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SHORT-TERM ENERGY OUTLOOK

QUARTERLY PROJECTIONS

ENERGY INFORMATION ADMINISTRATION

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Forecasts for domestic crude oil production are provided by the EIA Dallas Field Office, under the supervision of John H. Wood. Forecasts of nuclear electricity generation are provided by Roger Diedrich; hydroelectric generation, electricity imports, and electricity purchases from nonutilities are provided by Patricia Toner; and coal production is provided by Frederick Freme--all of the EIA Office of Coal, Nuclear, Electric and Alternate Fuels. World petroleum forecasts are prepared by the International and Contingency Information Division, with Mark Rodekohr as Acting Director. Jon Rasmussen of the Office of Energy Markets and End Use contributed to the article on oil company profitability and investment.

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 discusses current topics of the short-term energy markets (see *Short-Term Energy Outlook: Annual Supplement,* DOE/EIA-0202). The principal users of the *Outlook* are managers and energy analysts in private industry and government. The projections in this volume extend through the fourth quarter of 1990.

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

The three projections for petroleum supply and demand are based on low, middle, and high crude oil price trajectories. The discussion and tables in this volume refer primarily to the middle, or base case, scenario and, unless otherwise noted, to the domestic situation. Other cases examining the sensitivity of total petroleum demand to varying assumptions about prices, weather, and economic activity are shown in Table 7 on page 43. Discussions of the world oil price refer to the cost of imported crude oil to U.S. refiners.

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

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Highlights

Low oil prices and further economic growth will continue to encourage a growing appetite for jet fuel and motor gasoline in the transportation sector (Table 1). Some significant switching from gas to oil at utilities is expected to have carried over from late 1988 into early 1989. Hence, total petroleum consumption this year should expand by about another 180,000 barrels per day. Next year, however, a slowdown in the trade sector-led boom in the general economy and the assumption that oil will not maintain its recent level of use at utilities dampens projected growth in domestic oil demand. Nevertheless, since additional petroleum supplies will come not from domestic resources but from foreign production, net oil imports are anticipated to continue a strong increase over the period.

Growth in Domestic Petroleum Consumption Concentrated in Transportation Sector

The transportation sector continues to lead overall demand growth for petroleum. All major categories of oil consumption are expected to post healthy increases in 1989, except for residual fuel oil. Oil demand in 1990 will exhibit a similar pattern of growth among fuel categories, but the pace will slacken.

Net Oil Imports Continue to Increase

U.S. net imports of crude oil (including the Strategic Petroleum Reserve) and petroleum products are expected to continue rising through 1990, reaching 7.30 million barrels per day or 42 percent of domestic consumption. The increase in net imports between 1988 and 1990 is expected to be about 800,000 barrels per day. This reflects continued increases in demand, declines in production, and our current belief that the crude oil import data for 1988 (shown in Table 1) are probably understated by about 100,000 barrels per day.

Imported Oil Prices Firm Up Somewhat by 1990

World oil prices bottomed out in November of 1988 at about $12.50 per barrel. By 1990 the average price should stabilize at $15.00 per barrel. Despite growing worldwide demand for petroleum, high production levels and excess inventories are counteracting attempts by the Organization of Petroleum Exporting Countries to support higher prices.

Natural Gas Use Remains Strong

Natural gas consumption should continue to exceed 18 trillion cubic feet in 1989 and 1990. Although natural gas use at electric utilities generally lost ground in favor of oil in 1988, gas use in industrial applications gained significantly last year, and is expected to continue to grow moderately through 1990. While residential and commercial gas are not assumed to get the boost from cold weather seen in early 1988 for the forecast, utility use of gas should return to more normal levels by late 1989.

Electricity Demand Continues at Steady Pace Through 1990

The extreme temperatures that occurred during the first and third quarters of 1988 are not assumed to be replicated in 1989 or 1990. Hence, the 4.7-percent growth in total electric power sales estimated for last year should settle down to just under 3.0 percent for each of the next 2 years. The highest rate of growth is expected to be in the commercial sector.

Utilization Rates at Nuclear Plants Reached Record Levels in 1988

Capacity utilization rates reached 65 percent during the first 9 months of 1988, greatly above the average of 58 percent for the same period of 1987. This improvement is possibly due to several factors: higher operation and maintenance expenditures, fewer plant refuelings, and shorter downtimes for maintenance.

Coal Production Approaches 1 Billion Tons by 1990

Coal consumption gains should be paced by the utility sector where coal continues to play a large role in meeting total electric power demand. As a result, domestic production requirements will reach almost 1 billion tons by 1990.

Forecast Sensitivities

The forecasts previously discussed are the base case projections, summarized in Table 1. Additional sensitivity cases, using alternative assumptions, are shown in Table 7 on page 43. Should imported crude oil prices, weather, or economic growth rates differ from the base case assumptions (with all other factors held constant), the following would 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 1990, 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 1990, 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 130,000 barrels per day in 1990, for example).

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

Table 1. Summary of Base Case Assumptions and Projections

Assumptions and Projections	Year				Annual Percentage Change		
	1987	1988	1989	1990	1987-1988	1988-1989	1989-1990
Macroeconomic Indicators							
Real Gross National Product (billion 1982 dollars)	**3847**	**3996**	*4095*	*4170*	**3.9**	*2.5*	*1.8*
Index of Industrial Production (Mfg.) (index, 1977=1.000)	**1.346**	**1.427**	*1.473*	*1.509*	**6.0**	*3.2*	*2.5*
Imported Crude Oil Price (nominal dollars per barrel)	**18.13**	**14.74**	*14.50*	*15.00*	**-18.7**	*-1.6*	*3.4*
Retail Prices (nominal)[a]							
Motor Gasoline[b] (dollars per gallon)	**.96**	**.97**	*.98*	*.98*	**1.0**	*1.0*	*.0*
No. 2 Heating Oil (dollars per gallon)	**.80**	**.80**	*.79*	*.82*	**.0**	*-1.3*	*3.8*
Residential Natural Gas (dollars per thousand cubic feet)	**5.54**	**5.50**	*5.75*	*5.99*	**-.7**	*4.5*	*4.2*
Residential Electricity (cents per kilowatthour)	**7.41**	**7.45**	*7.32*	*7.64*	**.5**	*-1.7*	*4.4*
Petroleum Supply							
Crude Oil Production[c] (million barrels per day)	**8.35**	**8.14**	*7.86*	*7.64*	**-2.5**	*-3.4*	*-2.8*
Net Petroleum Imports, Including SPR (million barrels per day)	**5.91**	**6.40**	*7.08*	*7.30*	**8.3**	*10.6*	*3.1*
Energy Demands							
Total Market Economies Petroleum (million barrels per day)	**49.07**	*50.29*	*51.16*	*51.97*	**2.5**	*1.7*	*1.6*
Total U.S. Petroleum Consumption (million barrels per day)	**16.67**	**17.15**	*17.33*	*17.38*	**2.9**	*1.0*	*.3*
Motor Gasoline	**7.21**	**7.31**	*7.42*	*7.45*	**1.4**	*1.5*	*.4*
Distillate Fuel Oil	**2.98**	**3.10**	*3.20*	*3.25*	**4.0**	*3.2*	*1.6*
Residual Fuel Oil	**1.26**	**1.32**	*1.27*	*1.17*	**4.8**	*-3.8*	*-7.9*
Other Petroleum[d]	**5.22**	**5.41**	*5.44*	*5.51*	**3.6**	*.6*	*1.3*
Coal Consumption (million short tons)	**837**	**880**	*890*	*905*	**5.1**	*1.1*	*1.7*
Natural Gas Consumption (trillion cubic feet)	**17.14**	**18.04**	*18.29*	*18.52*	**5.3**	*1.4*	*1.3*
Electricity Sales (billion kilowatthours)	**2,455.4**	**2,569.8**	*2,642.0*	*2,717.8*	**4.7**	*2.8*	*2.9*
Gross Energy Consumption[e] (quadrillion Btus)	**76.78**	**80.08**	*81.36*	*82.45*	**4.3**	*1.6*	*1.3*
Thousand Btu/1982 Dollar of GNP	**19.96**	**20.04**	*19.87*	*19.77*	**.4**	*-.8*	*-.5*

[a] All prices include taxes, except prices for No. 2 heating oil and residential electricity.
[b] Average for all grades and services.
[c] Includes lease condensate.
[d] Includes crude oil, pentanes plus, other hydrocarbons and alcohol, unfinished oil, and gasoline blending components.
[e] The conversion from physical units to Btu is calculated by STIFS using a subset of *Monthly Energy Review* (MER) conversion factors. Consequently, the historical data may not precisely match that published in the MER.

SPR: Strategic Petroleum Reserve.

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

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/10); *International Energy Annual 1987* DOE/EIA-0219(87); *Petroleum Marketing Monthly*, DOE/EIA-0380(88/10); *Petroleum Supply Monthly*, DOE/EIA-0109(88/10); *Petroleum Supply Annual 1987*, DOE/EIA-0340(87)/1; *Natural Gas Monthly*, DOE/EIA-0130(88/10); *Electric Power Monthly*, DOE/EIA-0226(88/10); and *Quarterly Coal Report*, DOE/EIA-0121(88/3Q); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through August 1988. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL1288.

Assumptions

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

International Petroleum

Recent Developments

By the end of 1988, spot prices for OPEC crude oil ranged from about $12 to $16 per barrel. This range was about $1 to $2 per barrel less than the corresponding range at the end of 1987, but it was significantly higher than what many analysts were predicting 1 to 2 months earlier. Prior to the OPEC Ministerial Conference that convened on November 21, 1988, many analysts speculated that OPEC would fail to agree on a new production strategy and that oil prices would subsequently collapse. Then, even after OPEC agreed on a new crude oil production ceiling of 18.5 million barrels per day for the first half of 1989 that reincorporated Iraq into the OPEC quota system, many analysts predicted that continuing high levels of OPEC production in November and December would contribute to lower prices at least through the end of 1988. OPEC oil production (including about 1.7 million barrels per day of condensate and liquefied petroleum gas production and refinery gain) averaged almost 23.3 million barrels per day in October, rose to almost 24.3 million barrels per day in November, and was expected to rise even higher in December, as member countries tried to earn additional revenues before the new quota system took effect. These high levels of production were expected, in turn, to swell stocks of oil in the major consuming countries. Such a stock build had yet to occur by the end of the year, however, and oil prices had firmed as much as $4 per barrel from the low levels seen in mid-November.

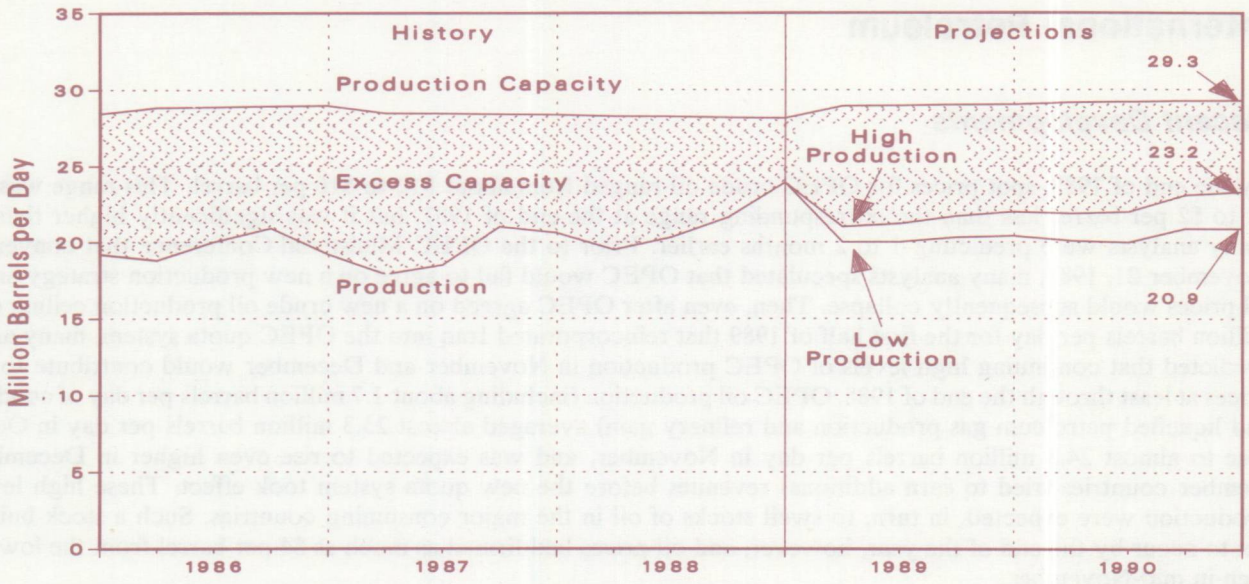
Why did the analysts' price and inventory forecasts go wrong? It now appears that most analysts had been underestimating the growth in oil consumption, and, as a result, overestimating the rate of growth of oil inventories. In the OECD countries, it now appears that consumption in the fourth quarter of 1988 was probably about 1.6 million barrels per day, or 4.2 percent, higher than in the same quarter of 1987. As a result, petroleum demand by the OECD countries averaged 36.6 million barrels per day in 1988, an increase of 820,000 barrels per day, or 2.3 percent, from the 1987 rate.

In the developing countries, or Other Market Economies, a recent review of currently available but fragmentary data suggests that the rate of growth of consumption in both 1987 and 1988 was probably higher than was estimated in the last *Outlook*. It is now estimated that petroleum demand by the Other Market Economies increased by 460,000 barrels per day to almost 13.3 million barrels per day in 1987, and increased by another 400,000 barrels per day in 1988. Most of this growth occurred in the non-OPEC developing countries, such as South Korea, India, Egypt, Taiwan, Thailand, and Singapore.

One result of these upward revisions in consumption is that it now seems likely that petroleum demand by the Market Economies averaged almost 50.3 million barrels per day in 1988, an increase of over 1.2 million barrels per day, or 2.5 percent, from the 1987 rate (Table 1 on page 3). This rate of consumption for 1988 is also 480,000 barrels per day higher than that estimated in the last *Outlook*. A second result is that it now appears that the world oil market was reasonably balanced at the end of the third quarter of 1988. This would explain why stocks of oil on land did not increase sharply in the fourth quarter. Also, it would imply that a stock overhang will not become evident on land until the truly excessive OPEC production from November and December works its way through the transportation system. The size and time of arrival of this stock overhang will, in turn, help to determine the magnitude and timing of any weakening in oil prices in 1989. Other important determinants of price, which are also subject to varying degrees of uncertainty, include the growth rate of oil consumption, the size of voluntary and involuntary changes in production from non-OPEC oil producers, the level of adherence by OPEC member countries to their new production quotas, and decisions by OPEC members as to the disposition of stocks which they hold.

The price outlook for the near-term is for continued volatility, with weakness beginning by late in the first quarter of 1989, as the seasonal decline in refiner demand coincides with the arrival on land of November and December production. This weakness should occur, even if OPEC production is only modestly above the new production ceiling, and it will probably continue into the third quarter.

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

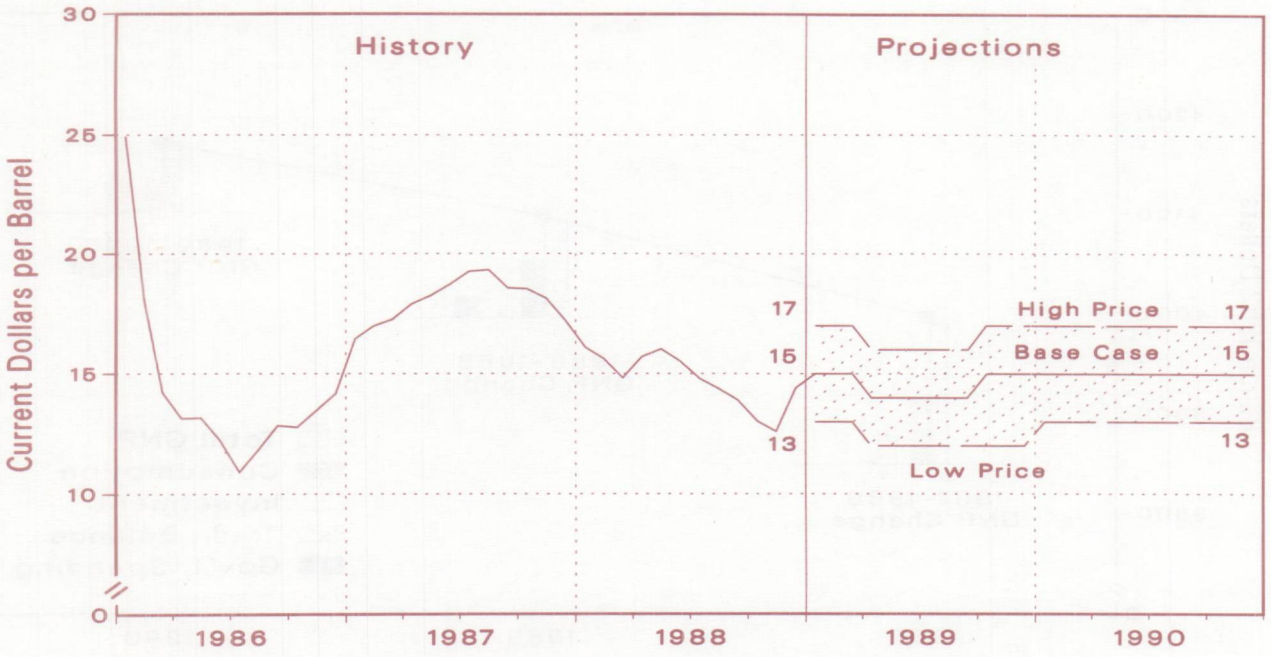
The demand for petroleum products by the Market Economies is expected to average 51.2 million barrels per day in 1989, an increase of 870,000 barrels per day, or 1.7 percent, from the 1988 rate (Table 2 on page 39). In 1990, demand is expected to increase by 810,000 barrels per day, or 1.6 percent.

- Petroleum demand by the OECD countries is expected to average over 37.1 million barrels per day in 1989, an increase of 530,000 barrels per day, or 1.4 percent. This increase is based on the assumption that the OECD economies will grow at a 2.8 percent rate in 1989, down sharply from the 3.9 percent rate for 1988 (Table 3 on page 39). Europe and the United States are expected to account for about one-half and one-third, respectively, of this increase. In 1990, as a result of a further slowing in OECD economic growth to 2.4 percent, petroleum demand is expected to increase by only 380,000 barrels per day, or 1.0 percent. In the Other Market Economies, petroleum demand is expected to increase by about 330,000 barrels per day, or 2.4 percent, in 1989, and by a further 440,000 barrels per day, or 3.1 percent, in 1990.

- Oil production from the non-OPEC market economies should increase by about 130,000 barrels per day in 1989, followed by a larger increase of 240,000 barrels per day in 1990 (Table 2). These production projections assume that: (1) production from the non-Piper Alpha fields of the Flotta System and from the Fulmar, Auk, and Clyde fields in the United Kingdom's sector of the North Sea will be restored by the second quarter of 1989; and (2) Colombian production will no longer be affected by sabotage efforts. In 1989, significant production increases from Norway (280,000 barrels per day) and Colombia (70,000 barrels per day) will be more than offset by declines from the United States (280,000 barrels per day) and the United Kingdom (140,000 barrels per day). In 1990, production increases of about 100,000 barrels per day are expected from Colombia and North Yemen, while Syrian production is expected to increase by about 70,000 barrels per day.

- The forecast detailed above implies OPEC oil production in 1989 of over 20.8 million barrels per day, or 500,000 barrels per day below the rate for 1988. In 1990, OPEC production will probably increase, given the desire of Iraq and Gabon to use their new export and/or production capacities and of other member countries to increase revenues. 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(88/10) (Washington, DC, 1989). • Projections: Table 4.

World Oil Prices

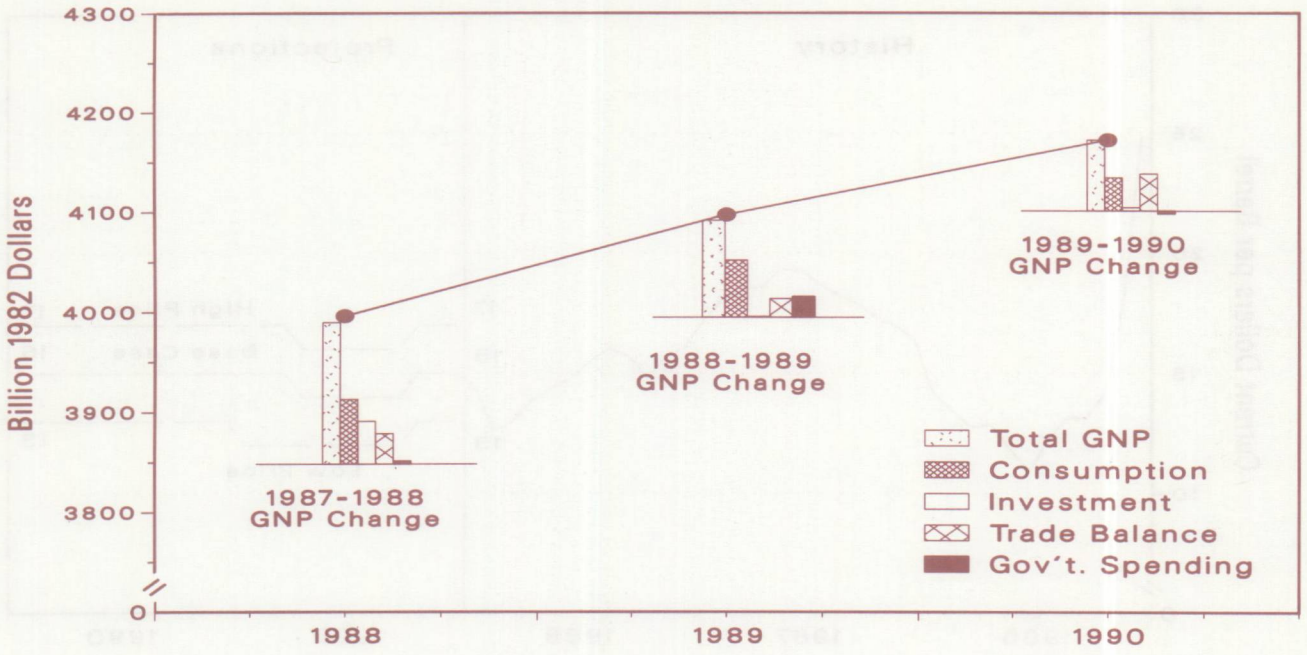
One of the most uncertain factors affecting the domestic short-term energy outlook is the world oil price, defined here as the nominal price of imported crude oil delivered to U.S. refiners. Because of this uncertainty, three different world oil price scenarios are employed (Figure 2). These scenarios 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 40).

- In the base oil price scenario, the world oil price increases from about $13.35 per barrel in the fourth quarter of 1988 to $15.00 in the first quarter of 1989, decreases to $14.00 in the second and third quarters, increases to $15.00 in the fourth quarter of 1989, and remains at this level through 1990. This scenario is based on the assumption that OPEC crude oil production, while remaining only modestly above the new production ceiling in the first half of 1989, increases during the second half of the year and in 1990 whether or not OPEC agrees to raise the ceiling. At the same time, the growth rate of oil consumption is lower in both years, in line with lower economic growth in the developed countries and high stock levels until the end of the forecast period.

- In the low oil price scenario, the world oil price decreases to $13.00 per barrel in the first quarter of 1989 and then to $12.00 for the remainder of 1989. In 1990, the oil price increases to $13.00. In this scenario, it is assumed that, after the first quarter of 1989, a combination of OPEC overproduction, a continuing stock overhang, and very slow growth in oil consumption, as a result of sharply lower economic growth, keep oil prices at a low level. This level is not low enough, however, to force OPEC to agree on and/or to implement production restraints capable of lifting prices significantly.

- In the high oil price scenario, the world oil price increases to $17.00 per barrel in the first quarter of 1989, decreases to $16.00 in the second and third quarters, and then increases to $17.00 for the remainder of the forecast period. In this scenario, it is assumed that OPEC producers generally adhere to their production agreements and that oil consumption growth remains strong, as a result of continued high economic growth. As a result, much of the oil stock overhang is worked off by the end of the third quarter of 1989.

Figure 3. Real GNP and Components of Change



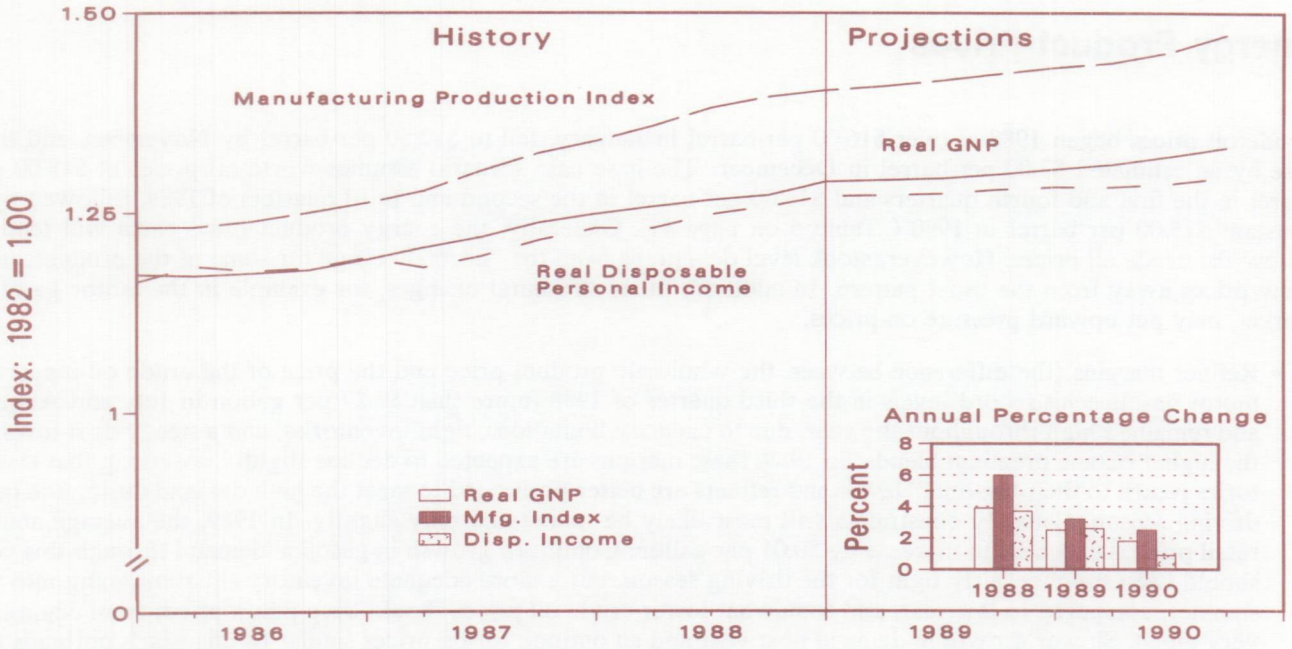
Sources: • History: Bureau of Economic Analysis, U.S. Department of Commerce, *Survey of Current Business*, December 1988; Federal Reserve System, *Statistical Release G.12.3*, December 1988.• Projections: Table 4.

