1987 Annual Energy Outlook
Oil and Gas Highlights
(see Appendix A)

EIA

Energy Information Administration

Short-Term Energy Outlook

Quarterly Projections

April 1988

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U.S. Department of Energy
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 and electricity imports are produced by Thomas Petersik; 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 Acting Director. Discussions concerning the effect of the Federal motor fuels tax on distillate fuel oil and concerning the natural gas spot market were contributed by Beth Campbell and James Todaro--both of the EIA Office of Oil and Gas.

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 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 fourth 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.

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Highlights

The short-term outlook for overall growth in the domestic economy is less bleak than reported in the January 1988 *Short-Term Energy Outlook (Outlook)*--thanks, in part, to several months of relatively encouraging news about consumer confidence. Despite some recent disquieting trade news, a continuing improvement in the trade situation is expected. The prospects for adverse consequences stemming from the October 1987 stock market crash have been discounted. Current excess crude oil stocks, weak demand for petroleum worldwide, and continued overproduction by OPEC have resulted in declining oil prices at the outset of the current forecast and good prospects for continued price weakness over the next two years.

Expectations Slightly Lower for World Oil Prices	During 1988 and 1989, oil prices are expected to range from $15 to $18 per barrel in the base case, $1 to $2 less than expected in the January 1988 *Outlook.*
Petroleum Demand Continues Upward	Petroleum demand has been increasing steadily since 1985 and is expected to continue in that direction in 1988 and 1989. Demand should rise by 290,000 barrels per day in 1988 to 16.9 million barrels per day. First-quarter growth accounts for about 75 percent of this increase. In 1989, demand is expected to continue to increase by about 140,000 barrels per day to 17.0 million barrels per day. High transportation activity and chemical production are the primary factors responsible for petroleum growth. In addition, the first quarter of 1988 was much colder than the first quarter of 1987, leading to greater use of oil in meeting heating needs.
Imports Become Increasingly Important in Meeting Petroleum Demand	Expanding demand coupled with falling domestic production may lead to an increase in crude oil imports of 11 percent this year to 5.1 million barrels per day (excluding imports for the Strategic Petroleum Reserve), or about 490,000 barrels per day above 1987 import levels. Despite the assumption of a return to normal weather in the forecast period, further declines in domestic production and advances in demand could stimulate an additional increase in imports of 6.3 percent in 1989.
Domestic Oil Production Decline Expected to Slow	Although domestic crude oil production is expected to slacken by 130,000 barrels per day in 1988, the drop is far less than the decline of 370,000 barrels per day posted for 1987. The decline in Alaskan production is expected to begin next year and will worsen slightly the overall oil production picture in 1989 (when production is expected to erode by 150,000 barrels per day).
Electricity Growth Lower Than in 1987, but Still Strong	The combined effects of a hot summer and a healthy domestic economy last year, particularly in the industrial sector, stimulated growth in electricity generation of 3.4 percent. An optimistic portrait for the economy in 1988 and 1989 and cold weather in the first quarter of this year should push generation up by an additional 2.0 percent and 2.1 percent, respectively. If temperatures across the United States vary from normal expectations, these growth rates could differ considerably.

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 differ from the base case assumptions (with all other factors held constant), the following could occur:

- For a 10-percent decline in the price of imported crude oil from the base case level, petroleum consumption could increase by about 0.8 percent (about 140,000 barrels per day in 1989, for example).

- For a 10-percent increase in heating degree days from the base case level during the heating season, petroleum consumption could increase by about 0.9 percent (about 150,000 barrels per day in the first quarter of 1989, for example).

- For a 10-percent increment in economic activity above the base case level, petroleum consumption could increase by about 0.7 percent (about 119,000 barrels per day in 1989, for example).

Assuming no domestic production response, these petroleum demand sensitivities would translate directly into increased net imports of petroleum on a barrel-for-barrel basis.

Table 1. Summary of Base Case Assumptions and Projections

Assumptions and Projections	Year				Annual Percentage Change		
	1986	1987	1988	1989	1986-1987	1987-1988	1988-1989
Macroeconomic Indicators							
Real Gross National Product (billion 1982 dollars)	3,713	3,821	*3,906*	*4,048*	2.9	*2.2*	*3.6*
Index of Industrial Production (Mfg.) (index, 1977=1.000)	1.291	1.346	*1.387*	*1.466*	4.3	*3.0*	*5.7*
Imported Crude Oil Price (nominal dollars per barrel)	14.00	18.15	*16.00*	*18.00*	29.6	*-11.8*	*12.5*
Retail Prices (nominal) [a]							
Motor Gasoline [b] (dollars per gallon)	.93	.96	*.91*	*.97*	3.2	*-5.2*	*6.6*
Retail No. 2 Heating Oil (dollars per gallon)	.84	.80	*.80*	*.82*	-4.8	*.0*	*2.5*
Residential Natural Gas (dollars per thousand cubic feet)	5.83	5.56	*5.67*	*5.95*	-4.6	*2.0*	*4.9*
Residential Electricity (cents per kilowatthour)	7.80	7.76	*7.74*	*7.97*	-.5	*-.3*	*3.0*
Petroleum Supply							
Crude Oil Production [c] (million barrels per day)	8.68	8.31	*8.18*	*8.03*	-4.3	*-1.6*	*-1.8*
Net Petroleum Imports, Including SPR (million barrels per day)	5.44	5.77	*6.27*	*6.65*	6.1	*8.7*	*6.1*
Consumption							
Total Market Economies Petroleum Consumption (million barrels per day)	47.97	48.50	*49.12*	*49.95*	1.1	*1.3*	*1.7*
Total U.S. Petroleum Consumption (million barrels per day)	16.28	16.56	*16.85*	*16.99*	1.7	*1.8*	*.8*
Motor Gasoline	7.03	7.18	*7.29*	*7.37*	2.1	*1.5*	*1.1*
Distillate Fuel Oil	2.91	2.96	*3.04*	*3.06*	1.7	*2.7*	*.7*
Residual Fuel Oil	1.42	1.25	*1.22*	*1.19*	-12.0	*-2.4*	*-2.5*
Other Petroleum [d]	4.92	5.17	*5.30*	*5.37*	5.1	*2.5*	*1.3*
Coal Consumption (million short tons)	804	837	*843*	*851*	4.1	*.7*	*.9*
Natural Gas Consumption (trillion cubic feet)	16.22	16.68	*17.01*	*17.54*	2.8	*2.0*	*3.1*
Electricity Generation (billion kilowatthours)	2,487.3	2,571.4	*2,621.6*	*2,676.9*	3.4	*2.0*	*2.1*
Total Energy Consumption[e] (quadrillion Btu)	74.26	75.99	*77.65*	*79.19*	2.3	*2.2*	*2.0*
Thousand Btu/1982 Dollar of GNP	20.00	19.89	*19.88*	*19.56*	-.6	*-.1*	*-1.6*

[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(88/01); *International Energy Annual 1986* DOE/EIA-0219(86); *Petroleum Marketing Monthly,* DOE/EIA-0380(88/01); *Petroleum Supply Monthly,* DOE/EIA-0109(88/01); *Petroleum Supply Annual 1986,* DOE/EIA-0340(86)/1; *Natural Gas Monthly,* DOE/EIA-0130(88/01); *Electric Power Monthly,* DOE/EIA-0226(88/01); and *Quarterly Coal Report,* DOE/EIA-0121(87/4Q); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through November 1987.
  Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0388.

Assumptions

- *International Petroleum*

- *World Oil Prices*

- *Macroeconomic Activity*

- *Energy Product Prices*

International Petroleum

Recent Developments

By the end of the first quarter of 1988, the OPEC oil producers had completely lost the test of wills with buyers over pricing terms described in the last *Outlook*, and most OPEC crude oils were selling at market-related prices. As a result, spot prices for OPEC crude oils on April 1 ranged between $13 and $16 per barrel, up from their lows of $12 to $14 in early March, but still well below the corresponding official selling prices of about $16 to $19. OPEC lost the battle despite production restraint by OPEC and refusals by buyers to purchase OPEC crude oil at official prices. These factors kept OPEC production in the first quarter (for the 12 members with quotas) below OPEC's production ceiling of 15.06 million barrels per day. Two developments outside OPEC's control contributed most to the downward pressure on prices in the first quarter. First, initial estimates indicate that unseasonably warm weather in Europe during the period pushed European oil consumption well below the previously expected rate, more than offsetting an increase in U.S. consumption that was larger than expected. Second, the rates of non-OPEC oil production and net Communist exports to the market economies were both above rates for the first quarter of 1987.

At the end of March, the OPEC producers faced a set of circumstances that had the potential to force crude oil prices even lower during the second quarter. First, the consumption of oil products was expected to decrease sharply from the rate in the first quarter, assuming normal seasonal demand patterns. Second, the OPEC countries still appeared to be so deeply divided that they would be unable to agree on an effective course of action, unless faced with the possibility of a complete price collapse. One indication of the depths of OPEC's difficulties was that Saudi Arabia stubbornly refused to be OPEC's swing producer. In the first quarter, the Saudis produced at close to their OPEC quota rate, even though significant volumes of that production went unsold and had to be added to Saudi inventories. Third, non-OPEC oil producers, although concerned about falling crude oil prices, were unwilling to reduce their production unless OPEC agreed to a reduction first.

On April 9, 1988, the OPEC Price Monitoring Committee made an unexpected announcement that OPEC and non-OPEC oil producers would meet in late April to discuss the situation in the world oil market. As a result, spot prices for OPEC crude oil increased by about $1 per barrel, to a range between $14 and $17 per barrel on April 15. Ultimately, however, the ability of producers to bring supply in line with demand will determine world oil price levels.

- In 1987, the price of imported crude oil delivered to U.S. refiners declined from $18.57 per barrel in October to $17.45 in December, averaging $18.00 for the fourth quarter. Imported oil fell to $16.09 this January.

- It is estimated from current data that OPEC oil production (including about 1.69 million barrels per day of condensate and liquefied petroleum gas production and refinery gain) averaged 18.99 million barrels per day in the first quarter of 1988, a decrease of 1.54 million barrels per day from the revised rate for the fourth quarter of 1987 (Figure 1 on page 8 and Table 2 on page 39). OPEC crude oil production, which averaged 18.68 million barrels per day in December of last year, decreased to about 17.24 million barrels per day this January and to about 17.21 million barrels per day in February, as oil buyers refused to purchase crude oil at official prices. In March of this year, OPEC crude oil production increased to 17.46 million barrels per day, as more producers offered market-related prices.

- Beginning in this *Outlook*, seasonality factors have been used to develop the quarterly forecasts of petroleum demand from the developing or Other Market Economies. Separate factors were developed for the OPEC country group and the Other Developing Country group, using seasonal trends in comparable OECD countries. Previously, petroleum demand for these regions was assumed to grow uniformly over the year.

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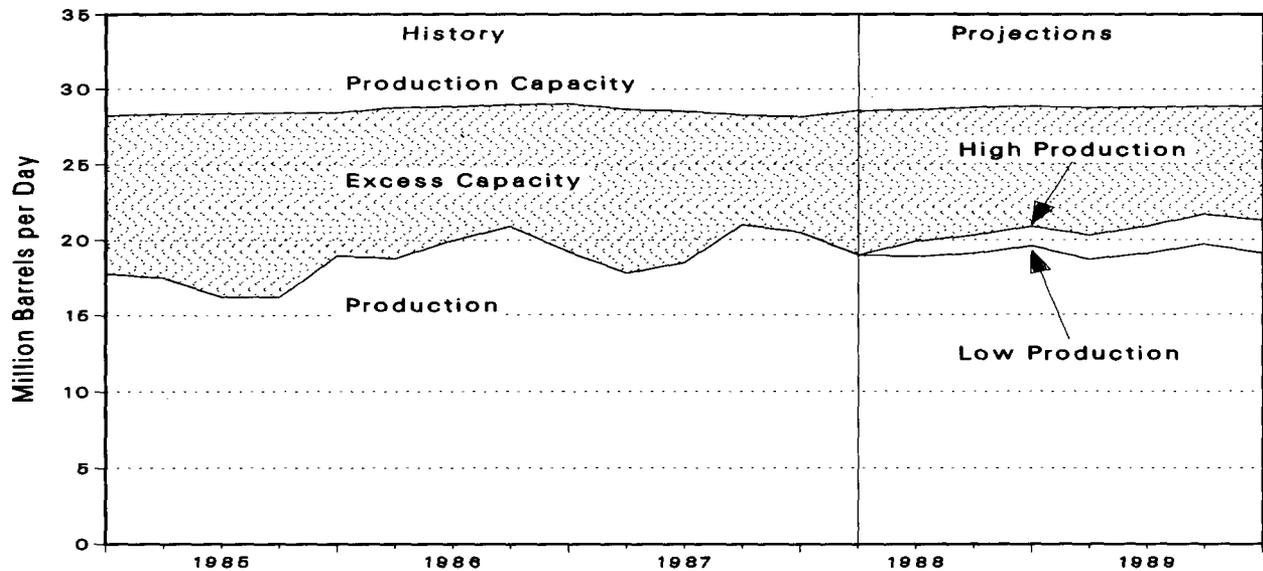
Note: OPEC production includes crude oil, natural gas liquids, and refinery gain.
Sources: • History: Energy Information Administration, Office of Energy Markets and End Use, International and Contingency Information Division. • Projections: Table 2.

Forecast

The demand for petroleum products by the market economies is expected to average 49.12 million barrels per day in 1988, an increase of about 620,000 barrels per day, or 1.3 percent from the 1987 rate. In 1989, demand is expected to increase by about 830,000 barrels per day, or 1.7 percent (Table 2 on page 39).

- Petroleum demand by the OECD countries is expected to average 35.78 million barrels per day in 1988, an increase of 290,000 barrels per day, or 0.8 percent from the 1987 rate. While the magnitude of growth is similar to that reported in the last *Outlook*, the regional composition has shifted. In the last *Outlook*, the United States and OECD Europe were each expected to account for about 40 percent of the 1988 increase in OECD consumption. Now, however, U.S. consumption is expected to increase by an amount equal to the aggregate OECD increase, while European consumption should decrease by 80,000 barrels per day, as a result of first-quarter 1988 consumption falling 400,000 barrels per day below the year-earlier rate. In 1989, OECD consumption is expected to increase by 490,000 barrels per day, or 1.4 percent, assuming a return to normal weather patterns in Europe and higher economic growth in the United States (Table 3 on page 39).

- Oil production from the non-OPEC market economies will increase by about 300,000 barrels per day in 1988, reaching 27.10 million barrels per day, followed by a further increase of 230,000 barrels per day in 1989. In 1988, production increases expected from Mexico, the North Sea, and other European oil producers should just offset the combined decline of about 225,000 barrels per day expected in production from the United States, Canada, and Australia, with the net production increase coming from smaller producers in the developing countries. The aggregate production increase is expected to be lower in 1989 primarily because no increase is expected in North Sea production.

- Net oil exports from Communist countries to the market economies are expected to remain unchanged in 1988, with the decrease of 100,000 barrels per day reported in the last *Outlook* now postponed until 1989.

- The forecast detailed above implies a call on OPEC oil in 1988 of 19.59 million barrels per day, or only about 120,000 barrels per day more than the average OPEC oil production in 1987. The implied call on OPEC oil in 1989 is 20.1 million barrels per day. 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
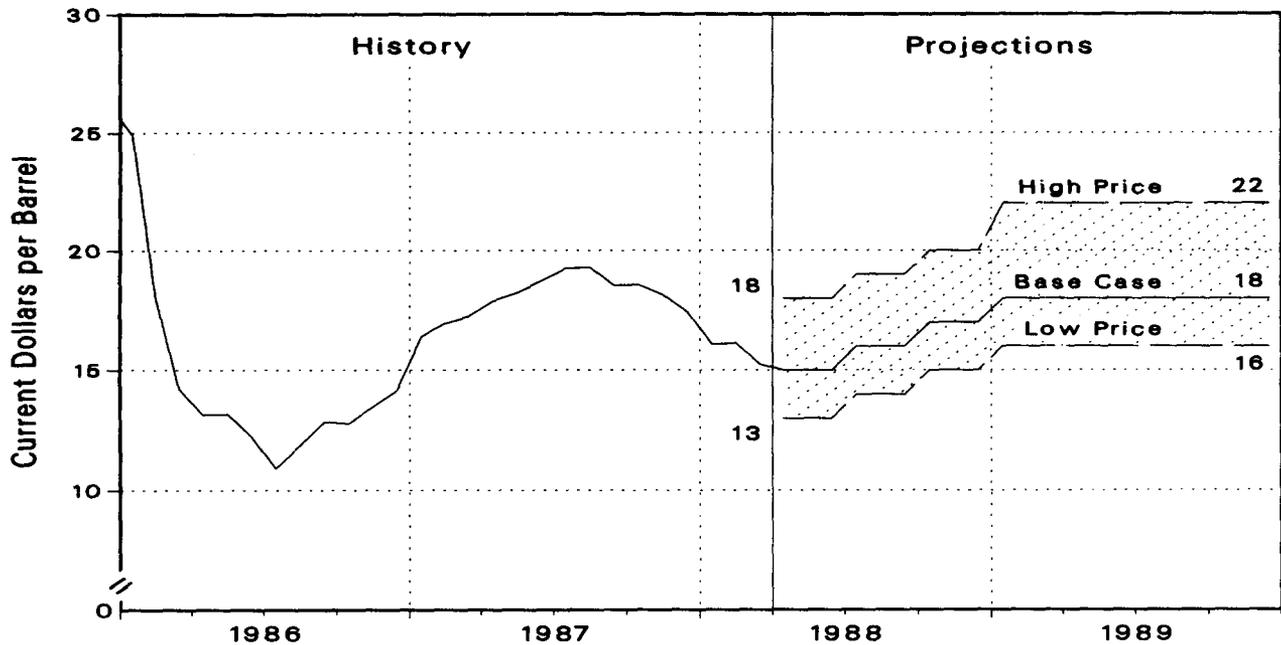
World Oil Prices

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 base case energy projections and two alternative 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 4 on page 40). None of the scenarios addresses the potential effects on oil prices of a significant disruption in oil supplies from the Persian Gulf resulting from increased military hostilities.

- In the base oil price scenario, the world oil price falls from about $16 per barrel in the first quarter of 1988 to $15 in the second quarter, then rises to $16 in the third quarter, $17 in the fourth quarter, and $18 in 1989. This scenario is based on the assumption that OPEC oil producers will take no action to reduce their production quotas, and that their actual production levels will not greatly exceed those quotas. Seasonally weak demand will force the OPEC producers to offer larger price discounts in the second quarter, but, subsequently, increasing seasonal demand will allow producers gradually to eliminate discounts by the end of the fourth quarter.

- In the low oil price scenario, the world oil price falls to $13 per barrel in the second quarter of 1988, then rises to $14 in the third quarter, $15 in the fourth quarter, and $16 in 1989. In this scenario, it is assumed that OPEC oil producers will be forced to offer much larger price discounts in the second quarter, as they attempt to push production significantly above quota levels. In the second half of the year, the seasonal increase in demand allows producers to reduce gradually the size of their discounts, but not below the level that prevailed in the first quarter of 1988.

- In the high oil price scenario, the world oil price increases to $18 per barrel in the second quarter of 1988, $19 in the third quarter, $20 in the fourth quarter, and $22 in 1989. In this scenario, it is assumed that the OPEC countries, along with some non-OPEC oil producers, will reduce their production sufficiently in the second quarter to force market-related prices for OPEC crude oil back to their official levels. Subsequently, continued production restraint and Persian Gulf tensions would result in continuing upward pressure on prices.

