Energy Information Administration

Short-Term
Energy Outlook

Quarterly
Projections

January 1988

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Short-Term Energy Outlook

Quarterly Projections

January 1988

Energy Information Administration
Office of Energy Markets and End Use
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Washington, DC 20585

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Forecasts for domestic crude oil production are made by the EIA Dallas Field Office, under the supervision of John H. Wood. Forecasts of nuclear electricity generation are produced by Roger Diedrich; hydroelectric generation is produced by Christopher Freitas; and coal production is produced by Frederick Freme--all of the EIA Office of Coal, Nuclear, Electric and Alternate Fuels. World petroleum forecasts are prepared by the International and Contingency Information Division, with W. Calvin Kilgore as Director.

Preface

The Energy Information Administration (EIA) quarterly forecasts 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)*. An annual supplement analyzes previous forecast errors, compares recent projections by other forecasters, and analyzes in depth current topics in short-term energy analysis and forecasting. The principal users of the *Outlook* are managers and energy analysts in private industry and government. The projections in this volume extend through the second quarter of 1989.

The forecasts are produced using the Short-Term Integrated Forecasting System (STIFS). The STIFS model uses two principal driving variables: a macroeconomic forecast and 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 world oil prices. (These models are available on computer tape from the National Technical Information Service.)

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 refer primarily 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 7 on page 43. 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 those publications and the historical data in this *Outlook* are due to independent rounding. All percentage changes are calculated from the values in the tables rather than from the rounded numbers cited in the text.

Contents

Tables

Illustrations

Highlights

Since the previous *Short-Term Energy Outlook (Outlook),* two issues have surfaced which could have major impacts on energy markets. First, the stock market crash in October 1987 has caused almost all major forecasters to lower expectations for gross national product (GNP) growth in 1988 by about 1 percentage point. These lower expectations are based on anticipated declines in consumer spending. Second, overproduction of oil by the Organization of Petroleum Exporting Countries (OPEC) late last year has put downward pressure on world oil prices. As a result, current oil price projections are lower than those shown in the last *Outlook.* World oil prices are expected to average $16 per barrel in the first quarter of this year, or about $1 per barrel below the first-quarter level of a year ago, before increasing to $19 per barrel by the beginning of 1989. The energy projections presented in this *Outlook* have been revised to reflect these new assumptions.

Petroleum Demand Higher in 1988, But Rate of Increase Slows

In 1988, U.S. petroleum demand is expected to grow by about 140,000 barrels per day, or about 1 percent. This figure is well below the increase of about 560,000 barrels per day observed in 1986, but represents the third year in a row in which demand will have increased.

Large Stock Draw Expected for 1988

Crude oil and refined product stocks are projected to drop by 64 million barrels in the first quarter of 1988 from the fourth quarter of 1987. This stock draw represents normal seasonal declines in product stocks and the expected realignment of crude oil stocks to more normal levels.

Imports Continue to Supply a Greater Fraction of U.S. Petroleum Needs

As a result of increased demand and declining production, petroleum imports are expected to accommodate 36 percent of U.S. petroleum consumption in 1988, up slightly from 35 percent estimated for 1987. These figures are still well below the 46-percent high observed in 1977.

Domestic Oil Production in 1988 Should be Below 1985 Peak

While projected 1988 crude oil production is about 800,000 barrels per day below the 1985 peak of approximately 9 million barrels per day, the rate of decline is expected to slow. Between 1987 and 1988, domestic production should fall by a relatively small 130,000 barrels per day.

Electricity Generation Growth Should Slow Markedly in 1988

In 1987, relatively high growth in industrial output and a warm summer combined to increase electricity generation by about 3 percent above year-earlier levels, the largest increase in several years. Expected slower growth in industrial output and a return to normal weather, however, should slow generation growth significantly, to around 1 percent between 1987 and 1988.

The forecasts previously discussed are the base case projections, summarized in Table 1 on page 3. Additional sensitivity cases, using alternative assumptions, are shown in Table 7 on page 43. Should imported crude oil prices, weather, or economic growth rates during the forecast period differ from the base case assumptions (with all other factors held constant), the following could occur:

- For ~~each $1 per barrel~~ decline ~~(5.8 percent)~~ from the base case in the price of imported crude oil, petroleum consumption ~~and total net imports in 1988~~ would increase by about ~~70,000 barrels per day~~ ~~(0.4 percent and 1.2 percent, respectively).~~
- For ~~each~~ 10-percent increase in heating degree days from the base case level during the ~~first and fourth quarters~~ (the heating season), petroleum consumption ~~and total net imports for those two quarters~~ would increase by ~~an average of~~ about ~~170,000 barrels per day (1.0 percent and 2.8 percent, respectively).~~
- For ~~each 1-percent~~ increment in economic activity above the base case level, petroleum consumption ~~and total net imports in 1988~~ would increase by about ~~100,000 barrels per day (0.6 percent and 1.7 percent, respectively).~~

Table 1. Summary of Base Case Assumptions and Projections

Assumptions and Projections	Year				Annual Percentage Change		
	1985	1986	1987	1988	1985-1986	1986-1987	1987-1988
Macroeconomic Indicators							
Real Gross National Product (billion 1982 dollars)	3,607	3,713	3,815	*3,885*	2.9	2.7	*1.8*
Index of Industrial Production (Mfg.) (index, 1977=1.000)	1.263	1.291	1.343	*1.374*	2.2	4.0	*2.3*
Imported Crude Oil Price (nominal dollars per barrel)	26.99	13.98	18.11	*17.30*	-48.2	29.5	*-4.5*
Retail Prices (nominal)[a]							
Motor Gasoline[b] (dollars per gallon)	1.20	.93	.96	*.94*	-22.5	3.2	*-2.1*
Retail No. 2 Heating Oil (dollars per gallon)	1.05	.84	.80	*.82*	-20.0	-4.8	*2.5*
Residential Natural Gas (dollars per thousand cubic feet)	6.12	5.83	5.51	*5.63*	-4.7	-5.5	*2.2*
Residential Electricity (cents per kilowatthour)	7.79	7.80	7.78	*8.00*	.1	-.3	*2.8*
Petroleum Supply							
Crude Oil Production[c] (million barrels per day)	8.97	8.68	8.31	*8.18*	-3.2	-4.3	*-1.6*
Net Petroleum Imports, Including SPR (million barrels per day)	4.29	5.44	5.80	*6.04*	26.8	6.6	*4.1*
Consumption							
Total Market Economies Petroleum Consumption (million barrels per day)	46.71	47.96	48.47	*49.11*	2.7	1.1	*1.3*
Total U.S. Petroleum Consumption (million barrels per day)	15.73	16.28	16.52	*16.66*	3.5	1.5	*.8*
Motor Gasoline	6.83	7.03	7.16	*7.24*	2.9	1.8	*1.1*
Distillate Fuel Oil	2.87	2.91	2.96	*3.02*	1.4	1.7	*2.0*
Residual Fuel Oil	1.20	1.42	1.24	*1.21*	18.3	-12.7	*-2.4*
Other Petroleum[d]	4.83	4.92	5.16	*5.19*	1.9	4.9	*.6*
Coal Consumption (million short tons)	818	804	837	*837*	-1.7	4.1	*.0*
Natural Gas Consumption (trillion cubic feet)	17.28	16.21	16.85	*16.93*	-6.2	3.9	*.5*
Electricity Generation (billion kilowatthours)	2,469.8	2,487.3	2,568.2	*2,598.2*	.7	3.3	*1.2*
Total Energy Consumption[e] (quadrillion Btu)	73.96	74.25	76.19	*77.18*	.4	2.6	*1.3*
Thousand Btu/1982 Dollar of GNP	20.50	20.00	19.97	*19.87*	-2.4	-.2	*-.5*

[a] All prices include taxes, except prices for No. 2 heating oil and residential electricity.
[b] Average for all grades and services.
[c] Includes lease condensate.
[d] Includes crude oil, pentanes plus, other hydrocarbons and alcohol, unfinished oil, and gasoline blending components.
[e] 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 may not precisely match that published in the MER.
SPR: Strategic Petroleum Reserve.
Notes: Minor discrepancies with other published EIA historical data are due to independent rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *International Energy Annual 1986* DOE/EIA-0219(86); *Petroleum Marketing Monthly*, DOE/EIA-0380(87/10); *Petroleum Supply Monthly*, DOE/EIA-0109(87/10); *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Natural Gas Monthly*, DOE/EIA-0130(87/10); *Electric Power Monthly*, DOE/EIA-0226(87/10); and *Quarterly Coal Report*, DOE/EIA-0121(87/3Q); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through September 1987. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL1287.

Assumptions

● *International Petroleum*

● *World Oil Prices*

● *Macroeconomic Activity*

● *Energy Product Prices*

International Petroleum

Recent Developments

At the beginning of this year (as occurred at the beginning of last year), OPEC oil producers and buyers are locked in a test of wills over pricing terms. The result may significantly influence the world oil price level for all of 1988. Differences between OPEC's situation in the two time periods suggest that the world oil price will probably be somewhat weaker in 1988 than in 1987. OPEC won the test of wills in early 1987 because the member countries were strongly united behind the decisions made in December 1986 to restrict OPEC production and to return by February 1987 to a system of official crude oil prices tied to an $18-per-barrel reference price. Encouraged by rising spot prices, the OPEC producers resisted the attempts of buyers to maintain market-related prices and, particularly in the case of Saudi Arabia, allowed their production rates to fall. At the same time, Iraq, while rejecting its production quota, did not have the capacity to export significantly more than the 1.5 million barrels per day assigned to it, and sold its crude oil at official prices. In contrast, in December 1987, a deeply divided group of OPEC oil ministers rejected both a Saudi-backed plan to bring Iraq, whose enhanced export capacity now allows it to produce more than 2.7 million barrels per day, back into the OPEC quota system by granting the country a 2.37-million-barrel-per-day quota and an Iranian request to raise the OPEC reference price to $20 per barrel. The only agreement that OPEC could reach was to roll over into 1988 the production quotas used in the second half of 1987, which, with Iraq now specifically excluded, totaled 15.06 million barrels per day. At the same time, Saudi Arabia repeated its earlier assertion that it would no longer allow its production to fall below its quota in order to defend the OPEC reference price. As a result of OPEC's perceived weakness, crude oil prices, which had already begun to weaken because of overproduction and price discounting, dropped sharply in mid-December. The volatility of crude oil futures and spot prices will probably continue during the first quarter, until this year's test of wills in the world oil market is decided.

- The price of imported crude oil delivered to U.S. refiners, which rose as high as $19.30 per barrel in August, decreased from $19.03 in the third quarter of 1987 to $18.57 in October.

- It is estimated, on the basis of current data, that OPEC oil production (including 1.30 million barrels per day of natural gas liquids production and refinery gain) averaged 20.33 million barrels per day in the fourth quarter of 1987, after averaging 20.60 million barrels per day in the third quarter (Figure 1 on page 8 and Table 2 on page 39). As a result, OPEC oil production in 1987 averaged 19.29 million barrels per day, a decrease of 450,000 barrels per day from the 1986 rate. Early indications are that OPEC crude oil production, which averaged almost 19.0 million barrels per day in December, could fall to 17.4 million barrels per day or lower in January, as a result of the standoff between OPEC producers and oil buyers.

- The demand for petroleum products by the market economies averaged 48.47 million barrels per day in 1987, an increase of about 510,000 barrels per day, or 1.1 percent, from the 1986 rate. Demand by the developed or OECD countries increased by about 320,000 barrels per day or 0.9 percent, with the United States accounting for 75 percent of this increase (Table 2 on page 39).

- Petroleum demand from the developing or Other Market Economies countries is estimated to have averaged 13.03 million barrels per day in 1987, an increase of 190,000 barrels per day, or about 1.5 percent, from the 1986 rate. It should be noted that the demand estimates for both 1986 and 1987 have been revised upward by about 400,000 barrels per day compared to the rates shown in the last *Outlook,* on the basis of recent data revisions and analysis (Table 2 on page 39).

- Net oil exports from communist countries to the market economies are estimated to have averaged 2.20 million barrels per day in 1987, an increase of about 110,000 barrels per day over the rate for 1986. The 1986 and 1987 rates have been revised upward by 290,000 and 190,000 barrels per day, respectively, from the rates in the last *Outlook* (Table 2 on page 39).

## Figure 1. OPEC Oil Production and Production Capacity
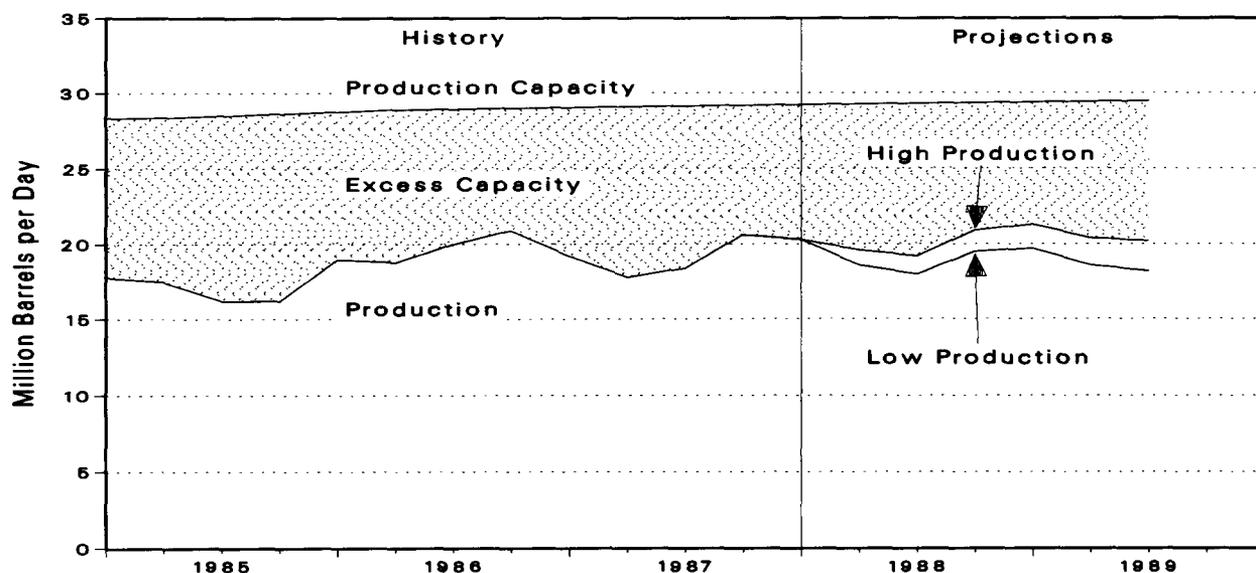
Note: OPEC production includes crude oil, natural gas liquids, and refinery gain.
Sources: • History: Energy Information Administration, Office of Energy Markets and End Use, International and Contingency Information Division. • Projections: Table 2.

Forecast

The demand for petroleum products by the market economies is expected to average 49.11 million barrels per day in 1988, an increase of about 640,000 barrels per day, or 1.3 percent, from the 1987 rate. This increase will be divided about equally between the developed or OECD countries and the developing or Other Market Economies countries (Table 2 on page 39).

• Petroleum demand by the OECD countries is expected to increase by 0.9 percent to 35.76 million barrels per day in 1988, despite a reduction in the economic growth rate from 2.7 percent in 1987 to 2.1 percent in 1988 (Table 3 on page 39). In the non-U.S. OECD countries, the negative effect of lower economic growth on petroleum demand is expected to be offset by the recent sharp decline in the value of the dollar relative to European and Japanese currencies. Because crude oil is priced in dollars, a weaker dollar translates into lower petroleum product prices, assuming that taxes are not raised concurrently. The net effect of lower economic growth and lower domestic currency prices for petroleum products is expected to leave petroleum demand relatively unchanged in most non-U.S. OECD regions in 1988. The exception is Europe, where demand is expected to increase by about 120,000 barrels per day.

• Oil production from the non-OPEC market economies will increase by about 350,000 barrels per day in 1988, reaching a rate of 27.10 million barrels per day. Production increases expected from Mexico, the North Sea, and other European oil producers should more than exceed the combined decline of 175,000 barrels per day expected in production from the United States, Canada, and Australia. At the same time, production from smaller producers in the developing countries, including North Yemen, Colombia, and Syria, should increase by over 310,000 barrels per day.

• Net oil exports from communist countries to the market economies are expected to decrease by 100,000 barrels per day in 1988, dropping to a rate of 2.10 million barrels per day.

• The forecast assumes that petroleum stocks held by the market economies will be built at a rate of 130,000 barrels per day in 1988, with most of the additions going to government strategic stocks in the United States and Japan.

• The forecast detailed above implies a call on OPEC oil in 1988 of 19.64 million barrels per day, or about 350,000 barrels per day more than the average OPEC oil production in 1987. A range of possible OPEC oil production is projected, based on a range of assumed inventory behavior (Figure 1). Significant excess oil production capacity is expected to persist in the OPEC member nations throughout the forecast period.

Figure 2. World Oil Prices
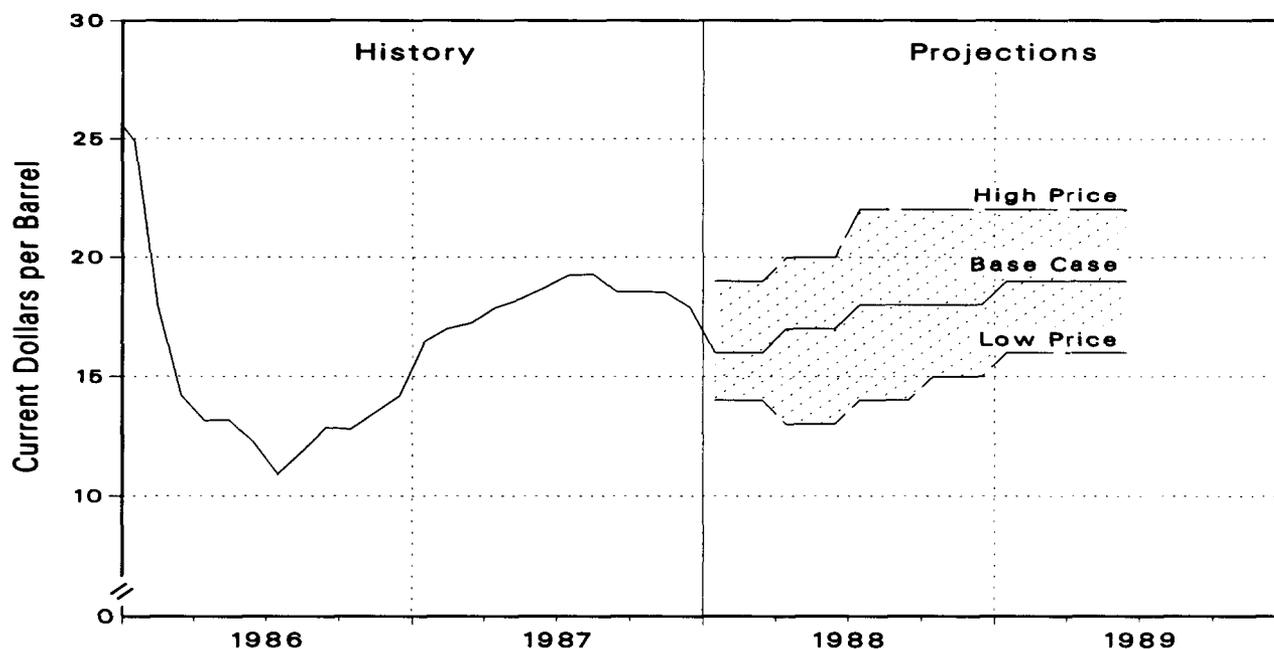
World Oil Prices

One of the most uncertain factors affecting the domestic short-term energy outlook is the world oil price, defined here as the nominal price of imported crude oil delivered to U.S. refiners. Because of this uncertainty, three different world oil price scenarios are employed (Figure 2). These scenarios are used to develop a base case projection and two alternative projections that provide a range of domestic energy projections. The same initial economic assumptions are used in all three cases, modified only for feedback effects resulting from the specific oil price scenarios (Table 3 on page 39). None of the scenarios addresses the potential effects on oil prices if a significant disruption in oil supplies from the Persian Gulf results from increased military hostilities.