Macroeconomic Activity

The economy expanded at a rate of 3.9 percent in 1988, due largely to the long-awaited benefits of the dollar depreciation which began in 1985. Export-led increases in demand brought remarkably high industrial capacity utilization and an investment boom which resulted in large increases in outlays for nonresidential structures and producers' durable equipment. Growth over the next 2 years, however, is expected to be less robust, as trade sector growth wanes, interest rates rise, and the general inflation rate accelerates (Table 4 on page 40 and Figure 3).

- After an estimated 3.9-percent improvement in real gross national product (GNP) in 1988, a gradual slowing of the economy is anticipated for 1989, with GNP growth at 2.5 percent. In 1990, it declines to 1.8 percent, following the traditional business cycle. Investment in the trade and service sectors is expected to slow because of relatively stable growth in demand for consumer goods and slower growth in exports. The forecast does not expect recent highs in export growth (13 percent in 1987 and 18 percent in 1988) to continue into 1989 and 1990.
- Consumption continues to play a key role in economic growth through 1989, increasing by 2.3 percent. The lagged effect of lower wage and commodity price inflation during 1987 and 1988 on real disposable income keeps consumer confidence and spending relatively high. By 1990, however, consumer price inflation should accelerate enough to reduce real wage growth significantly, weaken confidence, and slow real consumer spending to only 1.3 percent.
- It is unlikely that investment will experience high growth in 1989 amidst weaker export growth, increased uncertainty from higher expected inflation, and rising interest rates. After registering healthy growth of 6.7 percent in 1988, improvement in total investment slows to 0.1 percent in 1989 and 0.5 percent in 1990. Declines in nonresidential, fixed investment, and inventory accumulation are the expected causes of this stagnation.

Figure 4. Indices of Economic Activity



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

- The gradual moderation in final demand leads manufacturing industries to experience slower growth, as well (Figure 4). The index of industrial production is expected to increase by 3.2 percent in 1989 and 2.5 percent in 1990, compared to a robust 6.0 percent estimated for 1988.
- Real disposable income should rise by 2.6 percent in 1989, but soften considerably in 1990 (to 0.9 percent growth), following the pattern of GNP.

Energy Product Prices

Crude oil prices began 1988 at over $16.00 per barrel in January, fell to $12.50 per barrel by November, and then rose by an estimated $2.00 per barrel in December. The base case scenario assumes world oil prices of $15.00 per barrel in the first and fourth quarters and $14.00 per barrel in the second and third quarters of 1989, followed by a constant $15.00 per barrel in 1990 (Table 5 on page 41). Generally, the energy product price paths will tend to follow the crude oil prices. However, stock level deviations from the "normal" range for some of the products may skew prices away from the usual pattern. In addition, other structural changes, for example in the motor gasoline market, may put upward pressure on prices.

- Refiner margins (the difference between the wholesale product price and the price of the crude oil input) for motor gasoline hit record levels in the third quarter of 1988 (more than $0.27 per gallon in July and August) and remained high throughout the year, due to capacity limitations, tight inventories, and a steady drift towards the higher octane premium blends. In 1989, these margins are expected to decline slightly, assuming that inventories return to their "normal" levels and refiners are better positioned to meet the high demand during the peak driving season. Capacity constraints will most likely be moderated only slightly. In 1989, the average annual retail price is expected to increase by $0.01 per gallon. Continued growth in gasoline demand through this year should keep supplies fairly tight for the driving season, but a more adequate inventory situation going into the summer, compared to last year, and somewhat lower crude oil prices should keep pump prices from edging up very much. Slower growth in demand next year and an outlook for oil prices similar to this year's portends flat retail gasoline prices in 1990. These projections assume no significant increases in average state or local excise taxes on gasoline throughout the forecast.

- At $0.84 per gallon, retail heating oil prices are expected to be as high for the first quarter this year as they were last year, if only because stocks going into this winter were somewhat lower than last year. Heating oil demand should be lower this winter than last, assuming normal weather, but diesel demand remains strong, maintaining pressure on the distillate market generally. Beyond the first quarter, normal seasonal movements in heating oil prices are expected. For 1990, heating oil prices should edge up slightly as continued, though moderate distillate demand growth keeps the domestic market firm.

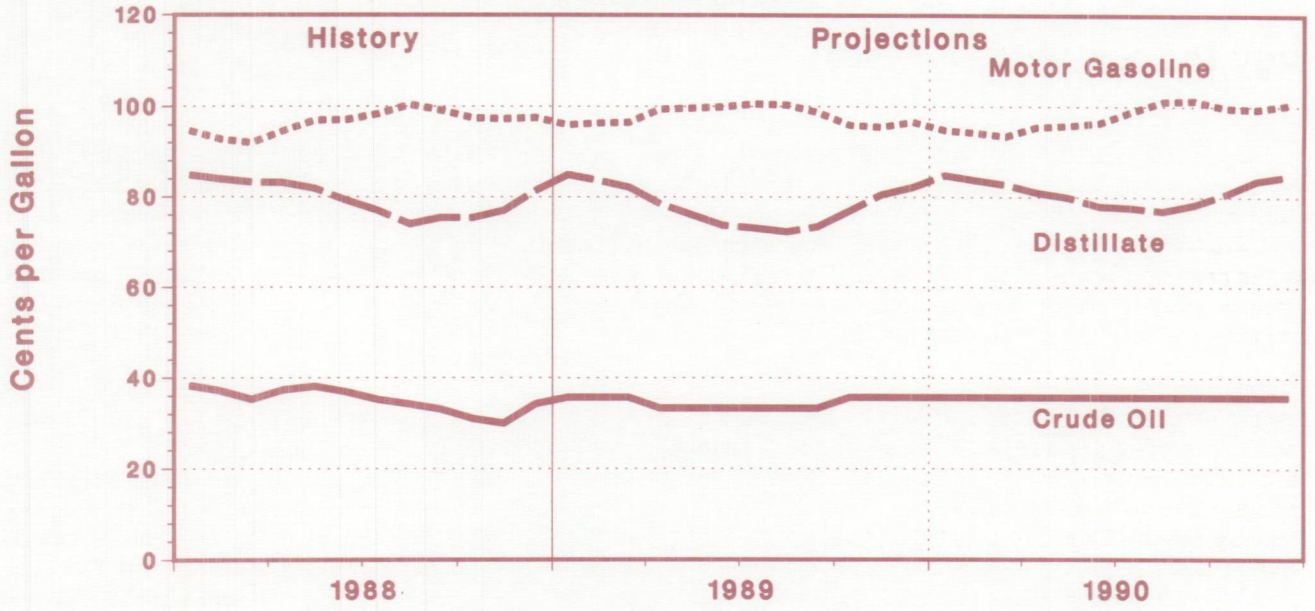
- At the national level, the price ratio of residual fuel oil to natural gas consumed at electric utilities was estimated to be 1.08 in 1988 and is expected to decrease slightly to 1.06 in 1989 and to 1.04 in 1990 (Figure 6). Only in 1986 was this ratio lower on an annual average basis, at 1.02.[1] In the second and third quarters of that year, the ratio actually fell below 1.0, which explains much of the resurgence in residual fuel demand in 1986. While gas prices are not expected to become as uncompetitive as they did in 1986 in the current outlook, it is true that some East Coast utilities were finding very good prices for oil late last year. For example, the Consolidated Edison Company of New York paid an average of $2.26 per million Btu for 0.25-sulfur residual fuel oil versus $2.34 for natural gas in September 1988 but paid $2.93 for similar grade residual fuel oil and $2.83 for natural gas in September 1987.[2] Other electric utilities experienced the same or even greater price differentials. Under such circumstances, electric utilities will thus favor oil for generating electricity. While it is estimated that utility oil consumption jumped significantly during late 1988 and early 1989, with oil prices having recovered sharply since November, this gas-to-oil switching is not expected to last past February.

- Natural gas spot prices climbed steadily from $1.30 per thousand cubic feet in May 1988 to $1.88 per thousand cubic feet in November.[3] Part of the price increase was seasonal, but a great deal was countercyclical to normal patterns caused by the summer increase in consumption at electric utilities. Strong industrial sector demand has been pushing up spot prices, as well. Low-sulfur fuel oil prices tend to constrain natural gas prices, and the projected rise in crude oil prices is likely to lead to an increase in utility gas prices of about $0.06 per million Btu in 1989 and $0.09 per million Btu in 1990.

- After remaining essentially flat in 1988, residential electricity prices seem likely to rise modestly by 1990. The cause is a higher interest rate that translates into higher plant investment costs for utilities. These additional costs are mitigated, however, by expectations for very moderate growth in average fuel prices, particularly for coal.

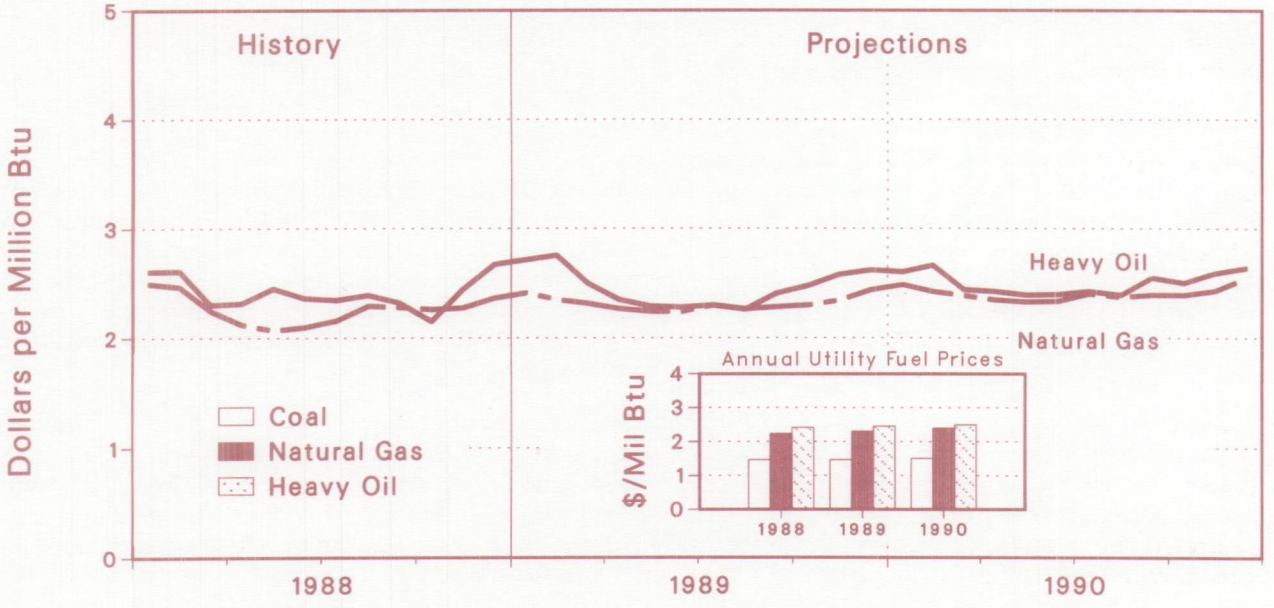
[1]Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(88/10) (Washington, DC), Table 9.10.
[2]Energy Information Administration, *Electric Power Quarterly,* DOE/EIA(87/3Q,88/3Q) (Washington, DC), Table 14.
[3] *Natural Gas Intelligence,* May 16, 1988, and December 5, 1988, issues. This price represents the average high and low spot price quotations for the southwestern regions (Texas and Gulf, Oklahoma, and Louisiana).

Figure 5. Motor Gasoline and Distillate Prices

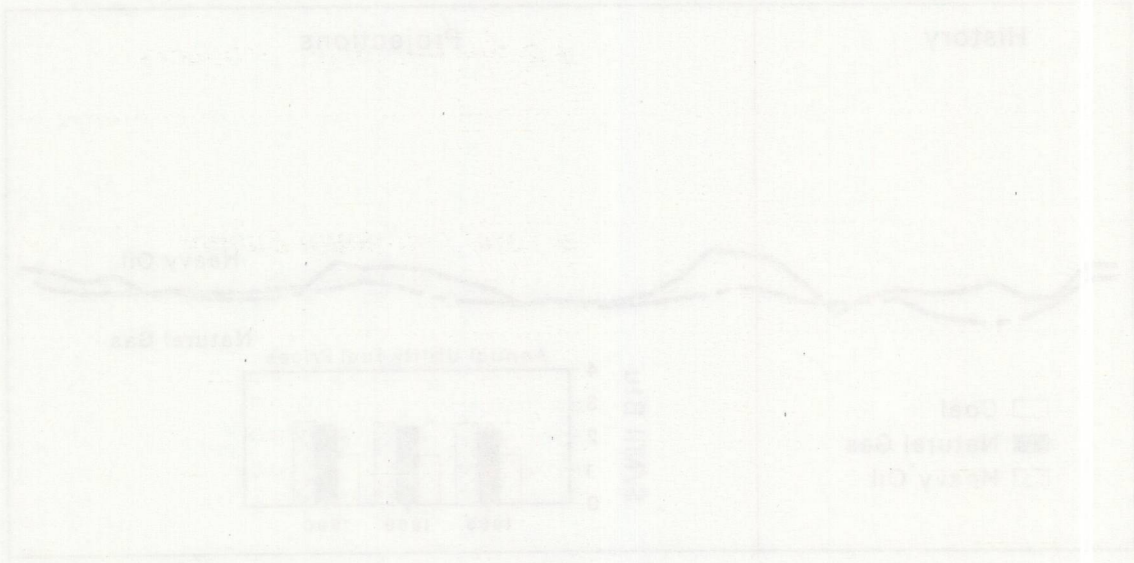


Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, 1989). • Projections: Table 5.

Figure 6. Utility Fossil Fuel Prices



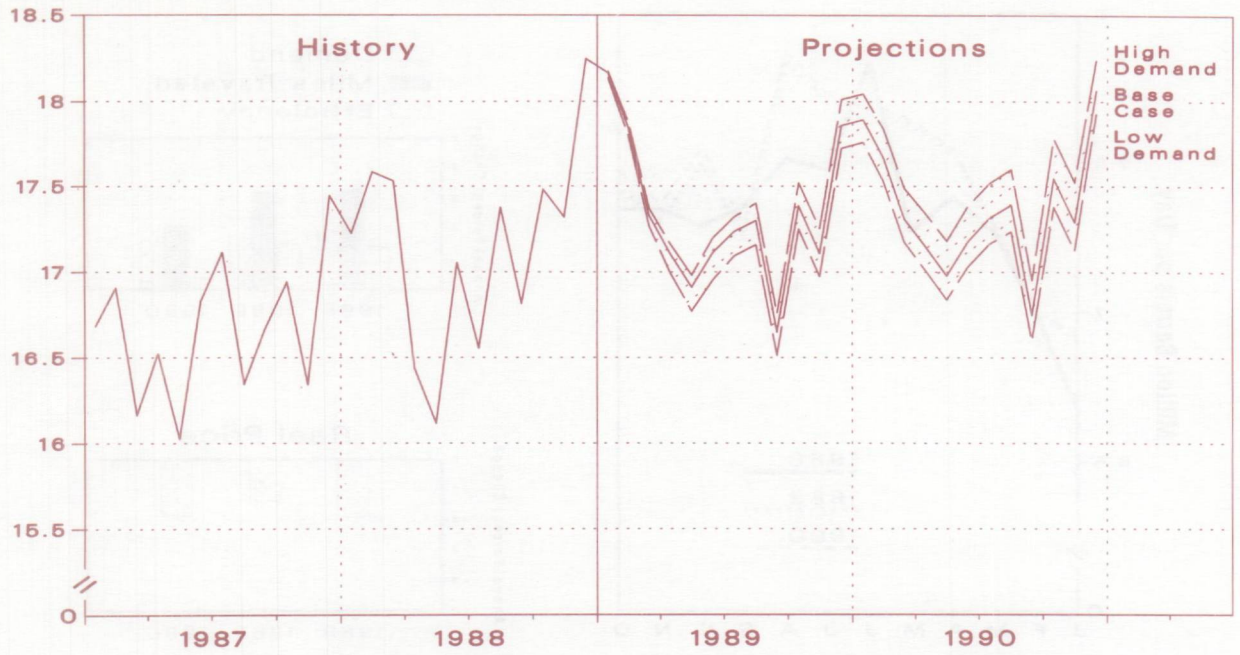
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, 1989). • Projections: Table 5.



U.S. Petroleum Outlook

- *Total Petroleum Demand*
- *Motor Gasoline*
- *Distillate Fuel Oil*
- *Residual Fuel Oil*
- *Other Petroleum Products*
- *Total Petroleum Supply*

Figure 7. Total Petroleum Demand



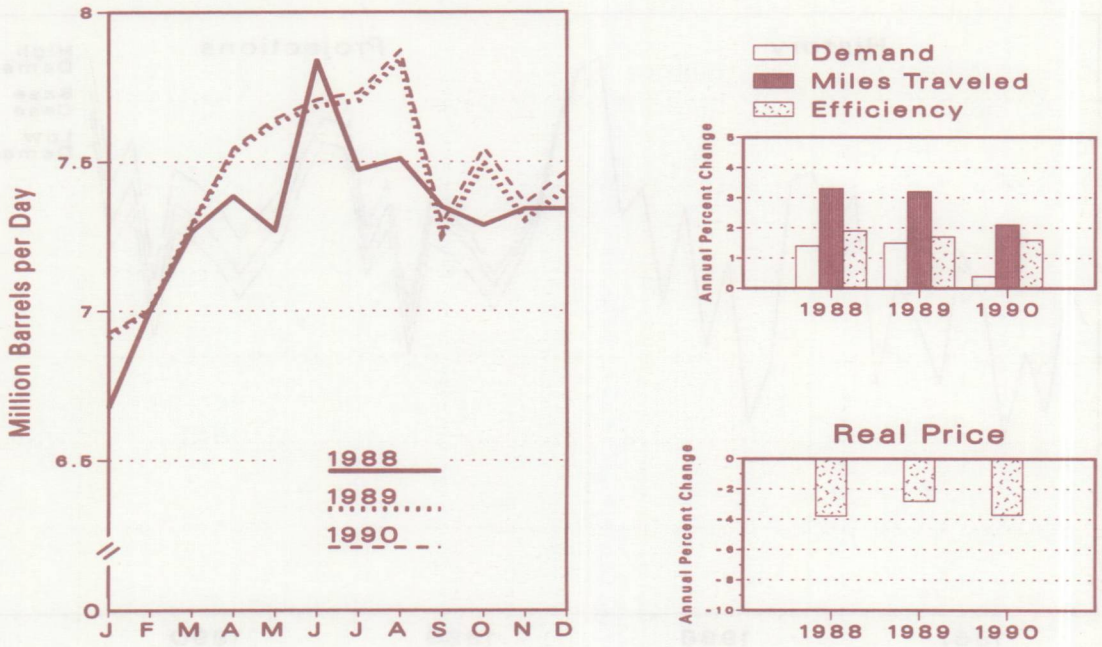
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, 1989). • Projections: Tables 6, 8, and 9.

Total Petroleum Demand

Total petroleum demand increased at an estimated rate of 2.9 percent in 1988, with all major product categories increasing together for only the second time since 1977 (Table 6 on page 42 and Figure 7). Strong growth in the major transportation-related fuels (motor gasoline, jet fuel, and distillate for diesel fuel use) accounted for about 50 percent of the total growth. This sector will continue to be the main source of growth in petroleum use through 1990. Total petroleum use is expected to increase by an additional 1.0 percent in 1989 but slow to under 0.3 percent in 1990. Growth will be distributed to all fuel categories, except residual fuel oil. A decline is foreseen for this fuel largely because of the assumption that hydropower availability will recover to near normal levels by late 1989.

- The latest estimate of 1988 petroleum product supplied is 17.15 million barrels per day, the highest annual average demand level since 1979. Although about 15 percent of the total petroleum growth between 1987 and 1988 can be attributed to weather changes or other transitory factors, additional growth of about 180,000 barrels per day is projected for 1989. By 1990, small increases in real energy prices and the cumulative effect of sharply reduced economic growth rates should reduce overall demand growth to about 50,000 barrels per day.
- Residual fuel oil enjoyed a resurgence in domestic use in 1988 that was partially the result of record summer electricity demands, but was also a reflection of the competitive prices for oil in the boiler fuel market, particularly late in the year. Thus, residual fuel product supplied grew by 4.8 percent overall, but by about 24 percent between the third and fourth quarters of 1988. A return to more competitive gas prices and increased use of coal and hydroelectric resources at electric utilities are likely to constrain additional residual fuel oil use, shifting demand trends for this fuel downward.

Figure 8. Motor Gasoline Demand and Components



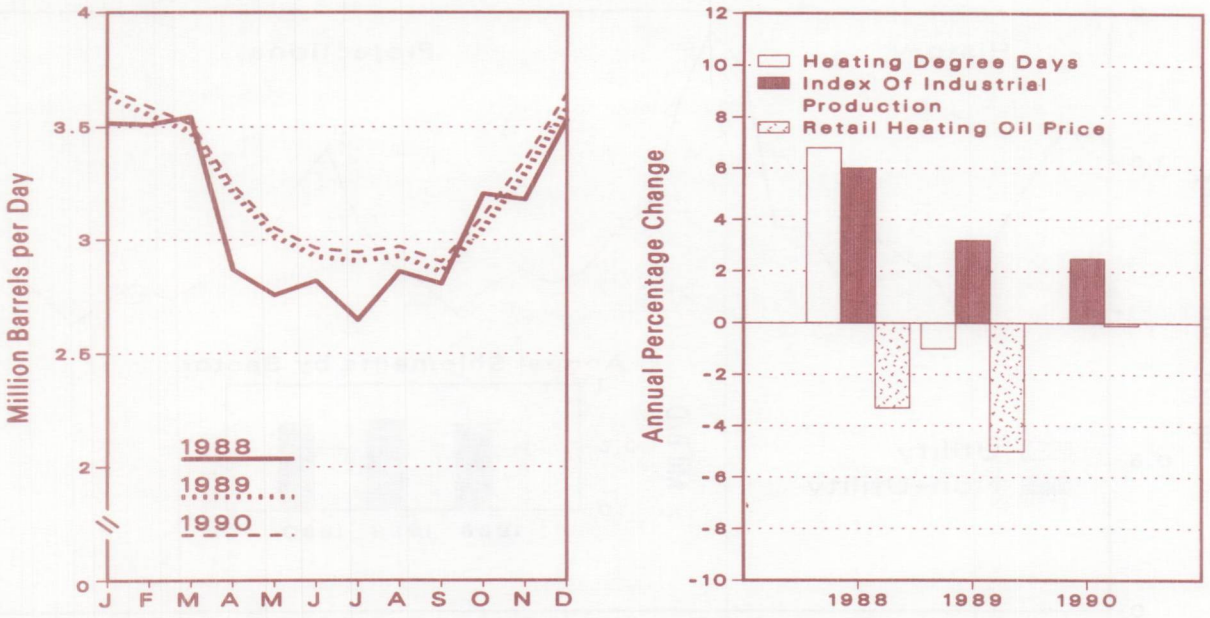
Note: Projections begin in the first quarter of 1989.
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, 1989). • Projections: Table 10.

Motor Gasoline

Growth in the demand for motor gasoline was 1.4 percent in 1988 after climbing 2.6 percent during the previous year (Table 10 on page 46). Travel growth is estimated to have reached an average of about 3.3 percent last year. This indicates that average vehicle efficiency increased by about 1.9 percent. Travel growth will remain at about the 1988 level in 1989 as continued declines in real fuel prices offset slower economic growth (Figure 8). By 1990, much slower growth in the economy and relatively flat real fuel prices are expected to keep gasoline demand growth to well below 1 percent. Nevertheless, motor gasoline demand is expected to reach 7.45 million barrels per day in 1990, exceeding the previous record of 7.41 million barrels per day set in 1978. The levels of demand for gasoline (and other petroleum products) projected over the next 2 years imply continued high domestic refinery utilization rates and, more than likely, high profit margins for domestic petroleum companies in downstream operations (see "Recent Financial Developments and Outlook," page 34).

- Gasoline demand increased by about 100,000 barrels per day in 1988, to an average level of 7.31 million barrels per day. An additional 110,000 barrels per day is projected for 1989, on average, with next year's growth being concentrated in the spring and summer quarters. Sustained low real fuel prices and continued growth in economic activity affecting personal and business motor vehicle travel is expected to yield another very busy driving season next year. By 1990, domestic gasoline demand is expected to grow at a very slow rate, as little impetus for motor vehicle travel growth is expected. Fleet efficiency gains will continue as new cars replace older, less efficient models.
- In 1988, net imports of motor gasoline increased by about 20,000 barrels per day. The limited potential for expanding domestic gasoline yields at refineries probably implies that an additional 100,000 to 110,000 barrels per day will be imported in 1989 and 1990, respectively.

Figure 9. Distillate Fuel Oil Demand



Note: Projections begin with the first quarter of 1989. Real heating oil prices are defined as retail No. 2 heating oil prices divided by the GNP deflator.