Figure 3. Real GNP and Components of Change
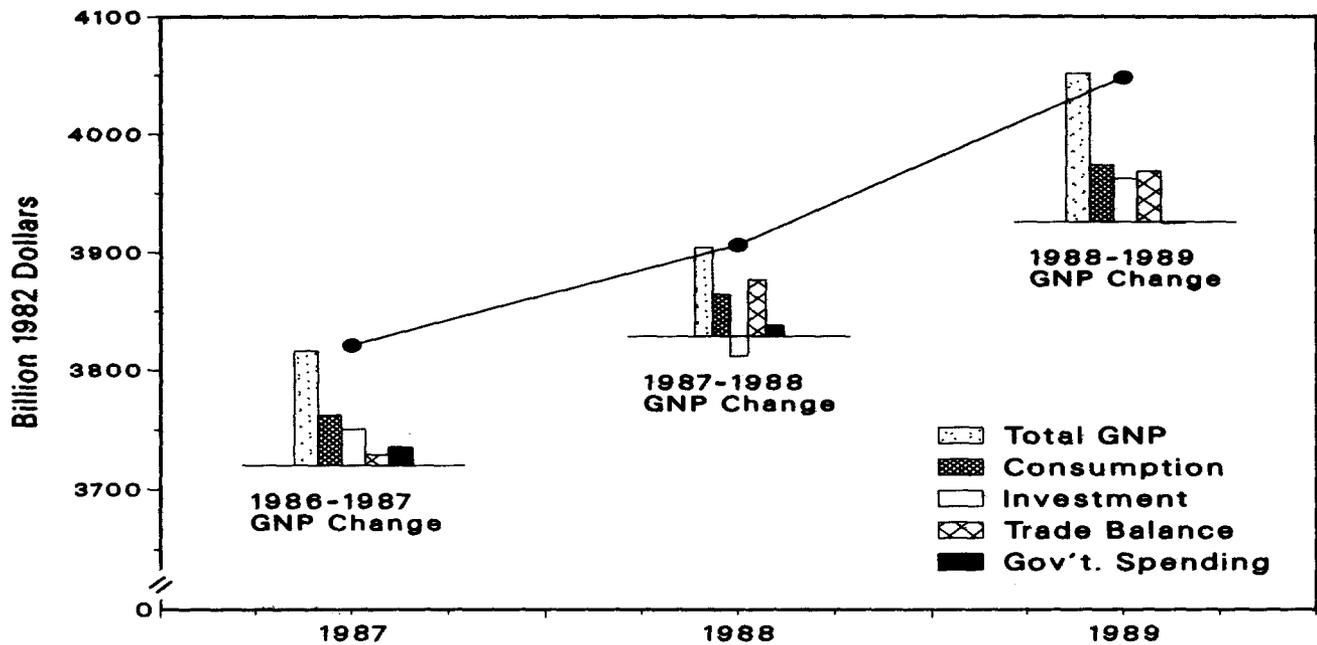
Macroeconomic Activity

The short-run view of the U.S. economy has changed from the view presented in the January 1988 *Outlook*. The effects of the October stock market crash were not as pervasive as previously forecast. Consumer confidence dropped sharply in October but has now returned to the level attained preceding the crash; the public seemed to decide that the market crash was largely a financial market phenomenon. Growth in real gross national product (GNP) in 1988 should approach 2.2 percent, up from 1.8 percent projected in the January *Outlook* (Table 4 on page 40). The export sector continues to be the primary source of growth in GNP this year. Consumption is not expected to serve as a major source of growth; rather, consumers should begin rebuilding savings. Total investment spending is expected to decline in 1988, as expenditures on investment for residential and stockpiling purposes should fall. In 1989, total investment spending is seen to recover sharply, with both residential and nonresidential investment posting gains. Growth in GNP is expected to reach 3.6 percent next year, concurrent with this sharp rebound in investment. With a stimulation in consumption behavior foreseen as well, the change in GNP in 1989 should be more evenly spread among its components than is expected for this year.

- The expected improvement in the U.S. trade balance should account for about 60 percent of real GNP growth in 1988. The dollar continues to depreciate throughout the forecast period. In 1989, the trade balance should improve further; however, its contribution to GNP growth declines somewhat due to the recovery in consumption and investment.

- The bond market has shown continued improvement in response to the recent optimistic outlook for U.S. trade and the persistent stock market instability; bond prices have risen while yields have declined. The assumption of relatively low interest rates is part of the investment recovery expected in 1989.

- Consumption growth is expected to be 1.7 percent in 1988 and 2.1 percent in 1989, contributing less to the GNP change than in previous years (Figure 3).

Figure 4. Indices of Economic Activity
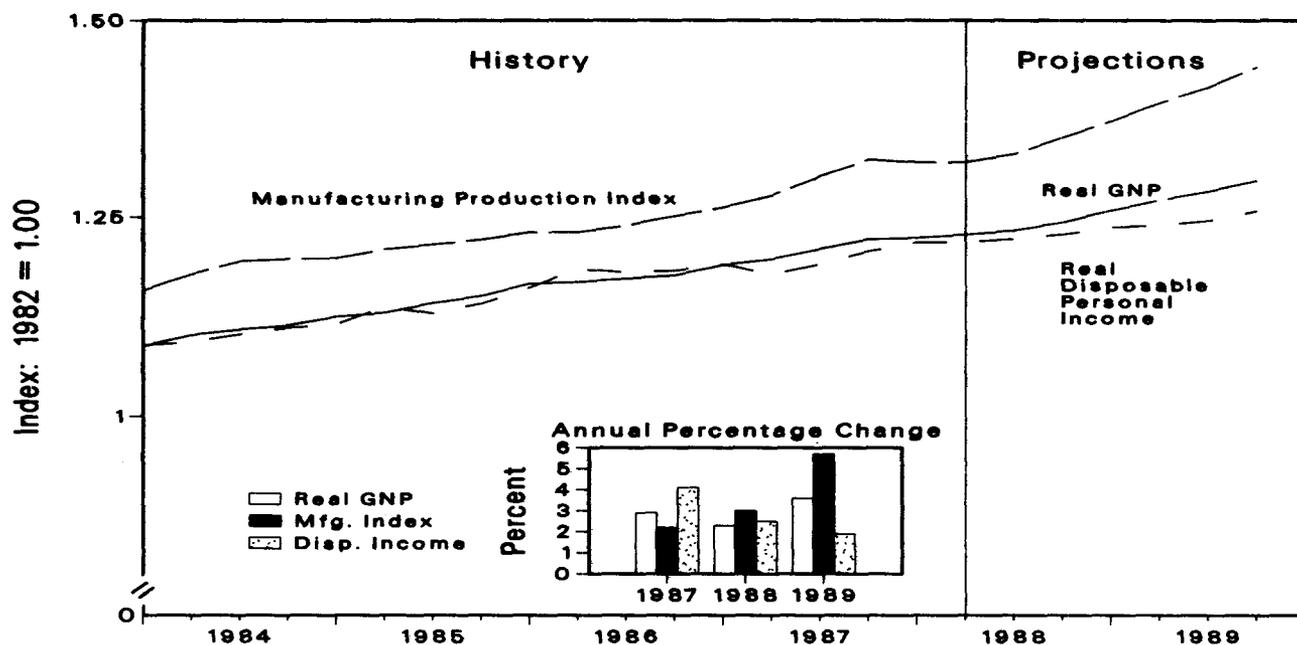
- Improvement in the U.S. export sector should stimulate growth of 3.0 percent among manufacturing industries in 1988. The paper, chemical, and steel industries show the greatest promise through the end of next year. Overall, the manufacturing industry should expand by 5.7 percent next year, concurrent with a recovery in domestic markets and continued penetration into foreign markets brought on by declining exchange rates (Figure 4).

- Real disposable income is expected to grow by 2.5 percent in 1988, compared to 2.0 percent projected in the January *Outlook*. In 1989, disposable income should improve by 1.9 percent.

Energy Product Prices

This year began with crude oil prices at just under $16 per barrel, and prices are expected to dip to $15 in the spring before rising to $18 next year. On an annual basis, prices are expected to fall by nearly 12 percent in 1988, then rebound at a similar rate in 1989. Most prices for petroleum products will follow the price path of crude oil, but at a lagged pace and with seasonal price variations (Table 5 on page 41). Natural gas prices are likely to increase throughout the forecast period, particularly in 1989.

- Gasoline prices in 1988 are expected to fall by 5 cents per gallon (Figure 5 on page 13). High margins in the first quarter of 1988 combined with normal seasonal increases in margins during the peak driving season prevent this decline from reflecting the full impact of lower crude oil costs. In fact, margins generally increase as crude costs decline. In 1989, projected stability in crude oil costs (barring any major supply disruptions) should settle the gasoline market. Margins are projected to increase at the rate of inflation, resulting in a price jump of 6 cents per gallon over 1988 prices. Prices should peak at about $1 per gallon in the summer of 1989--the height of the driving season.

- Heating oil stocks for this past winter were below normal levels. Consequently, margins (and therefore prices) rose significantly, even as crude oil costs fell. Moreover, the usual seasonal high in heating oil demand kept prices high for the first quarter. A drop to 74 cents per gallon is expected by this summer, however, as crude oil costs continue to slide and demand slackens during the nonheating season (Figure 6 on page 13). Next year should post an increase of 2 cents per gallon, primarily a reflection of a rise in the cost of crude oil. Retail heating oil prices are projected to reach 85 cents per gallon in the first quarter of 1989, the highest level since the first quarter of 1986.

- Retail prices for residual fuel oil should follow the crude oil market, but with some seasonal variation. Prices of both residual and crude oil are projected to decrease by 12 percent in 1988 and then rise by nearly 13 percent in 1989. However, inventories in the first quarter of this year remain high and have driven down the spot market price (New York, 1 percent sulfur) to as little as $12.75 per barrel (March 18, 1988), which is several dollars per barrel less than the crude oil price. If this trend continues, residual fuel oil prices in 1988 could average considerably less than crude oil costs. Unusually low prices, however, would most likely stimulate demand; higher demand would in turn place upward pressure on prices.

- After falling by 4.7 percent in 1987, residential natural gas prices are expected to increase by 2.0 percent in 1988 and by another 4.9 percent in 1989. Gas prices to electric utilities, which fell by 32 percent in 1986 and by an additional 4.4 percent in 1987, are expected to increase by 2.7 percent in 1988 and close to 10 percent in 1989. Declining petroleum prices for most of this year are the primary cause of the small amount of upward movement shown for natural gas prices in the face of recent upswings in spot prices for gas. In 1989, increasing petroleum prices should result in higher wellhead and end-user prices for natural gas.

- Residential electricity prices should fall slightly in 1988 (by 0.3 percent), as fossil fuel prices to electric utilities, especially for coal and oil, are projected to decrease (Figure 7 on page 13). In 1989, fossil fuel prices, particularly for natural gas, are expected to rise and contribute to electricity price gains of 3.0 percent, or just under the anticipated rate of inflation.

Figure 5. Motor Gasoline Prices
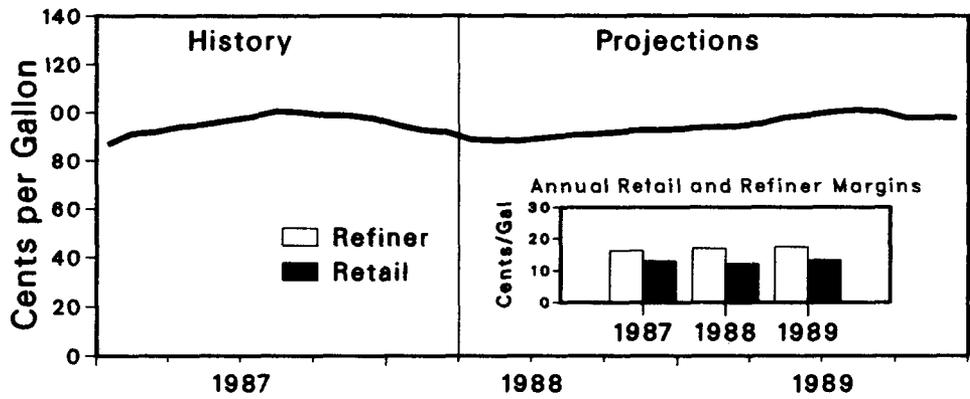
Gasoline Prices Should Fall in 1988 but Recover in 1989, in Reaction to the Price Path for Crude Oil

Sources: • History: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/01) (Washington, DC, 1988). • Projections: Table 5.

Figure 6. Distillate Prices
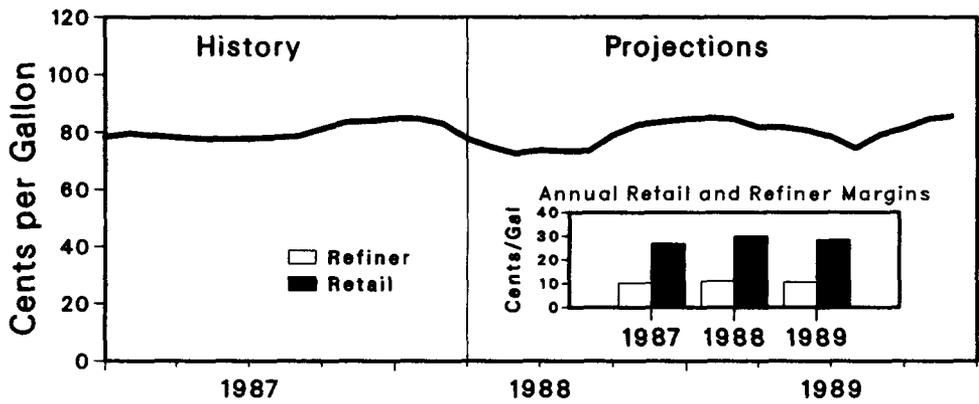
Prices for Heating Oil This Summer Should Reach Their Lowest Levels Since 1986

Sources: • History: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/01) (Washington, DC, 1988). • Projections: Table 5.

Figure 7. Utility Oil and Gas Prices
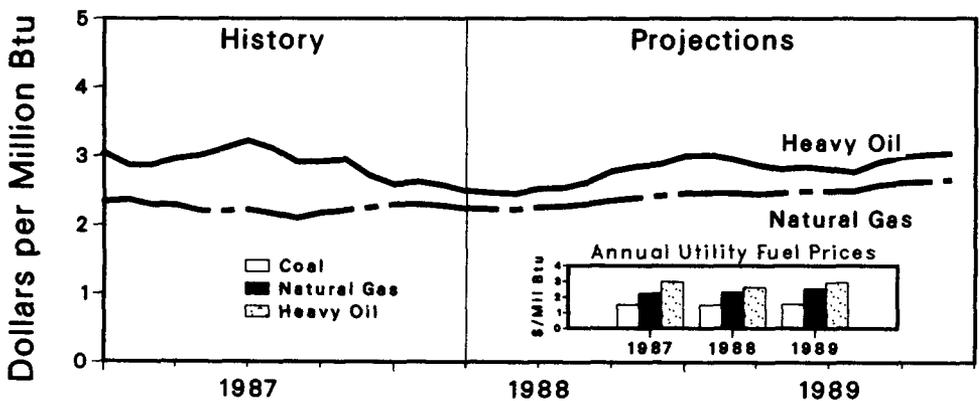
The Gap Between Oil and Gas Prices Should Narrow This Spring, Then Diverge as Prices of Oil Climb Faster Than Those of Gas

Sources: • History: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/01) (Washington, DC, 1988). • Projections: Table 5.

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
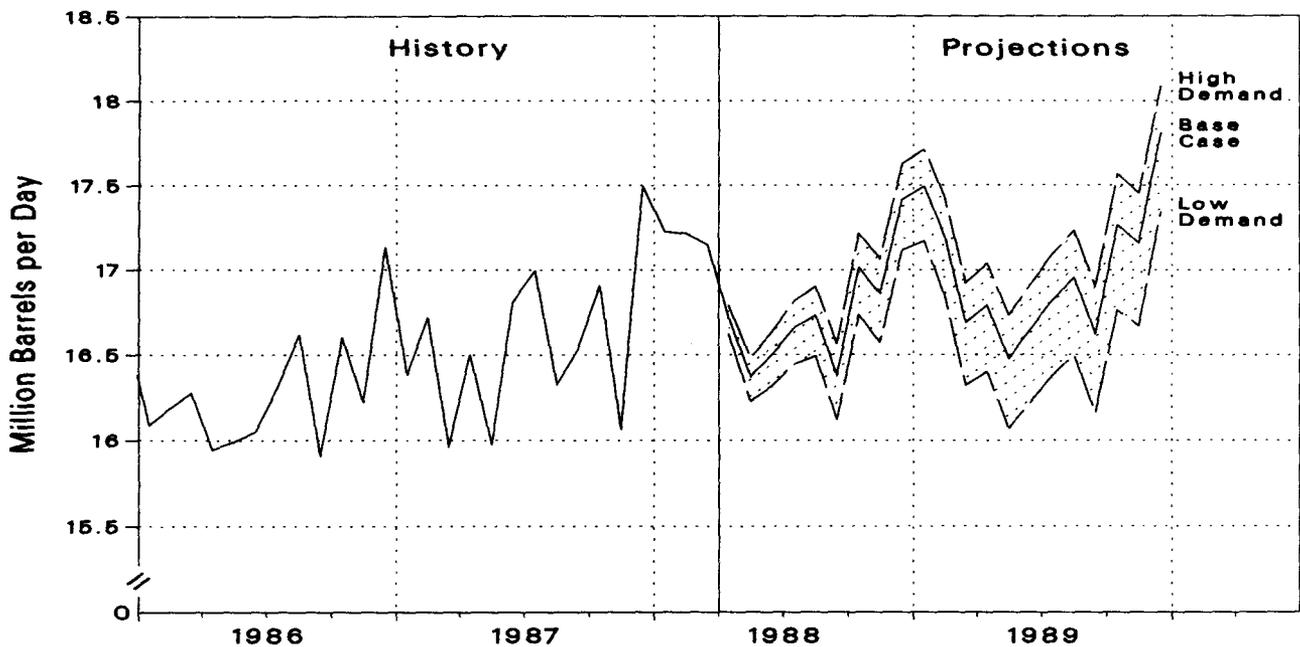
Total Petroleum

Much higher space-heating requirements in the first quarter of this year and a significant break in oil prices from the 1987 rebound are expected to contribute to continued growth in domestic petroleum demand for 1988. Petroleum consumption should approach about 16.9 million barrels per day, exceeding the 1987 level of 16.6 million barrels per day and the growth rate for that year (Table 6 on page 42 and Figure 8). Perhaps one-third of this growth for 1988 can be accounted for by colder temperatures in the first quarter compared to a year earlier. The remaining portion is attributable to healthy activity in two markets: transportation (primarily motor gasoline and jet fuel) and petrochemical feedstocks. Travel demand should remain strong this year, as favorable prices and moderate income growth emerge. Furthermore, export-led industrial production growth will feature the chemical industry prominently. This situation should carry through to 1989. Normal weather conditions are assumed for next year, however; this could limit petroleum demand to 17.0 million barrels per day.

* Barring extraordinary gains in efficiency for motor vehicle travel (as measured by average miles per gallon), motor gasoline demand should grow by more than 100,000 barrels per day in 1988 and by 80,000 barrels per day in 1989. Should the current forecast hold, motor gasoline use will register seven straight years of growth averaging 1.7 percent per year.

* Jet fuel demand is expected to gain in volume by 60,000 to 70,000 barrels per day over the forecast horizon, which is about equal to the average annual growth recorded for the last five years.

* The incremental growth in distillate fuel demand that remains beyond 1988 will be driven by modest increases in diesel demand and industrial process fuel use.

The range of uncertainty surrounding most of the current forecast for total petroleum demand has narrowed somewhat compared to previous outlooks. The maximum world oil price spread between high and low price assumptions is $6 per barrel, or 33 percent of the base-case price. This compares with a maximum of $8 per barrel, or 44 percent of the base-case price, assumed in the January 1988 *Outlook*. As a result of these price assumptions combined with alternative estimates for economic growth and weather, the average expected range over the forecast period for total petroleum demand is 740,000 barrels per day (Table 7 on page 43). Petroleum demand sensitivities relating to price and economic growth assumptions are detailed in Table 8 on page 44 and Table 9 on page 47.

Figure 9. Motor Gasoline Demand and Components
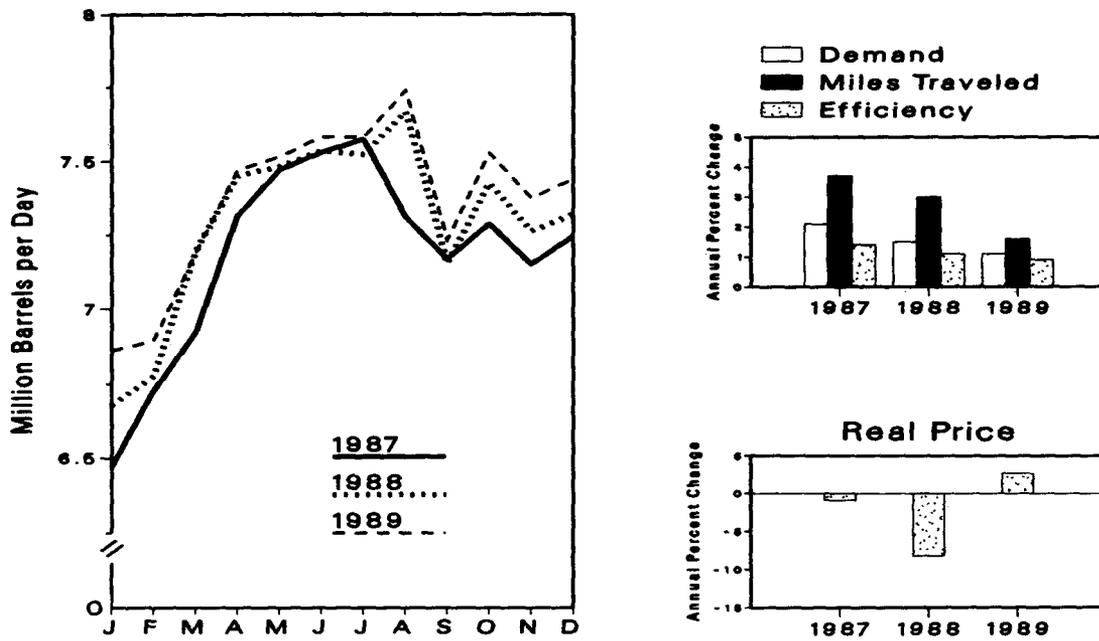
Note: Projections begin in the second quarter of 1988.
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/01) (Washington, DC, 1988). • Projections: Table 10.

