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SHORT-TERM ENERGY OUTLOOK

QUARTERLY PROJECTIONS

ENERGY INFORMATION ADMINISTRATION

February 1991

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Short-Term Energy Outlook

Quarterly Projections, First Quarter 1991

February 1991

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Domestic crude oil production figures are provided by the EIA Dallas Field Office, under the supervision of John H. Wood. Nuclear electricity generation is provided by Roger Diedrich; hydroelectric generation, electricity imports, and electricity purchases from nonutilities are provided by Patricia Toner; and coal production, imports, and exports are provided by Frederick Freme—all of the EIA Office of Coal, Nuclear, Electric and Alternate Fuels. World petroleum values are prepared by the International and Contingency Information Division, Mark Rodekohr, Director. The article on "Oil Home Heating Conversions" was prepared by James Kendell of the EIA Office of Oil and Gas. The article on "Vehicle Efficiency Improvements: 1989 and 1990" was prepared by Michael Morris of the EIA Office of Energy Markets and End Use.

Preface

The Energy Information Administration (EIA) presents future scenarios of quarterly short-term energy supply, demand, and prices for publication in February, May, August, and November in the *Short-Term Energy Outlook (Outlook)*. An annual supplement analyzes previous estimate errors, compares recent scenarios with those of other forecasting services, and discusses current topics related to the short-term energy markets. (See *Short-Term Energy Outlook: Annual Supplement*, DOE/EIA-0202.) The principal users of the *Outlook* are managers and energy analysts in private industry and government. The scenario period for this issue of the *Outlook* extends from the first quarter of 1991 through the fourth quarter of 1991. Some data for the fourth quarter of 1990 are preliminary EIA estimates (for example, some petroleum estimates are based on statistics from the *Weekly Petroleum Status Report*) or are derived from internal model simulations using the latest exogenous information available (for example, some electricity demand estimates are based on recent weather data).

The scenarios are produced using the Short-Term Integrated Forecasting System (STIFS). The STIFS model is driven principally by the following sets of assumptions or inputs: estimates of key macroeconomic variables, world oil price assumptions, and assumptions about the severity of weather. Macroeconomic estimates are produced by DRI/McGraw-Hill, but are adjusted by EIA to reflect EIA assumptions about the world price of crude oil, energy product prices, and other assumptions which may affect the macroeconomic outlook. (The EIA model is available on computer tape from the National Technical Information Service.)

The scenarios and historical data are based on EIA data published in the *Monthly Energy Review, Petroleum Supply Monthly*, and other EIA publications. Minor discrepancies between the data in those publications and the historical data in this *Outlook* are due to independent rounding. All percentage changes are calculated from the values in the tables rather than from any rounded numbers cited in the text.

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Highlights

Oil Prices Remain Uncertain

Crude oil prices have fluctuated sharply since last August. The collapse of prices to near $20 per barrel immediately following the start of Desert Storm provided the latest segment of a steep downward trend which began last October. Absent any additional disruption to production and transportation facilities in the Persian Gulf, there is market pressure for continued lower oil prices. Falling demand, combined with more than adequate inventories worldwide, are promoting the expectation of continued low oil prices, especially if the Gulf crisis abates. This expectation has been reinforced by sales of strategic oil reserves currently being conducted by the members of the International Energy Agency. Although lower world oil price cases dominate the news now, because of the possibility of continued volatility, three world oil prices are considered—$20, $25, and $30 per barrel. Summaries of results for these cases are shown in Tables 1 through 3.

Recession Stalls Energy Growth This Year

An economic recession has been slowing growth in energy demand since at least the fourth quarter of 1990. Average growth in the United States economy is expected to be slightly negative in 1991, and declines or substantial slowing of growth for most energy products are expected this year especially if energy prices remain at or above the levels of late January. Petroleum demand is expected to be affected most by the downturn, with the slowing of economic activity contributing to a significant reduction in consumption even if oil prices average near $20 per barrel.

Net Oil Imports: Growth May Resume if Prices Stay Low

Falling oil demand combined with the response of domestic oil producers to both market and non-market incentives for higher output since the onset of the current Persian Gulf crisis resulted in virtually flat net imports of oil and oil products in 1990. If the current, relatively low price situation continues, net imports could rise by about 100,000 barrels per day this year, as demand is kept from falling sharply and oil production improvements level off.

Natural Gas Demand Rises in 1991

The assumption of normal weather in 1991 leads to the projection of sharply higher residential gas demand this year compared to the weather-depressed levels of 1990. Total gas demand will rise if the relatively strong use in industrial and electric utility applications in 1990 continues. However, the currently low oil prices make this latter development less likely than if oil prices regain strength.

Growth in Electricity Demand Led by Residential Sector

Electricity sales are expected to increase by 1.5 percent in 1991. Most of this growth should occur in the residential sector because of stable long-term trends, such as population growth and continued household formation. Due to the economic slowdown, commercial sector growth should slow somewhat and industrial sales should decline.

Note: The data referenced on this page may be found in the tables that follow or in the tables located in the back of this report.

Table 1. $20 World Oil Price Case Summary

Assumptions and Projections	Year				Annual Percentage Change		
	1988	1989	1990	1991	1988-1989	1989-1990	1990-1991
Macroeconomic Indicators							
Real Gross National Product (billion 1982 dollars)	4,017	4,118	4,157	4,154	2.5	0.9	-0.1
Index of Industrial Production (Mfg.) (index, 1977=1.000)	1.058	1.089	1.101	1.081	2.9	1.1	-1.8
Imported Crude Oil Price (nominal dollars per barrel)	14.56	18.08	21.75	20.00	24.2	20.3	-8.0
Retail Prices (nominal)[a]							
Motor Gasoline[b] (dollars per gallon)	.96	1.06	1.22	1.22	10.4	15.1	.0
No. 2 Heating Oil (dollars per gallon)	.81	.90	1.07	1.04	11.1	18.9	-2.8
Residential Natural Gas (dollars per thousand cubic feet)	5.47	5.64	5.81	5.90	3.1	3.0	1.5
Residential Electricity (cents per kilowatthour)	7.49	7.64	7.87	8.10	2.0	3.0	2.9
Petroleum Supply							
Crude Oil Production[c] (million barrels per day)	8.14	7.61	7.30	7.21	-6.5	-4.1	-1.2
Net Petroleum Imports, Including SPR (million barrels per day)	6.59	7.20	7.17	7.28	9.3	-.4	1.5
Energy Demands							
Total Market Economies Petroleum Consumption (million barrels per day)	51.05	52.37	53.06	53.89	2.6	1.3	1.6
Total U. S. Petroleum Consumption (million barrels per day)	17.28	17.33	16.96	16.79	.3	-2.1	-1.0
Motor Gasoline	7.34	7.33	7.21	7.13	-.1	-1.6	-1.1
Jet Fuel	1.45	1.49	1.49	1.49	2.8	.0	.0
Distillate Fuel Oil	3.12	3.16	3.05	3.07	1.3	-3.5	.7
Residual Fuel Oil	1.38	1.37	1.22	1.17	-.7	-10.9	-4.1
Other Petroleum[d]	4.00	3.98	3.99	3.93	-.5	.3	-1.5
Natural Gas Consumption (trillion cubic feet)	18.03	18.90	18.79	18.71	4.8	-.6	-.4
Coal Consumption (million short tons)	884	889	892	906	.6	.3	1.6
Electricity Sales[e] (billion kilowatthours)	2,567.9	2,646.7	2,706.8	2,747.8	3.1	2.3	1.5
Gross Energy Consumption[f] (quadrillion Btu)	80.20	81.41	81.13	81.24	1.5	-.3	.1
Thousand Btu/1982 Dollar of GNP	19.97	19.77	19.52	19.56	-1.0	-1.3	.2

[a]All prices include taxes, except for No. 2 heating oil and residential electricity.
[b]Average for all grades and services.
[c]Includes lease condensate.
[d]Includes crude oil product supplied, natural gas liquids, liquefied refinery gases, other liquids, and all finished petroleum products expect motor gasoline, jet fuel, and distillate and residual fuel oils.
[e]Total annual electricity sales for historical periods are derived from the sum of monthly sales figures based on submissions by electric utilities of Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." These historical values differ from annual sales totals based on Form EIA-861, reported in several EIA publications, but match alternate annual totals reported in EIA's *Electric Power Monthly,* DOE/EIA-0226.
[f]The conversion from physical units to Btu is calculated using a subset of *Monthly Energy Review* (MER) conversion factors. Consequently, the historical data may not precisely match that published in the MER.
SPR: Strategic Petroleum Reserve
Notes: Minor discrepancies with other published EIA historical data are due to independent rounding. Historical values are printed in **boldface**, forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(90/10); *International Petroleum Statistics Report,* DOE/EIA-0520(90/12); *International Energy Annual 1988,* DOE/EIA-0219(88); *Petroleum Marketing Monthly,* DOE/EIA-0380(90/10); *Petroleum Supply Monthly,* DOE/EIA-0190(90/11); *Petroleum Supply Annual 1989,* DOE/EIA-0340(89)/1; *Natural Gas Monthly,* DOE/EIA-0130(90/10); *Electric Power Monthly,* DOE/EIA-0226(90/11); and *Quarterly Coal Report,* DOE/EIA-0121(90/3Q); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through September 1990. Macroeconomic projections are based on DRI/McGraw-Hill Forecast CONTROL1290.

Table 2. $25 World Oil Price Case Summary

Assumptions and Projections	Year				Annual Percentage Change		
	1988	1989	1990	1991	1988-1989	1989-1990	1990-1991
Macroeconomic Indicators							
Real Gross National Product (billion 1982 dollars)	4,017	4,118	4,157	4,154	2.5	0.9	-0.1
Index of Industrial Production (Mfg.) (index, 1977=1.000)	1.058	1.089	1.101	1.081	2.9	1.1	-1.8
Imported Crude Oil Price (nominal dollars per barrel)	14.56	18.08	21.75	25.00	24.2	20.3	14.9
Retail Prices (nominal)*							
Motor Gasoline[b] (dollars per gallon)	.96	1.06	1.22	1.36	10.4	15.1	11.5
No. 2 Heating Oil (dollars per gallon)	.81	.90	1.07	1.18	11.1	18.9	10.3
Residential Natural Gas (dollars per thousand cubic feet)	5.47	5.64	5.81	6.01	3.1	3.0	3.4
Residential Electricity (cents per kilowatthour)	7.49	7.64	7.87	8.16	2.0	3.0	3.7
Petroleum Supply							
Crude Oil Production[c] (million barrels per day)	8.14	7.61	7.30	7.41	-6.5	-4.1	1.5
Net Petroleum Imports, Including SPR (million barrels per day)	6.59	7.20	7.17	6.77	9.3	-.4	-5.6
Energy Demands							
Total Market Economies Petroleum Consumption (million barrels per day)	51.05	52.37	53.06	52.87	2.6	1.3	-.4
Total U. S. Petroleum Consumption (million barrels per day)	17.28	17.33	16.96	16.48	.3	-2.1	-2.8
Motor Gasoline	7.34	7.33	7.21	7.11	-.1	-1.6	-1.4
Jet Fuel	1.45	1.49	1.49	1.48	2.8	.0	-.7
Distillate Fuel Oil	3.12	3.16	3.05	3.00	1.3	-3.5	-1.6
Residual Fuel Oil	1.38	1.37	1.22	1.00	-.7	-10.9	-18.0
Other Petroleum[d]	4.00	3.98	3.99	3.89	-.5	.3	-2.5
Natural Gas Consumption (trillion cubic feet)	18.03	18.90	18.79	19.32	4.8	-.6	2.8
Coal Consumption (million short tons)	884	889	892	906	.6	.3	1.6
Electricity Sales* (billion kilowatthours)	2,567.9	2,646.7	2,706.8	2,747.8	3.1	2.3	1.5
Gross Energy Consumption[f] (quadrillion Btu)	80.20	81.41	81.13	81.26	1.5	-.3	.2
Thousand Btu/1982 Dollar of GNP	19.97	19.77	19.52	19.56	-1.0	-1.3	.2

*All prices include taxes, except for No. 2 heating oil and residential electricity.
[b]Average for all grades and services.
[c]Includes lease condensate.
[d]Includes crude oil product supplied, natural gas liquids, liguefied refinery gases, other liquids, and all finished petroleum products expect motor gasoline, jet fuel, and distillate and residual fuel oils.
*Total annual electricity sales for historical periods are derived from the sum of monthly sales figures based on submissions by electric utilities of Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." These historical values differ from annual sales totals based on Form EIA-861, reported in several EIA publications, but match alternate annual totals reported in EIA's *Electric Power Monthly*, DOE/EIA-0226.
[f]The conversion from physical units to Btu is calculated using a subset of *Monthly Energy Review* (MER) conversion factors. Consequently, the historical data may not precisely match that published in the MER.
SPR: Strategic Petroleum Reserve
Notes: Minor discrepancies with other published EIA historical data are due to independent rounding. Historical values are printed in boldface, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/10); *International Petroleum Statistics Report*, DOE/EIA-0520(90/12); *International Energy Annual 1988*, DOE/EIA-0219(88); *Petroleum Marketing Monthly*, DOE/EIA-0380(90/10); *Petroleum Supply Monthly*, DOE/EIA-0190(90/11); *Petroleum Supply Annual 1989*, DOE/EIA-0340(89)/1; *Natural Gas Monthly*, DOE/EIA-0130(90/10); *Electric Power Monthly*, DOE/EIA-0226(90/11); and *Quarterly Coal Report*, DOE/EIA-0121(90/3Q); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through September 1990. Macroeconomic projections are based on DRI/McGraw-Hill Forecast CONTROL1290.

Table 3. $30 World Oil Price Case Summary

Assumptions and Projections	Year				Annual Percentage Change		
	1988	1989	1990	1991	1988-1989	1989-1990	1990-1991
Macroeconomic Indicators							
Real Gross National Product (billion 1982 dollars)	4,017	4,118	4,157	4,154	2.5	0.9	-0.1
Index of Industrial Production (Mfg.) (index, 1977=1.000)	1.058	1.089	1.101	1.081	2.9	1.1	-1.8
Imported Crude Oil Price (nominal dollars per barrel)	14.56	18.08	21.75	30.00	24.2	20.3	37.9
Retail Prices (nominal)*							
Motor Gasoline[b] (dollars per gallon)	.96	1.06	1.22	1.51	10.4	15.1	23.8
No. 2 Heating Oil (dollars per gallon)	.81	.90	1.07	1.33	11.1	18.9	24.3
Residential Natural Gas (dollars per thousand cubic feet)	5.47	5.64	5.81	6.13	3.1	3.0	5.5
Residential Electricity (cents per kilowatthour)	7.49	7.64	7.87	8.22	2.0	3.0	4.4
Petroleum Supply							
Crude Oil Production[c] (million barrels per day)	8.14	7.61	7.30	7.50	-6.5	-4.1	2.7
Net Petroleum Imports, Including SPR (million barrels per day)	6.59	7.20	7.17	6.45	9.3	-.4	-10.0
Energy Demands							
Total Market Economies Petroleum Consumption (million barrels per day)	51.05	52.37	53.06	52.07	2.6	1.3	-1.9
Total U. S. Petroleum Consumption (million barrels per day)	17.28	17.33	16.96	16.29	.3	-2.1	-4.0
Motor Gasoline	7.34	7.33	7.21	7.05	-.1	-1.6	-2.2
Jet Fuel	1.45	1.49	1.49	1.47	2.8	.0	-1.3
Distillate Fuel Oil	3.12	3.16	3.05	2.93	1.3	-3.5	-3.9
Residual Fuel Oil	1.38	1.37	1.22	.98	-.7	-10.9	-19.7
Other Petroleum[d]	4.00	3.98	3.99	3.86	-.5	.3	-3.3
Natural Gas Consumption (trillion cubic feet)	18.03	18.90	18.79	19.53	4.8	-.6	3.9
Coal Consumption (million short tons)	884	889	892	906	.6	.3	1.6
Electricity Sales* (billion kilowatthours)	2,567.9	2,646.7	2,706.8	2,747.8	3.1	2.3	1.5
Gross Energy Consumption[f] (quadrillion Btu)	80.20	81.41	81.13	81.10	1.5	-.3	.0
Thousand Btu/1982 Dollar of GNP	19.97	19.77	19.52	19.52	-1.0	-1.3	.0

*All prices include taxes, except for No. 2 heating oil and residential electricity.

[b]Average for all grades and services.

[c]Includes lease condensate.

[d]Includes crude oil product supplied, natural gas liquids, liquefied refinery gases, other liquids, and all finished petroleum products expect motor gasoline, jet fuel, and distillate and residual fuel oils.