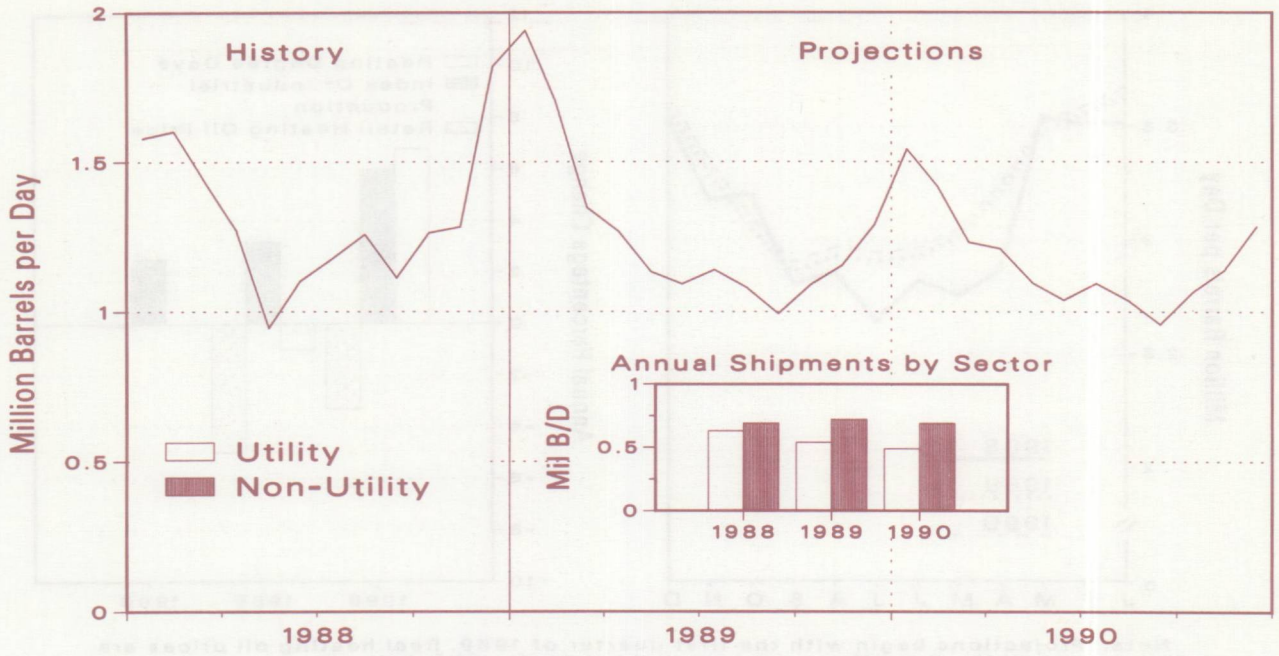
Sources: • History: Energy Information Administration, *Electric Power Monthly*, DOE/EIA-0226(88/10) and *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, 1989). • Projections: Table 11.

Distillate Fuel Oil

In 1988, distillate demand averaged 3.10 million barrels per day, a 4.0 percent rate of growth over the 1987 level (Table 11 on page 47 and Figure 9). Colder weather, growth in manufacturing, and favorable consumer prices played a significant role in this increase, and all demand sectors exhibited strong growth. Assuming normal weather and moderate gains in manufacturing leads to an average growth rate of 2.4 percent through 1990.

- Much of the gain in 1988 was due to increased demand for diesel fuel in trucking transportation. Overall, transportation demand for diesel fuel in 1988 increased by an estimated 3.2 percent over the 1987 level. Annual demand growth slows somewhat during 1989 and 1990, due to slower rates of industrial growth. Transportation demand accounts for almost 60 percent of distillate demand growth in 1989 and 1990, compared with 30 percent of 1988 growth.
- Relatively cold weather boosted residential and commercial demand for distillate heating oil during 1988. Demand increased an estimated 4.8 percent from the 1987 level. Assuming normal weather patterns, this sector's demand is expected to remain at the 1988 level during 1989 and 1990. The combined residential and commercial share of total distillate demand will drop slightly to about 25 percent of total demand.
- Industrial use of distillate in 1988 showed an estimated increase of 13 percent over the 1987 level. This sector accounted for almost 50 percent of distillate growth in 1988, even though it comprises less than 25 percent of the distillate market. Increased heating usage and manufacturing production contributed to demand growth. Industrial demand for distillate is projected to grow by 25,000 barrels per day in each year of the forecast period.

Figure 10. Residual Fuel Oil Demand



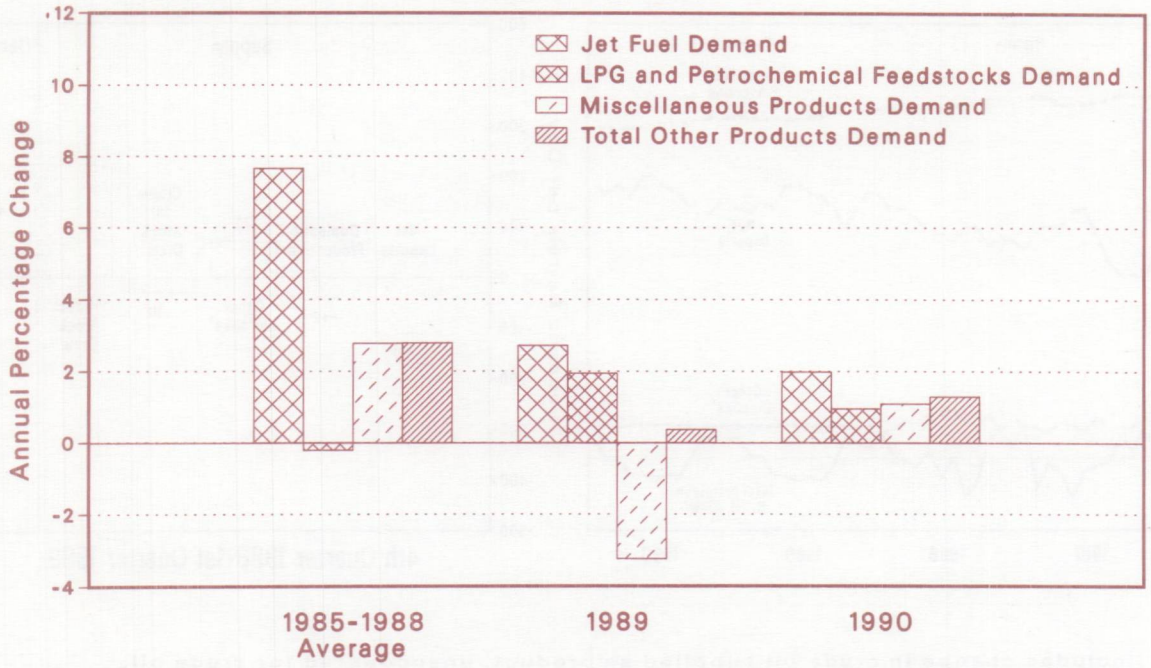
Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, 1989). • Projections: Table 12.

Residual Fuel Oil

Total residual fuel oil consumption is estimated to have increased by 4.8 percent in 1988 compared to 1987 levels (Table 12 on page 48). The increase was concentrated almost exclusively in the electric utility sector. In 1989, total consumption is expected to decrease by 3.8 percent, as more normal weather conditions are assumed and less incentives for switching to oil at utilities is present. In 1990, the rate of decline should accelerate to 7.9 percent.

- Shipments of residual fuel oil to electric utilities were an estimated 26 percent higher in 1988 compared to 1987, due to cold winter months and an exceedingly hot and dry third quarter. In the fourth quarter of 1988, electric utility consumption was an estimated 66 percent above year earlier levels, as many utilities switched from natural gas to residual fuel quite significantly. Imports of residual fuel in the last 2 weeks of 1988 have averaged over 1 million barrels per day, indicative of the willingness of electric utilities to use oil so far this winter. In 1989, shipments to electric utilities should drop by about 14 percent on an annual basis, due to an assumption of normal weather and reduced fuel switching by utilities.
- Industrial and bunker demand in 1988 is estimated to have been about 10 percent lower than the previous years' level primarily due to the big difference in the third quarter where apparent switching to natural gas in the industrial sector displaced residual fuel.
- In 1989, the assumption of normal winter weather should partially offset an expected increase in industrial production, resulting in a 4.3-percent increase in nonutility shipments.
- In 1990, nonutility residual fuel oil demand is expected to fall by 4.2 percent from the previous year's level, as natural gas should still maintain a slight price advantage.

Figure 11. Other Petroleum Products Demand



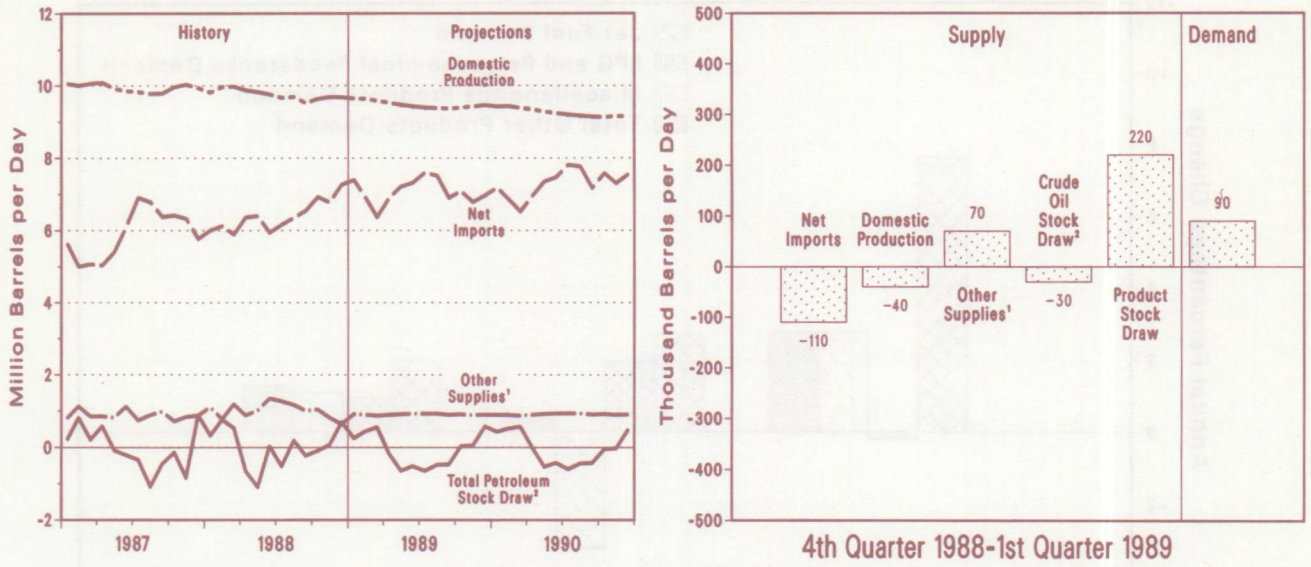
Sources: • History: Energy Information Administration, *Petroleum Supply Monthly*, DOE/EIA-0109(88/10) (Washington, DC, 1989). • Projections: Table 13.

Other Petroleum Products

Total demand for other petroleum products, including jet fuel, liquefied petroleum gas, and miscellaneous products increased by about 3.7 percent in 1988, and is expected to show only modest additional gains throughout the forecast (Table 13 on page 49 and Figure 11). Slower air traffic growth and lower industrial growth rates, as well as assumptions of normal weather, are expected to yield only 90,000 barrels per day greater demand between 1988 and 1990.

- Jet fuel demand, after exhibiting an estimated 6.5-percent growth in 1988, is expected to grow by 2.7 percent in 1989 and 2.0 percent in 1990. Signs of slackening growth in air traffic appeared in 1988. This trend is expected to continue through 1990, due to slower economic growth and higher ticket prices. Revenue ton-miles (a measure of air traffic) is expected to grow by 4.7 percent in 1989 and 1.6 percent in 1990. Although the airlines have ordered a record number of new aircraft in 1988, the resulting increases in overall fleet efficiency are not anticipated until after the forecast period.
- Demand for liquefied petroleum gas grew 3.1 percent during 1988, to 1.66 million barrels per day. Propane demand declined (although cold weather increased its use as a heating fuel), because producers of basic chemicals opted for ethane feedstocks. Ethane demand had a second straight year of strong demand growth, due to its use as a petrochemical feedstock. Ethane demand is expected to gradually decline throughout 1989 and 1990, as chemical producers switch more to oil-based feedstock. Overall, demand for liquefied petroleum gas is projected to remain close to its 1988 level during 1989 and 1990.
- Demand for oil-based petrochemical feedstock declined by 50,000 barrels per day during 1988, to a level of 390,000 barrels per day, despite almost a 9.0-percent increase in overall chemical production and favorable prices of this feedstock compared with liquefied petroleum gas feedstock. With favorable prices projected through 1990, and continued strong growth in chemical production, oil-based feedstock is expected to gradually increase to just above its 1987 demand level by the end of 1990.
- Demand for other miscellaneous products is estimated to have grown by 6.3 percent in 1988. Demand for most products remained flat except for the strong growth exhibited by petroleum coke and still gas used in refinery operations. These last two products benefited, in part, from an increased rate of refinery production. Overall, demand for miscellaneous products (including oil-based petrochemical feedstocks) is expected to remain at about the 1988 level during 1989, and show over 2 percent growth in 1990.

Figure 12. Changes in Sources of Petroleum Supply



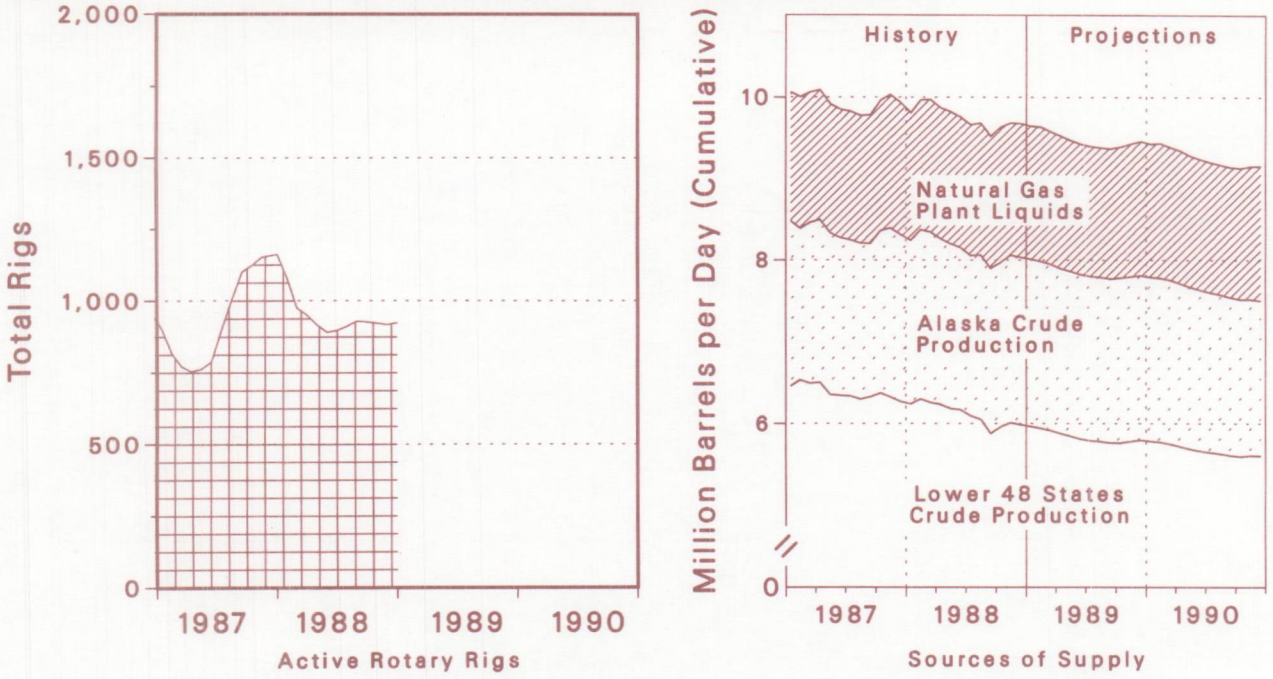
¹ Includes change in crude oil supplied as product, unaccounted for crude oil, other hydrocarbon inputs, and refinery gains.
² Includes change in Strategic Petroleum Reserve build rate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual, 1987*, DOE/EIA-0340(87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1988 to October 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-50,51,52) (Washington, DC). • Projections: Table 6.

Total Petroleum Supply

The short-term outlook for sources of petroleum supply needed to meet forecasted demand levels includes significant increases in both crude oil and refined product imports (Table 6 on page 42 and Figure 12). Little change in crude oil stocks is forecast, but stock drawdowns of distillate and liquefied petroleum gases (primarily propane) in the first quarter of 1989 are expected to help meet winter heating requirements for those fuels. High domestic refinery utilization rates should continue through 1990.

- U.S. net imports of crude oil (including the Strategic Petroleum Reserve) and petroleum imports are expected to continue rising through 1990, reaching 7.30 million barrels per day or 42 percent of domestic consumption.
- With domestic refinery utilization rates averaging a relatively high 84 percent in 1988 and with no significant additions to refinery capacity assumed for the next 2 years, a growing share of supply is expected to come from refined product imports. Net imports of refined products are forecast to increase by 12 percent in 1989.
- Crude oil inventories, which were drawn down from 349 million barrels at the end of 1987 (excluding the Strategic Petroleum Reserve) to 333 million barrels by the end of 1988, are expected to change little from that level over the forecast. This outlook is consistent with the view that no large increases in oil prices or instability in world oil markets will occur in the short term.
- Changes in total petroleum inventories are driven mainly by seasonal movements in refined product stocks. In the first quarter 1989 this movement is dominated by withdrawals of distillate, liquefied petroleum gas, and other oils stocks.

Figure 13. Components of Domestic Petroleum Production



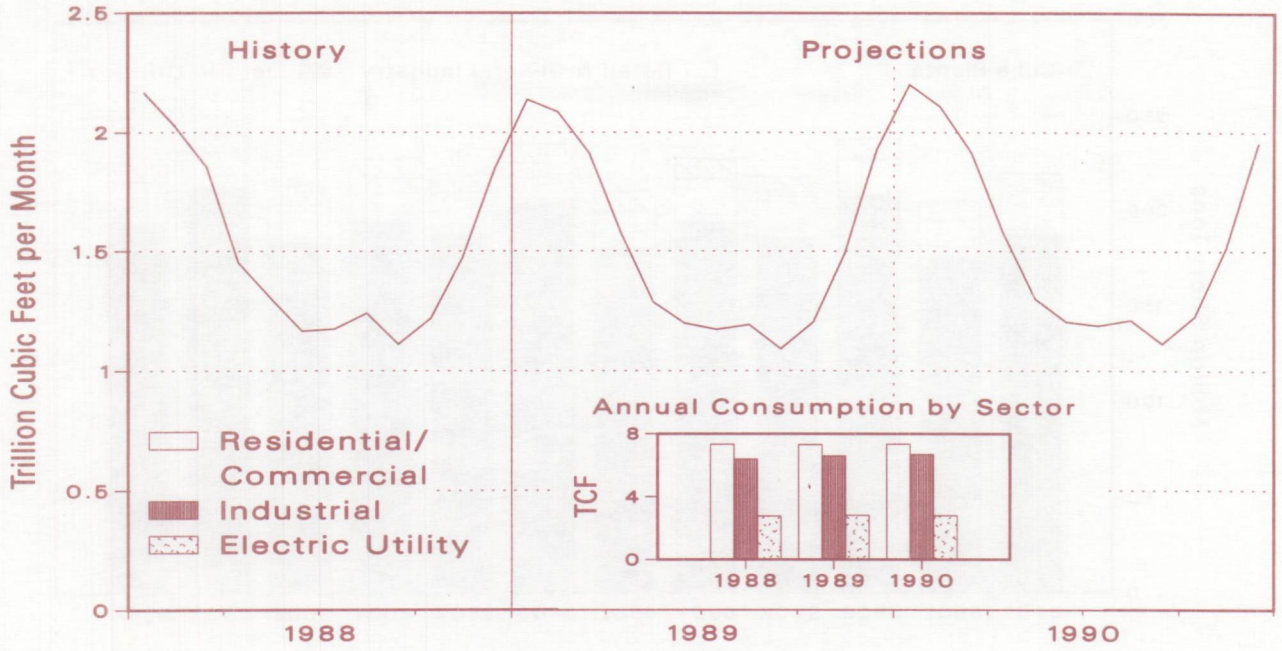
Note: Crude oil production includes lease condensate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual, 1987*, DOE/EIA-0340(87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1988 to October 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-50,51,52)(Washington, DC). • Projections: Table 6.

- Distillate stocks ended 1988 at 124 million barrels, or about 11 million barrels below the year-earlier level. With increased net imports and increased refinery production of this fuel over the winter, however, stocks at the end of the first quarter 1989 should reach a level comparable to the year-earlier volume of about 90 million barrels--assuming normal weather patterns prevail.
- Total domestic production of crude oil should fall from an average 8.1 million barrels per day in 1988 to under 7.7 million barrels per day in 1990 (Figure 13). By the last quarter of 1990, production may be as low as 7.3 million barrels per day.
- Natural gas plant liquids production, which accounts for 17 percent of total domestic petroleum production, is projected to stay constant in the forecast period.
- Oil production declines are expected in all major regions of the country, including Alaska. One bright spot is the Federal offshore areas of the Pacific and the Gulf of Mexico, although problems with local permits are currently holding back the start up of new production in the Point Arguello field of Southern California.
- A slowdown in the rate of decline for domestic oil production is expected in 1990 in response to higher oil price expectations. Drilling activity declined over 1988 along with weakening oil prices, reaching 924 rigs by December. Exploration and development activity should increase through the forecast period, however, if oil prices increase.

Outlook for Other Major Energy Sources

- *Natural Gas*
- *Coal*
- *Electricity*
- *Electric Utility Fuel Consumption*

Figure 14. 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(88/10) (Washington, DC, 1989). • Projections: Table 14.

Natural Gas

Total natural gas consumption exceeded 18 trillion cubic feet in 1988 (5.3 percent above the 1987 level), the highest level since 1981 according to current estimates. A good part of this growth was driven by the rebounding industrial sector, but residential and commercial demand have performed similarly. It is estimated that, for the combined residential and commercial sectors, 75 percent of the 1988 growth was due to the weather. Discount spot market prices and gas-fired cogeneration have also contributed to this recent surge, particularly in the industrial sector. Projected growth for 1989 and 1990 is about 1.0 percent per year as the economy weakens and normal weather returns (Table 14 on page 50 and Figure 14).

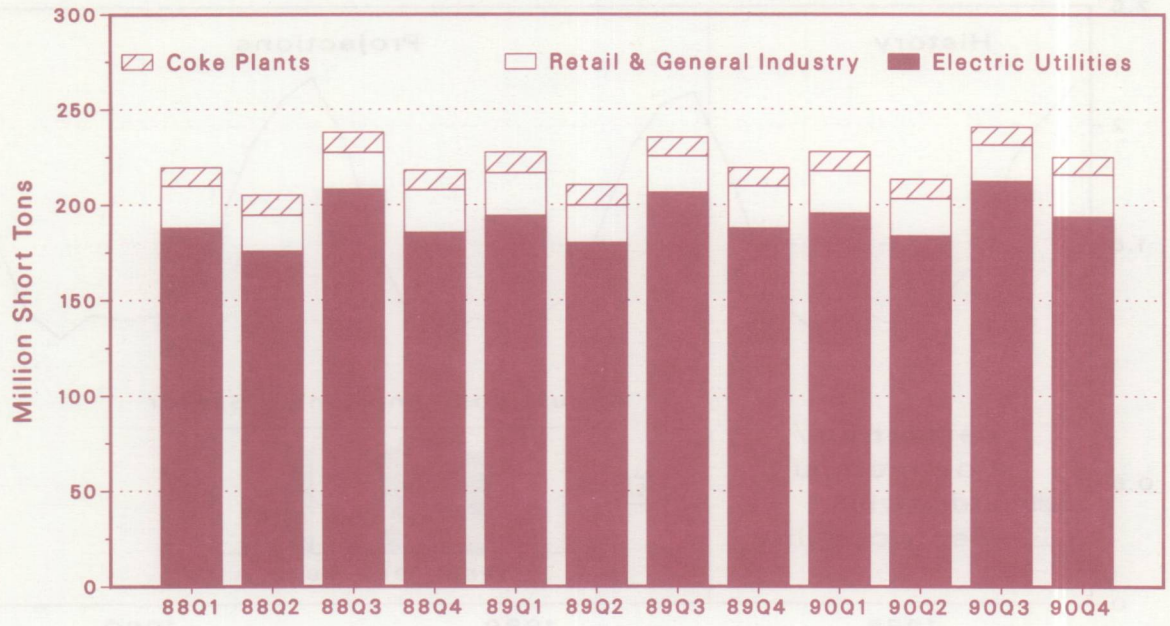
- By 1988, natural gas appeared to have regained much of the industrial and utility volumes that it lost to fuel oil when oil prices fell steeply in 1986. Increased competition from gas transported under open-access programs accounted for much of the recaptured sales in 1987. The combination of falling oil prices and rising gas prices, however, had given residual oil the edge in the dual-fired boiler fuel market by late 1988. This situation is not expected to continue throughout the forecast, and gas is expected to remain competitive and in adequate supply.

- Residential natural gas use increased an estimated 8.0 percent in 1988, largely because of colder weather in the first quarter. Consumption projections for 1989 and 1990 that exhibit almost no growth assume a return to normal weather conditions, which more than offsets the projected 1.8-percent annual growth in residential gas customers.

- Commercial natural gas use jumped by almost 11 percent in 1988 due to the weather and to lower real gas prices. The subsequent demand slowdown would be due to the return to normal weather and somewhat higher real gas prices, notwithstanding a steady 2.5-percent annual projected increase in commercial gas hookups.

- In the industrial market, the American Gas Association reports that 19 billion cubic feet of gas replaced coal in 1988. This shows that even coal is not immune from competition from natural gas. Industrial use of natural gas grew an estimated 8.2 percent in 1988. The rate of growth dips slightly to 6.3 percent during the first half of 1989. Thereafter, industrial gas use should grow by an average 1.0 percent, as growth in industrial output slows.

Figure 15. Coal Consumption Pattern



Sources: • History: Energy Information Administration, *Quarterly Coal Report*, DOE/EIA-0121(88/3Q) (Washington, DC, 1989). • Projections: Table 15.

