources Evaluation program. The modification includes assessing domestic thorium resources.

We agree with these objectives. In a report to the Congress 1/, we noted that officials of the U.S. Geological Survey said in 1974 that extensive exploratory drilling would be necessary to thoroughly appraise domestic uranium resources. The Geological Survey noted that this work probably would have to be done by the Federal Government. In that report, we concluded that an aggressive, accelerated effort was needed to estimate economically recoverable uranium resources. We also recommended expediting the work and the final report of ERDA's National Uranium Resources Evaluation program, and giving consideration to the Geological Survey's alternative approach of extensive exploratory drilling by the Federal Government.

In a more recent report 2/, we restated our concerns on the lack of adequate data on uranium resources and reserves. We recommended that ERDA and the Department of the Interior, under the general direction of FEA, undertake a joint effort to identify the costs and benefits of a uranium exploratory drilling program, including suitable levels of private industry and government financing. We further recommended that the results of this joint effort be reported to the Congress.

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1/See footnote 1/ on p. 6.4.

2/"Domestic Energy Resource and Reserve Estimates--Uses, Limitations, and Needed Data," EMD-77-6, Mar. 17, 1977.

According to an ERDA official, the National Uranium Resources Evaluation program is being reoriented to place the highest priority on increasing ERDA's estimates of uranium "reserves" and "probable potential resources." This will probably involve ERDA-funded exploratory drilling and joint ventures with uranium companies to "prove out" reserves. This action seems to be in line with suggestions in both of our previous reports.

In addition, ERDA and the Geological Survey are working out an agreement whereby the latter agency will conduct a 1-year study under the National Uranium Resources Evaluation program to update knowledge of the Nation's thorium resources.

Currently, we are assessing the issues affecting the availability of uranium to meet the Nation's nuclear power needs. Among other things, we are examining the reliability of the estimated domestic uranium resource base, how this base can be increased, and what present and future Government actions would be beneficial.

## DOMESTIC NUCLEAR SAFETY AND STORAGE

The administration's plan for domestic commercial nuclear powerplants contains five separate actions. Four of these actions call for NRC to:

--Increase unannounced or "surprise" inspections of nuclear facilities and assign a permanent inspector to every nuclear site.

--Change the current reporting system for minor mishaps and component failures from voluntary to mandatory.

--Develop firm siting criteria to prevent siting in densely populated areas or in potentially hazardous areas.

--Review its licensing process--which is unsatisfactory to the Government, anti-nuclear groups, and utilities--with a view toward reducing the time required to license a nuclear powerplant.

The fifth action requires a review of ERDA's nuclear waste disposal program.

### Unannounced inspections and resident inspectors

NRC's current inspection program is carried out by inspectors from one of five NRC regional offices, sometimes located

hundreds of miles from many nuclear powerplant sites. These inspectors are specialists--some inspect only those reactors under construction, others look at powerplant security systems, and still others review systems and procedures to protect powerplant workers from radiation hazards.

Most of these inspections are supposed to be unannounced or surprise inspections. The administration's plan would increase the number of these unannounced inspections.

We agree with this proposal. In a recent report 1/ dealing with nuclear powerplant security, we discussed some shortcomings in the way that unannounced inspections were conducted. During our review that led to that report, NRC issued a directive to all inspectors--not just those that specialize in security systems--to encourage and promote unannounced inspections and to insure that these inspections are indeed a surprise to the utilities.

We are currently reviewing NRC's inspection efforts for nuclear powerplants under construction, particularly the methods and techniques the inspectors use to assure safe construction practices. We expect to issue a report during 1977.

The administration's plan also calls for NRC to assign a permanent (resident) inspector to every nuclear site. From 1974 to 1976, NRC had a trial resident inspector program at two operating powerplants. It has evaluated this trial program and now believes that the resident inspector concept is the preferred method of inspection. NRC is now studying several different alternatives for implementing the resident inspector concept. Regardless of the alternative chosen, the program could not begin until late 1977 or early 1978 and could not be fully implemented until 1980 or later.

We endorse NRC's efforts to implement a resident inspector program because our work has indicated that past and current NRC inspections do not provide enough direct observation of utility actions. We cannot comment further because NRC has not yet selected an implementation alternative nor delineated the program in such important areas as how to insure the continued objectivity of resident inspectors.

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1/"Security at Nuclear Powerplants--At Best, Inadequate," EMD-77-32, Apr. 7, 1977.

Mandatory reporting of minor mishaps and component failures

NRC uses an industry-sponsored data system that collects and analyzes information on powerplant component reliability and failures. Powerplant operators' participation in this recently developed system is voluntary. Some nuclear powerplant operators do not provide input to the system, and those that do may not be reporting all mishaps or failures.

The administration's plan calls for NRC to make this system mandatory. To do this, NRC must take over the system and start an inspection effort to assure that utilities comply with the reporting requirements. NRC is now developing alternatives for converting the system. These alternatives differ in timing, cost, and in the type and amount of information that the new system would require.

A system that can provide information on the reliability and performance of components and component manufacturers should be a valuable tool to help NRC meet its responsibilities. Of course, the effectiveness of this or any system depends on the information it produces and how that information is used.

We are currently reviewing NRC's inspection and enforcement program. We expect to issue a report later in 1977 in which we will also discuss existing and proposed reporting systems.

Development of siting criteria

About 1 year ago, the NRC Commissioners directed the NRC staff to reexamine the policies used in siting nuclear powerplants. Of particular interest were powerplant locations in relationship to population density, faults, and valuable natural areas such as parklands. The staff study on these topics is expected to be completed in the Summer of 1977. Thus, action to meet this aspect of the administration's plan is underway.

