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SHORT-TERM ENERGY OUTLOOK

QUARTERLY PROJECTIONS

ENERGY INFORMATION ADMINISTRATION

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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 (see *Short-Term Energy Outlook: Annual Supplement,* DOE/EIA-0202). The principal users of the *Outlook* are managers and energy analysts in private industry and government. The 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 45. 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

Total demand for petroleum in the United States appears to be on track for recording another year of strong growth, with total oil demand for all of 1988 likely to average above 17 million barrels per day for the first time since 1980. The expected 2.0-percent growth this year can be attributed to a combination of low world oil prices, adverse weather conditions, and a buoyant economy. Next year, if the assumptions of slightly higher oil prices (on average), normal weather, and a decelerating economy hold, noticeably slower growth in petroleum use (and other energy sources) is expected for the United States. This year's strong increase in electricity use may not be closely matched in 1989 if the weather returns to the normal, hence milder, temperatures assumed in this *Outlook*. However, industrial use of electricity continues to exhibit robust growth, and this sector should lead overall electricity use to record levels again in 1989.

Low World Oil Prices Seen as More Likely Case Now

Expectations for weak oil prices in the short run have been strengthened by the continuing increase in overproduction by the Organization of Petroleum Exporting Countries (OPEC). Oil prices may rise to about $15 per barrel in 1989, but this assumes success by OPEC leaders in achieving production restraint within the cartel in the near future. The crude oil and product price forecasts published in this *Outlook* reflect market conditions as of October 20, 1988.

Petroleum Demand Growth Strong, but Underlying Factors Point to a Slowing Trend

Petroleum growth this year may nearly match the solid increase in 1987 but should not exceed it, given the booming economy and relatively low prices. If the economy settles to a trend growth rate of less than 3 percent and oil prices track upward again, however, it is unlikely that petroleum demand will increase annually by more than 300,000 barrels per day over the next 5 years.

Petroleum Imports Continue to Grow in Importance

U.S. net imports of crude oil (including the Strategic Petroleum Reserve) and petroleum products are expected to continue rising through 1989, from 5.9 million barrels per day in 1987 to 6.3 in 1988 and 6.8 in 1989, the latter corresponding to 40 percent of domestic consumption. These rates compare with a record high of 8.6 in 1977 and a low of 4.3 in 1985. The upward trend in imports is the result of projected reductions in domestic production of crude oil and natural gas liquids (160,000 barrels per day in 1988 and 200,000 in 1989). Slower growth in petroleum demand in 1989 is not sufficient to curb import growth because of the large drop in expected domestic production.

Despite Low Crude Oil Prices, Gasoline Prices Remain High This Year

It is expected that gasoline prices will continue to average 96 cents per gallon for all of 1988, as they did in 1987. The falloff of 8 cents per gallon in crude oil prices is not expected to be matched at the gasoline pump because of shifts in the quality of gasoline being marketed and because of certain supply constraints in the domestic market (see "Motor Gasoline Markets and Margins," page 33). In 1989, however, prices should fall to 94 cents per gallon.

Electricity Sales Post Growth in Excess of 4 Percent Again This Year

Total electricity sales are expected to show an average increase of 4.1 percent this year. Growth in the residential and commercial sectors should reach 4.0 percent and 5.2 percent, respectively, for 1988. In 1989, however, growth in these sectors should diminish appreciably if normal weather prevails. Industrial sales growth has been fairly strong this year and should continue at a strong though slightly diminished pace next year (see "The Impact of Industrial Demand and Weather on Electricity Sales," page 36).

Forecast Sensitivities

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 45. 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 0.2 percent (about 50,000 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 1.4 percent (about 240,000 barrels per day during the first quarter of 1989, for example).
- For a 1-percent increment in economic activity above the base case level, petroleum consumption could increase by about 0.7 percent (about 120,000 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.

Important Notice Concerning Industrial Natural Gas Consumption in 1988

A comparison of the Energy Information Administration's annual natural gas consumption data reported for 1987 on Form EIA-176 (a census of those companies having custody of natural gas between producers and consumers) and monthly natural gas consumption data reported for January through July 1988 on Form EIA-857 (a sample of companies that deliver to consumers, drawn from the EIA-176 frame) revealed that 43 companies apparently have consistently misreported their monthly industrial consumption. This resulted in an overstatement of industrial consumption in the first 6 months of 1988 of 0.5 trillion cubic feet. The erroneous data submissions have been removed from the data base, and new estimates have been generated for sectoral natural gas consumption. The revised estimates are reflected in the current *Outlook*. Each company that misreported has been contacted and instructed to file a revised Form EIA-857. The new estimate of industrial natural gas consumption for the first half of 1988, 3.1 trillion cubic feet, is 6 percent higher than the level for the first 6 months of 1987. Prior to this revision, EIA's published estimates of industrial natural gas consumption for the first 6 months of 1988 indicated an increase of 26 percent over the same period in 1987.

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)	**3,722**	**3,847**	*4,001*	*4,116*	**3.4**	*4.0*	*2.9*
Index of Industrial Production (Mfg.) (index, 1977=1.000)	**1.291**	**1.346**	*1.425*	*1.485*	**4.3**	*5.9*	*4.2*
Imported Crude Oil Price (nominal dollars per barrel)	**14.00**	**18.16**	*14.70*	*15.00*	**29.7**	*-19.1*	*2.0*
Retail Prices (nominal) [a]							
Motor Gasoline [b] (dollars per gallon)	**.93**	**.96**	*.96*	*.94*	**3.2**	*.0*	*-2.1*
Retail No. 2 Heating Oil (dollars per gallon)	**.84**	**.80**	*.79*	*.78*	**-4.8**	*-1.3*	*-1.3*
Residential Natural Gas (dollars per thousand cubic feet)	**5.83**	**5.56**	*5.50*	*5.68*	**-4.6**	*-1.1*	*3.3*
Residential Electricity (cents per kilowatthour)	**7.41**	**7.41**	*7.58*	*7.70*	**.0**	*2.3*	*1.6*
Petroleum Supply							
Crude Oil Production [c] (million barrels per day)	**8.68**	**8.35**	*8.18*	*7.97*	**-3.8**	*-2.0*	*-2.6*
Net Petroleum Imports, Including SPR (million barrels per day)	**5.44**	**5.91**	*6.28*	*6.84*	**8.6**	*6.3*	*8.9*
Consumption							
Total Market Economies Petroleum Consumption (million barrels per day)	**47.95**	**48.86**	*49.81*	*50.48*	**1.9**	*1.9*	*1.3*
Total U.S. Petroleum Consumption (million barrels per day)	**16.28**	**16.67**	*17.01*	*17.21*	**2.4**	*2.0*	*1.2*
Motor Gasoline	**7.03**	**7.21**	*7.34*	*7.44*	**2.6**	*1.8*	*1.4*
Distillate Fuel Oil	**2.91**	**2.98**	*3.09*	*3.19*	**2.4**	*3.7*	*3.2*
Residual Fuel Oil	**1.42**	**1.26**	*1.25*	*1.20*	**-11.3**	*-.8*	*-.4*
Other Petroleum [d]	**4.92**	**5.22**	*5.33*	*5.38*	**6.1**	*2.1*	*.9*
Coal Consumption (million short tons)	**804**	**837**	*872*	*882*	**4.1**	*4.2*	*1.1*
Natural Gas Consumption (trillion cubic feet)	**16.22**	**17.14**	*17.74*	*17.94*	**5.7**	*3.5*	*1.1*
Electricity Generation (billion kilowatthours)	**2,487.3**	**2,572.1**	*2,683.8*	*2,738.6*	**3.4**	*4.3*	*2.0*
Total Energy Consumption[e] (quadrillion Btu)	**74.24**	**76.77**	*79.39*	*80.64*	**3.4**	*3.4*	*1.6*
Thousand Btu/1982 Dollar of GNP	**19.95**	**19.96**	*19.84*	*19.59*	**.1**	*-.6*	*-1.3*

[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(88/07); *International Energy Annual 1986* DOE/EIA-0219(86); *Petroleum Marketing Monthly*, DOE/EIA-0380(88/07); *Petroleum Supply Monthly*, DOE/EIA-0109(88/07); *Petroleum Supply Annual 1987*, DOE/EIA-0340(87)/1; *Natural Gas Monthly*, DOE/EIA-0130(88/07); *Electric Power Monthly*, DOE/EIA-0226(88/07); and *Quarterly Coal Report*, DOE/EIA-0121(88/2Q); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through May 1988. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0988.

Assumptions

- *International Petroleum*
- *World Oil Prices*
- *Macroeconomic Activity*
- *Energy Product Prices*

International Petroleum

Recent Developments

In late August, it appeared that the Organization of Petroleum Exporting Countries (OPEC) was beginning to move toward an agreement on production quotas that could have led to firmer oil prices in late 1988 and throughout 1989. Such an agreement would have included the following components: (1) Iraq would have returned to the quota system, with Iraq and Iran having been given equal quotas, probably somewhat larger than Iran's current quota of 2.4 million barrels per day; (2) the United Arab Emirates (UAE) would have been granted its request for a larger quota of 1.5 million barrels per day; (3) production from the Neutral Zone would have been explicitly included in the quota system; and (4) compromises would have been reached on the definitions of production and condensates and on the treatment of crude oil loans among OPEC countries. The result would have been a crude oil production ceiling of about 18.6 million barrels per day.

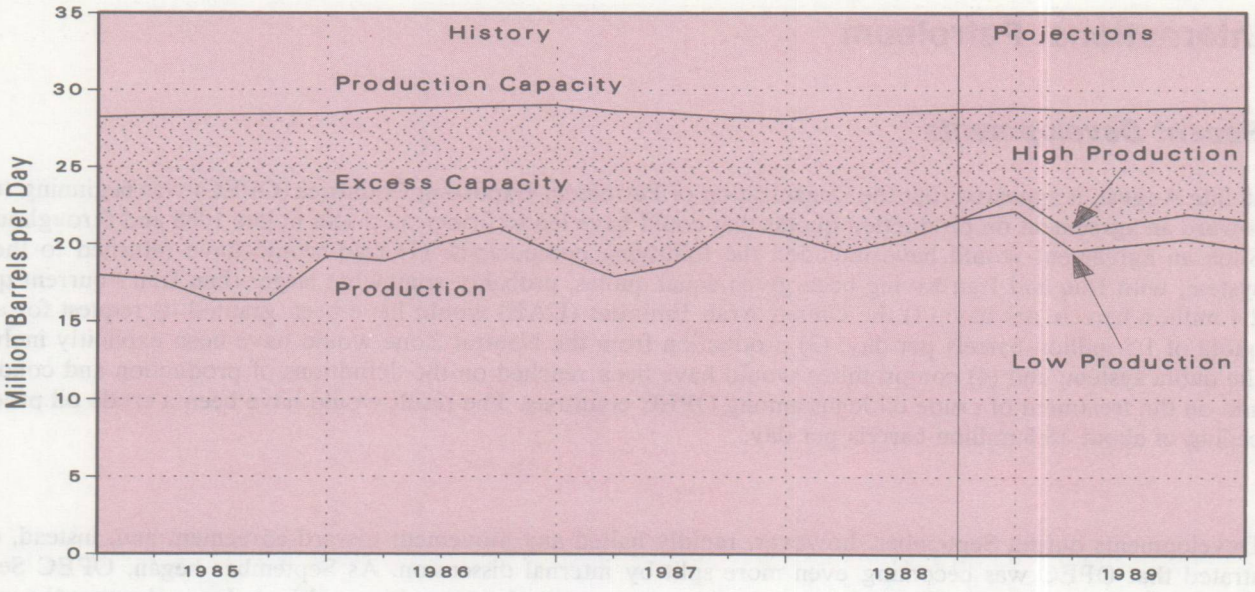
Developments during September, however, rapidly halted any movement toward agreement and, instead, demonstrated that OPEC was becoming even more split by internal dissension. As September began, OPEC Secretary General Subroto failed in his attempt to negotiate quota parity between Iran and Iraq. Iraq subsequently indicated that parity was no longer an issue and hinted that it wanted a quota equal to or greater than its current production rate of 2.7 million barrels per day. This, in turn, raised fears in the market that Iraq and Iran might both, in the wake of the ceasefire in their 8-year war, flood the market with increased production (see "Potential Effects of the Iran-Iraq Ceasefire on OPEC Production," page 35). Meanwhile, it became clear that, in August, OPEC crude oil production had increased by almost 1.3 million barrels per day to an estimated 20.1 million barrels per day. More than one-third of this increase was accounted for by the UAE, where production exceeded the country's own self-proclaimed production quota of 1.5 million barrels per day by over 300,000 barrels per day. More ominous, though, was the realization that, as a result of a late-month surge in production, Saudi Arabian crude oil production had increased by about 500,000 barrels per day to 5.0 million barrels per day, fully 650,000 barrels per day above its OPEC quota.

As a result of these developments, spot prices for OPEC crude oils had decreased to a range of $10.50 to $13.50 per barrel by September 23, the lowest range since August 6, 1986. Within a week, spot prices had declined further to a range of $9.50 to $12.50 per barrel. This decrease occurred because the OPEC Price Monitoring Committee failed to take any concrete action to reduce OPEC overproduction, and because Secretary General Subroto warned, in an extensive interview reported by Dow Jones on September 30, that Saudi Arabia might sharply increase its crude oil production to drive prices down and deter other OPEC quota violators. Subsequently, Saudi Arabia confirmed that it would continue to overproduce as long as other OPEC member nations did, with some reports indicating that Saudi Arabia would increase its production to 5.6 or even 6.0 million barrels per day in October. At the same time, initial estimates indicated that OPEC crude oil production in September may have been as high as 20.6 million barrels and that Libya, Nigeria, and Venezuela had been added to the list of significant quota violators.

In early October, then, it would seem that OPEC's mutual overproduction may contribute to even lower world oil prices in the near term. This price decline may help to facilitate discussion of a new OPEC production and pricing strategy at OPEC's Joint Committee meeting on October 20. It is unlikely, however, that a new strategy will be agreed on at that meeting and such agreement may not even be possible at the regular OPEC Ministerial Conference on November 21. As Secretary General Subroto indicated in his interview with Dow Jones, the OPEC factions were currently so far apart that there was no middle ground or compromise proposal on a production and pricing strategy to discuss. What will make the search even more difficult is that OPEC is now faced with the more basic and divisive question of what the Organization wants as its primary goal. Does it want to set a more comfortable level of production and let the market determine prices, or does it still want to set a reference price and then adjust production to attain that price?

The price outlook for the near term is for continued weakness but high volatility as the market reacts to developments in OPEC's search for a new strategy. In the longer term, agreement on a new, more realistic OPEC strategy, if and when it occurs, should contribute to higher prices than would otherwise be the case.

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

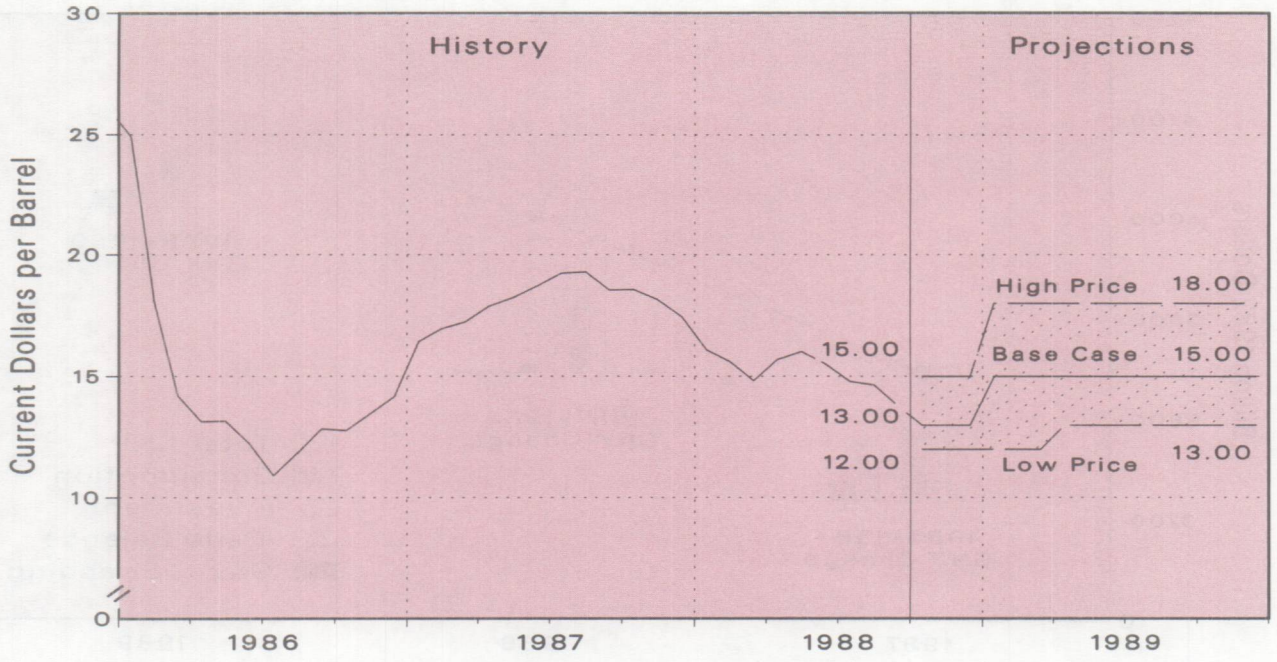
The demand for petroleum products by the Market Economies is expected to average about 49.8 million barrels per day in 1988, an increase of 950,000 barrels per day, or 1.9 percent, from the 1987 rate (Table 2 on page 41). In 1989, demand is expected to increase by about 670,000 barrels per day, or 1.3 percent. The developing countries, or Other Market Economies, should account for about one-third of the increase in each of these years.

- Petroleum demand by the OECD countries is expected to average almost 36.5 million barrels per day in 1988, an increase of 690,000 barrels per day, or 1.9 percent. This increase is based on the assumption that the OECD economies will grow at a 3.9 percent rate in 1988 (Table 3 on page 41). The United States and Japan are expected to account for about one-half and one-third, respectively, of the 1988 increase in OECD petroleum demand. In 1989, despite a slowing of OECD economic growth to 2.8 percent, petroleum demand is expected to increase by an additional 420,000 barrels per day, or 1.2 percent. This forecast assumes that normal winter weather conditions will return to Europe and Japan in 1989. A return to cooler temperatures in Europe should increase heating-related petroleum demand, except in Germany, where consumers are assumed to have already filled their tanks in anticipation of a large tax increase proposed for January 1.

- Oil production from the non-OPEC market economies should increase by about 300,000 barrels per day in 1988, followed by a further increase of about 210,000 barrels per day in 1989. These production projections assume that, in 1989: (1) the United Kingdom will be able to restore 170,000 barrels per day of the North Sea production that was shut in after the Piper Alpha platform explosion; and (2) Colombian production will continue to average about 70,000 barrels per day below capacity because of sabotage attacks on its main crude oil pipeline. In 1988, production increases of 100,000 barrels per day or more each are expected from four countries, while production decreases of about 150,000 barrels per day each should occur in the United States and the United Kingdom. In 1989, by contrast, only three countries are expected to have production increases of as much as 50,000 barrels per day each, while U.S. production declines by 200,000 barrels per day.

- The forecast detailed above implies OPEC oil production in 1988 of about 21.0 million barrels per day, or 1.45 million barrels per day above the 1987 rate. In 1989, OPEC production will probably decline, given the smaller increases in demand and petroleum stocks that are expected. A range of possible aggregate OPEC oil production is projected, based on a range of assumed inventory behavior, but these projections are not disaggregated to the country level (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



Note: Prices are defined as the cost of imported crude oil to U.S. refiners.
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Table 4.

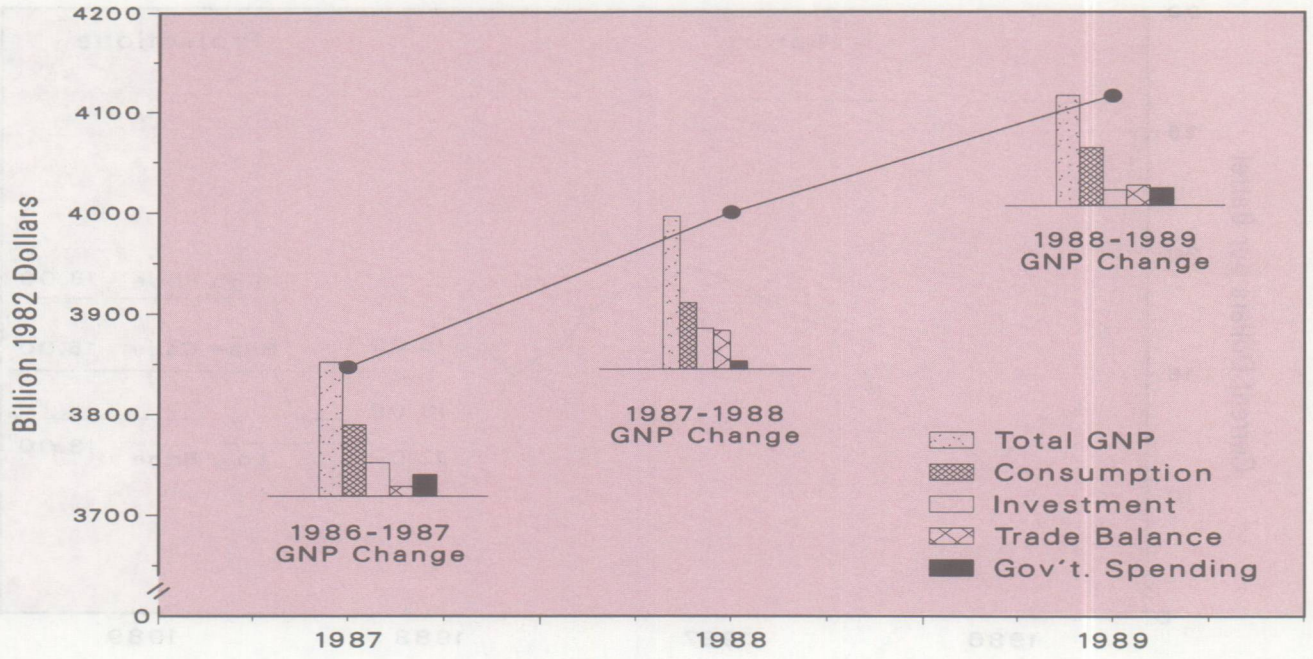
World Oil Prices

One of the most uncertain factors affecting the domestic short-term energy outlook is the world oil price, defined here as the nominal price of imported crude oil delivered to U.S. refiners. Because of this uncertainty, three different world oil price scenarios are employed (Figure 2). These scenarios are used to develop a base case projection and two alternative projections that provide a range of projections for domestic energy supply and demand. 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 42).

- In the base oil price scenario, the world oil price decreases from about $14 per barrel in the third quarter of 1988 to $13 in the fourth quarter, and then increases to $15 in 1989.
- In the low oil price scenario, the world oil price decreases to $12 per barrel in the fourth quarter of 1988 and the first quarter of 1989, and then increases to $13 for the remainder of 1989.
- In the high oil price scenario, the world oil price increases to $15 per barrel in the fourth quarter of 1988 and $18 in 1989.

The oil and product price forecasts presented in this *Outlook* reflect expectations about price formulated as of October 20, 1988, in order that a timely evaluation of the price situation be provided. The macroeconomic and energy demand and supply forecasts which appear in this *Outlook* are based on prices which reflect expectations of a month earlier, in accordance with the normal publication schedule. Under the earlier forecast, base case oil prices were, on average, 50 cents per barrel higher for 1988 and 80 cents per barrel higher for 1989 than those presented in Table 4. If the energy demand and supply forecasts had been revised to reflect these updated oil price expectations, petroleum demand levels would be slightly higher than those presented in this *Outlook,* and crude oil production levels would be slightly lower (see forecast sensitivities on page 2).

