

PRESIDENT CARTER'S ENERGY PROPOSALS: A PERSPECTIVE

Staff Working Paper

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**PRESIDENT CARTER'S ENERGY PROPOSALS:
A PERSPECTIVE**

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PREFACE

One of the major issues to be decided by the 95th Congress is that of a national energy plan. Decisions on energy policy will affect virtually every household and business in the United States, with direct impacts on patterns of consumption and investment practices, and indirect effects on unemployment and economic growth. The complex proposed system of energy-related taxes and rebates may also be felt--often unevenly--by different income groups, regions, and economic sectors.

At the request of the Senate Energy and Natural Resources Committee and the Ad Hoc Committee on Energy of the House of Representatives, the Congressional Budget Office has prepared this preliminary evaluation of the Administration's proposed National Energy Plan. While it is impossible at this stage to provide a comprehensive analysis, the information presented here may assist in focusing the Congressional debate. In keeping with CBO's mandate to provide objective analysis; this report contains no recommendations. More detailed analysis of specific proposals will be prepared over the next several months.

The report was prepared under the supervision of Raymond C. Scheppach of CBO's Natural Resources and Commerce Division with the assistance of Richard D. Morgenstern, who also contributed to individual chapters. Major contributors included Damian Kulash, Lawrence Oppenheimer, Richard M. Dowd, and Reginald Brown of the Natural Resources Division; Peter Karpoff of the Tax Analysis Division; Frank de Leeuw of the Fiscal Analysis Division; and June O'Neill of the Budget Analysis Division. The authors received valuable assistance from Craig Roach, Richard Mudge, Mike Owen, Ron Hoffman and other members of the CBO staff as well. Katharine Terrie Bateman, Patricia A. Knapick, Patricia H. Johnston, and Johanna Zacharias each edited portions of the manuscript. The task of typing the several drafts was shared by Barbara M. Bishop, Angela Z. Evans, Janet L. Fain, Shirley G. Hornbuckle, Dorothy J. Kornegay, Connie S. Leonard, and Cheryl L. Miller.

Alice M. Rivlin
Director

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SUMMARY

The energy plan submitted by President Carter to the Congress contains more than 100 interdependent proposals aimed at reducing consumption of petroleum, converting from oil and natural gas to coal as an energy source, and increasing domestic supplies of energy. These proposals are designed to reduce imports of crude oil from a potential 11.5 million barrels a day to 7.0 million barrels by 1985. Of these projected 4.5 million barrels a day saved, the Administration estimates that approximately 2.1 million would be attributable to conservation and 2.4 to the substitution of coal for oil and gas.

This report analyses five major sets of proposals in the Administration's plan:

- o Pricing of crude oil,
- o Pricing of natural gas,
- o Conversion to coal,
- o Automobile-related proposals, and
- o Tax credits for home insulation and solar heating equipment.

The Administration estimates that altogether, these sets of proposals would achieve a reduction in oil imports of 3.2 million barrels a day by 1985. The analysis conducted by the Congressional Budget Office and presented in this report, however, indicates that this saving is overoptimistic; CBO estimates that the proposals would be likely to save closer to 2.3 million barrels a day. About 0.6 of the 0.9-million-barrel difference results from lower estimates of coal conversion potential; the remaining 0.3-million-barrel discrepancy is due to differing estimates of the results from the home insulation and solar equipment tax credits. The Administration asserts that an additional savings of 1.3 million barrels a day (over and above the savings from the five main proposals) can be expected to result from various proposals such as new building standards; these have not been analyzed by CBO. On the assumption that these unanalyzed savings will be realized, however, the total oil import savings achieved by the Administration's plan are estimated by CBO to be about 3.6 million barrels a day, rather than

the Administration's estimated 4.5 million barrels. The Administration's plan leaves open the possibility of future measures not included in the present proposed legislation that could help close this gap.

THE NEED FOR AN ENERGY PLAN

The need for a national energy plan arises from both immediate and long-run problems. The long-run problem is simply that the growth in oil and gas consumption exceeds the growth in proven reserves--both domestic and foreign. Before long, we will have to shift to new energy sources or face drastic reductions in our standard of living. The more immediate problem is that U.S. imports of oil have increased substantially--from 3.5 to 7.3 million barrels per day between 1970 and 1977. The fact that almost half of the oil consumed in the United States is now imported creates national security risks and makes our economy highly vulnerable to shocks from outside, especially because the supply and price of oil are to a great extent dictated by an international cartel.

The major reason for the substantial increase in our dependence on imports is the current system of price controls on oil and gas, which have kept the domestic price of these fuels artificially below world levels. Over the past four years, this regulatory system has served to cushion Americans from the dramatic shifts in consumption, and in turn in lifestyles, that might otherwise have been caused by the abrupt quadrupling of world oil prices by the OPEC cartel in 1973-1974. Artificially low prices have also tended to encourage energy consumption and discourage the search for and production of new domestic resources--thereby further increasing our dependence on potentially unreliable foreign suppliers.

THE ADMINISTRATION'S STRATEGIES

To reduce our dependence on imports, the President has proposed three major strategies:

- o Reduce the long-term growth in energy demand by imposing various excise taxes that would serve to raise the price of petroleum and related products to world levels or near world levels. New regulatory standards are also proposed, and special efforts are made to reduce the growth in demand for gasoline.

- o Increase large industries' and utilities' use of coal instead of oil or natural gas by taxing their use of the latter two fuels. Regulations are designed to prohibit most new industrial and utility use of oil and natural gas.
- o Increase domestic supplies by reintroducing market pricing, or near market pricing, for truly new energy supplies. Accelerated development of new energy sources, however, is not stressed.

A critical element in the President's proposal is the effort to raise the price of petroleum and natural gas by predictable increments so that consumers and businesses can begin to make decisions on the basis of higher future energy prices. The theme of the plan is that the transition to a less energy-intensive economy is a long and complex process. Incentives established now to alter consumption and investment decisions regarding energy will only begin to yield significant savings within the next few years. Truly large-scale energy savings will not show up until the middle of the next decade or later.

Energy price increases under the plan would be achieved mainly by a system of taxes to be rebated to consumers. Such taxes are preferred to simple increases in private-sector prices because the taxes capture windfall profits for the public rather than for industry. These tax revenues would then be rebated in order to maintain the real purchasing power of consumers. Since the taxes would have raised energy prices relative to others, however, it is expected that most of the rebates would be spent on other goods; energy would thus be saved.

CONCLUSIONS OF THE STUDY

The general conclusion of the CBO analysis is that the strategies proposed by the Administration would be effective in reducing energy use and dependence on oil imports, but that the Administration's estimates of the magnitudes of import savings are overoptimistic.

One of the costs of the plan would be a rise in the general price level, but the inflationary effect would be small and gradual compared to that of the OPEC price increases of 1973-1974. The plan would redistribute real income from some groups to others, but on the average, lower-income people would be protected. The shift to a more energy-efficient economy envisioned by the plan would not involve dramatic adjustments in American lifestyles; for example, the increase in miles driven per household would be slowed but not reversed.

Crude Oil Pricing

The Administration's plan would retain controls on prices received by domestic oil producers, but it would allow the controlled price of newly discovered oil to rise over three years to the 1977 world price with subsequent adjustments for domestic inflation. This price would offer substantial incentives to increase production of domestic oil, but actual increases in production are likely to be relatively small. CBO estimates that the rise in price for newly discovered oil would increase production by about 100,000 barrels a day by 1985; the Administration's estimate of increased production is slightly higher.

To discourage consumption of oil, the plan would raise prices paid by domestic consumers to world levels by imposing a "crude oil equalization tax" equal to the difference between world and domestic prices. This tax would capture for the public the windfall profits associated with higher prices on already discovered oil and would return those profits to consumers in the form of rebates.

The equalization tax on crude oil will increase the price of petroleum products by an estimated 4 to 5 cents per gallon (in current dollars) by 1980; this amount is in addition to the increase of 4 to 5 cents per gallon projected under existing legislation. The tax would also lead to the elimination of the so-called "entitlements program," and would thereby reduce some of the regulatory burden on the industry. The equalization tax appears to be an effective mechanism for equalizing foreign and domestic oil prices and capturing windfall profits. It would provide a slight incentive for consumers to reduce consumption or convert to alternative sources. Proposed user taxes on oil provide additional incentives for industry and utilities to convert to coal.

Natural Gas Pricing

The pricing proposal for natural gas eliminates the current distinction between interstate and intrastate markets by placing all gas under federal jurisdiction; it places a cap on the price of new gas at \$1.75 per thousand cubic feet. In addition, a special excise tax is placed on use of natural gas by industries and public utilities. The purpose of these proposals is three-fold:

- o To protect residential consumers against high prices and shortages,
- o To make gas expensive for industries that can convert to coal, and
- o To increase new supplies but reduce the possibilities of producers' gaining excessive profits on previously discovered gas.

With the exception of the degree of coal conversion, CBO finds that the natural gas proposals will attain the stated objectives. The proposals would generally reallocate the existing supplies of natural gas; no energy savings would therefore be attributable to this proposal according to either the Administration or CBO.

Coal Conversion

Since the goal for conversion of utilities from oil and gas to coal is generally consistent with current trends, CBO concurs with the Administration's conversion estimates in this area. A major discrepancy exists, however, in estimates of the likelihood of attaining the goal for industrial conversion. If present policy were continued to 1985, only 12 percent of new industrial demand would burn coal. The President's plan envisions that industrial consumption of coal would more than double by 1985. Accomplishing the Administration's goal would require that 10 percent of all existing oil and gas used for industry be converted to coal and that 44 percent of all new potential users would convert to coal. This report agrees with the President's 10 percent conversion of existing industrial use but projects only 33 percent of new uses to be converted to coal. (The reasons for this lower estimate include the logistics of transporting coal, concerns about protecting the environment, and problems of scheduling new coal facilities to maximize the benefits of rebates,

all of which will impede new conversion.) This would result in total coal consumption by industry of 360 million tons by 1985--50 million tons below the Administration's estimate.

In terms of equivalents in barrels of crude oil, CBO's estimate translates into a savings in imported oil of 1.8 million barrels a day, which is 0.6 million below the Administration's figure. To some extent, however, the attainment of the goal would depend upon the future actions of the Administration since it could control both the specification of coal regulations and their subsequent enforcement.

Auto-Related Proposals

The automobile-related provisions of the President's energy package are aimed at reducing gasoline consumption through production and sales of vehicles with greater fuel efficiencies, and through price-induced reductions in the number of miles driven. The goal of the plan is to reduce total gasoline consumption by 10 percent from current levels by 1985. This is an ambitious goal, considering that motor gasoline consumption has increased at 4.5 percent per year between 1965 and 1975, but its attainment would be aided substantially by existing legislation. In particular, the Energy Policy and Conservation Act of 1975 set fuel economy standards for new cars under the threat of civil penalties. While CBO does not expect these standards to be met in every year, it does anticipate that they would have significant effects on automobile gasoline use. In 1985, holding it within one percent of the present level. CBO estimates that adoption of the President's plan would reduce automotive gasoline consumption further, but to 5 percent beneath its present level, not 10 percent below as projected by the Administration.

Three programs in the President's plan contribute to gasoline savings. More than half of the savings come from the President's proposed "gas-guzzler" taxes and rebates based upon a new car fuel economy. This program is estimated to yield fuel savings of 215,000 barrels a day in 1985. Second, standby gasoline tax could be triggered as early as 1982 according to CBO projections, and assuming that it is triggered then, it would produce gasoline savings of 65,000 barrels per day in 1985. Finally, the crude oil equalization tax is expected to contribute an additional 25,000 barrels a day of gasoline savings in 1985. Taken together, these three programs would yield total gasoline savings of 305,000 barrels a day in 1985, less than a tenth of the energy savings produced by the President's plan as a whole.

CBO's estimate of the fuel savings for the gas-guzzler excise tax and rebate program is slightly higher than the Administration's, and the Administration has not yet computed comparable estimates for the standby gasoline tax and crude oil equalization tax. The Administration has indicated, however, that without the standby gasoline tax, 1985 gasoline consumption would be 350,000 barrels per day above target. While CBO expects that 1985 gas consumption would most likely exceed the target by more than this, the excess above target in both sets of projections is greater than the estimated 65,000-barrel savings of the standby gasoline tax, implying that the President's goal of a 10 percent gasoline reduction by 1985 appears unlikely.

Future gasoline consumption by trucks introduces considerable uncertainty as to whether or when the President's goal would be met. At present, trucks account for more than 20 percent of the nation's gasoline consumption, and their future share of gasoline use could rise if their fuel economy improvement does not keep pace with that of autos. The fuel economy of light trucks is expected to improve as a result of existing legislation as well as through the President's gas-guzzler proposal as it would apply to light trucks. But both existing and proposed legislation in this area are keyed to a set of standards that have not yet been specified, so that assessment of their conservation impact is impossible at this stage. CBO analysis indicates that these future developments in the fuel economy of trucks would have a major effect on the triggering of the standby gasoline tax, and could delay it from 1982, as projected above, to 1983 or 1984. Policies related to trucks play a key role in shaping an effective and even-handed policy for transportation fuel conservation.

Insulation Tax Credit

The proposed insulation tax credit is likely to encourage some additional homeowners to upgrade the insulation in their homes. With sharp rises in fuel prices since 1973, however, many homeowners have already reinsulated or have decided to do so in the future. For example, about 3 million homeowners chose to upgrade their insulation in 1976. With current energy prices, insulation is already a good investment since the savings in fuel bills are about three times the cost of the insulation. The proposed credit would increase this ratio of savings to cost to 4 to 1.

Between now and 1985, an estimated 24 million homeowners and renters are likely to reinsulate their dwellings. CBO estimates that nearly 8 million of the 24 million would be an increase attributable to the tax credit. The 24 million translates into a total of 70 percent of all residential homeowners as opposed to the 90 percent projected by the President. CBO estimates the energy savings attributable to these nearly 8 million households would be approximately 120,000 barrels of oil a day.

The Administration, on the other hand, estimates that a savings of 480,000 barrels would be due to the credit and related programs. The major difference is that CBO estimates that an additional 280,000 barrels a day will be saved by re-insulation that people would do anyway without the Carter plan, adding up to a total of 400,000 barrels per day from all insulation. The Administration assumes that a total of 480,000 barrels a day savings would be induced by the plan.

Short-Run Impacts on the Economy

President Carter's package would have a major impact on energy markets, a noticeable but small impact on the overall rate of inflation, and only a minor impact on total output and employment. CBO estimates that the President's plan would add about 1.6 percent of the level of consumer prices by 1980 or about half a percentage point a year to the rate of inflation from 1978 through 1980. The output effect is estimated to reduce constant-dollar gross national product by no more than 0.7 percent by the end of 1980, thus adding 0.2 percent to the unemployment rate. These estimates do, however, assume that there will be no new investment for conversion during the next two years. The total impacts on unemployment and real growth could therefore be partially offset if additional investment is forthcoming.

Distribution Effects

A final issue addressed in this study is the combined impact that the energy proposals and tax rebates would have on various groups of Americans. Assuming that the various taxes would be passed on to consumers almost entirely, close to \$13 billion would be paid by 1980 (in 1977 price levels) in higher energy prices.

In addition to this total effect, the energy proposals would redistribute purchasing power from persons in the upper three income quintiles to the two lowest quintiles in 1980 and from the upper three quintiles to the lowest two in 1985.

Other shifts are likely to take place as well. For example, people who do not own automobiles would gain at the expense of automobile owners. Homeowners would gain at the expense of renters, and city dwellers with access to public transportation would gain at the expense of persons in suburbs and rural areas.

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CHAPTER I. SCOPE OF THE REPORT

President Carter's energy proposals focus on one of the most critical issues to be debated by the 95th Congress. They address a problem that has become progressively acute and then promises to get still worse. If the proposals are enacted, they will affect every household and business in the United States. It is essential, therefore, that the Congress be able to debate the major issues and decisions quickly.

This working paper is intended to assist in the Congressional debate by offering an independent evaluation of the proposed energy program. Because of the timing of this response, however, its scope must be restricted. Accordingly, the report focuses on the major energy initiatives of coal conversion, the crude oil equalization tax, natural gas pricing, home insulation and solar equipment tax credits, and the two automobile-related proposals. Secondary proposals, such as standards on new appliances and buildings, which altogether the Administration estimates account for less than 30 percent of the potential savings, are not addressed in this report.

Essentially, the paper has five major objectives:

- o To give an overview of the general strategy,
- o To provide analysis of the major initiatives,
- o To convey information about the incentive mechanisms,
- o To indicate short-run macroeconomic impacts, and
- o To specify possible changes in the distribution of income.

Chapter II offers a general orientation, describing the overall philosophy of the President's approach and its critical features, and placing it in the spectrum of possible alternatives. Perhaps more important, however, it specifies a framework for evaluating the individual proposals that is used throughout

the subsequent chapters. Chapters III through VII evaluate and analyze the major energy initiatives within the package. Chapters VIII through X attempt to assess the general costs and benefits of the major proposals. Budget costs, macroeconomic effects, and distributional impacts are addressed in these final three chapters..

The President's energy plan contains a variety of interlocking pricing policies, regulatory mechanisms, and administrative actions designed to accomplish two goals: to reduce the nation's reliance on imported oil, and to speed the transition toward an economy that consumes less energy. This chapter presents an overview of the general direction of the plan, contrasting its emphases with those of alternative approaches. It outlines the principal costs and benefits of the plan; it also examines some general characteristics of the nation's consumption of energy, which must be understood in order to develop a balanced and effective energy policy.

THE PRESIDENT'S STRATEGY

Artificially low prices for oil and natural gas have contributed to putting the United States in a precarious position. The complex system of controls on oil and gas prices now in force in the United States has kept the domestic price of these fuels below world levels. This regulatory system has cushioned Americans against the dramatic changes in consumption, and in turn lifestyles, that might have been caused by the abrupt quadrupling of oil prices by the cartel of Oil Producing and Exporting Countries (OPEC) in 1973 and 1974. Artificially low prices have also tended to encourage energy consumption however, and to discourage the search for and production of new domestic resources. The indirect effect, therefore, has been to increase our dependence on foreign suppliers. With energy consumption continuing to grow, and proven reserves of oil and natural gas not keeping pace, the potential impact on the United States of another disruption like that of the OPEC oil embargo of four years ago is great.

To solve the problem that has been partly caused by these artificial energy prices, the Administration has put forth three major strategies:

- o Reduce the long-term growth in energy demand by imposing various excise taxes to raise the price of petroleum and related products to world or near world levels. New regulatory standards are also proposed and special efforts are taken to reduce the growth in demand for gasoline.
- o Shift large industries and utilities to burning coal (of which domestic supplies are abundant) instead of oil or natural gas by taxing the use of the latter two fuels. Regulations are designed to prohibit most new industrial and utility use of oil and natural gas.
- o Promote the increase of domestic supplies by reintroducing market pricing, or near market pricing, for truly new supplies of oil and natural gas.

An underlying theme of President Carter's program is that the transition to a less energy-intensive economy is a long and complex process. Incentives set in motion now to alter consumption patterns and investment decisions will begin to yield significant savings only after a few years. Genuinely large-scale energy savings will not begin to show up until the middle of the next decade.

To avoid uncertainties about future shortages and disruptions, however, major changes in incentives and in patterns of energy use may have to start now. A clear set of signals with respect to future energy prices is essential. Future price uncertainties must be minimized; this, in turn, should encourage both consumers and businesses to begin the long, gradual process of changing their capital purchases to reflect higher energy prices over the long term. Use of a more efficient capital stock should substantially curb the growth in energy demand.

Market incentives are not the only consumption-curbing devices in the Administration's program. The plan also uses taxes to capture most of the windfall gains that would otherwise go to energy-producing industries and returns these tax revenues to the public by means of a system of rebates. Higher prices for energy are phased in over several years, and fuels

for certain uses (e.g., home heating) are effectively excluded from the price increases. The use of gasoline is particularly discouraged, as is the use by large industrial consumers and utilities of oil and natural gas instead of coal. Certain direct monetary inducements are offered for particular types of energy conservation (e.g., home insulation). And, regulations are designed to reduce consumption in other areas (e.g., home appliances).

Producers of oil and natural gas are allowed price increases of 20 to 30 percent for truly new production and for tertiary recovery (i.e., third-time use of a given well), and prices are protected from future domestic inflation. Should the rate of growth in world prices exceed the rate of domestic inflation, oil prices received by domestic producers will be limited to the growth in the general inflation rate. Thus, future actions of OPEC will not necessarily determine prices charged by domestic producers, but unless they are excessive, future OPEC actions will affect prices paid by American consumers.

ALTERNATIVE APPROACHES TO NATIONAL ENERGY POLICY

In view of the numerous, highly specialized components required in a national energy plan, there can be many alternative programs. While the number of combinations of elements is limitless, there are three general directions against which it is useful to compare the President's plan:

- o Set more ambitious conservation goals,
- o Rely more heavily on free market mechanisms to increase supply of oil and gas, or
- o Undertake crash programs for new technologies.

More Ambitious Conservation Goals

The belief that a severe energy crisis is close, or the belief that the hazards to the environment and to health associated with a continuation of present levels of energy consumption are unacceptable, might lead one to advocate more ambitious conservation goals than those put forth by President Carter.

Energy conservation is to be brought about largely by gradual changes in the type and efficiency of consumer durable and of producer's investment goods. Such changes would inevitably be slow. Therefore, the argument goes, in order to have any real impact, a program must set more ambitious goals.

The implementation of such a strategy might involve either a more complete and less gradual reliance on the price mechanism; alternatively, it might involve direct controls and regulations. If the latter approach were followed, production subsidies might be required. The immediate sacrifices required of both individuals and businesses would be greater than those called for by the President's plan.

Greater Reliance on Market Mechanisms

Underlying the free market emphasis is the belief that government intervention in energy markets distorts the desired economic signals to both consumers and producers. The logic of this approach is that, if domestic production is inadequate and dependence on imports too great, domestic prices should be allowed to rise to stimulate new production; presumably, this increased production would boost the demand otherwise inhibited by higher prices. In fact, to a large extent this is the approach of the President's plan, but mainly on the demand reduction side. Rather than extending the incentives of higher prices to potential producers, the plan uses taxes to raise prices to consumers--and continues many price controls.

Opposition to extending the market approach has developed on several grounds. First, the OPEC cartel is just that, a cartel. The prices it sets do not necessarily imply "market justice." Second, opinion varies widely about the ability of the U.S. resources to meet domestic energy needs--even if prices were allowed to rise to world levels. Many experts believe that freeing prices from all controls would yield little additional domestic supply; others contend that higher prices could induce both the discovery of new resources and substantial additional production from existing reserves. Third, there are questions about the extent of economic disruption that the higher prices would cause. Finally, feeling among Americans is widespread that the producers are not entitled to the large windfall profits associated with higher prices.

Crash Programs for New Technologies

A crash program for new energy technologies is often compared with the Manhattan project, which developed the first atomic bomb, or with the Apollo program, which succeeded in landing a man on the moon. In both of these programs, massive federal funding was used to accelerate the research, development, and demonstration (termed R, D, and D) process. Some observers argue for a similar program in the energy field, focusing efforts on new energy technologies and on attempts to reduce the health and safety risks of known technologies, especially those involving plutonium and the completion of the nuclear fuel cycle.

It is probably true that massive new federal spending (beyond the \$3 billion allocated to the Energy Research and Development Administration--ERDA--in 1977) would accelerate the R, D, and D process. But even the most optimistic scientists indicate that new technologies could not be developed and adopted before 1990. Consequently, in the short to intermediate term, the crash program appears not to be a reasonable substitute for a conservation plan.

BENEFITS AND COSTS OF THE NATIONAL ENERGY PLAN

The President and members of his Administration credit the national energy plan with several major benefits, among them reduced reliance on imported oil, an orderly transition toward an energy scarce economy, and insulation from future energy shocks. The Congressional Budget Office is in general agreement that the plan would make progress toward achieving these benefits. In some important instances, however, CBO's numerical estimates of savings and related magnitudes are smaller than the Administration's.

Reduced Reliance on Imported Oil

The principal benefit attributed to the President's energy plan is that it would reduce U.S. dependence on oil imports. The Administration estimates a reduction of 4.5 million barrels a day by 1985; CBO estimates are closer to 3.6 million barrels per day. Even in the lesser case, however, such a reduction in imports is translated into a reduction in the economic and national security risks associated with a critical natural

resource, the supply and price of which may be dictated by an international cartel. Not only does the Administration's program offer some insulation from both short-run supply interruptions and long-run curtailments; it may also increase the ability of the United States to exercise some influence over the OPEC price.

Smooth Transition to an Energy Efficient Economy

A principal potential benefit of the plan is that it will help steer an orderly transition from what now appears to be an energy-rich economy to one that is generally expected to be more energy-poor. Since the use of energy is closely tied to the efficiency of equipment in factories and farms, the transition to a less energy-intensive economy involves considerable time while capital stock is replaced with energy-efficient substitutes. A gradual move toward greater efficiency, as opposed to a crash program at some later date, will help prevent excessive capital losses by individuals or businesses, and will help to avoid general economic disruptions.

Insurance Against Future Energy-Shock

Because there is so much uncertainty about energy futures, the President's energy plan can be viewed as a type of insurance policy. By reintroducing market or near-market price incentives for both consumers and producers, the plan attempts to discourage consumption and encourage domestic production, thereby reducing doubts about the ability of the U.S. economy to survive any energy crisis that may develop.

Costs Of the Plan

The Administration's energy policy would also impose several major costs on the nation, however. First, modes of living and working are likely to change as a result of higher fuel prices and therefore many people may be inconvenienced.

Second, many individuals and businesses may incur capital losses on their consumer durables and investment goods that are inefficient in energy use and that become obsolescent.

Third, the macroeconomic effects would be small but noticeable. If the President's plan is enacted, the rate of inflation is expected to increase by an annual rate of about 0.5 percent over the next several years. The growth rate of the gross national product (GNP) is likely to be slowed slightly and the unemployment rate increased by a small amount. If increases in the demand for new (energy-efficient) investment goods is only slightly larger than anticipated, however, this increase could more than wipe out the expected GNP and employment losses, making the macroeconomic impacts of the President's plan negligible.

Fourth, although the plan would use rebates to cushion the losses in purchasing power associated with the overall increase in energy prices, these rebates would not be distributed evenly. Families in upper-income classes would generally pay a higher absolute amount of their incomes for energy, while lower-income families would receive a disproportionately large share of the rebates. Any individual's automobile ownership and place of residence, however, would produce a different effect.

THE PRESIDENT'S PLAN IN CONTEXT

Before analyzing individual programs within the President's plan, it should be helpful to examine several features of the plan as a whole in the context that surrounds it. Specific features include:

- o The differences between the President's plan and his proposed energy act,
- o The expected future growth in petroleum consumption,
- o The nature of the much-discussed "sacrifices,"
- o The importance of regulatory measures,
- o The interdependence of proposals within the plan, and
- o The timing of costs and benefits.

The Plan and the Proposed Legislation

A key feature of the President's energy plan is that the goals and energy savings incorporated into it may not be fully achieved by the National Energy Act as introduced. While the Administration hopes that the act will attain the stated goals, it recognizes that this hope may not be realized and that additional legislation or regulations may be required later. Indeed, the Administration seems to be viewing its plan in two stages: the initiative contained in the proposed act first, then more severe measures if the legislation does not accomplish the specified goals. Many of these more severe measures are included in the plan, but are not incorporated into the legislation now before the Congress.

