Energy Information Administration

Short-Term
Energy Outlook

Quarterly
Projections

October 1987

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Short-Term Energy Outlook

Quarterly Projections

October 1987

Energy Information Administration
Office of Energy Markets and End Use
U.S. Department of Energy
Washington, DC 20585

Contacts

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

Preface

The Energy Information Administration (EIA) quarterly forecasts of short-term energy supply, demand, and prices are revised in January, April, July, and October for publication in the *Short-Term Energy Outlook (Outlook)*. An annual supplement analyzes previous forecast errors, compares recent projections by other forecasters, and analyzes in depth current topics in short-term energy analysis and forecasting. The principal users of the *Outlook* are managers and energy analysts in private industry and government. The projections in this volume extend through the end of 1988.

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 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 13 on page 53. 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

As worries over crude oil prices eased during the third quarter of 1987, other concerns heated up -- namely, the weather. Cooling degree days, which were 7 percent above last year during the summer months of June, July, and August, kicked up total electricity generation by more than 5 percent over the corresponding period of 1986. As a result, generation from coal, gas, and nuclear rose substantially, and even oil-fired generation posted a smaller-than-expected decline. Now that the summer peak is over, attention is shifting to heating oil supplies for the coming winter, with distillate stocks some 24 million barrels below last year's pre-winter level.

Distillate Prices and Demand Higher in Winter of 1987-88

Rising crude oil costs and somewhat improved margins will lead to heating oil prices over 9 cents per gallon higher this winter compared to last. However, about one-half of the increase has already occurred, with almost no seasonal decline over the summer. Demand should also be up, assuming normal winter weather, as last winter was 4 percent warmer than normal nationwide.

Petroleum Demand Higher in 1987, Expected to Stabilize in 1988

Overall petroleum demand, bolstered by the demand for motor gasoline and other products, is rising at a 1.7-percent pace in 1987. With increased efficiency stabilizing motor gasoline demand and a slowdown in petrochemical manufacturing growth dampening increases in feedstocks, 1988 will see flat or slightly decreasing consumption.

Coal and Natural Gas Recover to Meet Electricity Demand

Electricity generation, now estimated to rise by 2.9 percent in 1987, is boosting the markets for coal and natural gas. Much lower growth (1.2 percent) foreseen for 1988, however, could have a dampening effect on growth in demand for these fuels, especially with the expected increases in nuclear and hydroelectric generation.

Decline in Industrial Use of Natural Gas Expected to be Arrested

Industrial consumption of natural gas, plummeting despite healthy gains in overall industrial output, should recover partially in 1988. The estimated 14-percent decline in 1987 will give way to partial recovery in 1988, as gas prices continue their advantage over oil in this sector.

The forecasts previously discussed are the base case projections, summarized in Table 1 on page 3. Additional sensitivity cases, using alternative assumptions, are shown in Table 13 on page 53. Should the imported crude oil prices, economic growth rates, or weather during the forecast period differ from the base case assumptions (with all other factors held constant), the following could occur:

- For each 1-percent increment in economic activity above the base case level, petroleum consumption and total net imports in 1988 would increase by about 130,000 barrels per day (approximately 0.8 percent and 2.1 percent, respectively).

- For each $1-per-barrel (approximately 5.4 percent) decline from the base case in the price of imported crude oil, petroleum consumption and total net imports in 1988 would increase by about 80,000 barrels per day (approximately 0.5 percent and 1.3 percent, respectively).

- For each 10-percent increase in heating degree days (from the base case level) during the first and fourth quarters (the heating season), petroleum consumption and total net imports for those two quarters would increase by an average of about 150,000 barrels per day (approximately 0.9 percent and 2.5 percent, respectively).

Table 1. Summary of Base Case Assumptions and Projections

Assumptions and Projections	Year				Annual Percentage Change		
	1985	1986	1987	1988	1985-1986	1986-1987	1987-1988
Macroeconomic Indicators							
Real Gross National Product (billion 1982 dollars)	3,608	3,714	3,810	3,914	2.9	2.6	2.7
Index of Industrial Production (Mfg.) (index, 1977 = 1.000)	1.264	1.292	1.340	1.380	2.2	3.7	3.0
Imported Crude Oil Price (nominal dollars per barrel)	26.99	13.98	18.20	18.50	-48.2	30.2	1.6
Retail Prices (nominal)[a]							
Motor Gasoline[b] (dollars per gallon)	1.20	.93	.96	.99	-22.5	3.2	3.1
Retail No. 2 Heating Oil (dollars per gallon)	1.05	.84	.79	.83	-20.0	-6.0	5.1
Residential Natural Gas (dollars per thousand cubic feet)	6.12	5.83	5.50	5.62	-4.7	-5.7	2.2
Residential Electricity (cents per kilowatthour)	7.79	7.80	7.77	8.04	.1	-.4	3.5
Petroleum Supply							
Crude Oil Production[c] (million barrels per day)	8.97	8.68	8.30	8.11	-3.2	-4.4	-2.3
Net Petroleum Imports, Including SPR (million barrels per day)	4.29	5.44	5.73	6.08	26.8	5.3	6.1
Consumption							
Total Market Economies Petroleum Consumption (million barrels per day)	46.4	47.5	48.1	48.5	2.4	1.3	.8
U.S. Total Petroleum Consumption (million barrels per day)	15.73	16.28	16.55	16.51	3.5	1.7	-.2
Motor Gasoline	6.83	7.03	7.16	7.14	2.9	1.8	-.3
Distillate Fuel Oil	2.87	2.91	2.96	3.02	1.4	1.7	2.0
Residual Fuel Oil	1.20	1.42	1.25	1.22	18.3	-12.0	-2.4
Other Petroleum[d]	4.83	4.92	5.18	5.13	1.9	5.3	-1.0
Coal Consumption (million short tons)	818	804	822	832	-1.7	2.2	1.2
Natural Gas Consumption (trillion cubic feet)	17.28	16.22	15.78	16.19	-6.1	-2.7	2.6
Electricity Generation (billion kilowatthours)	2,469.8	2,487.3	2,560.5	2,590.7	.7	2.9	1.2
Total Energy Consumption[e] (quadrillion Btu)	73.96	74.28	75.04	76.27	.4	1.0	1.6
Thousand Btu/1982 Dollar of GNP	20.50	20.00	19.70	19.49	-2.4	-1.5	-1.1

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

SPR: Strategic Petroleum Reserve.

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

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07); *International Energy Annual 1985* DOE/EIA-0219(86); *Petroleum Marketing Monthly*, DOE/EIA-0380(87/07); *Petroleum Supply Monthly*, DOE/EIA-0109(87/07); *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Natural Gas Monthly*, DOE/EIA-0130(87/07); *Electric Power Monthly*, DOE/EIA-0226(87/07); and *Quarterly Coal Report*, DOE/EIA-0121(87/2Q); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through June 1987. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0987.

The Outlook

● *Assumptions*

● *U.S. Petroleum Outlook*

o *Outlook for Other Major Energy Sources*

Assumptions

● *International Petroleum*

o *World Oil Prices*

● *Macroeconomic Activity*

● *Energy Product Prices*

International Petroleum

Recent Developments

The world oil price increased from $18.28 in the second quarter of 1987 to an estimated $19.25 in July. This increase coincided with a sharp increase in spot prices for most crude oils in early to mid-July, just prior to the commencement of U.S. naval protection for Kuwaiti tankers on July 20. Spot prices increased when crude oil purchases rose out of fear that increased hostilities might lead to supply disruptions in the Persian Gulf. In early August, when no disruptions occurred, spot prices began to weaken. Later in August, as reports appeared that OPEC crude oil production was running as much as 3 million barrels per day above OPEC's ceiling of 16.6 million barrels per day for the second half of 1987, spot crude oil prices dropped sharply. Since that time, spot prices have remained in a narrow range around OPEC's $18 reference price, as a result of the balance between ample crude oil supplies and continued fears of hostility in the Persian Gulf. Spot price trends in the fourth quarter of 1987 will be jointly determined by the rate of OPEC crude oil production and by the level of hostilities in the Persian Gulf, as well as by how these factors affect the purchasing and inventory behavior of oil buyers. Looking into 1988, the world oil price will also be affected by the decisions made at OPEC's regular December Ministerial Conference on the reference price for OPEC crude oil in 1988 and on the crude oil production ceiling and quotas for the coming year.

- It is estimated, on the basis of current data, that OPEC oil production (including just over 1.3 million barrels per day of natural gas liquids production and refinery gain) averaged between 20.5 million and 20.7 million barrels per day in the third quarter of 1987, an increase of between 2.1 and 2.3 million barrels per day from the rate for the second quarter of 1987 (Figure 1 on page 10 and Table 2 on page 43). As a result, OPEC crude oil production in the third quarter was about 2.6 million to 2.8 million barrels per day above OPEC's production ceiling of 16.6 million barrels per day for the second half of 1987.

- OPEC crude oil production averaged about 18.8 million barrels per day in July, increased to over 20.2 million barrels per day in August, and then decreased to about 18.7 million barrels per day in September. Early indications are that OPEC production will decline further in October as some oil buyers refuse to purchase crude oil at OPEC's official selling prices. At the same time, however, recent reports show that some OPEC member countries are offering or may offer to sell their crude oil at discounted prices in an attempt to maintain production at or above their quotas.

- At the present time, it is not clear what decisions the OPEC Oil Ministers will make on OPEC's 1988 reference price and production rates when they meet in early December. Earlier this summer, it had appeared that most OPEC member countries favored a $2-per-barrel increase in the OPEC reference price to $20 per barrel, an increase that would help to compensate for the declines in member country purchasing power caused by the fall in the value of the U.S. dollar and by inflation. Since then, however, relations between Saudi Arabia and Iran, whose cooperation had made agreement possible at the last two OPEC conferences, have been damaged by the killing of Iranian pilgrims at Mecca. In addition, the Oil Ministers of Indonesia and Kuwait have recently argued for price moderation, and OPEC's ability to raise prices in 1988 has been called into question by its recent high levels of production and the resulting increase in oil inventories.

- There is little indication as to what decisions the OPEC Oil Ministers will make on the organization's crude oil production ceiling and individual country quotas for 1988. OPEC President and Nigerian Oil Minister Rilwanu Lukman indicated recently that the current production ceiling may be retained or changed. Lukman also stated that bringing Iraq back into the quota system is a "major concern," but Iraq continues to insist on a quota equal to Iran's. Estimates indicate that, as a result of the completion of its new crude oil pipeline through Turkey, Iraq's crude oil production is now between 2.4 million and 2.5 million barrels per day. This rate is well in excess of the quota of 1.5 million barrels per day assigned by OPEC, but rejected by Iraq, and it also exceeds Iran's current quota of 2.4 million barrels per day.

- Other issues that will complicate agreement on a new OPEC production ceiling for 1988 include continued quota violations by the United Arab Emirates, the question of how war-relief crude oil produced in the former Saudi-Kuwait Neutral Zone should be treated in the quota system, and the continued hostilities between Iran and Iraq. The level of these hostilities has increased recently, after United Nations efforts to negotiate a cease-fire bogged down, and a new Iranian land offensive against Iraq is expected.

## Figure 1. OPEC Oil Production and Production Capacity
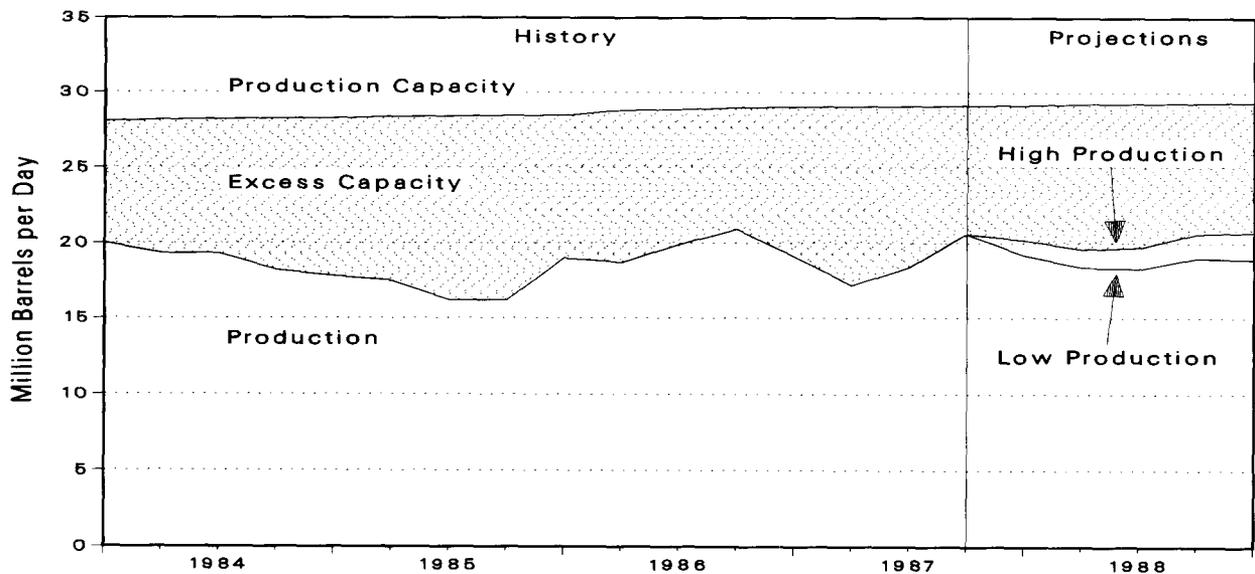
Note: OPEC production includes crude oil, natural gas liquids, and refinery gain.
Sources: • History: Energy Information Administration,
International Contingency and Information Division. • Projections: Table 4.