Figure 3. Real GNP and Components of Change



Sources: • History: Bureau of Economic Analysis, U.S. Department of Commerce, *Survey of Current Business*, September 1988; Federal Reserve System, *Statistical Release G.12.3*, September 1988.• Projections: Table 4.

Macroeconomic Activity

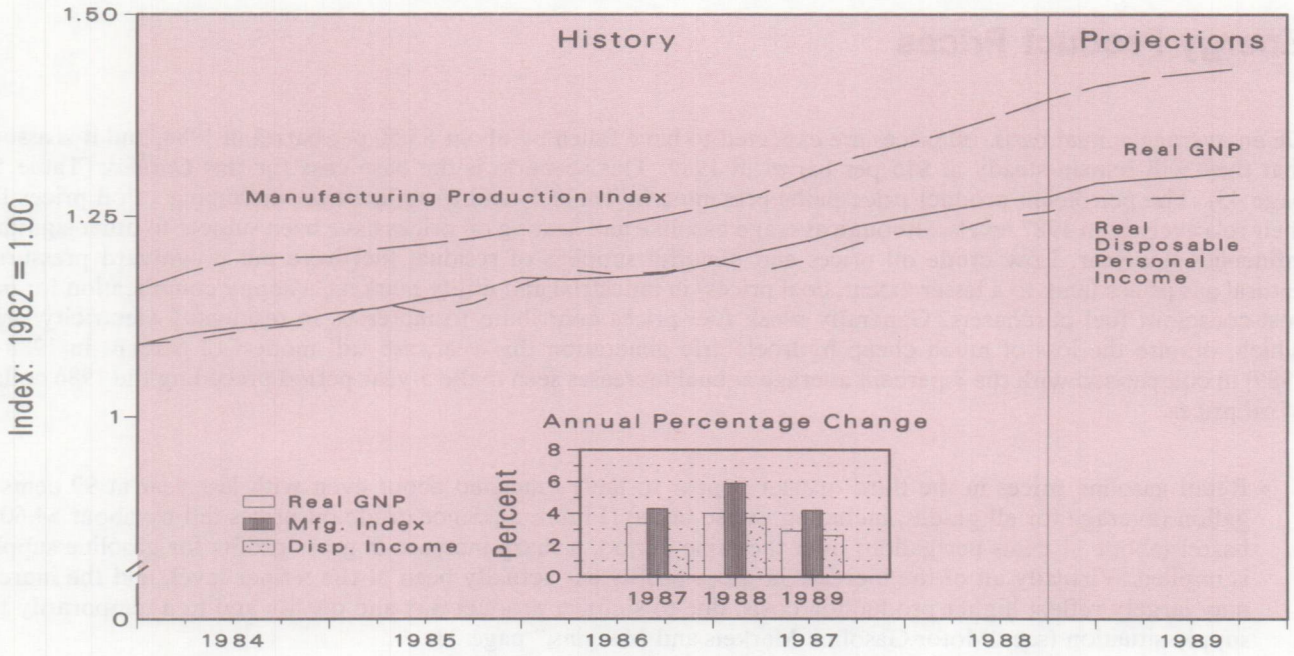
The recent revision of the National Income and Product Account data by the Bureau of Economic Analysis, U.S. Department of Commerce, has raised the growth rate of real gross national product (GNP) by an average of 0.3 percent per year between 1984 and the second quarter of 1988 (Table 4 on page 42). The expected real GNP growth rate in 1988 has increased from 3.2 percent in the July *Outlook* to the current 4.0 percent. The revisions to the national income accounts show continued strength in domestic demand. Coupled with signs that wages and prices are increasing, the focus of the Federal Reserve is to contain inflation. The Federal Reserve rate for Federal funds is projected to be 33 basis points higher in 1988 and 37 basis points higher in 1989 compared to the July forecast.

The current estimates are for real GNP to increase by 4.0 percent in 1988 and then slow to a 2.9-percent growth rate in 1989 due to a slowing of investment in 1989. Over the same period, interest rates rise steadily. Real investment spending is significantly higher in 1988, with nonresidential investment expenditures, especially investment in producer durable equipment, registering healthy gains. In 1988, residential investment spending experiences a decline because of its interest rate sensitivity. Consumer confidence is up in 1988, but higher interest rates lead confidence to drop in 1989. In 1989, real investment spending slows because of much lower growth in nonresidential investment spending.

In addition, the dollar exchange rate is projected to be, on average, 4.6 percent higher over the forecast period compared to the July forecast. Compared to the July forecast, the real trade balance improves in 1988 but deteriorates in 1989 due to the higher projected dollar exchange rate. As a result, domestic consumption is relatively more important in GNP growth in 1989, since with a higher dollar and higher interest rates, improvement in the trade balance and rates of investment will begin to moderate.

In 1988, consumption, investment, and the trade sector contribute more or less equally to GNP growth. In 1989, consumption fuels GNP growth with investment and the trade sector contributing relatively little to output growth (Figure 3).

Figure 4. Indices of Economic Activity



Sources: • History: Bureau of Economic Analysis, U.S. Department of Commerce, *Survey of Current Business*, September 1988; Federal Reserve System, *Statistical Release G.12.3* September 1988. • Projections: Table 4.

- The tightening of Federal Reserve policy is projected to increase interest rates in 1988 and 1989. Residential investment spending falls in 1988 but the increase in nonresidential investment allows total investment spending to increase. In 1989, total investment spending slows as a result of slower growth in both nonresidential and residential investment expenditures.
- Consumption growth is expected to be 2.6 percent in 1988 and 2.3 percent in 1989. These rates are higher than forecast in July because of higher expectations for demand growth and consumer confidence.
- Higher investment and consumption spending should lead manufacturing industries to experience healthy gains in 1988, increasing 5.9 percent in 1988. Growth drops to 4.2 percent in 1989, with the export sector registering high growth rates in 1989 (Figure 4).
- Real disposable income is expected to increase 3.7 percent in 1988 and 2.6 percent in 1989. Since the dollar is projected to be stronger than earlier forecast, the growth in consumer prices in 1989 will be more moderate. As a result, growth in real disposable income shows greater strength.

Energy Product Prices

On an average annual basis, oil prices are expected to have fallen by about $3.50 per barrel in 1988, and it is assumed that they will remain steady at $15 per barrel in 1989. This scenario is the base case for this *Outlook* (Table 5 on page 43). The petroleum product price paths presented in Table 5 tend to reflect this weakening of oil prices from their relatively high 1987 levels, although average gasoline and heating oil prices have been subject to other significant influences this year. Low crude oil prices and plentiful supplies of residual fuel have put downward pressure on natural gas prices (and, to a lesser extent, coal prices) in industrial and utility markets, a happy complication for many cost-conscious fuel purchasers. Generally weak fuel prices contribute to increases in residential electricity prices, which, despite the loss of much cheap hydroelectric generation this year, are still modest (2 percent in 1988 and 1989) in comparison with the 8-percent average annual increases seen in the 5-year period preceding the 1986 collapse of oil prices.

- Retail gasoline prices in the third quarter appear to have remained about even with last year at 99 cents per gallon (average for all grades, including excise taxes) (Figure 5). Since crude oil prices fell by about $4.60 per barrel (about 11 cents per gallon) over the same period, a sharp increase in gross profits for gasoline suppliers is implied. Virtually all of the increase in gross profits has actually been at the refiner level, and the increases may largely reflect higher production costs, due to shifts in product mix and quality and to a temporarily tight supply situation (see "Motor Gasoline Markets and Margins," page 33).

- Heating oil prices did not reflect the downturn in crude oil prices this year until the third quarter, and even then lower prices were more evident at the wholesale level (Figure 5). Very strong demand during the cold months of early 1988 allowed dealers to receive relatively high prices for heating oil, and this contributed heavily to the comparatively high average price for residential heating oil--79 cents for all of 1988. Barring unusual external influences, retail heating oil prices are not expected to repeat their 1988 surge in the winter of 1989. However, a very cold winter this year could very well result in higher distillate prices than shown for the base case (see "Winter Distillate Outlook," page 34).

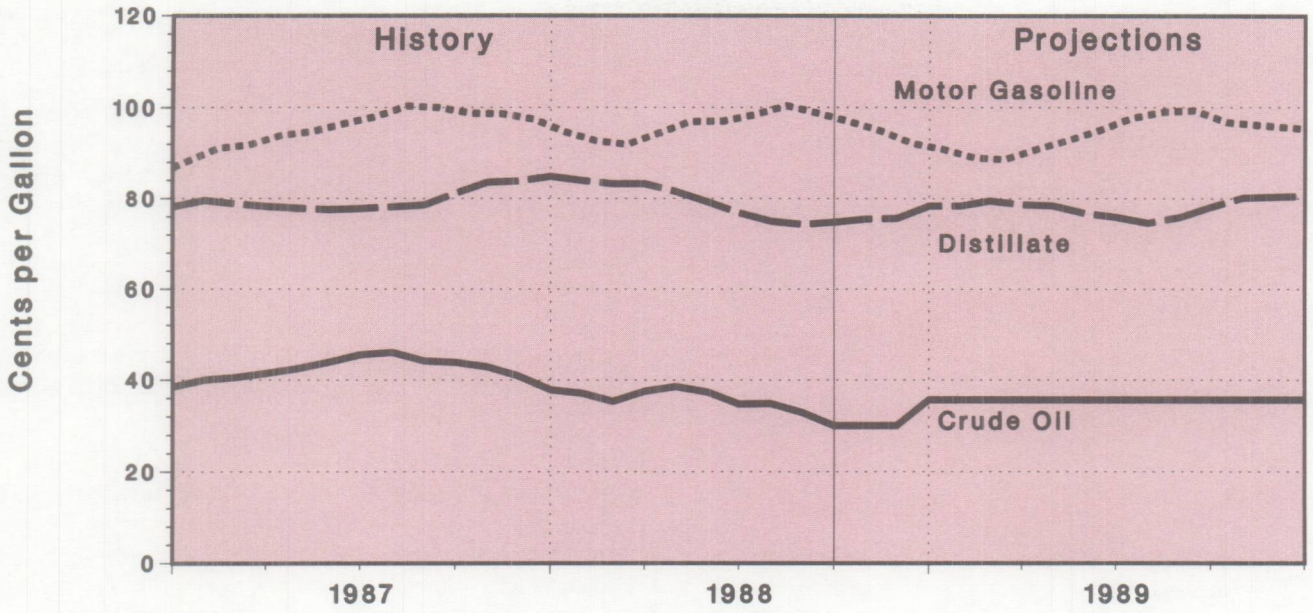
- Since bottoming out at around $1.30 per thousand cubic feet in May of this year, spot prices for natural gas have been climbing steadily, rising to $1.55 by the end of September.[1] The primary reason for this rise was the increase in consumption at electric utilities during the hot summer. Also, environmental regulations restricted the burning of heavy oil in Southern California. However, the prices of substitute fuels, such as residual fuel oil, have not increased, and this has kept a lid on price increases for natural gas to some end users, such as electric utilities (Figure 6). In 1988, the price of natural gas to electric utilities is projected to decline by about 2 percent. In 1989, however, the price is projected to increase by about 5 percent as the wellhead price of gas increases. Despite the increase, natural gas prices to electric utilities should remain competitive with residual fuel oil in this market. Due to low first-quarter prices, residential natural gas prices should decrease by 1 percent in 1988 on an annual basis. Based on higher expected wellhead prices, residential natural gas prices should edge up by 3.3 percent in 1989.

- Residential electricity prices in 1988 are projected to increase by about 2 percent, with most of the increase occurring in the second half of the year. The primary reason for this increase is that the heat wave and the drought during the summer of 1988 resulted in increased consumption of relatively more expensive fossil fuels at electric utilities in lieu of cheaper hydroelectric generation. In 1989, prices are expected to increase by an additional 2 percent (still a decrease in real terms), as utility fuel costs and interest rates (the cost to utilities to borrow money) are both projected to rise. Reported electricity price levels are about 1 to 5 percent lower than in the previous *Outlook,* because the current projections are based on the Energy Information Administration's new price series,[2] which provides lower average price levels than the previous series.

[1] *Natural Gas Intelligence,* May 16, 1988, and September 26, 1988, issues. The price represents the average high and low spot price quotes for the Southwest regions (Texas and Gulf, Oklahoma, and Louisiana).

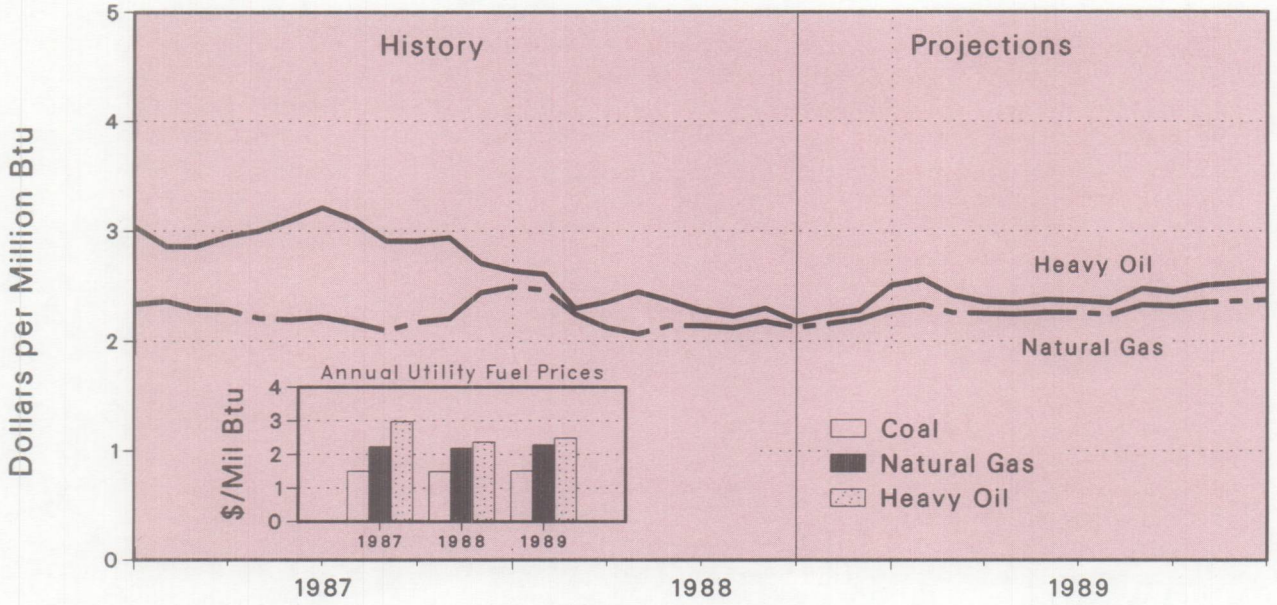
[2]Beginning with this issue of the *Outlook,* a new price series for residential electricity will be reported, replacing the old series in the forecasts. The Energy Information Administration presently publishes both the old and new series, but will soon be publishing only the new series. The old series surveyed a group of large, privately owned electric utilities. The new series surveys small and publicly owned utilities as well, and is thus more comprehensive than the old series (see Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/06) (Washington, DC, June 1988), Table 9.9).

Figure 5. Motor Gasoline and Distillate Prices



Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Table 5.

Figure 6. Utility Fossil Fuel Prices

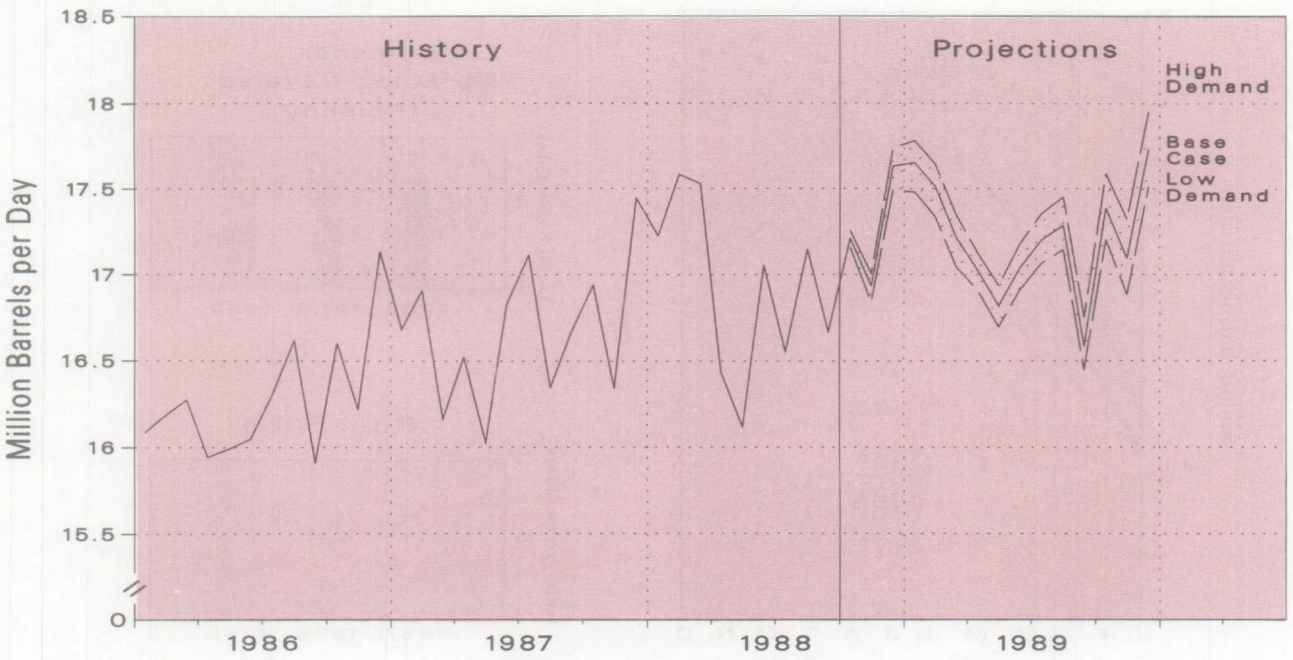


Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Table 5.

U.S. Petroleum Outlook

- *Total Petroleum*
- *Motor Gasoline*
- *Distillate Fuel Oil*
- *Residual Fuel Oil*
- *Other Petroleum Products*
- *Petroleum Supply Overview*
- *Crude Oil and Natural Gas Liquids Production*
- *Petroleum Stocks and Imports*

Figure 7. Total Petroleum Demand



Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Tables 6, 8, and 9.

Total Petroleum

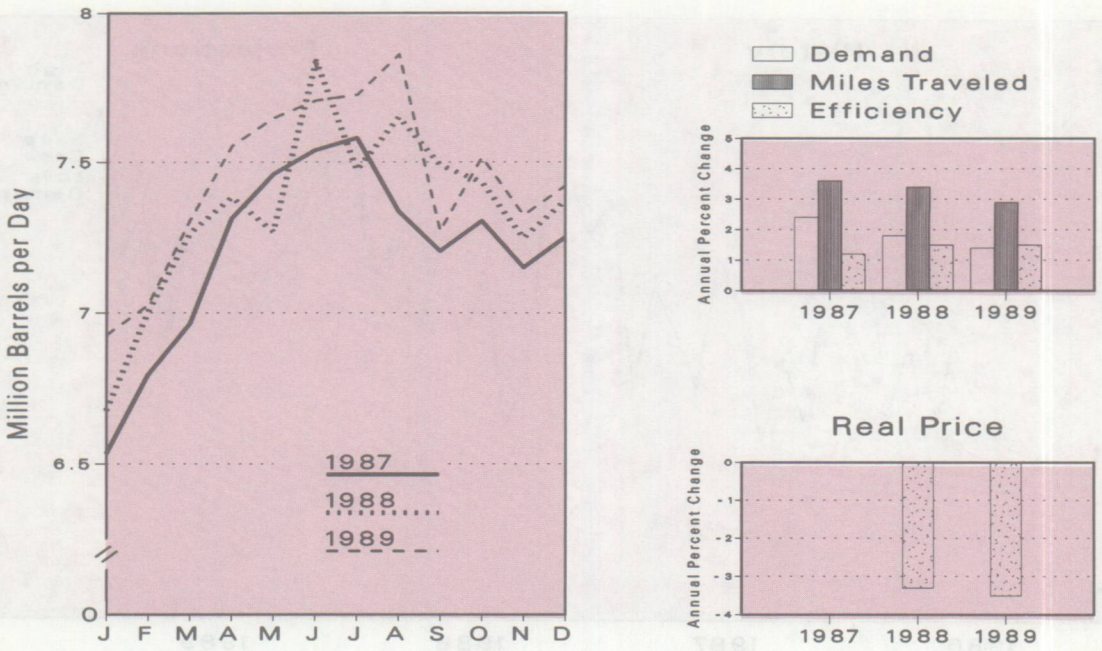
Recent data on summer petroleum demand are tending to confirm the expectation set forth in the July *Outlook* that 1988 will be the first year since 1980 in which domestic petroleum demand averages over 17.0 million barrels per day for the year (Table 6 on page 44 and Figure 7). Extreme weather conditions (winter cold, record summer heat, and drought) have played some role in this year's situation. High heating oil demand early this year, and greater utility use of oil in winter and summer (partly exacerbated by significantly lower hydroelectric availability), are largely weather-related factors that would be attenuated or reversed under the assumption of normal weather. Nevertheless, continued strong demand for transportation fuels (including a near-record summer for motor gasoline demand; see "Motor Gasoline Markets and Margins," page 33) will help ensure additional growth in petroleum demand in 1989. With some additional help from LPG and oil-based petrochemical feedstocks, total petroleum demand is expected to exhibit an average growth rate of 1.6 percent from 1987 to 1989, with demand averaging 17.2 million barrels per day in 1989.

- Motor gasoline demand is expected to grow by about 1.8 percent in 1988, or by 130,000 barrels per day on average. An additional 100,000 barrels per day is expected for 1989, as continued (though slower) economic growth and relatively flat gasoline prices next year imply additional growth in travel demand.

- Increased use of distillate fuel oil in transportation (diesel) and industrial and commercial uses is expected to continue through 1989. Although somewhat inflated because of weather effects last winter, 1988 distillate demand is expected to be 110,000 barrels per day higher for all of 1988 compared to 1987 levels. An additional 100,000 barrels per day could materialize in 1989 with the relatively weak oil prices being assumed for this *Outlook*.

The average world oil price spread between high and low price assumptions is about $5 per barrel, or approximately 33 percent of the base case price assumptions. Combining this with alternative estimates for economic growth and weather, the average expected range over the forecast period for total petroleum demand is 394,000 barrels per day (Table 7 on page 45). Petroleum demand sensitivities relating to price and economic growth assumptions are described in Table 8 on page 46 and Table 9 on page 47.