- In the base oil price scenario, the world oil price falls from about $18 per barrel in the fourth quarter of 1987 to $16 in the first quarter of 1988, followed by increases to $17 in the second quarter, $18 in the second half of 1988, and $19 in the first half of 1989. This scenario is based on the assumption that OPEC oil producers will be forced to offer discounted prices in the first quarter, when their desire to maintain production at rates somewhat above their quota levels conflicts with attempts by refiners to undertake large stock drawdowns. The price discounts, however, disappear by the third quarter, as seasonally increasing demand and refiner stock building come more in line with production.

- In the low oil price scenario, the world oil price falls to $14 per barrel in the first quarter of 1988 and $13 in the second quarter, then rises to $14 in the third quarter, $15 in the fourth quarter, and $16 in the first half of 1989. In this scenario, it is assumed that the OPEC oil producers will be forced to discount prices heavily in the first half of 1988, as they attempt to push production back up to the August 1987 rate of 21 million barrels per day. In the second half of the year, the seasonal increase in demand allows producers gradually to reduce the size of their price discounts.

- In the high oil price scenario, the world oil price increases to $19 per barrel in the first quarter of 1988, $20 in the second quarter, and $22 for the remainder of the forecast period. In this scenario, it is assumed that the OPEC countries will revert to strict adherence to their production quotas, with Iraq holding its production to a rate about equal to Iran's quota. At the same time, Persian Gulf tensions are assumed to contribute to the upward pressure on prices.

## Figure 3.   Real GNP and Components of Change
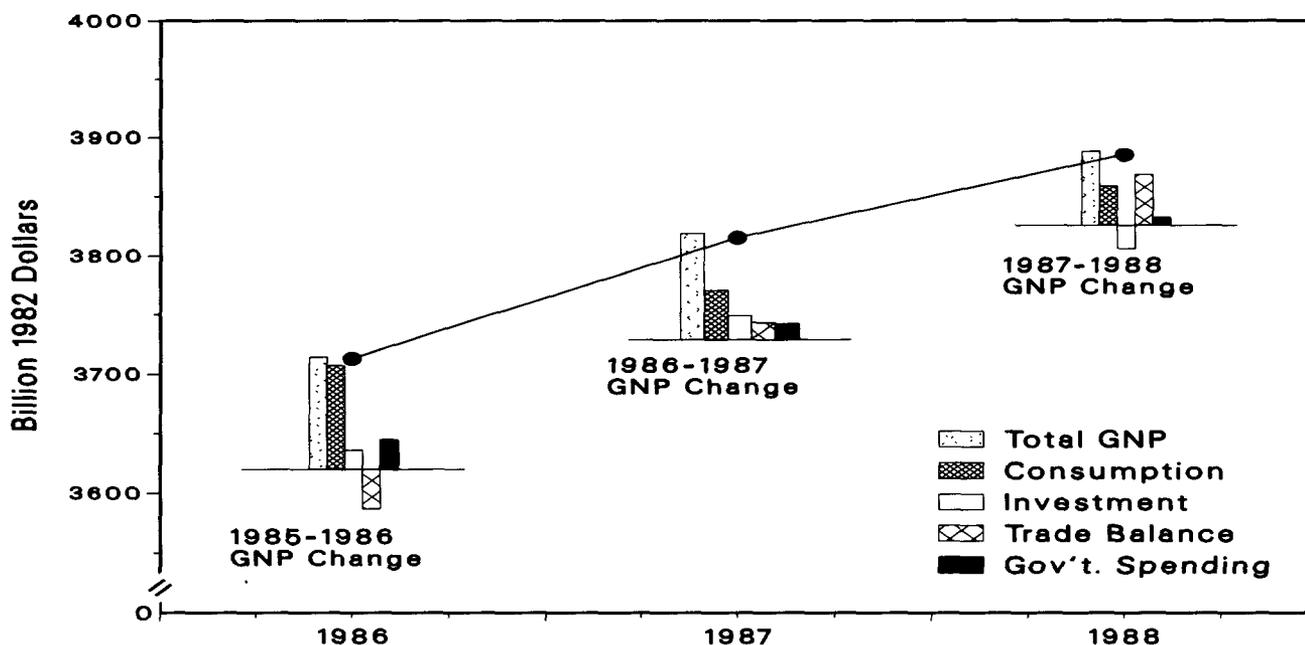
Macroeconomic Activity

The short-run view of the U.S. economy has changed considerably from the view presented in the October 1987 *Outlook*. The revised outlook is characterized by lower expected growth in consumer spending and significant reductions in business inventory accumulation in 1988. Growth in real gross national product (GNP) is expected to be 1.8 percent in 1988, nearly 1 percentage point lower than the growth rate projected in the October *Outlook* (Table 4 on page 40). The reaction to the stock market crash of October 1987 is an important motivator of these changes.

• The stock market crash of October 19, 1987, and subsequent instability in share prices, have shaken consumer confidence to such an extent that consumers are expected to retrench in the next 12 to 18 months as they attempt to rebuild their savings.

• The resurgence of the bond market that has resulted from the recent stock market instability has had the effect of lowering expected net interest income levels as bond yields decline.

• Real personal disposable income is expected to grow by 2.0 percent in 1988, compared to 3.1 percent projected in the October *Outlook*.[1]

• An increase of only 1.5 percent is anticipated for consumer spending in 1988, contributing somewhat less than usual to overall growth in GNP (Figure 3).

• The slowdown in consumer spending growth will exacerbate high inventory levels for many producers, reducing growth in domestic spending for stockpiling purposes. As a result, overall investment spending will actually decline somewhat in 1988 (Figure 3).

• For this *Outlook*, improvement in the real trade deficit is expected to account for more than two-thirds of real GNP growth between 1987 and 1988, compared to less than one-half in the October *Outlook* (Figure 3).

[1]The source of the macroeconomic forecast is the Data Resources, Inc., base case for December 1987, adjusted for EIA's oil price assumptions. All figures not shown in Table 4 are from that forecast.

Figure 4.   Indices of Economic Activity
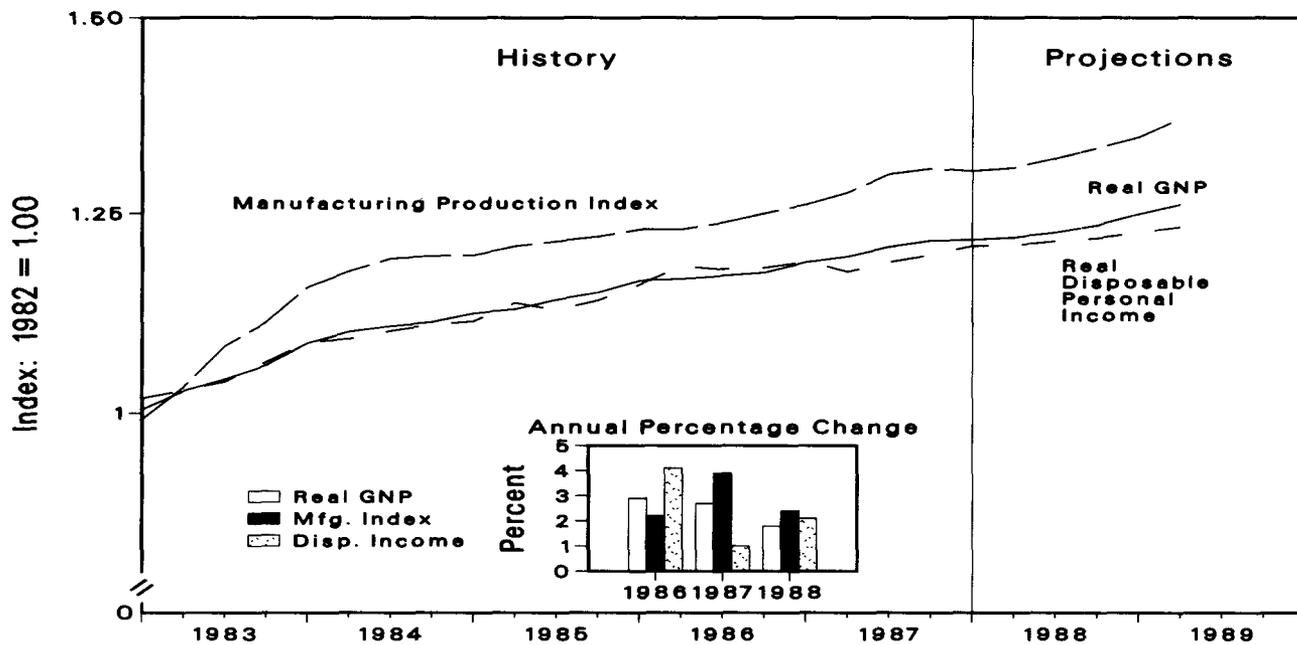
• Although overall industrial output growth will be modest in 1988 (Figure 4), some highly export-intensive industries and industries which compete closely with imports are expected to do well. For example, steel and chemicals should show above-average growth in the short run as domestic manufacturing costs become more competitive. The overall outlook for the manufacturing sector is a rather anemic 2.3-percent growth in 1988, followed by a healthy improvement in 1989 as export growth broadens.
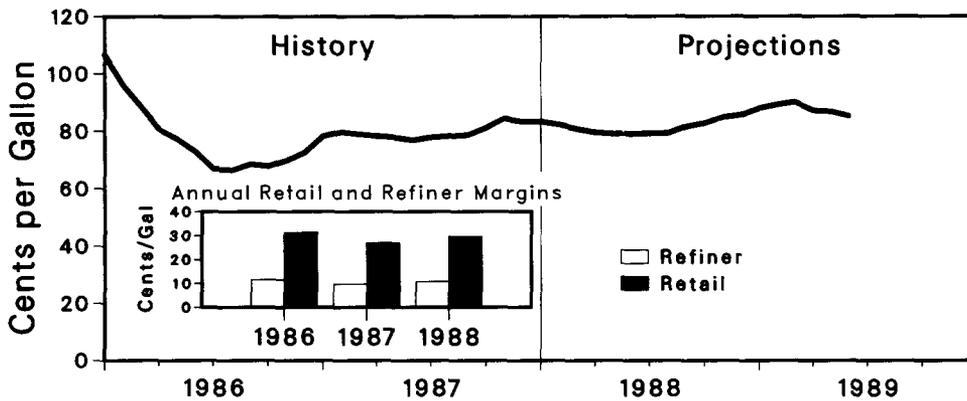
Figure 5. Motor Gasoline Prices
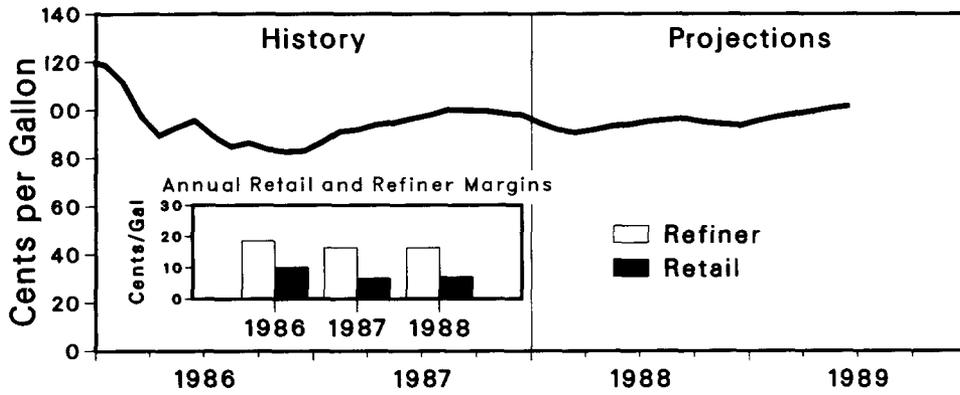
Due Largely to Falling Crude Oil Costs, Gasoline Prices Will Average 2 Cents per Gallon Less in 1988 Than in 1987

Sources: • History: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(87/10) (Washington, DC, 1988). • Projections: Table 5.

Figure 6. Distillate Prices

Barring a Long Cold Spell, Distillate Prices This Winter Will Climb 5 Cents from the 1987 Summer Average

Sources: • History: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(87/10) (Washington, DC, 1988). • Projections: Table 5.
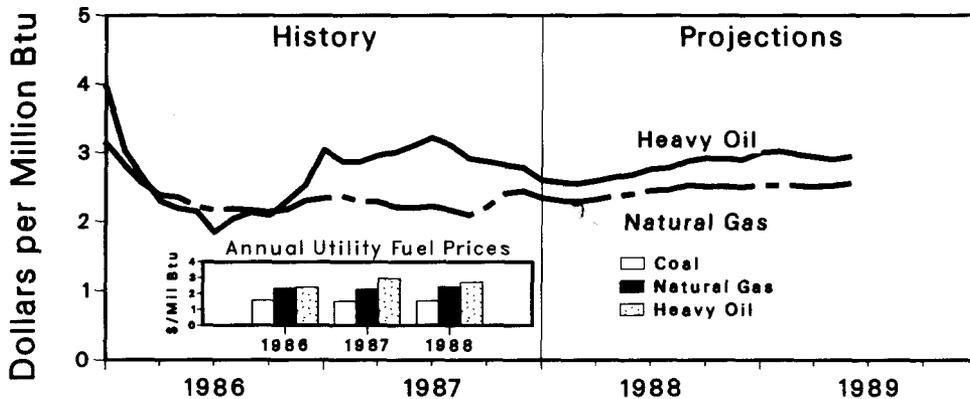

Figure 7. Utility Oil and Gas Prices

Oil Prices to Utilities Will Approach Natural Gas Prices in the First Part of 1988, But a Gap Will Arise Thereafter

Sources: • History: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(87/10) (Washington, DC, 1988). • Projections: Table 5.

Energy Product Prices

Crude oil prices are expected to start the year at $16 per barrel in 1988 and rise to $19 per barrel through the first half of 1989. On an annual basis, crude oil prices fall from about $18 per barrel in 1987 to about $17 per barrel in 1988. Most petroleum product prices will more or less follow the price path of crude oil, but at a lagged pace and with seasonal price variations (Table 5 on page 41). Heating oil prices are a major exception to this pattern, however. In 1988, heating oil prices should increase only slightly, as margins recover to more normal levels. Natural gas prices are likely to increase throughout the forecast period.

- Gasoline prices in 1988 should decline by about 2 cents per gallon or by about the same amount as crude oil prices (Figure 5 on page 12). Both refiner and retail margins fell in 1987, but they should stabilize in 1988, as the high inventories of the previous year begin to moderate. In 1989, rising crude oil costs will drive up gasoline prices to over $1.00 per gallon, with average prices peaking at $1.01 per gallon by the spring.

- Heating oil stocks in the latter part of 1987 were near seasonal lows. In November and in the beginning of December, stocks were 15 to 20 million barrels below the average range for that time of year. As a result, some predictions are for increases of 10 to 15 cents per gallon during the 1987-1988 heating season from summer and fall prices. Thus far, these large price increases have failed to materialize; warm weather at the beginning of the heating season has kept demand at moderate levels. Therefore, falling crude oil costs and warm weather at the beginning of this winter should keep the price increase from the summer to about 5 cents per gallon (Figure 6 on page 12). Typically, stock levels fall during December and January. Stocks have risen thus far this year, however, limiting price increases. While current stock levels appear to be adequate, prolonged cold weather for the remainder of the heating season (especially on the East Coast) could cause price spikes. Such price spikes have generally been short-lived in the past, however, as refiners have been eager to take advantage of high margins and have increased production or imports. Higher inventories have then led to price reductions. Prices for the remainder of the forecast period should increase along with crude oil prices, assuming that inventories and weather are normal. By the first quarter of 1989, the retail price should peak at 89 cents per gallon. Like motor gasoline margins, heating oil margins declined in 1987, due mainly to unusually high stock levels. In 1988 and in the first half of 1989, margins should recover as refiners maintain smaller, but still adequate inventories.

- After falling by more than 5 percent in 1987 under the influence of the gas "bubble," residential natural gas prices should increase by 2 percent in 1988 and another 2 percent in the first half of 1989, compared to year-earlier levels. Prices to electric utilities, which fell by 32 percent in 1986 and an additional 3 percent in 1987, should increase by 7 percent in 1988 (Figure 7 on page 12). (The projected percentage increase to residential users is much smaller than that for utilities, because the wellhead price represents over two-thirds of the utility price, compared to one-third or less of the residential price.)

- Spot prices for natural gas increased rapidly in the last 2 months of 1987, due primarily to the reaction of producers to the Federal Energy Regulatory Commission's new rule (FERC 500). This rule, allowing pipelines to offset their take-or-pay liabilities with producers by the amount producers sell to non-pipeline customers, has led some producers to withhold sales, thus driving up the spot price for utilities and other users. These increases in turn will be passed on to end users. Producer concerns about the cost of making direct sales to end users or brokers may have been allayed somewhat with the issuance of revisions to Order 500 in late December 1987. Declining oil costs and a return to warmer weather in the spring should further limit price increases, since many industrial users and utilities can switch over to oil. In the first half of 1989, crude oil price increases will allow natural gas wellhead prices to continue to rise, resulting in further price increases at the burner tip. As with heating oil, a prolonged severe winter could result in prices considerably higher than the average projected price in some regions of the country.

- Residential electricity prices should rise by about 3 percent in 1988 over 1987 prices, or at about the rate of inflation. This low price increase results from projected lower capital costs and low coal prices for the next 18 months.

