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THE ECONOMIC IMPACT OF AN INTERRUPTION IN UNITED STATES PETROLEUM IMPORTS: 1975-2000

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INTRODUCTION

The objective of this paper is to estimate the economic impact of a possible interruption is petroleum imports during the period from 1975 to the year 2000. The world energy situation is undergoing a great deal of change at the present time, upsetting the stable patterns of trade in energy resources that have evolved over the past thirty years. Because the United States energy situation is undergoing a period of transition, research concerning the degree of our dependence on foreign oil sources can provide a valuable contribution in the formulation of an intelligent energy policy. The assessment of the economic impact of an interruption in imports is an integral piece of information in formulating an energy policy.

The oil embargo during the winter of 1973-74 was a painful indicator that the United States economy is vulnerable to interruptions in imports from the major oil exporting nations. The events of the embargo have caused both producing nations and consuming nations to rethink their positions on energy policies. The early reaction of the United States was to embark upon "project independence;" a program to make the United States self-sufficient in energy by 1980. Since our early dedication to "project independence," many energy experts have decided that the program is not feasible. Some believe that 1980 is too early to achieve self-sufficiency; a more realistic goal is 1985. Others assert that complete self-sufficiency is too costly a goal, and recommend varying degrees of dependence on energy imports. In order to make an intelligent decision on "project independence," the economic cost of a forced reduction in oil imports at some time in the future must be assessed. If a forced reduction in imports would be very costly, then complete self-sufficiency in energy might provide us with the best insurance against a future embargo. The less costly a future embargo would be, the more willing we should be to rely on lower-cost oil imports to supply a part of our energy consumption. Therefore, a study designed to estimate the economic impact of a future interruption in oil imports would be an important decision-making tool for assessing the best course of the future United States energy policy.

A study of the United States petroleum imports holds a particular interest to the Navy also, because petroleum constitutes over half of the United States' waterborne imports. An interruption of the sea lanes over which those imports are transported could greatly impair the U.S. economy; therefore, the protection of these sea lanes is a vital task for the Navy. For that reason, this paper will project the sources of future U.S. oil imports, in addition to the impact of their interruption.

The paper will begin by incorporating the data of the recent oil embargo into an input-output model of the U.S. economy, in order to assess the economic impact of the interruption in imports. The model will be used as a framework for estimating the impact of

all sizes of oil import interruptions, from small interruptions to a complete cutoff of imports. The next step in the analysis will be a projection of energy and petroleum consumption, as well as domestic petroleum production. These projections will be used in conjunction with the input-output model to forecast the impact on the economy of a forced reduction in petroleum imports.

Any projection of the future is a combination of the extrapolation of past trends and an attempt to take account of new developments and influences that will alter future events from the course that they have followed in the past. The assessment of new developments in the energy field is a particularly uncertain undertaking, because so many events have recently occurred that will influence the energy future of the world, and because the full impact of these events has not yet become evident. It is because of the uncertainties in the energy field that research of this type is important. An intelligent energy policy cannot be formulated without an estimation of the vulnerability of the U.S. economy to interruptions in petroleum imports.

This paper develops several different scenarios of petroleum supply and demand; indicating the uncertainties in our energy future, but also reflecting the fact that there are many policy options that can be chosen in order to encourage -- and discourage -- self-sufficiency in energy. With our course of inquiry plotted, we are ready to begin our analysis of interruptions in petroleum imports.

AN ECONOMIC MODEL OF AN INTERRUPTION IN PETROLEUM IMPORTS

An Input-Output Model of the Economy

The oil embargo during the winter of 1973-74 provides an idea about the consequences of an interruption in oil imports. This section of the paper will describe the procedure used to build a model for estimating the impact of embargoes of larger or smaller magnitudes, using the data of the 1973-74 embargo. The major problem in making this estimation is in projecting how much of any additional cutback in petroleum can be compensated for by conservation and the substitution of other fuels, and how much of the cutback will have the effect of reducing the output of the economy. The model in this paper will disaggregate the economy into 82 sectors, and evaluate the impact of a reduction of petroleum into each sector. The aggregate impact will then be calculated by combining the impacts on each of the sectors. This method has several advantages. First, the model is more able to take account of conservation and substitution possibilities by examining the economy on a sector-by-sector basis. Second, the model could be easily adapted to predict the impact on particular industries or areas of the country, in addition to predicting aggregate effects. The model also provides a framework upon which a more detailed analysis of energy problems could be undertaken.

The input-output model uses three matrices to summarize the interdependencies among the sectors of the economy. Each sector of the economy uses inputs from the other sectors to produce its output. Each sector also supplies some of its output to the other sectors as inputs into their production processes. The rest of the output is consumed; it constitutes the final demand of the economy. All of the inter-sectoral transactions are recorded in an 82 x 82 matrix, called the transactions matrix.

Each element a_{ij} of the transactions matrix indicates the dollar value of output from output from sector i that is used as an input into sector j. Thus, the elements along a row of the matrix describe where the output of that sector is used, and the elements along a column indicate the origin of the inputs into that sector. An additional column, column 83, records the output of the various sectors that supplies all types of final demand, and row 83 indicates the value added in each sector.

The sum of the a_{ij} for all j is the value of the output of sector i. When one element a_{ij} is divided by this sum, the result is the value of the input i that is used in the production

of one dollar's worth of j. Thus, a matrix, B, can be developed by calculating all of the b_{ij} according to equation (1).[1]

$$b_{ij} = a_{ij} / \sum_{n=1}^{82} a_{in} \qquad (1)$$

The element b_{ij} calculates the direct requirements of input i needed to produce one dollar's worth of j. Under the assumptions that a column of matrix B indicates the proportions of inputs from the other sectors that are required to produce the output of the sector under examination, and that production functions are linearly homogeneous, each column of matrix B defines a fixed-proportions production function for that sector. The fixed proportions production function is not an unrealistic feature of the model if relative prices are assumed constant. This means that for every dollar of increased (decreased) output in sector j, inputs into the production of j from sector i would increase (decrease) by the amount shown in b_{ij}. The elements in matrix B are called the input coefficients; therefore, matrix B is the input coefficient matrix.

An increase in the output of j will initially cause the output of i to increase by the amount indicated by b_{ij}. Since the production of j increases, the production of all of the other inputs of j must increase also, and those inputs also use i as an input. The output of i must increase in order to provide more i for direct input into j (which is represented by b_{ij}), but also must increase in order to provide additional inputs into the other inputs of j. For example, an increase in automobile production will cause an increase in steel production to provide more steel input into the auto industry. More steel will also be required to expand the other industries that provide inputs into the auto industry. These feedback effects will continue, and many other feedbacks will be occurring simultaneously. A new matrix can be constructed that will take account of all of these feedback effects. This matrix is calculated, as shown in equation (2), by subtracting B from the identity matrix, and taking the transposed inverse of that result. Matrix C is called the direct and indirect requirements matrix, because c_{ij} shows the amount of input from sector j that is used, both directly and indirectly, to produce a dollar's worth of output from

[1]Throughout this paper, capital letters will be used to designate matrices, with lower case letters representing elements of the matrices identified with the same letter. The subscript p will indicate the petroleum sector.

sector i. Therefore, for every dollar increase in the output of sector i, sector j's input would increase by c_{ij} to provide the necessary direct and indirect requirements for the production of i.

$$C = (I-B)^{-1}_{T} \tag{2}$$

These three matrices provide the foundation for the economic analysis of this paper, which will estimate the impact of a forced reduction in oil imports.[1]

The Effects of a Reduction in Petroleum Imports

In the framework of an input-output model, a forced reduction in petroleum imports would have three effects. First, it would reduce the final consumption of petroleum products, which is element $a_{p, 83}$ in the model. Second, it would reduce the input of petroleum into the other sectors of the economy, causing a reduction in the output of those other sectors. That is, it would reduce a_{pj} for all j. These reductions are called supply constraints. Finally, a reduction in petroleum will cause the final demand for the output of some other sectors to decline, independently of supply constraints. For example, the reduction in petroleum could cause people to purchase fewer automobiles and hotel and motel services, even though output from these industries is still available. These effects are called demand constraints. In terms of the input-output model, demand constraints are reductions in some of the elements $a_{i, 83}$. This section of the paper will include the effects of these two constraints in the model.

The fixed-proportions production functions implied in an input-output model present too rigid a picture of the economy. Conservation measures and the possibility of substitution among energy sources make the economy more flexible in its response to a reduction in the input of petroleum than the production functions would indicate. A graphical exposition would be the simplest method of explaining this point, and describing how the necessary flexibilities can be incorporated into the model. Figure 1 measures the percent reduction in oil on the horizontal axis, and plots the corresponding reduction in the output of one sector of the economy on the vertical axis. A fixed proportions production function implies that a one percent cutback in the input of oil causes a one percent reduction in output. The strictly interpreted input-output model, therefore, would dictate that the function in figure 1 be a 45 degree line emanating from the origin; the dashed line. In fact, as we have already noted, conservation and the use of alternative sources will cause the actual function to lie below the 45 degree line.

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[1] Reference (1) provides a more detailed but easily understood description of input-output analysis. Reference (2) is a more technical treatment of the subject.

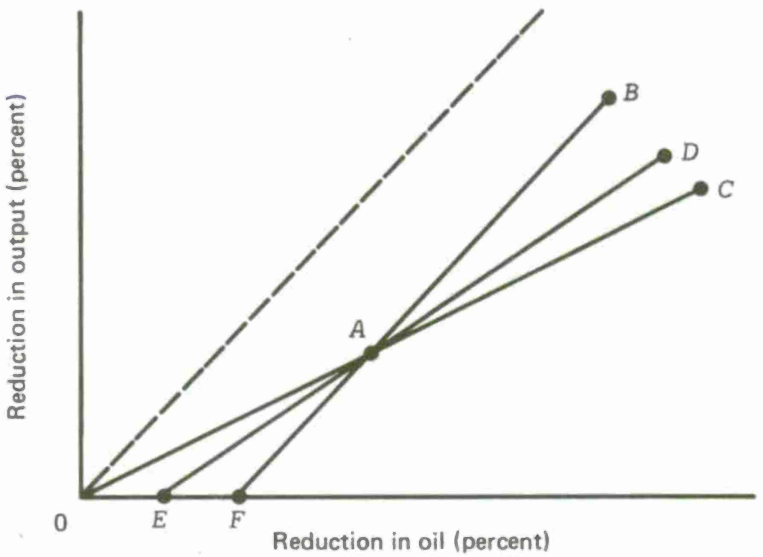

FIG. 1: CONSTRUCTION OF THE SUPPLY CONSTRAINTS

One point on the actual function can be determined from the data of the "energy crisis" during the winter of 1973-74. The percent reduction in oil for a sector of the economy and the percent decline in output in that sector during the crisis indicates one point on the function. That point, like point A, will lie below the 45 degree line. The function cannot be any steeper than 45 degrees, since a reduction in oil could, at worst, be met by an equal percentage reduction in all other inputs, to yield an equal percentage reduction in output. The function could not be less steep than a line through the origin, and intersecting point A. Conservation and substitution possibilities will be taken advantage of as soon as a reduction in the input of oil begins, so as the percentage reduction increases, fewer opportunities will remain for conservation and substitution. The actual function must, therefore, lie between OC and FB, and must pass through point A. The next sections of this paper will calculate a function, ED, which is between OC and EB, and relates the percent reduction in the input of oil into that sector with the percent reduction in output of the sector. These functions will be derived for all sectors of the economy, and will specify the supply constraints of the model.[1]

[1] Similar supply constraints were used by Anne Carter, in "Economic Impact of the Petroleum Shortage" (reference (3)).

The demand constraints can be similarly derived. Figure 2 illustrates that the percentage reduction in the input of oil can be functionally related to the percentage reduction in the demand for output of a certain sector. In the demand case, however, the data point from the energy crisis could fall either above the 45 degree line (as Q does) or below it (as R does). The only other information available about the demand constraints is that they must pass through the origin. The assumption will be that the constraints are linear, so OQ and OR are two examples of possible demand constraints.[1]

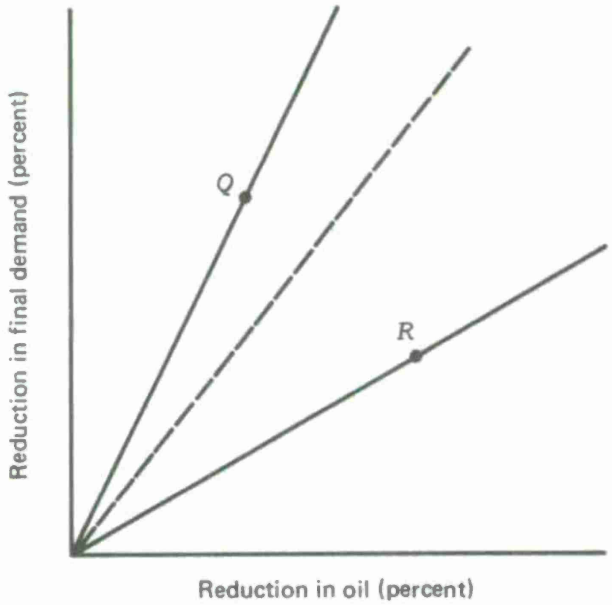

FIG. 2: CONSTRUCTION OF THE DEMAND CONSTRAINTS

Care must be taken to "double-count" the impact of an interruption of oil on a sector of the economy. For example, a reduction in the input of oil into the textiles industry will cause the output of that sector to fall by a certain amount. The reduction in oil going

[1] In this model, every sector that was located above the 45 degree line during the oil embargo was assumed to be demand-constrained. Feedback effects due to demand constraints were calculated only for the motor vehicles and hotels and motels sectors, which were the most severely demand-constrained. See reference (4), pages 19-22, for a discussion of the demand-induced effects of the embargo.

into the petrochemicals industry will also mean that fewer synthetic fibers will be produced in the textiles industry. Only the largest impact should be included, as the other feedbacks have no constraining effect on the potential output of the sector. The distribution of the petroleum reduction among the various sectors of the economy will be a major determinant of which sector provides the largest constraint on any given sector. The assumption of this model is that the petroleum sector is always the constraining sector. Although it is likely that other industries, such as petrochemicals, would be a larger constraint in some sectors, this assumption will have little effect on the aggregate result of the model. When computing the effects of the demand constraints, all feedback effects should be taken into account. After the supply and demand constraints have been calculated, the larger of the two will be used as the effective constraint.

Constructing the constraints of the model in the manner just described effectively eliminates the fixed-proportions productions functions implied in an input-output model, and models the substitution and conservation efforts of each sector in adjusting to the conditions of the embargo. Because the constraints are constructed using the actual data of the embargo, substitution and conservation in this model are exactly the same as during the embargo. The demand and supply constraints, along with the reduction in the final consumption of petroleum products, provide all of the modifications necessary to estimate the impact of a petroleum reduction on the output of the economy through an input-output model.

The Data of the Oil Embargo

This section of the paper will use data generated by the oil embargo in the winter of 1973-74 to provide parameters for the constraints of the model. The input-output matrices used in this model are composed of 1967 data, which is the most recent available. The age of the data should not significantly affect the analysis, however, since input-output coefficients tend to remain relatively stable over time. Input-output coefficients provide a model of the structure of the economy, and the structure of the economy changes very gradually;[1] therefore the data of the input-output matrix will be compatible with the data generated during the oil embargo.

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[1] The input-output matrices used in this analysis are available on computer tape from the Bureau of Economic Analysis, Department of Commerce, and are reprinted in "Survey of Current Business," February 1974 (reference (5)). Data from 1967 is used in the most recent matrices, since it takes a long time to compile the data and construct the matrices. Changes from year to year in the matrices are slight, so that the analysis of this paper should be relatively unaffected by the age of the data in the input-output matrix. On the gradualness of change in the input-output structure of the economy, see reference (6) part III, "stability of coefficients"; and reference (7).

Table 1 shows some key petroleum import figures for the periods just before the oil embargo, and during the worst period of the embargo. In the period before the embargo, imports were consistently at a level of about 2.1 million barrels per day higher than in the previous year. At the height of the embargo, imports were about one million barrels per day lower than at the same time in the previous year. Since the first quarter is normally a period of high consumption, these figures indicate that, in the absence of the embargo, imports would have been at least 3.1 million barrels per day greater than their actual level. Table 2 combines this 3.1 million barrels per day shortfall figure with the actual total consumption of 17.4 million barrels per day to calculate the estimated consumption in the absence of the embargo as 20.5 million barrels per day.[1] The estimated shortfall in petroleum consumption due to the embargo was therefore about 15 percent.

TABLE 1

U.S. PETROLEUM IMPORTS
(Thousand barrels per day)

Date	Total imports	Total one year before	Change from previous year
Aug 24-73	5, 767	3, 649	2, 118
Sept 21-73	6, 291	4, 170	2, 121
Oct 19-73	6, 720	4, 594	2, 126
Nov 16-73	6, 639	4, 531	2, 108
Feb 1-74	5, 200	6, 538	-1, 338
Feb 8-74	4, 446	5, 353	- 907
Feb 15-74	4, 578	5, 707	-1, 129
Feb 22-74	4, 933	5, 900	- 967
Mar 1-74	5, 211	6, 354	-1, 143
Mar 22-74	5, 502	6, 627	-1, 125

Source: Oil and Gas Journal (reference (8)).

[1] The Federal Energy Administration estimated unconstrained demand during that period to be between 20 and 21 million barrels per day. See reference (4), page 2.

TABLE 2

ESTIMATED EMBARGO PETROLEUM SHORTAGE
(First quarter 1974)

	Million barrels per day	Percent
Total consumption	17.4*	84.9%
Estimated shortfall	3.1	15.1%
Total	20.5	100.0%

*Source: Bureau of Mines.

The stated goal of policy-makers during the embargo was to allocate petroleum products in the manner that would minimize the impact of the embargo on GNP. This would imply minimizing the reduction of petroleum into the industrial sector of the economy, at the expense of greater reductions in household, commercial, and transportation usage. The industrial sector did suffer a smaller cutback than the other sectors of the economy, although it is likely that market forces were a more powerful determinant of petroleum allocations than the government allocation plans.

Table 3 summarizes the composition of output from domestic refineries, and table 4 shows the composition of imports. The percentages in these two tables indicate that residual's share of petroleum consumption rose by about ten percent, while the share of consumption composed of distillates decreased by about two percent. The percentage share of motor gasoline remained roughly unchanged. Table 5 demonstrates that residual oils are by far the largest refined petroleum product group used by the industrial sector of the economy. Similarly, distillates are the major input into the household and commercial sectors, and gasoline is the largest input into transportation. Using residuals as a proxy for industrial petroleum input, distillates as a proxy for household and commercial usage, and gasoline as the proxy for the transportation sector's petroleum input, we can draw some conclusions about how the reduction in petroleum during the embargo was distributed. Table 2 calculated the overall shortfall during the embargo to about 15 percent, so the distribution of the embargo among the sectors of the economy would be the figures shown in table 6.

Isolating the Effects of the Embargo

The analysis of the economic impact of the oil embargo is complicated by the fact that the economy was entering a recessionary period as the embargo began. Some of the decline in economic activity during the first quarter of 1974 would have been present without the embargo. This section will address the question of how much of the reduction in output during the first quarter of 1974 should be attributed to the embargo.

TABLE 3

COMPOSITION OF PRODUCTION FROM U.S. OIL REFINERIES

	Feb 2-73	Feb 16-73	Feb 1-74	Feb 15-74
Motor gasoline	53.5%	54.7%	54.7%	57.7%
Aviation fuel	8.3%	8.1%	8.0%	7.8%
Kerosene	2.1%	2.9%	1.7%	1.8%
Distillate	27.2%	26.0%	25.9%	22.9%
Residual	8.8%	8.2%	9.7%	9.6%
Total	100.0%	100.0%	100.0%	100.0%

Source: Oil and Gas Journal Weekly statistical section.

TABLE 4

COMPOSITION OF U.S. PETROLEUM IMPORTS

	Feb 1-74	Feb 15-74	Feb 2-73	Feb 16-73
Gasoline	3.3%	2.6%	1.6%	1.8%
Jet fuel	3.0%	2.7%	3.3%	3.0%
Kerosene	0.0%	0.0%	0.1%	0.0%
Distillate	4.8%	5.3%	4.1%	4.7%
Residual	33.0%	37.6%	35.2%	42.0%
Other	10.2%	10.3%	8.4%	8.8%
Total products	54.2%	58.5%	52.5%	60.4%
Total crude	45.8%	41.5%	47.5%	39.6%
Total imports	100.0%	100.0%	100.0%	100.0%

Source: Oil and Gas Journal weekly statistical section.

The method taken by the Federal Energy Administration (FEA) to answer this question is to compare pre-embargo forecasts of GNP to post-embargo forecasts.[1] The FEA study extimates that the oil embargo was responsible for between a 1.2 percent and 2.5 percent reduction in projected GNP. The total decline in GNP during the embargo was greater than this amount, however, since the pre-embargo projections include an estimation of the economic slowdown that would have occurred in the absence of the embargo,

[1] "The Economic Impact of the Oil Embargo on the American Economy," Office of Economic Impact, FEA, August 8, 1974 (reference (5)).

due to the beginning of a recession. At this point, we should be careful to distinguish between two different questions that we could ask with respect to the oil embargo. The first question is: how much did the oil embargo actually hurt the economy? The second is: at what percent of full capacity could the economy operate when under the constraint of the oil embargo?

TABLE 5

CONSUMPTION OF PETROLEUM PRODUCTS BY CONSUMING SECTOR, 1968

	Household & commerical	Industrial	Transportation	Utilities
Liquefied gases	10.4%	1.9%	0.8%	0.0%
Gasoline	0.0%	0.0%	70.7%	0.0%
Aviation	0.0%	0.0%	13.4%	0.0%
Kerosene	6.8%	3.0%	0.0%	0.0%
Distillate	49.1%	8.0%	8.5%	1.5%
Residual	18.7%	24.0%	5.5%	98.5%
Raw materials	15.0%	35.8%	1.0%	0.0%
Other	0.0%	27.4%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%

Adapted from data in Patterns of Energy Consumption in the United States (reference (3)).

TABLE 6

THE DISTRIBUTION OF EMBARGO OIL SHORTFALL ON THE SECTORS OF THE ECONOMY

Household and commercial	17%
Industrial	5%
Transportation	17%
All sectors	15%

Estimating the actual damage of the embargo can be done in precisely the manner that the FEA used -- a comparison of pre-embargo and post-embargo forecasts. Estimating the percent of full capacity that the economy could operate due to the embargo requires a comparison of the economy when operating at full employment with the embargo-constrained economy. An economy that is entering a recessionary period, as the U.S. economy was in late 1973 and early 1974, will automatically use less petroleum, because

less fuel is required to produce a smaller amount of output. Therefore, a reduction in the amount of imports will not cause a reduction in output, if output would have declined anyway due to other causes. For example, if GNP declines to 1.5 percent lower than the full-employment level, we only need imports enough to allow the economy to work at 98.5 percent capacity. If an embargo causes oil imports to fall further, so that the economy can only work at a 98 percent capacity, then the actual effect of the embargo is a reduction in GNP of 0.5 percent. Still, the embargo constrains the economy so that it can only produce 98 percent of its full capacity, even without the recession. For the purposes of this study, we are interested in the amount that the economy is constrained by the embargo, two percent in the above example, rather than the actual damage done by the embargo.

A comparison of pre-embargo with post-embargo forecasts of GNP will not provide us with the answer that we want. That comparison would indicate the actual damage done by the embargo, rather than the percent of full capacity that the economy could operate. We want to compare the embargo-constrained economy with the economy at full employment. That comparison is made in table 7. The first column of table 7 shows indices of industrial production for the U.S. economy, using 1967 as the base year. The rates of growth from 1967 to 1973, shown in the second column, were assumed to be the full-employment growth rates of those sectors, since they have demonstrated an ability to maintain those rates of growth over a period of six years. The growth rates were used to project the values of the indices in February of 1974, and the projected indices were compared with the actual February 1974 indices. The final column indicates the percent that the actual indices fell short of their projected values.

The sectors in table 7 were matched with the input-output sectors according to the pairings in table 8. Agricultural output is assumed to have had the same reduction as industrial production. Data is not available that will indicate the impact of the embargo on agriculture, since the embargo was for a short period during the winter months. Transportation and utilities are both assumed to vary proportionally with fuel inputs; and service industries were assumed to have the same reduction in output as the industrial sector. Reductions in fuel inputs were made according to the sector classifications in table 6, so we now have enough information to locate a point analogous to A in figure 1 for each sector of the economy.

In an attempt to take account of conservation and substitution possibilities, the slopes for the functions are calculated according to the percentage of other fuels used in the sectors. Petroleum is weighted twice as heavily as other fuels, indicating that fuels are not perfectly substitutable. We now have all of the information necessary to calculate the functions represented in figure 1 for all sectors of the economy.

TABLE 7

INDUSTRIAL PRODUCTION
(1967 = 100)

Industry grouping	1973 Average*	Avg. annual growth rate 1967-1973	Feb-74*	Projected Feb-74	Percent below projected
Manufacturing	125.2	4.6%	124.5	128.1	2.87%
Durable	121.8	4.0%	120.2	124.3	3.37%
Non-durable	129.6	5.3%	130.9	133.0	1.64%
Mining and utilities	128.9	5.2%	127.4	132.3	3.81%
Mining	110.2	2.0%	112.5	111.3	-1.08%
Utilities	152.3	8.8%	146.3	159.0	8.67%
Durable manufactures					
Primary and fabricated metals	128.8	5.2%	128.6	132.1	2.76%
Primary metals	127.1	4.9%	126.1	130.2	3.27%
Iron & steel, subtotal	121.6	4.0%	119.6	124.0	3.70%
Fabricated metal products	130.7	5.5%	131.5	134.3	2.13%
Machinery and allied goods	117.3	3.2%	114.5	119.2	4.11%
Machinery	125.9	4.7%	128.0	128.9	0.68%
Nonelectrical machinery	125.1	4.6%	129.0	128.0	-0.80%
Electrical machinery	126.8	4.9%	126.8	129.9	2.43%
Transportation equipment	109.2	1.8%	94.7	110.2	16.34%
Motor vehicles & parts	138.1	6.7%	109.7	142.7	30.09%
Aerospace & misc. trans. equip.	81.4	-4.0%	80.3	79.8	-0.67%
Instruments	138.4	6.7%	142.9	143.0	0.10%
Ordnance, private & govt.	85.4	-3.1%	84.0	84.1	0.09%
Lumber, clay, and glass	129.5	5.3%	128.1	132.9	3.78%
Lumber and products	128.9	5.2%	126.1	132.3	4.88%
Clay, glass, and stone products	129.9	5.4%	129.3	133.4	3.16%
Furniture and miscellaneous	135.2	6.2%	136.8	139.4	1.90%
Furniture and fixtures	126.3	4.8%	126.8	129.3	1.99%
Miscellaneous manufactures	143.3	7.5%	145.8	148.6	1.95%
Nondurable manufactures					
Textiles, apparel, and leather	114.7	2.8%	113.2	116.3	2.73%
Textile mill products	127.1	4.9%	125.0	130.2	4.18%
Apparel products	112.9	2.5%	111.5	114.3	2.50%
Leather and products	83.6	-3.5%	83.0	82.1	-1.05%
Paper and printing	122.1	4.1%	122.5	124.6	1.70%
Paper and products	135.4	6.3%	140.2	139.6	-0.41%
Printing and publishing	113.2	2.5%	110.7	114.6	3.54%
Chemicals, petroleum, and rubber	149.3	8.4%	151.3	155.5	2.80%
Chemical and products	150.1	8.5%	155.3	156.5	0.74%
Petroleum products	127.4	5.0%	117.3	130.6	11.31%
Rubber and plastics products	164.0	10.4%	164.0	172.5	5.20%
Foods and tobacco	121.9	4.0%	125.1	124.4	-0.59%
Foods	122.7	4.2%	126.2	.25.3	-0.74%
Tobacco products	111.6	2.2%	110.4	112.8	2.21%
Mining					
Metal, stone, and earth minerals	118.1	3.4%	119.7	120.1	0.33%
Metal mining	130.4	5.5%	132.9	134.4	1.13%
Stone and earth minerals	109.5	1.8%	110.7	110.5	-0.18%
Coal, oil, and gas	108.3	1.6%	110.7	109.2	-1.38
Coal	103.6	0.7%	114.7	104.0	-9.36
Oil and gas extraction	109.0	1.7%	110.1	109.9	-0.14

*Source: Federal Reserve Bulletin, June, 1974.