Coal

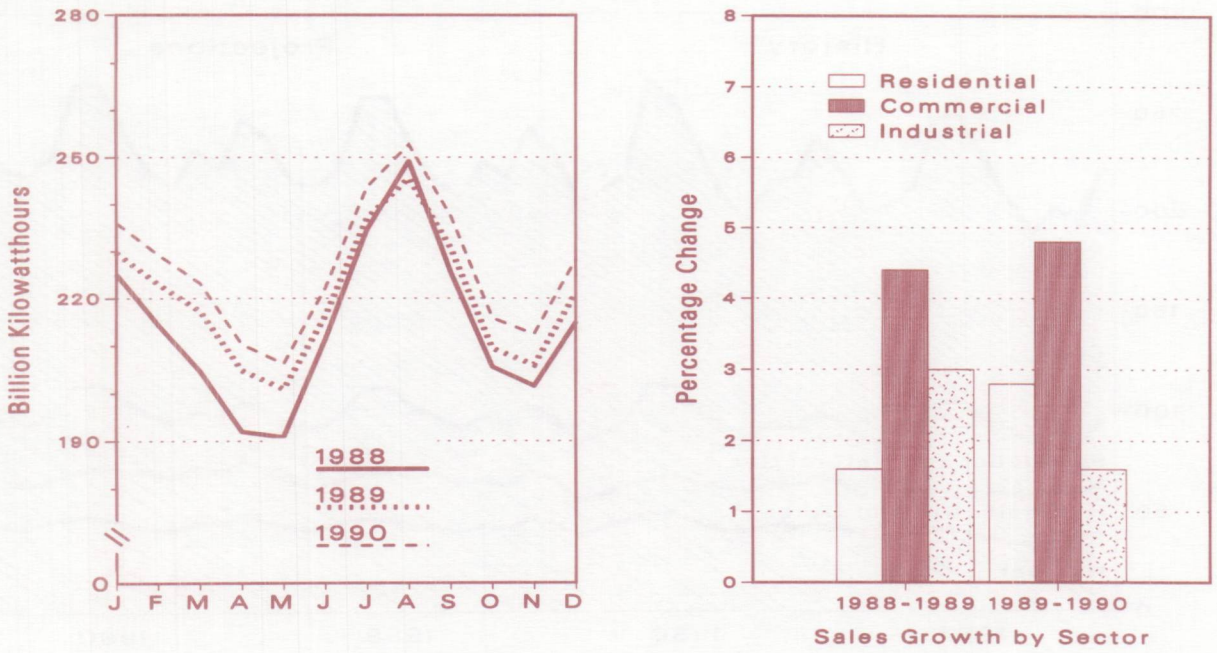
Demand for domestically produced coal (defined as domestic consumption plus U.S. net exports of coal) increased by an estimated 56 million tons (6.2 percent) in 1988, to a record 971 million tons (Table 15 on page 51 and Figure 15). A utility-led jump in domestic consumption of 43 million tons (added to a surge in net exports) kept domestic coal operators busy all year. Unusual circumstances involving the weather and electricity supply contributed significantly to the coal boom of 1988. Prospects for considerably slower economic growth and the assumptions of normal weather and more normal electricity supply patterns in 1989 and 1990 imply sharply reduced growth rates in coal demand for the next 2 years. Nevertheless, continued growth in utility use of coal is likely to push domestic coal production close to 1 billion tons in 1990.

- Adverse weather conditions, low availability of hydroelectric power, and strong growth in the industrial sector pushed domestic coal consumption to an estimated 880 million tons in 1988, 5.1 percent above 1987's amount. It is estimated that about 30 percent of the growth in domestic use in 1988 was due to the combined factors of severe weather and drought (implying reduced hydroelectric output). An expected recovery in hydroelectric generation by mid-1989 and normal weather assumptions will reduce the growth prospects for domestic coal use in 1989. By 1990, lower growth in total electricity use will reduce the pace of growth in coal demand in this sector.

- It is estimated that domestic producers mined 959 million short tons of coal in 1988, an increase of 40 million tons (4.4 percent) over 1987's level. Net stock drawdowns of 15 million tons made up the difference between production and consumption, leaving domestic stocks (primary and secondary) at the lowest levels in 10 years. Production is expected to increase another 33 million tons by 1990 to 992 million, solely on the basis of increased utility demand.

- Although U.S coal exports in 1988 recovered sharply from 1987's level of 80 million tons to 93 million tons (the highest level since 1982), additional growth is not expected for the next 2 years. The surprising export boom in 1988 resulted largely from supply problems for several coal competitors. In 1989, however, expectations of fewer labor-induced disruptions in Australia and Poland, as well as less production problems in Venezuela and Colombia, might reduce the U.S. share of coal supply despite continued strength in world coal demand.

Figure 16. Electricity Demand



Note: Projections begin in the first quarter of 1989.
Sources: • History: Energy Information Administration, *Electric Power Monthly*, DOE/EIA-0226(88/10) and *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, 1989). • Projections: Table 16.

Electricity

Electric power demand should continue to display a healthy pattern of growth through 1990. Despite assumptions of a slowing in the expansion of the domestic economy and normal (hence, milder) weather, electricity sales growth should still approach 3.0 percent in 1989 and 1990 (Table 16 on page 52 and Figure 16). The fundamental basis for continued strength in electricity demand is the trend toward increased electrification in businesses and households.

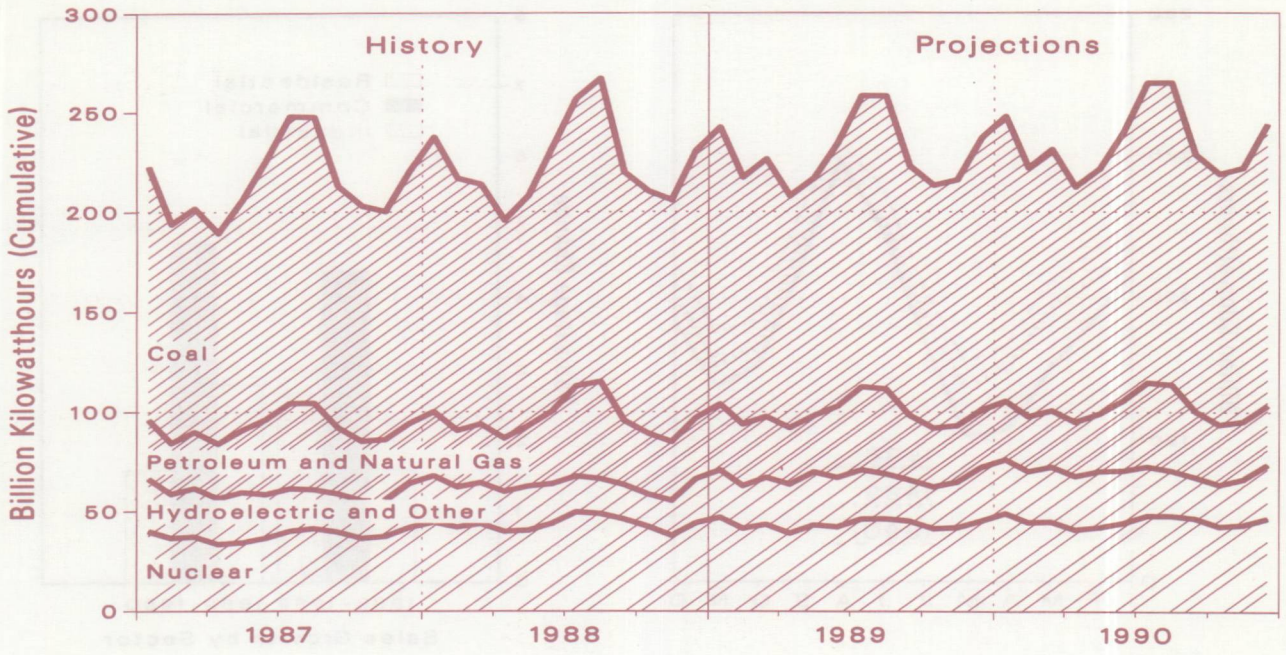
- The momentum in total electric power use is not expected to slacken this year. The stage that was set in 1988--healthy output in the electricity-intensive industries and the continued introduction of electric appliances into businesses and individual homes--should provide for the growth expected in 1989. An assumed return to normal, hence milder, temperatures and some slowing in activity in the manufacturing sector should bring total electricity sales growth down from an estimated 4.7 percent in 1988 to 2.8 percent in 1989. The 1988 growth rate is not expected to be matched, as the peaks in heating and air-conditioning use in the first and third quarters of last year explain much of the unexpected high levels of electricity demand for 1988 and are not assumed to reoccur.

- In 1990, a further weakening in industrial demand for electric power (related to a slowing in the general economy) is offset by continued strength in residential and commercial sector sales. The net result is a 2.9-percent expansion in total electricity sales.

- Strong growth in net imports of electric power (primarily from Canada) is anticipated in both 1989 and 1990. Drought conditions in Canada during this past summer prevented domestic utilities from obtaining desired imported power. Adequate rainfall at Canadian hydroelectric watersheds should enable net import levels to reach 1.5 percent of U.S. electricity supplies by 1990.

- Purchases of electric power from nonutilities (cogenerators and other power producers) should take some pressure off domestic utility generation requirements both next year and into 1990. This source of electricity supply is expected to continue to surpass the level of net imports, reaching 2.7 percent of total domestic electricity supply by 1990.

Figure 17. Electricity Generation by Fuel Source



Sources: • History: Energy Information Administration, *Electric Power Monthly*, DOE/EIA-0226(88/10) (Washington, DC, 1989). • Projections: Table 16.

Electric Utility Fuel Consumption

During 1988, electricity supply patterns were altered significantly from what would have been considered normal because of continued and worsening hydroelectric shortages and because of some regional demand surges. Nuclear power generation achieved a very high average capacity factor in 1988. Several factors may have contributed to this improvement, such as higher operation and maintenance expenditures, fewer plants refueling during the year, and a lessening of major maintenance down times. A return to normal output levels for hydroelectricity by mid-year will tend to suppress the need for coal-, oil-, and gas-based generation (Table 16 on page 52 and Figure 17).

- Partly because of curtailments to utility gas customers in California during the first quarter and hot weather in oil-burning utility regions during the third quarter, 1988 was a good year for suppliers of residual fuel to electric utilities. Oil-based generation was up 27 percent between the third quarter of 1987 and 1988. During the fourth quarter of 1988, it was apparent that significant switching to oil use at utilities had occurred on the basis of price. Based on estimated data through November, utility oil use in the fourth quarter of 1988 was 66 percent above the year-earlier amount. Since November, oil prices have recovered significantly, and it is not expected that the gas-to-oil switching apparent in recent months will continue much beyond January of this year. Assuming normal weather patterns and the absence of utility gas curtailments, oil-based generation will show a considerable drop in 1989 because 1988 was at a particularly high level. With the use of petroleum at electric utilities decreasing to a more normal rate after the first quarter of 1989, natural gas generation is expected to increase by about 3 percent per year on average from 1989 to 1990.

- Because of 2 successive years of drought, hydroelectric generation in 1988 is estimated to have fallen to a level which has not been seen in over 10 years. Although precipitation levels are assumed to return to normal in 1989, low water levels should persist through the first half of the year. Hydroelectric power is expected to increase by 21 percent in 1989. In 1990, hydroelectric generation should increase by 6.3 percent.

- An unprecedented increase in the average nuclear capacity factor (58 percent in 1987 to 65 percent in 1988) and the addition of two new units allowed for growth in nuclear generation of 16 percent in 1988. With an expected return to a normal utilization rate, 1989 nuclear generation should remain close to 1988 levels, and grow by only 3.2 percent in 1990.

Special Topics

- *The Year 1988 in Retrospect*

- *Recent Financial Developments and Outlook*

The Year 1988 in Retrospect

Strong economic growth, adverse weather, and low fuel prices led to high growth in domestic energy consumption in 1988. Based on preliminary data, overall energy use increased by 4.3 percent in 1988, the highest rate of growth in 4 years (Table 17 on page 53).[4] Despite higher demand, widespread overproduction and a resultant stockpiling of crude oil on world markets assured a renewed decline in imported oil prices (and fostered greater doubt about the ability and/or willingness of OPEC to maintain higher world prices after 1988). Imported oil prices, having recovered to over $19 per barrel in July 1987 from a low of $11, a year earlier, fell from early 1988 through the year to below $13 in November 1988. For 1988, on average, oil prices were 19 percent lower than in 1987 (Table 1 on page 3).

Severe weather conditions in the United States during the winter and summer months added significantly to both fossil fuel use and electricity consumption in 1988. High rates of growth in the industrial and transportation sectors of the economy, tied largely to the revival of domestic manufacturing industries under a depreciated dollar and moderate domestic inflation, spurred strong growth in energy use. Continuing growth in spot market sales of natural gas and improved access to gas supplies by end users helped keep end-use gas prices competitive with oil during most of the year. This fostered lower energy costs overall and generally more robust growth in energy consumption.

Although there was strong growth in domestic energy consumption in 1988, domestic energy production did not keep pace. The result was sharply higher energy imports, particularly of petroleum but also of natural gas (Table 17). Lower oil and gas prices halted the revival in domestic oil and gas drilling that had begun in the second half of 1987. Total losses in crude oil production remained within narrow limits, however, as long-planned production increases from Alaska were realized, and as lower well servicing and maintenance costs in the rest of the country helped sustain the profitability of older producing fields. The repeal of the crude oil windfall profits tax was passed in 1988 under provisions of the Trade Expansion Act of 1988. However, little or no immediate effect from lifting the tax was discernible, since oil prices already had fallen below average statutory base prices in all taxable oil categories. Total oil production in 1988 was down 210,000 barrels per day, or 2.5 percent lower than in 1987.

The net result of the high growth in petroleum demand in 1988 and the continued slide of domestic oil production was an increase in net oil imports to levels not experienced since 1980.

At least 0.8 percentage points out of the overall rise in energy consumption of 4.3 percent that took place during 1988 could be attributed to an unusually cold winter (which boosted the consumption of all types of energy for space heating) and a record hot summer (which spurred extraordinary use of electrical cooling equipment). Because of these unusual circumstances (including "bargain" prices for oil), the energy intensity of the U.S. economy (measured as Btu consumed per dollar of real gross national product) rose by an estimated 0.4 percent during 1988 (Table 1 on page 3). If weather effects are removed from this statistic, there was a decline of approximately 0.4 percent. Thus, even with weak energy prices and an accelerating economy, conservation effects continued to be observed.

Petroleum consumption increased by an estimated 2.9 percent in 1988, to over 17 million barrels per day, partly as a result of the weather effects on demands for heating oil, propane, and on electric utility oil use, but largely reflecting the continued growth in petroleum demand in the transportation sector (Table 6). Increased consumption of motor gasoline, highway diesel, and jet fuel accounted for about one-half of the demand growth. Although growth in demand for transportation fuels may tend to slacken in 1989 along with the economy, this consuming sector will tend to dominate changes in U.S. oil requirements for the next few years. Some switching by electric utilities to oil was evident in 1988, and a sizeable surge in imports of residual fuel oil late in the year drove total product supplied for oil to surprisingly high levels. It is assumed that much of this additional fuel oil was for utility stockpiling; hence, relatively low levels of shipments are expected this year.

Natural gas consumption increased by 5.3 percent in 1988, but more than 30 percent of that growth can be attributed to weather effects in the residential and commercial sectors (Table 14 on page 50). Industrial gas use remained strong, gaining more than 8 percent from 1987 levels as manufacturing output boomed. Despite low oil prices, natural gas is maintaining a strong market share among industrial users, as aggressive marketing strategies and flexible supply arrangements keep gas competitive. Regulatory changes promoted by the Federal Energy Regulatory Commission

[4]Data prior to 1988 referenced throughout this article are available from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/10) (Washington, DC, January 1989).

is maintaining a strong market share among industrial users, as aggressive marketing strategies and flexible supply arrangements keep gas competitive. Regulatory changes promoted by the Federal Energy Regulatory Commission (FERC) have increased incentives for interstate gas transmission companies to act as "open-access" carriers, widening the scope of supply arrangements that are available to end users. Domestic producers, who meet about 95 percent of total natural gas supply each year, recorded their second straight year of production increases. At the same time, net imports of natural gas from Canada increased by over 25 percent.

Electricity sales are estimated to have grown 4.7 percent in 1988, with about 17 percent of that growth related to weather severity (Table 16 on page 52). This effect was particularly evident in the residential sector which exhibited a 4.4-percent growth in 1988, more than 1 percentage point above the current trend. Solid economic growth in 1988, as evidenced by a 3.9-percent increase in the U.S. real gross national product, helped boost commercial and industrial electricity demand by 5.5 and 5.0 percent, respectively, though some of the growth in commercial electricity demand was also due to weather. If the economy slows to a trend growth of about 2.5 percent over the next decade, growth in electricity sales can be expected to settle down to a rate of about 2.6 percent per year.

The domestic electricity supply system had increased difficulty meeting demand in some regions of the United States in 1988, as record generation requirements during the August heat wave exacerbated the problem of low hydroelectric availability resulting from 2 consecutive years of drought. Higher utilization of oil-fired generating units than would otherwise have been expected made up for some of the supply tightness, particularly in the New England States. Natural gas use at utilities declined slightly in 1988, partly because of interruptions during the winter in favor of residential customers. Utilities were able to meet excess electricity generation requirements in 1988 primarily through increased capacity utilization of existing nuclear and coal-fired generating units. Average nuclear unit capacity factors reached levels not seen since 1978.

Recent Financial Developments and Outlook

Sharp swings in oil prices over the 1985 through 1988 period have led to volatile movements in petroleum companies net income. On balance, although major petroleum companies earnings in 1987 and 1988 evidenced a recovery from the historically low levels of 1986, they continued to be noticeably below the levels of 1985 and earlier years of this decade. Between 1985 and 1986, the net income of the 22 major energy companies reporting to the Energy Information Administration's (EIA's) Financial Reporting System (FRS)[5] fell by nearly 50 percent to $9.2 billion, the lowest level since at least 1974. In 1987, their net income rose by 23 percent on the strength of income gains from oil and gas production and chemical operations. For the first 9 months of 1988, major petroleum companies evidenced a 50 percent increase from the first 9 months of 1987 due to increased income from downstream petroleum and chemical operations.

Income from oil and gas production has been the most volatile component of earnings. The oil price plunge of 1986 largely accounted for a $14.5 billion decline, to $5.6 billion, in the majors' net income from their worldwide oil and gas operations. A partial recovery in oil prices in 1987 and sharp reductions in exploration expenses led to an 83-percent increase in the majors' upstream earnings in the following year. However, slipping oil prices in 1988 reduced their oil and gas income by 24 percent, based on 9 months of data. Similarily, 21 independent oil and gas producers registered a 39 percent decrease over the same time period.

The wide swings in the majors' upstream income have been somewhat moderated by counter movements in their downstream earnings. Generally, refined product price movements have tended to lag changes in crude oil prices. In periods of falling crude oil prices, such as those experienced in 1986 and 1988, the margin between refined product prices and crude oil input prices has increased while in a period of generally rising crude oil prices, such as 1987, refining margins are squeezed. Patterns of income change in the majors' refining/marketing operations reflected the changes in margins. Between 1985 and 1986, their worldwide refining/marketing net income rose by over 60 percent, to $4.6 billion, but fell by over 50 percent, to $2.1 billion, between 1986 and 1987. For the first 9 months of 1988, during which crude oil prices were falling again, the majors reported a seven-fold increase in refining/marketing income compared to the first 9 months of 1987. Eight independent refiner/marketers reported a less dramatic, but still substantial, 89 percent increase in net income over the same period. Also contributing to the improvement in refining/marketing income has been the growth in petroleum demand, which EIA estimated to be 2.9 percent for 1988.

[5]Annual data through 1987 are from Energy Information Administration, *Performance Profiles of Major Energy Producers 1987*, DOE/EIA-0206(87) (Washington, DC, January 1989). Data for the first 9 months of 1988 are from Energy Information Administration, *U.S. Energy Industry Financial Developments*, 1988 Third Quarter (Washington, D.C., November 1988).

Despite the fact that a substantial part of the growth in petroleum demand in 1988 was related to increases in the severity of weather, additional growth (1.0 percent) is projected for all of 1989 in the current *Outlook,* even with normal weather assumed. With little or no slack in the domestic product supply system, it remains a sellers' market for the time being. With relatively weak crude oil prices through 1990 expected, refiner margins should remain strong and overall refining profits should remain steady or increase. A possible negative for total refining profits in 1989 stems from the fact that most of the increase in domestic product supplied will come from product imports (see Table 6 above). U.S. refiners will have to yield a higher percentage of the aggregate profits from domestic product sales to independent importers and foreign refiners (although some of the foreign refiners will actually be subsidiaries of U.S. multinational oil companies).

The generally lower oil and natural gas prices of recent years together with growth in U.S. industrial output and exports have greatly benefited the majors' chemical operations. The 22 majors registered an increase in operating income from their chemical operations of over 100 percent between 1985 and 1986 and nearly 60 percent between 1986 and 1987. For the first 9 months of 1988, the majors' chemical earnings were up 68 percent over the first 9 months of 1987.

Capital expenditures of the 22 majors were cut back severely in response to the oil price plunge of 1986. Their overall capital expenditures fell by nearly $10 billion, to $39.7 billion, between 1985 and 1986. Decreased expenditures for oil and gas production more than accounted for the decline. Uncertainties regarding the future course of oil prices carried through the first half of 1987 with the majors' capital expenditures falling by 25 percent compared to the first half of 1986. However, as the prospects for an oil price recovery became less uncertain, the majors' capital expenditures rose at a 29 percent rate in the second half of 1987. Expenditures continued to increase in the first 9 months of 1988, rising by 28 percent compared to the first 9 months of 1987.

Worldwide exploration and development (E&D) expenditures (which include exploration expenses charged to income as well as capitalized expenditures) of the majors have steadily fallen from their peak value of $45.4 billion in 1981 to $23.5 billion in 1987, closely paralleling the path of oil prices. However, in recent years, their global resource development strategy has shifted increasingly to foreign areas, where finding rates are higher and production agreement with host countries results in lower lease acquisition costs. The share of the 22 majors' worldwide E&D spending going to foreign areas has increased from 27 percent in 1984 to 40 percent in 1987. Similarly, foreign areas' share of their worldwide oil and gas reserve additions has risen from 26 percent to 39 percent over the same period.

Final spending estimates for 1988 will not be available soon, but EIA estimates that real declines of 4 percent or more in spending for exploration and development drilling will be recorded for 1988 by the domestic oil and gas industry.[6] Incentives for much greater efforts in 1989 do not appear likely to materialize, as reflected in the base case scenario for oil prices in the current (January 1989) *Outlook.* EIA projections for oil and gas spending would indicate relatively depressed drilling activity and expenditure levels until well after 1990 under the kind of oil price scenarios assumed in this *Outlook* and in EIA's *Annual Energy Outlook 1989.*

[6]Energy Information Administration, *Annual Energy Outlook 1989,* DOE/EIA-0383(89) (Washington, DC, January 1989), Table 2.

Detailed Tables

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

	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply [a]															
Production															
U.S. (50 States)	**10.66**	**10.54**	**10.33**	*10.39*	*10.33*	*10.20*	*10.12*	*10.14*	*10.12*	*10.02*	*9.92*	*9.87*	*10.48*	*10.20*	*9.98*
OPEC	**19.46**	**20.32**	**21.59**	*23.90*	*20.52*	*20.56*	*21.04*	*21.20*	*21.00*	*21.06*	*22.05*	*22.21*	*21.33*	*20.83*	*21.58*
Other Non-OPEC	**16.96**	**16.61**	**16.44**	*16.65*	*16.92*	*17.05*	*17.13*	*17.19*	*17.85*	*17.47*	*17.30*	*17.50*	*16.66*	*17.07*	*17.53*
Total Market Economies	**47.08**	**47.47**	**48.36**	*50.94*	*47.77*	*47.81*	*48.29*	*48.52*	*48.97*	*48.55*	*49.27*	*49.58*	*48.47*	*48.10*	*49.09*
Net Communist Exports	**2.05**	**2.65**	**2.71**	*2.35*	*2.05*	*2.55*	*2.51*	*2.45*	*2.05*	*2.55*	*2.51*	*2.45*	*2.44*	*2.39*	*2.39*
Total Supply	**49.13**	**50.11**	**51.07**	*53.29*	*49.82*	*50.36*	*50.80*	*50.97*	*51.02*	*51.09*	*51.78*	*52.03*	*50.91*	*50.49*	*51.48*
Net Stock Withdrawals or Additions (-)															
U.S. (50 States Excluding SPR)	**.58**	**-.52**	**-.13**	*.28*	*.50*	*-.35*	*-.44*	*.25*	*.53*	*-.30*	*-.46*	*.22*	*.05*	*-.01*	*-.01*
U.S. SPR	**-.05**	**-.06**	**-.05**	*-.05*	*-.09*	*-.09*	*-.09*	*-.02*	*-.02*	*-.02*	*-.02*	*-.08*	*-.05*	*-.07*	*-.03*
Other Market Economies	**.76**	**-.99**	**-2.07**	*-1.53*	*1.92*	*-.76*	*-.37*	*.87*	*1.34*	*-.83*	*-.56*	*.85*	*-.95*	*.41*	*.20*
Total Stock Withdrawals	**1.32**	**-1.56**	**-2.25**	*-1.30*	*2.34*	*-1.20*	*-.90*	*1.10*	*1.85*	*-1.15*	*-1.05*	*1.00*	*-.95*	*.33*	*.16*
Product Supplied															
U.S. (50 States)	**17.44**	**16.53**	**16.92**	*17.69*	*17.78*	*17.04*	*17.07*	*17.45*	*17.62*	*17.10*	*17.16*	*17.64*	*17.15*	*17.33*	*17.38*
U.S. Territories	**.19**	**.20**	**.22**	*.24*	*.19*	*.22*	*.20*	*.23*	*.19*	*.22*	*.20*	*.23*	*.21*	*.21*	*.21*
Canada	**1.57**	**1.56**	**1.62**	*1.70*	*1.58*	*1.60*	*1.66*	*1.73*	*1.62*	*1.63*	*1.70*	*1.77*	*1.61*	*1.64*	*1.68*
Japan	**5.21**	**4.13**	**4.35**	*5.00*	*5.25*	*4.15*	*4.35*	*5.12*	*5.37*	*4.24*	*4.44*	*5.22*	*4.67*	*4.72*	*4.82*
Australia and New Zealand	**.73**	**.75**	**.74**	*.76*	*.73*	*.77*	*.77*	*.78*	*.75*	*.79*	*.79*	*.80*	*.74*	*.76*	*.78*
OECD Europe	**12.17**	**11.67**	**11.99**	*13.00*	*12.97*	*11.79*	*12.28*	*12.87*	*13.22*	*11.93*	*12.43*	*13.02*	*12.21*	*12.48*	*12.65*
Total OECD	**37.31**	**34.83**	**35.84**	*38.39*	*38.49*	*35.57*	*36.32*	*38.18*	*38.76*	*35.91*	*36.71*	*38.68*	*36.60*	*37.13*	*37.51*
Other Market Economies	**13.68**	**13.60**	**13.60**	*13.90*	*14.01*	*13.93*	*13.92*	*14.23*	*14.45*	*14.37*	*14.36*	*14.68*	*13.69*	*14.02*	*14.46*
Total Market Economies	**50.99**	**48.44**	**49.44**	*52.29*	*52.50*	*49.49*	*50.24*	*52.41*	*53.20*	*50.28*	*51.06*	*53.36*	*50.29*	*51.16*	*51.97*
Statistical Discrepancy	**.54**	**-.12**	**.62**	*.30*	*.34*	*.34*	*.33*	*.33*	*.33*	*.33*	*.33*	*.33*	*.34*	*.34*	*.33*
Closing Stocks (billion barrels)	**4.97**	**5.11**	**5.32**	*5.44*	*5.23*	*5.34*	*5.42*	*5.32*	*5.15*	*5.26*	*5.36*	*5.26*	*5.44*	*5.32*	*5.26*

[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(88/10); and *International Energy Annual 1987,* DOE/EIA-0219(87); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through August 1988.