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Assumptions

World Oil Prices

One of the most uncertain factors affecting the domestic short-term energy outlook is the world oil price, defined here as the nominal price of imported crude oil delivered to U.S. refiners. Because of this uncertainty, which is largely caused by the military situation currently existing in the Middle East, three world oil price scenarios are employed to examine the range of effects that different levels of world oil prices would have on energy supply and demand balances (Figure 1). The three levels chosen, $20, $25, and $30 per barrel, are not intended to represent actual projections or to define the range of possible price outcomes. At the time of this publication, however, the lower end of this range of prices was prevailing, and the higher end of the range seemed less likely to come about for any sustained period.
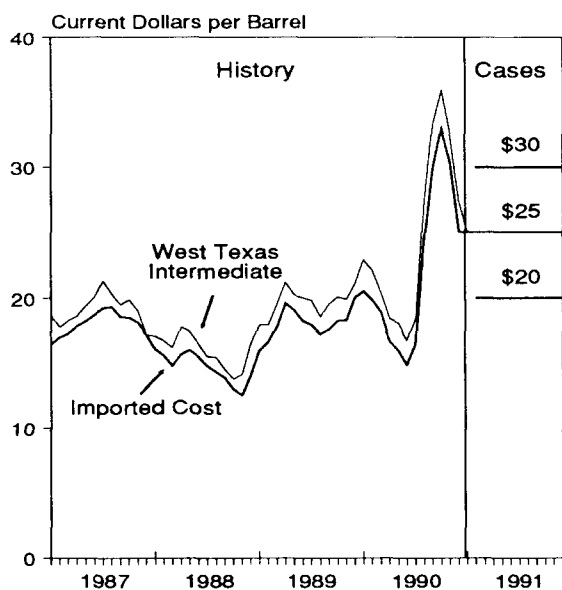
Figure 1. Crude Oil Prices

Note: Imported prices are defined as the cost of imported crude oil to U.S. refiners.

Sources: History: Energy Information Administration, *Monthly Energy Review* (Washington, DC) and *Oil and Gas Journal* Energy Database (Tulsa, OK). Cases: Table 8.

Macroeconomic Activity

It now appears that the economy has entered a recessionary period that is expected to continue through the first half of 1991.[1] Several estimates of real gross national product (GNP), the broadest measure of economic activity, indicate a decrease in the fourth quarter of 1990, yielding an annual growth rate of 0.9 percent for all of 1990.[2] The economic forecast used in the *Outlook* shows a further decline before entering an expansionary period starting in the second half of 1991 (Table 4).

Economic growth is a major determinant in forecasting the demand for energy. The sensitivity of total petroleum demand to a change in real GNP is provided in Table 12. The sensitivity estimate is a summary of the combined impact of real GNP and other economic indicators that are used in the forecasting models, including industrial production for manufacturing and real disposable personal income. Manufacturing production is projected to decline for 2 consecutive quarters beginning with fourth quarter 1990. Disposable income, however, remains almost flat in 1991.

International Petroleum

International petroleum balances are based on three world oil price cases in this *Outlook* of $20, $25, and $30 per barrel (Tables 5, 6, and 7). These price cases were developed to present a reasonable range of annual average prices at the time of publication. At this time, crude oil prices are hovering around the low end of this price range. Just prior to the start of Operation Desert Storm, oil prices were well inside or above the $20 to $30 range, with the benchmark West Texas Intermediate crude oil actually reaching $32 per barrel on the eve of hostilities.[3] The collapse of price after the war started clearly illustrates the volatility of the oil market. Even these cases do not reflect the full extent of oil price volatility that is possible, given the current situation in the Middle East. Thus, despite the fact that prices are low now, it is instructive to discuss the significance of oil prices in the entire $20 to $30 range.

In 1991, petroleum demand by the Market Economies would be about 1.8 million barrels per day lower in the

$30 oil price case than in the $20 oil price case (Tables 5 and 7). The countries that comprise the Organization for Economic Cooperation and Development (OECD) should account for about 1.4 million barrels per day of this difference in demand, with the remainder occurring in the developing countries. Oil production from the non-OPEC Market Economies is expected to vary among price cases, at 280,000 barrels per day higher in the $30 oil price case than in the $20 oil price case. This reflects expected differences in total U.S. production. Also, net oil exports from the Centrally Planned Economies to the Market Economies are expected to be 210,000 barrels per day higher in the $30 case than in the $20 case, primarily because of the impact of higher prices on petroleum demand in Eastern Europe.

In the $20 world oil price case, the OPEC oil production rate for the first quarter of 1991 (including crude oil, natural gas liquids, and refinery gain) is based on a preliminary estimate of the actual rate in the fourth quarter of 1990 (Table 5). The OPEC oil production rates for the last 3 quarters of 1991 are based on estimates of current production plans.

In the $25 and $30 cases, the OPEC oil production rate for the first quarter of 1991 is assumed to be the same as that in the $20 case. In the $25 case, a rate of OPEC production for the last 3 quarters of 1991 would maintain the commercial oil inventories of the OECD countries at levels equal to about 75 days of forward consumption, throughout the period (Tables 5, 6, and 7).[4] Even a greater amount of coverage (80 days) would be implied in a demand/supply balance consistent with a $30 oil price case. This contrasts with 67 days implied for a $20 oil price case. The more reasonable commercial inventory implications of a $20 case lends credence to the idea that lower rather than higher oil prices will prevail in the short run.

Energy Product Prices

Current Situation

Spot prices for crude oil fell more than $5.00 per barrel from November to December of 1990 as the world market adjusted to the elimination of the initial crude oil shortfall in the Persian Gulf and confidence grew concerning the adequacy of petroleum supplies this winter. War fears seemed to prop up spot prices for crude oil in mid-January, but prices plummeted the day after the onset of Desert Storm. Since the last days of January, spot prices for West Texas Intermediate have remained in the $20 to $22 range. Prices are expected

to continue to fluctuate in response to significant and, in some cases, rumored events in the Middle East.

Spot market prices for the major petroleum products (motor gasoline, distillate fuel, and residual fuel oil) fell sharply in December. Much of this drop was the result of falling crude oil prices. However, in the case of distillate fuel and residual fuel, part of the decline can be attributed to more than adequate supplies which were the result of particularly mild weather on the East Coast. Temperatures remained above normal for most weeks of this winter.

Retail motor gasoline prices, which rose sharply from August through October of 1990, started to decline in November and December, largely absorbing the effects of the recently enacted tax package that increased Federal taxes on motor fuels (gasoline and diesel) by 5 cents per gallon on December 1, 1990. Prices at the pump reflected the tax increase, but not by the full 5 cents, as many dealers initially absorbed part of this increase because of competition at the retail level. Under the assumption of steady crude oil prices, it is expected that over the next several months, retailers might gradually increase their margins (Figure 2).
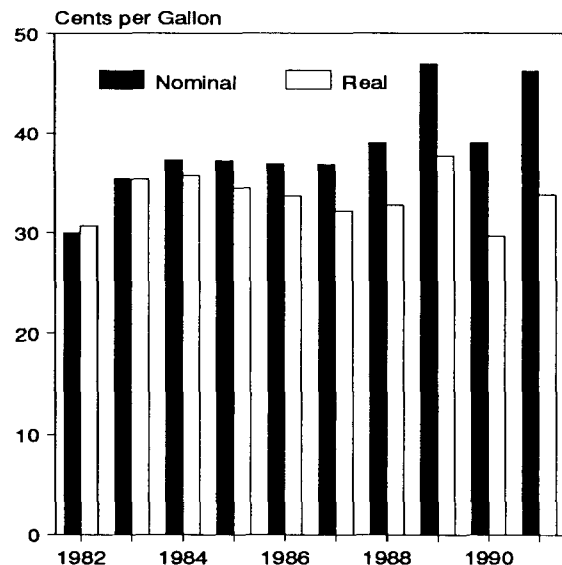

Figure 2. Retail Motor Gasoline Margins for August (Including taxes)

Sources: **History:** Energy Information Administration, *Monthly Energy Review* (Washington, DC). **Projections:** Internal model calculations from the Short-Term Integrated Forecasting System.

Residual fuel oil prices, which usually track closely to crude oil prices, have shown much more stability than the crude oil price since last summer. Low consumption and high stock levels have not only kept residual fuel prices relatively stable, but have also kept them well below crude oil prices this winter.

Historically, they typically exceed the price of crude oil during the peak heating season because of higher levels of demand by utilities and industry.

Retail heating oil prices fell in December due to lower crude oil costs and warm weather. Continued above-normal temperatures for most of the Northeast United States in January kept heating oil demand down and prices subdued, except for a brief upward spike at the U.N.-sponsored deadline for the Iraqi withdrawal of Kuwait. At the end of 1990, primary stocks were approximately 24 million barrels higher than those of 1989 (Table 10). Stocks have been drawn down heavily since then despite low heating oil demand.[5] Nevertheless, substantial slack capacity exists currently in the U.S. refining industry, and additional supplies required if weather does turn cold in February should be forthcoming.

Spot prices in December 1990 for wellhead natural gas were about 6 percent higher than the previous year,[6] due in part to the uncertainty caused by the situation in the Persian Gulf. These prices were unseasonably low in 1989; they rose sharply in January 1990 in response to the cold weather in December 1989. Since at least mid-December, spot natural gas prices have been falling, and are currently about $1.30 per million Btu, on a national average basis. This brings gas wellhead prices to a point which is as low as any monthly average in 1990.[7]One reason for this drop in the price is that supplies appear adequate for natural gas for the balance of the winter. Moreover, the sluggish economic outlook in the near term has dampened expectations of more robust demand for this fuel.

Price Outlook

The following discussion provides projections for energy product prices, given three assumed crude oil price cases (Table 8). It should be noted that each of these three scenarios—$20, $25, and $30 per barrel are $5.00 per barrel less than the three scenarios made in the previous *Outlook*. At the time of publication, oil prices were near the $20 level. Most of the variation in the petroleum product prices cases comes from pass-throughs of the differences in the crude oil price paths.

$20 Oil Price Case. If crude oil were to remain at $20 per barrel throughout the forecast, most petroleum product prices would remain flat or fall slightly from their average 1990 levels since this represents a drop of more than $2.00 per barrel, or nearly 5 cents per gallon. Prices would not be expected to fall by the full 5 cents as inflation and increased State taxes should offset some of the price drop. Residual fuel oil prices are expected to be about $1.40 per barrel less than crude oil in 1991, as adequate stock levels keep prices down.

The wellhead price for natural gas is assumed to increase near the rate of inflation. Generally, industrial and electric utility gas prices would be under some pressure to remain low in 1991 because of low industrial output as well as the competitive price of fuel oil at a crude oil price of $20 per barrel.

Residential electricity prices are expected to increase in this scenario, but only at about half the rate of inflation as fuel and capital costs either fall or increase at slight rates. Coal prices to electric utilities could drop slightly through 1991 as the cost of diesel fuel used in mining and transporting coal decreases.

$25 Oil Price Case. Excluding seasonal fluctuations, most petroleum product prices in the $25 per barrel case would rise on an annual basis from 1990 levels, although they should retreat from the high levels seen in the fourth quarter 1990. Retail motor gasoline prices, after the initial price rise of 1990, should remain stable in 1991, with a decrease in refiner margins offsetting increases in State and local taxes. Refiner margins for gasoline were relatively high during the first half of 1990 when crude oil prices dropped slightly from a late 1989 to early 1990 peak. Residual fuel oil prices in this scenario are expected to follow the pattern in the $20 per barrel scenario with prices held below crude oil costs as stock levels are projected to be in the normal to high range.

Natural gas wellhead prices in the $25 scenario are expected to increase only moderately in 1991, since the slow economy is expected to result in sluggish industrial and electric utility demand for gas, causing little upward pressure on the price. The price differential between residual fuel oil and natural gas at electric utilities is expected to remain relatively unchanged in 1991 compared to 1990.

$30 Oil Price Case. In the $30 scenario, world crude oil prices would increase by slightly more than $8 per barrel over average 1990 prices. This increase would be passed on to the petroleum product prices.

Furthermore, natural gas prices at the wellhead and for all sectors would rise as competitive pressure from oil prices eases. The price of coal to electric utilities and residential electricity would likewise increase.

Effects of the Clean Air Act

The Clean Air Act Amendments of 1990 that received Presidential approval in November will have minimal effect on energy prices in 1991 because most provisions for the Act will not be effective until subsequent years. Ultimately, the energy sources that will experience the greatest impact are electricity, coal, motor gasoline and diesel.

In the electric utility industry, the amended Clean Air Act requires further reductions of sulfur dioxide and nitrogen oxide (NOx) emissions by 1995. To achieve these reductions, some utilities will switch to cleaner, and more expensive, low sulfur coal. Others will add scrubber equipment for burning coal which will require a major capital expenditure. In addition, it is likely that utilities will add low-NOx burners to existing plants, requiring additional capital expenditures. Even though utilities may incur costs as they begin the transition to meet future standards, the lag time in utility price regulation is expected to defer any impacts on electricity prices until at least 1992.

The new regulatory requirements for motor gasoline and diesel also do not become effective until after 1991, and therefore, are not expected to have an impact on prices in 1991. The amended Clean Air Act includes the mandatory use of reformulated gasoline in nine large metropolitan areas beginning in 1995 and a nationwide reduction in the sulfur content of diesel fuel starting in October, 1993. In the near future, lower volatility and higher levels of oxygen in gasoline will be required in some areas beginning in 1992 which may cause a small increase in the average price of gasoline during 1992. However, for many of these regulations, the U.S. Environmental Protection Agency can revise standards or implementation dates because of technological limitations such as an inadequate supply of oxygenated or reformulated gasoline. Another area of uncertainty is that cities covered by the regulations may file for exemption, and conversely, other cities may elect to implement the standards earlier than required.

U.S. Petroleum Outlook

Petroleum Demand

Oil consumption in 1990 declined by 2.1 percent, or 370,000 barrels per day, to an estimated 16.96 million barrels per day (Table 1). This marks the first time since 1987 that demand has fallen below 17 million barrels per day on an average annual basis. Demand is expected to decline further in 1991 under all three world oil price scenarios.

Three factors account for much of the weakness in oil demand in 1990. First, growth in the economy, as measured by real gross national product (GNP), slowed to 0.9 percent in 1990 from 2.5 percent in 1989 (Table 1). Second, the weather, in terms of heating degree-days, was 14.6 percent milder than the previous year (Table 4). This factor accounts for an average decline in consumption of 130,000 barrels per day during 1990. Third, crude oil prices increased to an average $21.75 per barrel in 1990 from $18.08 per barrel in 1989. Third-quarter 1990 oil consumption, however, averaged slightly higher than during the same period in 1989. Much of that increase probably resulted from secondary stock building in the wake of higher energy prices. This would have amounted to shifting some fourth quarter product shipments into the third quarter, thereby exacerbating the fourth quarter weakness. Although jet fuel consumption matched that of the previous year, it would have declined without the Persian Gulf-related activity of the last several months.

The 1991 projections for petroleum demand range from 16.79 million barrels per day ($20 oil price case) to as low as 16.29 million barrels per day ($30 oil price case), implying a possible decline in demand ranging from 170,000 to 670,000 barrels per day from the 1990 average (Tables 9, 10, and 11). These projections assume a 0.1-percent decline in real GNP (the mid-price case), and normal weather patterns. They indicate not only a modest short-term reaction to changes in crude oil prices but also an asymmetrical price response because of constraints on fuel-switching when crude oil prices exceed $25 per barrel.

By incorporating ranges for economic growth and weather patterns, the band of possible outcomes for oil demand for 1991 is much wider than that based on oil prices alone (Figure 3). The width of the spectrum of

possible oil demand outcomes is 1.4 million barrels per day, ranging from a low of 15.8 million barrels per day to a high of 17.2 million barrels per day. The lower bound assumes an average crude oil price of $30 per barrel, a 1.8-percent decline in real GNP, and temperatures 16 percent warmer than normal, corresponding to a 15-year low in terms of heating degree-days (Table 2). The upper bound reflects an average crude oil price of $20 per barrel, a 1.6-percent growth in real GNP (no recession), and 20 percent colder than normal weather (comparable to the highest number of heating degree-days of the last 15 years).
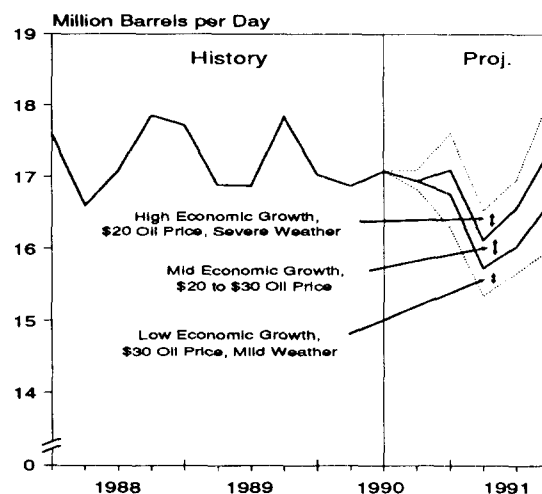
Figure 3. Total Petroleum Demand

Sources: **History:** Energy Information Administration, *Petroleum Supply Monthly* (Washington, DC). **Projections:** Tables 9, 10, and 11 and internal model calculations from the Short-Term Integrated Forecasting System.

Petroleum Demand Sensitivities

The petroleum demand outlook is based on normal temperatures and a particular set of macroeconomic assumptions. In order to widen the usefulness of the basic projections provided in the *Outlook*, Table 10 summarizes the range of possible outcomes in terms of range and sensitivities by incorporating alternative macroeconomic, price, and weather assumptions. Two petroleum price sensitivities are presented. The first assumes that non-petroleum prices respond to shifts in crude oil prices; the second holds non-petroleum prices constant. The first set of sensitivities indicate that other

energy products absorb part of any shift in demand brought about by oil price changes if non-oil prices respond to changes in crude oil prices; the second shows that if non-oil prices remain unresponsive to shifts in oil prices, oil demand responses to those price changes are larger.