Figure 8. Motor Gasoline Demand and Components



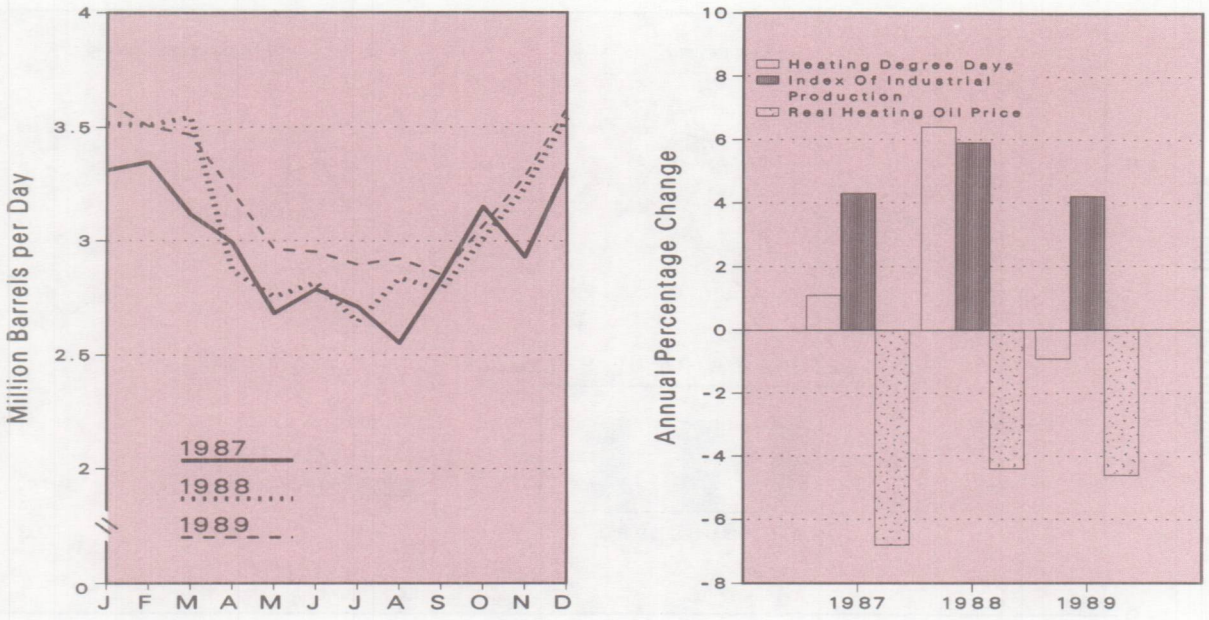
Note: Projections begin in the third quarter of 1988.
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Table 10.

Motor Gasoline

Gasoline demand has remained strong this year, following above-average growth of 2.6 percent in 1987. So far this year, growth has been around 2 percent, and it is expected to remain close to that rate through the end of the year (Table 10 on page 48). The additional 160,000 barrels per day expected for the third quarter of 1988, compared to the same quarter in 1987, has put some strain on the domestic gasoline supply system, and has contributed to relatively high gasoline prices and margins this year (see "Motor Gasoline Markets and Margins," page 33). Despite a boom in economic growth in 1988 (and despite weak oil prices generally), travel growth, though still strong, is slowing (Figure 8). Still, with the expected growth of 1.4 percent in 1989, gasoline demand will have exhibited 7 consecutive years of growth averaging 1.8 percent per year.

- The first half of 1988 brought conflicting signals for the direction of the motor gasoline market in the short run, at least in regard to the product supplied statistics reported here. A remarkable 3.3-percent yearly growth rate in gasoline product supplied in the first quarter was followed by a relatively anemic 0.7-percent growth rate in the second quarter. This situation was clearly anomalous, and may be explained, in part, by a surge of product supplied destined for secondary and tertiary storage in anticipation of a busy driving season (and perhaps also in anticipation of possibly higher future prices) in the first quarter. However, much of this odd pattern can be explained by a reverse pattern (that is, relatively lower first-quarter demand) in 1987. In 1987, growth from the first quarter to the second quarter was 10.1 percent. The "normal" or average seasonal growth is about 7.1 percent between these quarters.
- It is apparent that efficiency gains--that is, increases in miles per gallon (mpg)--are running at about 1.5 percent in 1988, particularly if the total vehicle travel statistics are a good guide to gasoline-powered travel. It is assumed that this growth rate will continue in 1989. It has been suggested that some of the growth in gasoline demand in 1987 was due to the raising of the speed limit to 65 miles per hour in certain sections of 38 States, which would have tended to reduce fuel use efficiency in those areas. If some of the same effects (higher average speeds) are causing part of this year's growth in gasoline demand, and these effects dissipate in 1989 (that is, no additional growth in average speed, leading to higher growth in average mpg), then the forecast for gasoline demand in 1989 may be high.

Figure 9. Distillate Fuel Oil Demand



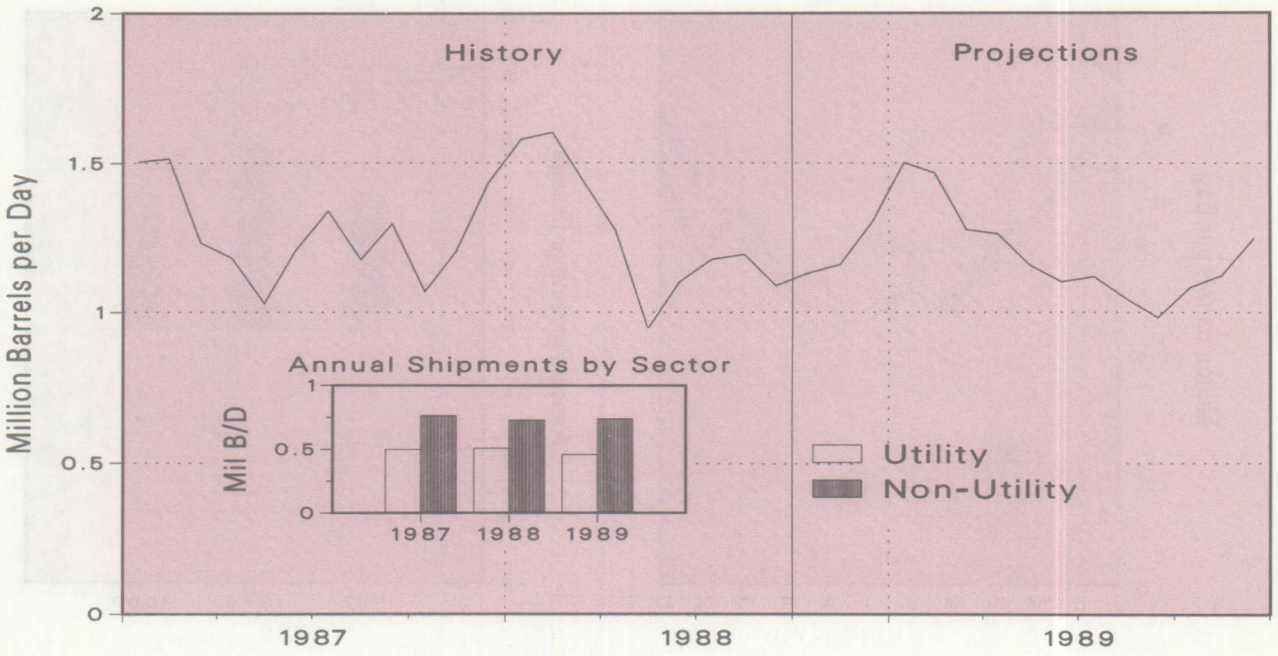
Note: Projections begin with the fourth quarter of 1988.
Sources: • History: Energy Information Administration, *Electric Power Monthly*, DOE/EIA-0226(88/07) and *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Table 16.

Distillate Fuel Oil

Since the end of the recession of 1982, demand for distillate fuel oil has exhibited average growth of 2.3 percent per year through 1987, making it the second-fastest-growing category among the major petroleum products over that period. Some growth swings have been observed that reflect the effects of abnormal winter weather patterns on the demand for heating oil. This factor is particularly significant in 1988. Even assuming normal weather for the forecast period, strong growth in distillate demand is expected for the rest of 1988 and for 1989 because of the influence of increasing industrial and commercial activity on the demand for distillate for transportation and industrial fuel uses.

- For all of 1988, the growth in demand for distillate fuel oil is expected to be 3.7 percent. A projected increase of 110,000 barrels per day is followed by an additional increase of about 100,000 barrels per day in 1989 (Table 11 on page 49 and Figure 9).
- Of the 1988 increase, 22 percent can be attributed to colder temperatures during the winter months than during the winter of 1987, boosting the demand for residential heating oil. Though distillate demand growth will remain strong next year, residential heating oil demand should not contribute much to this growth (see "Winter Distillate Outlook," page 34).
- In 1989, the cumulative effect of low oil prices through the forecast period and the relatively high rates of industrial growth through the middle of next year are expected to keep diesel and distillate demand high. Demand for diesel fuel grew by an estimated 6.9 percent through July compared to 1987 levels. Similar growth in demand for diesel next year would contribute most of the overall growth in distillate demand in 1989.

Figure 10. Residual Fuel Oil Demand



Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Table 12.

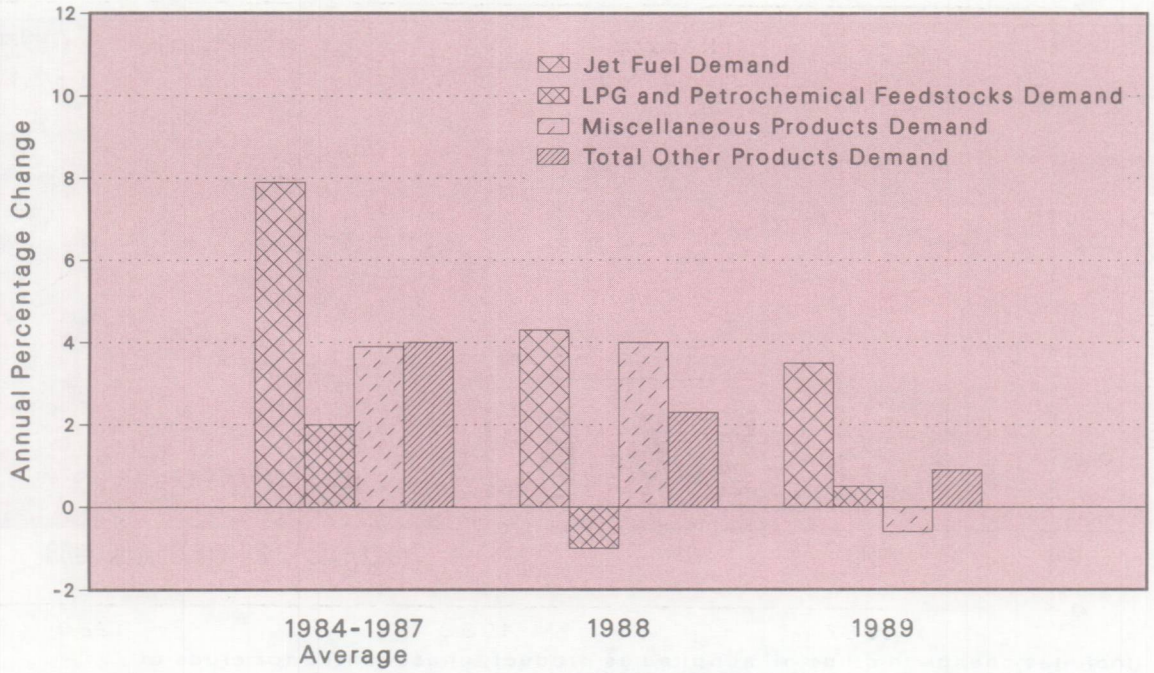
Residual Fuel Oil

Residual fuel oil consumption should decrease by less than 1 percent in 1988 compared to 1987 levels (Table 12 on page 50). In 1989, consumption is expected to decrease by 4 percent, with all of the decline occurring in the electric utility sector (Figure 10).

- Compared to 1987, shipments of residual fuel oil to electric utilities are projected to grow by 2 percent in 1988; most of this increase has already occurred in the first and third quarters. In the first quarter, colder-than-normal temperatures increased total electricity demand, and residual fuel oil was used more extensively because of constraints on the supply of natural gas to electric utilities. In the third quarter, hotter-than-normal temperatures pushed electricity demand up, particularly in the Northeast and Mid-Atlantic States, two regions with substantial petroleum-based generation at electric utilities. According to fuel buyers at several electric utilities in the Northeast, if the price of residual fuel oil drops below $11 per barrel, some electricity generated from coal may be displaced by generation from residual fuel. As a result, the demand for residual fuel could surge temporarily in the fourth quarter. In 1989, assuming that temperatures return to normal and there are no constraints on natural gas supplies to utilities, residual fuel oil use at electric utilities should drop. Compared to 1988, shipments of residual fuel to utilities are projected to decline by 9.8 percent next year.
- Nonutility demand in 1988 is projected to be about 5 percent below the 1987 level, even though industrial production is expected to increase by nearly 6 percent and the price is expected to decline by 21 percent. The reason for this is that natural gas prices are still expected to undercut residual fuel oil prices, particularly in the industrial sector. Foreign ports are expected to continue to offer bunker fuel oil at lower prices than can be found at domestic ports, causing additional decreases in demand. For example, for the week ending September 30, 1988, bunker fuel prices were 20 percent lower in Rotterdam than in New York.[3]
- In 1989, shipments of residual fuel oil to nonutility end users are expected to increase by about 1 percent, due to an expected increase in industrial production. All of the increase is expected in the first and second quarters, with projected levels about 6 percent above those in the same periods of 1988.

[3] *Journal of Commerce*, October 4, 1988.

Figure 11. Other Petroleum Products Demand



Sources: • History: Energy Information Administration, *Petroleum Supply Monthly*, DOE/EIA-0109(88/07) (Washington, DC, 1988). • Projections: Table 13.

Other Petroleum Products Demand

The combined demand for other petroleum products is projected to show growth of 2.1 percent during 1988, reaching 5.29 million barrels per day. This level of demand implies a tapering off of growth in the total demand for other petroleum products, which reached 6.8 percent between 1986 and 1987. In 1989, demand is projected to increase by 0.8 percent over the 1988 level (Table 13 on page 51 and Figure 11).

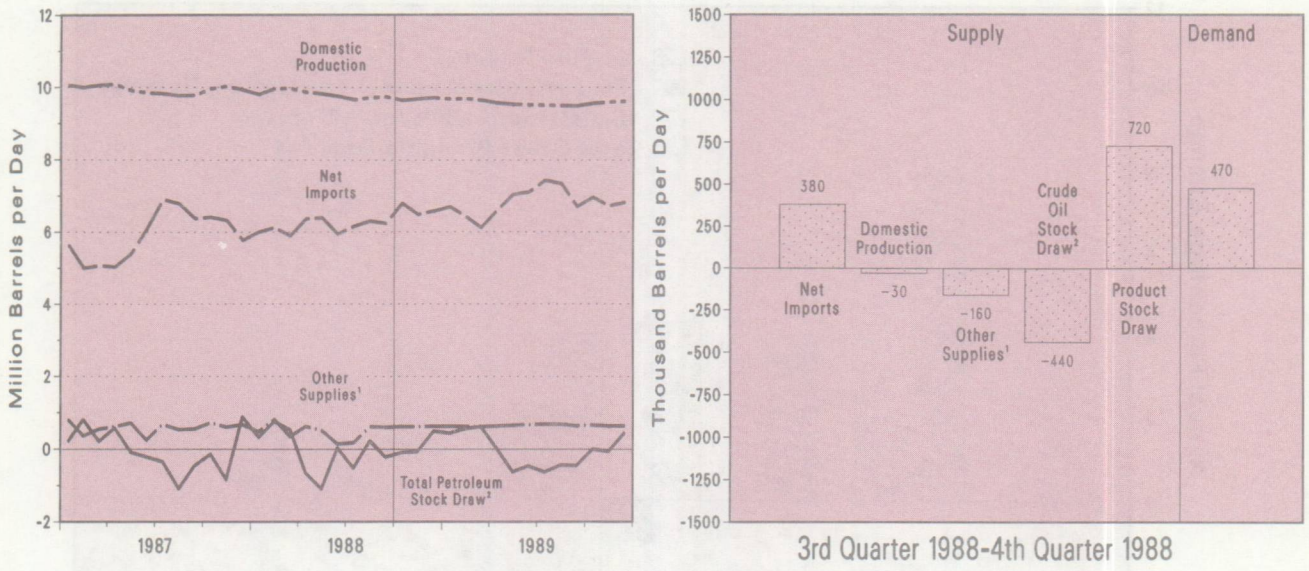
- The demand for jet fuel is projected to grow by 4.3 percent in 1988 and by 3.5 percent in 1989, which marks a slowdown in comparison to recent years. The slowdown is due to slower growth in the demand for airline services. Compared to the first half of 1987, revenue ton miles (a measure of air traffic) increased by only 5.8 percent in the first half of 1988, spurred by steady economic growth but mitigated by a 6.0-percent increase in average ticket prices (measured as airline revenue divided by revenue passenger miles) in this time period. Assuming that real ticket prices stay constant in the second half of 1988 and in 1989, revenue ton miles are projected to grow by 5.0 percent in 1988 and 4.4 percent in 1989.

- Demand for liquefied petroleum gas (LPG) appeared to plateau during mid-1988, after showing strong 1987 growth, due in part to increased use of LPG as a petrochemical feedstock. Demand is projected to pick up during the fourth quarter of 1988 if the weather turns colder than a year earlier. Average demand is projected at 1.63 million barrels per day in 1988, 1.2 percent higher than 1987 demand. Ethane use as a petrochemical feedstock is projected to fall gradually in 1989, and overall LPG use should fall by 0.6 percent.

- Demand for oil-based petrochemical feedstocks declined by 4.7 percent in 1987 and is projected to decline by another 9.1 percent during 1988, from 0.44 to 0.40 million barrels per day. Demand growth has not materialized during 1988 despite favorable prices for oil relative to LPG feedstock. However, the use of oil-based feedstocks is projected to increase by 5.0 percent in 1989.

- Demand for miscellaneous petroleum products is projected to increase by 4.0 percent during 1988. Demand is projected to decrease slightly (by 0.6 percent) during 1989, to about 1.8 million barrels per day.

Figure 12. Changes in Sources of Petroleum Supply



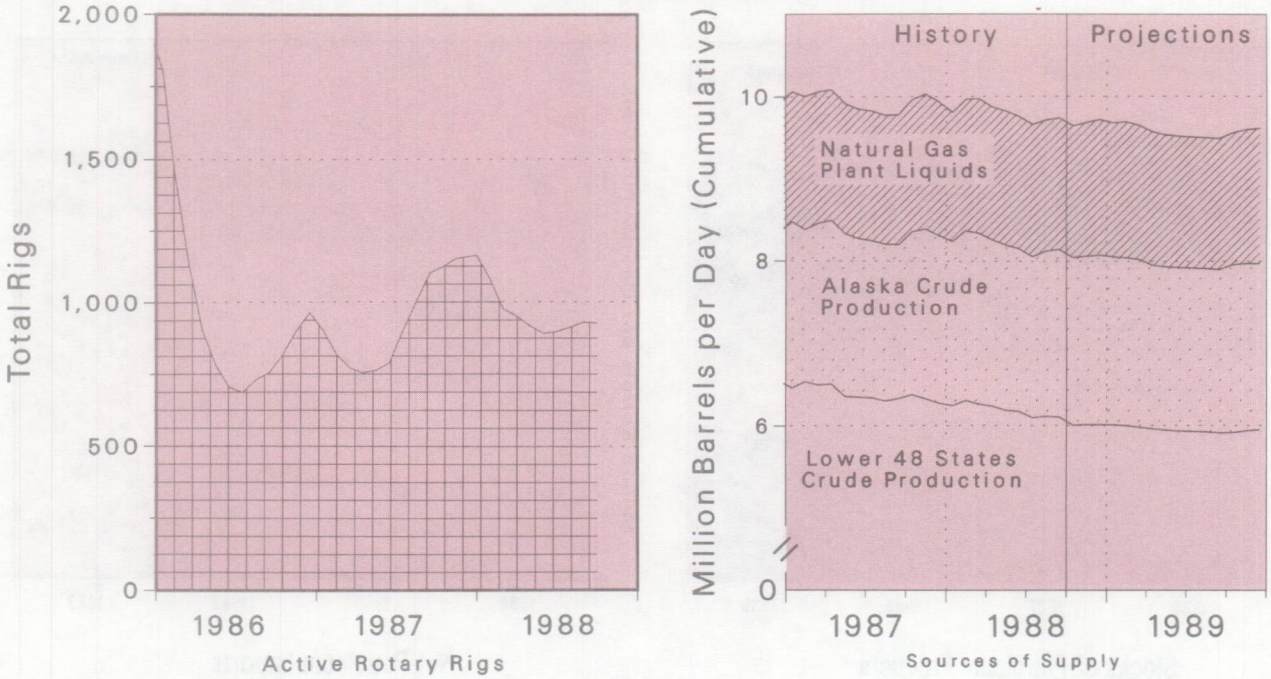
¹ Includes change in crude oil supplied as product, unaccounted for crude oil, other hydrocarbon inputs, and refinery gains.
² Includes change in Strategic Petroleum Reserve build rate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1986, and 1987, DOE/EIA-0340(86,87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1988 to July 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-37,41,42) (Washington, DC). • Projections: Table 6.

Petroleum Supply Overview

The expected increase in demand for petroleum products from the third to the fourth quarter of 1988 will be met by a combination of net imports and an increase in the rate of net withdrawals from total primary stocks (Table 6 on page 44 and Figure 12). The increase in net imports is mainly in the form of crude oil. Refinery utilization rates should increase as well, as the oil is turned into products.

- In the third quarter of 1988, refiners reduced crude oil stocks to more moderate levels by increasing the amount of crude oil input to distillation units, thus producing more product than was required by the level of demand. The surplus was added to the product stock levels at refineries. The resulting build of product stocks is expected to be reversed in the fourth quarter.
- In 1988, the changes in the rates of stock withdrawals of both crude oil and petroleum products represent an end to the third-quarter draw of crude oil and build of petroleum products. Crude oil stocks are expected to increase slightly by the end of this year; and, with refinery inputs of crude oil falling off slightly and demand picking up, petroleum product stocks are expected to fall by more than 20 million barrels in the fourth quarter.
- Domestic crude oil production is expected to fall by 50,000 barrels per day in the fourth quarter of 1988. Production of natural gas plant liquids is expected to offset this decline, in part, rising by 20,000 barrels per day in the fourth quarter, as natural gas production rises. Overall, crude oil production is projected to decline by 2.1 percent in 1988 and by 2.6 percent in 1989.