Forecast

The demand for petroleum by the market economies should average about 48.1 million barrels per day in 1987, an increase of about 535,000 barrels per day, or about 1 percent, from the 1986 rate. The United States should account for about one-half of this increase and for over three-fourths of the increase in demand from the OECD (developed) countries (Table 2 on page 43). U.S. demand in 1987 should be over 16.5 million barrels per day. In 1988, demand for petroleum by the market economies will increase by about 470,000 barrels per day. (The values reported here are based on more precise numbers than appear in Table 2.) U.S. demand will change little, while demand by OECD Europe could increase by over 200,000 barrels per day if consumer (tertiary) stocks of heating oil are rebuilt to normal levels.

- Oil production from the non-OPEC market economies will increase by about 50,000 barrels per day in 1987, remaining near the 1986 rate of about 26.7 million barrels per day. Production increases expected from Mexico, the North Sea, and some smaller producers should just exceed the decline of 335,000 barrels per day expected in North American production. In 1988, non-OPEC supply will increase by about 160,000 barrels per day, because the decline in North American production will be offset by increased production from other countries (Mexico, North Yemen, Colombia, Egypt, and Syria).

- Petroleum stocks held by the market economies should be built at a rate of about 120,000 barrels per day in 1987, as a result of OPEC overproduction. This rate is still well below the 1986 rate of 800,000 barrels per day. Private stock building in 1988 should mirror that for 1987, with most of the additions going to government strategic stocks. It is assumed that commercial stocks will stabilize in 1988.

- OPEC oil production will average about 19.0 million barrels per day in 1987, even if production in the fourth quarter reaches 19.7 million barrels per day. In spite of OPEC's loss of restraint in the third quarter, this 1987 rate is still almost 660,000 barrels per day less than the rate for 1986. Uncertainty abounds, however, through 1988. A range of possible OPEC oil production is projected, based on a range of assumed inventory behavior (Figure 1). Significant excess oil production capacity is expected to persist in the OPEC member nations throughout the forecast period.

Figure 2. World Oil Prices
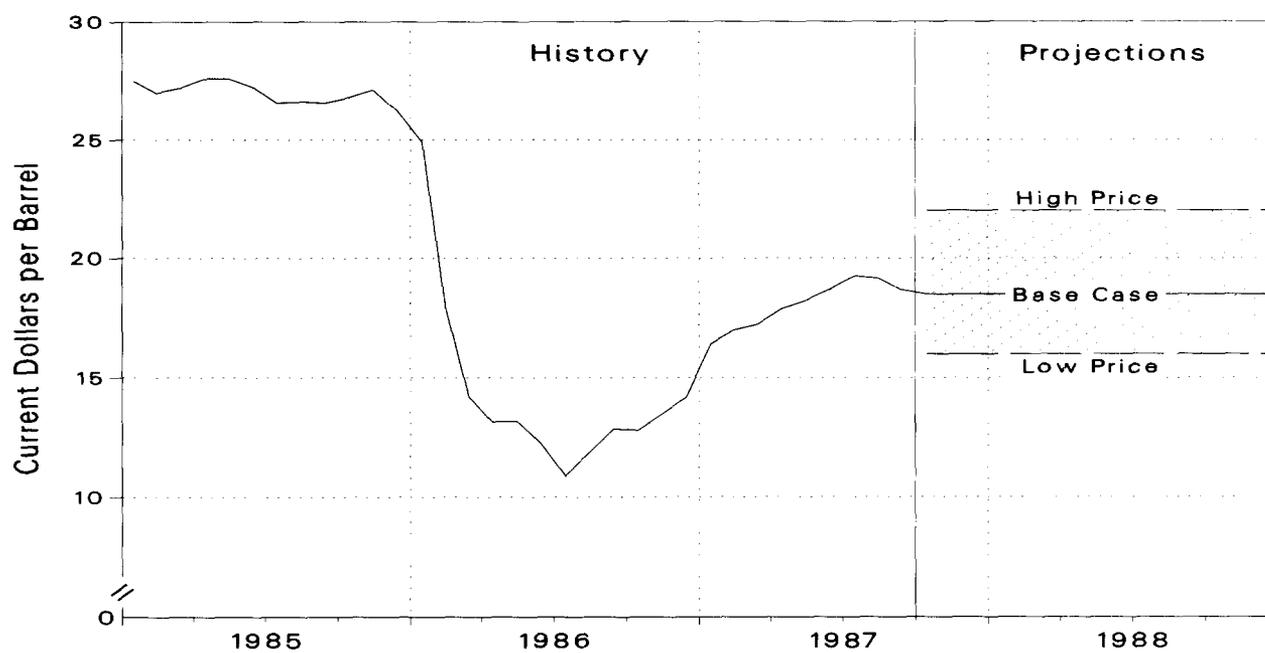
World Oil Prices

One of the most uncertain factors affecting the domestic short-term energy outlook is the world oil price, defined here as the nominal price of imported crude oil delivered to U.S. refiners. Because of this uncertainty, three different world oil price scenarios are employed (Figure 2). These scenarios are used to develop a base case projection and two alternative projections that provide a range of domestic energy projections. The same initial economic assumptions are used in all three cases, modified only for feedback effects resulting from the specific oil price scenarios (Table 3 on page 43). None of the scenarios addresses the potential effects on oil prices of a significant disruption in oil supplies from the Persian Gulf resulting from increased military hostilities.

• In the base case oil price scenario, the world oil price averages $18.50 per barrel throughout the forecast period. This scenario is based on the assumption that OPEC production in excess of the agreed production ceiling will return to moderate amounts, after the excessive overproduction in the third quarter 1987. World oil markets are assumed to become more stable, as available supply moves more into balance with slowly growing demand. At the same time, the high level of petroleum inventories resulting from OPEC's summer overproduction prevents oil prices from increasing above current levels.

• In the low oil price scenario, the world oil price decreases from $19 per barrel in the third quarter of 1987 to $16 for the remainder of the forecast period. In this scenario, it is assumed that several OPEC countries, particularly those in the Persian Gulf, continue to produce at rates that are significantly higher than their OPEC quotas, while world oil demand shows little or no growth.

• In the high oil price scenario, the world oil price increases from $19 per barrel in the third quarter of 1987 to $22 for the remainder of the forecast period. In this scenario it is assumed that the OPEC countries adhere rather strictly to their production ceiling. At the same time, Persian Gulf tensions cause oil consumers to hold high levels of oil inventories and OPEC to raise its reference price to $22 per barrel in 1988.

Figure 3. Real GNP and Components of Change
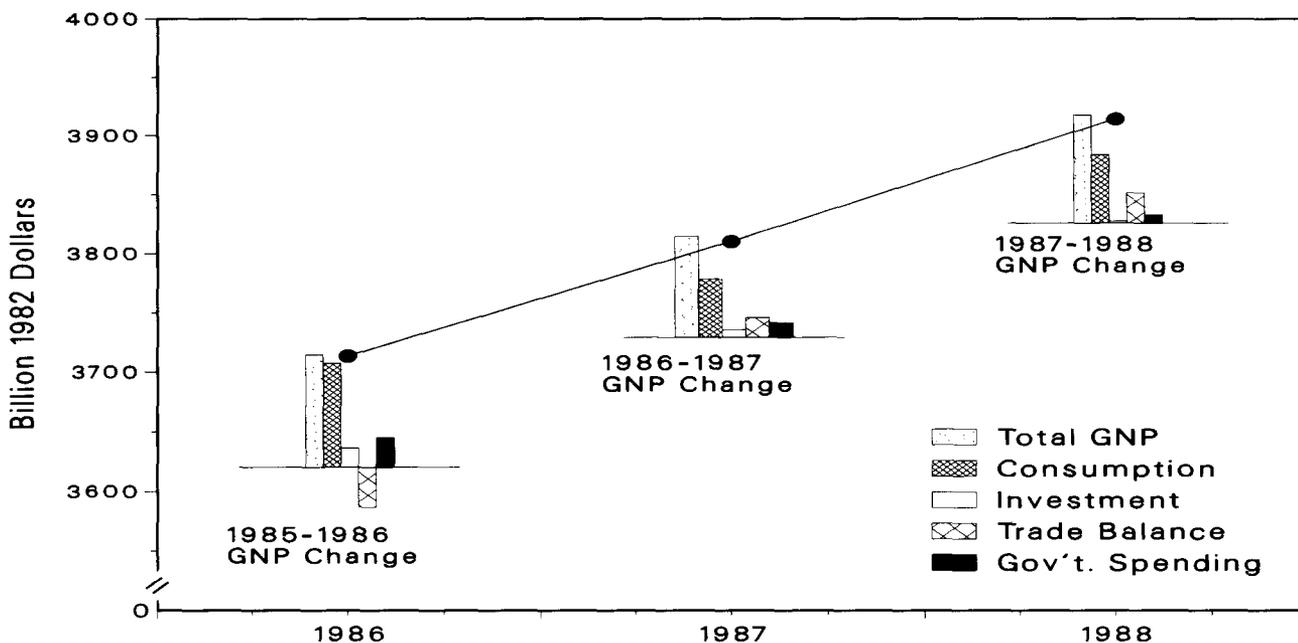
Sources: • History: Bureau of Economic Analysis, U.S. Department of Commerce, *Survey of Current Business*, September 1987; Federal Reserve System, *Statistical Release G.12.3*, October 1987.• Projections: Table 4.
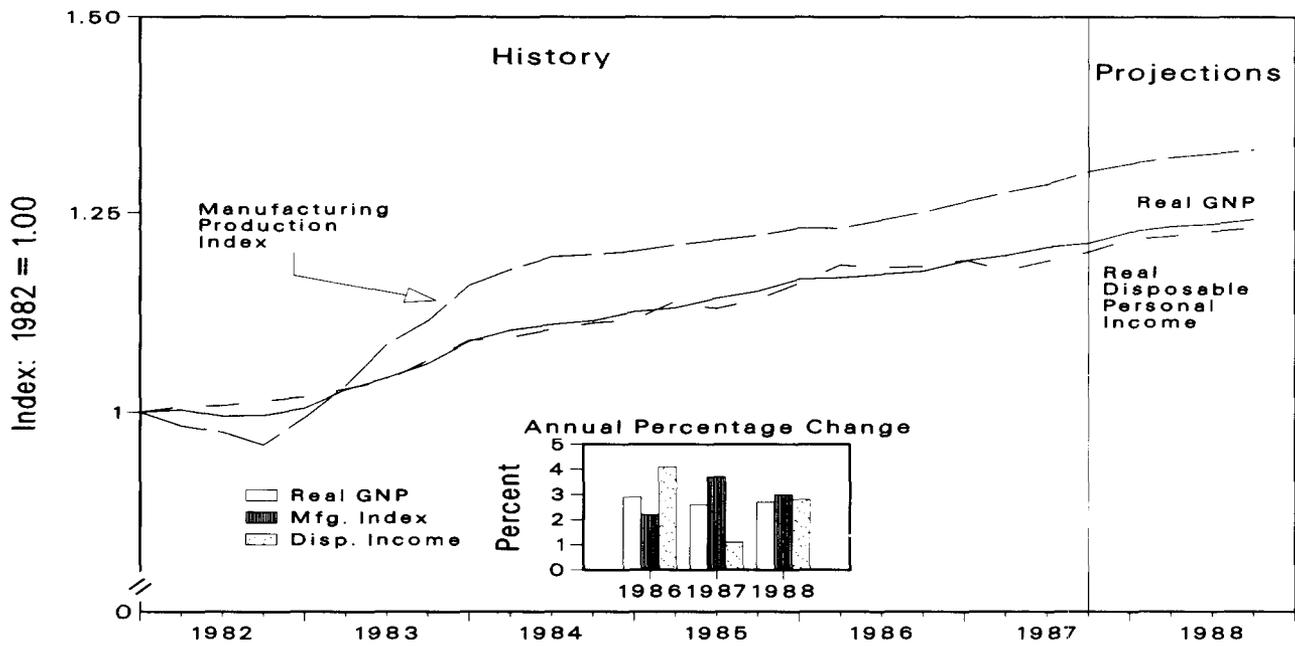
Macroeconomic Activity

The outlook for the U.S. economy is for continued steady growth in the Nation's real gross national product (GNP) of 2.6 to 2.7 percent annually in 1987 and 1988 (Table 4 on page 44). Real growth in net exports is expected to be an important source of continued moderate expansion in the near term.[1]

- Despite an expected decline in the growth of personal consumption from 4.1 percent in 1986 to 1.1 percent for 1987 and 2.8 percent for 1988, GNP growth should hold at 2.6 percent in 1987 and 2.7 percent in 1988 (Figure 3). Partly responsible for this continued growth is a 13-percent reduction in the real trade deficit to $127 billion in 1987 from $146 billion in 1986. Prospects are for an even sharper, 23-percent reduction in the real trade deficit for 1988.

