

# Short-Term Energy Outlook

Energy Information Administration  
Washington, D C

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## Quarterly Projections

April 1986

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# **Short-Term Energy Outlook**

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## **Quarterly Projections**

**April 1986**

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# Preface

The Energy Information Administration (EIA) quarterly projections of short-term energy supply, demand, and prices are revised in January, April, July, and October for publication in the *Short-Term Energy Outlook* (*Outlook*). A methodology volume, published annually, contains descriptions of major changes in the forecasting system, analyzes previous forecast errors, and provides detailed analyses of current issues that affect EIA's short-term energy forecasts. The principal users of the *Outlook* are managers and energy analysts in private industry and government. The projections in this volume extend through the first half of 1987.

The forecasts are produced using the Short-Term Integrated Forecasting System (STIFS). The STIFS model uses two principal driving variables: a macroeconomic forecast and the world oil price assumptions. Macroeconomic forecasts produced by Data Resources, Inc., (DRI) are adjusted by EIA to reflect EIA assumptions about the world price of crude oil, which differ from DRI estimates. EIA's Oil Market Simulation Model is used to project the world oil prices.

(These models are available on tape from the National Energy Information Center.)

The three projections for petroleum supply and demand are based on low, middle, and high crude oil price trajectories. The discussion and tables in this volume primarily refer to the middle, or base case, scenario and, unless otherwise noted, to the domestic situation. Other cases examining the sensitivity of total petroleum demand to varying assumptions about prices, weather, and economic activity are shown in (Table 13 on page 34). Discussions of the world oil price refer to the cost of imported crude oil to U.S. refiners.

The forecasts 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 these 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 the rounded numbers cited in the text.



# 1. Highlights

At no time in recent history has the U.S. energy market been so difficult to forecast. The prices of petroleum products, the major forms of energy consumed in this country, are changing drastically on a daily basis. These changes are not being determined by fundamental market forces, but rather by production decisions of other countries (mainly Saudi Arabia) and are influenced by complex social, political, and longer term economic considerations. For this reason, the range of world oil prices assumed in this analysis varies between \$10 and \$20 per barrel in the third quarter of 1986, the widest range assumed in any recent *Short-Term Energy Outlook* ( *Outlook*). Because of the uncertainty surrounding energy markets, more attention than usual should be given to alternative projections because the world oil price could easily move to the extremes of the range assumed in this analysis.

Despite significant drops in world oil prices, U.S. demand for petroleum products in the base case is projected to increase by only 2.7 percent between 1985 and 1986, to 16.1 million barrels per day. Lower prices and higher personal income are expected to result in gasoline demand this summer at levels not seen since 1978, with travel demand up by nearly 5 percent this driving season over the year-earlier level. The dramatic decline in residual fuel oil consumption experienced over the past 8 years is expected to slow in 1986, mainly because of stronger demand at electric utilities. Domestic production of crude oil is expected to fall slightly in 1986. (The base case assumptions and projections are summarized in Table 1 on page 5.) Additional highlights of the base case forecast are as follows:

- The price of imported crude oil to refineries in the United States in the base case is assumed to fall to about \$15 per barrel (in nominal terms) by the second quarter of 1986, and then rise to \$18 per barrel in the first quarter of 1987. In the low price case, the world oil price is assumed to drop to about \$10 per barrel by the third quarter of 1986 and then rise to \$14 per barrel by the middle of 1987.

- U. S. petroleum demand in 1986 and the first half of 1987 is projected to increase moderately from year-earlier levels, as continued conservation and limited possibilities for increased energy use temper the effect of falling energy prices on demand.
- Net oil imports are expected to average 4.8 million barrels per day in 1986 and 4.6 million barrels per day in the first half of 1987, up from the 1985 level of 4.3 million barrels per day.
- After an initial increase in margins, the prices of petroleum products are expected to follow the pattern of world crude oil prices, falling through the second quarter of 1986 and then rising slowly through the middle of 1987, but to levels still well below prices experienced during 1985. The price of gasoline this summer is projected to be 28 cents per gallon lower than the year-earlier level, or about equal to the price in the summer of 1979.
- In response to lower oil prices, the demands for motor gasoline and distillate fuel oil are forecast to increase in 1986, while the decline in residual fuel oil demand is projected to be significant slower than the rate experienced in 1985.
- Consumption of natural gas is projected to decrease slightly between 1985 and 1986, to about 17.0 trillion cubic feet. The price of natural gas (in real and nominal terms) is projected to decline over the forecast period. Domestic production of natural gas is projected to remain virtually unchanged between 1985 and 1986.
- Domestic coal consumption is expected to increase to 827 million tons in 1986 (up less than 1 percent from the 1985 level), with coal production at 909 million tons (up almost 3 percent from the year-earlier level). Coal consumption and production in the first half of 1987 are forecast to increase by nearly 4 percent and nearly 7 percent, respectively, from the first-half 1986 levels.

- An increase of more than 2 percent in total electricity generation is projected between 1985 and 1986, followed by an increase of nearly 5 percent between the first half of 1986 and the first half of 1987. Generation levels from all fuel sources except natural gas are expected to show increases in 1986. The real price of electricity is forecast to show little change over the forecast period.
- Total U. S. energy consumption (as measured by gross energy consumption) is projected to increase by 2 percent in 1986 to 75.4 quadrillion Btu and then to increase by almost 4 percent between first-half 1986 and first-half 1987. The energy intensity of U. S. economic activity is projected to be 20.6 thousand Btu per 1982 dollar of real gross national product in 1986, a slight decline from the year-earlier level.

The forecasts previously discussed are the base case projections. Additional sensitivity cases are discussed in the consumption section for petroleum supply and disposition, based on the alternative assumptions about world oil prices. Should the imported crude oil prices, economic growth rates, or weather during the forecast period differ from the base case assumptions, it is estimated that:

- For each 1-percent increase in GNP above the base case level, petroleum consumption and total imports in 1986 would increase by about 190,000 barrels per day (approximately 1.2 percent and 3.4 percent, respectively).
- For each \$1-per-barrel (approximately 6.0 percent) decline in the price of imported crude oil, petroleum consumption and total imports in 1986 would increase by about 30,000 barrels per day (approximately 0.2 percent and 0.5 percent, respectively).

- For each 10-percent increase in heating degree-days (from the base case level) during the first and fourth quarters, petroleum consumption and total imports for those two quarters would increase by an average of about 230,000 barrels per day (approximately 1.4 percent and 4.1 percent, respectively).

These estimates differ considerably from those published in the January *Outlook*, particularly those relating to price. In general, the price sensitivity is much lower than assumed previously because of changes in the models to accommodate the very low prices now expected for 1986 (see box in U.S. Petroleum Outlook Section). Sharp declines in oil prices are expected to induce some increased consumption, but not as much as might be expected based on the 1978-1985 time period. Caution is in order when extrapolating demand estimates to prices outside the range of experience of the demand models.

**Table 1. Summary of Base Case Assumptions and Projections**

Assumptions and Projections	Year				Annual Percentage Change		
	1983	1984	1985	1986	1983-1984	1984-1985	1985-1986
<b>Assumptions</b>							
Real Gross National Product (billion 1982 dollars) .....	<b>3,278</b>	<b>3,492</b>	<b>3,570</b>	<i>3,666</i>	<b>6.5</b>	<b>2.2</b>	<i>2.7</i>
Index of Industrial Production (Mfg.) (index, 1977: 100) .....	<b>110.2</b>	<b>123.9</b>	<b>127.1</b>	<i>130.2</i>	<b>12.4</b>	<b>2.6</b>	<i>2.4</i>
Average Cost of Imported Crude Oil (nominal dollars per barrel) .....	<b>29.30</b>	<b>28.88</b>	<b>27.04</b>	<i>16.80</i>	<b>-1.4</b>	<b>-6.4</b>	<i>-37.9</i>
<b>Price Projections (nominal values)<sup>a</sup></b>							
Motor Gasoline <sup>b</sup> (dollars per gallon) .....	<b>1.22</b>	<b>1.20</b>	<b>1.20</b>	<i>.97</i>	<b>-1.6</b>	<b>.0</b>	<i>-19.2</i>
Retail No. 2 Heating Oil (dollars per gallon) .....	<b>1.08</b>	<b>1.09</b>	<b>1.05</b>	<i>.81</i>	<b>.9</b>	<b>-3.7</b>	<i>-22.9</i>
Residential Natural Gas (dollars per thousand cubic feet) .....	<b>6.06</b>	<b>6.12</b>	<b>6.13</b>	<i>5.91</i>	<b>1.0</b>	<b>.2</b>	<i>-3.6</i>
Residential Electricity (cents per kilowatthour) .....	<b>7.18</b>	<b>7.54</b>	<b>7.79</b>	<i>7.87</i>	<b>5.0</b>	<b>3.3</b>	<i>1.0</i>
<b>Consumption Projections</b>							
Total Market Economies Petroleum Consumption (million barrels per day) .....	<b>45.5</b>	<b>46.2</b>	<b>45.8</b>	<i>46.7</i>	<b>1.5</b>	<b>-9</b>	<i>2.0</i>
U.S. Total Petroleum Consumption (million barrels per day) .....	<b>15.23</b>	<b>15.73</b>	<b>15.70</b>	<i>16.13</i>	<b>3.3</b>	<b>-2</b>	<i>2.7</i>
Motor Gasoline .....	<b>6.62</b>	<b>6.69</b>	<b>6.82</b>	<i>7.00</i>	<b>1.1</b>	<b>1.9</b>	<i>2.6</i>
Distillate Fuel Oil .....	<b>2.69</b>	<b>2.84</b>	<b>2.86</b>	<i>2.99</i>	<b>5.6</b>	<b>.7</b>	<i>4.5</i>
Residual Fuel Oil .....	<b>1.42</b>	<b>1.37</b>	<b>1.19</b>	<i>1.15</i>	<b>-3.5</b>	<b>-13.1</b>	<i>-3.4</i>
Other Petroleum <sup>c</sup> .....	<b>4.50</b>	<b>4.82</b>	<b>4.82</b>	<i>4.99</i>	<b>7.1</b>	<b>.0</b>	<i>3.5</i>
Net Petroleum Imports (million barrels per day, including SPR <sup>d</sup> ) .....	<b>4.31</b>	<b>4.72</b>	<b>4.26</b>	<i>4.83</i>	<b>9.5</b>	<b>-9.7</b>	<i>13.4</i>
Coal Consumption (million short tons) .....	<b>737</b>	<b>791</b>	<b>818</b>	<i>827</i>	<b>7.3</b>	<b>3.4</b>	<i>1.1</i>
Natural Gas Consumption (trillion cubic feet) .....	<b>16.83</b>	<b>17.95</b>	<b>17.23</b>	<i>16.95</i>	<b>6.7</b>	<b>-4.0</b>	<i>-1.6</i>
Electricity Generation (billion kilowatthours) .....	<b>2,310.3</b>	<b>2,416.3</b>	<b>2,469.8</b>	<i>2,521.8</i>	<b>4.6</b>	<b>2.2</b>	<i>2.1</i>
Total Energy Consumption <sup>e</sup> (quadrillion Btu) .....	<b>70.50</b>	<b>74.11</b>	<b>73.83</b>	<i>75.42</i>	<b>5.1</b>	<b>-4</b>	<i>2.2</i>
Thousand Btu/1982 Dollar of GNP .....	<b>21.51</b>	<b>21.22</b>	<b>20.68</b>	<i>20.57</i>	<b>-1.3</b>	<b>-2.5</b>	<i>-5</i>

<sup>a</sup> All prices include taxes, except retail no. 2 heating oil prices.

<sup>b</sup> Average for all grades and services.

<sup>c</sup> Includes crude oil, pentanes plus, other hydrocarbons and alcohol, unfinished oil, and gasoline blending components.

<sup>d</sup> SPR: Strategic Petroleum Reserve.

<sup>e</sup> The conversion from physical units to Btu is calculated by STIFS using a subset of *Monthly Energy Review* (MER) conversion factors. Consequently, the historical data will not precisely match that published in the MER.

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(86/01); *1984 International Energy Annual* DOE/EIA-0219(84); *Petroleum Marketing Monthly*, DOE/EIA-0380(86/01); *Petroleum Supply Monthly*, DOE/EIA-0109(86/01); *Petroleum Supply Annual 1984*, DOE/EIA-0340(84)/1; *Natural Gas Monthly*, DOE/EIA-0130(86/02); *Electric Power Monthly*, DOE/EIA-0226(86/02); and *Quarterly Coal Report*, DOE/EIA-0121(85/4Q); Organization for Economic Cooperation and Development, *Quarterly Oil Statistics, Third Quarter 1985*; Petroleum Economics Limited, *World Quarterly Primary Energy and Supply/Demand*, January 1986. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0486.



## 2. The Outlook

### International Petroleum Markets

#### Current Situation

The collapse in oil prices that has occurred since the beginning of 1986 indicates that the oil market is in a state of transition that may prove to be just as significant as the oil price shocks of the 1970's. If the recent decline in spot and futures prices is ultimately realized in average contract prices, real oil prices (when adjusted for inflation) will have returned to levels not seen since 1973. As of the end of April, the average price of imported crude oil to the United States had declined to an estimated \$13 to \$15 per barrel and futures prices had declined to about \$13 per barrel.

The immediate impetus for falling crude oil prices has been the recent major increase in production by the Organization of Petroleum Exporting Countries (OPEC)--of nearly 3 million barrels per day during the fourth quarter of 1985. There has been downward pressure on oil prices for the past 4 1/2 years, however, as a result of weak demand for oil products in the industrialized countries and a continued increase in crude oil production outside OPEC. Speculative declines of oil stocks in the consuming countries--a response to expectations of lower oil prices-- have acted to reduce the effective demand for oil further yet, reinforcing the downward pressure on world crude oil prices. Low economic growth (restraining overall energy requirements) and the continued shift away from residual fuel oil by industry and utilities have made significant contributions to reduced petroleum consumption in the industrialized countries. The growing strength of the U.S. dollar through the first quarter of 1985 acted to sustain the cost of oil outside the U.S., which also helped to reduce worldwide demand. Oil demand in the market economies has declined by over 6 million barrels per day (12 percent) since 1979. Meanwhile, major non-OPEC producers such as Mexico, the United Kingdom, and Norway are still developing their oil resources. Significant new volumes also are coming from China, Canada, India, Brazil, and many other countries, as the energy investments of the late 1970's are coming on line.

For the past several years, modest production restraint by the OPEC nations along with major cutbacks by Saudi Arabia have acted to offset the influence of these new oil supplies on prices. By late summer 1985, however, Saudi Arabia had reduced its production to less than 3 million barrels per day (from a high of 9.9 million barrels per day in 1980) and apparently no longer would or could prevent a further slide in oil prices. With its very low production costs and tremendous excess capacity, Saudi Arabia could in principle significantly improve its net revenues by increasing production and letting world oil prices fall. At the mid-April OPEC meeting, 10 member countries agreed in principle that, in order to restore market stability, OPEC oil production levels would have to be reduced. A realistic OPEC production level, according to the OPEC communique, would be 16.7 million barrels per day (excluding natural gas liquids) in 1986.

The move by Saudi Arabia to adopt netback pricing for its crude oil was formally announced as a new strategy to regain market share in September 1985. This marketing arrangement is being used increasingly by other countries, with the objective of protecting market share, rather than price. It was formally adopted by all of OPEC in December 1985 (although many members in the subsequent meetings of March 1986 argued unsuccessfully for a return to price maintenance). Even the U.S.S.R., the world's largest oil producer, found it difficult to resist the general market trend and adopted netback pricing in April of 1986.

As a short-term strategy, the Saudis have demonstrated their willingness to let prices fall if the major non-OPEC exporters (such as the United Kingdom) and other OPEC members cannot or will not agree to restrain their own production in order to support prices. As a longer-term strategy, lower oil prices should have the effect of both reducing oil supply outside OPEC (that is, in the higher-cost production areas of the world) and providing a disincentive to further investments in alternative energy sources and in energy conservation.

Netback contracts tie the price of crude oil to the sales price of refined products less refining and transportation costs. The increased production by Saudi Arabia (from 2.3 million barrels per day in August 1985 to about 4.5 million barrels per day in January 1986) on this basis indicates that current contracts are specifying a very favorable netback margin. In addition to the size

of the margin, refiners are also attracted to this contract because much of the risk as to the eventual sales price is transferred to the crude oil producer. Thus, whereas the historical refiner response to declining oil prices has been to draw down stocks in anticipation of lower prices yet to come, crude oil stocks in the market economies actually increased during late 1985 and early 1986, reversing the prior trend. An important side effect of this risk transfer if it continues may be a dampening of normal speculative movements in stocks and a consequent dampening in world oil price cycles.

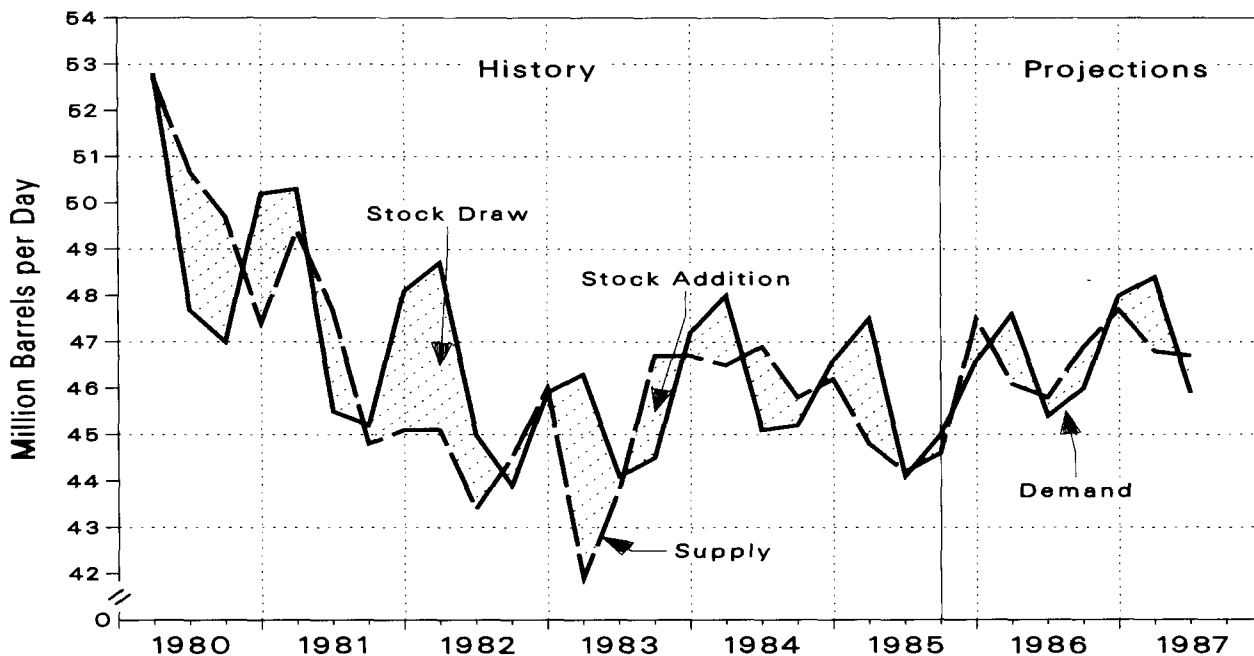
## International Petroleum Forecast

Total petroleum demand (product supplied) in the market economies is projected to increase by about 0.9 million barrels per day between 1985 and 1986 (Figure 1). This growth is attributed to lower oil prices which are expected to result in increases in oil consumption in the United States, the developing countries, and Europe (Table 2 on page 24). In the first half of 1987, petroleum demand in the market economies is expected to be 0.7 million barrels per day higher than year-earlier levels. However, policy actions in some countries will continue to result in substitution of other fuels for oil in electricity generation. Also, use of excise taxes and import fees will partially offset the stimulating effect on consumption that would occur if the sub-

stantial decrease in real oil prices were fully passed through to the consumer. These forecasts are based on the expectations that economic growth in the industrial countries will be 3.0 percent between 1985 and 1986 and remain at that rate between first-half 1986 and first-half 1987, about equal to the longer term trend of 2.9 percent per year experienced between 1970 and 1984 (Table 3 on page 24).