TABLE 8

INPUT-OUTPUT SECTOR

Industry number	Input-output sector	Constraint sector
1	Livestock & livestock products	Agriculture
2	Other agricultural products	Agriculture
3	Forestry & fishery products	Agriculture
4	Agriculture, forestry & fishery services	Agriculture
5	Iron & ferroalloy ores mining	Metal mining
6	Nonferrous metal ores mining	Metal mining
7	Coal mining	Coal
8	Crude petroleum & natural gas	Oil & gas extraction
9	Stone & clay mining & quarrying	Stone & earth minerals
10	Chemical & fertilizer mineral mining	Stone & earth minerals
11	New construction	Durable manufacturing
12	Maintenance & repair construction	Durable manufacturing
13	Ordnance & accessories	Ordnance, private & government
14	Food & kindred products	Foods
15	Tobacco manufactures	Tobacco products
16	Broad & narrow fabrics, yarn & thread mills	Textile mill products
17	Miscellaneous textile goods and floor coverings	Textile mill products
18	Apparel	Apparel products
19	Miscellaneous fabricated textile products	Textile mill products
20	Lumber & wood products, except containers	Lumber & products
21	Wooden containers	Lumber & products
22	Household furniture	Furniture & fixtures
23	Other furniture & fixtures	Furniture & fixtures
24	Paper & allied products, except containers	Paper & products
25	Paperboard containers & boxes	Paper & products
26	Printing & publishing	Printing & publishing
27	Chemicals & selected chemical products	Chemicals & products
28	Plastics & synthetic materials	Rubber & plastic products
29	Drugs, cleaning, and toilet preparations	Chemicals & products
30	Paints & allied products	Chemicals & products
31	Petroleum refining and related industries	Petroleum products
32	Rubber & miscellaneous plastic products	Rubber & plastics products
33	Leather tanning & industrial leather products	Leather & products
34	Footwear & other leather products	Leather and products
35	Glass & glass products	Clay, glass, & stone products
36	Stone & clay products	Clay, glass, & stone products
37	Primary iron & steel manufacturing	Iron & steel
38	Primary nonferrous metal manufacturing	Primary metals
39	Metal containers	Fabricated metal products
40	Heating, plumbing, & structural metal products	Fabricated metal products
41	Stampings, screw machine products, & bolts	Fabricated metal products
42	Other fabricated metal products	Fabricated metal products
43	Engines & turbines	Machinery
44	Farm machinery & equipment	Machinery
45	Construction, mining, & oil field machinery	Machinery
46	Materials handling machinery & equipment	Machinery
47	Metalworking machinery & equipment	Machinery
48	Special industry machinery & equipment	Machinery
49	General industrial machinery & equipment	Machinery
50	Machine shop products	Fabricated metal products
51	Office, computing, & accounting machines	Instruments
52	Service industry machines	Machinery
53	Electrical industrial equipment & apparatus	Electrical machinery
54	Household appliances	Electrical machinery
55	Electric wiring and lighting equipment	Miscellaneous manufactures
56	Radio, television, & communication equipment	Miscellaneous manufactures
57	Electronic components & accessories	Miscellaneous manufactures
58	Misc. electrical machinery, equip. & supplies	Miscellaneous manufactures
59	Motor vehicles & equipment	Motor vehicles & parts
60	Aircraft & parts	Aerospace & misc. trans. equipment
61	Other transportation equipment	Aerospace & misc. trans. equipment
62	Scientific & controlling instruments	Instruments
63	Optical, ophthalmic, & photographic equipment	Instruments
64	Miscellaneous manufacturing	Miscellaneous manufacturing
65	Transportation & warehousing	Transportation
66	Communications, except radio & TV broadcasting	Service
67	Radio & TV broadcasting	Service
68	Electric, gas, water, & sanitary services	Utilities
69	Wholesale & retail trade	Service
70	Finance & insurance	Service
71	Real estate & rental	Service
72	Hotels; personal repair services except autos	Service
73	Business services	Service
75	Automobile repair & services	Service
76	Amusements	Service
77	Medical, educational services & nonprofit org.	Service
78	Federal Government enterprises	Service
79	State & local government enterprises	Service
80	Imports	Service
81	Business travel, entertainment, & gifts	Service
82	Office supplies	Service
83	Scrap, used, & secondhand goods	Service

The petroleum reductions for any size embargo are weighted heavily in favor of the industrial sectors, since their output is more sensitive to fuel reductions. The proportions in table 6 indicate that the industrial sectors suffered less than one-third of the percentage reductions borne by the other sectors of the economy. Accordingly, this analysis assumes a heavy wieghting of fuel reductions in favor of the industrial sectors, until the household and commercial reductions reach a combined reduction level of 22 percent. At that point, essential needs such as home heating and transportation of food tilt the weighting of additional reductions against industrial production, and toward the household and commercial sectors. The weighting system used in this paper reduces the economic impact of the reduction from a system of proportional allocations, since it allocates the most fuel to the sectors that would be most damaged by a fuel reduction. Also, the data of the oil embargo suggest that the actual distribution of fuel during an interruption in oil imports would approximate the system used in this analysis.

The aggregate projections of this model are illustrated in figure 3 and table 9. They match the percent reduction in GNP that would occur from a certain percent reduction of petroleum into the economy.

TABLE 9

THE PERCENT REDUCTION IN GNP CAUSED
BY A REDUCTION IN PETROLEUM INPUT

Percent reduction in petroleum	Percent reduction in GNP
2	0.4
4	0.7
6	1.1
8	1.5
10	1.9
12	2.5
14	3.4
16	4.5
18	6.3
20	8.3

Figure 4 illustrates the effect of varying the assumptions of the model. Curve 1 is the projection when all slopes of the sectoral constraint functions are assumed to equal one. Curve 2 is the function used in the model; and curve 3 shows the projections when the demade constraints are not forced through the origin, when only the first-round feedbacks of demand constraints are considered, and when reductions are assumed proportional to

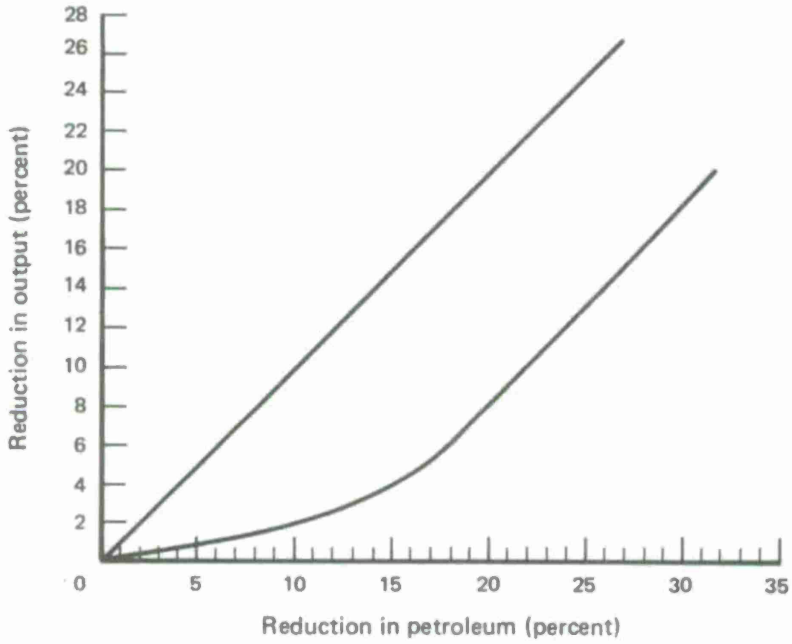

FIG. 3: THE PERCENT REDUCTION IN GNP CAUSED BY A REDUCTION IN PETROLEUM INPUT

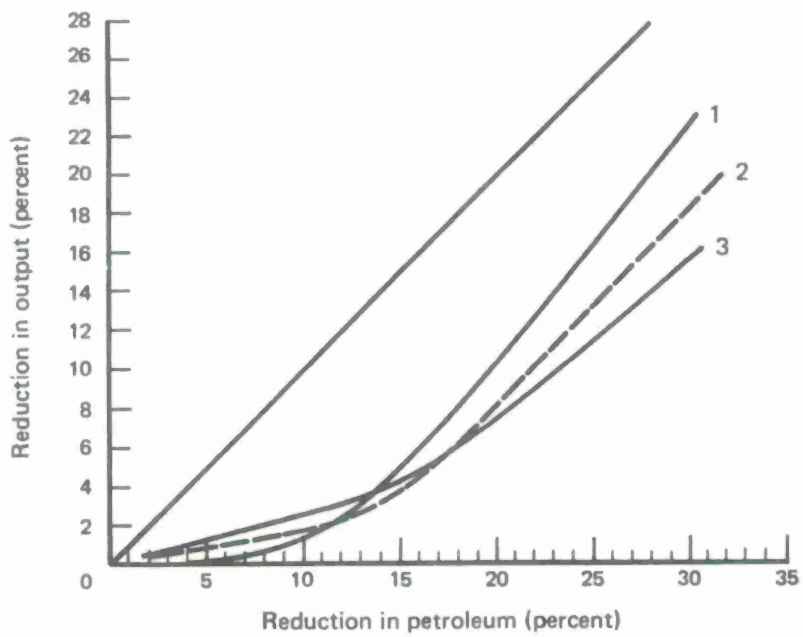

FIG. 4: THE EFFECT ON THE MODEL OF VARYING ASSUMPTIONS

energy reductions. Other assumptions were tried that yielded results between functions 1 and 3, suggesting that the model is not subject to wide variations due to changes in the assumptions.

PROJECTING PETROLEUM IMPORTS

Energy Consumption and Economic Growth

Energy consumption can be measured in three basic ways. Gross Energy Input (GEI), which is the total quantity of energy resources supplied to the economy, will be the measure used in this paper. GEI is the total amount of energy resources that the country has at its disposal. An alternative measurement is net energy input, which is GEI minus conversion losses. Conversion losses measure the amount of energy used to transform energy from one form to another. The largest conversion losses occur in the transformation of primary fuels, such as coal, oil, and gas, into electricity. A final alternative is to measure used energy. Over half of GEI is lost through inefficiencies, such as heat generated in motors, and the already noted conversion losses. The remaining energy, which performs the final work for which energy inputs were demanded, is used energy. The evidence indicates a highly stable relationship between the three measures of energy consumption; although conversion losses have been gradually increasing over time, as a greater percentage of our energy is consumed in the form of electricity.

The trend of increasing conversion losses can be seen in figure 5. The year is graphed on the horizontal axis, and the conversion efficiency is plotted on the vertical axis. The conversion efficiency is the percent of gross energy input that is transformed into net energy input. There is a strong statistical relationship in the conversion efficiency's decline over time. A log-linear regression of the conversion efficiency with the year yields an R^2 of .78, a t-value of 9.21, and indicates a downward trend of the conversion efficiency by .21 percent per year. The trend is slight, but it can be expected to continue as an increasing percentage of our energy demands are met through electricity.

Gross energy input has demonstrated a highly stable growth rate over time. Figure 6 shows gross energy input from 1902 to 1972, and includes in the graph the least squares regression lines of GEI both from 1850 to 1972 and from 1947 to 1972. A significant item to notice is that the two trend lines have approximately the same slope, indicating that the recent rate of growth in gross energy input is roughly equal to the historical rate of growth.

Table 10 shows the rate of growth in GEI from four different years to the present, and those figures indicate that the rate of growth does not vary much from the long-term trend.

Figure 6 demonstrates that the deviation in the long-term trend of GEI occurred during 1929-33, the period of the great depression. We should not be surprised to find a strong correlation between economic activity and energy consumption. Indeed, an analysis of the economic impact of an oil embargo on the economy begins from the premise that there is a strong correlation between GEI and GNP.

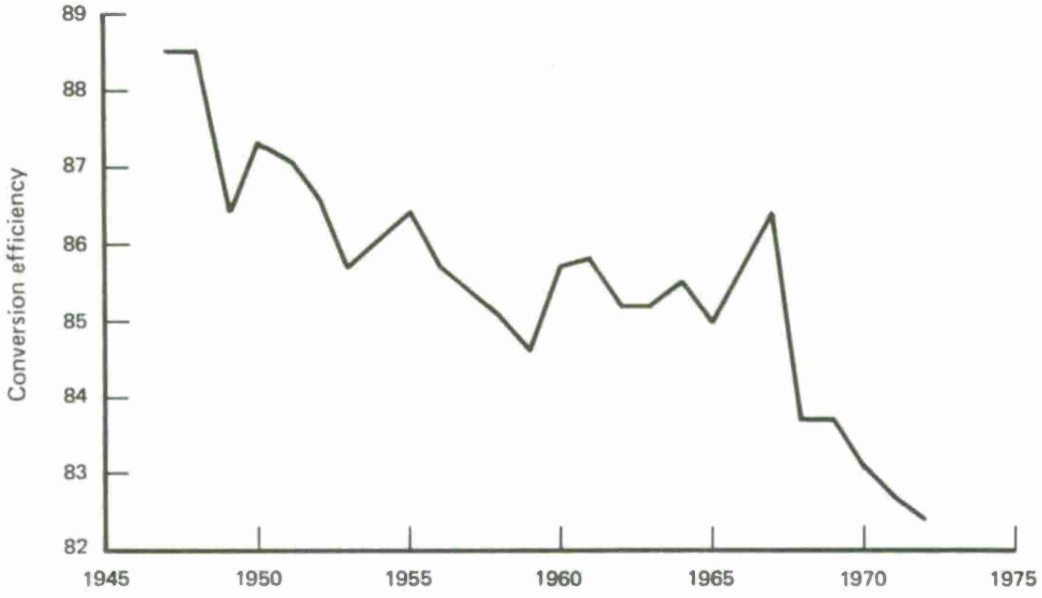

FIG. 5: CONVERSION EFFICIENCY (1947-72)

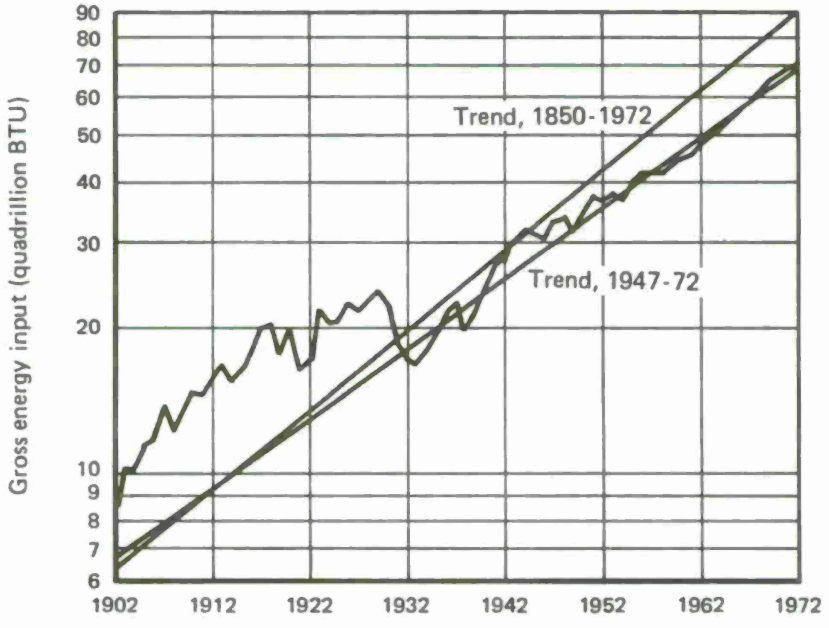

FIG. 6: GROSS ENERGY INPUT (1902-1972)

TABLE 10

AVERAGE ANNUAL RATES OF GROWTH OF GROSS ENERGY INPUT

Period	Percent
1850-1972	3.81%
1947-1972	3.20%
1950-1972	3.35%
1962-1972	4.31%

Figure 7 shows the relationship between gross energy input and GNP. A linear regression of GNP with GEI has an R^2 of .98 and a t-value of 35.7, indicating strong statistical significance. There is a large time trend in both variables that could cause the high correlation, however. To eliminate the effect of this time trend and test for the statistical significance of the relationship between GNP and GEI, the following test was used.

First, the differences of GNP and GEI were calculated. Next, the natural log of the first differences of GEI were run in a linear regression with the natural logs of GNP and the year in which they were observed. Natural logs were used for GEI and GNP to reduce their growth paths from exponential to linear growth paths. Thus, the growth of those variables would correspond with the linear growth of the year.

The result of this test was that the t-value of GNP was 3.41, significant at the .05 level, and the t-value of the year was 1.58, not significant at the .05 level. The conclusion of this test is that GNP is more closely correlated with GEI than the year. When both GNP and the year are used in a regression with GEI, GNP is a stastically significant variable in explaining GEI. The year is not. The indication is, then, that GNP and GEI can be expected to move together.

In the short run, technology as well as our existing stock of capital goods will keep the relationship between used energy, net energy input, gross energy input, and GNP in the neighborhood of their relationships in the recent past. In the absence of changes in the relative price of energy, it would be reasonable to merely extrapolate these trends of the past. The abrupt increase in the price of energy will certainly have the long-run effect of reducing the consumption of energy by providing an incentive to build more efficient machinery, manufacture smaller cars, build homes closer to urban centers, use more insulation in buildings, etc. In the short run, our alternatives are not so broad, and we must either pay more to use the same amount of energy, or reduce the level of energy consumption and also reduce our rate of economic growth.

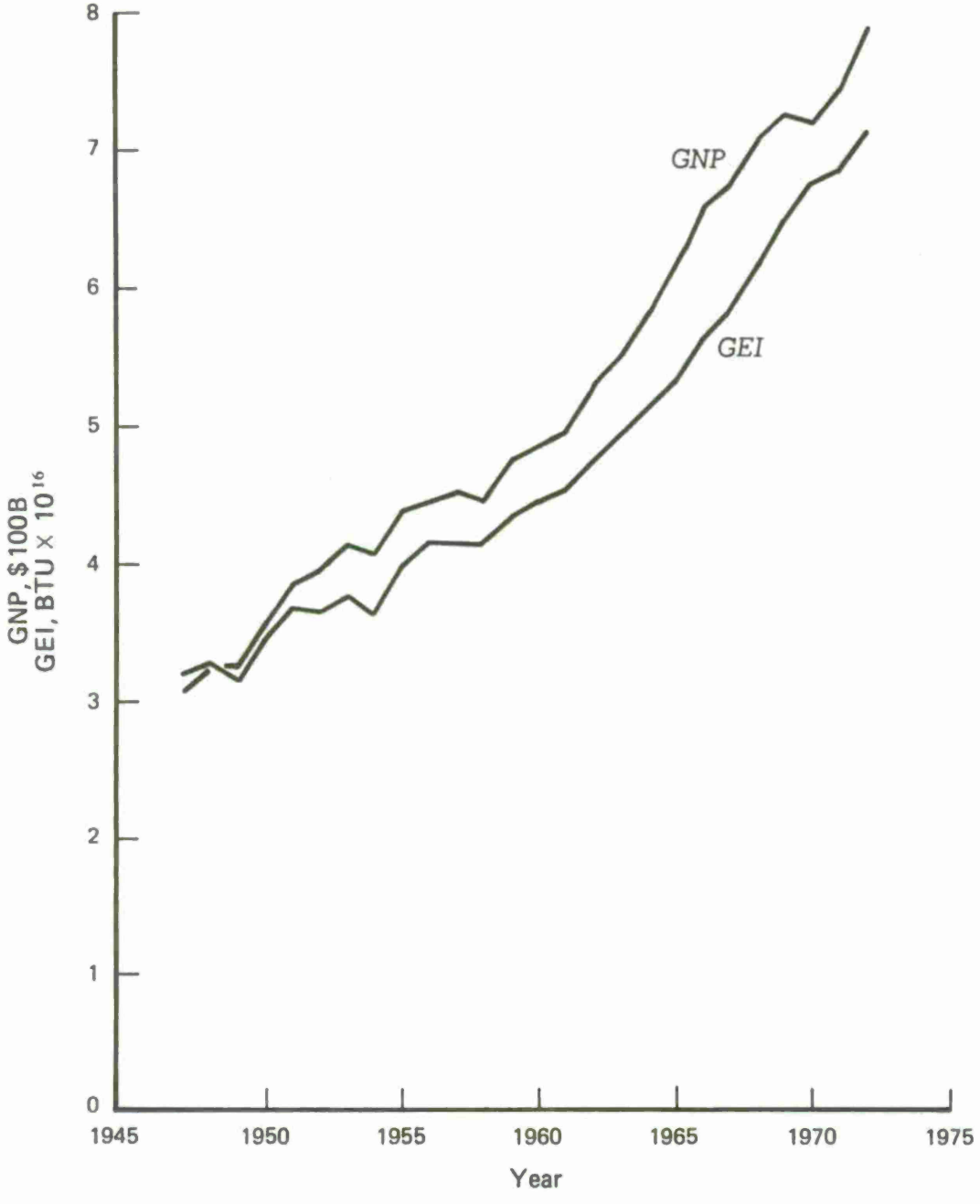

FIG. 7: GNP AND GEI, 1947-1972

Given these facts, it is reasonable to assume that the growth rate in gross energy input will be greater in the near future than in the far future, when the economy has had a chance to adjust its capital goods and spatial relationships to the new higher prices. The best estimate of this paper is that the price increase will reduce the recent rapid growth rate (see table 10) of GEI to its long-term growth rate of 3.8 percent, with that growth rate slowing after 1985 to reflect a more complete economic adjustment to the new conditions. Projecting beyond that date is uncertain, because of unforeseen technological, political, and economic considerations. It is probable, however, that more efficient conversion and utilization of energy, as well as new spatial relationships will reduce energy consumption even further. The assumption on this issue will be that increased conservation and efficiency in utilization of energy will compensate for the present annual loss in conversion efficiency of about .2 percent. The best estimate of the growth rate of energy consumption after 1985 will then be 3.6 percent.

It is possible that the increased prices will do little to reduce energy consumption in the near future, so that the growth rate could remain as high as 4.1 percent. As the economy adjusted capital equipment and spatial relationships to higher prices, the growth rate would probably fall to its long-term trend value of 3.8 percent. High estimates for growth in energy consumption would be 4.1 percent to 1985, and 3.8 percent after that time.

It is unlikely that rising prices will cause the growth rate of energy to fall below the growth rate of the 1947-1972 period, because technological relationships determine to a large degree the amount of energy necessary to continue economic activity. The growth rate of the past ten years has been about 4.3 percent, so a reduction to the 1947-72 rate of 3.2 percent would be a sizable reduction. If such a reduction were to occur, the economic adjustment over a longer period of time would probably increase energy consumption rather than decrease it, as new and more efficient techniques are used. This might imply a growth rate at the 1950-72 average of 3.35 percent. The low estimate of the growth rate in energy consumption is therefore 3.2 percent until 1985, and 3.35 after 1985. Table 11 summarizes these estimates of the growth rate in energy consumption. Table 12 uses these growth rates to project the demand for energy to the year 2000.

TABLE 11

THE PROJECTED GROWTH RATE OF ENERGY CONSUMPTION

	High	Best	Low
Present to 1985	4.1%	3.8%	3.2%
After 1985	3.8%	3.6%	3.4%

TABLE 12

PROJECTED ENERGY CONSUMPTION TO THE YEAR 2000, QUADRILLION BTU

YEAR	HIGH	BEST	LOW
1975	81.3	80.6	79.2
1976	84.7	83.7	81.8
1977	88.1	86.9	84.4
1978	91.8	90.2	87.1
1979	95.5	93.6	89.9
1980	99.4	97.2	92.8
1981	103.5	100.9	95.7
1982	107.8	104.7	98.8
1983	112.2	108.7	102.0
1984	116.8	112.8	105.2
1985	121.6	117.1	108.6
1986	126.2	121.3	112.2
1987	131.0	125.7	116.0
1988	136.0	130.2	119.9
1989	141.1	134.9	123.9
1990	146.5	139.7	128.0
1991	152.0	144.8	132.3
1992	157.8	150.0	136.8
1993	163.8	155.4	141.3
1994	170.0	161.0	146.1
1995	176.5	166.8	151.0
1996	183.2	172.8	156.0
1997	190.2	179.0	161.2
1998	197.4	185.4	166.7
1999	204.9	192.1	172.2
2000	212.7	199.0	178.0

Because the consumption of energy is closely related to GNP, the projections of energy consumption in table 12 can be related with GNP projections to the year 2000. Figure 8 synthesizes the data in the two curves of figure 7 into one curve, showing the relationship of GEI and GNP from 1947 to 1972. Table 13 lists the growth rates in GEI and GNP from 1947 to 1972. Table 13 lists the growth rates in GEI/GNP for four periods shown in the graph.

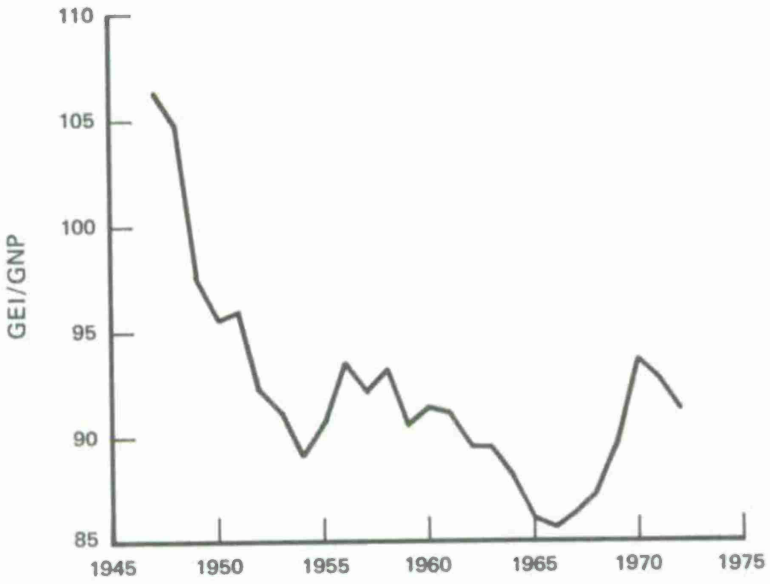

FIG. 8: GEI/GNP OVER TIME (1945-1975)

TABLE 13

GROWTH RATES OF GEI/GNP

Years	Growth Rate
1947-72	-0.46%
1950-72	-0.22%
1953-72	-0.11%
1962-72	.47%

The decline in the ratio for the period 1947-72 is due mostly to the years 1947-53, when the ratio fell tremendously. The period from 1953 to 1972 showed an almost negligible change, and the ratio increased slightly from 1962-1972. The period from 1950 to 1972 is representative of the movement of the ratio, since those years were not in a peak or a trough of the cycle. During that period, the ratio declined at an annual rate of about 0.2 percent which will be used as the projected change in the ratio of GEI/GNP for this paper. In projecting the growth rate of energy consumption, the assumption was made that the

adjustments to the higher relative prices of energy would cause a substitution of other factors for energy, reducing the annual growth rate of energy consumption. This substitution should not slow the growth of GNP. Table 14 relates the implied growth rates in GNP for the three cases of growth in energy consumption.