- Higher real oil prices, the inflationary effects of dollar depreciation on import prices, and other factors will result in consumer price inflation of 3.7 percent in 1987 and 4.4 percent in 1988, compared to 1.9 percent in 1986. As a result, real wages -- and consequently real personal disposable income -- are now estimated to grow slowly in 1987. Since no rapid acceleration in price inflation is expected beyond 1987, however, real personal income growth should improve again by late 1987, leading to expected average growth in 1988 of 2.8 percent.

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

Figure 4. Indices of Economic Activity

- Manufacturing sector growth, spurred by higher exports, will fare better than GNP, with growth forecasts of 3.7 percent for 1987 and 3.0 percent for 1988 (Figure 4).

- Although much has been made of the apparent difficulty the U.S. economy is having in reducing its current account deficit, real trade flows are in fact tending toward a lower real trade deficit. It should also be noted that, except for increases in oil imports in 1987 and 1988, the real trade balance on goods and services would be improved by an additional $19.4 billion between 1986 and 1988 than is indicated for this *Outlook*.

- The energy intensity of the economy continues to decline. Total energy consumption is not growing as rapidly as GNP. The ratio of energy use to GNP should be lower for 1987 and 1988, but the rate of decline is slowing (Table 17 on page 57).

Figure 5. Motor Gasoline Prices
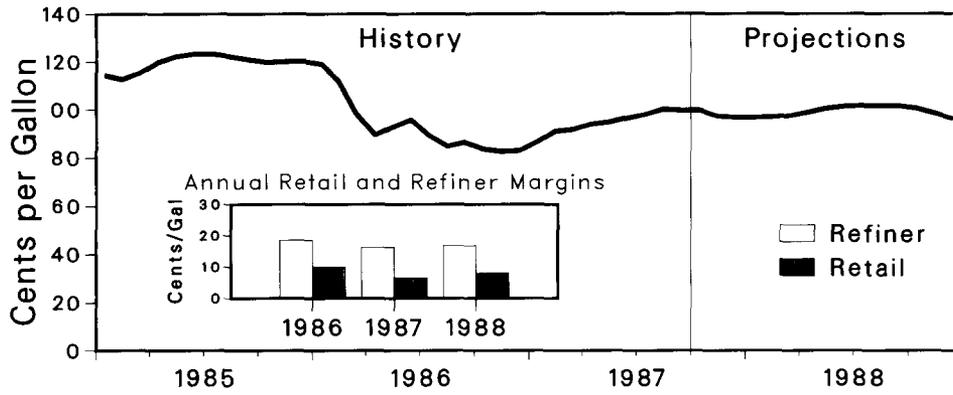
Gasoline Prices Will Average 3 Cents per Gallon More in 1988 Than in 1987

Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07) (Washington, DC, 1987). • Projections: Table 5.

Figure 6. Distillate Prices
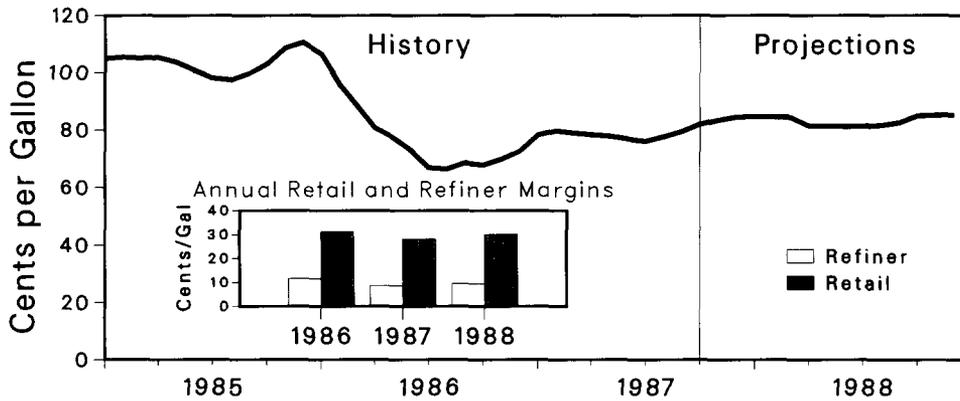
Distillate Prices This Winter Will Climb 6 Cents from the Summer Average

Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07) (Washington, DC, 1987). • Projections: Table 5.

Figure 7. Utility Oil and Gas Prices
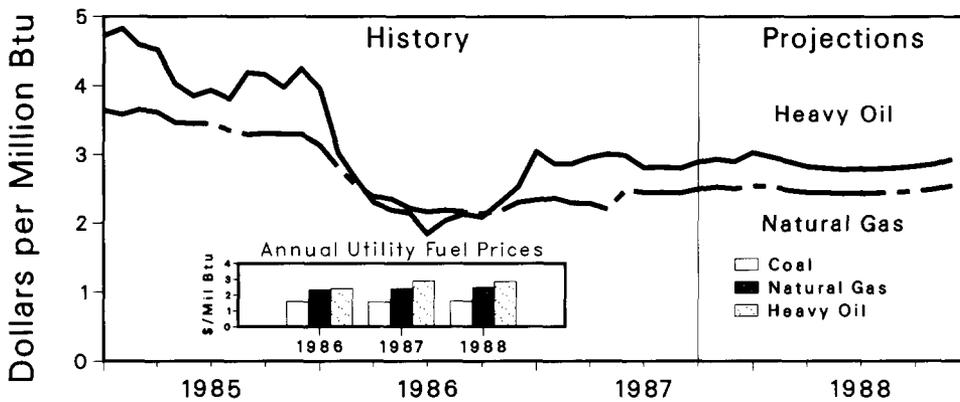
The Gap Between Oil and Gas Prices to Utilities Should Continue Through 1988

Sources: • History: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07) (Washington, DC, 1987). • Projections: Table 5.

Energy Product Prices

Stable crude oil prices in 1988 should lead to essentially stable product prices. However, the narrow margins in 1987 -- especially for motor gasoline because of abnormally high stock levels -- will also abate, leading to annual increases of 3 to 4 cents per gallon for motor gasoline and heating oil prices (Table 5 on page 45).

- Gasoline prices, moderated this summer by a stubborn overhang of product stocks, should nevertheless rise by about 3 cents per gallon in 1988, despite almost no change in crude oil costs (Figure 5 on page 14). Crude oil costs in 1987 are now estimated to rise by about 10 cents per gallon; but because of high refinery runs and increased output of motor gasoline (especially in the first half of the year), stock levels have been above normal for most of 1987. As a result, refiners and retailers have absorbed most of the increase in the cost of crude oil so far this year. For 1988, stock levels are assumed to return to normal as markets clear, leading to an opportunity for higher margins. Prices should peak in the summer of 1988 at $1.02 per gallon.

- Heating oil prices for the winter of 1987-1988 contain elements of good and bad news. The bad news is that prices seem likely to increase by more than 9 cents per gallon above last winter's prices (Figure 6 on page 14). The good news is that well over one-half of the increase has already been felt this year, implying that remaining increases may not be quite as painful to consumers. Almost no seasonal dip was discernible this past summer, with higher crude oil costs and surprisingly high demand bolstering retail prices. The average price should rise by only another 6 cents per gallon this winter, to 84 cents per gallon. For all of 1988, refiners and retailers are expected to improve their margins in the wake of stable crude oil costs, leading to an overall increase of 4 cents per gallon.

- Residential natural gas prices are expected to rise slowly through 1988 (by about 2 percent), as wellhead prices drift upward in a lagged response to the increased world oil price. Price increases could become more extreme over the next five quarters, especially on a regional basis, if a prolonged severe winter results in spot shortages of gas. In 1987, gas prices are estimated to fall by 6 percent compared to 1986, while wellhead prices will fall by 12 percent. A variety of factors are responsible for the drop in wellhead prices: a lagged response to the price of oil, competition among different sources of gas, low anticipated demand, and a continuation of the "bubble" or surplus of gas.

- Residential electricity prices are foreseen to rise, in nominal terms, by 3.5 percent in 1988 over 1987 prices, or approximately at the rate of inflation. The factors behind this increase are an expected rise of about 2 percent in the weighted average price for fossil fuels (Figure 7 on page 14) and rising capital costs. Although interest rates in general are expected to rise in 1988, the delayed completions of several nuclear power units (such as Shoreham and Seabrook) may increase utility bond rates at a faster pace. Offsetting these factors, however, are lower tax rates and more deductions than additions to the rate base. For 1987, residential electricity prices are declining slightly, due to lower tax rates and a slowdown in capacity additions.

U.S. Petroleum Outlook

o Total Petroleum

o Motor Gasoline

o Distillate Fuel Oil

o Residual Fuel Oil

o Jet Fuel

o Petroleum Supply

o Crude Oil and Natural Gas Liquids
Production

o Petroleum Stocks and Imports

Figure 8. Total Petroleum Demand
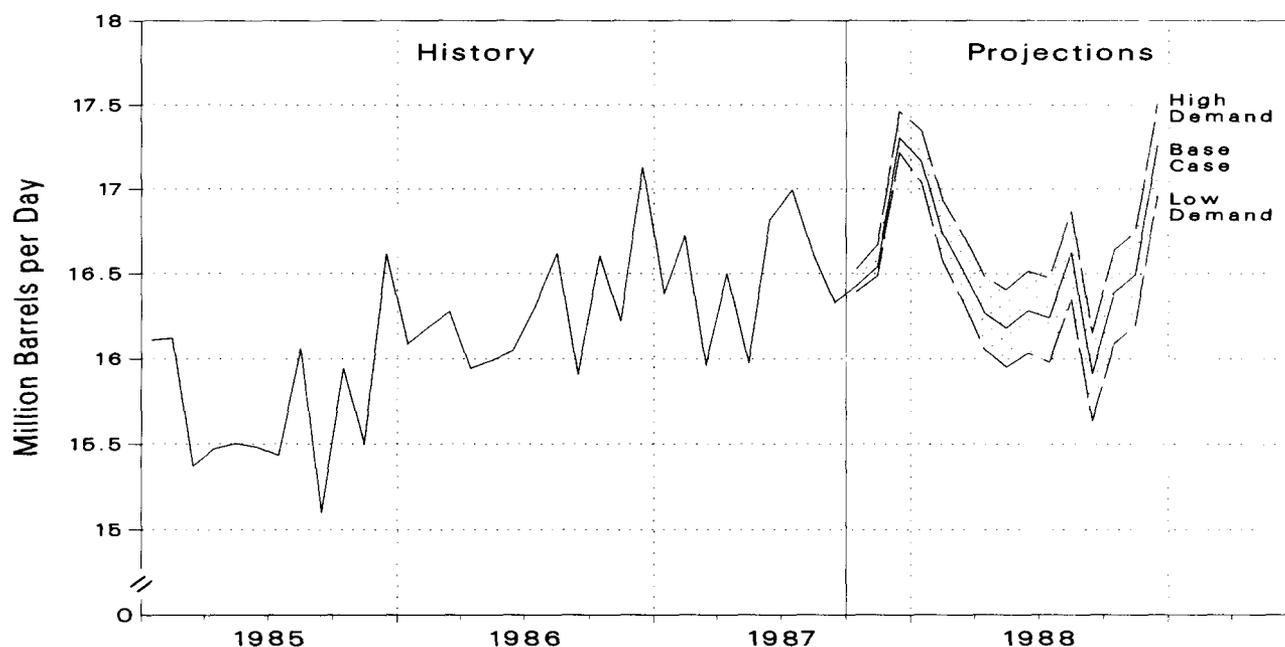
Total Petroleum

After a 1.7-percent climb in 1987, total petroleum demand should stabilize at about 16.5 million barrels per day in 1988 (Table 6 on page 46 and Figure 8). Strong third-quarter demand, led by increases in the demand for motor gasoline and "other" petroleum, has produced a 2-percent increase in overall consumption for the year to date compared to 1986. In addition, hot weather has helped keep utility consumption of residual fuel oil higher than previously expected, although considerably below last summer's demand.