Motor Gasoline

Lower gasoline prices and further economic growth will augment motor gasoline demand in 1988 (Table 10 on page 46 and Figure 9). Compared with 1986, demand strengthened by 2.1 percent in 1987 and is expected to expand by another 1.5 percent in 1988. Nonetheless, advances in motor gasoline demand should slow to 1.1 percent in 1989, due to an upturn in motor gasoline prices.

- Compared with 1986, motor vehicle-miles traveled increased by 3.7 percent in 1987.[1] Vehicle-miles traveled should pick up by an additional 3.0 percent in 1988 before tapering off to a rate of 1.6 percent in 1989. This slowdown in growth is attributable to projected upward movement in the price of motor gasoline.

- Compared to 1986, vehicle efficiency improved by 1.4 percent in 1987. This modest growth is expected to continue this year and into 1989.

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[1]Federal Highway Administration, Highway Statistics Division, *Traffic Volume Trends*, (February 1988).

Figure 10. Distillate Fuel Oil Demand
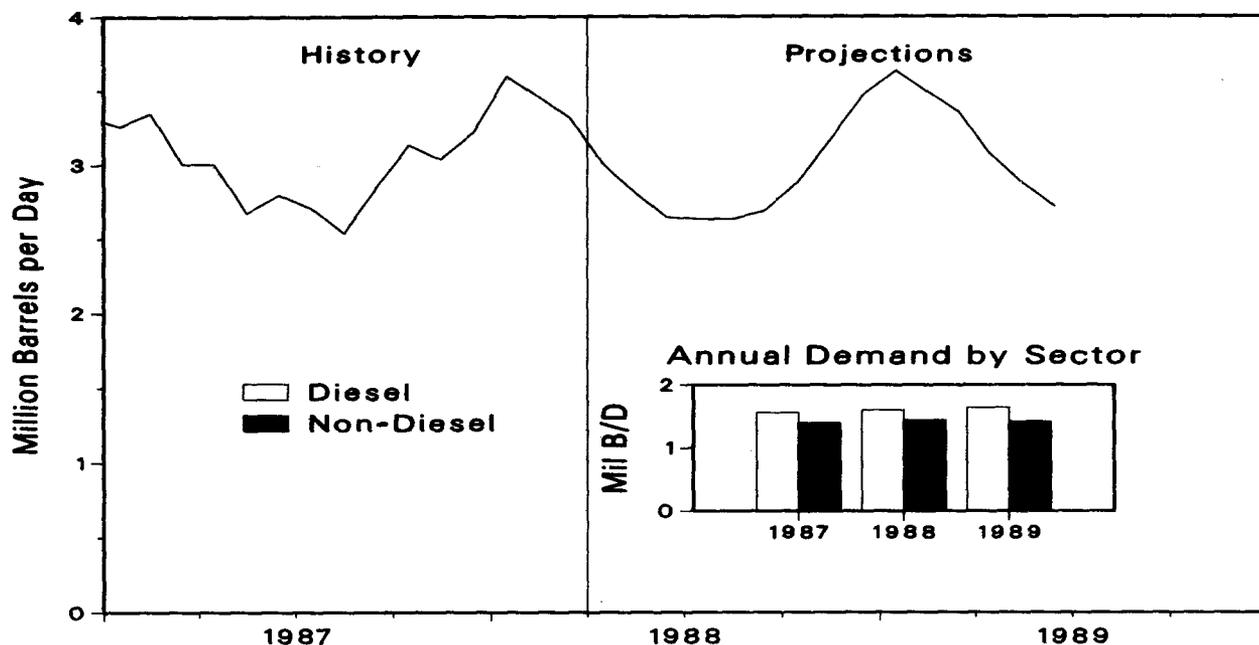
Distillate Fuel Oil

Distillate demand is projected to expand by 2.7 percent in 1988 (Table 11 on page 47 and Figure 10). Most of this growth stems from high demand in the first quarter of this year, due to colder weather and stronger industrial output than a year earlier. In 1989, the projected need for distillates should increase by 0.6 percent above the 1988 level to 3.06 million barrels per day. During the forecast period, the diesel share of distillate demand remains close to its 1987 level of 54 percent.

• After the first quarter of this year, the optimistic picture for diesel demand tapers off slightly. A slowdown in industrial output growth in the latter quarters of 1988, compared with 1987, provides the rationale behind this assumed reduction in demand. A weakening in diesel prices, however, stimulates diesel use somewhat (Table 5 on page 41). Diesel demand in 1989 should strengthen, driven by a pickup in industrial production. Annual growth for diesel demand is projected at 2.5 percent in 1988 and at 2.7 percent in 1989.

• Non-diesel demand for distillates is projected to increase by 3.0 percent between 1987 and 1988. Most of this growth occurs in the first quarter of 1988, when cold weather (7.4 percent colder than a year earlier and 1.3 percent colder than normal) stimulated heating-oil needs. Industrial use of distillates should reflect an expansion in overall industrial output. In the fourth quarter of 1988, an assumed slowdown in industrial production may offset slight gains in demand attributable to lower prices and moderately colder weather from a year earlier. With an anticipated return to normal weather in 1989, non-diesel demand should fall by 1.2 percent from the level of 1.40 million barrels per day shown for 1988.

Figure 11. Residual Fuel Oil Demand
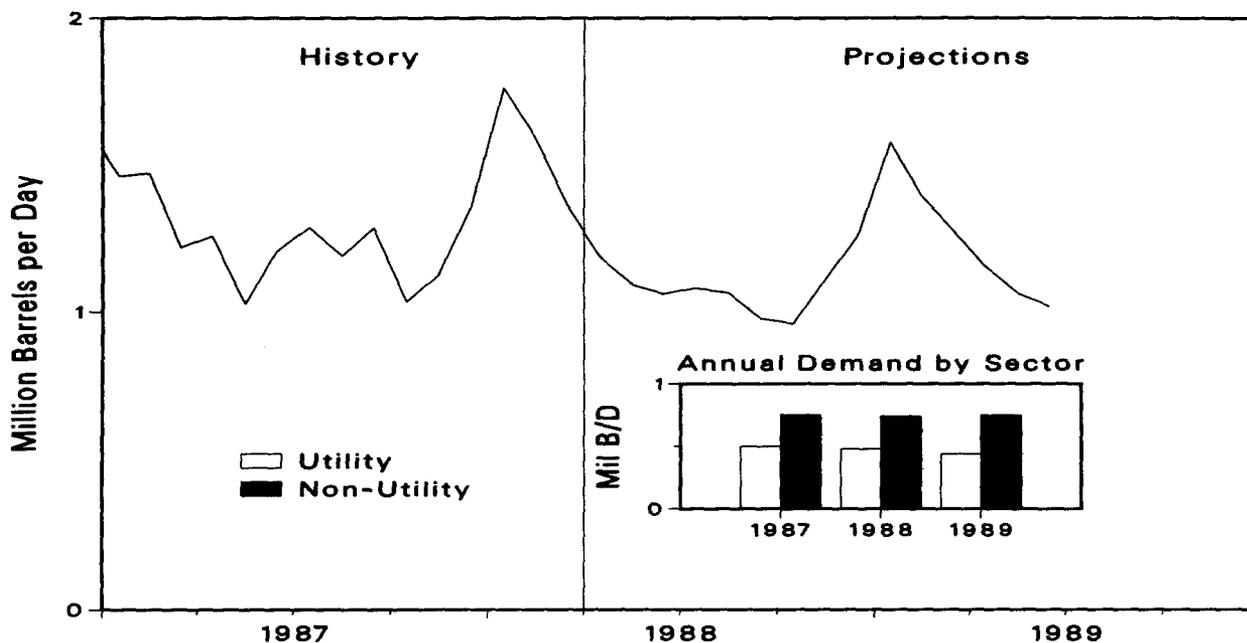
Residual Fuel Oil

Consumption of residual fuel oil is likely to continue to weaken throughout the forecast period, but more slowly than the rate of almost 12 percent seen in 1987. Demand is expected to decline by 2.4 percent in 1988 and by an additional 2.5 percent in 1989 (Table 12 on page 48).

- Total demand for residual fuel oil for the first quarter of this year was 5.1 percent higher than the year-earlier level, primarily due to lower prices and colder temperatures than last year (Figure 11). For the remaining three quarters of 1988, demand is projected to fall off (albeit slightly) for the following reasons: (1) natural gas, especially that sold to utilities, should continue to hold a price advantage over residual fuel oil; (2) a normal, thus warmer, winter is expected for the fourth quarter; and (3) the price advantage available at foreign ports for bunker fuel should continue throughout the forecast period.

- In 1989, shipments of residual fuel oil to electric utilities are expected to slacken by 8.3 percent from 1988 levels, as the price of this fuel to utilities is projected to increase by more than 11 percent.

- Nonutility demand in 1989 should increase slightly (1.4 percent) on an annual basis compared to 1988; an expected strengthening in industrial production should offset the effects of projected price increases.

## Figure 12.   Petrochemical Feedstocks and Liquefied Petroleum Gas
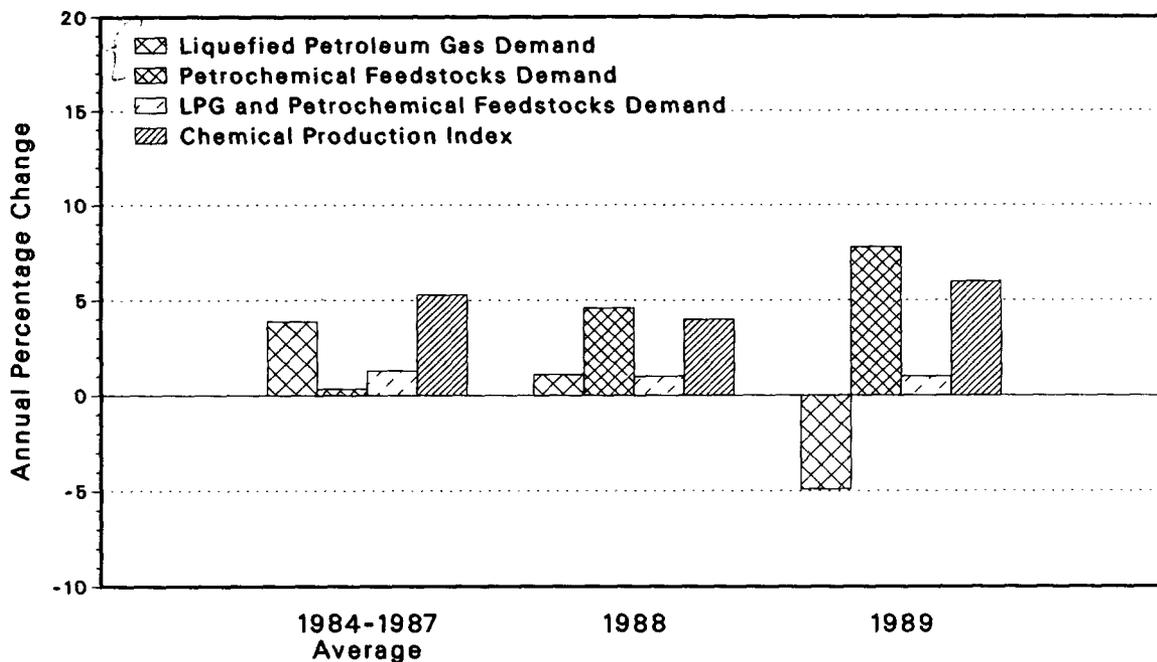
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/01) (Washington, DC, 1988). • Projections: Table 13.

Other Petroleum Products

Demand for other petroleum products increased at an annual rate of 5.0 percent during 1987. Growth should slow to 2.5 percent in 1988 and 1.1 percent in 1989, with jet fuel and petrochemical feedstocks setting the pace (Table 13 on page 49). Consumption of liquefied petroleum gas should taper off after strong growth during 1987. Combined demand for other miscellaneous products should hover around the 1987 level, after attaining 8-percent growth in 1987.

- A high level of airline travel during 1987 stimulated jet fuel use. Revenue ton miles (a measure of the miles traveled by passengers and freight) grew by over 12 percent in 1987. Jet fuel demand did not react fully to the expansion in airline travel, however, because of growth in the aircraft load factor and average aircraft efficiency.[2] In 1988, jet fuel demand should escalate by 4.4 percent. Slower growth in the economy would be expected to dampen growth in airline traffic; however, lower yields (a measure of the price of an airline ticket) should keep airline travel demand strong next year. Compared to 1988, jet fuel demand is projected to grow by 5.0 percent in 1989.

- Last year was a milestone for liquefied petroleum gas (LPG) demand. Compared to 1986, the demand for LPG increased by almost 12 percent; this was probably due to increased use of LPG in the petrochemical industry. In 1988, demand for LPG should stabilize, despite cold weather in the first part of the year. An assumption of normal weather contributes to an expected shrinkage of 4.4 percent in LPG use in 1989.

- Petrochemical feedstocks demand is projected to expand at an annual rate of 4.3 percent in 1988 and 8.2 percent in 1989, due to the general health of the chemical industry (Figure 12). Despite a rapid increase in output from the chemical industry in 1987, demand for petrochemical feedstocks fell by 3.1 percent from the 1986 level. The projected recovery probably depends on lighter petroleum-based feedstocks gaining market advantage over LPG.

[2]Average aircraft efficiency is calculated by dividing the number of revenue ton miles by the quantity of jet fuel supplied.

Figure 13.   Changes in Sources and Uses of Petroleum

4th Quarter 1987-1st Quarter 1988

1st Quarter 1988-2nd Quarter 1988
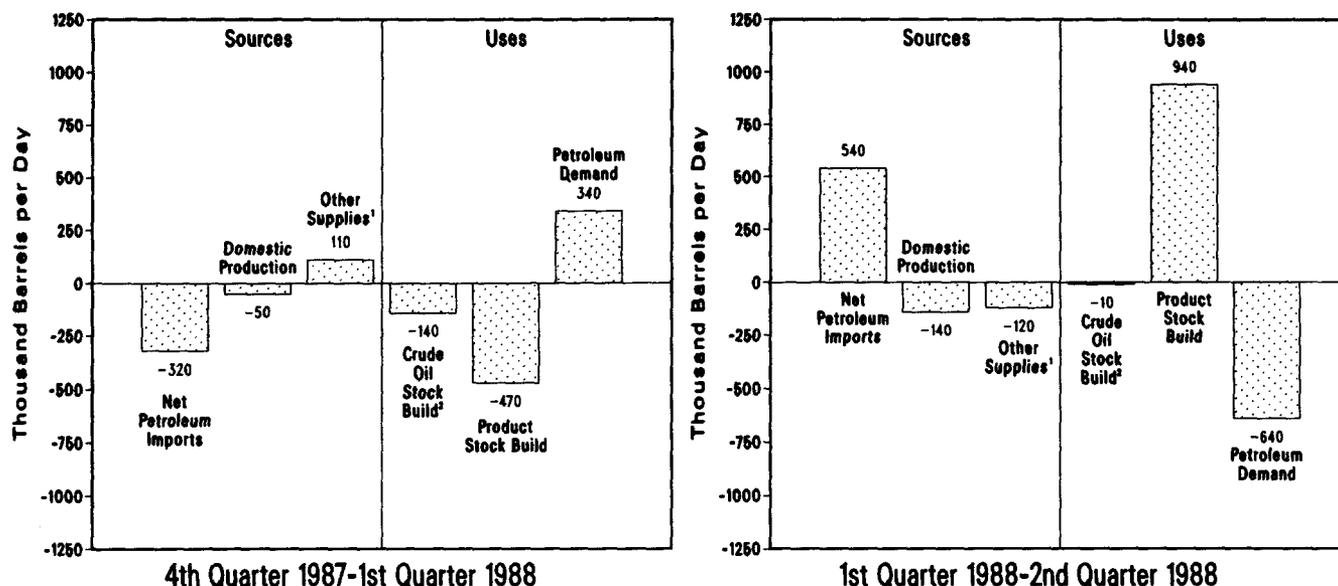
¹ Includes change in crude oil supplied as product, unaccounted for crude oil, other hydrocarbon inputs, and refinery gains.
² Includes change in Strategic Petroleum Reserve build rate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1986, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1987 to January 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-11,16) (Washington, DC). • Projections: Table 6.

Petroleum Supply

The combination of higher petroleum product demand and lower net petroleum imports in the first quarter of 1988 was accommodated mainly by the drawdown of product stocks (Table 6 on page 42 and Figure 13). This situation is expected to reverse in the second quarter, as falling demand and rising net imports lead to higher product stocks. Crude oil stocks, which had accumulated to a three-year high in late 1987, should change little in the first half of 1988. Domestic crude oil production is projected to fall off slightly in early 1988, despite production additions from Alaska.

* In the second quarter of 1988, higher crude oil imports will be needed to offset lower domestic oil production and the cessation of the seasonal product stock draw of distillates and LPG.

* The overall drop in product demand in the second quarter of this year is derived from the combined decline in demands for distillate, jet fuel, residual fuel oil, and LPG, which outweighs an expected seasonal increase in motor gasoline demand.

* Crude oil stocks, which were drawn down early in the first quarter of 1988 but finished the quarter near the 1987 year-end level, should remain at about the same level through the close of the second quarter.

* Continued uncertainty in world markets and a general outlook for a firming up of oil prices may encourage refiners to maintain crude oil stocks near the levels seen at the end of the first quarter through the rest of 1988.

Figure 14. Components of Domestic Petroleum Production
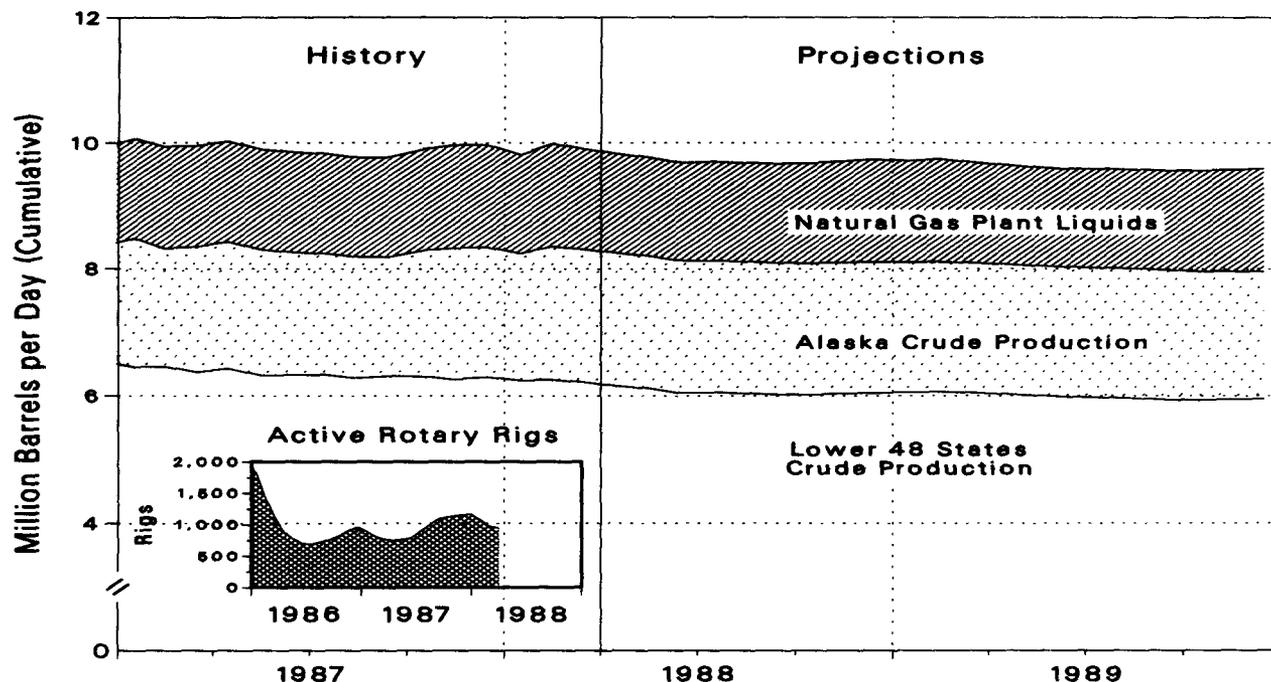
Note: Crude oil production includes lease condensate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1986, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1987 to January 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-11,15) (Washington, DC). • Projections: Table 6.