TABLE 14

PROJECTED GNP GROWTH RATES

Case	Percent per year
High	3.9
Best	3.6
Low	3.0

The Consumption of Petroleum

The projection of petroleum consumption is a more complicated task than the projection of energy consumption, because in the long run, a great deal of substitution is possible among energy sources. In the short run, technological considerations reduce the options to make substitutions among fuels, but a higher relative price of petroleum will still cause a decrease in its consumption. Furthermore, the time trend in petroleum consumption is not as significant as in energy in general. The R^2 in a log-linear regression of energy consumption over the time period 1850-1972 is .89, whereas the R^2 of petroleum consumption is .83. The time trend in petroleum consumption is, of course, very significant, but recently the rate of growth in petroleum consumption has differed greatly from its long-term growth path. From 1850 to 1972, the growth rate in petroleum consumption has averaged 6.4 percent, but the rate of growth since 1960 has been only 4.0 percent. The rate of growth in crude oil consumption has shown an even more significant deviation from its trend. Crude oil consumption has averaged an annual increase of 6.3 percent since 1850, but shown only a 3.3 percent annual growth since 1950. Figure 9 shows the relationships between crude oil consumption and petroleum consumption over time. The difference between crude oil and petroleum is composed of still gas, liquified refinery gas, and natural gas liquids; and these fuels have been making up an increasing percentage of petroleum consumption.

The factor that lends the largest amount of uncertainty to the projection of petroleum consumption is that we are currently undergoing a period of transition. The recent oil embargo and rising petroleum prices have provided a new incentive to petroleum (and energy) conservation. Thus, an extrapolation of past consumption trends would almost certainly overestimate the petroleum consumption of the future.

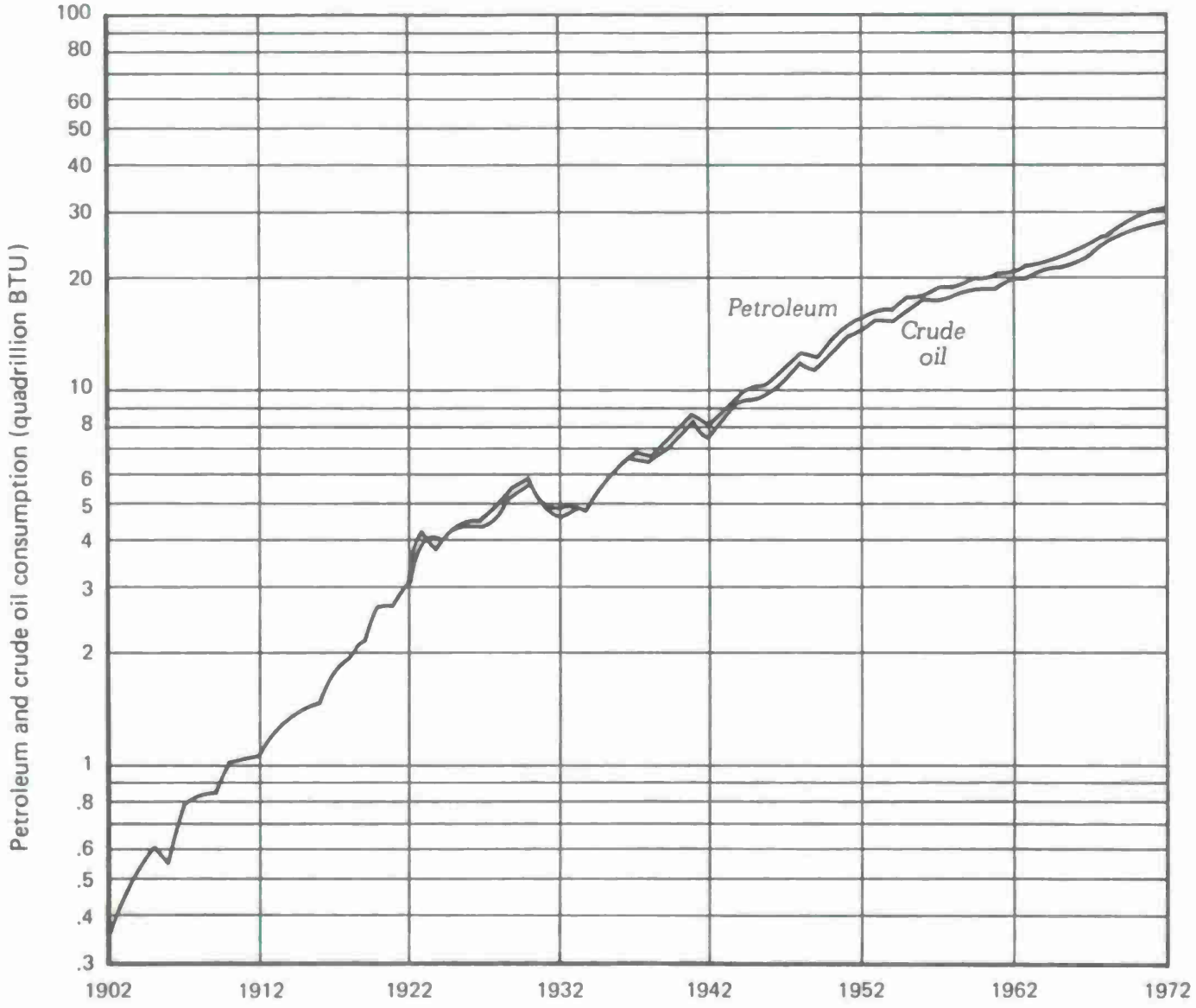

FIG. 9: PETROLEUM AND CRUDE OIL CONSUMPTION (1902-1972)

The recent rate of growth in petroleum consumption has been less than the rate of growth in energy consumption, so petroleum has been becoming a smaller percentage of total energy consumption in the recent past. This trend is illustrated in figure 10. The trend can be expected to continue, and will probably accelerate, for several reasons. One important reason will be the increasing use of nuclear power in the generation of electricity. Another contributing factor is the rise in the price of petroleum relative to other energy sources. The relative price increase will encourage the use of substitute fuels, as well as increased efficiency in the continuing uses of oil. Furthermore, political pressures for self-sufficiency in energy, whether they are completely successful or not, are an additional factor helping to discourage petroleum consumption. Petroleum, therefore, will surely constitute a declining percentage of our future energy consumption.

Evidence of attempts to conserve petroleum is already manifesting itself in the form of smaller cars and renewed interest in using coal as a source of electrical power generation. These and other conservation measures insure that the future demand for petroleum will accelerate at a considerably lower rate than the 4.0 percent of the previous decade. The high estimate for this paper is that consumption will increase at 3.8 percent, but a lower 3.3 percent is most likely. Because the transportation sector of the economy uses over 50 percent of petroleum fuels, it is doubtful that the rate of growth could be slowed below 3.0 percent in the near future. These estimates will be used to calculate the high, best, and low estimates of the consumption of petroleum through 1985.

After 1985, nuclear power should be supplying an increasing fraction of our energy output. When added to the current emphasis of shifting to alternative energy sources, the rate of growth in petroleum consumption should continue to decrease. The high, best, and low rates of growth for the years 1986-2000 are 3.3 percent, 3.0 percent, and 2.5 percent respectively. Because of the uncertainty of the course of future technological and political developments in the energy area, these estimates must be considered rough estimates. Nevertheless, they are closely in line with other estimates in the energy literature, and provide some guide to the projection of future petroleum consumption. These rates of growth are summarized in table 15.

TABLE 15

THE PROJECTED GROWTH RATE OF PETROLEUM CONSUMPTION

	High	Best	Low
Present to 1985	3.8%	3.3%	3.0%
After 1985	3.3%	3.0%	2.5%

FIG. 10: PETROLEUM AS A FRACTION OF GROSS ENERGY INPUT (1875-1972)

The figures in table 15 are used to project the amount of petroleum consumption to the year 2000. The projection is summarized in table 16. Table 17 indicates the percent of total energy consumption that will be composed of petroleum.

Because the same factors that would cause a high level of energy consumption would also cause a high level of petroleum consumption, table 17 matches the high estimate of energy consumption with the high estimate of petroleum consumption, and also pairs the best estimates and low estimates of each variable. There is no appreciable difference among the three columns.

TABLE 16

PROJECTED OIL CONSUMPTION TO THE YEAR 2000, QUADRILLION BTU

YEAR	HIGH	BEST	LOW
1975	35.2	34.7	34.4
1976	36.6	35.9	35.5
1977	38.0	37.0	36.5
1978	39.4	38.3	37.6
1979	40.9	39.5	38.7
1980	42.4	40.8	39.9
1981	44.1	42.2	41.1
1982	45.7	43.6	42.3
1983	47.5	45.0	43.6
1984	49.3	46.5	44.9
1985	51.2	48.0	46.3
1986	52.8	49.5	47.4
1987	54.6	51.0	48.6
1988	56.4	52.5	49.8
1989	58.2	54.1	51.1
1990	60.2	55.7	52.3
1991	62.2	57.4	53.6
1992	64.2	59.1	55.0
1993	66.3	60.9	56.4
1994	68.5	62.7	57.8
1995	70.8	64.6	59.2
1996	73.1	66.5	60.7
1997	75.5	68.5	62.2
1998	78.0	70.5	63.8
1999	80.6	72.7	65.4
2000	83.2	74.8	67.0

TABLE 17

PROJECTED PETROLEUM AS A PERCENT OF TOTAL ENERGY CONSUMPTION

YEAR	HIGH	BEST	LOW
1975	43.3	43.1	43.4
1976	43.2	42.9	43.3
1977	43.1	42.6	43.3
1978	42.9	42.4	43.2
1979	42.8	42.2	43.1
1980	42.7	42.0	43.0
1981	42.6	41.8	42.9
1982	42.4	41.6	42.8
1983	42.3	41.4	42.8
1984	42.2	41.2	42.7
1985	42.1	41.0	42.6
1986	41.9	40.8	42.2
1987	41.7	40.6	41.9
1988	41.5	40.3	41.6
1989	41.3	40.1	41.2
1990	41.1	39.9	40.9
1991	40.9	39.6	40.5
1992	40.7	39.4	40.2
1993	40.5	39.2	39.9
1994	40.3	38.9	39.5
1995	40.1	38.7	39.2
1996	39.9	38.5	38.9
1997	39.7	38.3	38.6
1998	39.5	38.0	38.3
1999	39.3	37.8	37.9
2000	39.1	37.6	37.6

The Projected Domestic Supply of Petroleum

With projections of the future demand for petroleum in hand, a projection of the domestic supply of petroleum will enable us to project the amount of imports. The projection of imports will provide an estimate of how dependent the United States will be on foreign sources for supply of our future energy consumption.

There are several important factors that will determine the U.S. output of oil in the future. These factors can be placed in the broad categories of technological factors, price effects, and political actions. Technological factors include the amount of new drilling to occur each year, the rate of discovery per foot drilled, and the adoption of new techniques to increase the yield from existing fields. Price changes will moderate these effects. Higher prices would encourage increased drilling; and the adoption of new techniques, such as flooding, would be more attractive at higher prices. Conversely, lower prices would discourage production. Political actions can also provide stimulating or dampening effects on oil production.

The National Petroleum Council has made estimates of future oil production for 1975, 1980, and 1985, which are summarized in table 18. The variables behind the four cases are technological rather than economic in nature. New sources, such as Alaskan oil, as well as the drilling rate and finding rate per foot drilled are variables in the four supply cases. Case IV, the lowest supply case, represents an extrapolation of recent trends in oil production; with the other three cases based on increasingly optimistic assumptions. Interpolation of the data in table 18 to calculate the underlying average annual growth rates in production yields the figures in table 19.

Table 19 illustrates the wide variation in the domestic production estimates. The estimates in table 19 cover the range of estimates computed in other studies, indicating that they are representative of the opinion of energy experts. These figures will therefore be used for the calculations in this paper. Production estimates for 1985-2000 will be extrapolations of the 1980-85 trend, with the exception of Case IV which will be extrapolated at the Case III rate. These estimates were made by taking into account the technological and natural resource possibilities, but were made before the recent oil embargo. Since then, emphasis on self-sufficiency and the certainty of price rises should provide an incentive for increasing domestic production. For this reason, Case IV, which is an extrapolation of recent trends, is unlikely to indicate the future direction of petroleum production.

Table 20 uses the percentages in table 19 to estimate the domestic supply of petroleum to the year 2000.

TABLE 18

NPC PROJECTED DOMESTIC PRODUCTION OF OIL
(Trillion BTU)

		Case I	Case II	Case III	Case IV
1975	Oil - Domestic Liquid Production	20,735	20,630	19,754	19,502
	- Shale Syncrude	0	0	0	0
	- Coal Syncrude	0	0	0	0
	Total Oil	20,735	20,630	19,754	19,502
1980	Oil - Domestic Liquid Production	27,758	26,456	23,789	18,112
	- Shale Syncrude	296	197	197	0
	- Coal Syncrude	175	0	0	0
	Total Oil	28,229	26,653	23,986	18,112
1985	Oil - Domestic Liquid Production	31,689	28,477	24,346	21,426
	- Shale Syncrude	2,117	788	788	197
	- Coal Syncrude	1,489	175	175	0
	Total Oil	35,295	29,440	25,309	21,623

Source: U.S. Energy Outlook (reference (12))

TABLE 19

PROJECTED AVERAGE ANNUAL RATES OF GROWTH IN DOMESTIC OIL PRODUCTION

	Case I	Case II	Case III	Case IV
1975-80	3.12%	2.56%	1.94%	-.74%
1980-85	2.02%	.99%	.54%	1.77%

TABLE 20

PROJECTED PETROLEUM PRODUCTION TO THE YEAR 2000, QUADRILLION BTU

YEAR	CASE 1	CASE 2	CASE 3	CASE 4
1975	20.7	20.6	19.8	19.5
1976	21.4	21.2	20.1	19.4
1977	22.0	21.7	20.5	19.2
1978	22.7	22.3	20.9	19.1
1979	23.4	22.8	21.3	18.9
1980	24.2	23.4	21.7	18.8
1981	24.7	23.6	21.9	19.1
1982	25.2	23.9	22.0	19.5
1983	25.7	24.1	22.1	19.8
1984	26.2	24.4	22.2	20.2
1985	26.7	24.6	22.3	20.5
1986	27.3	24.8	22.5	20.6
1987	27.8	25.1	22.6	20.7
1988	28.4	25.3	22.7	20.8
1989	28.9	25.6	22.8	21.0
1990	29.5	25.8	22.9	21.1
1991	30.1	26.1	23.1	21.2
1992	30.7	26.3	23.2	21.3
1993	31.4	26.6	23.3	21.4
1994	32.0	26.9	23.4	21.5
1995	32.6	27.1	23.6	21.6
1996	33.3	27.4	23.7	21.8
1997	34.0	27.7	23.8	21.9
1998	34.7	28.0	24.0	22.0
1999	35.4	28.2	24.1	22.1
2000	36.1	28.5	24.2	22.2

The Projection of Petroleum Imports

The data of the previous sections of this paper provide us with all of the information necessary to project petroleum imports through the year 2000. Net imports are calculated by subtracting total consumption from domestic production. The best estimate of imports is calculated using the best estimates of petroleum and energy consumption, and petroleum supply case III. Case III projects approximately a two percent increase in domestic production for the next ten years, slowing then to about 0.5 percent. This is a sizeable increase over our negative rate of domestic supply growth in the recent past, reflecting increased production incentives. The best estimate of petroleum imports is shown in table 21.

The high estimate of imports is calculated using the high energy and petroleum consumption estimates, combined with the low domestic production rate; the low estimate of imports uses the low consumption estimates with the high domestic production rates. The high and low import estimates, shown in tables 22 and 23 should provide realistic bounds for the projection of petroleum imports.

TABLE 21

PROJECTED PETROLEUM IMPORTS TO THE YEAR 2000
BEST ESTIMATE

YEAR	1	2	3
1975	7.1	43.1	18.6
1976	7.4	43.9	18.8
1977	7.8	44.6	19.0
1978	8.2	45.3	19.2
1979	8.6	46.0	19.4
1980	9.0	46.8	19.7
1981	9.6	48.2	20.2
1982	10.2	49.6	20.6
1983	10.8	50.9	21.1
1984	11.5	52.2	21.5
1985	12.1	53.5	21.9
1986	12.8	54.6	22.3
1987	13.4	55.7	22.6
1988	14.1	56.7	22.9
1989	14.8	57.8	23.2
1990	15.5	58.8	23.4
1991	16.2	59.8	23.7
1992	17.0	60.7	23.9
1993	17.7	61.7	24.2
1994	18.5	62.6	24.4
1995	19.4	63.5	24.6
1996	20.2	64.4	24.8
1997	21.1	65.2	25.0
1998	22.0	66.0	25.1
1999	22.9	66.8	25.3
2000	23.9	67.6	25.4

COLUMN 1--MILLION BBLS/DAY
COLUMN 2--AS A PERCENT OF PETROLEUM CONSUMPTION
COLUMN 3--AS A PERCENT OF GROSS ENERGY INPUT

TABLE 22

PROJECTED PETROLEUM IMPORTS TO THE YEAR 2000
HIGH ESTIMATE

YEAR	1	2	3
1975	7.4	44.6	19.3
1976	8.1	47.1	20.3
1977	8.9	49.4	21.3
1978	9.6	51.6	22.2
1979	10.4	53.7	23.0
1980	11.2	55.7	23.8
1981	11.8	56.6	24.1
1982	12.4	57.4	24.4
1983	13.1	58.3	24.7
1984	13.8	59.1	24.9
1985	14.5	59.9	25.2
1986	15.2	61.0	25.5
1987	16.0	62.0	25.8
1988	15.8	63.0	26.1
1989	17.6	64.0	26.4
1990	18.5	65.0	26.7
1991	19.3	65.9	26.9
1992	20.3	66.8	27.2
1993	21.2	67.7	27.4
1994	22.2	68.6	27.6
1995	23.2	69.4	27.8
1996	24.3	70.2	28.0
1997	25.3	71.0	28.2
1998	26.5	71.8	28.4
1999	27.6	72.6	28.5
2000	28.8	73.3	28.7

COLUMN 1--MILLION BBLS/DAY
COLUMN 2--AS A PERCENT OF PETROLEUM CONSUMPTION
COLUMN 3--AS A PERCENT OF GROSS ENERGY INPUT

TABLE 23

PROJECTED PETROLEUM IMPORTS TO THE YEAR 2000
LOW ESTIMATE

YEAR	1	2	3
1975	6.5	39.8	17.3
1976	6.6	39.7	17.2
1977	6.8	39.6	17.1
1978	7.0	39.5	17.1
1979	7.2	39.5	17.0
1980	7.4	39.4	16.9
1981	7.8	40.0	17.2
1982	8.1	40.6	17.4
1983	8.5	41.1	17.6
1984	8.8	41.7	17.8
1985	9.2	42.2	18.0
1986	9.5	42.5	18.0
1987	9.9	42.8	17.9
1988	10.1	43.0	17.9
1989	10.4	43.3	17.8
1990	10.8	43.6	17.8
1991	11.1	43.8	17.8
1992	11.5	44.1	17.7
1993	11.8	44.4	17.7
1994	12.2	44.6	17.6
1995	12.6	44.9	17.6
1996	12.9	45.1	17.6
1997	13.3	45.4	17.5
1998	13.8	45.7	17.5
1999	14.2	45.9	17.4
2000	14.6	46.2	17.4

COLUMN 1--MILLION BBLS/DAY
COLUMN 2--AS A PERCENT OF PETROLEUM CONSUMPTION
COLUMN 3--AS A PERCENT OF GROSS ENERGY INPUT

THE ECONOMIC IMPACT OF FUTURE PETROLEUM IMPORT INTERRUPTIONS

The earlier sections of this paper have estimated the economic impact of various sized interruptions in petroleum imports; and have projected the magnitude of petroleum imports and consumption, as well as energy consumption. This section will combine the results of the earlier analysis to project the impact of a future interruption in oil imports. One way to make this projection would be to estimate the gradual change in input-output coefficients over time; and rerun the input-output model for each year, using the estimated coefficients. This paper will use a less time- consuming approach, by assuming that an equal percentage reduction in gross energy input in any year will lead to the same percentage reduction in output. Table 17 illustrates that petroleum's percentage of total energy consumption is expected to decline only slightly during the period under examination, suggesting that this assumption will not adversely affect the results of the analysis.

The analysis begins by translating the percent reduction in petroleum in figure 3 to a percent reduction in energy, under the assumption that petroleum would supply 43.4 percent of gross energy input in 1974, in the absence of an interruption in imports. (Due to the embargo, the actual figure should be less.) The new function is used to calculate the impact of an energy interruption for all cases under study. Then, the numbers in tables 21, 22, and 23 are used to translate the percent energy reduction into a percent petroleum import reduction for each case. The projected growth rates in GNP in table 14 are used to estimate the impact of an interruption in imports in 1973 dollars. The results of the analysis are depicted graphically for the years 1980, 1985, 1990, and 2000, in figures 11, 12, 13, and 14. The horizontal axes indicate the percent reduction in imports, and the vertical axes relate the resulting percentage reduction in output. Figure 15 compares the best estimates for each of the four years, demonstrating that our economic dependence on imported oil will probably increase for the next twenty-five years, although at a decreasing rate. Inspection of figures 11 through 14 indicates that the low estimate projects an approximately constant dependence on imports for the next twenty-five years. Appendix A provides tables associating the percent reduction in petroleum imports with the percent reduction in output and the dollar cost of the import interruption, for each year from 1975 to 2000.

The results of the analysis are stated in annual terms, meaning that they should be interpreted as the economic impact of an oil import interruption lasting one year. For interruptions lasting a fraction of a year, that fraction of the dollar value of the impact should be used. The supply effects of the interruption would show up almost immediately, but the demand and feedback effects would take more time, lessening the effect of the interruption. The recovery from the interruption would not be instantaneous, however, meaning that some cost of the interruption would continue to be paid after the interruption had ceased. This cost would not vary greatly with the length of the interruption. These offsetting effects suggest that estimating the impact of an embargo for a fraction of a year as that fraction of the total year's dollar impact will yield acceptably accurate projections.