Figure 13. Components of Domestic Petroleum Production



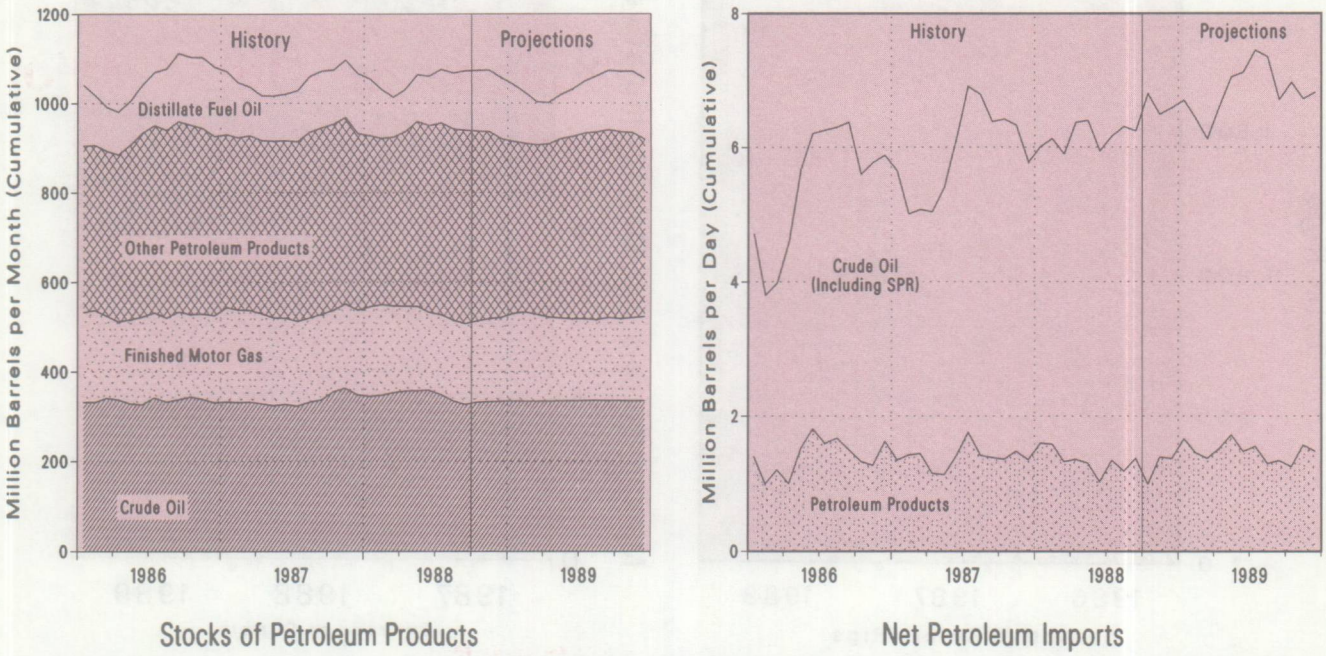
Note: Crude oil production includes lease condensate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1986 and 1987 DOE/EIA-0340(86,87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1988 to July 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-37,41,42)(Washington, DC). • Projections: Table 6.

Crude Oil and Natural Gas Liquids Production

The combination of low drilling levels and weak oil prices is projected to result in a decline in domestic crude oil production of 170,000 barrels per day in 1988, with an additional decline of 210,000 barrels per day in 1989 (Table 6 on page 44 and Figure 13). An increase in production from Alaska and new oil production from the Federal Offshore areas only partially offset the decline in production from the onshore fields in the lower 48 States.

- The rotary rig count fell off slightly in September to 927 rigs, from 930 rigs in August. This represents a 16-percent decline from the 1,101 active rigs in September 1987. The number of active offshore rigs increased slightly during the same period.
- Increased oil production from the Endicott and Prudhoe Bay fields in Alaska partially masks the 3.8-percent decline in production from the lower 48 States from 1987 to 1988. Also, production from the Federal Offshore areas expected to come on stream in 1989 should hold the decline for the lower 48 States to 3.2 percent in 1989.
- Production of natural gas plant liquids is expected to increase slightly in 1988 and 1989, as natural gas producers respond to higher levels of demand by increasing their marketed production.
- The spread in the forecasts for crude oil production in the high and low price cases is 260,000 barrels per day for 1989. In the low price scenario, a decline in production from the Prudhoe Bay field begins in the fourth quarter of 1989.

Figure 14. Stocks and Net Imports of Petroleum



Stocks of Petroleum Products

Net Petroleum Imports

Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1986 and 1987, DOE/EIA-0340(86,87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1988 to July 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-37,41,42) (Washington, DC). • Projections: Table 6.

Petroleum Stocks and Imports

As refiners tried to keep up with the high third-quarter demand for motor gasoline, stocks of all petroleum categories were affected. Crude oil refinery inputs averaged 13.6 million barrels per day for the third quarter this year, keeping gross crude oil imports (excluding the Strategic Petroleum Reserve) above 5 million barrels per day, while drawing primary crude oil stocks below 330 million barrels, down from 359 million barrels at the end of the second quarter of 1988 (Table 6 on page 44 and Figure 14).

- The level of refinery inputs created a build of 43.3 million barrels in distillate fuel oil stocks from the end of the first quarter to the end of the third quarter of 1988, as opposed to the build of 17.4 million barrels during the same period in 1987. This leaves distillate stocks at over 132 million barrels at the end of the third quarter, almost 6 million barrels above the level of a year ago, despite starting the second quarter 20 million barrels below the previous year's level.
- The projected decline in domestic production and increase in product supplied combine to create an increase in total net petroleum imports of almost 360,000 barrels per day in 1988 and approximately 570,000 barrels per day in 1989, mostly in the form of crude oil. Total petroleum net imports are expected to average 7 million barrels per day for the final 2 quarters of 1989.
- As refinery utilization approaches operational limits, averaging over 84 percent for the first 9 months of 1988, imports of petroleum products are expected to help meet the demand levels expected in 1989. Net product imports are projected to reach 1.48 million barrels per day in 1989, an increase of 13 percent from the 1988 level.

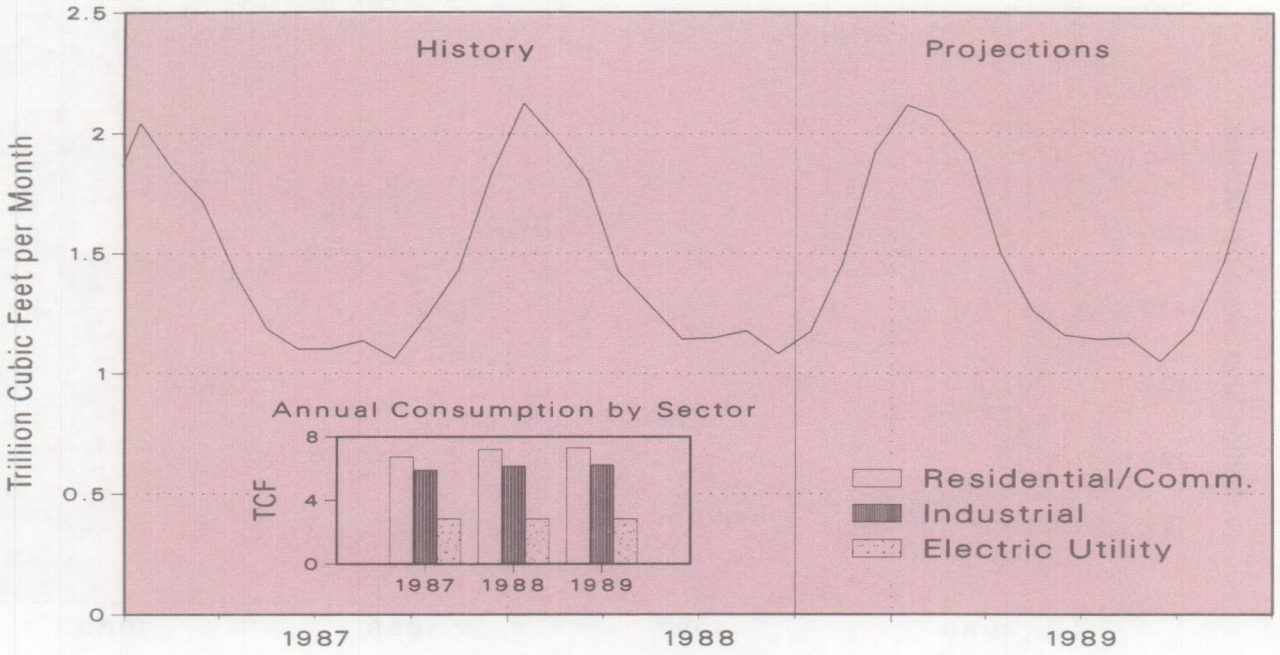
Outlook for Other Major Energy Sources

- *Natural Gas*
- *Coal*
- *Electricity*
- *Electricity Fuel Shares*

Outlook for Other Major Energy Sources

- Natural Gas
- Coal
- Electricity
- Electricity From Sources

Figure 15. 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(88/07) (Washington, DC, 1988). • Projections: Table 14.

Natural Gas

Total natural gas consumption is expected to reach 17.7 trillion cubic feet in 1988, posting a 3.5-percent increase over the revised 1987 total of 17.1 trillion cubic feet, but still 3 percent below the 18.3 trillion cubic feet projected in the July 1988 *Outlook* (Table 14 on page 52 and Figure 15). Major revisions to EIA's 1988 natural gas consumption data have resulted in reduced consumption estimates for the year, particularly in the industrial sector (see page 2 for an explanation of the revisions).

- Industrial use of natural gas is expected to grow by 4.4 percent in 1988, reflecting 6.2-percent growth through July. Lower demand growth for natural gas in the industrial sector is expected for 1989, as manufacturing growth tapers off.

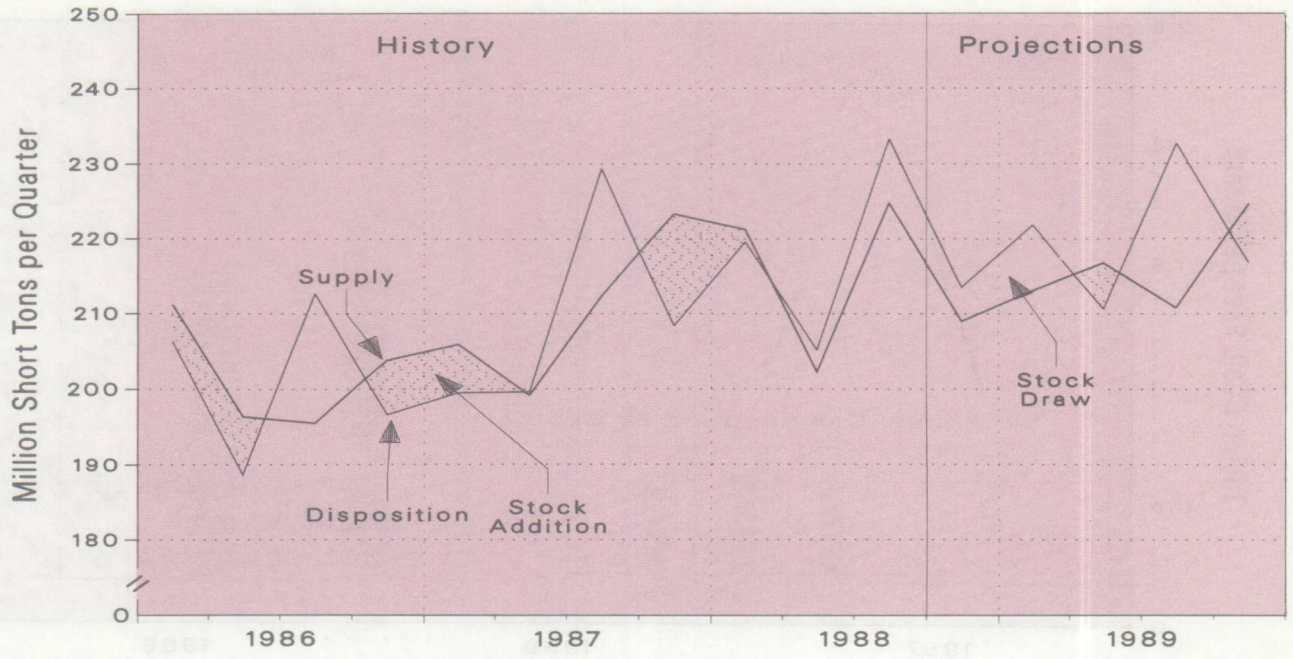
- Residential and commercial natural gas demand showed large increases related to the weather and to lower real gas prices in the first half of 1988, which contributed most of the 7-percent expected growth for these combined sectors in 1988.

- The first half of 1988 exhibited particularly strong manufacturing production, with output growth of close to 7 percent inducing an average 6-percent growth in industrial gas use. Although the manufacturing pace is expected to slacken for the rest of 1988 in comparison to the first 2 quarters, some growth is again expected in the first half of 1989. Industrial gas use should maintain its 35-percent share of total gas consumption through 1989.

- Natural gas use at electric utilities is projected to remain close to the 1987 level through 1989. Relatively low oil prices and deliverability constraints to some electric utilities last winter account for the weakness in demand in 1988, despite increased gas use this summer. A recovery in hydroelectricity use should offset some natural gas demand by electric utilities in 1989.

- Net imports of natural gas should grow by 22 percent in 1988 and by another 15 percent in 1989, as Canadian suppliers respond to increased industrial demand in the United States.

Figure 16. Coal Supply and Disposition



Sources: • History: Energy Information Administration, *Quarterly Coal Report*, DOE/EIA-0121(88/3Q) (Washington, DC, 1988). • Projections: Table 15.

Coal

Growth in domestic demand for coal is expected to reach 1.1 percent in 1989, due principally to 1.3-percent growth in electric utility coal consumption. The strong 4.2-percent growth outlook for domestic coal consumption in 1988 does not continue into 1989, as assumptions of normal weather and a recovery of hydroelectric power prevent additional growth in coal demand next year (Table 15 on page 53 and Figure 16).

- Coal use at electric utilities is projected to keep pace with the growth in total electricity generation, growing by 4.5 percent in 1988 and 1.3 percent in 1989. In 1988, nuclear generation is expected to increase by 15 percent. However, drought conditions, which kept hydroelectric power availability quite low, and a 4.3-percent increase in total electric generation contribute to such a high growth rate in coal use in 1988.

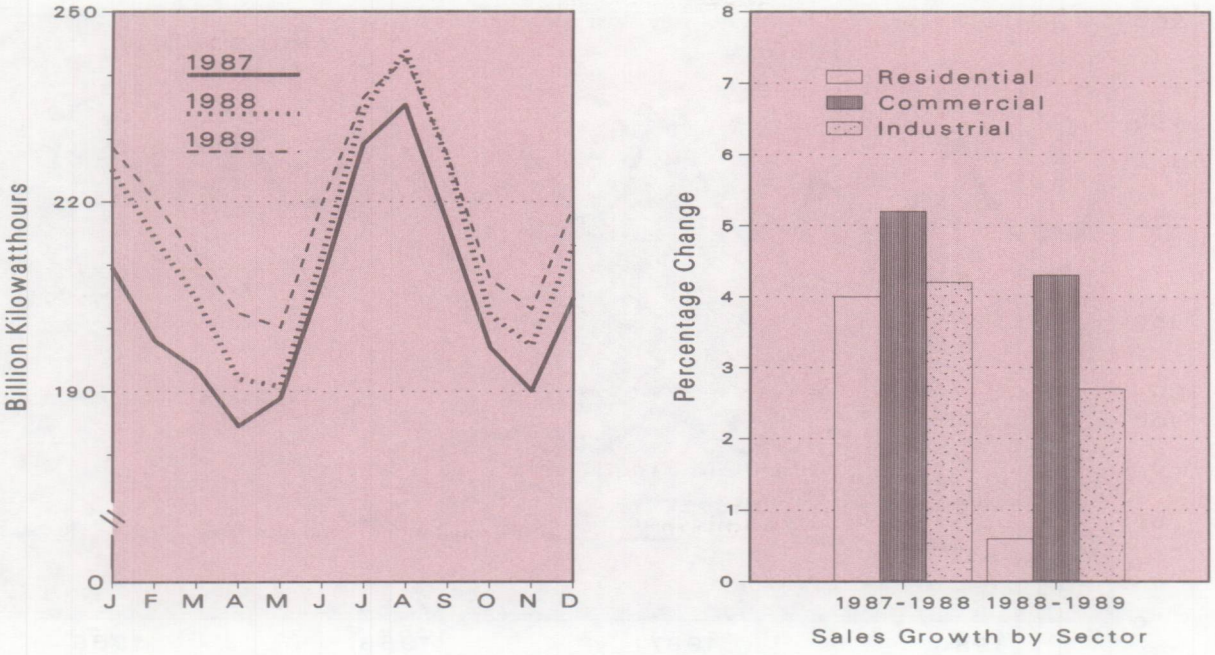
- In 1989, normal weather assumptions and a projected recovery of hydroelectricity (close to its normal level) should limit any substantial growth in coal demand. Nuclear generation is expected to remain relatively flat through 1989, however, and prevent utility coal demand from falling back to pre-1988 levels.

- Coking coal use may increase slightly in the first half of 1989 as steel output continues its strong growth, but the trend away from coke use in steelmaking should generally hold down growth in coking coal use. In addition, imports of coke have been rising rapidly in recent quarters, and it is assumed that much of any additional demand for coke at steel plants will come from this source.

- Industrial coal use is expected to remain relatively constant throughout the forecast period. While some industrial processes are expected to make greater use of natural gas than coal as output expands, other uses of coal will likely remain stable or increase somewhat through 1989.

- Coal exports should grow by nearly 8 percent this year in response to high industrial production in Japan and the European Economic Community. U.S. coal is supplanting foreign supplies, which have recently been beset by coal transport problems in China and labor strikes in Australia and Poland. Coal exports in 1989 should decline as normal world supply conditions return.

Figure 17. Electricity Demand



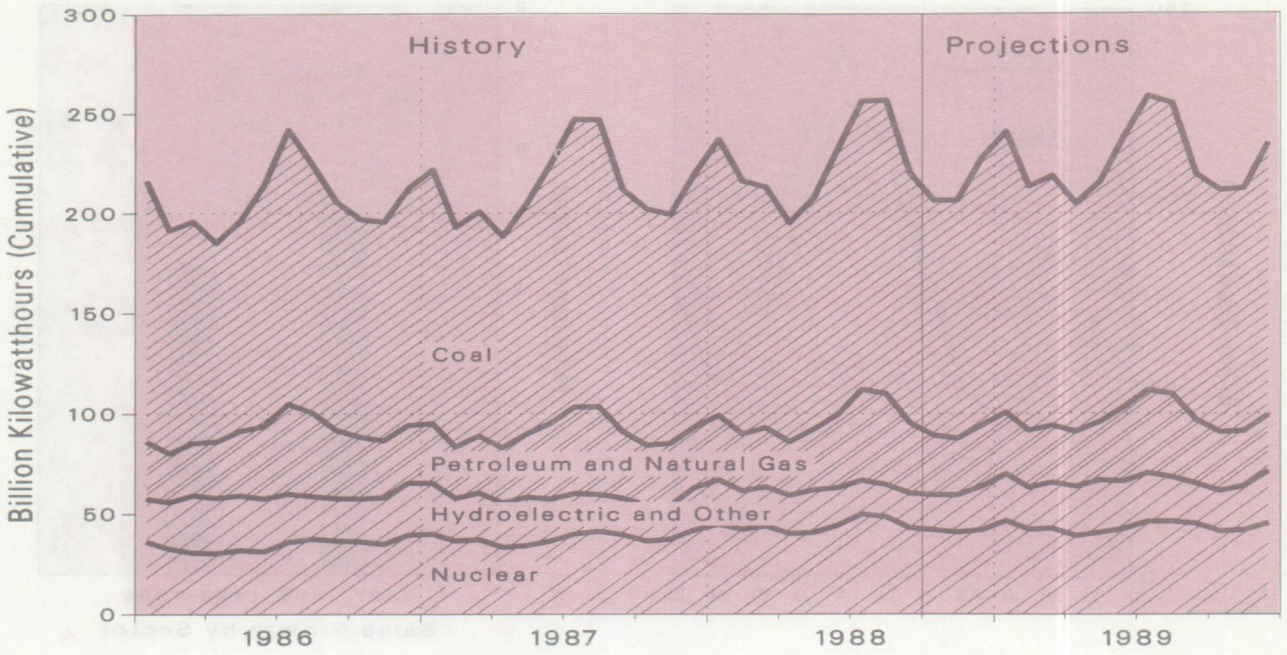
Note: Projections begin with the fourth quarter of 1988.
Sources: • History: Energy Information Administration, *Electric Power Monthly*, DOE/EIA-0226(88/07) and *Monthly Energy Review*, DOE/EIA-0035(88/07) (Washington, DC, 1988). • Projections: Table 16.

Electricity

In 1988, total electricity sales are expected to continue at the pace begun in 1987 because of a warmer-than-normal summer and continued health in the industrial sector. Growth should taper off somewhat in 1989 if milder weather develops (Table 16 on page 54 and Figure 17).

- Total electricity sales should post another year of healthy growth in 1988--4.1 percent. The market conditions are similar to last year (hot summer temperatures and strong industrial demand), but 1988 also reflects a colder first quarter than 1987 (see "The Impact of Industrial Demand and Weather on Electricity Sales," page 36). It is estimated that 17 percent of this year's growth will have come from the effects of lower winter temperatures and higher summer temperatures compared to 1987.
- In 1989, electricity demand should slacken slightly across all sectors, primarily because of an assumed return to normal, hence milder, weather. Total sales should increase by 2.5 percent next year. About 38 percent of the growth in demand in 1989 is associated with the industrial sector.
- U.S. electricity imports from Canada last year were higher than in 1986 to offset cutbacks in U.S. hydroelectric generation caused by the drought. In 1988, however, an extension of the drought into Canada reduced Canadian hydroelectric power surpluses available for export to the United States. Imports are expected to account for 1.5 percent of the total U.S. electricity supply in 1988 and 1989.
- Rapid growth in purchases of electricity from nonutility suppliers (cogenerators and independent power producers) should offset some utility generation. Though the overall contribution is small (2.3 percent of total supply in 1989), this nonutility supply is expected to increase its share in the longer term.

Figure 18. Electricity Generation by Fuel Source



Sources: • History: Energy Information Administration, *Electric Power Monthly*, DOE/EIA-0226(88/07) (Washington, DC, 1988). • Projections: Table 16.

Electricity Fuel Shares

Total electricity generation is projected to grow by 4.3 percent in 1988 and by 2.0 percent in 1989. In 1988, the use of coal, nuclear, and petroleum is projected to increase, whereas hydroelectric power and coal generation sustain the increase in electricity generation in 1989 (Table 16 on page 54 and Figure 18).

- The demand for coal at electric utilities is projected to remain strong in 1988, growing at a 4.0-percent rate. In 1989, however, slow growth in total generation and a recovery in hydroelectric generation should yield more modest growth of 1.7 percent for coal-fired generation.

- The aggregate share of petroleum and natural gas used at electric utilities is projected to increase by 1.8 percent in 1988, with nuclear and coal generation the source of the increase in total electricity generation. In 1989, hydroelectric generation should increase, leaving little room for demand growth in petroleum and gas, with the combined share declining by 4.7 percent. In 1988, natural gas generation stays virtually constant, whereas petroleum demand is projected to grow by 6.1 percent, with most of the increase occurring in the first and third quarters. Compared to 1988, natural gas generation is expected to change very little in 1989, and petroleum-based generation is projected to decline by 13 percent.

- Two consecutive years of drought caused many hydroelectric power plants to reduce electricity output in 1988. The level of hydroelectric generation for the year is expected to approach a low not seen since 1977 (a decline of 8.5 percent from 1987). Low water levels are anticipated to persist through the first 6 months of 1989, keeping hydroelectric generation levels below normal. Hydroelectric power should still be 21 percent above the 1988 level, however, because of an assumed return to normal precipitation levels.

- Growth of 15 percent is anticipated for nuclear generation in 1988. This projection is the result of the addition of two new units and of high capacity utilization rates reported for the first 6 months of 1988 and not seen since 1978 (before the accident at the Three Mile Island plant in Pennsylvania). Capacity utilization is expected to return to a more normal level in 1989. Three new units are planned to begin operation next year, and this should support nuclear generation levels that are very close to 1988 levels.