Crude Oil and Natural Gas Liquids Production

Total U.S. crude oil production is projected to decline by 130,000 barrels per day between 1987 and 1988 as a result of lower oil prices assumed for the first half of this year, combined with low drilling levels (Figure 14). A decline of about 240,000 barrels per day from the lower 48 States is partially offset by increased oil production from Alaska (Table 6 on page 42).

• Increases in Alaskan oil production were recorded in late 1987 and early 1988 as a result of new output from the Endicott field.

• Higher production is expected also from the Federal offshore region off the west coast, as several platforms are scheduled to come on stream in the third quarter of this year.

• A further decline of 150,000 barrels per day in total U.S. production is forecast for 1989, despite an outlook for rising oil prices. Moderate declines in production from the lower 48 States are accompanied by the beginning of a decline in production from the giant Prudhoe Bay field in Alaska.

• Steady growth in drilling activity in the second half of 1987 brought the number of active rotary rigs to near 1,160 at the end of the year. As a result of lower oil prices in early 1988, however, rig activity has fallen significantly, reaching an average of 951 for March. Drilling is expected to pick up again in mid-1988, along with oil prices.

• The spread in total oil production between the high and low oil price cases is 530,000 barrels per day in 1989 (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

Petroleum Stocks and Imports

The first quarter of 1988 was marked by a drop of approximately 60 million barrels in total primary stocks (crude oil and petroleum products). Seasonal drawdowns of distillate and LPG were responsible for most of the overall reduction in primary stocks (Table 6 on page 42 and Figure 15).

• Crude oil stocks (excluding the Strategic Petroleum Reserve) remained about 15 million barrels higher than normal, closing the first quarter of 1988 at 350 million barrels--even with the closing 1987 level.

• Finished motor gasoline stocks at the end of the second quarter of 1988 are projected at about 189 million barrels--similar to the year-earlier level. With generally high levels of refinery utilization and increased gasoline yields during the summer, levels of gasoline imports are not expected to be higher than normal in 1988.

• Distillate stocks closed the first quarter of 1988 at 92 million barrels, lower than any end-of-month level in the past 10 years. Increased off-road demand for diesel fuel in the agricultural sector contributed to the distillate draw in March, as farmers reportedly tried to avoid the initial consequences of a revised Federal excise tax collection process for diesel that went into effect on April 1, 1988 (see "Effect of the Federal Motor Fuels Tax on Distillate Stocks," page 35).

• Net petroleum imports (crude oil and petroleum products) in 1988 should be approximately 500,000 barrels per day higher than in 1987. Growing demand, falling domestic production, and a smaller stock draw than was expected (as crude oil stocks remain high) contribute to this increase in imports.

• Net imports of refined products are projected to be about the same in 1988 as they were in 1987.

Outlook for Other Major Energy Sources

- *Natural Gas*

- *Coal*

- *Electricity*

- *Electricity Fuel Shares*

Figure 16. Natural Gas Demand
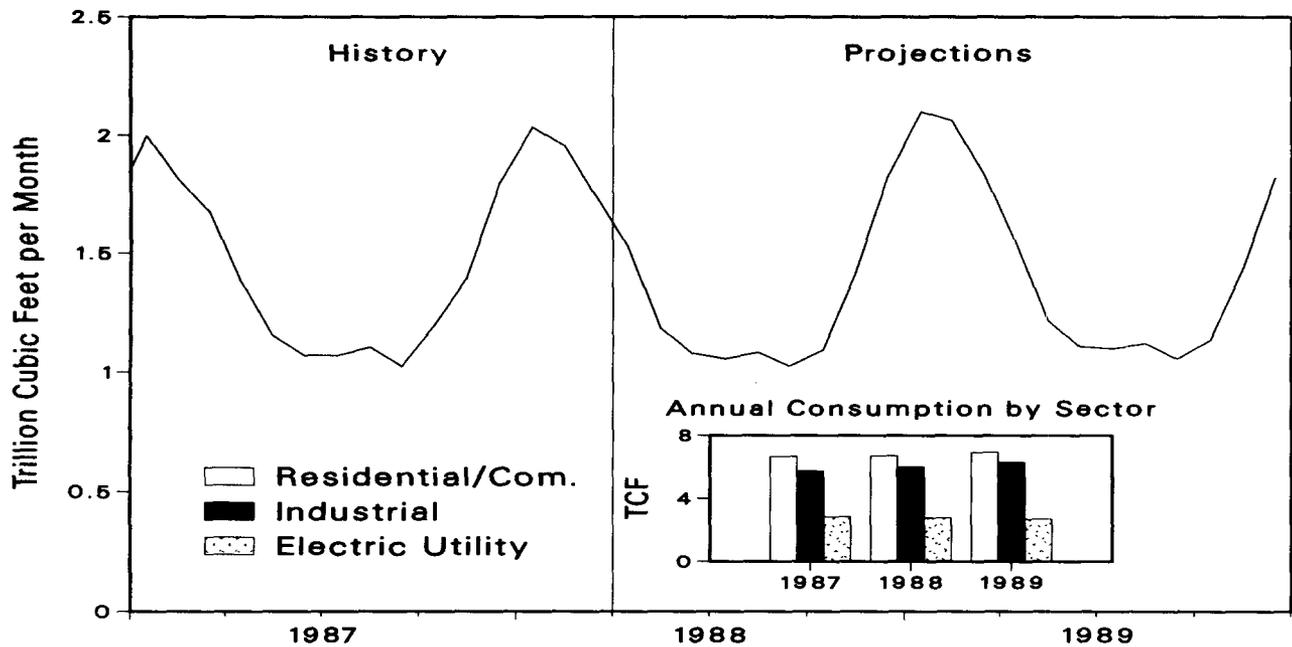
Note: Consumption excludes lease and plant fuel and pipeline compressor fuel.
Sources: • History: Energy Information Administration, *Monthly Energy Review*,
DOE/EIA-0035(88/01) (Washington, DC, 1988). • Projections: Table 14.

Natural Gas

Following a reported increase in 1987, total consumption of natural gas is projected to grow by 2.0 percent in 1988 and 3.1 percent in 1989 (Table 14 on page 50 and Figure 16). Consumption forecasts for 1988 are higher than in the previous *Outlook*, reflecting a higher growth assumption for disposable income and weather colder than normal for the first three months of this year, as opposed to the normal temperatures previously assumed.

• Residential natural gas use should increase by 1.4 percent to 4.4 trillion cubic feet in 1988 and post additional growth of 2.5 percent in 1989. Colder weather than in 1987 for the first and fourth quarters of 1988 and continued growth of about 1 percent in the number of natural gas customers are responsible for the growth in gas demand this year.

• Industrial natural gas use grew in 1987 in response to greater industrial production and to changes in the price of natural gas relative to residual fuel oil. Despite a projected sharp decline in the price ratio of oil to gas, industrial gas demand is still expected to grow by 4.7 percent in 1988 and by a similar rate in 1989 because of strong growth in industrial output during both years.

• Natural gas use at electric utilities should continue to decline over the forecast period, concurrent with an expected shrinking of combined oil and gas use at utilities.

Figure 17. Coal Supply and Disposition
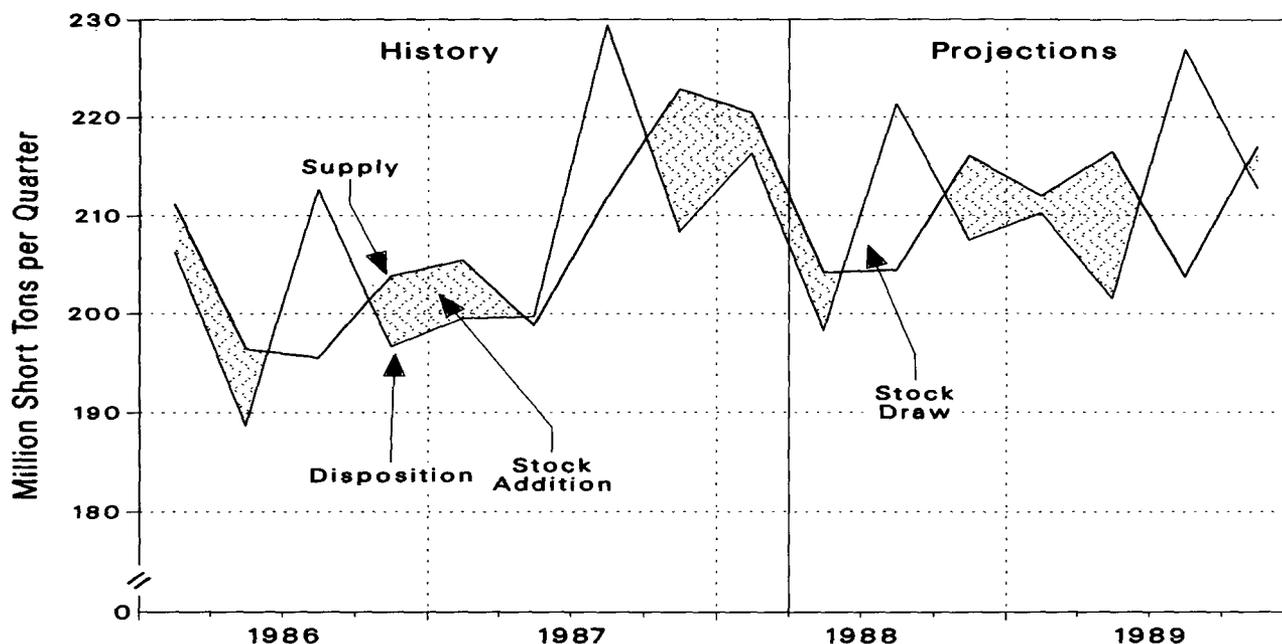
Coal

Total domestic coal demand should rise by about 1.0 percent per year through 1989, following a significant jump in coal use in 1987 (Table 15 on page 51 and Figure 17). A large part of the increase in 1987 resulted from the high level of electricity consumed last summer. Similarly, growth in 1988 is largely attributable to high electric utility use of coal estimated for the first quarter of this year--a 9-percent increase over the first quarter of 1987.

• Electric utility coal use should approach 723 million tons in 1988, which corresponds to coal-fired generation growth of about 1.0 percent through 1989. Coal-fired generating capacity should remain relatively constant. The 2.0-percent growth in total electricity generation through 1989 is largely accounted for by increased nuclear and hydroelectric generation.

• Coking coal use should rise to 38 million tons in 1988 in response to projected growth in iron and steel output. Demand is expected to fall slightly in 1989 when steel production levels off and electric-arc furnaces further infiltrate the marketplace.

• Retail and general industry coal consumption should remain constant in 1988, exhibiting little change since 1984. A slight improvement in consumption should be realized in 1989.

• Following a 4.3-percent increase in new domestic coal supply in 1987, supply in 1988 should remain essentially unchanged. Falling exports are expected to offset rising domestic demand, leaving requirements of domestic suppliers at the 1987 level. Small export growth and weak domestic demand next year could lead to domestic coal production growth of less than 1 percent.

Figure 18. Electricity Generation and Capacity
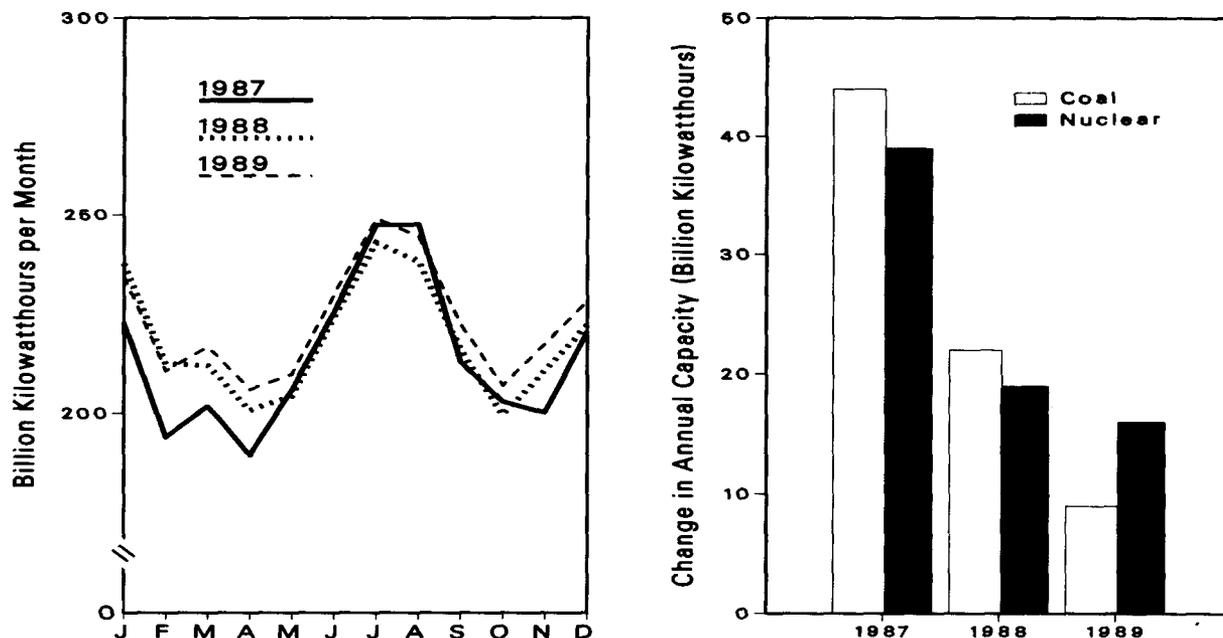
Electricity

Electricity consumption in 1988 may not match last year's strong performance, but steady growth is still expected for this year and into 1989 (Table 16 on page 52). The combined effects of a hot summer and a healthy domestic economy last year, particularly in the industrial sector, led to a rate of growth in electricity generation not seen since 1984.

- Temperatures colder than normal in the first part of this year have already pushed utility generation levels above expectations. With the level of economic activity (as measured by gross national product) expected to slow slightly this year to 2.2 percent and weather assumed normal for the remainder of the year, however, total electricity generation should rise by 2.0 percent in 1988 (Figure 18). A rebound in gross national product and industrial output in 1989 should carry generation 2.1 percent above the 1988 projection. Expectations for electricity use are based on normal weather patterns; however, another hot summer or a colder winter next season could amplify these growth rates.

- Electricity import projections reflect a continuation of observed long-term growth in electricity trade with Canada. By 1989, net imports could account for as much as 1.7 percent of the total U.S. supply of electricity.

- The nonutility supply of electricity (utility purchases from nonutility sources, including cogenerators and small power producers) has grown rapidly in recent years--26 percent in 1987 alone. Applications to the Federal Energy Regulatory Commission for qualifying status by nonutility power producers have risen considerably. Projections for nonutility supply thus assume robust growth in the nonutility electricity market through 1989. Nonutility supply could account for as much as 2.4 percent of the total electricity supply by 1989 (this share was 1.8 percent in 1987).

Figure 19. Electricity Generation by Fuel Source
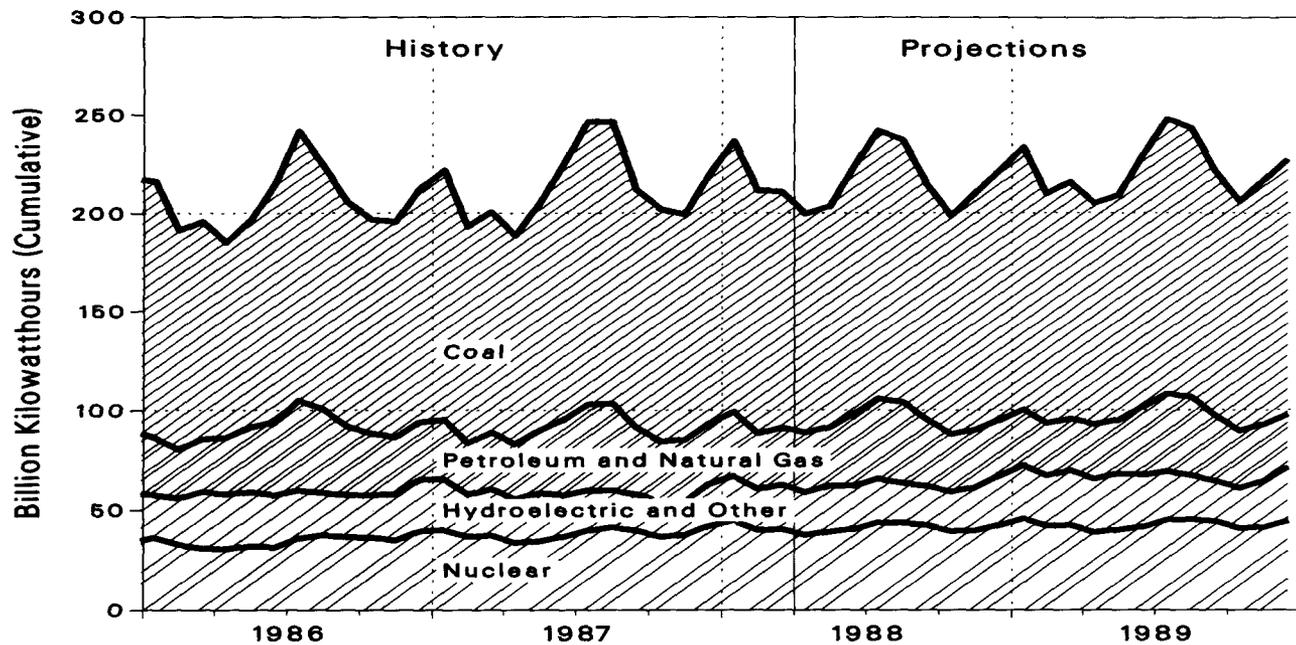
Electricity Fuel Shares

Nuclear, coal, and hydroelectric fuel sources will support growth in generation through this year and next (Table 16 on page 52). Nuclear power will make the largest additional contribution in 1988, while hydroelectric power is expected to lead generation growth in 1989, assuming that water levels return to normal. Low levels of hydroelectric generation in 1988 are due to a current lack of adequate precipitation at almost all major hydroelectric watersheds. Natural gas and petroleum are expected to continue losing share in the electric utility market (Figure 19).

- With only incremental growth in coal-fired capacity projected for this year and next (Figure 18 on page 29), generation from coal-fired sources should rise by only 0.7 percent in 1988 and 1.3 percent in 1989. Colder weather for the first quarter of this year than for the first quarter of 1987 accounts for a majority of the increase shown for 1988. As was evidenced last summer, coal is used to meet a large part of the gap in generation created when lower cost hydroelectric sources are not available.

- Additions to nuclear capacity are decreasing, though average utilization rates continue to climb because of improved maintenance at nuclear facilities and fewer additions of new units. (New units tend to be less efficient in the early stages of operation.) Capacity utilization should approach 59 percent in 1988 and 60 percent in 1989. Therefore, efficiency improvement combined with the operation of two new units this year should lead to growth of 8.3 percent in nuclear generation. Three units are expected to come on line in 1989, two of which will not begin full-power operation until late in the year; hence, generation from nuclear power may increase by only 3.7 percent next year.

- Natural gas and oil should continue to be squeezed out of the electric utility market by all other fuels. Oil may gain a slight edge over gas this year, as oil prices in the utility market are expected to drop a bit from last year, while gas prices should rise. In 1989, oil prices should return almost to their 1987 levels and outpace a rise in gas prices; hence, oil will lose share to gas in meeting generation requirements.

- Below-normal precipitation persists throughout U.S. hydroelectric watersheds. Nevertheless, hydroelectric generation is projected to reach levels this year that are 3.6 percent higher than for 1987. Given assumptions of normal water levels, hydroelectric power is expected to make a strong comeback in 1989--rising by 15 percent.

Special Topics

- *Electric Utility Capacity Additions Slowing in 1988 and 1989*

- *Summer Outlook for Motor Gasoline*

- *High Crude Oil Stocks and Low Oil Prices*

- *Effect of the Federal Motor Fuels Tax on Distillate Stocks*

- *Surplus Deliverability and the Growing Spot Market for Natural Gas*

Electric Utility Capacity Additions Slowing in 1988 and 1989

After adding more than 40 gigawatts of generating capacity over the past three years, the electric utility industry is expected to add less than 12 gigawatts of new capacity in 1988 and 1989. Five new nuclear units will account for more than one-half of the additional capacity. The remaining capacity is primarily coal-based, but includes some additional hydroelectric and gas turbine units as well. Although the exact dates on which generating units will begin operation are uncertain, specific assumptions are required for the short-run forecasts of electricity fuel shares. The discussion below is centered around these assumptions.