Obviously, any effort that better defines siting parameters for nuclear powerplants and assures greater safety and environmental harmony should be commended. It should be pointed out, however, that any decisions on nuclear powerplant siting must take into account the siting regulations of the individual States.

In a recent report 1/, we pointed out that NRC had proposed changes to its regulations whereby utilities could seek NRC site reviews up to 5 years before applying to construct powerplants at those sites. NRC has not adopted that change, partly because State powerplant siting officials raised concerns that

--NRC early site approvals may unduly influence sound State and/or local government land use planning;

--States might disapprove sites already approved by NRC; or, conversely,

--utilities might use the NRC early site approval procedures to win State approvals of the selected sites.

Review of licensing process

NRC is responsible for assuring that each nuclear powerplant can be constructed at its proposed site without undue risk to public health and safety or to the environment. A major portion of NRC's effort goes into reviewing each powerplant's preliminary design before issuing a construction permit, and reviewing the final design before issuing an operating license.

It currently takes a utility 10 years or more to plan, obtain licenses for, and construct a nuclear powerplant. Almost 40 percent of a nuclear powerplant's cost--$700 million to $1 billion--is interest and inflation incurred during this 10-year period. These high capital costs have caused many utilities to defer or cancel construction of planned units.

The administration's plan recognizes the cost and scheduling problems in constructing nuclear powerplants. The plan directs NRC to thoroughly review its entire licensing process. As part of this review, the administration has proposed that reasonable and objective licensing criteria be established, and that plants based on standard designs not undergo extensive individual licensing review.

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1/"Reducing Nuclear Powerplant Leadtimes: Many Obstacles Remain," EMD-77-15, Mar. 2, 1977.

In our recent report 1/, we noted that NRC has taken steps to reduce nuclear powerplant leadtimes, and to make its powerplant design safety review process more stable and predictable. These steps include

--authorizing some construction work prior to completing the construction permit review;

--encouraging the development and use of standard nuclear powerplant designs; and

--more carefully controlling the way it applies new safety requirements to powerplants in design, licensing, and construction stages.

The report stresses that these attempts have had very limited success to date. Safety reviews of construction permit applications which refer to standard powerplant design have taken longer than expected because of problems in assuring that all parts of the plant are compatible with each other and with individual site characteristics. In addition, other factors which have affected leadtimes include

--growing public opposition to nuclear power,

--changing regulatory requirements resulting from technological solutions to outstanding safety issues, and

--changing regulatory requirements caused by recent court cases.

The report concludes that the prospects are not good for reducing leadtimes in the future due to increasing State and local government requirements, evolving safety criteria, and other factors--many of which are not under NRC's control.

We are currently reviewing NRC's licensing process to determine if it assures public safety. We expect to issue a report later in 1977.

Review of waste disposal program

The administration's plan calls for a task force, under the direction of the Special Assistant to the President for

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1/See footnote 1/ on p. 6.16.

Energy, to review ERDA's entire nuclear waste management program. We agree with this proposal.

Because the President has proposed to indefinitely defer commercial fuel reprocessing, spent nuclear fuel may ultimately have to be disposed of as waste rather than reprocessed as had been assumed. Consequently, ERDA is now beginning to look at the feasibility of geologic disposal of reactor spent fuel. In addition, ERDA is studying the surface storage concept for spent fuel. According to ERDA, the earliest possible date a surface storage facility or a geological waste repository could be ready to receive spent fuel is 1985.

NRC is developing performance criteria for the transportation and disposal of processed high-level waste forms, cannisters, and shipping casks. Because of the administration's position, NRC will revise its performance criteria to include criteria for spent fuel transportation, storage, and/or disposal.

In the last several years, we have issued three reports 1/ 2/ 3/ on radioactive waste. In addition, we are currently doing a major study of the issues involved in managing this country's high level nuclear wastes. This study addresses ERDA's program for geological waste disposal, management of military waste, and management of commercial spent fuel. This report should be issued to the Congress later in 1977.

## CONCLUSIONS AND RECOMMENDATIONS

### Plutonium economy

We support the administration's goal of stopping the international proliferation of nuclear weapons capability.

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1/"Controlling the Radiation Hazards from Uranium Mill Tailings," RED-75-365, May 21, 1975.

2/"Improvements needed in the Land Disposal of Radioactive Wastes--A Problem of Centuries," RED-76-54, Jan. 12, 1976.

3/"Issues Related to the Closing of the Nuclear Fuel Services, Incorporated, Reprocessing Plant at West Valley, New York," EMD-77-27, Mar. 8, 1977.

We generally agree with the proposals to defer nuclear fuel reprocessing and to expand America's uranium enrichment capabilities. However, the success of these unilateral actions in reducing international nuclear weapons proliferation will depend on the response by other countries. Such response should be greatly influenced by U.S. diplomatic initiatives and possibly by economic considerations.

We disagree with the administration's proposal to drastically reduce funding for the LMFBR program and, in particular, its decision to cancel construction of the proposed Clinch River Breeder Reactor demonstration project. We do not see these actions as reducing proliferation risks. In fact, we see them as reducing this Nation's ability to influence breeder safety and safeguards concerns worldwide.

We recommend that the LMFBR program be continued on a schedule which recognizes that it is still a research and development effort. Not until some point in the future, perhaps 7 to 10 years from now, need a firm decision be made as to whether the Nation will commit itself to the LMFBR as a basic central station energy source. At that time, many of todays uncertainties should be reduced or eliminated, particularly if priority efforts are made to resolve as many as possible between now and then.