- Gasoline demand will flatten in 1988, with increased vehicle-miles traveled offset by improving efficiency.

- More robust industrial output should help boost diesel demand, which strengthened in 1987. Seasonably cold temperatures will also increase first-quarter demand for heating oil, which was low last winter due to warmer-than-normal weather.

- Residual fuel oil is likely to continue losing market share to natural gas in both the industrial and utility sectors.

Of the major uncertainty factors of price, economic activity, and weather, price will have the greatest impact. The range of prices from $16 to $22 per barrel in 1988 leads to a range of 0.43 million barrels per day for total petroleum consumption. Weather uncertainties contribute another 0.17 million barrels per day to the 1988 demand sensitivity range. Total demand in 1988 should average between 16.2 and 16.8 million barrels per day, given the combined uncertainty of the input projections (Table 13 on page 53).

Figure 9. Motor Gasoline Demand
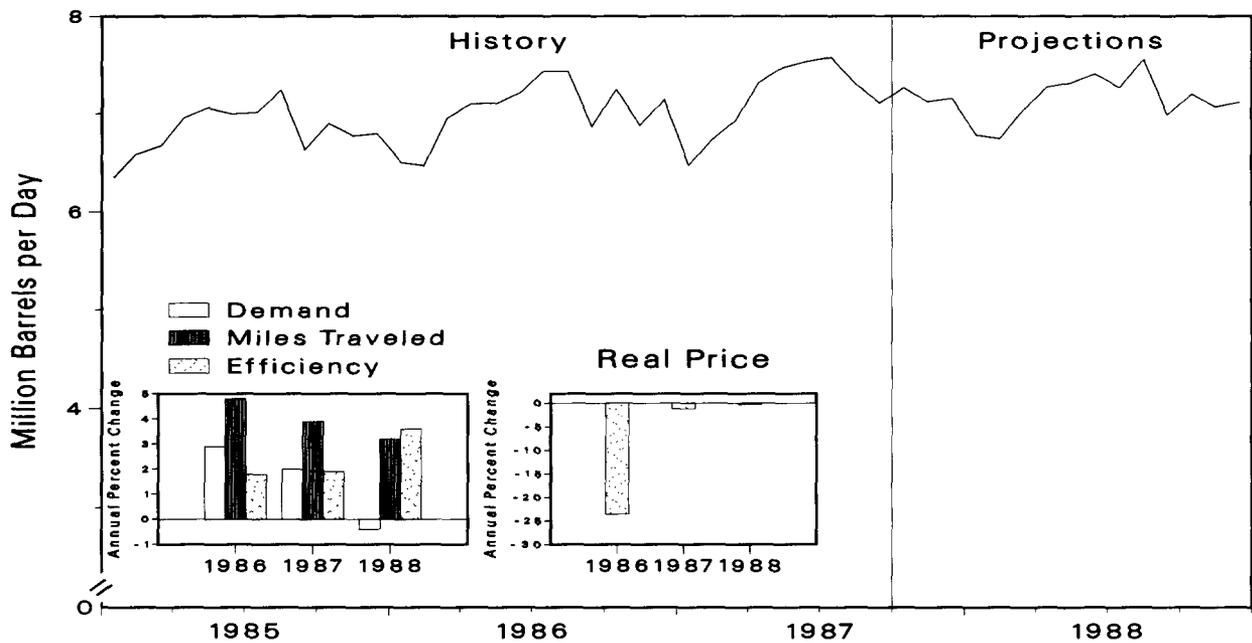
Motor Gasoline

Higher gasoline prices (an estimated 99 cents per gallon during the third quarter of 1987, 12 cents higher than a year earlier) have not yet dampened motor gasoline demand. Through September, year-to-date consumption was 2 percent above the corresponding period of 1986 (Table 9 on page 49). The highest annual growth occurred in the second quarter of this year, with a substantial 4.2-percent increase above the level for the second quarter of 1986, to 7.44 million barrels per day. Even with third-quarter prices 14 percent higher than a year ago, summer demand climbed, although at a somewhat slower pace.

- Estimated vehicle-miles traveled, which increased by almost 5 percent in 1986 (Figure 9), are still expected to increase, but at a slower pace (4 percent growth in 1987 and 3 percent in 1988). So far, 1987 has been a strong year for travel demand; and, with no change in gasoline prices and significant growth in personal income, 1988 should show respectable growth in vehicle-miles traveled as well.

- Improvements in fleet efficiency slowed considerably in 1986; 1987 showed a similar low gain of just under 2 percent.[2] The prospect is for higher efficiency growth in 1988, mainly because the higher crude oil prices experienced in 1987 should translate into increased concern over future gasoline prices, despite the fact that refiners and retailers have so far absorbed most of the increase in crude oil costs.

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

Figure 10. Distillate Fuel Oil Demand
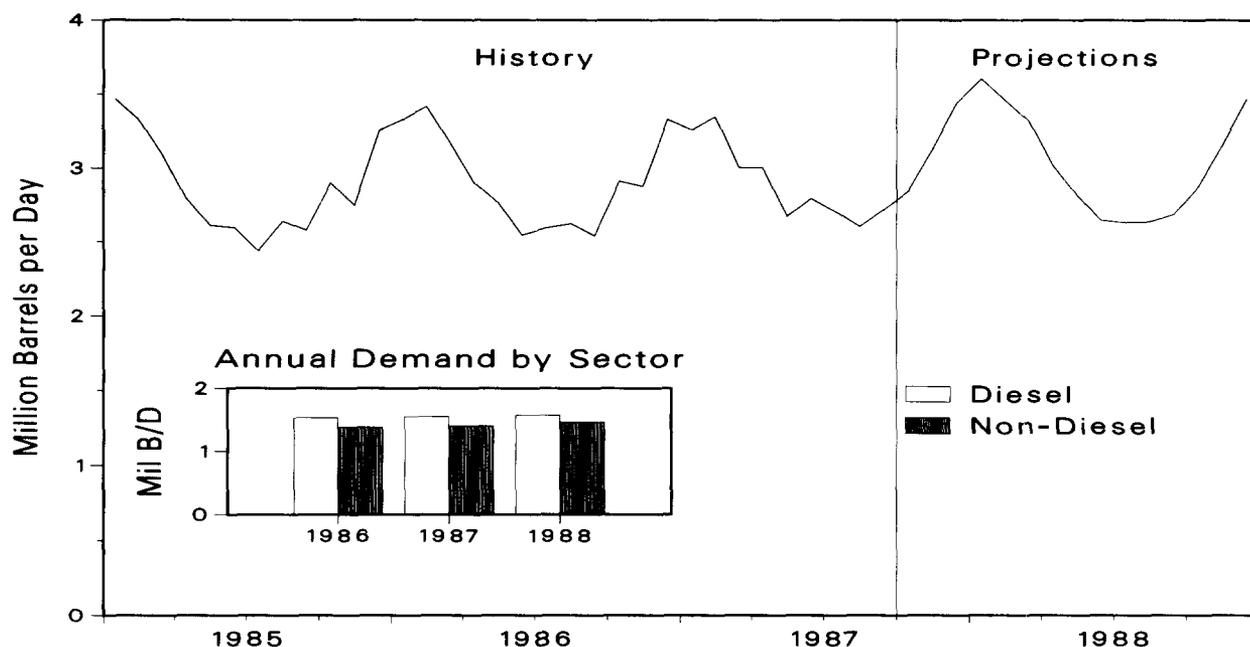
Distillate Fuel Oil

Distillate demand in the first half of 1987 remained about the same as a year ago (Table 10 on page 50). A major factor was the unseasonably warm weather in the first quarter of 1987, which suppressed heating oil demand. Demand rose in the second quarter of this year, because industrial production drove up demand for diesel fuel. Tonnage for truck transportation increased by 12 percent during the first half of 1987 over the first half of 1986. In addition, continued declines in the price of heating oil may have encouraged secondary inventory building by wholesalers in expectation of future price increases. Although the price of heating oil has probably bottomed out for 1987, the weighted annual average will still be some 5 cents per gallon below the 1986 level.

- Distillate demand in 1987 is expected to reach 2.96 million barrels per day, up by about 2 percent over the 1986 level (Figure 10). Sluggish demand for diesel and heating oil in the first quarter of 1987 will offset an average gain of 2.5 percent expected for the remainder of the year. Residential and commercial use of heating oil should be off slightly from 1986; oil in these sectors continues to lose market share to natural gas and electricity.

- The projected demand for distillate in 1988 is 3.02 million barrels per day, about 2 percent over 1987 demand. A major cause for this increase is weather; the first quarter of 1987 was 6 percent warmer than normal (see "Winter Distillate Outlook," page 35). Thus, an assumed return to normal, hence colder, weather in the first quarter of 1988 should stimulate demand for heating oil. In addition, diesel demand should be stronger in the first quarter of 1988 than in the first quarter of 1987. Growth in industrial production, however, will taper off progressively in 1988. Together with somewhat higher prices, this should lead to virtually no growth in overall distillate demand during the last three quarters of 1988 compared to year-earlier levels.

Figure 11.   Residual Fuel Oil Demand
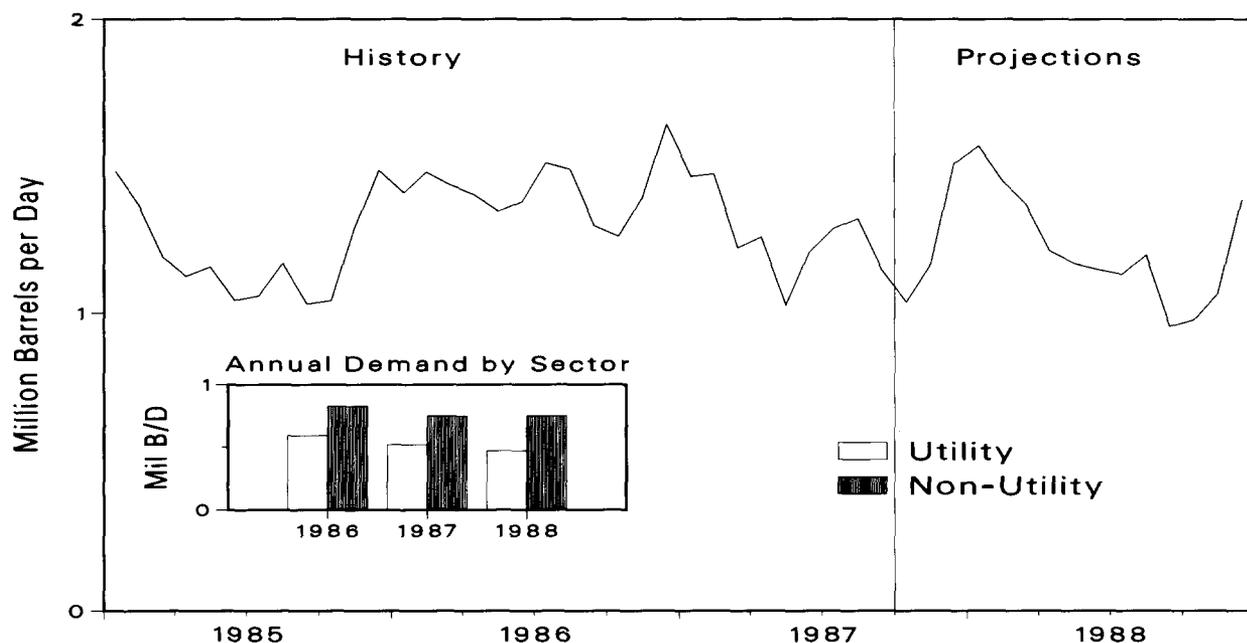
Residual Fuel Oil

Demand for residual fuel oil has waned in 1987 and is returning to its 1985 level, due to competition from other utility fuels and from foreign bunker fuel. Further weakening of demand will be evident in 1988, as utility use of residual fuel oil continues its descent (Table 11 on page 51).