The potential gap between the energy savings of the plan and the act depend significantly on a number of additional regulatory decisions, such as exemptions from mandatory coal conversion, over which the Administration would have control. Strict enforcement would increase the probability that the goals would be attained. Consequently, the commitment of the Administration to the goals is critical in determining the efficacy of the overall plan.

Energy Savings and Rising Consumption

Because the nation's population is expected to grow and the standard of living is expected to rise, the nation's use of energy in 1985 is anticipated to be 30 percent greater than it was in 1976 if present policies and practices continue. Similarly, the nation's use of petroleum products in 1985 is projected to be almost 23 million barrels per day--again, about 30 percent greater than it was in 1976. While the President's plan would reduce this petroleum use (by 3.6 million barrels per day according to CBO estimates and by 4.5 million barrels per day according to the Administration), the reliance of the United States on petroleum in 1985 will, in absolute terms, still be greater than it is now. Thus, the savings reflect reduced growth in energy consumption, rather than absolute declines. This should be kept in mind, since all the estimates of energy savings provided by the President's plan are analyzed relative to expected outcomes under present policy, that is, assuming the extension of the Energy Policy and Conservation Act (EPCA) through 1985. Although both CBO and the Administration have worked with this baseline,

savings would be overestimated if, in fact, EPCA were not extended and prices were allowed to approach the world market levels after 1981.

The "Sacrifices"

Much of the discussion of the plan describes reductions and substitutions in consumption that will be made by the American people in response to the President's plan. By and large, these adjustments are really slowdowns in the rate of the rise of the standards of living between now and 1985. But even with the rate slowed, the standard in 1985 would still be higher than it is now. For example, the average American family now drives slightly less than 15,000 miles per year. Under the plan, they would likely drive 17,000 miles in 1985, which is more than they drive now even though it is less than the 18,000 miles they would drive without the plan.

Regulatory Measures

The major thrust of the President's package appears to be one of increasing energy prices to consumers so that they will make their normal market adjustment of decreased consumption. But, a relatively high proportion of the estimated energy savings comes from the implementation of new standards on appliances, on new commercial and residential buildings, and so forth. These features represent an extremely important part of the program.

Interdependence of the Proposals in the Act

The plan embodies a set of proposals that are very interdependent. To a large degree, there is a "carrot and stick" philosophy. An example of this principle is the extension of tax credits to industry. Firms, which would already benefit to some extent from raising the prices of their products, would be further induced to increase their output of energy-efficient items by the reward of a tax credit. The importance of this reward would rise over time as increased costs threatened to erode profits. Taken one by one, either of these two proposals might yield only marginal energy savings, but combined, the effect may be substantial.

Timing of Costs and Benefits

Finally, the costs of the plan--higher taxes and the like --would begin immediately upon adoption, but most large-scale benefits would not become apparent until the latter part of the next decade and beyond. Further, like many national defense expenditures, the benefits are likely to accrue to the nation as a whole and not necessarily to individuals. The costs, however, are likely to be experienced first, more directly, and by more people.

The President's proposals on crude oil pricing are intended to accomplish several objectives:

- o to increase incentives for domestic oil production by raising the price received by producers of newly discovered oil;
- o to prevent the petroleum industry from gaining windfall profits on already discovered oil;
- o to discourage consumption of crude oil by raising the prices paid by domestic consumers to world levels;
- o to discourage consumption further by imposing a tax on industrial and utilities users of petroleum products.

The plan would retain controls on prices received by domestic producers of oil, although it would allow the controlled price of newly discovered oil to rise. It would raise the price of oil paid by consumers to the world level by imposing "a crude oil equalization tax" equal to the difference between world and domestic prices.

Incentives for new production under the plan are where they would be most effective--on newly discovered oil. Although domestic production costs are high, the producer revenues permitted for new oil would be among the highest in the world. In addition, large users of petroleum would be taxed in order to encourage them to convert to coal. The revenues from the tax would be available as rebates to be used to defray the costs of conversion. This chapter projects the total revenues of the tax while the success of this tax on coal conversion is addressed in Chapter V.

The conclusions presented in this chapter are that the equalization tax is an effective mechanism to equalize crude

oil prices and capture the potential windfall profits. It also will lead to elimination of the entitlements program and thereby reduce some of the regulatory burden on industry. The crude oil equalization tax also increases prices to consumers by between \$0.4 and \$0.5 per gallon (in current dollars) over the increase that would occur under current legislation between 1978 and 1980, thereby providing a small incentive to consumers to reduce consumption or convert to alternative energy sources.

With respect to the effects of the plan on energy supply and demand, CBO is close to the projections claimed by the Administration. Production is likely to increase as projected, although somewhat less than forecast by the Administration. Furthermore, the plan effectively reduces pricing inequities, and increases producer incentives relative to present policy. The nation would be in a decidedly better economic position during the 1980s if the Administration's crude oil proposals were implemented than it would be with a continuation of present policies.

PROPOSED POLICY

The crude oil pricing proposals are particularly relevant to the Administration's conservation objectives because the current regulation of domestic crude oil prices contribute to continually increasing consumption. Most domestic oil is currently priced well below the world market price which represents the replacement cost of oil to this country. Existing legislation limits the price of lower- and upper-tier oil to \$5.25 and \$11.28 per barrel respectively. ^{1/}

Under the Administration's pricing proposals, the price of previously discovered oil (discovered prior to April 20, 1977) would remain subject to price controls, but the controlled price would be allowed to increase at the general rate of inflation. The price of oil discovered after April 20, 1977 (called

1/ Lower tier prices apply to oil produced from wells that were in operation during 1972 or prior; while upper- tier prices apply to new oil from wells that were completed after 1972, but prior to April 20, 1977. The definition of new oil also encompasses increased production from old wells (production above the "decline rate").

"newly discovered" oil) and oil from tertiary recovery from existing wells will be allowed to rise over a three-year period to the 1977 world price, adjusted for inflation.

Should the rate of growth of world prices exceed the rate of domestic inflation, however, domestic oil prices paid to producers would be limited to the growth in the domestic price level. Thus, future OPEC actions would not necessarily determine prices received by domestic producers.

From the consumers' point of view, the most important facet of the Administration's crude oil pricing proposals is that the price of domestic crude oil will be raised to the world price level. The mechanism by which this price increase is achieved is a crude oil equalization tax which is applied to all domestically produced oil in three stages, so that by the end of the third year, the price paid for all domestic oil is equal to the world price. The first tax would go into effect on January 1, 1978. It would increase the price of lower-tier oil by \$3.50 in nominal terms, or by about half the difference between its level and the upper-tier level. The second stage (January 1979) would equalize all controlled domestic production at the upper-tier level and the last stage would move all domestic prices to the level of world prices.

Thus the American consumer of crude oil would pay the world price of oil, not the present artificially low price. To keep the American consumer from being totally at the mercy of the pricing decisions of an international cartel, however, the plan provides that the rate of price increase can be controlled to match the rate of domestic inflation.

ENERGY IMPACTS

In order to evaluate the proposals related to crude oil pricing, two possible cases have been constructed. The first--the present policy case--assumes that the pricing provisions of the Energy Policy and Conservation Act (EPCA) of 1975 and the Energy Conservation and Production Act (ECPA) of 1976 continue in effect indefinitely. The alternative case represents the President's proposals.

The major impacts of the crude oil proposals are summarized in Table III-1. All prices are expressed in 1977 dollars. As shown in the table, the President's proposals will affect both the price and amount of crude oil which will be available to consumers.

TABLE III-1. PROJECTED COMPARISON OF PRICES AND QUANTITIES OF OIL a/: PRICES IN 1977 DOLLARS PER BARREL: QUANTITIES IN MILLIONS OF BARRELS PER DAY

	1977	1980		1985	
		Present Policy	Carter Plan	Present Policy	Carter Plan
Quantity of Oil Demanded	17.9	19.7	18.9	22.8	18.9 <u>b/</u>
Average Price per Barrel	\$11.56	\$12.67	\$14.69	\$13.55	\$14.69

SOURCE: Congressional Budget Office.

a/ Prices are refiner acquisition costs and are equal to about \$0.35-\$0.45 per barrel more than wellhead prices. Quantities are in barrels of refined products and therefore the totals are about 0.4 million barrels per day above the demand equivalent crude oil.

b/ This is a minimum estimate. Since this report did not address all the parts of the President's proposals, it is possible that actual petroleum demand will exceed this number.

Prices of Petroleum

The 1980 prices for the various sources of crude oil that would be charged under the two cases described above are shown in Table III-2. These prices are refiner acquisition costs as defined by FEA and are about 40 cents per barrel above the wellhead costs. The prices also are national aggregates and therefore take no account of sulfur content, gravity, viscosity, or location.

The assumptions on which the present policy prices are based is that price controls under the terms of EPCA are continued indefinitely, allowing for an increase in real crude prices of 2.5 percent per year.

The prices established for the President's proposals are based on the assumption that: wellhead prices of upper- and lower-tier oil and natural gas liquids would be held constant in real terms; a tax (of about \$3.29 per barrel in 1977 terms) would be imposed on lower-tier oil in 1978 and would be doubled in 1979, in order to bring lower-tier oil up to the level of upper-tier oil; and that all domestic oils would be taxed to bring their prices up to world levels starting in January 1980.

An important assumption in the CBO analysis of the President's plan is that the price of imported oil rises at about the same rate as inflation. If the price were to increase faster than inflation, there is a provision in the President's crude oil proposals to limit prices to a level below the world price. If world prices fall, there is no provision proposed to support domestic prices; thus they would fall accordingly.

As a result of the proposed pricing policies, the average price of domestic and imported crude oil paid by refiners in 1978 would be about \$0.95 per barrel (8 percent) greater than it would be under present policy. By 1980, the difference would be about \$2.00 per barrel (16 percent).

The crude oil equalization tax would be rebated to consumers. This mechanism and its impacts on the consumers are discussed in Chapter X. In 1980 the total amount of tax revenues should be about \$15.8 billion in 1977 dollars. This estimate assumes that taxes would be collected on 7.3 million barrels per day of domestic crude. In 1985, the tax revenues would be about \$11.2 billion on 5.4 million barrels per day.

TABLE III-2. PROJECTED CRUDE OIL PRICES a/: IN 1977 DOLLARS
PER BARREL

	1977	1980		1985	
		Present Policy	Carter Proposal	Present Policy	Carter Proposal
Lower Tier	5.65	5.65	14.69	5.65	14.69
Upper Tier	12.05	13.72	14.69	14.69	14.69
(to 4/20/77)					
Newly Discovered					
(after 4/20/77)					
12.05-12.71 <u>b/</u>		13.72	14.69	14.69	14.69
Stripper Wells	14.69	14.69	14.69	14.69	14.69
Alaskan					
North Slope 12.05-14.69 <u>b/</u>		14.69	14.69	14.69	14.69
Naval Petroleum					
Reserves	12.05	13.72	14.69	14.69	14.69
Special and Ter-					
tiary Production	14.69	14.69	14.69	14.69	14.69
Natural Gas Liquids	8.33	8.33	14.69	8.33	14.69

Total Average	11.56	12.67	14.69	13.55	14.69
(including imports)					

SOURCE: Congressional Budget Office.

a/ These are prices paid by refineries after transportation costs. Wellhead prices are about 35 to 45 cents lower, except in the case of Alaskan oil.

b/ The lower figure is for the Current Policy Case, the higher is for the Carter proposal.

Prices of Refined Products.

Refineries produce literally dozens of products; however, the primary products are gasoline, diesel fuel, distillates (home heating oil), and residual fuel (industrial fuel oil). The present and future prices of these fuels under the two cases are presented in Table III-3.

Administration estimates indicate that if domestic oil prices are increased to world levels in 1980, only two-thirds of this increase will be passed through to consumers in the form of higher prices. The Administration believes that approximately one-third of the higher price would be absorbed in the profits of refiners. This would result from the fact that the lower price on imported refined products charged by some foreign refiners would tend to exert a downward pressure on domestic prices.

Unfortunately, little solid evidence is available to support any assumption on the magnitude of the price increase which will be passed on to consumers.^{2/} In the view of the Congressional Budget Office, the two-thirds assumption is very optimistic. Our estimates are based on the assumption that virtually all of the tax will eventually be passed through to consumers.

^{2/} The Administration projects that several prices of refined products will be limited by international market prices, just as is residual fuel. This analysis agrees that such is possible particularly with respect to heating oil in New England and the Mid-Atlantic regions. However, competition with refined imports is not expected to be an important factor in other regions or with other products. This projection has been made because the price differences are small domestic refineries are very efficient producers of all products other than residual fuel, and existing transportation systems favor domestic refineries. The home heating oil rebate will reduce the competitive position of foreign refiners further.

TABLE III-3. PROJECTED PRICES OF REFINED PRODUCTS: CENTS
PER GALLON; IN 1977 DOLLARS

Products	<u>1977</u>	<u>1980</u>		<u>1985</u>	
		Present Policy	Carter Plan	Present Policy	Carter Plan
Gasoline (Unleaded regular at the pump, full service stations)	65.5	68.5	73.5	71.0	73.5
Diesel Fuel (No. 2 at truckstops)	55.0	58.0	63.0	60.5	63.0
Distillates (Retail)	44.0	47.0	46.5	49.5	48.0
Residual Fuel (Retail)	29.0	29.0	29.0	29.0	29.0

SOURCE: Monthly Energy Review, March 1977, Federal Energy
Administration, pp. 12-20, 58-69, 79, and Congressional
Budget Office estimates.

The proposed crude oil equalization tax is, in general, an effective mechanism for raising consumer prices of petroleum products to equal their replacement costs (i.e., imports) without allowing the producers to collect windfall profits; however, some regulatory problems will continue.

- o Definition of which specific types of oil receive what price will remain an issue as long as the definitions determine the price.
- o Some incentive will remain for producers to reduce production from old wells so that they can receive the higher stripper oil prices.
- o If world prices change rapidly, in either direction, executive decisions might be necessary to maintain prices.

As Table III-3 indicates, the prices of gasoline, diesel fuel, and home heating fuels will rise in real terms in both cases, but that by 1980 the prices estimated under the President's proposals will more than double the increase expected under present policy. The prices of residual fuels, however, will not rise, because they are dominated by international market prices. Slightly over 50 percent of the residual fuel consumed in this country is imported. Almost 70 percent of this residual fuel is consumed where the price is largely determined by the price of imports. The assumption in this chapter is that international prices do not increase in real terms over time and therefore residual fuel prices are projected to be constant through 1980. Domestic refiners will, therefore, allocate their increased costs of residual fuel to other products.

Consumption of Petroleum

In Table III-4 the effects of the President's proposals on consumption of refined products are displayed. As a result of the crude oil equalization tax, the automobile related proposals, the insulation tax credit and the coal conversion program, consumption in 1980 would be 4 percent lower in the President's plan than under present policy. By 1985 the difference is estimated to be 17 percent. Because the crude oil equalization tax would operate in tandem with many of the other proposals within the plan, however, no independent estimates are made of this particular proposal.

Generally, the impact of all the proposals by 1980 is uniform among the sectors--the Carter plan decreased consumption in each sector in comparison with a continuation of present policy. The plan would decrease consumption in the residential and commercial sector in absolute terms. After 1980, the plan would also lead to the reduction of the amount of oil used by electrical utilities.

An important point in this regard is that the industrial consumption of oil continues to grow from present levels in both cases. Under the President's plan, industrial consumption in 1985 is 44 percent above consumption for 1977. This implies an average annual growth rate in the industrial sector of 4.6 percent per year. By 1985, however, the number of industrial

TABLE III-4. PROJECTED CONSUMPTION OF REFINED OIL PRODUCTS:
IN MILLIONS OF BARRELS PER DAY

	1977	1980		1985	
		Present Policy	Carter Plan	Present Policy	Carter Plan
Residential/Commercial (90 percent distillate)	3.4	3.4	3.3	3.2	2.8
Industrial (70 percent residual)	3.2	4.2	3.8	7.0	4.6
Transportation (70 percent gasoline)	9.7	10.3	10.2	10.6	10.2
Utilities (90 percent residual)	<u>1.6</u>	<u>1.8</u>	<u>1.6</u>	<u>2.0</u>	<u>1.3</u>
Total Refined Products	17.9	19.7	18.9	22.8	18.9

Equivalent Amount of Crude Oil	17.5	19.2	18.4	22.3	18.4

SOURCE: Congressional Budget Office.

boilers burning oil would decline, whereas consumption of petroleum as feedstocks would continue to expand.

Since most of the oil price increases in the residential sector will be rebated, the President's plan will not substantially affect residential consumption of oil. However, implementation of the home insulation tax credits would reduce consumption in this sector. But because increased use of insulation is cost-effective, with or without the proposed tax credit, demand for residential fuel would decline after 1980 in both cases.

The largest use of petroleum is for transportation. As is explained in Chapter VI, demand for all fuels for transportation expand slowly in both cases, but reach a plateau in the early-1980s under the President's proposals. Demand for gasoline for automobiles may then start declining between 1982 and 1984.

The Petroleum User Tax

The Tax On Industry. The President's plan proposes a tax on industrial consumers of petroleum products that would go into effect in 1979. A similar tax on utilities would be implemented in 1983. The user tax is graduated according to consumption, so that consumers of less than 500 billion BTU of oil per year pay no tax and consumers of more than 1,500 billion BTU pay tax on their entire consumption.

The tax is planned to start at 95 cents per barrel of residual fuel oil and 87 cents per barrel of distillate. The tax doubles in 1980 and then rises each year to \$3.15 and \$2.90 for residual and distillate respectively by 1985. In terms of real change, the tax increases fuel prices to industry by 12.9 percent in 1980 and 21.5 percent in 1985 relative to a price without the tax. The price and revenue impacts of the user tax on industry are displayed in Table III-5.

The costs of using petroleum in new plants are already higher on a BTU basis than competing coal prices. Thus it is doubtful whether the user tax provision taken alone would influence many consumers to convert to coal. Perhaps more important than the negative incentive of the user tax is the positive incentive of the proposed rebate provision for new industrial investment for conversion to coal.

Industry is eligible under the President's plan for either an additional 10 percent investment tax credit for expenditures to convert to coal or a rebate of user taxes (on either natural gas or petroleum) for the amount of expenditures incurred during conversion. In order to encourage accelerated investment in conversion, there is a carry-forward provision in the proposed tax amendment which would enable industry (and in later years, utilities) to accumulate credits in advance which could be used later to reduce the tax.

TABLE III-5. THE INDUSTRIAL USER TAX: IN 1977 DOLLARS

	Quantity Consumed <u>a/</u>	Approximate Taxable Use <u>a/</u>	Average Price Before Tax <u>b/</u>	Price After Tax <u>b/</u>	Revenue <u>c/</u>
Revenue in 1980					
Residual Fuel	2.66	2.39	12.15	14.05	1.7
Distillates	<u>1.14</u>	<u>0.68</u>	<u>22.26</u>	<u>24.00</u>	<u>0.4</u>
Total	3.80	3.07	14.40	16.26	2.1

Revenue in 1985					
Residual Fuel	3.22	2.90	12.15	15.30	3.3
Distillates	<u>1.38</u>	<u>0.83</u>	<u>22.26</u>	<u>25.16</u>	<u>0.9</u>
Total	4.60	3.73	14.40	17.50	4.2

SOURCE: Congressional Budget Office.

a/ Millions of barrels per day.

b/ Dollars per barrel.

c/ In billions of dollars.

The Tax on Utilities. The corresponding user tax for utilities would go into effect in 1983 at a flat rate of 25 cents per million BTUs. Based on the assumption that 90 percent of utility oil consumption would be residual fuel and that 1.4 million barrels per day in 1985 would be consumed, the tax revenues are estimated to be approximately \$470 million in that year. (Chapter V explains this tax in detail.)

Increases in Production of Oil

The President's proposals attempt to provide incentives to seek new oil production by allowing the price of newly discovered oil to escalate within three years to 1977 world prices, adjusted for domestic inflation. The plan correctly states

that the revenues per barrel collected by the oil industry would be higher than in any other oil producing countries due primarily to the low production taxes or royalties permitted United States producers. Because domestic costs of production are also high relative to other countries, however, producers still argue that additional incentives are necessary.

CBO believes that the amount of oil produced in response to small price increases seems very limited. The increase in oil and gas prices since 1973 has been several times larger than the increase proposed by the plan, yet increases in production have been modest. It is questionable whether price increases above those proposed in the President's plan would stimulate substantial additional investment in exploration and development. Second, incentives such as decontrol of old oil would not necessarily be an efficient means of stimulating new production as this decontrol would not represent a rate of return on the new exploration and development, but mainly a windfall profit. It could, however, be argued that decontrol would improve the cash flow position of the industry. Most economists agree, however, that investment is influenced most heavily by the price of new oil (discovered after April 20, 1977) rather than by the average prices. Unless an industry cannot attract credit, and the oil industry has few such problems, the price of newly discovered oil would generally be the most important determinant of new investment. The National Energy Plan correctly states that the marginal prices proposed in the plan (\$14.69 per barrel) would yield among the highest revenues per barrel available to the industry anywhere in the world.

In conclusion, it is possible that some huge new discoveries in virgin areas (the Atlantic, the Gulf of Alaska) could change the entire outlook. However, without those discoveries, the increase in production of oil will come from increased development of known but costly fields and advanced recovery from older fields.

This report projects that 200,000 barrels per day additional oil would be produced in 1980 as a result of the President's energy plan. About half of the increase is from advanced recovery, and half is from increased drilling of known but sub-commercial pools or extensions. New discoveries as a result of enactment of the President's proposals could not be developed by 1980.

By 1985, production could be increased substantially but it is virtually impossible to make a prediction of how much at this time. There are few additional incentives that are efficient which can be created by using market mechanisms without explicit subsidies. Although the President's proposals have been criticized because they allegedly provide a few incentives for increased production, in fact, the plan does virtually decontrol prices of new oil and thereby rewards exploration and new production. The effects of the incentives will probably be modest but may be the best that can be expected. No amount of additional incentive is likely to substantially change the situation.

The proposals in the Administration's energy plan related to natural gas are designed to accomplish four objectives:

- o to equalize the costs between interstate and intrastate markets
- o to place the burden of new high-priced discoveries of natural gas on industry, and thus encourage them to convert to the use of coal
- o to eliminate the possibility that producers could collect windfall profits because of new higher prices
- o to protect interstate residential consumers from supply curtailments

The specific proposals within the plan are: to merge interstate and intrastate markets by placing federal controls on intrastate production, thereby limiting intrastate price increases; to pass price increases through to large consumers; to place a user tax on industrial and large commercial consumers; and to restrict the construction of facilities that burn natural gas.

CBO analysis indicates that implementation of these proposals would accomplish the above objectives. Shortages or curtailments to industrial and residential customers would be greatly reduced or avoided, large price anomalies would be reduced and industry and electrical utilities would begin conversion toward use of coal and renewable energy resources. However, it is likely that the most significant impacts of implementation of these proposals would be felt after 1985.

But the plan has, however, been criticized by producers for not adequately stimulating new production. CBO analysis of these proposals does not concur with this criticism. Although prices for new gas are controlled under the plan, the proposed level of the controls (a cap of \$1.75 per thousand cubic feet, at current prices) appears to be high enough to encourage exploration and new production, and it is unlikely that production would be much higher if prices were not controlled. Moreover,

if the prices were not limited, new gas prices could go as high as \$4-\$5 per thousand cubic feet and producers could reap large windfall profits.

PROPOSED POLICY

Currently, natural gas is sold in two distinct markets: The interstate market, where natural gas prices are regulated by the Federal Power Commission (FPC); and the intrastate market, where prices are not controlled. In recent years, the intrastate price has been far above the interstate price allowed by the FPC. Interstate prices regulated at low rates have encouraged gas consumption and discouraged the search for new gas to supply the interstate system. Since 1970, over 90 percent of new reserves have been dedicated to intrastate markets. 1/

A key proposal in the Administration's energy plan is to end the distinction between the two markets by bringing intrastate gas under federal control. The price allowed for new gas in this combined market would be equivalent to the average price of domestic crude oil. This price is expected to be about \$1.75 per thousand cubic feet in 1978. 2/ This price is higher than the price now allowed for new gas in the interstate market (\$1.46 per thousand cubic feet), but lower than many of the prices now paid for new intrastate gas which vary from \$1.50 to \$2.00 per thousand cubic feet. 3/ In addition, the plan would authorize the establishment of higher price levels to provide an incentive for specific categories of high-cost gas.

1/ Federal Energy Administration, National Energy Outlook, February 1976, p. 9.

2/ New gas is defined as gas from a well more than 2.5 miles from an existing onshore well or more than 1,000 feet deeper than any well within the 2.5 mile radius. New offshore gas is defined as gas from lands leased after April 20, 1977. The price for new gas will be limited to the BTU equivalent.

3/ Federal Energy Administration, Monthly Energy Review, March 1977, p. 75.

Under the President's plan, industries and electric utilities will be encouraged to switch from natural gas (and oil) to other fuels. Incentives to convert will be provided by use of incremental pricing and a user tax.

The incremental pricing proposal would require all utilities using or distributing natural gas to pass on all the additional costs of new, usually higher-priced, gas to consumers in industrial, large commercial, and electrical utility sectors. This proposal therefore buffers residential and small commercial users from increased prices, and, instead, places the burden of the higher prices on those consumers (utilities and industry) who are most able to convert to coal. CBO analysis indicates that incremental prices could be as much as three times higher than average prices currently in existence.

Starting in 1979, a user tax would be imposed on all large industrial users of natural gas except fertilizer producers and certain agricultural users. ^{4/} In 1983 a similar tax would be imposed on utilities that consume natural gas. Furthermore, federal regulations would prohibit the use of natural gas in new industrial boilers. Utilities and existing industrial facilities that can burn coal might also be prohibited from using gas in the future.

The President's proposals would also encourage the development of new gas supplies. For example, it would promote "full development" of the Outer Continental Shelf (consistent with environmental safeguards) and would allow additional imports of liquefied natural gas. A federal task force would be established to identify areas where additional synthetic natural gas plants could be built. Finally, research and development programs would be expanded to explore new sources of gas such as Devonian shale.

^{4/} Industrial users would be taxed by an amount equal to the difference between their average gas cost and a target price which is determined by the price of distillate oil. The proposal exempts small industrial users and proposes a graduated scale of taxable use for intermediate users.

TABLE IV-1. PROJECTED NATURAL GAS WELLHEAD PRICES AND QUANTITIES a/
SOLD: IN 1977

		<u>1980</u>		<u>1985</u>	
	<u>1977</u>	Present Policy	Carter Proposal	Present Policy	Carter Proposal
Interstate Gas					
Quantity <u>b/</u>	10.1	9.0	9.4	8.1	9.4
Price <u>c/</u>	78	97	104	141	147
Intrastate Gas					
Quantity <u>b/</u>	9.3	9.7	9.3	10.8	9.5
Price <u>c/</u>	92	149	139	205	166
Total National Average					
Quantity <u>b/</u>	19.4	18.7	18.7	18.9	18.9
Price <u>c/</u>	84.5	124	121	178	156

SOURCE: Congressional Budget Office.

a/ Quantity is net marketed production as defined by the U.S. Bureau of Mines.

b/ Per trillion cubic feet.

c/ Per thousand cubic feet.