Because it is a logical extension of the LMFBR research and development program, we recommend that the Clinch River Breeder Reactor demonstration project be continued. As indicated by the information ERDA provided (see pp. 6.6 and 6.7), once the Clinch River project was terminated, any future decision to reinstate it would be difficult in view of the cost growth and schedule slippage involved.

We agree with the administration's proposal to increase research on alternative nuclear technologies. However, we recognize that most of the known alternatives are in very early research stages and some have not been proven scientifically feasible. In addition, all these alternatives have some potential for diversion of weapons grade materials.

We also agree with the proposed improvements in the uranium resources assessment programs and, in fact, have recommended similar improvements ourselves.

Domestic nuclear safety and storage

The administration proposes five actions to promote increased numbers of present generation commercial nuclear powerplants.

The administration's plan calls for NRC to conduct more "surprise" inspections at the powerplants and to assign permanent or "resident" inspectors at each powerplant installation. We agree with both proposals.

The administration also proposes mandatory reporting by utilities of minor mishaps and component failures at nuclear powerplants. This would replace the current voluntary reporting of such incidents. We agree with this proposal.

We also support the administration's proposals to improve nuclear powerplant siting criteria and to improve the nuclear waste disposal program. We endorse any efforts to make this Nation's nuclear power program safer for the public and the environment.

The administration also proposes a review of NRC's nuclear powerplant licensing process, with the objective of reducing the present 10-year leadtime in getting a plant designed, constructed, and licensed. We doubt that the 10-year leadtime can be significantly reduced. We recently reported that NRC efforts to reduce the leadtime have had limited success due to increasing State and local government requirements, evolving safety criteria, and other factors--many of which are not under NRC's control.

The last proposal calls for a review of the entire ERDA nuclear waste management program by a task force under the direction of the Assistant to the President for Energy. We agree with this proposal and any other that will help resolve this Nation's nuclear waste problems.

## CHAPTER 7

## NONCONVENTIONAL SOURCES OF ENERGY AND RESEARCH OF DECENTRALIZED ENERGY SYSTEMS

The administration proposes several actions aimed at increasing the use of nonconventional or "renewable" energy resources. These renewable resources include solar and geothermal energy resources, and energy from municipal solid wastes and from nuclear fusion. These resources could be applied directly to heating and cooling homes and other buildings or, in some cases, on a larger scale to generating electricity.

The administration emphasizes increased use of solar and geothermal energy applications that have been or are being demonstrated commercially. It also proposes expanded research and development on all these technologies.

### Solar energy

More than other energy sources, the administration's plan aggressively promotes solar energy use. Four separate items in the plan aim at stimulating this emerging technology. Those items are discussed in chapter 3 and include (1) solar tax credits, (2) a business investment tax credit, (3) installing solar equipment on Federal buildings, and (4) urging States to actively promote solar energy uses.

Most of our work has focused on ERDA's solar energy research, development, and demonstration program rather than the incentives that might be needed to commercialize solar energy. Three of our reports 1/ 2/ 3/ on solar energy discuss the program's status and the need to improve planning for research and development. As a result, ERDA has taken action to improve its planning process.

The administration also proposes expanded research and development programs for solar energy technologies. These

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1/ "Federal and State Solar Energy Research, Development, and Demonstration Activities," RED-75-376, June 10, 1975.

2/ "Opportunities to Improve Planning for Solar Energy Research and Development," EMD-77-8, Nov. 30, 1976.

3/ Letter report (EMD-77-33, March 29, 1977) to the Acting Administrator, Energy Research and Development Administration.

include photovoltaic conversion, wind energy, agricultural and forestry residues, and ocean thermal energy (the heat captured by the ocean surface).

Photovoltaic conversion is a process of directly converting sunlight into electricity by using a photo-sensitive material (solar cells). In our June 1975 report, we stated that this technology was scientifically feasible, but that it was far too expensive for commercial application. We agree that further research is needed to develop economic photovoltaic systems.

Wind systems can supply energy to small utilities, hydroelectric systems, and dispersed power users such as farmers. The administration proposes to demonstrate small wind energy conversion systems.

In March 1977, we reported 1/ on the Wind Energy Program administered by ERDA and supported by the National Science Foundation, the National Aeronautics and Space Administration, and the Department of Agriculture.

We concluded that the Wind Energy Program had not been supported by thorough planning studies. The program was emphasizing large wind energy systems, but there had been no comparative analysis performed on the advantages and disadvantages of small, medium, and large size systems. We recommended that ERDA perform market studies to determine the commercial potential of the three sizes of wind energy systems, and that the results of these studies be used in directing the Wind Energy Program.

Agricultural and forestry residues ("biomass") already are used as fuel, and the administration plans to increase that use through improved collection methods and energy farms, in which crops are grown specifically for energy uses. The administration will also support a demonstration project to use wood-derived biomass as a substitute for fuel oil.

We are currently reviewing Federal programs to develop biomass energy, and we expect to issue a report to the Congress in the fall of 1977. Our initial observations are that biomass can contribute considerable amounts of energy to this Nation; however, Federal biomass energy development efforts generally have suffered from inadequate funding and low priorities.

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1/See footnote 3/ on p. 7.1.

We agree with the administration's plan to provide more funding for biomass research, development, and demonstration.

Municipal solid waste

Municipal solid waste is a valuable energy resource. Using the waste for energy purposes also solves the environmental and economic problems associated with disposing of it.