* A hot summer helped to keep demand for residual fuel oil from falling even lower than it did, with utility consumption down by 12 percent this summer from last summer (Figure 11). Overall, 1987 is seeing a reversal of the gains made last year in the demand for residual fuel oil, with prices no longer as competitive as they were, especially against natural gas.

* Residual oil demand during 1987 was nearly 12 percent lower than a year ago. Some of the decline in the electric utility sector is due to the displacement of existing oil generators by new coal-fired and nuclear power plants. Transportation (bunker) consumption is continuing to decline, as overseas suppliers maintain their price advantage over domestic sources.

* In 1988, residual fuel oil demand should fall by an additional 2.4 percent from 1987 levels. Most of this loss will occur in the electric utility sector, as natural gas continues to increase its share of generation for peaking demand. Despite significant growth in industrial output, residual fuel will hold its own against competition from natural gas and electricity.

Figure 12.   Jet Fuel Demand
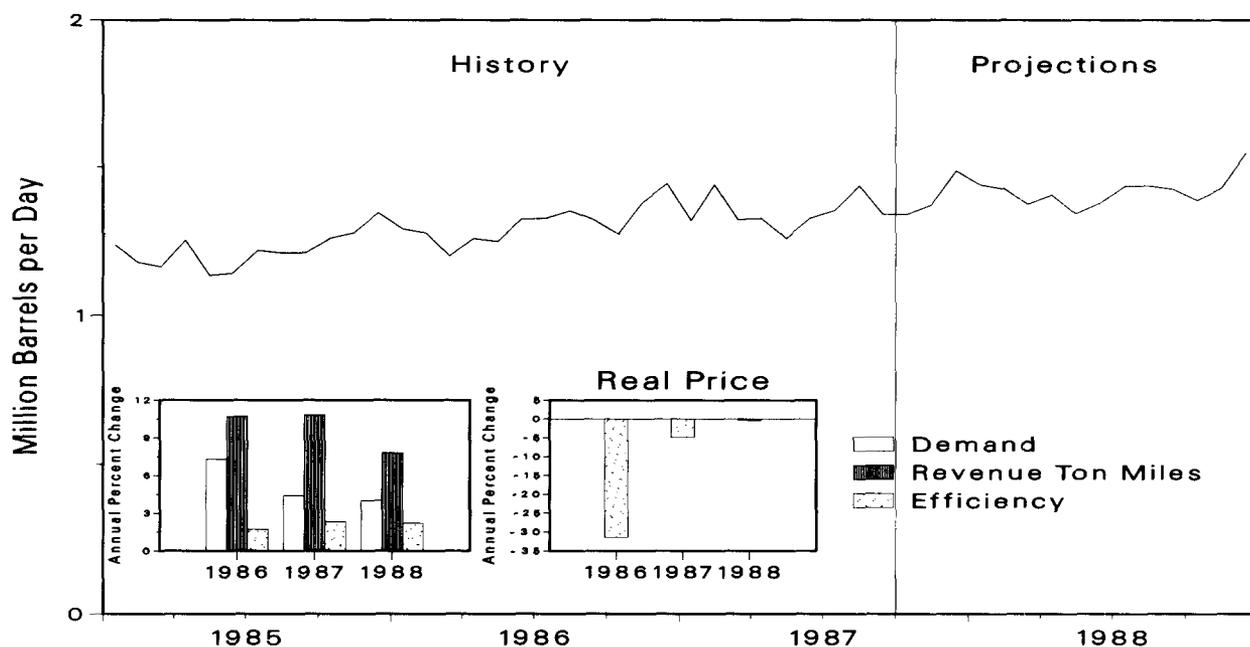
Jet Fuel

Recent airline accidents do not appear to have dampened overall airline traffic in the first half of 1987, and the demand for jet fuel has remained strong as well (Table 12 on page 52). Airlines have announced increases in the prices of discount fares and stricter advance purchase requirements for the fall of 1987. Such action is generally taken only with expectations of heavy airline traffic. Moreover, the airline industry has taken steps to head off a possible negative consumer reaction to scheduling delays. Faced with pressure from the Department of Transportation, the Nation's six largest airlines have announced an agreement designed to make the published flight times closer to actual flight times. Even if these changes turn out to be only cosmetic, jet fuel demand should increase through the rest of 1987 and into 1988.

* Economic growth and declining real prices of airline tickets stimulated airline traffic in the first half of this year. Revenue ton miles (a measure of the miles traveled by passengers and freight) increased by more than 11 percent between the first half of 1986 and the first half of 1987; hence, jet fuel demand grew by 5 percent over the same time period (Figure 12).

* Increases in the aircraft load factor (a gauge of the total aircraft capacity used by passengers and freight) and average aircraft efficiency (revenue ton miles divided by jet fuel demand) have dampened jet fuel demand to some extent. During the first half of this year, the load factor grew by more than 3 percent, and efficiency rose by 1 percent compared to the first half of 1986. The efficiency gains are not as high, however, as those of the 1970's. Smaller, less fuel-efficient aircraft are being used for an expanding level of interairport traffic.

* Compared to the second half of 1986, revenue ton miles are expected to increase by 10.2 percent in the second half of 1987, fueled primarily by growth in the economy. In this same time period, jet fuel demand will rise by 3.3 percent and efficiency will rise by 3.6 percent, as airlines replace older aircraft with newer, more efficient planes. Compared to 1987, the following positive growth rates are predicted for 1988: demand for jet fuel, 4.4 percent; revenue ton miles, 7.8 percent; and efficiency, 2.2 percent.

Figure 13.　Changes in Sources and Uses of Petroleum

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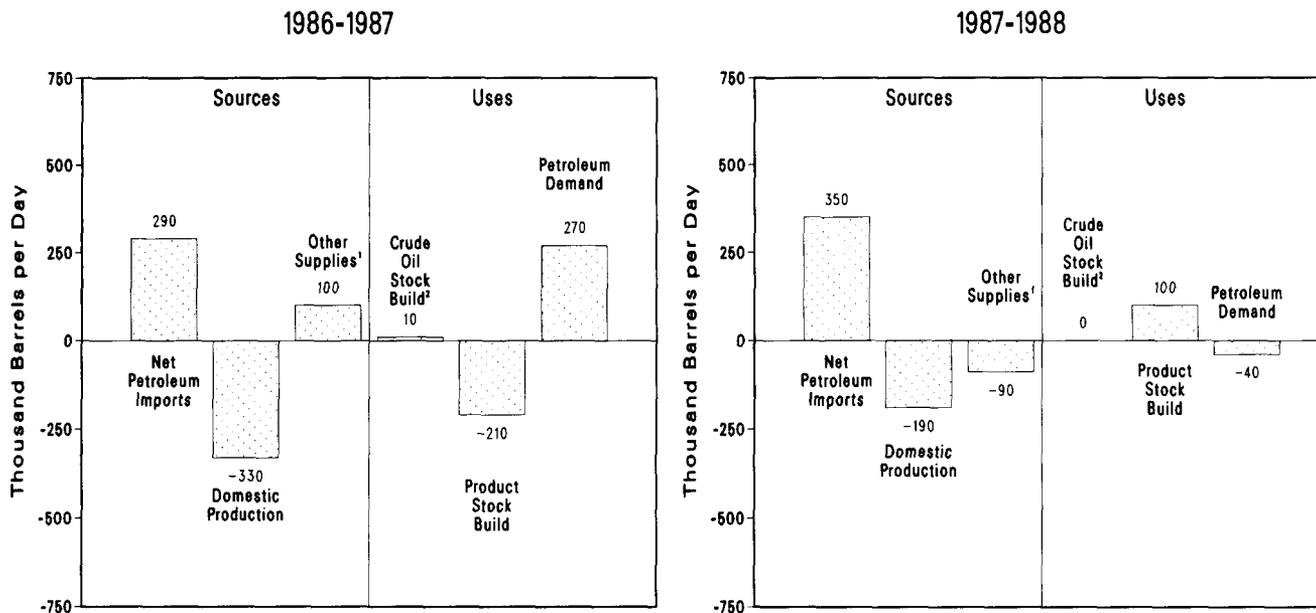
¹ Includes change in crude oil supplied as product, unaccounted for crude oil, other hydrocarbon inputs, and refinery gains.
² Includes change in Strategic Petroleum Reserve build rate.
　　Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1986, DOE/EIA-0340(86)/1; *Petroleum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

Petroleum Supply

Crude oil production is expected to continue its decline throughout the forecast period. Small price increases should spur additional drilling activity, but not enough to reverse the decline in oil production. Rising levels of net petroleum imports are required to offset the decline in crude oil production throughout the forecast period and to support building of petroleum product stocks from 1987 to 1988 (Table 6 on page 46).

• Domestic production of petroleum (crude oil and natural gas liquids) is expected to decline by 330,000 barrels per day from 1986 to 1987 and by 190,000 barrels per day from 1987 to 1988 (Figure 13). Crude oil stocks (excluding the Strategic Petroleum Reserve) and refinery inputs of crude oil should remain relatively stable.

• The percentage of total petroleum product supplied by net petroleum imports is expected to increase from 33.4 percent in 1986 to 34.6 percent in 1987 and to 36.8 percent in 1988.

• Petroleum product stocks should be built up at a rate of 10,000 barrels per day in 1988, in contrast to an expected drawdown of 90,000 barrels per day in 1987. The result is a net positive change of 100,000 barrels per day in the stock build rate for 1988 compared with 1987. Petroleum product stocks are expected to be 719.2 million barrels in 1988, up 2.7 million barrels over the closing 1987 stock level, but well below the closing 1986 stock level of 749.7 million barrels.

Figure 14. Components of Domestic Petroleum Production
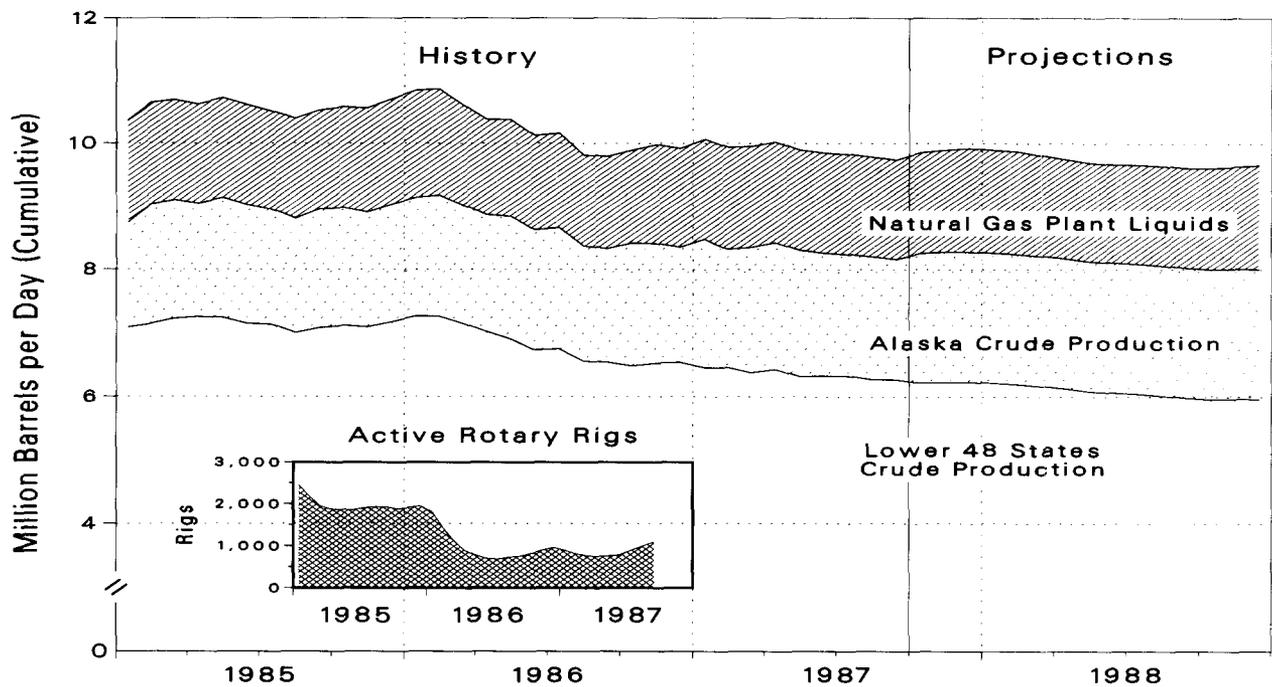
Note: Crude oil production includes lease condensate.
Sources: • History: Energy Information Administration, *Petroleum Supply Annual*, 1985 and 1986, DOE/EIA-0340(85,86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, January 1987 to July 1987; and *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41) (Washington, DC). • Projections: Table 6.