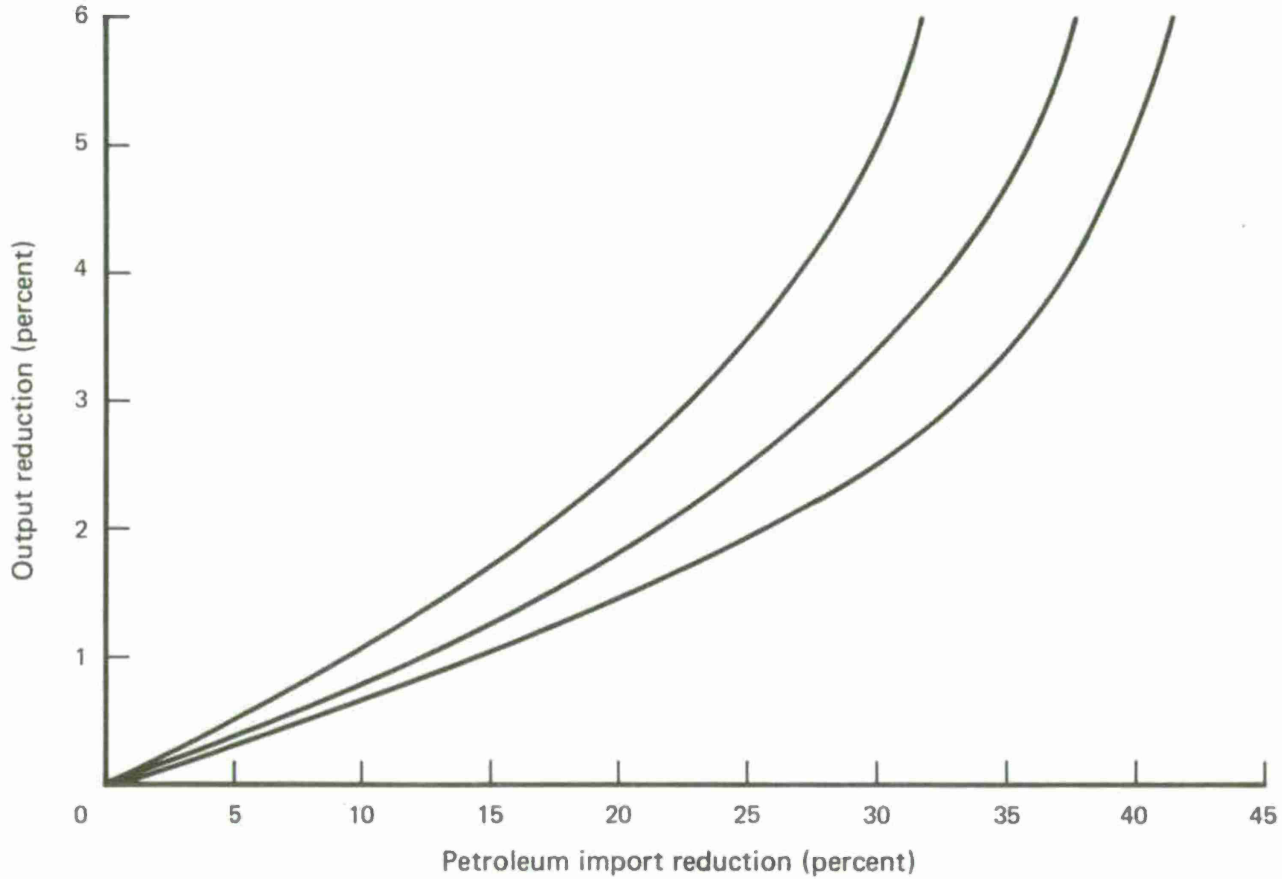

FIG. 11: THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS—1980

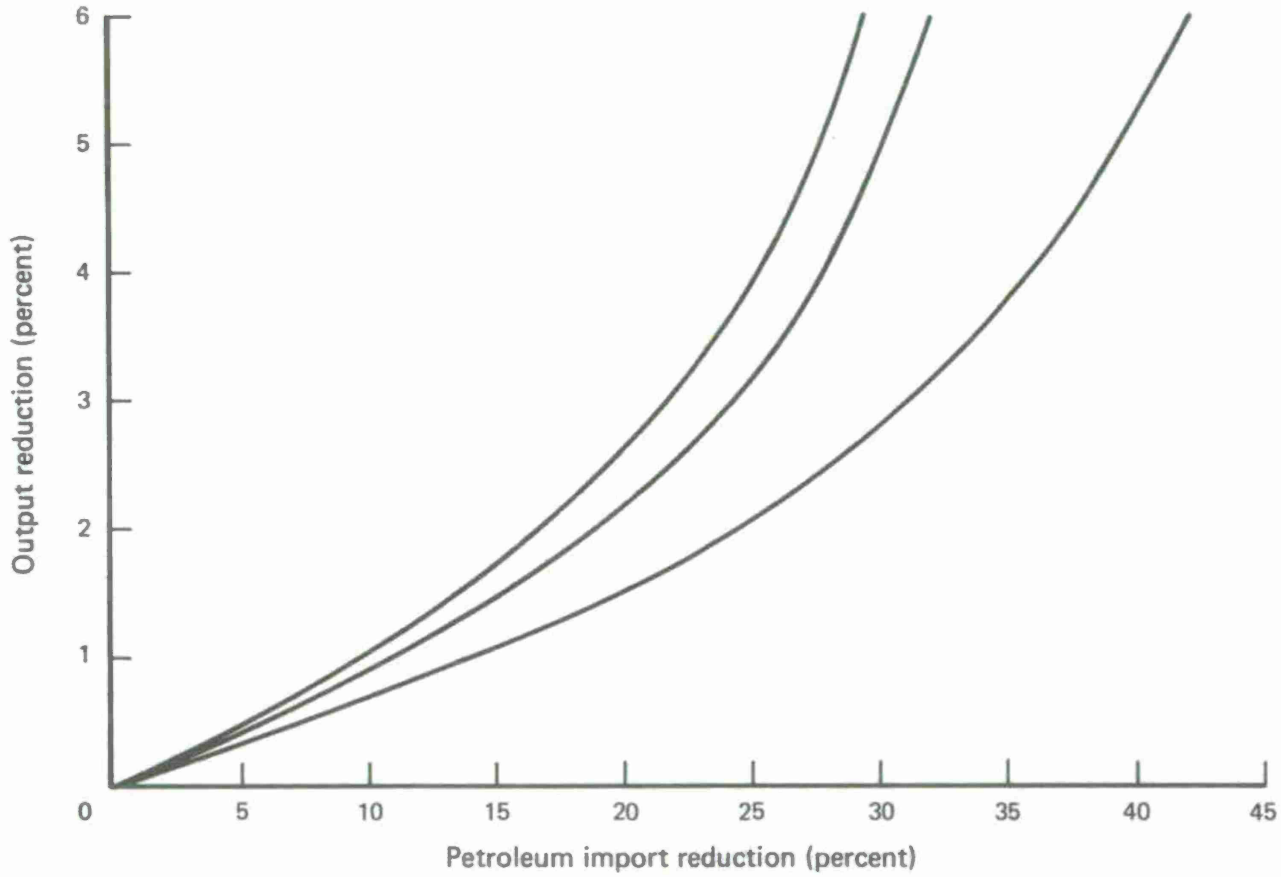

FIG. 12: THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS – 1985

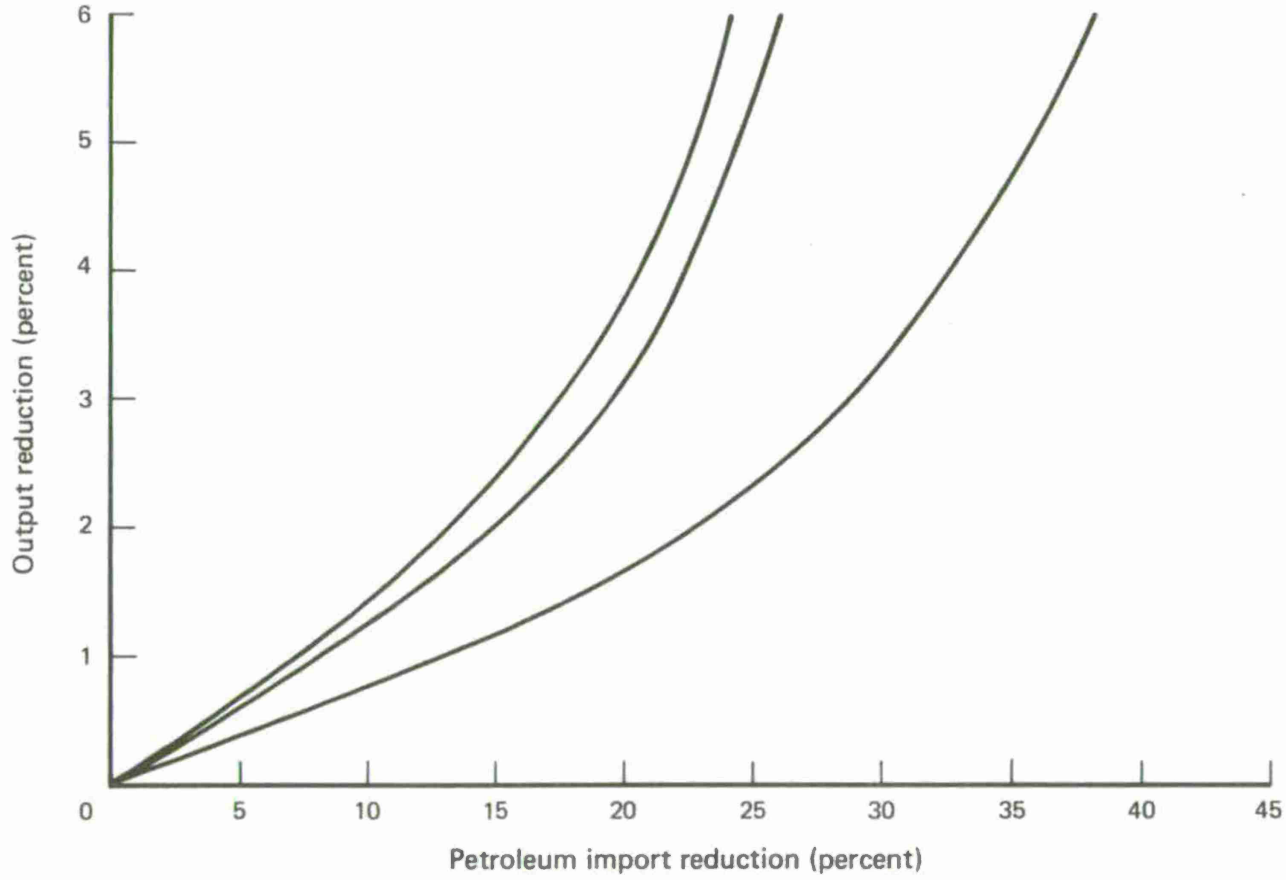

FIG. 13: THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS – 1990

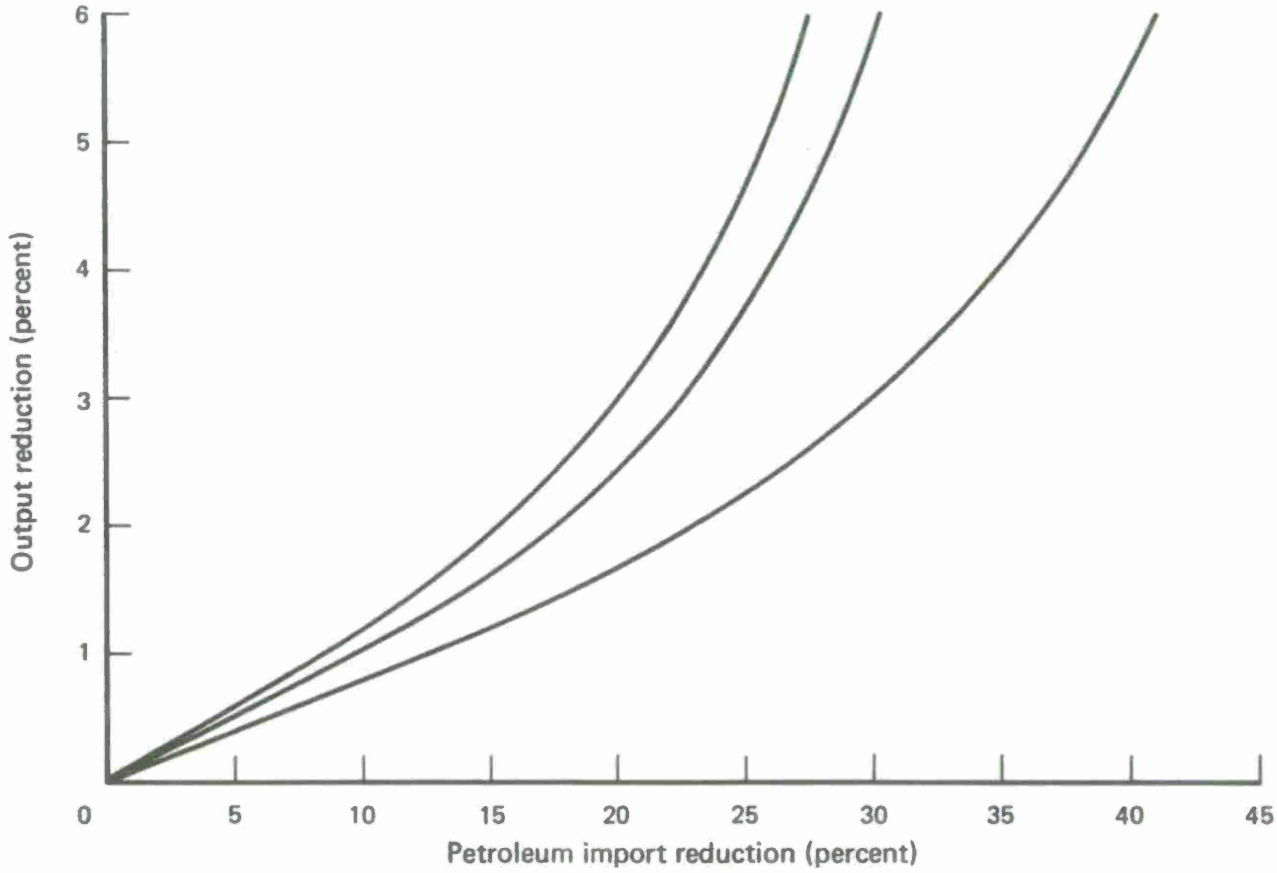

FIG. 14: THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS – 2000

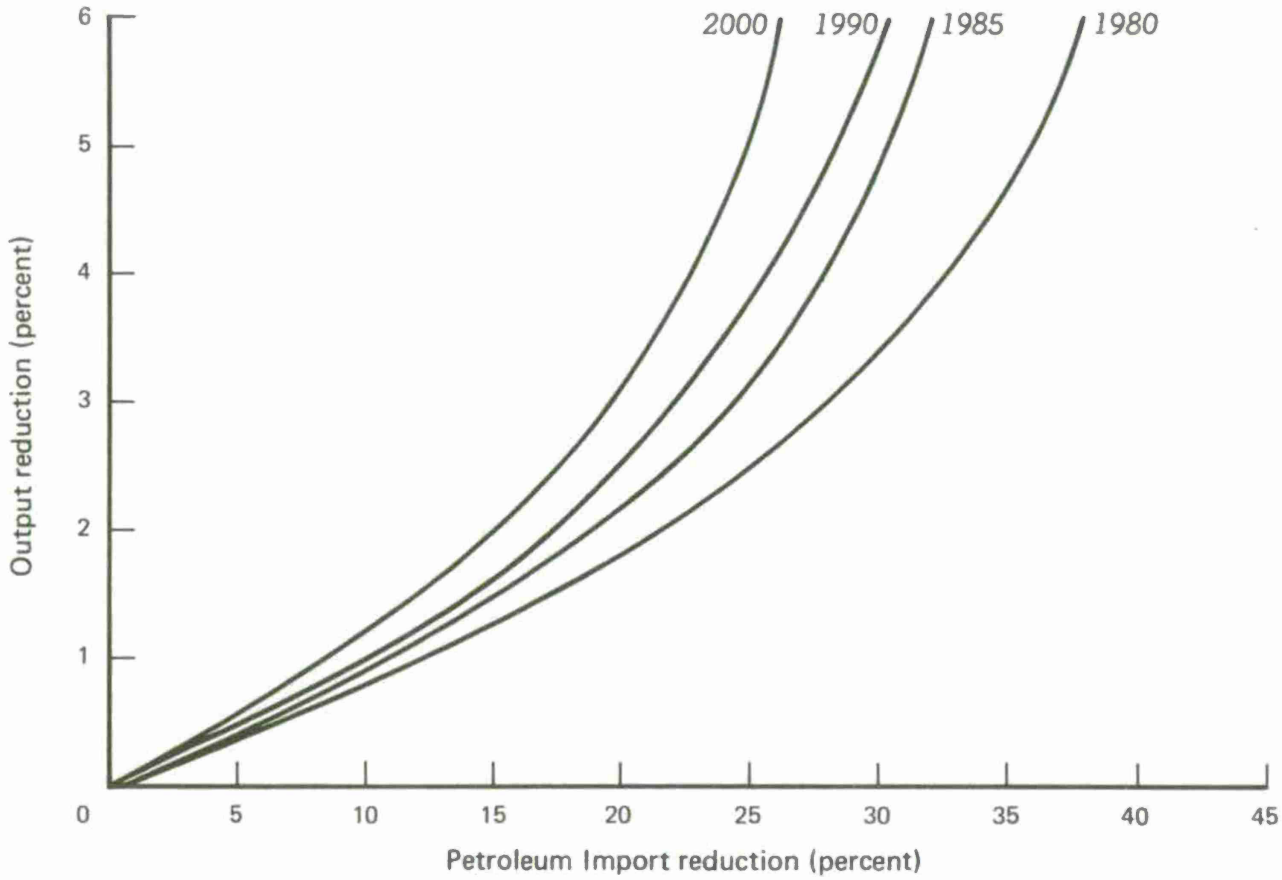

FIG. 15: THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS

The remainder of the paper will provide a perspective for analyzing the results of this section. The following section will project the origin of future U.S. oil imports, and the final section will draw some conclusions about the possible economic consequences of a future interruption in oil imports.

THE FUTURE SOURCES OF U.S. PETROLEUM IMPORTS

An important piece of information that should be used to temper any policy conclusions drawn from the preceding analysis is the future sources of U.S. petroleum imports. If our imports will emanate primarily from allies, or from many disbursed sources, we should feel more secure from the threat of an interruption in imports than if our imports will originate from concentrated or antagonistic sources. Similarly, sources that require shipments over long sea routes would be more vulnerable to attack during a military conflict at sea. The projections of this section will be made on the basis of current oil production and reserves, as well as the pattern of international oil shipments.

World Oil Production and Reserves

The past decade has seen a tremendous increase in oil production in both the Middle East and Africa. In the years from 1961 to 1971, Middle East oil production grew at an 11.1 percent average annual rate, and African output increased at a phenomenal 27.6 percent annual rate. In 1961, North American petroleum production of 9.1 million barrels per day was considerably larger than the Middle East output of 5.6 million barrels per day. By 1971, North American output was 14.3 million barrels per day, while the Middle East was producing 16.2 million barrels per day. Africa was producing 5.8 million barrels per day, making that continent a significant and growing contributor to world oil output. Table 24 shows some key figures in world petroleum output.

TABLE 24

OIL PRODUCTION
(Millions of barrels per day)

	1961	1971	Average annual increase (percent)
United States	8.2	11.2	3.1
Canada	.6	1.6	9.4
Mexico	.3	.5	4.6
Total North America	9.1	13.3	3.7
Caribbean	3.2	4.0	2.2
Middle East	5.6	16.3	11.1
Africa	.5	5.8	27.6
Southeast Asia	.5	1.1	8.1

Source: BP Statistical Review (reference 13).

An additional consideration when projecting the future pattern of world oil production is the stock of proved reserves held by producing nations. Table 25 indicates that over half of the reserves in the world are in the Middle East. Africa also has considerable reserves, however, and could emerge as a major source of United States imports in the next decade.

TABLE 25

PROVED OIL RESERVES, 1971*

	Billion barrels	Percent of total
United States	45.4	6.8
Canada	10.2	1.5
Caribbean	17.1	2.8
Other Western Hemisphere	14.5	2.3
Western Europe	14.8	2.3
Africa	58.9	8.9
Middle East	366.8	57.6
USSR, E. Europe and China	98.5	15.4
Other Eastern Hemisphere	15.6	2.4
World	641.8	100.0

*Proved Reserves are the volume of oil remaining in the ground which geological and engineering information indicates with reasonable certainty to be recoverable in the future from known reservoirs under existing economic and operating conditions.

Source: BP Statistical Review, (reference (13)).

The Caribbean, which provided well over half of our petroleum imports in 1971, is contributing a declining percentage of world oil output. Coupled with the fact that proven reserves in the Caribbean are scant when compared with Africa and the Middle East, Caribbean oil production will constitute a declining percent of world production in the future. We can still expect to import a large portion of our oil from the Western Hemisphere, however, because of large increases in Canadian production, and because of the lower shipping cost of Canadian and Caribbean oil. Also, new discoveries of oil reserves in Mexico will provide an additional source of oil imports in the Western Hemisphere.

The increased production of the past decade has supplied a world demand for oil that has grown at a far faster rate than the U.S. demand. Table 26 indicates that the growth rate of the U.S. consumption of petroleum has been far less than the world growth rate. This trend can be expected to continue as an increasing portion of the world becomes

more industrialized, and approaches the standard of living enjoyed in the West. Thus, although Africa and the Middle East will supply a growing percentage of world oil output, much of their increased output will be consumed by Europe, Japan, and developing nations, where the growth rate in the consumption of petroleum exceeds the growth rate in the United States.

TABLE 26

AVERAGE ANNUAL INCREASE IN PETROLEUM CONSUMPTION
1961-1971

	Percent
United States	4.1
Canada	5.8
Other Western Hemisphere	5.6
Western Europe	11.1
Japan	18.3
USSR, E. Europe, and China	8.8
World	7.8

Source: Reference (13).

International Oil Shipments

Table 27 summarizes the pattern of international oil shipments in 1971. Each entry of the table indicates how much oil was shipped from the country or area listed at the left of the entry to the country or area listed above. Thus, the sum of each vertical column contains the total imports of the area at the top of the column. Similarly, the sum of each horizontal row contains the total exports from the area at the left of the row. The origin of the imports of any area can be found by reading down the row of that area; the destination of exports can be found by reading across the column of the area. Total imports and exports, as well as consumption and production, are listed at the border of the table. Some re-exports are included in the figures, and inventory accumulation is counted as a part of consumption. Because of this system of accounting, production and imports are the only possible sources of petroleum, and exports and consumption are the only possible uses. Therefore, imports and production should equal exports and consumption for each area represented in the table.

Table 28 is derived from table 27 and indicates the origin of U.S. oil imports. Over 75 percent of U.S. imports were shipped from Canada and the Caribbean. Imports from the Middle East accounted for only 10 percent of our direct imports, although imports from other areas (such as Europe) include oil that was produced in the Middle East, shipped elsewhere for processing, and then re-exported to the United States.

TABLE 27

INTERNATIONAL OIL SHIPMENTS, 1971
(Thousands of barrels per day)

Exporter \ Importer	USA	Canada	Caribbean	Other Western Hemisphere	Western Europe	Middle East	Africa	S.E. Asia	Japan	Australasia	USSR, E. Europe, & Other East. Hem.	Total Exports	Total Production
USA	-	30	0	70	65	0	5	5	40	5	5	225	11,225
Canada	800	-	0	0	0	0	0	0	0	0	0	800	1,595
Caribbean	2,170	410	-	40	510	0	5	0	15	0	0	3,150	3,970
Other Western Hem.	30	0	0	-	0	0	0	0	0	0	0	30	1,135
Western Europe	145	25	0	85	-	0	45	0	10	0	25	335	440
Middle East	390	300	310	465	7,685	-	520	980	3,865	320	415	15,250	16,290
Africa	195	60	0	240	4,590	0	-	125	60	0	215	5,485	5,800
S.E. Asia	130	0	0	10	5	0	5	-	645	60	0	855	1,130
Japan	0	0	0	0	0	0	0	75	-	84	0	159	16
Australasia	0	0	0	0	0	0	0	0	104	-	95	199	434
USSR, E. Europe, Other Eastern Hem.	15	0	0	135	860	0	65	30	35	0	-	1,140	32,345
Total Imports	3,875	825	310	1,045	13,715	0	645	1,215	4,774	469	755		
Total Consumption*	14,875	1,620	1,130	2,150	13,820	1,040	960	1,490	4,631	704	31,960		

* Including inventory accumulation.

Sources: BP Statistical Review of the World Oil Industry
Petroleum Facts and Figures, (references (13 & 14))

TABLE 28

THE ORIGIN OF U.S. OIL IMPORTS, 1971

	Million barrels per day	Percent
Caribbean	2.2	55.9
Canada	.8	20.6
Middle East	.4	10.1
Africa	.2	5.0
Other	.3	8.4
Total	3.9	100.0

U.S. oil consumption has been growing at a much slower rate than world consumption over the past decade, but domestic production has failed to keep pace with consumption increases. Tables 21, 22, and 23 are the projections of petroleum imports made earlier in this analysis. These projections, along with the production and shipping data of this paper, will be used to project the origin of U.S. oil imports in the future.

The Future Sources of U.S. Petroleum Imports

The future sources of U.S. petroleum imports depend on a number of factors affecting the differential increases in production and consumption of petroleum throughout the world. Although the development of sources of petroleum cannot be perfectly foreseen, it is evident that African and Middle Eastern sources will constitute an increasing percentage of the world market, and probably of the U.S. market as well. Petroleum production in the Caribbean has been growing at a modest 2.2 percent annual rate for the past decade; and a smaller percentage of Caribbean oil will find its way to U.S. ports in the future, since consumption in the Western Hemisphere is growing at a faster rate than U.S. demand. Three scenarios will be developed to take account of some of the contingencies upon which the source of U.S. oil imports will depend. The first scenario will contain a high projection of imports from the Western Hemisphere, reducing Middle Eastern and African imports. The second scenario will provide the best estimates of imports, and the third scenario will project low Western Hemisphere and high Middle Eastern and African imports.

Canadian oil production has been increasing at a 9.4 percent annual rate recently, and Canadian consumption has been advancing at a 5.8 percent annual rate. Thus, although Canada has been producing only enough petroleum to supply her own demand, Canada's exports should be increasing in the future. On the basis of these historical figures, a low estimate of a 3.6 percent annual increase in imports to the U.S. is

easily justified. Canada's consumption increases have been large in the past, however, and will probably begin to approach the U.S. rate. This fact, combined with the recent emphasis on increased production, could increase Canadian imports by as much as 4.9 percent per year, but a more likely figure is 3.9 percent.

Caribbean production has been increasing at only 2.2 percent per year, as has already been noted. Despite the recent emphasis on increasing production, much of the new Caribbean production will be channeled into South American markets, where the consumption of oil is increasing at a faster rate than U.S. consumption. The optimistic figure for increases in imports from the Caribbean will be 2.2 percent. This paper will use 1 percent and no increase as the figures for scenarios 2 and 3.

Sources of imports other than Canada, the Caribbean, Africa, and the Middle East can be expected to increase their flow of imports by about 5 percent each year. Mexico and Southeast Asia are sources that are likely to provide much of the imports in this category. The 5 percent figure will be used in the "other" category in all cases. Because of the great amount of uncertainty in projecting the development of newly discovered sources of petroleum, it is difficult to put realistic bounds on the growth of imports from the "other" category. News of the recent Mexican oil discoveries came as this paper was being completed, and if our imports from Mexico increase sizeably, the estimate could be too low. However, it is too early to accurately foresee the magnitude of our future oil imports from Mexico.

Africa and the Middle East will supply the remainder of our imports. There has been such an increase in the growth of productive capacity in these areas, and they possess such a large volume of proven reserves, that they have the capability to produce the petroleum to meet the world demand with a minimum amount of new development. All scenarios assume that the Middle East will supply two-thirds of the remaining U.S. imports, while Africa supplies one-third. These are 1971 proportions, and assume that Africa's phenomenal growth rate in production during the last decade will subside.

Using the assumptions in this section, the origin of U.S. oil imports can be projected. Table 29 lists the best estimates of this paper for 1980, 1985, and 2000. Table 29 suggests that as the percent of U.S. petroleum that is imported increases, the percent of our imports originating from the Middle East will increase also. In 1980, slightly more than one-third of our imports are projected to originate in the Middle East; but by 2000, about half of our imports will emanate from the Middle Eastern nations.

TABLE 29

THE ORIGIN OF UNITED STATES IMPORTS, MILLION BBLS/DAY

	1980	1985	1990	2000
Caribbean	2.4	2.5	2.7	3.0
Canada	1.2	1.5	1.8	2.6
Middle East	3.2	4.9	6.7	11.3
Africa	1.6	2.5	3.4	5.6
Other	0.5	0.7	0.9	1.5
Total	9.0	12.1	15.5	23.9

Appendix B contains nine import projections for each year from 1975 to 2000 . High, best, and low estimates of imports refer to the total quantity of imports. Scenario 1 projects the high estimates of imports from the Western hemisphere; scenario 3 projects the high estimates of Middle Eastern imports. Scenario 2 is the best estimate of the origin of imports, given the quantity of imports. Therefore, the best estimate in scenario 2 represents the most likely estimate of the origin of oil imports in each year.

CONCLUSIONS

The main results of this analysis are contained in the tables composing appendixes A and B. Appendix A projects the economic impact of an interruption in petroleum imports during the years from 1975 to 2000. Appendix B projects the sources of those imports. This final section of the paper will analyze the data in those appendixes, drawing some conclusions and implications.

The first observation that should be made is that many of the variables used in the analysis are subject to deliberate manipulation by policy makers. The projections in this paper indicate the most likely course of events, based on current information; but projections such as the ones in this paper might provide new information to policy makers, causing new policy decisions which could affect the variables in this analysis. Still, the high and low estimates of this paper should provide realistic bounds for any but the most drastic energy policy revisions.

The most striking conclusion of this paper is that the vulnerability of the U.S. economy to an interruption in imports will be increasing over the next twenty-five years; and that at the same time, our reliance upon the Middle East as a source of imports will also be increasing. To those that believed our dependence on imports to be too great during the 1973-74 embargo, this study should serve as a warning that we will become more dependent on oil imports in the future. The high estimate of imports in this paper projects domestic supply to continue along its recent trend, but projects a slight decrease in the growth rate of consumption over its rate of the past ten years. Therefore, the high estimate is lower than a projection of current trends. The low estimate of this analysis projects a large decline in the growth rate of consumption, with a very large increase in the rate of growth in domestic production. This estimate projects a slight increase in our dependence on imported oil, but present energy and environmental policies would make those large increases in domestic production impossible to attain. The conclusion on this issue has to be: the United States will become increasingly dependent on foreign sources of oil.

In order to analyze the magnitude of this dependence, let us select 1980 as a year for examination. During 1980, we are projected to import about one-third of our imports from the Middle East, according to table B-6. Table A-6 suggests that an interruption of 34 percent of our imports would result in a reduction in GNP of between 3.2 and 7.2 percent, with the best estimate being 4.4 percent.[1] Thus, in the absence of altered shipping patterns,

[1] This does not imply that a total embargo by the Middle Ease would result in a one-third decrease in U.S. imports. In the 1973-74 embargo, the reduction in U.S. imports was greater than U.S. imports from the Middle East; partly because some re-exports were stopped, and partly because domestic price controls diverted other imports away from the U.S. to more lucrative markets. Because of the possibility of changing shipping patterns, the effect on particular consuming nations of a reduction in production by producing nations cannot be precisely predicted.

the cost of a total embargo of Middle Eastern imports for a year would be between $49 and $117 billion. This would represent a sizable impact on the economy. A common definition of a recession is a decline in GNP for two consecutive quarters. Since GNP was projected to increase at between 3.0 and 3.9 percent, the least damage that this interruption could do would put the economy on to the border of a recession. The high estimate of a 7.2 percent reduction in GNP would almost certainly send the unemployment rate above ten percent, and cause a severe recession. A reduction in GNP of about 30 percent would approach the severity of the Great Depression; a clearly unacceptable impact. In 1980, a depression-level impact would be felt after a 75 to 100 percent reduction in petroleum imports. By 1990, that level impact would occur due to a 65 to 96 percent oil import interruption; by 2000, the reduction would only have to be in the 57 to 91 percent range. The highest estimate of table B-26 suggests that in the year 2000, this impact could be felt by an interruption solely of Middle Eastern imports. Similarly, the threshold beyond which the economy would suffer a recession is projected to decline each year. That figure is a 31 percent reduction in imports in 1980; a 21 percent reduction in 2000.