U.S. Petroleum Outlook

● *Total Petroleum*

● *Motor Gasoline*

● *Distillate Fuel Oil*

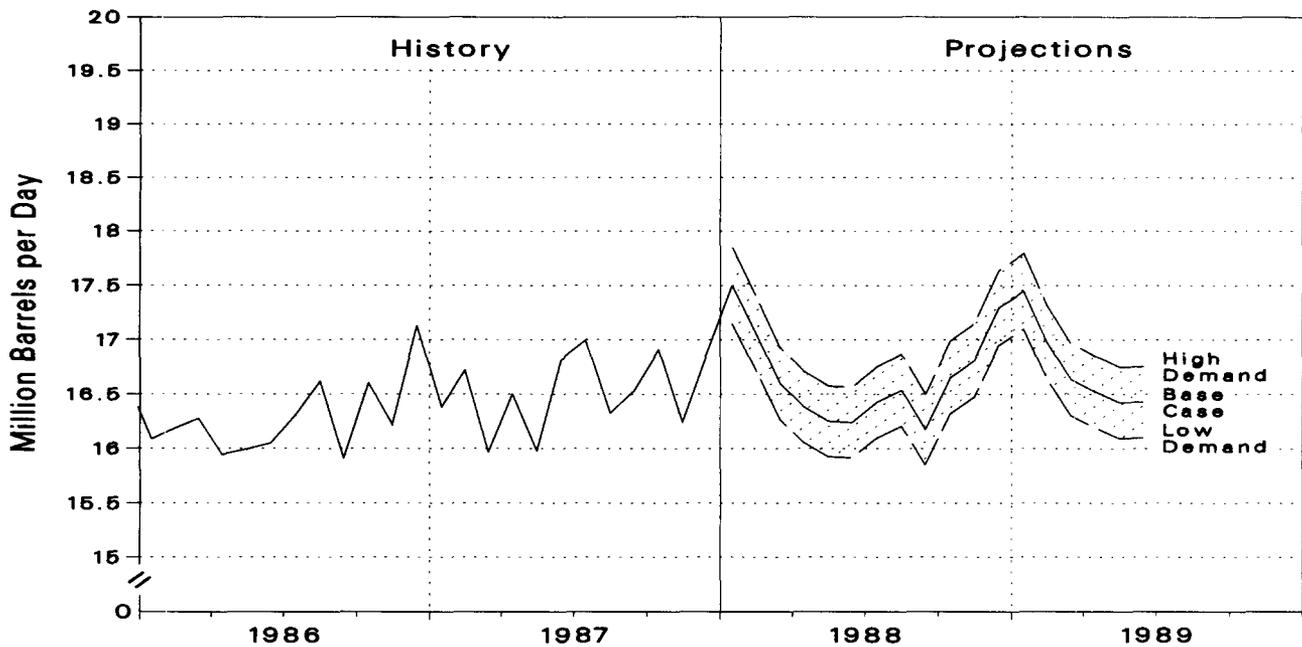● *Residual Fuel Oil*

● *Other Petroleum Products*

● *Petroleum Supply*

● *Crude Oil and Natural Gas Liquids Production*

● *Petroleum Stocks and Imports*

Figure 8. Total Petroleum Demand

Total Petroleum

Total petroleum demand in the United States should continue to respond to the relatively low oil prices in 1988, but at a slower rate than experienced in the past 2 years. The decline of crude oil costs in 1986 led to an increase in petroleum demand of about 560,000 barrels per day in that year. While final data are not available for 1987, preliminary figures show that demand in 1987 should be about 240,000 barrels per day above the 1986 level. In 1988, total petroleum demand is projected to grow by about 140,000 barrels per day, due mainly to increases in gasoline consumption (Table 6 on page 42 and Figure 8).

- Gasoline demand should increase by about 80,000 barrels per day in 1988, or 1.1 percent. An expected increase in travel demand is not completely offset by an expected increase in automobile efficiency (miles per gallon). Gasoline demand has been increasing steadily since 1982, at an average rate of 1.8 percent per year.

- Jet fuel demand should continue its recent growth, showing an increase of about 50,000 barrels per day in 1988, or about equal to the growth in 1987.

- While residual fuel oil use is expected to decline in 1988, the decrease may be moderated somewhat by low prices for residual fuel oil in the first quarter of 1988. Demand should increase during the first quarter of this year, as residual fuel oil gains market share relative to natural gas before returning to its declining trend.

Of the major uncertainty factors of price, economic activity, and weather, price will have the greatest impact on petroleum demand. The range of prices from $14 to $21 per barrel in 1988 leads to a range of 0.43 million barrels per day for total petroleum consumption. Weather uncertainties contribute another 0.18 million barrels per day to the 1988 demand sensitivity range. Total demand in 1988 should average between 16.3 and 17.0 million barrels per day, given the combined uncertainty of the input projections (Table 7 on page 43). The combined sensitivities of petroleum supply and demand to low and high world oil prices and optimistic and pessimistic economic conditions are presented in detail in Table 8 on page 44 and Table 9 on page 45.

# Figure 9. Motor Gasoline Demand
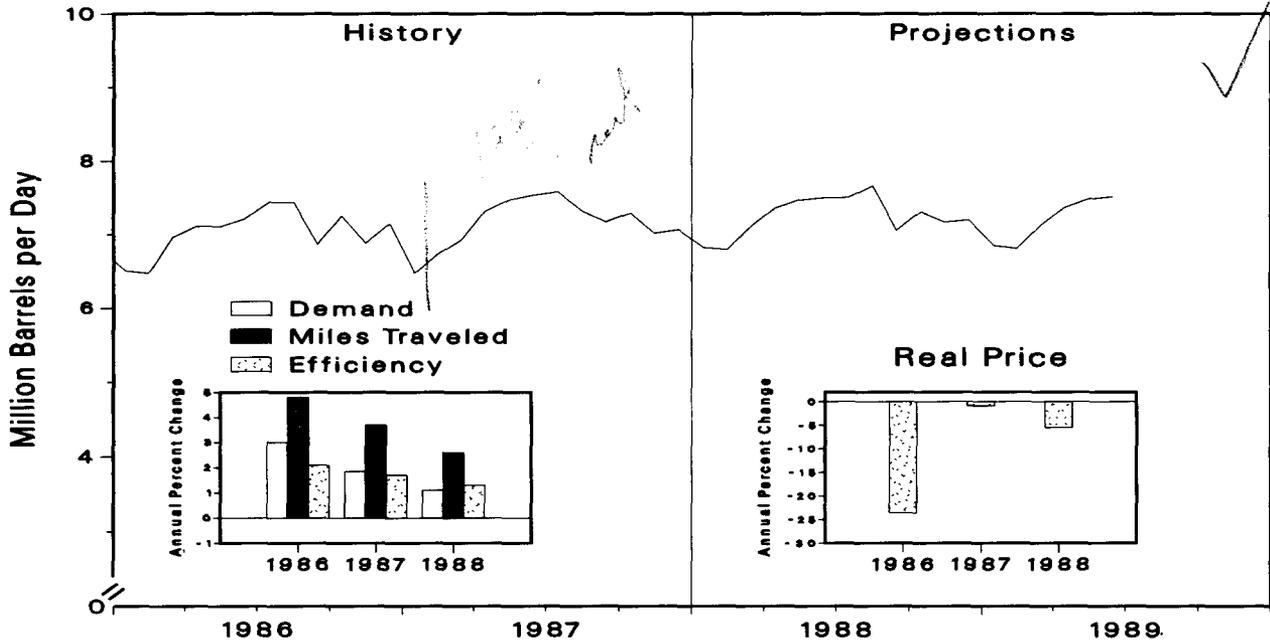
Motor Gasoline

Following a modest rise in total vehicle-miles traveled, motor gasoline demand should increase in 1988. Compared with 1986, demand has grown by almost 2 percent in 1987 and is expected to grow by about 1 percent in 1988 (Table 10 on page 46 and Figure 9). Due to an increase in the price of motor gasoline in the second half of 1987, the growth in motor gasoline demand has slowed in this time period; however, falling motor gasoline prices in 1988 should encourage demand.

• Compared with the third quarter of 1986, motor vehicle-miles traveled increased by about 4 percent in the third quarter of 1987.[2] This rate is somewhat lower than that for 1986. Little change is expected in 1988 and 1989, due to lower growth expectations for personal income. Compared to 1987, vehicle-miles traveled should rise by between 2 and 3 percent in 1988, with additional growth of over 1 percent in the first half of 1989 compared to the first half of 1988.

• The rate of increase in the efficiency of the passenger car fleet has been declining steadily since 1984.[3] This sluggish improvement in efficiency is expected to continue through the first half of 1989, due to a projected decline in the price of motor gasoline. Compared to 1987, average vehicle efficiency may increase by only 1 to 2 percent in 1988. This trend reflects recent trends in consumer preference for larger, relatively less efficient automobiles.

[2]Federal Highway Administration, Highway Statistics Division, "Traffic Volume Trends" (January 1988).
[3]Vehicle efficiency is calculated by dividing vehicle-miles traveled by finished motor gasoline product supplied.

**Figure 10.   Distillate Fuel Oil Demand**
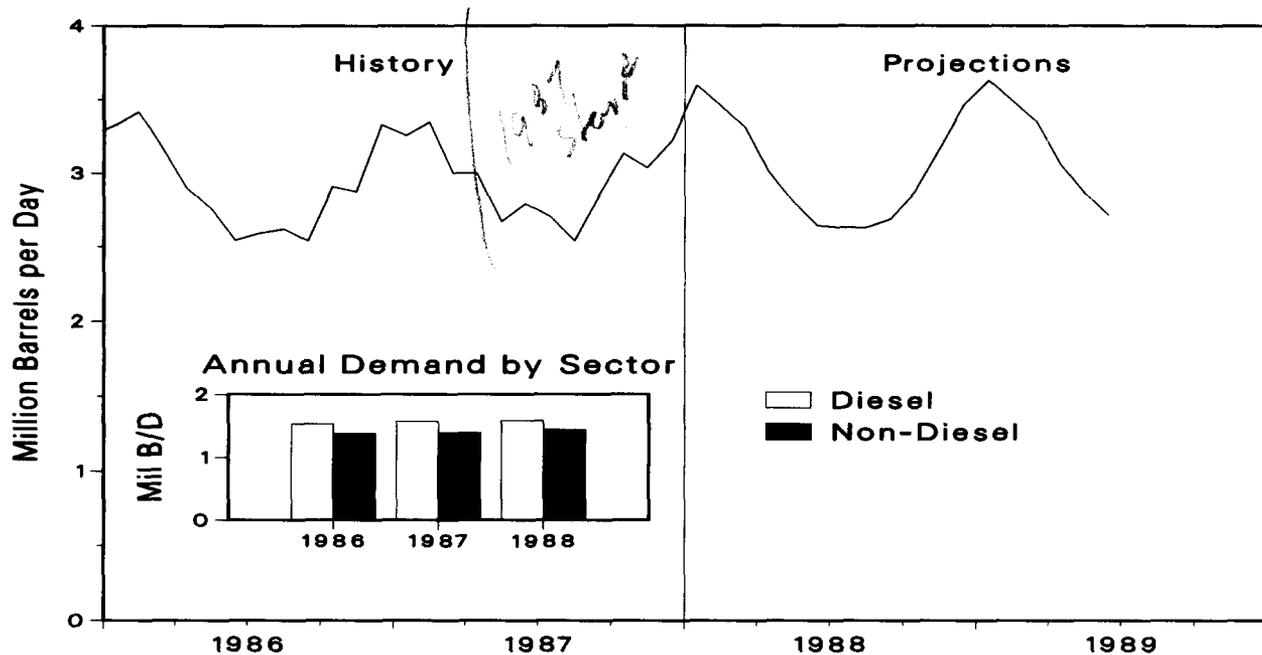
Distillate Fuel Oil

Distillate demand rose by about 2 percent in 1987 compared with 1986. Although demand in the first half of 1987 was unchanged from 1986, the demand for both diesel and non-diesel distillates grew at a 4-percent pace in the second half of 1987. On an annual basis, the forecast is for stable growth in distillate demand at the 1987 rate of 2 percent through 1989 (Table 11 on page 47 and Figure 10).

- For the final three quarters of 1987 compared to the same period of 1986, growth in demand for diesel fuel remained slightly below the growth of industrial production. Strong diesel demand should continue through the first quarter of 1988 before tapering off in the final three quarters due to a slowdown in industrial production. Overall demand for diesel fuel in 1988 is 1 percent greater than the 1987 level.

- Growth in non-diesel demand of 3 percent is projected in 1988 over the level in 1987. Most of that growth will occur in the first quarter of 1988, when weather is expected to be 6 percent colder than a year earlier. In 1987, heating oil prices bottomed out in the summer and remained moderate during the rest of the year. Moderate prices encouraged higher than usual accumulation of stocks by wholesalers. With declining prices forecast for the first half of 1988, further demand for secondary stocks can be expected.

Figure 11.   Residual Fuel Oil Demand
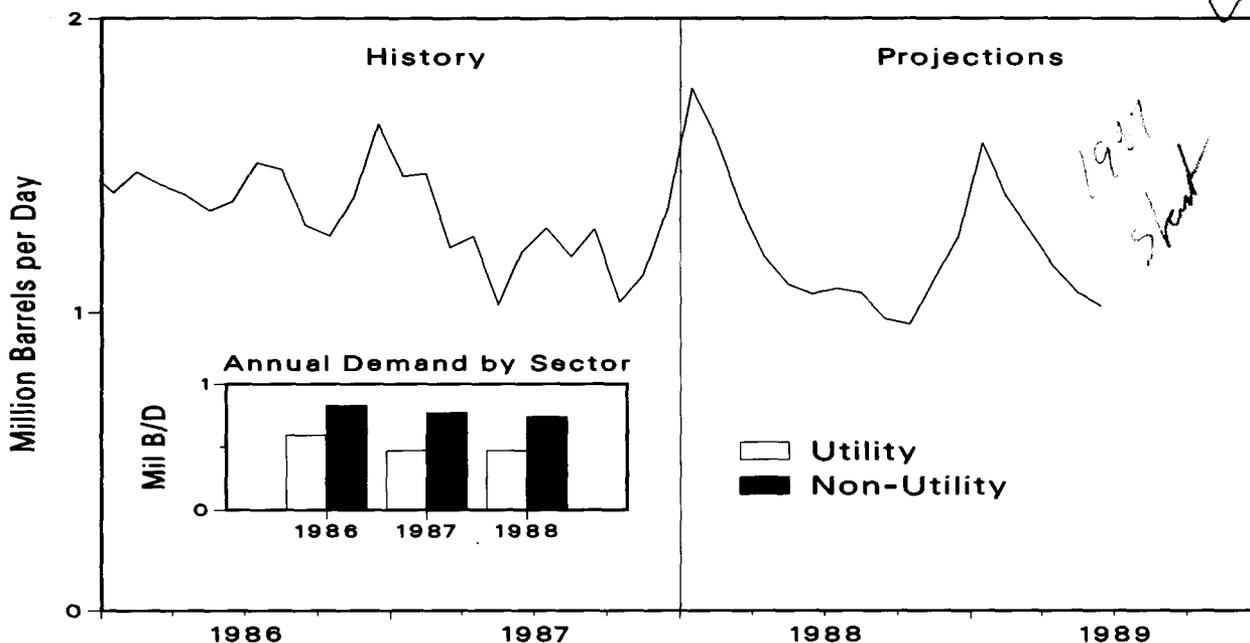
Residual Fuel Oil

The demand for residual fuel oil is likely to continue declining throughout the forecast period, following a decline of 13 percent in 1987 compared to 1986. However, a slower rate of decline is expected in 1988 (2 percent), since lower prices in the first half of the year should cause corresponding increases in consumption (Table 12 on page 48).

• Total demand in the first quarter of 1988 is likely to be 14 percent higher than year-earlier levels, due primarily to lower prices resulting from weak prices for crude oil. Moreover, rising natural gas prices in 1988 should also result in some switching to residual fuel in both the industrial and utility sectors. Once crude oil prices climb to the point of yielding higher product prices, however, demand will taper off. This should start during the second quarter of the year (Figure 11).

• In the first half of 1989, both utility and nonutility demand are projected to fall--by 12 percent and 4 percent, respectively, from the first half of 1988--as prices continue to rise.

• The price advantage offered by foreign ports for bunker fuel should continue into the forecast period, further eroding domestic demand for this fuel.

## Figure 12. Petrochemical Feedstocks and Liquefied Petroleum Gas
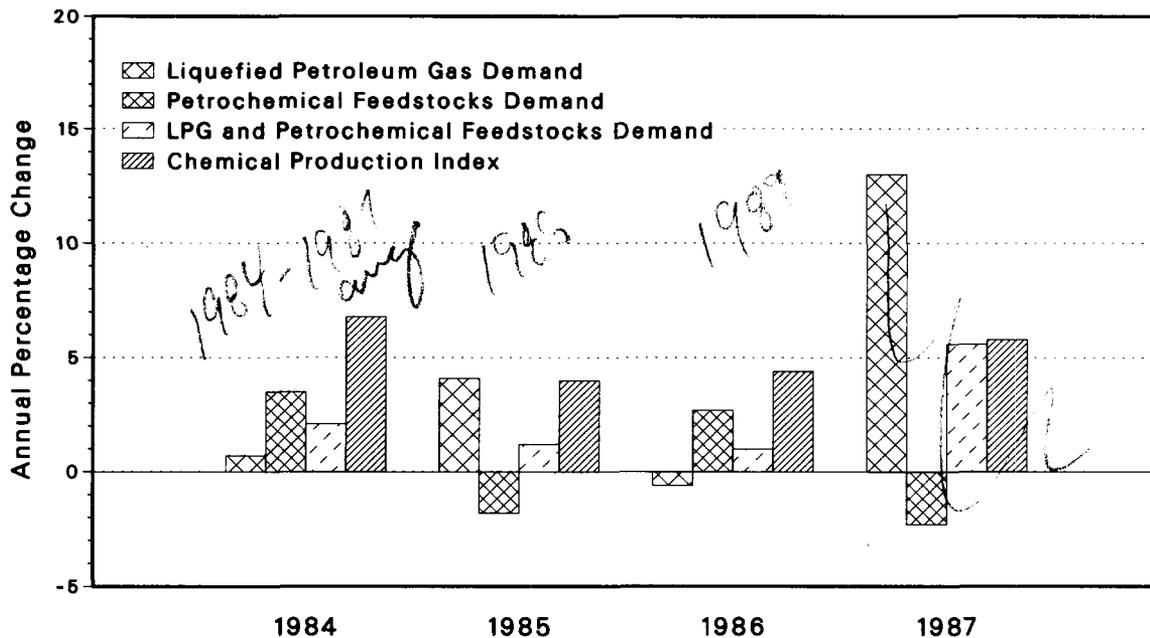
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10) (Washington, DC, 1988). • Projections: Table 6.

Other Petroleum Products

Compared with 1986, the demand for other petroleum products increased by 5 percent in 1987. Except for petrochemical feedstocks, demand for all products in this category increased, with liquefied petroleum gas showing the largest increase at 13 percent. Compared to 1987, demand for other petroleum products is projected to increase by less than 1 percent in 1988, due to a stabilization in the demand for liquefied petroleum gases (Table 13 on page 49).

- In 1987, large increases in airline travel spurred the demand for jet fuel. Compared to the first three quarters of 1986, revenue ton miles (a measure of the miles traveled by passengers and freight) grew by nearly 11 percent in the first three quarters of 1987. Jet fuel demand grew by 4 percent in the same time period. In 1988, airline traffic growth should dampen somewhat due to slower growth in the economy; however, average aircraft efficiency will grow more slowly, keeping jet fuel demand strong. Compared to 1987, jet fuel demand should grow by somewhat less than 4 percent in 1988, with a little over 4-percent growth in the first half of 1989 compared with the first half of 1988.