Weather sensitivities are based on assumed deviations from normal temperatures which correspond to the greatest quarterly variances in weather observed during the past 15 years. Based on the information in Table 10 for the mid-price case, the results from Table 12 are summarized below:[8]

- a 1-percent increase in real GNP raises petroleum demand by about 156,000 barrels per day;

- a $1 increase in crude oil prices, assuming no price response from non-oil energy sources, reduces oil consumption by about 54,000 barrels per day;

- a 1-percent increase in cooling degree-days increases oil demand by about 6,000 barrels per day; a 1-percent increase in heating degree-days increases petroleum demand by about 21,000 barrels per day.

Petroleum Supply

Strategic Petroleum Reserve Drawdown

The President of the United States ordered the release of crude oil from the Strategic Petroleum Reserve (SPR) on January 16, 1991, in accordance with the International Energy Agency's energy response plan to the war in the Persian Gulf. Bids were accepted from 13 companies on January 30, 1991, out of offers from 26 companies for the sale of 17.3 million barrels of oil. This volume is just over half of the 33.8 million barrels offered, but the amount of sweet crude sold was far greater, and the amount of sour crude far less, than anticipated due to demand. Deliveries are expected to occur in February and March. Final prices will depend on market rates at the time of payment. The supply/demand balances illustrated in this issue of the Outlook do not show the effects of the release of SPR oil. However, the International Energy Agency's response plan (which includes the release of SPR oil) is a major contributing factor to currently lower oil prices.

Domestic crude oil production in 1990 was estimated to have been 7.30 million barrels per day, down 310,000

barrels per day from that of 1989. If the world oil price falls back to $20 per barrel in 1991, output would decline by 90,000 barrels per day to 7.21 million barrels per day. Production rates in the higher price scenarios lead to increases in domestic production of 110,000 barrels per day in the $25 case and 200,000 barrels per day in the $30 case (Figure 4). The range of production between the low and high cases can be broken down into price and uncertainty effects.[9] The $10 change in price between the high and low price cases amounts to a difference of 256,000 barrels per day out of the 370,000 barrel per day total difference in production projected for the fourth quarter of 1991. Uncertainty about the decline rates of existing fields accounts for the remaining difference of 114,000 barrels per day, with the higher prices encouraging higher rates of oil recovery. In Alaska, by the fourth quarter of 1991, the uncertainty in this decline rate accounts for over half (22,000 out of 40,000 barrels per day) of the increase from the level in the $20 price case level to the level in the $30 case. The largest difference occurs in the Prudhoe Bay field, the major oil producing area in Alaska.

Figure 4. U.S. Crude Oil Production

Sources: **History:** Energy Information Administration, *Petroleum Supply Annual, Petroleum Supply Monthly, and Weekly Petroleum Status Report* (Washington, DC). **Projections:** Tables 9 and 11.

In each of the three price scenarios, Alaskan crude oil production in 1991 is expected to increase, rebounding from the 1990 level of 1.77 million barrels per day. Production is expected to vary from 1.91 million barrels

per day in the $20 case to 1.93 million barrels per day in the $30 case (Tables 9, 10, and 11). These levels are higher than any previous year except for 1987 at 1.96 million barrels per day and 1988 at 2.02 million barrels per day.

The higher Alaskan production level is supplemented in the $30 case by a small increase in production in the Lower 48 States. In the $20 and $25 prices cases, however, a decline in production in the Lower 48 States continues into 1991. The Baker-Hughes rotary rig count stood at 1,136 rigs in operation at the end of 1990, the highest level since December of 1987, placing the annual average over 1,000 for the first time since 1985. The count is expected to increase again in 1991, resulting in more wells being drilled.

Historically, as demand posted dramatic increases or declines from year to year, the refining industry has made up the difference by either raising or lowering crude oil inputs. However, 1990 has been an exception to this pattern: demand fell by 370,000 barrels per day, while refinery inputs of crude oil rose by 20,000 barrels per day. This has been slightly offset by a 9.3-percent decline in net petroleum product imports. Nonetheless, crude oil inputs have been sufficient to initiate a build-up in product stocks of approximately 50 million barrels during the course of the year.

Essentially, this entire buildup in product stocks occurred during the first half of the year, with a product stock buildup of 610,000 barrels per day in the third quarter canceled out by the product stock draw of 660,000 barrels per day in the fourth quarter. In general, the refiners spent the third quarter of 1990 turning abundant crude oil stocks they had into product stocks and spent the fourth quarter drawing the product stocks.

The projection for 1991 for crude oil refinery inputs factors in this recent behavior, as well as an expected increase in refinery capacity in 1991. As a result, the expected drop in petroleum demand in 1991 is not completely offset by a decrease in refinery inputs of crude oil (Tables 9, 10, and 11). In the $30 case, demand falls by 670,000 barrels per day, but crude oil runs fall by only 320,000 barrels per day, or about 48 percent of the decline in demand. In the $25 case, crude oil runs account for 180,000 barrels per day, or 38 percent, of the decline in demand. In both cases, net product imports absorb most of the remainder of the demand decline, resulting in levels of 0.96 million barrels per day in the $30 case and 1.04 million barrels per day in the $25 case, down from the 1990 level of 1.36 million barrels per day. Total petroleum net

imports are expected to decrease from the 1990 level of 7.17 million barrels per day by 10.0 percent in the $30 case, by 5.6 percent in the $25 case, and to rise by 1.5 percent in the $20 case (Figure 5).
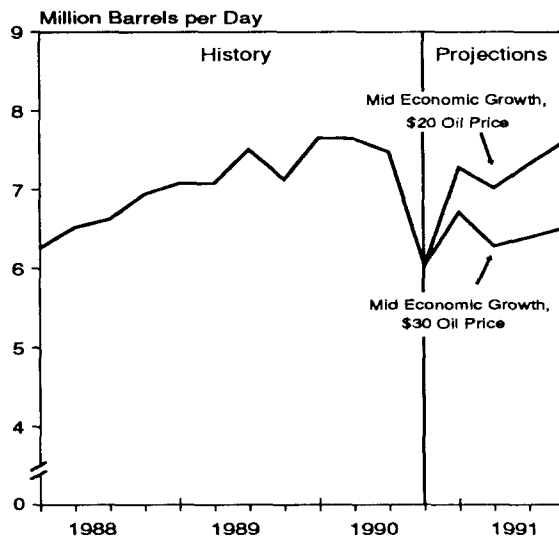
Figure 5. Total Net Petroleum Imports

Note: Crude oil production includes lease condensate.
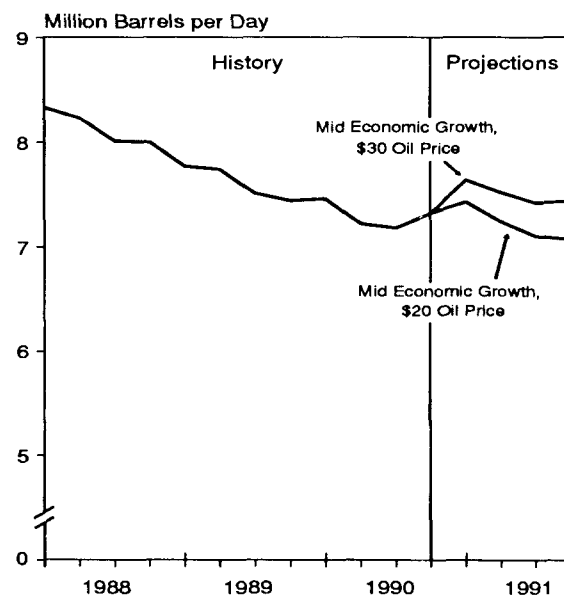Sources: **History**: Energy Information Administration, *Petroleum Supply Annual, Petroleum Supply Monthly*, and *Weekly Petroleum Status Report* (Washington, DC). **Projections**: Table 9 and 11.

Motor Gasoline

Following an estimated 1.6-percent decline in 1990, motor gasoline demand is projected to continue its substantial downward trend throughout most of 1991 (Tables 9, 10, and 11). Although the recent price hikes following the Iraqi invasion of Kuwait in August contributed to the softening of demand in the second half of 1990, the first half of the year also registered sizable declines. Part of that weakness stemmed from a slowdown in economic growth, resulting in a substantial slowing in highway travel activity. Vehicle-miles traveled are estimated to have risen by only 2.2 percent last year, the smallest increase in 8 years and only half of the growth rate for 1989.[10] Another source of weakness is an apparently large drawdown in secondary stocks brought about by federally-mandated changes in volatility requirements as measured by the Reid Vapor Pressure (RVP). As a result, the 1990 estimate of the decline in product supplied is believed to have been greater than the real decline in retail sales. Consequently, the robust 3.8-percent increase in estimated apparent miles per gallon for 1990 may have overstated actual fuel efficiency gains based on actual consumption patterns.

In 1991, the continued contraction in motor gasoline demand is expected to reflect the economic downturn. The economy is expected to decline slightly in all three scenarios, resulting in little or no growth in highway travel. Because of the one-time nature of earlier changes in RVP requirements, which brought secondary stocks to near record lows, further secondary stock drawdowns are not expected to be a factor in 1991. As a result, increases in fuel efficiencies based on product supplied estimates are projected to be more moderate than those observed in 1989 and 1990.

The price hikes since last July have resulted in sizable shifts in market shares of the different grades of gasoline (Figure 6). Unleaded's share of the market, which stood at 63 percent in July, increased to a record 71 percent by October, the most recent month of available data. Premium grade gasoline's share of the market, which claimed 22 percent prior to the invasion, had shrunk to only 15 percent by October, the smallest such share for that grade since 1985. Reflecting price pressures that boosted unleaded regular's share of the market, mid-grade gasoline's market penetration, which had briefly exceeded 10 percent prior to the Iraqi invasion, retreated slightly for the first time since its introduction. Leaded gasoline's share of the market reached an all-time low of 4 percent as a result of continuing retirements of older vehicles as well as an increasing tendency of refineries to manufacture mid-grade as a substitute for leaded gasoline for those vehicles.
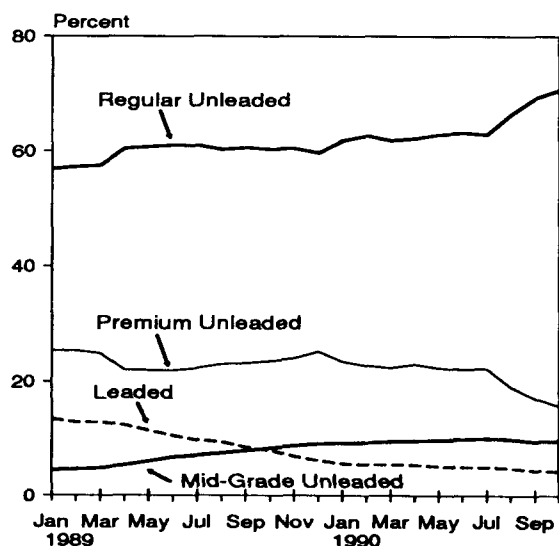
Figure 6. Motor Gasoline Market Shares

Sources: Energy Information Administration, *Petroleum Marketing Monthly* (Washington, DC).

Jet Fuel

In 1990, jet fuel demand averaged 1.49 million barrels per day, unchanged from that of the previous year (Tables 9, 10, and 11). For 1991, jet fuel demand is projected to remain flat in the $20 case but decline by 0.7 and 1.3 percent in the $25 and $30 cases, respectively.

Non-military use of jet fuel is believed to have declined in 1990. Although higher prices in the wake of the Iraqi invasion of Kuwait contributed to that decline, a slowdown in civilian air travel was apparent prior to the Persian Gulf crisis as a result of slowing economic activity. In the first half of 1990, revenue ton miles were 2.9 percent higher than in 1989,[11] approximately half the growth rate of the previous year, despite a decline in jet fuel prices. During the second half of the year, civilian air travel activity is estimated by EIA to have fallen by 1.0 percent, resulting in an increase of only 1.0 percent for the year as a whole, the smallest increase in 9 years.

Continued weakness in economic activity and continued high fuel prices in 1991 are expected to result in flat demand growth in the $20 case and moderate declines in the other two scenarios. Revenue ton miles are projected to decline by 3 percent or more in each of the price scenarios. Although the U.S. contribution to military jet fuel requirements relating to Persian Gulf activity is not assumed to be very large, it is expected to offset somewhat the impact of the year-to-year decline in non-military jet fuel demand.

Distillate Fuel Oil

Demand for distillate fuel oil in 1990 is estimated to be 3.5 percent below the 1989 level because of warm weather, slower economic growth and higher crude oil prices (Tables 9, 10, and 11). If crude oil prices are in the $25 to $30 a barrel range, a decline in demand is also projected for 1991 largely because of a sluggish economy.

Compared to 1989, the number of heating degree-days in the Northeast United States in 1990 was much lower in both the first and fourth quarters. The Northeast region is most dependent on distillate fuel oil for home heating, and therefore, the weather in this region has a major impact on demand. The fact that the weather was as mild as it was last year resulted in 70,000 barrels per day less demand for distillate fuel in 1990 than if the weather had been the same in both years. Economic growth for the Nation was also down as real

gross national product increased 2.5 percent in 1989 compared to an estimated 0.9-percent increase in 1990—too little strength to overcome the negative factors affecting demand. These factors, along with relatively high crude oil prices, depressed demand in 1990.

The economic slowdown is expected to result in weak distillate fuel demand in 1991, despite the tendency for normal weather assumptions to boost demand next year. The net effect is that demand for distillate fuel may increase slightly by as much as 0.7 percent at a crude oil price of $20 a barrel or decline by as much as 3.9 percent at $30 a barrel. In the mid-price case of $25 a barrel, demand for distillate in 1991 is expected to decline 1.6 percent, with decreases in both the electric utility and transportation sectors, while increasing in other sectors.

In the residential and commercial sectors it is assumed that a small amount of switching from distillate to natural gas for home heating may occur at crude oil prices of $30 and above. (See article on "Oil Home Heating Conversions".) If this switching does not occur, demand may be higher than projected in 1991. Additionally, if the weather is colder than normal or economic activity rebounds quicker than assumed, demand could be stronger than projected under all three price scenarios.

Residual Fuel Oil

Under all three price scenarios, the demand for residual fuel oil is expected to drop in 1991 after posting an estimated 10.9 percent decline in 1990 (Tables 9, 10, and 11). The decrease in demand for 1990 and 1991 is expected to occur in both the electric utility and non-utility sectors. Electricity generation is projected to come from increasing amounts of coal and hydroelectric power and, to a greater extent, natural gas. Natural gas prices have fallen in 1990, while the price of residual fuel oil has substantially increased. Demand for residual may be stronger than forecasted, however, if extreme cold weather causes interruptions in the supply

of natural gas to dual-fired industrial and utility customers in order to meet demand in the residential sector during the heating season.

Other Petroleum Products

Demand for minor petroleum products increased by an estimated 0.3 percent in 1990, having declined by 0.5 percent in 1989 (Tables 9, 10, and 11). Demand for liquefied petroleum gases (LPG), however, fell by an estimated 7.7 percent as a result of warmer than normal weather in 1990, following the colder than normal first and fourth quarters of 1989. Oil-based petroleum feedstock demand, on the other hand, rose by a robust 11.6 percent in 1990. That growth resulted from a combination of strength during the first half of the year when oil prices fell and weakness during the same period in 1989 during which oil prices rose. Miscellaneous products demand grew by an estimated 5.3 percent despite continued moderation of economic growth. Part of that increase, however, stems from a sharp decline in refinery gas demand during the fourth quarter of 1989. A sizeable year-to-year increase in asphalt and road oil demand resulting from year-to-year changes in weather patterns would also have accounted for part of that strength.

In 1991, demand for minor petroleum products is projected to decline noticeably in all three price scenarios as a result of negative economic growth. The assumption of normal weather compared to the mild weather of 1990 and favorable relative prices in an environment of higher oil prices, however, are expected to result in resumed LPG demand growth. Nonetheless, the combination of high product prices and a decline in petrochemical activity is expected to bring about declines in oil-based petrochemical feedstock demand. The miscellaneous products category is expected to bear the brunt of the contraction in minor petroleum products demand in 1991 resulting from projected declines in industrial production and rates of refinery utilization. Moreover, anticipated budgetary constraints in several States are expected to reduce demand for asphalt and road oil.

Oil Home Heating Conversions

One of the domestic uses of oil that is impacted by the Iraqi crisis is home heating oil. Retail heating oil prices are estimated to have averaged about $1.34 per gallon in the fourth quarter of 1990. This compares to $0.96 per gallon in the fourth quarter of 1989, when prices were already high due to unusually cold weather in the United States.