Special Topics

- ***Motor Gasoline Markets and Margins***

- ***Winter Distillate Outlook***

- ***Potential Effects of the Iran-Iraq Ceasefire on OPEC Production***

- ***The Impact of Industrial Demand and Weather on Electricity Sales***

Motor Gasoline Markets and Margins

High demand for gasoline and other products, along with unexpected supply constraints, have kept motor gasoline prices high this year in comparison to the falling price of crude oil. When crude oil prices take relatively sharp swings downward, refiner margins increase, at least temporarily. (Refiner margins are the difference between the refiner (reseller) price[4] per barrel of petroleum products and the per barrel price of crude oil input.)[5] Generally, increases in refiner margins are passed through to retail prices, although retailers absorb some of the increase. The expected refiner response to suddenly higher margins is to increase supply. This increased supply will tend to drive prices lower, eventually reducing margins again. This year, however, unusual supply constraints extended the period of high margins. Crude oil prices in the second and third quarters of 1988 have fallen by more than $3 per barrel (more than 7 cents per gallon) from the levels a year earlier. During the same period, motor gasoline prices have not generally fallen, and refiner margins have increased by about 8 cents per gallon. There are several factors that help to explain the relative robustness of gasoline prices and margins this year.

Strong growth in total petroleum demand this year (following healthy 1987 growth of 2.1 percent) has pushed many refineries to higher operating rates than have been seen in some years. This summer, average utilization rates of operating refineries (actually up and running) ranged from 91 to 95 percent. These conditions limit the short-run flexibility of refiners to respond to market signals for expanded supply. Meanwhile, strong growth in motor vehicle travel (up 3.7 percent through July) has pushed gasoline demand higher, competing with increased requirements for jet fuel and distillate (up 3.4 percent and 3.0 percent, respectively, through July). A cold winter brought strong demand for heating fuel and residual fuel, while booming industrial growth kept boiler fuel and chemical feedstock demand high. These developments limited gasoline production capability. The observed demand pressure for motor gasoline (and other petroleum products) on the domestic supply system is probably the most significant reason for continued high gasoline margins this year. A contributing factor to the shortage was that a major Shell Oil refinery was crippled by an explosion earlier in the year.

Motor gasoline is becoming more expensive to make because of continued lead phaseout and because of shifts in consumer tastes toward higher octane gasolines. Maintaining or boosting octane without lead is more expensive, because it requires some combination of (a) more expensive additives (such as MTBE);[6] (b) more extensive treatment by complex refinery processes; and (c) more crude oil input per barrel of gasoline output (that is, lower gasoline yields). Lead phaseout has been occurring over several years, so that part of the effect on gasoline prices has been gradual. The shift to higher octane gasoline does seem to be accelerating of late, though, and it seems that strong marketing efforts in this direction by major refiners have been successful. For example, it appears that premium unleaded gasoline increased from under one-fifth to about one-quarter of the market between last summer and this summer.[7] Based on average prices from the Bureau of Labor Statistics,[8] this development alone could have increased average gasoline prices by about 1 cent per gallon. While shifts in the gasoline mix to more unleaded/higher octane gasolines may explain some of this year's relatively high gasoline prices, they may not have that much to do with unit profits, because of the correspondingly higher operating costs involved. Nevertheless, these shifts will tend to raise apparent refiner margins, which capture only the product price/crude price spread. An interesting question is whether sharply increased efforts to market high-octane products contributed to an already tight gasoline supply situation this year, exacerbating the price effects.

The implicit assumption under the base case for this *Outlook* is that selective capacity enhancements and debottlenecking by refiners (mostly downstream of the distillation unit), along with adjustments in product slate management and stockpiling, will be sufficient to bring gasoline margins more in line with crude oil prices in 1989 than has been the case in 1988. A very cold winter, another unexpected large surge in demand for fuel in the transportation and/or industrial sectors, or a failure of needed capacity changes to materialize could create net excess demand for motor gasoline and other products, which could push both prices and margins to above-normal levels again next year. Since gasoline demand and total petroleum demand are expected to grow by 100,000 barrels per

[4]Energy Information Administration, *Petroleum Marketing Monthly,* DOE/EIA-0380(88/06) (Washington, DC, August 1988), Table 28.

[5]The crude oil input cost is taken from Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/06) (Washington, DC, August 1988), Table 9.1, "Composite Refiner Acquisition Cost."

[6]Methyl tertiary butyl ether (MTBE) is a methanol-based blendstock which can significantly raise the octane rating of gasoline.

[7]Energy Information Administration, *Petroleum Marketing Monthly,* DOE/EIA-0380(88/06) (Washington, DC, August 1988), Table 41.

[8]These prices are reported in Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/06) (Washington, DC, August 1988), Table 9.4.

day and 200,000 barrels per day next year, respectively, even with normal weather conditions, perhaps the risk of the base case gasoline price forecast in this *Outlook* is that it is too low.

Winter Distillate Outlook

This article highlights the base case outlook for distillate fuel oil for the current fall and winter period (October 1988 through March 1989), providing historical perspective for the forecast and insight into the sensitivity of the outlook to alternative assumptions about the weather. A discussion of the potential impact of the Federal Republic of Germany's currently planned excise tax on distillate fuel (to take effect in January) on the domestic price and availability of heating oil is included.

Fall and winter demand for distillate fuel oil is expected to average about 3.4 million barrels per day, or about 2.1 percent above demand in the last fall and winter season (1987-1988). This rate of growth is below the 3.7-percent annual rate for all of 1988 reported on page 19 of this *Outlook,* primarily because the base case projection for the first quarter of 1989 shows no growth as compared with the first quarter of 1988. In 1988, above-normal temperatures, and downstream stockpiling designed to avoid the effects of tax law changes affecting diesel fuel,[9] pushed distillate demand in the first quarter to abnormally high levels. With normal weather assumed in the forecast, first-quarter 1989 distillate demand will show sluggish growth compared to the abnormal 1988 first quarter. However, the 3.2-percent annual growth projected for 1989 from the 1988 level is more indicative of the fundamental trends in distillate use that are expected to influence the outlook for next year, although most of this growth is attributable to transportation diesel and industrial use of distillate fuel rather than the use of home heating oil.

The above forecasts are premised on projections of weather, prices of distillate, and industrial production. Distillate demand includes that for residential and commercial, industrial, and transportation uses. Quarterly demand projections are referenced in Table 11 on page 49.

In meeting this winter's base case projections, distillate production and imports are expected to increase, with supply from inventories being unchanged. Primary distillate inventories this winter are projected to begin and end at somewhat higher levels than last winter. The primary inventory level was 133 million barrels as of September 30, 1988, and is projected at 97 million barrels as of March 31, 1989. This inventory pattern compares with 127 and 89 million barrels at the start and end of last winter. The distillate yield of refinery production is 22 percent. Overall refinery utilization is projected at 86 percent, compared with 83 percent last winter.

The projected retail prices of heating oil in the base case forecast are 75 and 79 cents per gallon in the fourth quarter of 1988 and the first quarter of 1989, respectively. These nominal prices are lower than the quarterly prices of 83 cents and 84 cents last winter, primarily as a result of a projected lower price of crude oil.

If winter weather is 10 percent colder than normal, projected distillate demand could grow by an additional 76,000 barrels per day compared with the base case, reflecting increased heating oil usage. All else the same, primary inventories could supply 65 percent of this additional demand, before falling below last year's ending level. All of the additional demand could be met by increasing projected refinery utilization from 86 percent to 88 percent, assuming a distillate yield of 22 percent. The additional demand would likely be met from a combination of sources, depending on a number of factors, including the availability and cost of imports.

If the winter is 10 percent colder than normal, retail prices could increase by as much as 5 to 10 cents per gallon. That range, in part, depends on how imports alleviate or exacerbate the price pressure from supply constraints in the United States. A historical perspective indicates the importance of import prices in setting incremental supply price in the United States, particularly at the wholesale level. From December 1983 through January 1984, weather that was 13 percent colder than the previous year helped drive a 22-percent increase in distillate demand. Wholesale and retail heating oil prices grew by 6 cents per gallon over that period. Further increases were tempered as imports grew in response to favorable spot prices for sellers. During the cold weather of January 1988, declining inventory again put pressure on the retail price, as prices increased by 7 cents per gallon. The wholesale price of heating oil declined by 2 cents, as the retail price reflected a lagged response to earlier wholesale price increases, and more

[9]See "Effect of the Federal Motor Fuels Tax on Distillate Stocks" in Energy Information Administration, *Short-Term Energy Outlook,* DOE/EIA-0202(88/2Q) (Washington, DC, July 1988).

sensitivity to demand swings than the wholesale price. Two other factors combined to mitigate upward price pressure at the refinery level, compared to 1984. First, excess supply in Europe made for favorable import prices. Second, production response was not delayed as it was in 1984, when more refinery maintenance occurred in winter.

A potential supply factor is the distillate excise tax currently planned by the Federal Republic of Germany, effective January 1989.[10] This country is Europe's leading distillate consumer, and has large storage capacity. It is believed that the combination of unseasonably cold weather in Europe and advance stocking to avoid the tax may temporarily tighten European supply, setting a higher marginal price for heating oil imports into the United States. This event would increase inventory usage in the first half of winter and imports in the second half of winter within the United States. However, heavy stocking in the Federal Republic of Germany has already occurred this summer as a result of favorable prices. At winter's start, neither the New York to Rotterdam distillate spot price margin nor futures price margins indicated supply pressure in Europe.

Potential Effects of the Iran-Iraq Ceasefire on OPEC Production

After Iran announced on July 18 that it was accepting a ceasefire (sponsored by the United Nations) in its 8-year-old war with Iraq, oil market analysts began to consider the implications for future crude oil production from Iran and Iraq. Initial predictions that the market would be flooded with increased production from the two countries have not been fulfilled. While no one knows exactly what will happen through the end of 1989, the final determinants of actual production from each country will include: (1) current and future capacities of oilfield production and of oil export facilities; (2) revenue requirements; and (3) the prevailing situation in the world oil market.

Prior to the onset of the Iran-Iraq War in 1980, crude oil production from both countries was significantly higher than current production rates. In Iran, where production is currently estimated to be between 2.4 and 2.5 million barrels per day, oil production peaked at over 6.0 million barrels per day in 1974, before falling to less than 5.7 million barrels per day in 1977. The political turmoil of the Islamic Revolution further reduced Iranian production to about 5.2 million barrels per day in 1978 and to less than 3.2 million barrels per day in 1979. Meanwhile, in Iraq, where crude oil production is currently estimated at between 2.6 and 2.7 million barrels per day, production increased from less than 2.0 million barrels per day in 1974 to almost 2.6 million barrels per day in 1978, and then jumped to about 3.5 million barrels per day in 1979.

The question that arises from this historical review is whether Iran and Iraq can quickly increase their crude oil production to these pre-war rates. The answer, on the basis of current analyses, is that, while both countries may be technically capable of approaching their 1979 production rates at some time in 1989, neither can sharply increase production during the remainder of 1988.

In Iran, the chief constraint will be crude oil production capacity. As a result of damage done to Iranian oil fields by Iraqi bombing attacks, lack of maintenance and spare parts, and the emigration of technical experts, Iran's current production capacity is generally estimated to be between 2.4 and 2.8 million barrels per day. Iranian production capacity is not expected to expand rapidly in the future, probably increasing to no more than 3.0 million barrels per day in the first year after hostilities end, and to no more than 3.2 million barrels per day during the second year.

In Iraq, the limited capacity of oil export facilities should hold crude oil production near current rates, at least through early 1989. Then, oilfield production capacity will become the binding constraint and will likely hold production at or below pre-war levels. Iraq's oil exports are currently limited to about 2.0 million barrels per day of crude oil through pipelines to the Red Sea and the Mediterranean Sea, and about 0.3 million barrels per day of oil products transported by truck through Jordan and Turkey. Adding in Iraq's domestic oil consumption of about 0.3 million barrels per day, Iraqi crude oil production is currently export-constrained at between 2.6 and 2.7 million barrels per day. It is generally expected that Iraq will seek to resume oil exports through the Persian Gulf as soon as possible. This will probably be done initially by installing a number of single-point mooring buoys at Iraq's pre-war oil export facility on the Fao Peninsula. Installation is estimated to take about 3 months, and the export capacity is expected to be about 1 million barrels per day. Iraq will not be able to increase exports by an additional 1 million barrels per day, however, because Iraq's oilfield production capacity will become a binding constraint. Current

[10]The status of this excise tax is based on information obtained informally from the embassy of the Federal Republic of Germany in Washington, DC.

analysis indicates that Iraqi production will not be able to exceed 3.5 million barrels per day through the end of 1989. The underlying reasoning is that it is unlikely that Iraq will have funds available to increase its production capacity beyond its pre-war 1979 rate. In fact, it is more likely that Iraqi production capacity is currently below the rate of 3.5 million barrels per day, possibly as low as 3.0 million barrels per day. It should also be noted that Iraq still plans to complete its IPSA 2 pipeline in late 1989, which will increase the capacity of its crude oil export facilities to the Red Sea by over 1.1 million barrels per day.

The capacity constraints on oilfield production and/or oil export facilities represent a technical upper limit on increases in crude oil production by Iran and Iraq during the forecast period. Two other factors that will help determine how much the countries will actually increase production are their oil revenue requirements and the existing conditions in the world oil market. Post-war reconstruction is clearly the highest priority in both countries, and both are expected to attempt to maximize oil export revenues. Whether or not an increase in production at a given time will actually increase total revenues will be determined, however, by the price elasticity of demand at that time. If, for example, Iran and Iraq should attempt to add significant incremental production to the market at the present time, it is highly likely that a price collapse would become inevitable. Thus, future production increases by Iran and Iraq may be constrained not only by their own production and export capacities but also by both the demand for oil and the supply of oil from other oil producers at that time.

The Impact of Industrial Demand and Weather on Electricity Sales

Electricity demand continues to grow at a faster rate than it did in the early 1980's. Last year, total electricity sales rose by 4.4 percent. Sales are expected to increase by another 4.1 percent by the end of this year. While it is true that there have been abnormal weather influences this year--a colder-than-normal winter and record-breaking temperatures during the summer--a sustained domestic industry boom is driving a significant portion of these growth rates. Industrial production is expected to taper off in the short term, however, limiting growth in total electricity sales to present rates or lower.

Between 1980 and the end of 1985, total electricity sales averaged 2.0 percent growth per year. During 1982, total sales fell by 2.8 percent, coinciding with a general economic recession. This decline was caused primarily by a drop in industrial electricity sales of 9.8 percent that year. The residential and commercial sectors showed a general slowing in growth also, but not any downturns. It appears that overall electricity demand is dominated by the cyclical nature of the industrial sector. Electricity demand in the residential and commercial sectors is influenced by short-term weather factors and longer term trends that are fairly stable. When residential and commercial sales growth picked up in 1985, industrial electricity sales showed a slight decline. Total sales were thus held below 2.0-percent growth that year. The same situation occurred in 1986, when total sales rose by only 1.1 percent because industrial sales were down 3.2 percent. An example of the upside of this cycle occurred in 1984, when industrial sales were up 8.1 percent and total sales were up 6.2 percent.

The manufacturing sector was hit hard in the early 1980's, first by the general economic recession in 1982 and later by the loss of an edge over foreign competition when the U.S. dollar climbed in value on the international currency market. Recently, however, the U.S. dollar has fallen in value, and U.S. exports have enjoyed a healthy revival. This is reflected in 1987 electricity sales figures to industrial consumers, when levels grew by 4.6 percent. As a result, total sales figures showed a gain of 4.4 percent that year.

To understand the total effect of industrial demand trends on overall electricity consumption, it is necessary to isolate the impact of the weather. Electricity consumption is influenced by the weather in the residential and commercial sectors primarily. The residential sector is the most vulnerable to temperature fluctuations, because this sector relies on electricity for space heating and cooling to a large extent. The commercial sector purchases electric power primarily for lighting and operating electrical equipment (for example, computers and refrigerated food storage compartments); space heating and cooling are of secondary importance.

Between 1980 and the end of 1985, residential sales increased by an average of 2.8 percent per year based on normal weather conditions. Between 1985 and 1987, the rate was 2.7 percent. The rate is expected to be 2.6 percent from 1987 through 1989. These growth rates emphasize the underlying stability in electricity sales in this sector, as the weather is assumed to follow normal seasonal patterns (30-year averages compiled by the National Oceanic and

Atmospheric Administration, U.S. Department of Commerce). The commercial sector shows a similar pattern. Between 1980 and 1985, annual growth averaged 4.8 percent based on normal weather conditions. From 1985 through 1987, the rate was 5.1 percent; and from 1987 through 1989, 5.0-percent growth is expected per year.

It is the varied nature of industrial electricity demand that explains fluctuations in total electricity demand. Demand across all sectors averaged 2.5 percent between 1980 and the end of 1985, and a similar rate of 2.4 percent was seen from 1985 through 1987 (normal weather assumed). These growth rates are below those in both the residential and commercial sectors, but they reflect the slow pace (under 1.0 in both time periods) in the industrial sector. Between 1987 and 1989, total electricity demand is expected to pick up to a pace of 3.4 percent per year (normal weather assumed), largely reflecting an expected average annual growth rate of 3.4 percent in the industrial sector over this period. For 1988, it is estimated that abnormal weather conditions will have added 0.7 percentage points to the annual underlying growth in total electricity sales. Thus, the weather-normalized rate of 3.4 percent between 1987 and 1988 reflects a continuation of previously established upward trends in residential and commercial electricity demand and a healthy industrial sector. However, this rate is an upper bound for growth in total electricity in the short run, so long as industrial growth rates can be expected to diminish.

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)	**10.76**	**10.64**	**10.50**	**10.69**	**10.66**	**10.54**	*10.43*	*10.39*	*10.37*	*10.27*	*10.24*	*10.31*	**10.65**	*10.50*	*10.30*
OPEC	**17.93**	**18.58**	**21.09**	**20.62**	**19.47**	**20.33**	*21.57*	*22.70*	*20.15*	*20.67*	*21.15*	*20.67*	**19.57**	*21.02*	*20.66*
Other Non-OPEC	**16.18**	**15.93**	**16.26**	**16.49**	**16.90**	**16.54**	*16.50*	*16.70*	*17.19*	*16.94*	*17.02*	*17.13*	**16.22**	*16.66*	*17.07*
Total Market Economies	**44.87**	**45.15**	**47.85**	**47.80**	**47.03**	**47.41**	*48.50*	*49.79*	*47.72*	*47.88*	*48.42*	*48.11*	**46.43**	*48.19*	*48.03*
Net Communist Exports	**1.90**	**2.20**	**2.60**	**2.30**	**2.10**	**2.50**	*2.60*	*2.30*	*1.90*	*2.20*	*2.60*	*2.30*	**2.25**	*2.38*	*2.25*
Total Supply	**46.77**	**47.35**	**50.45**	**50.10**	**49.13**	**49.91**	*51.10*	*52.09*	*49.62*	*50.08*	*51.02*	*50.41*	**48.68**	*50.56*	*50.29*
Net Stock Withdrawals or Additions (-)															
U.S. (50 States Excluding SPR)	**.49**	**.17**	**-.55**	**.05**	**.58**	**-.52**	*-.13*	*.16*	*.59*	*-.30*	*-.45*	*.19*	**.04**	*.03*	*.00*
U.S. SPR	**-.09**	**-.08**	**-.07**	**-.07**	**-.05**	**-.06**	*-.04*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.08**	*-.05*	*-.05*
Other Market Economies	**1.33**	**-.17**	**-1.26**	**-.22**	**.75**	**-1.23**	*-1.83*	*-1.46*	*1.11*	*-1.30*	*-1.30*	*.81*	**-.09**	*-.95*	*-.17*
Total Stock Withdrawals	**1.73**	**-.08**	**-1.89**	**-.24**	**1.29**	**-1.80**	*-2.00*	*-1.35*	*1.65*	*-1.65*	*-1.80*	*.95*	**-.13**	*-.97*	*-.22*
Product Supplied															
U.S. (50 States)	**16.57**	**16.45**	**16.71**	**16.92**	**17.44**	**16.53**	*16.79*	*17.26*	*17.46*	*16.96*	*17.03*	*17.41*	**16.67**	*17.01*	*17.21*
U.S. Territories	**.19**	**.22**	**.21**	**.23**	**.19**	**.23**	*.21*	*.24*	*.19*	*.23*	*.21*	*.24*	**.21**	*.22*	*.22*
Canada	**1.50**	**1.52**	**1.58**	**1.66**	**1.57**	**1.59**	*1.65*	*1.72*	*1.63*	*1.65*	*1.71*	*1.79*	**1.56**	*1.63*	*1.69*
Japan	**4.92**	**3.94**	**4.18**	**4.77**	**5.21**	**4.19**	*4.31*	*4.90*	*5.14*	*4.06*	*4.25*	*5.01*	**4.45**	*4.65*	*4.62*
Australia and New Zealand	**.69**	**.72**	**.72**	**.74**	**.73**	**.75**	*.74*	*.76*	*.72*	*.76*	*.75*	*.77*	**.72**	*.74*	*.75*
OECD Europe	**12.69**	**11.44**	**12.00**	**12.51**	**12.15**	**11.67**	*12.28*	*12.73*	*12.96*	*11.68*	*12.16*	*12.75*	**12.16**	*12.21*	*12.39*
Total OECD	**36.56**	**34.30**	**35.39**	**36.83**	**37.29**	**34.95**	*35.98*	*37.61*	*38.10*	*35.34*	*36.12*	*37.96*	**35.77**	*36.46*	*36.88*
Other Market Economies	**13.07**	**13.00**	**13.00**	**13.29**	**13.33**	**13.26**	*13.26*	*13.56*	*13.59*	*13.52*	*13.51*	*13.81*	**13.09**	*13.35*	*13.61*
Total Market Economies	**49.63**	**47.30**	**48.39**	**50.12**	**50.62**	**48.21**	*49.24*	*51.17*	*51.69*	*48.85*	*49.63*	*51.78*	**48.86**	*49.81*	*50.48*
Statistical Discrepancy	**1.13**	**.02**	**-.18**	**.25**	**.21**	**.10**	*.14*	*.43*	*.42*	*.42*	*.41*	*.41*	**.30**	*.22*	*.42*
Closing Stocks (billion barrels)	**4.89**	**4.89**	**5.07**	**5.09**	**4.97**	**5.14**	*5.32*	*5.45*	*5.30*	*5.45*	*5.61*	*5.53*	**5.09**	*5.45*	*5.53*

[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(88/07); and *International Energy Annual 1986,* DOE/EIA-0219(86); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through May 1988.

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

	Annual Average 1976-1986	1987	1988	1989
OECD Total [a]	**2.7**	**3.2**	*3.9*	*2.8*
United States [b]	**2.8**	**3.4**	*4.0*	*2.9*
Western Europe	**2.2**	**2.6**	*3.1*	*2.3*
Japan	**4.2**	**3.9**	*5.8*	*4.2*
Other OECD [c]	**2.8**	**3.8**	*3.7*	*2.8*

[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, CONTROL0988; Non-U.S. historical data: The WEFA Group, *World Economic Service: Historical Data,* April 1988 and *World Economic Outlook: Developed Economies Volume,* July 1988. Non-U.S. forecasts: Energy Information Administration, Office of Energy Markets and End Use, International and Contingency Information Division.