Total OPEC oil production (including natural gas liquids) is forecast to increase by about 7 percent between 1985 and 1986, from 17.1 to 18.3 million barrels per day. Non-OPEC oil production (including liquids produced from natural gas, coal, and other sources) is expected to recover from its decline in the first-quarter of 1986 and finish the year with a daily average production about 300,000 barrels per day above the 1985 level of 26.7 million barrels per day. Although Mexico and other non-OPEC developing countries were responsible for the first-quarter decline, these countries are expected to be the primary source of the increased output in the non-OPEC countries for the remainder of the year and into 1987. Some increases in output are projected to occur in the North Sea, but production is expected to remain at the 1986 level in the first half of 1987. Despite lower oil prices, Mexico and other non-OPEC developing countries are expected to increase their exports in an effort to mitigate the loss in oil revenue. Net oil exports from the centrally planned economies are expected to recover from their low level in the first quarter of 1986, but remain slightly below

**Figure 1. Market Economies Supply and Demand**



Sources: o History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0036(86/01) and 1984 *International Energy Annual* DOE/EIA-0219(84) (Washington, DC); Organization for Economic Cooperation and Development, *Quarterly Oil Statistics, Third Quarter 1985*; Petroleum Economics Limited, *World Quarterly Primary Energy and Supply/Demand*, January 1986. o Projections: Table 2.



the 1985 level in 1986. Although the Soviet Union is experiencing difficulty in maintaining oil production, one reason for the expected increases in their oil exports is the need for hard currency to purchase imports from the market economies.

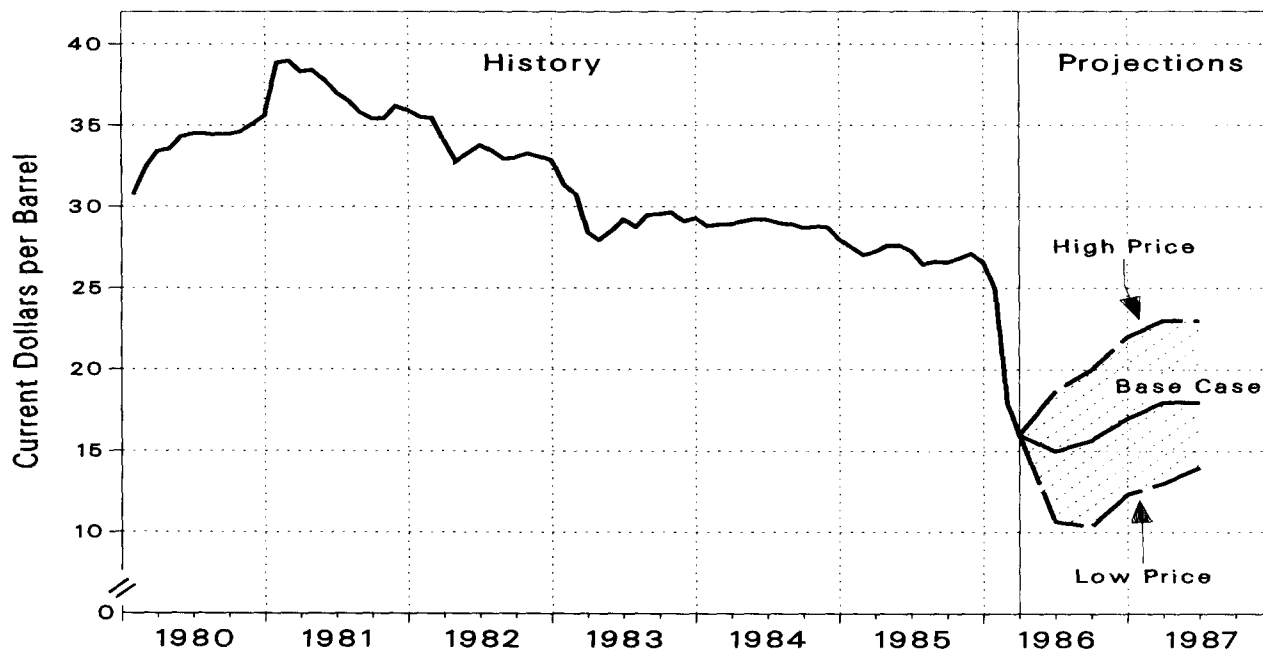
The total supply of oil to the market economies is projected to increase by 3 percent between 1985 and 1986 (Figure 1 on page 8), based on expected production increases in OPEC and non-OPEC countries. Petroleum stocks in the market economies at the end of 1986 are projected to be about 4.7 billion barrels (the same as in 1985) and then drop to 4.6 billion barrels by mid-1987. At the end of the second quarter of 1986, total petroleum stocks (including strategic petroleum reserves) in the market economies are projected to be at a level equivalent to about 102 days of forward consumption (at the average consumption rate of 46 million barrels per day during the third quarter of 1986), which is still above the 88 days of forward consumption during the market turbulence in 1979.

## Forecast Assumptions

### World Oil Prices

In the base case, the nominal price of imported crude oil delivered to U.S. refiners is assumed to decline to \$15 per barrel in the second quarter of 1986, then increase to \$18 per barrel in the first quarter of 1987, and remain at that level through the middle of 1987 (Figure 2). This price path is based on the assumption that the expected increase in oil demand will be strong enough to stabilize prices but not strong enough to return oil prices to their previous level. This assumption is based on the expectation of continued policy-directed substitution of other fuels for oil in some countries, sympathetic movement of the prices of other fuels (especially in Europe), and the imposition of excise taxes and import fees on petroleum products in some countries.

**Figure 2. Imported Crude Oil Prices**



Sources: o History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(86/01) (Washington, DC, 1986). o Projections: Table 4.

Because of the uncertainty about world oil prices, two alternative forecasts are presented in this *Outlook* to provide a range of energy projections. The petroleum price assumptions associated with these cases are as follows:

- **Low Price Case:**

As a result of OPEC production above its current level and weak oil demand, oil prices are assumed to fall to \$10 per barrel by the third quarter of 1986. Demand is assumed to recover slightly at the beginning of the 1986-1987 heating season, resulting in gradually increasing oil prices to \$14 per barrel by the second quarter of 1987.

- **High Price Case:**

As a result of OPEC production remaining near its 1985 quota, oil prices are assumed to firm at \$23 per barrel in 1987. However, petroleum demand is expected to remain weak, preventing prices from returning to their previous levels.

Unlike recent editions of the *Outlook*, this report does not incorporate additional variation in the assumed rate of economic growth for the sensitivity cases other than that resulting from the change in oil prices. Prior to this *Outlook*, separate economic cases (low growth and high growth) had been combined with high and low oil price paths, respectively, to produce the petroleum sensitivity cases. In this report the same economic assumptions have been used in all three cases, modified only for the feedback effects due to the various oil price assumptions.

## Macroeconomic Activity

The base case projections assume that economic growth will be somewhat higher in 1986 than was experienced in 1985. Based on the Data Resources, Inc., forecast (DRI CONTROL0486), as modified to reflect EIA's imported crude oil price assumptions, growth in real gross national product (GNP) between 1985 and 1986 is assumed to be 2.7 percent, higher than the 2.2-percent growth experienced in 1985. Growth in real disposable personal income is projected to be 2.9 percent in 1986, while manufacturing growth is expected to be 2.4 percent for the year. Stronger growth is expected this year because of the combined influence of falling oil prices and moderating interest rates. (Assumptions for the price of imported crude oil, the economy, and the weather are shown in Table 4 on page 25.)

In the first half of 1987, real GNP is projected to be 3.3 percent higher than the year-earlier level. Real

disposable income growth is projected to be 3.1 percent over that period, and manufacturing growth is expected to be 3.3 percent. All of these growth rates exceed those expected for 1986. Two alternative cases, designated as high and low oil price cases, are presented to show a range of possible energy demands as a result of either significantly higher or lower world oil prices. Real GNP growth rates between 1985 and 1986 and between first-half 1986 and first-half 1987 are as follows: high oil price case, 2.3 percent and 2.4 percent, respectively; low oil price case, 3.2 percent and 4.4 percent, respectively. In the high and low oil price cases, the DRI base case economic forecasts are adjusted to incorporate the effects of higher (and lower) oil prices in restraining (or stimulating) economic growth.

## Energy Product Prices

Rapid and unprecedented declines in world oil prices are expected to lower all fuel prices through the middle of 1986 (Figure 3 on page 11 and Table 5 on page 26). From the summer of 1986 through the second quarter of 1987, the world crude oil price is expected to rise slightly, and, as a result, petroleum product price increases will follow, although with some lags.

Anticipating a decline in world oil prices, refiners reduced their inventories in October of 1985, a period when stocks normally are built, resulting in some upward pressure on petroleum product prices. The prices of heating oil and diesel fuel rose sharply (by almost 9 cents per gallon) during the fourth quarter of 1985. Motor gasoline prices fell, but by less than is normal for that time of year. By the beginning of 1986, the rapid decline in the world price of crude oil helped to reverse the effect of low inventories, with the prices of gasoline, distillate, and residual fuel oil all falling sharply compared with prices in the previous quarter.

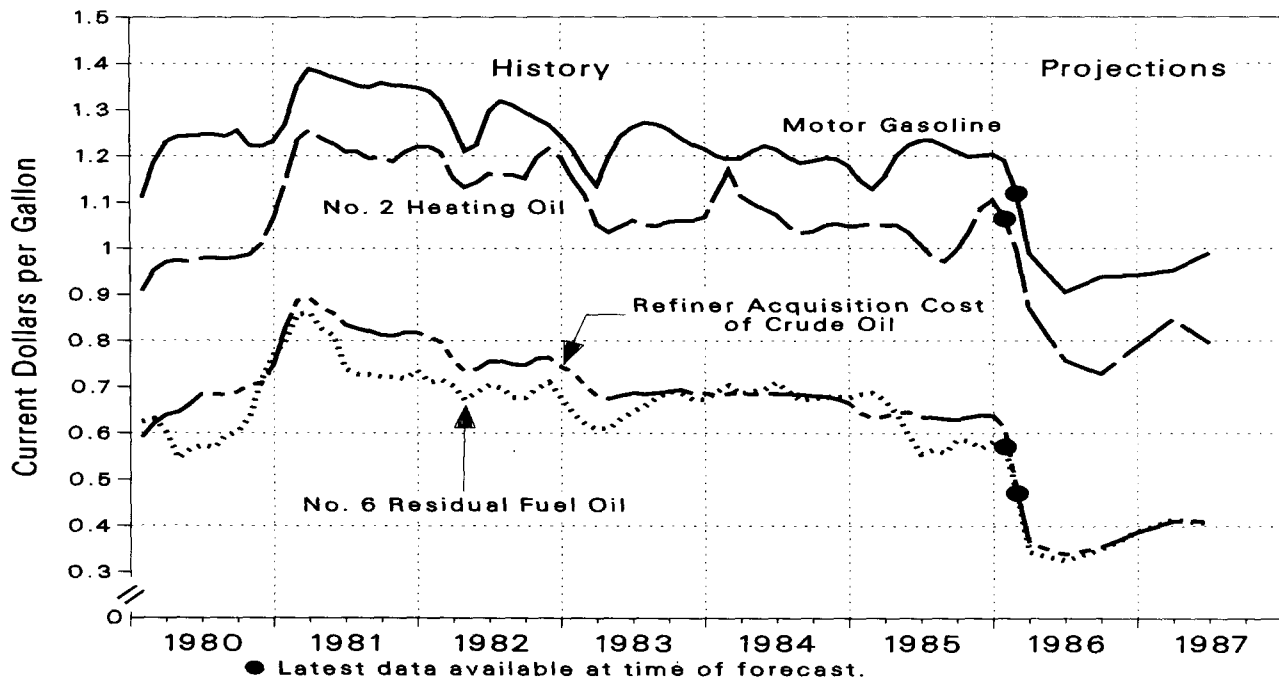
The average price of motor gasoline is expected to decrease by 23 cents per gallon in 1986. Average prices in the first quarter of 1986 were only 4 cents lower than year-earlier prices as both refiner margins and retail margins increased by 6 cents each compared with year-earlier levels (which had been unusually low). By the second quarter of 1986, lower world oil prices and stable refiner margins (relative to year-earlier levels) are expected to lower gasoline prices at the pump by more than 30 cents per gallon compared with the price 1 year earlier. Refiner margins are projected to remain constant in real terms for the remainder of the forecast period. At the same time, margins at the more competitive retail end should remain relatively flat in nominal terms. Prices for motor gasoline in the second quarter of 1987 are projected to be about 9 cents per gallon higher than the year-earlier level.

Retail heating oil prices are expected to generally follow the price path of world crude oil. Similar to the trend in motor gasoline prices, heating oil prices climbed sharply in the last quarter of 1985 due to low stock levels and colder-than-normal weather in Europe. Combined retail and refiner heating oil margins in the first quarter of 1986 were much higher than year-earlier levels. Moreover, the usual winter seasonal price patterns added to the price increase. By the second quarter of 1986, however, retail heating oil prices are projected to fall by more than 22 cents per gallon from the previous quarter. This drop is attributable mostly to falling crude oil prices, but low seasonal demand also is expected to contribute to the price decrease. Heating oil prices are expected to bottom out in the third quarter of 1986, the period of lowest demand for that fuel. Assuming normal winter weather and normal inventories, prices for heating oil are projected to rebound in the winter of 1986-1987, but to levels considerably below those a year earlier due to the lower crude oil price.

Refiner margins for diesel fuel are expected to follow the same pattern as those for heating oil. Margins in the first quarter of 1986 were high, but they are expected to drop considerably this spring. Retail diesel fuel oil prices are expected to decline by 17 cents per gallon between 1985 and 1986 and then fall by almost 4 cents per gallon between first-half 1986 and first-half 1987.

Residual fuel oil prices tend to fluctuate near crude oil prices depending on supply and demand conditions. Residual fuel oil prices in the first quarter of 1985 were about \$1.80 per barrel (or more than 4 cents per gallon) higher than the crude oil price, presumably as a result of the disruption in the world market caused by the British coal strike. By the third quarter of 1985, residual fuel oil prices were \$2.60 per barrel (or 6 cents per gallon) lower than the price of crude oil as adequate supply and seasonal factors resulted in a price drop.

**Figure 3. Retail Prices for Petroleum Products**



Sources: o History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(86/01) (Washington, DC, 1985). o Projections: Table 5.

In the forecast period, residual fuel prices are expected to follow the price of crude oil but fluctuate somewhat with seasonal demand patterns, falling by \$9.60 per barrel (23 cents per gallon) between 1985 and 1986. These low residual fuel oil prices are projected to cause downward price pressure on competing fuels such as natural gas and, in some cases, coal. However, should the demand for residual fuel oil increase significantly as a result of fuel switching, residual prices could be higher than crude oil prices.

The decline in the price of crude oil is expected to cause the price of natural gas to fall. However, natural gas prices in the residential sector are not expected to decrease by as much as the world oil price nor by as much as natural gas prices in other sectors. In 1986, natural gas prices in the residential sector are projected to decrease by 4 percent following almost no price change in 1985. In contrast, prices to electric utilities are projected to decrease by 20 percent in 1986 and by an additional 2 percent in the first half of 1987. Residential natural gas prices in the first half of 1987 are projected to remain virtually unchanged from year-earlier levels. The disparity in projected natural gas price patterns between sectors is attributable to the intense competition by natural gas pipelines and distributors for sales to electric utilities. Similar competition is not prevalent for sales to the residential and other sectors that are not able to switch to other fuels in the short term.

Residential electricity prices increased by about the rate of inflation in 1985. In the fourth quarter of 1985, electricity prices increased by only 1 percent from year-earlier levels, or by 2 percent less than the rate of inflation. Lower capital costs and lower coal prices to utilities caused the slowdown in electricity prices. In 1986 and the first half of 1987, continued lower

capital costs, along with an expected decline in the costs of all fossil fuels to electric utilities, are expected to keep electricity prices nearly flat in nominal terms, offsetting cost increases resulting from the addition of new capacity. This trend is expected to continue through the first half of 1987.

## U.S. Petroleum Outlook

### Overview

Despite unprecedented declines in world oil prices, U.S. petroleum product supplied is projected to increase by a modest 2.7 percent in 1986, to 16.1 million barrels per day. This relatively small increase (considering the significant price drop) primarily reflects the fact that conservation and efficiency improvements made during the era of high oil prices are not expected to be reversed in the near term. The opportunities for increased use of motor gasoline and distillate fuel oil are limited. Net petroleum imports (crude oil plus petroleum products) are projected to average more than 4.8 million barrels per day in 1986, 13 percent above the 1985 level. This increase reflects increased demand, decreased production, and a slight buildup projected for total stocks. (The base case forecast is shown in Table 6 on page 27; alternative cases for high and low world oil prices are shown in Table 7 on page 28 and Table 8 on page 29 respectively.) During the first half of 1987, total petroleum demand is projected to average 16.1 million barrels per day, about the same as the corresponding 1986 rate.

## **Low Crude Oil Prices and Petroleum Markets: Econometric Forecasts Versus Reality**

The current nose dive in world oil prices and the resultant (though still lagging) decline in petroleum product prices raises questions about the usefulness of econometric models that were estimated over a period of more stable prices. Most of the demand and supply models used to make the forecasts in the *Outlook* have been estimated using data beginning approximately with the Iranian revolution in early 1979. During the first two years of this period, world oil prices increased dramatically, with sharp increases in the prices of motor gasoline, distillate fuel oil, and other petroleum products. During the first quarter of 1981, prices peaked following the total deregulation of crude oil and petroleum product prices in January of that year. During the next 5 years, the prices of crude oil and refined products, as well as the demand for these products declined gradually.

Given this history, it would be prudent to be cautious when forecasting short-term demand and supply given unprecedented price decreases. Without careful analysis, it is possible to conclude that the impacts in the short run will be much greater than technical constraints might dictate. In statistical terms, it can be shown that the greater the difference between a forecasted exogenous input variable and its mean value in the estimation period, the wider the dependent variable forecast interval will be for a given confidence level. Simply, the further the assumed prices are from their recent averages, the more uncertain will be the demand and supply forecasts. The goal of reducing that uncertainty for this forecast required some changes in the petroleum demand models, primarily those for gasoline, distillate, and residual fuel oil.

In each case, the initial formulation tended to provide too much short-run demand response to sharply lower prices. The reason for this result was that, over the period of estimation, gradual price changes have produced gradual changes in both utilization and efficiency of the capital stock (although it is difficult to disentangle the effects in the price and income coefficients). However, because of the low turnover rate of the capital stock, it is unlikely that efficiency gains would

be reversed in a short time period in response to sharply lower prices, especially because new boilers and furnaces tend to be more efficient than the average of those now being used. (However, a probable effect of lower fuel prices would be to postpone the purchase of new equipment, thus reducing the turnover rate). In addition, there would be limits to increased utilization. In the case of motor gasoline, the question is how much additional discretionary driving would be done by motorists. In the case of distillate, the issue is whether or not thermostats would be raised because of the lower fuel prices. Residual fuel oil presents another issue, that of fuel switching, which is partially dependent on the price response of natural gas.

Changes to the models depended on the particular fuel. In the case of motor gasoline, changing from an exponential formulation to a linear formulation considerably reduced the demand increase in response to lower prices. This is because with a constant-elasticity (exponential) formulation, a given percentage decrease in the price induces a given percentage increase in demand without regard to the initial price and demand levels. A linear formulation, however, implies a lower percentage increase in demand as price decreases from the initial level. Heating oil demand, because of its unique relationship with levels of insulation, is posited to have an asymmetric elasticity with respect to prices (meaning a smaller response to falling prices than to rising prices). Based on an analysis of regional trends, residual fuel oil demand is assumed to show some switching at the expense of natural gas as prices fall below levels prevailing in 1985.