This sharp increase in heating fuel prices, in the wake of a similar, sharp weather-related increase in December 1989, has prompted many homeowners to consider switching from oil to natural gas. Gas utilities report increased interest in conversions since the invasion of Kuwait. Based on a telephone survey of utilities in December 1990, the American Gas Association (AGA) expects that conversions to gas from other fuels (primarily oil) will reach 250,000 in 1990, compared to about 180,000 in the more formal 1989 survey.[12] The last time conversions were that high was in the early 1980's, when fuel oil prices also rose above $1.10 per gallon.[13]

Two key factors in a homeowner's decision to switch to natural gas appear to be the relative price of heating oil and natural gas, and consumer spending. During 1990, according to the projections in this *Short-Term Energy Outlook*, the real residential price of heating oil has risen more than 20 percent, while the real residential price of natural gas has actually fallen. In addition, consumer personal spending per person rose only slightly during 1990.[14]

Natural gas is already the main heating fuel for a majority of American households. In 1987, the last year for which detailed data by sector are available, 55 percent of all households heated with gas, 20 percent with electricity, and 12 percent with fuel oil. Other fuels used for space heating included wood, propane, and kerosene. The use of natural gas as the main space heating fuel is prevalent in all parts of the country; however, the percentage of households heating with natural gas is the highest in the Midwest and West. The use of fuel oil for heating is concentrated in the Northeast. Yet, even in the Northeast, more homes are heated with natural gas than with fuel oil.[15]

Conversions to natural gas from all fuel types rose after the Arab oil embargo of 1973-74, dropped off in the mid-1970's, and peaked in 1980 at more than 580,000 conversions during the disruption caused by the Iranian revolution and the Iran/Iraq war (Figure 7). From 1983

through 1989, conversions increased gradually and averaged more than 150,000 annually. During the peak years for conversions, 1980 and 1981, oil users comprised about 85 percent of those switching to natural gas. In 1988 and 1989, however, oil users comprised 58 percent of those switching to gas.[16]
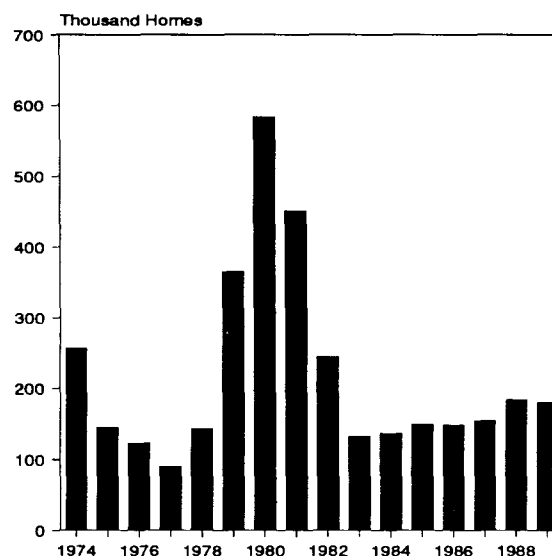
Figure 7. Natural Gas Home Heating Conversions

Source: American Gas Association, *Residential Gas Market Survey, 1989* (Arlington, VA, 1990).

While rising heating oil prices appeared to be the main factor in most households for switching to natural gas, relatively stable natural gas prices also played a role. Real heating oil prices were fairly stable from 1974 through 1978, but increased sharply from 1979 through 1981. From 1982 through 1988, prices declined, but began rising again in 1989. Natural gas prices, on the other hand, rose gradually from 1974 through 1983, and have declined since then.[17] Over these years, homeowners switched from fuel oil to natural gas in significant numbers whenever the real cost of heating oil on a dollars per Btu basis was about twice that of natural gas.

The amount of money spent by consumers also affected the numbers of conversions from fuel oil to natural gas. Consumer spending per person generally rose in real

terms from 1974 though 1989, except for 1978 through 1982, when it remained generally stable.[18] Apparently, if consumers saw their income stabilize at the same time heating oil prices rose, they were more likely to switch from heating oil to natural gas.

In trying to dissuade oil heat users from switching to natural gas, the oil heat industry has recently warned consumers about the high capital cost of the changeover. Two separate surveys by the oil heat industry in the fall of 1990 found that the cost of switching was about $2,800; the AGA puts the cost at about $2,300.[19] This is between $3.28 and $4.00 per gallon at typical consumption rates if all costs are to be recouped in the first year, which they clearly are not. However, the cost of gas heating equipment rose so gradually from 1974 through 1989 that it seems to have had little effect on reducing conversions.[20]

Vehicle Efficiency Improvements: 1989 and 1990

Motor gasoline consumption and highway travel activity patterns during the last 2 years have revealed remarkable growth in apparent automobile fuel efficiency. Apparent fuel efficiency is defined here as total highway vehicle-miles traveled, divided by total motor gasoline use (as measured by motor gasoline product supplied). This spurt in fuel economy gains follows several years of moderate progress in fuel efficiency growth and occurred despite lack of increases in new-vehicle Corporate Average Fuel Economy (CAFE) ratings, continued mileage degradation resulting from increased urbanization and congestion, and the gradual relaxation of highway speed limits. This paper shows that temporary phenomena, related to shifts in secondary stock behavior and weather patterns, depressed motor gasoline shipments in 1989 and 1990, raising apparent fuel efficiencies. These conditions, are unlikely to recur in the near future, resulting in a return to more moderate rates of fuel economy growth.

Efficiency calculations are based on motor gasoline *product supplied* data published by the Energy Information Administration (EIA) and total vehicle miles traveled, as published by the Federal Highway Administration (FHWA). The EIA series constitutes the basis for EIA's motor gasoline forecasts published in both its *Short-Term Energy Outlook* and *Annual Energy Outlook* and, therefore, is the focus of this article. As such, that efficiency measure differs from that based on FHWA "Reported Motor Gasoline Sales", as reported in Table MF33GA in various issues of the annual *Highway Statistics Monthly Motor Fuel Reported by States* publications. Although the FHWA also publishes data for highway gasoline sales only, which might be more closely related to travel data, "reported" sales data include both highway and non-highway gasoline, allowing for comparison with the EIA product supplied data. The FHWA data, however, are a wholesale measure and therefore more closely reflect actual motor gasoline consumption than does the EIA product supplied series.

In terms of the EIA data, apparent efficiency gains during the last 2 years are substantially larger than those based on FHWA reported sales. Sizeable fuel efficiencies had been observed during the late 1970's and early 1980's as a result of energy price hikes at that time. During the last 2 years, however, substantial increases in fuel economy based on EIA product supplied data have occurred in the absence of such

price movements. FHWA-based fuel efficiency increases, however, continued to remain more moderate. Increases in fuel economy based on product supplied were 4.4 and 3.8 percent for 1989 and 1990, respectively, compared to 3.3 and 3.0 percent based on FHWA data. Between 1981 and 1988, during which inflation-adjusted motor gasoline prices declined substantially, fuel efficiency gains averaged only 2.2 percent in terms of the EIA data and 2.6 percent in terms of the FHWA data.

Fuel efficiency gains computed on the basis of the EIA's product supplied series in 1989 and 1990 are larger than those based on the FHWA reported sales data for reasons associated with differences in definitions and measurement techniques between the two series. These factors include, but are not necessarily limited to, the following: secondary stock fluctuations, which may create a divergence between trends in product supplied and FHWA sales data; and supply disruptions resulting from bad weather, which may have distorted derived efficiency calculations based on product supplied data. Each of these factors is discussed below.

The Impact of Changes in Secondary Stocks

Changes in secondary stocks may result in a sustained divergence between trends in the EIA product supplied series and sales on an FHWA basis. Secondary stocks refer to inventories held by wholesalers, distributors, and retailers. Although changes in secondary stocks are not included in calculations of refinery shipments, such changes will ultimately affect the quantity of motor gasoline product delivered to end users and, hence, calculations of fuel efficiency based on that data series. Unlike primary inventory data, which have been published by the EIA for several years, secondary stocks data, published in *Platt's Oilgram Price Report*, have only recently begun to appear on a year-round basis. In prior years, Platt's collected gasoline secondary stock data only from late May through early September, when concerns about the availability of motor gasoline typically reach their peak. In addition, the sample frame associated with the data represents holdings of secondary stocks based on a capacity of approximately 650,000 barrels, equivalent to less than one-tenth of one day's current consumption and should be regarded as a small sample. Therefore, the data should be viewed with caution.

The total size of secondary stocks of motor gasoline is not completely known. However, the National Petroleum Council estimated these inventories to be 48 million barrels and total capacity to be 92 million barrels as of March 31, 1988.[21] An average daily reduction in secondary stocks equivalent to 70,000 barrels per day, or 1 percent of consumption, would result in a drawdown of only 6.3 million barrels in any quarter. Available data for the past several years indicate substantial fluctuations in holdings of secondary stocks. During the past few years, they have been as high as 70 percent of available capacity and as low as 6 percent. The complex multi-stage nature of the motor gasoline distribution network allows for considerable fluctuation in secondary stocks not normally observed in primary stocks. As a result, increased sales as reported by the FHWA could be sustained even during prolonged periods of a declining trend in product supplied. Although measurement error may account for part of the difference in trends between the two series, much of the divergence can be attributed to secondary stock behavior.

Available data from Platt's indicate a substantial downward trend in secondary stock levels during the past few years. Within that trend, these inventories have experienced increasingly larger drawdowns during the first half of each year. On the other hand, secondary stocks held steady or rose slightly during the second half of each year. (It should be noted that, in assessing the impact of secondary stock behavior on refinery shipments between comparable periods, it is the difference in the change in stock levels that may be a factor determining the extent to which trends in product supplied and FHWA sales diverge).

For both 1989 and 1990, the data support the hypothesis that the magnitude of changes within a given interval partly reflects differences in products supplied and FHWA sales trends. In 1989, secondary stocks declined from an estimated 25 to 30 percent of total capacity at the beginning of the year to only 18 percent by the end of June. EIA motor gasoline product supplied remained flat compared to the same period in the previous year; FHWA gasoline sales, however, rose by more than 1 percent. During the first half of 1990, secondary stocks declined from 20 to 25 percent to only 9 percent of available capacity. EIA data for the first half of 1990 indicate that product supplied declined 1.3 percent; preliminary data from the FHWA, however, indicate an increase in gasoline sales of approximately 1 percent for the same interval. As a result, year-to-year growth in fuel efficiencies based on EIA shipments data was larger than those based on FHWA sales data.

Volatility Requirements

Two reasons apparently account for the bulk of the sizeable fluctuations and downward trend in secondary stocks in 1989 and 1990 that resulted in divergences in the two motor gasoline time series trends: new restrictions on permissible motor gasoline volatility, or Reid Vapor Pressure (RVP); and price expectations, based on crude oil market behavior. The new volatility restrictions contributed to the stock drawdowns in the first half of both 1989 and 1990. Beginning in 1989, the maximum RVP allowed by Federal regulations was 10.5 psi for the summer driving season, which encompassed the period from May 1 to September 15. Five Northeastern States subsequently implemented legislation that limited the RVP to 9.0 psi. Due to implementation delays, however, 1989 volatility restrictions in these areas remained at 10.5 psi until June 30. (Nonetheless, some upstream entities, including the Colonial Pipeline Co., imposed the 9.0-psi limit for the entire driving season in anticipation of earlier EPA approval of that standard by the five Northeastern States). In 1990, the 9.0-psi standard became effective as of May 1 in those States. The adoption of these RVP standards in 1989 are believed to have contributed to the decline in deliveries for the first half of that year even as reported sales continued to grow. However, the delay in adoption of the more stringent standards in the five Northeastern States—which had the effect of "phasing in" the new RVP measures over 1989 and 1990—as well as the implementation of the 9.0-psi standard by additional States in 1990 contributed to the significant drawdown in secondary stocks during the first half of 1990. In addition, the experience acquired by distributors in managing the drawdown of secondary stocks in the wake of newly-imposed RVP constraints enabled them to deplete those stocks even further in 1990 without retailers incurring major disruptions in the process, contributing to the downward trend.

Price Expectations

In addition to concerns about meeting increasingly restrictive volatility requirements, price expectations also played a role during 1989 and 1990 in secondary stock fluctuations and, ultimately, on apparent fuel-efficiency growth. In 1989, both wholesale and retail prices increased in response to gradual increases in crude oil prices. Product prices subsequently declined in the third quarter as crude oil prices retreated. In addition to the impact of RVP restrictions on secondary stocks mentioned above, price expectations were an important factor in determining the magnitude of the first-half 1990 decline in those stocks. During that

interval, crude oil prices fell by more than 25 percent; wholesale and retail prices, on the other hand, continued to rise. Nonetheless, the *expectation* that product prices would fall in response to the crude oil price decline raised concerns about profit margins at both the wholesale and retail levels, contributing to the secondary stock drawdown. (The low secondary stock levels during the summer of 1988 reflected tightness in supply resulting from several refinery accidents, preventing product prices from responding to the decline in crude prices that resembled that of the first half of 1990. Those stocks, however, are believed to have recovered to pre-summer levels during the fall, reflecting seasonal patterns that prevailed prior to implementation of the RVP requirements.)

Weather Patterns

Weather extremes in late 1989 and early 1990 also distorted the relationship between shipments of motor gasoline and highway travel activity, thereby inflating fuel efficiencies in 1990. Weather has an asymmetric impact on highway activity: mild weather does not necessarily increase travel; bad weather, however, is more likely to reduce it. Moreover, refinery shipments typically adjust with a lag of several weeks to unanticipated changes in retail sales. The extremely cold weather in December 1989 resulted in a small, 1.7-percent, year-to-year increase in vehicle miles traveled. For the first 11 months of 1989, highway travel had been increasing at more than 4 percent compared to the same period in 1988. Suppliers, however, in anticipation of high seasonal demand, shipped 7.4 million barrels per day in December, an increase of 0.9 percent from the previous year. The FHWA figure for highway gasoline sales showed a decline of 1.3 percent for the same month. The weather-related weakness in

December retail sales resulted in January 1990 shipments of less than 6.7 million barrels per day, 1.0 percent less than that in January 1989.

If the weather in December 1989 had not been so severe, deliveries would have been stronger in the following January. Higher shipments in that month would have reduced efficiency gains from 4.0 percent to 3.8 percent for the first 9 months of 1990 without affecting fuel efficiency estimates for the previous year. Mild weather during the first quarter of 1990, compared to the harsh winter of the previous year, may have also contributed to the substantial first-half increase in 1990 fuel efficiency.

Recent Developments and Near-Term Outlook

Motor gasoline markets during the second half of 1990 reflect the transient nature of the factors which contributed to the large fuel efficiency gains based only on the product supplied time series. Product supplied declined 1.9 percent from that of the same period in 1989, reflecting an overall decline in the trend of deliveries since the beginning of the year. But vehicle-miles traveled rose only 1.1 percent during the same period compared to 3.0 percent during the first half of 1990. As a result, second-half 1990 fuel efficiencies rose by a more moderate 3.0 percent compared to the second half of 1989, the smallest such increase in more than two years.

The downward trend in secondary stocks, whose levels reached all-time lows last summer, is unlikely to continue. As a result, the boost in fuel efficiencies resulting from additional States adopting the more stringent summer RVP standards is likely to be minimal in 1991 as well as in 1992, the year in which the 9.0-psi standard becomes effective throughout all of the Lower 48 States.

Outlook for Other Major Energy Sources

Natural Gas

The discussion below is based primarily on a world oil price of $25 per barrel and the mid-economic forecast (Table 4). However, gas consumption will vary somewhat if the oil price is changed significantly. If the world oil price assumption is $30 per barrel, natural gas demand is expected to rise by 3.9 percent in 1991 (Figure 8). Natural gas would be more competitive in price terms, causing some additional industrial and utility switching. If the world oil price assumption is $20, however, residual fuel oil becomes more attractive than natural gas to these sectors in some regions of the country. The result would be a decline of 0.5 percent in total demand in 1991 (Figure 8).

Growth in overall demand for natural gas was low during 1990, primarily because of mild weather in the first and fourth quarters. This caused declines in residential and commercial demand. Other causes were higher levels of utility generation from nuclear and hydroelectric sources which tend to push out more expensive sources such as natural gas. Industrial sector demand was also very weak in the first quarter of 1990. The manufacturing index increased by only 0.6 percent during this quarter (Table 4). By the later half of 1990, however, the price of residual fuel oil increased substantially. Natural gas prices became more competitive as a result and induced industrial switching from oil to natural gas. Utility demand also picked up in the second half of 1990 as increases in nuclear and hydroelectric power slowed. The net impact on total demand for natural gas was an estimated decrease of 0.6 percent in 1990 (Table 13).

Natural gas demand is expected to pick up by 2.8 percent in 1991 (Table 13). Most of this growth will be seen in the residential and commercial sectors, if average winter temperatures return to normal (hence, colder than in 1990). Further growth should occur in the utility sector, as utility oil prices remain higher than utility natural gas prices and demand for electricity remains relatively strong. On the other hand, the industrial sector should post negative growth in 1991. Manufacturing output indicators are expected to show negative or flat growth this year.
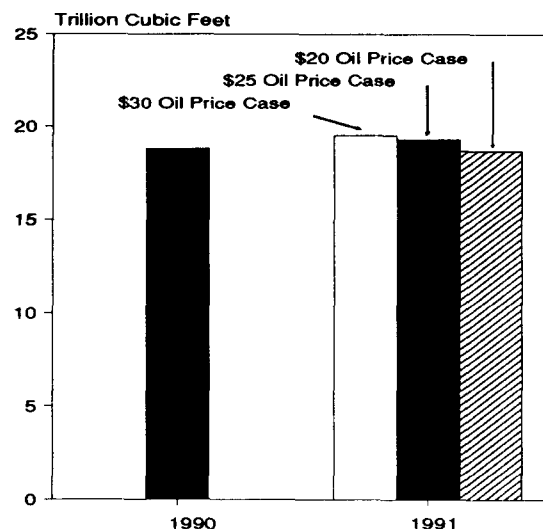
Figure 8. Natural Gas Demand

Note: Projections begin in the fourth quarter of 1990.