Crude Oil and Natural Gas Liquids Production

U.S. crude oil production is projected to decline by 380,000 barrels per day from 1986 to 1987 and by another 190,000 barrels per day from 1987 to 1988 (Table 6 on page 46).

• Production from the lower 48 States is expected to drop by about 480,000 barrels per day from 1986 to 1987 (Figure 14). Declines in production from this region are partially offset by increased oil production from Alaska -- specifically, the Lisburne reservoir of Prudhoe Bay and the startup of the Endicott field.

• In 1988, it is projected that Alaska will surpass Texas as the number one oil-producing State.

• Rotary rig activity in the first 9 months of 1987 was below that in 1986 for the same period. Drilling activity, however, has begun to recover; more than 1,100 rotary rigs were operating in September of this year for the first time since March 1986. Drilling activity is expected to increase to near-1986 levels in 1988.

• Domestic production is projected to decline in both the low and high price cases. The spread between the two cases is 30,000 barrels per day in 1987 and 300,000 barrels per day in 1988 (Table 7 on page 47 and Table 8 on page 48).

Figure 15. Stocks and Net Imports of Petroleum

Stocks of Petroleum Products   Net Petroleum Imports

Petroleum Stocks and Imports

Little change in private stocks of either crude oil or refined products is expected in the short term (Table 6 on page 46 and Figure 15).

- Finished motor gasoline stocks at the end of the third quarter of 1987 are estimated at 191 million barrels, lower than the level a year earlier.

- Ending stocks of distillate fuel oil for the third quarter of 1987 are estimated at 129 million barrels, about 24 million barrels lower than the level a year earlier (Table 9 on page 49), but still indicating no strong pressure on distillate prices for the rest of the year (see "Winter Distillate Outlook," page 35).

- In 1988, net petroleum imports are expected to increase by 350,000 barrels per day over the 1987 level. Slightly more than two-thirds of the increase in 1988 is expected to be crude oil.

Outlook for Other Major Energy Sources

o *Natural Gas*

o *Coal*

o *Electric Power*

o *Electricity Fuel Shares*

Figure 16.   Natural Gas Demand
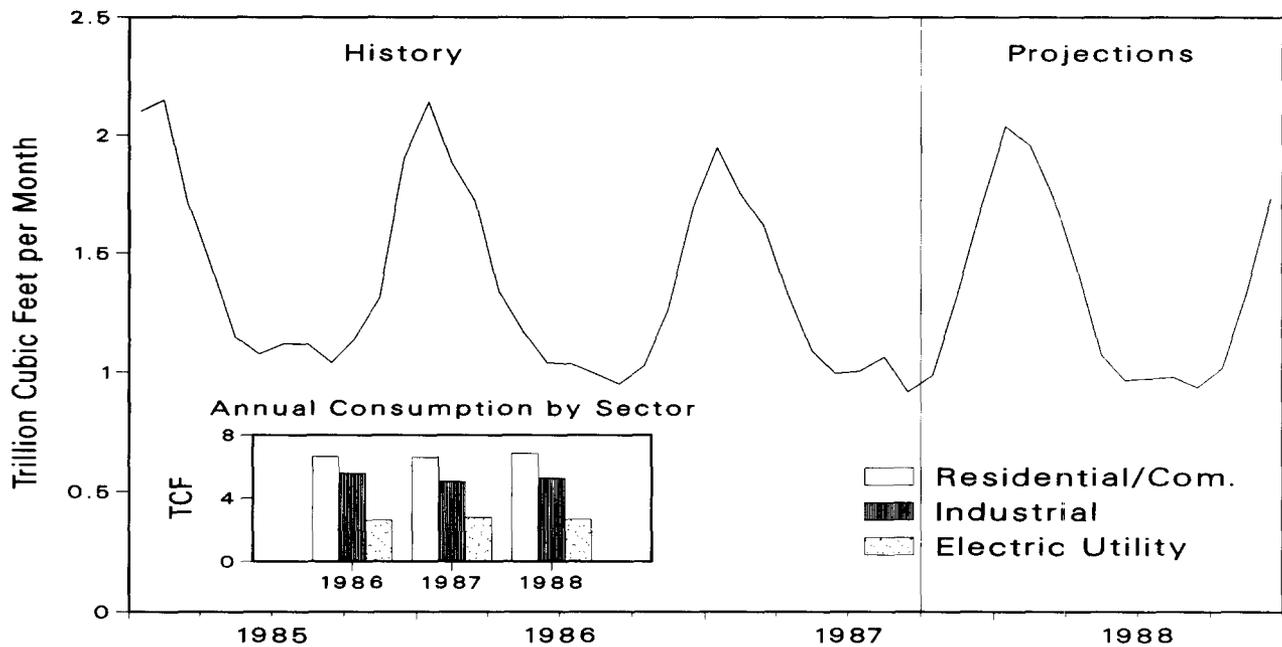
Natural Gas

Total demand for natural gas is expected to fall well below 16 trillion cubic feet in 1987, reflecting unusually low levels for the first quarter of this year. In 1988, however, demand should return to over 16 trillion cubic feet, as higher oil prices and increased economic activity encourage natural gas use (Table 14 on page 54).

• Residential natural gas use is likely to increase by about 6 percent between 1986 and 1987 (Figure 16). A return to normal weather and continued growth in the number of natural gas customers will act to push demand up by an additional 4 percent in 1988.

• A 2-percent increase in sales of natural gas to commercial consumers is likely to occur between 1987 and 1988. Commercial sales were off by 3 percent during the first quarter of this year, primarily as a result of the relatively warm winter. Normal weather, rising economic activity, and higher oil prices should act to restore commercial demand for natural gas.

• Industrial natural gas use should start to pick up during the latter part of 1987, in response to higher oil prices and increased levels of economic activity. With industrial demand during the first quarter of 1987 down by almost 30 percent from the first-quarter 1986 level, the annual projection for 1987 falls well below the 1986 level. Second-quarter data for 1987 indicate that industrial gas consumers are beginning to respond to falling gas prices and rising residual fuel oil prices. The 6-percent rise in industrial demand for natural gas between 1987 and 1988 reflects continued growth in the principal gas-consuming industries, combined with an oil-to-gas price ratio that approaches pre-1986 levels.

• Natural gas use at electric utilities should rise by 7 percent in 1987 and then fall in 1988 by 5 percent. Coal and nuclear power will continue to squeeze the oil and gas share of total generation, but natural gas is expected to become an increasingly important contributor relative to oil.

Figure 17. Coal Supply and Disposition
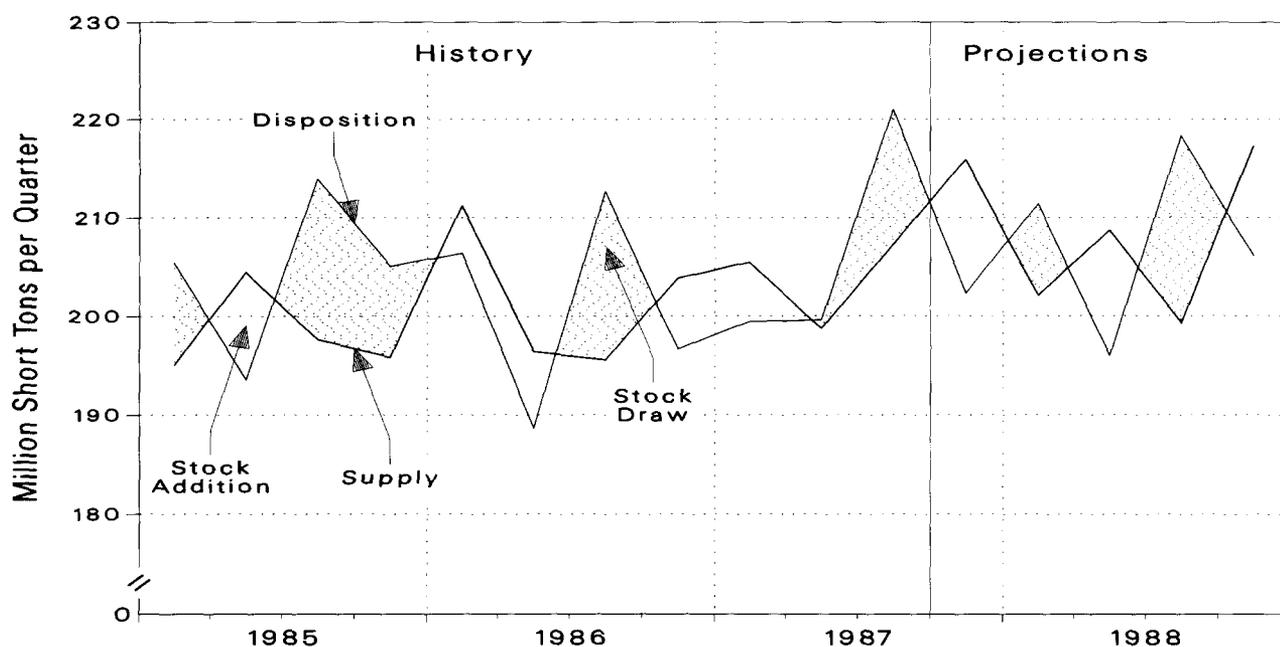
Sources: • History: Energy Information Administration, *Quarterly Coal Report*, DOE/EIA-0121(87/2Q) (Washington, DC, 1987). • Projections: Table 15.

Coal

Total domestic coal consumption is projected to grow by around 1 percent in 1988, following a 2-percent rise in 1987 (Table 15 on page 55 and Figure 17). Most of the increase in 1987 is concentrated during the summer months, corresponding to strong electricity demand.

- Electric utility coal use should remain steady between 1987 and 1988, with nuclear and hydroelectric generation dominating the rise in electricity generation. The jump in utility coal use during the second quarter of 1987, relative to the second quarter of 1986, corresponds to unusually low hydroelectric generation combined with warmer-than-normal weather. In addition, lower prices for coal and natural gas discouraged the use of oil. Coal-fired capacity utilization should remain constant between 1987 and 1988, given few planned additions.
- Coking coal use should rise in 1988 to 36 million tons, as greater use of electric arc furnaces partially offsets the growth in steel output. The dip in 1987 is attributable to low first-quarter demand for coke; although the United Steel Workers strike ended on January 31, 1987, domestic raw steel output showed no gains over 1986 levels until well into the second quarter. For the second half of 1987, raw steel production should be well over prior-year levels. (Steel output data are from the American Iron and Steel Institute.)
- Retail and general industry coal demand should decline slightly in 1987 and then increase by 5 percent in 1988. Industrial coal demand declined by 6 percent during the first half of this year compared to the first half of 1986, despite higher output by the major coal-consuming sectors (stone, clay, and glass; chemicals; and paper). With no apparent reason for this decline to continue, industrial coal use should return to normal levels later this year.
- A modest buildup of consumer stocks will occur during the fourth quarter of 1987 in anticipation of a strike by the United Mine Workers of America in 1988. Stock levels should peak close to 180 million tons, well below the level reached prior to the last contract expiration date. This forecast assumes that no strike will occur.
- Coal exports dropped 12 percent during the first 7 months of 1987 and may not improve in 1988. Competition from other exporters has intensified this year. Substantial volumes of coal have been added by Colombia and China to already glutted world markets. The United States is at a disadvantage because of high production and domestic freight costs, as well as unfavorable exchange rates. The Canadian and Australian dollars and the South African rand are worth much less now relative to the U.S. dollar than in previous years.