- The large increase in demand for liquefied petroleum gas (LPG) in 1987 is particularly striking, and it is probable that part of the increase was due to its increased use in the petrochemical industry. Although the chemical production index increased by about 6 percent in 1987 compared to 1986, demand for petrochemical feedstocks (ethane and naphtha) declined by 2 percent. LPG demand increased by 13 percent in the same time period (Figure 12).

Figure 13. Changes in Sources and Uses of Petroleum
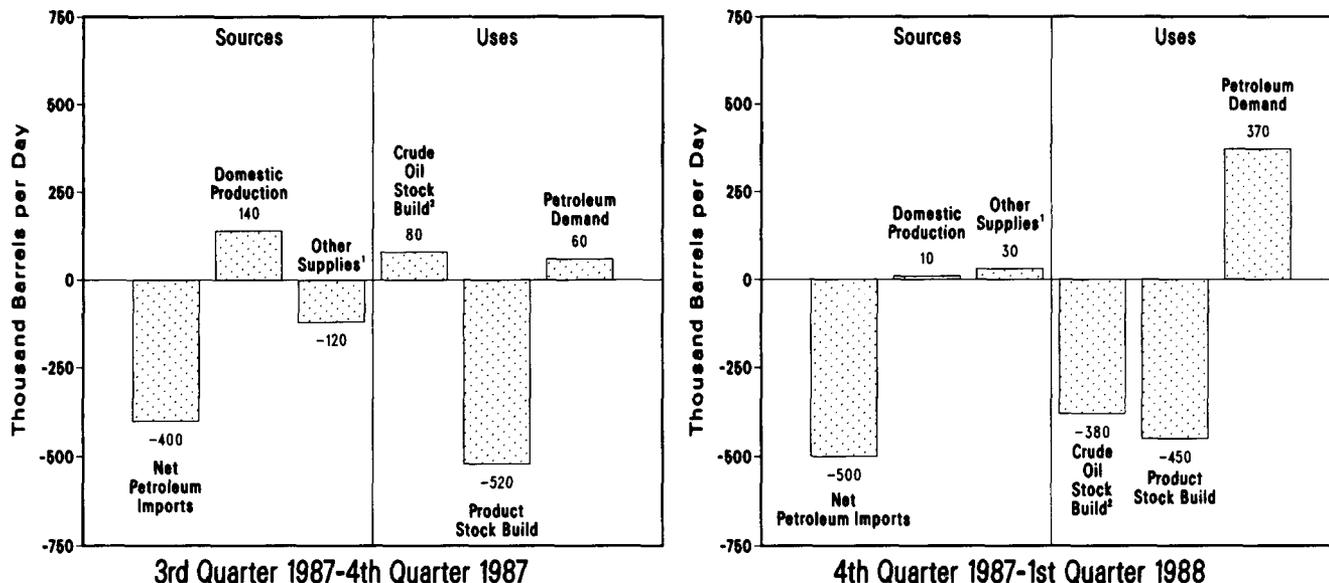
3rd Quarter 1987-4th Quarter 1987

4th Quarter 1987-1st Quarter 1988

Petroleum Supply

Large seasonal increases in total petroleum use in the first quarter of 1988 should be met by increased withdrawals of both crude oil and refined product stocks (Figure 13). Stock draws are expected to offset a continued decline in net imports of crude oil early in the year. The challenge of meeting demand requirements is further lessened by the temporary stabilization of total domestic oil output made possible by production increases from Alaska. The world supply situation supports the outlook for continued weak oil prices in early 1988. Seasonal demand increases are led by residual fuel and distillate fuel oil, which together account for a rise of 730,000 barrels per day over the fourth-quarter 1987 level (Table 6 on page 42).

• Domestic production of petroleum (crude oil and natural gas liquids) is expected to remain essentially constant in the first quarter of 1988 before resuming its decline. Total output for the year should be 130,000 barrels per day below the 1987 average.

• Crude oil stocks (excluding the Strategic Petroleum Reserve, or SPR), which at the end of 1987 had reached their highest level since mid-1985, are projected to be drawn down at a rate of 180,000 barrels per day during the first quarter (compared with a build rate of 180,000 barrels per day in the last quarter of 1987) and then remain fairly constant through the rest of 1988. Total petroleum stocks (excluding the SPR) are expected to be 1,022 million barrels at the end of the first quarter, down by about 64 million barrels from the closing 1987 stock level.

• Given the high level of crude oil stocks at the close of 1987, net imports of crude oil (including SPR imports) should decline by 910,000 barrels per day in the first quarter of 1988 from the previous quarter. Net imports of refined products, however, are projected to increase by 420,000 barrels per day over the same time frame, largely on the basis of demand for seasonal products.

Figure 14. Components of Domestic Petroleum Production

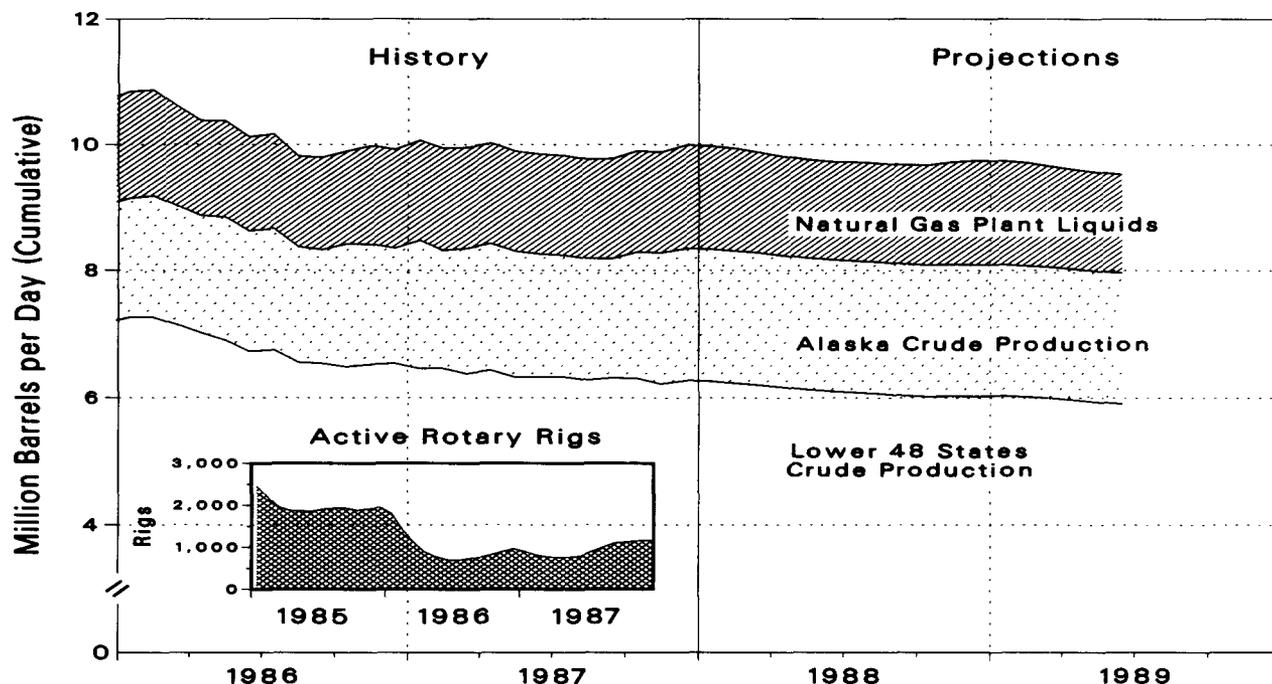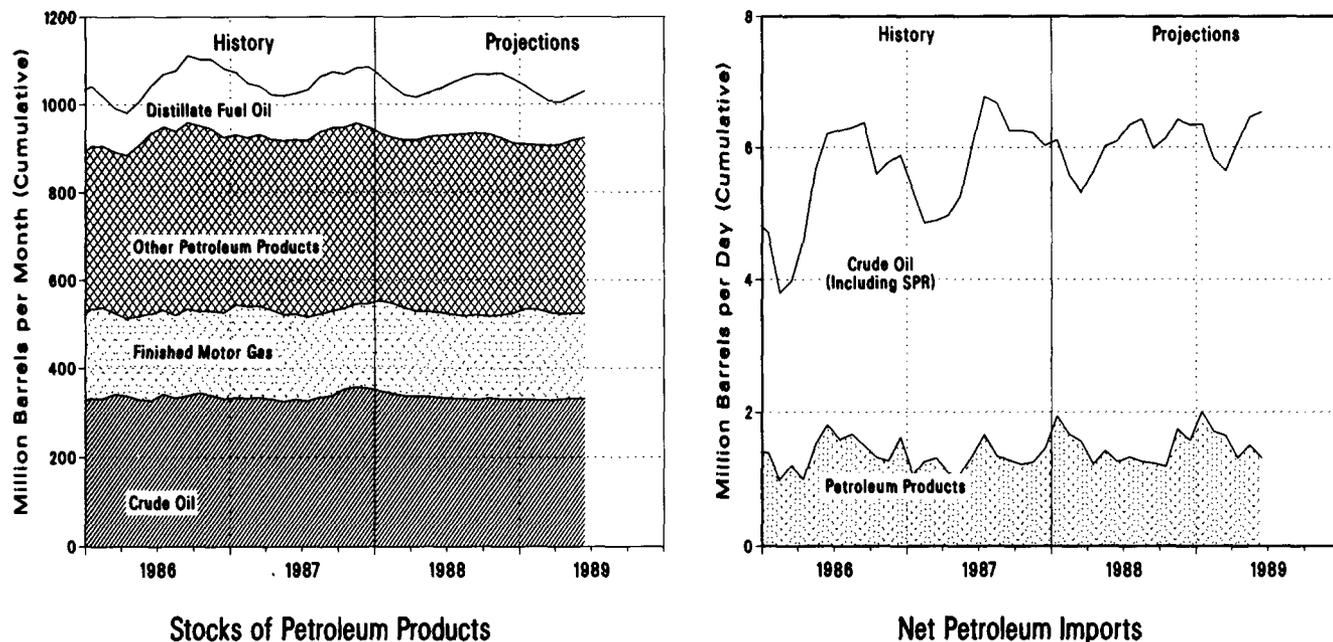Note: Crude oil production includes lease condensate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1986, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1987 to October 1987; and *Weekly Petroleum Status Report*, DOE/EIA-0208(87, 50, 88-02) (Washington, DC). • Projections: Table 6.

Crude Oil and Natural Gas Liquids Production

U.S. crude oil production should decline by a relatively small 130,000 barrels per day from 1987 to 1988, while output from the lower 48 States should fall by 230,000 barrels, resuming the historical rate of decline of over 3 percent per year for this region (Table 6 on page 42).

• Declines in crude oil production from the lower 48 States are partially offset by the increase in Alaskan oil production at the end of 1987--specifically from the Lisburne reservoir of Prudhoe Bay and the startup of the Endicott field (Figure 14).

• Output from natural gas plant liquids should remain stable at 1.60 million barrels per day through 1988.

• The number of rotary drilling rigs in operation in 1987 averaged 936, down slightly from the average of 964 reported for 1986. Since the 1987 low point of 754 last April, drilling activity has grown steadily, reaching 1,162 active rigs by December.

• Domestic production in 1988 declines in the low price case, but remains roughly at 1987 levels in the high case. The spread between these two cases for 1988 is over 300,000 barrels per day (Table 8 on page 44 and Table 9 on page 45).

Figure 15. Stocks and Net Imports of Petroleum

Stocks of Petroleum Products

Net Petroleum Imports

Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1985 and 1986, DOE/EIA-0340(85,86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1987 to October 1987; and *Weekly Petroleum Status Report*, DOE/EIA-0208(87-50, 88-02) (Washington, DC). • Projections: Table 6.

Petroleum Stocks and Imports

The large draw on private stocks of crude oil and refined products dominates the supply picture in early 1988. The projected drop of 64 million barrels in private stocks in the first quarter of 1988 from the fourth quarter of 1987 is attributable mainly to price- and security-sensitive movements of crude oil (17 million barrels) and a normal seasonal draw of distillates and residual fuel oil (45 million barrels) (Table 6 on page 42 and Figure 15).

* Finished motor gasoline stocks at the end of the first quarter of 1988 (the beginning of the spring increase in gasoline consumption) should be at 197.7 million barrels, or only about 4 percent lower than the level a year earlier. The gasoline stock situation at the beginning of 1988 is consistent with an expectation that gasoline markets this spring will be largely in balance, assuming no major upheavals on the international scene.

* Ending stocks of distillate fuel oil for the first quarter of 1988 (the end of the heating season) are 101.6 million barrels. This level is about 8 percent lower than that of a year earlier, but still above the observed minimum for this fuel for the past 3 years, indicating no strong pressures on distillate prices for the rest of the 1987-1988 heating season.

* In 1988, net petroleum imports of crude oil and product (including SPR imports) are projected to increase by 240,000 barrels per day over the average 1987 level. Net imports of crude oil in the first quarter of 1988 continue their decline from the high mid-1987 level, but growing demand, declining domestic production, and level stocks for the remainder of 1988 combine to increase the requirement for imports in the following three quarters. After the seasonal spike in net product imports in the first quarter, purchases of foreign product for the rest of 1988 are expected to fall back to near year-earlier levels.

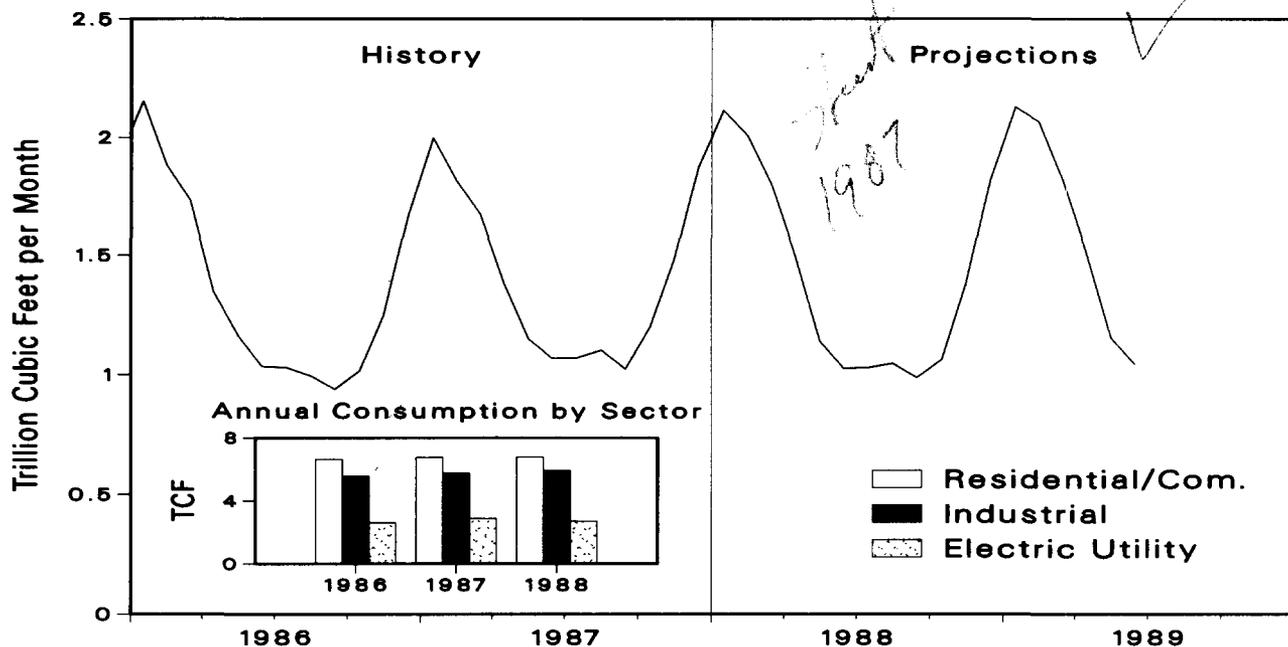# Outlook for Other Major Energy Sources

● *Natural Gas*

● *Coal*

● *Electric Power*

● *Electricity Fuel Shares*

Figure 16. Natural Gas Demand

Note: Consumption excludes lease and plant fuel and pipeline compressor fuel.
Sources: • History: Energy Information Administration, *Monthly Energy Review*,
DOE/EIA-0035(87/10) (Washington, DC, 1988). • Projections: Table 14.

Natural Gas

Total demand for natural gas should rise to almost 17 trillion cubic feet in 1988, following the rebound in demand in 1987 (Table 14 on page 50). The forecast for natural gas demand is substantially higher than in the previous *Outlook,* reflecting major revisions to the industrial demand data for 1987 (see "Industrial Natural Gas Demand: A Revised Outlook," page 34).

- Residential natural gas use is likely to increase by about 1 percent between 1987 and 1988 and again during the first half of 1989 (Figure 16). A return to normal cold winter weather and continued growth in the number of natural gas customers are responsible for the increase.

- Industrial natural gas use recovered in 1987, in response to rising prices for residual fuel oil and lower prices for natural gas. Industrial demands are expected to grow by 3 percent in 1988 and 2 percent in the first half of 1989, reflecting strong growth in industrial output, offset in part by a modest decline in the oil-to-gas price ratio.

- Natural gas use at electric utilities will decline in 1988 and then remain fairly constant between the first half of 1988 and the first half of 1989. The decline in utility gas use reflects a declining share for oil and gas combined, together with higher prices for natural gas and declining prices for residual fuel oil, particularly for the first quarter of 1988.

Figure 17. Coal Supply and Disposition
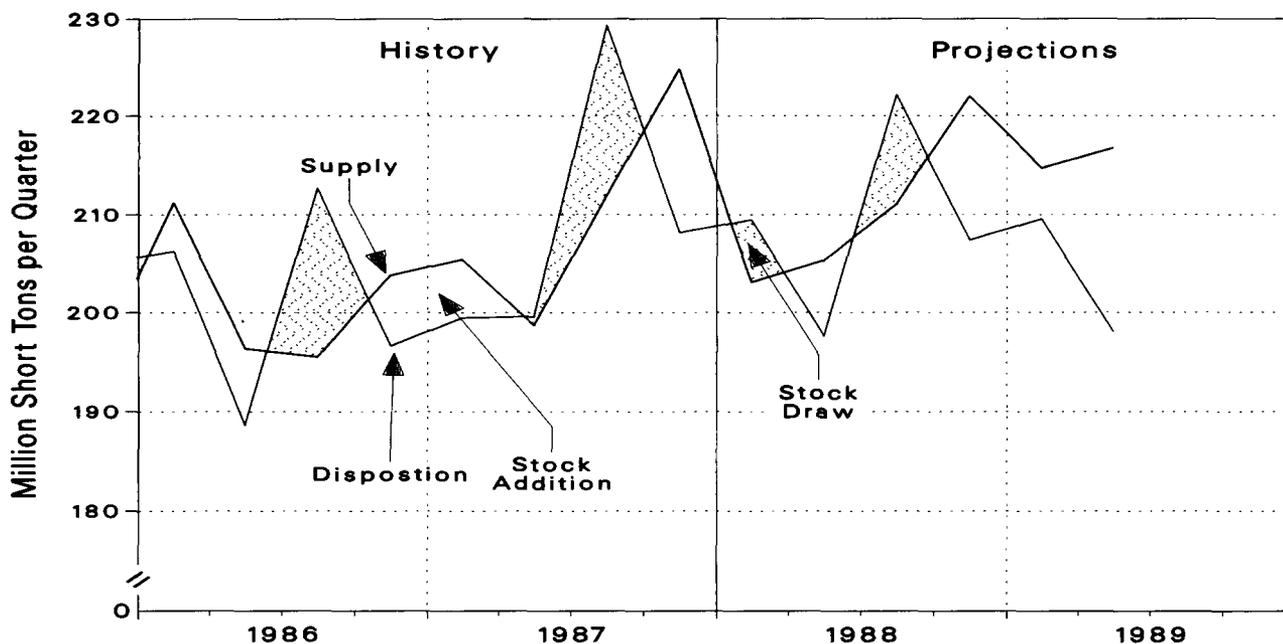
Coal

Total domestic coal consumption should remain fairly constant throughout the forecast period, following a significant jump in coal use in 1987 (Table 15 on page 51 and Figure 17). Most of the increase in 1987 corresponds to higher than normal peak summer demands for electricity.