Sources: **History**: Energy Information Administration, *Monthly Energy Review* (Washington, DC). **Projections**: Internal model calculations from the Short-Term Integrated Forecasting System.

Coal

Despite the expected economic slowdown, total coal consumption will grow slowly in 1991 under a $25 oil price and a middle economic growth scenario (Table 14 and Figure 9). Very little or no difference in coal consumption would be expected in the alternative $20 or $30 cases. In 1991, only the electric utility sector shows growth in coal consumption. Total coal consumption is expected to increase by 1.6 percent in 1991. The weak economy will cause nonutility coal demand to decrease in 1991.

Coal demand at electric utilities will continue to grow in 1991. Utility consumption is estimated to have risen by 0.7 percent in 1990 and is projected to rise by 2.3 percent in 1991 (Table 14). Normal weather and a decrease in nuclear generation will offset economic factors that would cause coal-fired generation to decline in 1991.

Raw steel demand will drop significantly in 1991, and this decline is expected to contribute to a decrease in coal demand at coke plants.[22] The expected decrease in consumption is 5.0 percent in 1991. Net coke imports are expected to fall in 1991, keeping domestic coking coal from dropping as fast as the demand for raw steel.

Coal consumption in the retail and general industry sectors is expected to decrease in 1991 because of poor macroeconomic conditions in the first half of this year. Reductions in production from several key coal-consuming industries will cause the decrease in consumption in the industrial coal sector. Coal consumption in the residential and commercial sectors may feel a small effect from the weak economy in 1991, but should remain virtually flat.
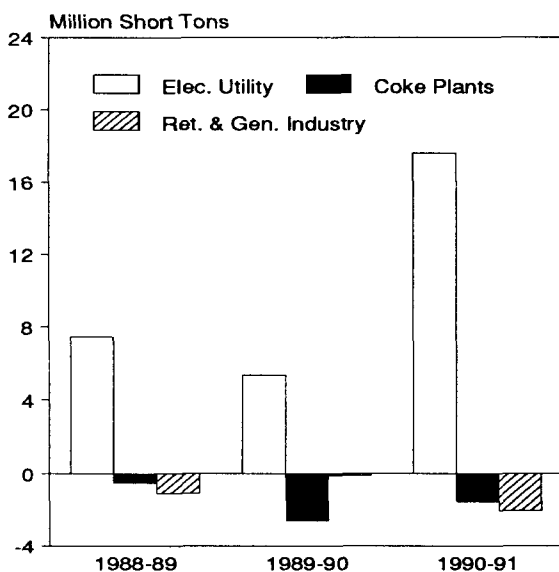
Figure 9. Annual Change In Coal Consumption

Sources: **History**: Energy Information Administration, *Quarterly Coal Report* (Washington, DC). **Projections**: Table 14 and internal model calculations from the Short-Term Integrated Forecasting System.

Coal exports, which reached an estimated level of 107 million short tons in 1990, should fall somewhat in 1991 as a slowdown in economic growth worldwide reduces demand for internationally traded coal. After reaching the record estimated level of 1.036 billion short tons in 1990, coal production is expected to decline slightly in 1991 as consumers reduce their rate of stock building from 29 million short tons in 1990 to 8 million short tons in 1991.

Electricity

The following discussion is based on a $25 world oil price and the mid-macroeconomic forecast (Table 4). If the world oil price assumption is changed, the influence on electricity demand is minimal. The only appreciable impact on electricity demand is assumed to be felt through the resulting variance in economic assumptions. The largest impact is on the supply side, in the split between oil and natural gas generation. A lower oil price would result in a smaller decline in oil generation and a smaller increase in natural gas generation in 1991 than is shown in Table 15. A higher oil price would result in the opposite effect, though declines in oil generation are limited by the current amount of switchable capacity.

Demand

The response in the demand for electricity to the current economic recession will vary depending on the sector (Figure 10). Demand in the industrial sector is closely related to the economic climate. One of the key indicators of the health of the industrial community is the manufacturing index. This index is expected to fall by 1.8 percent in 1991, after gaining 1.1 percent in 1990 (Table 4). The resulting influence on industrial sales is similar: growth of 1.1 percent in 1990 and -1.1 percent in 1991 (Table 15). Of the largest industrial electricity consumers, the economic impact is being felt most severely in the primary metals industry—growth was negative last year. This is the largest industrial electricity consumer. Growth was also slow in the food sector, the fourth largest industrial electricity consumer.[23]

The strongest area of electricity growth this year should be in the residential sector. The impact of an economic recession on electricity consumption in this sector should be minimal because of stable long-term trends in residential demand for electricity, and because real electricity prices are expected to fall slightly. Increased electricity demand from population growth and new household formation is expected to outweigh lower demand for electrical goods per household. Growth in this sector should reach 3.7 percent in 1991, after reaching 2.3 percent in 1990 (Table 15). Approximately 1.1 percentage points of the 1991 growth rate are due to assumed weather differences between 1990 and 1991.[24] The weather was milder than normal in 1990 (for heating purposes) and is assumed to be normal in 1991. The weather-normalized growth rates reflect the trend in electricity consumption, as weather is held constant between the years.

Billion Kilowatthours
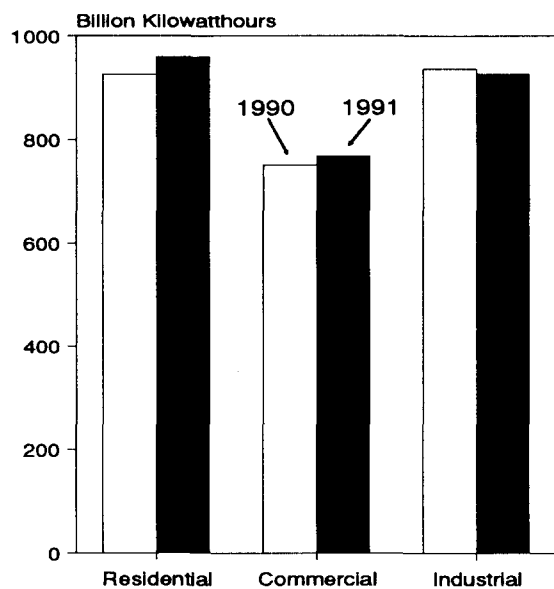
Figure 10. Electricity Sales by Sector

Sources: **History**: Energy Information Administration, *Electric Power Monthly* (Washington, DC). **Projections**: Table 15 and internal model calculations from the Short-Term Integrated Forecasting System.

Commercial electricity consumption should increase by 2.3 percent in 1991, after increasing by 3.6 percent in 1990 (Table 15). If weather patterns had been normal, these rates change to 3.9 percent in 1990 and 1.9 percent in 1991.[25] A slowdown in business activity and retailing is expected to be the cause for lower commercial electricity demand growth this year. Total U.S. demand for electricity is thus expected to increase by 1.5 percent this year, after growth of 2.3 percent in 1990. Weather-normalized growth rates are 2.5 percent in 1990 and 1.1 percent in 1991.

Supply

Total electricity generation is not expected to increase as rapidly as total demand in 1991, because imports

from Canada are expected to pick up considerably and nonutility supply is expected to continue increasing at a steady pace. Coal-fired generation is expected to gain in its share of total electricity generation in 1991. Coal capacity additions combined with a decline in nuclear power should push up coal generation by 2.5 percent next year (Table 15). Coal generation lost a slight amount of market share in 1990, because nuclear power availability was high. Generation from nuclear plants is estimated to have increased by 8.9 percent in 1990 (Table 15). The average capacity factor for nuclear plants is estimated to be 66 percent for last year, 4 percentage points above the 1989 value, and 65 percent in 1991.[26] The estimated decline in the 1991 factor is based on the recognition of lower long-term historical performance levels and on information on extended periods of downtime for individual units. No new units are expected to come on line in 1991. The result is a 1.8-percent decline in nuclear generation in 1991.

Hydroelectric power is estimated to have risen by 4.8 percent in 1990 and is projected to increase 3.9 percent in 1991 (Table 15). Normal precipitation is assumed for 1991, but above normal precipitation is needed over the winter months to return reservoirs to normal levels. The areas that are still experiencing dry water conditions are the West, Northwest, and the North Central Plains.[27]

Generation from oil and natural gas combined should continue to decline in 1991, but not as much as in 1990. This slower decline in 1991 is caused in part by lower nuclear power availability in 1991 than in 1990. It is also caused by the high oil generation level at the end of 1989 due to unusually cold weather. This abnormal weather inflated the 1989 level compared to the 1990 level when weather was mild. Oil will shoulder all of the decline in this combined source in 1991. Natural gas should continue to increase in popularity because of its price advantage over oil. Despite high oil prices, however, utility oil demand is not expected to collapse entirely. Many regions do not have the capacity to switch to natural gas from oil in a short time frame. The result is an increase in natural gas generation of 3.1 percent in 1991, coinciding with a decrease in oil generation of 12.1 percent (Table 15).

References and Notes

1. The macroeconomic projections were derived from a simulation of the DRI/McGraw-Hill quarterly model of the U.S. Economy in which DRI's December macroeconomic forecast (CONTROL1290) was solved using EIA's assumptions about basic energy prices at a world oil price of $25 per barrel. The results from this simulation were used to forecast demand in all three oil price scenarios. This was done for convenience and to provide oil price cases that would not be obscured by the effects of possible macroeconomic feedbacks relating to higher or lower oil prices. Table 12 provides sensitivity information which illustrates the potential impact on total petroleum demand from alternative macroeconomic assumptions.

2. In their December 1990 publications, both DRI/McGraw-Hill and the WEFA group estimate the annual growth rate in real gross national product at 1.0 percent for 1990. Both forecasting groups also project negative economic growth for at least two consecutive quarters, beginning in the fourth quarter of 1990, albeit at slightly different rates.

3. Energy Information Administration, *Energy Situation Analysis Report*, February 6, 1991.

4. Based on internal calculations from the Energy Information Administration, Office of Energy Markets and End Use, International and Contingency Information Division. The OECD inventory levels needed for the days-of-forward-consumption calculation are not reported in Tables 5, 6, and 7.

5. Energy Information Administration, *Energy Situation Analysis Report*, February 5, 1991.

6. "Gas Price Index", *Natural Gas Intelligence*, Washington DC, January 28, 1991.

7. Energy Information Administration, *Energy Situation Analysis Report*, February 5, 1991.

8. These factors were derived from internal calculations of the Demand Models of the Short-Term Integrated Forecasting System.

9. The crude oil production estimates for the low and high cases contain an uncertainty component as well as component due to the price impact. The uncertainty component was introduced in order to have the low and high cases generally cover the likely range of crude oil production levels expected during the forecast period. The two basic types of uncertainties applicable to the low and high cases are those associated with the current production level and those associated with the timing of expected events such as the onset of production from a relatively large, new field.

   The difference in domestic production for the fourth quarter of 1991 between the low and high cases was 370,000 barrels of oil per day. Of this total, the Lower 48 States had 330,000 barrels per day. The uncertainty portion of 92,000 barrels per day resulted from varying the starting points of the oil projections for the low and high cases. The larger portion of this difference is attributed to the price impact where more drilling is expected at the higher prices as well as more frequent well maintenance and reduction of well abandonments. The difference in Alaska was relatively small at 40,000 barrels of oil per day. More than half the difference was attributed to the uncertainty in the decline rate. The impact of price is small because the operations in Alaska, particularly in the North Slope, are not as sensitive to price changes as operations in the Lower 48 States. For example, after the crude oil price collapse of 1986, production for the Lower 48 States declined between 1985 and 1986, while production for the Alaska North Slope increased.

10. Based on FHWA data and internal model estimates for the fourth quarter of 1989.

11. Based on FHWA data and internal model estimates for the fourth quarter of 1989.

12. Kim Coghill, "Rising Oil Prices Prompt Conversion to Natural Gas Heating, Utilities Say," *Oil Daily* (Washington, DC, September 25, 1990); "Consumer survey spells trouble for oil dealers," *U.S. Oil Week* (Alexandria, VA, August 20, 1990), p. 6; "U.S. Natgas Demand Expected to Rise 2.6 Pct," Reuters New Service (New York, December 11, 1990).

13. Energy Information Administration, *Annual Energy Review 1989*, DOE/EIA-0384(89)(Washington, DC, May 1990), p. 155.

14. Estimate based on *STEO* projection of Real Disposable Personal Income and population data in Federal Reserve, *Federal Reserve Bulletin* (Washington, DC, December 1990), Table A54.

15. Energy Information Administration, *Housing Characteristics 1987*, DOE/EIA-314(87)(Washington, DC, May 1989), p. 33.

16. American Gas Association, *Residential Gas Market Survey: 1989* (Arlington, VA, July 1990), and previous editions.

17. Energy Information Administration, *Annual Energy Review 1989*, DOE/EIA-0384(89)(Washington, DC, May 1990), pp. 155, 175, 293.

18. Council of Economic Advisers, *Economic Report of the President* (Washington, DC, February 1990), p. 325.

19. "Conversion Costs Higher Than Utilities Claim...," *Yankee Oilman* (Watertown, MA, December 1990), 36:7, p. 9.; telephone communication with American Gas Association representative, December 18, 1990.

20. Bureau of Labor Statistics, *Producer Price Indexes* (Washington, DC, July 1989), p. 167, and previous editions.

21. National Petroleum Council, *Petroleum Inventories and Storage* (April 1989).

22. Steel production forecasts are produced by using the Coking Coal Demand Model of the Short-Term Integrated Forecasting System.

23. Federal Reserve System, *Statistical Release G.17(419)* (Washington, DC, September 1990).

24. Based on internal calculations from the Electricity Demand Model of the Short-Term Integrated Forecasting System.

25. Based on internal calculations from the Electricity Demand Model of the Short-Term Integrated Forecasting System.

26. Based on calculations from the Energy Information Administration's Office of Coal, Nuclear, Electric, and Alternate Fuels.

27. Based on information from the Energy Information Administration's Office of Coal, Nuclear, Electric, and Alternate Fuels.

Table 4. Macroeconomic, Oil Price, and Weather Assumptions

Assumption	1989 1st	2nd	3rd	4th	1990 1st	2nd	3rd	4th	Case	1991 1st	2nd	3rd	4th	Year 1989	1990	1991
Macroeconomic [a]																
Real Gross National Product									High	*4,161*	*4,202*	*4,247*	*4,286*			*4,224*
(billion 1982 dollars)	**4,096**	**4,112**	**4,130**	**4,133**	**4,151**	**4,155**	**4,173**	*4,150*	Mid	*4,128*	*4,129*	*4,161*	*4,198*	**4,118**	*4,157*	*4,154*
									Low	*4,095*	*4,056*	*4,075*	*4,110*			*4,084*
Percentage Change									High	*.2*	*1.1*	*1.8*	*3.3*			*1.6*
from Prior Year	**3.2**	**2.6**	**2.4**	**1.8**	**1.3**	**1.0**	**1.0**	*.4*	Mid	*-.6*	*-.6*	*-.3*	*1.2*	**2.5**	*.9*	*-.1*
									Low	*-1.3*	*-2.4*	*-2.3*	*-1.0*			*-1.8*
GNP Implicit Price Deflator									High	*1.337*	*1.343*	*1.352*	*1.363*			*1.349*
(index, 1982=1.000)	**1.246**	**1.258**	**1.268**	**1.280**	**1.295**	**1.310**	**1.323**	*1.332*	Mid	*1.340*	*1.351*	*1.361*	*1.372*	**1.263**	*1.315*	*1.356*
									Low	*1.343*	*1.358*	*1.370*	*1.381*			*1.363*
Percentage Change									High	*3.2*	*2.5*	*2.2*	*2.3*			*2.6*
from Prior Year	**4.4**	**4.3**	**3.9**	**3.7**	**3.9**	**4.1**	**4.3**	*4.1*	Mid	*3.5*	*3.1*	*2.9*	*3.0*	**4.1**	*4.1*	*3.1*
									Low	*3.7*	*3.7*	*3.6*	*3.7*			*3.7*
Real Disposable									High	*2,916*	*2,939*	*2,950*	*2,957*			*2,941*
Personal Income [b]	**2,863**	**2,855**	**2,874**	**2,883**	**2,901**	**2,903**	**2,899**	*2,871*	Mid	*2,892*	*2,885*	*2,887*	*2,893*	**2,869**	*2,894*	*2,889*
(billion 1982 dollars)									Low	*2,868*	*2,832*	*2,824*	*2,830*			*2,838*
Percentage Change									High	*.5*	*1.2*	*1.8*	*3.0*			*1.6*
from Prior Year	**3.5**	**2.6**	**2.0**	**1.7**	**1.3**	**1.7**	**.9**	*-.4*	Mid	*-.3*	*-.6*	*-.4*	*.8*	**2.4**	*.9*	*-.2*
									Low	*-1.1*	*-2.4*	*-2.6*	*-1.4*			*-1.9*
Index of Industrial									High	*1.096*	*1.113*	*1.131*	*1.150*			*1.123*
Production (Mfg.)	**1.086**	**1.093**	**1.089**	**1.087**	**1.092**	**1.102**	**1.111**	*1.097*	Mid	*1.076*	*1.070*	*1.081*	*1.098*	**1.089**	*1.101*	*1.081*
(index, 1977=1.000)									Low	*1.057*	*1.027*	*1.031*	*1.046*			*1.040*
Percentage Change									High	*.4*	*1.0*	*1.8*	*4.8*			*2.0*
from Prior Year	**4.7**	**4.0**	**2.1**	**.9**	**.6**	**.8**	**2.0**	*.9*	Mid	*-1.5*	*-2.9*	*-2.7*	*.1*	**2.9**	*1.1*	*-1.8*
									Low	*-3.2*	*-6.8*	*-7.2*	*-4.6*			*-5.5*
Oil Price																
Imported Crude Oil Price [c]									Low	*20.00*	*20.00*	*20.00*	*20.00*			*20.00*
(U.S. dollars/barrel)	**16.76**	**18.97**	**17.60**	**18.85**	**19.76**	**15.85**	**23.16**	*29.15*	Mid	*25.00*	*25.00*	*25.00*	*25.00*	**18.08**	*21.75*	*25.00*
									High	*30.00*	*30.00*	*30.00*	*30.00*			*30.00*
Weather [d]																
Heating Degree Days	**2,289**	**560**	**96**	**1,930**	**1,970**	**553**	**82**	*1,559*		*2,401*	*536*	*88*	*1,669*	**4,875**	*4,164*	*4,694*
Cooling Degree Days	**39**	**317**	**700**	**60**	**47**	**335**	**772**	*89*		*28*	*327*	*755*	*63*	**1,116**	*1,243*	*1,172*

[a] Macroeconomic projections from the Data Resources, Inc., model forecasts are seasonally adjusted at annual rates and modified as appropriate to the $30 world oil price case. The mid macroeconomic projections are then modified by the $20 and $30 world oil price cases and by various explicit economic assumptions, with $20 world oil prices are applied to the high macroeconomic case, and $30 world oil prices are applied to the low macroeconomic case.
[b] Seasonally adjusted at annual rates.
[c] Cost of imported crude oil to U.S. refiners.
[d] Population-weighted average degree days. A degree day indicates the temperature variation from 65 degrees Farenheit (calculated as the simple average of the daily minimum and maximum temperatures) weighted by 1980 population.