When conditions are changing as rapidly as they have been in early 1986, even a model with a high degree of statistical fit to historical data may not be expected to forecast as accurately in the future as it has done in the past. When that happens, some degree of judgment must enter the process. Ideally, judgment can be used to recast the model formulation in such a way that reasonable results will be provided by econometric estimation. In some cases, however, a more direct intervention outside of the model is required to ensure that the projections adhere to a reasonable view of reality.

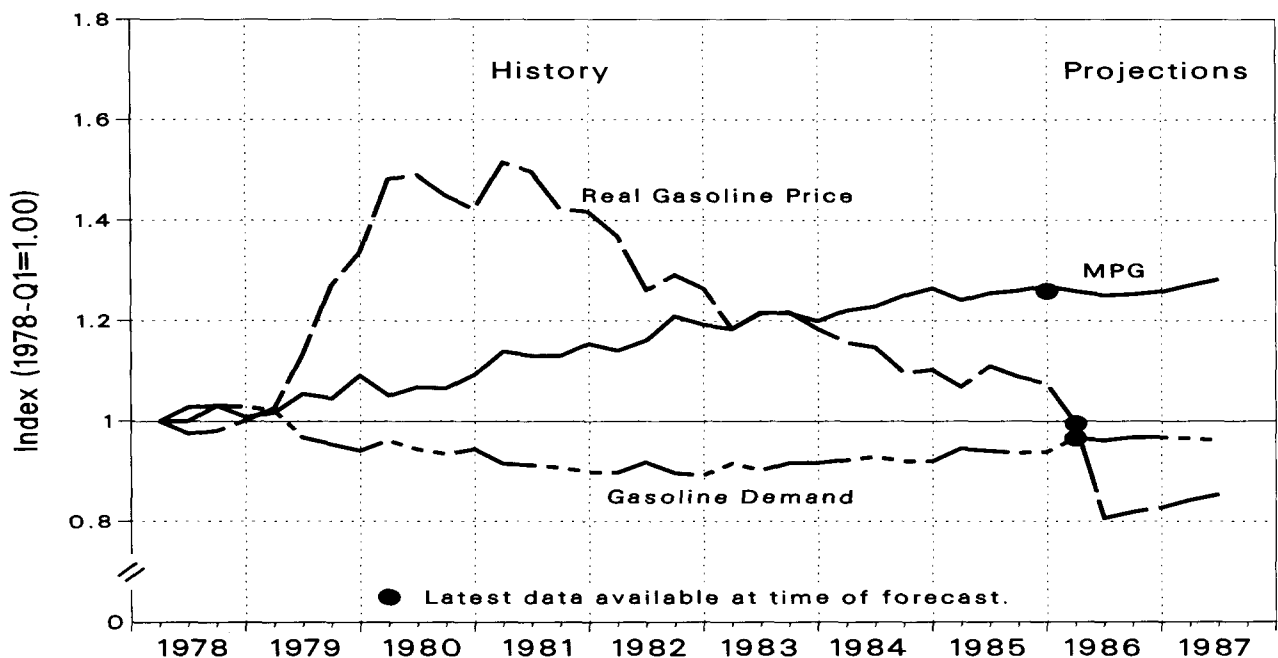
## Motor Gasoline

Average retail gasoline prices are projected to be lower in real terms this year than in any year since 1973. Partly as a result of this significant price break, gasoline demand in 1986 is projected to increase by 2.6 percent over 1985 levels, bringing 1986 demand to an average of 7.00 million barrels per day (Table 9 on page 30). This rate of growth contrasts with a range of annual growth rates between 1.1 and 1.9 percent observed for 1982 through 1985.

Projections of plummeting oil prices through the first half of 1986, resulting in refiner acquisition costs of imported oil as low as \$15 per barrel, lead to the projected 21-percent decline in real retail gasoline prices for all of 1986. Sharply lower gasoline prices, coupled with a noticeable rebound in personal income growth from nearly 2 percent in 1985 to about 3 percent per year for 1986 and 1987, would be expected to increase domestic motor vehicle travel by approximately 4 percent in 1986 and an additional 3 percent for the first half of 1987 compared with year-earlier levels. Real gasoline prices are expected to rebound by the second quarter of 1987, resulting in relatively little additional fall-off in average prices for the first half of 1987, and thus in the tapering off of travel demand growth by mid-1987.

Increases in average miles per gallon are expected to continue in the forecast period because the trend toward more efficient cars (stemming from past increases in fuel costs) makes the average efficiency of new cars substantially greater than that of vehicles leaving the fleet and greater than that of the average existing fleet. Average efficiency gains of about 1.9 percent per year are expected through the second half of 1987 (Figure 4). Although these increases in miles per gallon tend to limit the impact on gasoline demand due to increased vehicle travel, they represent slower rates of improvement than were generally observed between 1981 and 1984. During that period, average miles per gallon for gasoline-powered vehicles improved at an estimated average rate of 2.9 percent per year. Continued lower prices for motor gasoline will tend to slow the trend toward higher average vehicle efficiency, because with lower prices consumers are expected to be less concerned about sacrificing efficiency for comfort and other amenities in buying new cars. In addition, older, less efficient cars still on the road may be kept and used longer as gasoline prices fall, although this effect may be balanced by the higher income and lower interest rates which tend to encourage consumers to buy new cars. In the short term, the effect of prices on vehicle efficiency will not be very strong. Despite the dramatic price declines expected for 1986, gasoline demand is not projected to exceed levels observed in 1979, even though vehicle travel in the United States is expected to be 20 percent higher in 1986 than in 1979.

**Figure 4. Motor Gasoline Demand, Vehicle Efficiency, and Real Gasoline Price**



Sources: o History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(86/01) (Washington, DC, 1985); Federal Highway Administration, *Traffic Volume Trends* (monthly). o Projections: Tables 5 and 9 and from unpublished output from the Energy Information Administration's Short Term Integrated Forecasting System.

## Summer Outlook for Motor Gasoline

Drastically lower retail gasoline prices and a noticeable revival in personal income growth this year are key factors pointing toward strong summer-season growth in domestic gasoline demand. Retail gasoline prices are expected to be 25 percent lower in real (inflation adjusted) terms this summer compared with last year. At the same time, real disposable personal income is expected to be 3.6 percent higher during the peak vacation season (third quarter) this year compared with 1985 levels.

These determinants of travel demand are expected to push gasoline use to an average 7.19 million barrels per day during the third quarter of 1986, or 3.3 percent higher than last summer. Third-quarter gasoline demand has not been above this level since 1978. Third-quarter demand had slipped to 6.65 million barrels per day by 1982, but has been rising since then. This upward trend through 1985 has been characterized by a relatively modest annual growth rate of about 1.6 percent per year, which is half the rate expected between 1985 and 1986. Travel demand, in terms of vehicle-miles traveled, for gasoline-powered vehicles (including passenger cars, personal vans and trucks, and commercial vehicles) is expected to be nearly 5 percent higher this summer compared to last year's level. Expected growth in average vehicle efficiency of 1.6 percent for the third quarter of 1986 compared with the same period in 1985, will temper gasoline demand growth somewhat.

The range of uncertainty surrounding the motor gasoline forecast is illustrated by the three demand cases (Table 7 on page 28, Table 8 on page 29, and Table 9 on page 30). Most of the uncertainty centers on the likely upper and lower bounds on gasoline prices for the next several quarters, which is reflective of the considerable uncertainty surrounding crude oil prices (Table 4 on page 25). In the low oil price case, gasoline prices are assumed to be 15 percent lower than in the base case for the third quarter of 1986, while the high oil price case would result in gasoline prices 12 percent above those in the base case for that quarter. Despite this wide range of possibilities for real gasoline prices, the range of gasoline demand between high-price and low-price scenarios represents just over 2 percent of the base case demand.

A new element in the motor gasoline supply picture this summer is the full implementation of the Environmental Protection Agency's (EPA) lead phase-down

rule. This rule requires that gasoline manufacturers restrict the lead content of leaded gasoline brands to 0.1 gram per gallon, effective January 1, 1986. A reduction to 0.5 grams per gallon from 1.1 grams per gallon was mandated as of July 1, 1985. Until early 1986, unleaded regular gasoline was selling for about 8 cents per gallon above leaded regular.<sup>1</sup> Casual observation and some survey results<sup>2</sup> suggest that retail price differentials between the two types of regular gasoline have been falling since full implementation of the phasedown rule. Higher costs are associated with the supply of leaded gasoline as the lead content is reduced at a given octane level, so some narrowing of the differential had been expected. The current situation with regard to these price differentials is somewhat clouded as marketers are preoccupied with the problem of adjusting to a rapid slide in all retail prices. Banking provisions of the phasedown rule, which give credit to suppliers who exceeded the requirements of the lead rule in the past by allowing them to supply leaded gasoline below the new standards for a time, are currently in effect, also complicating pricing strategies. If and when oil prices stabilize and as lead banking allowances phase out, the ultimate effect on retail regular gasoline price differentials should become clearer.

Currently, stocks of finished motor gasoline appear to be low relative to levels that normally prevail at mid-spring. It is projected that, at the beginning of the third quarter of 1986, stocks of finished motor gasoline will represent less than 26 days of supply compared with an average of 28 days observed over the past 4 years. A similar situation existed in 1985, but incremental domestic gasoline production alleviated the temporarily tight stock situation. Gasoline stocks this year are relatively low as the peak driving season approaches, in large part because of the recent price drops and the continued price uncertainty. This situation induces refiners to push expensive existing stockpiles into the supply stream, in anticipation of or in preparation for stock replenishment at greatly reduced prices. The wide availability of oil and oil products at low prices this year ensures that gasoline supplies will be quite adequate, despite a projected strong growth in summer gasoline use this year. It is expected that of the total 7.19 million barrels per day of product supplied for the third quarter of 1986, 6.81 million barrels per day will come from domestic production plus stock change and 0.38 million barrels per day from gasoline net imports. Gasoline net imports in the summer of 1986 are projected to be about 5 percent of total supply, the same share as was experienced last summer.

<sup>1</sup>The Bureau of Labor Statistics (BLS) series on retail motor gasoline prices, compiled in conjunction with the BLS Consumer Price Index Series, indicates that average (all types of service) prices for unleaded regular gasoline were 6 to 9 cents per gallon above the leaded regular price for January 1983 through February 1986.

<sup>2</sup> *Lundberg Letter*, vol 13, no. 16 (February 14, 1986): p.1 ff.

## Distillate Fuel Oil

As a result of the sharp decreases in oil prices, distillate fuel oil consumption is projected to increase by about 5 percent between 1985 and 1986 (Table 10 on page 31), to almost 3.0 million barrels per day. The combination of low prices and high economic growth is expected to increase industrial demand for distillate. Lower gasoline prices and general consumer disenchantment with diesel engines are expected to work against any increase in diesel penetration in the private automobile fleet. However, increased economic activity is projected to increase transportation demand for medium and large trucks. In addition, some conversions of truck engines from gasoline-fueled to diesel-fueled are now occurring in response to the adverse impact of the lead phasedown on heavy-duty, gasoline-powered engines. Offsetting this expected increase in diesel use, however, is little or no growth projected for space heating use of distillate fuel oil, as this demand is not believed to be very sensitive to lower prices. In the first half of 1987, total demand for distillate fuel oil is expected to average slightly more than 3.0 million barrels per day, about the same as the corresponding 1986 rate of consumption.

## Residual Fuel Oil

Total consumption of residual fuel oil declined by more than 60 percent between 1977 and 1985, showing the largest rate of decrease of any of the major petroleum products. The decline in the use of this fuel accounted for about 70 percent of the decline in total petroleum product demand over this period. The decline in residual fuel consumption in 1985 was 13 percent, even though prices dropped by almost the same amount. Decreases occurred in both nonutility and utility demand for residual fuel oil.

In 1986, total residual fuel oil demand is expected to fall only slightly, slowing the downward trend of the last 8 years (Table 11 on page 32). Consumption of residual fuel oil at electric utilities is projected to rise somewhat from the 1985 level in 1986 because the dramatic decline in oil prices is expected to cause switching at utilities away from natural gas and into oil in some areas of the country. However, nonutility residual fuel oil demand is projected to decrease by almost 9 percent between 1985 and 1986 because of continued conservation and fewer opportunities for fuel substitution in the transportation and commercial sectors than in the utility sector. While opportunities

for switching in the industrial sector do exist, natural gas prices are expected to fall to some extent to meet the competition. The issue of industrial fuel switching makes the residual fuel oil forecast one of the most uncertain areas of this *Outlook*.

In the first half of 1987, total residual fuel oil demand is expected to decrease by about 5 percent from year-earlier levels in response to higher fuel oil prices. Nonutility demand is projected to remain close to the year-earlier level in the first half of 1987. Utility demand for residual fuel oil is projected to decline by 15 percent over that period, based on assumptions of lower natural gas prices and nuclear and coal capacity additions.

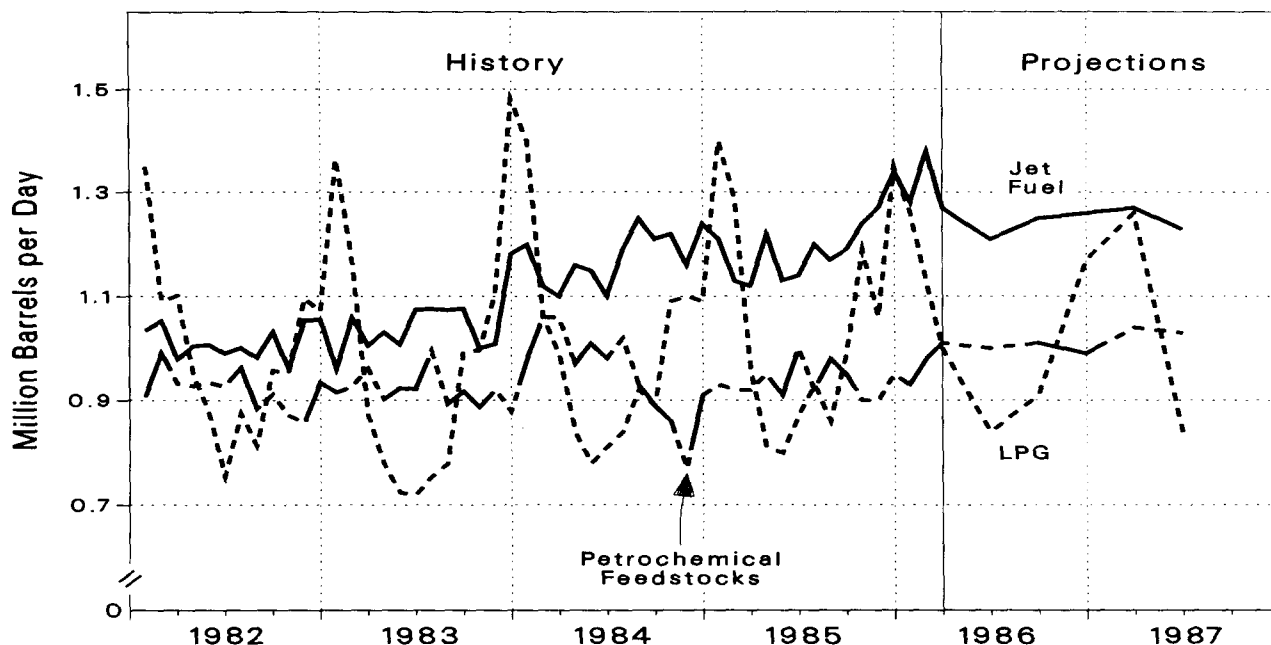
## Other Petroleum Products

Other petroleum products supplied is projected to grow by more than 3 percent between 1985 and 1986 and then to increase by about 4 percent between first-half 1986 and first-half 1987. Jet fuel, petrochemical feedstocks, and liquefied petroleum gases (LPG) are the principal components of the other products category, accounting for 3.2 million barrels per day out of a total of nearly 4.8 million barrels per day during 1985 (Table 12 on page 33). The remaining products, grouped under the miscellaneous category, include petroleum coke, kerosene, still gas, road oil and asphalt, lubricants, waxes, aviation gasoline, special naphthas, and other small-volume petroleum products. LPG product supplied in 1985 increased by 6 percent from 1984 levels (Figure 5 on page 17). This increase was mainly attributed to colder-than-normal weather experienced during the early part of 1985. LPG demand is expected to decline by 3 percent in 1986, primarily because of warmer-than-normal weather in the first quarter of the year. Assuming normal weather in 1987, LPG demand is projected to increase by more than 6 percent between first-half 1986 and first-half 1987.

Jet fuel demand is projected to increase by 6 percent between 1985 and 1986 but remain relatively stable between first-half 1986 and first-half 1987. The 1985 increase reflects the combined impact of higher incomes and lower fuel costs. Jet fuel product supplied increased by less than 1 percent in 1985 relative to the 1984 level. The use of petroleum to produce petrochemicals dropped by about 2 percent between 1984 and 1985. Feedstock product supplied is expected to increase by more than 6 percent in 1986 and by 5 percent in the first half of 1987, corresponding to anticipated increases in output in the chemical sector.



**Figure 5. Major Components of Other Petroleum Demand**



Sources: o History: Energy Information Administration, *Petroleum Supply Annual* (1982-1984), DOE/EIA-0340(82/84)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1985 to Jan. 1986; and *Weekly Petroleum Status Report*, DOE/EIA-0208(86-10,15) (Washington, DC). o Projections: Table 12.

Demand for miscellaneous petroleum products is expected to continue to grow moderately throughout the forecast period. Asphalt and road oil product supplied is projected to grow the most rapidly of the miscellaneous products, as increased demand for gasoline increases excise tax revenues for the States (and thus boosts highway repair and construction work), while little change is anticipated for still gas, coke, and most of the other small-volume petroleum products. Only kerosene demand is projected to decline in 1986 and in the first half of 1987, corresponding to the historical evidence that kerosene demand declines as income rises.

## Domestic Crude Oil Production

Domestic production of crude oil in the base case is projected to decline by nearly 2 percent, or by approximately 150,000 barrels per day, between 1985 and 1986, to less than 8.8 million barrels per day (Table 6 on page 27). In the first half of 1987, domestic production of crude oil is expected to be about 1 percent below year-earlier levels. Alaskan production in 1986 is projected to be almost 3 percent higher than the level in 1985. A 3-percent increase in Alaskan production is expected during the first half of 1987 compared with year-earlier levels, due mainly to increased production from the Lisburne reservoir of the Prudhoe Bay field and from the Milne Point field. Oil production in the

lower 48 States is expected to decrease by nearly 3 percent in 1986 to 6.92 million barrels per day.

In the low oil price case, domestic production of crude oil is projected to decline by nearly 4 percent between 1985 and 1986, with an increase in Alaskan production offset by a sharp decrease in production from the lower 48 States. A 3-percent decrease in domestic oil production is expected between first-half 1986 and first-half 1987 in the low price case. In the high oil price case, domestic oil production is projected to decline by nearly 1 percent between 1985 and 1986 and then remain unchanged between first-half 1986 and first-half 1987.

The projected decline in domestic production levels is moderate because most existing wells have variable production costs that are substantially below anticipated price levels. Based on data reported to EIA's Financial Reporting System by the largest producers in this country, U.S. lifting costs in 1984 averaged \$7.04 per barrel of crude oil equivalent (i.e., reflecting the barrel equivalent of natural gas also produced from oil wells). Of this amount, \$4.35 was for direct operation and maintenance costs, \$1.05 was for severance and production taxes, and \$1.64 was the Windfall Profit Tax. In general, the current producing properties most vulnerable to lower oil prices are those having relatively high operating costs. Marginal projects (such as low-yield stripper wells and costly secondary and tertiary recovery systems) would shut down first.