Nuclear. Two large nuclear plants are projected to become operable in 1988. South Texas 1, with net summer operating capability estimated at 1.2 gigawatts, became operational in March of this year. This unit will provide electricity primarily for the Houston area. Braidwood 2, owned and operated by Chicago's Commonwealth Edison Company, will add 1.1 gigawatts of capacity to that utility's system. In 1989, three units totaling 3.5 gigawatts are expected to begin operation: Georgia Power's Vogtle 2 unit; Watts Bar 1, to be operated by the Tennessee Valley Authority; and Comanche Peak 1, a project of the Texas Utilities Generating Company, to begin operation at the end of next year.

Two large units previously expected to come on line during 1989 have been postponed. Both Seabrook 1, a 1-gigawatt reactor to be operated by Public Service Company of New Hampshire, and Long Island Lighting Company's 800-megawatt Shoreham 1 unit have been beset by financial and political problems. Neither is now expected to be operating before 1990, thus delaying almost 2 gigawatts of additional capacity in the short term.

Coal and Other. Six medium-to-large baseload coal units are projected to become operable over the next two years, three each in 1988 and 1989. The largest, Indiana and Michigan Electric Company's Rockport 2 unit (summer capability of 1.2 gigawatts), will not come on line until December 1989--another one-year delay from the most recently published completion date. Thus it will have little impact on coal consumption and generation over the forecast period. In 1988, three coal-fired plants will commence operation. Sam Seymour 3 in Texas, owned and operated by the Lower Colorado River Authority, is the smallest at 400 megawatts. Jacksonville Electric Authority's St. Johns River 2 unit, rated at 630 megawatts, is estimated to be operating later this year. At the end of this year, Georgia Power Company's Scherer 4 unit will add 760 megawatts of capacity. In 1989, two generating units will be added besides the Rockport plant: Alabama Power's Miller 3 unit, at 650 megawatts; and Tucson Electric Power's Springerville 2 plant, the smallest of the six coal plants coming on line before 1990 at 330 megawatts.

Total additional summer capability will equal almost 4 gigawatts with the opening of these six coal plants. In contrast, more than 11 gigawatts of capacity was added in 1985 and 1986, although coal-fired additions slowed to just over 2 gigawatts in 1987. In addition to coal and nuclear plants, a number of smaller units (mostly hydroelectric) are also expected to provide electricity by the end of next year. Additional capability from these units should total 1.1 gigawatts in 1988 and another 0.7 gigawatts in 1989. It should be noted that nonutility capacity additions are not included in these data. Such capacity, which is being built by third-party vendors (such as industrials) for sale of power to utilities, is authorized by the Public Utility Regulatory Policies Act of 1978 (PURPA). While the pipeline for utility construction is emptying, planning for new independent capacity is expected to accelerate, especially if the proposed FERC rulemakings to open up electricity markets are implemented in the near future.

The following list[3] summarizes recent and projected capacity additions (in megawatts):

Additions	Average, 1985-1987	1988	1989	Total, 1988-1989
Nuclear	8,035	2,346	3,487	5,833
Coal	4,478	1,785	2,171	3,956
Other	1,546	1,103	678	1,781
Total	14,059	5,234	6,336	11,570

[3]Sources: Energy Information Administration, Form EIA-860, "Annual Electric Generator Report," and EIA estimates.

Summer Outlook for Motor Gasoline

Continued economic growth and falling gasoline prices combine to keep motor gasoline demand growing in 1988. Compared to the summer months of June, July, and August of 1987, the summer months of 1988 should post growth of 1.4 percent in motor gasoline demand (Table 10 on page 46).

With the real price of gasoline expected to drop by more than 8 percent, and demand for travel outpacing increases in vehicle efficiency this year, motor gasoline demand should increase by 1.5 percent in 1988. In the summer months of 1988, vehicle-miles traveled are projected to increase by almost 3 percent over the summer months of 1987, whereas average vehicle efficiency should grow by over 1 percent in this time period. This increase in summer travel demand is due largely to decreases in the retail price of motor gasoline. The real price of motor gasoline is predicted to decrease by about 12 percent in the summer of 1988 from the price seen last summer.

Only modest increases in vehicle efficiency[4] are expected in 1988 and 1989. Compared to 1987, vehicle efficiency is projected to increase by about 1 percent in 1988. This same growth rate is expected for vehicle efficiency in 1989. It is likely that the increased passage by States of a 65-miles-per-hour (mph) speed limit on rural highways will dampen growth in vehicle efficiency. As of mid-April, 38 States had passed laws allowing 65-mph speeds on rural interstates. Two more States (Virginia and Georgia) are expected to pass similar legislation by this summer.

Lower gasoline prices should encourage greater gasoline demand this summer, although demand is not very sensitive to price historically. In the first quarter of 1988, the average retail price of motor gasoline was 92 cents per gallon. Controlling for all the factors affecting price except seasonal variation, the retail price would rise to 94 cents by the third quarter of 1988. However, the price is projected to be 90 cents in the third quarter of 1988 for the base case scenario because of a projected decline in the price of crude oil. With this base price and the base value for economic growth, motor gasoline demand is projected to be 7.45 million barrels per day in this time period. Nonetheless, the demand does not vary much with alternative price scenarios. Under the low price (85 cents per gallon) and high economic growth scenario, motor gasoline demand is only 30,000 barrels per day higher than the base case in the third quarter of 1988. Under the high price (98 cents per gallon) and low economic growth scenario, motor gasoline demand is only 40,000 barrels per day lower than in the base case.

Supply should be adequate to meet summer gasoline demand, with the days supplied value in the third quarter of 1988 being only 3 percent lower than the value for the third quarter of 1987. From 1980 to 1987, the average days supply for the start of the third quarter is about 28 days. At the end of the first quarter of 1988, stocks of finished motor gasoline stood at 194 million barrels. By the beginning of the third quarter of 1988, stocks are projected to decline to 189.1 million barrels, down by about 2 percent from the beginning of the third quarter of 1987. Given demand of 7.5 million barrels per day in the third quarter of 1988, there will be about a 25-day supply in this time period.

High Crude Oil Stocks and Low Oil Prices

Affected by growing OPEC oil production and high crude oil stocks at the end of 1987, domestic oil stocks remain at unexpectedly high levels at the end of the winter heating season (Table 6 on page 42). A large buildup in stocks began last September and continued to a November peak of 363 million barrels--the highest level in three years. According to EIA's January *Outlook*, crude oil stocks had been expected to return to a more normal level by the end of the first quarter of 1988. This prediction was made in anticipation of the seasonal drawdowns that occur during January and February of each year, as the result of increased heating demand. While the expected seasonal stock draw occurred in January, however, stock levels began to rise again unexpectedly in mid-February and continued throughout the remainder of the quarter. The level of crude oil stocks at the end of March was about even with the year-end inventory.

Market conditions throughout the first quarter showed no signs of increased demand beyond the predicted seasonal upswings. Domestic oil production remained stable at around 8.30 million barrels per day. Although cold temperatures

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[4]Vehicle efficiency is calculated by dividing vehicle-miles traveled by finished motor gasoline product supplied.

affected parts of the country early in the year, total petroleum consumption remained in the expected range. Yet, the amount of crude oil imports increased in the weeks prior to the February stock build. In effect, stocks were allowed to accumulate while additional seasonal demand was met with imported oil. The decision of refiners to keep the level of imports high apparently was influenced by the availability of bargain spot prices.

Despite current inflation of stock levels, U.S. refiners are not likely to forego further opportunities to pick up bargain crude oil shipments as long as oil prices are expected to increase later this year. As a result, oil stocks are now projected to remain high at least through the second quarter, and begin to come down only with the start of the motor gasoline season. Meanwhile, it is expected that excess stocks (beyond the level needed to support refinery and distribution activities) will continue to contribute to downward pressures on the market, minimizing oil price increases this summer.

Effect of the Federal Motor Fuels Tax on Distillate Stocks

A change in Federal motor fuels tax collection procedures (effective April 1, 1988) contributed to strong demand for distillate fuel oil in late March of this year and to a consequent sharp decline in primary inventories for distillate. At the end of March, distillate stocks were 92 million barrels, the lowest first-quarter level since 1967 (Table 11 on page 47).

As part of the 1987 Omnibus Budget Reconciliation Act (passed last December), the collection point for Federal excise taxes on motor fuels was moved from the retail to the wholesale level. As a further change under the new collection procedures, those consumers who are exempt from paying Federal motor fuel taxes on diesel will now have to pay the tax (whether purchased at retail or wholesale outlets) and then file for a refund with the Internal Revenue Service (IRS).

The impact on distillate demand and stocks came about because purchases made before the April 1 effective date remained tax-exempt. Exempt users who accelerated their normal spring purchases of diesel could improve their immediate cash flow as well as avoid having significant funds tied up while waiting for IRS refunds. Claims have been known to take up to 18 months.

Data from EIA indicate that the agricultural sector will be particularly hard hit by the new tax collection. More than 3.2 billion gallons of diesel fuel are used each year in this part of the U.S. economy.[5] With the tax on diesel set at 15.1 cents per gallon, as much as $483 million could be lost to the farmers for some portion of each year until rebates are returned. Industrial, commercial, construction, and other off-highway consumers add another 5.2 billion gallons per year of demand, suggesting a "tax float" that may total as high as $1.27 billion. (Important off-highway uses include agriculture, mining, fishing and shipping.) Thus, the incentives for making purchases early are clear.

Unusually high distillate demand in March (almost 12 percent higher than last year), combined with lower net imports and normal distillate production levels, led to the sharp fall in primary distillate stocks. Additional purchases in anticipation of the new tax probably have not been consumed, however, but rather added to consumer inventories. As a result, distillate demand may be slightly lower than normal in the second quarter of 1988.

The change in tax collection procedures has been protested to the Congress, and several revisions to the law have been proposed. If any revisions are passed, end users may instead delay diesel purchases until after the tax is reduced. Demand from these consumers would then appear to be below normal for a short period, while distillate stocks accumulate to levels higher than anticipated.

[5]Energy Information Administration, *Petroleum Marketing Monthly*, DOE/EIA-0380 (Washington, DC).

Surplus Deliverability and the Growing Spot Market for Natural Gas

The natural gas spot market has evolved, in large part, from changes in the regulatory climate brought about by the Federal Energy Regulatory Commission (FERC). The FERC was responding to the following:

- The National Gas Policy Act of 1978 (NGPA), which provided for price escalations in many NGPA supply categories and made a phased deregulation possible

- Declining oil prices, which had not been paralleled in gas prices and thus led to a decrease in natural gas demand by large consumers

- The resulting increase in surplus contracted deliverability and increased take-or-pay exposure.

The large interstate pipelines were able to move some of the relatively large amounts of surplus deliverability that developed beginning in 1983 and 1984 through the use of blanket certificates and special marketing programs instituted during this period. These programs (generally blanket approval of new short-term sales given by the FERC to several interstate pipeline companies) were subsequently struck down by the courts as discriminatory. However, a significant amount of surplus deliverability remained, representing approximately 10 to 15 percent of production capacity during 1985.[6] This volume has come to be known as the "gas bubble."

The need for producers and pipelines to find a market for this excess deliverability has been a primary motivation in the development of spot gas sales as a significant part of the natural gas market. Local distribution companies, industrial consumers, and electric utilities are the prime purchasers of natural gas on the spot market. Firms will usually enter into contracts for a period of 1 to 12 months. Large amounts of gas are moved through the spot market, and transactions may involve as much as 800 to 900 million cubic feet a day.[7] The cost advantage to the purchasers is significant. Currently, spot prices are being quoted at $1.25 per thousand cubic feet in parts of Texas and Oklahoma, versus city gate prices in Michigan and Illinois of $3.04 per thousand cubic feet. After adding transportation charges to the spot price, the price advantage may remain substantial.

The key issue of moving the gas to the purchasers' delivery points has been addressed with the enactment of two FERC Orders: Order 436 in October 1985, later replaced by Order 500 in September 1987. Order 500 offers substantial encouragement to pipeline companies to become "open access" transporters--that is, to carry gas for all who wish to ship, without preference for system supply. To date, over half of the interstate pipelines have designated themselves as participants under the Order 500 guidelines.

The spot market serves as the mechanism whereby natural gas can be purchased on a short-term basis, currently at a cost advantage. When long-term contracts become more flexible and market-responsive, the importance of the spot market may diminish somewhat. However, with the present excess supply capability, the spot market is flourishing--low prices are apparently more important to buyers than the long-term security of supply. Indeed, in some regional markets as much as half of the gas supplied has been through the spot market. The experience of other energy markets suggests that the spot market for natural gas will become an institutionalized part of the overall gas market and will continue to act as a safety valve for short-term market changes.

[6]Energy Information Administration, Office of Oil and Gas.
[7]Energy Information Administration, Office of Oil and Gas.

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	3rd	4th	1987	1988	1989
Supply [a]															
Production															
U.S. (50 States)	10.68	10.61	10.48	10.65	10.61	10.46	10.39	10.41	10.39	10.32	10.29	10.29	10.60	10.47	10.32
OPEC	17.83	18.48	21.00	20.53	18.99	19.44	19.71	20.22	19.48	19.98	20.67	20.24	19.47	19.59	20.10
Other Non-OPEC	16.17	15.92	16.25	16.45	16.72	16.45	16.60	16.73	17.13	16.88	16.96	17.06	16.20	16.63	17.01
Total Market Economies	44.69	45.01	47.73	47.62	46.32	46.36	46.70	47.35	47.00	47.18	47.92	47.60	46.27	46.68	47.43
Net Communist Exports	2.00	2.20	2.60	2.00	2.20	2.00	2.60	2.00	1.90	2.10	2.50	1.90	2.20	2.20	2.10
Total Supply	46.69	47.21	50.33	49.62	48.52	48.36	49.30	49.35	48.90	49.28	50.42	49.50	48.48	48.89	49.53
Net Stock Withdrawals or Additions (-)															
U.S. (50 States excl. SPR)	.44	.18	-.54	.08	.63	-.22	-.38	.04	.43	-.12	-.39	.03	.04	.02	-.01
U.S. SPR	-.09	-.08	-.07	-.07	-.05	-.04	-.04	-.10	-.10	-.10	-.10	-.10	-.08	-.05	-.10
Other Market Economies	1.43	-.32	-1.25	-.43	.82	-.78	-.88	.61	1.47	-1.08	-1.21	1.27	-.15	-.06	.11
Total Stock Withdrawals	1.78	-.22	-1.87	-.43	1.40	-1.04	-1.30	.55	1.80	-1.30	-1.70	1.20	-.19	-.10	-.01
Product Supplied															
U.S. (50 States)	16.34	16.43	16.62	16.83	17.20	16.53	16.59	17.10	17.12	16.64	16.80	17.41	16.56	16.85	16.99
U.S. Territories	.19	.22	.21	.23	.19	.23	.21	.23	.19	.23	.21	.23	.21	.21	.22
Canada	1.51	1.54	1.53	1.66	1.56	1.53	1.61	1.67	1.59	1.52	1.60	1.67	1.56	1.59	1.60
Japan	4.86	3.86	4.15	4.71	4.84	3.95	4.22	4.71	5.13	3.98	4.09	4.69	4.39	4.43	4.47
Australia and New Zealand	.71	.71	.76	.74	.71	.75	.73	.74	.72	.76	.74	.75	.73	.73	.74
OECD Europe	12.55	11.33	11.92	12.36	12.15	11.52	11.82	12.35	12.72	11.70	12.10	12.49	12.04	11.96	12.25
Total OECD	36.16	34.08	35.18	36.52	36.64	34.50	35.18	36.80	37.48	34.83	35.55	37.24	35.49	35.78	36.27
Other Market Economies	13.00	12.93	12.92	13.21	13.32	13.25	13.25	13.54	13.66	13.59	13.58	13.89	13.02	13.34	13.68
Total Market Economies	49.16	47.01	48.10	49.73	49.96	47.75	48.42	50.34	51.14	48.42	49.14	51.13	48.50	49.12	49.95
Statistical Discrepancy	.69	.02	-.35	.54	.04	.44	.42	.44	.44	.44	.42	.43	.22	.34	.43
Closing Stocks (billion barrels)	4.94	4.96	5.13	5.17	5.04	5.14	5.26	5.21	5.04	5.16	5.32	5.21	5.17	5.21	5.21

[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(88/01); and *International Energy Annual 1986,* DOE/EIA-0219(86); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through November 1987.

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

	Annual Average 1976-1986	1987	1988	1989
OECD Total [a]	2.7	2.9	2.5	2.8
United States [b]	2.8	2.9	2.2	3.6
Western Europe	2.0	2.5	2.3	2.1
Japan	4.4	3.9	3.6	3.2
Other OECD [c]	2.8	3.6	2.8	2.1

[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, CONTROL0388; Non-U.S. historical data and forecasts: The WEFA Group, *World Economic Service: Historical Data,* January 1987 and *World Economic Outlook: Developed Economies Volume,* April 1987.

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

Assumptions	1987 1st	2nd	3rd	4th	1988 1st	World Oil Price Case	1988 2nd	3rd	4th	1989 1st	2nd	3rd	4th	Year 1987	1988	1989
Macroeconomic [a]																
Real Gross National Product						Low	3,895	3,918	3,954	4,004	4,045	4,082	4,127		3,912	4,065
(billion 1982 dollars)	3,772	3,795	3,836	3,881	3,880	Base	3,893	3,909	3,941	3,990	4,029	4,065	4,108	3,821	3,906	4,048
						High	3,891	3,898	3,925	3,969	4,008	4,037	4,079		3,899	4,023
Percentage Change						Low	2.6	2.1	1.9	3.2	3.8	4.2	4.4		2.4	3.9
from Prior Year	2.0	2.4	3.2	4.0	2.8	Base	2.6	1.9	1.5	2.8	3.5	4.0	4.2	2.9	2.2	3.6
						High	2.5	1.6	1.1	2.3	3.0	3.6	3.9		2.0	3.2
GNP Implicit Price Deflator						Low	1.200	1.209	1.215	1.224	1.238	1.250	1.258		1.205	1.243
(index, 1982=1.000)	1.161	1.171	1.179	1.187	1.194	Base	1.202	1.212	1.219	1.230	1.243	1.257	1.266	1.175	1.207	1.249
						High	1.204	1.217	1.227	1.238	1.254	1.269	1.280		1.211	1.260
Percentage Change						Low	2.5	2.5	2.3	2.6	3.1	3.4	3.6		2.5	3.2
from Prior Year	2.8	3.0	2.8	3.3	2.8	Base	2.6	2.8	2.7	3.0	3.5	3.7	3.8	3.0	2.7	3.5
						High	2.8	3.3	3.4	3.7	4.2	4.3	4.4		3.1	4.1
Real Disposable						Low	2,746	2,759	2,774	2,793	2,799	2,813	2,840		2,754	2,811
Personal Income [b]	2,675	2,646	2,675	2,714	2,735	Base	2,738	2,745	2,758	2,777	2,783	2,797	2,823	2,678	2,744	2,795
(billion 1982 dollars)						High	2,726	2,727	2,735	2,752	2,756	2,768	2,792		2,731	2,767
Percentage Change						Low	3.8	3.1	2.2	2.1	1.9	2.0	2.4		2.8	2.1
from Prior Year	2.5	-.6	.8	2.1	2.2	Base	3.5	2.6	1.6	1.5	1.7	1.9	2.3	1.2	2.5	1.9
						High	3.0	2.0	.8	.6	1.1	1.5	2.1		2.0	1.3
Index of Industrial						Low	1.379	1.393	1.418	1.443	1.471	1.494	1.523		1.392	1.483
Production (Mfg.)	1.316	1.332	1.357	1.380	1.377	Base	1.376	1.387	1.408	1.430	1.455	1.476	1.503	1.346	1.387	1.466
(index, 1977=1.000)						High	1.372	1.379	1.397	1.416	1.436	1.452	1.476		1.381	1.445
Percentage Change						Low	3.5	2.7	2.8	4.8	6.6	7.2	7.4		3.4	6.5
from Prior Year	2.4	3.7	5.1	5.8	4.6	Base	3.3	2.2	2.0	3.9	5.7	6.4	6.7	4.3	3.0	5.7
						High	3.0	1.6	1.2	2.9	4.6	5.3	5.7		2.6	4.6
Oil Price																
Imported Crude Oil Price [c]						Low	13.00	14.00	15.00	16.00	16.00	16.00	16.00		14.50	16.00
(U.S. dollars/barrel)	16.88	18.28	19.03	18.00	15.83	Base	15.00	16.00	17.00	18.00	18.00	18.00	18.00	18.15	16.00	18.00
						High	18.00	19.00	20.00	22.00	22.00	22.00	22.00		18.20	22.00
U.S. Refiners' Cost [d]						Low	12.90	13.90	14.90	15.90	15.90	15.90	15.90		14.40	15.90
(U.S. dollars/barrel)	16.67	17.91	19.02	17.89	15.70	Base	14.90	15.90	16.90	17.90	17.90	17.90	17.90	17.87	15.90	17.90
						High	17.90	18.90	19.90	21.90	21.90	21.90	21.90		18.10	21.90
Weather [e]																
Heating Degree Days	2,266	449	85	1,618	2,433		536	88	1,669	2,401	536	88	1,669	4,418	4,726	4,694
Cooling Degree Days	24	385	774	49	17		327	755	63	28	327	755	63	1,232	1,162	1,173

[a] Macroeconomic projections from the Data Resources, Inc., model forecasts 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(88/01); U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, March 1988; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Monthly State, Regional, and National Heating/Cooling Degree Days Weighted by Population*; Federal Reserve System, *Statistical Release G.12.3*, March 1988. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0388.