The military implication of this analysis is that the optimum level of protection for the sea lanes over which we import our oil will increase over the next twenty-five years. Our economic dependence on imports will be increasing; and our imports will increasingly be originating from Middle Eastern and African sources, rather than from nearby Canada and the Caribbean. Since oil imports will be travelling over longer and more exposed sea lanes, they will require a greater amount of protection during a conflict-at-sea. During any type of prolonged military engagement, an important task for the Navy would be insuring the security of our petroleum imports.

The primary message of this paper is that the dependence of the United States on foreign sources of oil will increase. Preliminary studies by the Federal Energy Administration indicate that the capital requirements to further "Project Independence" will be tremendous; but it is important to know the costs of dependence, in order to evaluate the proper trade-offs, and formulate an intelligent energy policy. This study, designed to estimate the cost of a future interruption in oil imports, should therefore provide an important decision-making tool for assessing the best course of the future United States energy policy.

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APPENDIX A

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS

TABLE A-1

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1975

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	2.4	0.2	2.3	0.2	2.1
4	0.4	4.8	0.3	4.6	0.3	4.2
6	0.5	6.3	0.5	6.1	0.4	5.8
8	0.6	8.2	0.6	7.9	0.5	7.1
10	0.8	10.6	0.8	10.2	0.7	9.2
12	1.0	13.0	0.9	12.5	0.9	11.4
14	1.1	15.4	1.1	14.8	1.0	13.5
16	1.3	17.8	1.3	17.1	1.2	15.6
18	1.5	20.2	1.5	19.4	1.3	17.7
20	1.7	22.6	1.6	21.7	1.5	19.8
22	1.9	24.9	1.8	24.0	1.7	21.9
24	2.1	28.3	2.0	26.8	1.8	24.0
26	2.4	31.9	2.3	30.2	2.0	26.6
28	2.7	36.8	2.5	33.8	2.2	29.8
30	3.2	42.2	3.0	39.6	2.5	33.0
32	3.5	47.4	3.3	44.3	2.9	38.1
34	4.0	53.6	3.7	49.8	3.2	42.7
36	4.5	60.9	4.2	56.2	3.6	47.3
38	5.3	70.4	4.8	64.1	4.0	52.8
40	6.1	82.2	5.5	74.0	4.5	59.1
42	7.0	94.2	6.4	85.5	5.1	67.4
44	7.9	106.1	7.3	97.0	5.8	77.2
46	8.8	118.1	8.1	108.5	6.6	87.7
48	9.7	130.0	9.0	120.0	7.4	98.3
50	10.6	142.0	9.8	131.5	8.2	108.9
52	11.5	153.9	10.7	143.1	9.0	119.4
54	12.4	165.9	11.6	154.6	9.8	130.0
56	13.3	177.8	12.4	166.1	10.6	140.6
58	14.2	189.8	13.3	177.6	11.4	151.2
60	15.1	201.7	14.2	189.1	12.2	161.7
62	16.0	213.7	15.0	200.6	13.0	172.3
64	16.8	225.6	15.9	212.1	13.8	182.9
66	17.7	237.6	16.7	223.6	14.6	193.4
68	18.6	249.5	17.6	235.2	15.4	204.0
70	19.5	261.4	18.5	246.7	16.2	214.6
72	20.4	273.4	19.3	258.2	17.0	225.1
74	21.3	285.3	20.2	269.7	17.8	235.7
76	22.2	297.3	21.1	281.2	18.5	246.3
78	23.1	309.2	21.9	292.7	19.3	256.8
80	24.0	321.2	22.8	304.2	20.1	267.4
82	24.9	333.1	23.6	315.7	20.9	278.0
84	25.8	345.1	24.5	327.3	21.7	288.6
86	26.7	357.0	25.4	338.8	22.5	299.1
88	27.5	369.0	26.2	350.3	23.3	309.7
90	28.4	380.9	27.1	361.8	24.1	320.3
92	29.3	392.9	28.0	373.3	24.9	330.8
94	30.2	404.8	28.8	384.8	25.7	341.4
96	31.1	416.8	29.7	396.3	26.5	352.0
98	32.0	428.7	30.5	407.8	27.3	362.5
100	32.9	440.7	31.4	419.3	28.1	373.1

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-2

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1976

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	2.6	0.2	2.4	0.2	2.2
4	0.4	5.2	0.4	4.9	0.3	4.3
6	0.5	6.7	0.5	6.4	0.4	6.0
8	0.7	9.1	0.6	8.3	0.5	7.3
10	0.8	11.7	0.8	10.8	0.7	9.5
12	1.0	14.3	1.0	13.2	0.9	11.7
14	1.2	17.0	1.1	15.6	1.0	13.8
16	1.4	19.6	1.3	18.1	1.2	16.0
18	1.6	22.2	1.5	20.5	1.3	18.2
20	1.8	24.8	1.7	22.9	1.5	20.3
22	2.0	28.0	1.8	25.3	1.6	22.5
24	2.3	31.9	2.1	28.5	1.8	24.7
26	2.6	36.5	2.3	32.2	2.0	27.3
28	3.1	42.8	2.6	36.6	2.2	30.6
30	3.5	48.2	3.1	42.4	2.5	33.8
32	3.9	54.9	3.4	47.4	2.9	39.0
34	4.5	62.8	3.9	53.4	3.2	43.8
36	5.3	73.3	4.4	60.6	3.5	48.5
38	6.2	86.3	5.0	69.8	4.0	54.0
40	7.1	99.4	5.9	81.1	4.4	60.6
42	8.1	112.5	6.7	93.2	5.0	68.9
44	9.0	125.6	7.6	105.4	5.8	78.9
46	10.0	138.7	8.5	117.5	6.6	89.7
48	10.9	151.8	9.4	129.7	7.4	100.6
50	11.8	164.9	10.3	141.8	8.2	111.5
52	12.8	178.0	11.1	154.0	8.9	122.3
54	13.7	191.1	12.0	166.1	9.7	133.2
56	14.7	204.2	12.9	178.3	10.5	144.0
58	15.6	217.3	13.8	190.4	11.3	154.9
60	16.6	230.5	14.6	202.6	12.1	165.8
62	17.5	243.6	15.5	214.7	12.9	176.6
64	18.4	256.7	16.4	226.9	13.7	187.5
66	19.4	269.8	17.3	239.0	14.5	198.3
68	20.3	282.9	18.2	251.1	15.3	209.2
70	21.3	296.0	19.0	263.3	16.1	220.0
72	22.2	309.1	19.9	275.4	16.9	230.9
74	23.2	322.2	20.8	287.6	17.7	241.8
76	24.1	335.3	21.7	299.7	18.5	252.6
78	25.0	348.4	22.5	311.9	19.3	263.5
80	26.0	361.5	23.4	324.0	20.1	274.3
82	26.9	374.6	24.3	336.2	20.9	285.2
84	27.9	387.8	25.2	348.3	21.6	296.1
86	28.8	400.9	26.1	360.5	22.4	306.9
88	29.7	414.0	26.9	372.6	23.2	317.8
90	30.7	427.1	27.8	384.8	24.0	328.6
92	31.6	440.2	28.7	396.9	24.8	339.5
94	32.6	453.3	29.6	409.1	25.6	350.4
96	33.5	466.4	30.4	421.2	26.4	361.2
98	34.5	479.5	31.3	433.4	27.2	372.1
100	35.4	492.6	32.2	445.5	28.0	382.9

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-3

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1977

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	2.9	0.2	2.6	0.2	2.2
4	0.4	5.7	0.4	5.1	0.3	4.5
6	0.5	7.2	0.5	6.7	0.4	6.2
8	0.7	10.0	0.6	8.8	0.5	7.5
10	0.9	12.8	0.8	11.4	0.7	9.7
12	1.1	15.7	1.0	13.9	0.9	12.0
14	1.3	18.6	1.1	16.5	1.0	14.2
16	1.5	21.4	1.3	19.0	1.2	16.4
18	1.7	24.3	1.5	21.6	1.3	18.7
20	1.9	27.1	1.7	24.1	1.5	20.9
22	2.2	31.2	1.9	26.7	1.6	23.1
24	2.5	35.5	2.1	30.3	1.8	25.4
26	2.9	42.2	2.4	34.1	2.0	28.0
28	3.3	48.2	2.7	39.3	2.2	31.4
30	3.8	55.1	3.2	45.2	2.5	34.7
32	4.4	63.4	3.5	50.7	2.8	39.9
34	5.1	74.3	4.0	57.3	3.2	44.9
36	6.1	88.0	4.5	65.1	3.5	49.7
38	7.1	102.3	5.3	75.4	3.9	55.3
40	8.1	116.5	6.1	88.0	4.4	62.0
42	9.0	130.8	7.0	100.8	5.0	70.5
44	10.0	145.1	7.9	113.6	5.7	80.6
46	11.0	159.4	8.8	126.4	6.5	91.8
48	12.0	173.7	9.7	139.2	7.3	102.9
50	13.0	188.0	10.6	151.9	8.1	114.1
52	14.0	202.3	11.5	164.7	8.9	125.3
54	15.0	216.5	12.4	177.5	9.7	136.4
56	16.0	230.8	13.3	190.3	10.5	147.6
58	17.0	245.1	14.2	203.1	11.3	158.7
60	17.9	259.4	15.1	215.9	12.1	169.9
62	18.9	273.7	16.0	228.7	12.9	181.0
64	19.9	288.0	16.8	241.4	13.6	192.2
66	20.9	302.2	17.7	254.2	14.4	203.4
68	21.9	316.5	18.6	267.0	15.2	214.5
70	22.9	330.8	19.5	279.8	16.0	225.7
72	23.9	345.1	20.4	292.6	16.8	236.8
74	24.9	359.4	21.3	305.4	17.6	248.0
76	25.8	373.7	22.2	318.2	18.4	259.1
78	26.8	388.0	23.1	330.9	19.2	270.3
80	27.8	402.2	24.0	343.7	20.0	281.4
82	28.8	416.5	24.9	356.5	20.8	292.6
84	29.8	430.8	25.8	369.3	21.6	303.8
86	30.8	445.1	26.7	382.1	22.4	314.9
88	31.8	459.4	27.5	394.9	23.1	326.1
90	32.8	473.7	28.4	407.7	23.9	337.2
92	33.7	488.0	29.3	420.4	24.7	348.4
94	34.7	502.2	30.2	433.2	25.5	359.5
96	35.7	516.5	31.1	446.0	26.3	370.7
98	36.7	530.8	32.0	458.8	27.1	381.9
100	37.7	545.1	32.9	471.6	27.9	393.0

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-4

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1978

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	3.1	0.2	2.7	0.2	2.3
4	0.4	6.1	0.4	5.4	0.3	4.6
6	0.5	7.8	0.5	7.0	0.4	6.3
8	0.7	10.9	0.6	9.3	0.5	7.7
10	0.9	14.0	0.8	12.0	0.7	10.0
12	1.1	17.1	1.0	14.7	0.8	12.3
14	1.3	20.2	1.2	17.4	1.0	14.6
16	1.6	23.3	1.3	20.0	1.2	16.9
18	1.8	26.4	1.5	22.7	1.3	19.2
20	2.0	30.0	1.7	25.4	1.5	21.5
22	2.3	34.6	1.9	28.1	1.6	23.8
24	2.7	40.4	2.2	32.1	1.8	26.1
26	3.2	47.6	2.4	36.1	2.0	28.7
28	3.6	54.4	2.8	42.2	2.2	32.2
30	4.2	62.9	3.2	48.1	2.5	35.6
32	4.9	73.8	3.6	54.2	2.8	40.9
34	5.8	87.8	4.1	61.5	3.2	46.0
36	6.9	103.3	4.7	70.5	3.5	50.9
38	7.9	118.8	5.5	81.9	3.9	56.7
40	8.9	134.3	6.4	95.3	4.4	63.5
42	10.0	149.8	7.3	108.8	5.0	72.1
44	11.0	165.3	8.2	122.2	5.7	82.4
46	12.0	180.8	9.1	135.7	6.5	93.9
48	13.1	196.3	10.0	149.2	7.3	105.3
50	14.1	211.8	10.9	162.6	8.1	116.8
52	15.1	227.3	11.9	176.1	8.8	128.3
54	16.2	242.8	12.8	189.5	9.6	139.7
56	17.2	258.3	13.7	203.0	10.4	151.2
58	18.2	273.8	14.6	216.4	11.2	162.6
60	19.3	289.3	15.5	229.9	12.0	174.1
62	20.3	304.8	16.4	243.3	12.8	185.6
64	21.3	320.3	17.3	256.8	13.6	197.0
66	22.4	335.8	18.2	270.2	14.4	208.5
68	23.4	351.4	19.1	283.7	15.2	220.0
70	24.4	366.9	20.0	297.1	15.9	231.4
72	25.5	382.4	20.9	310.6	16.7	242.9
74	26.5	397.9	21.8	324.1	17.5	254.3
76	27.5	413.4	22.7	337.5	18.3	265.8
78	28.5	428.9	23.6	351.0	19.1	277.3
80	29.6	444.4	24.5	364.4	19.9	288.7
82	30.6	459.9	25.4	377.9	20.7	300.2
84	31.6	475.4	26.4	391.3	21.5	311.7
86	32.7	490.9	27.3	404.8	22.3	323.1
88	33.7	506.4	28.2	418.2	23.1	334.6
90	34.7	521.9	29.1	431.7	23.9	346.0
92	35.8	537.4	30.0	445.1	24.6	357.5
94	36.8	552.9	30.9	458.6	25.4	369.0
96	37.8	568.4	31.8	472.1	26.2	380.4
98	38.9	583.9	32.7	485.5	27.0	391.9
100	39.9	599.4	33.6	499.0	27.8	403.3

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-5

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1979

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	3.4	0.2	2.8	0.2	2.4
4	0.4	6.5	0.4	5.7	0.3	4.7
6	0.5	8.5	0.5	7.3	0.4	6.5
8	0.8	11.9	0.6	9.8	0.5	8.0
10	1.0	15.2	0.8	12.6	0.7	10.3
12	1.2	18.6	1.0	15.4	0.8	12.7
14	1.4	21.9	1.2	18.3	1.0	15.0
16	1.6	25.3	1.4	21.1	1.2	17.4
18	1.8	28.6	1.6	23.9	1.3	19.8
20	2.1	33.1	1.7	26.8	1.5	22.1
22	2.4	38.2	1.9	29.8	1.6	24.5
24	2.9	46.0	2.2	34.0	1.8	26.8
26	3.4	52.8	2.5	38.3	2.0	29.6
28	3.9	61.2	2.9	45.2	2.2	33.1
30	4.6	71.6	3.3	51.1	2.5	36.7
32	5.5	85.6	3.8	57.8	2.8	42.1
34	6.6	102.4	4.3	65.9	3.2	47.4
36	7.6	119.1	4.9	76.1	3.5	52.5
38	8.7	135.9	5.8	88.9	3.9	58.4
40	9.8	152.7	6.7	103.1	4.4	65.5
42	10.9	169.4	7.6	117.2	5.0	74.3
44	11.9	186.2	8.5	131.4	5.7	84.9
46	13.0	202.9	9.5	145.5	6.5	96.7
48	14.1	219.7	10.4	159.7	7.3	108.5
50	15.2	236.5	11.3	173.8	8.1	120.3
52	16.2	253.2	12.2	188.0	8.8	132.1
54	17.3	270.0	13.1	202.2	9.6	143.9
56	18.4	286.8	14.1	216.3	10.4	155.7
58	19.4	303.5	15.0	230.5	11.2	167.5
60	20.5	320.3	15.9	244.6	12.0	179.3
62	21.6	337.1	16.8	258.8	12.8	191.1
64	22.7	353.8	17.7	272.9	13.6	202.9
66	23.7	370.6	18.7	287.1	14.4	214.7
68	24.8	387.3	19.6	301.2	15.2	226.6
70	25.9	404.1	20.5	315.4	15.9	238.4
72	27.0	420.9	21.4	329.5	16.7	250.2
74	28.0	437.6	22.3	343.7	17.5	262.0
76	29.1	454.4	23.3	357.8	18.3	273.8
78	30.2	471.2	24.2	372.0	19.1	285.6
80	31.3	487.9	25.1	386.2	19.9	297.4
82	32.3	504.7	26.0	400.3	20.7	309.2
84	33.4	521.5	26.9	414.5	21.5	321.0
86	34.5	538.2	27.9	428.6	22.3	332.8
88	35.6	555.0	28.8	442.8	23.1	344.6
90	36.6	571.7	29.7	456.9	23.8	356.4
92	37.7	588.5	30.6	471.1	24.6	368.2
94	38.8	605.3	31.5	485.2	25.4	380.0
96	39.9	622.0	32.5	499.4	26.2	391.8
98	40.9	638.8	33.4	513.5	27.0	403.6
100	42.0	655.6	34.3	527.7	27.8	415.4

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-6

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1980

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	3.6	0.2	3.0	0.2	2.4
4	0.4	6.9	0.4	6.0	0.3	4.9
6	0.6	9.2	0.5	7.7	0.4	6.7
8	0.8	12.8	0.6	10.3	0.5	8.2
10	1.0	16.4	0.8	13.3	0.7	10.6
12	1.2	20.1	1.0	16.3	0.8	13.0
14	1.5	23.7	1.2	19.3	1.0	15.4
16	1.7	27.3	1.4	22.3	1.2	17.9
18	1.9	30.9	1.6	25.3	1.3	20.3
20	2.2	36.4	1.8	28.2	1.5	22.7
22	2.6	42.6	2.0	31.7	1.6	25.1
24	3.1	51.0	2.3	36.2	1.8	27.6
26	3.6	59.0	2.6	41.2	2.0	30.4
28	4.3	69.0	3.0	48.5	2.2	34.0
30	5.1	82.2	3.4	54.5	2.4	37.7
32	6.1	99.3	3.9	62.0	2.8	43.2
34	7.2	117.4	4.4	70.9	3.2	48.6
36	8.4	135.4	5.2	82.5	3.5	53.8
38	9.5	153.5	6.1	97.0	3.9	59.8
40	10.6	171.6	7.0	111.9	4.4	67.0
42	11.7	189.6	8.0	126.8	4.9	76.0
44	12.8	207.7	8.9	141.7	5.6	86.8
46	13.9	225.8	9.8	156.6	6.4	98.9
48	15.0	243.8	10.8	171.6	7.2	111.0
50	16.1	261.9	11.7	186.5	8.0	123.1
52	17.3	280.0	12.6	201.4	8.8	135.3
54	18.4	298.0	13.6	216.3	9.6	147.4
56	19.5	316.1	14.5	231.2	10.4	159.5
58	20.6	334.2	15.4	246.2	11.2	171.7
60	21.7	352.2	16.4	261.1	11.9	183.8
62	22.8	370.3	17.3	276.0	12.7	195.9
64	23.9	388.4	18.3	290.9	13.5	208.0
66	25.1	406.4	19.2	305.8	14.3	220.2
68	26.2	424.5	20.1	320.7	15.1	232.3
70	27.3	442.6	21.1	335.7	15.9	244.4
72	28.4	460.6	22.0	350.6	16.7	256.6
74	29.5	478.7	22.9	365.5	17.5	268.7
76	30.6	496.8	23.9	380.4	18.2	280.8
78	31.7	514.8	24.8	395.3	19.0	293.0
80	32.9	532.9	25.7	410.3	19.8	305.1
82	34.0	551.0	26.7	425.2	20.6	317.2
84	35.1	569.0	27.6	440.1	21.4	329.3
86	36.2	587.1	28.5	455.0	22.2	341.5
88	37.3	605.2	29.5	469.9	23.0	353.6
90	38.4	623.2	30.4	484.8	23.8	365.7
92	39.5	641.3	31.4	499.8	24.5	377.9
94	40.7	659.4	32.3	514.7	25.3	390.0
96	41.8	677.4	33.2	529.6	26.1	402.1
98	42.9	695.5	34.2	544.5	26.9	414.2
100	44.0	713.6	35.1	559.4	27.7	426.4

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-7

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1981

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	3.8	0.2	3.2	0.2	2.5
4	0.4	7.2	0.4	6.4	0.3	5.1
6	0.6	9.8	0.5	8.1	0.4	7.0
8	0.8	13.6	0.7	11.1	0.5	8.6
10	1.0	17.4	0.9	14.3	0.7	11.1
12	1.3	21.2	1.1	17.5	0.9	13.6
14	1.5	25.0	1.2	20.6	1.0	16.2
16	1.7	28.8	1.4	23.8	1.2	18.7
18	2.0	33.0	1.6	27.0	1.3	21.2
20	2.3	38.7	1.8	30.2	1.5	23.8
22	2.7	45.9	2.1	34.4	1.7	26.3
24	3.2	54.5	2.4	39.1	1.8	28.9
26	3.8	63.3	2.8	45.7	2.0	32.0
28	4.4	74.3	3.2	52.8	2.3	35.8
30	5.3	89.0	3.6	59.9	2.5	39.6
32	6.4	108.0	4.2	68.6	2.9	46.0
34	7.5	127.1	4.8	79.4	3.2	51.4
36	8.7	146.2	5.7	93.3	3.6	57.1
38	9.8	165.3	6.6	109.2	4.0	63.7
40	10.9	184.3	7.6	125.2	4.5	71.3
42	12.1	203.4	8.5	141.1	5.1	81.5
44	13.2	222.5	9.5	157.0	5.9	93.5
46	14.3	241.6	10.5	172.9	6.7	106.2
48	15.5	260.6	11.4	188.8	7.5	118.9
50	16.6	279.7	12.4	204.8	8.3	131.6
52	17.7	298.8	13.4	220.7	9.1	144.3
54	18.9	317.9	14.3	236.6	9.9	157.0
56	20.0	336.9	15.3	252.5	10.7	169.6
58	21.1	356.0	16.3	268.4	11.5	182.3
60	22.3	375.1	17.2	284.3	12.3	195.0
62	23.4	394.2	18.2	300.3	13.1	207.7
64	24.5	413.2	19.1	316.2	13.9	220.4
66	25.7	432.3	20.1	332.1	14.7	233.1
68	26.8	451.4	21.1	348.0	15.5	245.7
70	27.9	470.4	22.0	363.9	16.3	258.4
72	29.1	489.5	23.0	379.8	17.1	271.1
74	30.2	508.6	24.0	395.8	17.9	283.8
76	31.3	527.7	24.9	411.7	18.7	296.5
78	32.4	546.7	25.9	427.6	19.5	309.2
80	33.6	565.8	26.9	443.5	20.3	321.8
82	34.7	584.9	27.8	459.4	21.1	334.5
84	35.8	604.0	28.8	475.4	21.9	347.2
86	37.0	623.0	29.8	491.3	22.7	359.9
88	38.1	642.1	30.7	507.2	23.5	372.6
90	39.2	661.2	31.7	523.1	24.3	385.3
92	40.4	680.3	32.6	539.0	25.1	397.9
94	41.5	699.3	33.6	554.9	25.9	410.6
96	42.6	718.4	34.6	570.9	26.7	423.3
98	43.8	737.5	35.5	586.8	27.5	436.0
100	44.9	756.6	36.5	602.7	28.3	448.7

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-8

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1982

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	4.0	0.2	3.4	0.2	2.7
4	0.4	7.5	0.4	6.8	0.3	5.3
6	0.6	10.3	0.5	8.5	0.4	7.2
8	0.8	14.3	0.7	11.9	0.5	9.0
10	1.0	18.3	0.9	15.3	0.7	11.6
12	1.3	22.4	1.1	18.7	0.9	14.3
14	1.5	26.4	1.3	22.0	1.0	16.9
16	1.7	30.4	1.5	25.4	1.2	19.6
18	2.0	35.0	1.7	28.8	1.4	22.2
20	2.3	41.0	1.9	32.2	1.5	24.9
22	2.8	49.3	2.2	37.2	1.7	27.5
24	3.3	58.0	2.5	42.3	1.8	30.2
26	3.9	67.6	2.9	50.4	2.1	33.8
28	4.6	79.8	3.4	57.4	2.3	37.7
30	5.5	96.6	3.8	65.7	2.6	42.3
32	6.7	116.7	4.4	75.7	3.0	48.9
34	7.8	136.8	5.2	88.8	3.3	54.2
36	9.0	156.9	6.2	105.3	3.7	60.6
38	10.1	177.0	7.1	122.3	4.2	67.9
40	11.3	197.1	8.1	139.2	4.7	76.6
42	12.4	217.2	9.1	156.2	5.4	87.4
44	13.6	237.3	10.1	173.2	6.2	100.7
46	14.7	257.4	11.1	190.2	7.0	113.9
48	15.9	277.5	12.1	207.1	7.8	127.2
50	17.0	297.6	13.1	224.1	8.6	140.4
52	18.1	317.7	14.1	241.1	9.4	153.7
54	19.3	337.8	15.1	258.0	10.2	167.0
56	20.4	357.9	16.1	275.0	11.0	180.2
58	21.6	378.0	17.1	292.0	11.8	193.5
60	22.7	398.1	18.1	308.9	12.7	206.7
62	23.9	418.2	19.1	325.9	13.5	220.0
64	25.0	438.3	20.0	342.9	14.3	233.3
66	26.2	458.4	21.0	359.9	15.1	246.5
68	27.3	478.5	22.0	376.8	15.9	259.8
70	28.5	498.6	23.0	393.8	16.7	273.0
72	29.6	518.7	24.0	410.8	17.5	286.3
74	30.8	538.8	25.0	427.7	18.3	299.6
76	31.9	558.9	26.0	444.7	19.2	312.8
78	33.1	579.0	27.0	461.7	20.0	326.1
80	34.2	599.1	28.0	478.6	20.8	339.3
82	35.4	619.2	29.0	495.6	21.6	352.6
84	36.5	639.3	30.0	512.6	22.4	365.9
86	37.7	659.4	31.0	529.6	23.2	379.1
88	38.8	679.5	31.9	546.5	24.0	392.4
90	40.0	699.6	32.9	563.5	24.8	405.6
92	41.1	719.7	33.9	580.5	25.7	418.9
94	42.3	739.8	34.9	597.4	26.5	432.2
96	43.4	759.9	35.9	614.4	27.3	445.4
98	44.6	780.0	36.9	631.4	28.1	458.7
100	45.7	800.1	37.9	648.3	28.9	471.9