A price sufficient to cover short-run marginal costs, however, may not assure full cost recovery for major new exploration and development projects. Thus, any impact of lower oil prices would be cumulative over time as a slowdown in exploration and development, along with continued production from existing wells, results in the depletion of the developed reserves.

## Petroleum Inventories

With oil prices falling, primary stock holders can be expected to keep petroleum stocks low to reduce carrying costs, maintaining the option to buy oil if price increases appear likely. At the same time, however, falling prices are expected to lead to higher demand, which means that primary stock holders need sufficient inventories to satisfy the higher demand. As a result, the total primary petroleum stock level (excluding the Strategic Petroleum Reserve) at the end of 1986 is projected to be 1,025 million barrels, only 2 million barrels above the year-earlier level, and representing about the same number of days of supply (about 63 days), based on the next quarter's anticipated rate of product supplied (Table 6 on page 27).

Motor gasoline stocks at the end of the first quarter of 1986 were at the same level as a year earlier, but are facing higher demands during the driving season this year, mainly because of lower gasoline prices. Additional supplies are expected from higher imports of gasoline and higher production levels through the second and third quarters of 1986. As a result, gasoline stocks are expected to end the second quarter at 184 million barrels and then rise to 189 million barrels at the end of the third quarter. These levels represent 25.6 and 26.9 days of supply, respectively, compared with 26.8 and 27.5 days for the year-earlier periods. Distillate stocks, which were drawn down by 45.5 million barrels in the first quarter of 1986, ended that quarter at 98.4 million barrels. They are forecast to end 1986 at 148 million barrels and the first quarter of 1987 at 104 million barrels. This represents 46.1 and 36.4 days of supply, respectively, compared with 43.0 and 34.9 days for the year earlier.

The Strategic Petroleum Reserve's fill rate for the third quarter of fiscal year 1986 is projected to be 50,000 barrels per day. The forecast for the fourth quarter of fiscal year 1986 is 6,000 barrels per day. These fill rates will complete the requirement in the Consolidated Omnibus Budget Reconciliation Act of 1985 that the Reserve be filled during fiscal year 1986 at an average annual rate of 35,000 barrels per day.

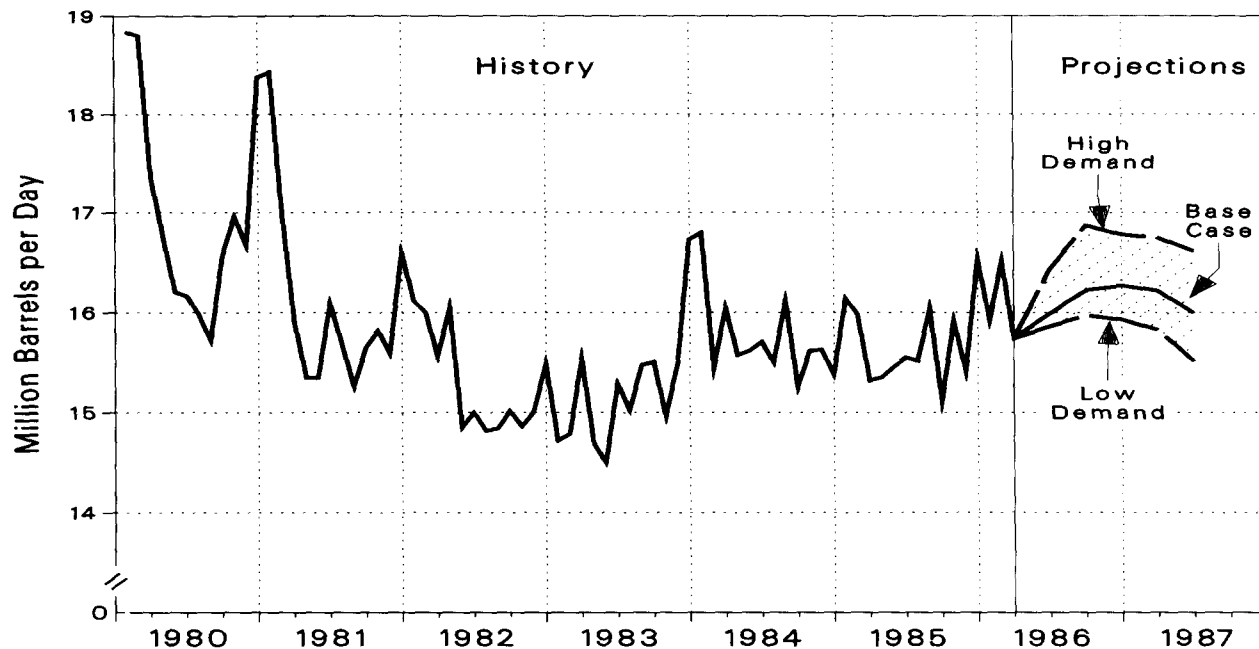
## Petroleum Demand Sensitivities

Table 13 on page 34 and Figure 6 on page 19 show the response of petroleum demand to changes in price, income, and weather. The sensitivity cases were developed as follows:

- The low and high price demands are based on the price paths shown in Table 5 on page 26, holding the variables representing economic activity at their base case levels.
- The economic sensitivity cases are derived from the low and high economic growth assumptions given in Table 4 on page 25, holding prices at their base case trajectories.
- The weather sensitivity cases are based on variations in population weighted heating degree-days and cooling degree-days of 10 percent in the first and fourth quarters and 15 percent in the second and third quarters, respectively.

During 1986, prices are expected to contribute most to the uncertainty range, which averages about 0.4 million barrels per day overall. The uncertainty attributed to income in 1986 also is projected to be significant, with a range of 160,000 barrels per day resulting from income variations above and below the base case level. During the first half of 1987, the addition of weather as a significant contribution to uncertainty in the first quarter results in a wide uncertainty range of about 1.0 million barrels per day.

**Figure 6. Total Petroleum Demand**



Sources: o History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(86/01) (Washington, DC, 1986). o Projections: Tables 6, 7, and 8.

## Projections for the Other Major Energy Sources

### Natural Gas

Total natural gas consumption is projected to decline by about 2 percent between 1985 and 1986 and to increase by 7 percent between first-half 1986 and first-half 1987 (Table 14 on page 35). Slight increases in natural gas demand for all other uses and refinery fuel in 1986 are expected to be offset by a sharp decline in natural gas use at electric utilities. Because the price of natural gas compared with that for oil has increased in recent months, electric utilities are projected to switch to oil-fired generation this year, despite falling natural gas prices and healthy projected growth for the economy and total electricity generation. The all other uses category of natural gas demand is expected to show increases throughout the forecast period, but the very low consumption level during the first quarter of 1986 (attributed to warmer-than-normal weather in all three months) led to a lower demand level for 1986 than was projected in the January 1986 *Outlook*.

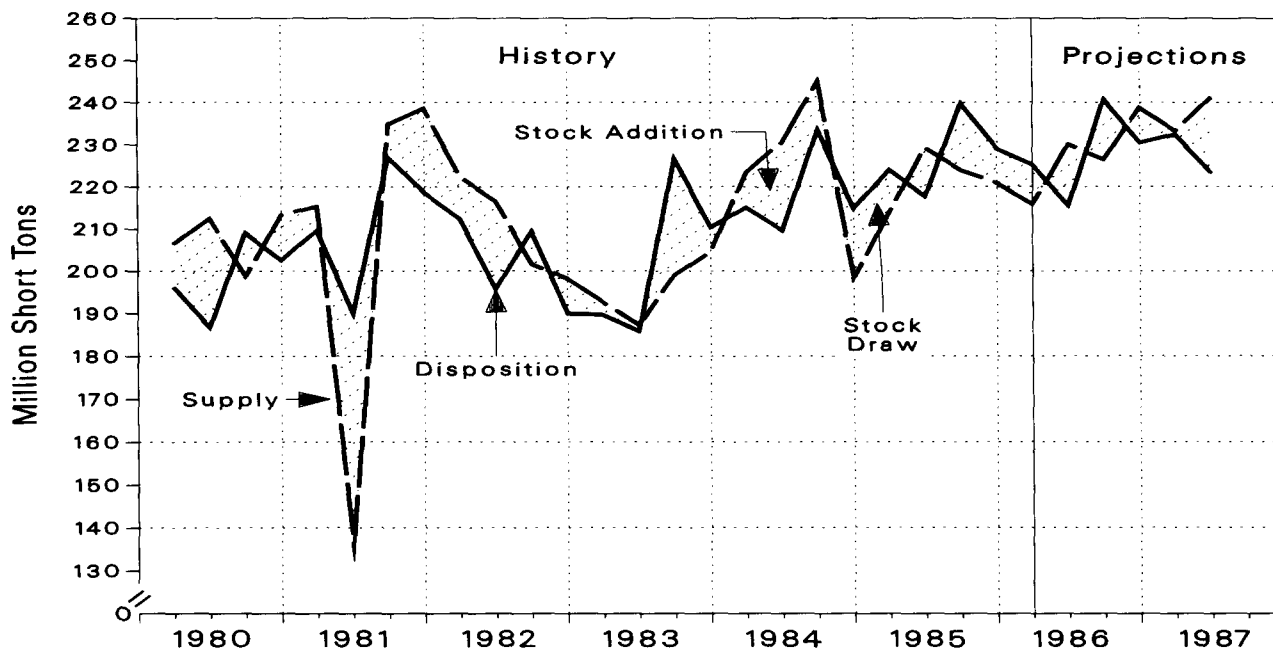
Natural gas production is expected to remain virtually unchanged between 1985 and 1986 but to increase by 2 percent between first-half 1986 and first-half 1987. Low stocks of natural gas at the end of 1985 are projected to result in net stock additions in 1986. Net imports of natural gas from Canada are expected to increase to approximately 1 trillion cubic feet in 1986, representing nearly 6 percent of total new supply.

### Coal

**Coal Production.** By the beginning of 1986, excess domestic coal stocks that were evident at the beginning of 1985 had been substantially reduced, leading to the projection of moderate growth in coal production to about 909 million tons in 1986. Coal production in 1985 is estimated to have been about 886 million tons, 1 percent below the 1984 level (Table 15 on page 36 and Figure 7 on page 20). Continued growth in domestic coal use is projected to push coal production in the first half of 1987 to 474 million tons, nearly 7 percent higher than the first-half 1986 level.

**Domestic Coal Consumption.** Total domestic coal consumption is forecast to rise by just over 1 percent between 1985 and 1986 (Figure 7 on page 20). Utility coal consumption in 1986 is not expected to show the high growth experienced in the previous 2 years. Relatively weak demand for industrial coal in 1986 and 1987

**Figure 7. Coal Supply and Disposition**



Sources: o History: Energy Information Administration, *Quarterly Coal Report*, DOE/EIA-0121(86/4Q) (Washington, DC, 1985). o Projections: Table 15.

should keep overall coal demand growth at modest levels.

Electric utility coal consumption in 1986 is expected to be 703 million tons, an increase of more than 1 percent from 1985 levels. This rate of increase contrasts with the nearly 5-percent growth observed between 1984 and 1985. Utility coal consumption growth in 1985 was high due to increased utilization of coal plants and new coal capacity that became operational and to a sharp drop in hydroelectric availability as a result of lower-than-normal water levels. Hydroelectric generation which, when in abundance, tends to displace coal-fired generation in certain regions of the country, is projected to return to normal levels in 1986. Additional factors explaining the slowing of coal consumption in 1986 include the continued growth expected in nuclear generation and the slowing of coal-fired capacity additions.

Because coal-fired generating capacity is projected only to keep pace with electricity demand, the average utilization for coal-fired plants is not expected to improve significantly over the forecast period. Utilization rates at coal-fired generating plants are estimated to have averaged 53 percent in 1985.<sup>3</sup>The current projec-

tions imply a slight decline in plant utilization in 1986 to just under 53 percent. Utilization rates for coal plants should improve in the first half of 1987, contributing to a growth rate of over 4 percent in utility coal consumption between first-half 1986 and first-half 1987.

In 1986, coking coal consumption is expected to fall to about 40 million tons from 41 million tons in 1985 because of the weak overall performance expected for the domestic steel industry. However, this forecast tends to discount any significant impact from possible tightening of steel import quotas and therefore would be higher should import restrictions become binding. Aside from quotas, continued declines in the value of the dollar may weaken imported steel demand in the United States, leading to higher domestic steel production and, thus, higher coking coal demand. Whether any incremental steel production results in higher coke production and higher coking coal demand depends on whether or not that incremental production is captured by producers using basic oxygen furnaces or electric arc furnaces (such as the mini-mills). In any case, the trend toward greater use of continuous casting will raise steel mill yields and reduce the relative requirements for coking coal in the future.

<sup>3</sup>Electric plant utilization is defined here as monthly generation (kilowatthours) divided by nameplate capacity (kilowatts) times the number of hours in the month. The utilization figures are based on monthly capacity numbers which are derived from the same data source used in the Energy Information Administration, *Inventory of Power Plants in the United States*, DOE/EIA-0095(84) (Washington, DC, 1984).

With a projected increase of more than 2 percent in industrial output between 1985 and 1986, an increase of more than 2 percent in coal consumption in the retail and general industry sector is expected for 1986. This projection mainly reflects an increase in other industrial coal consumption, including manufacturing consumption (other than at coke plants). The remainder of the growth within this sector is due to synfuels manufacture, including the assumed continuation of the Great Plains Coal Gasification Project throughout the forecast period.

**Coal Exports.** Coal exports are projected to fall by about 8 million tons between 1985 and 1986. Exports were an estimated 93 million tons in 1985, 12 million tons higher than in 1984. The increase in 1985 primarily reflected increased shipments of bituminous steam coal to Europe and the Pacific Rim. Bituminous metallurgical coal exports in 1985 increased by about 6 percent compared with year-earlier levels. Despite projected economic expansion in Europe and elsewhere, continued reductions in Canadian steam coal requirements and expanded competition from Colombia in European steam coal markets are expected to result in reduced U. S. coal exports in 1986. In addition, attempts to boycott South African coal may fail if prices fall far enough, and this possibility tends to limit market expansion for U. S. exporters in the short term. Metallurgical coal exports to Japan are expected to fall by about 20 percent in 1986, so that total U. S. exports are projected to fall to 85 million tons in 1986, and remain flat in the first half of 1987 compared with the year-earlier level.

## Electric Power

Electricity generation is projected to increase by more than 2 percent between 1985 and 1986 and by nearly 5 percent between the first half of 1986 and the first half of 1987 (Table 16 on page 37). These increases are larger than the projections published in the January 1986 *Outlook* because of the strong upward revision in the economic assumptions for the near future. Growth in electricity generation in 1986 might have been even higher than shown here, but very mild weather (9 percent warmer than normal) in the first quarter of 1986 resulted in somewhat lower than expected electricity demand during that quarter. This mild weather also is partly responsible for the relative-

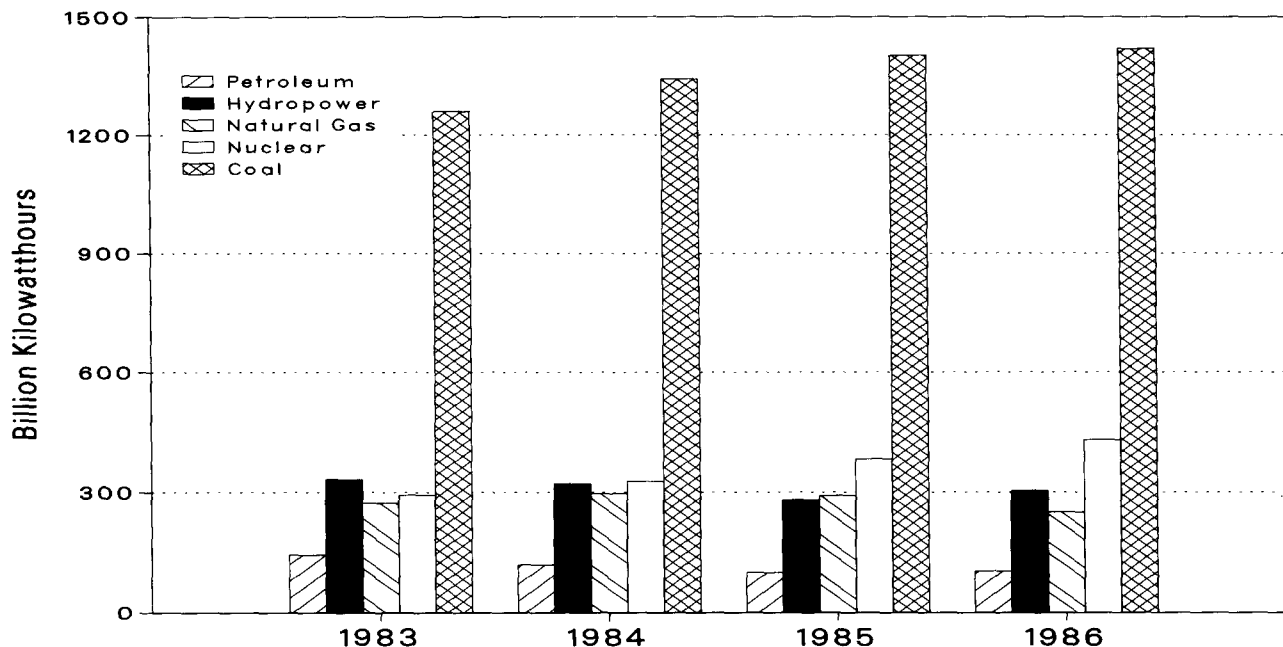
ly large increase expected for generation in the first half of next year, when weather conditions are assumed to return to normal.

The real price of electricity is expected to experience little change over the forecast period, although recent data have shown declines. Electricity price changes remain difficult to forecast because of the uncertainty associated with the inclusion of the costs of new generating capacity being added to the rate base. Another factor involved is the effect of falling fuel costs on the end-use price of electricity: fuel costs represent about one-third of the total price of electricity, so significant downward movement in the prices of fuels used to generate electricity may counteract any possible upward price pressure from capital additions.

**Generation by Energy Source.** Significant gains are expected for nuclear and coal-fired generation over the forecast period, with hydroelectric generation assumed to return to normal levels after a relatively dry year in 1985 (Figure 8 on page 22). Nuclear generation is projected to increase by about 12 percent between 1985 and 1986, to nearly 432 billion kilowatthours. Nuclear generation in the first half of 1987 is projected to be more than 12 percent above year-earlier levels. Output from new capacity is the major reason for the increase in nuclear generation expected over the forecast period. This forecast assumes the addition of 8 new units (Millstone 3, Catawba 2, Palo Verde 2, Shoreham, Perry 1, Hope Creek 1, Clinton 1, and Seabrook 1) totaling nearly 9 gigawatts in 1986, and 4 additional units (Harris 1, Nine Mile Point 2, Watts Bar 1, and Byron 2) totaling more than 4 gigawatts during the first half of 1987. Based on these additions, a total of 107 nuclear units are expected to be operable in the United States by mid-1987. The forecast for nuclear generation in 1986 is greater than that published in the January 1986 *Outlook* due to revised assumptions about future capacity factors for nuclear units and a more disaggregated method for estimating their generation in the very near term.

Coal-fired generation is expected to increase by more than 1 percent between 1985 and 1986 and by more than 4 percent between first-half 1986 and first-half 1987. These increases are slightly lower than the projected growth in total electricity generation because of the expected growth in nuclear generation and, to some extent, the flattening out of coal-fired capacity additions. More than 5 gigawatts of coal capability are expected to be added in 1986, and more than 1 additional gigawatt is expected during the first half of 1987.

**Figure 8. Electricity Generation by Fuel Source**



Sources: o History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(86/01) (Washington, DC, 1985). o Projections: Table 16.