As with the other components of the Carter plan, the proposals concerning natural gas are designed to conserve energy, to provide proper incentives for development of new gas supplies, to encourage conversion to coal, to allocate scarce resources among regions and consumers, and to avoid unnecessary costs to the consumer. The extent to which the proposals would attain these goals is addressed in the remaining parts of this chapter.

ENERGY IMPACTS

With or without implementation of the National Energy Plan, natural gas prices will be higher in the future and slightly less gas might be available. If enacted, however, the plan would make a difference in how high prices would be, what regions would bear the burden of the price increases, and what regions would receive the limited supplies.

The estimated prices charged at the wellhead and quantities of gas available in the interstate and intrastate markets with and without the Carter plan in 1980 and 1985 are shown in Table IV-1. Enactment of the Administration's proposal would mean that, in both years, customers served with interstate gas would find more gas available, but at somewhat higher prices. However, the gas that intrastate consumers received would be less expensive under the plan. ^{5/} For the nation as a whole, natural gas prices will be slightly lower with enactment of the plan.

Effects of the Proposals on Consumers

As shown in Tables IV-2 and IV-3, the President's natural gas proposals will affect various groups of consumers in different ways. This section will discuss the effects of these proposals on the availability of gas and the prices that would be paid by various groups of consumers. The subsequent section will discuss the effect of the proposed user tax on prices for industries and utilities.

Residential and Commercial. Residential and commercial users of natural gas would have slightly more gas available with enactment of the proposals. Furthermore, in both 1980 and 1985 implementation of the President's proposals would significantly reduce average fuel bills paid by residential and

^{5/} It is often misleading to use average prices for the intrastate market. Many industrial customers are served directly by producers so that their rates will increase abruptly as new contracts are negotiated. In the interstate market, customers are usually served by distributors who co-mingle cheap and expensive gas so that prices charged to consumers often reflect average gas prices.

TABLE IV-3. PROJECTED CONSUMER PRICES OF NATURAL GAS BEFORE USER TAXES:
IN CENTS PER THOUSAND CUBIC FEET

	<u>1977</u>	<u>1980</u>		<u>1985</u>	
		Present Policy	Carter Proposal	Present Policy	Carter Proposal
Residential Commercial					
Intrastate	192	249	202	305	222
Interstate	223	242	221	286	242
Industrial					
Intrastate	112	169	161	225	196
Lease and Plant	97	154	146	210	181
Interstate	118	137	170	180	237
Transportation					
Total	105	130	123	165	220
Utility					
Intrastate	112	169	141	225	196
Interstate	123	142	130	185	242

SOURCE: Congressional Budget Office.

TABLE IV-2. PROJECTED CONSUMPTION OF NATURAL GAS IN TRILLIONS OF
CUBIC FEET

	<u>1977</u>	<u>1980</u>		<u>1985</u>	
		Present Policy	Carter Proposal	Present Policy	Carter Proposal
Residential and Commercial					
Intrastate	2.0	2.1	2.2	2.1	2.3
Interstate	<u>5.5</u>	<u>5.7</u>	<u>5.7</u>	<u>5.5</u>	<u>5.9</u>
Total	7.5	7.8	7.9	7.6	8.2
Industrial					
Intrastate	3.6	4.2	4.2	6.0	4.8
Lease and Plant	1.6	1.1	1.1	0.9	0.9
Interstate	<u>3.3</u>	<u>2.4</u>	<u>2.7</u>	<u>2.1</u>	<u>3.3</u>
Total	8.5	7.7	8.0	9.0	9.0
Transportation					
Total	0.6	0.5	0.5	0.4	0.5
Utilities					
Intrastate	2.0	2.3	1.9	1.8	1.1
Interstate	<u>0.8</u>	<u>0.4</u>	<u>0.4</u>	<u>0.1</u>	<u>0.1</u>
Total	<u>2.8</u>	<u>2.7</u>	<u>2.3</u>	<u>1.9</u>	<u>1.2</u>
Grand Total	19.4	18.7	18.7	18.9	18.9

SOURCE: Congressional Budget Office.

commercial customers compared to what they would pay under continuation of present policy, particularly those served by intrastate sources. The gas prices paid by these groups would, on average, be 22 percent lower. Furthermore, both residential and commercial groups would be protected against curtailment of supply.

It should not be expected, however, that the availability of natural gas will permit many new homes to be serviced by gas.

Industry. In recent years, because of federal and state gas emergency allocation priorities, interstate industrial customers have borne the brunt of gas service curtailments. Because more gas would be available to consumers now served by the interstate systems than would be available under present policy, interstate industrial customers would have more gas available to them with the President's proposals. The additional supplies, however, will be at much higher prices than at present.

If the incremental pricing proposal were enacted, industries using gas would pay significantly higher prices than they would under present policy because the new higher prices would be passed on to them and to utilities and not to residential and commercial customers. The proposed user tax would further increase the price of gas for industry and utilities.

Industries served by interstate pipelines would receive less gas in 1980 under the Carter proposals than they do now, but as a result of general conservation measures in other sectors, gas supplies to industrial customers could increase after 1980. In the long run, the supply position of industries using interstate gas would be much better with implementation of the plan. Intrastate industry would have more gas available in 1980 and 1985 than it has in 1977, but less in 1980 and 1985 than it would have under present policy.

Electric Utilities. The proposed user tax on utilities burning gas is intended to encourage a significant number of utilities to convert from gas (and oil) to coal. However, if this user tax were implemented, it would not go into effect until 1983. Thus any significant conversions by utilities would not take place until after 1983. At present the prices

paid by utilities using intrastate gas are actually substantially lower than the prices they would have to pay for alternative fuels. By 1985, however, electric utilities would be using about 37 percent less gas with the plan.

The Effect of the User Tax on Natural Gas Prices

If the President's plan were enacted, a user tax for industrial consumers of natural gas would go into effect in 1979. In 1979, the tax would be the difference between the specific price charged the industrial consumer, and a target level which would be set at about \$1.05 per thousand cubic feet below that of competing liquid fuels (distillate fuel oil would sell for the equivalent of about \$3.05 per thousand cubic feet). The target level would escalate each year until 1985 when it would equal the price of distillate. The expected prices and tax revenues for industrial users (gas use in transportation is not included) are summarized in Table IV-4.

By 1980, the price of distillates is expected to be equivalent to about \$3.09 per thousand cubic feet, and the target price would be \$2.69 per thousand cubic feet. Industrial prices should range from a low of about \$1.46 per thousand cubic feet for field use of intrastate gas to about \$1.70 per thousand cubic feet for average interstate gas. The tax (the difference between the specific price and \$2.69 per thousand cubic feet would therefore apply to virtually all marketed gas in 1980 except for that proportion exempted for small consumers. Total revenue to the treasury is expected to be about \$6.1 billion in 1980 (in 1977 dollars).

In 1985, the price of distillates is expected to be about \$3.32 per million BTU, and the target price in that year equals the distillate price. Virtually all industrial gas would be sold at delivered prices below the target and would therefore be subject to the user taxes. Revenue in 1985 would be approximately \$8.0 billion.

In summary, natural gas prices paid by industrial users would more than double from 1977 to 1980. Of the increase in prices, about one third would be due to increased prices in the field--much of which would occur even without implementation of the President's plan. The remainder of the increase is due to the user tax. Prices would increase another 23 percent in real terms by 1985. Furthermore, despite differences in wellhead prices for intra and interstate gas, all classes of industrial users would be paying identical gas prices under the President's plan.

TABLE IV-4. PROJECTED INDUSTRIAL PRICES AND TAX REVENUES

	Quantity Subject to Tax <u>a/</u>	Average Price Before Tax <u>b/</u>	Average Price After Tax <u>b/</u>	Average Tax <u>b/</u>	Revenue (In billions of dollars)
<u>For 1980</u>					
Intrastate	2.8 <u>c/</u>	161	269	108	3.0
Lease & Plant	0.6 <u>c/</u>	146	269	123	0.7
Interstate	2.4 <u>c/</u>	170	269	99	<u>2.4</u>
Total Revenue					\$6.1
<u>For 1985</u>					
Intrastate	3.2 <u>c/</u>	196	332	136	4.4
Lease & Plant	.5 <u>c/</u>	181	332	151	0.8
Interstate	3.0 <u>c/</u>	237	332	95	<u>2.8</u>
Total Revenue					\$8.0

a/ In trillion cubic feet.

b/ In cents per thousand cubic feet.

c/ An estimated 25 percent of intrastate gas would be exempt from user taxes (petrochemical and fertilizer feedstocks, agriculture uses, or field use) and about 50 percent of lease and plant uses would be exempt. Furthermore, about 10 percent of intrastate and interstate consumption would not be "taxable use" as defined in Sec. 4992 of the proposed National Energy Act.

As stated earlier a similar user tax is proposed for electrical utilities, beginning in the year 1983. By the year 1985, utilities would pay a tax based on the difference between the price of distillates, less \$.50 per thousand cubic feet, and the specific price of gas paid by the utility. On average, interstate utilities should expect prices averaging about \$2.42 per thousand cubic feet in 1985, and intrastate utilities should expect prices of about \$1.96 per thousand cubic feet. As a result, interstate utilities will be taxed about \$.40 per thousand cubic feet on the average. The tax for intrastate utilities would be about \$.86 per thousand cubic feet. Because some specific interstate utilities might have contracts in excess of the target, only 90 percent are estimated to pay taxes. Virtually all intrastate utilities would pay taxes. Total tax revenues are estimated to be about \$1.0 billion in 1985.

Increases in Production

Prices received by the majority of onshore producers of new gas are presently between \$1.50 per thousand cubic feet and \$2.05 per thousand cubic feet (the price of new intrastate contracts). ^{4/} Offshore producers would pay a price of \$1.46 per thousand cubic feet because Outer Continental Shelf (OCS) gas can only be sold in interstate markets. The President's plan would combine the markets and limit the price to \$1.75 per thousand cubic feet in 1977. This price would escalate in real terms, depending on the price of domestic crude oil. Under present policy, average new intrastate prices, are projected to escalate to about \$2.55 per thousand cubic feet by 1985; under the President's plan, the equivalent new gas price would be about \$2.08 per thousand cubic feet.

CBO's analysis concludes that exploration and development of new reserves would be stimulated by increased prices, but that the difference in impact between the prices both under present policy and under the President's proposals would be very small--certainly not enough to elicit a measureable difference in production by 1980. By 1985, however, the increase in interstate prices should stimulate slightly more production from the OCS than would occur under present policy. This increase will probably compensate for the projected decrease in new intrastate gas production.

The President's Plan forecasts that under a continuation of present policies, intrastate prices for new gas would plateau or even decline because of an expected increase in gas supplies as a result of recent price increases. This forecast is controversial. Some assert (primarily industry experts) that producible reserves are lower than recent federal estimates and that the amount of new production will be disappointing. They believe, therefore, that intrastate new contract prices will continue to rise toward the price of alternative fuels (about \$2.80 per thousand cubic feet).

^{4/} "Summary of Intrastate Natural Gas Prices," Federal Power Commission, as reported in Monthly Energy Review, Federal Energy Administration, March 1977, p. 75.

If prices were to level off, or recede somewhat, the price cap in the President's plan would pose no constraint to prices and the free-market price would float somewhere below the cap. The purpose of the cap would be to avoid producers charging prices which distributors could "roll-in" with their older supplies. The projections in this analysis, however, indicate that the proposed cap is below the potential market price, but probably not to an extent to affect exploration or production to a significant degree when combined with a projected increase in OCS production.

Finally, it is noted that some pricing provisions of the plan seem inconsistent with the aim of achieving high levels of gas production without providing windfalls to the producers. For example, there seems to be no justification for allowing expiring contracts for interstate gas to be renewed at prices as high as \$1.42 per thousand cubic feet. This would appear to be an invitation to windfall profits for some producers.

Several of the proposals in the National Energy Plan involve encouraging or requiring the substitution of coal for oil and natural gas in industrial and public utility use. In fact, more than half of the anticipated savings in imported oil by 1985, projected in the President's plan, would be the result of coal conversion.

Although, CBO is in general agreement with the President's estimates of public utility uses, it is skeptical that the amount of industrial conversion envisioned by the Administration will be forthcoming by 1985. The President's plan anticipates an increase in the industrial consumption of coal from 156 million tons in 1977 to 410 million tons in 1985. Most of the increase would take place in non-metallurgical coal which would have to increase from 70 million tons in 1977 to 305 million tons in 1985. The Administration estimates that the attainment of this goal would require that 10 percent of all existing industrial facilities burning oil or gas and 44 percent of newly constructed industrial facilities would have to convert to coal. This contrasts with the continuation of current policy where only 12 percent of new industrial facilities would burn coal in 1985.

CBO agrees with the Administration's estimate of a 10 percent conversion of existing industrial facilities, but projects only a 33 percent increase in new industrial uses with implementation of the President's proposals. A 33 percent increase would result in total coal consumption by industry of 360 million tons by 1985—50 million tons short of the Administration's projections. In terms of barrels of crude oil equivalents, CBO conversion estimates translate into oil import savings of 1.8 million barrels per day which is 0.6 million barrels below the President's estimate.

The lower estimate of industrial coal conversion provided by CBO is based on the difficulties of altering existing planned construction, the problems that may arise with transporting coal to the factory, environmental restrictions and the desire of industry to take full advantage of the rebate system by stretching out new construction.

It is possible, however, that the additional 50 million tons of coal production estimated by the Administration could be achieved if more stringent regulations regarding future burning of oil and gas were imposed by the Administration, or if the above problems prove easier to solve.

PROPOSED POLICIES

The immediate goal of the President's proposed coal program is to increase the production of coal, presently at about 680 million tons per year, by 400 million tons per year by 1985. This increase is to be encouraged primarily through the use of price incentives and regulation, implemented without adverse effects in the environment.

A second goal is to provide efficient, economically feasible technologies for the longer term that will support the substitution of coal for oil and gas.

Two types of taxes have been proposed to further the incentive to conversion to coal. The first, designed to increase the price of domestic oil, has been discussed in detail in Chapter III of this paper. The second, a users tax plus rebates is designed specifically to encourage the use of coal in new and existing facilities.

If this users tax is implemented, industrial users of oil would be taxed beginning in 1979 at about \$0.90 per barrel. This tax would increase to about \$3.00 per barrel by 1985. Industrial users of natural gas would also be taxed. This tax would be imposed in 1979 and would be the difference between the average price of natural gas and a target price that would be set in 1979 at about \$1.05 per thousand cubic feet below the price of other liquid fuels--such as distillate oil. The target price would increase incrementally each year until 1985. At that time, the price of natural gas would equal that of distillate.

Public utilities would also be taxed under the President's plan but the tax on utilities would not be implemented until 1983. At that time, an additional tax of about \$1.50 per barrel would be applied to all oil burned by utilities.

Utilities burning natural gas would pay a tax based on the difference between their cost of gas and the equivalent BTU price of distillate. This tax would also begin in 1983 and would be imposed in the same fashion as the tax on industrial users of gas except that the target price would be set at about \$0.50 per thousand cubic feet below the price of distillate oil.

Since it is less feasible for economic reasons for small industrial users to convert to coal, users consuming less than 500 billion BTUs per year--about 90,000 barrels of oil per year--would not be required to pay tax.

A major component of the proposed user tax is the existence of tax rebates to industries that convert to coal. An industrial user would have the option of either using an additional 10 percent investment tax credit or taking a rebate of up to that year's oil or gas tax and investing the rebate in coal conversion. Utilities would have the option of receiving a rebate on the user tax paid to be used for new construction which would help accelerate the retirement of facilities burning gas or oil.

President Carter's coal conversion program also includes restrictions on the burning of natural gas:

- o With only limited exception, no new boilers would be constructed that burned either oil or natural gas.
- o Other industrial facilities could be prohibited from burning natural gas.
- o Existing boilers capable of burning coal could be prohibited from burning oil or natural gas.
- o Utility boilers would be prohibited from burning gas after 1990, with certain limited exceptions.
- o Any industrial facilities burning coal would need permits to shift to oil or gas, and utilities would need permits to shift from gas to oil.

An integral part of any coal conversion program is a policy regarding the effects of conversion on the environment. The President's plan would require that the best available technology be applied to clean up all coal burning plants. At present, this requirement would make scrubbers (flue gas disulfurization)

mandatory in all large coal-fired facilities whether or not low sulfur coal is used, thus reducing the pressure to use low sulfur western coal.

Although not a part of the present energy plan before the Congress, proposals to fund expanded research and development (R and D) in the area of coal technology will eventually become part of an overall energy policy. New R and D initiatives would probably include accelerated research on ways to clean coal before it is burned and to clean the smoke from coal burning; plus demonstrations of new ways to process and burn coal (e.g., fluidized bed combustion and low BTU coal gasification). These efforts would not include subsidies for existing BTU gasification technologies.

ENERGY IMPACTS

Unless converted to liquid or gaseous form, coal is inconvenient to use except as fuel for relatively large, stationary boilers. Consequently, the market for coal is likely to be greatest for the electric utilities and large industrial consumers that have such boilers. Demand for coal is sensitive to its price and availability and to that of alternative fuels. Air pollution regulations, and the cost of coal-fired facilities and related coal handling equipment also affect its use.

In 1976, U.S. coal production was 681 million tons, which included 459 million tons for electric utilities, 6 million tons for household and commercial consumers, 156 million tons for industrial users, and 60 million tons for export. Total domestic coal consumption was 621 million tons.

Different assumptions about factors affecting coal demand can give rise to very different projections of coal consumption in 1985. Various estimates project that under present policy, domestic coal consumption in 1985 could be as low as 730 million tons, or as high as 1,305 million tons.

The projections of present policy assume that oil price controls will be continued, interstate natural gas will be regulated at \$1.42 per thousand cubic feet by the Federal Power Commission, air pollution standards will require either scrubbers or low sulphur coal, coal conversions required under present law are carried out, world oil prices are constant in real dollars, and real coal prices rise at about 2 percent per year.

The projections for the President's coal conversion proposals assume that the wellhead taxes on crude oil and industrial and utility user taxes will be implemented, the rebates will be available, and regulatory restrictions on burning oil and gas will be implemented. The major variables affecting coal demand that are not components of any of the above assumptions are: the relative capital cost of coal and the use of nuclear power by utilities. Consequently, considerable uncertainty about coal demand remains.

Utility Coal Consumption

For the present policy projections, coal demand by electric utilities has been estimated to increase to about 768 million tons by 1985, resulting in an annual rate of increase of 5.9 percent.

Under the President's proposals utility demand for coal has been estimated to increase to about 777 million tons by 1985 which is in general agreement with present policy projections.

Electric utilities will find coal superior to oil and gas as fuel for new base-load facilities given almost any set of energy prices. 1/ The level of coal demand for new baseload facilities will depend on total electricity demand and on the coal-nuclear mix. Under present policy, construction of new coal-fired power plants to substitute for existing oil-fueled base-load facilities will probably also be economically attractive to utilities.

However, substitution of coal for oil in intermediate-load facilities is less likely to be attractive until oil price controls are removed and domestic oil prices rise. The price of utility fuel would have to go substantially above current world coal prices before it would become attractive to construct new coal-fired facilities to substitute for existing oil-fired plants in intermediate load service. 2/

There are various reasons why implementation of the President's coal conversion program would result in only a small

1/ Council on Wage and Price Stability Staff Report, A Study of Coal Prices, March 1976, pp. 52-53.

2/ Federal Energy Administration, 1976 National Energy Outlook, p. 182.

increase in the use of coal in utilities by 1985. In brief, these reasons relate to proposed requirements for protecting the environment, and long lead times associated with building new facilities.

- o Environmental Restrictions. The proposed environmental standards for coal use would require the best available pollution control technology for all new facilities (including those burning low sulfur coal), thus increasing the capital cost of coal-fired plants. Consequently, because of these restrictions, a slightly larger number of utilities would turn to nuclear power than is anticipated under present policy. However, this factor will not be of any great significance until after 1985.
- o Long Lead Times. Over the past few years, construction of a significant number of coal-fired power plants has already begun, many of which are scheduled to begin operation in 1978-1981. ^{3/} However, it is not likely that these plants will be affected by the President's proposals. Any concentrated effort to construct new coal-fired plants, resulting from the coal conversion program, will mean that these plants will not become operational until well after 1985, because of the long lead time needed to construct the facilities. However, conversion of existing facilities, when technically feasible, may occur more quickly.

Industrial Coal Consumption

The key to the President's coal conversion program is the conversion of industrial facilities from oil and gas to coal. The success of industrial conversion will account for nearly all of the difference between present policy projections of coal consumption and projections of the President's proposals. Indus-

^{3/} R. L. Gordon, The Future of Western Coal, Chapter 5; and Marketing Prospects for Western Coal, a report to the National Science Foundation, Grant Number OEP-75-20827, December 1976, Chapter 5, pp. 31-34.

trial consumption of metallurgical coal will increase somewhat, but will be the same in 1985 whether the coal conversion program is enacted or not.

Fossil fuels are presently used in industrial settings in four ways:

- o to generate steam
- o to generate electric power
- o as a source of direct heat
- o as feedstocks

The major growth in demand for coal will be for those uses, exclusive of feedstocks, which in 1968 resulted in 89 percent of all industrial fossil fuel consumption. 4/

The economics of coal transportation and combustion technology make the costs of burning coal much higher for smaller installations than for larger ones. Therefore, it is not feasible to anticipate that all industrial facilities could convert to coal to generate steam and electric power in the foreseeable future. Furthermore, small installations may find meeting air quality standards more difficult if they convert to coal. 5/ There will be further difficulties in converting to coal as a source of direct heat because of elements in the coal--such as sulfur--that may contaminate the product being heated.

Projections of present policy indicate that industrial demand for non-metallurgical coal will increase by 4 percent a year reaching about 100 million tons by 1985. Combining all industrial uses for coal will create a demand for about 206 million tons in 1985, under present policy.

4/ R. L. Gordon, Historical Trends in Coal Utilization and Supply, August 1976, prepared for U.S. Bureau of Mines, Chapter 7, pp. 3-5.

5/ If new technology, such as the fluidized bed combustion passes the demonstration stage soon, industry may be able to use more coal in small installations.

President Carter's energy proposals for coal conversion combine economic incentives with user taxes and regulatory restrictions to convince various energy sectors to convert both new and existing facilities to the use of coal. However, projections of energy use in industry indicate that even if gas were taxed at a rate higher than that proposed by the President, most industrial facilities would still substitute gas for coal if the gas were available. Consequently, oil and gas taxes and conversion incentives by themselves may be ineffective in discouraging the use of gas as a primary energy source in industry.

On the other hand, direct regulatory restrictions on gas use, also proposed by the President, would transfer the demand for gas to oil or coal.

The Administration estimates that the President's proposals would result in the conversion of about 10 percent of existing industrial facilities from oil and gas to coal plus the substitution of coal for oil and gas in about 44 percent of new facilities by 1985.

This conversion and substitution is estimated by the Administration to result in industrial non-metallurgical coal consumption of nearly 305 million tons by 1985, a growth rate of 16 percent per year. This is an increase of 200 million tons over estimated demand under present policy. About 50 million tons of the increase is due to conversion of existing facilities and about 150 million tons would result from the substitution of coal for oil and gas in new facilities.

CBO analysis concurs with Administration estimates of a conversion to coal by 10 percent of existing facilities by 1985. However, CBO estimates conclude that 33 percent of new facilities would substitute coal for oil and gas by 1985 instead of the 44 percent estimated by the Administration, if the President's proposals were implemented. Various problems exist which CBO believes may affect the Administration estimates. These include the exemption of user taxes on small facilities, facilities already planned or under construction which may not be able to convert to coal, difficulty in meeting environmental standards, difficulties in transporting coal to newly constructed facilities, and the stretching out of construction of new facilities beyond 1985 to gain optimal benefits from tax incentives. However, it is possible that a strong regulatory program which simply prohibited most non-coal facilities and strong government efforts to solve the aforementioned problems could increase coal production closer to the Administration estimates.

CBO estimates that if the President's coal conversion proposals were implemented, non-metallurgical industrial coal consumption in 1985 would be about 150 million tons more than consumption estimated under present policy, resulting in a growth rate of about 14 percent. Although CBO estimates indicate 50 million tons less in industrial coal consumption by 1985 than the Administration estimates, it is likely that if these estimates were projected to 1990, CBO and the Administration estimates would differ only slightly.

The export of coal would, on the whole, not be affected by the President's proposals. Thus, estimates of exports under present policy and with implementation of the President's proposals do not differ. The projections suggest an increase in the amount of coal exported from about 60 million tons in 1976 to 90 million tons by 1985. Estimated coal consumption for various sectors, both under present policy and under CBO estimates of the President's proposal, is shown in Table V-1.

TABLE V-1. COAL CONSUMPTION (MILLION OF TONS)

Coal Consumers	Current Policy		Carter Policy
	1976	1985	1985
1) Electric Utilities	459	768	777
2) Household/Commercial	6	2	2
3) Industrial	156	206	360
4) Exports	60	90	90
Total	681	1,066	1,229

SOURCE: National Energy Plan and Congressional Budget Office.

SUPPLY OF COAL

The success of conversion from gas and oil to coal is more likely to be constrained by inadequate demand than by inadequate supply.

U.S. coal reserves are concentrated in the Appalachians, the Midwest, and the Northern Great Plains. Most Appalachian and midwestern coal has higher heating value and higher sulfur content than does Great Plains coal. Appalachian and midwestern coal is also more expensive to mine, because it is found in thinner, deeper seams than the Great Plains coal which can be easily strip-mined. However, Great Plains coal is located further from major electricity markets, and thus, carries higher transportation charges. Great Plains coal reserves are also sufficiently large and of such even quality that production can be expanded without increasing unit costs. Costs of producing coal in other regions are likely to rise as it becomes necessary to utilize less accessible and lower-quality reserves. The amount of western coal that finds its way to eastern markets will depend on relative production costs in the different regions, transportation costs, and on the premium users are willing to pay for low-sulfur coal.

Financing for coal mine expansion has been cited by some authorities as a potential constraint to increasing coal production. However, financing is readily available to any mining concern with long-standing contracts with its customers. These contracts can be used as collateral to provide financing for new operations. If the demand for coal continues to increase, the desire for contracts by coal users will also increase, 6/ as will the collateral.

If conversion to the use of coal is undertaken to the extent estimated in the President's proposals, coal production could fall short in the short term. And the mismatch of short-term demand and supply could cause sharp coal price increases which could, in turn, create decreases in future coal demand. The phasing in of user taxes as proposed may greatly mitigate such effects.

6/ Mitre Corporation, Report on Potential Constraints to Coal Supply, January 1975.

In all of these projections of the increase in coal supply one very large uncertainty remains. The effect of an increase in coal production in the West from about 100 million tons now to near 400 million tons in 1985 will require a great effort to mitigate adverse effects on the environment, transportation systems, and the life of western communities. To the extent that these issues cannot be easily solved, coal prices may rise and production may be reduced. Since utility consumption has to be contracted in advance, it is likely that any net reduction of western production that may occur will reduce the conversion of industries which are more dependent on shorter-term commitments. Of course if this results in simply a shift to eastern coal, industry may still have adequate coal, at somewhat higher prices.