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-9

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1983

PERCENT IMPORT REDUCTION	HIGH		REST		LOW	
	1	2	1	2	1	2
2	0.2	4.2	0.2	3.6	0.2	2.8
4	0.4	7.9	0.4	7.2	0.3	5.5
6	0.6	10.9	0.5	9.1	0.4	7.5
8	0.8	15.1	0.7	12.7	0.6	9.4
10	1.1	19.4	0.9	16.3	0.7	12.1
12	1.3	23.6	1.1	19.9	0.9	14.9
14	1.5	27.9	1.3	23.5	1.1	17.7
16	1.8	32.1	1.5	27.1	1.2	20.4
18	2.0	37.3	1.7	30.7	1.4	23.2
20	2.4	43.6	2.0	34.6	1.5	26.0
22	2.9	53.0	2.3	40.0	1.7	28.7
24	3.4	61.8	2.6	46.2	1.9	31.5
26	4.0	72.7	3.1	54.8	2.1	35.4
28	4.8	86.6	3.5	62.5	2.4	39.6
30	5.8	105.3	4.1	72.0	2.7	44.8
32	7.0	126.5	4.7	83.8	3.1	51.5
34	8.1	147.7	5.6	99.4	3.4	57.0
36	9.3	168.9	6.6	117.4	3.8	63.9
38	10.5	190.2	7.6	135.4	4.3	71.8
40	11.6	211.4	8.7	153.5	4.9	81.6
42	12.8	232.6	9.7	171.5	5.6	93.6
44	14.0	253.8	10.7	189.6	6.4	107.4
46	15.1	275.0	11.7	207.6	7.2	121.2
48	16.3	296.2	12.7	225.6	8.0	135.0
50	17.4	317.4	13.8	243.7	8.8	148.9
52	18.6	338.6	14.8	261.7	9.7	162.7
54	19.8	359.8	15.8	279.8	10.5	176.5
56	20.9	381.0	16.8	297.9	11.3	190.3
58	22.1	402.2	17.8	315.9	12.1	204.2
60	23.3	423.5	18.8	333.9	13.0	218.0
62	24.4	444.7	19.9	351.9	13.8	231.8
64	25.6	465.9	20.9	370.0	14.6	245.6
66	26.8	487.1	21.9	388.0	15.4	259.5
68	27.9	508.3	22.9	406.1	16.2	273.3
70	29.1	529.5	23.9	424.1	17.1	287.1
72	30.3	550.7	24.9	442.1	17.9	300.9
74	31.4	571.9	26.0	460.2	18.7	314.8
76	32.6	593.1	27.0	478.2	19.5	328.6
78	33.8	614.3	28.0	496.3	20.4	342.4
80	34.9	635.5	29.0	514.3	21.2	356.2
82	36.1	656.8	30.0	532.3	22.0	370.1
84	37.3	678.0	31.1	550.4	22.8	383.9
86	38.4	699.2	32.1	568.4	23.6	397.7
88	39.6	720.4	33.1	586.5	24.5	411.5
90	40.8	741.6	34.1	604.5	25.3	425.4
92	41.9	762.8	35.1	622.6	26.1	439.2
94	43.1	784.0	36.1	640.6	26.9	453.0
96	44.3	805.2	37.2	658.6	27.8	466.9
98	45.4	826.4	38.2	676.7	28.6	480.7
100	46.6	847.6	39.2	694.7	29.4	494.5

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-10

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1984

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	4.5	0.2	3.8	0.2	2.9
4	0.4	8.2	0.4	7.5	0.3	5.8
6	0.6	11.5	0.5	9.7	0.5	7.8
8	0.8	16.0	0.7	13.5	0.6	9.8
10	1.1	20.4	0.9	17.3	0.7	12.7
12	1.3	24.9	1.2	21.2	0.9	15.6
14	1.6	29.4	1.4	25.0	1.1	18.5
16	1.8	33.9	1.6	28.8	1.2	21.4
18	2.1	39.5	1.8	32.7	1.4	24.3
20	2.4	46.2	2.0	37.3	1.6	27.2
22	3.0	56.7	2.3	43.1	1.7	30.1
24	3.5	66.0	2.8	50.7	1.9	33.0
26	4.1	77.9	3.2	59.3	2.2	37.3
28	4.9	93.3	3.7	68.1	2.4	41.6
30	6.0	114.0	4.3	78.9	2.8	47.7
32	7.2	136.3	5.1	93.0	3.1	54.4
34	8.4	158.6	6.0	111.0	3.5	60.4
36	9.6	181.0	7.1	130.2	3.9	67.7
38	10.8	203.3	8.1	149.4	4.4	76.4
40	11.9	225.7	9.2	168.5	5.0	87.4
42	13.1	248.0	10.2	187.7	5.8	100.7
44	14.3	270.3	11.3	206.9	6.6	115.2
46	15.5	292.7	12.3	226.1	7.5	129.6
48	16.7	315.0	13.4	245.2	8.3	144.1
50	17.8	337.3	14.4	264.4	9.2	158.5
52	19.0	359.7	15.4	283.6	10.0	173.0
54	20.2	382.0	16.5	302.7	10.8	187.4
56	21.4	404.4	17.5	321.9	11.7	201.9
58	22.6	426.7	18.6	341.1	12.5	216.3
60	23.8	449.0	19.6	360.2	13.3	230.8
62	24.9	471.4	20.7	379.4	14.2	245.2
64	26.1	493.7	21.7	398.6	15.0	259.7
66	27.3	516.1	22.8	417.7	15.8	274.1
68	28.5	538.4	23.8	436.9	16.7	288.6
70	29.7	560.7	24.8	456.1	17.5	303.0
72	30.9	583.1	25.9	475.2	18.3	317.5
74	32.0	605.4	26.9	494.4	19.2	331.9
76	33.2	627.8	28.0	513.6	20.0	346.3
78	34.4	650.1	29.0	532.7	20.8	360.8
80	35.6	672.4	30.1	551.9	21.7	375.2
82	36.8	694.8	31.1	571.1	22.5	389.7
84	37.9	717.1	32.1	590.3	23.3	404.1
86	39.1	739.4	33.2	609.4	24.2	418.6
88	40.3	761.8	34.2	628.6	25.0	433.0
90	41.5	784.1	35.3	647.8	25.8	447.5
92	42.7	806.5	36.3	666.9	26.7	461.9
94	43.9	828.8	37.4	686.1	27.5	476.4
96	45.0	851.1	38.4	705.3	28.3	490.8
98	46.2	873.5	39.5	724.4	29.2	505.3
100	47.4	895.8	40.5	743.6	30.0	519.7

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-11

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1985

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	4.7	0.2	4.1	0.2	3.0
4	0.4	8.6	0.4	7.9	0.3	6.0
6	0.6	12.2	0.5	10.3	0.5	8.1
8	0.9	16.9	0.8	14.4	0.6	10.3
10	1.1	21.6	1.0	18.5	0.7	13.3
12	1.3	26.3	1.2	22.5	0.9	16.3
14	1.6	31.0	1.4	26.6	1.1	19.3
16	1.8	35.7	1.6	30.7	1.3	22.3
18	2.1	41.9	1.8	34.7	1.4	25.3
20	2.5	49.0	2.1	40.1	1.6	28.3
22	3.1	60.3	2.4	46.2	1.8	31.3
24	3.6	70.5	2.9	55.5	1.9	34.6
26	4.2	83.3	3.4	64.0	2.2	39.1
28	5.1	100.5	3.9	74.0	2.4	43.6
30	6.3	123.1	4.5	86.4	2.8	50.5
32	7.5	146.6	5.4	103.1	3.2	57.1
34	8.7	170.2	6.5	123.4	3.6	63.8
36	9.9	193.7	7.6	143.8	4.0	71.6
38	11.1	217.2	8.6	164.2	4.5	80.8
40	12.3	240.7	9.7	184.5	5.2	92.9
42	13.5	264.3	10.8	204.9	6.0	107.5
44	14.7	287.8	11.8	225.2	6.9	122.6
46	15.9	311.3	12.9	245.6	7.7	137.6
48	17.1	334.8	14.0	265.9	8.6	152.7
50	18.3	358.4	15.1	286.3	9.4	167.7
52	19.4	381.9	16.1	306.6	10.2	182.8
54	20.6	405.4	17.2	327.0	11.1	197.9
56	21.8	428.9	18.3	347.3	11.9	212.9
58	23.0	452.5	19.3	367.7	12.8	228.0
60	24.2	476.0	20.4	388.0	13.6	243.0
62	25.4	499.5	21.5	408.4	14.5	258.1
64	26.6	523.0	22.5	428.7	15.3	273.2
66	27.8	546.6	23.6	449.1	16.2	288.2
68	29.0	570.1	24.7	469.4	17.0	303.3
70	30.2	593.6	25.8	489.8	17.8	318.3
72	31.4	617.1	26.8	510.2	18.7	333.4
74	32.6	640.7	27.9	530.5	19.5	348.5
76	33.8	664.2	29.0	550.9	20.4	363.5
78	35.0	687.7	30.0	571.2	21.2	378.6
80	36.2	711.2	31.1	591.6	22.1	393.6
82	37.4	734.7	32.2	611.9	22.9	408.7
84	38.6	758.3	33.2	632.3	23.7	423.8
86	39.8	781.8	34.3	652.6	24.6	438.8
88	41.0	805.3	35.4	673.0	25.4	453.9
90	42.2	828.8	36.5	693.3	26.3	468.9
92	43.4	852.4	37.5	713.7	27.1	484.0
94	44.6	875.9	38.6	734.0	28.0	499.1
96	45.8	899.4	39.7	754.4	28.8	514.1
98	47.0	922.9	40.7	774.7	29.7	529.2
100	48.2	946.5	41.8	795.1	30.5	544.2

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-12

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1986

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	5.0	0.2	4.3	0.2	3.1
4	0.4	9.1	0.4	8.2	0.3	6.2
6	0.6	12.9	0.6	10.9	0.5	8.4
8	0.9	17.9	0.8	15.2	0.6	10.7
10	1.1	22.9	1.0	19.5	0.8	13.8
12	1.4	27.8	1.2	23.9	0.9	16.9
14	1.6	32.8	1.4	28.2	1.1	20.0
16	1.9	37.8	1.6	32.5	1.3	23.2
18	2.2	44.8	1.9	36.8	1.4	26.3
20	2.6	53.0	2.2	42.9	1.6	29.4
22	3.2	64.6	2.5	49.4	1.8	32.5
24	3.7	75.9	3.0	59.9	2.0	36.0
26	4.4	90.1	3.5	68.9	2.2	40.7
28	5.4	109.8	4.1	80.3	2.5	45.4
30	6.6	134.7	4.8	94.7	2.9	52.8
32	7.8	159.5	5.8	113.7	3.2	59.5
34	9.0	184.4	6.9	135.3	3.6	66.6
36	10.3	209.3	8.0	156.8	4.1	75.0
38	11.5	234.2	9.0	178.3	4.6	84.9
40	12.7	259.1	10.1	199.8	5.3	97.4
42	13.9	284.0	11.2	221.3	6.2	113.0
44	15.1	308.9	12.3	242.9	7.0	128.7
46	16.4	333.8	13.4	264.4	7.8	144.3
48	17.6	358.7	14.5	285.9	8.7	159.9
50	18.8	383.6	15.6	307.4	9.6	175.5
52	20.0	408.4	16.7	328.9	10.4	191.1
54	21.2	433.3	17.8	350.5	11.3	206.8
56	22.5	458.2	18.9	372.0	12.1	222.4
58	23.7	483.1	20.0	393.5	12.9	238.0
60	24.9	508.0	21.1	415.0	13.8	253.6
62	26.1	532.9	22.2	436.5	14.7	269.3
64	27.3	557.8	23.2	458.1	15.5	284.9
66	28.6	582.7	24.3	479.6	16.3	300.5
68	29.8	607.6	25.4	501.1	17.2	316.1
70	31.0	632.5	26.5	522.6	18.0	331.7
72	32.2	657.4	27.6	544.1	18.9	347.4
74	33.4	682.2	28.7	565.6	19.8	363.0
76	34.7	707.1	29.8	587.2	20.6	378.6
78	35.9	732.0	30.9	608.7	21.4	394.2
80	37.1	756.9	32.0	630.2	22.3	409.9
82	38.3	781.8	33.1	651.7	23.1	425.5
84	39.5	806.7	34.2	673.2	24.0	441.1
86	40.8	831.6	35.3	694.8	24.8	456.7
88	42.0	856.5	36.3	716.3	25.7	472.4
90	43.2	881.4	37.4	737.8	26.5	488.0
92	44.4	906.3	38.5	759.3	27.4	503.6
94	45.6	931.1	39.6	780.8	28.3	519.2
96	46.9	956.0	40.7	802.4	29.1	534.8
98	48.1	980.9	41.8	823.9	30.0	550.5
100	49.3	1005.8	42.9	845.4	30.8	566.1

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-13

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1987

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.2	5.3	0.2	4.5	0.2	3.2
4	0.4	9.5	0.4	8.6	0.3	6.5
6	0.6	13.7	0.6	11.6	0.5	8.6
8	0.9	18.9	0.8	16.2	0.6	11.1
10	1.1	24.2	1.0	20.7	0.8	14.3
12	1.4	29.4	1.2	25.3	0.9	17.6
14	1.6	34.7	1.5	29.8	1.1	20.8
16	1.9	39.9	1.7	34.3	1.3	24.0
18	2.2	47.7	1.9	38.9	1.4	27.3
20	2.7	57.2	2.2	45.8	1.6	30.5
22	3.3	69.0	2.6	53.6	1.8	33.8
24	3.8	81.4	3.1	64.3	2.0	37.5
26	4.6	97.4	3.6	74.3	2.2	42.4
28	5.7	120.0	4.3	86.9	2.5	47.2
30	6.9	146.3	5.1	103.5	2.9	55.3
32	8.1	172.5	6.1	125.0	3.3	62.1
34	9.4	198.8	7.2	147.8	3.7	69.6
36	10.6	225.1	8.4	170.5	4.1	78.5
38	11.9	251.4	9.5	193.3	4.7	89.2
40	13.1	277.7	10.6	216.0	5.4	102.6
42	14.3	304.0	11.7	238.7	6.3	118.8
44	15.6	330.3	12.8	261.5	7.1	135.0
46	16.8	356.5	13.9	284.2	8.0	151.2
48	18.1	382.8	15.0	307.0	8.8	167.4
50	19.3	409.1	16.1	329.7	9.7	183.6
52	20.5	435.4	17.3	352.5	10.6	199.8
54	21.8	461.7	18.4	375.2	11.4	216.0
56	23.0	488.0	19.5	397.9	12.3	232.2
58	24.3	514.3	20.6	420.7	13.1	248.4
60	25.5	540.5	21.7	443.4	14.0	264.7
62	26.7	566.8	22.8	466.2	14.8	280.9
64	28.0	593.1	23.9	488.9	15.7	297.1
66	29.2	619.4	25.1	511.7	16.5	313.3
68	30.5	645.7	26.2	534.4	17.4	329.5
70	31.7	672.0	27.3	557.1	18.3	345.7
72	32.9	698.3	28.4	579.9	19.1	361.9
74	34.2	724.5	29.5	602.6	20.0	378.1
76	35.4	750.8	30.6	625.4	20.8	394.3
78	36.7	777.1	31.7	648.1	21.7	410.5
80	37.9	803.4	32.9	670.9	22.5	426.7
82	39.1	829.7	34.0	693.6	23.4	442.9
84	40.4	856.0	35.1	716.3	24.3	459.1
86	41.6	882.2	36.2	739.1	25.1	475.3
88	42.9	908.5	37.3	761.8	26.0	491.5
90	44.1	934.8	38.4	784.6	26.8	507.7
92	45.3	961.1	39.5	807.3	27.7	523.9
94	46.6	987.4	40.7	830.1	28.5	540.1
96	47.8	1013.7	41.8	852.8	29.4	556.3
98	49.1	1040.0	42.9	875.5	30.2	572.5
100	50.3	1066.2	44.0	898.3	31.1	588.7

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-14

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1988

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	5.6	0.2	4.8	0.2	3.4
4	0.5	10.0	0.4	9.0	0.3	6.7
6	0.7	14.4	0.6	12.3	0.5	8.9
8	0.9	20.0	0.8	17.1	0.6	11.5
10	1.2	25.5	1.0	21.9	0.8	14.8
12	1.4	31.1	1.3	26.7	0.9	18.2
14	1.7	36.6	1.5	31.5	1.1	21.5
16	1.9	42.4	1.7	36.3	1.3	24.9
18	2.3	50.7	2.0	41.5	1.4	28.2
20	2.8	61.7	2.3	48.7	1.6	31.6
22	3.3	73.6	2.7	57.9	1.8	34.9
24	4.0	87.5	3.2	68.6	2.0	38.9
26	4.8	105.8	3.8	79.8	2.3	44.0
28	5.9	130.8	4.4	93.6	2.5	49.1
30	7.2	158.6	5.3	112.3	2.9	57.5
32	8.5	186.3	6.4	136.3	3.3	64.4
34	9.7	214.1	7.6	160.3	3.7	72.3
36	11.0	241.8	8.7	184.3	4.2	81.7
38	12.2	269.6	9.8	208.2	4.8	93.0
40	13.5	297.3	11.0	232.2	5.5	107.2
42	14.8	325.1	12.1	256.2	6.4	124.0
44	16.0	352.8	13.2	280.2	7.2	140.8
46	17.3	380.6	14.4	304.2	8.1	157.6
48	18.5	408.3	15.5	328.2	8.9	174.3
50	19.8	436.1	16.6	352.2	9.8	191.1
52	21.1	463.8	17.8	376.1	10.7	207.9
54	22.3	491.6	18.9	400.1	11.5	224.6
56	23.6	519.3	20.1	424.1	12.4	241.4
58	24.8	547.1	21.2	448.1	13.2	258.2
60	26.1	574.8	22.3	472.1	14.1	274.9
62	27.4	602.6	23.5	496.1	15.0	291.7
64	28.6	630.3	24.6	520.1	15.8	308.5
66	29.9	658.1	25.7	544.0	16.7	325.2
68	31.1	685.8	26.9	568.0	17.5	342.0
70	32.4	713.6	28.0	592.0	18.4	358.8
72	33.7	741.3	29.1	616.0	19.3	375.5
74	34.9	769.1	30.3	640.0	20.1	392.3
76	36.2	796.8	31.4	664.0	21.0	409.1
78	37.4	824.6	32.5	687.9	21.8	425.9
80	38.7	852.3	33.7	711.9	22.7	442.6
82	40.0	880.1	34.8	735.9	23.6	459.4
84	41.2	907.8	35.9	759.9	24.4	476.2
86	42.5	935.6	37.1	783.9	25.3	492.9
88	43.7	963.3	38.2	807.9	26.1	509.7
90	45.0	991.1	39.3	831.9	27.0	526.5
92	46.3	1018.8	40.5	855.8	27.9	543.2
94	47.5	1046.6	41.6	879.8	28.7	560.0
96	48.8	1074.4	42.7	903.8	29.6	576.8
98	50.0	1102.1	43.9	927.8	30.4	593.5
100	51.3	1129.9	45.0	951.8	31.3	610.3

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-15

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1989

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	5.9	0.2	5.1	0.2	3.5
4	0.5	10.4	0.4	9.4	0.3	7.0
6	0.7	15.3	0.6	13.0	0.5	9.2
8	0.9	21.1	0.8	18.1	0.6	11.9
10	1.2	27.0	1.1	23.1	0.8	15.4
12	1.4	32.9	1.3	28.2	0.9	18.9
14	1.7	38.7	1.5	33.3	1.1	22.3
16	2.0	45.1	1.7	38.3	1.3	25.8
18	2.4	53.9	2.0	44.3	1.5	29.3
20	2.9	66.4	2.4	51.9	1.6	32.8
22	3.4	78.7	2.9	62.6	1.8	36.3
24	4.1	94.2	3.3	73.4	2.0	40.5
26	5.0	114.7	3.9	85.8	2.3	45.7
28	6.2	142.3	4.6	101.8	2.6	51.5
30	7.5	171.6	5.6	123.6	3.0	60.2
32	8.8	200.9	6.8	148.9	3.3	67.1
34	10.1	230.2	8.0	174.2	3.8	75.5
36	11.3	259.5	9.1	199.6	4.3	85.4
38	12.6	288.8	10.3	224.9	4.9	97.7
40	13.9	318.1	11.4	250.2	5.6	112.9
42	15.2	347.4	12.6	275.6	6.5	130.3
44	16.5	376.7	13.7	300.9	7.4	147.7
46	17.7	406.0	14.9	326.2	8.2	165.0
48	19.0	435.2	16.0	351.6	9.1	182.4
50	20.3	464.5	17.2	376.9	9.9	199.8
52	21.6	493.8	18.4	402.2	10.8	217.2
54	22.9	523.1	19.5	427.5	11.7	234.6
56	24.1	552.4	20.7	452.9	12.5	252.0
58	25.4	581.7	21.8	478.2	13.4	269.4
60	26.7	611.0	23.0	503.5	14.3	286.8
62	28.0	640.3	24.1	528.9	15.1	304.2
64	29.3	669.6	25.3	554.2	16.0	321.6
66	30.5	698.9	26.4	579.5	16.9	339.0
68	31.8	728.1	27.6	604.9	17.7	356.4
70	33.1	757.4	28.8	630.2	18.6	373.8
72	34.4	786.7	29.9	655.5	19.5	391.2
74	35.7	816.0	31.1	680.9	20.3	408.5
76	36.9	845.3	32.2	706.2	21.2	425.9
78	38.2	874.6	33.4	731.5	22.1	443.3
80	39.5	903.9	34.5	756.8	22.9	460.7
82	40.8	933.2	35.7	782.2	23.8	478.1
84	42.1	962.5	36.9	807.5	24.7	495.5
86	43.3	991.8	38.0	832.8	25.5	512.9
88	44.6	1021.1	39.2	858.2	26.4	530.3
90	45.9	1050.3	40.3	883.5	27.3	547.7
92	47.2	1079.6	41.5	908.8	28.1	565.1
94	48.5	1108.9	42.6	934.2	29.0	582.5
96	49.7	1138.2	43.8	959.5	29.9	599.9
98	51.0	1167.5	44.9	984.8	30.7	617.3
100	52.3	1196.8	46.1	1010.1	31.6	634.6

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-16

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1990

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	6.2	0.2	5.3	0.2	3.6
4	0.5	10.9	0.4	9.9	0.3	7.2
6	0.7	16.2	0.6	13.7	0.5	9.5
8	0.9	22.3	0.8	19.1	0.6	12.4
10	1.2	28.5	1.1	24.4	0.8	16.0
12	1.5	34.7	1.3	29.8	0.9	19.6
14	1.7	40.9	1.5	35.1	1.1	23.2
16	2.0	48.0	1.8	40.4	1.3	26.8
18	2.4	57.3	2.1	47.1	1.5	30.4
20	3.0	71.3	2.4	55.1	1.6	34.0
22	3.6	84.4	3.0	67.4	1.8	37.6
24	4.3	101.3	3.5	78.5	2.0	42.2
26	5.2	124.1	4.1	92.5	2.3	47.6
28	6.5	154.5	4.9	110.6	2.6	53.9
30	7.8	185.5	5.9	134.8	3.0	62.7
32	9.1	216.4	7.1	161.5	3.4	69.9
34	10.4	247.3	8.3	188.2	3.8	78.9
36	11.7	278.2	9.5	214.9	4.3	89.3
38	13.0	309.1	10.6	241.6	5.0	102.5
40	14.3	340.0	11.8	268.3	5.7	118.7
42	15.6	370.9	13.0	295.0	6.6	136.8
44	16.9	401.8	14.2	321.7	7.5	154.8
46	18.2	432.7	15.3	348.4	8.4	172.9
48	19.5	463.6	16.5	375.1	9.2	190.9
50	20.8	494.5	17.7	401.8	10.1	208.9
52	22.1	525.4	18.9	428.5	11.0	227.0
54	23.4	556.4	20.1	455.2	11.8	245.0
56	24.7	587.3	21.2	481.9	12.7	263.0
58	26.0	618.2	22.4	508.6	13.6	281.1
60	27.3	649.1	23.6	535.3	14.5	299.1
62	28.6	680.0	24.8	562.0	15.3	317.2
64	29.9	710.9	25.9	588.7	16.2	335.2
66	31.2	741.8	27.1	615.4	17.1	353.2
68	32.5	772.7	28.3	642.1	17.9	371.3
70	33.8	803.6	29.5	668.8	18.8	389.3
72	35.1	834.5	30.6	695.5	19.7	407.4
74	36.4	865.4	31.8	722.2	20.6	425.4
76	37.7	896.3	33.0	748.9	21.4	443.4
78	39.0	927.3	34.2	775.6	22.3	461.5
80	40.3	958.2	35.3	802.2	23.2	479.5
82	41.6	989.1	36.5	828.9	24.1	497.5
84	42.9	1020.0	37.7	855.6	24.9	515.6
86	44.2	1050.9	38.9	882.3	25.8	533.6
88	45.5	1081.8	40.0	909.0	26.7	551.7
90	46.8	1112.7	41.2	935.7	27.5	569.7
92	48.1	1143.6	42.4	962.4	28.4	587.7
94	49.4	1174.5	43.6	989.1	29.3	605.8
96	50.7	1205.4	44.7	1015.8	30.2	623.8
98	52.0	1236.3	45.9	1042.5	31.0	641.9
100	53.3	1267.3	47.1	1069.2	31.9	659.9

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-17

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1991

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	6.5	0.2	5.6	0.2	3.7
4	0.5	11.5	0.4	10.3	0.4	7.5
6	0.7	17.1	0.6	14.5	0.5	9.9
8	1.0	23.6	0.9	20.2	0.6	12.8
10	1.2	30.1	1.1	25.8	0.8	16.5
12	1.5	36.6	1.3	31.4	1.0	20.3
14	1.7	43.1	1.6	37.0	1.1	24.0
16	2.1	51.0	1.8	42.7	1.3	27.7
18	2.5	60.7	2.1	50.1	1.5	31.5
20	3.1	75.9	2.5	58.5	1.7	35.2
22	3.6	90.1	3.1	72.0	1.8	38.9
24	4.4	108.4	3.6	84.1	2.1	43.8
26	5.4	134.2	4.2	99.5	2.3	49.4
28	6.8	166.8	5.1	119.8	2.6	56.1
30	8.1	199.4	6.2	146.8	3.1	65.1
32	9.4	231.9	7.4	174.9	3.4	72.6
34	10.7	264.5	8.6	203.0	3.8	81.9
36	12.0	297.0	9.8	231.1	4.4	92.9
38	13.3	329.6	11.0	259.3	5.0	106.9
40	14.7	362.1	12.2	287.4	5.8	124.0
42	16.0	394.7	13.4	315.5	6.7	142.7
44	17.3	427.3	14.6	343.6	7.6	161.3
46	18.6	459.8	15.8	371.8	8.4	180.0
48	19.9	492.4	17.0	399.9	9.3	198.7
50	21.3	524.9	18.2	428.0	10.2	217.3
52	22.6	557.5	19.4	456.2	11.1	236.0
54	23.9	590.1	20.6	484.3	12.0	254.7
56	25.2	622.6	21.8	512.4	12.8	273.3
58	26.5	655.2	23.0	540.5	13.7	292.0
60	27.8	687.7	24.2	568.7	14.6	310.7
62	29.2	720.3	25.4	596.8	15.5	329.3
64	30.5	752.9	26.6	624.9	16.3	348.0
66	31.8	785.4	27.8	653.1	17.2	366.6
68	33.1	818.0	29.0	681.2	18.1	385.3
70	34.4	850.5	30.2	709.3	19.0	404.0
72	35.7	883.1	31.4	737.4	19.8	422.6
74	37.1	915.6	32.6	765.6	20.7	441.3
76	38.4	948.2	33.7	793.7	21.6	460.0
78	39.7	980.8	34.9	821.8	22.5	478.6
80	41.0	1013.3	36.1	849.9	23.3	497.3
82	42.3	1045.9	37.3	878.1	24.2	516.0
84	43.7	1078.4	38.5	906.2	25.1	534.6
86	45.0	1111.0	39.7	934.3	26.0	553.3
88	46.3	1143.6	40.9	962.5	26.8	572.0
90	47.6	1176.1	42.1	990.6	27.7	590.6
92	48.9	1208.7	43.3	1018.7	28.6	609.3
94	50.2	1241.2	44.5	1046.8	29.5	628.0
96	51.6	1273.8	45.7	1075.0	30.3	646.6
98	52.9	1306.3	46.9	1103.1	31.2	665.3
100	54.2	1338.9	48.1	1131.2	32.1	684.0