The combined amount of oil- and natural gas-fired generation is projected to drop by more than 9 percent between 1985 and 1986 and decline by an additional 2 percent between first-half 1986 and first-half 1987. This downward trend is attributed to the significant increases in generation from other fuels. The actual level of generation from each of these fuels is difficult to forecast because of factors including the level of total generation, the relative prices of the two fuels, the availability of these fuels, and the displacement of these fuels by new coal and nuclear capacity. The projected levels of oil- and natural gas-fired generation in this report are based, in part, on an analysis of new capacity additions expected in those States that are major consumers of these fuels at electric utilities. This analysis was then modified to consider the dramatic drop in oil prices and resulted in a projected increase in oil generation during 1986, in sharp contrast with the declines experienced over the past few years. The price of natural gas also is projected to decline over the forecast period, but the greater drop expected for oil prices makes oil the less expensive choice for some electric utilities. Hence, natural gas-fired generation is forecast to decline between 1985 and 1986, despite lower gas prices. With the upturn in oil prices forecast in the first half of 1987 and the additional nuclear ca-

capacity additions expected during that period, oil-fired generation is projected to drop compared to year-earlier levels.

Generation of electricity from other sources has increased rapidly over the recent past, nearly doubling between 1980 and 1985. Geothermal accounted for almost 90 percent of the total "other" category in 1985, the remainder being wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems. Growth in generation from other sources is expected to continue in the forecast period based on the expected opening of several new facilities.

**Net Electricity Imports.** Electricity imports have experienced a significant upward trend since the late 1970's. A decade of rising oil prices in the United States has encouraged areas dependent on oil-fired generation, such as the Northeast, to purchase electricity from Canada, which currently has a surplus of hydroelectric power. (The New England area and New York together accounted for 59 percent of net electricity imports into the United States in 1985.) In addition, a small amount of electricity was imported from Mexico in 1985 by the southwestern area of the country.

Net electricity imports are projected to rise to 44 billion kilowatt hours in 1986, an increase of 3 billion kilowatthours over the 1985 level (Table 16 on page 37). This increase is expected to result from the improvement of transmission capability within the United States and the anticipated operation of a major transmission line between Canada and New England in the first half of 1986. Net electricity imports are expected to increase by more than 1 billion kilowatthours between first-half 1986 and first-half 1987, mainly due to the full-service operation of the transmission line between New England and Hydro-Quebec of Canada.

## Total Domestic Energy Balance

Total energy consumption is forecast to increase by more than 2 percent between 1985 and 1986, to 75.4 quadrillion Btu (Table 17 on page 38). Based on higher economic growth assumed for 1987, total energy consumption is projected to increase by nearly 4 percent between first-half 1986 and first-half 1987. The energy/GNP ratio in 1986 is projected to be 20.6 thousand Btu per 1982 dollar of real GNP, down slightly from the 20.7 thousand Btu per 1982 dollar of real GNP in 1985. The energy/GNP ratio during the first half of 1987 is projected to remain essentially unchanged from the same period in 1986.

### *Fuel-Switching Potential at Electric Utilities*

Historically, because oil is the most expensive fossil fuel, electric utilities generally have limited the use of oil-fired plants. From 1974 through 1985, oil-fired electricity generation declined by 67 percent. At the same time, gas-fired generation decreased by 9 percent and coal-fired generation increased by 69 percent. In 1985, the national average delivered price of residual fuel oil to electric utilities was about 26 percent higher than the corresponding price of natural gas and about 160 percent higher than the price of coal. Consequently, oil-fired plants accounted for only 4 percent of total generation in 1985, compared with 12 percent for gas-fired units and 57 percent for coal-fired plants.

The decline in oil prices could alter the recent trends in utility fuel consumption in two ways. First, utilities can revise the dispatch order of plants so that units burning the less expensive fuel are used more intensively. Second, many fossil-fuel plants with multifuel boilers (those capable of burning an alternative fuel) may

respond to changing prices by switching input fuels. Fuel switching could occur in those areas with abundant oil supplies or where foreign oil is accessible. However, switching potential may be limited both by engineering constraints (such as modifications needed to boilers and lack of storage facilities for oil) and by contractual obligations for fuel purchases. The areas most likely to experience switching away from natural gas into oil are California, the New York/New Jersey area, and Florida. The electric utilities in these areas have a substantial number of dual-fired units that have burned natural gas in recent years but are capable of burning oil. The Southwest also has considerable gas-to-oil switching capability. Only minimal fuel switching is expected there, however, because it is also the largest producer of natural gas, and the combination of abundant supplies and low transportation costs are expected to enable gas to maintain its competitive price advantage over oil in that area.

**Table 2. International Petroleum Balance  
(Million Barrels per Day, Except Closing Stocks)**

	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply*</b>													
<b>Production</b>													
U.S. (50 States) .....	<b>11.0</b>	<b>11.1</b>	<b>11.1</b>	<i>11.2</i>	<i>11.2</i>	<i>11.0</i>	<i>10.9</i>	<i>10.9</i>	<i>11.0</i>	<i>11.0</i>	<b>11.1</b>	<i>11.1</i>	<i>11.0</i>
OPEC .....	<b>17.3</b>	<b>16.1</b>	<b>16.1</b>	<i>18.9</i>	<i>18.8</i>	<i>17.5</i>	<i>18.2</i>	<i>18.9</i>	<i>18.6</i>	<i>18.3</i>	<b>18.6</b>	<i>17.1</i>	<i>18.3</i>
Other Non-OPEC .....	<b>15.3</b>	<b>15.2</b>	<b>15.2</b>	<i>15.6</i>	<i>15.1</i>	<i>15.6</i>	<i>16.0</i>	<i>16.0</i>	<i>15.9</i>	<i>15.9</i>	<b>14.6</b>	<i>15.3</i>	<i>15.7</i>
Total Market Economies .....	<b>43.7</b>	<b>42.4</b>	<b>42.4</b>	<i>45.8</i>	<i>45.1</i>	<i>44.1</i>	<i>45.1</i>	<i>45.9</i>	<i>45.5</i>	<i>45.1</i>	<b>44.4</b>	<i>43.6</i>	<i>45.1</i>
Net Communist Exports .....	<b>1.1</b>	<b>1.8</b>	<b>2.2</b>	<i>1.7</i>	<i>1.0</i>	<i>1.7</i>	<i>1.8</i>	<i>1.8</i>	<i>1.3</i>	<i>1.6</i>	<b>2.0</b>	<i>1.7</i>	<i>1.6</i>
Total Supply .....	<b>44.8</b>	<b>44.2</b>	<b>44.6</b>	<i>47.5</i>	<i>46.1</i>	<i>45.8</i>	<i>46.9</i>	<i>47.7</i>	<i>46.8</i>	<i>46.7</i>	<b>46.3</b>	<i>45.3</i>	<i>46.7</i>
<b>Net Stock Withdrawals or Additions (-)</b>													
U.S. (50 States excl. SPR) .....	<b>1.2</b>	<b>-4</b>	<b>.2</b>	<i>-1</i>	<i>.3</i>	<i>.0</i>	<i>-2</i>	<i>-1</i>	<i>.3</i>	<i>.0</i>	<b>-1</b>	<i>.2</i>	<i>.0</i>
U.S. SPR .....	<b>-1</b>	<b>-2</b>	<b>-1</b>	<i>.0</i>	<i>.0</i>	<i>-1</i>	<i>.0</i>	<i>.0</i>	<i>.0</i>	<i>.0</i>	<b>-2</b>	<i>-1</i>	<i>.0</i>
Other Market Economies .....	<b>1.6</b>	<b>.1</b>	<b>-1</b>	<i>-4</i>	<i>.8</i>	<i>-4</i>	<i>-7</i>	<i>.5</i>	<i>1.3</i>	<i>-8</i>	<b>.1</b>	<i>.3</i>	<i>.0</i>
Total Stock Withdrawals .....	<b>2.6</b>	<b>-4</b>	<b>.0</b>	<i>-6</i>	<i>1.1</i>	<i>-4</i>	<i>-9</i>	<i>.4</i>	<i>1.6</i>	<i>-8</i>	<b>-2</b>	<i>.4</i>	<i>.0</i>
<b>Product Supplied</b>													
U.S. (50 States) .....	<b>15.8</b>	<b>15.5</b>	<b>15.6</b>	<i>16.0</i>	<i>16.0</i>	<i>16.0</i>	<i>16.2</i>	<i>16.3</i>	<i>16.2</i>	<i>16.0</i>	<b>15.7</b>	<i>15.7</i>	<i>16.1</i>
U.S. Territories .....	<b>.2</b>	<b>.3</b>	<b>.3</b>	<i>.3</i>	<i>.3</i>	<i>.3</i>	<i>.3</i>	<i>.3</i>	<i>.3</i>	<i>.3</i>	<b>.3</b>	<i>.3</i>	<i>.3</i>
Japan .....	<b>4.9</b>	<b>3.8</b>	<b>4.0</b>	<i>4.6</i>	<i>4.8</i>	<i>4.0</i>	<i>4.1</i>	<i>4.8</i>	<i>4.9</i>	<i>4.0</i>	<b>4.6</b>	<i>4.4</i>	<i>4.4</i>
OECD Europe .....	<b>12.7</b>	<b>10.8</b>	<b>11.3</b>	<i>11.8</i>	<i>12.4</i>	<i>11.2</i>	<i>11.4</i>	<i>12.6</i>	<i>12.8</i>	<i>11.5</i>	<b>11.8</b>	<i>11.6</i>	<i>11.9</i>
Other Market Economies .....	<b>13.9</b>	<b>13.8</b>	<b>13.9</b>	<i>14.0</i>	<i>14.0</i>	<i>13.9</i>	<i>14.0</i>	<i>14.1</i>	<i>14.3</i>	<i>14.1</i>	<b>13.8</b>	<i>13.9</i>	<i>14.0</i>
Total Market Economies .....	<b>47.5</b>	<b>44.1</b>	<b>45.0</b>	<i>46.6</i>	<i>47.6</i>	<i>45.4</i>	<i>46.0</i>	<i>48.0</i>	<i>48.4</i>	<i>45.9</i>	<b>46.2</b>	<i>45.8</i>	<i>46.7</i>
Statistical Discrepancy .....	<b>.1</b>	<b>.4</b>	<b>.4</b>	<i>-3</i>	<i>.3</i>	<i>.0</i>	<i>.0</i>	<i>.0</i>	<i>.0</i>	<i>.0</i>	<b>.1</b>	<i>.2</i>	<i>.1</i>
<b>Closing Stocks (billion barrels)</b>													
	<b>4.6</b>	<b>4.7</b>	<b>4.7</b>	<i>4.7</i>	<i>4.6</i>	<i>4.7</i>	<i>4.7</i>	<i>4.7</i>	<i>4.6</i>	<i>4.6</i>	<b>4.8</b>	<i>4.7</i>	<i>4.7</i>

\* 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, *Monthly Energy Review*, DOE/EIA-0035(86/01); and *International Energy Annual, 1984*, DOE/EIA-0219(84); Organization for Economic Cooperation and Development, *Quarterly Oil Statistics, Third Quarter 1985*; and Petroleum Economics Limited, *World Quarterly Primary Energy and Supply/Demand*, January 1986.

**Table 3. International Economic Growth  
(Percent Change from Previous Period)**

	Annual Average 1970-1984	1985*	1986	First Half 1987
OECD Total <sup>b</sup> .....	<b>2.9</b>	<b>2.8</b>	<i>3.0</i>	<i>3.0</i>
United States <sup>c</sup> .....	<b>3.0</b>	<b>2.2</b>	<i>2.7</i>	<i>3.3</i>
Western Europe .....	<b>2.4</b>	<b>2.2</b>	<i>3.3</i>	<i>2.6</i>
Japan <sup>e</sup> .....	<b>4.6</b>	<b>4.3</b>	<i>3.1</i>	<i>3.7</i>
Other OECD <sup>d</sup> .....	<b>3.3</b>	<b>3.8</b>	<i>3.5</i>	<i>3.5</i>

<sup>a</sup> Preliminary estimates for Organization for Economic Cooperation and Development (OECD) countries.

<sup>b</sup> Gross domestic product.

<sup>c</sup> Gross national product.

<sup>d</sup> Canada, Australia, and New Zealand.

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

Sources: Historical data: Organization for Economic Cooperation and Development, *Main Economic Indicators*, March 1986. Forecasts: Wharton Economic Forecasting Associates, *World Economic Outlook* December 1985; Data Resources, Inc., Canadian Forecast, CONTROL031486, European Forecast CONTROL032086, and Japanese Forecast, JPCONTROL0286.



**Table 4. Macroeconomic, Price, and Weather Data Assumptions for Low, Base, and High World Oil Price Cases**

Assumptions	1985				1986	World Oil Price Case	1986			1987		Year		
	1st	2nd	3rd	4th	1st		2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Macroeconomic<sup>a</sup></b>														
Real Gross National Product (billion 1982 dollars) ....	<b>3,548</b>	<b>3,557</b>	<b>3,584</b>	<b>3,591</b>	<b>3,619</b>	Low	<i>3,663</i>	<i>3,714</i>	<i>3,736</i>	<i>3,784</i>	<i>3,820</i>	-	-	<i>3,683</i>
						Base	<i>3,650</i>	<i>3,689</i>	<i>3,704</i>	<i>3,741</i>	<i>3,769</i>	<b>3,492</b>	<b>3,570</b>	<i>3,666</i>
						High	<i>3,639</i>	<i>3,670</i>	<i>3,678</i>	<i>3,707</i>	<i>3,727</i>	-	-	<i>3,652</i>
Percent Change from Prior Year .....	<b>2.9</b>	<b>1.8</b>	<b>2.1</b>	<b>2.1</b>	<b>1.9</b>	Low	<i>3.0</i>	<i>3.6</i>	<i>4.0</i>	<i>4.6</i>	<i>4.3</i>	-	-	<i>3.2</i>
						Base	<i>2.6</i>	<i>2.9</i>	<i>3.1</i>	<i>3.4</i>	<i>3.3</i>	<b>6.5</b>	<b>2.2</b>	<i>2.7</i>
						High	<i>2.3</i>	<i>2.4</i>	<i>2.4</i>	<i>2.4</i>	<i>2.4</i>	-	-	<i>2.3</i>
GNP Implicit Price Deflator (index, 1982: 100) .....	<b>110.4</b>	<b>111.3</b>	<b>112.1</b>	<b>113.0</b>	<b>113.7</b>	Low	<i>114.0</i>	<i>114.4</i>	<i>114.9</i>	<i>115.8</i>	<i>116.7</i>	-	-	<i>114.3</i>
						Base	<i>114.1</i>	<i>114.6</i>	<i>115.2</i>	<i>116.1</i>	<i>117.1</i>	<b>108.1</b>	<b>111.7</b>	<i>114.4</i>
						High	<i>114.1</i>	<i>114.7</i>	<i>115.5</i>	<i>116.5</i>	<i>117.5</i>	-	-	<i>114.5</i>
Percent Change from Prior Year .....	<b>3.6</b>	<b>3.4</b>	<b>3.2</b>	<b>3.1</b>	<b>3.0</b>	Low	<i>2.4</i>	<i>2.1</i>	<i>1.7</i>	<i>1.8</i>	<i>2.4</i>	-	-	<i>2.3</i>
						Base	<i>2.5</i>	<i>2.2</i>	<i>1.9</i>	<i>2.1</i>	<i>2.6</i>	<b>4.1</b>	<b>3.3</b>	<i>2.4</i>
						High	<i>2.5</i>	<i>2.3</i>	<i>2.2</i>	<i>2.5</i>	<i>3.0</i>	-	-	<i>2.5</i>
Real Disposable Personal Income <sup>b</sup> (billion 1982 dollars)	<b>2,483</b>	<b>2,532</b>	<b>2,503</b>	<b>2,517</b>	<b>2,552</b>	Low	<i>2,587</i>	<i>2,606</i>	<i>2,618</i>	<i>2,660</i>	<i>2,684</i>	-	-	<i>2,591</i>
						Base	<i>2,578</i>	<i>2,594</i>	<i>2,601</i>	<i>2,636</i>	<i>2,655</i>	<b>2,468</b>	<b>2,509</b>	<i>2,581</i>
						High	<i>2,571</i>	<i>2,585</i>	<i>2,586</i>	<i>2,615</i>	<i>2,629</i>	-	-	<i>2,574</i>
Percent Change from Prior Year .....	<b>1.5</b>	<b>2.8</b>	<b>.9</b>	<b>1.3</b>	<b>2.8</b>	Low	<i>2.2</i>	<i>4.1</i>	<i>4.0</i>	<i>4.2</i>	<i>3.7</i>	-	-	<i>3.3</i>
						Base	<i>1.8</i>	<i>3.6</i>	<i>3.3</i>	<i>3.3</i>	<i>3.0</i>	<b>5.7</b>	<b>1.7</b>	<i>2.9</i>
						High	<i>1.5</i>	<i>3.3</i>	<i>2.7</i>	<i>2.5</i>	<i>2.3</i>	-	-	<i>2.6</i>
Index of Industrial Production (Mfg.) (index, 1977: 100)	<b>126.0</b>	<b>126.6</b>	<b>127.6</b>	<b>128.2</b>	<b>129.0</b>	Low	<i>131.8</i>	<i>132.9</i>	<i>134.9</i>	<i>138.4</i>	<i>139.8</i>	-	-	<i>132.2</i>
						Base	<i>129.7</i>	<i>130.5</i>	<i>131.4</i>	<i>133.1</i>	<i>134.1</i>	<b>123.9</b>	<b>127.1</b>	<i>130.2</i>
						High	<i>128.2</i>	<i>128.6</i>	<i>128.4</i>	<i>129.2</i>	<i>129.3</i>	-	-	<i>128.6</i>
Percent Change from Prior Year .....	<b>4.2</b>	<b>2.6</b>	<b>1.6</b>	<b>1.9</b>	<b>2.4</b>	Low	<i>4.1</i>	<i>4.2</i>	<i>5.1</i>	<i>7.3</i>	<i>6.1</i>	-	-	<i>4.0</i>
						Base	<i>2.4</i>	<i>2.3</i>	<i>2.4</i>	<i>3.2</i>	<i>3.4</i>	<b>12.4</b>	<b>2.6</b>	<i>2.4</i>
						High	<i>1.3</i>	<i>.8</i>	<i>.1</i>	<i>.2</i>	<i>.9</i>	-	-	<i>1.2</i>
<b>Oil Price</b>														
Imported Crude Oil Price <sup>c</sup> (U.S. dollars/barrel) ....	<b>27.26</b>	<b>27.50</b>	<b>26.56</b>	<b>26.84</b>	<b>19.60</b>	Low	<i>10.70</i>	<i>10.30</i>	<i>12.30</i>	<i>13.00</i>	<i>14.00</i>	-	-	<i>13.20</i>
						Base	<i>15.00</i>	<i>15.70</i>	<i>17.00</i>	<i>18.00</i>	<i>18.00</i>	<b>28.88</b>	<b>27.04</b>	<i>16.80</i>
						High	<i>18.70</i>	<i>20.00</i>	<i>22.00</i>	<i>23.00</i>	<i>23.00</i>	-	-	<i>20.10</i>
U.S. Refiners' Cost <sup>d</sup> (U.S. dollars/barrel) ....	<b>26.77</b>	<b>26.95</b>	<b>26.52</b>	<b>26.77</b>	<b>20.60</b>	Low	<i>11.10</i>	<i>10.70</i>	<i>12.70</i>	<i>13.40</i>	<i>14.40</i>	-	-	<i>13.80</i>
						Base	<i>15.40</i>	<i>16.10</i>	<i>17.40</i>	<i>18.40</i>	<i>18.40</i>	<b>28.63</b>	<b>26.75</b>	<i>17.40</i>
						High	<i>19.10</i>	<i>20.40</i>	<i>22.40</i>	<i>23.40</i>	<i>23.40</i>	-	-	<i>20.60</i>
<b>Weather<sup>e</sup></b>														
Heating Degree Days .....	<b>2,491</b>	<b>441</b>	<b>93</b>	<b>1,746</b>	<b>2,184</b>		<i>538</i>	<i>88</i>	<i>1,668</i>	<i>2,401</i>	<i>538</i>	<b>4,643</b>	<b>4,771</b>	<i>4,478</i>
Cooling Degree Days .....	<b>28</b>	<b>327</b>	<b>711</b>	<b>87</b>	<b>22</b>		<i>328</i>	<i>754</i>	<i>62</i>	<i>28</i>	<i>328</i>	<b>1,174</b>	<b>1,153</b>	<i>1,166</i>

<sup>a</sup> Macroeconomic projections from the Data Resources, Inc., model forecast are seasonally adjusted at annual rates and modified as appropriate to the three world oil price cases.