OTHER IMPACTS

Consequence of Environmental Restrictions

The most significant problems associated with future coal use relate to the adverse effects on the environment of coal production and use.

Strip-mining of coal is a very visible example of the deleterious effects to the environment of coal production. Strip-mining necessitates excavating very large land areas. This land must be completely restored and revegetated in order to be used for other purposes. There is some question about the feasibility of restoring strip-mined land in the Great Plains coal fields; eastern strip mines can be restored, but at a cost that could be as high as \$4.85 per ton of coal mined. ^{7/} Mining can also adversely affect water supply and quality. More sulfur oxides and particulates are emitted into the atmosphere by typical coal-burning installations than would be emitted by similar facilities burning oil or gas. Measures that would mitigate these effects are available, at a cost.

The stringent application of environmental regulations, coupled with the desire to increase dramatically the use of coal in all energy sectors, creates a paradox. Furthermore, should environmental goals become even more ambitious, it is possible that expanded use of coal will become relatively less desirable.

^{7/} Council on Environmental Quality estimates cited in Council on Wage and Price Stability, Study of Coal Prices, p. 79.

This could be true particularly for use of coal by small industrial facilities, or in facilities that do not have a long history of pollution control.

However, for the time being it is likely that coal use and production will respond to government incentives whether stringent or lenient environmental regulations are chosen. But stringent standards and rapid development may be consistent only if substantial expenditures to compensate for higher coal costs or penalties on the use of other fuels are imposed.

BUDGET IMPACTS

If the President's coal conversion proposals were implemented, user taxes on industrial and utility oil and gas consumption would be phased in over a five-year period. Industrial users of oil and gas converting to coal would be eligible for a rebate of these taxes paid in any given year, not to exceed investment expenditures on "alternative energy property"--i.e., property that qualifies for the rebate plan--in the same year. Qualified expenditures in excess of the firm's user tax each year could be carried forward and claimed as a rebate of a future year's user taxes. Industrial firms would have the option of electing--on a once and for all basis--an additional 10 percent investment tax credit instead of the rebate plan.

The user tax itself increases the incentive to use coal by raising the cost of oil and gas relative to coal. The rebate reduces the capital cost of acquiring coal-burning equipment; together the two give a strong incentive to use coal rather than oil or gas.

The user tax is a business expense deductible from sales revenues in computing taxable income. CBO estimates assume that the businesses will pass the user tax through to their customers in higher sales prices, thus increasing sales revenues by the amount of the tax. Under this assumption the user tax will not change businesses' income tax liability. ^{8/} Every \$1.00 of

^{8/} On the other hand, to the extent that a dollar of user tax is not "passed through," then, as corporation income is taxed at the 48 percent corporate rate, every dollar of user tax paid will reduce corporate income tax liability by \$0.48. The net tax bill to the corporation will be \$0.52 and thus total federal tax revenues will increase by only \$0.52.

eligible investment can earn a rebate of \$1.00 of user tax. But in electing the rebate the firm loses its income tax deduction for that amount of user tax. The net result then is to provide the firm with a taxable cash grant of \$1.00 or \$0.52 after tax at the 48 percent corporate tax rate. Therefore, as compared to the option of an additional 10 percent investment tax credit, firms often will be better off paying the user tax and obtaining a rebate. As a result, there will be an incentive to delay conversion of part of a firm's oil- and gas-burning facilities, so that the firm can obtain the largest possible rebate.

User taxes would also be collected from electric utilities. The rebate mechanism is available for utilities but the additional investment tax credit option is not. The definition of qualifying investment is broader for utilities than for other enterprises.

CBO estimates that user tax liability for industries that have not converted to coal would be about \$8.2 billion in 1980 rising to \$12.2 billion in 1985. The total tax liability for these industries during the period 1979-1985 would amount to \$64 billion in 1977 dollars.

The rebate would substantially reduce this tax liability. The cost of constructing a new asset is large compared to the amount of tax a firm will pay for using oil and gas. Therefore, investments that account for even a small proportion of existing capacity can absorb a large proportion of the excise tax. For example, CBO estimates that the cost of converting to or using new coal facilities would be in the neighborhood of \$7.5 billion for each quad of energy. The tax on a quad of gas used in 1985 would be about \$1.2 billion and the tax on a quad of oil would be about \$0.5 billion. CBO estimates that the President's proposals would result in conversion of 10 percent of existing oil and gas uses and the substitution of 33 percent of all new fossil fuel uses for coal, thus rebating between 1970 and 1985 \$38 billion and reducing tax revenues to \$26 million over the period.

Utility tax liability would be considerably smaller. It would only begin in 1983 amounting to about \$1.5 billion each year. Because of the requirement to retire all gas-fueled generators by 1990, it is quite likely that all of this tax will be rebated to defray costs of retirement.

The automobile-related provisions of the President's energy proposals are aimed at reducing gasoline consumption 10 percent below current levels by 1985. The plan is to:

- o encourage the manufacture and purchase of cars that are more fuel-efficient through a system of taxes and rebates that would make more efficient cars cheaper and less efficient cars more expensive for the buyer;
- o encourage people to drive fewer miles by imposing taxes that would raise the price of gasoline.

CBO analysis indicates that the President's proposals--combined with fuel-efficiency regulations already on the books--would indeed cut automotive gasoline consumption but probably by no more than 5 percent below current levels by 1985.

The goal of 10 percent reduction in gasoline consumption by 1985 is ambitious, considering that motor gasoline consumption increased an average of 4.5 percent per year between 1965 and 1975. Legislation already on the books, however, as well as the delayed effects of post-embargo gasoline price increases, will slow future increases in gasoline consumption even if no further steps are taken. This slowing will take place as auto manufacturers adjust to higher fuel prices and to existing energy legislation by producing cars with improved fuel economy. It will become evident in national gasoline consumption when, during the next decade, these new fuel-efficient vehicles are phased in and the nation's auto fleet as a whole reflects substantially upgraded fuel economy.

CBO projections presented later in this chapter indicate that, because of improvements in auto fuel economy anticipated under present policy, the gasoline cost per mile of driving a new car in 1985 will be 18 percent lower than it is now. Because of reduced fuel costs per mile and increased affluence, the number of vehicle miles of travel per household in 1985 is projected to be over 20 percent higher than it is now.

There has been considerable public concern about the adjustments in travel which the American people will be forced to make in response to the President's plan. By and large, these adjustments are really slowdowns in the rate of the rise of the standards of living between now and 1985. But even with the rate slowed, the standard in 1985 would still be higher than it is now. For example, the average American family now drives slightly less than 15,000 miles per year. Under the plan, they would likely drive 17,000 miles in 1985, which is more than they drive now even though it is less than the 18,000 miles they would drive without the plan. Similarly, the cost per mile of fueling cars will be lower in 1985 under the President's plan than it is presently, although it would still be lower in 1985 under a continuation of present policy.

Three programs in the President's proposals are likely to reduce future automotive gasoline consumption. The "gas-guzzler" excise taxes and rebates for new cars appear to offer the greatest fuel savings. CBO estimates fuel savings for the gas-guzzler program to be 215,000 barrels a day in 1985 and 450,000 barrels a day in 1990, savings slightly above those projected by the Administration for this program. The crude oil equalization tax would have only minor effects on gasoline consumption, reducing it by about 40,000 barrels a day in 1980, 25,000 barrels a day in 1985, and even less thereafter. The standby gasoline tax could eventually lead to significant fuel savings, but CBO expects only moderate effects by 1985. The stringent gasoline consumption goals contained in the President's plan are projected to trigger the standby gasoline tax from 1982 on, producing additional fuel savings of 65,000 barrels per day in 1985, and 200,000 barrels per day in 1990. Taken together, CBO estimates these three program elements lead to total gasoline savings, relative to present policy, of 305,000 barrels per day in 1985, and 650,000 barrels per day in 1990.

The greater the fuel savings from other measures, the later the standby gasoline tax will be triggered, and consequently, the smaller the savings attributable to the standby tax by 1985. Both the extent of diesel usage within the auto and truck fleets and the stringency of fuel-economy standards to be set for light trucks under the EPCA will play major roles in determining when the standby tax is initially triggered. More diesel usage and more stringent light-duty truck standards could delay triggering

of the standby gasoline tax from 1982 (as projected by CBO) until 1984. On the other hand slower developments in these highly uncertain areas could lead to 1985 motor gasoline consumption that exceeds the Administration target by anywhere from 400,000 to 740,000 barrels per day. The Administration projects 1985 gasoline consumption of 350,000 barrels a day above target without consideration of the standby gasoline tax. Given the magnitude of the differences between the likely outcome and the target projected by both the Administration and CBO, 1985 gasoline consumption is not likely to be held beneath the target that will trigger that standby gasoline tax.

In short, President Carter's program produces sizable gasoline savings--equivalent to about 20 days of auto gasoline use in 1985 and 45 days in 1990. The provisions contained in these proposals do not appear to be sufficient, however, to meet his goal for 1985 gasoline consumption. CBO expects 1985 automobile gasoline consumption under the President's program to be only about 5 percent beneath that experienced in 1976, compared with the 10 percent reduction called for by the President.

Trucks hold the key to narrowing the gap between actual and target gasoline consumption in 1985. There is now one truck for every four cars registered in this country, and the number of light-duty trucks continues to soar as vans, pick-ups, and recreational vehicles increase in popularity. Because of the great variety of trucking equipment and operations, federal programs for trucks can be cumbersome, particularly for heavy trucks, and current truck fuel-economy programs lag behind those for automobiles. As yet to be specified fuel-economy standards for light-duty trucks, authorized by the Congress under the Energy Policy and Conservation Act, will play a key role in shaping an effective and even-handed policy for transportation fuel conservation.

PROPOSED POLICIES

Three of President Carter's energy proposals could have particularly strong impacts on automobile sales, ownership, use, and fuel consumption:

- o Crude oil provisions (price controls and equalization taxes) that would effectively bring domestic crude oil prices up to the world price by 1980 and that would increase them at the rate of inflation thereafter.

- o Graduated gas-guzzler excise taxes and rebates imposed on new cars on the basis of their fuel economy. Similar taxes and rebates would be imposed on light trucks.
- o A standby gasoline tax of up to 50 cents per gallon, imposed in five-cent increments starting in 1979, if actual gasoline consumption exceeds a predetermined target level for each year.

This chapter explores the likely automobile-related consequences of these proposals. 1/ Before examining the effects of the Administration program, each of these auto-related proposals will be summarized and major areas of uncertainty specified.

Crude Oil Equalization Taxes

As noted above, the President's proposal includes measures that would levy a tax on domestic crude oil to bring its net price up to the prevailing world price by 1980. This would in turn increase the price of gasoline at the pump in future years.

Gas-Guzzler Excise Taxes and Rebates

The so-called gas-guzzler provisions of the President's program are excise taxes and rebates for auto manufacturers 2/

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- 1/ The term "automobile" in this report refers to conventional passenger cars and does not include light-duty trucks as does the same term in the Administration's proposed energy bill.
 - 2/ The proposed act would require manufacturers to validate that the rebates and taxes had been passed along to vehicle purchasers. Inclusion of the tax or rebate as a separate item in computing the sticker price would apparently constitute such validation. The act would not prohibit manufacturers from raising the price of vehicles nor from passing along the costs of technological changes made in order to improve fuel economy.

based upon the fuel-economy ratings of new cars that they sell. The objective of this proposal is to provide an additional incentive to automobile manufacturers to improve the fuel economy of their cars and to encourage consumers to purchase vehicles that are fuel-efficient.

The Energy Policy and Conservation Act of 1975 (EPCA, P.L. 94-163) established a set of gradually more stringent new car fuel-economy standards to be implemented between 1978 and 1985. An auto manufacturer who does not meet these standards is liable for civil penalties based upon the degree to which the average fuel economy on its cars falls short of the standards. On the basis of CBO's analysis, it does not appear that the standards and noncompliance penalties built into current law are sufficiently strong to induce full compliance in all future years. Indeed, the analysis presented later in this chapter indicates that, in the absence of further policy changes relative to auto fuel economy and gasoline prices, EPCA standards will yield an average new car fuel economy of only 23.3 miles per gallon (mpg) in model year 1985, well short of the statutory standard of 27.5 mpg.

The gas-guzzler element of the Administration's program is designed to reinforce the existing standards. As stated earlier, the President's proposal calls for imposition of a set of graduated excise taxes and rebates based upon the relative fuel consumption of new vehicles. As proposed, taxes (in current dollars) would range from \$449 for a 12-mpg car to a rebate of up to \$473 for a 38-mpg car in model year 1978. In 1985, the corresponding figures would be a tax of \$2,488 for a 12-mpg car and a rebate of up to \$493 for a 39-mpg car.

In each future year, the proposed tax/rebate schedule uses the current EPCA miles per gallon standards as the dividing line between those cars subject to taxes and those eligible for rebates (for example, 18 mpg for 1978 and 27.5 mpg for 1985).

The magnitude of taxes and rebates increases throughout the 1978-1985 period; but in any single year the differences between tax and rebate entries are roughly proportional to the fuel savings implicit in each extra mile per gallon. For example, if cars are assumed to travel 10,000 miles per year, then improving a car's fuel economy from 12 to 13 miles per gallon saves 64

gallons of fuel per year. Similarly, a simple computation shows that improving a car's fuel economy from 35 mpg to 36 mpg yields fuel savings of 8 gallons per year. Thus, the extra fuel savings associated with one mpg improvement to the 12 mpg car are about eight times those of a one mpg improvement to the 35 mpg car. The Administration tax/rebate schedule reflects these fuel savings by including large steps in the schedule for fuel-economy improvement at the low-mpg end of the table, and small rebate differences for improvements toward the high-mpg end.

Under this proposal, the rebate side of the table would not be specified for future years, however, but would be adjusted from year to year so that rebate payments just balance tax collections. That is, the net tax collections under the gas-guzzler proposal would be zero.

One major area of uncertainty in this proposal is the treatment of imported cars. Since imports are generally smaller and more fuel efficient than domestic cars, the rebates for them would be substantially larger than for the average domestic car if they are treated on the same basis as domestic cars. Thus, equal treatment of foreign and domestic cars could be viewed as a substantial subsidy for foreign automobile production, while omission of foreign cars from the rebate system could be viewed as a trade barrier with effects similar to a tariff.

The actual rebates for imported cars will be determined through negotiations with individual countries to "develop equitable rebate agreements." ^{3/} The Administration's proposed legislation is no more specific, declaring that the agreements with foreign countries "...shall be designed to assure that manufacturers of domestically manufactured automobiles are not disadvantaged...." ^{4/} At this writing, the exact mechanism of achieving this goal is yet to be specified.

Another major uncertainty involves the treatment of light trucks. Under the Energy Policy and Conservation Act, the Secretary of Transportation is authorized to promulgate efficiency

^{3/} Executive Office of the President, Office of Energy Policy and Planning, The National Energy Plan, 1977, p. 38.

^{4/} The National Energy Act, H.R. 6831, Title II, Part B, Section 1202a.

standards for trucks with gross vehicle weight ratings of up to 10,000 pounds. Standards for vehicles under 6,000 pounds (gross vehicle weight) are currently being promulgated, and the President has directed that the Secretary of Transportation begin to set standards on vehicles in the 6,000 pound to 10,000 pound (gross vehicle weight) range. These standards, when set, would encourage improved fuel economy of light trucks in two ways. First, by establishing a set of fuel-economy standards and noncompliance penalties for light trucks, a clear economic and legal signal is given to manufacturers of light trucks to comply with the standard. Second, the standard to be set under the Energy Policy and Conservation Act would also serve as the dividing line between light truck taxes and rebates for light trucks under the President's energy plan, thus giving light truck manufacturers a reinforcing set of economic incentives to meet (and exceed) whatever fuel-economy standard is set for them. Together, these incentives have the potential to be very effective in conserving fuel in light trucks. It is impossible to provide estimates of their effect at this stage, however, since the standards themselves have not yet been set by the Secretary of Transportation.

Standby Gasoline Tax

Probably the most controversial proposal in the President's energy package is the standby gasoline tax. Under this program, at the end of each year starting with 1978, actual nationwide gasoline consumption would be compared to the predetermined consumption target. If actual consumption is found to exceed the target consumption, a gasoline tax of five cents per gallon would be imposed for each full percentage point by which the actual consumption exceeds the target. However, year-to-year changes are limited so that the tax never changes by more than five cents from the previous year. If the standby tax were to grow at the maximum possible rate under this constraint, the tax could start at five cents per gallon in 1979 and reach a level of 50 cents per gallon by 1988, in current dollars.

The proposed target levels of consumption increase from 7.35 million barrels per day in 1978 to 7.45 million in 1980 and then decline rapidly to 6.6 million barrels per day in 1985 and 6.5 million barrels in 1987 (see Table VI-1). For comparison, actual 1976 gasoline consumption is estimated to be 7.0 million barrels.

TABLE VI-1. PROPOSED TARGET LEVELS FOR NATIONAL GASOLINE CONSUMPTION, AVERAGE DAILY CONSUMPTION IN MILLION OF BARRELS

Year <u>a/</u>	Target
1978	7.35
1979	7.40
1980	7.45
1981	7.40
1982	7.20
1983	7.00
1984	6.80
1985	6.60
1986	6.55
1987 and thereafter	6.50

SOURCE: H.R. 6831, Section 1221c, Title II, Part B.

a/ For 12-month period ending September 30.

The standby gasoline tax would probably not have any effect until the early 1980s. Fuel-economy improvements already in evidence in model year 1977 vehicles as well as anticipated fuel-economy improvements between now and 1980 lead to a forecast of auto gasoline consumption that increases from 1976 to 1978, levels out through 1980, and then declines slightly between 1980 and 1986. Thus, the target proposed in the Administration plan appears to reflect the general shape of the trajectory expected for future automobile gasoline consumption. Since the standby gasoline tax would be triggered by overall gasoline consumption, however, (not just automobile gasoline consumption) the gasoline used for other purposes must be taken into account when analyzing the likelihood that the standby gasoline tax would be triggered in any given year.

Trucks are the principal nonautomobile users of gasoline. In 1972 trucks used about 20 percent of the nation's gasoline. Of this, more than half was used by light-duty trucks such as

pick-ups, vans, and recreational vehicles. Light-duty trucks have been growing in number by more than 5 percent a year during the last decade. A continuation of this growth trend would lead to increases in fuel consumption that more than offset automobile fuel savings in 1985, as discussed below under the analysis of energy impacts.

ENERGY IMPACTS

Options Examined in this Report

Using an econometric model, ^{5/} forecasts are developed for each of five different policy options. These five options represent present policy and four combinations of proposals from President Carter's proposals.

Option 1 (Present Policy):

Present policy reflects the imposition of the EPCA (although not necessarily assuming attainment of the standards contained therein) and assumes that, except for a gradual relaxation of price controls, gasoline prices increase at the rate that inflation increases.

Option 2 (Crude Oil Equalization Tax):

Implementation of the crude oil equalization tax.

Option 3 (Gas Guzzler):

Implementation of both the crude oil equalization tax and the new car excise taxes/rebates of the President's package.

Option 4 (Full Package):

Implementation of all provisions within the President's energy package (i.e., crude oil equalization tax,

^{5/} For details, please refer to Marketing and Mobility, report of a panel of the Interagency Task Force on Motor Vehicle Goals Beyond 1980, March 1976; and Damian Kulash, "Forecasting Long-Run Automobile Demand," in Transportation Research Board Special Report 169, 1975, pp. 14-19.

gas-guzzler excise taxes and rebates, and the standby gasoline tax.) This option assumes that the standby gasoline tax is triggered in each year from 1982 to 1981.

Option 5 (Fully Triggered Tax):

Implementation of all provisions of the President's energy package, assuming that the standby gasoline tax is triggered from 1979 to 1988. This option represents the most restrictive outcome possible under the standby gasoline tax and is not judged to be a likely outcome.

Present Policy Forecast for the Auto Sector

The impacts of President Carter's energy program should be gauged in terms of shifts from what would be expected in the absence of his program. In view of changing technology, rising population, and increasing affluence, automobile usage and the associated fuel consumption will differ from previous usage and consumption. The increase in gasoline prices of recent years and the existence of the standards required by EPCA will also play significant roles in shaping that future.

Under present policy, vehicle miles of travel are expected to increase more rapidly than new car sales, fleet size, or use of gasoline by automobiles. Travel growth is projected to average nearly 3.2 percent per year between 1977 and 1985. The stock of cars is forecast to grow somewhat more slowly, around 1.9 percent per year less than the very rapid growth experienced in the late 1960s and early 1970s. Its tapering off is attributable to several factors:

- o a decline in the rate of increase of driver-age population;
- o increases in automobile operating costs;
- o increases in automobile purchase prices; and
- o the existence of near-saturation levels of auto ownership among upper-income groups.

This slow growth in the number of cars translates into an almost level pattern of auto sales from now until 1985. Under present policy, new car sales are not projected to vary by more than 3.5 percent from their current level throughout the next decade.

In spite of the 32 percent growth in vehicle miles of travel forecast between 1977 and 1985, total auto fuel consumption is expected to change only slightly. As vehicles with improved fuel efficiency are phased in, the historic pattern of annually increasing automotive fuel use is expected to reverse itself. Auto fuel consumption is expected to peak in 1978 at about 5.4 percent above the 1976 level, then fall to about 0.7 percent above the 1976 level in 1985, and to begin to increase again in the late 1980s. The slight growth and eventual decline of auto gasoline usage between now and 1985 is primarily attributable to fuel economy improvements made in response to the fuel-economy provisions of the EPCA and to today's gasoline prices (which are considerably higher than those which prevailed when most existing cars were manufactured). The average fuel economy of new cars is projected to rise from 18.3 mpg in 1978, to 20.5 in 1980, and to 23.3 in 1985. These gains in new car fuel economy imply that the fuel cost per mile of model year 1985 cars will be 30 percent lower than that of model year 1976 cars. Along with increasing affluence, this decrease in projected fuel cost per mile is expected to increase auto travel per household from 15,000 miles per year in 1976 to 18,000 miles per year in 1985.

Future truck gasoline consumption under a continuation of present policy is difficult to predict for two reasons. First, as noted earlier in this chapter, it is not yet clear how stringent the EPCA truck fuel-economy standards will be. Thus, their impact on truck fuel consumption is still unclear. Second, increases in the diesel-powered share of trucks will reduce truck demand for gasoline, but the extent to which the diesel share will increase in future years is subject to considerable uncertainty because of technological, environmental, and regulatory questions.

It has been assumed here that truck gasoline consumption increases 1.6 million barrels per day in 1976 to 1.9 million barrels per day in 1980, to 2.2 million in 1985, and to 2.6 million in 1990. This assumption, based upon a forecast made

for the Federal Energy Administration, ^{6/} reflects expected increase in trucking activity, modest increases in the share of diesel trucks (for example, the diesel share of heavy trucks increases from 61 percent in 1973 to 84 percent in 1985,) and no increases in truck fuel economy. In view of the light truck provisions of the Energy Policy and Conservation Act and other conservation actions being taken by truckers, the future truck fuel consumption assumed here is probably conservative, that is, higher than what would be expected if these initiatives are successful. Nevertheless, it is adopted here in order to gauge the maximum possible impact of the standby gasoline tax. That is, to the extent that this forecast may overstate future truck gasoline consumption, the future total gasoline consumption which it implies will be high, with the result that the standby gasoline tax is projected to be triggered earlier than it probably would. Correspondingly, the effect of this assumption about truck fuel consumption is to examine the standby gasoline tax proposal in the strongest form it could take.

Although the automobile fuel consumption projected above implies a downturn in the nation's gasoline consumption during the early 1980s, taken together with the truck fuel consumption projections of the preceding paragraph, the result is gasoline consumption substantially above the targets for the mid-1980s put forth in President Carter's energy proposals.

Estimated Fuel Savings

Under present policy, (which includes the EPCA new car fuel-economy standards) automotive gasoline consumption will probably increase by 1.2 percent per year until 1980, decrease by about 0.8 percent per year from then to 1985, and then begin increasing again by 0.3 percent per year from 1985 to 1990. Table VI-2 shows expected gasoline savings resulting from adding various components of the energy package to present policy. These findings indicate:

- o Option 2: The crude oil equalization tax by itself would likely save only minimal amounts of gasoline

^{6/} Jack Faucett Associates, Trucking Activity and Fuel Consumption: 1973, 1980, 1985, and 1990, report submitted to the Federal Energy Administration, June 1976.

TABLE VI-2. PROJECTED GASOLINE CONSUMPTION UNDER PRESENT POLICY AND
ALTERNATIVE OPTIONS: PRESENT CONSUMPTION AND CHANGES
(MINUS) IN THOUSANDS OF BARRELS PER DAY

Option	1978	1980	1985	1990
1. Present Policy EPCA Standards ^{a/}	7,390	7,530	7,650	8,160
2. Crude Oil Equalization Tax	-10	-40	- 25	0
3. Crude Oil Equalization Tax, Excise Taxes and Rebates	-20	-55	-240	-450
4. Crude Oil Equalization Tax Excise Taxes and Rebates, and Partial Gas Tax (level of tax)	-20	-55	-305 (20 cents)	-650 (45 cents)
5. Crude Oil Equalization Tax, Excise Taxes and Rebates, and Full Gas Tax (level of tax)	-20	-120 (10 cents)	-390 (35 cents)	-710 (50 cents)

SOURCE: Congressional Budget Office.

^{a/} Figures shown for present policy refer to projected consumption levels;
figures for the other cases refer to differences relative to present
policy.

by 1978, but by 1980 would save about 40,000 barrels per day and about 25,000 per day in 1985.

- o Option 3: By adding auto excise taxes and rebates onto the crude oil equalization tax, the gasoline savings would become quite substantial, beginning with 55,000 barrels per day in 1980 and rising to 240,000 in 1985 and 450,000 by 1990. (This option would increase savings by about 15,000, 215,000, and 450,000 barrels per day over Option 2 for 1980, 1985, and 1990 respectively.)
- o Option 4: The standby gasoline tax, which most likely would not begin before 1982, would, combined with the crude oil equalization tax and the excise tax/rebates, save about 305,000 barrels per day in 1985 and about 650,000 by 1990. (This option would increase savings by about 65,000 and 200,000 barrels per day over Option 3 in 1985 and 1990.)
- o Option 5: In conjunction with the crude oil and excise tax/rebate provisions, a gasoline tax triggered in 1979 by much stricter consumption standards could produce substantial gasoline savings much earlier: 120,000 barrels per day could be saved by 1980, 390,000 by 1985, and 710,000 by 1990, if the full five cent per gallon increase in the gasoline tax were imposed every year. (This option would increase savings by about 65,000, 85,000, and 60,000 barrels per day over Option 4 for 1980, 1985, and 1990 respectively.)

Options 4 and 5 reflect two possible outcomes under the standby gasoline tax, namely, that it would be triggered from 1982 on and from 1979 on, respectively. CBO projections indicate that, in 1990, the standby gasoline tax would add 200,000 barrels per day to the gasoline savings of the other proposals in the President's package, assuming that it is triggered from 1982 on and reaches a value (in current dollars) of 45 cents per gallon in 1990. The corresponding projection assuming triggering from 1979 on is 260,000 barrels per day in 1990. These projections suggest that the standby tax could have substantially different effects on fuel conservation depending upon when it would take effect. Furthermore, the determination of when it would take effect is strongly influenced by what happens to future gasoline consumption by trucks.