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

Product	1987 1st	2nd	3rd	4th	1988 1st	World Oil Price Case	1988 2nd	3rd	4th	1989 1st	2nd	3rd	4th	Year 1987	1988	1989
Petroleum																
Imported Crude Oil Price [a]						Low	13.00	14.00	15.00	16.00	16.00	16.00	16.00		14.50	16.00
(dollars per barrel)	16.88	18.28	19.03	18.00	15.83	Base	15.00	16.00	17.00	18.00	18.00	18.00	18.00	18.15	16.00	18.00
						High	18.00	19.00	20.00	22.00	22.00	22.00	22.00		18.20	22.00
Gasoline [b]						Low	.86	.85	.86	.88	.91	.94	.92		.88	.91
(dollars per gallon)	.90	.95	.99	.98	.93	Base	.89	.90	.92	.94	.97	1.00	.98	.96	.91	.97
						High	.93	.98	1.01	1.04	1.09	1.13	1.10		.96	1.09
No. 2 Diesel Oil, Retail						Low	.86	.82	.83	.86	.88	.89	.89		.86	.88
(dollars per gallon)	.89	.91	.95	.97	.93	Base	.89	.87	.88	.91	.94	.95	.95	.92	.89	.94
						High	.93	.95	.97	1.02	1.05	1.06	1.06		.94	1.05
No. 2 Heating Oil, Wholesale						Low	.42	.43	.45	.48	.47	.47	.48		.46	.48
(dollars per gallon)	.50	.51	.54	.56	.51	Base	.46	.48	.53	.55	.54	.52	.55	.53	.50	.54
						High	.53	.54	.58	.64	.63	.63	.65		.54	.64
No. 2 Heating Oil, Retail						Low	.72	.65	.69	.75	.73	.72	.76		.74	.74
(dollars per gallon)	.79	.78	.78	.83	.84	Base	.75	.74	.82	.85	.81	.78	.83	.80	.80	.82
						High	.80	.79	.89	.95	.92	.90	.97		.84	.94
No. 6 Residual Fuel Oil [c]						Low	12.80	13.00	14.60	15.50	14.70	14.60	15.60		14.00	15.10
(dollars per barrel)	17.08	18.19	18.59	17.04	15.52	Base	14.70	15.30	17.00	18.00	17.10	17.00	18.20	17.72	15.60	17.60
						High	17.30	18.40	20.40	22.10	21.10	21.10	22.50		17.90	21.70
Electric Utility Fuels																
Coal						Low	1.44	1.46	1.47	1.47	1.48	1.50	1.50		1.46	1.49
(dollars per million Btu)	1.52	1.54	1.50	1.48	1.47	Base	1.49	1.51	1.52	1.52	1.53	1.55	1.56	1.51	1.50	1.54
						High	1.52	1.54	1.55	1.55	1.56	1.58	1.59		1.52	1.57
Heavy Oil [d]						Low	2.17	2.20	2.45	2.59	2.47	2.45	2.61		2.36	2.53
(dollars per million Btu)	2.92	3.02	3.09	2.86	2.60	Base	2.47	2.56	2.84	2.99	2.85	2.83	3.02	2.98	2.62	2.92
						High	2.88	3.06	3.38	3.65	3.49	3.48	3.71		2.98	3.58
Natural Gas						Low	2.11	2.13	2.23	2.30	2.32	2.37	2.48		2.19	2.37
(dollars per million Btu)	2.33	2.23	2.16	2.28	2.29	Base	2.23	2.28	2.39	2.47	2.47	2.52	2.64	2.24	2.30	2.52
						High	2.47	2.56	2.70	2.83	2.83	2.89	3.02		2.50	2.89
Other Residential																
Natural Gas						Low	5.88	6.75	5.33	5.43	6.08	7.04	5.58		5.56	5.78
(dollars per 1,000 cu. ft.)	5.35	5.86	6.76	5.37	5.33	Base	5.97	6.90	5.48	5.60	6.27	7.25	5.75	5.56	5.67	5.95
						High	6.07	7.04	5.62	5.77	6.46	7.47	5.92		5.78	6.13
Electricity						Low	7.65	8.02	7.61	7.31	7.84	8.20	7.81		7.61	7.79
(cents per kilowatthour)	7.33	7.85	8.20	7.67	7.16	Base	7.81	8.20	7.79	7.47	8.02	8.39	7.99	7.76	7.74	7.97
						High	7.98	8.40	7.98	7.74	8.30	8.68	8.27		7.88	8.25

[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: First quarter 1988 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(88/01); and *Petroleum Marketing Monthly*, DOE/EIA-0380(88/01).

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

Supply and Disposition	1987 1st	2nd	3rd	4th	1988 1st	2nd	3rd	4th	1989 1st	2nd	3rd	4th	Year 1987	1988	1989
Supply															
Crude Oil Supply															
Domestic Production [a]	8.38	8.33	8.21	8.32	8.30	8.20	8.11	8.10	8.10	8.05	8.00	7.96	8.31	8.18	8.03
Alaska	1.95	1.97	1.90	2.03	2.06	2.09	2.07	2.06	2.04	2.04	2.04	2.02	1.96	2.07	2.04
Lower 48	6.43	6.36	6.31	6.29	6.24	6.11	6.04	6.04	6.06	6.01	5.96	5.95	6.35	6.11	5.99
Net Imports (including SPR) [b]	3.83	4.24	5.14	4.72	4.50	4.91	5.18	5.15	4.78	5.19	5.60	5.64	4.49	4.93	5.30
Gross Imports															
(Excluding SPR)	3.93	4.31	5.21	4.80	4.65	5.05	5.31	5.21	4.87	5.27	5.66	5.70	4.57	5.06	5.38
SPR Imports	.06	.07	.07	.07	.05	.03	.03	.10	.10	.10	.10	.10	.07	.05	.10
Exports	.18	.14	.14	.16	.21	.18	.16	.17	.19	.18	.16	.17	.15	.18	.17
SPR Stock Withdrawn															
or Added (-)	-.09	-.08	-.07	-.07	-.05	-.03	-.03	-.10	-.10	-.10	-.10	-.10	-.08	-.05	-.10
Other Stock Withdrawn															
or Added (-)	-.02	.04	-.10	-.12	.00	.00	.09	-.06	-.04	-.04	.09	-.06	-.05	.01	-.01
Products Supplied and Losses	-.04	-.04	-.03	-.03	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.03	-.05	-.05
Unaccounted-for Crude	.26	.30	.18	.15	.23	.14	.12	.14	.14	.14	.12	.13	.22	.16	.13
Crude Oil Input to Refineries	12.32	12.79	13.33	12.97	12.93	13.15	13.42	13.18	12.84	13.19	13.66	13.53	12.86	13.17	13.31
Other Supply															
NGL Production	1.61	1.59	1.58	1.63	1.60	1.56	1.57	1.61	1.61	1.56	1.57	1.60	1.60	1.59	1.59
Other Hydrocarbon and															
Alcohol Inputs	.07	.05	.06	.07	.06	.06	.06	.07	.06	.06	.07	.07	.06	.06	.06
Crude Oil Product Supplied	.04	.04	.03	.03	.05	.05	.05	.05	.05	.05	.05	.05	.03	.05	.05
Processing Gain	.62	.63	.63	.63	.65	.64	.64	.64	.62	.64	.65	.65	.63	.64	.64
Net Product Imports [c]	1.21	1.18	1.43	1.30	1.28	1.29	1.31	1.46	1.49	1.21	1.28	1.42	1.28	1.34	1.35
Gross Product Imports [c]	1.87	1.76	2.01	1.96	2.01	1.82	1.82	2.05	2.07	1.75	1.79	2.01	1.90	1.93	1.90
Product Exports	.66	.59	.57	.66	.73	.54	.51	.59	.58	.54	.51	.59	.62	.59	.55
Product Stock Withdrawn															
or Added (-) [d]	.46	.14	-.45	.20	.63	-.22	-.47	.10	.46	-.08	-.48	.09	.09	.01	.00
Total Product Supplied,															
Domestic Use	16.33	16.43	16.62	16.83	17.20	16.53	16.59	17.10	17.12	16.64	16.80	17.41	16.55	16.85	16.99
Disposition															
Motor Gasoline	6.70	7.44	7.35	7.23	6.89	7.49	7.45	7.34	6.99	7.52	7.52	7.45	7.18	7.29	7.37
Jet Fuel	1.36	1.30	1.35	1.39	1.46	1.31	1.37	1.52	1.50	1.38	1.43	1.60	1.35	1.41	1.48
Distillate Fuel Oil	3.20	2.82	2.69	3.12	3.45	2.85	2.70	3.16	3.41	2.89	2.74	3.20	2.96	3.04	3.06
Residual Fuel Oil	1.38	1.16	1.25	1.22	1.45	1.16	1.10	1.14	1.44	1.12	1.08	1.14	1.25	1.22	1.19
Other Oils Supplied [e]	3.70	3.70	3.96	3.87	3.95	3.71	3.97	3.94	3.79	3.73	4.03	4.02	3.81	3.89	3.89
Total Product Supplied	16.34	16.43	16.62	16.83	17.20	16.53	16.59	17.10	17.12	16.64	16.80	17.41	16.56	16.85	16.99
Total Petroleum Net Imports	5.04	5.41	6.57	6.02	5.78	6.19	6.50	6.61	6.26	6.40	6.88	7.06	5.77	6.27	6.65
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	333	330	339	349	350	350	342	347	350	353	345	351	349	347	351
Total Motor Gasoline	249	231	230	226	231	225	226	226	236	226	228	229	226	226	229
Finished Motor Gasoline	206	193	191	189	194	189	190	192	199	191	191	193	189	192	193
Blending Components	43	38	38	37	37	36	36	36	37	36	36	36	37	36	36
Jet Fuel	48	46	50	50	46	46	48	48	46	46	48	48	50	48	48
Distillate Fuel Oil	110	104	127	134	92	106	133	139	102	104	133	140	134	139	140
Residual Fuel Oil	40	41	44	47	44	41	44	47	39	40	43	46	47	47	46
Other Oils [g]	261	273	285	260	248	263	273	253	251	264	273	253	260	253	253
Total Stocks (Excluding SPR)	1041	1025	1075	1067	1010	1031	1066	1062	1023	1034	1070	1067	1067	1062	1067
Crude Oil in SPR	520	527	534	541	545	548	551	561	570	579	588	597	541	561	597
Total Stocks (Including SPR)	1561	1552	1609	1608	1555	1579	1617	1622	1593	1613	1658	1664	1608	1622	1664

[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 Jan. 1988; *Weekly Petroleum Status Report*, DOE/EIA-0208(88-11,15).

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

Sensitivities	1988			1989				Year	
	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989
Demand in 50 States									
Low Price	*16.63*	*16.74*	*17.27*	*17.14*	*16.82*	*16.98*	*17.60*	*16.96*	*17.14*
Base Case	*16.53*	*16.59*	*17.10*	*17.12*	*16.64*	*16.80*	*17.41*	*16.85*	*16.99*
High Price	*16.40*	*16.37*	*16.86*	*16.83*	*16.32*	*16.46*	*16.39*	*16.71*	*16.50*
Weather Sensitivity									
Adverse Weather	*.02*	*.00*	*.12*	*.21*	*.03*	*.02*	*.12*	*.04*	*.09*
Favorable Weather	*-.03*	*-.02*	*-.12*	*-.21*	*-.03*	*-.02*	*-.12*	*-.04*	*-.09*
Economic Sensitivity									
High Economic Activity	*.02*	*.03*	*.05*	*.05*	*.08*	*.10*	*.12*	*.03*	*.09*
Low Economic Activity	*-.02*	*-.03*	*-.05*	*-.07*	*-.10*	*-.13*	*-.16*	*-.03*	*-.12*
Combined Sensitivity Differentials [a] **(excl. price)**									
Upper Range	*.03*	*.03*	*.13*	*.22*	*.09*	*.10*	*.17*	*.05*	*.14*
Lower Range	*.04*	*.04*	*.13*	*.22*	*.10*	*.13*	*.20*	*.05*	*.16*
Range of Projected Demand									
High Demand [b]	*16.66*	*16.77*	*17.40*	*17.36*	*16.91*	*17.08*	*17.77*	*17.01*	*17.28*
Low Demand [c]	*16.36*	*16.33*	*16.73*	*16.61*	*16.22*	*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	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	1989 1st	1989 2nd	1989 3rd	1989 4th	Year 1987	Year 1988	Year 1989
Supply															
Crude Oil Supply															
Domestic Production [a]	8.38	8.33	8.21	8.32	8.30	8.09	7.95	7.89	7.86	7.78	7.68	7.59	8.31	8.06	7.73
Alaska	1.95	1.97	1.90	2.03	2.06	2.09	2.07	2.06	2.04	2.04	2.03	1.99	1.96	2.07	2.03
Lower 48	6.43	6.36	6.31	6.29	6.24	6.00	5.88	5.83	5.82	5.73	5.65	5.60	6.35	5.99	5.70
Net Imports (Including SPR) [b]	3.83	4.24	5.14	4.72	4.50	5.14	5.52	5.55	5.24	5.71	6.21	6.28	4.49	5.18	5.86
Gross Imports															
(Excluding SPR)	3.93	4.31	5.21	4.80	4.65	5.28	5.64	5.62	5.33	5.79	6.27	6.35	4.57	5.30	5.94
SPR Imports	.08	.07	.07	.07	.05	.03	.03	.10	.10	.10	.10	.10	.07	.05	.10
Exports	.18	.14	.14	.16	.21	.18	.16	.17	.19	.18	.16	.17	.15	.18	.17
SPR Stock Withdrawn or Added (-)	-.09	-.06	-.07	-.07	-.05	-.03	-.03	-.10	-.10	-.10	-.10	-.10	-.08	-.05	-.10
Other Stock Withdrawn or Added (-)	-.02	.04	-.10	-.12	.00	-.03	.08	-.06	-.04	-.05	.05	-.03	-.05	-.01	-.02
Products Supplied and Losses	-.04	-.04	-.03	-.03	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.03	-.05	-.05
Unaccounted-for Crude	.26	.30	.18	.15	.23	.14	.12	.13	.14	.13	.12	.12	.22	.16	.13
Crude Oil Input to Refineries	12.32	12.79	13.33	12.97	12.93	13.24	13.58	13.37	13.05	13.42	13.91	13.82	12.86	13.28	13.55
Other Supply															
NGL Production	1.61	1.59	1.58	1.63	1.60	1.57	1.57	1.61	1.61	1.56	1.57	1.61	1.60	1.59	1.59
Other Hydrocarbon and Alcohol Inputs	.07	.05	.06	.07	.06	.06	.06	.07	.06	.06	.07	.07	.06	.06	.06
Crude Oil Product Supplied	.04	.04	.03	.03	.05	.05	.05	.05	.05	.05	.05	.05	.03	.05	.05
Processing Gain	.62	.63	.63	.63	.65	.64	.65	.64	.63	.65	.66	.66	.63	.65	.65
Net Product Imports [c]	1.21	1.18	1.43	1.30	1.28	1.33	1.35	1.48	1.50	1.23	1.30	1.43	1.28	1.36	1.37
Gross Product Imports [c]	1.87	1.76	2.01	1.96	2.01	1.87	1.86	2.07	2.08	1.77	1.81	2.01	1.90	1.95	1.92
Product Exports	.66	.59	.57	.66	.73	.54	.51	.59	.58	.54	.51	.59	.62	.59	.55
Product Stock Withdrawn or Added (-) [d]	.46	.14	-.45	.20	.63	-.26	-.50	.09	.46	-.09	-.48	.08	.09	-.01	-.01
Total Product Supplied, Domestic Use	16.33	16.43	16.62	16.83	17.20	16.63	16.76	17.31	17.35	16.89	17.08	17.71	16.55	16.97	17.26
Disposition															
Motor Gasoline	6.70	7.44	7.35	7.23	6.89	7.50	7.48	7.38	7.04	7.59	7.60	7.53	7.18	7.31	7.44
Jet Fuel	1.36	1.30	1.35	1.39	1.46	1.32	1.38	1.53	1.51	1.39	1.45	1.62	1.35	1.42	1.49
Distillate Fuel Oil	3.20	2.82	2.69	3.12	3.45	2.86	2.71	3.17	3.43	2.91	2.76	3.22	2.96	3.05	3.08
Residual Fuel Oil	1.38	1.16	1.25	1.22	1.45	1.23	1.19	1.24	1.54	1.22	1.18	1.25	1.25	1.28	1.29
Other Oils Supplied [e]	3.70	3.70	3.96	3.87	3.95	3.73	4.01	3.98	3.83	3.78	4.09	4.08	3.81	3.92	3.95
Total Product Supplied	16.34	16.43	16.62	16.83	17.20	16.63	16.76	17.31	17.35	16.89	17.08	17.71	16.56	16.97	17.26
Total Petroleum Net Imports	5.04	5.41	6.57	6.02	5.78	6.47	6.86	7.04	6.74	6.95	7.51	7.70	5.77	6.54	7.23
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	333	330	339	349	350	353	346	352	355	360	355	357	349	352	357
Total Motor Gasoline	249	231	230	226	231	225	227	229	237	228	229	231	226	229	231
Finished Motor Gasoline	206	193	191	189	194	189	191	193	200	192	193	195	189	193	195
Blending Components	43	38	38	37	37	35	36	36	37	35	36	36	37	36	36
Jet Fuel	48	46	50	50	46	46	49	48	46	46	49	49	50	48	49
Distillate Fuel Oil	110	104	127	134	92	107	133	140	102	105	134	141	134	140	141
Residual Fuel Oil	40	41	44	47	44	43	47	50	42	44	47	50	47	50	50
Other Oils [g]	261	273	285	260	248	263	274	254	253	267	275	256	260	254	256
Total Stocks (Excluding SPR)	1041	1025	1075	1067	1010	1037	1076	1073	1036	1049	1088	1084	1067	1073	1084
Crude Oil in SPR	520	527	534	541	545	548	551	561	570	579	588	597	541	561	597
Total Stocks (Including SPR)	1561	1552	1609	1608	1555	1585	1627	1634	1606	1627	1676	1681	1608	1634	1681

[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 Jan. 1988; *Weekly Petroleum Status Report*, DOE/EIA-0208(88-11,15).