<sup>b</sup> Seasonally adjusted at annual rates.

<sup>c</sup> Cost of imported crude oil to U.S. refiners.

<sup>d</sup> U.S. Refiner Acquisition Cost of foreign and domestic crude oil.

<sup>e</sup> Population-weighted average degree days, revised December 1981. A degree day indicates the temperature variation from 65 degrees Fahrenheit (calculated as the simple average of the daily minimum and maximum temperatures).

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

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(86/01); Bureau of Economic Analysis, U.S. Department of Commerce, *Survey of Current Business*, as revised, March 1986; National Oceanic and Atmospheric Administration, U.S. Department of Commerce, *Monthly State, Regional, and National Heating/Cooling Degree Days Weighted by Population*; Federal Reserve System, *Statistical Release G.12.3*, April 1986. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0486.

**Table 5. Quarterly Energy Prices (Nominal), History and Projections**

Product	1985				1986	World Oil Price Case	1986			1987		Year		
	1st	2nd	3rd	4th	1st		2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Petroleum</b>														
Gasoline <sup>a</sup> (dollars per gallon) .....	<b>1.14</b>	<b>1.22</b>	<b>1.22</b>	<b>1.20</b>	<b>1.10</b>	Low	<i>0.82</i>	<i>0.80</i>	<i>0.80</i>	<i>0.83</i>	<i>0.87</i>	-	-	<i>0.88</i>
						Base	<i>.90</i>	<i>.94</i>	<i>.94</i>	<i>.95</i>	<i>.99</i>	<b>1.20</b>	<b>1.20</b>	<i>.97</i>
						High	<i>.97</i>	<i>1.05</i>	<i>1.07</i>	<i>1.08</i>	<i>1.12</i>	-	-	<i>1.05</i>
No. 2 Heating Oil, Wholesale (dollars per gallon) .....	<b>.76</b>	<b>.76</b>	<b>.73</b>	<b>.83</b>	<b>.64</b>	Low	<i>.38</i>	<i>.35</i>	<i>.40</i>	<i>.43</i>	<i>.44</i>	-	-	<i>.44</i>
						Base	<i>.48</i>	<i>.48</i>	<i>.52</i>	<i>.56</i>	<i>.54</i>	<b>.92</b>	<b>.77</b>	<i>.53</i>
						High	<i>.56</i>	<i>.59</i>	<i>.65</i>	<i>.69</i>	<i>.67</i>	-	-	<i>.61</i>
No. 2 Heating Oil, Retail (dollars per gallon) .....	<b>1.05</b>	<b>1.03</b>	<b>.98</b>	<b>1.07</b>	<b>.98</b>	Low	<i>.67</i>	<i>.59</i>	<i>.65</i>	<i>.70</i>	<i>.67</i>	-	-	<i>.72</i>
						Base	<i>.76</i>	<i>.73</i>	<i>.79</i>	<i>.85</i>	<i>.80</i>	<b>1.09</b>	<b>1.05</b>	<i>.81</i>
						High	<i>.83</i>	<i>.84</i>	<i>.93</i>	<i>1.00</i>	<i>.94</i>	-	-	<i>.89</i>
No. 6 Residual Fuel Oil <sup>b</sup> (dollars per gallon) .....	<b>.68</b>	<b>.60</b>	<b>.57</b>	<b>.59</b>	<b>.46</b>	Low	<i>.22</i>	<i>.23</i>	<i>.28</i>	<i>.30</i>	<i>.32</i>	-	-	<i>.30</i>
						Base	<i>.33</i>	<i>.35</i>	<i>.39</i>	<i>.41</i>	<i>.41</i>	<b>.69</b>	<b>.61</b>	<i>.38</i>
						High	<i>.41</i>	<i>.45</i>	<i>.50</i>	<i>.53</i>	<i>.52</i>	-	-	<i>.46</i>
No. 2 Diesel Oil, Retail (dollars per gallon) .....	<b>1.14</b>	<b>1.15</b>	<b>1.12</b>	<b>1.21</b>	<b>1.13</b>	Low	<i>.86</i>	<i>.81</i>	<i>.84</i>	<i>.87</i>	<i>.89</i>	-	-	<i>.90</i>
						Base	<i>.93</i>	<i>.93</i>	<i>.96</i>	<i>1.00</i>	<i>.99</i>	<b>1.15</b>	<b>1.16</b>	<i>.99</i>
						High	<i>1.00</i>	<i>1.03</i>	<i>1.08</i>	<i>1.13</i>	<i>1.12</i>	-	-	<i>1.06</i>
<b>Other</b>														
Coal, Delivered to Utilities (dollars per million Btu)	<b>1.66</b>	<b>1.67</b>	<b>1.64</b>	<b>1.63</b>	<b>1.62</b>	Low	<i>1.54</i>	<i>1.53</i>	<i>1.53</i>	<i>1.54</i>	<i>1.54</i>	-	-	<i>1.55</i>
						Base	<i>1.61</i>	<i>1.61</i>	<i>1.61</i>	<i>1.62</i>	<i>1.62</i>	<b>1.66</b>	<b>1.65</b>	<i>1.61</i>
						High	<i>1.64</i>	<i>1.64</i>	<i>1.64</i>	<i>1.65</i>	<i>1.65</i>	-	-	<i>1.64</i>
Natural Gas, Residential (dollars per 1,000 cu. ft.)	<b>5.93</b>	<b>6.42</b>	<b>7.10</b>	<b>6.12</b>	<b>5.72</b>	Low	<i>5.79</i>	<i>6.49</i>	<i>5.62</i>	<i>5.43</i>	<i>5.84</i>	-	-	<i>5.68</i>
						Base	<i>6.10</i>	<i>6.84</i>	<i>5.92</i>	<i>5.72</i>	<i>6.15</i>	<b>6.12</b>	<b>6.13</b>	<i>5.91</i>
						High	<i>6.22</i>	<i>6.97</i>	<i>6.04</i>	<i>5.83</i>	<i>6.27</i>	-	-	<i>6.00</i>
Natural Gas, to Utilities (dollars per million Btu)	<b>3.62</b>	<b>3.51</b>	<b>3.36</b>	<b>3.29</b>	<b>2.98</b>	Low	<i>2.64</i>	<i>2.49</i>	<i>2.64</i>	<i>2.66</i>	<i>2.71</i>	-	-	<i>2.69</i>
						Base	<i>2.68</i>	<i>2.58</i>	<i>2.79</i>	<i>2.84</i>	<i>2.91</i>	<b>3.58</b>	<b>3.44</b>	<i>2.76</i>
						High	<i>2.82</i>	<i>2.85</i>	<i>2.92</i>	<i>3.01</i>	<i>3.11</i>	-	-	<i>2.89</i>
Electricity, Residential (cents per kilowatthour)	<b>7.32</b>	<b>7.95</b>	<b>8.20</b>	<b>7.74</b>	<b>7.43</b>	Low	<i>7.81</i>	<i>8.04</i>	<i>7.64</i>	<i>7.27</i>	<i>7.84</i>	-	-	<i>7.69</i>
						Base	<i>7.98</i>	<i>8.24</i>	<i>7.84</i>	<i>7.48</i>	<i>8.07</i>	<b>7.54</b>	<b>7.79</b>	<i>7.87</i>
						High	<i>8.13</i>	<i>8.41</i>	<i>8.01</i>	<i>7.66</i>	<i>8.28</i>	-	-	<i>8.03</i>

<sup>a</sup> Average for all grades and services.

<sup>b</sup> Retail residual fuel oil--average, all sulfur contents.

Notes: First quarter 1986 estimated for all fuels, except gasoline. All prices exclude taxes, except gasoline, residential natural gas, and diesel. Historical values are printed in **boldface**, forecasts in *italics*.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(86/01); and *Petroleum Marketing Monthly*, DOE/EIA-0380(86/01).







**Table 9. Quarterly Supply and Disposition of Motor Gasoline: Base Case  
(Million Barrels per Day, Except Stocks)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply</b>													
Domestic Production <sup>a</sup> .....	<b>5.94</b>	<b>6.54</b>	<b>6.63</b>	<b>6.49</b>	<b>6.30</b>	<i>6.73</i>	<i>6.86</i>	<i>6.72</i>	<i>6.25</i>	<i>6.75</i>	<b>6.45</b>	<b>6.40</b>	<i>6.65</i>
Imports .....	<b>.34</b>	<b>.45</b>	<b>.35</b>	<b>.37</b>	<b>.30</b>	<i>.39</i>	<i>.39</i>	<i>.38</i>	<i>.35</i>	<i>.35</i>	<b>.30</b>	<b>.38</b>	<i>.37</i>
Exports .....	<b>.00</b>	<b>.01</b>	<b>.01</b>	<b>.02</b>	<b>.01</b>	<i>.01</i>	<i>.01</i>	<i>.01</i>	<i>.01</i>	<i>.01</i>	<b>.01</b>	<b>.01</b>	<i>.01</i>
Net Imports .....	<b>.34</b>	<b>.44</b>	<b>.34</b>	<b>.36</b>	<b>.30</b>	<i>.39</i>	<i>.38</i>	<i>.37</i>	<i>.34</i>	<i>.35</i>	<b>.29</b>	<b>.37</b>	<i>.36</i>
Net Withdrawals .....	<b>.21</b>	<b>.00</b>	<b>-.01</b>	<b>-.03</b>	<b>.04</b>	<i>.02</i>	<i>-.05</i>	<i>-.06</i>	<i>.04</i>	<i>.05</i>	<b>-.05</b>	<b>.04</b>	<i>-.01</i>
<b>Total Primary Supply</b> .....	<b>6.49</b>	<b>6.98</b>	<b>6.96</b>	<b>6.82</b>	<b>6.63</b>	<i>7.14</i>	<i>7.19</i>	<i>7.03</i>	<i>6.63</i>	<i>7.14</i>	<b>6.69</b>	<b>6.81</b>	<i>7.00</i>
<b>Disposition</b>													
Leaded .....	<b>2.41</b>	<b>2.56</b>	<b>2.40</b>	<b>2.31</b>	<b>2.12</b>	<i>2.09</i>	<i>1.98</i>	<i>1.81</i>	<i>1.62</i>	<i>1.66</i>	<b>2.71</b>	<b>2.42</b>	<i>2.00</i>
Unleaded .....	<b>4.09</b>	<b>4.42</b>	<b>4.56</b>	<b>4.51</b>	<b>4.51</b>	<i>5.04</i>	<i>5.21</i>	<i>5.22</i>	<i>5.01</i>	<i>5.48</i>	<b>3.99</b>	<b>4.39</b>	<i>5.00</i>
<b>Total Product Supplied</b> .....	<b>6.49</b>	<b>6.98</b>	<b>6.96</b>	<b>6.82</b>	<b>6.63</b>	<i>7.14</i>	<i>7.19</i>	<i>7.03</i>	<i>6.63</i>	<i>7.14</i>	<b>6.69</b>	<b>6.82</b>	<i>7.00</i>
<b>Stocks</b>													
Primary Finished Stock Levels <sup>b</sup> (million barrels)													
Opening .....	<b>205.19</b>	<b>186.38</b>	<b>186.32</b>	<b>187.22</b>	<b>189.80</b>	<i>186.39</i>	<i>184.18</i>	<i>189.04</i>	<i>194.92</i>	<i>191.27</i>	<b>185.50</b>	<b>205.19</b>	<i>189.80</i>
Closing .....	<b>186.38</b>	<b>186.32</b>	<b>187.22</b>	<b>189.80</b>	<b>186.39</b>	<i>184.18</i>	<i>189.04</i>	<i>194.92</i>	<i>191.27</i>	<i>187.05</i>	<b>205.19</b>	<b>189.80</b>	<i>194.92</i>

<sup>a</sup> Refinery Production plus production at natural gas processing plants.

<sup>b</sup> Includes stocks at natural gas processing plants. Excludes stocks of reclassified motor gasoline blending components.

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, 1984*, DOE/EIA-0340(84)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1985 to Jan. 1986; *Weekly Petroleum Status Report*, DOE/EIA-0208(86-10,15).

**Table 10. Quarterly Supply and Disposition of Distillate Fuel Oil: Base Case  
(Million Barrels per Day, Except Stocks)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply</b>													
Refinery Output .....	<b>2.45</b>	<b>2.60</b>	<b>2.62</b>	<b>3.06</b>	<b>2.71</b>	<i>2.64</i>	<i>2.71</i>	<i>2.96</i>	<i>2.61</i>	<i>2.66</i>	<b>2.68</b>	<b>2.68</b>	<i>2.76</i>
Imports .....	<b>.19</b>	<b>.20</b>	<b>.13</b>	<b>.27</b>	<b>.20</b>	<i>.28</i>	<i>.36</i>	<i>.33</i>	<i>.17</i>	<i>.28</i>	<b>.27</b>	<b>.20</b>	<i>.30</i>
Exports .....	<b>.05</b>	<b>.03</b>	<b>.11</b>	<b>.08</b>	<b>.07</b>	<i>.03</i>	<i>.04</i>	<i>.05</i>	<i>.06</i>	<i>.03</i>	<b>.05</b>	<b>.07</b>	<i>.05</i>
Net Imports .....	<b>.14</b>	<b>.17</b>	<b>.02</b>	<b>.19</b>	<b>.13</b>	<i>.25</i>	<i>.32</i>	<i>.29</i>	<i>.11</i>	<i>.25</i>	<b>.22</b>	<b>.13</b>	<i>.25</i>
Net Withdrawals .....	<b>.69</b>	<b>-.12</b>	<b>-.08</b>	<b>-.29</b>	<b>.51</b>	<i>-.07</i>	<i>-.31</i>	<i>-.17</i>	<i>.49</i>	<i>-.04</i>	<b>-.06</b>	<b>.05</b>	<i>-.01</i>
<b>Disposition</b>													
Electric Utility Consumption .....	<b>.05</b>	<b>.03</b>	<b>.04</b>	<b>.04</b>	<b>.04</b>	<i>.05</i>	<i>.06</i>	<i>.03</i>	<i>.04</i>	<i>.05</i>	<b>.04</b>	<b>.04</b>	<i>.05</i>
Utility Stock Additions .....	<b>-.01</b>	<b>-.01</b>	<b>-.01</b>	<b>.00</b>	<b>.00</b>	<i>.00</i>	<i>-.01</i>	<i>.00</i>	<i>.00</i>	<i>.00</i>	<b>.00</b>	<b>-.01</b>	<i>.00</i>
Electric Utility Shipments .....	<b>.04</b>	<b>.02</b>	<b>.03</b>	<b>.04</b>	<b>.04</b>	<i>.05</i>	<i>.05</i>	<i>.03</i>	<i>.04</i>	<i>.04</i>	<b>.04</b>	<b>.03</b>	<i>.04</i>
Nonutility Shipments .....	<b>3.24</b>	<b>2.63</b>	<b>2.53</b>	<b>2.92</b>	<b>3.31</b>	<i>2.76</i>	<i>2.68</i>	<i>3.05</i>	<i>3.18</i>	<i>2.82</i>	<b>2.80</b>	<b>2.83</b>	<i>2.95</i>
Total Product Supplied .....	<b>3.28</b>	<b>2.65</b>	<b>2.56</b>	<b>2.96</b>	<b>3.35</b>	<i>2.82</i>	<i>2.72</i>	<i>3.08</i>	<i>3.22</i>	<i>2.86</i>	<b>2.84</b>	<b>2.86</b>	<i>2.99</i>
<b>Stocks</b>													
<b>Electric Utility Stock Levels (million barrels)</b>													
Opening .....	<b>19.12</b>	<b>17.80</b>	<b>17.09</b>	<b>16.41</b>	<b>16.36</b>	<i>16.02</i>	<i>15.92</i>	<i>15.17</i>	<i>15.09</i>	<i>14.82</i>	<b>18.80</b>	<b>19.12</b>	<i>16.36</i>
Closing .....	<b>17.80</b>	<b>17.09</b>	<b>16.41</b>	<b>16.36</b>	<b>16.02</b>	<i>15.92</i>	<i>15.17</i>	<i>15.09</i>	<i>14.82</i>	<i>14.72</i>	<b>19.12</b>	<b>16.36</b>	<i>15.09</i>
<b>Primary Stock Levels (million barrels)</b>													
Opening .....	<b>161.07</b>	<b>99.38</b>	<b>109.98</b>	<b>117.13</b>	<b>143.91</b>	<i>98.43</i>	<i>104.56</i>	<i>132.78</i>	<i>148.42</i>	<i>103.98</i>	<b>140.26</b>	<b>161.07</b>	<i>143.91</i>
Closing .....	<b>99.38</b>	<b>109.98</b>	<b>117.13</b>	<b>143.91</b>	<b>98.43</b>	<i>104.56</i>	<i>132.78</i>	<i>148.42</i>	<i>103.98</i>	<i>107.80</i>	<b>161.07</b>	<b>143.91</b>	<i>148.42</i>

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, 1984*, DOE/EIA-0340(84)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1985 to Jan. 1986; the *Monthly Energy Review*, DOE/EIA-0035(86/01); the *Electric Power Monthly*, DOE/EIA-0226(86/02); *Weekly Petroleum Status Report*, DOE/EIA-0208(86-10,15).