- Electric utility coal use should decline slightly between 1987 and 1988, with nuclear and hydroelectric generation dominating the rise in electricity generation. Coal-fired generating capacity is likely to remain essentially constant, with capacity utilization averaging close to 52 percent in 1988 and 1989.

- Coking coal use should rise in 1988 to 38 million tons, in response to projected growth of 6.5 percent for iron and steel output. For 1989, coking coal use is expected to drop off slightly, as greater use of electric-arc furnaces more than offsets the growth in steel output.

- Retail and general industry coal demand should remain constant in 1988, with little change reported since 1984. Demand should increase slightly in 1989, corresponding to continued strong growth in two of its principal consuming industries: the stone, clay, and glass industry and the chemical industry.

- A modest buildup of consumer stocks is estimated to have occurred during the fourth quarter of 1987 in anticipation of a strike by the United Mine Workers of America in 1988. Stock levels reached 180 million tons during that quarter, well below the level reached prior to the last contract expiration date.

- Coal exports dropped by 11 percent during the first 9 months of 1987. This decline is expected to continue through 1988, as competition from other exporters continues to intensify. Exports should start to recover in 1989, reflecting rising world coal demand.

Figure 18. Electricity Supply and Disposition
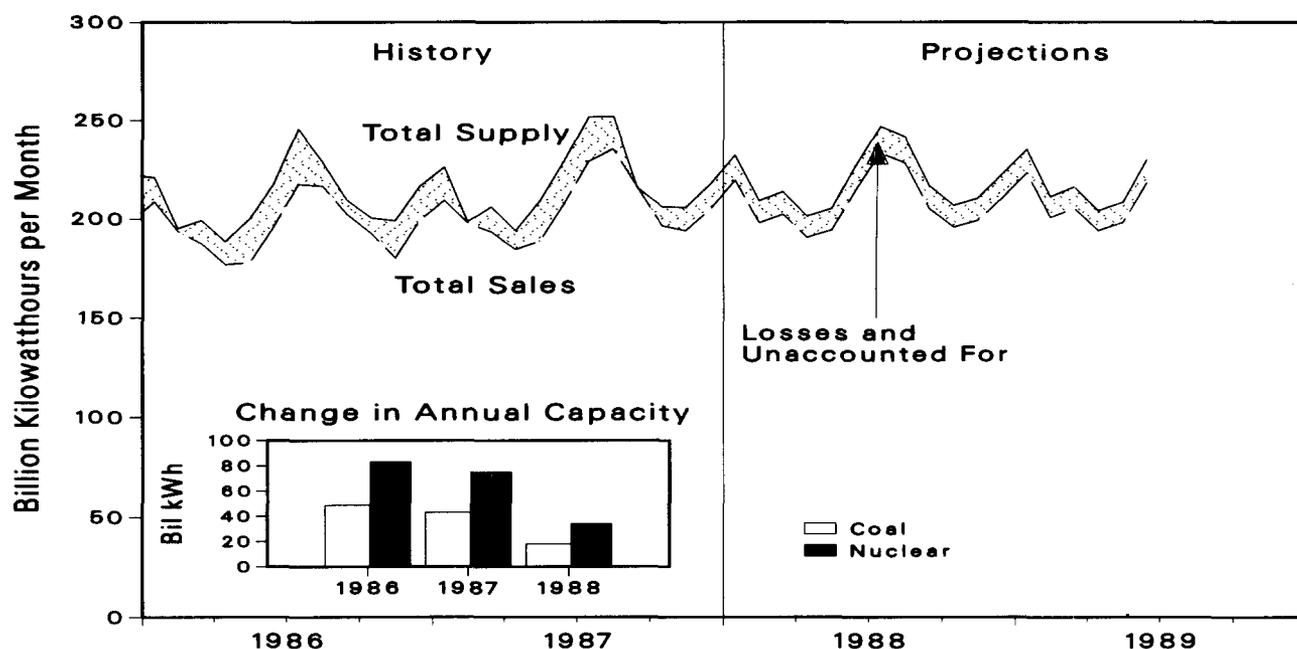
Electric Power

In contrast to 1987, the outlook for electricity demand this year and through the first half of 1989 is fairly conservative. Demand levels in 1988 and 1989 should just keep pace with personal income levels, whereas electricity needs surpassed income levels in 1987. The estimated rate of growth for 1987 demand was inflated by warm summer weather and relatively robust growth in industrial output (Table 16 on page 52).

- Total electricity generation by utilities should approach a level this year that is about 1 percent above the 1987 level. When this rate is adjusted for weather influences on the 1987 generation level, however, growth is closer to the 2-percent level assumed for income growth in 1988. The first 4 months of 1987 were about 3 percent colder, and May through August was about 8 percent warmer, than the same months in 1986. Furthermore, industrial use of electricity posted healthy gains last year in response to 4-percent growth in manufacturing output. This is the first growth in U.S. industrial electricity demand since 1984. Thus, with industrial output assumed to slow to around 2-percent growth and with the weather assumed to return to normal in 1988, generation growth should slow considerably from the rate of 3 percent estimated for 1987. During the first half of 1989, electricity generation should approach growth of about 1 percent.

- Net imports of electric power, primarily from Canada, should return to the 1986 level of 1.4 percent of total U.S. electricity supply in 1988. In 1987, imports were about 1.8 percent of supply because of unusually low hydroelectric generation in the western United States. With water levels assumed to return to normal in 1989, electricity imports should fall slightly as a percentage of U.S. electricity supply, or remain close to the 1988 level.

- Electric utility sales should continue growing at a higher rate than the total projected supply of electric power in 1988 and 1989 (Figure 18). This expectation is based on anticipated growth in cogeneration, since industrial and commercial customers are turning increasingly to generating their own electricity and selling excess power to utilities.

Figure 19. Electricity Generation by Fuel Source
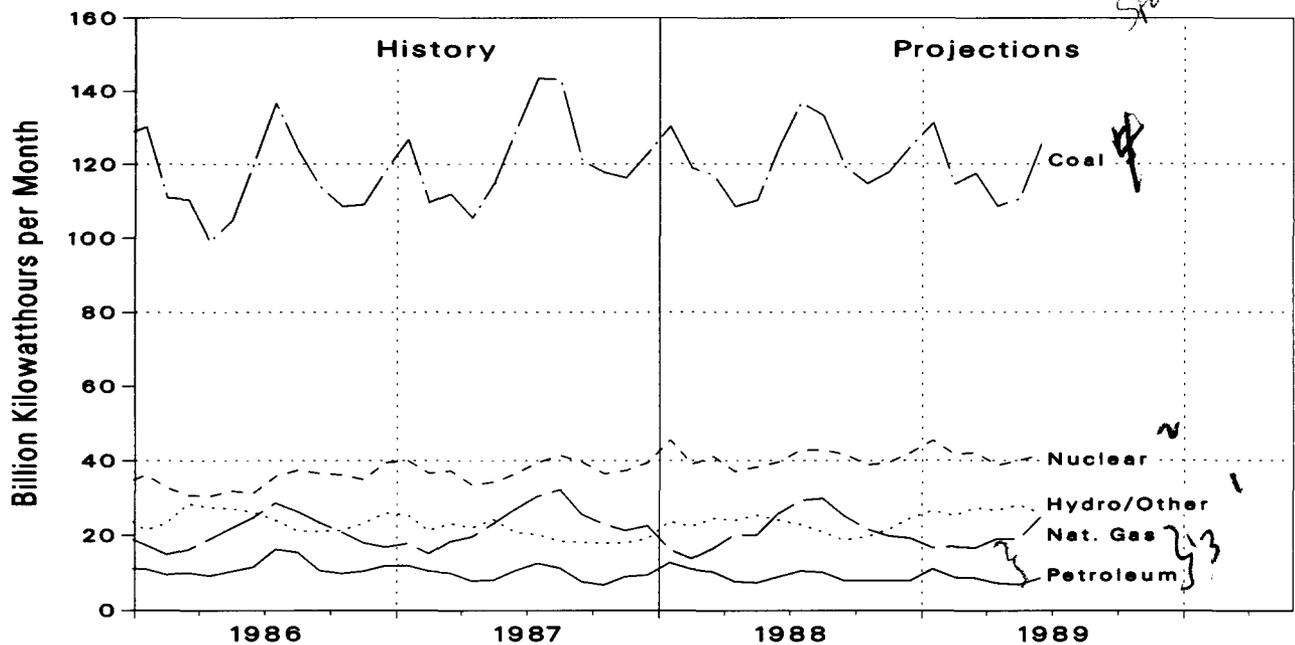
Electricity Fuel Shares

The major sources of electric power generation will continue to be coal and nuclear in 1988 and 1989; however, growth in generation in 1988 will be met by growth in hydroelectric and nuclear power sources. Coal-fired generation should decline slightly, as abnormally high generation from coal in 1987 resulted primarily from unusually high summer demand due to the hot weather and from low availability of hydroelectric power. An assumed return to normal levels of precipitation is expected to boost hydroelectric generation in 1988 (Table 16 on page 52 and Figure 19).

- Coal generation this year should decline by less than 1 percent, after growing by more than 5 percent in 1987. An abnormally hot summer led to unexpected demand for electricity, and utilities met this demand with coal. Below-normal hydroelectric generation was an additional cause for the demand on coal sources. The weather is assumed to return to normal, however, lowering expectations for coal use at utilities through 1989.

- The addition of two new nuclear units this year and a capacity utilization factor of 60 percent should produce 8-percent growth in electricity generation from nuclear power. This rate is not quite as strong as the 9-percent rate estimated for last year, when eight units came on line. Continued growth in nuclear generation is anticipated for 1989 as more units come on line.

- Natural gas and oil will continue competing for an ever smaller share of the electric power market in 1988 and 1989. Thereafter, higher oil prices will give natural gas an edge over oil. Oil prices are expected to remain competitive with gas prices in the first quarter of this year; hence, some switching to oil use and away from gas will result in a first-quarter gain for oil generation over the 1987 level. The overall picture for oil is a decline of around 4 percent in 1988, while gas declines by nearly 7 percent. A continuation of the 1988 trend is expected for 1989, but with no foreseeable switching.

- Existing water shortages in the Rocky Mountains, Southwest, and western United States will limit water availability for electricity generation through 1988, but not as severely as in 1987. Precipitation is assumed to return to normal levels this year, with water supplies returning to normal status by 1989. Hence, hydroelectric generation should increase by more than 9 percent this year and by even more next year.

Special Topics

● *Will Lower Home Heating Oil Prices Increase Reliance on Oil?*

● *Industrial Natural Gas Demand: A Revised Outlook*

● *Preliminary Evidence for Fuel Switching in the Manufacturing Sector*

Will Lower Home Heating Oil Prices Increase Reliance on Oil?

Sales of oil-heating equipment have increased steadily since 1980. Shipments reached 326,000 units in 1986, or about 3 times the 1980 level.[4] Over the same period, the price of distillate fuel oil has declined significantly relative to both natural gas and electricity prices. These developments suggest that today's lower oil prices may be causing a significant increase in reliance on home heating oil.

There is some evidence, however, that such increased dependence will not occur, although oil may be used longer than would otherwise be the case. An increase in the number of shipments of oil-heating equipment appears to be entirely consistent with historical trends showing a decline in the share of new houses constructed with oil-heating equipment. The data indicate that the increase in shipments of oil-heating equipment is due to a decrease in the number of conversions from oil to other fuels for heating in existing houses.

Assuming a 30-year lifetime for oil-heating equipment and that there were about 11 million oil-heated homes in 1986 (both consistent with historical trends), 365,000 oil-heating units would have worn out in existing homes in 1986.[5] However, about 105,000 of those oil-heating units that were worn out would have been replaced with fuels other than oil.[6] Therefore, there would have been a need for 260,000 replacements of oil-heating units in existing houses in 1986. In addition, there were about 60,000 new oil-heated homes built in 1986, resulting in a total need for about 320,000 oil-heating units in 1986.[7] This closely matches the 326,000 units that were shipped in 1986. Furthermore, the same correspondence between the number of units shipped and the requirement for new units in new and existing houses can also be seen in earlier years. Shipments of oil-heating equipment have rebounded to higher levels from the lows of the early 1980's, not because of an increase in installations in new homes but because the number of conversions from oil to other heating fuels has declined.

In other words, although shipments of oil-heating equipment have increased dramatically since the early 1980's while oil prices have fallen dramatically, this does not seem to indicate a significant increase in the share of oil-heating equipment in new homes. Rather, significantly fewer existing homes are switching from oil to other fuels for their heating needs.

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[4]Gas Appliance Manufacturers Association, Inc., *Statistical Highlights, Ten Year Summary, 1977-1986* (Arlington, VA, 1986).

[5]Energy Information Administration, *Annual Energy Outlook 1986,* DOE/EIA-0383(86) (Washington, DC, February 1987).

[6]American Gas Association, *Gas Househeating Survey: 1986* (Arlington, VA, 1986).

[7]U.S. Department of Commerce, *Characteristics of New Housing: 1986* (Washington, DC, 1987).

Industrial Natural Gas Demand: A Revised Outlook

Deliveries of natural gas to industrial customers were reported by the Energy Information Administration (EIA) in the October *Natural Gas Monthly (NGM)* to be 15 percent below year-earlier levels for the first 9 months of 1987. This decline is attributable to a growing volume of gas that was transported for other pipelines but was not accounted for under the existing system for estimating monthly deliveries. Data to be published in the November *NGM* will be revised upward, resulting in only a 4-percent decline in industrial gas use for the first 9 months of 1987 relative to year-earlier levels. This revision has major implications for the demand forecast, which now shows industrial natural gas demand for 1988 at a level almost 700 billion cubic feet higher than in the October 1987 *Outlook.*

EIA's Natural Gas Division is revising the data to reflect the rising trend in volumes of gas transported but not owned by pipelines. The previously published data for 1987 had already been adjusted to account for some of the gas transported for others, but this adjustment was not large enough given the growing volumes of nonequity gas. Specifically, the new estimation process incorporates an adjustment for the year-to-year rate of change in the difference between the sales data from Form EIA-857 and the data for annual total delivered volumes from Form EIA-176.[8] In addition to revising the year-to-date total for 1987, the monthly values for the years 1984 through 1986 will also be revised to reflect the new estimation procedure; annual totals will remain fixed, however, at the levels reported on Form EIA-176.

The monthly data will be revised again in October 1989, based on the annual data from Form EIA-176, which has been designed to account for all deliveries of gas. Starting in 1988, a new system for collecting data on monthly deliveries of natural gas will be implemented that should take care of the problems that have arisen with the existing system.

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[8]For more detailed information on the data reporting and estimation process, see Energy Information Administration, *Natural Gas Monthly,* DOE/EIA-0130 (Washington, DC).

Preliminary Evidence for Fuel Switching in the Manufacturing Sector

Forthcoming information from EIA's Manufacturing Energy Consumption Survey (MECS) will shed light on fuel switching capability in the industrial manufacturing sector. Very preliminary tabulations are now available, and they provisionally indicate the following:

- Between one-quarter and one-half of oil (distillate and residual) consumption in the manufacturing sector in 1985 could have been replaced by alternate fuels. The total switchable consumption, however, was on the order of less than 1 percent of total petroleum demand (or about 150,000 barrels per day).

- Similarly, somewhere between one-quarter and one-half of natural gas consumption could have been replaced by other fuels in manufacturing in 1985. But total natural gas consumption was much greater (over three times greater than oil for all industrial demand, and probably a higher ratio for manufacturing consumption), and therefore this figure represents switchable natural gas consumption, at a minimum, of about 0.5 million barrels per day of oil equivalent (a very rough estimate).

- Significant differences in switching capability will be seen by region and by industrial category.

While these very preliminary data will be revised, the indications are that considerable switching capacity exists in the manufacturing sector.

Detailed Tables

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

	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply[a]													
Production													
U.S. (50 States)	10.68	10.61	10.48	10.62	10.62	10.47	10.41	10.43	10.41	10.28	10.90	10.60	10.48
OPEC	17.75	18.44	20.60	20.33	19.14	18.65	20.19	20.56	19.55	19.23	19.74	19.29	19.64
Other Non-OPEC	16.16	15.86	16.19	16.40	16.72	16.44	16.59	16.72	17.02	16.76	15.77	16.15	16.62
Total Market Economies	44.59	44.91	47.27	47.35	46.48	45.56	47.19	47.70	46.98	46.27	46.42	46.04	46.74
Net Communist Exports	2.00	2.20	2.60	2.00	1.90	2.10	2.50	1.90	1.80	2.00	2.09	2.20	2.10
Total Supply	46.59	47.11	49.87	49.35	48.38	47.66	49.69	49.60	48.78	48.27	48.51	48.24	48.84
Net Stock Withdrawals or Additions (-)													
U.S. (50 States excl. SPR)	.44	.18	-.54	-.11	.70	-.17	-.35	.12	.57	-.26	-.15	-.01	.07
U.S. SPR	-.09	-.08	-.07	-.07	-.05	-.04	-.04	-.05	-.05	-.05	-.05	-.08	-.04
Other Market Economies	1.09	-.31	-1.38	.09	1.15	-.39	-1.40	.03	1.28	-.29	-.70	-.14	-.16
Total Stock Withdrawals	1.43	-.21	-2.00	-.10	1.80	-.60	-1.79	.10	1.80	-.60	-.90	-.23	-.13
Product Supplied													
U.S. (50 States)	16.34	16.43	16.62	16.68	17.05	16.29	16.38	16.92	17.02	16.46	16.28	16.52	16.66
U.S. Territories	.19	.22	.31	.31	.28	.23	.26	.27	.28	.23	.25	.26	.26
Canada	1.52	1.54	1.52	1.56	1.56	1.49	1.57	1.65	1.56	1.50	1.52	1.53	1.57
Japan	4.86	3.86	4.12	4.81	5.02	3.90	4.08	4.70	5.04	3.91	4.38	4.41	4.43
Australia and New Zealand	.71	.70	.75	.73	.70	.73	.74	.74	.70	.73	.70	.72	.72
OECD Europe	12.55	11.30	12.01	12.15	12.73	11.51	11.87	12.37	12.84	11.62	11.98	12.00	12.12
Total OECD	36.16	34.05	35.33	36.22	37.34	34.15	34.91	36.66	37.45	34.45	35.12	35.44	35.76
Other Market Economies	12.94	12.99	13.05	13.13	13.24	13.32	13.39	13.46	13.56	13.64	12.84	13.03	13.35
Total Market Economies	49.10	47.04	48.38	49.36	50.57	47.47	48.30	50.12	51.01	48.09	47.96	48.47	49.11
Statistical Discrepancy	1.07	.13	.51	.11	.39	.40	.39	.41	.43	.42	.35	.45	.40
Closing Stocks (billion barrels)	4.97	4.99	5.17	5.18	5.02	5.07	5.24	5.23	5.07	5.12	5.11	5.18	5.23

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

SPR: Strategic Petroleum Reserve

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

Sources: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); and *International Energy Annual 1986*, DOE/EIA-0219(86); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through September 1987.