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

	Annual Average 1977-1987	1988	1989	1990
OECD Total [a]	**2.7**	**3.9**	*2.8*	*2.4*
United States [b]	**2.7**	**3.9**	*2.5*	*1.8*
Western Europe	**2.2**	**3.5**	*2.6*	*2.5*
Japan	**4.1**	**5.3**	*4.1*	*3.5*
Other OECD [c]	**3.1**	**3.7**	*2.5*	*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, CONTROL1288; Non-U.S. historical data: The WEFA Group, *World Economic Service: Historical Data,* April 1988 and *World Economic Outlook: Developed Economies Volume,* October 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	1988				World Oil Price Case	1989				1990				Year		
	1st	2nd	3rd	4th		1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Macroeconomic [a]																
Real Gross National Product (billion 1982 dollars)	**3,956**	**3,985**	**4,011**	**4,030**	Low	*4,083*	*4,094*	*4,103*	*4,124*	*4,150*	*4,174*	*4,206*	*4,244*		*4,101*	*4,194*
					Base	*4,082*	*4,090*	*4,096*	*4,111*	*4,130*	*4,151*	*4,181*	*4,217*	**3,996**	*4,095*	*4,170*
					High	*4,079*	*4,081*	*4,080*	*4,094*	*4,113*	*4,134*	*4,163*	*4,198*		*4,084*	*4,152*
Percentage Change from Prior Year	**4.8**	**4.2**	**3.8**	**2.7**	Low	*3.2*	*2.7*	*2.3*	*2.3*	*1.6*	*2.0*	*2.5*	*2.9*		*2.6*	*2.3*
					Base	*3.2*	*2.6*	*2.1*	*2.0*	*1.2*	*1.5*	*2.1*	*2.6*	**3.9**	*2.5*	*1.8*
					High	*3.1*	*2.4*	*1.7*	*1.6*	*.8*	*1.3*	*2.0*	*2.5*		*2.2*	*1.7*
GNP Implicit Price Deflator (index, 1982=1.000)	**1.194**	**1.210**	**1.224**	**1.238**	Low	*1.244*	*1.257*	*1.270*	*1.277*	*1.287*	*1.300*	*1.314*	*1.322*		*1.262*	*1.306*
					Base	*1.245*	*1.259*	*1.273*	*1.282*	*1.294*	*1.308*	*1.322*	*1.332*	**1.217**	*1.265*	*1.314*
					High	*1.246*	*1.262*	*1.278*	*1.287*	*1.299*	*1.314*	*1.329*	*1.339*		*1.268*	*1.320*
Percentage Change from Prior Year	**2.7**	**3.2**	**3.6**	**4.1**	Low	*4.2*	*3.9*	*3.7*	*3.1*	*3.4*	*3.4*	*3.4*	*3.6*		*3.7*	*3.5*
					Base	*4.3*	*4.0*	*4.0*	*3.5*	*3.9*	*3.9*	*3.8*	*3.9*	**3.4**	*4.0*	*3.9*
					High	*4.4*	*4.3*	*4.4*	*3.9*	*4.3*	*4.1*	*3.9*	*4.0*		*4.3*	*4.1*
Real Disposable Personal Income [b] (billion 1982 dollars)	**2,762**	**2,762**	**2,800**	**2,822**	Low	*2,858*	*2,863*	*2,873*	*2,891*	*2,900*	*2,900*	*2,908*	*2,930*		*2,871*	*2,910*
					Base	*2,852*	*2,854*	*2,859*	*2,869*	*2,876*	*2,877*	*2,885*	*2,905*	**2,787**	*2,859*	*2,886*
					High	*2,844*	*2,836*	*2,840*	*2,852*	*2,860*	*2,861*	*2,868*	*2,887*		*2,843*	*2,869*
Percentage Change from Prior Year	**3.1**	**4.1**	**4.3**	**3.4**	Low	*3.5*	*3.7*	*2.6*	*2.4*	*1.5*	*1.3*	*1.2*	*1.4*		*3.0*	*1.3*
					Base	*3.3*	*3.3*	*2.1*	*1.7*	*.8*	*.8*	*.9*	*1.2*	**3.7**	*2.6*	*.9*
					High	*3.0*	*2.7*	*1.4*	*1.0*	*.6*	*.9*	*1.0*	*1.2*		*2.0*	*.9*
Index of Industrial Production (Mfg.) (index, 1977=1.000)	**1.396**	**1.416**	**1.440**	**1.454**	Low	*1.465*	*1.473*	*1.484*	*1.499*	*1.514*	*1.525*	*1.541*	*1.566*		*1.480*	*1.537*
					Base	*1.463*	*1.468*	*1.475*	*1.484*	*1.492*	*1.498*	*1.512*	*1.535*	**1.427**	*1.473*	*1.509*
					High	*1.459*	*1.457*	*1.459*	*1.467*	*1.474*	*1.479*	*1.491*	*1.514*		*1.461*	*1.490*
Percentage Change from Prior Year	**6.1**	**6.3**	**6.1**	**5.4**	Low	*4.9*	*4.0*	*3.1*	*3.1*	*3.4*	*3.5*	*3.8*	*4.5*		*3.8*	*3.8*
					Base	*4.8*	*3.7*	*2.4*	*2.0*	*2.0*	*2.0*	*2.5*	*3.4*	**6.0**	*3.2*	*2.5*
					High	*4.5*	*2.9*	*1.3*	*.9*	*1.1*	*1.5*	*2.2*	*3.2*		*2.4*	*2.0*
Oil Price																
Imported Crude Oil Price [c] (U.S. dollars/barrel)	**15.48**	**15.75**	**14.37**	**13.35**	Low	*13.00*	*12.00*	*12.00*	*12.00*	*13.00*	*13.00*	*13.00*	*13.00*		*12.20*	*13.00*
					Base	*15.00*	*14.00*	*14.00*	*15.00*	*15.00*	*15.00*	*15.00*	*15.00*	**14.74**	*14.50*	*15.00*
					High	*17.00*	*16.00*	*16.00*	*17.00*	*17.00*	*17.00*	*17.00*	*17.00*		*16.50*	*17.00*
U.S. Refiners' Cost [d] (U.S. dollars/barrel)	**15.46**	**15.92**	**14.35**	**13.35**	Low	*13.00*	*12.00*	*12.00*	*12.00*	*13.00*	*13.00*	*13.00*	*13.00*		*12.20*	*13.00*
					Base	*15.00*	*14.00*	*14.00*	*15.00*	*15.00*	*15.00*	*15.00*	*15.00*	**14.77**	*14.50*	*15.00*
					High	*17.00*	*16.00*	*16.00*	*17.00*	*17.00*	*17.00*	*17.00*	*17.00*		*16.50*	*17.00*
Weather [e]																
Heating Degree Days	**2,451**	**523**	**75**	**1,694**		*2,401*	*536*	*88*	*1,699*	*2,401*	*536*	*88*	*1,669*	**4,743**	*4,694*	*4,694*
Cooling Degree Days	**22**	**327**	**846**	**59**		*28*	*327*	*755*	*63*	*28*	*327*	*755*	*63*	**1,254**	*1,173*	*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(88/10); 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 CONTROL1288.

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

Product	1988				World Oil Price Case	1989				1990				Year		
	1st	2nd	3rd	4th		1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Petroleum																
Imported Crude Oil Price [a]					Low	*13.00*	*12.00*	*12.00*	*12.00*	*13.00*	*13.00*	*13.00*	*13.00*		*12.20*	*13.00*
(dollars per barrel)	**15.48**	**15.75**	**14.37**	**13.35**	Base	*15.00*	*14.00*	*14.00*	*15.00*	*15.00*	*15.00*	*15.00*	*15.00*	**14.74**	*14.50*	*15.00*
					High	*17.00*	*16.00*	*16.00*	*17.00*	*17.00*	*17.00*	*17.00*	*17.00*		*16.50*	*17.00*
Gasoline [b]					Low	*.94*	*.93*	*.93*	*.87*	*.84*	*.87*	*.92*	*.91*		*.92*	*.89*
(dollars per gallon)	**.93**	**.96**	**.99**	**.97**	Base	*.96*	*1.00*	*1.00*	*.96*	*.94*	*.96*	*1.00*	*1.00*	**.97**	*.98*	*.98*
					High	*.98*	*1.06*	*1.08*	*1.03*	*1.00*	*1.02*	*1.07*	*1.05*		*1.04*	*1.03*
No. 2 Diesel Oil, Retail					Low	*.86*	*.82*	*.82*	*.84*	*.85*	*.83*	*.84*	*.86*		*.83*	*.85*
(dollars per gallon)	**.93**	**.93**	**.89**	**.88**	Base	*.89*	*.86*	*.85*	*.89*	*.89*	*.87*	*.87*	*.90*	**.91**	*.87*	*.88*
					High	*.92*	*.91*	*.89*	*.93*	*.92*	*.90*	*.90*	*.93*		*.91*	*.91*
No. 2 Heating Oil, Wholesale					Low	*.45*	*.38*	*.39*	*.42*	*.43*	*.40*	*.41*	*.45*		*.42*	*.43*
(dollars per gallon)	**.50**	**.49**	**.44**	**.46**	Base	*.50*	*.43*	*.44*	*.50*	*.49*	*.46*	*.47*	*.51*	**.48**	*.47*	*.48*
					High	*.55*	*.50*	*.49*	*.56*	*.54*	*.51*	*.52*	*.57*		*.53*	*.54*
No. 2 Heating Oil, Retail					Low	*.78*	*.70*	*.66*	*.70*	*.75*	*.72*	*.71*	*.75*		*.72*	*.74*
(dollars per gallon)	**.84**	**.82**	**.75**	**.78**	Base	*.84*	*.76*	*.73*	*.80*	*.84*	*.80*	*.78*	*.83*	**.80**	*.79*	*.82*
					High	*.88*	*.84*	*.80*	*.86*	*.90*	*.85*	*.83*	*.89*		*.85*	*.87*
No. 6 Residual Fuel Oil [c]					Low	*14.17*	*11.80*	*11.79*	*12.35*	*13.38*	*12.35*	*12.58*	*13.26*		*12.62*	*12.93*
(dollars per barrel)	**14.76**	**13.94**	**13.67**	**14.32**	Base	*15.85*	*13.46*	*13.49*	*14.96*	*15.26*	*14.03*	*14.29*	*15.05*	**14.22**	*14.54*	*14.70*
					High	*17.54*	*15.89*	*15.24*	*16.75*	*17.07*	*15.69*	*15.98*	*16.83*		*16.45*	*16.45*
Electric Utility Fuels																
Coal					Low	*1.45*	*1.45*	*1.45*	*1.44*	*1.45*	*1.45*	*1.46*	*1.47*		*1.45*	*1.46*
(dollars per million Btu)	**1.48**	**1.49**	**1.45**	**1.45**	Base	*1.46*	*1.47*	*1.48*	*1.49*	*1.49*	*1.50*	*1.51*	*1.52*	**1.47**	*1.47*	*1.51*
					High	*1.48*	*1.50*	*1.51*	*1.52*	*1.53*	*1.55*	*1.56*	*1.57*		*1.50*	*1.55*
Heavy Oil [d]					Low	*2.40*	*2.04*	*2.04*	*2.14*	*2.28*	*2.13*	*2.17*	*2.29*		*2.15*	*2.22*
(dollars per million Btu)	**2.53**	**2.37**	**2.36**	**2.39**	Base	*2.67*	*2.31*	*2.31*	*2.56*	*2.58*	*2.40*	*2.45*	*2.58*	**2.42**	*2.46*	*2.50*
					High	*2.94*	*2.70*	*2.60*	*2.84*	*2.87*	*2.67*	*2.72*	*2.86*		*2.76*	*2.78*
Natural Gas					Low	*2.21*	*2.16*	*2.13*	*2.12*	*2.14*	*2.16*	*2.18*	*2.19*		*2.15*	*2.17*
(dollars per million Btu)	**2.39**	**2.09**	**2.24**	**2.30**	Base	*2.36*	*2.25*	*2.28*	*2.36*	*2.43*	*2.34*	*2.39*	*2.46*	**2.25**	*2.31*	*2.40*
					High	*2.41*	*2.37*	*2.43*	*2.53*	*2.61*	*2.52*	*2.58*	*2.66*		*2.43*	*2.59*
Other Residential																
Natural Gas					Low	*5.35*	*5.89*	*6.75*	*5.61*	*5.41*	*6.01*	*6.93*	*5.80*		*5.63*	*5.75*
(dollars per 1,000 cu. ft.)	**5.14**	**5.72**	**6.73**	**5.62**	Base	*5.42*	*6.00*	*6.90*	*5.80*	*5.63*	*6.25*	*7.21*	*6.07*	**5.50**	*5.75*	*5.99*
					High	*5.49*	*6.11*	*7.05*	*5.95*	*5.86*	*6.50*	*7.50*	*6.35*		*5.86*	*6.24*
Electricity					Low	*6.83*	*7.31*	*7.60*	*7.23*	*6.96*	*7.54*	*7.86*	*7.47*		*7.24*	*7.45*
(cents per kilowatthour)	**7.00**	**7.59**	**7.91**	**7.27**	Base	*6.86*	*7.38*	*7.69*	*7.37*	*7.14*	*7.71*	*8.03*	*7.69*	**7.45**	*7.32*	*7.64*
					High	*6.89*	*7.49*	*7.82*	*7.47*	*7.20*	*7.80*	*8.14*	*7.75*		*7.41*	*7.72*

[a] Cost of imported crude oil to U.S. refiners.
[b] Average retail for all grades and services.
[c] Retail residual fuel oil--average, all sulfur contents.
[d] Heavy fuel oil prices include fuel oils No. 4., No. 5, and No. 6, and topped crude fuel oil prices.

Notes: Fourth quarter 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(88/10); and *Petroleum Marketing Monthly*, DOE/EIA-0380(88/10).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Crude Oil Supply															
Domestic Production [a]	**8.32**	**8.21**	**8.01**	**8.02**	*7.99*	*7.86*	*7.79*	*7.80*	*7.78*	*7.68*	*7.58*	*7.52*	**8.14**	*7.86*	*7.64*
Alaska	**2.05**	**2.01**	**2.00**	**2.04**	*2.04*	*2.02*	*2.01*	*2.02*	*2.01*	*1.98*	*1.95*	*1.91*	**2.02**	*2.02*	*1.96*
Lower 48	**6.27**	**6.20**	**6.01**	**5.99**	*5.94*	*5.85*	*5.78*	*5.78*	*5.77*	*5.69*	*5.63*	*5.60*	**6.12**	*5.84*	*5.67*
Net Imports (Including SPR) [b]	**4.51**	**5.01**	**4.92**	**5.30**	*5.11*	*5.48*	*5.76*	*5.37*	*5.21*	*5.56*	*6.00*	*5.92*	**4.93**	*5.43*	*5.68*
Gross Imports (Excluding SPR)	**4.65**	**5.08**	**5.02**	**5.41**	*5.21*	*5.57*	*5.84*	*5.52*	*5.37*	*5.71*	*6.14*	*6.02*	**5.04**	*5.54*	*5.81*
SPR Imports	**.05**	**.06**	**.05**	**.05**	*.09*	*.09*	*.09*	*.02*	*.02*	*.02*	*.02*	*.08*	**.05**	*.07*	*.03*
Exports	**.19**	**.13**	**.16**	**.15**	*.18*	*.17*	*.16*	*.17*	*.18*	*.17*	*.16*	*.17*	**.16**	*.17*	*.17*
SPR Stock Withdrawn or Added (-)	**-.05**	**-.06**	**-.05**	**-.05**	*-.09*	*-.09*	*-.09*	*-.02*	*-.02*	*-.02*	*-.02*	*-.08*	**-.05**	*-.07*	*-.03*
Other Stock Withdrawn or Added (-)	**-.05**	**-.06**	**.33**	**-.05**	*-.04*	*-.01*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	**.04**	*-.01*	*.00*
Products Supplied and Losses	**-.05**	**-.04**	**-.03**	**-.04**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.04**	*-.05*	*-.05*
Unaccounted-for Crude	**.24**	**.33**	**.42**	**.07**	*.14*	*.14*	*.13*	*.13*	*.13*	*.13*	*.13*	*.13*	**.26**	*.14*	*.13*
Crude Oil Input to Refineries	**12.93**	**13.39**	**13.59**	**13.26**	*13.06*	*13.34*	*13.55*	*13.23*	*13.05*	*13.30*	*13.64*	*13.45*	**13.29**	*13.30*	*13.36*
Other Supply															
NGL Production	**1.60**	**1.61**	**1.62**	**1.65**	*1.64*	*1.61*	*1.59*	*1.63*	*1.64*	*1.61*	*1.59*	*1.63*	**1.62**	*1.62*	*1.62*
Other Hydrocarbon and Alcohol Inputs	**.06**	**.05**	**.06**	**.06**	*.06*	*.06*	*.06*	*.07*	*.06*	*.06*	*.07*	*.07*	**.06**	*.06*	*.06*
Crude Oil Product Supplied	**.05**	**.04**	**.03**	**.04**	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	**.04**	*.05*	*.05*
Processing Gain	**.68**	**.66**	**.64**	**.66**	*.65*	*.66*	*.67*	*.65*	*.64*	*.67*	*.67*	*.66*	**.66**	*.66*	*.66*
Net Product Imports [c]	**1.50**	**1.23**	**1.43**	**1.69**	*1.78*	*1.66*	*1.58*	*1.58*	*1.65*	*1.70*	*1.59*	*1.56*	**1.47**	*1.65*	*1.62*
Gross Product Imports [c]	**2.18**	**1.91**	**2.05**	**2.38**	*2.43*	*2.28*	*2.16*	*2.23*	*2.30*	*2.32*	*2.17*	*2.22*	**2.13**	*2.27*	*2.25*
Product Exports	**.67**	**.68**	**.62**	**.69**	*.64*	*.62*	*.58*	*.65*	*.65*	*.62*	*.58*	*.65*	**.66**	*.62*	*.63*
Product Stock Withdrawn or Added (-) [d]	**.64**	**-.46**	**-.46**	**.33**	*.55*	*-.35*	*-.44*	*.25*	*.53*	*-.29*	*-.46*	*.22*	**.01**	*.00*	*.00*
Total Product Supplied, Domestic Use	**17.45**	**16.53**	**16.92**	**17.69**	*17.78*	*17.04*	*17.07*	*17.45*	*17.62*	*17.10*	*17.16*	*17.64*	**17.15**	*17.33*	*17.38*
Disposition															
Motor Gasoline	**6.98**	**7.49**	**7.45**	**7.32**	*7.07*	*7.61*	*7.60*	*7.40*	*7.08*	*7.63*	*7.64*	*7.46*	**7.31**	*7.42*	*7.45*
Jet Fuel	**1.48**	**1.39**	**1.42**	**1.57**	*1.57*	*1.46*	*1.50*	*1.53*	*1.59*	*1.48*	*1.52*	*1.56*	**1.47**	*1.51*	*1.54*
Distillate Fuel Oil	**3.52**	**2.81**	**2.77**	**3.31**	*3.55*	*3.05*	*2.90*	*3.31*	*3.59*	*3.09*	*2.94*	*3.37*	**3.10**	*3.20*	*3.25*
Residual Fuel Oil	**1.54**	**1.10**	**1.18**	**1.46**	*1.66*	*1.16*	*1.07*	*1.18*	*1.40*	*1.11*	*1.03*	*1.16*	**1.32**	*1.27*	*1.17*
Other Oils Supplied [e]	**3.92**	**3.72**	**4.10**	**4.03**	*3.93*	*3.75*	*3.99*	*4.03*	*3.96*	*3.79*	*4.03*	*4.09*	**3.94**	*3.93*	*3.97*
Total Product Supplied	**17.44**	**16.53**	**16.92**	**17.69**	*17.78*	*17.04*	*17.07*	*17.45*	*17.62*	*17.10*	*17.16*	*17.64*	**17.15**	*17.33*	*17.38*
Total Petroleum Net Imports	**6.01**	**6.24**	**6.35**	**7.00**	*6.89*	*7.14*	*7.35*	*6.95*	*6.86*	*7.26*	*7.59*	*7.49*	**6.40**	*7.08*	*7.30*
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	**354**	**359**	**328**	**333**	*337*	*337*	*338*	*338*	*337*	*337*	*338*	*338*	**333**	*338*	*338*
Total Motor Gasoline	**231**	**209**	**221**	**229**	*232*	*218*	*223*	*224*	*231*	*217*	*222*	*224*	**229**	*224*	*224*
Finished Motor Gasoline	**194**	**174**	**182**	**190**	*194*	*182*	*184*	*186*	*194*	*182*	*184*	*186*	**190**	*186*	*186*
Blending Components	**37**	**35**	**39**	**39**	*38*	*36*	*38*	*38*	*38*	*35*	*38*	*38*	**39**	*38*	*38*
Jet Fuel	**47**	**46**	**47**	**43**	*45*	*46*	*49*	*48*	*46*	*46*	*49*	*48*	**43**	*48*	*48*
Distillate Fuel Oil	**89**	**111**	**131**	**124**	*90*	*104*	*131*	*131*	*91*	*104*	*131*	*132*	**124**	*131*	*132*
Residual Fuel Oil	**44**	**42**	**44**	**45**	*41*	*40*	*42*	*44*	*41*	*40*	*42*	*45*	**45**	*44*	*45*
Other Oils [g]	**249**	**294**	**302**	**274**	*258*	*288*	*292*	*267*	*257*	*286*	*292*	*268*	**274**	*267*	*268*
Total Stocks (Excluding SPR)	**1014**	**1061**	**1073**	**1047**	*1002*	*1034*	*1075*	*1052*	*1005*	*1032*	*1074*	*1054*	**1047**	*1052*	*1054*
Crude Oil in SPR	**545**	**550**	**555**	**560**	*567*	*575*	*583*	*585*	*586*	*588*	*590*	*597*	**560**	*585*	*597*
Total Stocks (Including SPR)	**1559**	**1611**	**1627**	**1606**	*1569*	*1609*	*1658*	*1637*	*1591*	*1620*	*1664*	*1651*	**1606**	*1637*	*1651*

[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 Oct. 1988; *Weekly Petroleum Status Report,* DOE/EIA-0208(88-50,89-01,02,03).