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-18

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1992

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	6.9	0.2	5.9	0.2	3.9
4	0.5	12.0	0.4	10.8	0.4	7.7
6	0.7	18.0	0.6	15.3	0.5	10.2
8	1.0	24.9	0.9	21.2	0.6	13.3
10	1.2	31.7	1.1	27.1	0.8	17.2
12	1.5	38.6	1.4	33.1	1.0	21.0
14	1.8	45.4	1.6	39.0	1.1	24.9
16	2.1	54.1	1.8	44.9	1.3	28.8
18	2.5	64.5	2.2	53.1	1.5	32.6
20	3.1	80.7	2.6	62.6	1.7	36.5
22	3.7	96.2	3.1	76.5	1.8	40.4
24	4.5	116.2	3.7	89.8	2.1	45.5
26	5.7	145.5	4.4	106.5	2.3	51.3
28	7.0	179.8	5.3	129.1	2.7	58.7
30	8.3	214.1	6.5	158.6	3.1	67.9
32	9.7	248.3	7.7	188.2	3.5	75.8
34	11.0	282.6	8.9	217.8	3.9	85.5
36	12.3	316.9	10.2	247.4	4.4	97.1
38	13.7	351.2	11.4	276.9	5.1	112.1
40	15.0	385.5	12.6	306.5	5.9	130.4
42	16.4	419.8	13.8	336.1	6.8	149.7
44	17.7	454.1	15.0	365.7	7.7	169.1
46	19.0	488.4	16.2	395.2	8.6	188.4
48	20.4	522.7	17.4	424.8	9.5	207.8
50	21.7	557.0	18.6	454.4	10.3	227.1
52	23.0	591.3	19.9	484.0	11.2	246.5
54	24.4	625.5	21.1	513.6	12.1	265.9
56	25.7	659.8	22.3	543.1	13.0	285.2
58	27.0	694.1	23.5	572.7	13.9	304.6
60	28.4	728.4	24.7	602.3	14.8	323.9
62	29.7	762.7	25.9	631.9	15.6	343.3
64	31.1	797.0	27.1	661.5	16.5	362.6
66	32.4	831.3	28.4	691.0	17.4	382.0
68	33.7	865.6	29.6	720.6	18.3	401.3
70	35.1	899.9	30.8	750.2	19.2	420.7
72	36.4	934.2	32.0	779.8	20.1	440.1
74	37.7	968.4	33.2	809.3	20.9	459.4
76	39.1	1002.7	34.4	838.9	21.8	478.8
78	40.4	1037.0	35.6	868.5	22.7	498.1
80	41.7	1071.3	36.9	898.1	23.6	517.5
82	43.1	1105.6	38.1	927.7	24.5	536.8
84	44.4	1139.9	39.3	957.2	25.3	556.2
86	45.7	1174.2	40.5	986.8	26.2	575.6
88	47.1	1208.5	41.7	1016.4	27.1	594.9
90	48.4	1242.8	42.9	1046.0	28.0	614.3
92	49.8	1277.1	44.1	1075.6	28.9	633.6
94	51.1	1311.4	45.4	1105.1	29.8	653.0
96	52.4	1345.6	46.6	1134.7	30.6	672.3
98	53.8	1379.9	47.8	1164.3	31.5	691.7
100	55.1	1414.2	49.0	1193.9	32.4	711.1

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-19

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1993

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	7.2	0.2	6.2	0.2	4.0
4	0.5	12.6	0.4	11.3	0.4	8.0
6	0.7	19.0	0.6	16.2	0.5	10.5
8	1.0	26.2	0.9	22.4	0.6	13.8
10	1.3	33.4	1.1	28.6	0.8	17.8
12	1.5	40.7	1.4	34.9	1.0	21.8
14	1.8	47.9	1.6	41.1	1.1	25.8
16	2.1	57.3	1.9	47.3	1.3	29.9
18	2.6	69.1	2.2	56.3	1.5	33.9
20	3.2	85.8	2.7	67.4	1.7	37.9
22	3.8	102.6	3.2	81.5	1.9	41.9
24	4.7	125.3	3.8	96.0	2.1	47.4
26	5.9	157.4	4.5	114.4	2.4	53.4
28	7.3	193.5	5.6	140.7	2.7	61.4
30	8.6	229.6	6.8	171.9	3.1	70.7
32	10.0	265.7	8.0	203.0	3.5	79.2
34	11.3	301.8	9.3	234.2	4.0	89.5
36	12.7	337.9	10.5	265.3	4.5	101.5
38	14.0	374.0	11.7	296.5	5.2	117.5
40	15.4	410.1	13.0	327.6	6.1	137.0
42	16.7	446.3	14.2	358.8	6.9	157.1
44	18.1	482.4	15.4	389.9	7.8	177.1
46	19.4	518.5	16.7	421.1	8.7	197.2
48	20.8	554.6	17.9	452.2	9.6	217.3
50	22.1	590.7	19.1	483.4	10.5	237.3
52	23.5	626.8	20.4	514.5	11.4	257.4
54	24.9	662.9	21.6	545.7	12.3	277.5
56	26.2	699.0	22.9	576.8	13.2	297.6
58	27.6	735.1	24.1	608.0	14.1	317.6
60	28.9	771.2	25.3	639.1	14.9	337.7
62	30.3	807.3	26.6	670.3	15.8	357.8
64	31.6	843.4	27.8	701.4	16.7	377.9
66	33.0	879.5	29.0	732.6	17.6	397.9
68	34.3	915.7	30.3	763.7	18.5	418.0
70	35.7	951.8	31.5	794.9	19.4	438.1
72	37.0	987.9	32.7	826.0	20.3	458.1
74	38.4	1024.0	34.0	857.2	21.2	478.2
76	39.8	1060.1	35.2	888.3	22.0	498.3
78	41.1	1096.2	36.4	919.5	22.9	518.4
80	42.5	1132.3	37.7	950.6	23.8	538.4
82	43.8	1168.4	38.9	981.8	24.7	558.5
84	45.2	1204.5	40.1	1012.9	25.6	578.6
86	46.5	1240.6	41.4	1044.1	26.5	598.7
88	47.9	1276.7	42.6	1075.2	27.4	618.7
90	49.2	1312.8	43.8	1106.4	28.3	638.8
92	50.6	1348.9	45.1	1137.5	29.1	658.9
94	51.9	1385.1	46.3	1168.6	30.0	678.9
96	53.3	1421.2	47.5	1199.8	30.9	699.0
98	54.6	1457.3	48.8	1230.9	31.8	719.1
100	56.0	1493.4	50.0	1262.1	32.7	739.2

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-20

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1994

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	7.6	0.3	6.5	0.2	4.2
4	0.5	13.1	0.5	11.8	0.4	8.3
6	0.7	20.0	0.7	17.0	0.5	10.9
8	1.0	27.6	0.9	23.6	0.6	14.3
10	1.3	35.2	1.2	30.1	0.8	18.4
12	1.5	42.8	1.4	36.7	1.0	22.6
14	1.8	50.4	1.7	43.2	1.1	26.7
16	2.2	60.8	1.9	49.8	1.3	30.9
18	2.7	74.1	2.3	59.6	1.5	35.1
20	3.3	91.1	2.8	72.2	1.7	39.2
22	4.0	109.6	3.3	86.5	1.9	43.4
24	4.9	135.0	3.9	102.4	2.1	49.2
26	6.1	170.0	4.7	123.5	2.4	55.4
28	7.5	208.0	5.8	152.4	2.7	63.9
30	8.9	246.0	7.1	185.1	3.2	73.4
32	10.3	284.1	8.3	217.9	3.5	82.3
34	11.6	322.1	9.6	250.6	4.0	93.1
36	13.0	360.1	10.8	283.4	4.5	105.8
38	14.4	398.1	12.1	316.1	5.3	122.4
40	15.7	436.1	13.3	348.8	6.1	143.0
42	17.1	474.1	14.6	381.6	7.0	163.7
44	18.5	512.1	15.8	414.3	7.9	184.5
46	19.9	550.2	17.1	447.1	8.8	205.3
48	21.2	588.2	18.3	479.8	9.7	226.0
50	22.6	626.2	19.6	512.6	10.6	246.8
52	24.0	664.2	20.9	545.3	11.5	267.6
54	25.3	702.2	22.1	578.0	12.4	288.3
56	26.7	740.2	23.4	610.8	13.3	309.1
58	28.1	778.2	24.6	643.5	14.2	329.9
60	29.5	816.3	25.9	676.3	15.1	350.6
62	30.8	854.3	27.1	709.0	16.0	371.4
64	32.2	892.3	28.4	741.7	16.8	392.2
66	33.6	930.3	29.6	774.5	17.7	412.9
68	34.9	968.3	30.9	807.2	18.6	433.7
70	36.3	1006.3	32.1	840.0	19.5	454.5
72	37.7	1044.4	33.4	872.7	20.4	475.2
74	39.1	1082.4	34.6	905.4	21.3	496.0
76	40.4	1120.4	35.9	938.2	22.2	516.8
78	41.8	1158.4	37.1	970.9	23.1	537.5
80	43.2	1196.4	38.4	1003.7	24.0	558.3
82	44.6	1234.4	39.6	1036.4	24.9	579.1
84	45.9	1272.4	40.9	1069.1	25.8	599.9
86	47.3	1310.5	42.1	1101.9	26.7	620.6
88	48.7	1348.5	43.4	1134.6	27.5	641.4
90	50.0	1386.5	44.6	1167.4	28.4	662.2
92	51.4	1424.5	45.9	1200.1	29.3	682.9
94	52.8	1462.5	47.1	1232.8	30.2	703.7
96	54.2	1500.5	48.4	1265.6	31.1	724.5
98	55.5	1538.5	49.6	1298.3	32.0	745.2
100	56.9	1576.6	50.9	1331.1	32.9	766.0

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-21

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1995

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	8.0	0.3	6.9	0.2	4.3
4	0.5	13.7	0.5	12.3	0.4	8.6
6	0.7	21.1	0.7	17.9	0.5	11.3
8	1.0	29.1	0.9	24.8	0.6	14.8
10	1.3	37.1	1.2	31.7	0.8	19.1
12	1.6	45.1	1.4	38.6	1.0	23.4
14	1.8	53.1	1.7	45.5	1.2	27.8
16	2.2	64.2	1.9	52.8	1.3	32.1
18	2.7	79.1	2.3	63.1	1.5	36.4
20	3.4	96.5	2.8	77.2	1.7	40.7
22	4.1	116.9	3.4	91.8	1.9	45.0
24	5.0	144.7	4.0	109.6	2.1	51.1
26	6.3	182.6	4.9	133.0	2.4	57.6
28	7.7	222.6	6.1	164.7	2.8	66.8
30	9.1	262.5	7.3	199.1	3.2	76.5
32	10.5	302.5	8.6	233.5	3.6	85.9
34	11.9	342.5	9.9	267.9	4.1	97.4
36	13.3	382.4	11.2	302.3	4.6	111.1
38	14.7	422.4	12.4	336.8	5.4	128.6
40	16.1	462.3	13.7	371.2	6.3	150.1
42	17.4	502.3	15.0	405.6	7.2	171.7
44	18.8	542.3	16.2	440.0	8.1	193.2
46	20.2	582.2	17.5	474.4	9.0	214.7
48	21.6	622.2	18.8	508.8	9.9	236.3
50	23.0	662.1	20.0	543.2	10.8	257.8
52	24.4	702.1	21.3	577.6	11.6	279.3
54	25.8	742.0	22.6	612.0	12.5	300.9
56	27.2	782.0	23.9	646.4	13.4	322.4
58	28.6	822.0	25.1	680.8	14.3	343.9
60	29.9	861.9	26.4	715.2	15.2	365.5
62	31.3	901.9	27.7	749.6	16.1	387.0
64	32.7	941.8	28.9	784.0	17.0	408.5
66	34.1	981.8	30.2	818.5	17.9	430.1
68	35.5	1021.7	31.5	852.9	18.8	451.6
70	36.9	1061.7	32.8	887.3	19.7	473.1
72	38.3	1101.7	34.0	921.7	20.6	494.7
74	39.7	1141.6	35.3	956.1	21.5	516.2
76	41.0	1181.6	36.6	990.5	22.4	537.8
78	42.4	1221.5	37.8	1024.9	23.3	559.3
80	43.8	1261.5	39.1	1059.3	24.2	580.8
82	45.2	1301.5	40.4	1093.7	25.1	602.4
84	46.6	1341.4	41.6	1128.1	26.0	623.9
86	48.0	1381.4	42.9	1162.5	26.9	645.4
88	49.4	1421.3	44.2	1196.9	27.8	667.0
90	50.8	1461.3	45.5	1231.3	28.7	688.5
92	52.1	1501.2	46.7	1265.7	29.6	710.0
94	53.5	1541.2	48.0	1300.1	30.5	731.6
96	54.9	1581.2	49.3	1334.6	31.4	753.1
98	56.3	1621.1	50.5	1369.0	32.3	774.6
100	57.7	1661.1	51.8	1403.4	33.2	796.2

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-22

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1996

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	8.4	0.3	7.2	0.2	4.5
4	0.5	14.4	0.5	12.8	0.4	8.9
6	0.7	22.2	0.7	18.9	0.5	11.6
8	1.0	30.6	0.9	26.1	0.6	15.4
10	1.3	39.0	1.2	33.3	0.8	19.8
12	1.6	47.4	1.4	40.6	1.0	24.3
14	1.9	55.8	1.7	47.8	1.2	28.7
16	2.3	67.9	2.0	55.9	1.3	33.2
18	2.8	84.3	2.4	66.7	1.5	37.6
20	3.4	102.3	2.9	82.5	1.7	42.1
22	4.2	124.6	3.5	97.8	1.9	46.5
24	5.2	154.9	4.2	117.1	2.1	53.0
26	6.6	196.0	5.1	143.0	2.4	59.7
28	8.0	238.0	6.3	177.7	2.8	69.5
30	9.4	280.0	7.6	213.9	3.2	79.3
32	10.8	322.0	8.9	250.0	3.6	89.3
34	12.2	364.0	10.2	286.2	4.1	101.3
36	13.6	405.9	11.5	322.3	4.7	115.8
38	15.0	447.9	12.8	358.5	5.4	134.3
40	16.4	489.9	14.1	394.6	6.3	156.6
42	17.8	531.9	15.3	430.8	7.2	178.9
44	19.2	573.9	16.6	466.9	8.1	201.2
46	20.6	615.9	17.9	503.1	9.0	223.4
48	22.0	657.9	19.2	539.2	9.9	245.7
50	23.4	699.9	20.5	575.4	10.8	268.0
52	24.8	741.9	21.8	611.5	11.8	290.3
54	26.2	783.9	23.1	647.7	12.7	312.6
56	27.6	825.9	24.4	683.8	13.6	334.8
58	29.0	867.9	25.7	720.0	14.5	357.1
60	30.4	909.9	26.9	756.1	15.4	379.4
62	31.8	951.9	28.2	792.3	16.3	401.7
64	33.2	993.9	29.5	828.4	17.2	424.0
66	34.6	1035.9	30.8	864.6	18.1	446.2
68	36.0	1077.9	32.1	900.7	19.0	468.5
70	37.4	1119.9	33.4	936.9	19.9	490.8
72	38.8	1161.9	34.7	973.0	20.8	513.1
74	40.2	1203.9	36.0	1009.2	21.7	535.4
76	41.7	1245.8	37.2	1045.3	22.6	557.6
78	43.1	1287.8	38.5	1081.5	23.5	579.9
80	44.5	1329.8	39.8	1117.6	24.4	602.2
82	45.9	1371.8	41.1	1153.8	25.3	624.5
84	47.3	1413.8	42.4	1189.9	26.2	646.8
86	48.7	1455.8	43.7	1226.1	27.1	669.0
88	50.1	1497.8	45.0	1262.2	28.0	691.3
90	51.5	1539.8	46.3	1298.4	28.9	713.6
92	52.9	1581.8	47.5	1334.5	29.8	735.9
94	54.3	1623.8	48.8	1370.7	30.7	758.2
96	55.7	1665.8	50.1	1406.8	31.6	780.4
98	57.1	1707.8	51.4	1443.0	32.5	802.7
100	58.5	1749.8	52.7	1479.1	33.4	825.0

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-23

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1997

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	8.8	0.3	7.6	0.2	4.6
4	0.5	15.0	0.5	13.4	0.4	9.2
6	0.8	23.4	0.7	19.8	0.5	12.0
8	1.0	32.2	0.9	27.4	0.6	15.9
10	1.3	41.0	1.2	35.0	0.8	20.6
12	1.6	49.8	1.5	42.6	1.0	25.2
14	1.9	58.7	1.7	50.2	1.2	29.8
16	2.3	71.7	2.0	59.0	1.4	34.4
18	2.9	89.8	2.4	70.4	1.5	39.0
20	3.5	108.8	3.0	87.7	1.7	43.7
22	4.3	132.8	3.6	103.9	1.9	48.3
24	5.3	166.0	4.3	124.7	2.2	55.2
26	6.8	210.1	5.3	153.0	2.4	62.1
28	8.2	254.2	6.6	190.6	2.9	72.7
30	9.6	298.3	7.9	228.6	3.2	82.6
32	11.0	342.5	9.2	266.5	3.7	93.2
34	12.4	386.6	10.5	304.4	4.2	105.9
36	13.9	430.7	11.8	342.3	4.8	121.5
38	15.3	474.9	13.1	380.2	5.6	141.3
40	16.7	519.0	14.4	418.1	6.5	164.4
42	18.1	563.1	15.7	456.1	7.4	187.5
44	19.5	607.3	17.0	494.0	8.3	210.6
46	21.0	651.4	18.3	531.9	9.2	233.7
48	22.4	695.5	19.6	569.8	10.1	256.8
50	23.8	739.6	20.9	607.7	11.0	279.9
52	25.2	783.8	22.2	645.6	11.9	303.0
54	26.6	827.9	23.5	683.6	12.8	326.1
56	28.1	872.0	24.8	721.5	13.7	349.2
58	29.5	916.2	26.1	759.4	14.6	372.3
60	30.9	960.3	27.4	797.3	15.5	395.4
62	32.3	1004.4	28.7	835.2	16.4	418.5
64	33.7	1048.6	30.0	873.1	17.4	441.6
66	35.2	1092.7	31.3	911.1	18.3	464.7
68	36.6	1136.8	32.6	949.0	19.2	487.8
70	38.0	1180.9	33.9	986.9	20.1	510.9
72	39.4	1225.1	35.2	1024.8	21.0	534.0
74	40.8	1269.2	36.5	1062.7	21.9	557.1
76	42.3	1313.3	37.9	1100.7	22.8	580.2
78	43.7	1357.5	39.2	1138.6	23.7	603.3
80	45.1	1401.6	40.5	1176.5	24.6	626.4
82	46.5	1445.7	41.8	1214.4	25.5	649.5
84	47.9	1489.8	43.1	1252.3	26.4	672.6
86	49.4	1534.0	44.4	1290.2	27.3	695.7
88	50.8	1578.1	45.7	1328.2	28.3	718.8
90	52.2	1622.2	47.0	1366.1	29.2	741.9
92	53.6	1666.4	48.3	1404.0	30.1	765.0
94	55.0	1710.5	49.6	1441.9	31.0	788.1
96	56.5	1754.6	50.9	1479.8	31.9	811.2
98	57.9	1798.8	52.2	1517.7	32.8	834.3
100	59.3	1842.9	53.5	1555.7	33.7	857.4

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-24

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1998

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	9.3	0.3	8.0	0.2	4.8
4	0.5	15.7	0.5	14.0	0.4	9.5
6	0.8	24.6	0.7	20.8	0.5	12.4
8	1.0	33.9	1.0	28.8	0.6	16.5
10	1.3	43.1	1.2	36.8	0.8	21.3
12	1.6	52.4	1.5	44.7	1.0	26.1
14	1.9	61.9	1.7	52.7	1.2	30.9
16	2.3	75.8	2.1	62.3	1.4	35.7
18	3.0	95.6	2.5	74.2	1.5	40.5
20	3.6	115.6	3.1	92.8	1.7	45.3
22	4.4	141.4	3.7	110.3	1.9	50.2
24	5.5	178.6	4.4	132.7	2.2	57.4
26	7.0	225.0	5.5	164.5	2.5	64.6
28	8.4	271.4	6.8	204.2	2.9	75.9
30	9.8	317.7	8.1	244.0	3.3	86.1
32	11.3	364.1	9.4	283.8	3.7	97.3
34	12.7	410.5	10.7	323.5	4.2	110.7
36	14.1	456.8	12.1	363.3	4.9	127.4
38	15.6	503.2	13.4	403.1	5.7	148.5
40	17.0	549.6	14.7	442.8	6.6	172.4
42	18.5	595.9	16.0	482.6	7.5	196.4
44	19.9	642.3	17.3	522.4	8.4	220.3
46	21.3	688.7	18.7	562.1	9.3	244.3
48	22.8	735.0	20.0	601.9	10.2	268.2
50	24.2	781.4	21.3	641.7	11.2	292.2
52	25.6	827.8	22.6	681.4	12.1	316.1
54	27.1	874.1	23.9	721.2	13.0	340.1
56	28.5	920.5	25.3	760.9	13.9	364.0
58	29.9	966.9	26.6	800.7	14.8	388.0
60	31.4	1013.2	27.9	840.5	15.7	411.9
62	32.8	1059.6	29.2	880.2	16.6	435.9
64	34.3	1106.0	30.5	920.0	17.5	459.8
66	35.7	1152.3	31.9	959.8	18.5	483.8
68	37.1	1198.7	33.2	999.5	19.4	507.7
70	38.6	1245.1	34.5	1039.3	20.3	531.7
72	40.0	1291.4	35.8	1079.1	21.2	555.6
74	41.4	1337.8	37.1	1118.8	22.1	579.6
76	42.9	1384.2	38.5	1158.6	23.0	603.5
78	44.3	1430.5	39.8	1198.4	23.9	627.5
80	45.7	1476.9	41.1	1238.1	24.9	651.5
82	47.2	1523.3	42.4	1277.9	25.8	675.4
84	48.6	1569.7	43.7	1317.6	26.7	699.4
86	50.0	1616.0	45.1	1357.4	27.6	723.3
88	51.5	1662.4	46.4	1397.2	28.5	747.3
90	52.9	1708.8	47.7	1436.9	29.4	771.2
92	54.4	1755.1	49.0	1476.7	30.3	795.2
94	55.8	1801.5	50.3	1516.5	31.3	819.1
96	57.2	1847.9	51.7	1556.2	32.2	843.1
98	58.7	1894.2	53.0	1596.0	33.1	867.0
100	60.1	1940.6	54.3	1635.8	34.0	891.0

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-25

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 1999

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	9.7	0.3	8.3	0.2	5.0
4	0.5	16.5	0.5	14.6	0.4	9.9
6	0.8	25.9	0.7	21.9	0.5	12.8
8	1.1	35.6	1.0	30.2	0.6	17.1
10	1.4	45.4	1.2	38.6	0.8	22.1
12	1.6	55.1	1.5	46.9	1.0	27.0
14	1.9	65.4	1.8	55.3	1.2	32.0
16	2.4	80.0	2.1	65.7	1.4	36.9
18	3.0	101.6	2.5	78.4	1.6	41.9
20	3.7	122.8	3.1	98.1	1.7	46.9
22	4.5	150.4	3.7	117.0	1.9	52.1
24	5.7	192.0	4.5	141.2	2.2	59.5
26	7.2	240.7	5.7	176.9	2.5	66.9
28	8.6	289.5	7.0	218.6	2.9	79.0
30	10.1	338.2	8.3	260.3	3.3	89.3
32	11.5	386.9	9.7	302.0	3.7	101.1
34	13.0	435.6	11.0	343.7	4.3	115.1
36	14.4	484.3	12.3	385.4	4.9	132.8
38	15.9	533.0	13.7	427.1	5.7	155.0
40	17.3	581.7	15.0	468.8	6.7	179.4
42	18.8	630.4	16.4	510.5	7.6	204.5
44	20.2	679.2	17.7	552.2	8.5	229.3
46	21.7	727.9	19.0	593.8	9.4	254.1
48	23.1	776.6	20.4	635.5	10.3	278.9
50	24.6	825.3	21.7	677.2	11.3	303.6
52	26.1	874.0	23.0	718.9	12.2	328.4
54	27.5	922.7	24.4	760.6	13.1	353.2
56	29.0	971.4	25.7	802.3	14.0	378.0
58	30.4	1020.1	27.0	844.0	14.9	402.8
60	31.9	1068.9	28.4	885.7	15.8	427.5
62	33.3	1117.6	29.7	927.4	16.8	452.3
64	34.8	1166.3	31.1	969.1	17.7	477.1
66	36.2	1215.0	32.4	1010.8	18.6	501.9
68	37.7	1263.7	33.7	1052.5	19.5	526.6
70	39.1	1312.4	35.1	1094.2	20.4	551.4
72	40.6	1361.1	36.4	1135.9	21.3	576.2
74	42.0	1409.8	37.7	1177.6	22.3	601.0
76	43.5	1458.6	39.1	1219.3	23.2	625.8
78	44.9	1507.3	40.4	1261.0	24.1	650.5
80	46.4	1556.0	41.7	1302.7	25.0	675.3
82	47.8	1604.7	43.1	1344.4	25.9	700.1
84	49.3	1653.4	44.4	1386.1	26.9	724.9
86	50.7	1702.1	45.7	1427.8	27.8	749.6
88	52.2	1750.8	47.1	1469.4	28.7	774.4
90	53.6	1799.6	48.4	1511.1	29.6	799.2
92	55.1	1848.3	49.8	1552.8	30.5	824.0
94	56.5	1897.0	51.1	1594.5	31.4	848.8
96	58.0	1945.7	52.4	1636.2	32.4	873.5
98	59.4	1994.4	53.8	1677.9	33.3	898.3
100	60.9	2043.1	55.1	1719.6	34.2	923.1