Option 4, which assumes that the standby gasoline tax would be triggered from 1982 on, is consistent with a very conservative view of future energy conservation by trucks. As was discussed earlier under the description of the present policy case, it is assumed here that the diesel share of heavy truck sales increases from 61 percent in 1973 to 84 percent in 1985, and that there are no gains in the fuel economy of light trucks. Both of these assumptions understate the extent of gasoline conservation likely to be achieved by the trucking industry. CBO estimates that, under the light truck standards of the Energy Policy and Conservation Act and the reinforcing taxes and rebates for light trucks proposed in the President's energy plan, it would be possible to obtain reductions in truck use of gasoline sufficient to delay triggering of the standby gasoline tax until 1984 and possibly even until 1985. It is difficult to attribute savings in gasoline consumption by trucks to the Administration plan versus present policy since both are based on the same, yet to be determined, fuel-economy standards for light trucks. It is clear, however, that these policies regarding trucks would exert a strong influence on the triggering mechanisms of the standby gasoline tax.

It should be noted that the standby gasoline tax would not apply to diesel-powered vehicles, apparently as an incentive to encourage greater diesel use. While diesel engines are generally more fuel-efficient than gasoline ones, their efficiency advantage does not appear to be very substantial for light vehicles in local use. 7/ Exclusion of diesel-powered vehicles from the standby gasoline tax would thus encourage some shifts to engines that save gasoline but would have little effect on overall petroleum product conservation.

The reduction in gasoline consumption projected under the standby gasoline tax would come largely through reductions in vehicle miles of travel. In the most restrictive case (including a gas tax starting in 1979 as in Option 5), travel reductions relative to present policy would be small until about 1980, but increase to about 4 percent in 1985 and 5 percent in 1990. These travel reductions are thought to be indicative of only minor traveler inconveniences since they represent declines in travel growth per household relative to what would be expected under present policy, not absolute reductions from current levels.

7/ See Jack Faucett Associates, op. cit.

OTHER IMPACTS

Impact on Motor Vehicle Manufacturers

President Carter's proposals would influence the auto manufacturers in two major ways: (1) by encouraging the manufacturers themselves to make changes in autos that result in greater fuel efficiency; and (2) by encouraging consumers to alter the number and type of cars they purchase.

Table VI-3 shows that both increases in gasoline prices and the new car excise tax/rebate scheme would reduce the number of

TABLE VI-3. PROJECTED AUTO SALES UNDER PRESENT POLICY AND
ALTERNATIVE OPTIONS: PRESENT SALES AND CHANGES
(MINUS) IN THOUSANDS OF AUTOS

Option	1978	1980	1985	1990
1. Present Policy, EPCA Standards ^{a/}	11,660	12,090	11,620	12,180
2. Crude Oil Equalization Tax	-120	-370	- 80	0
3. Crude Oil Equalization Tax, Excise Taxes and Rebates	-140	-360	-360	-160
4. Crude Oil Equalization Tax, Excise Taxes and Rebates, and Partial Gas Tax	-140	-360	-990	-1,240
5. Crude Oil Equalization Tax, Excise Taxes and Rebates, and Full Gas Tax	-140	-1,000	-1,210	-1,220

SOURCE: Congressional Budget Office.

^{a/} Figures shown for present policy are projected auto sales; figures for other years refer to differences relative to present policy.

autos sold in future years beneath the levels anticipated under present federal policy. This reduction is caused in part by expensive technological improvements that would be made by manufacturers under the Administration's plan (and whose cost would be passed along to consumers) in order to increase the amount of the rebate for which each new car is eligible. The decline in new unit sales would also be partly attributable to the increase in the cost per mile of fueling vehicles that would emerge under the President's proposals. By 1985, the President's package would increase the fuel efficiency of new cars by 12 percent above present policy, while the price of gasoline (including the standby gasoline tax triggered in 1982) would increase by 22 percent. Taken together, these factors would increase the cost per mile of fuel for new cars relative to present policy about 10 percent. As a result of the increased purchase cost and fueling cost of automobiles under the Administration program, the projected reductions in new cars sold relative to present policy would range from as little as 80,000 autos or 0.7 percent of anticipated new car sales in 1985 if only the crude oil taxes are imposed (Option 2) to as much as 1.2 million autos or 10.4 percent of new car sales if the crude tax is combined with the excise tax/rebate system and the imposition of maximum increases in the standby gasoline tax (Option 5). However, imposition of the excise tax/rebate proposal alone would probably increase unit sales slightly in the first few years.

Even though the number of new cars sold would decrease under the President's proposals, relative to present policy, the sales revenue of the auto industry adjusted for penalties under the Energy Policy and Conservation Act would probably remain about the same. The principal reason why auto industry revenues would not fall under the program is because of technological improvements made in response to the gas-guzzler excise taxes and rebates. CBO expects that these improvements would add between \$400 and \$600 to the price of new cars in 1985, thereby producing additional new car sales revenues almost equivalent to those lost through the decline in the number of new cars sold. Furthermore, penalty liabilities for noncompliance with the Energy Policy and Conservation Act are projected to be about \$1.3 billion lower in 1985 under the President's plan. If auto industry revenues were adjusted to reflect penalty liabilities, the President's plan would produce adjusted 1985 auto industry revenues that would be almost identical to those projected under present policy.

The effect that the President's proposals would have on the profits of the auto manufacturers is not clear. Under most options, auto unit sales would decrease, perhaps reducing the profit margin on each vehicle sold. Under most options the intermediate and large car proportion of new auto sales would increase even faster than under present policy, however (see following section). Since profit margins are thought to be greater on large autos, and since U.S. firms produce the vast majority of these vehicles, the profitability of U.S. auto manufacturers might not be impaired by the proposed auto energy controls.

The influence of the proposed energy package on auto imports cannot be estimated until the policy on rebates for fuel-efficient imports is clarified.

Mechanism of Influence of Auto Sales

The increase in gasoline prices and the system of excise taxes/rebates proposed by President Carter appear to affect the auto industry in different ways. As gasoline prices would be increased (either through the crude oil provisions or through triggering of the standby gasoline taxes), total auto sales would be decreased relative to sales anticipated under present policy as well as relative to alternative energy proposals that include the excise tax/rebate system.

In addition, increased gasoline prices would tend to encourage a shift in market share away from small cars and toward larger cars that are relatively fuel-efficient. (Of course, these new larger cars would be substantially more fuel-efficient than current ones.) This somewhat counter-intuitive result would occur because it is easier (and relatively less expensive) to make large percentage improvements in the fuel efficiency of large cars as compared to the already efficient small cars. Therefore, the combined cost of buying and fueling large cars would be increased relatively less than the corresponding cost for small cars. The smaller relative cost increase for large cars would thus encourage a greater proportion of consumers to buy large cars than would have been the case with no cost increase at all. This effect is magnified by the fact that small car buyers are more price-sensitive than are large car buyers.

In general, the proposed system of excise taxes and rebates is projected to encourage the purchases of small cars relative to the number estimated to be purchased under present policy and relative to the number purchased under proposals which increase gas prices. The market share of large cars projected under the gas-guzzler provisions would be reduced relative to options which include significant gas price increases. A combination of excise taxes with even a small increase in gas prices (for example, with the crude tax only as in Option 3) tends to increase the market share for large cars relative to present policy.

The proposed excise tax/rebate system would probably influence the auto manufacturer more than it would the auto purchaser. For example, most of the rebates would not be fully passed on to consumers in the form of lower prices for existing models; but some of the rebates would, in effect, be absorbed by manufacturers in making technological improvements that result in even more fuel-efficient models, that is, vehicles that can qualify for larger rebates.

Used Car Market

Changing the prices of new cars in turn changes the prices of used cars as well as the dynamics of the used car market. An excise tax on larger, less fuel-efficient autos would increase somewhat the value of existing cars of this type and discourage people from junking them. Under the existing EPCA standards, these gas guzzlers will become increasingly rare, however, so that the additional effect on fuel consumption associated with delayed scrappage is likely to be minor.

Similarly, rebates for new small- and medium-size autos that are fuel-efficient should decrease somewhat the value of existing cars of this type. This effect would be reduced since much of the rebates would likely be used by the manufacturers to make changes that improve auto fuel efficiency.

Increased gas prices would probably have the opposite effect on the used car market--encouraging a more rapid turnover of inefficient autos and a longer retention of fuel-efficient autos. Taken together, changes in vehicle scrappage patterns are not expected to have significant implications for the nation's fuel consumption. In 1985 even the most extreme of the energy options (Option 5) is projected to decrease the number of autos scrapped by less than 1.2 percent.

Penalty Liabilities on Industry

Individual auto companies must make penalty payments if their car sales do not meet the fuel-efficiency standards set by the Congress under the EPCA. ^{8/} It appears that the system of auto excise taxes and rebates proposed by President Carter would have a major effect in reducing the auto industry's overall penalty liability and in moving the industry as a whole toward meeting the EPCA standards. Under present policy the auto industry is projected to be liable for penalty payments of \$2.5 billion in 1985 (in 1977 dollars). Options 3, 4, and 5 (which include the excise tax/rebate system) would reduce the penalty liabilities by more than one-half, to between \$1.05 billion and \$1.21 billion in 1985.

Consumer Impacts

The shifts in crude oil price controls, the increase in crude oil taxes, and the standby gasoline tax would all translate into higher gasoline prices for consumers relative to those anticipated under present policy. Most motorists would simply pay these higher gasoline prices and continue driving much as before; some would curtail their driving; and a few would find that the increased gasoline prices made it no longer worthwhile to buy a second car or replace cars as often. CBO projections indicate that vehicle miles of travel would fall by 4.2 percent in 1985 as a result of the full Administration package, including a fully triggered standby gasoline tax. The gas-guzzler provisions are not expected to have any noticeable impact on the total vehicle miles of travel. The crude oil equalization taxes by themselves would lead to a reduction in 1985 auto travel of under 0.5 percent.

The number of cars in use would decrease slightly under the gas-guzzler taxes and rebates, although the drop appears to be only about 1.3 percent in 1985. The standby gasoline tax (if it is fully triggered) is the only element in the Carter package which promises to have a significant impact on automobile ownership patterns. The full gas tax combined with the other parts of

^{8/} These penalties equal \$50 per car for each mile per gallon by which a manufacturer's average new car mpg falls short of the standard. These civil penalties are not tax deductible.

the proposal could lead to a drop of 6.1 million cars in use by 1985, about 5.4 percent under the level expected under present policy.

It is difficult to project who will bear the brunt of the reduced travel and auto ownership that result from the Administration proposals, specifically from the standby gasoline tax. High-income groups would face the largest total travel price increases because they tend to own more cars per household, to use each car more, and to buy large cars that are relatively fuel inefficient. While these figures clearly indicate that relatively high-income households would encounter the greatest net price increases, they are also, however, clearly the households that are least inconvenienced by these extra charges. Low-income households whose fuel use is much lower could nonetheless curtail their travel the most. The evidence available on the effects of gasoline price increases on different income groups is discussed in detail in Chapter X.

DISTRIBUTIONAL IMPACT

There are several factors that would be likely to reduce the potentially regressive nature of increased gasoline prices. Most significantly, the revenues from the gas tax and crude oil provisions would be rebated on a per capita basis, regardless of automobile ownership. Families with no auto would receive the full rebate, and since these families are concentrated at lower incomes, the system of rebates would represent a transfer of income to them. In 1973, only 36 percent of families with incomes under \$3,000 owned a car, compared to over 90 percent car ownership by families with incomes over \$10,000. ^{9/} Also, because the sum to be rebated to individuals would include a part of the taxes paid by business, all income groups should receive larger rebates than their increased gas payments. A major offset to this rebate would be the likely increased prices for consumer goods as trucking firms and others pass on their increased fuel costs. These increased prices are addressed more fully in Chapter X.

Under present policy, significant improvements are expected in the fuel efficiency of new cars so that by the late 1980s,

^{9/} Bureau of Labor Statistics, Consumer Expenditure Survey Series: Interview Survey, 1972 and 1973, Table 16b.

when the nation's vehicle fleet as a whole should be about 30 percent more fuel efficient than now, families at virtually all income levels should be able to drive the same vehicle miles as today, for a lower expenditure on gasoline. (Of the options examined here, the only exception is if the standby gas tax is fully triggered, resulting in a 5 percent increase in gas cost per vehicle mile in 1985 over 1976.) Since higher-income families purchase a larger proportion of new cars than lower-income groups, they would be the first to receive these gains in fuel efficiency, however. In time, as new cars pass through the used car market, all income groups would enjoy these fuel-efficiency gains.

The President's proposals would improve average fuel efficiency of new cars over the gains likely to occur under present policy by about 12 percent in 1985, leading to an improvement in the average fuel efficiency of all cars of 1.6 percent relative to present policy. For the average consumer, these efficiency gains would be more than offset by increased gas prices, however, increasing the fuel cost per mile relative to that expected under present policy. But because of the significant improvements in average miles per gallon expected under the existing EPCA standards, the Administration proposals would still result in an improvement relative to today's conditions in gasoline costs per vehicle mile.

The increased gasoline prices would have different effects depending on where people live. Since people living in central cities are less apt to own cars (32 percent of central city inhabitants own no car versus 15 percent for other urban areas and 18 percent for rural families), more central city dwellers would receive rebates and yet bear relatively minor cost increases. Also, since public transportation is better in urban areas, it should be easier to shift some work-related trips from auto to public transit. In general, rural families with autos already spend a larger portion of their income on gasoline than do similar urban families.

BUDGETARY IMPACTS

Federal Budget

The direct impact on the federal budget of the gas price and new car excise tax/rebate proposals is planned to be neutral. Rebates would be adjusted annually so that total auto rebates

offset total auto excise taxes. Any temporary imbalances would be absorbed by the Treasury, but would likely to be small (perhaps \$50 million at most) and of little significance to the federal budget. Similarly, revenues from the standby gas tax (if and when it is imposed), would be returned to consumers through the income tax system and other mechanisms.

The revenues generated by the standby gas tax could be quite substantial. Using the proposed gasoline consumption targets, a five cent per gallon tax would likely be imposed in 1982, increasing to 20 cents in 1985 and 45 cents in 1990. A tax at these levels would produce about \$3.3 billion in 1982, \$11.2 billion in 1985, and \$19.9 billion in 1990 (in 1977 dollars), net of revenue losses due to business claiming the gas tax as an itemized deduction on their income taxes.

The energy provisions would have an important impact, however, on the ability of the auto manufacturers to meet the existing EPCA auto-efficiency standards, and thus on the penalty payments they are required to make. With no changes in existing law, penalty payments could equal \$2.5 billion in 1985. The influence of the crude oil provisions on the price of gas should lower this by only about \$15 million. Adding the excise tax/rebate system would, however, significantly improve the extent to which the auto industry is likely to meet the EPCA standards, reducing the expected 1985 penalty liabilities to between \$1.05 and \$1.21 billion. The federal budget might also be increased by as much as \$0.7 billion in 1985 and \$1.3 billion in 1990 if additional aid were provided to replace state revenue losses caused by decreased state and local gas tax receipts and other highway-related receipts. This problem is discussed in the next section.

State Budgets

Reductions in automotive gasoline consumption under the President's plan would be accompanied by adverse effects on state (and possibly local) budgets. Fuel tax revenues, auto license fees, and titling fees and taxes would all be reduced. Highway tolls would also be affected. There might also be a slight change in sales tax receipts, but this is indeterminate since consumers would simply spend roughly the same proportion of their incomes on a different market basket of goods and services, most of which would also be subject to sales taxes. Table VI-4 shows estimated state revenue losses in each option examined. There is no easy way to determine the share of losses on a state-by-state

basis, although some would be more severely affected than others. The most restrictive combination of President Carter's proposals (Option 5) could reduce state receipts by 0.4 percent, 2.5

TABLE VI-4. IMPACTS OF ENERGY PROPOSALS ON STATE BUDGETS:
IN MILLIONS OF DOLLARS

Option	Direct Auto-Related Revenue Changes Compared to Present Policy a/			
	1978	1980	1985	1990
1. Present Policy b/	10,500	10,600	10,460	10,670
2. Crude Oil Provisions	-25	-90	-55	0
3. Crude Oil Provisions, Excise Tax/Rebates	-40	-120	-380	-640
4. Crude Oil Provisions, Excise Tax/Rebates, Partial Gas Tax	-40	-120	-540	-1,130
5. Crude Oil Provisions, Excise Tax/Rebates, Full Gas Tax	-40	-270	-740	-1,270

SOURCE: Congressional Budget Office.

a/ Includes decreased fuel tax revenues, auto license and registration fees, and title fees and special titling taxes.

b/ Figures shown for present policy are projected auto-related state revenues; figures for other years refer to differences relative to present policy.

percent, 7.1 percent, and 11.9 percent in 1978, 1980, 1985, and 1990 respectively relative to present policy. 10/

The federal government might wish to consider state aid packages to make up these losses. Since many of the state losses would fall in revenue areas that are earmarked by law for highway use, one option would be to provide a system of block grants to the states, some of which would be tied to highway spending but not be tied to new highway construction. This could reduce the impact of the energy proposals on the state money available for maintenance of highways. Grants could be apportioned by a formula that attempts to simulate revenue losses by state.

SUMMARY OF PRINCIPAL IMPACTS OF THE PRESIDENT'S PROPOSALS

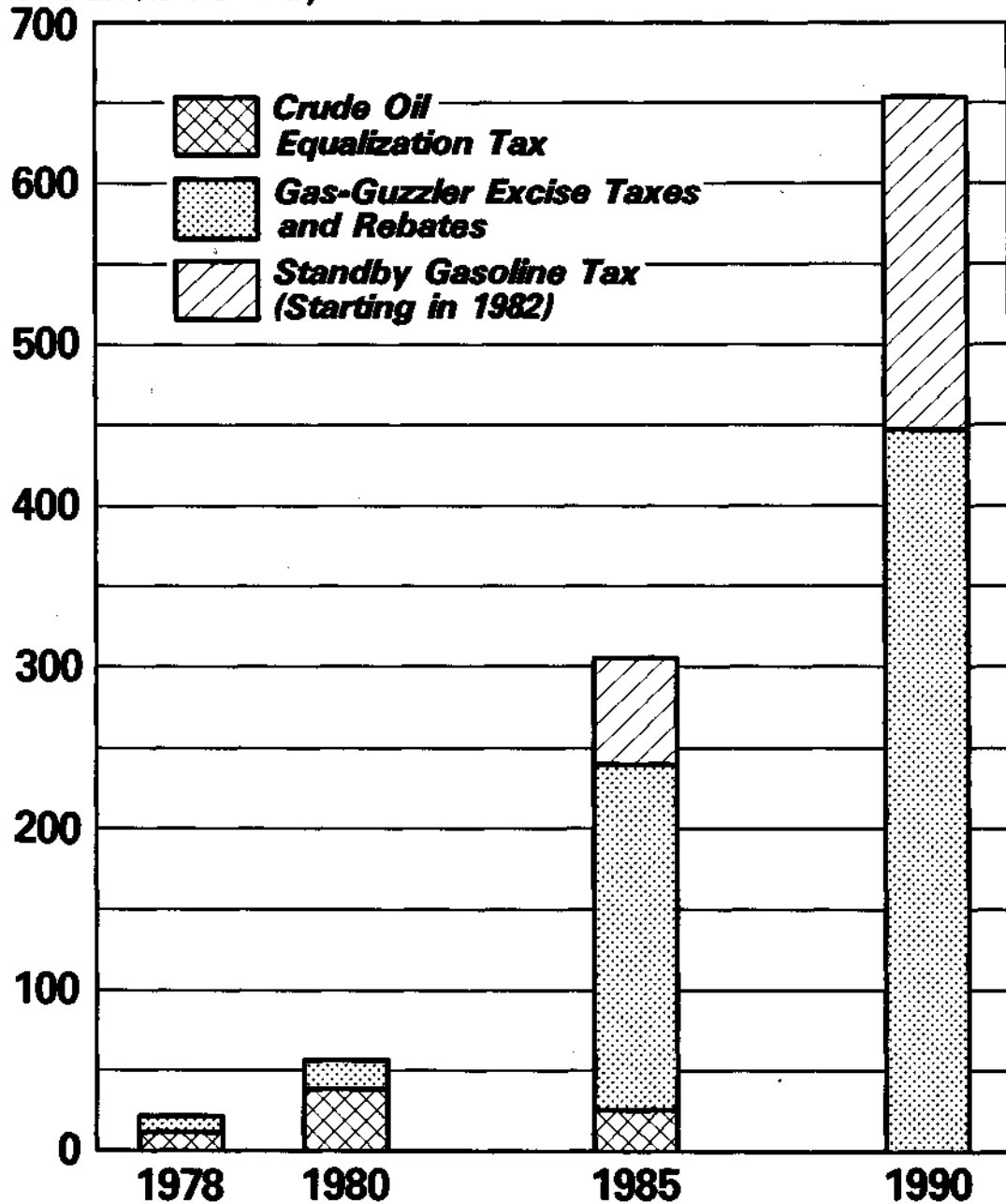
Of the three proposals in the President's energy program shown in the following figure, the gas-guzzler excise taxes would have the largest effect on fuel consumption, reducing automotive gasoline consumption in 1985 by 215,00 barrels a day. This saving could reach 450,000 barrels of gasoline a day in 1990. Because the gas-guzzler provision influences the type of new car produced by manufacturers and purchased by consumers, it would take a number of years for it to have an appreciable impact on gasoline consumption. At the same time, its effect on total car sales should be relatively minor, reaching a maximum reduction of about 280,000 new cars sold in 1985.

The standby gasoline tax appears unlikely to be triggered before 1982, and, in constant 1977 dollars, could reach as much as 23 cents per gallon in 1990. Under optimistic assumptions about diesel penetration and standards for light-duty trucks, the tax might not be triggered until 1984 or 1985. If the standby gasoline tax is triggered in 1982, it could reduce auto gasoline consumption by an additional 65,000 barrels a day in 1985 and 200,000 barrels a day in 1990.

10/ State governments are expected to spend about \$13.7 billion in highway-related tax receipts on highways in calendar year 1977. This sum includes truck-related taxes and parking charges and tolls that are not included in the estimates in Table VI-4. Local governments are expected to spend an additional \$600 million in highway-related receipts. (Federal Highway Administration News Release, December 31, 1976, Table HF-11.)

Projected Gasoline Savings of the President's Energy Proposals (Savings refer to gains relative to present policy.)

Savings in Thousands
of Barrels Per Day



In contrast to the gas-guzzler provisions, which would reduce new car sales by about 280,000 units in 1985, the standby gasoline tax could have a large impact on new car sales, reducing them by over 600,000 units in 1985. Total vehicle miles travelled could also be reduced by 1.7 percent in 1985 because of the standby gasoline tax.

As a whole, the President's proposals would reduce auto gasoline consumption compared to present policy by about 55,000 and 305,000 barrels per day in 1980 and 1985, respectively. New car sales would be reduced by a total of about 360,000 and 990,000 units in 1980 and 1985, respectively. Vehicle miles travelled would be reduced by 0.8 percent in 1980 and 2.3 percent in 1985 relative to present policy.

President Carter's proposed tax credits for insulation and solar equipment would help reduce private consumption of energy for heating the nation's homes. However, they would do so at sharply different costs. For each barrel of oil not burned because of responses to the insulation credit, the federal government would pay \$2.42 to taxpayers who insulate. For the solar credit, the figure is \$11.28 per barrel of oil not burned. These costs are high because a large portion of the credits are paid to people who would have made energy-saving improvements anyway.

Between 1978 and 1985, the proposed insulation tax credit would reduce federal revenues by \$2.1 billion. This tax expenditure would induce people to spend \$2.9 billion on insulation, in addition to the \$6.3 billion that would be spent without the tax credit. 1/ Of the 23.8 million households making insulation improvements, 7.8 million are expected to do so in response to the proposed credit. The 7.8 million who insulate only in response to credit would save themselves \$9.2 billion in heating costs by the year 2004. 2/ Without the proposed credit, consumers would (on average) save \$3 in

1/ The National Energy Plan (NEP) states that homeowners would be entitled to the insulation credit. The bill (H.R. 6831) submitted to the Congress does not exclude renters from claiming credits. This chapter proceeds on the basis that H.R. 6831 reflects the Administration's intent on this point. Even if the credit is available to renters, few of them are expected to make these improvements. Rental leases typically are shorter than the payback period for these investments.

2/ The \$9.2 billion is the present value of a saving of 890 million barrels of oil (or equivalent) in 7.8 million homes over a 27-year period.

heating costs by investing \$1 in insulation. The credit would raise the return to \$4 for \$1 invested in insulation.

During the same period, the solar tax credit would add \$460 million to the \$700 million that would be spent for solar equipment without the credit. By 1985, 773,000 households (compared to the Administration goal of 2.5 million) would own solar equipment. Without the credit, the number would be only 464,000. Tax credits from 1978-1985 (amounting to \$262 million) would lead to \$460 million of increased private investment, and would save the 309,000 affected homeowners 3/ \$240 million over a 27-year period. From a private perspective, investment in solar equipment barely repays its costs for most buyers, even with the proposed tax credit.

The costs and benefits of energy-saving investments for residences can be compared as cash amounts--the cost of improvements vs. the amount of fuel savings. Public costs can also be stated in dollars--the estimated tax credit. The public benefits, however, come in a less tangible form--one that cannot easily be reduced to a dollar value. The public benefit from reducing private energy purchases comes in the form of reduced national energy consumption (i.e., reduced consumption of oil and gas) and an implied decrease in imports, which reduces vulnerability associated with dependence on foreign energy. Measured by its impact on private energy consumption, the insulation tax credit is 4 1/2 times as efficient as the solar credit. Yet, neither tax credit may provide a sufficient public benefit to justify the public cost.

PROPOSED POLICY

Residential heating (space and hot water) accounts for 10 percent of total energy use in the United States. A reduction in the use of conventional fuels for these purposes would be desirable for many of the same reasons that reductions are sought in other sectors. Improved levels of insulation

3/ The solar credit is not specifically limited to owners, but few tenants are expected to invest in costly equipment for premises that they do not own.

and weatherproofing are highly efficient means for bringing about reductions (perhaps 30-40 percent) in the consumption of heating fuels. In addition, the increased use of solar heating equipment offers the potential to shift some heating demands away from conventional fuels.

Increased use of insulation and solar equipment may be encouraged in a number of ways, including:

- o raising fuel prices
- o educating the public
- o setting mandatory standards
- o subsidizing manufacturers
- o granting tax credits
- o offering direct grants.

The Administration plan focuses primarily on the tax credit strategy (although there are some educational efforts, direct grants, and minor price increases as well).

The proposed incentive for adding insulation and related equipment consists of a tax credit equal to 25 percent of the first \$800 spent, and 15 percent of the next \$1,400 spent to improve primary residences. The maximum allowable credit per household is therefore \$410. Major items eligible for the credit include insulation, storm windows, and clock thermostats. Some weather stripping, caulking, and miscellaneous improvements to heating equipment are also included.