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

Sensitivities	1989				1990				Year	
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1989	1990
Demand in 50 States										
Low Price	*17.79*	*17.07*	*17.11*	*17.50*	*17.67*	*17.15*	*17.21*	*17.69*	*17.37*	*17.43*
Base Case	*17.78*	*17.04*	*17.07*	*17.45*	*17.62*	*17.10*	*17.16*	*17.64*	*17.33*	*17.38*
High Price	*17.77*	*17.01*	*17.03*	*17.41*	*17.58*	*17.06*	*17.11*	*17.59*	*17.30*	*17.33*
Weather Sensitivity										
Adverse Weather	*.24*	*.07*	*.04*	*.14*	*.24*	*.07*	*.04*	*.14*	*.12*	*.12*
Favorable Weather	*-.24*	*-.07*	*-.04*	*-.14*	*-.24*	*-.07*	*-.04*	*-.14*	*-.12*	*-.12*
Economic Sensitivity										
High Economic Activity	*.02*	*.04*	*.06*	*.10*	*.12*	*.15*	*.15*	*.17*	*.05*	*.15*
Low Economic Activity	*-.03*	*-.11*	*-.10*	*-.09*	*-.09*	*-.10*	*-.11*	*-.19*	*-.08*	*-.12*
Combined Sensitivity Differentials [a] (excl. price)										
Upper Range	*.24*	*.08*	*.07*	*.17*	*.27*	*.17*	*.16*	*.22*	*.14*	*.20*
Lower Range	*.24*	*.13*	*.11*	*.17*	*.26*	*.12*	*.12*	*.24*	*.16*	*.18*
Range of Projected Demand										
High Demand [b]	*18.03*	*17.15*	*17.18*	*17.67*	*17.94*	*17.32*	*17.37*	*17.91*	*17.51*	*17.63*
Low Demand [c]	*17.53*	*16.89*	*16.92*	*17.24*	*17.32*	*16.94*	*17.00*	*17.35*	*17.14*	*17.15*

[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	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Crude Oil Supply															
Domestic Production [a]	**8.32**	**8.21**	**8.01**	**8.02**	*7.97*	*7.82*	*7.72*	*7.71*	*7.64*	*7.52*	*7.41*	*7.34*	**8.14**	*7.80*	*7.48*
Alaska	**2.05**	**2.01**	**2.00**	**2.04**	*2.04*	*2.01*	*2.01*	*2.01*	*1.98*	*1.94*	*1.91*	*1.88*	**2.02**	*2.02*	*1.93*
Lower 48	**6.27**	**6.20**	**6.01**	**5.99**	*5.93*	*5.81*	*5.72*	*5.69*	*5.66*	*5.57*	*5.50*	*5.47*	**6.12**	*5.79*	*5.55*
Net Imports (Including SPR) [b]	**4.51**	**5.01**	**4.92**	**5.30**	*5.21*	*5.57*	*5.88*	*5.57*	*5.39*	*5.81*	*6.26*	*6.20*	**4.93**	*5.56*	*5.92*
Gross Imports (Excluding SPR)	**4.65**	**5.08**	**5.02**	**5.41**	*5.31*	*5.66*	*5.95*	*5.72*	*5.56*	*5.96*	*6.39*	*6.30*	**5.04**	*5.66*	*6.05*
SPR Imports	**.05**	**.06**	**.05**	**.05**	*.09*	*.09*	*.09*	*.02*	*.02*	*.02*	*.02*	*.08*	**.05**	*.07*	*.03*
Exports	**.19**	**.13**	**.16**	**.15**	*.18*	*.17*	*.16*	*.17*	*.18*	*.17*	*.16*	*.17*	**.16**	*.17*	*.17*
SPR Stock Withdrawn or Added (-)	**-.05**	**-.06**	**-.05**	**-.05**	*-.09*	*-.09*	*-.09*	*-.02*	*-.02*	*-.02*	*-.02*	*-.08*	**-.05**	*-.07*	*-.03*
Other Stock Withdrawn or Added (-)	**-.05**	**-.06**	**.33**	**-.05**	*-.05*	*-.02*	*-.01*	*-.01*	*.00*	*-.01*	*.00*	*.00*	**.04**	*-.02*	*.00*
Products Supplied and Losses	**-.05**	**-.04**	**-.03**	**-.04**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.04**	*-.05*	*-.05*
Unaccounted-for Crude	**.24**	**.33**	**.42**	**.07**	*.14*	*.14*	*.13*	*.13*	*.13*	*.13*	*.13*	*.13*	**.26**	*.14*	*.13*
Crude Oil Input to Refineries	**12.93**	**13.39**	**13.59**	**13.26**	*13.14*	*13.38*	*13.60*	*13.33*	*13.10*	*13.38*	*13.72*	*13.55*	**13.29**	*13.36*	*13.44*
Other Supply															
NGL Production	**1.60**	**1.61**	**1.62**	**1.65**	*1.64*	*1.61*	*1.59*	*1.63*	*1.64*	*1.61*	*1.60*	*1.63*	**1.62**	*1.62*	*1.62*
Other Hydrocarbon and Alcohol Inputs	**.06**	**.05**	**.06**	**.06**	*.06*	*.06*	*.07*	*.07*	*.06*	*.06*	*.07*	*.07*	**.06**	*.06*	*.07*
Crude Oil Product Supplied	**.05**	**.04**	**.03**	**.04**	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	**.04**	*.05*	*.05*
Processing Gain	**.68**	**.66**	**.64**	**.66**	*.65*	*.66*	*.67*	*.65*	*.65*	*.68*	*.68*	*.67*	**.66**	*.66*	*.67*
Net Product Imports [c]	**1.50**	**1.23**	**1.43**	**1.69**	*1.78*	*1.70*	*1.64*	*1.65*	*1.74*	*1.84*	*1.71*	*1.67*	**1.47**	*1.69*	*1.74*
Gross Product Imports [c]	**2.18**	**1.91**	**2.05**	**2.38**	*2.42*	*2.32*	*2.21*	*2.30*	*2.39*	*2.45*	*2.29*	*2.33*	**2.13**	*2.31*	*2.36*
Product Exports	**.67**	**.68**	**.62**	**.69**	*.64*	*.62*	*.58*	*.65*	*.65*	*.62*	*.58*	*.65*	**.66**	*.62*	*.63*
Product Stock Withdrawn or Added (-) [d]	**.64**	**-.46**	**-.46**	**.33**	*.50*	*-.36*	*-.45*	*.22*	*.55*	*-.32*	*-.46*	*.22*	**.01**	*-.02*	*-.01*
Total Product Supplied, Domestic Use	**17.45**	**16.53**	**16.92**	**17.69**	*17.81*	*17.11*	*17.16*	*17.60*	*17.79*	*17.30*	*17.36*	*17.85*	**17.15**	*17.42*	*17.58*
Disposition															
Motor Gasoline	**6.98**	**7.49**	**7.45**	**7.32**	*7.08*	*7.64*	*7.64*	*7.46*	*7.14*	*7.71*	*7.71*	*7.53*	**7.31**	*7.46*	*7.53*
Jet Fuel	**1.48**	**1.39**	**1.42**	**1.57**	*1.57*	*1.46*	*1.51*	*1.54*	*1.61*	*1.50*	*1.54*	*1.58*	**1.47**	*1.52*	*1.56*
Distillate Fuel Oil	**3.52**	**2.81**	**2.77**	**3.31**	*3.56*	*3.07*	*2.92*	*3.34*	*3.63*	*3.12*	*2.98*	*3.41*	**3.10**	*3.22*	*3.28*
Residual Fuel Oil	**1.54**	**1.10**	**1.18**	**1.46**	*1.66*	*1.17*	*1.08*	*1.20*	*1.42*	*1.15*	*1.06*	*1.20*	**1.32**	*1.28*	*1.20*
Other Oils Supplied [e]	**3.92**	**3.72**	**4.10**	**4.03**	*3.94*	*3.77*	*4.01*	*4.05*	*3.99*	*3.82*	*4.07*	*4.13*	**3.94**	*3.94*	*4.01*
Total Product Supplied	**17.44**	**16.53**	**16.92**	**17.69**	*17.81*	*17.11*	*17.16*	*17.60*	*17.79*	*17.30*	*17.36*	*17.85*	**17.15**	*17.42*	*17.58*
Total Petroleum Net Imports	**6.01**	**6.24**	**6.35**	**7.00**	*6.99*	*7.27*	*7.52*	*7.22*	*7.14*	*7.64*	*7.96*	*7.87*	**6.40**	*7.25*	*7.66*
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	**354**	**359**	**328**	**333**	*337*	*339*	*340*	*340*	*341*	*342*	*342*	*342*	**333**	*340*	*342*
Total Motor Gasoline	**231**	**209**	**221**	**229**	*232*	*220*	*225*	*227*	*233*	*219*	*225*	*227*	**229**	*227*	*227*
Finished Motor Gasoline	**194**	**174**	**182**	**190**	*194*	*184*	*187*	*189*	*195*	*184*	*187*	*189*	**190**	*189*	*189*
Blending Components	**37**	**35**	**39**	**39**	*38*	*36*	*38*	*38*	*38*	*35*	*38*	*38*	**39**	*38*	*38*
Jet Fuel	**47**	**46**	**47**	**43**	*45*	*46*	*49*	*49*	*46*	*46*	*49*	*49*	**43**	*49*	*49*
Distillate Fuel Oil	**89**	**111**	**131**	**124**	*92*	*106*	*133*	*133*	*93*	*106*	*133*	*135*	**124**	*133*	*135*
Residual Fuel Oil	**44**	**42**	**44**	**45**	*41*	*41*	*42*	*45*	*42*	*42*	*43*	*45*	**45**	*45*	*45*
Other Oils [g]	**249**	**294**	**302**	**274**	*259*	*288*	*293*	*268*	*259*	*288*	*294*	*269*	**274**	*268*	*269*
Total Stocks (Excluding SPR)	**1014**	**1061**	**1073**	**1047**	*1006*	*1040*	*1082*	*1062*	*1013*	*1043*	*1086*	*1066*	**1047**	*1062*	*1066*
Crude Oil in SPR	**545**	**550**	**555**	**560**	*567*	*575*	*583*	*585*	*586*	*588*	*590*	*597*	**560**	*585*	*597*
Total Stocks (Including SPR)	**1559**	**1611**	**1627**	**1606**	*1573*	*1615*	*1664*	*1647*	*1600*	*1631*	*1676*	*1663*	**1606**	*1647*	*1663*

[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 Oct. 1988; *Weekly Petroleum Status Report*, DOE/EIA-0208(88-50,89-01,02,03).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Crude Oil Supply															
Domestic Production [a]	**8.32**	**8.21**	**8.01**	**8.02**	*8.01*	*7.96*	*7.91*	*7.92*	*7.92*	*7.83*	*7.76*	*7.71*	**8.14**	*7.95*	*7.80*
Alaska	**2.05**	**2.01**	**2.00**	**2.04**	*2.05*	*2.02*	*2.01*	*2.02*	*2.01*	*1.99*	*1.97*	*1.93*	**2.02**	*2.02*	*1.97*
Lower 48	**6.27**	**6.20**	**6.01**	**5.99**	*5.97*	*5.94*	*5.89*	*5.90*	*5.91*	*5.84*	*5.79*	*5.78*	**6.12**	*5.93*	*5.83*
Net Imports (Including SPR) [b]	**4.51**	**5.01**	**4.92**	**5.30**	*4.99*	*5.30*	*5.60*	*5.17*	*4.87*	*5.21*	*5.63*	*5.53*	**4.93**	*5.27*	*5.31*
Gross Imports (Excluding SPR)	**4.65**	**5.08**	**5.02**	**5.41**	*5.09*	*5.39*	*5.68*	*5.32*	*5.03*	*5.36*	*5.77*	*5.63*	**5.04**	*5.37*	*5.45*
SPR Imports	**.05**	**.06**	**.05**	**.05**	*.09*	*.09*	*.09*	*.02*	*.02*	*.02*	*.02*	*.08*	**.05**	*.07*	*.03*
Exports	**.19**	**.13**	**.16**	**.15**	*.18*	*.17*	*.16*	*.17*	*.18*	*.17*	*.16*	*.17*	**.16**	*.17*	*.17*
SPR Stock Withdrawn or Added (-)	**-.05**	**-.06**	**-.05**	**-.05**	*-.09*	*-.09*	*-.09*	*-.02*	*-.02*	*-.02*	*-.02*	*-.08*	**-.05**	*-.07*	*-.03*
Other Stock Withdrawn or Added (-)	**-.05**	**-.06**	**.33**	**-.05**	*-.03*	*.01*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	**.04**	*-.01*	*.00*
Products Supplied and Losses	**-.05**	**-.04**	**-.03**	**-.04**	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	*-.05*	**-.04**	*-.05*	*-.05*
Unaccounted-for Crude	**.24**	**.33**	**.42**	**.07**	*.14*	*.13*	*.13*	*.13*	*.14*	*.14*	*.13*	*.13*	**.26**	*.14*	*.13*
Crude Oil Input to Refineries	**12.93**	**13.39**	**13.59**	**13.26**	*12.97*	*13.27*	*13.51*	*13.16*	*12.86*	*13.11*	*13.45*	*13.24*	**13.29**	*13.23*	*13.17*
Other Supply															
NGL Production	**1.60**	**1.61**	**1.62**	**1.65**	*1.64*	*1.61*	*1.59*	*1.63*	*1.64*	*1.61*	*1.59*	*1.63*	**1.62**	*1.62*	*1.62*
Other Hydrocarbon and Alcohol Inputs	**.06**	**.05**	**.06**	**.06**	*.06*	*.06*	*.06*	*.07*	*.06*	*.06*	*.07*	*.07*	**.06**	*.06*	*.07*
Crude Oil Product Supplied	**.05**	**.04**	**.03**	**.04**	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	*.05*	**.04**	*.05*	*.05*
Processing Gain	**.68**	**.66**	**.64**	**.66**	*.65*	*.66*	*.66*	*.64*	*.64*	*.67*	*.67*	*.65*	**.66**	*.65*	*.66*
Net Product Imports [c]	**1.50**	**1.23**	**1.43**	**1.69**	*1.78*	*1.57*	*1.49*	*1.51*	*1.69*	*1.73*	*1.62*	*1.61*	**1.47**	*1.59*	*1.66*
Gross Product Imports [c]	**2.18**	**1.91**	**2.05**	**2.38**	*2.42*	*2.18*	*2.07*	*2.16*	*2.34*	*2.35*	*2.20*	*2.26*	**2.13**	*2.21*	*2.29*
Product Exports	**.67**	**.68**	**.62**	**.69**	*.64*	*.62*	*.58*	*.65*	*.65*	*.62*	*.58*	*.65*	**.66**	*.62*	*.63*
Product Stock Withdrawn or Added (-) [d]	**.64**	**-.46**	**-.46**	**.33**	*.59*	*-.32*	*-.44*	*.25*	*.55*	*-.27*	*-.45*	*.22*	**.01**	*.02*	*.01*
Total Product Supplied, Domestic Use	**17.45**	**16.53**	**16.92**	**17.69**	*17.74*	*16.91*	*16.93*	*17.32*	*17.49*	*16.96*	*17.00*	*17.48*	**17.15**	*17.22*	*17.23*
Disposition															
Motor Gasoline	**6.98**	**7.49**	**7.45**	**7.32**	*7.05*	*7.57*	*7.55*	*7.35*	*7.03*	*7.58*	*7.58*	*7.41*	**7.31**	*7.38*	*7.40*
Jet Fuel	**1.48**	**1.39**	**1.42**	**1.57**	*1.56*	*1.45*	*1.49*	*1.52*	*1.58*	*1.47*	*1.50*	*1.54*	**1.47**	*1.50*	*1.52*
Distillate Fuel Oil	**3.52**	**2.81**	**2.77**	**3.31**	*3.54*	*3.03*	*2.87*	*3.28*	*3.57*	*3.06*	*2.91*	*3.34*	**3.10**	*3.18*	*3.22*
Residual Fuel Oil	**1.54**	**1.10**	**1.18**	**1.46**	*1.65*	*1.13*	*1.05*	*1.16*	*1.38*	*1.09*	*1.01*	*1.14*	**1.32**	*1.24*	*1.15*
Other Oils Supplied [e]	**3.92**	**3.72**	**4.10**	**4.03**	*3.92*	*3.73*	*3.97*	*4.01*	*3.94*	*3.76*	*4.00*	*4.06*	**3.94**	*3.91*	*3.94*
Total Product Supplied	**17.44**	**16.53**	**16.92**	**17.69**	*17.74*	*16.91*	*16.93*	*17.32*	*17.49*	*16.96*	*17.00*	*17.48*	**17.15**	*17.22*	*17.23*
Total Petroleum Net Imports	**6.01**	**6.24**	**6.35**	**7.00**	*6.77*	*6.87*	*7.09*	*6.69*	*6.56*	*6.94*	*7.24*	*7.14*	**6.40**	*6.85*	*6.97*
Closing Stocks (million barrels)															
Crude Oil (Excluding SPR) [f]	**354**	**359**	**328**	**333**	*336*	*335*	*335*	*335*	*334*	*334*	*334*	*335*	**333**	*335*	*335*
Total Motor Gasoline	**231**	**209**	**221**	**229**	*231*	*216*	*220*	*221*	*228*	*213*	*217*	*219*	**229**	*221*	*219*
Finished Motor Gasoline	**194**	**174**	**182**	**190**	*193*	*180*	*181*	*183*	*191*	*178*	*180*	*182*	**190**	*183*	*182*
Blending Components	**37**	**35**	**39**	**39**	*38*	*36*	*38*	*38*	*37*	*35*	*38*	*37*	**39**	*38*	*37*
Jet Fuel	**47**	**46**	**47**	**43**	*44*	*46*	*49*	*48*	*46*	*45*	*48*	*47*	**43**	*48*	*47*
Distillate Fuel Oil	**89**	**111**	**131**	**124**	*89*	*103*	*130*	*129*	*89*	*102*	*129*	*129*	**124**	*129*	*129*
Residual Fuel Oil	**44**	**42**	**44**	**45**	*41*	*39*	*41*	*44*	*40*	*40*	*41*	*44*	**45**	*44*	*44*
Other Oils [g]	**249**	**294**	**302**	**274**	*257*	*286*	*291*	*266*	*254*	*283*	*289*	*264*	**274**	*266*	*264*
Total Stocks (Excluding SPR)	**1014**	**1061**	**1073**	**1047**	*996*	*1025*	*1066*	*1042*	*992*	*1017*	*1058*	*1038*	**1047**	*1042*	*1038*
Crude Oil in SPR	**545**	**550**	**555**	**560**	*567*	*575*	*583*	*585*	*586*	*588*	*590*	*597*	**560**	*585*	*597*
Total Stocks (Including SPR)	**1559**	**1611**	**1627**	**1606**	*1564*	*1600*	*1648*	*1627*	*1579*	*1605*	*1648*	*1635*	**1606**	*1627*	*1635*

[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 Oct. 1988; *Weekly Petroleum Status Report*, DOE/EIA-0208(88-50,89-01,02,03).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Domestic Production [a]	**6.72**	**6.91**	**7.11**	**7.05**	*6.75*	*7.00*	*7.08*	*6.95*	*6.77*	*6.99*	*7.11*	*7.01*	**6.95**	*6.95*	*6.97*
Imports	**.34**	**.40**	**.44**	**.42**	*.36*	*.50*	*.56*	*.49*	*.40*	*.51*	*.56*	*.48*	**.40**	*.48*	*.49*
Exports	**.01**	**.03**	**.01**	**.05**	*.01*	*.01*	*.01*	*.01*	*.01*	*.01*	*.01*	*.01*	**.03**	*.01*	*.01*
Net Imports	**.32**	**.36**	**.43**	**.36**	*.36*	*.49*	*.54*	*.47*	*.39*	*.50*	*.55*	*.47*	**.37**	*.47*	*.48*
Net Withdrawals	**-.06**	**.22**	**-.09**	**-.09**	*-.04*	*.13*	*-.02*	*-.02*	*-.09*	*.14*	*-.03*	*-.02*	**.00**	*.01*	*.00*
Total Primary Supply	**6.98**	**7.49**	**7.45**	**7.32**	*7.07*	*7.61*	*7.60*	*7.40*	*7.08*	*7.63*	*7.64*	*7.46*	**7.31**	*7.42*	*7.45*
Disposition															
Leaded	**1.38**	**1.46**	**1.32**	**1.15**	*1.16*	*1.20*	*1.15*	*1.07*	*.99*	*1.02*	*.98*	*.92*	**1.33**	*1.15*	*.98*
Unleaded	**5.60**	**6.04**	**6.13**	**6.18**	*5.91*	*6.42*	*6.45*	*6.33*	*6.09*	*6.61*	*6.66*	*6.54*	**5.99**	*6.28*	*6.48*
Total Product Supplied	**6.98**	**7.49**	**7.45**	**7.32**	*7.07*	*7.61*	*7.60*	*7.40*	*7.08*	*7.63*	*7.64*	*7.46*	**7.31**	*7.42*	*7.45*
Stocks															
Primary Finished Stock Levels [b] (million barrels)															
Opening	**188.8**	**193.9**	**173.8**	**181.9**	*190.3*	*193.9*	*182.1*	*184.3*	*186.1*	*193.8*	*181.5*	*184.2*	**188.8**	*190.3*	*186.1*
Closing	**193.9**	**173.8**	**181.9**	**190.3**	*193.9*	*182.1*	*184.3*	*186.1*	*193.8*	*181.5*	*184.2*	*186.2*	**190.3**	*186.1*	*186.2*

[a] Refinery Production plus production at natural gas processing plants.
[b] Includes stocks at natural gas processing plants. Excludes stocks of reclassified motor gasoline blending components.
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1987*, DOE/EIA-0340(87)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1988 to Oct. 1988; *Weekly Petroleum Status Report*, DOE/EIA-0208(88-50,89-01,02,03).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Refinery Output	**2.81**	**2.90**	**2.80**	**2.95**	*2.87*	*2.91*	*2.94*	*2.99*	*2.88*	*2.94*	*2.97*	*3.05*	**2.86**	*2.93*	*2.96*
Imports	**.31**	**.22**	**.26**	**.34**	*.39*	*.35*	*.33*	*.38*	*.36*	*.35*	*.33*	*.39*	**.28**	*.36*	*.36*
Exports	**.09**	**.06**	**.07**	**.06**	*.09*	*.06*	*.07*	*.07*	*.09*	*.06*	*.07*	*.07*	**.07**	*.07*	*.07*
Net Imports	**.22**	**.15**	**.19**	**.28**	*.30*	*.30*	*.26*	*.31*	*.27*	*.29*	*.26*	*.32*	**.21**	*.29*	*.29*
Net Withdrawals	**.50**	**-.23**	**-.22**	**.08**	*.38*	*-.16*	*-.30*	*.01*	*.44*	*-.14*	*-.30*	*-.01*	**.03**	*-.02*	*.00*
Disposition															
Electric Utility Consumption	**.05**	**.04**	**.07**	**.04**	*.04*	*.04*	*.05*	*.04*	*.04*	*.04*	*.05*	*.05*	**.05**	*.04*	*.04*
Utility Stock Additions	**-.01**	**.00**	**.00**	**.00**	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	**.00**	*.00*	*.00*
Electric Utility Shipments	**.04**	**.04**	**.07**	**.04**	*.04*	*.04*	*.05*	*.04*	*.04*	*.04*	*.05*	*.04*	**.05**	*.04*	*.04*
Nonutility Shipments	**3.48**	**2.77**	**2.70**	**3.27**	*3.51*	*3.01*	*2.85*	*3.27*	*3.55*	*3.05*	*2.89*	*3.32*	**3.06**	*3.16*	*3.20*
Total Product Supplied	**3.52**	**2.81**	**2.77**	**3.31**	*3.55*	*3.05*	*2.90*	*3.31*	*3.59*	*3.09*	*2.94*	*3.37*	**3.10**	*3.20*	*3.25*
Stocks															
Electric Utility Stock Levels (million barrels)															
Opening	**15.8**	**15.0**	**15.3**	**15.5**	*15.1*	*15.0*	*14.8*	*14.7*	*14.6*	*14.6*	*14.4*	*14.3*	**15.8**	*15.1*	*14.6*
Closing	**15.0**	**15.3**	**15.5**	**15.1**	*15.0*	*14.8*	*14.7*	*14.6*	*14.6*	*14.4*	*14.3*	*14.2*	**15.1**	*14.6*	*14.2*
Primary Stock Levels (million barrels)															
Opening	**134.5**	**89.3**	**110.7**	**131.0**	*123.9*	*89.7*	*104.0*	*131.4*	*130.7*	*91.0*	*104.1*	*131.2*	**134.5**	*123.9*	*130.7*
Closing	**89.3**	**110.7**	**131.0**	**123.9**	*89.7*	*104.0*	*131.4*	*130.7*	*91.0*	*104.1*	*131.2*	*131.9*	**123.9**	*130.7*	*131.9*

Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1987,* DOE/EIA-0340(87)/1; *Petroleum Supply Monthly,* DOE/EIA-0109, Jan. 1988 to Oct. 1988; *Monthly Energy Review,* DOE/EIA-0035(88/10); *Electric Power Monthly,* DOE/EIA-0226(88/10); *Weekly Petroleum Status Report,* DOE/EIA-0208(88-50,89-01,02,03).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Refinery Output	**0.98**	**0.90**	**0.88**	**0.93**	*1.02*	*0.86*	*0.84*	*0.88*	*0.91*	*0.82*	*0.83*	*0.89*	**0.92**	*0.90*	*0.86*
Imports	**.71**	**.41**	**.51**	**.72**	*.80*	*.48*	*.41*	*.53*	*.65*	*.47*	*.38*	*.51*	**.59**	*.55*	*.50*
Exports	**.19**	**.23**	**.18**	**.19**	*.20*	*.18*	*.16*	*.20*	*.20*	*.18*	*.16*	*.20*	**.20**	*.19*	*.19*
Net Imports	**.52**	**.18**	**.33**	**.53**	*.60*	*.30*	*.24*	*.32*	*.45*	*.28*	*.22*	*.30*	**.39**	*.37*	*.31*
Net Withdrawals	**.04**	**.02**	**-.02**	**.00**	*.04*	*.01*	*-.02*	*-.03*	*.04*	*.01*	*-.02*	*-.03*	**.01**	*.00*	*.00*
Disposition															
Electric Utility Consumption	**.64**	**.41**	**.67**	**.78**	*.72*	*.46*	*.55*	*.49*	*.46*	*.45*	*.55*	*.50*	**.63**	*.55*	*.49*
Utility Stock Additions	**-.02**	**.01**	**.01**	**.03**	*.01*	*-.01*	*-.04*	*.00*	*.04*	*-.01*	*-.04*	*.00*	**.01**	*-.01*	*.00*
Electric Utility Shipments	**.61**	**.42**	**.68**	**.81**	*.73*	*.45*	*.51*	*.49*	*.50*	*.44*	*.50*	*.50*	**.63**	*.54*	*.49*
Nonutility Shipments	**.92**	**.68**	**.50**	**.65**	*.93*	*.72*	*.56*	*.69*	*.90*	*.68*	*.53*	*.66*	**.69**	*.72*	*.69*
Total Product Supplied	**1.54**	**1.10**	**1.18**	**1.46**	*1.66*	*1.16*	*1.07*	*1.18*	*1.40*	*1.11*	*1.03*	*1.16*	**1.32**	*1.27*	*1.17*
Stocks															
Electric Utility Stock Levels (million barrels)															
Opening	**55.1**	**52.8**	**53.5**	**54.6**	*57.2*	*58.3*	*57.5*	*53.6*	*53.3*	*57.1*	*56.3*	*52.4*	**55.1**	*57.2*	*53.3*
Closing	**52.8**	**53.5**	**54.6**	**57.2**	*58.3*	*57.5*	*53.6*	*53.3*	*57.1*	*56.3*	*52.4*	*52.1*	**57.2**	*53.3*	*52.1*
Primary Stock Levels (million barrels)															
Opening	**47.4**	**44.1**	**42.1**	**44.2**	*44.6*	*40.9*	*40.4*	*41.9*	*44.4*	*41.1*	*40.5*	*42.2*	**47.4**	*44.6*	*44.4*
Closing	**44.1**	**42.1**	**44.2**	**44.6**	*40.9*	*40.4*	*41.9*	*44.4*	*41.1*	*40.5*	*42.2*	*44.5*	**44.6**	*44.4*	*44.5*