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

Assumptions	1987 1st	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	World Oil Price Case	1988 4th	1989 1st	1989 2nd	1989 3rd	1989 4th	Year 1987	Year 1988	Year 1989
Macroeconomic [a]																
Real Gross National Product (billion 1982 dollars)	**3,777**	**3,823**	**3,865**	**3,923**	**3,956**	**3,988**	**4,021**	Low	*4,040*	*4,098*	*4,119*	*4,135*	*4,157*		*4,001*	*4,127*
								Base	*4,039*	*4,094*	*4,109*	*4,120*	*4,140*	**3,847**	*4,001*	*4,116*
								High	*4,037*	*4,088*	*4,099*	*4,109*	*4,128*		*4,001*	*4,106*
Percentage Change from Prior Year	**1.5**	**3.0**	**3.9**	**5.0**	**4.8**	**4.3**	**4.0**	Low	*3.0*	*3.6*	*3.3*	*2.8*	*2.9*		*4.0*	*3.2*
								Base	*2.9*	*3.5*	*3.0*	*2.5*	*2.5*	**3.4**	*4.0*	*2.9*
								High	*2.9*	*3.3*	*2.8*	*2.2*	*2.3*		*4.0*	*2.6*
GNP Implicit Price Deflator (index, 1982=1.000)	**1.163**	**1.173**	**1.182**	**1.189**	**1.194**	**1.209**	**1.220**	Low	*1.229*	*1.237*	*1.248*	*1.259*	*1.270*		*1.213*	*1.254*
								Base	*1.231*	*1.240*	*1.253*	*1.266*	*1.278*	**1.177**	*1.214*	*1.259*
								High	*1.232*	*1.244*	*1.258*	*1.273*	*1.285*		*1.214*	*1.265*
Percentage Change from Prior Year	**3.5**	**3.4**	**3.1**	**3.1**	**2.7**	**3.1**	**3.2**	Low	*3.4*	*3.6*	*3.2*	*3.2*	*3.3*		*3.1*	*3.3*
								Base	*3.5*	*3.8*	*3.6*	*3.8*	*3.8*	**3.3**	*3.1*	*3.8*
								High	*3.6*	*4.2*	*4.1*	*4.3*	*4.3*		*3.2*	*4.2*
Real Disposable Personal Income [b] (billion 1982 dollars)	**2,680**	**2,653**	**2,684**	**2,729**	**2,762**	**2,765**	**2,802**	Low	*2,823*	*2,866*	*2,877*	*2,882*	*2,889*		*2,788*	*2,879*
								Base	*2,818*	*2,856*	*2,856*	*2,859*	*2,869*	**2,687**	*2,787*	*2,860*
								High	*2,810*	*2,840*	*2,837*	*2,841*	*2,851*		*2,784*	*2,842*
Percentage Change from Prior Year	**2.5**	**-.1**	**1.5**	**3.0**	**3.1**	**4.2**	**4.4**	Low	*3.5*	*3.8*	*4.1*	*2.8*	*2.3*		*3.8*	*3.2*
								Base	*3.3*	*3.4*	*3.3*	*2.0*	*1.8*	**1.7**	*3.7*	*2.6*
								High	*3.0*	*2.8*	*2.6*	*1.5*	*1.4*		*3.7*	*2.1*
Index of Industrial Production (Mfg.) (index, 1977=1.000)	**1.316**	**1.332**	**1.357**	**1.380**	**1.396**	**1.415**	**1.435**	Low	*1.457*	*1.477*	*1.494*	*1.506*	*1.515*		*1.426*	*1.498*
								Base	*1.455*	*1.472*	*1.483*	*1.489*	*1.495*	**1.346**	*1.425*	*1.485*
								High	*1.453*	*1.465*	*1.472*	*1.477*	*1.481*		*1.425*	*1.474*
Percentage Change from Prior Year	**2.4**	**3.7**	**5.1**	**5.9**	**6.1**	**6.2**	**5.7**	Low	*5.5*	*5.8*	*5.6*	*4.9*	*4.0*		*5.9*	*5.1*
								Base	*5.4*	*5.4*	*4.8*	*3.7*	*2.8*	**4.3**	*5.9*	*4.2*
								High	*5.2*	*4.9*	*4.0*	*2.9*	*2.0*		*5.8*	*3.5*
Oil Price																
Imported Crude Oil Price [c] (U.S. dollars/barrel)	**16.86**	**18.30**	**19.06**	**18.07**	**15.48**	**15.75**	**14.44**	Low	*12.00*	*12.00*	*13.00*	*13.00*	*13.00*		*14.40*	*12.80*
								Base	*13.00*	*15.00*	*15.00*	*15.00*	*15.00*	**18.16**	*14.70*	*15.00*
								High	*15.00*	*18.00*	*18.00*	*18.00*	*18.00*		*15.10*	*18.00*
U.S. Refiners' Cost [d] (U.S. dollars/barrel)	**16.68**	**17.91**	**19.03**	**17.88**	**15.46**	**15.92**	**14.36**	Low	*12.00*	*12.00*	*13.00*	*13.00*	*13.00*		*14.40*	*12.80*
								Base	*13.00*	*15.00*	*15.00*	*15.00*	*15.00*	**17.77**	*14.70*	*15.00*
								High	*15.00*	*18.00*	*18.00*	*18.00*	*18.00*		*15.20*	*18.00*
Weather [e]																
Heating Degree Days	**2,266**	**449**	**85**	**1,654**	**2,451**	**531**	**86**		*1,669*	*2,401*	*536*	*88*	*1,669*	**4,454**	*4,737*	*4,694*
Cooling Degree Days	**24**	**385**	**774**	**53**	**22**	**336**	**868**		*63*	*28*	*327*	*755*	*63*	**1,236**	*1,289*	*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(88/07); U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, September 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,* September 1988. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0988.

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

Product	1987				1988			World Oil Price Case	1988	1989				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd		4th	1st	2nd	3rd	4th	1987	1988	1989
Petroleum																
Imported Crude Oil Price [a]								Low	*12.00*	*12.00*	*13.00*	*13.00*	*13.00*		*14.40*	*12.80*
(dollars per barrel)	**16.86**	**18.30**	**19.06**	**18.07**	**15.48**	**15.75**	**14.44**	Base	*13.00*	*15.00*	*15.00*	*15.00*	*15.00*	**18.16**	*14.70*	*15.00*
								High	*15.00*	*18.00*	*18.00*	*18.00*	*18.00*		*15.10*	*18.00*
Gasoline [b]								Low	*.93*	*.84*	*.86*	*.92*	*.90*		*.96*	*.88*
(dollars per gallon)	**.90**	**.95**	**.99**	**.98**	**.93**	**.96**	**.99**	Base	*.95*	*.89*	*.93*	*.99*	*.96*	**.96**	*.96*	*.94*
								High	*.97*	*.96*	*1.02*	*1.08*	*1.06*		*.96*	*1.03*
No. 2 Diesel Oil, Retail								Low	*.86*	*.85*	*.87*	*.88*	*.87*		*.91*	*.87*
(dollars per gallon)	**.89**	**.91**	**.95**	**.97**	**.93**	**.93**	**.90**	Base	*.87*	*.89*	*.93*	*.92*	*.91*	**.93**	*.91*	*.92*
								High	*.89*	*.95*	*.99*	*1.00*	*.99*		*.92*	*.98*
No. 2 Heating Oil, Wholesale								Low	*.41*	*.41*	*.42*	*.41*	*.43*		*.46*	*.42*
(dollars per gallon)	**.50**	**.51**	**.54**	**.56**	**.50**	**.49**	**.45**	Base	*.43*	*.48*	*.47*	*.47*	*.48*	**.53**	*.47*	*.47*
								High	*.48*	*.55*	*.55*	*.54*	*.56*		*.48*	*.55*
No. 2 Heating Oil, Retail								Low	*.73*	*.72*	*.71*	*.69*	*.73*		*.78*	*.72*
(dollars per gallon)	**.79**	**.78**	**.78**	**.83**	**.84**	**.82**	**.75**	Base	*.75*	*.79*	*.78*	*.75*	*.80*	**.80**	*.79*	*.78*
								High	*.79*	*.87*	*.87*	*.85*	*.90*		*.80*	*.87*
No. 6 Residual Fuel Oil [c]								Low	*11.78*	*11.67*	*11.65*	*11.93*	*12.51*		*13.46*	*11.92*
(dollars per barrel)	**17.11**	**18.19**	**18.48**	**16.97**	**14.76**	**13.92**	**13.48**	Base	*13.31*	*14.92*	*14.05*	*14.31*	*15.02*	**17.68**	*13.95*	*14.60*
								High	*15.75*	*18.42*	*17.38*	*17.68*	*18.57*		*14.65*	*18.05*
Electric Utility Fuels																
Coal								Low	*1.46*	*1.46*	*1.46*	*1.46*	*1.47*		*1.47*	*1.46*
(dollars per million Btu)	**1.52**	**1.54**	**1.50**	**1.48**	**1.48**	**1.50**	**1.50**	Base	*1.51*	*1.51*	*1.51*	*1.52*	*1.52*	**1.51**	*1.50*	*1.52*
								High	*1.54*	*1.54*	*1.54*	*1.55*	*1.55*		*1.52*	*1.55*
Heavy Oil [d]								Low	*2.00*	*1.99*	*1.99*	*2.02*	*2.11*		*2.30*	*2.03*
(dollars per million Btu)	**2.93**	**3.03**	**3.10**	**2.85**	**2.55**	**2.39**	**2.27**	Base	*2.24*	*2.51*	*2.37*	*2.40*	*2.51*	**2.98**	*2.37*	*2.45*
								High	*2.62*	*3.07*	*2.90*	*2.93*	*3.07*		*2.48*	*2.99*
Natural Gas								Low	*2.04*	*2.00*	*2.03*	*2.06*	*2.12*		*2.16*	*2.05*
(dollars per million Btu)	**2.33**	**2.23**	**2.16**	**2.27**	**2.39**	**2.11**	**2.15**	Base	*2.16*	*2.30*	*2.26*	*2.27*	*2.35*	**2.24**	*2.19*	*2.29*
								High	*2.45*	*2.69*	*2.64*	*2.66*	*2.76*		*2.28*	*2.69*
Other Residential																
Natural Gas								Low	*5.36*	*5.16*	*5.70*	*6.59*	*5.53*		*5.43*	*5.48*
(dollars per 1,000 cu. ft.)	**5.35**	**5.83**	**6.76**	**5.37**	**5.15**	**5.73**	**6.78**	Base	*5.56*	*5.35*	*5.90*	*6.83*	*5.73*	**5.56**	*5.50*	*5.68*
								High	*5.72*	*5.51*	*6.08*	*7.04*	*5.90*		*5.56*	*5.85*
Electricity								Low	*7.26*	*6.95*	*7.53*	*7.84*	*7.49*		*7.46*	*7.45*
(cents per kilowatthour)	**7.00**	**7.54**	**7.76**	**7.35**	**7.00**	**7.59**	**7.87**	Base	*7.46*	*7.18*	*7.79*	*8.09*	*7.73*	**7.41**	*7.58*	*7.70*
								High	*7.68*	*7.43*	*8.06*	*8.37*	*8.00*		*7.70*	*7.96*

[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: Third quarter 1988 is estimated for all fuels. 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(88/07); and *Petroleum Marketing Monthly,* DOE/EIA-0380(88/07).

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

Supply and Disposition	1987				1988				1989				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1987	1988	1989
Supply															
Crude Oil Supply															
Domestic Production [a]	**8.45**	**8.37**	**8.22**	**8.36**	**8.32**	**8.21**	**8.11**	*8.06*	*8.04*	*7.94*	*7.91*	*7.97*	**8.35**	*8.18*	*7.97*
Alaska	**1.95**	**1.97**	**1.90**	**2.03**	**2.05**	**2.01**	**2.00**	*2.05*	*2.04*	*1.99*	*1.99*	*2.03*	**1.96**	*2.03*	*2.01*
Lower 48	**6.50**	**6.40**	**6.32**	**6.33**	**6.27**	**6.20**	**6.11**	*6.01*	*6.00*	*5.95*	*5.92*	*5.94*	**6.39**	*6.15*	*5.95*
Net Imports (Including SPR) [b]	**3.85**	**4.28**	**5.17**	**4.77**	**4.51**	**5.01**	**4.94**	*5.38*	*4.92*	*5.35*	*5.77*	*5.41*	**4.52**	*4.96*	*5.36*
Gross Imports (Excluding SPR)	**3.94**	**4.35**	**5.24**	**4.86**	**4.65**	**5.08**	**5.06**	*5.49*	*5.05*	*5.47*	*5.89*	*5.52*	**4.60**	*5.07*	*5.49*
SPR Imports	**.08**	**.07**	**.07**	**.07**	**.05**	**.06**	**.04**	*.05*	*.05*	*.05*	*.05*	*.05*	**.07**	*.05*	*.05*
Exports	**.17**	**.14**	**.14**	**.16**	**.19**	**.13**	**.17**	*.17*	*.18*	*.17*	*.16*	*.17*	**.15**	*.17*	*.17*
SPR Stock Withdrawn or Added (-)	**-.09**	**-.08**	**-.07**	**-.07**	**-.05**	**-.06**	**-.04**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.08**	*-.05*	*-.05*
Other Stock Withdrawn or Added (-)	**-.01**	**.05**	**-.10**	**-.13**	**-.05**	**-.06**	**.35**	*-.08*	*.00*	*-.01*	*.00*	*.00*	**-.05**	*.04*	*.00*
Products Supplied and Losses	**-.04**	**-.04**	**-.03**	**-.03**	**-.05**	**-.04**	**-.03**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.03**	*-.04*	*-.05*
Unaccounted-for Crude	**.17**	**.20**	**.14**	**.07**	**.24**	**.33**	**.29**	*.13*	*.12*	*.12*	*.11*	*.11*	**.14**	*.25*	*.12*
Crude Oil Input to Refineries	**12.31**	**12.79**	**13.33**	**12.98**	**12.93**	**13.39**	**13.61**	*13.39*	*12.98*	*13.29*	*13.69*	*13.39*	**12.85**	*13.33*	*13.34*
Other Supply															
NGL Production	**1.60**	**1.58**	**1.58**	**1.62**	**1.60**	**1.61**	**1.60**	*1.62*	*1.64*	*1.61*	*1.59*	*1.63*	**1.60**	*1.61*	*1.62*
Other Hydrocarbon and Alcohol Inputs	**.07**	**.05**	**.06**	**.07**	**.06**	**.05**	**.06**	*.06*	*.06*	*.06*	*.06*	*.07*	**.06**	*.06*	*.06*
Crude Oil Product Supplied	**.04**	**.04**	**.03**	**.03**	**.05**	**.04**	**.03**	*.05*	*.05*	*.05*	*.05*	*.05*	**.03**	*.04*	*.05*
Processing Gain	**.64**	**.64**	**.64**	**.64**	**.68**	**.66**	**.66**	*.64*	*.64*	*.66*	*.67*	*.65*	**.64**	*.66*	*.66*
Net Product Imports [c]	**1.41**	**1.23**	**1.53**	**1.40**	**1.50**	**1.23**	**1.30**	*1.25*	*1.50*	*1.57*	*1.40*	*1.43*	**1.39**	*1.32*	*1.48*
Gross Product Imports [c]	**2.03**	**1.82**	**2.10**	**2.06**	**2.18**	**1.91**	**1.85**	*1.90*	*2.14*	*2.19*	*1.98*	*2.08*	**2.00**	*1.96*	*2.10*
Product Exports	**.63**	**.59**	**.58**	**.66**	**.67**	**.68**	**.55**	*.65*	*.64*	*.62*	*.58*	*.65*	**.61**	*.64*	*.62*
Product Stock Withdrawn or Added (-) [d]	**.51**	**.12**	**-.45**	**.18**	**.64**	**-.46**	**-.47**	*.25*	*.59*	*-.29*	*-.45*	*.19*	**.09**	*-.01*	*.01*
Total Product Supplied, Domestic Use	**16.57**	**16.46**	**16.71**	**16.92**	**17.45**	**16.53**	**16.79**	*17.26*	*17.46*	*16.96*	*17.03*	*17.41*	**16.67**	*17.01*	*17.21*
Disposition															
Motor Gasoline	**6.76**	**7.44**	**7.38**	**7.24**	**6.98**	**7.49**	**7.54**	*7.35*	*7.09*	*7.64*	*7.62*	*7.42*	**7.21**	*7.34*	*7.44*
Jet Fuel	**1.38**	**1.34**	**1.39**	**1.43**	**1.48**	**1.39**	**1.44**	*1.46*	*1.51*	*1.44*	*1.51*	*1.51*	**1.38**	*1.44*	*1.49*
Distillate Fuel Oil	**3.25**	**2.82**	**2.70**	**3.14**	**3.52**	**2.81**	**2.76**	*3.26*	*3.53*	*3.04*	*2.89*	*3.31*	**2.98**	*3.09*	*3.19*
Residual Fuel Oil	**1.41**	**1.14**	**1.27**	**1.24**	**1.54**	**1.10**	**1.15**	*1.20*	*1.41*	*1.17*	*1.05*	*1.15*	**1.26**	*1.25*	*1.20*
Other Oils Supplied [e]	**3.76**	**3.72**	**3.97**	**3.88**	**3.92**	**3.72**	**3.90**	*3.99*	*3.92*	*3.67*	*3.95*	*4.01*	**3.83**	*3.88*	*3.89*
Total Product Supplied	**16.57**	**16.45**	**16.71**	**16.92**	**17.44**	**16.53**	**16.79**	*17.26*	*17.46*	*16.96*	*17.03*	*17.41*	**16.67**	*17.01*	*17.21*
Total Petroleum Net Imports	**5.25**	**5.51**	**6.70**	**6.17**	**6.01**	**6.24**	**6.24**	*6.63*	*6.42*	*6.92*	*7.17*	*6.84*	**5.91**	*6.28*	*6.84*
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	**332**	**328**	**337**	**349**	**354**	**359**	**327**	*334*	*334*	*335*	*336*	*335*	**349**	*334*	*335*
Total Motor Gasoline	**248**	**230**	**230**	**226**	**231**	**209**	**219**	*226*	*232*	*219*	*225*	*226*	**226**	*226*	*226*
Finished Motor Gasoline	**205**	**193**	**191**	**189**	**194**	**174**	**180**	*187*	*194*	*183*	*185*	*187*	**189**	*187*	*187*
Blending Components	**43**	**38**	**38**	**37**	**37**	**35**	**38**	*39*	*38*	*37*	*39*	*39*	**37**	*39*	*39*
Jet Fuel	**48**	**46**	**50**	**50**	**47**	**46**	**46**	*48*	*46*	*46*	*48*	*48*	**50**	*48*	*48*
Distillate Fuel Oil	**109**	**104**	**127**	**134**	**89**	**111**	**133**	*137*	*97*	*106*	*132*	*136*	**134**	*137*	*136*
Residual Fuel Oil	**39**	**41**	**44**	**47**	**44**	**42**	**44**	*47*	*41*	*40*	*42*	*44*	**47**	*47*	*44*
Other Oils [g]	**259**	**271**	**284**	**260**	**249**	**294**	**303**	*265*	*254*	*285*	*290*	*265*	**260**	*265*	*265*
Total Stocks (Excluding SPR)	**1037**	**1021**	**1072**	**1067**	**1014**	**1061**	**1072**	*1057*	*1004*	*1031*	*1073*	*1055*	**1067**	*1057*	*1055*
Crude Oil in SPR	**520**	**527**	**534**	**541**	**545**	**550**	**554**	*559*	*563*	*568*	*572*	*577*	**541**	*559*	*577*
Total Stocks (Including SPR)	**1557**	**1548**	**1606**	**1607**	**1559**	**1611**	**1626**	*1616*	*1567*	*1599*	*1645*	*1632*	**1607**	*1616*	*1632*

[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 1987,* DOE/EIA-0340(87)/1; *Petroleum Supply Monthly,* DOE/EIA-0109, Jan. 1988 to Jul. 1988; *Weekly Petroleum Status Report,* DOE/EIA-0208(88-37,41,42).

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

Sensitivities	1988	1989				Year	
	4th	1st	2nd	3rd	4th	1988	1989
Demand in 50 States							
Low Price	*17.29*	*17.50*	*17.00*	*17.08*	*17.47*	*17.01*	*17.26*
Base Case	*17.26*	*17.46*	*16.96*	*17.03*	*17.41*	*17.01*	*17.21*
High Price	*17.24*	*17.42*	*16.92*	*16.98*	*17.35*	*17.00*	*17.17*
Weather Sensitivity							
Adverse Weather	*.13*	*.24*	*.03*	*.01*	*.13*	*.03*	*.10*
Favorable Weather	*-.13*	*-.24*	*-.03*	*-.01*	*-.13*	*-.03*	*-.10*
Economic Sensitivity							
High Economic Activity	*.02*	*.05*	*.10*	*.13*	*.13*	*.00*	*.10*
Low Economic Activity	*-.03*	*-.06*	*-.09*	*-.10*	*-.11*	*-.01*	*-.09*
Combined Sensitivity Differentials [a] (excl. price)							
Upper Range	*.13*	*.24*	*.10*	*.13*	*.19*	*.03*	*.16*
Lower Range	*.13*	*.24*	*.09*	*.10*	*.17*	*.03*	*.15*
Range of Projected Demand							
High Demand [b]	*17.42*	*17.74*	*17.10*	*17.21*	*17.66*	*17.04*	*17.42*
Low Demand [c]	*17.10*	*17.18*	*16.82*	*16.88*	*17.18*	*16.97*	*17.02*