Note: Historical values are printed in **boldface**, forecasts in *italics*.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/10); U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, September 1990; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Monthly State, Regional, and National Heating/Cooling Degree Days Weighted by Population*; Federal Reserve System, *Statistical Release G.17(419)* September 1990. Macroeconomic projections are based on DRI/McGraw-Hill Forecast CONTROL1290.

Table 5. International Petroleum Balance: $20 World Oil Price Case

(Million Barrels per Day, Except Closing Stocks)

	1989				1990				1991				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1989	1990	1991
Supply *															
Production															
U.S. (50 States)	10.15	10.06	9.75	9.57	9.74	9.42	9.45	9.77	9.70	9.50	9.36	9.37	9.88	9.59	9.48
OPEC	22.20	23.26	24.13	25.35	25.25	25.44	23.83	24.96	24.90	25.10	25.30	25.50	23.74	24.87	25.20
Other Non-OPEC	16.64	16.30	16.79	17.13	17.25	17.22	16.98	17.57	17.49	17.30	17.68	17.95	16.72	17.26	17.60
Total Market Economies	48.99	49.62	50.67	52.04	52.24	52.08	50.26	52.29	52.08	51.90	52.33	52.81	50.34	51.71	52.28
Net Centrally Planned Economies Exports	1.81	1.95	1.96	1.85	1.58	1.82	1.62	1.29	1.24	1.54	1.47	1.15	1.89	1.58	1.35
Total Supply	50.80	51.56	52.63	53.89	53.82	53.90	51.88	53.58	53.32	53.44	53.80	53.96	52.23	53.29	53.63
Net Stock Withdrawals or Additions (-)															
U.S. (50 States Excluding SPR)	.39	-.37	-.59	.96	-.66	-.39	-.16	.79	.25	-.68	-.28	.24	.10	-.10	-.12
U.S. SPR	-.07	-.06	-.06	-.03	-.03	-.05	-.03	.05	.00	.00	.00	.00	-.06	-.01	.00
Other Market Economies	.53	-.29	-1.35	.13	-.41	-.46	1.19	-1.05	.90	-1.10	-.92	1.45	-.25	-.18	.08
Total Stock Withdrawals	.84	-.73	-2.00	1.07	-1.10	-.90	1.00	-.20	1.15	-1.79	-1.19	1.69	-.21	-.29	-.04
Product Supplied															
U.S. (50 States)	17.72	16.89	16.87	17.83	17.03	16.87	17.08	16.87	17.06	16.13	16.59	17.38	17.33	16.96	16.79
U.S. Territories	.20	.23	.19	.16	.20	.17	.20	.17	.18	.20	.19	.17	.19	.19	.18
Canada	1.75	1.70	1.76	1.84	1.75	1.69	1.81	1.79	1.76	1.74	1.81	1.90	1.76	1.76	1.80
Japan	5.46	4.47	4.60	5.41	5.71	4.63	5.18	5.52	5.98	4.78	4.96	5.88	4.98	5.26	5.40
Australia and New Zealand	.76	.79	.78	.80	.80	.81	.82	.78	.78	.82	.81	.83	.78	.80	.81
OECD Europe	12.70	12.01	12.22	13.31	12.93	12.24	12.71	12.62	13.05	12.28	12.55	13.34	12.56	12.62	12.81
Total OECD	38.59	36.07	36.42	39.36	38.41	36.41	37.81	37.75	38.80	35.95	36.91	39.49	37.61	37.59	37.79
Other Market Economies	14.69	14.60	14.51	15.26	15.46	15.12	15.46	15.82	15.97	16.01	15.99	16.46	14.76	15.47	16.11
Total Market Economies	53.27	50.67	50.93	54.61	53.88	51.53	53.26	53.57	54.77	51.96	52.90	55.95	52.37	53.06	53.89
Statistical Discrepancy	1.64	-.17	.30	-.34	1.15	-1.47	.38	.20	.30	.30	.29	.29	.35	.06	.30
Closing Stocks (billion barrels)															
Total Market Economies	5.18	5.24	5.43	5.33	5.43	5.51	5.42	5.44	5.33	5.50	5.61	5.45	5.33	5.44	5.45

* Includes production of crude oil and natural gas liquids, other hydrogen and hydrocarbons for refinery feedstock, refinery gains, alcohol, liquids produced from coal and other sources, and net exports from Communist countries.

SPR: Strategic Petroleum Reserve

Notes: Minor discrepancies with other published EIA historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.

Sources: Energy Information Administration, *International Petroleum Statistics Report*, DOE/EIA-0520(90/12); and *International Energy Annual 1988*, DOE/EIA-0219(88); Organization for Economic Cooperation and Development, Annual and Monthly Oil Statistics Database through September 1990.

Table 6. International Petroleum Balance: $25 World Oil Price Case

(Million Barrels per Day, Except Closing Stocks)

	1989				1990				1991				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1989	1990	1991
Supply [a]															
Production															
U.S. (50 States)	10.15	10.06	9.75	9.57	9.74	9.42	9.45	*9.77*	*9.83*	*9.69*	*9.56*	*9.60*	9.88	*9.59*	*9.67*
OPEC	22.20	23.26	24.13	25.35	25.25	25.44	23.83	*24.96*	*24.90*	*24.44*	*24.44*	*24.44*	23.74	*24.87*	*24.55*
Other Non-OPEC	16.64	16.30	16.79	17.13	17.25	17.22	16.98	*17.57*	*17.49*	*17.30*	*17.68*	*17.95*	16.72	*17.26*	*17.60*
Total Market Economies	48.99	49.62	50.67	52.04	52.24	52.08	50.26	*52.29*	*52.21*	*51.43*	*51.68*	*51.98*	50.34	*51.71*	*51.82*
Net Centrally Planned Economies Exports	1.81	1.95	1.96	1.85	1.58	1.82	1.62	*1.29*	*1.35*	*1.64*	*1.57*	*1.26*	1.89	*1.58*	*1.45*
Total Supply	50.80	51.56	52.63	53.89	53.82	53.90	51.88	*53.58*	*53.56*	*53.07*	*53.25*	*53.24*	52.23	*53.29*	*53.28*
Net Stock Withdrawals or Additions (-)															
U.S. (50 States Excluding SPR)	.39	-.37	-.59	.96	-.66	-.39	-.16	*.79*	*.28*	*-.65*	*-.25*	*.25*	.10	*-.10*	*-.10*
U.S. SPR	-.07	-.06	-.06	-.03	-.03	-.05	-.03	*.05*	*.00*	*.00*	*.00*	*.00*	-.06	*-.01*	*.00*
Other Market Economies	.53	-.29	-1.35	.13	-.41	-.46	1.19	*-1.05*	*-.32*	*-1.67*	*-1.41*	*.98*	-.25	*-.18*	*-.60*
Total Stock Withdrawals	.84	-.73	-2.00	1.07	-1.10	-.90	1.00	*-.20*	*-.04*	*-2.32*	*-1.66*	*1.23*	-.21	*-.29*	*-.70*
Product Supplied															
U.S. (50 States)	17.72	16.89	16.87	17.83	17.03	16.87	17.08	*16.87*	*16.82*	*15.92*	*16.27*	*16.93*	17.33	*16.96*	*16.48*
U.S. Territories	.20	.23	.19	.16	.20	.17	.20	*.17*	*.17*	*.20*	*.18*	*.17*	.19	*.19*	*.18*
Canada	1.75	1.70	1.76	1.84	1.75	1.69	1.81	*1.79*	*1.71*	*1.69*	*1.76*	*1.85*	1.76	*1.76*	*1.75*
Japan	5.46	4.47	4.60	5.41	5.71	4.63	5.18	*5.52*	*5.81*	*4.65*	*4.83*	*5.72*	4.98	*5.26*	*5.25*
Australia and New Zealand	.76	.79	.78	.80	.80	.81	.82	*.78*	*.76*	*.80*	*.79*	*.81*	.78	*.80*	*.79*
OECD Europe	12.70	12.01	12.22	13.31	12.93	12.24	12.71	*12.62*	*12.76*	*11.98*	*12.24*	*13.02*	12.56	*12.62*	*12.50*
Total OECD	38.59	36.07	36.42	39.36	38.41	36.41	37.81	*37.75*	*38.04*	*35.23*	*36.07*	*38.49*	37.61	*37.59*	*36.96*
Other Market Economies	14.69	14.60	14.51	15.26	15.46	15.12	15.46	*15.82*	*15.78*	*15.82*	*15.80*	*16.27*	14.76	*15.47*	*15.92*
Total Market Economies	53.27	50.67	50.93	54.61	53.88	51.53	53.26	*53.57*	*53.81*	*51.05*	*51.87*	*54.76*	52.37	*53.06*	*52.87*
Statistical Discrepancy	1.64	-.17	.30	-.34	1.15	-1.47	.38	*.20*	*.30*	*.30*	*.29*	*.29*	.35	*.06*	*.29*
Closing Stocks (billion barrels)															
Total Market Economies	5.18	5.24	5.43	5.33	5.43	5.51	5.42	*5.44*	*5.44*	*5.65*	*5.81*	*5.69*	5.33	*5.44*	*5.69*

[a] Includes production of crude oil and natural gas liquids, other hydrogen and hydrocarbons for refinery feedstock, refinery gains, alcohol, liquids produced from coal and other sources, and net exports from Communist countries.

SPR: Strategic Petroleum Reserve

Notes: Minor discrepancies with other published EIA historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.

Sources: Energy Information Administration, *International Petroleum Statistics Report*, DOE/EIA-0520(90/12); and *International Energy Annual 1988*, DOE/EIA-0219(88); Organization for Economic Cooperation and Development, Annual and Monthly Oil Statistics Database through September 1990.

Table 7. International Petroleum Balance: $30 World Oil Price Case

(Million Barrels per Day, Except Closing Stocks)

	1989				1990				1991				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1989	1990	1991
Supply [a]															
Production															
U.S. (50 States)	10.15	10.06	9.75	9.57	9.74	9.42	9.45	9.77	9.90	9.77	9.66	9.71	9.88	9.59	9.76
OPEC	22.20	23.26	24.13	25.35	25.25	25.44	23.83	24.96	24.90	23.80	23.80	23.80	23.74	24.87	24.07
Other Non-OPEC	16.64	16.30	16.79	17.13	17.25	17.22	16.98	17.57	17.49	17.30	17.68	17.95	16.72	17.26	17.60
Total Market Economies	48.99	49.62	50.67	52.04	52.24	52.08	50.26	52.29	52.28	50.87	51.13	51.46	50.34	51.71	51.43
Net Centrally Planned Economies Exports	1.81	1.95	1.96	1.85	1.58	1.82	1.62	1.29	1.45	1.75	1.67	1.36	1.89	1.58	1.56
Total Supply	50.80	51.56	52.63	53.89	53.82	53.90	51.88	53.58	53.73	52.62	52.81	52.82	52.23	53.29	52.99
Net Stock Withdrawals or Additions (-)															
U.S. (50 States Excluding SPR)	.39	-.37	-.59	.96	-.66	-.39	-.16	.79	.30	-.60	-.23	.28	.10	-.10	-.06
U.S. SPR	-.07	-.06	-.06	-.03	-.03	-.05	-.03	.05	.00	.00	.00	.00	-.06	-.01	.00
Other Market Economies	.53	-.29	-1.35	.13	-.41	-.46	1.19	-1.05	-1.24	-2.02	-1.81	.48	-.25	-.18	-1.14
Total Stock Withdrawals	.84	-.73	-2.00	1.07	-1.10	-.90	1.00	-.20	-.94	-2.62	-2.04	.75	-.21	-.29	-1.21
Product Supplied															
U.S. (50 States)	17.72	16.89	16.87	17.83	17.03	16.87	17.08	16.87	16.71	15.74	16.05	16.66	17.33	16.96	16.29
U.S. Territories	.20	.23	.19	.16	.20	.17	.20	.17	.17	.20	.18	.17	.19	.19	.18
Canada	1.75	1.70	1.76	1.84	1.75	1.69	1.81	1.79	1.68	1.66	1.73	1.82	1.76	1.76	1.72
Japan	5.46	4.47	4.60	5.41	5.71	4.63	5.18	5.52	5.70	4.56	4.73	5.61	4.98	5.26	5.15
Australia and New Zealand	.76	.79	.78	.80	.80	.81	.82	.78	.74	.78	.77	.79	.78	.80	.77
OECD Europe	12.70	12.01	12.22	13.31	12.93	12.24	12.71	12.62	12.49	11.72	11.98	12.75	12.56	12.62	12.24
Total OECD	38.59	36.07	36.42	39.36	38.41	36.41	37.81	37.75	37.50	34.66	35.45	37.78	37.61	37.59	36.35
Other Market Economies	14.69	14.60	14.51	15.26	15.46	15.12	15.46	15.82	15.59	15.63	15.61	16.08	14.76	15.47	15.73
Total Market Economies	53.27	50.67	50.93	54.61	53.88	51.53	53.26	53.57	53.09	50.29	51.06	53.86	52.37	53.06	52.07
Statistical Discrepancy	1.64	-.17	.30	-.34	1.15	-1.47	.38	.20	.30	.30	.29	.29	.35	.06	.29
Closing Stocks (billion barrels)															
Total Market Economies	5.18	5.24	5.43	5.33	5.43	5.51	5.42	5.44	5.52	5.76	5.95	5.88	5.33	5.44	5.88

[a] Includes production of crude oil and natural gas liquids, other hydrogen and hydrocarbons for refinery feedstock, refinery gains, alcohol, liquids produced from coal and other sources, and net exports from Communist countries.

SPR: Strategic Petroleum Reserve

Notes: Minor discrepancies with other published EIA historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.

Sources: Energy Information Administration, *International Petroleum Statistics Report*, DOE/EIA-0520(90/12); and *International Energy Annual 1988*, DOE/EIA-0219(88); Organization for Economic Cooperation and Development, Annual and Monthly Oil Statistics Database through September 1990.