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 Oct. 1988; *Monthly Energy Review,* DOE/EIA-0035(88/10); *Electric Power Monthly,* DOE/EIA-0226(88/10); *Weekly Petroleum Status Report,* DOE/EIA-0208(88-50,89-01,02,03).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Net Refinery Output [b]	**3.10**	**3.35**	**3.45**	**2.99**	*3.06*	*3.23*	*3.36*	*3.06*	*3.14*	*3.21*	*3.41*	*3.16*	**3.22**	*3.18*	*3.23*
Natural Gas Plant Output	**1.60**	**1.61**	**1.62**	**1.64**	*1.63*	*1.61*	*1.59*	*1.63*	*1.64*	*1.61*	*1.59*	*1.63*	**1.62**	*1.62*	*1.62*
Other Domestic [c]	**.06**	**.05**	**.06**	**.06**	*.06*	*.06*	*.06*	*.07*	*.06*	*.06*	*.07*	*.07*	**.06**	*.06*	*.06*
Net Imports	**.44**	**.54**	**.49**	**.51**	*.52*	*.58*	*.53*	*.47*	*.54*	*.63*	*.56*	*.47*	**.50**	*.53*	*.55*
Net Withdrawals	**.16**	**-.47**	**-.13**	**.35**	*.17*	*-.33*	*-.10*	*.28*	*.13*	*-.29*	*-.12*	*.28*	**-.02**	*.00*	*.00*
Total Primary Supply	**5.36**	**5.08**	**5.49**	**5.56**	*5.45*	*5.16*	*5.44*	*5.51*	*5.51*	*5.22*	*5.50*	*5.60*	**5.37**	*5.39*	*5.46*
Disposition															
Jet Fuel	**1.48**	**1.39**	**1.42**	**1.57**	*1.57*	*1.46*	*1.50*	*1.53*	*1.59*	*1.48*	*1.52*	*1.56*	**1.47**	*1.51*	*1.54*
Liquefied Petroleum Gas [d]	**1.92**	**1.34**	**1.54**	**1.85**	*1.88*	*1.40*	*1.49*	*1.87*	*1.86*	*1.39*	*1.48*	*1.87*	**1.66**	*1.66*	*1.65*
Petrochemical Feedstocks [e]	**.40**	**.40**	**.39**	**.39**	*.40*	*.48*	*.46*	*.39*	*.43*	*.51*	*.48*	*.42*	**.39**	*.43*	*.46*
Miscellaneous [f]	**1.56**	**1.94**	**2.13**	**1.75**	*1.61*	*1.82*	*2.00*	*1.72*	*1.62*	*1.84*	*2.02*	*1.75*	**1.85**	*1.79*	*1.81*
Total Product Supplied	**5.35**	**5.08**	**5.49**	**5.56**	*5.45*	*5.16*	*5.44*	*5.51*	*5.51*	*5.22*	*5.50*	*5.60*	**5.37**	*5.39*	*5.46*
Stock															
Primary Stocks (million barrels)															
Opening	**347.1**	**332.6**	**375.0**	**387.2**	*355.1*	*340.3*	*370.0*	*379.6*	*353.4*	*341.3*	*368.0*	*379.0*	**347.1**	*355.1*	*353.4*
Closing	**332.6**	**375.0**	**387.2**	**355.1**	*340.3*	*370.0*	*379.6*	*353.4*	*341.3*	*368.0*	*379.0*	*353.6*	**355.1**	*353.4*	*353.6*

[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 November and December 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 Oct. 1988; and *Weekly Petroleum Status Report*, DOE/EIA-0208(88-50,89-01,02,03).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Total Dry Gas Production [a]	**4.40**	**4.03**	**3.91**	**4.34**	*4.40*	*4.20*	*4.13*	*4.39*	*4.46*	*4.19*	*4.15*	*4.43*	**16.68**	*17.12*	*17.23*
Net Imports	**.34**	**.27**	**.29**	**.29**	*.37*	*.32*	*.29*	*.34*	*.40*	*.35*	*.32*	*.37*	**1.19**	*1.32*	*1.44*
Supplemental Gaseous Fuels	**.04**	**.03**	**.03**	**.05**	*.05*	*.04*	*.04*	*.05*	*.05*	*.04*	*.04*	*.05*	**.15**	*.17*	*.18*
Total New Supply	**4.79**	**4.33**	**4.23**	**4.67**	*4.82*	*4.55*	*4.45*	*4.77*	*4.91*	*4.58*	*4.51*	*4.84*	**18.02**	*18.60*	*18.84*
Underground Working Gas Storage															
Opening	**2.76**	**1.68**	**2.29**	**3.12**	*2.72*	*1.68*	*2.26*	*3.08*	*2.72*	*1.68*	*2.26*	*3.08*	**2.76**	*2.72*	*2.72*
Closing	**1.68**	**2.29**	**3.12**	**2.72**	*1.68*	*2.26*	*3.08*	*2.72*	*1.68*	*2.26*	*3.08*	*2.72*	**2.72**	*2.72*	*2.72*
Net Withdrawals [b]	**1.08**	**-.61**	**-.83**	**.38**	*1.03*	*-.58*	*-.82*	*.37*	*1.03*	*-.58*	*-.82*	*.37*	**.02**	*.00*	*.00*
Total Primary Supply [a]	**5.87**	**3.72**	**3.40**	**5.04**	*5.85*	*3.98*	*3.63*	*5.14*	*5.94*	*4.00*	*3.69*	*5.21*	**18.03**	*18.60*	*18.84*
Consumption															
Lease and Plant Fuel	**.31**	**.28**	**.27**	**.28**	*.30*	*.26*	*.25*	*.28*	*.30*	*.26*	*.25*	*.29*	**1.14**	*1.09*	*1.10*
Pipeline Use	**.15**	**.13**	**.13**	**.14**	*.16*	*.14*	*.13*	*.15*	*.16*	*.14*	*.13*	*.15*	**.55**	*.57*	*.58*
Residential	**2.19**	**.81**	**.37**	**1.28**	*2.17*	*.91*	*.37*	*1.22*	*2.17*	*.91*	*.37*	*1.23*	**4.66**	*4.67*	*4.68*
Commercial	**1.15**	**.50**	**.34**	**.68**	*1.12*	*.52*	*.33*	*.67*	*1.12*	*.52*	*.34*	*.67*	**2.67**	*2.64*	*2.66*
Industrial	**1.70**	**1.48**	**1.52**	**1.68**	*1.82*	*1.56*	*1.50*	*1.70*	*1.85*	*1.57*	*1.52*	*1.74*	**6.38**	*6.58*	*6.68*
Electric Utilities	**.54**	**.72**	**.91**	**.47**	*.56*	*.69*	*.88*	*.60*	*.62*	*.68*	*.90*	*.62*	**2.63**	*2.73*	*2.82*
Subtotal	**6.05**	**3.92**	**3.53**	**4.54**	*6.14*	*4.07*	*3.46*	*4.63*	*6.23*	*4.09*	*3.52*	*4.69*	**18.04**	*18.29*	*18.52*
Total Disposition	**5.87**	**3.72**	**3.40**	**5.04**	*5.85*	*3.98*	*3.63*	*5.14*	*5.94*	*4.00*	*3.69*	*5.21*	**18.03**	*18.60*	*18.84*
Unaccounted for	**-.18**	**-.20**	**-.13**	**.51**	*-.28*	*-.09*	*.17*	*.52*	*-.28*	*-.09*	*.17*	*.52*	**.00**	*.31*	*.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(88/10); *Natural Gas Monthly*, DOE/EIA-0130(88/10); and *Electric Power Monthly*, DOE/EIA-0226(88/10).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th[a]	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Production	**237**	**227**	**241**	**254**	*242*	*249*	*240*	*249*	*246*	*252*	*242*	*252*	**959**	*979*	*992*
Primary Stock Levels [b]															
Opening	**28**	**37**	**36**	**31**	*31*	*30*	*29*	*29*	*29*	*28*	*27*	*27*	**28**	*31*	*29*
Closing	**37**	**36**	**31**	**31**	*30*	*29*	*29*	*29*	*28*	*27*	*27*	*27*	**31**	*29*	*27*
Net Withdrawals	**-8**	**1**	**5**	**0**	*1*	*1*	*0*	*0*	*1*	*1*	*0*	*0*	**-3**	*2*	*2*
Imports	**1**	**1**	**0**	**1**	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	**2**	*2*	*2*
Exports	**16**	**25**	**28**	**24**	*19*	*25*	*24*	*25*	*19*	*24*	*24*	*23*	**93**	*93*	*90*
Total New Domestic Supply	**213**	**203**	**219**	**231**	*224*	*226*	*216*	*225*	*228*	*230*	*219*	*229*	**865**	*891*	*906*
Secondary Stock Levels [c]															
Opening	**185**	**174**	**173**	**154**	*168*	*166*	*182*	*163*	*169*	*170*	*187*	*166*	**185**	*168*	*169*
Closing	**174**	**173**	**154**	**168**	*166*	*182*	*163*	*169*	*170*	*187*	*166*	*170*	**168**	*169*	*170*
Net Withdrawals	**12**	**0**	**19**	**-13**	*1*	*-16*	*19*	*-6*	*-1*	*-17*	*21*	*-4*	**18**	*-1*	*-1*
Total Indicated Consumption	**225**	**203**	**238**	**217**	*225*	*210*	*235*	*220*	*227*	*213*	*240*	*225*	**883**	*890*	*905*
Consumption															
Coke Plants	**10**	**11**	**10**	**10**	*11*	*11*	*10*	*10*	*10*	*10*	*9*	*9*	**41**	*41*	*39*
Electric Utilities	**188**	**176**	**208**	**184**	*192*	*179*	*206*	*188*	*195*	*183*	*212*	*193*	**755**	*764*	*783*
Retail and General Industry [d]	**22**	**19**	**20**	**23**	*23*	*20*	*19*	*22*	*22*	*20*	*19*	*22*	**84**	*84*	*84*
Subtotal	**220**	**205**	**238**	**217**	*225*	*210*	*235*	*220*	*227*	*213*	*240*	*225*	**880**	*890*	*905*
Total Disposition	**225**	**203**	**238**	**217**	*225*	*210*	*235*	*220*	*227*	*213*	*240*	*225*	**883**	*890*	*905*
Discrepancy [e]	**5**	**-2**	**0**	**0**	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	**3**	*0*	*0*

[a] Estimated.
[b] Primary stocks are held at the mines, preparation plants, and distribution points.
[c] Secondary stocks are held by users. Most of the secondary stocks are held by electric utilities.
[d] Includes consumption at coal gasification plants of 6.3 million tons for 1988. Synfuels plant consumption is assumed to be 1.5 million tons per quarter through June 1989, and 1.4 million tons per quarter thereafter.
[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(88/10); and *Quarterly Coal Report,* DOE/EIA-0121(88/3Q).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th[a]	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Net Utility Generation															
Coal	**383.4**	**355.7**	**420.0**	**375.7**	*390.7*	*366.1*	*416.8*	*380.0*	*396.8*	*373.5*	*429.2*	*392.3*	**1534.8**	*1553.5*	*1591.8*
Petroleum	**37.6**	**24.4**	**40.1**	**45.6**	*40.7*	*26.8*	*32.7*	*29.1*	*26.5*	*26.1*	*32.4*	*29.9*	**147.9**	*129.4*	*115.0*
Natural Gas	**52.5**	**69.2**	**86.2**	**45.0**	*53.8*	*65.6*	*84.3*	*57.6*	*59.0*	*65.4*	*86.1*	*59.1*	**253.0**	*261.4*	*269.5*
Nuclear Power	**130.8**	**124.8**	**145.1**	**126.5**	*132.4*	*124.8*	*138.0*	*128.8*	*138.4*	*127.3*	*142.6*	*132.7*	**527.2**	*524.0*	*540.9*
Hydropower	**60.9**	**59.2**	**49.6**	**54.7**	*65.6*	*72.9*	*64.7*	*67.5*	*77.3*	*78.3*	*64.7*	*67.5*	**224.3**	*270.7*	*287.8*
Geothermal Power and Other[b]	**3.0**	**2.9**	**3.1**	**3.1**	*3.1*	*3.0*	*3.2*	*3.2*	*3.1*	*3.1*	*3.3*	*3.3*	**12.1**	*12.5*	*12.9*
Total Utility Generation	**668.2**	**636.1**	**744.2**	**650.3**	*686.3*	*659.3*	*739.6*	*666.3*	*701.2*	*673.7*	*758.3*	*684.8*	**2698.9**	*2751.4*	*2818.0*
Net Imports	**7.7**	**7.1**	**7.7**	**10.2**	*8.4*	*8.6*	*11.8*	*11.0*	*10.6*	*10.0*	*12.7*	*11.8*	**32.7**	*39.7*	*45.1*
Purchases from Nonutilities[c]	*14.7*	*14.0*	*15.5*	*14.2*	*17.1*	*16.6*	*18.2*	*16.6*	*19.6*	*19.0*	*20.9*	*19.1*	*58.4*	*68.5*	*78.6*
Total Supply	*690.6*	*657.3*	*767.4*	*674.7*	*711.8*	*684.4*	*769.6*	*693.9*	*731.4*	*702.7*	*791.9*	*715.7*	*2790.0*	*2859.6*	*2941.7*
Losses and Unaccounted For[d]	*46.4*	*63.1*	*58.1*	*52.6*	*41.7*	*62.3*	*56.3*	*57.3*	*42.9*	*64.0*	*57.9*	*59.1*	*220.2*	*217.7*	*223.9*
Utility Sales	**644.2**	**594.2**	**709.4**	**622.1**	*670.0*	*622.1*	*713.3*	*636.6*	*688.5*	*638.8*	*733.9*	*656.6*	**2569.8**	*2642.0*	*2717.8*

[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(88/10); and *Electric Power Monthly,* DOE/EIA-0226(88/10).

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

Supply and Disposition	1988				1989				1990				Year		
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1988	1989	1990
Supply															
Production															
Petroleum [a]	**4.94**	**4.89**	**4.84**	**4.86**	*4.73*	*4.71*	*4.71*	*4.73*	*4.62*	*4.61*	*4.60*	*4.58*	**19.53**	*18.88*	*18.41*
Natural Gas [b]	**4.54**	**4.15**	**4.03**	**4.47**	*4.54*	*4.33*	*4.25*	*4.53*	*4.60*	*4.32*	*4.28*	*4.56*	**17.19**	*17.65*	*17.76*
Coal	**5.19**	**4.97**	**5.29**	**5.57**	*5.29*	*5.45*	*5.26*	*5.47*	*5.40*	*5.53*	*5.31*	*5.52*	**21.02**	*21.47*	*21.76*
Nuclear Power	**1.41**	**1.35**	**1.57**	**1.37**	*1.43*	*1.35*	*1.49*	*1.39*	*1.49*	*1.37*	*1.54*	*1.43*	**5.69**	*5.66*	*5.84*
Hydropower [c]	**.63**	**.62**	**.52**	**.57**	*.68*	*.76*	*.67*	*.70*	*.80*	*.81*	*.67*	*.70*	**2.33**	*2.81*	*2.99*
Geothermal Power and Other [d]	**.06**	**.06**	**.06**	**.06**	*.06*	*.06*	*.06*	*.06*	*.06*	*.06*	*.07*	*.07*	**.24**	*.25*	*.26*
Subtotal	**16.78**	**16.03**	**16.31**	**16.89**	*16.74*	*16.65*	*16.45*	*16.88*	*16.98*	*16.70*	*16.47*	*16.86*	**66.01**	*66.72*	*67.02*
Net Imports															
Crude Oil	**2.42**	**2.69**	**2.67**	**2.88**	*2.72*	*2.94*	*3.13*	*2.92*	*2.77*	*2.99*	*3.26*	*3.22*	**10.66**	*11.71*	*12.23*
Other Petroleum	**.76**	**.62**	**.73**	**.86**	*.89*	*.84*	*.81*	*.81*	*.82*	*.86*	*.81*	*.80*	**2.96**	*3.34*	*3.29*
Natural Gas	**.34**	**.27**	**.29**	**.28**	*.37*	*.32*	*.29*	*.34*	*.40*	*.35*	*.32*	*.37*	**1.19**	*1.31*	*1.43*
Coal and Coke	**-.40**	**-.63**	**-.70**	**-.61**	*-.48*	*-.62*	*-.61*	*-.63*	*-.48*	*-.60*	*-.60*	*-.59*	**-2.35**	*-2.34*	*-2.27*
Electricity	**.08**	**.07**	**.08**	**.10**	*.09*	*.09*	*.12*	*.11*	*.11*	*.10*	*.13*	*.12*	**.34**	*.41*	*.46*
Subtotal	**3.20**	**3.02**	**3.07**	**3.52**	*3.58*	*3.57*	*3.74*	*3.54*	*3.62*	*3.70*	*3.92*	*3.91*	**12.80**	*14.43*	*15.15*
Primary Stocks															
Net Withdrawals	**1.17**	**-.83**	**-.77**	**.54**	*1.29*	*-.71*	*-1.04*	*.46*	*1.32*	*-.68*	*-1.05*	*.45*	**.11**	*.00*	*.03*
SPR Fill Rate Additions(-)	**-.03**	**-.03**	**-.03**	**-.03**	*-.04*	*-.05*	*-.05*	*-.01*	*-.01*	*-.01*	*-.01*	*-.04*	**-.11**	*-.15*	*-.07*
Secondary Stocks [e]															
Net Withdrawals	**.27**	**.00**	**.40**	**-.30**	*-.01*	*-.29*	*.44*	*-.11*	*-.11*	*-.33*	*.49*	*-.07*	**.37**	*.04*	*-.02*
Total Supply [f]	**21.40**	**18.19**	**18.98**	**20.62**	*21.56*	*19.17*	*19.54*	*20.76*	*21.80*	*19.38*	*19.82*	*21.11*	**79.19**	*81.04*	*82.11*
Disposition															
Nonutility Uses															
Petroleum	**8.18**	**7.87**	**7.98**	**8.32**	*8.21*	*8.09*	*8.14*	*8.37*	*8.29*	*8.13*	*8.18*	*8.45*	**32.35**	*32.81*	*33.05*
Natural Gas [g]	**5.68**	**3.30**	**2.70**	**4.19**	*5.75*	*3.49*	*2.66*	*4.15*	*5.78*	*3.51*	*2.70*	*4.20*	**15.88**	*16.04*	*16.19*
Coal [h]	**.77**	**.71**	**.74**	**.79**	*.80*	*.74*	*.74*	*.79*	*.78*	*.72*	*.73*	*.78*	**3.01**	*3.07*	*3.01*
Industrial Hydropower	**.01**	**.01**	**.01**	**.01**	*.01*	*.01*	*.01*	*.01*	*.01*	*.01*	*.01*	*.01*	**.03**	*.03*	*.03*
Subtotal	**14.64**	**11.89**	**11.43**	**13.31**	*14.77*	*12.33*	*11.55*	*13.31*	*14.86*	*12.37*	*11.62*	*13.44*	**51.27**	*51.95*	*52.29*
Electric Utility Inputs															
Petroleum	**.39**	**.26**	**.43**	**.48**	*.43*	*.28*	*.35*	*.31*	*.28*	*.28*	*.34*	*.32*	**1.56**	*1.37*	*1.22*
Natural Gas	**.56**	**.74**	**.93**	**.48**	*.58*	*.71*	*.91*	*.62*	*.64*	*.71*	*.93*	*.64*	**2.72**	*2.82*	*2.91*
Coal	**3.97**	**3.71**	**4.40**	**3.90**	*4.05*	*3.80*	*4.32*	*3.94*	*4.12*	*3.88*	*4.45*	*4.07*	**15.97**	*16.12*	*16.52*
Nuclear Power	**1.41**	**1.35**	**1.57**	**1.37**	*1.43*	*1.35*	*1.49*	*1.39*	*1.49*	*1.37*	*1.54*	*1.43*	**5.69**	*5.66*	*5.84*
Hydropower [i]	**.70**	**.68**	**.59**	**.67**	*.76*	*.84*	*.79*	*.81*	*.90*	*.91*	*.79*	*.81*	**2.64**	*3.19*	*3.42*
Geothermal Power and Other	**.06**	**.06**	**.06**	**.06**	*.06*	*.06*	*.06*	*.06*	*.06*	*.06*	*.07*	*.07*	**.24**	*.25*	*.26*
Subtotal	**7.09**	**6.80**	**7.97**	**6.95**	*7.32*	*7.04*	*7.92*	*7.13*	*7.50*	*7.20*	*8.13*	*7.34*	**28.81**	*29.41*	*30.16*
Gross Energy Consumption [f]	**21.73**	**18.69**	**19.40**	**20.26**	*22.09*	*19.36*	*19.47*	*20.45*	*22.36*	*19.57*	*19.74*	*20.78*	**80.08**	*81.36*	*82.45*
Electrical System Energy Losses [j]	**4.94**	**4.82**	**5.60**	**4.88**	*5.09*	*4.97*	*5.55*	*5.02*	*5.21*	*5.09*	*5.69*	*5.16*	**20.24**	*20.63*	*21.16*
Total Net Energy	**16.79**	**13.87**	**13.80**	**15.38**	*17.00*	*14.39*	*13.92*	*15.43*	*17.14*	*14.48*	*14.05*	*15.61*	**59.84**	*60.73*	*61.29*
Total Disposition	**21.40**	**18.19**	**18.98**	**20.62**	*21.56*	*19.17*	*19.54*	*20.76*	*21.80*	*19.38*	*19.82*	*21.11*	**79.19**	*81.04*	*82.11*
Unaccounted for	**-.33**	**-.50**	**-.42**	**.36**	*-.53*	*-.19*	*.08*	*.32*	*-.56*	*-.19*	*.08*	*.33*	**-.89**	*-.32*	*-.34*

[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(88/10); and *Electric Power Monthly,* DOE/EIA-0226(88/10).

Table 18. Conversion Factors

Fuel	Units	Heat Content
Coal		
Production	Million Btu/short ton	21.922
Consumption	Million Btu/short ton	21.517
Coke Plants	Million Btu/short ton	26.800
Industrial and Retail	Million Btu/short ton	22.472
Electric Utilities	Million Btu/short ton	21.136
Imports	Million Btu/short ton	25.000
Exports	Million Btu/short ton	26.291
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	1,031
Consumption	Btu/cubic foot	1,031
Non-electric Utilities	Btu/cubic foot	1,031
Electric Utilities	Btu/cubic foot	1,032
Imports	Btu/cubic foot	999
Exports	Btu/cubic foot	1,011

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

Appendix A

Annual Energy Outlook 1989: Forecast Summary

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Annual Energy Outlook 1989: Forecast Summary

According to EIA's *Annual Energy Outlook 1989 (AEO)*, published in January 1989, if real gross national product (GNP) grows at an average rate of 2.5 percent annually (a slower pace than was evident since 1970) while average crude oil prices increase only gradually in real terms (to the equivalent of $28 per barrel in 1988 dollars) by the end of the century, the *AEO* base case calculations suggest that the United States will be using over 90 quadrillion Btu of energy by the year 2000 (Table A1). Under these assumptions, a decline in U.S. domestic oil production will lead to imported oil levels equal to more than one-half of petroleum demand by as early as 1994 (Table A2).

Oil Prices Dependent on Utilization of Production Capacity

Erratic variations in the price of imported crude oil should persist for several years, while the Organization for Petroleum Exporting Countries (OPEC) attempts to regain control over the output of member countries with dissimilar interests. Furthermore, non-OPEC oil production is still growing, though slowly. By 2000, however, fundamental forces of supply and demand should raise imported oil prices (absent any dramatic technological changes), as rising consumption drains off excess capacity and the geographical concentration of reserves restores OPEC's power in the market.

U.S. Vulnerability in Oil Market Dependent on Stocks and Imports

U.S. oil imports have gone up by 50 percent since 1985--nearly an additional 2 million barrels per day. The free world as a whole, however, currently depends on OPEC production to satisfy only about 40 percent of its total demand (versus almost 70 percent in the 1970's). Though this level of dependency is expected to reach above 50 percent by the late 1990's, strategic petroleum stocks in this country, Japan, and the Federal Republic of Germany are now capable of supplying more than 5 million barrels per day for several months in an emergency.

Economic Growth Keeps Oil Demand Up in the Face of Falling Output

GNP increased by about 4 percent during 1988, concurrent with growth in domestic oil consumption at about three-quarters of that rate. Future increases in oil demand are expected for industrial diesel, farm diesel, and jet fuel uses, but not for gasoline use (due to increasing fuel efficiency among new automobiles). U.S. offshore oil production is expected to hold steady, yet overall output is expected to fall from 8.2 million barrels per day in 1988 to 5.9 million barrels per day by the end of the century.

Natural Gas Production Lags Rising Demand, Imports Fill the Gap

A recent turnaround in U.S. demand for natural gas has resulted in growing domestic production. Gas use could expand by between 10 and 15 percent before 2000, exceeding 20 trillion cubic feet per year (Table A3). Competition within the gas industry is increasing, particularly within the electric utility market. Net imports (mostly from Canada) will have to double by 2000 to meet peak demand during the heating season--with perhaps 0.3 trillion cubic feet per year in the form of liquefied natural gas.

Electricity Outpaces GNP, Coal and Gas Relied on More Heavily

Despite increasing efficiency, electricity sales are projected to rise a little more rapidly than GNP (Table A4). In fact, electric power purchases by industry (especially for primary metals, chemicals, metal fabrication, and paper) rise by an average rate of 3.2 percent per year. With no new orders for nuclear plants expected before 2000, fossil fuel plants, including coal (Table A5), must continue to satisfy most of U.S. generating needs. New construction of gas-fired, combined-cycle plants should begin contributing after 1995.