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

	Annual Average 1975-1985	1986	1987	1988
OECD Total[a]	2.9	2.7	2.7	2.1
United States[b]	3.0	2.9	2.7	1.8
Western Europe	2.2	2.6	2.4	2.0
Japan	4.7	2.5	3.2	2.5
Other OECD[c]	3.0	2.6	3.2	2.2

[a] Weighted average of growth in gross national product for the United States and growth in gross domestic product for the other countries of the Organization for Economic Cooperation and Development (OECD).

[b] Gross national product.

[c] Canada, Australia, and New Zealand.

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

Sources: U.S. historical data and forecasts: Data Resources, Inc., United States Forecast, CONTROL1287; Non-U.S. historical data and forecasts: The WEFA Group, *World Economic Service: Historical Data*, January 1987 and *World Economic Outlook: Developed Economies Volume*, December 1987.

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

Assumptions	1987				World Oil Price Case	1988				1989		Year		
	1st	2nd	3rd	4th		1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Macroeconomic[a]														
Real Gross National Product (billion 1982 dollars)	**3,772**	**3,795**	**3,836**	**3,858**	Low	*3,861*	*3,882*	*3,916*	*3,950*	*3,997*	*4,037*	*–*	*–*	*3,902*
					Base	*3,860*	*3,870*	*3,891*	*3,919*	*3,964*	*4,002*	**3,713**	**3,815**	*3,885*
					High	*3,859*	*3,861*	*3,876*	*3,899*	*3,939*	*3,975*	*–*	*–*	*3,874*
Percentage Change from Prior Year	**2.0**	**2.4**	**3.2**	**3.4**	Low	*2.4*	*2.3*	*2.1*	*2.4*	*3.5*	*4.0*	*–*	*–*	*2.3*
					Base	*2.3*	*2.0*	*1.4*	*1.6*	*2.7*	*3.4*	**2.9**	**2.7**	*1.8*
					High	*2.3*	*1.7*	*1.0*	*1.1*	*2.1*	*3.0*	*–*	*–*	*1.5*
GNP Implicit Price Deflator (index, 1982=1.000)	**1.161**	**1.171**	**1.179**	**1.188**	Low	*1.195*	*1.200*	*1.206*	*1.214*	*1.226*	*1.237*	*–*	*–*	*1.204*
					Base	*1.196*	*1.205*	*1.215*	*1.224*	*1.236*	*1.248*	**1.141**	**1.175**	*1.210*
					High	*1.198*	*1.209*	*1.222*	*1.233*	*1.247*	*1.260*	*–*	*–*	*1.215*
Percentage Change from Prior Year	**2.8**	**3.0**	**2.8**	**3.4**	Low	*3.0*	*2.5*	*2.3*	*2.2*	*2.5*	*3.1*	*–*	*–*	*2.5*
					Base	*3.0*	*2.9*	*3.1*	*3.0*	*3.3*	*3.6*	**2.6**	**3.0**	*3.0*
					High	*3.2*	*3.2*	*3.6*	*3.8*	*4.1*	*4.2*	*–*	*–*	*3.4*
Real Disposable Personal Income[b] (billion 1982 dollars)	**2,675**	**2,646**	**2,675**	**2,692**	Low	*2,725*	*2,743*	*2,760*	*2,768*	*2,782*	*2,797*	*–*	*–*	*2,749*
					Base	*2,717*	*2,718*	*2,730*	*2,739*	*2,755*	*2,770*	**2,645**	**2,672**	*2,726*
					High	*2,706*	*2,701*	*2,707*	*2,712*	*2,730*	*2,746*	*–*	*–*	*2,706*
Percentage Change from Prior Year	**2.5**	**-.5**	**.8**	**1.3**	Low	*1.9*	*3.6*	*3.2*	*2.8*	*2.1*	*2.0*	*–*	*–*	*2.9*
					Base	*1.6*	*2.7*	*2.1*	*1.7*	*1.4*	*1.9*	**4.1**	**1.0**	*2.0*
					High	*1.1*	*2.1*	*1.2*	*.7*	*.9*	*1.6*	*–*	*–*	*1.3*
Index of Industrial Production (Mfg.) (index, 1977=1.000)	**1.316**	**1.332**	**1.357**	**1.365**	Low	*1.364*	*1.375*	*1.394*	*1.412*	*1.429*	*1.460*	*–*	*–*	*1.386*
					Base	*1.361*	*1.365*	*1.378*	*1.392*	*1.406*	*1.431*	**1.291**	**1.343**	*1.374*
					High	*1.357*	*1.358*	*1.367*	*1.379*	*1.390*	*1.412*	*–*	*–*	*1.365*
Percentage Change from Prior Year	**2.5**	**3.7**	**5.0**	**4.7**	Low	*3.6*	*3.2*	*2.7*	*3.4*	*4.8*	*6.2*	*–*	*–*	*3.2*
					Base	*3.4*	*2.5*	*1.5*	*2.0*	*3.4*	*4.9*	**2.2**	**4.0**	*2.3*
					High	*3.1*	*2.0*	*.7*	*1.1*	*2.4*	*4.0*	*–*	*–*	*1.6*
Oil Price														
Imported Crude Oil Price[c] (U.S. dollars/barrel)	**16.88**	**18.28**	**19.03**	**18.26**	Low	*14.00*	*13.00*	*14.00*	*15.00*	*16.00*	*16.00*	*–*	*–*	*14.00*
					Base	*16.00*	*17.00*	*18.00*	*18.00*	*19.00*	*19.00*	**13.98**	**18.11**	*17.30*
					High	*19.00*	*20.00*	*22.00*	*22.00*	*22.00*	*22.00*	*–*	*–*	*20.80*
U.S. Refiners' Cost[d] (U.S. dollars/barrel)	**16.67**	**17.91**	**19.02**	**18.20**	Low	*14.00*	*13.00*	*14.00*	*15.00*	*16.00*	*16.00*	*–*	*–*	*14.00*
					Base	*16.00*	*17.00*	*18.00*	*18.00*	*19.00*	*19.00*	**14.55**	**17.95**	*17.30*
					High	*19.00*	*20.00*	*22.00*	*22.00*	*22.00*	*22.00*	*–*	*–*	*20.80*
Weather[e]														
Heating Degree Days	**2,266**	**449**	**85**	**1,618**		*2,401*	*538*	*88*	*1,668*	*2,401*	*538*	**4,430**	**4,418**	*4,695*
Cooling Degree Days	**24**	**385**	**774**	**49**		*28*	*328*	*754*	*62*	*28*	*328*	**1,208**	**1,232**	*1,172*

[a] 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.
[b] Seasonally adjusted at annual rates.
[c] Cost of imported crude oil to U.S. refiners.
[d] U.S. Refiner Acquisition Cost of foreign and domestic crude oil.
[e] Population-weighted average degree days, revised December 1981. A degree day indicates the temperature variation from 65 degrees Farenheit (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(87/10); Bureau of Economic Analysis, U.S. Department of Commerce, *Survey of Current Business*, December 1987; 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*, December 1987. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL1287.

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

Product	1987				World Oil Price Case	1988				1989		Year		
	1st	2nd	3rd	4th		1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Petroleum														
Imported Crude Oil Price[a]					Low	14.00	13.00	14.00	15.00	16.00	16.00	–	–	14.00
(dollars per barrel)	16.88	18.28	19.03	18.26	Base	16.00	17.00	18.00	18.00	19.00	19.00	13.98	18.11	17.30
					High	19.00	20.00	22.00	22.00	22.00	22.00	–	–	20.80
Gasoline[b]					Low	.90	.84	.85	.85	.87	.91	–	–	.86
(dollars per gallon)	.90	.95	.99	.98	Base	.92	.93	.96	.95	.97	1.01	.93	.96	.94
					High	.96	1.01	1.06	1.06	1.09	1.10	–	–	1.03
No. 2 Diesel Oil, Retail					Low	.89	.87	.87	.89	.92	.93	–	–	.88
(dollars per gallon)	.89	.91	.95	.94	Base	.92	.93	.95	.96	.98	.99	.88	.92	.94
					High	.96	.99	1.03	1.04	1.05	1.05	–	–	1.00
No. 2 Heating Oil, Wholesale					Low	.45	.42	.43	.47	.50	.49	–	–	.44
(dollars per gallon)	.50	.51	.54	.55	Base	.50	.51	.53	.54	.57	.56	.49	.52	.52
					High	.56	.58	.62	.63	.64	.63	–	–	.63
No. 2 Heating Oil, Retail					Low	.79	.72	.72	.76	.82	.80	–	–	.75
(dollars per gallon)	.79	.78	.78	.83	Base	.82	.79	.80	.84	.89	.86	.84	.80	.82
					High	.87	.86	.88	.94	.97	.93	–	–	.89
No. 6 Residual Fuel Oil[c]					Low	13.40	12.90	13.60	14.20	14.80	14.60	–	–	13.50
(dollars per barrel)	17.08	18.19	18.59	17.33	Base	16.20	16.60	17.70	18.30	18.90	18.40	14.41	17.80	17.20
					High	18.30	19.30	20.80	21.80	22.20	21.50	–	–	20.10
Electric Utility Fuels														
Coal					Low	1.47	1.49	1.50	1.51	1.52	1.53	–	–	1.50
(dollars per million Btu)	1.52	1.54	1.50	1.51	Base	1.52	1.55	1.56	1.57	1.57	1.59	1.58	1.52	1.55
					High	1.55	1.58	1.59	1.60	1.61	1.62	–	–	1.58
Heavy Oil[d]					Low	2.13	2.04	2.16	2.26	2.36	2.32	–	–	2.15
(dollars per million Btu)	2.92	3.02	3.09	2.82	Base	2.57	2.63	2.81	2.91	3.00	2.93	2.40	2.96	2.73
					High	2.92	3.06	3.31	3.47	3.54	3.42	–	–	3.19
Natural Gas					Low	2.16	2.11	2.19	2.23	2.26	2.28	–	–	2.17
(dollars per million Btu)	2.33	2.23	2.15	2.36	Base	2.31	2.36	2.48	2.51	2.52	2.53	2.34	2.27	2.42
					High	2.57	2.68	2.85	2.90	2.90	2.88	–	–	2.75
Other Residential														
Natural Gas					Low	5.38	5.86	6.60	5.19	5.43	5.95	–	–	5.49
(dollars per 1,000 cu. ft.)	5.35	5.86	6.76	5.18	Base	5.46	5.98	6.90	5.32	5.57	6.10	5.83	5.51	5.63
					High	5.57	6.13	7.11	5.50	5.76	6.34	–	–	5.79
Electricity					Low	7.37	7.80	8.16	7.79	7.50	8.03	–	–	7.78
(cents per kilowatthour)	7.33	7.85	8.16	7.78	Base	7.54	8.03	8.41	8.04	7.73	8.27	7.80	7.78	8.00
					High	7.73	8.26	8.67	8.30	7.97	8.52	–	–	8.30

[a] Cost of imported crude oil to U.S. refiners.
[b] Average retail for all grades and services.
[c] Retail residual fuel oil--average, all sulfur contents.
[d] Heavy fuel oil prices include fuel oils No. 4., No. 5, and No. 6, and topped crude fuel oil prices.
Notes: Fourth quarter 1987 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(87/10); and *Petroleum Marketing Monthly*, DOE/EIA-0380(87/10).

Table 6. Quarterly Supply and Disposition of Petroleum: Base Case
(Million Barrels per Day, Except Stocks)

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Crude Oil Supply													
Domestic Production [a]	8.38	8.33	8.21	8.31	8.31	8.20	8.13	8.09	8.07	7.99	8.68	8.31	8.18
Alaska	1.95	1.97	1.90	2.04	2.08	2.07	2.07	2.07	2.06	2.05	1.87	1.96	2.07
Lower 48	6.43	6.36	6.31	6.27	6.23	6.14	6.06	6.03	6.02	5.94	6.81	6.34	6.11
Net Imports (Including SPR)[b]	3.83	4.24	5.14	4.86	3.95	4.61	4.97	4.79	4.15	4.97	4.02	4.52	4.58
Gross Imports (Excluding SPR)	3.93	4.31	5.21	4.89	4.08	4.75	5.10	4.91	4.29	5.10	4.13	4.59	4.71
SPR Imports	.08	.07	.07	.07	.05	.04	.04	.05	.05	.05	.05	.07	.04
Exports	.18	.14	.14	.10	.18	.18	.16	.17	.18	.18	.15	.14	.17
SPR Stock Withdrawn or Added (-)	-.09	-.08	-.07	-.07	-.05	-.04	-.04	-.05	-.05	-.05	-.05	-.08	-.04
Other Stock Withdrawn or Added (-)	-.02	.04	-.10	-.18	.18	.04	.06	-.01	.02	-.04	-.03	-.07	.07
Products Supplied and Losses	-.04	-.04	-.03	-.04	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.04	-.05
Unaccounted-for Crude	.26	.30	.18	.08	.10	.11	.10	.12	.14	.13	.14	.21	.11
Crude Oil Input to Refineries	12.32	12.79	13.33	12.95	12.45	12.88	13.18	12.90	12.29	12.95	12.72	12.85	12.85
Other Supply													
NGL Production	1.61	1.59	1.58	1.62	1.63	1.57	1.57	1.62	1.63	1.57	1.55	1.60	1.60
Other Hydrocarbon and Alcohol Inputs	.07	.05	.06	.06	.06	.06	.06	.07	.06	.06	.06	.06	.06
Crude Oil Product Supplied	.04	.04	.03	.04	.05	.05	.05	.05	.05	.05	.05	.04	.05
Processing Gain	.62	.63	.63	.63	.63	.64	.65	.65	.64	.65	.62	.63	.64
Net Product Imports [c]	1.21	1.18	1.43	1.31	1.73	1.31	1.28	1.50	1.79	1.39	1.41	1.28	1.45
Gross Product Imports [c]	1.87	1.76	2.01	1.92	2.31	1.84	1.79	2.08	2.37	1.92	2.05	1.89	2.01
Product Exports	.66	.59	.57	.61	.58	.54	.51	.58	.58	.54	.63	.61	.55
Product Stock Withdrawn or Added (-)[d]	.46	.14	-.45	.07	.52	-.21	-.41	.13	.55	-.21	-.12	.05	.00
Total Product Supplied, Domestic Use	16.33	16.43	16.62	16.68	17.05	16.29	16.38	16.92	17.02	16.46	16.28	16.52	16.66
Disposition													
Motor Gasoline	6.70	7.44	7.35	7.12	6.91	7.44	7.41	7.22	6.92	7.45	7.03	7.16	7.24
Jet Fuel	1.36	1.30	1.35	1.42	1.42	1.32	1.39	1.52	1.48	1.38	1.31	1.36	1.41
Distillate Fuel Oil	3.20	2.82	2.69	3.13	3.46	2.82	2.65	3.17	3.49	2.88	2.91	2.96	3.02
Residual Fuel Oil	1.38	1.16	1.25	1.17	1.57	1.12	1.04	1.11	1.42	1.08	1.42	1.24	1.21
Other Oils Supplied [e]	3.70	3.70	3.96	3.84	3.70	3.59	3.90	3.90	3.71	3.67	3.61	3.80	3.77
Total Product Supplied	16.34	16.43	16.62	16.68	17.05	16.29	16.38	16.92	17.02	16.46	16.28	16.52	16.66
Total Petroleum Net Imports	5.04	5.41	6.57	6.17	5.67	5.91	6.25	6.30	5.95	6.35	5.44	5.80	6.04
Closing Stocks (million barrels)													
Crude Oil (Excluding SPR) [f]	333.4	329.8	338.6	355.0	338.3	334.7	329.1	329.8	328.0	331.7	331.2	355.0	329.8
Total Motor Gasoline	249.2	230.6	229.6	228.6	235.1	228.4	229.6	230.4	234.8	228.2	233.1	228.6	230.4
Finished Motor Gasoline	205.8	192.7	191.1	190.8	197.7	191.6	191.4	193.9	197.7	191.8	194.2	190.8	193.9
Blending Components	43.4	37.8	38.5	37.8	37.4	36.7	38.1	36.5	37.1	36.4	38.8	37.8	36.5
Jet Fuel	48.1	46.0	50.2	51.5	47.4	47.2	50.0	48.5	48.0	48.1	49.7	51.5	48.5
Distillate Fuel Oil	110.0	104.3	126.9	137.2	101.6	107.6	134.4	145.9	100.4	106.2	155.1	137.2	145.9
Residual Fuel Oil	39.6	41.3	44.2	48.8	39.3	41.2	43.5	47.0	39.4	41.3	47.4	48.8	47.0
Other Oils [g]	261.1	272.8	285.2	264.1	259.9	278.1	282.8	256.9	256.4	274.7	264.4	264.1	256.9
Total Stocks (Excluding SPR)	1041.4	1024.8	1074.8	1085.2	1021.6	1037.1	1069.5	1058.5	1007.0	1030.3	1080.9	1085.2	1058.5
Crude Oil in SPR	520.0	527.2	533.9	540.7	545.1	548.4	551.8	556.4	560.9	565.5	511.6	540.7	556.4
Total Stocks (Including SPR)	1561.4	1552.0	1608.7	1625.9	1566.7	1585.6	1621.3	1615.0	1567.9	1595.7	1592.5	1625.9	1615.0

[a] Includes lease condensate.
[b] Net Imports equals Gross Imports plus SPR Imports minus Exports.
[c] Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.
[d] Includes an estimate of minor product stock change based on monthly data.
[e] Includes crude oil product supplied, natural gas liquids, liquefied refinery gases, other liquids, and all finished petroleum products except motor gasoline, jet fuels, and distillate and residual fuel oils.
[f] Includes crude oil in transit to refineries.
[g] Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.
SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Oct. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-50,88-02).