The waste can be turned into energy through direct burning and through conversion into liquid, gaseous, and solid fuels ("refuse-derived fuels").

We commented briefly on municipal solid waste in our August 1976 report 1/ on emerging energy technologies. We concluded that it was a cost-effective technology that was being used successfully, but on a limited basis. Since this technology could best be used by utilities, municipalities, and local governments--many of which have limited financial capability--we further concluded that Federal loan guarantees appeared to be a preferred mechanism for accelerating its use.

We also are addressing municipal solid waste in our current review of biomass energy development.

Geothermal energy

The administration's plan proposes two actions to increase geothermal energy use. The first, a tax deduction to stimulate geothermal drilling, would involve intangible drilling costs and would be comparable to the deduction given for oil and natural gas drillings. The second action calls for the Departments of the Interior and Agriculture to streamline their leasing and environmental review procedures to remove unnecessary barriers to geothermal resources development.

In its broadest sense, geothermal energy is the natural heat of the earth. Geothermal "reservoirs" in the United States have been found primarily in the west, and more than half are on Federal lands. Geothermal resources are classified as hydrothermal (dry steam and hot water), hot dry rock, normal gradients, magma, and geopressurized water.

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1/"An Evaluation of Proposed Federal Assistance for Financing Commercialization of Emerging Energy Technologies," EMD-76-10, Aug. 24, 1976.

We have issued two reports 1/ 2/ addressing various aspects of geothermal energy development in this country. In both reports, we stated that there was a lack of information on exact location, magnitude, and longevity of geothermal resources. The first report also discussed the need to better define responsibilities for stratigraphic drilling and methods for encouraging drilling on leased land.

We are also currently reviewing Federal efforts to encourage geothermal energy development and commercialization. We are identifying problems relating to geothermal drilling and assessing the pros and cons of alternate solutions.

Our March 1975 report recommended that Federal leasing regulations be strengthened to encourage early drilling of exploratory wells, develop geothermal energy, and discourage speculation. We suggested that, since private industry should be responsible for exploratory drilling, the level of lessees expenditures required during the primary 10-year lease term should be increased to approximately the cost of drilling one deep well. At that time, the minimum expenditures required of lessees would not cover the cost of drilling such a well.

In the August 1976 report, we said that ERDA recently implemented a loan guarantee program to accelerate geothermal energy development, including the dry steam hydrothermal technology--the only currently economical type of geothermal energy. We believed no further Federal financial assistance to accelerate commercialization of dry steam energy was warranted at that time. For other geothermal technologies, federally sponsored research, development, and demonstration of the economic and technical viability of the concept seemed to be the appropriate Government role.

Neither of these reports included a recommendation for tax incentives such as the administration is proposing. However, since the loan guarantee program and geothermal energy development have progressed very slowly, we may modify our position after completing our current review. We will be in a better position at that time to determine whether tax deductions are appropriate to stimulate geothermal drilling.

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1/ "Problems in Identifying, Developing, and Using Geothermal Resources," RED-75-330, Mar. 6, 1975.

2/ See footnote 1/ on p. 7.3.

Our August 1976 report contained three factors which we believe should be carefully examined in determining the best financing mechanism to stimulate a particular energy technology.

--The technology's state of development.

--The technology's economic feasibility.

--The target group whose actions will be influenced.

In determining appropriate incentives, we stated that tax actions are some of the most effective and most frequently used methods of influencing economic behavior and that they could be used to accelerate commercialization of emerging energy supply technologies. They can be tailored to reach a specific target, are easy to administer, and provide visibility to the public. However, they reduce tax revenue and can assume permanent status.

In our current review we are evaluating the pros and cons of these tax and other incentives. It appears that the administration's proposal for tax deductions could stimulate geothermal energy development, but the extent of that stimulation is uncertain. Whether this is an appropriate action is being addressed.

The administration's plan calls for the Departments of the Interior and Agriculture to streamline their leasing and environmental review procedures to remove unnecessary barriers to geothermal resources development. It is difficult to tell whether the administration's proposal is aimed at streamlining only the review procedures or it is intended to overcome major leasing and environmental problems.

Environmental and leasing problems have long been identified as major impediments to developing geothermal energy. These problems existed when ERDA was established in January 1975 and still exist today. The Federal effort to develop geothermal energy is fragmented among many agencies and this contributes to the problems not being resolved.

In our 1975 report, we stated that delays in the leasing program were due to leasing regulations and to required environmental analyses. To overcome these problems, we recommended that the Secretary of the Interior take the following actions:

--Improve the methods for designating a Known Geothermal Resource Area by obtaining subsurface data when practicable and, for an area designated as a Known Geothermal Resource Area because of overlapping noncompetitive lease applications, analyze the

geology before a value is assigned to it and it is offered for lease.

--Strengthen leasing regulations by (1) increasing the level of expenditures required of lessees during the primary 10-year lease term to approximately the cost of one deep exploratory well and (2) providing more specific requirements on minimum development of leases during the initial 5 years.

--Where the ownership of geothermal resources is in dispute, consider issuing leases with the understanding that all rents, royalties, and bonuses would be held in escrow pending resolution of title questions.

--Propose legislation to classify geothermal resources in a special class of their own if the lack of a clear classification hampers their development.

--If offshore geothermal sites are considered worthy of development, propose legislation clarifying the Department's offshore leasing authority.

Our current work indicates that these problems have not been corrected.