[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				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]	**8.45**	**8.37**	**8.22**	**8.36**	**8.32**	**8.21**	**8.11**	*8.04*	*7.99*	*7.80*	*7.71*	*7.72*	**8.35**	*8.17*	*7.80*
Alaska	**1.95**	**1.97**	**1.90**	**2.03**	**2.05**	**2.01**	**2.00**	*2.05*	*2.04*	*1.98*	*1.98*	*2.00*	**1.96**	*2.03*	*2.00*
Lower 48	**6.50**	**6.40**	**6.32**	**6.33**	**6.27**	**6.20**	**6.11**	*5.99*	*5.94*	*5.81*	*5.73*	*5.72*	**6.39**	*6.14*	*5.80*
Net Imports (Including SPR) [b]	**3.85**	**4.28**	**5.17**	**4.77**	**4.51**	**5.01**	**4.94**	*5.55*	*5.11*	*5.69*	*6.11*	*5.80*	**4.52**	*5.00*	*5.68*
Gross Imports (Excluding SPR)	**3.94**	**4.35**	**5.24**	**4.86**	**4.65**	**5.08**	**5.06**	*5.66*	*5.25*	*5.82*	*6.22*	*5.92*	**4.60**	*5.12*	*5.80*
SPR Imports	**.08**	**.07**	**.07**	**.07**	**.05**	**.06**	**.04**	*.05*	*.05*	*.05*	*.05*	*.05*	**.07**	*.05*	*.05*
Exports	**.17**	**.14**	**.14**	**.16**	**.19**	**.13**	**.17**	*.17*	*.18*	*.17*	*.16*	*.17*	**.15**	*.17*	*.17*
SPR Stock Withdrawn or Added (-)	**-.09**	**-.08**	**-.07**	**-.07**	**-.05**	**-.06**	**-.04**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.08**	*-.05*	*-.05*
Other Stock Withdrawn or Added (-)	**-.01**	**.05**	**-.10**	**-.13**	**-.05**	**-.06**	**.35**	*-.10*	*-.01*	*-.01*	*-.01*	*-.01*	**-.05**	*.03*	*-.01*
Products Supplied and Losses	**-.04**	**-.04**	**-.03**	**-.03**	**-.05**	**-.04**	**-.03**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.03**	*-.04*	*-.05*
Unaccounted-for Crude	**.17**	**.20**	**.14**	**.07**	**.24**	**.33**	**.29**	*.13*	*.12*	*.11*	*.11*	*.11*	**.14**	*.25*	*.11*
Crude Oil Input to Refineries	**12.31**	**12.79**	**13.33**	**12.98**	**12.93**	**13.39**	**13.61**	*13.52*	*13.11*	*13.49*	*13.82*	*13.53*	**12.85**	*13.36*	*13.49*
Other Supply															
NGL Production	**1.60**	**1.58**	**1.58**	**1.62**	**1.60**	**1.61**	**1.60**	*1.62*	*1.64*	*1.61*	*1.59*	*1.63*	**1.60**	*1.61*	*1.62*
Other Hydrocarbon and Alcohol Inputs	**.07**	**.05**	**.06**	**.07**	**.06**	**.05**	**.06**	*.06*	*.06*	*.06*	*.06*	*.07*	**.06**	*.06*	*.06*
Crude Oil Product Supplied	**.04**	**.04**	**.03**	**.03**	**.05**	**.04**	**.03**	*.05*	*.05*	*.05*	*.05*	*.05*	**.03**	*.04*	*.05*
Processing Gain	**.64**	**.64**	**.64**	**.64**	**.68**	**.66**	**.66**	*.64*	*.64*	*.67*	*.68*	*.66*	**.64**	*.66*	*.66*
Net Product Imports [c]	**1.41**	**1.23**	**1.53**	**1.40**	**1.50**	**1.23**	**1.30**	*1.27*	*1.49*	*1.52*	*1.42*	*1.53*	**1.39**	*1.33*	*1.49*
Gross Product Imports [c]	**2.03**	**1.82**	**2.10**	**2.06**	**2.18**	**1.91**	**1.85**	*1.92*	*2.13*	*2.13*	*2.00*	*2.18*	**2.00**	*1.96*	*2.11*
Product Exports	**.63**	**.59**	**.58**	**.66**	**.67**	**.68**	**.55**	*.65*	*.64*	*.62*	*.58*	*.65*	**.61**	*.64*	*.62*
Product Stock Withdrawn or Added (-) [d]	**.51**	**.12**	**-.45**	**.18**	**.64**	**-.46**	**-.47**	*.17*	*.60*	*-.32*	*-.44*	*.17*	**.09**	*-.03*	*.00*
Total Product Supplied, Domestic Use	**16.57**	**16.46**	**16.71**	**16.92**	**17.45**	**16.53**	**16.79**	*17.34*	*17.59*	*17.08*	*17.19*	*17.62*	**16.67**	*17.03*	*17.37*
Disposition															
Motor Gasoline	**6.76**	**7.44**	**7.38**	**7.24**	**6.98**	**7.49**	**7.54**	*7.36*	*7.11*	*7.69*	*7.69*	*7.49*	**7.21**	*7.35*	*7.50*
Jet Fuel	**1.38**	**1.34**	**1.39**	**1.43**	**1.48**	**1.39**	**1.44**	*1.46*	*1.51*	*1.45*	*1.53*	*1.52*	**1.38**	*1.44*	*1.50*
Distillate Fuel Oil	**3.25**	**2.82**	**2.70**	**3.14**	**3.52**	**2.81**	**2.76**	*3.28*	*3.58*	*3.04*	*2.90*	*3.36*	**2.98**	*3.09*	*3.22*
Residual Fuel Oil	**1.41**	**1.14**	**1.27**	**1.24**	**1.54**	**1.10**	**1.15**	*1.23*	*1.45*	*1.21*	*1.10*	*1.21*	**1.26**	*1.26*	*1.24*
Other Oils Supplied [e]	**3.76**	**3.72**	**3.97**	**3.88**	**3.92**	**3.72**	**3.90**	*3.99*	*3.93*	*3.69*	*3.98*	*4.05*	**3.83**	*3.89*	*3.91*
Total Product Supplied	**16.57**	**16.45**	**16.71**	**16.92**	**17.44**	**16.53**	**16.79**	*17.34*	*17.59*	*17.08*	*17.19*	*17.62*	**16.67**	*17.03*	*17.37*
Total Petroleum Net Imports	**5.25**	**5.51**	**6.70**	**6.17**	**6.01**	**6.24**	**6.24**	*6.82*	*6.61*	*7.21*	*7.53*	*7.32*	**5.91**	*6.33*	*7.17*
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	**332**	**328**	**337**	**349**	**354**	**359**	**327**	*336*	*337*	*338*	*339*	*340*	**349**	*336*	*340*
Total Motor Gasoline	**248**	**230**	**230**	**226**	**231**	**209**	**219**	*228*	*233*	*222*	*227*	*228*	**226**	*228*	*228*
Finished Motor Gasoline	**205**	**193**	**191**	**189**	**194**	**174**	**180**	*189*	*195*	*185*	*188*	*190*	**189**	*189*	*190*
Blending Components	**43**	**38**	**38**	**37**	**37**	**35**	**38**	*39*	*38*	*37*	*39*	*38*	**37**	*39*	*38*
Jet Fuel	**48**	**46**	**50**	**50**	**47**	**46**	**46**	*48*	*46*	*47*	*49*	*48*	**50**	*48*	*48*
Distillate Fuel Oil	**109**	**104**	**127**	**134**	**89**	**111**	**133**	*140*	*98*	*107*	*134*	*140*	**134**	*140*	*140*
Residual Fuel Oil	**39**	**41**	**44**	**47**	**44**	**42**	**44**	*48*	*42*	*41*	*44*	*46*	**47**	*48*	*46*
Other Oils [g]	**259**	**271**	**284**	**260**	**249**	**294**	**303**	*266*	*256*	*287*	*292*	*267*	**260**	*266*	*267*
Total Stocks (Excluding SPR)	**1037**	**1021**	**1072**	**1067**	**1014**	**1061**	**1072**	*1066*	*1013*	*1043*	*1084*	*1070*	**1067**	*1066*	*1070*
Crude Oil in SPR	**520**	**527**	**534**	**541**	**545**	**550**	**554**	*559*	*563*	*568*	*572*	*577*	**541**	*559*	*577*
Total Stocks (Including SPR)	**1557**	**1548**	**1606**	**1607**	**1559**	**1611**	**1626**	*1625*	*1576*	*1611*	*1657*	*1647*	**1607**	*1625*	*1647*

[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 1987,* DOE/EIA-0340(87)/1; *Petroleum Supply Monthly,* DOE/EIA-0109, Jan. 1988 to Jul. 1988; *Weekly Petroleum Status Report,* DOE/EIA-0208(88-37,41,42).

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]	**8.45**	**8.37**	**8.22**	**8.36**	**8.32**	**8.21**	**8.11**	*8.07*	*8.09*	*8.03*	*8.03*	*8.10*	**8.35**	*8.18*	*8.06*
Alaska	**1.95**	**1.97**	**1.90**	**2.03**	**2.05**	**2.01**	**2.00**	*2.05*	*2.05*	*2.00*	*2.00*	*2.05*	**1.96**	*2.03*	*2.03*
Lower 48	**6.50**	**6.40**	**6.32**	**6.33**	**6.27**	**6.20**	**6.11**	*6.02*	*6.04*	*6.03*	*6.02*	*6.05*	**6.39**	*6.15*	*6.04*
Net Imports (Including SPR) [b]	**3.85**	**4.28**	**5.17**	**4.77**	**4.51**	**5.01**	**4.94**	*5.21*	*4.73*	*5.13*	*5.55*	*5.13*	**4.52**	*4.92*	*5.14*
Gross Imports (Excluding SPR)	**3.94**	**4.35**	**5.24**	**4.86**	**4.65**	**5.08**	**5.06**	*5.33*	*4.86*	*5.25*	*5.66*	*5.25*	**4.60**	*5.03*	*5.26*
SPR Imports	**.08**	**.07**	**.07**	**.07**	**.05**	**.06**	**.04**	*.05*	*.05*	*.05*	*.05*	*.05*	**.07**	*.05*	*.05*
Exports	**.17**	**.14**	**.14**	**.16**	**.19**	**.13**	**.17**	*.17*	*.18*	*.17*	*.16*	*.17*	**.15**	*.17*	*.17*
SPR Stock Withdrawn or Added (-)	**-.09**	**-.08**	**-.07**	**-.07**	**-.05**	**-.06**	**-.04**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.08**	*-.05*	*-.05*
Other Stock Withdrawn or Added (-)	**-.01**	**.05**	**-.10**	**-.13**	**-.05**	**-.06**	**.35**	*-.06*	*.02*	*-.02*	*.00*	*.02*	**-.05**	*.05*	*.00*
Products Supplied and Losses	**-.04**	**-.04**	**-.03**	**-.03**	**-.05**	**-.04**	**-.03**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.03**	*-.04*	*-.05*
Unaccounted-for Crude	**.17**	**.20**	**.14**	**.07**	**.24**	**.33**	**.29**	*.13*	*.12*	*.12*	*.11*	*.12*	**.14**	*.25*	*.12*
Crude Oil Input to Refineries	**12.31**	**12.79**	**13.33**	**12.98**	**12.93**	**13.39**	**13.61**	*13.25*	*12.86*	*13.17*	*13.59*	*13.27*	**12.85**	*13.29*	*13.22*
Other Supply															
NGL Production	**1.60**	**1.58**	**1.58**	**1.62**	**1.60**	**1.61**	**1.60**	*1.62*	*1.64*	*1.61*	*1.59*	*1.63*	**1.60**	*1.61*	*1.62*
Other Hydrocarbon and Alcohol Inputs	**.07**	**.05**	**.06**	**.07**	**.06**	**.05**	**.06**	*.06*	*.06*	*.06*	*.06*	*.07*	**.06**	*.06*	*.06*
Crude Oil Product Supplied	**.04**	**.04**	**.03**	**.03**	**.05**	**.04**	**.03**	*.05*	*.05*	*.05*	*.05*	*.05*	**.03**	*.04*	*.05*
Processing Gain	**.64**	**.64**	**.64**	**.64**	**.68**	**.66**	**.66**	*.63*	*.63*	*.66*	*.67*	*.64*	**.64**	*.66*	*.65*
Net Product Imports [c]	**1.41**	**1.23**	**1.53**	**1.40**	**1.50**	**1.23**	**1.30**	*1.22*	*1.47*	*1.56*	*1.36*	*1.36*	**1.39**	*1.31*	*1.44*
Gross Product Imports [c]	**2.03**	**1.82**	**2.10**	**2.06**	**2.18**	**1.91**	**1.85**	*1.86*	*2.11*	*2.18*	*1.94*	*2.01*	**2.00**	*1.95*	*2.06*
Product Exports	**.63**	**.59**	**.58**	**.66**	**.67**	**.68**	**.55**	*.65*	*.64*	*.62*	*.58*	*.65*	**.61**	*.64*	*.62*
Product Stock Withdrawn or Added (-) [d]	**.51**	**.12**	**-.45**	**.18**	**.64**	**-.46**	**-.47**	*.33*	*.58*	*-.27*	*-.44*	*.19*	**.09**	*.01*	*.01*
Total Product Supplied, Domestic Use	**16.57**	**16.46**	**16.71**	**16.92**	**17.45**	**16.53**	**16.79**	*17.17*	*17.29*	*16.84*	*16.89*	*17.20*	**16.67**	*16.98*	*17.05*
Disposition															
Motor Gasoline	**6.76**	**7.44**	**7.38**	**7.24**	**6.98**	**7.49**	**7.54**	*7.33*	*7.05*	*7.59*	*7.57*	*7.36*	**7.21**	*7.34*	*7.39*
Jet Fuel	**1.38**	**1.34**	**1.39**	**1.43**	**1.48**	**1.39**	**1.44**	*1.46*	*1.50*	*1.43*	*1.50*	*1.49*	**1.38**	*1.44*	*1.48*
Distillate Fuel Oil	**3.25**	**2.82**	**2.70**	**3.14**	**3.52**	**2.81**	**2.76**	*3.22*	*3.45*	*3.03*	*2.88*	*3.25*	**2.98**	*3.08*	*3.15*
Residual Fuel Oil	**1.41**	**1.14**	**1.27**	**1.24**	**1.54**	**1.10**	**1.15**	*1.17*	*1.38*	*1.14*	*1.01*	*1.11*	**1.26**	*1.24*	*1.16*
Other Oils Supplied [e]	**3.76**	**3.72**	**3.97**	**3.88**	**3.92**	**3.72**	**3.90**	*3.98*	*3.90*	*3.65*	*3.93*	*3.99*	**3.83**	*3.88*	*3.87*
Total Product Supplied	**16.57**	**16.45**	**16.71**	**16.92**	**17.44**	**16.53**	**16.79**	*17.17*	*17.29*	*16.84*	*16.89*	*17.20*	**16.67**	*16.98*	*17.05*
Total Petroleum Net Imports	**5.25**	**5.51**	**6.70**	**6.17**	**6.01**	**6.24**	**6.24**	*6.43*	*6.20*	*6.69*	*6.91*	*6.49*	**5.91**	*6.23*	*6.58*
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	**332**	**328**	**337**	**349**	**354**	**359**	**327**	*332*	*331*	*332*	*332*	*331*	**349**	*332*	*331*
Total Motor Gasoline	**248**	**230**	**230**	**226**	**231**	**209**	**219**	*224*	*230*	*217*	*221*	*223*	**226**	*224*	*223*
Finished Motor Gasoline	**205**	**193**	**191**	**189**	**194**	**174**	**180**	*185*	*192*	*180*	*182*	*185*	**189**	*185*	*185*
Blending Components	**43**	**38**	**38**	**37**	**37**	**35**	**38**	*39*	*38*	*36*	*39*	*39*	**37**	*39*	*39*
Jet Fuel	**48**	**46**	**50**	**50**	**47**	**46**	**46**	*48*	*45*	*45*	*47*	*47*	**50**	*48*	*47*
Distillate Fuel Oil	**109**	**104**	**127**	**134**	**89**	**111**	**133**	*135*	*95*	*104*	*131*	*134*	**134**	*135*	*134*
Residual Fuel Oil	**39**	**41**	**44**	**47**	**44**	**42**	**44**	*46*	*40*	*39*	*40*	*43*	**47**	*46*	*43*
Other Oils [g]	**259**	**271**	**284**	**260**	**249**	**294**	**303**	*263*	*252*	*283*	*288*	*263*	**260**	*263*	*263*
Total Stocks (Excluding SPR)	**1037**	**1021**	**1072**	**1067**	**1014**	**1061**	**1072**	*1047*	*994*	*1020*	*1060*	*1041*	**1067**	*1047*	*1041*
Crude Oil in SPR	**520**	**527**	**534**	**541**	**545**	**550**	**554**	*559*	*563*	*568*	*572*	*577*	**541**	*559*	*577*
Total Stocks (Including SPR)	**1557**	**1548**	**1606**	**1607**	**1559**	**1611**	**1626**	*1606*	*1557*	*1588*	*1633*	*1618*	**1607**	*1606*	*1618*

[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 1987*, DOE/EIA-0340(87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1988 to Jul. 1988; *Weekly Petroleum Status Report*, DOE/EIA-0208(88-37,41,42).

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]	**6.56**	**6.98**	**6.97**	**6.86**	**6.72**	**6.91**	**7.12**	*7.01*	*6.78*	*7.04*	*7.16*	*7.01*	**6.84**	*6.94*	*7.00*
Imports	**.36**	**.37**	**.42**	**.39**	**.34**	**.40**	**.51**	*.43*	*.39*	*.48*	*.50*	*.44*	**.38**	*.42*	*.46*
Exports	**.03**	**.05**	**.03**	**.04**	**.01**	**.03**	**.02**	*.01*	*.01*	*.01*	*.01*	*.01*	**.03**	*.02*	*.01*
Net Imports	**.33**	**.33**	**.40**	**.35**	**.32**	**.36**	**.49**	*.42*	*.39*	*.47*	*.49*	*.43*	**.35**	*.40*	*.45*
Net Withdrawals	**-.12**	**.14**	**.01**	**.03**	**-.06**	**.22**	**-.07**	*-.07*	*-.08*	*.12*	*-.03*	*-.02*	**.01**	*.00*	*.00*
Total Primary Supply	**6.76**	**7.44**	**7.38**	**7.24**	**6.98**	**7.49**	**7.54**	*7.35*	*7.09*	*7.64*	*7.62*	*7.42*	**7.21**	*7.34*	*7.44*
Disposition															
Leaded	**1.74**	**1.89**	**1.73**	**1.59**	**1.38**	**1.46**	**1.33**	*1.41*	*1.30*	*1.19*	*1.05*	*.95*	**1.74**	*1.39*	*1.12*
Unleaded	**5.03**	**5.55**	**5.65**	**5.65**	**5.60**	**6.04**	**6.21**	*5.94*	*5.79*	*6.45*	*6.57*	*6.47*	**5.47**	*5.95*	*6.32*
Total Product Supplied	**6.76**	**7.44**	**7.38**	**7.24**	**6.98**	**7.49**	**7.54**	*7.35*	*7.09*	*7.64*	*7.62*	*7.42*	**7.21**	*7.34*	*7.44*
Stocks															
Primary Finished Stock Levels [b] (million barrels)															
Opening	**194.2**	**205.0**	**192.6**	**191.2**	**188.8**	**193.9**	**173.8**	*180.4*	*187.1*	*193.9*	*182.8*	*185.2*	**194.2**	*188.8*	*187.1*
Closing	**205.0**	**192.6**	**191.2**	**188.8**	**193.9**	**173.8**	**180.4**	*187.1*	*193.9*	*182.8*	*185.2*	*187.3*	**188.8**	*187.1*	*187.3*

[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 1987*, DOE/EIA-0340(87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1988 to Jul. 1988; *Weekly Petroleum Status Report*, DOE/EIA-0208(88-37,41,42).

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**	**2.90**	**2.83**	*3.03*	*2.88*	*2.93*	*2.97*	*3.05*	**2.73**	*2.89*	*2.96*
Imports	**.26**	**.22**	**.28**	**.27**	**.31**	**.22**	**.21**	*.35*	*.30*	*.28*	*.28*	*.37*	**.26**	*.27*	*.31*
Exports	**.09**	**.06**	**.05**	**.07**	**.09**	**.06**	**.05**	*.07*	*.09*	*.06*	*.07*	*.07*	**.07**	*.07*	*.07*
Net Imports	**.17**	**.16**	**.23**	**.20**	**.22**	**.15**	**.16**	*.28*	*.21*	*.22*	*.21*	*.30*	**.19**	*.20*	*.24*
Net Withdrawals	**.51**	**.05**	**-.24**	**-.08**	**.50**	**-.23**	**-.24**	*-.04*	*.44*	*-.10*	*-.29*	*-.05*	**.06**	*-.01*	*.00*
Disposition															
Electric Utility Consumption	**.04**	**.04**	**.05**	**.04**	**.05**	**.04**	**.05**	*.04*	*.04*	*.04*	*.05*	*.04*	**.04**	*.05*	*.04*
Utility Stock Additions	**.00**	**.00**	**.00**	**.00**	**-.01**	**.00**	**.00**	*.00*	*.00*	*.00*	*.00*	*.00*	**.00**	*.00*	*.00*
Electric Utility Shipments	**.04**	**.04**	**.05**	**.03**	**.04**	**.04**	**.05**	*.04*	*.04*	*.04*	*.04*	*.04*	**.04**	*.04*	*.04*
Nonutility Shipments	**3.22**	**2.78**	**2.65**	**3.10**	**3.48**	**2.77**	**2.71**	*3.22*	*3.49*	*3.01*	*2.85*	*3.27*	**2.94**	*3.05*	*3.15*
Total Product Supplied	**3.25**	**2.82**	**2.70**	**3.14**	**3.52**	**2.81**	**2.76**	*3.26*	*3.53*	*3.04*	*2.89*	*3.31*	**2.98**	*3.09*	*3.19*
Stocks															
Electric Utility Stock Levels (million barrels)															
Opening	**16.3**	**15.9**	**15.8**	**16.0**	**15.8**	**15.0**	**15.3**	*15.0*	*14.8*	*14.6*	*14.4*	*14.3*	**16.3**	*15.8*	*14.8*
Closing	**15.9**	**15.8**	**16.0**	**15.8**	**15.0**	**15.3**	**15.0**	*14.8*	*14.6*	*14.4*	*14.3*	*14.2*	**15.8**	*14.8*	*14.2*
Primary Stock Levels (million barrels)															
Opening	**155.1**	**109.3**	**104.4**	**126.8**	**134.5**	**89.3**	**110.7**	*132.6*	*136.7*	*96.7*	*105.8*	*132.3*	**155.1**	*134.5*	*136.7*
Closing	**109.3**	**104.4**	**126.8**	**134.5**	**89.3**	**110.7**	**132.6**	*136.7*	*96.7*	*105.8*	*132.3*	*136.5*	**134.5**	*136.7*	*136.5*

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 1987*, DOE/EIA-0340(87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1988 to Jul. 1988; *Monthly Energy Review*, DOE/EIA-0035(88/07); *Electric Power Monthly*, DOE/EIA-0226(88/07); *Weekly Petroleum Status Report*, DOE/EIA-0208(88-37,41,42).

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**	**0.90**	**0.94**	**0.98**	**0.90**	**0.86**	*0.93*	*0.93*	*0.86*	*0.84*	*0.88*	**0.89**	*0.92*	*0.88*
Imports	**.64**	**.49**	**.59**	**.54**	**.71**	**.41**	**.48**	*.50*	*.62*	*.49*	*.39*	*.50*	**.56**	*.53*	*.50*
Exports	**.19**	**.16**	**.18**	**.21**	**.19**	**.23**	**.17**	*.20*	*.20*	*.18*	*.16*	*.20*	**.19**	*.20*	*.19*
Net Imports	**.45**	**.33**	**.41**	**.33**	**.52**	**.18**	**.32**	*.30*	*.42*	*.30*	*.23*	*.30*	**.38**	*.33*	*.31*
Net Withdrawals	**.09**	**-.02**	**-.03**	**-.03**	**.04**	**.02**	**-.02**	*-.03*	*.06*	*.01*	*-.02*	*-.03*	**.00**	*.00*	*.01*
Disposition															
Electric Utility Consumption	**.57**	**.45**	**.53**	**.47**	**.64**	**.41**	**.59**	*.49*	*.45*	*.43*	*.50*	*.47*	**.50**	*.53*	*.46*
Utility Stock Additions	**-.08**	**-.02**	**.04**	**.03**	**-.02**	**.01**	**-.03**	*-.02*	*.02*	*-.01*	*-.04*	*.00*	**.00**	*-.02*	*-.01*
Electric Utility Shipments	**.49**	**.43**	**.57**	**.50**	**.61**	**.42**	**.55**	*.46*	*.47*	*.43*	*.46*	*.47*	**.50**	*.51*	*.46*
Nonutility Shipments	**.92**	**.71**	**.70**	**.74**	**.92**	**.68**	**.60**	*.73*	*.95*	*.75*	*.59*	*.69*	**.77**	*.73*	*.74*
Total Product Supplied	**1.41**	**1.14**	**1.27**	**1.24**	**1.54**	**1.10**	**1.15**	*1.20*	*1.41*	*1.17*	*1.05*	*1.15*	**1.26**	*1.25*	*1.20*
Stocks															
Electric Utility Stock Levels (million barrels)															
Opening	**56.8**	**50.0**	**48.0**	**51.9**	**55.1**	**52.8**	**53.5**	*50.6*	*48.7*	*50.5*	*49.9*	*46.4*	**56.8**	*55.1*	*48.7*
Closing	**50.0**	**48.0**	**51.9**	**55.1**	**52.8**	**53.5**	**50.6**	*48.7*	*50.5*	*49.9*	*46.4*	*46.4*	**55.1**	*48.7*	*46.4*
Primary Stock Levels (million barrels)															
Opening	**47.4**	**39.3**	**41.4**	**44.4**	**47.4**	**44.1**	**42.1**	*44.2*	*46.6*	*40.9*	*40.2*	*42.0*	**47.4**	*47.4*	*46.6*
Closing	**39.3**	**41.4**	**44.4**	**47.4**	**44.1**	**42.1**	**44.2**	*46.6*	*40.9*	*40.2*	*42.0*	*44.4*	**47.4**	*46.6*	*44.4*

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 1987*, DOE/EIA-0340(87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1988 to Jul. 1988; *Monthly Energy Review*, DOE/EIA-0035(88/07); *Electric Power Monthly*, DOE/EIA-0226(88/07); *Weekly Petroleum Status Report*, DOE/EIA-0208(88-37,41,42).