**Table 11. Quarterly Supply and Disposition of Residual Fuel Oil: Base Case  
(Million Barrels per Day, Except Stocks)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply</b>													
Refinery Output .....	<b>0.99</b>	<b>0.78</b>	<b>0.75</b>	<b>0.96</b>	<b>0.87</b>	<i>0.83</i>	<i>0.72</i>	<i>0.79</i>	<i>0.94</i>	<i>0.85</i>	<b>0.89</b>	<b>0.87</b>	<i>0.80</i>
Imports .....	<b>.57</b>	<b>.45</b>	<b>.45</b>	<b>.58</b>	<b>.58</b>	<i>.61</i>	<i>.49</i>	<i>.43</i>	<i>.56</i>	<i>.48</i>	<b>.68</b>	<b>.51</b>	<i>.53</i>
Exports .....	<b>.27</b>	<b>.16</b>	<b>.12</b>	<b>.24</b>	<b>.23</b>	<i>.17</i>	<i>.15</i>	<i>.21</i>	<i>.20</i>	<i>.17</i>	<b>.19</b>	<b>.20</b>	<i>.19</i>
Net Imports .....	<b>.29</b>	<b>.29</b>	<b>.33</b>	<b>.35</b>	<b>.35</b>	<i>.44</i>	<i>.34</i>	<i>.22</i>	<i>.36</i>	<i>.30</i>	<b>.49</b>	<b>.31</b>	<i>.34</i>
Net Withdrawals .....	<b>.07</b>	<b>.07</b>	<b>-.03</b>	<b>-.09</b>	<b>.14</b>	<i>-.05</i>	<i>-.02</i>	<i>-.03</i>	<i>.06</i>	<i>-.04</i>	<b>-.01</b>	<b>.01</b>	<i>.01</i>
<b>Disposition</b>													
Electric Utility Consumption .....	<b>.50</b>	<b>.36</b>	<b>.45</b>	<b>.44</b>	<b>.43</b>	<i>.52</i>	<i>.54</i>	<i>.30</i>	<i>.37</i>	<i>.44</i>	<b>.52</b>	<b>.44</b>	<i>.45</i>
Utility Stock Additions .....	<b>-.07</b>	<b>-.03</b>	<b>-.03</b>	<b>.01</b>	<b>-.02</b>	<i>.00</i>	<i>.01</i>	<i>-.04</i>	<i>-.01</i>	<i>-.02</i>	<b>-.01</b>	<b>-.03</b>	<i>-.01</i>
Electric Utility Shipments .....	<b>.43</b>	<b>.33</b>	<b>.41</b>	<b>.45</b>	<b>.41</b>	<i>.52</i>	<i>.55</i>	<i>.26</i>	<i>.36</i>	<i>.42</i>	<b>.51</b>	<b>.40</b>	<i>.43</i>
Nonutility Shipments .....	<b>.93</b>	<b>.82</b>	<b>.64</b>	<b>.77</b>	<b>.95</b>	<i>.71</i>	<i>.50</i>	<i>.73</i>	<i>.99</i>	<i>.68</i>	<b>.86</b>	<b>.79</b>	<i>.72</i>
Total Product Supplied .....	<b>1.36</b>	<b>1.15</b>	<b>1.05</b>	<b>1.22</b>	<b>1.36</b>	<i>1.22</i>	<i>1.05</i>	<i>.99</i>	<i>1.35</i>	<i>1.11</i>	<b>1.37</b>	<b>1.19</b>	<i>1.15</i>
<b>Stocks</b>													
<b>Electric Utility Stock Levels (million barrels)</b>													
Opening .....	<b>68.50</b>	<b>62.56</b>	<b>59.61</b>	<b>56.46</b>	<b>57.28</b>	<i>55.16</i>	<i>54.99</i>	<i>55.78</i>	<i>52.37</i>	<i>51.90</i>	<b>70.57</b>	<b>68.50</b>	<i>57.28</i>
Closing .....	<b>62.56</b>	<b>59.61</b>	<b>56.46</b>	<b>57.28</b>	<b>55.16</b>	<i>54.99</i>	<i>55.78</i>	<i>52.37</i>	<i>51.90</i>	<i>50.08</i>	<b>68.50</b>	<b>57.28</b>	<i>52.37</i>
<b>Primary Stock Levels (million barrels)</b>													
Opening .....	<b>53.00</b>	<b>46.30</b>	<b>40.21</b>	<b>42.75</b>	<b>50.67</b>	<i>37.67</i>	<i>42.41</i>	<i>43.97</i>	<i>46.46</i>	<i>41.17</i>	<b>48.50</b>	<b>53.00</b>	<i>50.67</i>
Closing .....	<b>46.30</b>	<b>40.21</b>	<b>42.75</b>	<b>50.67</b>	<b>37.67</b>	<i>42.41</i>	<i>43.97</i>	<i>46.46</i>	<i>41.17</i>	<i>45.03</i>	<b>53.00</b>	<b>50.67</b>	<i>46.46</i>

Note: 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, 1984*, DOE/EIA-0340(84)/1; *Petroleum Supply Monthly* DOE/EIA-0109, Jan. 1985 to Jan. 1986; the *Monthly Energy Review*, DOE/EIA-0035(86/01); the *Electric Power Monthly*, DOE/EIA-0226(86/02); *Weekly Petroleum Status Report*, DOE/EIA-0208(86-10,15).



**Table 12. Quarterly Supply and Disposition of Other Petroleum Products: Base Case<sup>a</sup>**

**(Million Barrels per Day, Except Stocks)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply</b>													
Net Refinery Output <sup>b</sup> .....	<b>2.47</b>	<b>2.70</b>	<b>2.74</b>	<b>2.47</b>	<b>2.67</b>	<i>2.62</i>	<i>2.70</i>	<i>2.64</i>	<i>2.93</i>	<i>2.90</i>	<b>2.57</b>	<b>2.59</b>	<i>2.66</i>
Natural Gas Plant Output .....	<b>1.63</b>	<b>1.61</b>	<b>1.59</b>	<b>1.65</b>	<b>1.68</b>	<i>1.60</i>	<i>1.58</i>	<i>1.64</i>	<i>1.71</i>	<i>1.60</i>	<b>1.63</b>	<b>1.62</b>	<i>1.62</i>
Other Domestic <sup>c</sup> .....	<b>.04</b>	<b>.04</b>	<b>.06</b>	<b>.07</b>	<b>.05</b>	<i>.05</i>	<i>.06</i>	<i>.06</i>	<i>.05</i>	<i>.05</i>	<b>.05</b>	<b>.06</b>	<i>.06</i>
Net Imports .....	<b>.41</b>	<b>.46</b>	<b>.45</b>	<b>.42</b>	<b>.36</b>	<i>.53</i>	<i>.73</i>	<i>.66</i>	<i>.40</i>	<i>.40</i>	<b>.47</b>	<b>.44</b>	<i>.57</i>
Net Withdrawals .....	<b>.05</b>	<b>-.19</b>	<b>.08</b>	<b>.29</b>	<b>-.11</b>	<i>-.05</i>	<i>.14</i>	<i>.10</i>	<i>-.13</i>	<i>-.14</i>	<b>.04</b>	<b>.06</b>	<i>.02</i>
<b>Total Primary Supply</b> .....	<b>4.61</b>	<b>4.61</b>	<b>4.93</b>	<b>4.91</b>	<b>4.65</b>	<i>4.75</i>	<i>5.20</i>	<i>5.10</i>	<i>4.95</i>	<i>4.82</i>	<b>4.76</b>	<b>4.77</b>	<i>4.93</i>
<b>Disposition</b>													
Jet Fuel .....	<b>1.16</b>	<b>1.16</b>	<b>1.19</b>	<b>1.28</b>	<b>1.31</b>	<i>1.21</i>	<i>1.25</i>	<i>1.26</i>	<i>1.27</i>	<i>1.23</i>	<b>1.18</b>	<b>1.19</b>	<i>1.26</i>
Liquefied Petroleum Gas <sup>d</sup> .....	<b>1.21</b>	<b>.83</b>	<b>.93</b>	<b>1.20</b>	<b>1.13</b>	<i>.84</i>	<i>.91</i>	<i>1.17</i>	<i>1.26</i>	<i>.84</i>	<b>.98</b>	<b>1.04</b>	<i>1.01</i>
Petrochemical Feedstocks <sup>e</sup> .....	<b>.92</b>	<b>.95</b>	<b>.95</b>	<b>.92</b>	<b>.97</b>	<i>1.00</i>	<i>1.01</i>	<i>.99</i>	<i>1.04</i>	<i>1.03</i>	<b>.95</b>	<b>.93</b>	<i>.99</i>
Miscellaneous <sup>f</sup> .....	<b>1.32</b>	<b>1.67</b>	<b>1.87</b>	<b>1.51</b>	<b>1.24</b>	<i>1.70</i>	<i>2.02</i>	<i>1.69</i>	<i>1.38</i>	<i>1.72</i>	<b>1.64</b>	<b>1.60</b>	<i>1.66</i>
<b>Total Product Supplied</b> .....	<b>4.61</b>	<b>4.61</b>	<b>4.93</b>	<b>4.91</b>	<b>4.65</b>	<i>4.75</i>	<i>5.20</i>	<i>5.10</i>	<i>4.95</i>	<i>4.82</i>	<b>4.76</b>	<b>4.77</b>	<i>4.93</i>
<b>Stock</b>													
Primary Stocks (million barrels)													
Opening .....	<b>341.08</b>	<b>336.56</b>	<b>354.04</b>	<b>346.92</b>	<b>320.06</b>	<i>330.18</i>	<i>334.83</i>	<i>321.99</i>	<i>312.57</i>	<i>324.21</i>	<b>356.43</b>	<b>341.08</b>	<i>320.06</i>
Closing .....	<b>336.56</b>	<b>354.04</b>	<b>346.92</b>	<b>320.06</b>	<b>330.18</b>	<i>334.83</i>	<i>321.99</i>	<i>312.57</i>	<i>324.21</i>	<i>336.87</i>	<b>341.08</b>	<b>320.06</b>	<i>312.57</i>

<sup>a</sup> Excludes crude oil product supplied and other components of the crude oil supply/demand balance, all of which are accounted for under the total petroleum supply and disposition table.

<sup>b</sup> Includes refinery production of all other products less natural gas liquids, liquefied refinery gases, and "other liquids" input to refineries.

<sup>c</sup> Field production of other hydrocarbons and alcohol.

<sup>d</sup> Includes propane, normal butane, and isobutane.

<sup>e</sup> Includes ethane plus naphtha and other oils designated for petrochemical feedstock use.

<sup>f</sup> Includes all petroleum products supplied except motor gasoline, distillate, residual fuel, liquefied petroleum gases, petrochemical feedstocks, and jet fuel.

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

Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual, 1984*, DOE/EIA-0340(84)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1985 to Jan. 1986; and *Weekly Petroleum Status Report*, DOE/EIA-0208(86-10,15). Data for February and March 1986 are preliminary.

**Table 13. Petroleum Demand Sensitivity Differentials  
(Million Barrels per Day)**

Sensitivities	1986			1987		Year
	2nd	3rd	4th	1st	2nd	1986
<b>Demand in 50 States</b>						
Low Price .....	<i>16.06</i>	<i>16.41</i>	<i>16.48</i>	<i>16.41</i>	<i>16.19</i>	<i>16.25</i>
Base Case .....	<i>15.99</i>	<i>16.22</i>	<i>16.27</i>	<i>16.22</i>	<i>16.00</i>	<i>16.13</i>
High Price .....	<i>15.92</i>	<i>16.06</i>	<i>16.08</i>	<i>16.02</i>	<i>15.78</i>	<i>16.03</i>
<b>Weather Sensitivity</b>						
Adverse Weather .....	<i>.02</i>	<i>.00</i>	<i>.17</i>	<i>.29</i>	<i>.02</i>	<i>.05</i>
Favorable Weather .....	<i>-.02</i>	<i>.00</i>	<i>-.17</i>	<i>-.29</i>	<i>-.02</i>	<i>-.05</i>
<b>Economic Sensitivity</b>						
High Economic Activity .....	<i>.07</i>	<i>.11</i>	<i>.16</i>	<i>.24</i>	<i>.29</i>	<i>.09</i>
Low Economic Activity .....	<i>-.06</i>	<i>-.09</i>	<i>-.13</i>	<i>-.18</i>	<i>-.24</i>	<i>-.07</i>
<b>Combined Sensitivity Differentials<sup>a</sup> (excl. price)</b>						
Upper Range .....	<i>.07</i>	<i>.11</i>	<i>.23</i>	<i>.38</i>	<i>.29</i>	<i>.10</i>
Lower Range .....	<i>.06</i>	<i>.09</i>	<i>.21</i>	<i>.34</i>	<i>.24</i>	<i>.09</i>
<b>Range of Projected Demand</b>						
High Demand <sup>b</sup> .....	<i>16.13</i>	<i>16.52</i>	<i>16.71</i>	<i>16.79</i>	<i>16.48</i>	<i>16.36</i>
Low Demand <sup>c</sup> .....	<i>15.86</i>	<i>15.97</i>	<i>15.87</i>	<i>15.68</i>	<i>15.54</i>	<i>15.94</i>

<sup>a</sup> The upper range of the differentials is calculated by taking the square root of the sum of the squared adverse weather and high economic activity sensitivities. The lower range of differentials is calculated by taking the square root of the sum of squared favorable weather and low economic activity sensitivities.

<sup>b</sup> Low Price demand plus the combined effects of adverse weather and high economic activity.

<sup>c</sup> High Price demand less the combined effects of favorable weather and low economic activity

Note: Forecast values in *italics*.

**Table 14. Quarterly Supply and Disposition of Natural Gas  
(Trillion Cubic Feet)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply</b>													
Total Dry Gas Production <sup>a</sup> .....	<b>4.40</b>	<b>3.93</b>	<b>3.90</b>	<b>4.14</b>	<b>4.18</b>	<i>3.94</i>	<i>3.97</i>	<i>4.28</i>	<i>4.32</i>	<i>3.99</i>	<b>17.39</b>	<b>16.38</b>	<i>16.37</i>
Net Imports .....	<b>.28</b>	<b>.19</b>	<b>.16</b>	<b>.24</b>	<b>.25</b>	<i>.23</i>	<i>.22</i>	<i>.28</i>	<i>.34</i>	<i>.26</i>	<b>.78</b>	<b>.87</b>	<i>.98</i>
Supplemental Gaseous Fuels .....	<b>.04</b>	<b>.03</b>	<b>.03</b>	<b>.03</b>	<b>.04</b>	<i>.03</i>	<i>.03</i>	<i>.04</i>	<i>.04</i>	<i>.03</i>	<b>.11</b>	<b>.13</b>	<i>.14</i>
Total New Supply .....	<b>4.72</b>	<b>4.15</b>	<b>4.09</b>	<b>4.42</b>	<b>4.47</b>	<i>4.20</i>	<i>4.22</i>	<i>4.60</i>	<i>4.70</i>	<i>4.28</i>	<b>18.28</b>	<b>17.38</b>	<i>17.49</i>
<b>Underground Working Gas Storage</b>													
Opening .....	<b>2.88</b>	<b>1.74</b>	<b>2.35</b>	<b>3.08</b>	<b>2.61</b>	<i>1.66</i>	<i>2.31</i>	<i>3.14</i>	<i>2.78</i>	<i>1.63</i>	<b>2.60</b>	<b>2.88</b>	<i>2.61</i>
Closing .....	<b>1.74</b>	<b>2.35</b>	<b>3.08</b>	<b>2.61</b>	<b>1.66</b>	<i>2.31</i>	<i>3.14</i>	<i>2.78</i>	<i>1.63</i>	<i>2.21</i>	<b>2.88</b>	<b>2.61</b>	<i>2.78</i>
Net Withdrawals <sup>b</sup> .....	<b>1.13</b>	<b>-.61</b>	<b>-.74</b>	<b>.46</b>	<b>.95</b>	<i>-.65</i>	<i>-.83</i>	<i>.36</i>	<i>1.15</i>	<i>-.58</i>	<b>-.19</b>	<b>.24</b>	<i>-.17</i>
Total Primary Supply <sup>a</sup> .....	<b>5.85</b>	<b>3.54</b>	<b>3.35</b>	<b>4.88</b>	<b>5.42</b>	<i>3.55</i>	<i>3.39</i>	<i>4.96</i>	<i>5.85</i>	<i>3.70</i>	<b>18.10</b>	<b>17.62</b>	<i>17.32</i>
<b>Disposition</b>													
Electric Utilities .....	<b>.63</b>	<b>.75</b>	<b>.96</b>	<b>.69</b>	<b>.55</b>	<i>.56</i>	<i>.82</i>	<i>.71</i>	<i>.63</i>	<i>.61</i>	<b>3.11</b>	<b>3.03</b>	<i>2.63</i>
Refinery Fuel .....	<b>.13</b>	<b>.14</b>	<b>.15</b>	<b>.15</b>	<b>.14</b>	<i>.15</i>	<i>.15</i>	<i>.15</i>	<i>.14</i>	<i>.15</i>	<b>.57</b>	<b>.57</b>	<i>.59</i>
All Other Uses <sup>c</sup> .....	<b>4.98</b>	<b>2.55</b>	<b>2.15</b>	<b>3.95</b>	<b>4.61</b>	<i>2.76</i>	<i>2.33</i>	<i>4.03</i>	<i>4.99</i>	<i>2.86</i>	<b>14.27</b>	<b>13.63</b>	<i>13.72</i>
Subtotal .....	<b>5.75</b>	<b>3.45</b>	<b>3.25</b>	<b>4.78</b>	<b>5.30</b>	<i>3.46</i>	<i>3.30</i>	<i>4.89</i>	<i>5.76</i>	<i>3.62</i>	<b>17.95</b>	<b>17.23</b>	<i>16.95</i>
Total Disposition .....	<b>5.85</b>	<b>3.54</b>	<b>3.35</b>	<b>4.88</b>	<b>5.42</b>	<i>3.55</i>	<i>3.39</i>	<i>4.96</i>	<i>5.85</i>	<i>3.70</i>	<b>18.10</b>	<b>17.62</b>	<i>17.32</i>
Unaccounted for .....	<b>.10</b>	<b>.09</b>	<b>.09</b>	<b>.10</b>	<b>.12</b>	<i>.09</i>	<i>.09</i>	<i>.07</i>	<i>.09</i>	<i>.09</i>	<b>.15</b>	<b>.39</b>	<i>.38</i>

<sup>a</sup> Excludes nonhydrocarbon gases removed.

<sup>b</sup> 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.

<sup>c</sup> Includes residential, commercial, and industrial uses other than refinery fuel, plus use of supplemental gas.

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(86/01); *Natural Gas Monthly*, DOE/EIA-0130(86/02); and *Electric Power Monthly*, DOE/EIA-0226(86/02).

**Table 15. Quarterly Supply and Disposition of Coal  
(Million Short Tons)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply</b>													
Production .....	<b>b 214</b>	<b>b 229</b>	<b>b 223</b>	<b>b 220</b>	<b>c 215</b>	<i>230</i>	<i>226</i>	<i>238</i>	<i>233</i>	<i>241</i>	<b>896</b>	<b>b 886</b>	<i>909</i>
<b>Primary Stock Levels<sup>a</sup></b>													
Opening .....	<b>34</b>	<b>35</b>	<b>35</b>	<b>33</b>	<b>33</b>	<i>30</i>	<i>30</i>	<i>30</i>	<i>30</i>	<i>30</i>	<b>34</b>	<b>34</b>	<i>33</i>
Closing .....	<b>35</b>	<b>35</b>	<b>33</b>	<b>33</b>	<b>c 30</b>	<i>30</i>	<i>30</i>	<i>30</i>	<i>30</i>	<i>30</i>	<b>34</b>	<b>33</b>	<i>30</i>
Net Withdrawals .....	<b>-1</b>	<b>0</b>	<b>3</b>	<b>-1</b>	<b>c 3</b>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<b>0</b>	<b>1</b>	<i>3</i>
Imports .....	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>c 1</b>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<b>1</b>	<b>2</b>	<i>2</i>
Exports .....	<b>19</b>	<b>24</b>	<b>26</b>	<b>24</b>	<b>c 17</b>	<i>22</i>	<i>24</i>	<i>22</i>	<i>17</i>	<i>22</i>	<b>81</b>	<b>93</b>	<i>85</i>
Total New Domestic Supply .....	<b>b 194</b>	<b>b 205</b>	<b>b 201</b>	<b>b 196</b>	<b>c 202</b>	<i>208</i>	<i>203</i>	<i>217</i>	<i>216</i>	<i>220</i>	<b>816</b>	<b>b 796</b>	<i>829</i>
<b>Secondary Stock Levels<sup>d</sup></b>													
Opening .....	<b>197</b>	<b>179</b>	<b>188</b>	<b>176</b>	<b>170</b>	<i>164</i>	<i>178</i>	<i>164</i>	<i>172</i>	<i>173</i>	<b>169</b>	<b>197</b>	<i>170</i>
Closing .....	<b>179</b>	<b>188</b>	<b>176</b>	<b>170</b>	<b>c 164</b>	<i>178</i>	<i>164</i>	<i>172</i>	<i>173</i>	<i>191</i>	<b>197</b>	<b>170</b>	<i>172</i>
Net Withdrawals .....	<b>18</b>	<b>-9</b>	<b>12</b>	<b>6</b>	<b>c 6</b>	<i>-15</i>	<i>14</i>	<i>-8</i>	<i>-1</i>	<i>-18</i>	<b>-29</b>	<b>27</b>	<i>-2</i>
Total Indicated Consumption .....	<b>b 212</b>	<b>b 196</b>	<b>b 213</b>	<b>b 202</b>	<b>c 208</b>	<i>193</i>	<i>217</i>	<i>209</i>	<i>215</i>	<i>202</i>	<b>787</b>	<b>b 823</b>	<i>827</i>
<b>Disposition</b>													
Coke Plants .....	<b>10</b>	<b>11</b>	<b>10</b>	<b>10</b>	<b>c 11</b>	<i>10</i>	<i>9</i>	<i>9</i>	<i>11</i>	<i>9</i>	<b>44</b>	<b>41</b>	<i>40</i>
Electric Utilities .....	<b>174</b>	<b>163</b>	<b>184</b>	<b>173</b>	<b>c 175</b>	<i>163</i>	<i>188</i>	<i>176</i>	<i>181</i>	<i>172</i>	<b>664</b>	<b>694</b>	<i>703</i>
Retail and General Industry <sup>e</sup> .....	<b>21</b>	<b>19</b>	<b>20</b>	<b>23</b>	<b>c 23</b>	<i>20</i>	<i>19</i>	<i>23</i>	<i>23</i>	<i>21</i>	<b>83</b>	<b>83</b>	<i>85</i>
Total Domestic Consumption .....	<b>205</b>	<b>193</b>	<b>214</b>	<b>205</b>	<b>c 208</b>	<i>193</i>	<i>217</i>	<i>209</i>	<i>215</i>	<i>202</i>	<b>791</b>	<b>818</b>	<i>827</i>
Discrepancy <sup>f</sup> .....	<b>b 6</b>	<b>b 3</b>	<b>b -1</b>	<b>b -3</b>	<b>c 0</b>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<b>-4</b>	<b>b 5</b>	<i>0</i>

<sup>a</sup> Primary stocks are held at the mines, preparation plants, and distribution points.