Table 8. Energy Prices
(Nominal Dollars)

Product	1989				1990				Price Range	1991				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th		1st	2nd	3rd	4th	1989	1990	1991
Imported Crude Oil Price [a]									Low	20.00	20.00	20.00	20.00			20.00
(dollars per barrel)	16.76	18.97	17.60	18.85	19.76	15.85	23.16	29.15	Mid	25.00	25.00	25.00	25.00	18.08	21.75	25.00
									High	30.00	30.00	30.00	30.00			30.00
Natural Gas Wellhead Price									Low	1.89	1.54	1.70	1.96			1.77
(dollars per thousand cubic feet)	1.83	1.61	1.60	1.73	1.90	1.54	1.58	1.87	Mid	1.95	1.60	1.76	2.14	1.69	1.73	1.87
									High	2.16	1.76	1.95	2.35			2.05
Petroleum Products																
Gasoline [b]									Low	1.25	1.24	1.24	1.14			1.22
(dollars per gallon)	.96	1.13	1.10	1.05	1.08	1.12	1.24	1.45	Mid	1.34	1.40	1.40	1.31	1.06	1.22	1.36
									High	1.43	1.55	1.57	1.47			1.51
No. 2 Diesel Oil, Retail									Low	1.20	1.20	1.18	1.20			1.19
(dollars per gallon)	.95	.99	.96	1.05	1.10	1.01	1.10	1.42	Mid	1.31	1.31	1.29	1.32	.99	1.16	1.31
									High	1.43	1.43	1.40	1.43			1.42
No. 2 Heating Oil, Wholesale									Low	.73	.68	.65	.70			.70
(dollars per gallon)	.53	.53	.53	.65	.63	.54	.71	.99	Mid	.84	.81	.77	.83	.57	.72	.82
									High	.94	.93	.89	.96			.94
No. 2 Heating Oil, Retail									Low	1.11	1.02	.95	1.01			1.04
(dollars per gallon)	.86	.86	.82	.96	1.02	.90	1.00	1.34	Mid	1.23	1.18	1.11	1.17	.90	1.07	1.18
									High	1.35	1.33	1.26	1.33			1.33
No. 6 Residual Fuel Oil [c]									Low	18.57	18.52	18.39	18.84			18.61
(dollars per barrel)	15.12	17.10	15.87	17.88	19.24	13.94	17.38	26.04	Mid	22.97	21.18	20.96	22.78	16.47	18.99	22.08
									High	25.51	27.17	26.98	27.63			26.77
Electric Utility Fuels																
Coal									Low	1.46	1.46	1.44	1.43			1.45
(dollars per million Btu)	1.44	1.45	1.45	1.44	1.46	1.47	1.45	1.47	Mid	1.47	1.48	1.47	1.48	1.44	1.46	1.47
									High	1.47	1.50	1.50	1.52			1.50
Heavy Oil [d]									Low	2.97	2.91	2.91	3.02			2.96
(dollars per million Btu)	2.62	2.96	2.69	3.20	3.49	2.38	3.05	4.15	Mid	3.68	3.32	3.31	3.64	2.85	3.22	3.50
									High	4.09	4.27	4.26	4.43			4.26
Natural Gas									Low	2.67	2.28	2.39	2.74			2.48
(dollars per million Btu)	2.38	2.30	2.30	2.49	2.62	2.14	2.22	2.73	Mid	2.76	2.43	2.55	2.92	2.36	2.39	2.65
									High	2.85	2.58	2.72	3.10			2.80
Other Residential																
Natural Gas									Low	5.56	6.03	7.22	6.02			5.90
(dollars per thousand cubic feet)	5.41	5.85	6.91	5.49	5.53	5.91	6.94	5.85	Mid	5.64	6.16	7.39	6.17	5.64	5.81	6.01
									High	5.73	6.28	7.56	6.32			6.13
Electricity									Low	7.60	8.18	8.53	8.09			8.10
(cents per kilowatthour)	7.19	7.77	8.07	7.53	7.40	7.94	8.22	7.92	Mid	7.62	8.23	8.61	8.20	7.64	7.87	8.16
									High	7.63	8.28	8.68	8.28			8.22

[a] Cost of imported crude oil to U.S. refiners.
[b] Average retail for all grades and services.
[c] Retail residual fuel oil--average, all sulfur contents.
[d] Heavy fuel oil prices include fuel oils No. 4., No. 5, and No. 6, and topped crude fuel oil prices.
Notes: Fourth quarter 1990 is estimated. Prices exclude taxes, except gasoline, residential natural gas, and diesel prices. Price ranges are derived by simulating all energy product price models in STIFS under the assumptions of: $20 world oil prices (low price), $25 world oil prices (mid price), and $30 world oil prices (high price), with macroeconomic and weather assumptions kept as in the mid case for all price cases. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/10); and *Petroleum Marketing Monthly*, DOE/EIA-0380(90/10).

Table 9. Supply and Disposition of Petroleum: $20 World Oil Price Case

(Million Barrels per Day, Except Closing Stocks)

Supply and Disposition	1989				1990				1991				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1989	1990	1991
Supply															
Crude Oil Supply															
Domestic Production a	7.77	7.74	7.51	7.44	7.46	7.22	7.18	7.36	7.43	7.24	7.10	7.07	7.61	7.30	7.21
Alaska	1.87	1.91	1.82	1.90	1.84	1.73	1.71	1.80	2.00	1.92	1.85	1.86	1.87	1.77	1.91
Lower 48	5.90	5.83	5.69	5.54	5.62	5.50	5.47	5.56	5.43	5.31	5.25	5.21	5.74	5.53	5.30
Net Imports (Including SPR) b	5.17	5.65	6.18	5.80	5.95	6.10	6.23	4.99	5.68	6.06	6.51	6.32	5.70	5.81	6.15
Gross Imports (Excluding SPR)	5.26	5.75	6.22	5.91	6.04	6.15	6.27	5.10	5.80	6.19	6.59	6.46	5.79	5.89	6.26
SPR Imports	.07	.06	.06	.03	.03	.05	.03	.00	.00	.00	.00	.00	.06	.03	.00
Exports	.17	.17	.09	.14	.12	.10	.07	.11	.12	.13	.08	.14	.14	.10	.12
SPR Stock Withdrawn or Added (-)	-.07	-.06	-.06	-.03	-.03	-.05	-.03	.05	.00	.00	.00	.00	-.06	-.01	.00
Other Stock Withdrawn or Added (-)	.04	-.05	-.04	-.07	-.36	-.12	.45	.14	-.07	-.06	.03	-.01	-.03	.03	-.03
Products Supplied and Losses	-.05	-.02	-.02	-.03	-.03	-.03	-.02	-.02	-.02	-.02	-.02	-.02	-.03	-.02	-.02
Unaccounted-for Crude	.17	.17	.25	.20	.30	.25	.35	.33	.15	.15	.14	.14	.20	.31	.15
Crude Oil Input to Refineries	13.03	13.42	13.83	13.31	13.28	13.38	14.15	12.86	13.17	13.37	13.76	13.51	13.40	13.42	13.45
Other Supply															
NGL Production	1.64	1.60	1.51	1.43	1.53	1.48	1.54	1.63	1.56	1.55	1.53	1.56	1.55	1.55	1.55
Other Hydrocarbon and Alcohol Inputs	.06	.06	.06	.06	.07	.07	.07	.08	.07	.07	.08	.08	.06	.07	.07
Crude Oil Product Supplied	.05	.02	.02	.03	.03	.03	.02	.02	.02	.02	.02	.02	.03	.02	.02
Processing Gain	.68	.67	.67	.63	.68	.64	.66	.69	.63	.64	.65	.66	.66	.67	.65
Net Product Imports c	1.91	1.44	1.33	1.33	1.71	1.55	1.24	.93	1.28	1.10	.85	1.30	1.50	1.36	1.13
Gross Product Imports c	2.58	2.13	2.04	2.13	2.39	2.20	1.97	1.77	1.95	1.75	1.51	2.02	2.22	2.08	1.81
Product Exports	.66	.69	.71	.80	.68	.65	.72	.83	.67	.65	.66	.72	.72	.72	.67
Product Stock Withdrawn or Added (-) d	.35	-.32	-.55	1.03	-.30	-.28	-.61	.66	.32	-.62	-.31	.26	.13	-.13	-.09
Total Product Supplied, Domestic Use	17.72	16.89	16.87	17.83	17.01	16.87	17.08	16.87	17.06	16.13	16.59	17.38	17.33	16.96	16.79
Disposition															
Motor Gasoline	7.09	7.44	7.42	7.35	7.04	7.30	7.37	7.13	6.94	7.10	7.26	7.23	7.33	7.21	7.13
Jet Fuel	1.51	1.39	1.47	1.58	1.48	1.47	1.46	1.56	1.47	1.46	1.44	1.58	1.49	1.49	1.49
Distillate Fuel Oil	3.38	2.98	2.82	3.45	3.23	2.97	2.92	3.06	3.46	2.83	2.77	3.24	3.16	3.05	3.07
Residual Fuel Oil	1.63	1.25	1.14	1.47	1.40	1.24	1.18	1.08	1.33	1.02	1.01	1.33	1.37	1.22	1.17
Other Oils Supplied e	4.10	3.83	4.02	3.97	3.88	3.90	4.16	4.04	3.87	3.73	4.11	3.99	3.98	3.99	3.93
Total Product Supplied	17.72	16.89	16.87	17.83	17.03	16.87	17.08	16.87	17.06	16.13	16.59	17.38	17.33	16.96	16.79
Total Petroleum Net Imports	7.08	7.08	7.51	7.13	7.66	7.65	7.48	5.92	6.96	7.16	7.37	7.62	7.20	7.17	7.28
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) f	327	331	335	341	374	384	343	331	337	343	340	341	341	331	341
Total Motor Gasoline	230	216	227	213	228	213	230	222	232	229	233	231	213	222	231
Finished Motor Gasoline	189	178	186	177	186	176	189	182	193	188	190	191	177	182	191
Blending Components	41	38	41	36	42	38	41	40	39	41	43	40	36	40	40
Jet Fuel	43	45	48	41	49	47	50	52	49	49	50	48	41	52	48
Distillate Fuel Oil	97	100	123	106	100	109	136	130	102	113	127	136	106	130	136
Residual Fuel Oil	42	44	49	44	46	47	50	49	44	47	48	46	44	49	46
Other Oils g	264	300	308	256	265	296	303	255	252	297	305	279	256	255	279
Total Stocks (Excluding SPR)	1002	1036	1090	1002	1061	1097	1112	1039	1016	1078	1103	1081	1002	1039	1081
Crude Oil in SPR	566	572	577	580	582	587	590	586	586	586	586	586	580	586	586
Total Stocks (Including SPR)	1568	1608	1667	1581	1643	1684	1701	1624	1602	1664	1689	1667	1581	1624	1667

a Includes lease condensate.
b Net imports equals gross imports plus SPR imports minus exports.
c Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.
d Includes an estimate of minor product stock change based on monthly data.
e Includes crude oil product supplied, natural gas liquids, liquefied refinery gas, other liquids, and all finished petroleum products except motor gasoline, jet fuel, distillate, and residual fuel oil.
f Includes crude oil in transit to refineries.
g Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.
SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1989*, DOE/EIA-0340(89)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1990 to Nov. 1990; *Weekly Petroleum Status Report*, DOE/EIA-0208(91-02).

Table 10. Supply and Disposition of Petroleum: $25 World Oil Price Case
(Million Barrels per Day, Except Closing Stocks)

Supply and Disposition	1989 1st	2nd	3rd	4th	1990 1st	2nd	3rd	4th	1991 1st	2nd	3rd	4th	Year 1989	1990	1991
Supply															
Crude Oil Supply															
Domestic Production a	7.77	7.74	7.51	7.44	7.46	7.22	7.18	7.36	7.57	7.43	7.31	7.32	7.61	7.30	7.41
Alaska	1.87	1.91	1.82	1.90	1.84	1.73	1.71	1.80	2.00	1.93	1.86	1.88	1.87	1.77	1.92
Lower 48	5.90	5.83	5.69	5.54	5.62	5.50	5.47	5.56	5.57	5.50	5.45	5.43	5.74	5.53	5.49
Net Imports (Including SPR) b	5.17	5.65	6.18	5.80	5.95	6.10	6.23	4.99	5.45	5.70	6.02	5.72	5.70	5.81	5.73
Gross Imports (Excluding SPR)	5.26	5.75	6.22	5.91	6.04	6.15	6.27	5.10	5.58	5.83	6.11	5.86	5.79	5.89	5.84
SPR Imports	.07	.06	.06	.03	.03	.05	.03	.00	.00	.00	.00	.00	.06	.03	.00
Exports	.17	.17	.09	.14	.12	.10	.07	.11	.12	.13	.08	.14	.14	.10	.12
SPR Stock Withdrawn or Added (-)	-.07	-.06	-.06	-.03	-.03	-.05	-.03	.05	.00	.00	.00	.00	-.06	-.01	.00
Other Stock Withdrawn or Added (-)	.04	-.05	-.04	-.07	-.36	-.12	.45	.14	-.05	-.06	.04	.00	-.03	.03	-.02
Products Supplied and Losses	-.05	-.02	-.02	-.03	-.03	-.03	-.02	-.02	-.02	-.02	-.02	-.02	-.03	-.02	-.02
Unaccounted-for Crude	.17	.17	.25	.20	.30	.25	.35	.33	.15	.15	.14	.14	.20	.31	.14
Crude Oil Input to Refineries	13.03	13.42	13.83	13.31	13.28	13.38	14.15	12.86	13.10	13.19	13.49	13.16	13.40	13.42	13.24
Other Supply															
NGL Production	1.64	1.60	1.51	1.43	1.53	1.48	1.54	1.63	1.57	1.55	1.53	1.56	1.55	1.55	1.55
Other Hydrocarbon and Alcohol Inputs	.06	.06	.06	.06	.07	.07	.07	.08	.07	.07	.07	.08	.06	.07	.07
Crude Oil Product Supplied	.05	.02	.02	.03	.03	.03	.02	.02	.02	.02	.02	.02	.03	.02	.02
Processing Gain	.68	.67	.67	.63	.68	.64	.66	.69	.62	.63	.64	.64	.66	.67	.63
Net Product Imports c	1.91	1.44	1.33	1.33	1.71	1.55	1.24	.93	1.11	1.04	.80	1.22	1.50	1.36	1.04
Gross Product Imports c	2.58	2.13	2.04	2.13	2.39	2.20	1.97	1.77	1.78	1.69	1.46	1.93	2.22	2.08	1.71
Product Exports	.66	.69	.71	.80	.68	.65	.72	.83	.67	.65	.66	.72	.72	.72	.67
Product Stock Withdrawn or Added (-) d	.35	-.32	-.55	1.03	-.30	-.28	-.61	.66	.33	-.59	-.29	.26	.13	-.13	-.07
Total Product Supplied, Domestic Use	17.72	16.89	16.87	17.83	17.01	16.87	17.08	16.87	16.82	15.92	16.27	16.93	17.33	16.96	16.48
Disposition															
Motor Gasoline	7.09	7.44	7.42	7.35	7.04	7.30	7.37	7.13	6.94	7.08	7.23	7.19	7.33	7.21	7.11
Jet Fuel	1.51	1.39	1.47	1.58	1.48	1.47	1.46	1.56	1.46	1.45	1.43	1.57	1.49	1.49	1.48
Distillate Fuel Oil	3.38	2.98	2.82	3.45	3.23	2.97	2.92	3.06	3.40	2.76	2.69	3.16	3.16	3.05	3.00
Residual Fuel Oil	1.63	1.25	1.14	1.47	1.40	1.24	1.18	1.08	1.17	.93	.85	1.07	1.37	1.22	1.00
Other Oils Supplied e	4.10	3.83	4.02	3.97	3.88	3.90	4.16	4.04	3.85	3.69	4.07	3.94	3.98	3.99	3.89
Total Product Supplied	17.72	16.89	16.87	17.83	17.03	16.87	17.08	16.87	16.82	15.92	16.27	16.93	17.33	16.96	16.48
Total Petroleum Net Imports	7.08	7.08	7.51	7.13	7.66	7.65	7.48	5.92	6.57	6.74	6.82	6.94	7.20	7.17	6.77
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) f	327	331	335	341	374	384	343	331	335	341	338	338	341	331	338
Total Motor Gasoline	230	216	227	213	228	213	230	222	232	228	232	229	213	222	229
Finished Motor Gasoline	189	178	186	177	186	176	189	182	193	187	189	190	177	182	190
Blending Components	41	38	41	36	42	38	41	40	40	41	43	40	36	40	40
Jet Fuel	43	45	48	41	49	47	50	52	48	50	51	48	41	52	48
Distillate Fuel Oil	97	100	123	106	100	109	136	130	101	112	126	134	106	130	134
Residual Fuel Oil	42	44	49	44	46	47	50	49	45	48	47	45	44	49	45
Other Oils g	264	300	308	256	265	296	303	255	252	295	304	278	256	255	278
Total Stocks (Excluding SPR)	1002	1036	1090	1002	1061	1097	1112	1039	1014	1073	1097	1073	1002	1039	1073
Crude Oil in SPR	566	572	577	580	582	587	590	586	586	586	586	586	580	586	586
Total Stocks (Including SPR)	1568	1608	1667	1581	1643	1684	1701	1624	1599	1659	1682	1659	1581	1624	1659

a Includes lease condensate.
b Net imports equals gross imports plus SPR imports minus exports.
c Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.
d Includes an estimate of minor product stock change based on monthly data.
e Includes crude oil product supplied, natural gas liquids, liquefied refinery gas, other liquids, and all finished petroleum products except motor gasoline, jet fuel, distillate, and residual fuel oil.
f Includes crude oil in transit to refineries.
g Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.
SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1989*, DOE/EIA-0340(89)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1990 to Nov. 1990; *Weekly Petroleum Status Report*, DOE/EIA-0208(91-02)

Table 11. Supply and Disposition of Petroleum: $30 World Oil Price Case
(Million Barrels per Day, Except Closing Stocks)