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

Supply and Disposition	1987				1988				1989				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1987	1988	1989
Supply															
Crude Oil Supply															
Domestic Production [a]	8.38	8.33	8.21	8.32	8.30	8.25	8.25	8.27	8.32	8.28	8.24	8.20	8.31	8.27	8.26
Alaska	1.95	1.97	1.90	2.03	2.06	2.09	2.07	2.06	2.07	2.07	2.06	2.04	1.96	2.07	2.06
Lower 48	6.43	6.36	6.31	6.29	6.24	6.16	6.18	6.21	6.25	6.21	6.17	6.16	6.35	6.20	6.20
Net Imports (Including SPR) [b]	3.83	4.24	5.14	4.72	4.50	4.68	4.79	4.68	4.21	4.56	4.91	4.93	4.49	4.66	4.65
Gross Imports															
(Excluding SPR)	3.93	4.31	5.21	4.80	4.65	4.83	4.91	4.75	4.30	4.64	4.96	5.00	4.57	4.79	4.73
SPR Imports	.08	.07	.07	.07	.05	.03	.03	.10	.10	.10	.10	.10	.07	.05	.10
Exports	.18	.14	.14	.16	.21	.18	.16	.17	.19	.18	.16	.17	.15	.18	.17
SPR Stock Withdrawn or Added (-)	-.09	-.08	-.07	-.07	-.05	-.03	-.03	-.10	-.10	-.10	-.10	-.10	-.08	-.05	-.10
Other Stock Withdrawn or Added (-)	-.02	.04	-.10	-.12	.00	.03	.11	-.04	-.02	-.02	.09	-.05	-.05	.02	.00
Products Supplied and Losses	-.04	-.04	-.03	-.03	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.03	-.05	-.05
Unaccounted-for Crude	.26	.30	.18	.15	.23	.13	.12	.14	.14	.14	.12	.13	.22	.15	.13
Crude Oil Input to Refineries	12.32	12.79	13.33	12.97	12.93	13.00	13.17	12.90	12.50	12.80	13.21	13.06	12.86	13.00	12.90
Other Supply															
NGL Production	1.61	1.59	1.58	1.63	1.60	1.56	1.57	1.61	1.61	1.56	1.57	1.60	1.60	1.59	1.59
Other Hydrocarbon and Alcohol Inputs	.07	.05	.06	.07	.06	.06	.06	.07	.06	.06	.07	.07	.06	.06	.06
Crude Oil Product Supplied	.04	.04	.03	.03	.05	.05	.05	.05	.05	.05	.05	.05	.03	.05	.05
Processing Gain	.62	.63	.63	.63	.65	.63	.64	.63	.61	.62	.64	.63	.63	.63	.62
Net Product Imports [c]	1.21	1.18	1.43	1.30	1.28	1.24	1.29	1.44	1.48	1.19	1.27	1.42	1.28	1.31	1.34
Gross Product Imports [c]	1.87	1.76	2.01	1.96	2.01	1.78	1.80	2.03	2.06	1.72	1.78	2.00	1.90	1.90	1.89
Product Exports	.66	.59	.57	.66	.73	.54	.51	.59	.58	.54	.51	.59	.62	.59	.55
Product Stock Withdrawn or Added (-) [d]	.46	.14	-.45	.20	.63	-.16	-.42	.12	.47	-.05	-.45	.09	.09	.04	.01
Total Product Supplied, Domestic Use	16.33	16.43	16.62	16.83	17.20	16.39	16.36	16.81	16.78	16.23	16.35	16.93	16.55	16.69	16.57
Disposition															
Motor Gasoline	6.70	7.44	7.35	7.23	6.89	7.48	7.41	7.28	6.91	7.42	7.40	7.31	7.18	7.26	7.26
Jet Fuel	1.36	1.30	1.35	1.39	1.46	1.30	1.36	1.50	1.48	1.35	1.41	1.57	1.35	1.41	1.45
Distillate Fuel Oil	3.20	2.82	2.69	3.12	3.45	2.84	2.68	3.14	3.39	2.86	2.71	3.17	2.96	3.03	3.03
Residual Fuel Oil	1.38	1.16	1.25	1.22	1.45	1.08	.99	1.02	1.28	.96	.91	.97	1.25	1.13	1.03
Other Oils Supplied [e]	3.70	3.70	3.96	3.87	3.95	3.68	3.91	3.88	3.72	3.64	3.92	3.91	3.81	3.86	3.80
Total Product Supplied	16.34	16.43	16.62	16.83	17.20	16.39	16.36	16.81	16.78	16.23	16.35	16.93	16.56	16.69	16.57
Total Petroleum Net Imports	5.04	5.41	6.57	6.02	5.78	5.92	6.07	6.12	5.68	5.74	6.17	6.35	5.77	5.97	5.99
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	333	330	339	349	350	347	337	341	342	344	336	341	349	341	341
Total Motor Gasoline	249	231	230	226	231	224	225	226	234	223	224	225	226	226	225
Finished Motor Gasoline	206	193	191	189	194	189	189	190	196	188	188	189	189	190	189
Blending Components	43	38	38	37	37	36	37	36	37	36	37	36	37	36	36
Jet Fuel	48	46	50	50	46	46	48	47	45	45	47	47	50	47	47
Distillate Fuel Oil	110	104	127	134	92	106	132	138	101	103	131	139	134	138	139
Residual Fuel Oil	40	41	44	47	44	38	40	42	34	35	37	40	47	42	40
Other Oils [g]	261	273	285	260	248	261	270	250	247	260	268	247	260	250	247
Total Stocks (Excluding SPR)	1041	1025	1075	1067	1010	1022	1051	1044	1003	1010	1043	1039	1067	1044	1039
Crude Oil in SPR	520	527	534	541	545	548	551	561	570	579	588	597	541	561	597
Total Stocks (Including SPR)	1561	1552	1609	1608	1555	1570	1602	1604	1572	1588	1631	1636	1608	1604	1636

[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 Jan. 1988; *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	3rd	4th	1987	1988	1989
Supply															
Domestic Production [a]	6.54	6.98	6.97	6.86	6.69	7.03	7.08	7.00	6.72	7.04	7.15	7.11	6.84	6.95	7.01
Imports	.32	.36	.40	.38	.28	.42	.39	.37	.35	.41	.39	.37	.37	.36	.38
Exports	.03	.05	.03	.04	.03	.01	.01	.01	.01	.01	.01	.01	.04	.02	.01
Net Imports	.29	.32	.37	.34	.25	.41	.38	.36	.34	.40	.38	.36	.33	.35	.37
Net Withdrawals	-.13	.14	.02	.02	-.06	.06	-.01	-.02	-.08	.09	-.01	-.02	.01	-.01	.00
Total Primary Supply	6.70	7.44	7.35	7.23	6.89	7.49	7.45	7.34	6.99	7.52	7.52	7.45	7.18	7.29	7.37
Disposition															
Leaded	1.73	1.89	1.73	1.59	1.37	1.57	1.50	1.41	1.28	1.17	1.04	.95	1.74	1.46	1.11
Unleaded	4.97	5.55	5.62	5.64	5.52	5.92	5.95	5.93	5.70	6.35	6.49	6.50	5.45	5.83	6.26
Total Product Supplied	6.70	7.44	7.35	7.23	6.89	7.49	7.45	7.34	6.99	7.52	7.52	7.45	7.18	7.29	7.37
Stocks															
Primary Finished Stock Levels [b]															
(million barrels)															
Opening	194.2	205.8	192.7	191.1	188.9	194.3	189.1	190.0	191.9	198.7	190.5	191.3	194.2	188.9	191.9
Closing	205.8	192.7	191.1	188.9	194.3	189.1	190.0	191.9	198.7	190.5	191.3	193.2	188.9	191.9	193.2

[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 Jan. 1988; *Weekly Petroleum Status Report,* DOE/EIA-0208(88-11,15).

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	3rd	4th	1987	1988	1989
Supply															
Refinery Output	2.58	2.60	2.72	3.02	2.81	2.86	2.86	2.94	2.81	2.81	2.91	3.02	2.73	2.87	2.89
Imports	.23	.21	.27	.25	.26	.21	.19	.35	.28	.18	.20	.34	.24	.26	.25
Exports	.10	.06	.05	.07	.10	.06	.07	.07	.09	.06	.07	.07	.07	.07	.07
Net Imports	.12	.16	.22	.19	.17	.15	.12	.28	.19	.12	.14	.27	.17	.18	.18
Net Withdrawals	.50	.06	-.25	-.06	.47	-.16	-.29	-.07	.41	-.03	-.31	-.09	.06	-.01	.00
Disposition															
Electric Utility Consumption	.04	.04	.05	.04	.06	.04	.05	.04	.04	.04	.04	.04	.04	.05	.04
Utility Stock Additions	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Electric Utility Shipments	.04	.04	.05	.04	.05	.04	.04	.04	.04	.03	.04	.04	.04	.04	.04
Nonutility Shipments	3.16	2.78	2.64	3.09	3.40	2.82	2.65	3.12	3.37	2.86	2.70	3.16	2.92	3.00	3.02
Total Product Supplied	3.20	2.82	2.69	3.12	3.45	2.85	2.70	3.16	3.41	2.89	2.74	3.20	2.96	3.04	3.06
Stocks															
Electric Utility Stock Levels (million barrels)															
Opening	16.3	16.0	15.7	16.0	15.8	15.4	15.2	15.0	14.9	14.7	14.7	14.6	16.3	15.8	14.9
Closing	16.0	15.7	16.0	15.8	15.4	15.2	15.0	14.9	14.7	14.7	14.6	14.6	15.8	14.9	14.6
Primary Stock Levels (million barrels)															
Opening	155.1	110.0	104.3	126.9	134.5	92.0	106.3	132.7	139.0	101.6	104.3	132.5	155.1	134.5	139.0
Closing	110.0	104.3	126.9	134.5	92.0	106.3	132.7	139.0	101.6	104.3	132.5	140.5	134.5	139.0	140.5

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 Jan. 1988; *Monthly Energy Review,* DOE/EIA-0035(88/01); *Electric Power Monthly,* DOE/EIA-0226(88/01); *Weekly Petroleum Status Report,* DOE/EIA-0208(88-11,15).

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	3rd	4th	1987	1988	1989
Supply															
Refinery Output	0.87	0.84	0.89	0.94	0.97	0.82	0.82	0.84	0.91	0.82	0.82	0.86	0.89	0.86	0.85
Imports	.61	.51	.57	.53	.66	.49	.48	.54	.63	.48	.45	.52	.55	.54	.52
Exports	.19	.16	.18	.21	.22	.18	.16	.20	.20	.18	.16	.20	.19	.19	.19
Net Imports	.42	.34	.39	.32	.44	.31	.32	.34	.43	.31	.29	.32	.37	.35	.34
Net Withdrawals	.09	-.02	-.03	-.03	.04	.03	-.03	-.03	.09	-.02	-.03	-.03	.00	.00	.00
Disposition															
Electric Utility Consumption	.57	.45	.53	.47	.63	.43	.51	.42	.49	.39	.48	.41	.50	.50	.44
Utility Stock Additions	-.08	-.02	.04	.04	-.08	-.01	-.01	.02	.02	-.02	-.01	.01	.00	-.02	.00
Electric Utility Shipments	.49	.43	.57	.50	.55	.42	.50	.44	.51	.37	.46	.43	.50	.48	.44
Nonutility Shipments	.89	.73	.68	.72	.90	.74	.60	.71	.92	.75	.61	.72	.75	.74	.75
Total Product Supplied	1.38	1.16	1.25	1.22	1.45	1.16	1.10	1.14	1.44	1.12	1.08	1.14	1.25	1.22	1.19
Stocks															
Electric Utility Stock Levels (million barrels)															
Opening	56.8	50.0	47.9	51.8	55.2	47.7	46.5	46.0	47.6	49.3	47.5	46.1	56.8	55.2	47.6
Closing	50.0	47.9	51.8	55.2	47.7	46.5	46.0	47.6	49.3	47.5	46.1	47.2	55.2	47.6	47.2
Primary Stock Levels (million barrels)															
Opening	47.4	39.6	41.3	44.2	47.3	43.6	40.9	44.0	47.0	38.7	40.2	43.3	47.4	47.3	47.0
Closing	39.6	41.3	44.2	47.3	43.6	40.9	44.0	47.0	38.7	40.2	43.3	45.8	47.3	47.0	45.8

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 Jan. 1988; *Monthly Energy Review*, DOE/EIA-0035(88/01); *Electric Power Monthly*, DOE/EIA-0226(88/01); *Weekly Petroleum Status Report*, DOE/EIA-0208(88-11,15).

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	3rd	4th	1987	1988	1989
Supply															
Net Refinery Output [b]	2.95	3.01	3.38	2.79	3.10	3.08	3.31	3.03	3.01	3.16	3.43	3.20	3.03	3.13	3.20
Natural Gas Plant Output	1.61	1.59	1.58	1.62	1.60	1.56	1.57	1.60	1.61	1.56	1.57	1.60	1.60	1.58	1.59
Other Domestic [c]	.07	.05	.06	.07	.06	.06	.06	.07	.06	.06	.07	.07	.06	.06	.06
Net Imports	.38	.36	.45	.46	.42	.41	.49	.48	.52	.39	.48	.48	.41	.45	.47
Net Withdrawals	.00	-.04	-.19	.29	.18	-.15	-.14	.22	.03	-.12	-.13	.23	.02	.03	.00
Total Primary Supply	5.01	4.96	5.29	5.23	5.36	4.97	5.29	5.41	5.24	5.05	5.41	5.57	5.12	5.26	5.32
Disposition															
Jet Fuel	1.36	1.30	1.35	1.39	1.46	1.31	1.37	1.52	1.50	1.38	1.43	1.60	1.35	1.41	1.48
Liquefied Petroleum Gas [d]	1.29	.92	1.04	1.29	1.39	.92	.97	1.29	1.29	.87	.94	1.27	1.14	1.14	1.09
Petrochemical Feedstocks [e]	.93	.96	.92	.91	.94	.96	.97	.99	1.02	1.04	1.06	1.09	.93	.97	1.05
Miscellaneous [f]	1.44	1.78	1.97	1.64	1.58	1.78	1.98	1.60	1.43	1.77	1.98	1.61	1.71	1.73	1.70
Total Product Supplied	5.02	4.96	5.29	5.23	5.36	4.97	5.29	5.41	5.24	5.05	5.41	5.57	5.13	5.26	5.32
Stock															
Primary Stocks															
(million barrels)															
Opening	352.9	352.6	356.6	373.9	347.2	330.7	344.3	357.4	337.1	334.4	345.6	357.6	352.9	347.2	337.1
Closing	352.6	356.6	373.9	347.2	330.7	344.3	357.4	337.1	334.4	345.6	357.6	336.7	347.2	337.1	336.7

[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 February and March 1988 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 Jan. 1988; and *Weekly Petroleum Status Report,* DOE/EIA-0208(88-11,15).

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	3rd	4th	1987	1988	1989
Supply															
Total Dry Gas Production [a]	4.27	3.93	3.88	4.25	4.33	3.96	3.91	4.26	4.36	4.12	4.02	4.26	16.33	16.46	16.76
Net Imports	.25	.17	.20	.30	.29	.20	.20	.24	.36	.19	.19	.33	.93	.93	1.07
Supplemental Gaseous Fuels	.05	.03	.03	.04	.05	.03	.03	.03	.05	.03	.03	.03	.16	.14	.14
Total New Supply	4.57	4.13	4.11	4.60	4.68	4.20	4.13	4.53	4.78	4.34	4.24	4.62	17.42	17.54	17.97
Underground Working Gas Storage															
Opening	2.75	1.88	2.43	3.04	2.75	1.79	2.14	2.91	2.87	1.75	2.15	2.92	2.75	2.75	2.87
Closing	1.88	2.43	3.04	2.75	1.79	2.14	2.91	2.87	1.75	2.15	2.92	2.90	2.75	2.87	2.90
Net Withdrawals [b]	.88	-.56	-.61	.31	.96	-.35	-.77	.04	1.12	-.41	-.76	.01	.02	-.12	-.04
Total Primary Supply [a]	5.45	3.58	3.50	4.91	5.63	3.84	3.37	4.57	5.90	3.93	3.48	4.63	17.44	17.42	17.94
Consumption															
Lease and Plant Fuel	.25	.23	.22	.25	.29	.24	.21	.25	.29	.25	.23	.27	.94	.99	1.04
Pipeline Use	.14	.12	.11	.13	.15	.13	.11	.13	.15	.13	.12	.14	.50	.52	.55
Residential	2.03	.78	.37	1.18	2.08	.81	.38	1.16	2.18	.83	.38	1.15	4.37	4.43	4.54
Commercial	.99	.43	.27	.60	.95	.44	.28	.60	1.06	.46	.29	.59	2.29	2.27	2.40
Industrial	1.55	1.32	1.29	1.57	1.72	1.44	1.30	1.53	1.78	1.52	1.39	1.62	5.73	6.00	6.30
Electric Utilities	.53	.73	.93	.65	.54	.73	.88	.64	.54	.68	.87	.62	2.84	2.79	2.71
Subtotal	5.49	3.61	3.20	4.38	5.73	3.79	3.17	4.32	6.00	3.88	3.28	4.38	16.68	17.01	17.54
Total Disposition	5.45	3.58	3.50	4.91	5.63	3.84	3.37	4.57	5.90	3.93	3.48	4.63	17.44	17.42	17.94
Unaccounted for	-.04	-.03	.30	.53	-.09	.05	.20	.25	-.10	.05	.20	.25	.76	.41	.40

[a] Excludes nonhydrocarbon gases removed.

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

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

Sources: Historical data: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/01); *Natural Gas Monthly,* DOE/EIA-0130(88/01); and *Electric Power Monthly,* DOE/EIA-0226(88/01).

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

Supply and Disposition	1987				1988				1989				Year		
	1st	2nd	3rd	4th	1st[a]	2nd	3rd	4th	1st	2nd	3rd	4th	1987	1988	1989
Supply															
Production	222	218	232	244	237	224	223	234	229	235	223	236	917	917	923
Primary Stock Levels [b]															
Opening	32	37	34	29	28	29	30	31	31	31	31	31	32	28	31
Closing	37	34	29	28	29	30	31	31	31	31	31	31	28	31	31
Net Withdrawals	-4	3	5	1	-1	-1	-1	0	0	0	0	0	4	-3	0
Imports	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
Exports	17	20	21	22	17	20	19	18	17	19	20	20	80	74	76
Total New Domestic Supply	201	201	217	224	219	203	203	216	212	216	204	217	843	842	849
Secondary Stock Levels [c]															
Opening	175	173	176	166	186	189	194	176	184	186	201	178	175	186	184
Closing	173	176	166	186	189	194	176	184	186	201	178	182	186	184	182
Net Withdrawals	2	-3	10	-20	-3	-5	18	-9	-2	-15	23	-4	-10	1	2
Total Indicated Consumption	203	199	227	204	216	198	221	208	210	202	227	213	833	843	851
Consumption															
Coke Plants	8	9	10	10	9	9	10	10	9	9	10	9	37	38	37
Electric Utilities	171	171	200	176	187	170	191	176	181	172	197	182	718	723	732
Retail and General Industry [d]	21	19	20	23	21	19	20	22	21	20	20	22	82	82	83
Subtotal	200	200	229	208	216	198	221	208	210	202	227	213	837	843	851
Total Disposition	203	199	227	204	216	198	221	208	210	202	227	213	833	843	851
Discrepancy [e]	4	-1	-2	-5	0	0	0	0	0	0	0	0	-4	0	0

[a] Estimated.

[b] Primary stocks are held at the mines, preparation plants, and distribution points.

[c] Secondary stocks are held by users. Most of the secondary stocks are held by electric utilities.

[d] Includes consumption at coal gasification plants of 6.5 million tons for 1987. Starting in 1987, synfuels account for 1.63 million tons per quarter.

[e] Historical period discrepancy reflects an unaccounted shipper and receiver reporting difference.

Notes: Values for 1987 are preliminary. 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(88/01); and *Quarterly Coal Report,* DOE/EIA-0121(87/4Q).

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

Supply and Disposition	1987				1988				1989				Year		
	1st	2nd	3rd	4th	1st[a]	2nd	3rd	4th	1st	2nd	3rd	4th	1987	1988	1989
Net Utility Generation															
Coal	348.2	349.8	407.5	358.1	380.5	347.9	388.7	356.3	369.3	353.2	400.7	369.6	1463.6	1473.4	1492.8
Petroleum	32.4	26.7	31.5	27.8	37.1	25.4	30.2	25.0	28.7	23.0	28.4	24.6	118.5	117.7	104.7
Natural Gas	51.3	69.9	88.4	63.0	51.6	70.0	84.3	60.7	51.5	65.3	82.9	59.1	272.6	266.6	258.7
Nuclear Power	113.9	104.4	120.6	115.9	124.9	116.9	129.5	121.3	129.9	120.3	134.4	126.2	454.8	492.7	510.8
Hydropower	69.9	67.1	56.8	55.9	65.0	66.1	61.5	66.1	79.3	81.0	66.5	69.8	249.6	258.7	296.6
Geothermal Power and Other [b]	3.0	3.0	3.2	3.0	3.0	3.0	3.2	3.2	3.2	3.2	3.4	3.4	12.3	12.5	13.3
Total Utility Generation	618.6	621.0	708.1	623.7	662.1	629.4	697.4	632.6	661.9	645.9	716.2	652.8	2571.4	2621.6	2676.9
Net Imports	10.8	9.9	11.6	10.8	11.2	10.3	12.1	11.2	11.7	10.8	12.7	11.7	43.1	44.8	47.0
Nonutility Supply [c]	11.3	11.4	13.0	11.4	14.3	13.6	15.1	13.7	16.4	16.0	17.8	16.2	47.1	56.8	66.5
Total Supply	640.7	642.3	732.7	645.9	687.7	653.3	724.6	657.5	690.1	672.8	746.7	680.7	2661.6	2723.1	2790.4
Losses and Unaccounted For [d]	39.3	61.0	51.5	54.3	41.8	61.6	50.6	55.4	42.0	63.4	52.1	57.3	206.1	209.4	214.8
Utility Sales	601.4	581.3	681.1	591.6	645.8	591.7	674.1	602.2	648.1	609.4	694.7	623.4	2455.5	2513.8	2575.6

[a] Estimated.
[b] Includes wind, wood, waste, photovoltaic, and solar.
[c] Electricity purchased from nonutility sources, including cogenerators and small power producers.
[d] Balancing item, mainly transmission and distribution losses.
Notes: Values for net imports, nonutility supply, and losses and unaccounted for are estimated for 1987. 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(88/01); and *Electric Power Monthly*, DOE/EIA-0226(88/01).