Table 7. Petroleum Demand Sensitivity Differentials
(Million Barrels per Day)

Sensitivities	1988				1989		Year ~~1988~~ 3 yr	4H	88	89
	1st	2nd	3rd	4th	1st	2nd				
Demand in 50 States										
Low Price	17.20 ~~17.18~~	16.51 63	16.86 74	17.72 27	17.2X 14	16.X8²	16.8Q 98	17.60	16.96	17.14
Base Case	17.20 ~~17.05~~	16.80 53	16.98 55	~~16.82~~ 17.10	17.82 12	16.X6 64	16.86 80	17.41	16.85	16.99
High Price	17.2 0 ~~16.84~~	16.14 41	16.X 37	16.86 86	16.78 83	16.84 3²	16.46	16.39	16.71	16.50
Weather Sensitivity										
Adverse Weather	0.0 ~~0.20~~	.0X²	.0X0	.12	.21	.05³	.0X²	0.12	0.04	0.09
Favorable Weather	0.0 ~~0.20~~	-.0X³	-.02	-.12	-.21	-.05³	-.0X²	-0.12	-0.04	-0.09
Economic Sensitivity										
High Economic Activity	0.00 ~~02~~	.0X²	.X²0³	.X40⁵	.X50⁵	.X808	.0X10	0.12	0.03	0.09
Low Economic Activity	0.0X ~~02~~	-.0X²	-.0X³	-.X20⁵	-.X207	-.1X0	-.8X13	-0.16	-0.03	0.12
Combined Sensitivity Differentials[a]										
(excl. price)										
Upper Range	0.00 ~~20~~	.0X³	.X²0³	.1X3	.2X²	.X²09	.X610	0.17	0.05	0.14
Lower Range	0.0X ~~20~~	.0X4	.0X4	.1X3	.2X²	.X610	.13	0.20	0.05	0.16
Range of Projected Demand										
High Demand[b]	17.2 ~~17.98~~	16.6X 6	16.7X7	17.X 40	17.53 36	16.9X 2	17.0X 8	17.77	17.01	17.28
Low Demand[c]	17 ~~16.74~~	16.0X 36	16.86 33	16.5X 73	16.5X 61	16.0X 2²	16.33	16.19	16.65	16.34

[a] 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.

[b] Low Price demand plus the combined effects of adverse weather and high economic activity.

[c] High Price demand less the combined effects of favorable weather and low economic activity.

Note: Forecast values in *italics*.

Table 8. Quarterly Supply and Disposition of Petroleum: Low World Oil Price Case
(Million Barrels per Day, Except Stocks)

Supply and Disposition	1987 1st	2nd	3rd	4th	1988 1st	2nd	3rd	4th	1989 1st	2nd	Year 1986	1987	1988
Supply													
Crude Oil Supply													
Domestic Production [a]	8.38	8.33	8.21	8.31	8.23	8.02	7.89	7.84	7.81	7.71	8.68	8.31	7.99
Alaska	1.95	1.97	1.90	2.04	2.08	2.07	2.07	2.07	2.06	2.05	1.87	1.96	2.07
Lower 48	6.43	6.36	6.31	6.27	6.16	5.95	5.82	5.77	5.76	5.65	6.81	6.34	5.92
Net Imports (Including SPR)[b]	3.83	4.24	5.14	4.86	4.37	5.11	5.60	5.42	4.96	5.64	4.02	4.52	5.13
Gross Imports													
(Excluding SPR)	3.93	4.31	5.21	4.89	4.50	5.26	5.72	5.54	5.09	5.77	4.13	4.59	5.26
SPR Imports	.08	.07	.07	.07	.05	.04	.04	.05	.05	.05	.05	.07	.04
Exports	.18	.14	.14	.10	.18	.18	.16	.17	.18	.18	.15	.14	.17
SPR Stock Withdrawn													
or Added (-)	-.09	-.08	-.07	-.07	-.05	-.04	-.04	-.05	-.05	-.05	-.05	-.08	-.04
Other Stock Withdrawn													
or Added (-)	-.02	.04	-.10	-.18	.17	.04	.06	-.01	.01	-.03	-.03	-.07	.06
Products Supplied and Losses	-.04	-.04	-.03	-.04	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.04	-.05
Unaccounted-for Crude	.26	.30	.18	.08	.10	.10	.09	.11	.12	.11	.14	.21	.10
Crude Oil Input to Refineries	12.32	12.79	13.33	12.95	12.77	13.18	13.54	13.27	12.81	13.33	12.72	12.85	13.19
Other Supply													
NGL Production	1.61	1.59	1.58	1.62	1.62	1.57	1.57	1.62	1.63	1.57	1.55	1.60	1.60
Other Hydrocarbon and													
Alcohol Inputs	.07	.05	.06	.06	.06	.06	.06	.07	.06	.06	.06	.06	.06
Crude Oil Product Supplied	.04	.04	.03	.04	.05	.05	.05	.05	.05	.05	.05	.04	.05
Processing Gain	.62	.63	.63	.63	.63	.65	.66	.66	.65	.66	.62	.63	.65
Net Product Imports[c]	1.21	1.18	1.43	1.31	1.68	1.32	1.34	1.54	1.73	1.40	1.41	1.28	1.47
Gross Product Imports [c]	1.87	1.76	2.01	1.92	2.26	1.85	1.85	2.12	2.31	1.94	2.05	1.89	2.02
Product Exports	.66	.59	.57	.61	.58	.54	.51	.58	.58	.54	.63	.61	.55
Product Stock Withdrawn													
or Added (-)[d]	.46	.14	-.45	.07	.39	-.23	-.44	.14	.50	-.18	-.12	.05	-.04
Total Product Supplied,													
Domestic Use	16.33	16.43	16.62	16.68	17.20	16.59	16.79	17.34	17.44	16.89	16.28	16.52	16.98
Disposition													
Motor Gasoline	6.70	7.44	7.35	7.12	6.93	7.50	7.50	7.32	7.02	7.54	7.03	7.16	7.31
Jet Fuel	1.36	1.30	1.35	1.42	1.42	1.34	1.41	1.55	1.51	1.40	1.31	1.36	1.43
Distillate Fuel Oil	3.20	2.82	2.69	3.13	3.46	2.84	2.68	3.20	3.53	2.92	2.91	2.96	3.04
Residual Fuel Oil	1.38	1.16	1.25	1.17	1.67	1.26	1.22	1.29	1.60	1.26	1.42	1.24	1.36
Other Oils Supplied [e]	3.70	3.70	3.96	3.84	3.72	3.65	3.98	3.98	3.78	3.76	3.61	3.80	3.83
Total Product Supplied	16.34	16.43	16.62	16.68	17.20	16.59	16.79	17.34	17.44	16.89	16.28	16.52	16.98
Total Petroleum Net Imports	5.04	5.41	6.57	6.17	6.05	6.43	6.93	6.96	6.69	7.04	5.44	5.80	6.60
Closing Stocks (million barrels)													
Crude Oil (Excluding SPR) [f]	333.4	329.8	338.6	355.0	340.0	336.4	331.0	331.9	330.9	334.1	331.2	355.0	331.9
Total Motor Gasoline	249.2	230.6	229.6	228.6	236.9	230.6	232.3	233.4	238.5	231.0.	233.1	228.6	233.4
Finished Motor Gasoline	205.8	192.7	191.1	190.8	199.2	193.8	194.2	196.8	201.0	194.6	194.2	190.8	196.8
Blending Components	43.4	37.8	38.5	37.8	37.7	36.8	38.1	36.6	37.5	36.5	38.8	37.8	36.6
Jet Fuel	48.1	46.0	50.2	51.5	48.2	48.1	51.0	49.5	49.5	49.1	49.7	51.5	49.5
Distillate Fuel Oil	110.0	104.3	126.9	137.2	103.7	109.8	137.2	148.6	103.9	109.0	155.1	137.2	148.6
Residual Fuel Oil	39.6	41.3	44.2	48.8	41.7	46.0	49.9	51.8	43.5	47.0	47.4	48.8	51.8
Other Oils [g]	261.1	272.8	285.2	264.1	264.2	281.1	285.5	260.0	262.6	278.5	264.4	264.1	260.0
Total Stocks (Excluding SPR)	1041.4	1024.8	1074.8	1085.2	1034.8	1051.9	1086.9	1075.1	1028.9	1048.9	1080.9	1085.2	1075.1
Crude Oil in SPR	520.0	527.2	533.9	540.7	545.1	548.4	551.8	556.4	560.9	565.5	511.6	540.7	556.4
Total Stocks (Including SPR)	1561.4	1552.0	1608.7	1625.9	1579.9	1600.4	1638.7	1631.6	1589.9	1614.3	1592.5	1625.9	1631.6

[a] Includes lease condensate.
[b] Net Imports equals Gross Imports plus SPR Imports minus Exports.
[c] Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.
[d] Includes an estimate of minor product stock change based on monthly data.
[e] Includes crude oil product supplied, natural gas liquids, liquefied refinery gases, other liquids, and all finished petroleum products except motor gasoline, jet fuels, and distillate and residual fuel oils.
[f] Includes crude oil in transit to refineries.
[g] Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.
SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Oct. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-50,88-02).

Table 9. Quarterly Supply and Disposition of Petroleum: High World Oil Price Case
(Million Barrels per Day, Except Stocks)

Supply and Disposition	1987 1st	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	1989 1st	1989 2nd	Year 1986	Year 1987	Year 1988
Supply													
Crude Oil Supply													
Domestic Production [a]	8.38	8.33	8.21	8.31	8.35	8.30	8.29	8.29	8.32	8.26	8.68	8.31	8.31
Alaska	1.95	1.97	1.90	2.04	2.08	2.07	2.07	2.07	2.08	2.07	1.87	1.96	2.07
Lower 48	6.43	6.36	6.31	6.27	6.27	6.23	6.22	6.23	6.25	6.19	6.81	6.34	6.24
Net Imports (Including SPR) [b]	3.83	4.24	5.14	4.86	3.71	4.28	4.49	4.23	3.57	4.35	4.02	4.52	4.18
Gross Imports (Excluding SPR)	3.93	4.31	5.21	4.89	3.84	4.43	4.61	4.35	3.70	4.48	4.13	4.59	4.31
SPR Imports	.08	.07	.07	.07	.05	.04	.04	.05	.05	.05	.05	.07	.04
Exports	.18	.14	.14	.10	.18	.18	.16	.17	.18	.18	.15	.14	.17
SPR Stock Withdrawn or Added (-)	-.09	-.08	-.07	-.07	-.05	-.04	-.04	-.05	-.05	-.05	-.05	-.08	-.04
Other Stock Withdrawn or Added (-)	-.02	.04	-.10	-.18	.19	.04	.07	.00	.02	-.04	-.03	-.07	.07
Products Supplied and Losses	-.04	-.04	-.03	-.04	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.04	-.05
Unaccounted-for Crude	.26	.30	.18	.08	.11	.12	.11	.13	.15	.14	.14	.21	.12
Crude Oil Input to Refineries	12.32	12.79	13.33	12.95	12.26	12.66	12.86	12.55	11.97	12.62	12.72	12.85	12.58
Other Supply													
NGL Production	1.61	1.59	1.58	1.62	1.63	1.57	1.57	1.62	1.63	1.57	1.55	1.60	1.60
Other Hydrocarbon and Alcohol Inputs	.07	.05	.06	.06	.06	.06	.06	.07	.06	.06	.06	.06	.06
Crude Oil Product Supplied	.04	.04	.03	.04	.05	.05	.05	.05	.05	.05	.05	.04	.05
Processing Gain	.62	.63	.63	.63	.62	.63	.63	.63	.63	.64	.62	.63	.63
Net Product Imports [c]	1.21	1.18	1.43	1.31	1.71	1.26	1.24	1.48	1.77	1.35	1.41	1.28	1.42
Gross Product Imports [c]	1.87	1.76	2.01	1.92	2.29	1.80	1.75	2.06	2.35	1.89	2.05	1.89	1.97
Product Exports	.66	.59	.57	.61	.58	.54	.51	.58	.58	.54	.63	.61	.55
Product Stock Withdrawn or Added (-) [d]	.46	.14	-.45	.07	.58	-.18	-.37	.13	.54	-.21	-.12	.05	.04
Total Product Supplied, Domestic Use	16.33	16.43	16.62	16.68	16.90	16.04	16.05	16.54	16.65	16.09	16.28	16.52	16.38
Disposition													
Motor Gasoline	6.70	7.44	7.35	7.12	6.89	7.38	7.32	7.12	6.83	7.35	7.03	7.16	7.18
Jet Fuel	1.36	1.30	1.35	1.42	1.40	1.31	1.37	1.50	1.46	1.36	1.31	1.36	1.40
Distillate Fuel Oil	3.20	2.82	2.69	3.13	3.45	2.80	2.63	3.14	3.47	2.85	2.91	2.96	3.00
Residual Fuel Oil	1.38	1.16	1.25	1.17	1.49	1.00	.91	.95	1.26	.93	1.42	1.24	1.09
Other Oils Supplied [e]	3.70	3.70	3.96	3.84	3.67	3.54	3.82	3.82	3.63	3.59	3.61	3.80	3.72
Total Product Supplied	16.34	16.43	16.62	16.68	16.90	16.04	16.05	16.54	16.65	16.09	16.28	16.52	16.38
Total Petroleum Net Imports	5.04	5.41	6.57	6.17	5.41	5.54	5.72	5.71	5.34	5.70	5.44	5.80	5.60
Closing Stocks (million barrels)													
Crude Oil (Excluding SPR) [f]	333.4	329.8	338.6	355.0	337.7	333.8	327.8	328.1	326.2	329.9	331.2	355.0	328.1
Total Motor Gasoline	249.2	230.6	229.6	228.6	234.0	226.8	227.3	227.6	232.1	225.8	233.1	228.6	227.6
Finished Motor Gasoline	205.8	192.7	191.1	190.8	196.7	190.0	189.1	191.1	194.9	189.4	194.2	190.8	191.1
Blending Components	43.4	37.8	38.5	37.8	37.4	36.8	38.2	36.5	37.1	36.4	38.8	37.8	36.5
Jet Fuel	48.1	46.0	50.2	51.5	46.9	46.7	49.2	47.5	47.1	47.3	49.7	51.5	47.5
Distillate Fuel Oil	110.0	104.3	126.9	137.2	100.5	106.1	132.2	143.5	98.5	104.1	155.1	137.2	143.5
Residual Fuel Oil	39.6	41.3	44.2	48.8	37.3	37.6	38.5	42.9	36.1	36.9	47.4	48.8	42.9
Other Oils [g]	261.1	272.8	285.2	264.1	258.6	276.8	281.1	254.6	253.9	272.4	264.4	264.1	254.6
Total Stocks (Excluding SPR)	1041.4	1024.8	1074.8	1085.2	1014.9	1027.8	1056.2	1044.2	993.9	1016.3	1080.9	1085.2	1044.2
Crude Oil in SPR	520.0	527.2	533.9	540.7	545.1	548.4	551.8	556.4	560.9	565.5	511.6	540.7	556.4
Total Stocks (Including SPR)	1561.4	1552.0	1608.7	1625.9	1560.0	1576.2	1608.0	1600.6	1554.8	1581.8	1592.5	1625.9	1600.6

[a] Includes lease condensate.
[b] Net Imports equals Gross Imports plus SPR Imports minus Exports.
[c] Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.
[d] Includes an estimate of minor product stock change based on monthly data.
[e] Includes crude oil product supplied, natural gas liquids, liquefied refinery gases, other liquids, and all finished petroleum products except motor gasoline, jet fuels, and distillate and residual fuel oils.
[f] Includes crude oil in transit to refineries.
[g] Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.

SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Oct. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-50,88-41).

Table 10. Quarterly Supply and Disposition of Motor Gasoline: Base Case
(Million Barrels per Day, Except Stocks)

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Domestic Production[a]	6.54	6.98	6.97	6.80	6.60	6.96	7.02	6.87	6.55	6.95	6.75	6.82	6.86
Imports	.32	.36	.40	.33	.40	.42	.40	.39	.43	.44	.33	.35	.40
Exports	.03	.05	.03	.02	.01	.01	.01	.01	.01	.01	.03	.03	.01
Net Imports	.29	.32	.37	.31	.39	.41	.38	.38	.42	.43	.29	.32	.39
Net Withdrawals	-.13	.14	.02	.00	.08	.07	.00	-.03	-.04	.06	-.01	.01	-.01
Total Primary Supply	6.70	7.44	7.35	7.12	6.91	7.44	7.41	7.22	6.92	7.45	7.03	7.16	7.24
Disposition													
Leaded	1.73	1.89	1.73	1.55	1.51	1.56	1.49	1.39	1.27	1.16	2.18	1.73	1.49
Unleaded	4.97	5.55	5.62	5.57	5.40	5.88	5.92	5.83	5.65	6.29	4.85	5.43	5.76
Total Product Supplied	6.70	7.44	7.35	7.12	6.91	7.44	7.41	7.22	6.92	7.45	7.03	7.16	7.24
Stocks													
Primary Finished Stock Levels[b]													
(million barrels)													
Opening	194.2	205.8	192.7	191.1	190.8	197.7	191.6	191.4	193.9	197.7	190.3	194.2	190.8
Closing	205.8	192.7	191.1	190.8	197.7	191.6	191.4	193.9	197.7	191.8	194.2	190.8	193.9

[a] Refinery Production plus production at natural gas processing plants.
[b] 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 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Oct. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-50,88-02).

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

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Refinery Output	2.58	2.60	2.72	3.03	2.80	2.72	2.77	2.97	2.73	2.76	2.80	2.73	2.82
Imports	.23	.21	.27	.26	.35	.23	.23	.39	.35	.25	.25	.24	.30
Exports	.10	.06	.05	.04	.09	.06	.07	.07	.09	.06	.10	.06	.07
Net Imports	.12	.16	.22	.21	.26	.17	.17	.32	.26	.19	.15	.18	.23
Net Withdrawals	.50	.06	-.25	-.11	.39	-.07	-.29	-.12	.51	-.06	-.03	.05	-.02
Disposition													
Electric Utility Consumption	.04	.04	.05	.04	.05	.04	.04	.04	.05	.04	.04	.04	.04
Utility Stock Additions	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Electric Utility Shipments	.04	.04	.05	.04	.05	.04	.04	.04	.05	.04	.04	.04	.04
Nonutility Shipments	3.16	2.78	2.64	3.09	3.40	2.78	2.60	3.13	3.45	2.85	2.88	2.92	2.98
Total Product Supplied	3.20	2.82	2.69	3.13	3.46	2.82	2.65	3.17	3.49	2.88	2.91	2.96	3.02
Stocks													
Electric Utility Stock Levels													
(million barrels)													
Opening	16.3	16.0	15.7	16.0	15.9	15.8	15.6	15.4	15.3	15.2	16.4	16.3	15.9
Closing	16.0	15.7	16.0	15.9	15.8	15.6	15.4	15.3	15.2	15.2	16.3	15.9	15.3
Primary Stock Levels													
(million barrels)													
Opening	155.1	110.0	104.3	126.9	137.2	101.6	107.6	134.4	145.9	100.4	143.7	155.1	137.2
Closing	110.0	104.3	126.9	137.2	101.6	107.6	134.4	145.9	100.4	106.2	155.1	137.2	145.9

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 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Oct. 1987; *Monthly Energy Review*, DOE/EIA-0035(87/10); *Electric Power Monthly*, DOE/EIA-0226(87/10); *Weekly Petroleum Status Report*, DOE/EIA-0208(87-50,88-02).