The proposed incentive for solar equipment consists of a tax credit for solar space heating and solar water heating installations. The tax credit would initially be set at 40 percent of the first \$1,000 of expenditures and 25 percent of the next \$6,400 spent for eligible equipment. It would decline over time and expire at the end of 1984. The maximum credit

would be \$2,000 through 1979, \$1,580 through 1981, and \$1,210 through 1984. 4/

The home insulation and solar heating tax credits have at least one short-run goal--to speed the purchase and installation of certain materials and equipment--and at least one long-run goal--to reduce the use of scarce and costly conventional fuels for home heating. There is widespread acceptance of the fact that additional insulation and related weatherproofing can reduce heating fuel needs by 30 to 40 percent. In the case of solar heating, recent research and engineering experiments suggest that solar heating, despite high initial costs, is beginning to be competitive with conventional heating systems. 5/ In both instances, reduced fuel use will lessen the need for imported petroleum products.

ENERGY-SAVING IMPACT OF INSULATION CREDITS

The purchase of insulation and related materials after the effective date of the proposed tax credit will undoubtedly produce significant reductions in energy consumption. However, not all future reductions in energy usage should be attributed to the proposed tax credit. The proportion of future residential energy savings properly attributed to the tax credit depends on how many households will still respond to past increases in heating costs.

Motivation to Insulate

Generally, people are motivated to buy and install added insulation as a result of fuel cost increases--including

4/ These reductions are based on the assumption that equipment and related costs will decline as the relevant technology improves, reducing the need for large subsidies to purchasers.

5/ Cost comparisons between solar heating and conventional systems are best made by comparing payments necessary to repay a loan for the initial solar cost (amortized) with the initial cost plus the expected operating cost (largely fuel) of the conventional system.

those expected in the future (a tax credit merely adds to the impetus). 6/ Nevertheless, long delays often occur between recognition of fuel price increases and the purchase of added insulation. Many people are just now responding to fuel cost increases occurring years ago, and expectations about future energy costs will contribute to insulation sales for many years to come, even without a tax credit. 7/

Given the normally long response lags between fuel price increases and insulation purchases, a large share of any tax credit would be a windfall payment to people who have already decided to add insulation. It is estimated that two-thirds of the households receiving the credit would have bought insulation anyway.

The Demand for Insulation

Some 34 million dwelling units in the United States (all suitable candidates for improved insulation) are the target of the proposed credit. 8/ This figure is calculated as follows. First, of 45 million owner-occupied dwellings, an estimated 38 million are suitable for additional insulation (i.e.,

6/ Insulation sales began a sharp rise in 1974, with the rapid increase in heating fuel costs. In the intervening three years, insulation sales have shown no sign of tapering off. There is no reason to assume that sales would show a marked drop without the proposed tax credit.

7/ The literature on diffusion of technology and adoption of innovations suggests long lags and incomplete implementation, even though the savings from adding insulation are substantial. See Rogers and Shoemaker, Communication of Innovations, New York, 1971, especially pp. 129 and 350-352.

8/ The NEP includes a number of insulation measures in addition to tax credits, including utility-sponsored programs, grants to low-income households, and the prospect of mandatory standards. This analysis seeks to identify the cost and effectiveness of the proposed credit apart from the other related, but separable, initiatives aimed at the same objective.

have accessible attics). Approximately 8 million of these dwellings have already been upgraded since 1974. Thus, 30 million owner-occupied homes remain to be insulated. Second, of nearly 25 million rental housing units, an estimated 11.5 million are suitable for additional insulation. Among these 11.5 million, approximately 4.0 million are occupied by people who stand to benefit from the tax credit. 9/ Thus, a total of 34.0 million dwelling units are the possible focus of the insulation tax credit.

The fact that 8 million homeowners purchased insulation between 1974 and 1976 in response to increased heating costs indicates that insulation will be purchased even without the tax credit. These recent purchases are estimated to represent only a fraction (about one-third) of the eventual response to the 90 percent increase in fuel prices experienced since 1974. Therefore, an additional 16 million homes are expected to be insulated by 1985, even without a tax credit. The proposed credit (which would reduce the cost of insulation by 25 percent) would encourage still other homeowners and renters to make energy-saving improvements. Under assumptions used here, it would lead to insulation purchases by 7 million more homeowners and 0.8 million renters. Another 10.2 million dwellings would not receive improved insulation, because they are not physically suited to individual insulation, are occupied by short-term renters, are heated by landlords, or for some other reason.

Savings Due to Added Insulation

The prospects for reducing private consumption of energy for home heating are very bright. Together, normal insulating plans and the stimulus of the proposed tax credit could result in re-insulation by 1985 for 70 percent of all owner-occupied homes built before 1975. The tax credits for renters and landlords and other programs to insulate rental housing are expected

9/ In order for a renter to benefit from the tax credit, he must (1) pay for his own heat, (2) expect to remain in his home as long as the payback period for his investment, and (3) have sufficient tax liability to claim the credit as a tax offset.

to be less successful. The energy savings attainable by re-insulating a home and making related improvements are estimated to be 35 percent of the 100 million British thermal units (BTUs) per year currently used to heat the typical home. ^{10/} An energy saving of 35 million BTUs per home annually is equivalent to about 6 barrels of oil (worth \$84 at \$14 per barrel). This saving is achieved each year after re-insulation occurs for the useful life of the dwelling. Based on the expected level of insulating activity during the life of the credit, a rising pattern of energy savings could be expected as more homes receive additional insulation.

The full energy saving resulting from additional insulation installed after the effective date of the proposed credit is equivalent to 2.9 billion barrels of oil over 27 years. The present value of this energy saving to consumers, in the form of reduced expenditures for fuel, is \$29 billion. ^{11/}

The energy saving enjoyed by individuals would exceed the cost of the improvements needed to achieve those savings, both with and without the tax credit. The benefit-cost ratio for private investments in insulation and related items is about 3:1 without the proposed credit, and about 4:1 with the credit (i.e., after costs to homeowners are reduced). In other words,

^{10/} It has been estimated that the heating requirement for a home insulated to previous standards is about 17 BTUs per square foot of living space for each degree-day of heating demand. Insulating to up-to-date standards reduces the heating requirement to 10 BTUs per degree-day. (See The Economics of Solar Home Heating, Joint Economic Committee Print, March 13, 1977, p. 31.)

^{11/} The present value calculation is the customary way to measure benefits which accrue over time. In calculating the present value of future savings, oil prices are assumed to rise at the same rate as prices generally; therefore, future returns are discounted at the real rate of return. A 2 percent real discount rate is roughly equivalent to an 8 percent discount rate with 6 percent inflation.

TABLE VII-1. ESTIMATED IMPACT OF INSULATION TAX CREDITS: 1977-1985

Calendar Year	Homes Insulated in Response to Tax Credit <u>a/</u> (in millions)	Annual Energy Saving Stimulated by Tax Credit (in millions of barrels of oil)	Credits Allowed in Following Fiscal Year <u>b/</u> (in millions)	
			1977 Dollars	Budget Dollars <u>c/</u>
	(I)	(II)	(III)	(IV)
1977	0.8	--	\$ 224	\$ 224
1978	1.4	4.2	358	379
1979	1.3	12.0	348	391
1980	1.1	19.2	345	411
1981	1.0	25.8	313	395
1982	0.9	31.8	272	364
1983	0.6	36.6	230	326
1984	0.7	40.2	209	314
1985	--	44.4	--	--
Total 1977-1984	7.8	--	\$2,299	\$2,804

Present Value of Private Energy Saving: \$9.2 billion
(assumed 20-year life for improvement)

Present Value of Tax Expenditure (1978-1985): \$2.1 billion

SOURCE: Congressional Budget Office.

a/ The figures in Column I represent homes that would not have been improved without the credit; they do not show the total number of homes re-insulated from 1977-1984.

b/ The figures in Columns III and IV reflect the credits paid for improvements spurred by the tax credits, as well as those improvements which would have occurred anyway during the credit period.

c/ Budget dollars reflect the actual cost of the credits when paid, allowing for 6 percent inflation annually.

the fuel savings are three times the cost of insulation without the credit, and four times the cost with the credit. Thus, the credit further enhances an already profitable investment.

The proposed credit will motivate \$2.9 billion worth of home insulation that would not otherwise take place. As a consequence, private oil consumption will be reduced by 44 million barrels annually by 1985, and by 890 million barrels in total by the year 2004. Table VII-1 summarizes estimated responses to the credit and the energy saving that results.

ENERGY-SAVING IMPACT OF SOLAR EQUIPMENT TAX CREDITS

Expected Use of Solar Equipment

The potential for energy saving with the widespread use of solar equipment for residential space and water heating is immense, but so is the potential cost. Currently, equipment costs are high. Solar equipment is not expected to come into widespread use, unless fuel prices rise substantially more than is already projected, or solar equipment costs decline. Solar equipment is most attractive in new structures where savings on conventional equipment partially offset solar costs, and in areas where water is presently heated by high-cost electricity. The Administration goal of solar energy equipment in 2.5 million homes by 1985 suggests the potential for an annual saving by 1985 of 9 million barrels of oil (or equivalent) if those homes use solar power only for heating water. If some of the 2.5 million homes also use solar power for space heating, the saving would be even greater.

Administration Goal. The Administration goal of 2.5 million solar-equipped homes by 1985 seems unattainably high. Achieving that goal would require sales growth in excess of 75 percent annually or a technical breakthrough that permits even more rapid growth for the last few years of the credit. It is unlikely that a 75 percent growth rate will occur, and a technical breakthrough cannot be counted upon. Therefore, estimates reflecting a more modest (25 percent) annual growth from sales of 50,000 units in 1978 will be used for illustrative purposes.

Illustrated Response to Solar Tax Credit. In the following illustration, a number of assumptions apply. Each solar unit is assumed to save 75 percent of the energy required for domestic water heating, but none of the energy required for

TABLE VII-2. ESTIMATED IMPACT OF SOLAR TAX CREDIT: 1977-1988

Calendar Year	Solar Units Installed in Response to Tax Credits (in thousands)	Annual Energy Saving Stimulated by Tax Credit (in millions of barrels of oil)	Credits Allowed in Following Fiscal Year <u>b/</u> (in millions)	
			1977 Dollars	Budget Dollars <u>c/</u>
	(I)	(II)	(III)	(IV)
1977	8	--	\$ 10.5	\$ 10.5
1978	20	.03	26.2	28.1
1979	25	.10	32.8	36.9
1980	31	.20	31.2	37.2
1981	39	.32	39.1	49.4
1982	49	.46	39.7	53.1
1983	61	.64	49.6	70.4
1984	76	.87	62.0	93.2
1985	<u>a/</u>	1.16	--	--
Total 1977-1984	309	--	\$291.1	\$378.8
Present Value of Private Energy Saving: (assumed 20-year life for improvement)			\$240 billion	
Present Value of Tax Expenditure (1978-1985):			\$262 billion	

SOURCE: Congressional Budget Office.

a/ Proposed credit expires at the end of 1984. Figures in Column I represent solar units that would not be installed without the tax credit.

b/ The figures in Columns III and IV reflect estimates (based on the CBO illustration) of credits paid for improvements spurred by the tax credits, as well as those improvements which would have occurred anyway during the credit period.

c/ Budget dollars reflect the actual cost of the credits when paid, allowing for 6 percent inflation annually.

space heating. Sales grow at a 25 percent annual rate from 50,000 units in 1978. Solar equipment has a 20-year life. Oil is worth \$14 per barrel. The average annual savings per solar installation is 3.75 barrels of oil (or its equivalent in other energy forms).

CBO's estimates for sales of solar installations due to the proposed credit, energy savings due to the credit, and credit costs are presented in Table VII-2. Not all the expected savings can be attributed to the tax credit, however. A significant number of future purchases of solar heating equipment would have occurred in some regions (based on fuel savings) even without the credit. Although the annual energy savings are small initially (30,000 barrels of oil in 1978), they rise to 1.16 million barrels of oil in 1984 as more solar equipment is installed. The energy saving to consumers from responses to the credit would amount to a present value of \$240 million. Thus, the federal government would make a present-value tax expenditure of \$262 million to 773,000 citizens. The 773,000 credit recipients would include an estimated 309,000 who would save \$240 million in fuel costs from solar equipment they would not otherwise have purchased.

Efficiency of the Tax Credits

The proposed credits for insulation and solar equipment can be evaluated from many different perspectives: (1) How much of the total credit allowance actually stimulates the desired activity and how much goes to individuals who would have made energy-saving improvements anyway? (2) How much additional investment (hence energy savings) results from the credits? (3) Are the public benefits commensurate with the costs? The focus here will be on how much additional investment is spurred by the credits and how much additional energy saving results.

It is important to specify additional investment and savings because substantial purchases of insulation and solar equipment would occur even without the credit. Rising heating costs, for instance, represent a continuing incentive for such improvements.

Insulation Credit. In the absence of the proposed tax credit, an estimated 16 million homes would receive added insulation by 1985. The primary motivation for this activity is

the high return on private expenditures for insulation. ^{12/} It is estimated that publicity created by the tax credit and the increased return (\$4 instead of \$3 for \$1 invested) will motivate 7.8 million additional homeowners and renters to purchase additional insulation and related items. The tax expenditure of \$2.1 billion will stimulate improvements that would not otherwise occur, and that will reduce private energy consumption by the equivalent of 890 million barrels of oil. (See Table VII-3.) The cost to the public for each barrel by which private oil consumption is reduced comes out to \$2.42. This represents a payment from taxpayers in general to those who buy insulation.

Solar Credit. In terms of spurring additional investment and additional energy savings, the solar credit is less efficient than the insulation credit. The proposed tax credit, according to a CBO estimate, will motivate 309,000 homeowners to purchase solar units. In return for a \$262 million tax expenditure, oil import requirements will be reduced by 23.2 million barrels. The cost to the public would be approximately \$11.28 per barrel of oil not consumed. ^{13/}

For most households, solar equipment represents only a borderline investment. Consequently, the figures on the private return and the public benefit are not as impressive as for an investment in insulation.

With both credits, the saving from reduced consumption of fuel accrues to individuals, not taxpayers generally. Neither credit therefore provides a direct reduction in government costs.

INCOME DISTRIBUTION EFFECTS

The proposed tax credits will have varying effects upon families at different income levels. Three major conditions

^{12/} Over a 20-year life, insulation yields a return (on average) of more than \$3 for every \$1 invested.

^{13/} The public cost of reducing private oil consumption appears high because a large investment in solar equipment is required for each barrel of oil saved.

TABLE VII-3. COSTS AND BENEFITS OF PROPOSED RESIDENTIAL ENERGY CONSERVATION TAX CREDITS, PRESENT VALUE COMPARISONS

Item	Insulation Credit	Solar Equipment Credit
Costs		
Private (improvements)	\$ 8.60 billion	\$ 1.2 billion
Public (tax credit)	2.15	0.3
Net Private Cost	6.45	0.9
Benefits		
Private (reduced fuel expenditures)	\$ 29.1 billion	\$ 0.6 billion
Public (reduction in energy usage compared to present policy)	890 million barrels <u>a/</u>	23.2 million barrels <u>a/</u>
Tax Expenditure Costs of Reducing Private Demand <u>b/</u>	\$ 2.42 per barrel	\$11.28 per barrel

SOURCE: Congressional Budget Office.

a/ Public benefits occur as reduced private energy consumption, measurable in barrels of oil or equivalent, rather than as direct reductions in government cost.

b/ These costs are shown as the tax credit divided by the induced reduction in private demand for energy (e.g., \$2.15 billion/890 million barrels).

are responsible. First, the credits are available only to taxpayers whose tax liabilities are sufficient to cover the credit claim. To claim a \$50 credit for insulation expenditures of \$200, a family will generally need an income of at least \$7,000. ^{14/} The maximum solar credit (\$2,000) is generally available to families with incomes in excess of \$18,000, although it is available to single taxpayers with incomes as low as \$12,000. A refundable credit, which would avoid this selectivity, was incorporated in prior proposals for insulation credits (e.g., H.R. 6860, 94th Congress).

Second, because the credits are more available to middle- and upper-income households, they tend to favor homeowners more than renters, and homeowners with significant tax liabilities more than those with little or no tax liability. (Homeowners generally have higher income levels than renters--\$13,600 vs. \$7,900 in 1975.) ^{15/} The direct grant proposals incorporated in the National Energy Plan may help some low-income families, but the grant funds requested by the Administration would cover only about 2.5 million homes. ^{16/} The proposed 10 percent insulation credit for landlords may help some tenants, but the likely landlord response is uncertain. ^{17/} With regard to the solar credit, it is unlikely that any significant number of low-income families or renters will receive any benefit.

SUPPLY CONSIDERATIONS FOR INSULATION

Production and Prices

A sudden increase in the demand for insulation and related items could raise the prices of these products. If purchases

^{14/} This figure, like the following one, is based on a family of four using the standard deduction.

^{15/} See Department of Housing and Urban Development, Annual Housing Survey, 1976.

^{16/} The National Energy Plan proposes expenditures of \$530 million over three years. (See National Energy Plan, p. 41.)

^{17/} National Energy Plan, p. 42.

are delayed because of price increases or outright shortages, achievement of the Administration's energy-saving goals could be delayed. CBO regards widespread shortages of insulation materials as unlikely--partly because not everyone will buy the various insulating materials in the early years of the credit, and partly because production capacity is already being expanded.

Both glass fiber and cellulose are widely used for home insulation. Glass fiber insulation is manufactured by three dominant firms, all of which have expanded or are expanding their plants. Manufacturing capacity is expected to double by 1980. Cellulose insulation, which is coming into increasing use, is manufactured by a large number of small companies. Cellulose insulation is made from old newspapers, which are in plentiful supply. Growing use of this product may minimize the impact of possible supply limitations for glass fiber insulation.

Storm windows and materials for caulking and weather stripping are not expected to present any particular supply-constraint problems. Storm windows are fabricated by a large number of firms serving local markets. Although little is known about the total capacity for production, supply constraints are unlikely to bind, because storm windows are generally given a lower priority than insulation. The saving per dollar spent for added insulation generally exceeds that attainable from adding storm windows.

Prices for insulation products have gone up recently--even before the credit was proposed. The wholesale price index for insulating materials rose by about 55 percent between 1973 and 1976, compared to a 36 percent increase for all items. As the demand for insulation expands, insulation prices may increase still further. Some experts suggest that the windfall portion of the credits to buyers who planned to insulate anyway will only compensate those buyers for the cost increase resulting from announcement of the credit.

Producer Strategies

Insulation manufacturers face an interesting problem in deciding how rapidly to try to meet the burgeoning demand for insulation. Once a customer has purchased more insulation, his demand is satisfied, and he is not likely to need more unless he expands his house or there is another increase in oil prices. Under such circumstances, manufacturers will not want to build to meet a sudden demand and then have their factories idle after the demand is met. A more efficient strategy (from the producers' point of view) is to build capacity sufficient to satisfy the new demand over a period that corresponds to the useful life of the plants they build. For this reason, insulation manufacturers may prefer to meet the insulation demand over a longer time period than would be suggested by energy-conservation goals alone.

The aggregate impact of the President's energy program on the federal budget would be relatively small. On the basis of preliminary analysis, it appears that direct expenditures in the short run would be greater than net revenues from taxes. In 1978, increased outlays and reductions in revenues would cost the federal government \$2.13 billion, and in 1980, by \$2.68 billion. In the longer term, however, the situation should reverse. By 1985, a budgetary surplus of \$1.46 billion would appear, attributable for the most part to the industrial conversion from oil and gas to coal, induced by the proposed tax rebate formula. The surplus would be somewhat diminished, however, by the reduction of sales from the Naval Petroleum Reserves. But overall, CBO anticipates the effects on the budget to be neither extensive nor sudden.

The components of this gradual shift (in billions of dollars) are as follows:

	<u>1978</u>	<u>1980</u>	<u>1985</u>
Direct Outlays	1.14	5.02	5.97
Revenue Changes	-0.99	2.34	7.43
Tax Revenues			
less Tax Expenditures	-0.59	3.04	7.43
Naval Petroleum Reserves	-0.40	-0.70	—

TAX-RELATED EFFECTS

The impacts on the federal budget of the President's proposals fall into two general categories: tax and nontax effects. The former category includes revenues from the tax proposals designed to alter the cost of energy to businesses and consumers so that consumption (of oil and natural gas in particular) is reduced. Tax effects also include credits and payments designed

either to return revenues to the economy or to induce energy conservation or industrial conversion to coal. The net effect of the tax programs is an increase in revenues for each year between 1979 and 1985. Nontax effects include direct federal expenditures and receipts from energy-related sales, leases, and royalties.

Tax effects result from four types of provisions. The first--represented by the gas-guzzler tax, the crude oil equalization tax, and the standby gasoline tax--is designed to rebate all taxes collected, which would yield no net effect on the budget. These provisions are designed primarily to alter the structure of costs associated with inefficient uses of energy or to force the conversion to coal. A second type of tax provision is designed to induce energy conservation; these include tax expenditures for commercial and residential improvements or such tax reductions as the repeal of excise taxes on inter-city buses. In general, these provisions reduce revenues to the U.S. Treasury. A third type of tax provision is planned to increase the price of energy without a rebate; among these proposals are the motorboat and airplane fuel taxes. Finally, there are taxes related to inducing coal use, which generate net revenues only if firms do not convert. The estimates for these various tax provisions are presented in Table VIII-1. (The estimates are derived mostly from the analysis in previous chapters; other estimates were provided by the Office of Management and Budget.)

Effects on Expenditures

Six features in the National Energy Plan would contribute to direct federal expenditures:

- o Expanded and accelerated Strategic Petroleum Reserve Program,
- o New programs to improve the energy efficiency of federal buildings, residences of low-income families, schools, and hospitals,
- o Changes in federal energy research and development programs,
- o Reduced sales of petroleum products from the Naval Petroleum Reserves,

TABLE VIII-1. PROJECTED TAX GAINS AND LOSSES: IN MILLIONS OF CURRENT DOLLARS,
BY FISCAL YEARS

	1978	1980	1985
Tax Expenditures			
Thermal efficiency credit--residential <u>a/</u> (Insulation Tax Credits)	-224	-391	-314
Thermal efficiency credit--industrial <u>b/</u> and commercial	-306	-349	--
Cogeneration credit <u>b/</u>	-52	-106	--
Solar equipment credit--residential <u>a/</u>	-11	-37	-93
Expense geothermal intangible drilling <u>b/</u> costs	-5	-17	-54
Restricting minimum tax on intangible <u>b/</u> drilling cost	-19	-37	-74
SUBTOTAL	-617	-937	-535
Other Revenue Losing Provisions			
Repeal of excise tax on intercity buses <u>b/</u>	-13	-9	-9
SUBTOTAL (TAX EXPENDITURES & OTHER LOSSES)	-630	-946	-544
Revenue-Gaining Provisions			
Motorboat and airplane fuels tax <u>b/</u>	45	54	80
Coal conversion incentives industrial <u>c/</u> taxes: Revenues -	--	9,758	19,398
Rebates	--	-5,831	-11,607
Coal conversion incentives utility <u>c/</u> taxes net of rebate	--	--	101
Crude Oil Equalization Tax: <u>d/</u>			
Revenue	--	18,800	17,967
Rebates	--	-18,800	-17,967
SUBTOTAL (REVENUE GAINS)	45	3,981	7,972
TOTAL TAX EFFECTS	-585	3,035	7,428

a/ See Chapter VII.

b/ These provisions are detailed in the National Energy Act, Title II.
The data were provided by the Office of Management and Budget.

c/ See Chapter V.

d/ See Chapter III.

- o Direct rebates, and
- o Inflation, which would raise employee pay as well as those benefit payments that are indexed to the rate of inflation, (e.g., social security, federal civilian and military retirement, food stamps, and school lunch programs).

Some of these impacts are explicitly contained in the proposed National Energy Act (NEA) or would result indirectly from provisions of the act; others would result from administrative or legislative changes that would be made in the future. Table VIII-2 summarizes the outlays.

The largest increase in federal expenditures results from the proposal to expand the Strategic Petroleum Reserve of crude oil from 500 million barrels now projected to one billion barrels. As the reserve was originally conceived by the Ford Administration, 500 million barrels of crude oil costing \$7.3 billion were to be stockpiled by 1982. The Carter Administration's proposal to increase capacity from 500 million to 1 billion barrels of oil would cost roughly \$19 billion; of course, this figure could change depending on the fill rate and changes in oil prices. An estimated \$1.7 billion is the aggregate cost for storage facilities, administrative salaries and expenses, and other support efforts. The price of oil, which accounts for more than 90 percent of the project's total expense, therefore represents the critical factor in determining total cost of the reserve.

The second category of programs affecting federal expenditures includes those conceived to improve the energy efficiency of buildings. Under the National Energy Act, the program created by the Energy Policy and Conservation Act to conserve energy in low-income dwellings would be augmented by \$75 million in budget authority for fiscal year 1978; the recommended authorizations would be 200 million for fiscal years 1979 and 1980. A new grant program to finance energy conservation projects in private and non-profit schools and hospitals is proposed to commence in 1978. This proposal would authorize \$300 million annually for 1978 through 1980.

TABLE VIII-2. PROJECTED DIRECT FEDERAL OUTLAYS UNDER THE NATIONAL ENERGY PLAN: IN MILLIONS OF CURRENT DOLLARS, BY FISCAL YEARS

Program Component	1978	1980	1985
Strategic Petroleum Reserve Expansion <u>a/</u>	216	482	--
Building Conservation Programs <u>a/</u> , <u>b/</u>	330	1,000	--
Increased Federal Fuel Costs	110	360	1,100
Energy Research and Development <u>a/</u>	-116	-400	-250
Other Programs			
National Energy Act <u>a/</u> , <u>c/</u>	48	28	--
National Energy Plan <u>a/</u> , <u>d/</u>	100	90	95
Indexed Programs			
Indexed by Law	181	1,679	2,398 <u>e/</u>
Implicitly Indexed	<u>268</u>	<u>1,780</u>	<u>2,627</u> <u>e/</u>
TOTAL	1,137	5,019	5,970

a/ Based on data from the Office of Management and Budget.

b/ Includes the following programs: insulation of low-income residential units, insulation of schools and hospitals, improvement of federal buildings, and solar demonstration facilities in federal buildings.

c/ Programs include: development of building and appliance efficiency standards, development of home conservation plans by public utilities, and federal vanpooling.

d/ Programs include: creation of new reporting systems, expansion of HEW emergency assistance, augmentation NRC staff, and expansion of coal research.

e/ The 1981 estimate is shown here; the appropriate figure for 1985 will be at least this large.

The National Energy Plan calls for existing federal facilities to reduce their energy consumption by 20 percent from 1975 levels, and for 45 percent greater energy efficiency in new federal buildings. Because new construction proceeds at a rate of only 20 million square feet per year (adding 1.25 percent to existing federal space), the budgetary impact of the 45 percent reduction would be insignificant in the early years of the program. An approximation of the necessary funding level needed to achieve a 20 percent reduction of energy use in existing facilities can be derived by using the Department of Defense (DoD) energy conservation program as a base. Using DoD's six-year "retrofitting" program as a model, it is estimated that the average annual costs would be approximately \$250 million for all federal buildings.