<sup>b</sup> Preliminary.

<sup>c</sup> Estimated.

<sup>d</sup> Secondary stocks are held by users. Most of the secondary stocks are held by electric utilities.

<sup>e</sup> Included in retail and general industry coal consumption is consumption at coal gasification plants of 1.7 million tons for 1984, and an estimated 4.8 for 1985. For the first quarter of 1986 and for the forecast, syngas account for 1.4 million tons per quarter.

<sup>f</sup> Historical period discrepancy reflects unaccounted for shipper and receiver reporting discrepancies.

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(86/01); and *Quarterly Coal Report*, DOE/EIA-0121(85/4Q).

**Table 16. Quarterly Supply and Disposition of Electricity  
(Billion Kilowatthours)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st <sup>c</sup>	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Generation</b>													
Coal .....	<b>352.5</b>	<b>331.9</b>	<b>370.1</b>	<b>347.7</b>	<b>354.2</b>	<i>330.4</i>	<i>379.0</i>	<i>355.4</i>	<i>365.8</i>	<i>347.8</i>	<b>1341.7</b>	<b>1402.1</b>	<i>1418.9</i>
Petroleum .....	<b>28.5</b>	<b>20.5</b>	<b>25.6</b>	<b>25.7</b>	<b>25.1</b>	<i>29.9</i>	<i>31.3</i>	<i>17.5</i>	<i>21.1</i>	<i>25.6</i>	<b>119.8</b>	<b>100.2</b>	<i>103.7</i>
Natural Gas .....	<b>61.3</b>	<b>71.6</b>	<b>92.4</b>	<b>66.6</b>	<b>53.6</b>	<i>53.0</i>	<i>77.5</i>	<i>67.2</i>	<i>60.0</i>	<i>57.9</i>	<b>297.4</b>	<b>291.9</b>	<i>251.4</i>
Nuclear Power .....	<b>98.0</b>	<b>86.0</b>	<b>104.5</b>	<b>95.2</b>	<b>101.4</b>	<i>105.4</i>	<i>114.5</i>	<i>110.3</i>	<i>119.3</i>	<i>113.1</i>	<b>327.6</b>	<b>383.7</b>	<i>431.6</i>
Hydropower .....	<b>78.1</b>	<b>74.7</b>	<b>60.0</b>	<b>68.4</b>	<b>73.1</b>	<i>90.0</i>	<i>72.3</i>	<i>68.5</i>	<i>79.9</i>	<i>83.5</i>	<b>321.2</b>	<b>281.1</b>	<i>304.0</i>
Geothermal Power and Other <sup>a</sup> .....	<b>2.6</b>	<b>2.4</b>	<b>2.7</b>	<b>3.0</b>	<b>3.1</b>	<i>3.0</i>	<i>3.0</i>	<i>3.2</i>	<i>3.2</i>	<i>3.1</i>	<b>8.6</b>	<b>10.7</b>	<i>12.3</i>
<b>Total Generation</b> .....	<b>621.1</b>	<b>587.0</b>	<b>655.3</b>	<b>606.5</b>	<b>610.5</b>	<i>611.7</i>	<i>677.6</i>	<i>622.0</i>	<i>649.2</i>	<i>631.0</i>	<b>2416.3</b>	<b>2469.8</b>	<i>2521.8</i>
<b>Net Imports</b> .....	<b>8.9</b>	<b>9.7</b>	<b>12.5</b>	<b>9.9</b>	<b>10.1</b>	<i>9.4</i>	<i>12.2</i>	<i>12.3</i>	<i>10.8</i>	<i>10.0</i>	<b>39.7</b>	<b>40.9</b>	<i>44.0</i>
<b>Total Supply</b> .....	<b>630.0</b>	<b>596.7</b>	<b>667.7</b>	<b>616.4</b>	<b>620.6</b>	<i>621.1</i>	<i>689.8</i>	<i>634.3</i>	<i>660.0</i>	<i>641.0</i>	<b>2456.0</b>	<b>2510.8</b>	<i>2565.8</i>
<b>T &amp; D Loss<sup>b</sup></b> .....	<b>42.6</b>	<b>52.6</b>	<b>49.1</b>	<b>57.2</b>	<b>31.1</b>	<i>48.5</i>	<i>61.2</i>	<i>62.4</i>	<i>45.1</i>	<i>43.8</i>	<b>177.6</b>	<b>201.5</b>	<i>203.2</i>
<b>Total Consumption (sales)</b> .....	<b>587.3</b>	<b>544.1</b>	<b>618.6</b>	<b>559.2</b>	<b>589.5</b>	<i>572.6</i>	<i>628.6</i>	<i>571.9</i>	<i>614.9</i>	<i>597.2</i>	<b>2278.4</b>	<b>2309.3</b>	<i>2362.6</i>

<sup>a</sup> Includes wind, wood, and waste.

<sup>b</sup> Transmission and distribution losses through the power network, calculated as total supply minus total sales.

<sup>c</sup> Estimated.

Notes: Minor discrepancies with other EIA published historic 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(86/01); and *Electric Power Monthly*, DOE/EIA-0226(86/02).

**Table 17. Quarterly Supply and Disposition of Total Energy  
(Quadrillion Btu)**

Supply and Disposition	1985				1986				1987		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1984	1985	1986
<b>Supply</b>													
<b>Production</b>													
Petroleum <sup>a</sup> .....	5.22	5.27	5.30	5.35	5.24	5.20	5.20	5.18	5.15	5.17	21.12	21.14	20.82
Natural Gas <sup>b</sup> .....	4.54	4.06	4.02	4.27	4.31	4.06	4.09	4.41	4.45	4.11	17.93	16.89	16.88
Coal .....	4.67	5.01	4.88	4.82	4.71	5.08	5.00	5.27	5.15	5.32	19.72	19.38	20.06
Nuclear Power .....	1.06	.93	1.13	1.03	1.10	1.14	1.24	1.19	1.29	1.22	3.54	4.14	4.66
Hydropower <sup>c</sup> .....	.82	.78	.63	.71	.77	.94	.76	.72	.84	.87	3.36	2.95	3.18
Geothermal Power and Other <sup>d</sup> .....	.06	.05	.06	.06	.07	.06	.06	.07	.07	.07	.18	.23	.26
Subtotal .....	16.37	16.09	16.02	16.25	16.19	16.49	16.34	16.84	16.95	16.77	65.85	64.73	65.86
<b>Net Imports</b>													
Crude Oil .....	1.24	1.70	1.59	1.87	1.57	1.69	1.91	1.88	1.73	1.82	6.92	6.40	7.06
Other Petroleum .....	.58	.68	.57	.66	.56	.80	.89	.78	.60	.64	2.97	2.49	3.02
Natural Gas .....	.28	.19	.16	.24	.25	.23	.22	.28	.34	.26	.79	.88	.98
Coal and Coke .....	-.48	-.63	-.67	-.63	-.44	-.57	-.61	-.57	-.45	-.56	-2.13	-2.40	-2.19
Electricity .....	.09	.10	.13	.10	.10	.10	.13	.13	.11	.10	.41	.42	.46
Subtotal .....	1.72	2.04	1.79	2.24	2.04	2.25	2.54	2.50	2.34	2.27	8.95	7.79	9.34
<b>Primary Stocks</b>													
Net Withdrawals .....	1.68	-.81	-.55	.32	1.23	-.66	-.96	.29	1.32	-.60	-.37	.65	-.10
SPR Fill Rate Additions(-) .....	-.06	-.09	-.07	-.02	-.02	-.03	.00	.00	.00	.00	-.41	-.25	-.05
<b>Secondary Stocks<sup>e</sup></b>													
Net Withdrawals .....	.43	-.17	.29	.12	.15	-.30	.30	-.16	-.01	-.37	-.61	.67	-.01
<b>Total Supply<sup>f</sup> .....</b>	<b>20.14</b>	<b>17.07</b>	<b>17.47</b>	<b>18.91</b>	<b>19.59</b>	<b>17.75</b>	<b>18.22</b>	<b>19.48</b>	<b>20.60</b>	<b>18.08</b>	<b>73.42</b>	<b>73.59</b>	<b>75.04</b>
<b>Disposition</b>													
<b>Nonutility Uses</b>													
Petroleum .....	7.35	7.35	7.43	7.63	7.51	7.51	7.69	7.87	7.63	7.56	29.77	29.76	30.58
Natural Gas <sup>g</sup> .....	5.27	2.78	2.36	4.22	4.89	2.99	2.56	4.30	5.28	3.10	15.28	14.62	14.74
Coal <sup>h</sup> .....	.75	.71	.70	.76	.77	.68	.68	.74	.77	.67	3.04	2.92	2.87
Subtotal .....	13.37	10.84	10.50	12.60	13.17	11.18	10.93	12.91	13.68	11.33	48.09	47.30	48.20
<b>Electric Utility Inputs</b>													
Petroleum .....	.31	.22	.28	.28	.27	.33	.34	.19	.23	.28	1.29	1.09	1.13
Natural Gas .....	.65	.78	.99	.71	.57	.58	.84	.73	.65	.63	3.22	3.14	2.73
Coal .....	3.65	3.42	3.86	3.62	3.69	3.45	3.96	3.71	3.82	3.63	14.02	14.55	14.81
Nuclear Power .....	1.06	.93	1.13	1.03	1.10	1.14	1.24	1.19	1.29	1.22	3.54	4.14	4.66
Hydropower <sup>i</sup> .....	.91	.88	.76	.82	.87	1.04	.88	.84	.95	.98	3.77	3.37	3.64
Geothermal Power and Other .....	.06	.05	.06	.06	.07	.06	.06	.07	.07	.07	.18	.23	.26
Subtotal .....	6.64	6.28	7.08	6.52	6.56	6.60	7.33	6.74	7.01	6.81	26.02	26.52	27.23
<b>Gross Energy Consumption<sup>f</sup> .....</b>	<b>20.01</b>	<b>17.12</b>	<b>17.58</b>	<b>19.12</b>	<b>19.73</b>	<b>17.78</b>	<b>18.26</b>	<b>19.65</b>	<b>20.69</b>	<b>18.14</b>	<b>74.11</b>	<b>73.83</b>	<b>75.42</b>
<b>Electric Utility Adjustments</b>													
Conversion Loss <sup>j</sup> .....	4.63	4.42	4.97	4.61	4.55	4.64	5.18	4.79	4.91	4.77	18.24	18.63	19.16
<b>Total Net Energy .....</b>	<b>15.38</b>	<b>12.69</b>	<b>12.61</b>	<b>14.52</b>	<b>15.18</b>	<b>13.14</b>	<b>13.08</b>	<b>14.87</b>	<b>15.78</b>	<b>13.37</b>	<b>55.87</b>	<b>55.20</b>	<b>56.27</b>
<b>Total Disposition .....</b>	<b>20.14</b>	<b>17.07</b>	<b>17.47</b>	<b>18.91</b>	<b>19.59</b>	<b>17.75</b>	<b>18.22</b>	<b>19.48</b>	<b>20.60</b>	<b>18.08</b>	<b>73.42</b>	<b>73.59</b>	<b>75.04</b>
Unaccounted for .....	.14	-.05	-.11	-.22	-.14	-.03	-.04	-.17	-.10	-.06	-0.69	-.24	-.38

<sup>a</sup> Includes crude oil and lease condensate, natural gas liquids, hydrogen, etc., input to oil refineries.

<sup>b</sup> Total dry gas production excluding nonhydrocarbon gases removed.

<sup>c</sup> Includes industrial production.

<sup>d</sup> Includes wood and waste used to generate electricity.

<sup>e</sup> Primarily electric utility stocks.

<sup>f</sup> This total excludes approximately 2 quadrillion Btu of wood.

<sup>g</sup> Includes natural gas used as refinery fuel.

<sup>h</sup> Includes net imports of coal coke.

<sup>i</sup> Includes industrial hydroelectric production and net imports of electricity.

<sup>j</sup> Includes plant use and transmission and distribution losses.

SPR: Strategic Petroleum Reserve.

Notes: The conversion from physical units to Btu is calculated by STIFS using a subset of *Monthly Energy Review* conversion factors. Consequently, the historic data will not precisely match that published in the *Monthly Energy Review*. In addition, minor discrepancies with 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(86/01); and *Electric Power Monthly*, DOE/EIA-0226(86/02).

**Table 18. Forecast Conversion Factors Used in STIFS**

Most of the conversion factors used by the Short-Term Integrated Forecasting System (STIFS) are the 1985 EIA standard conversion factors (found in the Monthly Energy Review). Special factors used in STIFS are derived from data in the Monthly Energy Review or from energy data reports such as the Petroleum Supply Monthly.

Product Identification	Unit	Btu/Unit
<b>Thermal Content of Fuels and Energy</b>		
Crude Oil Production.....	barrel .....	5,800,000
Crude Oil Imports .....	barrel .....	5,823,000
Unfinished Oils .....	barrel .....	5,825,000
Petroleum Products Consumption .....	barrel .....	5,385,000
Petroleum Products Imports .....	barrel .....	5,565,000
Petroleum Products Exports .....	barrel .....	5,819,000
Motor Gasoline .....	barrel .....	5,253,000
Jet Fuel .....	barrel .....	5,610,848
Distillate Fuel Oil .....	barrel .....	5,825,000
Refinery Fuel (liquids) .....	barrel .....	5,963,850
All Refinery Inputs .....	barrel .....	5,768,800
Residual Fuel Oil .....	barrel .....	6,287,000
LPG and LRG (excluding ethane) .....	barrel .....	3,908,000
Ethane .....	barrel .....	3,082,000
Natural Gas Liquids (production) .....	barrel .....	3,815,000
Natural Gas Consumption (dry) .....	cubic foot .....	1,031
Natural Gas Production (dry) .....	cubic foot .....	1,031
Natural Gas Imports .....	cubic foot .....	1,005
Natural Gas Exports .....	cubic foot .....	1,010
Supplemental Gaseous Fuel .....	cubic foot .....	1,031
Natural Gas Refinery Fuel .....	cubic foot .....	1,031
Natural Gas to Utilities .....	cubic foot .....	1,035
Bituminous Coal and Lignite Prod. ....	short ton .....	21,876,000
Bituminous Coal & Lignite Consumed .....	short ton .....	21,376,000
Coal to Electric Utilities .....	short ton .....	20,974,000
General Industry and Retail Coal .....	short ton .....	21,978,000
Coking Coal .....	short ton .....	26,800,000
Coke .....	short ton .....	24,800,000
Bituminous Coal Imports.....	short ton .....	25,000,000
Bituminous Coal and Lignite Exports .....	short ton .....	26,320,000
<b>Efficiency of Conversion Processes</b>		
<b>Electric Power Generation Fuel or Power Source:</b>		
	Btu/kWh (heat rate)	
Coal .....	10,452	
Distillate Fuel Oil .....	13,501	
Residual Fuel Oil .....	10,720	
Geothermal and Other Energy .....	21,303	
Nuclear Energy .....	10,800	
Natural Gas .....	10,845	
Hydropower .....	10,369	





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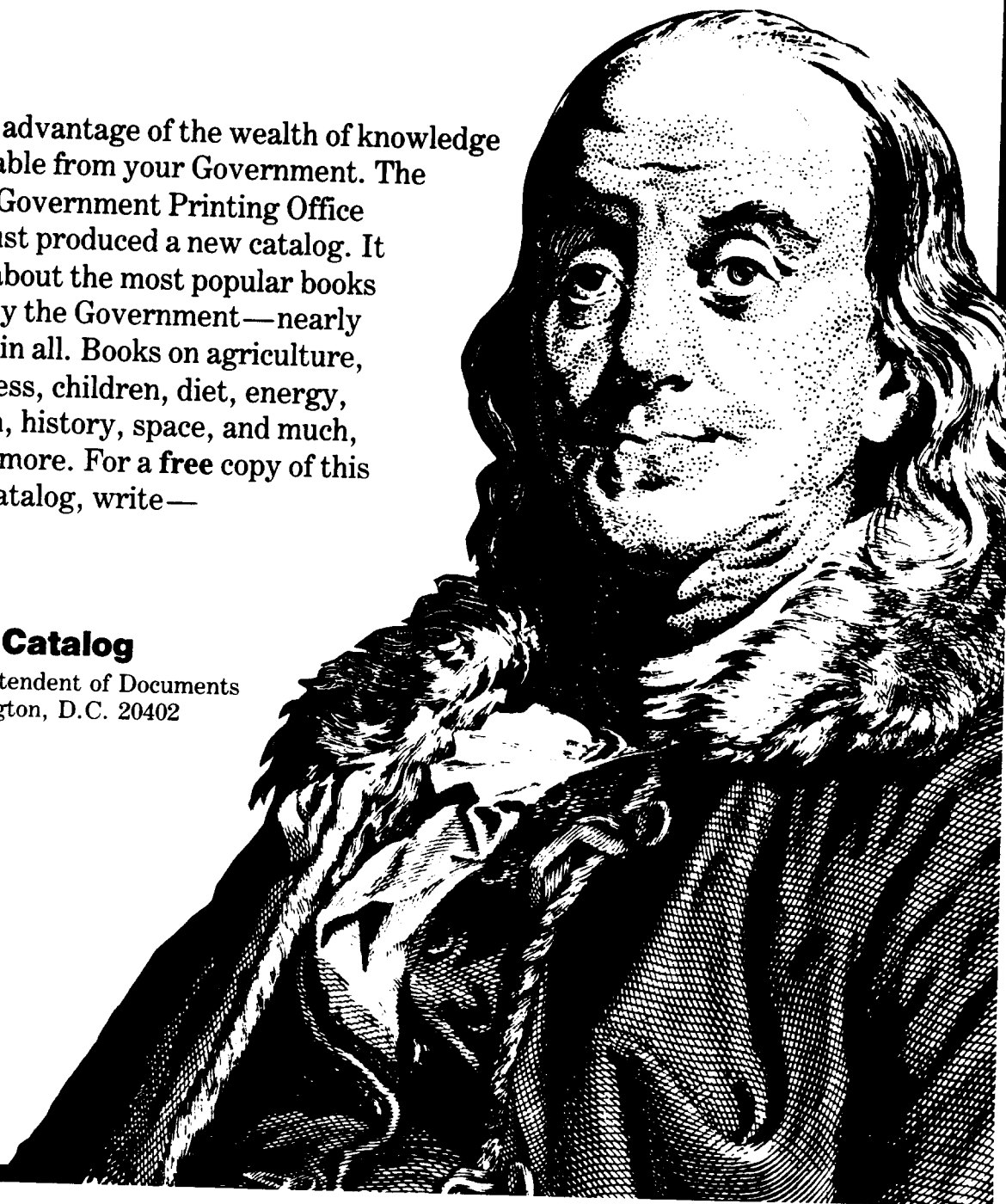


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