Overall lease processing times by the Departments of the Interior and Agriculture have been a major deterrent to geothermal energy development. According to Interior and ERDA officials, however, Interior has reduced its backlog on leasing land administered by the Bureau of Land Management. Current leasing rates of Federal lands under Forest Service jurisdiction have not improved and, if continued at the present rate, could be a matter of concern for future geothermal development. Lease processing times have also been delayed because Federal and State environmental protection agencies have failed to coordinate their respective actions.

From an administrative point of view, it is conceivable that the administration's proposal for streamlining the leasing and environmental review procedures can be accomplished. As lead agency for encouraging and coordinating geothermal energy development, ERDA established and chairs the Interagency Geothermal Coordinating Council. This is the formal mechanism for such coordination. However, neither ERDA nor the Council has authority to implement changes affecting other agencies activities, and this could be an impediment to the administration's proposal.

In order to properly manage energy resources on public lands, we believe the Government must establish certain policies and procedures, including:

--Basing leasing decisions on national energy needs, and not primarily on private industry initiative.

--Preparing a reliable inventory of energy resources on public lands before making leasing decisions.

--Carefully considering economic and environmental implications before making leasing decisions.

--Encouraging competition and providing a fair return to the public through leasing programs.

--Insuring that leaseholders actively attempt to develop the resources.

Nuclear fusion

Thermonuclear fusion, or simply fusion, holds the promise of an energy source with a virtually inexhaustible source of fuel; however, the concept has not yet been proven scientifically feasible.

The administration's plan briefly describes the fusion program, noting that despite many years of active effort, scientific feasibility has not been demonstrated. The plan sets no goals for the program, mentioning only that the revised fiscal year 1978 budget provides for continuing fusion work on an orderly basis.

We are currently evaluating the progress and potential problems in the fusion program, including problems that need to be addressed in order to move towards eventual commercialization. We are also reviewing the program's management and the effectiveness of international coordination and cooperation.

The administration's plan refers to the fiscal year 1978 budget reduction that has been made. To the extent that this signals the beginning of a reduced program level in future years, we believe that severe impact on fusion program plans should be expected. In our ongoing effort, we will attempt to determine the seriousness of that impact. According to program officials, the revised budget cutbacks will seriously affect progress towards proving scientific feasibility because the cutbacks are primarily being applied to the construction of facilities needed to prove whether fusion will work. It appears that the administration is willing to reduce the

level of basic research on fusion, presumably to provide more resources to the more immediate potential energy sources.

## CONCLUSIONS AND RECOMMENDATIONS

The administration proposes several actions aimed at increasing the development and use of nonconventional or "renewable" energy resources. These renewable resources include solar and geothermal energy resources, and energy from municipal solid wastes and from nuclear fusion. The administration emphasizes increased use of solar and geothermal energy applications that have been or are being demonstrated commercially. It also proposes expanded research and development on all these technologies.

The administration's proposals to promote solar energy use are discussed in chapter 3.

We agree with the proposal to expand solar energy research and development programs. However, for the Wind Energy Program, we want to restate the recommendations in our March 1977 report 1/. We recommend that ERDA perform market studies of the three sizes of wind energy systems, and use the results of those studies in directing the Wind Energy Program.

We also agree with the proposals to expand the biomass and municipal solid waste energy research and development programs.

To stimulate geothermal energy development and use, the administration proposes a tax deduction to stimulate geothermal drilling. We agree with this proposal. The administration also proposes to streamline Federal geothermal leasing and environmental review procedures. We also agree with this proposal, and made a similar recommendation in a previous report. 2/ We believe that in order to properly manage energy resources on public lands, the government must establish certain policies and procedures. We recommend that leasing decisions be based on national energy needs, and not primarily on private industry initiative. We also recommend that leaseholders be required to actively attempt to develop the resources.

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1/See footnote 3/ on p. 7.1.

2/See footnote 1/ on p. 7.4.

# CHAPTER 8

## RELATED MATTERS

This chapter contains information on selected parts of the administration's plan which is related to the matters discussed in the previous chapters.

### MANAGEMENT INFORMATION SYSTEMS

The administration's plan proposes a three part energy-information program, including a Petroleum Production and Reserve Information System, a Petroleum Company Financial Data System, and an Emergency Management Information System. The details of all three systems are still being formulated, and the administration does not contemplate that any additional legislation is necessary to put these systems into effect.

We have been concerned with the question of the adequacy and reliability of energy data for a number of years. In a 1976 report 1/, we pointed out that many problems continue to exist in the energy data area and that establishing a Department of Energy and Natural Resources with an independent data component offers the best long-term organizational solution to energy problems, including energy data problems. In the interim, we concluded that FEA could be strengthened to make it a more credible and objective focal point for Federal energy data efforts.

Partly as a result of the 1976 report and a similar report 2/ issued in 1974, the Energy Conservation and Production Act (Public Law 94-385, Aug. 14, 1976) included a number of measures providing for a more credible and objective focal point for collecting energy data. It established within FEA an Office of Energy Information and Analysis and a National Energy Information System. It also created a Professional Audit Review Team to conduct a thorough annual performance audit of the office's procedures and methodology. The team consists of employees from the leading Federal statistical agencies --the Council of Economic Advisors, Bureau of Labor Statistics, Bureau of the Census, Securities and Exchange Commission,

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1/"Improvements Still Needed in Federal Energy Data Collection, Analysis, and Reporting," OSP-76-21, June 15, 1976.

2/"Actions Needed to Improve Federal Efforts in Collecting, Analyzing, and Reporting Energy Data," B-178205, Feb. 2, 1974.

Federal Trade Commission, Federal Power Commission, and the General Accounting Office. The Chairman of the team is appointed by the Comptroller General.