Table 12. Quarterly Supply and Disposition of Residual Fuel Oil: Base Case
(Million Barrels per Day, Except Stocks)

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Refinery Output	0.87	0.84	0.89	0.93	0.97	0.83	0.81	0.81	0.86	0.80	0.89	0.88	0.85
Imports	.61	.51	.57	.49	.70	.49	.41	.54	.67	.48	.67	.54	.54
Exports	.19	.16	.18	.19	.20	.18	.16	.20	.20	.18	.15	.18	.19
Net Imports	.42	.34	.39	.29	.50	.31	.26	.33	.47	.31	.52	.36	.35
Net Withdrawals	.09	-.02	-.03	-.05	.10	-.02	-.03	-.04	.08	-.02	.01	.00	.00
Disposition													
Electric Utility Consumption	.57	.45	.53	.43	.58	.41	.48	.40	.49	.39	.59	.49	.47
Utility Stock Additions	-.08	-.02	.04	.01	.03	-.04	-.03	.02	.01	-.03	.00	-.01	.00
Electric Utility Shipments	.49	.43	.57	.43	.61	.37	.46	.42	.50	.36	.59	.48	.47
Nonutility Shipments	.89	.73	.68	.74	.96	.74	.58	.69	.91	.72	.83	.76	.74
Total Product Supplied	1.38	1.16	1.25	1.17	1.57	1.12	1.04	1.11	1.42	1.08	1.42	1.24	1.21
Stocks													
Electric Utility Stock Levels (million barrels)													
Opening	56.8	50.0	47.9	51.8	52.6	55.2	51.7	49.3	51.1	51.9	57.3	56.8	52.6
Closing	50.0	47.9	51.8	52.6	55.2	51.7	49.3	51.1	51.9	49.0	56.8	52.6	51.1
Primary Stock Levels (million barrels)													
Opening	47.4	39.6	41.3	44.2	48.8	39.3	41.2	43.5	47.0	39.4	50.4	47.4	48.8
Closing	39.6	41.3	44.2	48.8	39.3	41.2	43.5	47.0	39.4	41.3	47.4	48.8	47.0

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 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Oct. 1987; *Monthly Energy Review*, DOE/EIA-0035(87/10); *Electric Power Monthly*, DOE/EIA-0226(87/10); *Weekly Petroleum Status Report*, DOE/EIA-0208(87-50,88-02).

Table 13. Quarterly Supply and Disposition of Other Petroleum Products: Base Case[a]
(Million Barrels per Day, Except Stocks)

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Net Refinery Output[b]	2.95	3.01	3.38	2.82	2.71	3.01	3.22	2.90	2.80	3.10	2.89	3.04	2.96
Natural Gas Plant Output	1.61	1.59	1.58	1.62	1.62	1.57	1.57	1.62	1.63	1.57	1.55	1.60	1.59
Other Domestic[c]	.07	.05	.06	.06	.06	.06	.06	.07	.06	.06	.06	.06	.06
Net Imports	.38	.36	.45	.49	.58	.42	.47	.47	.65	.46	.45	.42	.49
Net Withdrawals	.00	-.04	-.19	.22	.10	-.19	-.10	.32	.00	-.19	-.09	.00	.03
Total Primary Supply	5.01	4.96	5.29	5.22	5.07	4.87	5.24	5.38	5.14	5.00	4.87	5.12	5.14
Disposition													
Jet Fuel	1.36	1.30	1.35	1.42	1.42	1.32	1.39	1.52	1.48	1.38	1.31	1.36	1.41
Liquefied Petroleum Gas[d]	1.29	.92	1.04	1.35	1.35	.89	.96	1.31	1.30	.87	1.02	1.15	1.13
Petrochemical Feedstocks[e]	.93	.96	.92	.94	.97	.97	.98	1.00	1.02	1.05	.96	.94	.98
Miscellaneous[f]	1.44	1.78	1.97	1.51	1.33	1.68	1.91	1.55	1.34	1.70	1.58	1.68	1.62
Total Product Supplied	5.02	4.96	5.29	5.22	5.07	4.87	5.24	5.38	5.14	5.00	4.87	5.12	5.14
Stock													
Primary Stocks													
(million barrels)													
Opening	352.9	352.6	356.6	373.9	353.4	344.6	362.0	371.0	341.9	341.6	320.2	352.9	353.4
Closing	352.6	356.6	373.9	353.4	344.6	362.0	371.0	341.9	341.6	359.1	352.9	353.4	341.9

[a] 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.

[b] Includes refinery production of all other products less natural gas liquids, liquefied refinery gases, and "other liquids" input to refineries.

[c] Field production of other hydrocarbons and alcohol.

[d] Includes propane, normal butane, and isobutane.

[e] Includes ethane plus naphtha and other oils designated for petrochemical feedstock use.

[f] Includes all petroleum products supplied except motor gasoline, distillate, residual fuel, liquefied petroleum gases, petrochemical feedstocks, and jet fuel.

Notes: Historical values are printed in **boldface,** forecasts in *italics. Data for November and December 1987 are preliminary.*

Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986,* DOE/EIA-0340(86)/1; *Petroleum Supply Monthly,* DOE/EIA-0109, Jan. 1987 to Oct. 1987; and *Weekly Petroleum Status Report,* DOE/EIA-0208(87-50,88-02).

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

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Total Dry Gas Production*	4.27	3.93	3.89	4.12	4.28	4.14	3.70	4.01	4.45	4.24	15.99	16.21	16.13
Net Imports	.25	.17	.16	.22	.29	.20	.19	.21	.34	.18	.69	.80	.89
Supplemental Gaseous Fuels	.05	.03	.03	.03	.05	.03	.03	.03	.05	.03	.11	.15	.14
Total New Supply	4.57	4.13	4.09	4.37	4.62	4.37	3.92	4.25	4.84	4.45	16.79	17.16	17.16
Underground Working Gas Storage													
Opening	2.75	1.88	2.43	3.04	2.89	1.63	2.19	2.91	2.77	1.63	2.61	2.75	2.89
Closing	1.88	2.43	3.04	2.89	1.63	2.19	2.91	2.77	1.63	2.23	2.75	2.89	2.77
Net Withdrawals^b	.88	-.56	-.61	.32	1.26	-.57	-.72	.14	1.14	-.61	-.15	.03	.12
Total Primary Supply*	5.45	3.58	3.48	4.69	5.89	3.80	3.20	4.40	5.98	3.85	16.64	17.20	17.28
Consumption													
Lease and Plant Fuel	.25	.23	.22	.25	.35	.22	.18	.25	.36	.22	.92	.95	1.00
Pipeline Use	.14	.12	.11	.13	.18	.11	.09	.13	.18	.11	.48	.50	.51
Residential	2.03	.78	.37	1.24	2.13	.81	.37	1.16	2.15	.83	4.31	4.43	4.46
Commercial	.99	.43	.27	.64	1.03	.43	.27	.59	1.04	.44	2.32	2.33	2.31
Industrial	1.55	1.32	1.29	1.59	1.75	1.41	1.27	1.50	1.77	1.45	5.57	5.76	5.93
Electric Utilities	.53	.73	.93	.70	.49	.69	.89	.64	.53	.66	2.60	2.89	2.71
Subtotal	5.49	3.61	3.20	4.55	5.92	3.67	3.07	4.27	6.02	3.72	16.21	16.85	16.93
Total Disposition	5.45	3.58	3.48	4.69	5.89	3.80	3.20	4.40	5.98	3.85	16.64	17.20	17.28
Unaccounted for	-.04	-.03	.28	.14	-.04	.13	.13	.13	-.04	.13	.43	.35	.36

* Excludes nonhydrocarbon gases removed.

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

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

Sources: Historical data: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(87/10); *Natural Gas Monthly,* DOE/EIA-0130(87/10); and *Electric Power Monthly,* DOE/EIA-0226(87/10).

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

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Production	b 222	b 218	b 232	c 244	220	225	230	239	231	235	b 890	c 917	914
Primary Stock Levels[a]													
Opening	32	37	34	29	31	31	31	31	31	31	33	32	31
Closing	b 37	b 34	b 29	c 31	31	31	31	31	31	31	b 32	c 31	31
Net Withdrawals	b –4	b 3	b 5	c –2	0	0	0	0	0	0	b 1	c 1	0
Imports	b 0	b 0	b 0	c 1	0	0	0	1	0	0	b 2	c 2	2
Exports	b 17	b 20	b 21	c 20	17	20	19	18	17	19	b 86	c 78	74
Total New Domestic Supply	b 201	b 201	b 217	c 223	203	205	211	222	215	217	b 808	c 842	842
Secondary Stock Levels[d]													
Opening	175	173	176	165	180	173	181	170	185	190\	170	175	180
Closing	b 173	b 176	b 165	c 180	173	181	170	185	190	208	b 175	c 180	185
Net Withdrawals	b 2	b –3	b 11	c –14	6	–8	11	–15	–5	–19	b –5	c –5	–5
Total Indicated Consumption	b 203	b 199	b 228	c 208	209	198	222	207	210	198	b 803	c 838	837
Consumption													
Coke Plants	b 8	b 9	b 10	c 10	9	10	10	10	9	10	b 36	c 36	38
Electric Utilities	b 171	b 171	b 200	c 176	180	168	192	176	178	169	b 685	c 719	717
Retail and General Industry[e]	b 21	b 19	b 20	c 22	21	20	20	21	22	20	b 83	c 81	82
Subtotal	b 199	b 200	b 229	c 208	209	198	222	207	210	198	b 804	c 837	837
Total Disposition	b 203	b 199	b 228	c 208	209	198	222	207	210	198	b 803	c 838	837
Discrepancy[f]	4	–1	–2	0	0	0	0	0	0	0	–1	1	0

[a] Primary stocks are held at the mines, preparation plants, and distribution points.
[b] Preliminary.
[c] Estimated.
[d] Secondary stocks are held by users. Most of the secondary stocks are held by electric utilities.
[e] Includes consumption at coal gasification plants of 6.0 million tons for 1986. For the third quarter of 1987 and for the forecast, synfuels account for 1.7 million tons per quarter.
[f] 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(87/10); and *Quarterly Coal Report*, DOE/EIA-0121(87/3Q).

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

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th[a]	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Net Utility Generation													
Coal	348.2	349.8	407.5	357.0	*366.3*	*343.1*	*389.4*	*357.3*	*363.2*	*344.4*	1385.8	1462.5	*1456.2*
Petroleum	32.4	26.7	31.5	25.3	*34.0*	*24.2*	*28.7*	*23.8*	*28.6*	*22.9*	136.6	115.9	*110.7*
Natural Gas	51.3	69.9	88.4	66.8	*46.5*	*66.1*	*84.5*	*60.8*	*50.4*	*62.9*	248.5	276.5	*257.8*
Nuclear Power	113.9	104.4	120.6	113.3	*125.7*	*115.1*	*127.4*	*120.4*	*129.3*	*120.3*	414.0	452.2	*488.7*
Hydropower	69.9	67.1	56.8	55.0	*70.6*	*73.5*	*62.5*	*65.7*	*79.3*	*81.0*	290.8	248.8	*272.4*
Geothermal Power and Other[b]	3.0	3.0	3.2	3.1	*3.0*	*3.0*	*3.2*	*3.3*	*3.2*	*3.2*	11.5	12.4	*12.5*
Total Utility Generation	618.6	621.0	708.1	620.6	*646.2*	*625.1*	*695.7*	*631.3*	*654.1*	*634.7*	2487.3	2568.2	*2598.2*
Net Imports	13.1	11.9	11.6	9.8	*9.5*	*8.7*	*10.2*	*9.3*	*9.1*	*8.6*	35.9	46.4	*37.9*
Total Supply	631.7	632.9	719.7	630.4	*655.7*	*633.9*	*705.9*	*640.6*	*663.2*	*643.3*	2523.2	2614.6	*2636.1*
Losses and Unaccounted For[c]	30.3	51.6	38.5	34.4	*35.4*	*34.2*	*38.1*	*34.6*	*33.2*	*32.2*	172.4	154.8	*142.3*
Utility Sales	601.4	581.3	681.1	595.9	*620.3*	*599.6*	*667.8*	*606.0*	*630.1*	*611.2*	2350.8	2459.8	*2493.8*

[a] Estimated.
[b] Includes wind, wood, waste, photovoltaic, and solar.
[c] Balancing item between supply and sales, representing transmission and distribution losses and nonutility generation sold into the utility grid.

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(87/10); and *Electric Power Monthly*, DOE/EIA-0226(87/10).

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

Supply and Disposition	1987				1988				1989		Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	1986	1987	1988
Supply													
Production													
Petroleum[a]	4.93	4.95	4.93	5.00	4.95	4.87	4.89	4.89	4.77	4.76	20.52	19.81	19.59
Natural Gas[b]	4.40	4.04	4.01	4.24	4.41	4.26	3.81	4.13	4.58	4.37	16.47	16.69	16.62
Coal	4.86	4.79	5.09	5.35	4.82	4.93	5.03	5.25	5.07	5.16	19.51	20.10	20.03
Nuclear Power	1.23	1.13	1.30	1.22	1.36	1.24	1.38	1.30	1.40	1.30	4.48	4.89	5.28
Hydropower[c]	.73	.70	.59	.58	.74	.77	.65	.69	.83	.85	3.04	2.60	2.85
Geothermal Power and Other[d]	.06	.06	.06	.06	.06	.06	.06	.07	.06	.07	.23	.25	.25
Subtotal	16.21	15.67	16.00	16.46	16.34	16.14	15.82	16.32	16.72	16.50	64.26	64.34	64.62
Net Imports													
Crude Oil	2.04	2.28	2.79	2.64	2.12	2.48	2.70	2.60	2.21	2.67	8.68	9.75	9.91
Other Petroleum	.60	.59	.73	.67	.87	.66	.65	.77	.90	.70	2.85	2.59	2.95
Natural Gas	.25	.17	.16	.22	.29	.20	.19	.21	.34	.18	.68	.80	.89
Coal and Coke	-.43	-.51	-.54	-.51	-.44	-.52	-.49	-.46	-.44	-.49	-2.21	-1.99	-1.91
Electricity	.14	.12	.12	.10	.10	.09	.11	.10	.09	.09	.37	.48	.39
Subtotal	2.60	2.65	3.27	3.11	2.94	2.91	3.16	3.22	3.10	3.15	10.38	11.62	12.23
Primary Stocks													
Net Withdrawals	1.04	-.42	-.77	.19	1.64	-.64	-.89	.16	1.46	-.73	-.35	.03	.27
SPR Fill Rate Additions(-)	-.05	-.04	-.04	-.04	-.03	-.02	-.02	-.03	-.03	-.03	-.11	-.17	-.09
Secondary Stocks[e]													
Net Withdrawals	.09	-.05	.20	-.31	.07	-.11	.26	-.29	-.19	-.34	-.12	-.07	-.07
Total Supply[f]	19.88	17.81	18.65	19.41	20.97	18.28	18.33	19.38	21.06	18.55	74.05	75.74	76.95
Disposition													
Nonutility Uses													
Petroleum	7.62	7.81	7.94	8.04	8.04	7.77	7.86	8.18	7.99	7.87	30.73	31.42	31.84
Natural Gas[g]	5.10	2.96	2.34	3.97	5.60	3.06	2.24	3.73	5.65	3.14	14.01	14.37	14.63
Coal[h]	.68	.67	.71	.75	.68	.66	.71	.73	.71	.66	2.81	2.81	2.78
Industrial Hydropower	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.03	.03	.03
Subtotal	13.41	11.45	11.00	12.77	14.32	11.50	10.81	12.64	14.36	11.68	47.58	48.63	49.28
Electric Utility Inputs													
Petroleum	.35	.28	.34	.27	.36	.26	.31	.25	.31	.24	1.45	1.23	1.18
Natural Gas	.55	.76	.96	.72	.51	.72	.92	.66	.55	.68	2.69	2.99	2.80
Coal	3.60	3.62	4.22	3.72	3.82	3.58	4.06	3.72	3.79	3.59	14.44	15.15	15.18
Nuclear Power	1.23	1.13	1.30	1.22	1.36	1.24	1.38	1.30	1.40	1.30	4.48	4.89	5.28
Hydropower[i]	.86	.82	.71	.67	.83	.85	.75	.78	.91	.93	3.38	3.05	3.21
Geothermal Power and Other	.06	.06	.06	.06	.06	.06	.06	.07	.06	.07	.23	.25	.25
Subtotal	6.65	6.66	7.59	6.67	6.93	6.71	7.48	6.78	7.02	6.81	26.67	27.56	27.90
Gross Energy Consumption[f]	20.06	18.11	18.58	19.43	21.26	18.21	18.29	19.42	21.38	18.49	74.25	76.19	77.18
Electrical System Energy Losses[j]	4.60	4.68	5.26	4.63	4.82	4.66	5.20	4.71	4.87	4.72	18.65	19.17	19.39
Total Net Energy	15.46	13.44	13.32	14.80	16.44	13.55	13.09	14.71	16.51	13.76	55.60	57.02	57.79
Total Disposition	19.88	17.81	18.65	19.41	20.97	18.28	18.33	19.38	21.06	18.55	74.05	75.74	76.95
Unaccounted for	-.17	-.31	.06	-.03	-.29	.06	.04	-.05	-.32	.06	-.20	-.44	-.23

[a] Includes crude oil and lease condensate, natural gas liquids, hydrogen, etc., input to oil refineries.
[b] Total dry gas production excluding nonhydrocarbon gases removed.
[c] Includes industrial production.
[d] Includes wood and waste used to generate electricity.
[e] Primarily electric utility stocks.
[f] This total excludes approximately 2 quadrillion Btu of wood.
[g] Includes natural gas used as refinery fuel.
[h] Includes net imports of coal coke.
[i] Includes net imports of electricity.
[j] 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 historical 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(87/10); and *Electric Power Monthly*, DOE/EIA-0226(87/10).

Table 18. Conversion Factors

Fuel	Unit	Heat Content (million Btu per unit)
Coal		
Production	Short ton	21.918
Consumption	Short ton	21.467
Coke Plants	Short ton	26.800
Industrial and Retail	Short ton	22.312
Electric Utilities	Short ton	21.084
Imports	Short ton	25.000
Exports	Short ton	26.292
Coal Coke	Short ton	24.800
Crude Oil		
Production	Barrel	5.800
Imports	Barrel	5.903
Petroleum Products		
Consumption	Barrel	5.415
Motor Gasoline	Barrel	5.253
Jet Fuel	Barrel	5.621
Distillate Fuel Oil	Barrel	5.825
Residual Fuel Oil	Barrel	6.287
LPG (excluding ethane)	Barrel	3.912
Ethane	Barrel	3.082
Unfinished Oils	Barrel	5.825
Imports	Barrel	5.624
Exports	Barrel	5.839
Natural Gas Plant Liquids		
Production	Barrel	3.797
Natural Gas		
Production, Dry	Cubic foot	1,030
Consumption	Cubic foot	1,030
Non-electric Utilities	Cubic foot	1,029
Electric Utilities	Cubic foot	1,034
Imports	Cubic foot	997
Exports	Cubic foot	1,008

Electricity Component	Heat Rate (Btu per kilowatthour)
Plant Generation Efficiency	
Coal	10,422
Petroleum	
Distillate Fuel Oil	11,988
Residual Fuel Oil	10,553
Natural Gas	10,828
Nuclear Energy	10,809
Hydropower	10,339
Geothermal and Other Energy	21,263
Electricity Consumption	3,412

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