The National Energy Act proposes a corollary program to install solar demonstration facilities in federal buildings, which would add \$37 million in budget authority for the Federal Energy Administration in fiscal year 1978, \$32 million in fiscal year 1979, and \$31 million in fiscal year 1980 for a cumulative funding level of \$100 million. 1/

The projected decrease in federal consumption of fuel would somewhat offset the higher costs anticipated as a result of fuel tax provisions in the act. The federal government spent approximately \$4 billion in fuel for facilities and transportation in fiscal year 1976. Without the plan, it is assumed that federal consumption would remain constant through 1985 while fuel prices would rise by about 5.5 percent a year. The cumulative fuel bill between fiscal years 1978 and 1985 would therefore be \$44 billion. If the fuel tax provisions are instituted, fuel prices will increase at higher rates (assuming an average annual increase of 10 percent in all fuel categories), but the cost to the government would be offset by a 2 percent reduction in federal consumption each year. Under the plan, therefore, the federal fuel bill through fiscal year 1985 would be \$48 billion, or \$4 billion higher than without the plan.

1/ These projections are based on present policy. If the proposal now before the Congress to merge federal energy-related agencies is adopted, the projections concerning the FEA, ERDA etc. would change.

The effect of the proposals on the research program conducted by the Energy Research and Development Administration (ERDA) would be a net reduction of \$455.1 million in budget authority and \$116 million in outlays for fiscal year 1978. This reduction would result from cancelling construction of the gaseous diffusion uranium enrichment plant in Portsmouth, Ohio, and the construction-related components of the Clinch River Liquified Metal Fast Breeder Reactor. These two decisions would result in reduced budget authority requests of \$512 million and \$173 million, respectively. An additional \$61.4 million would be saved through the elimination of research and development programs on fuel cycle technologies for light water reactors and uranium process development associated with gaseous diffusion technology. These reductions would be offset by an additional \$111.3 million in budget authority in fiscal year 1978 to expand research in the areas of fossil, geothermal and solar energy, and nuclear nonproliferation.

The energy plan also calls for increased emphasis on the construction of a gaseous centrifuge plant for uranium enrichment, which will increase the budget authority for ERDA for fiscal year 1978 by \$180 million. The cumulative project cost is not considered an additional cost element of the plan, however, because the centrifuge plant has already been included in ERDA budget projections. The primary effect of shifting the research and development effort away from nuclear energy to other energy sources, would be a substantial reduction in budget authority and outlays in the years discussed.

The Administration's proposed legislation would authorize development of energy efficiency standards for buildings and appliances, as well as for the development of home conservation plans by public utilities, and the establishment of a federal "vanpooling" program. (Vanpooling is a form of carpooling designed to reduce the number of vehicles the federal government uses.) The legislation would authorize \$10 million in fiscal years 1978 and 1979 for the building standards program. But it does not specify authorization levels for the appliance standards, utility plans, or vanpooling programs; however, estimates of these program costs in fiscal year 1978 are \$12.5 million, \$12.7 million, and \$12.5 million, respectively. The vanpooling program, which would ultimately be reimbursed through passenger fares, would nevertheless incur net outlays until the program is fully underway. The cumulative costs of these proposed programs through fiscal year 1985 (excluding the vanpooling program) are \$129 million.

The National Energy Plan proposals also include: creation of three new reporting systems to facilitate the management of energy data; expansion of the emergency assistance and energy development impact assistance programs administered by the Department of Health, Education, and Welfare; augmenting the Nuclear Regulatory Commission inspection staff; and enlarging coal research and development programs administered by the EPA and the Department of Interior. These proposals could increase the fiscal year 1978 budget authority by \$135 million, and would produce a cumulative increase of \$857 million through fiscal year 1985.

In addition, as a result of the slight inflationary effect of the proposed act (see Chapter IX), federal payment programs indexed to the cost of living would reflect corresponding increases in outlays. Federal programs tied by statute to the Consumer Price Index 2/ would show a cumulative increase in outlays of \$5.2 billion between fiscal year 1978 and fiscal year 1981. In addition, an increase of \$5.7 billion in outlays over the same period would be anticipated for other federal programs that, while not indexed by law, are implicitly indexed because payments are based on items whose prices increase with general price levels. 3/

In addition to the direct expenditure effects of the energy plan, nontax revenues will be affected as receipts from the sale of products from the Naval Petroleum Reserves decline pursuant to limiting production from Elk Hills. This reduction in receipts, however, would be offset in part by increased royalties and lease payments associated with acceleration of Outer Continental Shelf (OCS) development. Since information about the extent of anticipated OCS acceleration is not available, it is not possible to estimate the revenue impact. The effect of a limiting Elk Hills oil production to 30,000 barrels per day would be to reduce revenues by \$400 million in fiscal year 1978 and \$700 million in fiscal year 1980. After 1980 it is assumed that production will return to normal levels.

2/ Includes social security, federal civilian and military retirement, food stamps, child nutrition, supplemental security insurance, and railroad retirement programs.

3/ Includes unemployment insurance, aid to families with dependent children, medicaid, medicare, and federal and military pay programs.

INTRODUCTION

Through 1980, the energy proposals of the Carter Administration would have a major impact on energy markets, a noticeable but small impact on the overall rate of inflation, and only a minor impact on total output and employment. (Economic effects after 1980 have not been investigated for this chapter.) The inflation effect is estimated to add about 1.6 percent to the level of consumer prices by 1980 or about half a percentage point per year to the rate of inflation from 1977 to 1980. The output effect is estimated to reduce constant-dollar GNP by no more than 0.7 percent by the end of 1980. The employment effect is estimated to add 0.2 percentage points to the unemployment rate by 1980.

To understand these conclusions, it is helpful to consider what is likely to happen to the nation's fuel bill with and without the energy proposals. In 1976, as Table IX-1 shows, total U.S. expenditures on fossil fuels (including imports, but before domestic transportation, refining, or other processing) amounted to about \$90 billion or just over 5 percent of total GNP. A 10 percent increase in fuel prices passed through dollar for dollar to final product prices would, therefore, cause roughly a 0.5 percent increase (5 percent of 10 percent) in the overall price level.

This direct passthrough is not the end of the story, of course. On the one hand, reduced demands for fuel in response to higher prices could diminish the effect on the overall price level; but over a period of only a few years the demand response to fuel prices appears to be small enough so that this factor can safely be neglected in rough calculations. On the other hand, higher wage settlements in response to the higher prices, and additional price increases based on these wage settlements, could amplify the initial passthrough; and past experience suggests that this amplification would be of some importance.

Under the President's proposals, it is estimated that fuel prices would rise by approximately 74 percent from 1976 to 1980, which should result in an additional 3.7 percent increase in the

TABLE IX-1. PROJECTED FOSSIL FUEL PRICES a/

Fuel	Total Fuel Bill, 1976 (billions of dollars)	Price Indexes, 1976 = 1.0			
		1977	1978	1979	1980
Domestic Crude Oil					
Baseline	31.3	1.033	1.189	1.320	1.461
Carter		1.042	1.391	1.703	1.970
Imported Crude Oil					
Baseline	35.9	1.090	1.150	1.213	1.280
Carter		1.090	1.155	1.241	1.325
Natural Gas					
Baseline	12.5	1.341	1.758	1.943	2.311
Carter		1.341	1.725	2.107	2.652
Coal					
Baseline	9.8	1.078	1.163	1.254	1.352
Carter		1.078	1.174	1.272	1.377
Total					
Baseline	89.5	1.104	1.250	1.357	1.495
Carter		1.107	1.319	1.527	1.742

SOURCE: Congressional Budget Office.

a/ Prices are measured before transportation, refining, or other processing, but include excise and user taxes.

overall price level (before any amplification due to wage-price interaction). But this projected fuel price rise would by no means be all due to the Administration's proposals. Some would be due to general inflation and some to fuel market developments that would take place without the program. Without the Administration's proposals, it is estimated that fuel prices would rise by about 49.5 percent from 1976 to 1980, which translates to 2.5 percent in the overall price level before wage-price amplifications.

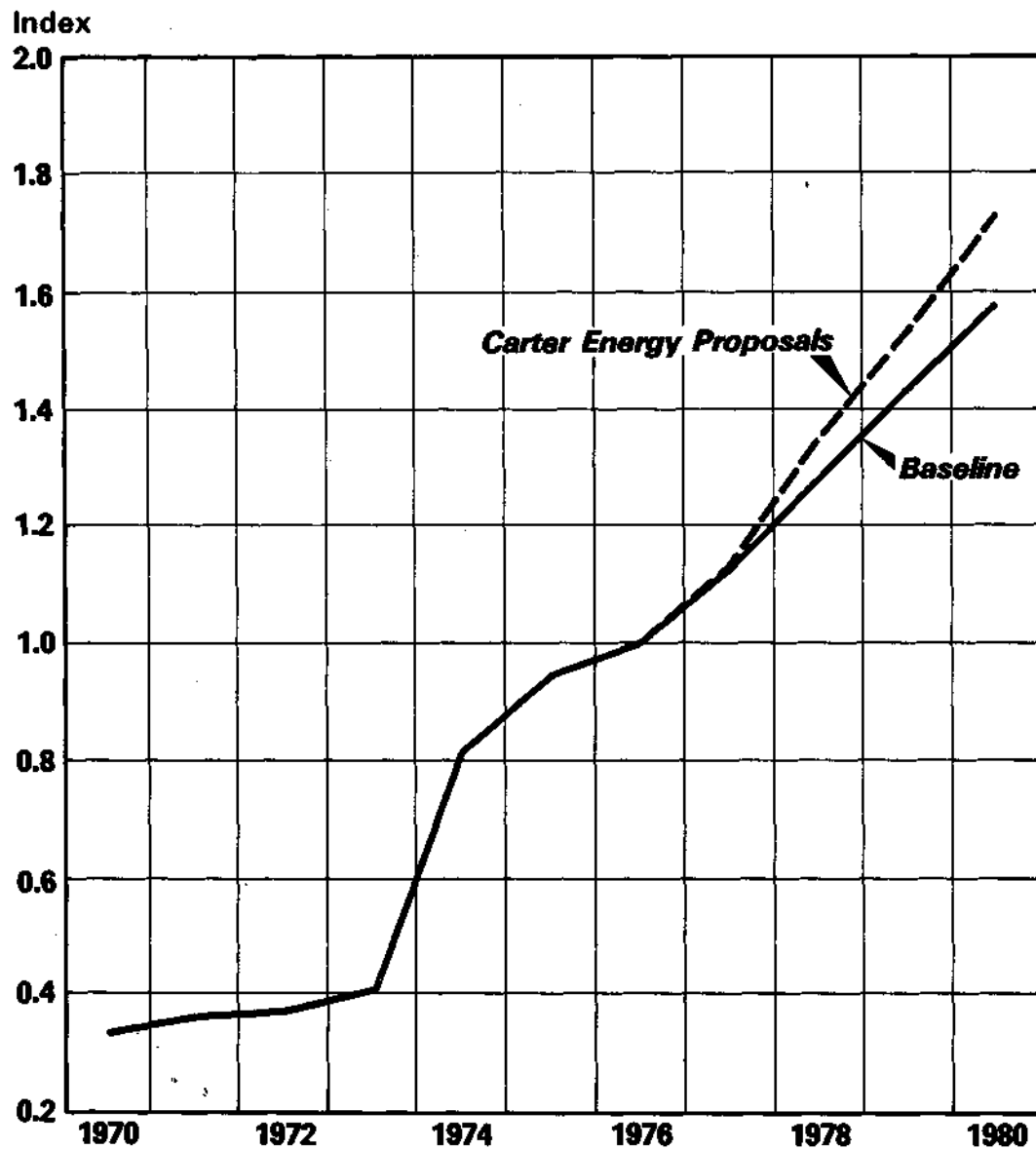
The differential increase in the general price level due to the President's proposals is thus only 3.7 minus 2.5 or 1.2 percent. Allowing for wage-price interactions raises this figure to 1.6 percent. Since this difference develops over the three-year span 1977-1980, it raises the annual rate of inflation during those years by 0.5 percentage points.

Output and unemployment effects are much more difficult to estimate than inflation effects. Calculations based on a number of models of the economy suggest that a 10 percent increase in the price level due to change in the price of a basic input commodity causes a drop somewhat smaller than 10 percent in total output. On this basis, the 1.6 percent price increase due to higher fossil fuel prices would decrease output by less than 1.6 percent. Rebates of the taxes collected under the oil excise and some other proposals would cut this output impact substantially, without adding much to the inflation projections during 1977-1980. Together, the price increases and rebates would reduce real output by an estimated 0.7 percent by 1980. If other provisions stimulated investment in new technologies, the reduction in real output could be even smaller.

As for unemployment, a rule of thumb is that, in the short run, a 1 percent reduction in output translates into a one-third percentage point increase in the unemployment rate. The energy proposals on this basis could add about 0.2 percentage points to the unemployment rate by the end of 1980.

From the macroeconomic point of view, the energy proposals invite comparisons with a major economic shock of recent years--namely, the OPEC quadrupling of oil prices in 1973-1974. The following figure, showing an index of fossil fuel prices (1976 = 1.0) from 1970 to 1980, is helpful in making the comparison. The Administration's energy proposals would add 0.25 points (the

Index of Fossil Fuel Prices^{a/} 1970-1980
(1976 = 1.0)



^{a/} Price index includes imported and domestic crude oil, natural gas, and coal.
Prices are inclusive of the proposed excise and user taxes but exclusive of transportation, refining, or other processing costs.

Source: Congressional Budget Office.

difference between the solid and dashed lines in 1980) to the price index of commodities worth \$90 billion in 1976. They thus add roughly 0.25 times \$90 billion, or \$22 billion to our national fuel bill (in 1976 prices), and do so gradually over a period of three years. The OPEC increase added 0.40 points to the price index, or a bill of \$36 billion (in 1976 prices), and did so all at once rather than over several years. Clearly, the OPEC increase was a much larger shock than the energy proposals. Immediate decontrol of "old" oil, had it taken place during 1975, would also have been a much larger shock than the energy proposals.

The remainder of this chapter deals with the short-run macroeconomic impacts of the President's proposals in greater detail. The price effect of the proposals will be discussed first, with the output and employment effects following.

PRICES

The central energy proposals which would directly raise prices are:

- o The excise tax on domestic crude oil to be introduced in stages beginning late in 1977;
- o The high price permitted on newly discovered oil;
- o Removal of the present ceiling on gasoline prices; and
- o The tax on industrial use of gas and oil beginning in 1979.

Two provisions that could raise prices under some circumstances, but that are not expected to do so during 1977-1980, are:

- o The increase of the ceiling price on interstate natural gas, which is offset by the reduction in intrastate natural gas prices;
- o The standby tax on gasoline to be imposed if gasoline consumption exceeds a target path, which is estimated not to be triggered before 1981.

In addition, other parts of the program could affect prices. Requirements for use of coal by utilities and industry could lead to more expensive technologies that, in turn, could be passed along in the form of higher prices. Subsidies for insulation, solar heating, and other energy-conserving measures could increase the demand for some kinds of output and raise their prices. The assumption underlying this analysis is that these more conjectural price effects are small enough to be neglected in an overall analysis. The price effects of the proposed gas-guzzler tax, which raises the price to consumers of some cars and lowers the price of others, are also neglected in this macroeconomic analysis. Finally, the analysis assumes that the standby tax on gasoline will not be triggered until after 1980. (For discussion of these last two points, see Chapter VI.)

The effects of the program on final demand also have price consequences. As discussed below, there are reasons for believing that price-raising features of the program would tend to depress final demands, while the proposed rebates would add to final demands. It is estimated that these offsetting influences on final demands net out to a fairly small impact and one which would have a scarcely measurable effect on inflation rates through 1980.

It is helpful to think of the price effects of the energy program in three stages, although in fact the three stages may overlap. In the first stage, the proposed taxes and other measures directly affect fuel prices, with consumers feeling the impact only to the extent that they purchase fuels--for example, gasoline--directly. In the second stage, increased fuel costs for producing many thousands of goods and services are reflected in higher final product prices. In the third, and most conjectural stage, higher consumer prices affect wage negotiations and price expectations generally and become magnified through a price-wage spiral.

To analyze this complex process, it is necessary to use econometric models of the economy. The results of such models are subject to wide margins of uncertainty, but they are the most complete way of taking account of a whole set of complex economic forces and their interactions. To minimize the uncertainty involved, the analysis below is based on several different models.

As Table IX-2 shows, the most immediate and largest price impact of the program is estimated to be at the wholesale level. Wholesale fuel prices could increase by an estimated 5.5 percent in 1978, an additional 7 percent in 1979, and by 4 percent more in 1980, so that by the end of the period they would be 16.5 percent higher than they would otherwise be. The overall Wholesale Price Index, mainly reflecting this fuel increase, goes up by 3.1 percent from 1977 to 1980 as a result of the energy package.

TABLE IX-2. IMPACT OF THE ENERGY PROPOSALS ON PRICES AND WAGES
(Percent Difference from Baseline Price Projections)

Prices and Wages	1977	1978	1979	1980
Wholesale Prices				
Fuels	0.3	5.5	12.5	16.5
Total	0.1	1.3	2.8	3.1
Consumer Prices	0.0	0.5	1.1	1.6
Average Hourly Wages	0.0	0.2	0.4	0.7

SOURCE: Congressional Budget Office.

At the consumer level, effects build more gradually. From 1977 to 1978, the calculated increase would be only 0.5 percent. In 1979 and 1980, the increase would be somewhat larger so that the three-year increase is 1.6 percent, or an average of just over 0.5 percent per year. The consumer increase reflects partly the transmission of higher wholesale costs to the retail level, but it also reflects the effect of the program on wage negotiations and, subsequently, second-round price adjustments. According to the models, by 1980 average hourly wages would be 0.7 percent higher with the energy proposals than without them.

What the models suggest, in short, is that the energy proposals would add 1.6 percent to the 1980 consumer price

level, or about 0.5 percentage points per year to the rate of inflation during 1977-1980. If the underlying rate of inflation without the program were 5 percent enactment of the program would raise the rate to 5.5 percent. To put this number in perspective, it may be useful to compare it to some recent rates of inflation. In 1974, the Consumer Price Index was 11 percent higher than a year earlier. Rates of increase in the two subsequent years were 9.1 and 5.7 percent. Thus, the 0.5 percent per year that the energy proposals are estimated to add to the rate of inflation, while measurable and significant, is not large in relation to the underlying rate or its changes in recent years.

OUTPUT AND EMPLOYMENT

There are three reasons for thinking that the price-raising portions of the energy package might depress constant-dollar spending on goods and services and hence exert a negative influence on output and employment. The first is that higher prices reduce the real value, or purchasing power, of many forms of wealth, such as money, savings accounts, insurance policies, and pension rights. This decrease in purchasing power, in turn, could reduce real expenditures on consumer goods. The second channel of influence is the effect of higher prices on interest rates. Fuel price increases tend to raise inflation rates and current-dollar incomes (even though they depress real incomes). If these changes are not offset by a more expansionary monetary policy, they tend to raise interest rates, which in turn depress investment and possibly other final demands. The third channel of effect is the redistribution of income away from households and toward government and businesses. To the extent that these transfers occur, they could cause a temporary rise--in all likelihood not a permanent one--in the national saving rate.

To offset this third channel of influence, the energy proposals include full rebates to households of the proceeds of the oil excise tax and the standby gasoline tax (if it comes into play) and a partial rebate to business of the oil and gas user tax. These rebates, by adding to purchasing power in the hands of consumers and businesses, would tend to offset the drop in private purchasing power caused by the price-increasing features of the energy program.

Other portions of the program could also affect final demand. Subsidies to certain kinds of conservation expenditures could well increase demands for those goods and could possibly increase overall demands. Creation of a national petroleum reserve, while it is being built up, would have a direct impact on demand for petroleum. Requirements for conversion from oil and gas use to coal use would affect the composition of investment and could affect its overall level.

Once again it is necessary to use econometric models to analyze the net effect of all of these provisions on output and employment. The results in Table IX-3 are based on the calculated effects of the price-raising measures and the rebates, assuming that the rebates are paid out at the same time that the revenues are collected. The calculated effects assume a zero net impact of the other provisions on investment. For this reason, the numbers in Table IX-3 might be considered to be upper-limit estimates of the reduction in output and the increase in unemployment that the energy proposals could cause.

TABLE IX-3. IMPACT OF THE ENERGY PROPOSALS ON OUTPUT AND EMPLOYMENT (Percent Difference from Baseline Projections)

Economic Variables	1977	1978	1979	1980
Real GNP and Components (Constant Dollars)	0.0	-0.2	-0.5	-0.7
Consumption Expenditures (Constant Dollars)	0.0	-0.1	-0.3	-0.4
Fixed Investment Expenditures (Constant Dollars)	0.0	-0.4	-1.2	-1.8
Unemployment Rate <u>a/</u>	0.0	0.0	+0.1	+0.2

SOURCE: Congressional Budget Office.

a/ Differences from baseline in percentage points.

Output and employment effects, even those in Table IX-3, are estimated to be fairly small. At the end of three years, the program is estimated to reduce output by approximately \$10 billion in 1972 dollars, or 0.7 percent of real GNP. This amounts to about \$14 billion in 1977 dollars. The unemployment rate, as calculated, would be about 0.2 percentage points higher under the energy program by the end of 1980 than it would otherwise be. Since these effects build up over three years, they must be considered to be fairly small compared to other influences on the course of macroeconomic activity. The unemployment effect, for example, is equivalent to an acceleration in the rate of growth of the labor force of approximately seventy thousand persons per year, which is only a small increase above its projected year-to-year growth of approximately two million persons.

Macroeconomic effects could be smaller than the amounts indicated in Table IX-3 if some of the investment incentives and conversion requirements proposed have a sizable stimulative effect on investment or government purchases. A spending impact, growing to approximately \$7 billion by 1980, would serve to offset completely the output and unemployment effects indicated in Table IX-3.

In summary, the impact on output and employment of the proposed energy program appears likely to be negative but of small size. If the energy program is enacted, the economic outlook for the next two or three years may be a shade worse than it would have been in the absence of the program, and these energy effects will be one among many factors that policymakers will wish to take into account in setting overall monetary and fiscal policies for the years ahead.

Several parts of the Administration's energy program are designed to change the energy-using habits of Americans by raising the relative cost of those goods and services that use scarce energy resources lavishly. At the same time, the program seeks to maintain the overall purchasing power of consumers by providing benefits that help to replace the losses stemming from higher prices. A system of taxes, efficiency standards, tax credits, and cash rebates has been proposed to induce both the desired changes in prices and in energy consumption and to provide compensatory benefits for the costs that will be imposed.

Although the income taken away by the higher prices of energy-intensive products is to be refunded, partly in the form of cash rebates, it is not expected that these refunds will simply be used to pay the higher energy prices. Because a dollar of income will buy relatively more of the energy-saving goods and less of the energy-intensive goods than before, it is anticipated that consumers will have a strong incentive to buy less energy-intensive goods with their cash rebates. In addition, some of the rebates can be obtained only by purchasing low energy-using products, as in the case of the rebate for purchasing gasoline-efficient autos.

Although the Administration's program is designed to replace the aggregate income lost through higher prices, the income losses and rebates implicit in the program can have very different impacts on individual consumers. The cost of auto travel, of new energy-inefficient cars, and of other goods and services that rely on oil or gasoline as inputs will rise relatively sharply. These price increases are likely to impose different burdens on different people. The proposed per capita rebates of oil and gasoline taxes, the rebates associated with new energy-efficient cars, and the tax credits for insulation and other energy-conserving expenditures for the home will provide benefits that may not be related to the individual burdens imposed. Whether, on balance, the distribution of those costs and benefits is perceived as being fair, however, is likely to be an important determinant of the political viability of the proposals.

This chapter contains a discussion of the conceptual and practical problems encountered in defining and implementing a

fair energy policy as well as a description of the likely effects that the Administration's proposals will have on families differing by income class and by place of residence.

THE CONCEPTUAL PROBLEM

While we may all believe in the principle of fairness, it is a difficult concept to define precisely or to put into practice with respect to energy policy. Generally, a policy is thought to be fair if the burdens imposed by that policy are related to the ability of individuals to bear those burdens.

The Administration's energy proposals will deliberately raise the price of commodities essential to modern American life-styles--gasoline and other products dependent on oil. Those who consume relatively few of the goods and services that are to rise in price will have minimal costs imposed on them. Those who consume relatively more of these products will be faced with the possibility of large losses in the purchasing power of their incomes. For example, if owners of fuel-inefficient cars were to persist in driving the same cars the same number of miles as before, they would have to give up substantial amounts of other goods and services to do so. Most people will, however, adjust their behavior somewhat by reducing their consumption of the goods and services that rise in price and substituting the use of cheaper products.

Not everyone has the same opportunities, or willingness, to make these substitutions. Some have ready access to car pools or mass transportation; others would make nontransportation substitutions, for example, playing tennis instead of taking a Sunday drive.

An ideal system of offsets would involve a separate evaluation of each family's preprogram energy use and the opportunities available to it to conserve. The offset from the federal government would then be tailored to equalize the excess burden or income loss imposed by higher energy prices after the family had made "reasonable" substitutions. Of course, in practice, only much cruder methods for moderating inequities are available.

The burden of an increase in prices for energy-intensive products will vary from group to group. Some of these variations may be traced to a few general characteristics, such as family

size, climate, and location. Consumption of energy-intensive products is likely to rise with family size. People living in warmer climates will be less affected by a rise in the price of home heating fuel. People living in cities with good public transit systems are likely to find it easier to reduce work trips by car. People using their cars mostly for commuting to work may find it more difficult to cut back on gasoline consumption.

The Administration's energy proposals offer various mechanisms for offsetting the burden imposed by increased energy prices. These include per capita credits and payments that will refund much of the money collected through the crude oil equalization and the standby gasoline taxes, rebates that will distribute the proceeds of the gas-guzzler tax to purchasers of energy-efficient cars, and refunds to suppliers of home heating oil that will keep the price to consumers from reflecting the crude oil equalization tax. These instruments implicitly make some rough adjustments to mitigate the burdens imposed by the price increases. Since the proposed rebates will be applied on a per capita basis, there is an implicit adjustment for the effect family size may have on energy consumption. Because of subsidies to keep down the price of home heating oil, there is an adjustment for regional impact (cold versus warm places) that the crude oil equalization tax would have had on those who heat with oil. Nevertheless, it is clear that, because of individual differences, the Administration's energy policy will compensate some families in excess of the added cost and will compensate others less than the added cost of the program.

The remainder of this chapter looks at the likely impact of the costs of the program on families differing by income and other characteristics. The extent to which the rebates mitigate the differential cost effect is also examined.

THE DISTRIBUTIONAL IMPACT OF RISING ENERGY PRICES

The Administration's energy proposals will cause prices of different types of energy and energy-using products to rise at different rates. The reliance of different income classes and regions on the various types of energy and products varies considerably. This section summarizes what is known about the possible distributional impacts of the major elements of the Administration's energy proposals affecting prices, particularly those elements that would increase gasoline prices.

Increased Gasoline Prices

The imposition of the crude oil equalization tax and the standby gasoline tax will cause a substantial rise in gasoline prices. CBO estimates that by 1980 the equalization tax will increase the price of gasoline by 3.5 cents per gallon (in 1977 prices). The standby gasoline tax is not expected to be triggered until at least 1982. By 1985, it is estimated to add an additional 12 cents per gallon (in 1977 prices) to the price of gasoline.