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

TABLE A-26

THE ECONOMIC IMPACT OF AN INTERRUPTION IN PETROLEUM IMPORTS, 2000

PERCENT IMPORT REDUCTION	HIGH		BEST		LOW	
	1	2	1	2	1	2
2	0.3	10.2	0.3	8.7	0.2	5.1
4	0.5	17.2	0.5	15.2	0.4	10.3
6	0.8	27.2	0.7	23.0	0.5	13.3
8	1.1	37.4	1.0	31.7	0.6	17.8
10	1.4	47.6	1.3	40.5	0.8	22.9
12	1.7	57.8	1.5	49.2	1.0	28.0
14	2.0	69.0	1.8	58.0	1.2	33.2
16	2.4	84.3	2.1	69.3	1.4	38.3
18	3.1	107.3	2.6	83.5	1.6	43.5
20	3.7	130.0	3.2	103.7	1.7	48.6
22	4.6	160.4	3.8	124.0	1.9	54.2
24	5.9	205.4	4.7	151.3	2.2	61.9
26	7.4	256.5	5.9	190.0	2.5	69.7
28	8.8	307.6	7.2	233.7	3.0	82.5
30	10.3	358.7	8.6	277.4	3.3	93.0
32	11.8	409.8	9.9	321.1	3.8	105.4
34	13.2	460.9	11.3	364.8	4.3	120.2
36	14.7	512.0	12.6	408.6	5.0	139.2
38	16.2	563.1	14.0	452.3	5.9	162.8
40	17.6	614.2	15.3	496.0	6.8	188.5
42	19.1	665.3	16.7	539.7	7.7	214.2
44	20.6	716.4	18.0	583.4	8.6	239.9
46	22.0	767.5	19.4	627.1	9.6	265.6
48	23.5	818.6	20.7	670.8	10.5	291.2
50	24.9	869.7	22.1	714.5	11.4	316.9
52	26.4	920.8	23.5	758.3	12.3	342.6
54	27.9	971.9	24.8	802.0	13.2	368.3
56	29.3	1023.0	26.2	845.7	14.2	394.0
58	30.8	1074.1	27.5	889.4	15.1	419.7
60	32.3	1125.2	28.9	933.1	16.0	445.4
62	33.7	1176.3	30.2	976.8	16.9	471.1
64	35.2	1227.4	31.6	1020.5	17.9	496.7
66	36.7	1278.5	32.9	1064.3	18.8	522.4
68	38.1	1329.6	34.3	1108.0	19.7	548.1
70	39.6	1380.7	35.6	1151.7	20.6	573.8
72	41.1	1431.8	37.0	1195.4	21.6	599.5
74	42.5	1482.9	38.3	1239.1	22.5	625.2
76	44.0	1534.0	39.7	1282.8	23.4	650.9
78	45.5	1585.1	41.0	1326.5	24.3	676.6
80	46.9	1636.2	42.4	1370.3	25.3	702.2
82	48.4	1687.3	43.7	1414.0	26.2	727.9
84	49.9	1738.4	45.1	1457.7	27.1	753.6
86	51.3	1789.5	46.4	1501.4	28.0	779.3
88	52.8	1840.6	47.8	1545.1	29.0	805.0
90	54.3	1891.7	49.1	1588.8	29.9	830.7
92	55.7	1942.8	50.5	1632.5	30.8	856.4
94	57.2	1993.9	51.8	1676.2	31.7	882.1
96	58.7	2045.0	53.2	1720.0	32.7	907.7
98	60.1	2096.1	54.5	1763.7	33.6	933.4
100	61.6	2147.2	55.9	1807.4	34.5	959.1

COLUMN 1--PERCENT OUTPUT REDUCTION
COLUMN 2--DOLLAR COST OF THE INTERRUPTION, BILLIONS OF 1973 DOLLARS

APPENDIX B

THE FUTURE SOURCES OF U.S. PETROLEUM IMPORTS

TABLE B-1

THE ORIGIN OF UNITED STATES IMPORTS, 1975, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.5	2.5	2.5
CANADA	1.1	1.1	1.1
MIDDLE EAST	2.3	2.1	1.7
AFRICA	1.2	1.0	0.8
OTHER	0.4	0.4	0.4
TOTAL	7.4	7.1	6.5

THE ORIGIN OF UNITED STATES IMPORTS, 1975, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.3	2.3	2.3
CANADA	1.0	1.0	1.0
MIDDLE EAST	2.5	2.2	1.8
AFRICA	1.2	1.1	0.9
OTHER	0.4	0.4	0.4
TOTAL	7.4	7.1	6.5

THE ORIGIN OF UNITED STATES IMPORTS, 1975, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.0	1.0	1.0
MIDDLE EAST	2.6	2.3	1.9
AFRICA	1.3	1.2	1.0
OTHER	0.4	0.4	0.4
TOTAL	7.4	7.1	6.5

TABLE B-2

THE ORIGIN OF UNITED STATES IMPORTS, 1976, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.5	2.5	2.5
CANADA	1.1	1.1	1.1
MIDDLE EAST	2.7	2.2	1.7
AFRICA	1.3	1.1	0.9
OTHER	0.5	0.5	0.5
TOTAL	8.1	7.4	6.6

THE ORIGIN OF UNITED STATES IMPORTS, 1976, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.3	2.3	2.3
CANADA	1.0	1.0	1.0
MIDDLE EAST	2.9	2.4	1.9
AFRICA	1.4	1.2	0.9
OTHER	0.5	0.5	0.5
TOTAL	8.1	7.4	6.6

THE ORIGIN OF UNITED STATES IMPORTS, 1976, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.0	1.0	1.0
MIDDLE EAST	3.0	2.5	2.0
AFRICA	1.5	1.3	1.0
OTHER	0.5	0.5	0.5
TOTAL	8.1	7.4	6.6

TABLE B-3

THE ORIGIN OF UNITED STATES IMPORTS, 1977, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.6	2.6	2.6
CANADA	1.2	1.2	1.2
MIDDLE EAST	3.1	2.4	1.7
AFRICA	1.5	1.2	0.9
OTHER	0.5	0.5	0.5
TOTAL	8.9	7.8	6.8

THE ORIGIN OF UNITED STATES IMPORTS, 1977, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.3	2.3	2.3
CANADA	1.1	1.1	1.1
MIDDLE EAST	3.3	2.6	1.9
AFRICA	1.6	1.3	1.0
OTHER	0.5	0.5	0.5
TOTAL	8.9	7.8	6.8

THE ORIGIN OF UNITED STATES IMPORTS, 1977, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.1	1.1	1.1
MIDDLE EAST	3.4	2.7	2.1
AFRICA	1.7	1.4	1.0
OTHER	0.5	0.5	0.5
TOTAL	8.9	7.8	6.8

TABLE B-4

THE ORIGIN OF UNITED STATES IMPORTS, 1978, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.6	2.6	2.6
CANADA	1.2	1.2	1.2
MIDDLE EAST	3.5	2.6	1.8
AFRICA	1.7	1.3	0.9
OTHER	0.5	0.5	0.5
TOTAL	9.6	8.2	7.0

THE ORIGIN OF UNITED STATES IMPORTS, 1978, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.4	2.4	2.4
CANADA	1.1	1.1	1.1
MIDDLE EAST	3.7	2.8	2.0
AFRICA	1.9	1.4	1.0
OTHER	0.5	0.5	0.5
TOTAL	9.6	8.2	7.0

THE ORIGIN OF UNITED STATES IMPORTS, 1978, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.1	1.1	1.1
MIDDLE EAST	3.9	3.0	2.2
AFRICA	1.9	1.5	1.1
OTHER	0.5	0.5	0.5
TOTAL	9.6	8.2	7.0

TABLE B-5

THE ORIGIN OF UNITED STATES IMPORTS, 1979, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.7	2.7	2.7
CANADA	1.3	1.3	1.3
MIDDLE EAST	3.9	2.7	1.8
AFRICA	2.0	1.4	0.9
OTHER	0.5	0.5	0.5
TOTAL	10.4	8.6	7.2

THE ORIGIN OF UNITED STATES IMPORTS, 1979, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.4	2.4	2.4
CANADA	1.2	1.2	1.2
MIDDLE EAST	4.2	3.0	2.1
AFRICA	2.1	1.5	1.0
OTHER	0.5	0.5	0.5
TOTAL	10.4	8.6	7.2

THE ORIGIN OF UNITED STATES IMPORTS, 1979, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.1	1.1	1.1
MIDDLE EAST	4.4	3.2	2.3
AFRICA	2.2	1.6	1.1
OTHER	0.5	0.5	0.5
TOTAL	10.4	8.6	7.2

TABLE B-6

THE ORIGIN OF UNITED STATES IMPORTS, 1980, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.8	2.8	2.8
CANADA	1.4	1.4	1.4
MIDDLE EAST	4.3	2.9	1.8
AFRICA	2.2	1.5	0.9
OTHER	0.5	0.5	0.5
TOTAL	11.2	9.0	7.4

THE ORIGIN OF UNITED STATES IMPORTS, 1980, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.4	2.4	2.4
CANADA	1.2	1.2	1.2
MIDDLE EAST	4.7	3.2	2.2
AFRICA	2.3	1.6	1.1
OTHER	0.5	0.5	0.5
TOTAL	11.2	9.0	7.4

THE ORIGIN OF UNITED STATES IMPORTS, 1980, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.2	1.2	1.2
MIDDLE EAST	4.9	3.4	2.4
AFRICA	2.4	1.7	1.2
OTHER	0.5	0.5	0.5
TOTAL	11.2	9.0	7.4

TABLE B-7

THE ORIGIN OF UNITED STATES IMPORTS, 1981, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.8	2.8	2.8
CANADA	1.4	1.4	1.4
MIDDLE EAST	4.6	3.2	2.0
AFRICA	2.3	1.6	1.0
OTHER	0.6	0.6	0.6
TOTAL	11.8	9.6	7.8

THE ORIGIN OF UNITED STATES IMPORTS, 1981, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.4	2.4	2.4
CANADA	1.3	1.3	1.3
MIDDLE EAST	5.0	3.5	2.3
AFRICA	2.5	1.8	1.2
OTHER	0.6	0.6	0.6
TOTAL	11.8	9.6	7.8

THE ORIGIN OF UNITED STATES IMPORTS, 1981, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.2	1.2	1.2
MIDDLE EAST	5.2	3.8	2.5
AFRICA	2.6	1.9	1.3
OTHER	0.6	0.6	0.6
TOTAL	11.8	9.6	7.8

TABLE B-8

THE ORIGIN OF UNITED STATES IMPORTS, 1982, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.9	2.9	2.9
CANADA	1.5	1.5	1.5
MIDDLE EAST	5.0	3.5	2.1
AFRICA	2.5	1.7	1.0
OTHER	0.6	0.6	0.6
TOTAL	12.4	10.2	8.1

THE ORIGIN OF UNITED STATES IMPORTS, 1982, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.5	2.5	2.5
CANADA	1.3	1.3	1.3
MIDDLE EAST	5.3	3.9	2.5
AFRICA	2.7	1.9	1.2
OTHER	0.6	0.6	0.6
TOTAL	12.4	10.2	8.1

THE ORIGIN OF UNITED STATES IMPORTS, 1982, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.3	1.3	1.3
MIDDLE EAST	5.6	4.1	2.7
AFRICA	2.8	2.1	1.4
OTHER	0.6	0.6	0.6
TOTAL	12.4	10.2	8.1

TABLE B-9

THE ORIGIN OF UNITED STATES IMPORTS, 1983, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.9	2.9	2.9
CANADA	1.6	1.6	1.6
MIDDLE EAST	5.3	3.8	2.2
AFRICA	2.6	1.9	1.1
OTHER	0.6	0.6	0.6
TOTAL	13.1	10.8	8.5

THE ORIGIN OF UNITED STATES IMPORTS, 1983, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.5	2.5	2.5
CANADA	1.4	1.4	1.4
MIDDLE EAST	5.7	4.2	2.6
AFRICA	2.9	2.1	1.3
OTHER	0.6	0.6	0.6
TOTAL	13.1	10.8	8.5

THE ORIGIN OF UNITED STATES IMPORTS, 1983, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.3	1.3	1.3
MIDDLE EAST	6.0	4.5	2.9
AFRICA	3.0	2.2	1.5
OTHER	0.6	0.6	0.6
TOTAL	13.1	10.8	8.5

TABLE B-10

THE ORIGIN OF UNITED STATES IMPORTS, 1984, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.0	3.0	3.0
CANADA	1.6	1.6	1.6
MIDDLE EAST	5.6	4.1	2.4
AFRICA	2.8	2.1	1.2
OTHER	0.7	0.7	0.7
TOTAL	13.8	11.5	8.8

THE ORIGIN OF UNITED STATES IMPORTS, 1984, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.5	2.5	2.5
CANADA	1.4	1.4	1.4
MIDDLE EAST	6.1	4.6	2.8
AFRICA	3.1	2.3	1.4
OTHER	0.7	0.7	0.7
TOTAL	13.8	11.5	8.8

THE ORIGIN OF UNITED STATES IMPORTS, 1984, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.4	1.4	1.4
MIDDLE EAST	6.4	4.9	3.1
AFRICA	3.2	2.4	1.5
OTHER	0.7	0.7	0.7
TOTAL	13.8	11.5	8.8

TABLE B-11

THE ORIGIN OF UNITED STATES IMPORTS, 1985, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.1	3.1	3.1
CANADA	1.7	1.7	1.7
MIDDLE EAST	6.0	4.4	2.5
AFRICA	3.0	2.2	1.2
OTHER	0.7	0.7	0.7
TOTAL	14.5	12.1	9.2

THE ORIGIN OF UNITED STATES IMPORTS, 1985, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.5	2.5	2.5
CANADA	1.5	1.5	1.5
MIDDLE EAST	6.5	4.9	3.0
AFRICA	3.3	2.5	1.5
OTHER	0.7	0.7	0.7
TOTAL	14.5	12.1	9.2

THE ORIGIN OF UNITED STATES IMPORTS, 1985, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.4	1.4	1.4
MIDDLE EAST	6.8	5.2	3.3
AFRICA	3.4	2.6	1.7
OTHER	0.7	0.7	0.7
TOTAL	14.5	12.1	9.2

TABLE B-12

THE ORIGIN OF UNITED STATES IMPORTS, 1986, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.1	3.1	3.1
CANADA	1.8	1.8	1.8
MIDDLE EAST	6.4	4.7	2.6
AFRICA	3.2	2.4	1.3
OTHER	0.7	0.7	0.7
TOTAL	15.2	12.8	9.5

THE ORIGIN OF UNITED STATES IMPORTS, 1986, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.6	2.6	2.6
CANADA	1.5	1.5	1.5
MIDDLE EAST	6.9	5.3	3.1
AFRICA	3.5	2.6	1.6
OTHER	0.7	0.7	0.7
TOTAL	15.2	12.8	9.5

THE ORIGIN OF UNITED STATES IMPORTS, 1986, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.5	1.5	1.5
MIDDLE EAST	7.2	5.6	3.4
AFRICA	3.6	2.8	1.7
OTHER	0.7	0.7	0.7
TOTAL	15.2	12.8	9.5

TABLE B-13

THE ORIGIN OF UNITED STATES IMPORTS, 1987, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.2	3.2	3.2
CANADA	1.9	1.9	1.9
MIDDLE EAST	6.7	5.0	2.6
AFRICA	3.4	2.5	1.3
OTHER	0.8	0.8	0.8
TOTAL	16.0	13.4	9.8

THE ORIGIN OF UNITED STATES IMPORTS, 1987, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.6	2.6	2.6
CANADA	1.6	1.6	1.6
MIDDLE EAST	7.4	5.6	3.2
AFRICA	3.7	2.8	1.6
OTHER	0.8	0.8	0.8
TOTAL	16.0	13.4	9.8

THE ORIGIN OF UNITED STATES IMPORTS, 1987, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.5	1.5	1.5
MIDDLE EAST	7.7	6.0	3.6
AFRICA	3.8	3.0	1.8
OTHER	0.8	0.8	0.8
TOTAL	16.0	13.4	9.8

TABLE B-14

THE ORIGIN OF UNITED STATES IMPORTS, 1988, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.3	3.3	3.3
CANADA	2.0	2.0	2.0
MIDDLE EAST	7.1	5.3	2.7
AFRICA	3.6	2.7	1.4
OTHER	0.8	0.8	0.8
TOTAL	16.8	14.1	10.1

THE ORIGIN OF UNITED STATES IMPORTS, 1988, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.6	2.6	2.6
CANADA	1.7	1.7	1.7
MIDDLE EAST	7.8	6.0	3.4
AFRICA	3.9	3.0	1.7
OTHER	0.8	0.8	0.8
TOTAL	16.8	14.1	10.1

THE ORIGIN OF UNITED STATES IMPORTS, 1988, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.6	1.6	1.6
MIDDLE EAST	8.2	6.4	3.7
AFRICA	4.1	3.2	1.9
OTHER	0.8	0.8	0.8
TOTAL	16.8	14.1	10.1

TABLE B-15

THE ORIGIN OF UNITED STATES IMPORTS, 1989, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.4	3.4	3.4
CANADA	2.1	2.1	2.1
MIDDLE EAST	7.6	5.6	2.8
AFRICA	3.8	2.8	1.4
OTHER	0.8	0.8	0.8
TOTAL	17.6	14.8	10.4

THE ORIGIN OF UNITED STATES IMPORTS, 1989, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.6	2.6	2.6
CANADA	1.7	1.7	1.7
MIDDLE EAST	8.3	6.4	3.5
AFRICA	4.1	3.2	1.7
OTHER	0.8	0.8	0.8
TOTAL	17.6	14.8	10.4

THE ORIGIN OF UNITED STATES IMPORTS, 1989, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.6	1.6	1.6
MIDDLE EAST	8.6	6.7	3.9
AFRICA	4.3	3.4	1.9
OTHER	0.8	0.8	0.8
TOTAL	17.6	14.8	10.4

TABLE B-16

THE ORIGIN OF UNITED STATES IMPORTS, 1990, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.4	3.4	3.4
CANADA	2.2	2.2	2.2
MIDDLE EAST	8.0	6.0	2.8
AFRICA	4.0	3.0	1.4
OTHER	0.9	0.9	0.9
TOTAL	18.5	15.5	10.8

THE ORIGIN OF UNITED STATES IMPORTS, 1990, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.7	2.7	2.7
CANADA	1.8	1.8	1.8
MIDDLE EAST	8.7	6.7	3.6
AFRICA	4.4	3.4	1.8
OTHER	0.9	0.9	0.9
TOTAL	18.5	15.5	10.8

THE ORIGIN OF UNITED STATES IMPORTS, 1990, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.7	1.7	1.7
MIDDLE EAST	9.1	7.1	4.0
AFRICA	4.6	3.6	2.0
OTHER	0.9	0.9	0.9
TOTAL	18.5	15.5	10.8

TABLE B-17

THE ORIGIN OF UNITED STATES IMPORTS, 1991, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.5	3.5	3.5
CANADA	2.3	2.3	2.3
MIDDLE EAST	8.4	6.3	2.9
AFRICA	4.2	3.2	1.5
OTHER	0.9	0.9	0.9
TOTAL	19.3	16.2	11.1

THE ORIGIN OF UNITED STATES IMPORTS, 1991, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.7	2.7	2.7
CANADA	1.9	1.9	1.9
MIDDLE EAST	9.2	7.1	3.7
AFRICA	4.6	3.6	1.9
OTHER	0.9	0.9	0.9
TOTAL	19.3	16.2	11.1

THE ORIGIN OF UNITED STATES IMPORTS, 1991, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.7	1.7	1.7
MIDDLE EAST	9.7	7.6	4.2
AFRICA	4.8	3.8	2.1
OTHER	0.9	0.9	0.9
TOTAL	19.3	16.2	11.1

TABLE B-18

THE ORIGIN OF UNITED STATES IMPORTS, 1992, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.6	3.6	3.6
CANADA	2.4	2.4	2.4
MIDDLE EAST	8.9	6.7	3.0
AFRICA	4.4	3.3	1.5
OTHER	1.0	1.0	1.0
TOTAL	20.3	17.0	11.5

THE ORIGIN OF UNITED STATES IMPORTS, 1992, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.7	2.7	2.7
CANADA	1.9	1.9	1.9
MIDDLE EAST	9.8	7.5	3.9
AFRICA	4.9	3.8	1.9
OTHER	1.0	1.0	1.0
TOTAL	20.3	17.0	11.5

THE ORIGIN OF UNITED STATES IMPORTS, 1992, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.8	1.8	1.8
MIDDLE EAST	10.2	8.0	4.3
AFRICA	5.1	4.0	2.2
OTHER	1.0	1.0	1.0
TOTAL	20.3	17.0	11.5

TABLE B-19

THE ORIGIN OF UNITED STATES IMPORTS, 1993, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.7	3.7	3.7
CANADA	2.5	2.5	2.5
MIDDLE EAST	9.3	7.0	3.1
AFRICA	4.7	3.5	1.5
OTHER	1.0	1.0	1.0
TOTAL	21.2	17.7	11.8

THE ORIGIN OF UNITED STATES IMPORTS, 1993, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.8	2.8	2.8
CANADA	2.0	2.0	2.0
MIDDLE EAST	10.3	8.0	4.0
AFRICA	5.1	4.0	2.0
OTHER	1.0	1.0	1.0
TOTAL	21.2	17.7	11.8

THE ORIGIN OF UNITED STATES IMPORTS, 1993, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.9	1.9	1.9
MIDDLE EAST	10.8	8.4	4.5
AFRICA	5.4	4.2	2.2
OTHER	1.0	1.0	1.0
TOTAL	21.2	17.7	11.8

TABLE B-20

THE ORIGIN OF UNITED STATES IMPORTS, 1994, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.7	3.7	3.7
CANADA	2.6	2.6	2.6
MIDDLE EAST	9.8	7.4	3.1
AFRICA	4.9	3.7	1.6
OTHER	1.1	1.1	1.1
TOTAL	22.2	18.5	12.2

THE ORIGIN OF UNITED STATES IMPORTS, 1994, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.8	2.8	2.8
CANADA	2.1	2.1	2.1
MIDDLE EAST	10.8	8.4	4.2
AFRICA	5.4	4.2	2.1
OTHER	1.1	1.1	1.1
TOTAL	22.2	18.5	12.2

THE ORIGIN OF UNITED STATES IMPORTS, 1994, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	1.9	1.9	1.9
MIDDLE EAST	11.3	8.9	4.7
AFRICA	5.7	4.4	2.3
OTHER	1.1	1.1	1.1
TOTAL	22.2	18.5	12.2

TABLE B-21

THE ORIGIN OF UNITED STATES IMPORTS, 1995, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.8	3.8	3.8
CANADA	2.8	2.8	2.8
MIDDLE EAST	10.3	7.8	3.2
AFRICA	5.2	3.9	1.6
OTHER	1.1	1.1	1.1
TOTAL	23.2	19.4	12.6

THE ORIGIN OF UNITED STATES IMPORTS, 1995, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.8	2.8	2.8
CANADA	2.2	2.2	2.2
MIDDLE EAST	11.4	8.8	4.3
AFRICA	5.7	4.4	2.1
OTHER	1.1	1.1	1.1
TOTAL	23.2	19.4	12.6

THE ORIGIN OF UNITED STATES IMPORTS, 1995, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	2.0	2.0	2.0
MIDDLE EAST	11.9	9.4	4.8
AFRICA	6.0	4.7	2.4
OTHER	1.1	1.1	1.1
TOTAL	23.2	19.4	12.6

TABLE B-22

THE ORIGIN OF UNITED STATES IMPORTS, 1996, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	3.9	3.9	3.9
CANADA	2.9	2.9	2.9
MIDDLE EAST	10.8	8.1	3.3
AFRICA	5.4	4.1	1.6
OTHER	1.2	1.2	1.2
TOTAL	24.3	20.2	12.9

THE ORIGIN OF UNITED STATES IMPORTS, 1996, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.8	2.8	2.8
CANADA	2.2	2.2	2.2
MIDDLE EAST	12.0	9.3	4.4
AFRICA	6.0	4.6	2.2
OTHER	1.2	1.2	1.2
TOTAL	24.3	20.2	12.9

THE ORIGIN OF UNITED STATES IMPORTS, 1996, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	2.1	2.1	2.1
MIDDLE EAST	12.5	9.8	5.0
AFRICA	6.3	4.9	2.5
OTHER	1.2	1.2	1.2
TOTAL	24.3	20.2	12.9

TABLE B-23

THE ORIGIN OF UNITED STATES IMPORTS, 1997, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	4.0	4.0	4.0
CANADA	3.1	3.1	3.1
MIDDLE EAST	11.4	8.5	3.4
AFRICA	5.7	4.3	1.7
OTHER	1.3	1.3	1.3
TOTAL	25.3	21.1	13.3

THE ORIGIN OF UNITED STATES IMPORTS, 1997, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.9	2.9	2.9
CANADA	2.3	2.3	2.3
MIDDLE EAST	12.6	9.8	4.6
AFRICA	6.3	4.9	2.3
OTHER	1.3	1.3	1.3
TOTAL	25.3	21.1	13.3

THE ORIGIN OF UNITED STATES IMPORTS, 1997, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	2.2	2.2	2.2
MIDDLE EAST	13.2	10.3	5.2
AFRICA	6.6	5.2	2.6
OTHER	1.3	1.3	1.3
TOTAL	25.3	21.1	13.3

TABLE B-24

THE ORIGIN OF UNITED STATES IMPORTS, 1990, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	4.1	4.1	4.1
CANADA	3.2	3.2	3.2
MIDDLE EAST	11.9	8.9	3.4
AFRICA	6.0	4.5	1.7
OTHER	1.3	1.3	1.3
TOTAL	26.5	22.0	13.8

THE ORIGIN OF UNITED STATES IMPORTS, 1998, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.9	2.9	2.9
CANADA	2.4	2.4	2.4
MIDDLE EAST	13.2	10.2	4.7
AFRICA	6.6	5.1	2.4
OTHER	1.3	1.3	1.3
TOTAL	26.5	22.0	13.8

THE ORIGIN OF UNITED STATES IMPORTS, 1998, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	2.2	2.2	2.2
MIDDLE EAST	13.8	10.9	5.4
AFRICA	6.9	5.4	2.7
OTHER	1.3	1.3	1.3
TOTAL	26.5	22.0	13.8

TABLE B-25

THE ORIGIN OF UNITED STATES IMPORTS, 1999, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	4.2	4.2	4.2
CANADA	3.4	3.4	3.4
MIDDLE EAST	12.5	9.4	3.5
AFRICA	6.2	4.7	1.8
OTHER	1.4	1.4	1.4
TOTAL	27.6	22.9	14.2

THE ORIGIN OF UNITED STATES IMPORTS, 1999, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.9	2.9	2.9
CANADA	2.5	2.5	2.5
MIDDLE EAST	13.9	10.7	4.9
AFRICA	6.9	5.4	2.4
OTHER	1.4	1.4	1.4
TOTAL	27.6	22.9	14.2

THE ORIGIN OF UNITED STATES IMPORTS, 1999, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	2.3	2.3	2.3
MIDDLE EAST	14.5	11.4	5.5
AFRICA	7.3	5.7	2.8
OTHER	1.4	1.4	1.4
TOTAL	27.6	22.9	14.2

TABLE B-26

THE ORIGIN OF UNITED STATES IMPORTS, 2000, MILLION BBLS/DAY

SCENARIO 1

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	4.3	4.3	4.3
CANADA	3.5	3.5	3.5
MIDDLE EAST	13.1	9.8	3.6
AFRICA	6.5	4.9	1.8
OTHER	1.5	1.5	1.5
TOTAL	28.8	23.9	14.6

THE ORIGIN OF UNITED STATES IMPORTS, 2000, MILLION BBLS/DAY

SCENARIO 2

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	3.0	3.0	3.0
CANADA	2.6	2.6	2.6
MIDDLE EAST	14.5	11.3	5.1
AFRICA	7.3	5.6	2.5
OTHER	1.5	1.5	1.5
TOTAL	28.8	23.9	14.6

THE ORIGIN OF UNITED STATES IMPORTS, 2000, MILLION BBLS/DAY

SCENARIO 3

	IMPORT CASE		
	HIGH	BEST	LOW
CARIBBEAN	2.2	2.2	2.2
CANADA	2.4	2.4	2.4
MIDDLE EAST	15.2	11.9	5.7
AFRICA	7.6	6.0	2.9
OTHER	1.5	1.5	1.5
TOTAL	28.8	23.9	14.6