Title V of the Energy Policy and Conservation Act (Public Law 94-163, Dec. 22, 1975) was enacted in direct response to congressional concern over the adequacy and accuracy of information, particularly oil and gas data. Under certain conditions, title V authorizes us to inspect the books and records of energy companies. The act also gave us a role in developing petroleum accounting practices. Section 503 requires the Securities and Exchange Commission, which is charged with developing such practices, to consult with us and others in developing accounting practices that will enable the compilation of a reliable energy data base. Under section 505, FEA must collect the energy information and submit quarterly reports to the President and the Congress.

In essence, the legislative requirements reflect concern that the diverse accounting practices used by the petroleum industry result in financial information that is unreliable for purposes of policymaking, Government regulation, and decisions by the investment community. It is expected that the Securities and Exchange Commission's accounting practices, once developed, will enable FEA to collect comparable and reliable petroleum exploration and production data.

Since the specifics of the proposed energy-information program (Petroleum Production and Reserve, Petroleum Company Financial Data, and the Emergency Management Information Systems) are still being developed, there will be opportunities to design the program so that the decisions the Government makes concerning various supply options are based on a better understanding of potential future supplies of domestic energy sources, who owns and controls those sources, and the costs associated with developing them.

We still believe that the best long-term approach to solving energy problems, including energy data collection problems, is establishing a Department of Energy. The administration's proposed legislation (S. 826 and H.R. 6804) to create a Department of Energy, including a statutorially separate Energy Information Administration within the Department, is consistent with our past recommendations and will be an essential first step in improving Federal energy data activities.

One difficulty will be properly allocating information collection and analysis activities between the Energy Information Administration and the proposed Energy Regulatory Administration. Certain information on regulatory proceedings

such as a pipeline rate setting or a gas well abandonment, may continue to be collected by the regulatory agency. There may be borderline cases where a trade-off must be made between possible duplication of collection efforts, and the chance that information collected by the information agency alone might be insufficient to meet the vigorous requirements that the regulatory agency's proceedings may demand. We currently have a review underway which analyzes this problem as it pertains to collecting and using natural gas reserves estimates by the Government, and most notably by FPC and FEA.

In a recently issued report 1/ on domestic resources and reserves, we indicated that certain information is needed to strengthen the basis for decisions about the Nation's energy future. Specifically, we found that

--data on the oil and gas potential of certain OCS areas is severely limited,

--a complete appraisal of domestic uranium resources is needed to better assess ongoing research and development programs,

--information to better assess the availability of various energy fuels under different economic conditions is lacking for most energy fuels,

--information on quantities of coal currently considered recoverable is lacking, and

--information on ownership and/or control of domestic energy resources and reserves is severely limited.

These matters should be carefully considered by the administration when it develops the specifics of the energy-information program.

In our oversight role under title V, we have closely monitored the efforts of all parties involved. We were concerned--and still are somewhat--that the scope of the energy data base has not been adequately defined and that the Securities and Exchange Commission and FEA were not working in tandem to get the job done properly, and on time. If the accounting practices needed to compile a reliable energy data base are not developed in coordination with financial accounting

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1/"Domestic Energy Resource and Reserve Estimates--Uses, Limitations, and Needed Data," EMD-77-6, Mar. 17, 1977.

practices, industry may be faced with maintaining two diverse and burdensome accounting systems.

The Securities and Exchange Commission and FEA recently began working together to define data elements and related accounting practices that they believe will be responsive to the act. We urged the development of this coordinated effort because we believe it is in the best interests of industry as well as Government. It seems to us that the responsibilities of the two agencies under title V and in the new energy-information program are directly related and their efforts will have to be closely coordinated if the Securities and Exchange Commission's accounting practices have an effect on the reliability of the energy data collected and reported by FEA.

We are continuing our energy data work (1) as part of our regular reviews of Federal programs, (2) through our verification examinations of energy company information, (3) through our consultant and oversight roles in the development of accounting practices, (4) through participation in the Professional Audit Review team, and (5) in the clearance of the information-gathering requests of independent regulatory agencies.

HYDROELECTRIC POWER

The administration's plan calls for the Corps of Engineers and other responsible agencies to report on the potential for additional hydroelectric power at existing dams, especially at small sites. Any resulting recommendations would undergo thorough environmental and budget review. The administration believes new or additional hydroelectric generating capacity at existing dams could be installed at less than the cost of equivalent new coal or nuclear capacity. Many of the sites are small, but are located near major demand centers currently dependent on imported fuel oil. The administration estimates that installing additional generating capacity at existing sites could add up to 14,000 megawatts (million watts) to the Nation's generating potential.

We have reviewed the potential for increased hydroelectric power production at existing Federal dams, and the potential for using secondary hydroelectric power from the Federal power system to displace oil and gas usage at fossil-fired powerplants. In a report to the Secretaries of the Interior and the Army and to the Chairman, Tennessee Valley

Authority 1/, we pointed out that potential exists to increase hydroelectric power production at some existing Federal powerplants by (1) modernizing turbines to increase their efficiencies and capacities and (2) modernizing generators to increase their power producing capacity. We recommended that the agencies evaluate opportunities to improve hydroelectric power production and act on those that are economically justified. In their evaluation we recommend that consideration be given to the value of the fossil-fuel consumption displaced by increased hydroelectric power production.

In another report 2/, we pointed out that oil and gas consumption could be reduced by giving priority to selling surplus Federal hydroelectric power to displace electricity generated with these fuels.