Table A1. Yearly Supply and Disposition Summary of Total Energy
(Quadrillion Btu)

Supply and Disposition	Base Case															Annual Pct. Growth
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1988-2000
Production																
Crude Oil	18.4	17.7	17.3	16.9	16.2	15.4	14.6	14.0	13.5	13.1	12.8	12.7	12.6	12.5	12.5	-2.7
Natural Gas Plant Liquids	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.6	1.2
Natural Gas [1]	16.5	17.0	17.2	17.2	17.5	17.5	17.4	17.6	17.9	18.1	18.2	18.5	18.7	18.8	19.0	.9
Coal	19.5	20.2	20.7	20.8	21.4	21.7	22.2	22.7	23.1	23.6	23.6	24.1	24.6	25.1	25.5	1.8
Nuclear Power	4.5	4.9	5.6	5.6	5.8	6.0	6.0	6.0	6.1	6.1	6.1	6.1	6.2	6.2	6.2	.8
Hydropower/Other [2]	3.3	2.8	2.6	3.1	3.3	3.3	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	2.2
Total Production	**64.3**	**64.9**	**65.7**	**65.9**	**66.4**	**66.2**	**65.9**	**66.0**	**66.3**	**66.6**	**66.6**	**67.4**	**68.1**	**68.6**	**69.3**	**.4**
Imports																
Crude Oil [3]	9.0	10.1	11.0	11.9	13.3	14.1	15.2	15.7	16.1	16.6	17.2	17.2	17.4	17.9	18.3	4.3
Petroleum Products	4.4	4.3	4.2	4.5	4.6	4.8	5.0	5.0	5.1	5.2	5.3	5.3	5.3	5.4	5.5	2.2
Natural Gas [4]	.7	.9	1.1	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.1	2.2	2.3	6.0
Other Imports [5]	.4	.5	.5	.5	.5	.6	.6	.7	.7	.7	.8	.8	.8	.9	.9	5.1
Total Imports	**14.5**	**15.8**	**16.9**	**18.3**	**19.9**	**21.1**	**22.4**	**23.1**	**23.7**	**24.4**	**25.2**	**25.4**	**25.8**	**26.5**	**27.0**	**4.0**
Exports																
Coal	2.2	2.1	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.7	2.8	2.9	2.9	2.2
Petroleum	1.7	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	.2
Total Exports	**3.9**	**3.7**	**4.0**	**3.8**	**4.0**	**4.0**	**4.1**	**4.1**	**4.2**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**1.4**
Adjustments [6]	**-.6**	**-.2**	**.8**	**.3**	**-.7**	**-.8**	**-.9**	**-.9**	**-.9**	**-1.0**	**-.9**	**-.8**	**-.9**	**-1.0**	**-1.0**	
Consumption																
Petroleum Products [7]	32.2	32.9	33.7	33.9	34.4	34.7	35.0	35.1	35.1	35.2	35.7	35.8	35.9	36.4	36.8	.7
Natural Gas	16.7	17.6	18.3	18.5	18.5	18.6	18.6	18.9	19.2	19.5	19.7	20.1	20.5	20.6	20.9	1.1
Coal	17.3	18.0	18.8	19.0	19.1	19.3	19.8	20.2	20.6	21.0	21.0	21.4	21.8	22.2	22.5	1.5
Nuclear Power	4.5	4.9	5.6	5.6	5.8	6.0	6.0	6.0	6.1	6.1	6.1	6.1	6.2	6.2	6.2	.8
Hydropower/Other [8]	3.6	3.3	3.1	3.6	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.1	4.1	4.2	4.2	2.6
Total Consumption	**74.3**	**76.8**	**79.4**	**80.6**	**81.6**	**82.5**	**83.3**	**84.2**	**84.9**	**85.8**	**86.6**	**87.5**	**88.5**	**89.5**	**90.6**	**1.1**
Net Imports - Petroleum	**11.7**	**12.6**	**13.6**	**14.8**	**16.2**	**17.2**	**18.4**	**19.0**	**19.5**	**20.0**	**20.7**	**20.8**	**21.0**	**21.6**	**22.0**	**4.1**
Prices (1988 dollars per unit)																
World Oil Price ($ per barrel)[9]	$14.92	$18.70	$14.70	$14.40	$15.00	$15.50	$15.90	$17.10	$18.90	$20.60	$22.50	$24.30	$26.00	$27.10	$28.00	5.5
Avg. Wellhead Price ($ per Mcf)	2.06	1.72	1.62	1.64	1.75	1.86	2.14	2.40	2.61	2.80	3.22	3.36	3.55	3.76	3.91	7.6
Avg. Coal Minemouth Price ($ per ton)	25.36	23.79	23.61	23.49	24.00	24.09	24.28	24.49	24.72	24.95	25.03	25.26	25.50	25.73	25.87	.8
Real GNP (billion 1982 dollars)	**3,722**	**3,847**	**4,001**	**4,116**	**4,217**	**4,326**	**4,434**	**4,540**	**4,648**	**4,757**	**4,875**	**4,976**	**5,095**	**5,230**	**5,368**	**2.5**

[1] Dry natural gas.
[2] Includes hydropower, geothermal power, wood, and waste.
[3] Includes imports of crude oil for the Strategic Petroleum Reserve.
[4] Represents net imports.
[5] Includes coal, net coal coke imports, and net electricity imports.
[6] Balancing item. Includes stock changes, unaccounted for supply, losses, and gains.
[7] *Includes natural gas plant liquids and crude oil consumed as fuels.*
[8] Includes industrial generation of hydroelectric power, net electricity imports, and electricity produced from geothermal, wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems. Also includes net coal coke imports.
[9] Represents the cost of imported crude oil to U.S. refiners.
Notes: Historical values are through 1987. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07); values for 1988 are estimates. Forecast: Based on Run 635; File Creation Date 12/20/88; Values for 1989 are benchmarked to the EIA, *Short-Term Energy Outlook*, DOE/EIA-0202(88/4Q).

Table A2. Petroleum Supply and Disposition Balance
(Million Barrels per Day)

Supply and Disposition	Base Case															Annual Pct. Growth
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1988-2000
World Oil Price [1] (1988 dollars per barrel)	**14.92**	**18.70**	**14.70**	**14.40**	**15.00**	**15.50**	**15.90**	**17.10**	**18.90**	**20.60**	**22.50**	**24.30**	**26.00**	**27.10**	**28.00**	**5.5**
Production																
Crude Oil [2]	8.68	8.35	8.18	7.97	7.64	7.25	6.87	6.59	6.37	6.17	6.05	6.00	5.94	5.90	5.89	-2.7
Alaska	1.87	1.96	2.03	2.01	1.96	1.80	1.62	1.51	1.41	1.29	1.21	1.16	1.06	.98	.91	-6.5
Lower 48	6.81	6.39	6.15	5.95	5.68	5.45	5.25	5.08	4.96	4.88	4.84	4.84	4.87	4.92	4.98	-1.7
Natural Gas Liquids	1.55	1.60	1.61	1.62	1.67	1.72	1.71	1.73	1.75	1.77	1.78	1.82	1.84	1.84	1.87	1.2
Other Domestic	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.6
Processing Gain [3]	.62	.64	.66	.66	.66	.65	.64	.64	.63	.62	.62	.62	.62	.62	.63	-.5
Total Production	**10.90**	**10.65**	**10.51**	**10.31**	**10.03**	**9.69**	**9.29**	**9.02**	**8.82**	**8.63**	**8.52**	**8.50**	**8.46**	**8.43**	**8.45**	**-1.8**
Imports (including SPR [4])																
Crude Oil	4.18	4.67	5.12	5.54	6.16	6.55	7.06	7.31	7.50	7.71	7.97	7.99	8.09	8.33	8.49	4.3
Refined Products	2.05	2.00	1.96	2.09	2.16	2.23	2.30	2.34	2.37	2.40	2.46	2.47	2.48	2.51	2.54	2.2
Total Imports	**6.22**	**6.67**	**7.08**	**7.63**	**8.31**	**8.78**	**9.36**	**9.65**	**9.86**	**10.11**	**10.43**	**10.46**	**10.57**	**10.84**	**11.03**	**3.8**
Exports																
Crude Oil	.15	.15	.17	.17	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	1.3
Refined Products	.63	.61	.64	.62	.63	.63	.63	.63	.63	.63	.63	.63	.63	.63	.63	.0
Total Exports	**.78**	**.76**	**.80**	**.79**	**.83**	**.83**	**.83**	**.83**	**.83**	**.83**	**.83**	**.83**	**.83**	**.83**	**.83**	**.2**
Net Imports	**5.44**	**5.91**	**6.28**	**6.84**	**7.49**	**7.96**	**8.53**	**8.83**	**9.04**	**9.28**	**9.60**	**9.64**	**9.75**	**10.02**	**10.20**	**4.1**
Primary Stock Changes [5]																
Net Withdrawals	-.15	.04	.04	.01	-.04	.00	-.03	.00	.00	-.01	-.04	-.01	-.01	-.04	-.04	
SPR [4] Fill Rate (-)	-.05	-.08	-.05	-.05	-.08	-.08	-.08	-.08	-.08	-.08	-.03	.00	.00	.00	.00	
Total Primary Supply [6]	**16.14**	**16.52**	**16.78**	**17.11**	**17.40**	**17.57**	**17.72**	**17.77**	**17.78**	**17.83**	**18.06**	**18.13**	**18.19**	**18.41**	**18.61**	**.9**
Refined Petroleum Products																
Motor Gasoline	7.03	7.21	7.34	7.44	7.46	7.38	7.33	7.27	7.23	7.20	7.19	7.17	7.18	7.21	7.26	-.1
Jet Fuel [7]	1.31	1.37	1.44	1.49	1.52	1.54	1.56	1.58	1.59	1.61	1.62	1.63	1.65	1.67	1.70	1.4
Distillate Fuel [8]	3.01	3.07	3.22	3.32	3.33	3.39	3.44	3.47	3.49	3.51	3.54	3.58	3.61	3.65	3.69	1.1
Residual Fuel	1.42	1.26	1.25	1.20	1.30	1.38	1.47	1.50	1.49	1.51	1.66	1.67	1.63	1.68	1.70	2.6
Other Petroleum Products [9]	3.52	3.76	3.76	3.75	3.83	3.87	3.91	3.94	3.96	3.99	4.04	4.07	4.12	4.19	4.26	1.1
Total Product Supplied	**16.29**	**16.67**	**17.01**	**17.20**	**17.44**	**17.57**	**17.72**	**17.76**	**17.78**	**17.82**	**18.05**	**18.12**	**18.19**	**18.40**	**18.61**	**.8**
Refined Petroleum Products Supplied by Sector																
Residential/Commercial	1.35	1.37	1.41	1.43	1.43	1.42	1.41	1.39	1.37	1.36	1.34	1.32	1.31	1.30	1.30	-.7
Industrial	4.09	4.30	4.30	4.33	4.40	4.45	4.49	4.51	4.53	4.56	4.60	4.64	4.68	4.76	4.84	1.0
Transportation	10.22	10.46	10.73	10.94	11.03	11.04	11.05	11.04	11.04	11.05	11.09	11.11	11.16	11.26	11.37	.5
Electric Utilities	.63	.55	.58	.51	.57	.67	.77	.82	.83	.86	1.03	1.05	1.03	1.08	1.11	5.6
Total Consumption	**16.29**	**16.67**	**17.01**	**17.20**	**17.44**	**17.57**	**17.72**	**17.76**	**17.78**	**17.82**	**18.05**	**18.12**	**18.19**	**18.40**	**18.61**	**.8**
Discrepancy [10]	**-.15**	**-.15**	**-.23**	**-.10**	**-.04**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.01**	**.00**	**.01**	**.01**	
Net Disposition [11]	**16.14**	**16.52**	**16.78**	**17.11**	**17.40**	**17.57**	**17.72**	**17.77**	**17.78**	**17.83**	**18.06**	**18.13**	**18.19**	**18.41**	**18.61**	**.9**

[1] Represents the cost of imported crude oil to U.S. refiners.
[2] Includes lease condensate.
[3] Represents volumetric gain in refinery distillation and cracking processes.
[4] SPR is the Strategic Petroleum Reserve.
[5] A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[6] Equals total production plus net imports plus net stock withdrawals minus SPR fill rate.
[7] Includes naphtha and kerosene type.
[8] Includes kerosene.
[9] Includes aviation gasoline, liquefied petroleum gas, petrochemical feedstocks, lubricants, waxes, plant condensate, pentanes plus, asphalt and road oil, still gas, special naphthas, petroleum coke, unfinished oils, and miscellaneous petroleum products.
[10] Represents the difference between total primary supply and total consumption.
[11] Represents the sum of total consumption and discrepancy.
Notes: Historical values are through 1987. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07); values for 1988 are estimates. Forecasts: Based on Run 635; File Creation Date 12/20/88; Values for 1989 are benchmarked to the EIA, *Short-Term Energy Outlook*, DOE/EIA-0202(88/4Q).

Table A3. Natural Gas Supply, Disposition, and Prices
(Trillion Cubic Feet)
(1988 Dollars per Thousand Cubic Feet)

Supply, Disposition, and Prices	Base Case															Annual Pct. Growth
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1988-2000
Production																
Dry Gas Production	15.99	16.54	16.71	16.71	16.94	17.01	16.93	17.09	17.35	17.54	17.67	17.98	18.20	18.25	18.49	0.9
Supplemental Gas [1]	.11	.10	.17	.18	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	-4.3
Net Imports	**.69**	**.94**	**1.15**	**1.32**	**1.44**	**1.52**	**1.61**	**1.70**	**1.79**	**1.87**	**1.98**	**2.06**	**2.15**	**2.23**	**2.31**	**6.0**
Net Storage Withdrawals [2]	**-.15**	**.00**	**.04**	**.05**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	
Total Supply [3]	**16.65**	**17.57**	**18.07**	**18.26**	**18.48**	**18.63**	**18.64**	**18.89**	**19.24**	**19.51**	**19.75**	**20.14**	**20.45**	**20.58**	**20.90**	**1.2**
Consumption by Sector																
Residential	4.30	4.32	4.59	4.66	4.62	4.62	4.59	4.56	4.52	4.49	4.42	4.39	4.37	4.32	4.31	-.5
Commercial [4]	2.31	2.41	2.61	2.65	2.65	2.68	2.68	2.68	2.67	2.68	2.65	2.66	2.68	2.67	2.69	.3
Industrial	5.60	5.89	6.15	6.24	6.29	6.36	6.37	6.36	6.34	6.31	6.27	6.24	6.21	6.16	6.14	.0
Lease & Plant Fuel [5]	.92	1.15	1.01	1.03	1.01	1.01	1.01	1.02	1.03	1.04	1.05	1.06	1.08	1.09	1.10	.7
Transportation [6]	.48	.52	.55	.54	.49	.50	.50	.51	.51	.52	.53	.54	.54	.55	.56	.1
Electric Utilities	2.61	2.84	2.83	2.83	2.88	2.91	2.95	3.22	3.61	3.89	4.26	4.66	4.97	5.18	5.50	5.7
Total Consumption	**16.23**	**17.13**	**17.75**	**17.95**	**17.94**	**18.08**	**18.10**	**18.34**	**18.68**	**18.94**	**19.17**	**19.55**	**19.86**	**19.98**	**20.29**	**1.1**
Unaccounted for [7]	**.41**	**.45**	**.32**	**.31**	**.54**	**.54**	**.54**	**.55**	**.56**	**.57**	**.58**	**.59**	**.60**	**.60**	**.61**	
Average Wellhead Price	**2.06**	**1.72**	**1.62**	**1.64**	**1.75**	**1.86**	**2.14**	**2.40**	**2.61**	**2.80**	**3.22**	**3.36**	**3.55**	**3.76**	**3.91**	**7.6**
Average Price by Sector																
Residential	6.21	5.74	5.50	5.48	5.61	5.73	5.94	6.15	6.38	6.54	6.95	7.12	7.26	7.56	7.70	2.8
Commercial [4]	5.43	4.93	4.75	4.73	4.84	4.94	5.14	5.35	5.57	5.73	6.14	6.30	6.44	6.74	6.87	3.1
Industrial	3.35	2.93	2.87	2.90	3.00	3.09	3.29	3.49	3.71	3.87	4.28	4.44	4.57	4.87	4.99	4.7
Electric Utilities	2.52	2.39	2.25	2.27	2.32	2.35	2.57	2.80	2.98	3.19	3.53	3.75	3.92	4.14	4.28	5.5
Average to All Sectors [8]	**4.36**	**3.93**	**3.81**	**3.82**	**3.91**	**4.00**	**4.19**	**4.37**	**4.55**	**4.70**	**5.05**	**5.19**	**5.31**	**5.57**	**5.68**	**3.4**

[1] Includes synthetic natural gas (results from the manufacture, conversion, or the reforming of petroleum hydrocarbons), and propane-air mixtures.
[2] Includes net withdrawals of dry natural gas from underground storage and liquefied natural gas. A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[3] Total supply represents the sum of dry gas production, supplemental gas, net imports, and net storage withdrawals.
[4] Includes deliveries to municipalities and other public authorities for use in schools and other institutions.
[5] Represents natural gas used in gathering systems and processing plants.
[6] Represents natural gas used to fuel compressors in pipeline pumping stations.
[7] Represents the difference between total supply and total consumption.
[8] Weighted average price. The weights used are the sectoral consumption values excluding lease and plant fuel and the transportation sector.
Notes: Historical values are through 1987. Totals may not equal sum of components due to independent rounding. Commercial and industrial natural gas prices for 1989, reflect base case values from PC-AEO Model run 635.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07); values for 1988 are estimates. Forecasts: Based on Run 635; File Creation Date 12/20/88; Values for 1989 are benchmarked to the EIA, *Short-Term Energy Outlook*, DOE/EIA-0202(88/4Q).

Table A4. Supply and Disposition of Electricity
(Quadrillion Btu)

Fuel Consumption and Disposition	Base Case															Annual Pct. Growth
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1988-2000
Electric Utilities																
Fuel Inputs																
Oil																
Distillate	0.08	0.09	0.11	0.09	0.05	0.06	0.09	0.11	0.13	0.12	0.16	0.19	0.20	0.21	0.22	5.9
Residual	1.37	1.17	1.21	1.07	1.27	1.46	1.67	1.76	1.76	1.84	2.19	2.22	2.16	2.27	2.32	5.6
Natural Gas	2.69	2.92	2.92	2.92	2.96	3.00	3.04	3.31	3.71	4.01	4.39	4.80	5.12	5.34	5.66	5.7
Steam Coal	14.45	15.19	15.84	16.06	16.23	16.39	16.89	17.31	17.68	18.11	18.16	18.47	18.84	19.23	19.55	1.8
Nuclear Power	4.47	4.92	5.64	5.63	5.78	5.98	5.99	6.04	6.06	6.08	6.10	6.12	6.20	6.22	6.22	.8
Hydropower/Other [1]	3.23	2.81	2.59	3.10	3.26	3.29	3.30	3.31	3.34	3.35	3.36	3.37	3.38	3.38	3.38	2.3
Total Fuel Inputs	**26.30**	**27.09**	**28.31**	**28.87**	**29.55**	**30.19**	**30.97**	**31.85**	**32.68**	**33.51**	**34.35**	**35.16**	**35.89**	**36.65**	**37.35**	**2.3**
Net Imports (fuel input equiv.)	.37	.48	.42	.43	.45	.51	.53	.55	.57	.59	.64	.66	.69	.72	.75	5.1
Total Electricity Inputs	**26.67**	**27.57**	**28.72**	**29.30**	**30.00**	**30.70**	**31.51**	**32.40**	**33.25**	**34.10**	**34.99**	**35.83**	**36.58**	**37.37**	**38.10**	**2.4**
Disposition																
Total Electricity Inputs	26.67	27.57	28.72	29.30	30.00	30.70	31.51	32.40	33.25	34.10	34.99	35.83	36.58	37.37	38.10	2.4
Minus Conversion Losses	18.18	18.79	19.56	19.96	20.47	20.94	21.49	22.10	22.69	23.27	23.88	24.45	24.95	25.45	25.92	2.4
Generation	**8.49**	**8.78**	**9.16**	**9.34**	**9.53**	**9.76**	**10.01**	**10.30**	**10.56**	**10.83**	**11.11**	**11.38**	**11.64**	**11.91**	**12.18**	**2.4**
Plus Nonutility Purchases	.13	.16	.19	.23	.26	.27	.29	.30	.32	.33	.34	.36	.37	.39	.40	6.3
Plus Net Imports (electricity equiv.)	.12	.16	.14	.14	.15	.17	.18	.18	.19	.19	.21	.22	.23	.24	.25	5.1
Minus Trans. & Dist. Losses	.72	.72	.77	.78	.76	.78	.80	.83	.85	.87	.89	.92	.94	.96	.98	2.1
Electricity Sales	**8.02**	**8.38**	**8.72**	**8.94**	**9.17**	**9.42**	**9.67**	**9.95**	**10.22**	**10.48**	**10.77**	**11.04**	**11.30**	**11.58**	**11.85**	**2.6**
Electricity Sales by End-Use Sector																
Residential	2.79	2.90	3.01	3.03	3.10	3.17	3.24	3.31	3.38	3.45	3.51	3.58	3.63	3.69	3.74	1.8
Commercial/Other [2]	2.47	2.60	2.70	2.82	2.90	2.97	3.06	3.15	3.23	3.32	3.40	3.48	3.55	3.63	3.71	2.7
Industrial	2.76	2.88	3.00	3.09	3.17	3.28	3.38	3.49	3.60	3.72	3.85	3.99	4.12	4.26	4.40	3.2
Total Electricity Sales	**8.02**	**8.38**	**8.72**	**8.94**	**9.17**	**9.42**	**9.67**	**9.95**	**10.22**	**10.48**	**10.77**	**11.04**	**11.30**	**11.58**	**11.85**	**2.6**
Nonutilities																
Fuel Inputs for Generation [3]																
Oil	.01	.01	.01	.01	.01	.01	.02	.02	.02	.02	.02	.02	.02	.03	.03	8.2
Gas	.26	.30	.35	.39	.44	.46	.48	.51	.53	.56	.59	.61	.64	.67	.70	6.1
Coal	.15	.17	.19	.21	.23	.24	.26	.27	.29	.30	.32	.34	.36	.38	.40	6.4
Nonfossil [4]	.33	.35	.38	.40	.43	.44	.46	.48	.50	.52	.55	.57	.60	.62	.65	4.7
Disposition of Generated Electricity																
Sales to Utilities	.13	.16	.19	.23	.26	.27	.29	.30	.32	.33	.34	.36	.37	.39	.40	6.3
Own Use	.25	.27	.28	.29	.31	.33	.34	.36	.38	.39	.42	.44	.46	.49	.51	5.1

[1] Includes renewable electric utility energy sources such as hydropower, geothermal power, wood, waste, solar power, and wind power.
[2] Includes street lighting and sales to the transportation sector.
[3] Represents energy content of fuel required for generation.
[4] Nonfossil includes biomass, wood, waste, hydroelectric, solar, geothermal, wind, and other.
Notes: Historical values are through 1987, except for nonutilities, which are estimates. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07); *State Energy Data Report 1960-1986*, DOE/EIA-0214(86); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1988 are estimates. Forecasts: Based on Forecast Run 635; File Creation Date 12/20/88; Values for 1989 are benchmarked to the EIA, *Short-Term Energy Outlook*, DOE/EIA-0202(88/4Q).

Table A5. Coal Supply, Disposition, and Prices
(Million Short Tons)
(1988 Dollars per Short Ton)

Supply, Disposition, and Prices	Base Case															Annual Pct. Growth
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1988-2000
Total Production [1]	890	919	941	946	977	990	1,018	1,039	1,058	1,082	1,084	1,107	1,130	1,152	1,171	1.8
Imports	2	2	2	2	3	4	4	4	5	5	5	5	6	6	7	10.1
Exports [2]	86	80	86	82	85	87	89	91	93	95	98	102	105	108	112	2.2
Net Imports	-83	-78	-84	-80	-82	-83	-85	-87	-88	-90	-93	-97	-99	-102	-105	1.9
Net Storage Withdrawals [3]	-4	-6	17	17	-2	-5	-7	-6	-5	-6	-1	-4	-5	-5	-4	
Total Supply [4]	803	834	875	882	894	903	927	947	965	987	990	1,006	1,026	1,045	1,062	1.6
Consumption by Sector																
Residential/Commercial	8	7	7	7	7	7	7	7	7	7	7	7	7	7	6	-.9
Industrial	76	75	75	75	75	76	76	76	77	77	78	79	80	81	83	.8
Coking Plants	36	37	39	39	39	39	38	38	37	37	37	36	36	36	36	-.8
Electric Utilities	685	718	750	760	773	782	806	826	844	866	869	884	903	921	937	1.9
Total Consumption	804	837	872	882	894	903	927	947	965	987	990	1,006	1,026	1,045	1,062	1.7
Discrepancy [5]	-1	-3	3	0	0	0	0	0	0	0	0	0	0	0	0	
Average Minemouth Price [6]	25.36	23.79	23.61	23.49	24.00	24.09	24.28	24.49	24.72	24.95	25.03	25.26	25.50	25.73	25.87	.8
Delivered Price by Sector																
Residential/Commercial	52.08	48.19	46.32	46.33	46.78	46.86	47.16	47.56	48.06	48.59	48.92	49.41	49.94	50.45	50.81	.8
Industrial	38.20	34.76	34.92	34.87	35.18	35.14	35.39	35.70	35.92	36.32	36.55	36.92	37.14	37.44	37.54	.6
Coking Plants	54.18	48.01	47.15	47.12	47.60	47.76	48.12	48.56	49.09	49.65	50.02	50.55	51.06	51.50	51.89	.8
Electric Utilities	35.49	32.95	31.74	31.01	32.43	32.51	32.77	33.09	33.40	33.76	33.93	34.24	34.53	34.80	35.02	.8
Average to All Sectors [7]	36.74	33.91	32.82	32.17	33.43	33.49	33.73	34.02	34.31	34.66	34.83	35.14	35.42	35.68	35.88	.7

[1] Includes anthracite, bituminous coal, and lignite.
[2] Excludes small quantities of anthracite shipped overseas to U.S. Armed Forces.
[3] From all stocks held by industrial plants, coke plants, electric utilities, and producers/distributors. A negative (-) result represents an increase to inventories. A *positive result represents a withdrawal from inventories.*
[4] Represents the sum of production, net imports, and net storage withdrawals.
[5] Represents the difference between total supply and total consumption.
[6] Free on board (F.O.B.) mines.
[7] Weighted average prices. The weights used are consumption values by sector.
Notes: Historical values are through 1987. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(88/07); *State Energy Price and Expenditure Report 1986*, DOE/EIA-0376(86); *Quarterly Coal Report*, DOE/EIA-0121(88/2Q); values for 1988 are estimates. Forecasts: Based on Run 635; File Creation Date 12/20/88; Values for 1989 are benchmarked to the EIA, *Short-Term Energy Outlook*, DOE/EIA-0202(88/4Q).

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