The initial burden imposed by these price increases will vary according to gasoline usage. On average, gasoline consumption increases with family income (see Table X-1). This reflects the fact that higher-income persons tend to have more cars per family, that they drive each car more miles, and (according to some evidence) that their cars tend to be less energy efficient--that is, they get fewer miles per gallon than cars owned by lower-income families (see Table X-2). ^{1/}

TABLE X-1. ANNUAL EXPENDITURES PER FAMILY ON GASOLINE, BY FIFTHS OF FAMILIES RANKED BY MONEY INCOME, 1973-1974

Families Ranked by Money Income <u>a/</u>	Average Annual Gasoline Expenditures		Average Annual Gasoline Expenditures, Families With Vehicles Only		Percent of Families Owning One or More Vehicles
	Percent		Percent		
	Dollars	of Income	Dollars	of Income	
Lowest Fifth	139	6.6	311	14.8	44.7
Second Fifth	290	5.2	383	6.9	75.8
Third Fifth	419	4.5	473	5.1	88.6
Fourth Fifth	497	3.6	522	3.8	95.2
Highest Fifth	605	2.5	624	2.6	97.0

SOURCE: Calculated by CBO based on data from the Consumer Expenditure Survey Series: Diary Survey, July 1973-June 1974, U.S. Department of Labor, Bureau of Labor Statistics, Report 448-3.

^{a/} In 1973-1974, the income ranges for each fifth were: lowest fifth-under \$3,800; second fifth-\$3,800 to \$7,456; third fifth-\$7,457 to \$11,198; fourth fifth-\$11,199 to \$17,010; highest fifth-\$17,011 and over.

^{1/} Evidence on the relative fuel efficiency of cars owned by high- and low-income families is contradictory. In any case, the improvements in auto efficiency expected over the next ten years benefit high-income families first.

TABLE X-2. FACTORS RELATED TO GASOLINE USE, FAMILIES CLASSIFIED BY INCOME, 1972-1973, IN PERCENTS a/

Factor	Income Class of Family or Car Owner <u>b/</u>			
	Poor	Lower-Middle	Upper-Middle	Well-off
Cars				
No cars	47	16	4	1
1	37	52	35	21
2	14	25	51	58
3 or more	2	7	10	21
All cars	100	100	100	100
Miles driven in past years <u>c/</u>				
Less than 10,000	64	39	15	12
10,000 to 14,999	17	27	18	15
15,000 or more	20	35	67	72
All cars	100	100	100	100
MPG (Locally)				
0-14 mpg	31	50	54	62
15-19	47	32	30	24
20 and over	22	17	16	14
All cars	100	100	100	100
MPG (Long distance)				
0-14 mpg	22	23	32	34
15-19	46	49	46	44
20 and over	32	29	22	22
All cars	100	100	100	100

SOURCE: Dorothy K. Newman and Dawn Day, The American Energy Consumer, a report to the Energy Policy Project of the Ford Foundation, 1975.

a/ Percents may not add to 100 due to rounding.

b/ Income in 1972. The average income of the poor as defined by the study was \$2,500; for the lower-middle, \$8,000; for the upper-middle, \$14,000; for the well-off, \$24,500. The classification of poor takes family size into account.

c/ Cars owned 12 months or more for which mileage was reported.

Car use varies by income in part because of differences in the age, work participation, and other characteristics of people at different income levels. According to one survey, commuting to work accounts for more than 40 percent of all car miles traveled. ^{2/} About three-quarters of all workers go to work by car. Families at the lowest-income levels, however, are much less likely to be composed of workers since they tend to be headed by older or retired people or by women with young children. ^{3/} By contrast, families in higher-income categories often have at least two earners. If one considers only heads of families who are working, however, there is not much difference in the means of transportation to work by income group. In the poorest-income fifth, 84 percent go to work by car and among the richest fifth, 91 percent do so. The difference is made up by a larger proportion of walkers and bicycle riders among the poorest fifth. Only 8 percent of the employed household heads (whether poor or rich) use public transportation to go to work ^{4/}.

While gasoline consumption does tend to increase with income, it does so less than proportionately. Thus, families in the lowest fifth of the income distribution in 1973-1974 spent an average of \$139 on gasoline during the year and families in the highest fifth spent \$605. This expenditure represented 6.6 percent of the income of the lowest fifth but only 2.5 percent of the income of the highest fifth (see Table X-1). If low-income families find it no easier than high-income families to reduce their consumption of gasoline, then the

^{2/} U.S. Department of Transportation, Federal Highway Administration, Household Travel in the United States, Report #7, December 1972.

^{3/} In 1973, among families in the lowest fifth, close to 50 percent were headed by a person who was out of the labor force and 39 percent had no family members in the labor force at all. Among families in the highest fifth, 97 percent were headed by a person in the labor force, 45 percent had two earners, and 31 percent had three earners or more. (U.S. Bureau of the Census, 1973 Current Population Report, Series P-60, #97.)

^{4/} Dorothy K. Newman and Dawn Day, The American Energy Consumer, a report to the Energy Policy Project of the Ford Foundation, 1975.

burden of an increase in gasoline prices will be regressive; that is, the increase will have a relatively larger impact on those with lower incomes than on those with higher incomes.

While there is clear evidence that average gasoline consumption varies by income group, there is also evidence that there is a great deal of variation within each group. While virtually all upper-income families own cars, a substantial portion of lower-income people do not. In 1973-1974, about 55 percent of families in the lowest-income fifth did not own a car and therefore were hardly affected by increased gasoline prices. Thus, the absolute and relative burden placed on those lower-income families who do own cars would be substantially greater than the average. As indicated in Table X-1, those families in the lowest-income fifth who did own cars spent close to 15 percent of their incomes on gasoline, compared to the average of 7 percent for all families at that income.

Greater detail about the distribution of the relative burden of gasoline expenditures is given in the estimates of Table X-3. It appears that there is considerable dispersion in the relative burden of gasoline expenditures within an income class, but that

TABLE X-3. PROPORTION OF INCOME SPENT ON GASOLINE, BY TENTHS OF FAMILIES RANKED BY MONEY INCOME, 1974

Family Income by Tenths	Fuel Cost as Percent of Family Money Income							Total
	No Car Zero Percent	0-5 Percent	5-10 Percent	10-15 Percent	15-20 Percent	20 Percent	NA	
(Distribution of Families)								
Lowest	57.8	14.7	6.2	5.4	2.8	6.0	7.0	100.0
Second	38.2	31.6	11.6	5.8	2.5	5.9	4.2	100.0
Third	23.2	34.3	21.3	8.7	2.8	3.7	6.0	100.0
Fourth	13.0	44.8	27.1	7.2	2.2	2.5	3.1	100.0
Fifth	10.3	48.2	29.8	6.2	1.8	1.6	2.1	100.0
Sixth	4.6	60.2	24.4	7.1	1.0	0.8	2.1	100.0
Seventh	3.4	64.4	23.8	5.6	0.6	0.3	1.9	100.0
Eighth	3.2	68.5	22.5	2.9	0.0	0.0	2.9	100.0
Ninth	0.6	80.1	13.0	2.0	0.2	0.4	3.7	100.0
Highest	0.7	88.3	8.0	0.4	0.0	0.0	2.6	100.0

SOURCE: John Holmes and James Morgan, The Impact of Rising Gasoline Prices: Some National Survey Data, Survey Research Center, University of Michigan, February 1975.

the dispersion narrows as income rises. Thus, among families in the lowest-income tenth, 58 percent spent nothing on gasoline in 1974, while 6 percent spent more than 20 percent of their income on gasoline. As income rises and car ownership becomes almost universal, the percentage of income spent on gasoline tends to concentrate in the 0-5 percent range. Among those in the highest tenth, 88 percent are in that range; in that group, however, about 8 percent spend more than 5 percent (a very large absolute expenditure) of their income on gasoline.

The impact of higher gasoline prices will differ significantly by region as well as income class. As indicated in Table X-4, families in the lowest-income fifth living in the South spent 57 percent more on gasoline than those living in the Northeast in 1973-1974. In general, within an income class, more is spent on gasoline in the South and West and less in the Northeast, but the regional differences are smaller at the highest-income levels.

TABLE X-4. REGIONAL DIFFERENCES IN ANNUAL EXPENDITURES ON GASOLINE FOR FAMILIES RANKED BY MONEY INCOME, 1973-1974

Family Ranked by Money Income <u>a/</u>	Annual Expenditures Per Family On Gasoline					
	North- east	North Central	South	West	Rural	Inside SMSAs <u>b/</u>
Lowest Fifth	102	132	160	146	208	124
Second Fifth	226	301	306	318	387	259
Third Fifth	346	415	475	421	529	407
Fourth Fifth	440	483	548	523	587	487
Highest Fifth	580	615	609	625	663	601

SOURCE: Calculated from the Consumer Expenditure Survey Series: Diary Survey, July 1973-June 1974, U.S. Department of Labor, Bureau of Labor Statistics, Report 448-3.

a/ See Table X-1 for income boundaries of each fifth.

b/ Standard Metropolitan Statistical Areas.

Regional differences partly reflect differences in the percentage of families who live in rural areas. As also shown in Table X-4, families who live in rural areas spend considerably more on gasoline than those living within metropolitan areas--even at the same income level. Other data suggest that there are differences in automobile use within metropolitan areas. As one would expect, those living in the suburban ring of a metropolitan area own more cars than those with the same income living in central cities. Car ownership has been found to be greater in the newer large cities (such as Los Angeles) than in the older large cities (such as Philadelphia). ^{5/} The new cities have grown up after the advent of the automobile and reflect that development in terms of lower density and lack of public transportation. Since old cities are clustered in the Northeast, this may help explain the relatively low usage of gasoline there. Of course, income, region, city size, and age of city are not independent characteristics. They overlap, and a detailed analysis would be needed to determine the net effect of each factor.

Data are not readily available to determine how different families would or could adjust to higher gasoline prices. One possible indicator is the extent to which driving is related to commuting to work. Presumably, in the short run, it is more difficult to change this type of automobile use. As indicated in Table X-5, the proportion of total miles spent driving to work is very small (less than 10 percent) for most low-income families, although a small percentage do use their cars heavily for commuting. Among families above the median income, about 20 percent generate more than 50 percent of their total mileage commuting to work.

Some auto commuters do have access to public transportation. One study estimated that, among employed household heads living in central cities of metropolitan areas, 24 percent could switch from private to public modes to get to work without incurring any additional commuter time. ^{6/} It would be possible for another 54 percent of the central city dwellers to switch to public transit,

^{5/} See J.B. Lansing and G. Hendricks, Automobile Ownership and Residential Density, Institution for Social Research, June 1967.

^{6/} Dorothy K. Newman and Dawn Day, The American Energy Consumer, a report to the Energy Policy Project of the Ford Foundation, 1975.

TABLE X-5. VARIATION BY INCOME TENTHS IN THE RATIO OF COMMUTING
MILES TO TOTAL MILES DRIVEN a/, FAMILIES WITH CARS, 1974

Family Income by Tenths	Commuting Miles as a Percent of Total Miles					Total
	0-10	10-20	20-30	30-50	More Than 50	
(Distribution of Families)						
Lowest	87.0	3.6	2.1	1.4	5.7	100.0
Second	74.8	7.9	3.1	4.8	9.5	100.0
Third	59.6	6.3	8.5	8.9	16.5	100.0
Fourth	51.8	11.3	7.4	11.5	17.9	100.0
Fifth	51.6	11.7	10.3	9.9	16.6	100.0
Sixth	38.5	13.6	11.5	15.7	20.6	100.0
Seventh	33.6	14.9	14.2	15.3	21.9	100.0
Eighth	30.0	15.1	14.9	15.0	25.2	100.0
Ninth	31.6	15.4	12.0	15.1	26.0	100.0
Highest	37.4	14.2	16.2	15.7	16.7	100.0

SOURCE: Calculated from The Impact of Rising Gasoline Prices:
Some National Survey Data, John Holmes and James Morgan,
Survey Research Center, University of Michigan, February
1975.

a/ Refers to commuting miles of head of household and, where applic-
able, of wife who drives to work.

but it would greatly increase their commuting time. Altogether, about 90 percent have some access to public transit, including the 13 percent who now use it. For those working heads of households who live in the ring of a metropolitan area, the prospects for public transit are lower--only 56 percent have any access to public transit, including the 8 percent who already use it. Public transit is virtually unavailable to workers in rural areas and small urban areas. In the largest cities, many downtown-oriented public transit systems operate at or close to capacity during commuting hours and thus are not capable of absorbing a great influx of commuters without further incentives to expand capacity. Systems oriented toward suburban employment tend to be less capacious, but service of this sort is costly to provide and often inadequate in route coverage and schedule frequency.

Further, many areas have no public transit systems, or have inadequate ones, so the above-mentioned conclusions may not hold everywhere. Thus, while many workers have some access to public transportation, it is not clear that there is a substantial number of nonusers for whom sufficiently convenient public transport alternatives are available. 7/

7/ From an energy conservation perspective, the concern about public transport is often overstated. While well-utilized bus services have been found to be less energy-intensive per passenger mile than cars, the evidence on fixed rail systems is less encouraging. For example, Charles Lave has estimated that, because of the extra energy needed to build San Francisco's BART rail system relative to its equivalent in highways, it would take over 160 years for the savings in operating energy to break even, even if ridership doubled and the proportion of riders diverted from the auto tripled. ("Negative Energy Impact of Modern Rail Transit Systems," Science, Feb. 11, 1977, pp. 595-596.) Similarly, an analysis of Philadelphia's Lindenwold Line found that, because many of the rail system's patrons were former bus passengers and because they made circuitous routing (often by automobile) in order to use the system, an average trip after the system was built used more energy than it had before the system was operating. (David E. Boyce, et. al., "Impact of a Suburban Rapid Transit Line on Fuel Consumption and Cost for the Journey to Work," report submitted to the Federal Energy Administration, December 1975.)

Since low-income people are concentrated in both central cities of larger metropolitan areas and in rural places, there is likely to be a larger variation in the extent to which they can adjust to rising gasoline prices (just as there is a larger dispersion in their gasoline consumption patterns). Upper-income people are most heavily concentrated in suburban areas of large metropolitan areas, where switching to public transit is possible for many, but time consuming. In the long run, adjustments can be made through job and residence changes. These changes are costly, however, and are not likely to be initiated solely in response to energy prices. Rather, higher energy prices would be one factor to be balanced against many other factors that affect the pattern of urban development.

Based on available information, it is not possible to determine the extent to which families will adjust to higher prices by cutting back their gasoline consumption. Perhaps because their driving consists largely of commuting to work, families above the median could cut back proportionately less, at least in the short run.

Impacts on Other Goods and Services

The equalization tax on crude oil would increase the prices of other goods and services (as well as gasoline) to consumers. The gasoline price increase would raise the cost of trucking ^{8/} and that expense for the most part would be passed on to consumers. Products that use oil as an input would also experience cost increases. In addition, taxes would be imposed on all industrial users of natural gas and oil. There are some offsets that would keep the price of some energy-using products from rising. In particular, controls and rebates are intended to prevent price increases affecting gas and oil for residential heating.

It is difficult to identify precisely which goods and services would rise in price and by how much. Furthermore, it is unlikely that all cost increases would be passed on as higher prices, dollar-for-dollar, particularly after the economy has had time to adjust.

^{8/} More than half of for-hire trucks (intercity and local) are gasoline powered; about 45 percent are diesel powered.

The chain of producer and consumer adjustments to increased energy prices would be very complex. There would be changes on the production side induced by the changes in relative input prices. Producers would seek to shift to technologies that use less of the oil- and gas-intensive inputs. Shifts in production would also be induced by changes in consumer demand. As the prices of oil- and gas-using products rise, consumers would be likely to substitute and to buy fewer of the goods increasing in price and more of the goods becoming relatively cheaper. As a result of these shifts in demand and changes in input prices, profits would fall in some industries and rise in others. There would be contractions in some industries resulting in reduced employment and expansions in other industries bringing increased employment. Such adjustments would undoubtedly have regional differences.

The final distributional effects of the induced increases in gas and oil prices would be extremely difficult to tabulate. To do so would require information on many aspects of the economy, including the substitutions consumers would be likely to make among products in response to price increases, the technological possibilities open to producers, and the supply of inputs that would be substituted for gas and oil products. The final effects would influence the earnings and employment of many individuals as well as the relative price consumers pay. In general, however, one would expect that a broad increase in prices would hit families in proportion to their total consumption expenditure. Since consumption generally rises less than proportionately to income, such price increases would be regressive.

TAXES AND TAX CREDITS

Automobiles

Incentives to encourage the purchase of gasoline-efficient cars and to discourage the purchase of gasoline-inefficient cars are contained in a system of rebates for the former and taxes on the latter. As noted above, those in the lowest-income fifth are less likely to own a car or to use cars as much if one is owned. Moreover, when a low-income family does buy a car, it is likely to be a used one. Therefore the tax rebate scheme for new cars is unlikely to involve directly many at the lowest-income levels. Among the rest of the income distribution, one can only guess who would gain and who would lose. The purchase of a new car is related to income, so those with higher incomes are more likely to be involved

in the scheme. Since the taxes and rebates are designed to cancel each other out, however, much of the outcome would be a transfer from high-income purchasers of gas-guzzlers to high-income purchasers of fuel-efficient cars. Since higher-income families tend to purchase a greater proportion of larger cars than do lower-income families, there would also be a transfer of income from high-income (over \$20,000) new car buyers to lower-income (under \$12,500) new car buyers.

Homes

Tax credits are also being offered to induce investments in home insulation and other fuel-saving equipment in the home and for solar heating systems. The home insulation proposal would entitle homeowners to a tax credit of 25 percent of the first \$800 spent and 15 percent of the next \$1,400 to install certain items, such as insulation, storm windows, and improvements in heating equipment. The Administration's proposal also calls for the Federal Home Loan Mortgage Corporation and the Federal National Mortgage Association to help ensure that capital is available to homeowners, at reasonable interest rates through private lending institutions, for energy conservation measures. Another provision of the proposal would increase funds to aid people with low incomes to weatherize their homes.

The home insulation tax credit would be nonrefundable so that families without a federal income tax liability would not be able to take advantage of it. For this reason, and also because home ownership is more limited at lower-income levels, families in the lowest-income fifth would be less likely to participate in the program.

Homeownership increases with income. Only about 43 percent of families in the lowest-income fifth are homeowners, with the percentage rising to 82 percent at the highest fifth. Correspondingly, it is likely that the proportion benefiting from the insulation tax credit would rise with income. It is possible that, among homeowners as a whole, response to insulation incentives could be greater among those at lower-income levels. Such a response is not likely to offset the effect of more homeowners in upper-income brackets, however.

Since 1974, many homeowners have added insulation in response to the increase in fuel prices. According to a 1976 survey for the National Insulation Tracking Study, about 20 percent of owner-occupied homes were reinsulated between 1973 and 1976. The proportion of homeowners who insulated was slightly higher for those with annual

incomes below \$10,000 (about 23 percent) than those with higher incomes (about 19 percent). But the differences would appear too small to offset the larger differences in the percentages owning homes as opposed to renting.

One aspect of the proposal is aimed specifically at the lowest-income households: expansion of the weatherization program for low-income homeowners. The program is currently operated by the Community Services Administration and serves families with incomes up to 125 percent of the official low-income category. In certain circumstances, renters are also eligible for this assistance. The Administration's proposal provides for an increasing level of funding for each year between fiscal year 1978 and fiscal year 1980 for this program.

REBATES AND THE DISTRIBUTIONAL BENEFITS AND COSTS

The Administration's energy package contains two direct cash rebates to consumers--rebate of the crude oil equalization tax and rebate of the standby gasoline tax. The entire tax in each case would not be refunded directly. Some of the equalization tax proceeds would be used as indirect rebates to prevent home heating fuel from increasing in price. (The precise method for the home heating oil exemption has not yet been announced.) Some of the gasoline standby tax would be used to pay for business tax deductions for costs incurred because of the gasoline price rise.

According to CBO estimates, \$15.0 billion (in 1977 prices) would be available for direct cash rebates in 1980; and, in 1985, when the standby gasoline tax is expected to have been triggered, about \$21.9 billion would be rebated directly. These rebates would be distributed as an equal amount per person. Taxpayers and their families would receive their rebates through the tax system. Those who do not pay taxes would be contacted through social security, other transfer programs such as Aid to Families with Dependent Children (AFDC), and through special state outreach programs. Assuming all recipients were found, each family would receive a rebate that varies only with family size. In 1980, the per capita cash rebate is estimated to be about \$197, and in 1985, about \$272 (both in 1977 prices).

Table X-6 shows how the direct cash rebate would vary for families at different income levels in 1980 and 1985. Because average family size generally increases with income, the average rebate would increase with income--though not proportionately. Thus,

TABLE X-6. FIRST-ROUND INCREASES IN EXPENDITURES PER FAMILY RESULTING FROM ENERGY PROPOSALS a/ AND REBATES PER FAMILY, ESTIMATES FOR 1980 AND 1985, IN 1977 DOLLARS

Fifths of Families Ranked by Money Income <u>b/</u>	Induced Cost Increases Relative to Present Policy			Rebate	Net Gain or Loss <u>c/</u>	
	Gasoline	Other Goods & Services	Total		1977	As a Percent
					Dollars	of Real Income
<u>1980</u>						
Lowest Fifth	11	47	58	139	+ 81	+2.8
Second Fifth	23	107	130	165	+ 35	+0.6
Third Fifth	33	162	195	197	+ 2	+0.0
Fourth Fifth	40	217	257	231	- 26	-0.2
Highest Fifth	48	320	368	248	-120	-0.4
Average	31	170	201	197	- 4	-0.0
<u>1985</u>						
Lowest Fifth	49	52	101	195	+ 94	+3.0
Second Fifth	103	113	216	229	+ 13	+0.2
Third Fifth	149	170	319	274	- 45	-0.3
Fourth Fifth	177	231	408	321	- 87	-0.4
Highest Fifth	215	338	553	343	-210	-0.6
Average	139	183	322	272	- 50	-0.3

a/ Gas guzzler taxes and rebates on new cars and home insulation provisions are not included.

b/ The boundaries of each fifth are extrapolated from the 1973-1974 Consumer Expenditure Survey (see Table X-1). Money income was assumed to grow at 6 percent a year until 1977, real income at 2 percent a year to 1980 and 1985.

c/ See note below for discussion of net loss.

NOTE: Gasoline cost increases assumed to be distributed proportionately for gasoline consumption in 1973-1974 (see Table X-1). The increased cost of other goods and services is distributed proportionately to an average of the distribution of gasoline consumption and family income. Total increases in cost of gasoline and of other goods and services assume some reductions in consumption of gasoline and some offsetting consumer substitution. However, given more time for adjustment, cost increases would not exceed rebates and average net cost for all families would be zero. Totals for cost increases and rebates were derived as follows:

	<u>1980</u>	<u>1985</u>
	(in billions of 1977 dollars)	
Increase in Prices Due to:		
1) Crude Equalization	13.5	12.6
(less home heating)	- 0.8	- 0.6
2) User Tax - Industry	8.2	12.2
User Tax - Utilities	--	1.7
3) Controls	- 0.6	- 4.0
4) Gasoline Standby	--	14.9
(less business deductions)	--	- 3.7
5) Coal Conversion Rebates	<u>- 4.9</u>	<u>- 7.3</u>
Total	\$ 15.4	\$ 25.8
Share for Auto Gas	2.4	11.2
Share for Other Goods and Services	13.0	14.6
Rebates:		
1) Crude Equalization	15.8	11.3
(less home heating)	- 0.8	- 0.6
2) Gasoline Standby	--	14.9
(less business deduction)	<u>--</u>	<u>- 3.7</u>
Total	\$ 15.0	\$ 21.9
Number of Families	77.0 million	80.7 million
Average Persons per Family	2.9	2.9

the rebate would be progressive, equalling about 3 percent of income in the lowest fifth in 1980 and declining as a percent of income to less than 0.5 percent for the highest.

The direct cash rebates are the most easily determined part of the proposals. It is much more difficult to determine the indirect effects on the incomes of consumers. As discussed above, families would be affected differently depending on the extent to which goods and services rising in price make up their budgets. In addition, second-order employment and wage effects would have an impact on incomes.

Table X-6 makes a rough attempt to measure how cost increases may affect families at different income levels. Gasoline will be one item experiencing a major price hike. Based on the gasoline consumption patterns shown in surveys and discussed above, the effect of increases in gasoline prices on family gasoline expenditures can be calculated. The estimates shown in Table X-6 assume that all families would cut back somewhat in their fuel consumption and at approximately the same rate (see Chapter 6).

Increases in expenditures per family on goods and services other than gasoline were calculated based on an estimate of the aggregate increase in prices induced by the energy program. It was assumed that these other goods and services would rise with income but less proportionately.

It should be noted that the total amount of price increases exceeds the amount of direct cash rebates in 1980, primarily because the tax on industrial users would not be included in the direct cash rebate. However, if tax deductions of a comparable amount were granted so that there were no net tax increase, the amount would be indirectly refunded in the form of some price reductions or changes in income. Therefore, the average net loss to families in 1985 could eventually be reduced to zero (instead of \$50). However, the general pattern of net gains for low-income families and net losses for high-income families would not necessarily change. In 1985, rebates would be slightly larger than price increase because of decreased natural gas prices relative to present policy. Because of the very intricate changes in the economy that would be likely to occur, the final incidence of price changes might be quite different from those shown; this should be remembered when interpreting Table X-6.

As shown in Table X-6, the increased cost per family attributable to the energy program would be regressive; that is, increased

cost as a percent of income falls as income rises. the rebates contained in the program would be highly progressive, however, and the net effect (increased costs and rebates together) would be progressive as a result. The average family in the lowest-income level should gain the most since the net cost rises proportionately faster than income. Of course, within income classes there would likely be considerable variation in the net gains or losses. Low-income families with automobiles would experience much steeper cost increases than the average low-income family. The rebate might not cover the cost increases for low-income families that must drive long distances to work.

In general, because the cash rebate would vary only by family size and would not take into account other factors affecting consumption, it would tend to redistribute income to low-income families who do not use automobiles. Represented in this group would be families consisting of retired persons and families living in central cities, particularly in the Northeast.

The proposed rebates are not designed to reflect any other form of compensation for energy-related price increases that might have been received by families. Thus, individuals whose incomes are automatically adjusted for changes in the Consumer Price Index (CPI)--such as social security recipients and workers whose wages are tied to cost of living escalations--would receive compensation twice for the energy-induced price rises.

Is the tax and rebate system fair? Very roughly, going up the income ladder, the plan would be progressive and would impose relatively greater costs as income increases. However, within income classes, the gains and losses would likely be extremely variable and therefore many might not consider them fair. Because of the greater variations in automobile use within lower-income levels, particularly related to commuting to work, this might be the area of greatest concern.

It is, of course, enormously difficult to design a rebate that takes into account individual circumstances and is administratively feasible. One possible alternative would be to give rebates of a somewhat larger amount to workers. This would provide some adjustment for increases in the cost of commuting, which would be one important source of dispersion in the cost of the gasoline tax.