We are currently reviewing the electrical energy options for the Pacific Northwest, including the potential for small hydroelectric units as one of the renewable energy options. We anticipate issuing a report to the Congress in January 1978.

There are about 49,000 existing dams 25 feet or higher in this country. FPC statistics show that only about 1,400 (4 percent) of the existing dams have been developed for hydropower. Some of these dams could be operated as conventional reservoir-type units while others could be run-of-the-river type units. Run-of-the-river plants use ponds or the streams' natural flow to generate power. Low-head dams using run-of-the-river allow water to flow through the turbines constantly with minimal fluctuation of water level in front of the dam. Most run-of-the-river type operations are low-head projects.

Estimates vary as to the total potential power available in existing hydroelectric plants. According to American Public Power Association estimates, the potential of small hydroelectric developments is 14,000 megawatts; however, an FPC staff member estimates a 24,500 megawatts potential. According to FPC, technology has been available for years, and manufacturers are willing to enter the market and are expecting increased demand for such equipment. FPC is also

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1/"Power Production Could be Increased by Modernizing Turbines and Generators," EMD-77-22, Mar. 16, 1977.

2/Letter report (Dec. 15, 1976) to the Assistant Secretary, Land and Water Resources, Department of the Interior.

expecting increased license requests for hydroelectric projects and is gearing up for this.

Further, ERDA is jointly funding a project with the City of Idaho Falls, leading to the operation of small hydroelectric power facilities along the Snake River. ERDA points out that these systems produce a minimum impact upon a river system and are environmentally attractive and that projected power costs appear to be competitive in today's market. If, in fact, these points are correct, we would agree that developing additional or new hydroelectric-generating capacity at existing dams would be more attractive than thermal powerplants.

STATE AND LOCAL GOVERNMENT PARTICIPATION

The administration's plan calls for a review of existing energy impact assistance programs to make certain that there are no gaps. If gaps are found to exist in coverage, legislation to remedy those problems will be proposed.

We recently issued a report 1/, which addresses the Federal, State, and industry roles in providing assistance to Rocky Mountain communities affected by energy development. We believe that State and local governments in the Rocky Mountain area should be primarily responsible for providing facilities and services prior to, or concurrent with, population increases. Industry has a strong and continuing responsibility to communicate its plans to State and local governments and to meet reasonable State requirements which could include posting performance bonds and industry guarantees of local debt incurred to build needed facilities. The Federal Government recently increased its assistance to Rocky Mountain States and communities through, among other things, the Federal Coal Leasing Amendments Act of 1976 (Public Law 94-377, Aug. 4, 1976) and the Federal Land Policy Management Act of 1976 (Public Law 94-579, Oct. 21, 1976). The Government will likely provide over $2 billion in royalties, annual payments, grants, and loans between now and 1985. The need for additional Federal assistance at this time has not been demonstrated.

Further, increasing funding of present Federal programs to assist State governments may not help energy-affected communities unless the States use their discretion to distribute the funds to them. No effective mechanism exists to guarantee

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1/"Rocky Mountain Energy Resource Development: Status, Potential, and Socioeconomic Issues," EMD-77-23, Jul. 13, 1977.

the Federal Government that the funds will go to communities where impacts occur. There is no evidence that the Federal Government should interfere in the relations between State and local governments. However, we believe there should be some assurances that impacted communities will receive funds available to mitigate the socioeconomic impacts of energy development.

Based on our report, we see only a need to (1) open and staff an office in the Rocky Mountain area where State and local officials can obtain advice on the availability of Federal assistance programs, (2) monitor and periodically evaluate the need for additional Federal assistance, and (3) report annually the results of such evaluations.

Increased socioeconomic impact assistance was provided to coastal State and local governments as a result of OCS development. The Coastal Zone Management Act Amendments of 1976 (Public Law 94-370, July 26, 1976) established a 10-year, $1.2 billion Coastal Energy Impact Fund to help these governments deal with the impacts of offshore drilling operations and other activities. We issued a report 1/ on progress of Coastal Zone Management Program development activities in six States, and on activities of the National Oceanic and Atmospheric Administration and other Federal agencies with interests in the program. We did not, however, assess the adequacy of the assistance fund.

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1/"The Coastal Zone Management Program: An Uncertain Future," GGD-76-107, Dec. 10, 1976.

## CHAPTER 9

## ADMINISTRATION COMMENTS

On July 8, 1977, we provided a draft of this report to the Energy Policy and Planning staff, Executive Office of the President, for review and comment. In a meeting on July 15, 1977, informal detailed comments were made by the staff and we considered these comments where appropriate in revising the report. On July 21, 1977, we received formal comments from the staff which are included as appendix II. The formal comments concern possible misinterpretations by readers of our report and one area where the administration feels there is a crucial difference.

The administration believes that the areas of possible misinterpretation are (1) our estimate that oil imports could total 10.3 MMB/D in 1985; (2) our conclusion that it is unlikely that coal production will reach 1 billion tons in 1985, let alone 1.2 billion tons; and (3) our discussion of environmental impacts in 1985. We attempted to be as explicit as possible concerning the basis for our statements in the above three areas. However, we recognize that misinterpretations can and do sometimes occur, over which we have no control.

We think it is appropriate that the administration wishes to avoid misinterpretation of our report. It was not our intention to establish a GAO base case forecast or a revised estimate of what the plan will achieve, but to comment on the plan from the perspective of our past and ongoing work.

However, we disagree with the administration's statements that (1) our discussion of environmental problems should not be taken as evidence that environmental problems in 1985 will be significantly greater if the plan is implemented and (2) that the administration's analysis shows that the plan will not generate significant environmental impacts beyond those which would otherwise occur.