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	3rd	4th	1987	1988	1989
Supply															
Production															
Petroleum a	4.93	4.95	4.93	5.01	4.94	4.87	4.88	4.88	4.78	4.79	4.82	4.81	19.82	19.57	19.20
Natural Gas b	4.40	4.04	4.00	4.38	4.46	4.08	4.03	4.39	4.49	4.24	4.14	4.39	16.83	16.95	17.26
Coal	4.87	4.79	5.10	5.36	5.20	4.91	4.89	5.13	5.02	5.16	4.90	5.19	20.12	20.13	20.26
Nuclear Power	1.23	1.13	1.30	1.25	1.35	1.26	1.40	1.31	1.40	1.30	1.45	1.36	4.92	5.32	5.52
Hydropower c	.73	.70	.59	.58	.68	.69	.64	.69	.83	.85	.69	.73	2.61	2.70	3.09
Geothermal Power and Other d	.06	.06	.06	.06	.06	.06	.06	.07	.06	.07	.07	.07	.24	.25	.27
Subtotal	16.21	15.68	15.99	16.65	16.68	15.87	15.91	16.46	16.59	16.40	16.08	16.55	64.53	64.92	65.61
Net Imports															
Crude Oil	2.04	2.28	2.79	2.56	2.42	2.64	2.82	2.80	2.54	2.79	3.04	3.06	9.67	10.67	11.43
Other Petroleum	.59	.58	.72	.65	.64	.64	.66	.74	.73	.60	.65	.72	2.56	2.68	2.70
Natural Gas	.25	.17	.20	.30	.29	.20	.20	.24	.36	.19	.19	.33	.92	.93	1.07
Coal and Coke	-.43	-.52	-.54	-.57	-.44	-.52	-.49	-.46	-.44	-.49	-.52	-.52	-2.05	-1.91	-1.97
Electricity	.11	.10	.12	.11	.12	.11	.12	.12	.12	.11	.13	.12	.44	.46	.48
Subtotal	2.56	2.62	3.29	3.07	3.02	3.07	3.31	3.42	3.31	3.20	3.49	3.71	11.54	12.82	13.71
Primary Stocks															
Net Withdrawals	1.04	-.42	-.77	.33	1.25	-.48	-.98	.04	1.36	-.46	-.96	.00	.17	-.17	-.07
SPR Fill Rate Additions(-)	-.05	-.04	-.04	-.04	-.03	-.02	-.02	-.05	-.05	-.05	-.05	-.05	-.17	-.12	-.22
Secondary Stocks e															
Net Withdrawals	.08	-.05	.19	-.44	-.02	-.10	.39	-.17	-.12	-.27	.51	-.07	-.22	.11	.05
Total Supply f	19.84	17.78	18.67	19.56	20.92	18.35	18.61	19.70	21.08	18.82	19.06	20.13	75.86	77.57	79.09
Disposition															
Nonutility Uses															
Petroleum	7.59	7.79	7.92	8.07	8.05	7.85	7.92	8.23	8.02	7.93	8.04	8.39	31.37	32.05	32.38
Natural Gas g	5.10	2.96	2.34	3.84	5.34	3.15	2.35	3.79	5.62	3.29	2.48	3.87	14.24	14.64	15.26
Coal h	.67	.66	.70	.76	.69	.64	.71	.75	.68	.66	.71	.73	2.78	2.80	2.77
Industrial Hydropower	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.03	.03	.03
Subtotal	13.37	11.42	10.96	12.67	14.10	11.65	10.99	12.78	14.33	11.88	11.24	13.00	48.42	49.52	50.45
Electric Utility Inputs															
Petroleum	.35	.28	.34	.29	.39	.27	.32	.27	.30	.24	.30	.26	1.26	1.25	1.11
Natural Gas	.55	.76	.96	.67	.55	.76	.91	.66	.56	.71	.90	.64	2.94	2.88	2.80
Coal	3.61	3.63	4.23	3.72	3.95	3.61	4.03	3.70	3.83	3.67	4.16	3.84	15.19	15.29	15.49
Nuclear Power	1.23	1.13	1.30	1.25	1.35	1.26	1.40	1.31	1.40	1.30	1.45	1.36	4.92	5.32	5.52
Hydropower i	.83	.79	.71	.69	.79	.79	.76	.80	.94	.95	.82	.84	3.02	3.13	3.55
Geothermal Power and Other	.06	.06	.06	.06	.06	.06	.06	.07	.06	.07	.07	.07	.24	.25	.27
Subtotal	6.63	6.65	7.60	6.68	7.09	6.75	7.49	6.79	7.10	6.93	7.70	7.01	27.57	28.13	28.74
Gross Energy Consumption f	20.01	18.07	18.56	19.35	21.19	18.40	18.48	19.58	21.43	18.81	18.93	20.01	75.99	77.65	79.19
Electrical System Energy Losses i	4.62	4.71	5.32	4.70	4.94	4.78	5.24	4.79	4.95	4.90	5.39	4.94	19.35	19.75	20.18
Total Net Energy	15.39	13.36	13.24	14.65	16.25	13.62	13.24	14.79	16.48	13.91	13.55	15.07	56.64	57.91	59.01
Total Disposition	19.84	17.78	18.67	19.56	20.92	18.35	18.61	19.70	21.08	18.82	19.06	20.13	75.86	77.57	79.09
Unaccounted for	-.16	-.28	.11	.21	-.27	-.06	.13	.12	-.34	.00	.12	.12	-.13	-.08	-.09

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(88/01); and *Electric Power Monthly*, DOE/EIA-0226(88/01).

Table 18. Conversion Factors

Fuel	Units	Heat Content
Coal		
Production	Million Btu/short ton	21.946
Consumption	Million Btu/short ton	21.467
Coke Plants	Million Btu/short ton	26.800
Industrial and Retail	Million Btu/short ton	22.312
Electric Utilities	Million Btu/short ton	21.157
Imports	Million Btu/short ton	25.000
Exports	Million Btu/short ton	26.344
Coal Coke	Million Btu/short ton	24.800
Crude Oil		
Production	Million Btu/barrel	5.800
Imports	Million Btu/barrel	5.902
Petroleum Products		
Consumption	Million Btu/barrel	5.399
Motor Gasoline	Million Btu/barrel	5.253
Jet Fuel	Million Btu/barrel	5.622
Distillate Fuel Oil	Million Btu/barrel	5.825
Residual Fuel Oil	Million Btu/barrel	6.287
LPG (excluding ethane)	Million Btu/barrel	3.909
Ethane	Million Btu/barrel	3.082
Unfinished Oils	Million Btu/barrel	5.825
Imports	Million Btu/barrel	5.599
Exports	Million Btu/barrel	5.885
Natural Gas Plant Liquids		
Production	Million Btu/barrel	3.805
Natural Gas		
Production, Dry	Btu/cubic foot	1,030
Consumption	Btu/cubic foot	1,030
Non-electric Utilities	Btu/cubic foot	1,029
Electric Utilities	Btu/cubic foot	1,034
Imports	Btu/cubic foot	997
Exports	Btu/cubic foot	1,008

Electricity Component	Heat Rate (Btu per kilowatthour)
Plant Generation Efficiency	
Coal	10,379
Petroleum	
Distillate Fuel Oil	11,666
Residual Fuel Oil	10,539
Natural Gas	10,783
Nuclear Energy	10,807
Hydropower	10,320
Geothermal and Other Energy	21,263
Electricity Consumption	3,412

Appendix A

1987 Annual Energy Outlook: Forecasts for Oil and Gas

1987 Annual Energy Outlook: Forecasts for Oil and Gas

According to EIA's *Annual Energy Outlook 1987 (AEO)*, the long-term outlook for domestic oil and gas may be brighter than previously thought (see Table A1 on page 58 and Table A2 on page 59). The recent publication contains projections for oil production that are slightly more optimistic than those in the 1986 *AEO* and a natural gas outlook that is altogether different.

Although the oil picture still includes declining domestic production, projections in the new *AEO* show production falling to a lesser extent than in other estimates. Recent projections indicate that crude oil production will decline from 8.3 million barrels per day in 1987 to 6.0 million barrels per day in 2000. This forecast is 0.5 million barrels per day higher than that presented in the 1986 *AEO*. The change in the oil supply outlook largely reflects the consequences of a revised assessment of the production capability of the lower 48 States. The responsiveness of this region to price changes in the early and mid-1980's indicates that the region's production potential is greater than foreseen in earlier EIA reports.

In contrast to the subtle changes in the oil outlook, more dramatic changes are expected in the natural gas market. An estimated increase in consumption for 1987 is seen as the beginning of a long-term upward trend in consumption. By the year 2000, total gas demand is expected to reach 19.7 trillion cubic feet, a level not seen since 1978. Driven by demand from the utility and industrial sectors, the bulk of the growth in natural gas consumption is expected in the late 1990's. Consumption by utilities is likely to have the most significant impact, as a large share of new electricity demand is expected to be met with generation from low-capital-cost combined-cycle units, fueled by natural gas.

In addition to growing demand, the natural gas picture has also been influenced by structural changes in the market. In recent years, the emergence of a viable spot market and several important regulatory changes have created a more flexible pricing system (see "Surplus Deliverability and the Growing Spot Market for Natural Gas," page 36). These changes are seen as helping to ameliorate some of the distortions produced by the former system of price controls, as well as allowing natural gas to compete more effectively for its share of overall energy requirements.

The 1987 *Annual Energy Outlook* is prepared by the Energy Information Administration's Office of Energy Markets and End Use. Copies are available from EIA's National Energy Information Center (202/586-8800).

Table A1. Petroleum Supply and Disposition Balance
(Million Barrels per Day)

Supply and Disposition	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
World Oil Price [1] (1987 dollars per barrel)	28.52	14.40	18.11	16.80	17.61	17.81	17.91	17.90	18.77	20.37	22.40	30.76	-9.0	5.6	4.2
Production															
Crude Oil [2]	8.97	8.68	8.31	8.18	8.00	7.63	7.34	7.09	6.86	6.64	6.54	6.03	-3.2	-2.3	-2.4
Alaska	1.83	1.87	1.96	2.07	2.05	1.87	1.76	1.66	1.56	1.42	1.36	.89	.4	-7.1	-5.9
Lower 48	7.15	6.81	6.34	6.11	5.95	5.76	5.58	5.42	5.31	5.23	5.18	5.14	-4.2	-1.1	-1.6
Natural Gas Liquids	1.61	1.55	1.60	1.60	1.58	1.57	1.57	1.57	1.59	1.60	1.62	1.67	-.4	.6	.3
Other Domestic	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	1.0	.0	-.5
Processing Gain [3]	.56	.62	.63	.64	.63	.62	.62	.62	.61	.61	.60	.59	2.2	-.5	-.5
Total Production	11.19	10.90	10.60	10.48	10.26	9.88	9.59	9.34	9.12	8.91	8.81	8.35	-2.5	-1.7	-1.8
Imports (Including SPR [4])															
Crude Oil	3.20	4.18	4.66	4.76	5.57	6.03	6.52	6.99	7.31	7.52	7.56	8.45	13.5	3.4	4.7
Refined Products	1.87	2.05	1.89	2.01	1.99	2.01	2.05	2.11	2.15	2.17	2.18	2.30	1.4	1.4	1.5
Total Imports	5.07	6.22	6.55	6.77	7.56	8.03	8.57	9.10	9.47	9.69	9.73	10.76	9.7	3.0	3.9
Exports															
Crude Oil	.20	.15	.14	.17	.19	.19	.19	.19	.19	.19	.19	.19	-1.2	.0	2.4
Refined Products	.58	.63	.61	.55	.56	.56	.56	.56	.56	.56	.56	.56	-.6	.0	-.6
Total Exports	.78	.78	.75	.72	.75	.75	.75	.75	.75	.75	.75	.75	-.8	.0	.0
Net Imports	4.29	5.44	5.81	6.04	6.81	7.28	7.82	8.34	8.71	8.94	8.98	10.01	11.2	3.2	4.3
Primary Stock Changes [5]															
Net Withdrawals	.22	-.15	-.01	.07	-.07	-.02	-.04	-.05	-.03	.00	.01	-.04			
SPR [4] Fill Rate (-)	-.12	-.05	-.08	-.04	-.05	-.08	-.08	-.08	-.08	-.08	-.08	.00			
Total Primary Supply [6]	15.58	16.14	16.31	16.55	16.95	17.07	17.29	17.56	17.73	17.77	17.73	18.31	1.8	.7	.9
Refined Petroleum Products															
Motor Gasoline	6.83	7.03	7.16	7.24	7.18	7.13	7.11	7.11	7.07	7.00	6.91	6.82	.9	-.4	-.4
Jet Fuel [7]	1.22	1.31	1.36	1.41	1.45	1.47	1.49	1.52	1.53	1.52	1.51	1.55	3.8	.6	1.0
Distillate Fuel [8]	2.98	3.01	3.08	3.14	3.18	3.25	3.31	3.37	3.42	3.47	3.51	3.71	1.7	1.3	1.4
Residual Fuel	1.20	1.42	1.25	1.21	1.31	1.32	1.42	1.55	1.64	1.68	1.70	1.95	1.9	4.0	3.5
Other Petroleum Products [9]	3.49	3.51	3.67	3.65	3.84	3.90	3.95	4.02	4.07	4.09	4.09	4.26	2.2	.9	1.1
Total Product Supplied	15.73	16.28	16.52	16.66	16.96	17.06	17.29	17.56	17.73	17.76	17.72	18.30	1.7	.7	.8
Refined Petroleum Products Supplied by Sector															
Residential/Commercial	1.35	1.34	1.33	1.39	1.39	1.39	1.38	1.38	1.37	1.36	1.35	1.29	.5	-.7	-.3
Industrial	4.01	4.08	4.18	4.17	4.39	4.47	4.55	4.64	4.70	4.72	4.73	4.92	2.2	1.0	1.3
Transportation	9.88	10.22	10.46	10.59	10.62	10.66	10.71	10.79	10.81	10.79	10.74	10.88	1.5	.2	.3
Electric Utilities	.48	.63	.54	.52	.56	.55	.64	.75	.84	.88	.90	1.21	3.0	8.1	6.4
Total Consumption	15.73	16.28	16.52	16.66	16.96	17.06	17.29	17.56	17.73	17.76	17.72	18.30	1.7	.7	.8
Discrepancy [10]	-.15	-.14	-.21	-.11	.00	.00	.00	.00	.00	.01	.01	.01			
Net Disposition [11]	15.58	16.14	16.31	16.55	16.95	17.07	17.29	17.56	17.73	17.77	17.73	18.31	1.8	.7	.9

[1] Represents the cost of imported crude oil to U.S. refiners.
[2] Includes lease condensate.
[3] Represents volumetric gain in refinery distillation and cracking processes.
[4] SPR is the Strategic Petroleum Reserve.
[5] A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[6] Equals total production plus net imports plus net stock withdrawals minus SPR fill rate.
[7] Includes naphtha and kerosene type.
[8] Includes kerosene.
[9] Includes aviation gasoline, liquefied petroleum gas, petrochemical feedstocks, lubricants, waxes, plant condensate, pentanes plus, asphalt and road oil, still gas, special naphthas, petroleum coke, unfinished oils, and miscellaneous petroleum products.
[10] Represents the difference between total primary supply and total consumption.
[11] Represents the sum of total consumption and discrepancy.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88; Values for 1988 and 1989 are benchmarked to the EIA, *Short-Term Energy Outlook*, DOE/EIA-0202(88/1Q).

Table A2. Natural Gas Supply, Disposition, and Prices
(Trillion Cubic Feet)
(1987 Dollars per Thousand Cubic Feet)

Supply, Disposition, and Prices	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Production															
Dry Gas Production	16.38	15.99	16.21	16.09	16.38	16.32	16.30	16.30	16.44	16.62	16.81	17.39	-0.1	0.6	0.5
Supplemental Gas [1]	.13	.11	.15	.14	.14	.14	.14	.14	.14	.14	.14	.14	2.1	.0	-.5
Net Imports	.89	.69	.84	.89	1.07	1.16	1.26	1.36	1.46	1.65	1.75	2.50	5.5	7.9	8.7
Net Storage Withdrawals [2]	.23	-.12	.03	.12	-.02	.00	.00	-.01	-.01	-.02	-.02	-.01			
Total Supply [3]	17.63	16.67	17.23	17.24	17.57	17.63	17.70	17.80	18.02	18.39	18.68	20.02	.0	1.3	1.2
Consumption by Sector															
Residential	4.43	4.31	4.43	4.46	4.49	4.50	4.52	4.53	4.53	4.51	4.48	4.36	.3	-.3	-.1
Commercial [4]	2.43	2.32	2.33	2.31	2.35	2.38	2.42	2.46	2.49	2.51	2.53	2.60	-.4	.9	.9
Industrial	5.90	5.58	5.76	5.92	6.15	6.30	6.38	6.44	6.51	6.53	6.54	6.36	1.3	.1	.8
Lease & Plant Fuel [5]	.97	.92	.95	1.00	1.02	1.02	1.02	1.02	1.03	1.04	1.05	1.09	1.1	.6	1.0
Transportation [6]	.50	.49	.50	.51	.52	.52	.52	.52	.53	.54	.55	.59	.6	1.3	1.3
Electric Utilities	3.04	2.60	2.89	2.72	2.72	2.54	2.47	2.46	2.57	2.88	3.16	4.65	-3.5	6.2	3.7
Total Consumption	17.28	16.22	16.85	16.93	17.24	17.27	17.34	17.43	17.66	18.02	18.31	19.65	.0	1.3	1.2
Unaccounted for [7]	.35	.43	.38	.32	.33	.36	.37	.36	.36	.37	.37	.37			
Average Wellhead Price	2.65	2.00	1.83	1.89	1.96	2.04	2.13	2.24	2.41	2.60	2.85	4.02	-5.1	7.0	6.2
Average Price by Sector															
Residential	6.47	6.00	5.51	5.66	5.73	5.80	5.88	5.97	6.12	6.31	6.54	7.65	-2.2	2.8	2.6
Commercial [4]	5.81	5.23	4.75	4.81	4.87	4.88	4.91	4.96	5.05	5.18	5.36	6.20	-3.4	2.4	2.1
Industrial	4.17	3.33	2.65	2.71	2.77	2.84	2.92	3.01	3.16	3.34	3.57	4.65	-7.4	5.1	4.4
Electric Utilities	3.75	2.50	2.34	2.36	2.44	2.53	2.64	2.77	2.95	3.16	3.40	4.67	-7.6	6.3	5.5
Average to All Sectors [8]	4.99	4.25	3.73	3.81	3.87	3.94	4.03	4.12	4.25	4.40	4.60	5.61	-4.6	3.6	3.2

[1] Includes synthetic natural gas (results from the manufacture, conversion, or the reforming of petroleum hydrocarbons), and propane-air mixtures.
[2] Includes net withdrawals of dry natural gas from underground storage and liquefied natural gas. A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[3] Total supply represents the sum of dry gas production, supplemental gas, net imports, and net storage withdrawals.
[4] Includes deliveries to municipalities and other public authorities for use in schools and other institutions.
[5] Represents natural gas used in gathering systems and processing plants.
[6] Represents natural gas used to fuel compressors in pipeline pumping stations.
[7] Represents the difference between total supply and total consumption.
[8] Weighted average price. The weights used are the sectoral consumption values excluding lease and plant fuel and the transportation sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88; Values for 1988 and 1989 are benchmarked to the EIA, *Short-Term Energy Outlook*, DOE/EIA-0202(88/1Q).

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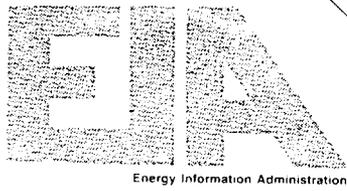
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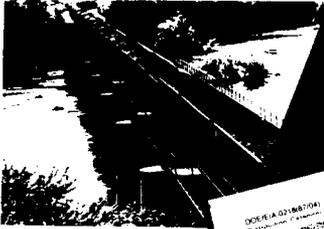
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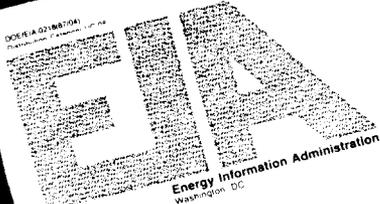
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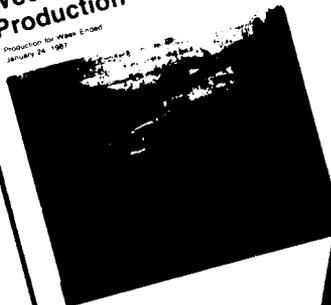
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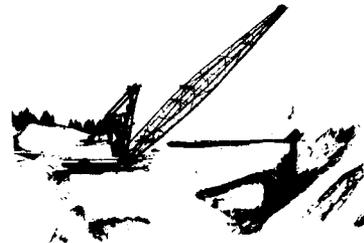
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