Figure 18.   Electricity Supply and Disposition
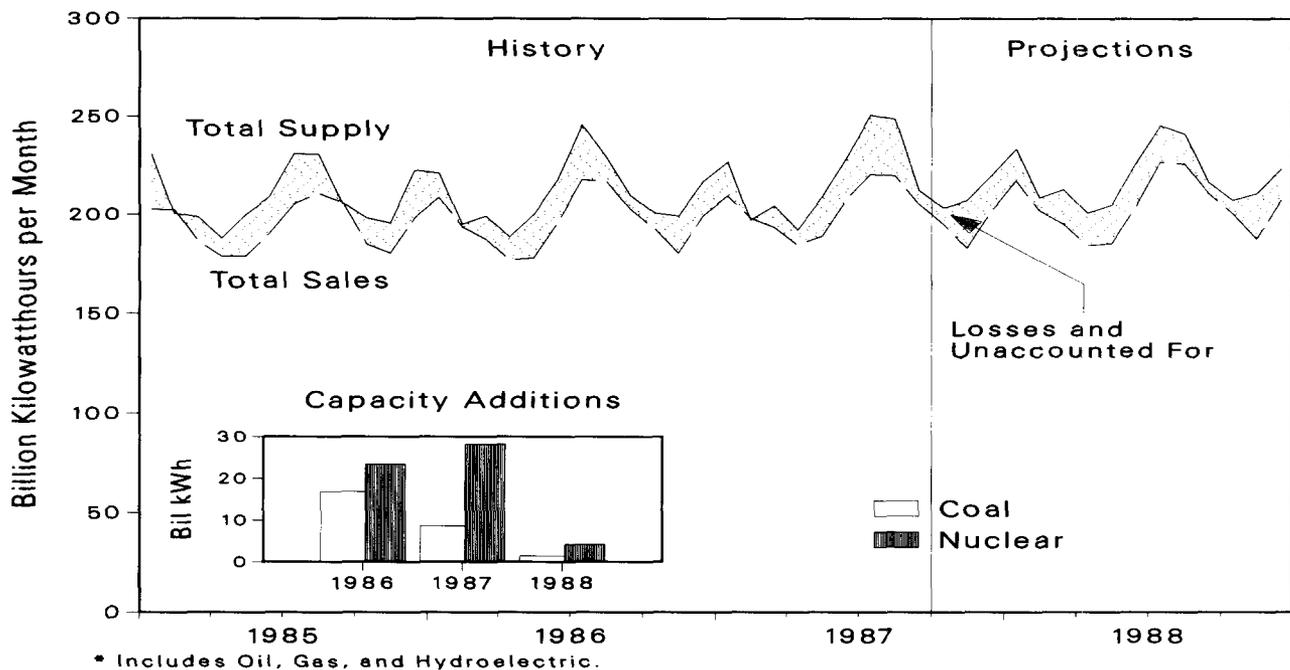
* Includes Oil, Gas, and Hydroelectric.

Electric Power

The outlook for total electricity demand this year is optimistic in comparison with last year's sluggish portrait. Varying levels of economic activity and weather patterns are responsible for the different growth rates. Demand growth in 1988 is not expected to be as strong as in 1987 but should surpass the 1986 rate (Table 16 on page 56).

* Total electricity generation in 1987 should outperform general income growth, increasing by 3 percent (Figure 18). National, and in particular regional, weather patterns have created strong needs for electricity for space heating and cooling (see "Electricity Generation in 1987: Regional Disparities," page 39). Nationally, the first 4 months of this year were about 3 percent colder than the same period in 1986. The weather was substantially colder, however, in three of the five regions (Middle Atlantic, East North Central, South Atlantic, West South Central, and Pacific) that represent three-quarters of residential electricity demand. Of greater impact was the heat wave experienced this summer; it was about 9 percent warmer than in 1986 from May through August, both nationally and in the five regions above. (Regional weather data are from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, "Automated Office System.")

* With weather patterns assumed to return to normal in 1988, electricity generation levels can be expected to increase by only 1.2 percent, despite a healthy growth rate of 2.8 percent assumed for personal income. This year's summer weather is again the culprit: it was 11 percent warmer than normal from May through August.

* Net imports of electricity (primarily from Canada, the remainder from Mexico) could reach 41 billion kilowatthours in 1987, or 1.6 percent of electricity supply. Imports in 1988 should grow along with the general demand for electricity, maintaining their share of supply at 1.6 percent, or 42 billion kilowatthours. This forecast is contingent upon the continued operation of the Phase I facility between Hydro-Quebec and New England and improved transmission over the existing U.S. utility grid.

Figure 19. Electricity Generation by Fuel Source
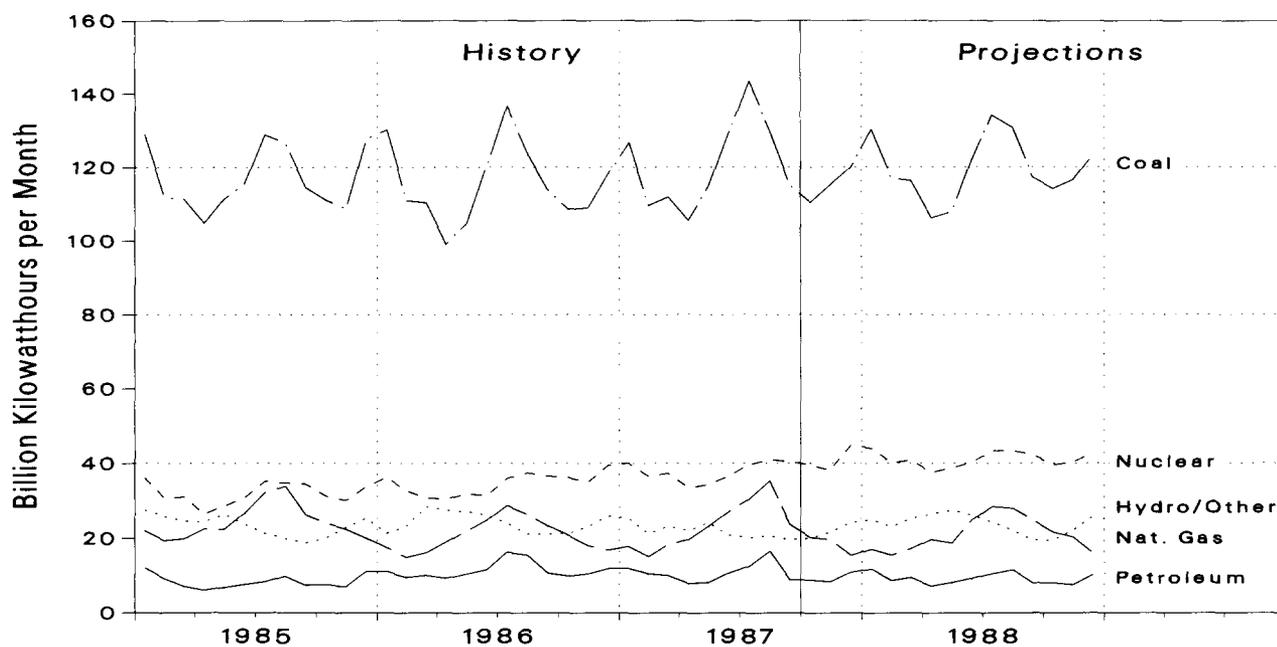
Electricity Fuel Shares

Increases in electricity demand in 1987 are being satisfied primarily by generation from two sources of power: coal and nuclear. Oil and hydroelectric sources have declined noticeably, and gas is still recovering from its 1986 low. Nuclear and hydroelectric power will supply most of the additional demand projected for 1988, while coal will contribute only a small addition (Table 16 on page 56 and Figure 19).

• The 1987 estimate for nuclear power generation is nearly 12 percent above the 1986 level, due to a rise in the average annual capacity factor to 58 percent and the addition of eight new nuclear units. One nuclear unit was retired this May (La Crosse of Wisconsin at 51 megawatts), but the impact was obscured by the startup of the Beaver Valley 2 unit in Pennsylvania earlier than expected, during August of this year. In 1988, nuclear power should grow by almost 7 percent, as three new units come on line.

• Unusually warm weather during the summer months and the availability of additional capacity should produce more than a 3-percent increase in coal generation in 1987. Capacity additions in 1988 are scheduled to come on line late in the year, partially explaining the small increase (less than 1 percent) in coal-fired generation for next year.

• Oil and natural gas continue to compete with each other for a dwindling share of the electric utility market. Nuclear and coal sources should continue to minimize dependence on oil and gas through 1988. Within the oil and gas share, gas maintains an edge because of rising oil prices -- a reversal of the situation in 1986. Although gas is gaining market share relative to oil, it is losing to hydroelectric and nuclear power in 1988.

• Water levels in the Rocky Mountains, Southwest, and Western United States remain at below-normal status. Hydroelectric generation has been lower than expected, and projections have been lowered accordingly from those in the last *Outlook*. Hydroelectric generation for 1987 is now shown to be over 9 percent lower than in 1986. Though lower than previously shown, the 1988 projection is close to the 1986 level.

Special Topics

- *Winter Distillate Outlook*

- *FERC Moves Ahead with Efforts to Put in Place More Flexible Market Mechanisms*

- *Electricity Generation in 1987: Regional Disparities*

Winter Distillate Outlook

Projected demand for distillate fuel oil during the upcoming winter (October 1987 through March 1988) averages 3.30 million barrels per day, about 6 percent higher than demand during last winter. This projected increase results mainly from an assumption of normal weather, as the first quarter of 1987 was 6 percent warmer than normal. Primary stocks of distillates at winter's end are projected at 98 million barrels, 11 percent lower than a year ago. If colder-than-normal weather occurs, then additional demand for heating oil will be met most likely through incremental increases in imports and production.

Projected demand in the fourth quarter of 1987 is 3.14 million barrels per day, 3 percent more than in the fourth quarter a year ago. The impact of industrial production on transportation and industrial use is the expected impetus. Distillate demand for residential and commercial heating in the fourth quarter of 1987 is expected to decline slightly from a year ago. Assuming a return to normal weather and a corresponding increase in heating oil usage, distillate demand is projected at 3.46 million barrels per day during the first quarter of 1988, 8 percent above a year ago.

The above projections are premised on normal weather and no disruption of supply. Low stock levels will increase the importance of imports in the event of colder weather. If the weather is 10 percent colder than normal, projected demand for distillate will increase by 65 thousand barrels per day. If such additional demand is met by inventory drawdown, end-of-winter stocks will decline to 86 million barrels, the lowest monthly level in recent history. An alternative means of meeting unexpected distillate demand is to increase capacity utilization at refineries. This would require increasing utilization to 90 percent, close to the short-term limit. Utilization at the start of winter was 85 percent. A more likely source for additional demand is imports. Adequate European stocks appear available at the start of this winter. Additionally, secondary stocks for wholesalers are stronger in the United States and in Europe than they were last winter.

The retail price of heating oil is expected to reach 85 cents per gallon this winter, about 10 cents above last winter's price. However, about one-half of that increase has already occurred through the summer. Under varying assumptions for crude oil prices, the projected price per gallon for heating oil ranges between 78 cents (low oil price assumption) and 93 cents (high oil price assumption). In the first quarter of 1988, lower inventory levels (compared to last year) and higher demand are expected to exert upward pressure on refiner and retailer margins (the difference between the retail price of heating oil and the crude oil price). Further upward pressure on price is expected if colder-than-normal weather occurs in Europe and in the United States, as secondary stocks and European primary stocks are depleted. Based on a reasonable set of supply and demand price elasticities, and assuming that the weather is 10 percent colder than normal, prices could increase by as much as 5 to 10 cents per gallon above those in the base case.

FERC Moves Ahead with Efforts to Put in Place More Flexible Market Mechanisms

It was a long summer for regulators and ratemakers in the natural gas industry. Federal Energy Regulatory Commission (FERC) Order 436, which was designed to promote competition in the interstate gas market, was set aside by a Federal Appeals Court this past June in response to a challenge by Associated Gas Distributors, a trade organization representing local distribution companies. In August, the FERC responded to the Court's criticism of Order 436 and issued an interim rule, Order 500, as a replacement. The Court allowed Order 500 to be put into effect in September, but key features of the order are not currently scheduled to be effective until January 1988.

Order 436: Open Access and the Growing Spot Market for Gas

FERC Order 436, issued in October 1985, was designed to promote competition by providing incentives for interstate pipelines to offer transportation services on a contract basis directly to gas producers and consumers. Formerly, the pipelines had operated largely by purchasing the gas themselves and then reselling it to local distributors and end users.

Open access transportation programs, the centerpiece of Order 436, permitted an interstate pipeline to transport gas on a nondiscriminatory, first-come first-served basis without additional approval from the FERC, provided that the pipeline agreed. The order also described general requirements for carriage rates that would not unduly discriminate between customers.

A further feature of Order 436 was designed to facilitate the access of local distributors to the emerging spot market by requiring that pipelines transporting gas under the new rules allow customers to reduce their contract demand commitments with the pipelines over time and buy gas elsewhere -- possibly to be transported by the same pipelines under the open access program.

The provision for open access transportation is seen as a key to greatly increasing competition in the market, as producers and consumers, once locked into dealing with only one or a few pipelines, may now contract directly with each other or with other third parties. This expanded opportunity for trade has been a major factor in the recent development of spot market sales for gas, which, according to trade accounts, have grown dramatically in recent years. These new spot contracts provide for the near-term delivery of generally smaller volumes of gas than were associated with the long-term delivery commitments that characterized earlier producer-pipeline contracts (and often involved the entire output of a natural gas reservoir).