Our discussion of environmental impacts deals with both the currently regulated pollutants from coal and those which are not regulated and which cannot be controlled with existing technology. We state on pages 5.21 and 5.35 that we believe further environmental degradation will take place despite the strong pollution control measures proposed in the plan because many pollutants emitted from coal burning are not regulated and cannot be controlled even using the best available control technology. Further, the administration's analysis, which we summarize in our report, does not

analyze unregulated pollutants such as trace metals and sulfates in reaching its conclusion concerning environmental impacts. Finally, if the administration's analysis demonstrated that the plan would not generate significant environmental impacts, we would question the need for the study of the health and environmental effects of increased coal use which is proposed in the plan.

The administration's main concern with our report relates to the necessity of designing a national energy plan which will meet its goals. The administration believes that a national plan should not be just a Federal plan but should call for a response from the States and citizens as well. There may be some validity to this point, but is virtually impossible to assess what that response might be.

Accordingly, we believe that a national energy plan should insure to the maximum extent possible that the response desired from all sectors will be achieved, and not rely so heavily on unspecified voluntary and other actions. Further, since under the best of circumstances, plans designed to meet goals often fall short, we continue to believe that the plan should be redesigned to provide a reasonable opportunity of achieving the stated goals. As such, we do not consider the goals to be redundant or meaningless. Rather, they need to be achieved if this Nation is to solve the energy problems of the coming years.

Finally, we agree with the administration that the measures contained in the plan must be viewed as a minimum agenda for national action. Much more needs to be done.

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**EXECUTIVE OFFICE OF THE PRESIDENT**
ENERGY POLICY AND PLANNING
WASHINGTON, D.C. 20500

JUL 21 1977

Dear Mr. Staats:

We have a strong belief that independent analysis of the Administration's National Energy Plan can make a significant contribution to Congressional consideration of new energy legislation. To this end, while we may disagree with some of the findings, we are pleased that studies of the Plan by the Congressional Budget Office and the Office of Technology Assessment have helped to focus attention on the severity of the nation's energy problems, the need for timely and effective action to deal with those problems, and the issues that Congress must consider in its deliberations on the Administration's proposal.

In the same spirit, we have also worked closely with the staff of the General Accounting Office to try to ensure that this report helps to clarify the issues before the Congress. Again, while we disagree on details, we are pleased that the GAO, too, recognizes the need for action.

However, we are concerned that this report may be a major source of unintended confusion. Throughout the report--which builds heavily on GAO analyses completed or under way prior to publication of the Plan--the GAO makes criticisms that apply not to the beneficial impacts of the Plan but instead (or at least equally) to the Administration's projections of the situation in 1985 without the Plan. Such a perspective tends to obscure the important benefits of the Plan, most of which will be achieved whatever the base case in 1985 may be.

There are three major examples that could cause misunderstanding.

The first of these is the GAO estimate that oil imports with the Plan could total 10.4 million barrels per day in 1985. The disagreement with the Administration's estimate of 6 million barrels per day is not due primarily to disagreement with estimates of savings or of coal conversion impacts of the Plan, but to GAO's disagreement with the supply projections in the base case. If, in fact, GAO is right in these assessments, then as a matter of arithmetic imports in the absence of the Plan would also be higher than the GAO's estimates of the imports with the Plan, and higher still than the Administration's estimates of the imports in the base case. GAO has not performed the calculations necessary to estimate total imports in the absence of the Plan or the savings attributable to the Plan.

The second example is the discussion of the consumption of coal in 1985. GAO believes it is unlikely that either the Administration's base case projection of 1 billion tons per year, or the Plan's projection of 1.2 billion tons per year, will be achieved. However, GAO presents no evidence that the Plan will not induce additional consumption of coal--over whatever is the appropriate baseline.

The third example concerns health and environmental impacts of the Plan. A healthy and growing economy between now and 1985 will mean a higher level of economic activity and a higher level of pollutant emissions in that year, with or without the National Energy Plan. GAO emphasizes the problems of controlling pollutants in 1985. However, this discussion should not be taken as evidence that environmental problems in 1985 will be significantly greater if the Plan is implemented. In fact, the Administration's analysis shows that the Plan will not generate significant environmental impacts beyond those which would otherwise occur.

Again, it is recognized that any confusion that may arise on these points is unintended. However, we feel that it is vital that any comparison of the effects of the National Energy Plan be made with respect to a projection of the situation in 1985 without the Plan. The reader is cautioned to distinguish carefully when the GAO is referring to estimated savings and when it is criticizing the projections of the Administration's base case.

The Honorable Elmer Staats -3-

There are other matters on which we differ with the GAO report. However, we feel that one is crucial.

Unlike GAO, the Administration believes that a national plan should not be just a Federal plan but should call for a response from the States and citizens as well. With a national response the energy goals proposed in the National Energy Plan can be achieved. Besides stimulating State and private action, however, the goals also provide a benchmark. Failure to achieve the goals would indicate the need for further legislative action. If, as GAO recommends, legislation now would insure achievement of the goals, the goals would be redundant or meaningless.

Finally, we would also point out that, if the GAO's assessment is, in fact, correct, the nation's energy situation in 1985 will be far worse, without the Plan, than the Administration has projected. In that case, the arguments for the measures contained in the Plan become even more urgent, and the Plan must be viewed as a minimum agenda for national action.

Sincerely,

Alvin L. Alm

Alvin L. Alm

The Honorable Elmer Staats
Comptroller General of
the United States
Washington, D. C.

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