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**	**3.39**	**2.80**	**3.10**	**3.35**	**3.46**	*3.06*	*3.03*	*3.13*	*3.40*	*3.10*	**3.04**	*3.24*	*3.17*
Natural Gas Plant Output	**1.60**	**1.58**	**1.58**	**1.62**	**1.60**	**1.61**	**1.60**	*1.62*	*1.63*	*1.61*	*1.59*	*1.62*	**1.59**	*1.61*	*1.61*
Other Domestic [c]	**.07**	**.05**	**.06**	**.07**	**.06**	**.05**	**.06**	*.06*	*.06*	*.06*	*.06*	*.07*	**.06**	*.06*	*.06*
Net Imports	**.46**	**.42**	**.50**	**.52**	**.44**	**.54**	**.33**	*.26*	*.49*	*.58*	*.47*	*.41*	**.47**	*.39*	*.49*
Net Withdrawals	**.03**	**-.05**	**-.19**	**.27**	**.16**	**-.47**	**-.14**	*.39*	*.16*	*-.32*	*-.11*	*.28*	**.02**	*-.01*	*.00*
Total Primary Supply	**5.10**	**5.02**	**5.33**	**5.28**	**5.36**	**5.08**	**5.30**	*5.40*	*5.38*	*5.06*	*5.41*	*5.47*	**5.18**	*5.29*	*5.33*
Disposition															
Jet Fuel	**1.38**	**1.34**	**1.39**	**1.43**	**1.48**	**1.39**	**1.44**	*1.46*	*1.51*	*1.44*	*1.51*	*1.51*	**1.38**	*1.44*	*1.49*
Liquefied Petroleum Gas [d]	**1.77**	**1.39**	**1.51**	**1.78**	**1.92**	**1.34**	**1.45**	*1.81*	*1.83*	*1.37*	*1.46*	*1.81*	**1.61**	*1.63*	*1.62*
Petrochemical Feedstocks [e]	**.43**	**.48**	**.46**	**.40**	**.40**	**.40**	**.39**	*.40*	*.41*	*.42*	*.42*	*.42*	**.44**	*.40*	*.42*
Miscellaneous [f]	**1.52**	**1.81**	**1.98**	**1.67**	**1.56**	**1.94**	**2.02**	*1.72*	*1.62*	*1.82*	*2.01*	*1.73*	**1.74**	*1.81*	*1.80*
Total Product Supplied	**5.10**	**5.02**	**5.33**	**5.28**	**5.35**	**5.08**	**5.30**	*5.40*	*5.38*	*5.06*	*5.41*	*5.47*	**5.18**	*5.29*	*5.33*
Stock															
Primary Stocks (*million barrels*)															
Opening	**352.9**	**350.6**	**354.9**	**372.3**	**347.1**	**332.6**	**375.0**	*387.9*	*352.1*	*337.8*	*367.3*	*377.6*	**352.9**	*347.1*	*352.1*
Closing	**350.6**	**354.9**	**372.3**	**347.1**	**332.6**	**375.0**	**387.9**	*352.1*	*337.8*	*367.3*	*377.6*	*351.8*	**347.1**	*352.1*	*351.8*

[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 ethane, propane, normal butane, and isobutane.
[e] Includes naphthas 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 August and September 1988 are preliminary.

Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1987,* DOE/EIA-0340(87)/1; *Petroleum Supply Monthly,* DOE/EIA-0109, Jan. 1988 to Jul. 1988; and *Weekly Petroleum Status Report,* DOE/EIA-0208(88-37,41,42).

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]	**4.36**	**3.97**	**3.89**	**4.32**	**4.40**	**4.03**	**3.97**	*4.32*	*4.37*	*4.03*	*3.98*	*4.32*	**16.54**	*16.71*	*16.71*
Net Imports	**.26**	**.18**	**.20**	**.31**	**.34**	**.27**	**.20**	*.33*	*.37*	*.32*	*.29*	*.34*	**.94**	*1.15*	*1.32*
Supplemental Gaseous Fuels	**.03**	**.02**	**.02**	**.03**	**.05**	**.04**	**.03**	*.05*	*.05*	*.04*	*.04*	*.05*	**.10**	*.17*	*.18*
Total New Supply	**4.65**	**4.17**	**4.11**	**4.65**	**4.79**	**4.33**	**4.21**	*4.70*	*4.79*	*4.40*	*4.31*	*4.71*	**17.57**	*18.03*	*18.21*
Underground Working Gas Storage															
Opening	**2.75**	**1.88**	**2.43**	**3.04**	**2.75**	**1.68**	**2.29**	*3.09*	*2.72*	*1.90*	*2.33*	*3.39*	**2.75**	*2.75*	*2.72*
Closing	**1.88**	**2.43**	**3.04**	**2.75**	**1.68**	**2.29**	**3.09**	*2.72*	*1.90*	*2.33*	*3.39*	*2.81*	**2.75**	*2.72*	*2.81*
Net Withdrawals [b]	**.88**	**-.57**	**-.61**	**.29**	**1.07**	**-.61**	**-.80**	*.37*	*1.03*	*-.56*	*-.79*	*.37*	**.00**	*.04*	*.05*
Total Primary Supply [a]	**5.53**	**3.61**	**3.50**	**4.94**	**5.86**	**3.72**	**3.41**	*5.07*	*5.82*	*3.84*	*3.52*	*5.08*	**17.57**	*18.07*	*18.26*
Consumption															
Lease and Plant Fuel	**.30**	**.28**	**.27**	**.30**	**.25**	**.23**	**.25**	*.27*	*.28*	*.24*	*.23*	*.28*	**1.15**	*1.01*	*1.03*
Pipeline Use	**.14**	**.12**	**.12**	**.13**	**.15**	**.12**	**.13**	*.14*	*.15*	*.13*	*.12*	*.15*	**.52**	*.55*	*.54*
Residential	**2.01**	**.77**	**.37**	**1.17**	**2.19**	**.82**	**.39**	*1.19*	*2.20*	*.86*	*.40*	*1.20*	**4.32**	*4.59*	*4.66*
Commercial	**1.04**	**.45**	**.29**	**.63**	**1.12**	**.50**	**.33**	*.66*	*1.11*	*.52*	*.34*	*.67*	**2.41**	*2.61*	*2.65*
Industrial	**1.60**	**1.36**	**1.32**	**1.62**	**1.66**	**1.47**	**1.36**	*1.66*	*1.72*	*1.47*	*1.37*	*1.68*	**5.89**	*6.15*	*6.24*
Electric Utilities	**.53**	**.73**	**.93**	**.65**	**.54**	**.72**	**.95**	*.62*	*.64*	*.71*	*.88*	*.60*	**2.84**	*2.83*	*2.83*
Subtotal	**5.62**	**3.71**	**3.30**	**4.51**	**5.92**	**3.85**	**3.41**	*4.56*	*6.10*	*3.93*	*3.34*	*4.57*	**17.14**	*17.74*	*17.94*
Total Disposition	**5.53**	**3.61**	**3.50**	**4.94**	**5.86**	**3.72**	**3.41**	*5.07*	*5.82*	*3.84*	*3.52*	*5.08*	**17.57**	*18.07*	*18.26*
Unaccounted for	**-.09**	**-.10**	**.19**	**.44**	**-.05**	**-.13**	**.00**	*.52*	*-.28*	*-.09*	*.17*	*.52*	**.44**	*.33*	*.31*

[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(88/07); *Natural Gas Monthly*, DOE/EIA-0130(88/07); and *Electric Power Monthly*, DOE/EIA-0226(88/07).

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

Supply and Disposition	1987				1988				1989				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd[a]	4th	1st	2nd	3rd	4th	1987	1988	1989
Supply															
Production	**222**	**219**	**233**	**245**	**237**	**227**	**247**	*231*	*229*	*237*	*232*	*247*	**919**	*941*	*946*
Primary Stock Levels [b]															
Opening	**32**	**37**	**34**	**29**	**28**	**37**	**36**	*33*	*31*	*31*	*31*	*30*	**32**	*28*	*31*
Closing	**37**	**34**	**29**	**28**	**37**	**36**	**33**	*31*	*31*	*31*	*30*	*30*	**28**	*31*	*30*
Net Withdrawals	**-4**	**3**	**5**	**0**	**-8**	**1**	**3**	*2*	*0*	*0*	*1*	*0*	**4**	*-3*	*1*
Imports	**0**	**0**	**0**	**0**	**1**	**1**	**1**	*0*	*0*	*1*	*1*	*0*	**2**	*2*	*2*
Exports	**17**	**20**	**21**	**22**	**16**	**25**	**23**	*22*	*17*	*21*	*22*	*23*	**80**	*86*	*82*
Total New Domestic Supply	**201**	**202**	**218**	**224**	**213**	**203**	**228**	*211*	*213*	*217*	*212*	*225*	**845**	*855*	*866*
Secondary Stock Levels [c]															
Opening	**175**	**173**	**176**	**166**	**185**	**174**	**173**	*168*	*165*	*157*	*163*	*142*	**175**	*185*	*165*
Closing	**173**	**176**	**166**	**185**	**174**	**173**	**168**	*165*	*157*	*163*	*142*	*150*	**185**	*165*	*150*
Net Withdrawals	**2**	**-3**	**10**	**-20**	**12**	**0**	**5**	*3*	*9*	*-6*	*21*	*-8*	**-10**	*20*	*16*
Total Indicated Consumption	**204**	**199**	**228**	**204**	**225**	**203**	**233**	*214*	*222*	*211*	*233*	*217*	**834**	*875*	*882*
Consumption															
Coke Plants	**8**	**9**	**10**	**10**	**10**	**11**	**9**	*9*	*10*	*11*	*9*	*9*	**37**	*39*	*39*
Electric Utilities	**171**	**171**	**200**	**176**	**188**	**176**	**205**	*182*	*189*	*181*	*205*	*186*	**718**	*750*	*760*
Retail and General Industry [d]	**21**	**19**	**20**	**23**	**22**	**19**	**19**	*22*	*22*	*19*	*19*	*22*	**82**	*83*	*82*
Subtotal	**200**	**200**	**229**	**208**	**220**	**205**	**233**	*214*	*222*	*211*	*233*	*217*	**837**	*872*	*882*
Total Disposition	**204**	**199**	**228**	**204**	**225**	**203**	**233**	*214*	*222*	*211*	*233*	*217*	**834**	*875*	*882*
Discrepancy [e]	**4**	**-1**	**-1**	**-4**	**5**	**-2**	**0**	*0*	*0*	*0*	*0*	*0*	**-3**	*3*	*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 6.8 million tons for 1987. Starting in the second quarter of 1988, synfuels account for 1.8 million tons per quarter.
[e] Historical period discrepancy reflects an unaccounted shipper and receiver reporting difference.
Notes: Rows and columns may not add due to independent rounding. Zeros indicate amounts of less than 500,000 tons. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07); and *Quarterly Coal Report*, DOE/EIA-0121(88/2Q).

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

Supply and Disposition	1987				1988				1989				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd[a]	4th	1st	2nd	3rd	4th	1987	1988	1989
Net Utility Generation															
Coal	**348.2**	**350.0**	**407.5**	**358.1**	**383.4**	**355.7**	**415.0**	*368.7*	*386.6*	*369.2*	*415.0*	*377.3*	**1463.8**	*1522.8*	*1548.0*
Petroleum	**32.4**	**26.7**	**31.5**	**27.8**	**37.6**	**24.4**	**34.8**	*28.8*	*25.9*	*25.5*	*29.8*	*27.7*	**118.5**	*125.7*	*108.9*
Natural Gas	**51.3**	**69.9**	**88.5**	**63.0**	**52.5**	**69.2**	**91.1**	*59.5*	*61.3*	*67.4*	*84.5*	*57.3*	**272.6**	*272.3*	*270.5*
Nuclear Power	**113.9**	**104.4**	**121.1**	**115.9**	**130.8**	**124.8**	**141.4**	*125.1*	*132.1*	*122.9*	*137.8*	*128.8*	**455.3**	*522.1*	*521.5*
Hydropower	**69.9**	**67.1**	**56.8**	**55.9**	**60.9**	**59.2**	**50.4**	*58.1*	*67.4*	*74.5*	*66.5*	*68.2*	**249.7**	*228.5*	*276.6*
Geothermal Power and Other[b]	**3.0**	**3.0**	**3.2**	**3.0**	**3.0**	**2.9**	**3.2**	*3.2*	*3.2*	*3.2*	*3.4*	*3.4*	**12.3**	*12.3*	*13.1*
Total Utility Generation	**618.6**	**621.2**	**708.6**	**623.8**	**668.2**	**636.1**	**735.9**	*643.5*	*676.5*	*662.5*	*737.0*	*662.6*	**2572.1**	*2683.8*	*2738.6*
Net Imports	**12.6**	**12.2**	**12.4**	**9.2**	*9.3*	*8.7*	*11.5*	*11.0*	*9.6*	*9.0*	*11.9*	*11.4*	**46.3**	*40.5*	*41.9*
Purchases from Nonutilities[c]	*11.3*	*11.4*	*13.0*	*11.4*	*14.3*	*13.7*	*15.1*	*13.8*	*16.6*	*16.1*	*17.7*	*16.1*	*47.1*	*56.8*	*66.5*
Total Supply	*642.5*	*644.7*	*733.9*	*644.4*	*691.8*	*658.5*	*762.5*	*668.3*	*702.7*	*687.6*	*766.5*	*690.1*	*2665.6*	*2781.1*	*2846.9*
Losses and Unaccounted For[d]	*41.4*	*63.5*	*52.8*	*52.4*	*47.6*	*64.3*	*57.1*	*55.8*	*42.6*	*65.4*	*59.8*	*60.0*	*210.1*	*224.8*	*227.8*
Utility Sales	**601.1**	**581.3**	**681.1**	**592.0**	**644.2**	**594.2**	**705.4**	*612.6*	*660.0*	*622.3*	*706.7*	*630.2*	**2455.4**	*2556.3*	*2619.1*

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

Notes: Values for nonutility supply, and losses and unaccounted for are estimated for 1987. Values for net imports, nonutility supply, and losses and unaccounted for are estimated for the first three quarters of 1988. 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(88/07); and *Electric Power Monthly*, DOE/EIA-0226(88/07).

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]	**4.96**	**4.97**	**4.94**	**5.03**	**4.94**	**4.89**	**4.89**	*4.87*	*4.76*	*4.75*	*4.78*	*4.82*	**19.89**	*19.60*	*19.11*
Natural Gas [b]	**4.49**	**4.09**	**4.00**	**4.45**	**4.53**	**4.15**	**4.09**	*4.45*	*4.50*	*4.15*	*4.10*	*4.45*	**17.03**	*17.21*	*17.21*
Coal	**4.88**	**4.80**	**5.11**	**5.37**	**5.20**	**4.97**	**5.42**	*5.06*	*5.03*	*5.21*	*5.10*	*5.41*	**20.16**	*20.65*	*20.75*
Nuclear Power	**1.23**	**1.13**	**1.31**	**1.25**	**1.41**	**1.35**	**1.53**	*1.35*	*1.43*	*1.33*	*1.49*	*1.39*	**4.92**	*5.64*	*5.63*
Hydropower [c]	**.73**	**.70**	**.59**	**.58**	**.63**	**.62**	**.52**	*.60*	*.70*	*.77*	*.69*	*.71*	**2.59**	*2.38*	*2.87*
Geothermal Power and Other [d]	**.06**	**.06**	**.06**	**.06**	**.06**	**.06**	**.06**	*.06*	*.06*	*.06*	*.07*	*.07*	**.24**	*.24*	*.26*
Subtotal	**16.34**	**15.75**	**16.02**	**16.74**	**16.78**	**16.03**	**16.51**	*16.40*	*16.48*	*16.27*	*16.23*	*16.86*	**64.84**	*65.72*	*65.84*
Net Imports															
Crude Oil	**2.04**	**2.30**	**2.81**	**2.59**	**2.42**	**2.69**	**2.68**	*2.92*	*2.61*	*2.87*	*3.14*	*2.94*	**9.75**	*10.71*	*11.56*
Other Petroleum	**.70**	**.62**	**.78**	**.71**	**.76**	**.62**	**.66**	*.63*	*.75*	*.79*	*.71*	*.73*	**2.81**	*2.67*	*2.98*
Natural Gas	**.26**	**.18**	**.20**	**.30**	**.34**	**.27**	**.20**	*.33*	*.37*	*.32*	*.29*	*.33*	**.93**	*1.14*	*1.32*
Coal and Coke	**-.43**	**-.52**	**-.54**	**-.56**	**-.39**	**-.62**	**-.57**	*-.57*	*-.41*	*-.54*	*-.56*	*-.58*	**-2.04**	*-2.16*	*-2.09*
Electricity	**.13**	**.13**	**.13**	**.09**	**.10**	**.09**	**.12**	*.11*	*.10*	*.09*	*.12*	*.12*	**.48**	*.42*	*.43*
Subtotal	**2.70**	**2.70**	**3.37**	**3.14**	**3.22**	**3.04**	**3.09**	*3.44*	*3.42*	*3.55*	*3.70*	*3.54*	**11.92**	*12.79*	*14.20*
Primary Stocks															
Net Withdrawals	**1.02**	**-.39**	**-.78**	**.29**	**1.18**	**-.83**	**-.76**	*.46*	*1.11*	*-.56*	*-1.27*	*.65*	**.14**	*.04*	*-.06*
SPR Fill Rate Additions(-)	**-.05**	**-.04**	**-.04**	**-.04**	**-.03**	**-.03**	**-.02**	*-.03*	*-.03*	*-.03*	*-.03*	*-.03*	**-.17**	*-.11*	*-.11*
Secondary Stocks [e]															
Net Withdrawals	**.08**	**-.05**	**.20**	**-.44**	**.27**	**.00**	**.13**	*.10*	*.12*	*-.10*	*.48*	*-.15*	**-.22**	*.51*	*.35*
Total Supply [f]	**20.09**	**17.97**	**18.77**	**19.69**	**21.42**	**18.22**	**18.95**	*20.36*	*21.10*	*19.13*	*19.11*	*20.87*	**76.51**	*78.95*	*80.21*
Disposition															
Nonutility Uses															
Petroleum	**7.71**	**7.81**	**7.97**	**8.12**	**8.18**	**7.87**	**7.98**	*8.27*	*8.21*	*8.07*	*8.15*	*8.36*	**31.61**	*32.30*	*32.79*
Natural Gas [g]	**5.23**	**3.06**	**2.45**	**3.97**	**5.54**	**3.23**	**2.53**	*4.05*	*5.62*	*3.32*	*2.53*	*4.08*	**14.71**	*15.34*	*15.55*
Coal [h]	**.68**	**.67**	**.71**	**.77**	**.78**	**.72**	**.70**	*.78*	*.77*	*.71*	*.71*	*.76*	**2.84**	*2.97*	*2.95*
Industrial Hydropower	**.01**	**.01**	**.01**	**.01**	**.01**	**.01**	**.01**	*.01*	*.01*	*.01*	*.01*	*.01*	**.03**	*.03*	*.03*
Subtotal	**13.63**	**11.56**	**11.13**	**12.86**	**14.50**	**11.83**	**11.21**	*13.11*	*14.62*	*12.11*	*11.39*	*13.21*	**49.19**	*50.64*	*51.33*
Electric Utility Inputs															
Petroleum	**.35**	**.28**	**.34**	**.29**	**.39**	**.26**	**.37**	*.31*	*.28*	*.27*	*.32*	*.29*	**1.26**	*1.33*	*1.16*
Natural Gas	**.55**	**.76**	**.96**	**.67**	**.56**	**.74**	**.98**	*.64*	*.66*	*.73*	*.91*	*.62*	**2.94**	*2.93*	*2.93*
Coal	**3.61**	**3.63**	**4.23**	**3.72**	**3.97**	**3.71**	**4.33**	*3.83*	*4.01*	*3.83*	*4.31*	*3.91*	**15.19**	*15.84*	*16.06*
Nuclear Power	**1.23**	**1.13**	**1.31**	**1.25**	**1.41**	**1.35**	**1.53**	*1.35*	*1.43*	*1.33*	*1.49*	*1.39*	**4.92**	*5.64*	*5.63*
Hydropower [i]	**.85**	**.81**	**.71**	**.67**	**.72**	**.70**	**.63**	*.71*	*.79*	*.86*	*.80*	*.82*	**3.04**	*2.76*	*3.27*
Geothermal Power and Other	**.06**	**.06**	**.06**	**.06**	**.06**	**.06**	**.06**	*.06*	*.06*	*.06*	*.07*	*.07*	**.24**	*.24*	*.26*
Subtotal	**6.65**	**6.67**	**7.61**	**6.66**	**7.11**	**6.82**	**7.91**	*6.90*	*7.23*	*7.08*	*7.90*	*7.10*	**27.58**	*28.75*	*29.31*
Gross Energy Consumption [f]	**20.28**	**18.22**	**18.74**	**19.53**	**21.62**	**18.64**	**19.12**	*20.01*	*21.85*	*19.19*	*19.29*	*20.31*	**76.77**	*79.39*	*80.64*
Electrical System Energy Losses [j]	**4.64**	**4.72**	**5.33**	**4.68**	**4.96**	**4.84**	**5.56**	*4.86*	*5.03*	*5.01*	*5.55*	*5.01*	**19.37**	*20.22*	*20.60*
Total Net Energy	**15.65**	**13.50**	**13.41**	**14.85**	**16.65**	**13.81**	**13.56**	*15.15*	*16.82*	*14.18*	*13.75*	*15.30*	**57.41**	*59.17*	*60.04*
Total Disposition	**20.09**	**17.97**	**18.77**	**19.69**	**21.42**	**18.22**	**18.95**	*20.36*	*21.10*	*19.13*	*19.11*	*20.87*	**76.51**	*78.95*	*80.21*
Unaccounted for	**-.19**	**-.26**	**.02**	**.16**	**-.19**	**-.43**	**-.17**	*.35*	*-.75*	*-.05*	*-.18*	*.56*	**-.26**	*-.44*	*-.43*

[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(88/07); and *Electric Power Monthly*, DOE/EIA-0226(88/07).

Table 18. Conversion Factors

Fuel	Units	Heat Content
Coal		
Production	Million Btu/short ton	21.946
Consumption	Million Btu/short ton	21.531
Coke Plants	Million Btu/short ton	26.800
Industrial and Retail	Million Btu/short ton	22.472
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	5.901
Petroleum Products		
Consumption	Million Btu/barrel	5.403
Motor Gasoline	Million Btu/barrel	5.253
Jet Fuel	Million Btu/barrel	5.624
Distillate Fuel Oil	Million Btu/barrel	5.825
Residual Fuel Oil	Million Btu/barrel	6.287
Liquefied Petroleum Gas	Million Btu/barrel	3.659
Unfinished Oils	Million Btu/barrel	5.825
Imports	Million Btu/barrel	5.633
Exports	Million Btu/barrel	5.873
Natural Gas Plant Liquids		
Production	Million Btu/barrel	3.804
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	10,376
Petroleum	
Distillate Fuel Oil	11,666
Residual Fuel Oil	10,539
Natural Gas	10,783
Nuclear Energy	10,799
Hydropower	10,261
Geothermal and Other Energy	21,263
Electricity Consumption	3,412

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