Supply and Disposition	1989 1st	2nd	3rd	4th	1990 1st	2nd	3rd	4th	1991 1st	2nd	3rd	4th	Year 1989	1990	1991
Supply															
Crude Oil Supply															
Domestic Production ª	7.77	7.74	7.51	7.44	7.46	7.22	7.18	7.36	7.64	7.52	7.42	7.44	7.61	7.30	7.50
Alaska	1.87	1.91	1.82	1.90	1.84	1.73	1.71	1.80	2.00	1.94	1.87	1.90	1.87	1.77	1.93
Lower 48	5.90	5.83	5.69	5.54	5.62	5.50	5.47	5.56	5.64	5.58	5.55	5.54	5.74	5.53	5.58
Net Imports (Including SPR) ᵇ	5.17	5.65	6.18	5.80	5.95	6.10	6.23	4.99	5.33	5.49	5.74	5.38	5.70	5.81	5.49
Gross Imports (Excluding SPR)	5.26	5.75	6.22	5.91	6.04	6.15	6.27	5.10	5.45	5.62	5.82	5.52	5.79	5.89	5.61
SPR Imports	.07	.06	.06	.03	.03	.05	.03	.00	.00	.00	.00	.00	.06	.03	.00
Exports	.17	.17	.09	.14	.12	.10	.07	.11	.12	.13	.08	.14	.14	.10	.12
SPR Stock Withdrawn or Added (-)	-.07	-.06	-.06	-.03	-.03	-.05	-.03	.05	.00	.00	.00	.00	-.06	-.01	.00
Other Stock Withdrawn or Added (-)	.04	-.05	-.04	-.07	-.36	-.12	.45	.14	-.05	-.05	.04	.00	-.03	.03	-.02
Products Supplied and Losses	-.05	-.02	-.02	-.03	-.03	-.03	-.02	-.02	-.02	-.02	-.02	-.02	-.03	-.02	-.02
Unaccounted-for Crude	.17	.17	.25	.20	.30	.25	.35	.33	.15	.15	.14	.14	.20	.31	.14
Crude Oil Input to Refineries	13.03	13.42	13.83	13.31	13.28	13.38	14.15	12.86	13.05	13.08	13.32	12.94	13.40	13.42	13.10
Other Supply															
NGL Production	1.64	1.60	1.51	1.43	1.53	1.48	1.54	1.63	1.57	1.55	1.53	1.56	1.55	1.55	1.56
Other Hydrocarbon and Alcohol Inputs	.06	.06	.06	.06	.07	.07	.07	.08	.07	.07	.07	.07	.06	.07	.07
Crude Oil Product Supplied	.05	.02	.02	.03	.03	.03	.02	.02	.02	.02	.02	.02	.03	.02	.02
Processing Gain	.68	.67	.67	.63	.68	.64	.66	.69	.62	.63	.63	.63	.66	.67	.63
Net Product Imports ᶜ	1.91	1.44	1.33	1.33	1.71	1.55	1.24	.93	1.04	.93	.74	1.15	1.50	1.36	.96
Gross Product Imports ᶜ	2.58	2.13	2.04	2.13	2.39	2.20	1.97	1.77	1.71	1.59	1.39	1.86	2.22	2.08	1.64
Product Exports	.66	.69	.71	.80	.68	.65	.72	.83	.67	.65	.66	.72	.72	.72	.67
Product Stock Withdrawn or Added (-) ᵈ	.35	-.32	-.55	1.03	-.30	-.28	-.61	.66	.34	-.55	-.27	.28	.13	-.13	-.05
Total Product Supplied, Domestic Use	17.72	16.89	16.87	17.83	17.01	16.87	17.08	16.87	16.71	15.74	16.05	16.66	17.33	16.96	16.29
Disposition															
Motor Gasoline	7.09	7.44	7.42	7.35	7.04	7.30	7.37	7.13	6.93	7.05	7.16	7.08	7.33	7.21	7.05
Jet Fuel	1.51	1.39	1.47	1.58	1.48	1.47	1.46	1.56	1.46	1.44	1.42	1.56	1.49	1.47	1.47
Distillate Fuel Oil	3.38	2.98	2.82	3.45	3.23	2.97	2.92	3.06	3.35	2.68	2.61	3.07	3.16	3.05	2.93
Residual Fuel Oil	1.63	1.25	1.14	1.47	1.40	1.24	1.18	1.08	1.15	.91	.83	1.05	1.37	1.22	.98
Other Oils Supplied ᵉ	4.10	3.83	4.02	3.97	3.88	3.90	4.16	4.04	3.83	3.66	4.03	3.90	3.98	3.99	3.86
Total Product Supplied	17.72	16.89	16.87	17.83	17.03	16.87	17.08	16.87	16.71	15.74	16.05	16.66	17.33	16.96	16.29
Total Petroleum Net Imports	7.08	7.08	7.51	7.13	7.66	7.65	7.48	5.92	6.37	6.43	6.48	6.53	7.20	7.17	6.45
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) ᶠ	327	331	335	341	374	384	343	331	335	340	336	336	341	331	336
Total Motor Gasoline	230	216	227	213	228	213	230	222	232	227	230	226	213	222	226
Finished Motor Gasoline	189	178	186	177	186	176	189	182	192	186	186	186	177	182	186
Blending Components	41	38	41	36	42	38	41	40	40	41	43	40	36	40	40
Jet Fuel	43	45	48	41	49	47	50	52	49	49	50	48	41	52	48
Distillate Fuel Oil	97	100	123	106	100	109	136	130	100	111	125	132	106	130	132
Residual Fuel Oil	42	44	49	44	46	47	50	49	46	48	46	45	44	49	45
Other Oils ᵍ	264	300	308	256	265	296	303	255	250	293	301	275	256	255	275
Total Stocks (Excluding SPR)	1002	1036	1090	1002	1061	1097	1112	1039	1012	1066	1087	1062	1002	1039	1062
Crude Oil in SPR	566	572	577	580	582	587	590	586	586	586	586	586	580	586	586
Total Stocks (Including SPR)	1568	1608	1667	1581	1643	1684	1701	1624	1597	1652	1673	1648	1581	1624	1648

ª Includes lease condensate.
ᵇ Net imports equals gross imports plus SPR imports minus exports.
ᶜ Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.
ᵈ Includes an estimate of minor product stock change based on monthly data.
ᵉ Includes crude oil product supplied, natural gas liquids, liquefied refinery gas, other liquids, and all finished petroleum products except motor gasoline, jet fuel, distillate, and residual fuel oil.
ᶠ Includes crude oil in transit to refineries.
ᵍ Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.
SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1989*, DOE/EIA-0340(89)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1990 to Nov. 1990; *Weekly Petroleum Status Report*, DOE/EIA-0208(91-02).

Table 12. Petroleum Demand Sensitivities

Demand Determinant	1991 Four Quarters
Economic Activity	
Level of GNP [a]	4,084 - 4,224
Resulting Petroleum Demand Difference [b]	0.53
Energy Prices	
Crude Oil [c]	$20 - $30
Resulting Petroleum Demand Difference [b] All Energy Prices Change	.42
Only Oil Prices Change	.50
Weather	
Heating Degree Days [d]	3,949 - 5,614
Cooling Degree Days [d]	991 - 1,411
Resulting Petroleum Demand Difference [b]	.44

[a] Real gross national product, in billion 1982 dollars per year.
[b] Petroleum demand ranges associated with varying each demand determinant (or set of demand determinants), holding other things equal, in million barrels per day.
[c] Refiners' acquisition cost of imported oil, in current dollars per barrel.
[d] Heating and cooling degree days shown are national population-weighted.
Source: Energy Information Administration, Office of Energy Markets and End Use, Demand Analysis and Forecasting Branch.

Table 13. Supply and Disposition of Natural Gas: $25 World Oil Price Case
(Trillion Cubic Feet)

Supply and Disposition	1989				1990				1991				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1989	1990	1991
Supply															
Total Dry Gas Production [a]	4.45	4.26	4.16	4.38	4.54	4.28	4.14	4.54	4.59	4.39	4.16	4.56	17.24	17.50	17.69
Net Imports	.32	.29	.30	.37	.36	.32	.33	.36	.43	.37	.34	.39	1.28	1.37	1.53
Supplemental Gaseous Fuels	.03	.02	.02	.03	.04	.04	.03	.04	.04	.03	.03	.03	.11	.15	.13
Total New Supply	4.80	4.58	4.48	4.77	4.94	4.63	4.51	4.93	5.05	4.79	4.53	4.98	18.63	19.02	19.35
Underground Working Gas Storage															
Opening	2.85	1.78	2.37	3.19	2.51	1.88	2.45	3.27	2.79	1.72	2.31	3.15	2.85	2.51	2.79
Closing	1.78	2.37	3.19	2.51	1.88	2.45	3.27	2.79	1.72	2.31	3.15	2.77	2.51	2.79	2.77
Net Withdrawals [b]	1.22	-.69	-.97	.76	.63	-.57	-.83	.49	1.07	-.59	-.84	.38	.32	-.28	.02
Total Primary Supply [a]	6.01	3.89	3.51	5.54	5.58	4.06	3.68	5.42	6.13	4.19	3.69	5.36	18.95	18.74	19.37
Consumption															
Lease and Plant Fuel	.31	.30	.29	.30	.32	.30	.29	.30	.28	.29	.26	.29	1.19	1.20	1.12
Pipeline Use	.17	.15	.15	.16	.15	.14	.15	.18	.16	.17	.15	.17	.63	.61	.66
Residential	2.14	.83	.39	1.42	1.97	.81	.39	1.19	2.24	.85	.37	1.29	4.78	4.36	4.74
Commercial	1.10	.51	.33	.77	1.05	.53	.37	.68	1.16	.54	.33	.73	2.72	2.62	2.75
Industrial	1.77	1.64	1.60	1.81	1.75	1.78	1.73	1.92	1.77	1.86	1.64	1.87	6.82	7.18	7.14
Electric Utilities	.53	.74	.89	.61	.46	.73	.97	.66	.58	.73	.93	.66	2.77	2.82	2.90
Subtotal	6.01	4.16	3.64	5.09	5.69	4.28	3.90	4.92	6.18	4.45	3.67	5.02	18.90	18.79	19.32
Total Disposition	6.01	3.89	3.51	5.54	5.58	4.06	3.68	5.42	6.13	4.19	3.69	5.36	18.95	18.74	19.37
Unaccounted for	.01	-.27	-.13	.45	-.11	-.21	-.22	.49	-.05	-.25	.01	.34	.05	-.05	.05

[a] Excludes nonhydrocarbon gases removed.

[b] Net withdrawals may vary from the difference between opening and closing stocks of gas in working gas storage due to book transfers between base and working gas categories, and other storage operator revisions of working gas inventories.

Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/10); *Natural Gas Monthly*, DOE/EIA-0130(90/10); and *Electric Power Monthly*, DOE/EIA-0226(90/11).

Table 14. Supply and Disposition of Coal: $25 World Oil Price Case
(Million Short Tons)

Supply and Disposition	1989 1st	1989 2nd	1989 3rd	1989 4th	1990 1st	1990 2nd	1990 3rd	1990 4th	1991 1st	1991 2nd	1991 3rd	1991 4th	Year 1989	Year 1990	Year 1991
Supply															
Production	247	239	243	251	264	254	255	*263*	*262*	*250*	*251*	*252*	981	*1036*	*1015*
Primary Stock Levels [a]															
Opening	30	35	30	29	29	35	37	*34*	*31*	*31*	*31*	*31*	30	*29*	*31*
Closing	35	30	29	29	35	37	34	*31*	*31*	*31*	*31*	*31*	29	*31*	*31*
Net Withdrawals	-5	5	2	0	-6	-2	3	*3*	*0*	*0*	*0*	*0*	1	*-2*	*0*
Imports	1	1	1	1	1	1	1	*1*	*1*	*1*	*1*	*1*	3	*2*	*3*
Exports	21	28	24	27	22	28	29	*27*	*23*	*27*	*27*	*27*	101	*107*	*104*
Total New Domestic Supply	221	216	222	225	237	225	229	*238*	*240*	*224*	*225*	*226*	884	*929*	*914*
Secondary Stock Levels [b]															
Opening	158	149	159	147	146	161	174	*161*	*175*	*190*	*201*	*185*	158	*146*	*175*
Closing	149	159	147	146	161	174	161	*175*	*190*	*201*	*185*	*183*	146	*175*	*183*
Net Withdrawals	9	-10	12	1	-15	-12	13	*-14*	*-15*	*-11*	*17*	*1*	12	*-29*	*-8*
Total Indicated Consumption	231	206	233	226	221	213	242	*224*	*225*	*213*	*242*	*227*	896	*900*	*906*
Consumption															
Coke Plants	11	11	10	10	10	10	10	*9*	*9*	*9*	*9*	*9*	41	*39*	*37*
Electric Utilities	191	178	203	194	185	182	211	*193*	*194*	*185*	*214*	*196*	766	*771*	*789*
Retail and General Industry [c]	22	19	19	22	22	19	20	*21*	*21*	*19*	*19*	*21*	82	*82*	*80*
Subtotal	223	208	232	226	216	211	241	*224*	*225*	*213*	*242*	*227*	889	*892*	*906*
Total Disposition	231	206	233	226	221	213	242	*224*	*225*	*213*	*242*	*227*	896	*900*	*906*
Discrepancy [d]	7	-1	1	0	5	2	1	*0*	*0*	*0*	*0*	*0*	7	*8*	*0*

[a] Primary stocks are held at the mines, preparation plants, and distribution points.
[b] Secondary stocks are held by users. Most of the secondary stocks are held by electric utilities.
[c] Synfuels plant consumption in 1989 was 1.7 million tons per quarter, and is assumed to remain at that level in 1990 and 1991.
[d] Historical period discrepancy reflects an unaccounted shipper and receiver reporting difference.
Notes: Rows and columns may not add due to independent rounding. Zeros indicate amounts of less than 500,000 tons. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/10); and *Quarterly Coal Report*, DOE/EIA-0121(90/3Q).

Table 15. Supply and Disposition of Electricity: $25 World Oil Price Case

(Billion Kilowatthours)

Supply and Disposition	1989 1st	1989 2nd	1989 3rd	1989 4th	1990 1st	1990 2nd	1990 3rd	1990 4th	1991 1st	1991 2nd	1991 3rd	1991 4th	Year 1989	Year 1990	Year 1991
Net Utility Generation															
Coal	388.9	362.7	406.9	393.4	371.4	369.2	426.3	390.6	393.0	375.0	432.0	396.9	1551.9	1557.5	1597.0
Petroleum	49.7	34.1	33.1	41.3	31.1	32.8	31.8	21.9	28.7	22.5	27.0	25.3	158.2	117.7	103.5
Natural Gas	50.4	70.6	85.1	58.9	43.5	69.9	91.7	63.2	54.9	69.8	88.9	63.0	265.0	268.3	276.7
Nuclear	124.7	114.8	152.1	137.7	151.2	127.8	157.8	139.6	148.1	130.6	150.0	137.0	529.4	576.3	565.7
Hydroelectric	62.2	78.0	61.8	63.1	75.6	80.0	61.7	60.6	73.3	79.0	67.7	68.7	265.1	277.9	288.7
Geothermal and Other [a]	2.8	2.8	2.8	2.9	2.7	2.5	2.7	2.8	3.1	3.1	3.2	3.2	11.3	10.8	12.6
Total Utility Generation	678.7	663.0	741.9	697.2	675.5	682.3	772.1	678.7	701.1	680.0	768.9	694.2	2780.8	2808.5	2844.2
Net Imports	3.8	3.8	4.8	-1.4	-2.6	-1.7	2.8	3.2	3.7	4.5	6.3	6.3	11.0	1.8	20.7
Purchases from Nonutilities [b]	21.9	21.4	24.0	22.5	25.7	25.1	28.0	26.4	26.9	26.3	29.4	27.6	89.8	105.3	110.2
Total Supply	704.4	688.1	770.7	718.3	698.6	705.7	803.0	708.3	731.7	710.8	804.6	728.1	2881.6	2915.6	2975.2
Losses and Unaccounted For [c]	47.3	62.5	54.9	70.3	31.8	67.9	57.0	52.0	42.7	65.5	59.1	60.1	234.9	208.8	227.4
Sales															
Residential	240.4	197.5	250.5	215.6	241.2	201.3	264.5	218.0	257.5	209.0	267.8	224.7	904.0	925.0	959.0
Commercial	172.2	174.6	201.3	177.1	177.9	180.3	211.6	181.3	185.1	184.6	212.9	185.9	725.2	751.2	768.5
Industrial	222.2	231.4	240.1	232.6	224.6	233.3	244.7	233.8	222.7	229.0	240.5	233.9	926.4	936.3	926.1
Other	22.3	22.1	23.9	22.8	23.1	22.9	25.1	23.2	23.7	22.7	24.3	23.6	91.1	94.2	94.2
Total	657.1	625.6	715.8	648.1	666.7	637.8	745.9	656.3	689.0	645.3	745.5	668.0	2646.7	2706.8	2747.8

[a] Other includes generation from wind, wood, waste, and solar sources.
[b] Electricity received from nonutility sources, including cogenerators and small power producers.
[c] Balancing item, mainly transmission and distribution losses.

Notes: Values for purchases from nonutilities and losses and unaccounted for are estimated for 1989. Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/10); and *Electric Power Monthly*, DOE/EIA-0226(90/11).

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