Take-or-Pay Contracts and Pipeline Opposition to Order 436

In recent years, many pipeline customers reduced their purchases of system supply gas, instead contracting directly with producers or third parties for supplies and with the pipelines for transportation services. The problem here for interstate pipelines is that many pipelines are still burdened by long-term, take-or-pay contracts negotiated several years ago when oil and gas prices were much higher and supplies were relatively uncertain. For the pipelines, a key feature of these contracts is the guaranteed access of the pipeline to a producer's supply, for a price, regardless of whether the gas is actually lifted. For the producers, take-or-pay contracts offer a guaranteed cash flow.

As gas prices have fallen, and as pipeline customers who formerly paid the high costs incurred under these contracts have switched to contract carriage and found their own, cheaper sources of gas, many pipelines have become unwilling or financially unable to fulfill their contractual obligations either to take or to pay for this now relatively expensive gas. The pipelines are unable to roll higher-priced gas into their total supply without excessively raising their average selling price. Lower utilization of pipeline system supply along with falling demand in the past few years has exacerbated the problem, since the pipelines are now facing a smaller user base to which their fixed capital costs can be passed through.

In issuing Order 436, FERC took the position that it had little authority to deal with the take-or-pay problem, instead viewing this as a market problem. In contrast, the view expressed by pipelines is that the high prices negotiated between producers and pipelines were in large part a result of the design of the Natural Gas Policy Act of 1978, as the Federal Government sought at that time to encourage the development of additional energy reserves. The combined success of that policy, with respect to the current gas bubble (or excess deliverability in the interstate market), and Order 436, which gave producers a free-market option that was not available when the contracts were negotiated, are blamed for exacerbating the current decline in gas prices that has rendered the take-or-pay contracts so unprofitable. (Of course, this is not the whole story, since the decline in the real price of oil since 1981 and the major collapse in oil prices since January 1986 have increased the competitiveness of oil products and greatly exacerbated the gas price reduction problem.)

In June 1987, the U.S. Court of Appeals in the District of Columbia, in response to a challenge to Order 436 by Associated Gas Distributors, upheld the substance of the order. At the same time, however, the Court found FERC's legal authority for requiring contract demand reductions to be inadequate and, in accepting the pipelines' argument that the order aggravates the take-or-pay problem, questioned FERC's decision not to address this problem directly. The Court vacated the order and remanded it to FERC for further proceedings.

FERC's Effort to Resolve Take-or-Pay Issues

FERC Order 500, issued as a response to the Court's decision, was accepted by the Court and allowed to become effective as a replacement for Order 436 in September 1987. Based on immediate industry comments on Order 500, however, the complete open access to interstate pipelines envisioned by FERC may face still more problems in the near future.

In Order 500, the FERC has remained committed to its goal of promoting open access. While reissuing much of Order 436, FERC has responded to specific criticisms of the Court by eliminating the contract demand reduction provision and making an effort to address the take-or-pay problem directly. In addition to providing a rate mechanism to avoid future problems in this area, two specific provisions of Order 500 are designed to help reduce the total liability that pipelines have accumulated as a result of take-or-pay deficiencies (volumes of gas for which the pipelines are still contractually obligated to pay, even if not taken).

The first provides a mechanism to reduce a part of the pipelines' liability to the extent the pipelines transport gas under the open access program. Where pipelines have take-or-pay deficiencies with specific producers, those producers must offer to credit certain production volumes transported under contract carriage against the transporting pipeline's respective deficiency as a precondition for being granted open access to that pipeline. That is, each unit of the producer's gas transported on a contract carriage basis would be subtracted from that pipeline's deficiency. This represents a major departure from both the pre-Order 436 and the Order 436 environments, where producers' only obligation to accommodate pipeline deficiencies was through private actions (pipeline buyouts or buydowns of their liability with individual producers) or litigation.

The second provision would allow pipelines greater flexibility in recovering their outstanding liability from all their customers, if pipelines are willing to absorb a portion of these liabilities. Prior to Order 500, FERC had allowed pipelines to pass their costs of buying out or buying down take-or-pay deficiencies through their sales commodity charges. As the percentage of pipeline throughput accounted for by contract carriage increased, however, the ability to pass these costs through has become increasingly difficult. Under Order 500, pipelines that transport gas under the open access rules may alternatively pass 25 to 50 percent of their take-or-pay liabilities through to all customers in the form of a fixed demand charge, if they in turn elect to absorb an equivalent amount as losses. Up to 50 percent of the remaining costs of paying off the pipelines' liabilities will be allowed by FERC to be recovered through commodity surcharges or volumetric surcharges applied to total pipeline throughput.

Order 500 and the Outlook for Natural Gas Prices

Order 500 provides a mechanism for allocating the buyout or buydown costs of take-or-pay liabilities among producers, interstate pipelines, and all pipeline customers. Previously, this allocation was limited by private actions -- pipeline buyouts or buydowns of obligations with specific producers and the passthrough of some of those costs. To the extent that Order 500 turns out to be more effective than these private actions in sharing pipeline costs out to producers and consumers, the order could tend to raise interstate gas prices in some local gas markets. There are several reasons, however, involving the competitive situation at all levels of the industry, for believing that prices will not rise appreciably.

First, it should be noted that the absorption by producers of any part of the pipelines' liability -- whether via buydowns or the Order 500 transportation credits -- will not affect their production costs. Thus, wellhead prices will continue to be set by local competitive conditions regardless of the effects of Order 500.

Second, although Order 500 provides pipelines with opportunities for recovering costs from a broader group than was possible under Order 436, any further price increases as a result of Order 500 would additionally require that interstate pipelines indeed be able to pass some part of their take-or-pay buyout or buydown costs through to their customers. Of particular significance here is the fact that not all interstate pipelines (and, indirectly, not all pipeline customers) are burdened to the same extent by take-or-pay liabilities. In local markets where pipelines face competition, either from other gas pipelines or from other fuels, the ability to pass through take-or-pay costs will be limited by the prices of their lower-cost competitors.

In the face of competition, the ability of high-cost pipelines to pass on costs would be supported by limits on the capacity of their competitors with lower take-or-pay obligations to take on new business and by the contractual inability or unwillingness of their customers to switch to new suppliers. In general, however, the increased flexibility afforded by the growing spot market and open access to producers and consumers alike in seeking out the best price should tend to limit the ability of pipelines to increase rates as a result of Order 500.

Electricity Generation in 1987: Regional Disparities

This year has been a period of recovery for electricity demand. After increasing by only 0.7 percent in 1986, electricity generation should display growth of 2.9 percent by the end of 1987. Year-to-date data measure a growth rate of 2.7 percent. Behind the national growth rate, however, there is significant regional disparity.

Regional growth in electricity demand ranges from a decline in the Pacific region to an increase of more than 6 percent in the Middle Atlantic States. While price and income affect the national trend, regional disparities are generally the result of differences in weather. The following list shows the year-to-date changes in regional generation and weather patterns (heating and cooling degree days) through July of this year, as compared with the same period in 1986. The U.S. total is contrasted to the five Census Divisions that represent about 75 percent of U.S. electricity consumption. Heating and cooling degree days are from the National Oceanic and Atmospheric Administration and are weighted by the number of households using electricity to meet heating and cooling needs.

Census Division	Generation	Heating Degree Days	Cooling Degree Days
Middle Atlantic	6.1%	0.3%	19.8%
East North Central	5.2%	-5.9%	28.4%
South Atlantic	3.4%	8.2%	-2.2%
West South Central	0.6%	30.2%	-8.3%
Pacific	-5.0%	-2.1%	-18.5%
Total United States	2.7%	3.5%	1.4%

Clearly, weather patterns have helped shape the overall pattern of electricity demand. An unusually hot summer in the Middle Atlantic and East North Central States generated the highest year-to-date demand for electricity among the five regions listed. Although the number of heating degree days in the West South Central region was far above the previous year's level, the resulting demand was offset by a cool summer with a decline in air-conditioning requirements. As a result, there was practically no change in electricity demand. Finally, the Pacific region enjoyed both a more moderate winter and a cooler summer than last year, leading to the only year-to-date decline in generation among the five regions.

Detailed Tables

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

	1986		1987				1988				Year		
	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1986	1987	1988
Supply[a]													
Production													
U.S. (50 States)	10.6	10.6	10.7	10.6	10.5	10.6	10.5	10.4	10.3	10.3	10.9	10.6	10.4
OPEC	20.9	19.1	17.2	18.4	20.6	19.7	19.0	19.0	19.8	19.8	19.6	19.0	19.4
Other Non-OPEC	16.0	16.1	16.3	15.9	16.1	16.3	16.5	16.3	16.6	16.6	15.8	16.2	16.5
Total Market Economies	47.5	45.8	44.2	45.0	47.2	46.5	46.0	45.7	46.7	46.7	46.3	45.7	46.3
Net Communist Exports	2.0	1.9	1.9	2.3	2.0	1.9	1.8	2.2	1.9	1.8	1.8	2.0	1.9
Total Supply	49.5	47.7	46.1	47.2	49.2	48.4	47.8	47.8	48.6	48.5	48.1	47.7	48.2
Net Stock Withdrawals or Additions (-)													
U.S. (50 States excl. SPR)	-.8	.3	.4	.2	-.5	.2	.5	-.2	-.6	.3	-.2	.1	.0
U.S. SPR	-.1	-.1	-.1	-.1	-.1	-.1	-.1	-.1	-.1	-.1	.0	-.1	-.1
Other Market Economies	-2.0	-.1	1.4	-.7	-1.2	.0	1.6	-.9	-1.1	.3	-.6	-.1	.0
Total Stock Withdrawals	-2.8	.2	1.8	-.6	-1.8	.1	1.9	-1.1	-1.7	.5	-.8	-.1	-.1
Product Supplied													
U.S. (50 States)	16.3	16.7	16.3	16.4	16.6	16.8	16.8	16.2	16.3	16.7	16.3	16.5	16.5
U.S. Territories	.3	.3	.3	.2	.3	.3	.2	.2	.3	.3	.3	.3	.3
Canada	1.5	1.6	1.5	1.5	1.5	1.6	1.6	1.5	1.6	1.6	1.5	1.5	1.6
Japan	3.9	4.8	4.9	3.9	4.3	4.6	5.1	4.0	4.1	4.7	4.4	4.4	4.5
Australia and New Zealand	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7
OECD Europe	11.8	12.0	12.5	11.7	11.5	12.4	13.1	11.7	11.6	12.5	12.0	12.0	12.2
Total OECD	34.5	36.0	36.2	34.5	34.9	36.3	37.5	34.4	34.5	36.5	35.1	35.5	35.7
Other Market Economies	12.4	12.4	12.5	12.6	12.6	12.7	12.7	12.8	12.8	12.9	12.4	12.6	12.8
Total Market Economies	46.9	48.5	48.7	47.0	47.5	49.0	50.2	47.1	47.3	49.4	47.5	48.1	48.5
Statistical Discrepancy	.2	.5	.8	.4	.0	.4	.4	.4	.4	.4	.2	.4	.4
Closing Stocks (billion barrels)	5.1	5.1	4.9	5.0	5.1	5.1	4.9	5.0	5.2	5.2	5.1	5.1	5.2

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

SPR: Strategic Petroleum Reserve

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

Sources: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07); and *International Energy Annual 1985*, DOE/EIA-0219(86); Organization for Economic Cooperation and Development, Monthly Oil Statistics Database through April 1987.

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

	Annual Average 1975-1985	1986	1987	1988
OECD Total[a]	2.9	2.6	2.5	2.6
United States[b]	3.0	2.9	2.6	2.7
Western Europe	2.2	2.6	2.3	2.4
Japan	4.7	2.5	3.0	2.9
Other OECD[c]	3.1	1.8	2.8	3.0

[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, CONTROL0987; Non-U.S. historical data and forecasts: The WEFA Group, *World Economic Service: Historical Data*, January 1987 and *World Economic Outlook: Developed Economies Volume*, October 1987.

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

Assumptions	1986 3rd	1986 4th	1987 1st	1987 2nd	1987 3rd	World Oil Price Case	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1986	Year 1987	Year 1988
Macroeconomic[a]														
Real Gross National Product (billion 1982 dollars)	**3,718**	**3,732**	**3,772**	**3,795**	**3,828**	Low	*3,843*	*3,889*	*3,912*	*3,921*	*3,940*	–	*3,810*	*3,916*
						Base	*3,844*	*3,888*	*3,910*	*3,919*	*3,937*	**3,714**	*3,810*	*3,914*
						High	*3,845*	*3,887*	*3,905*	*3,912*	*3,927*	–	*3,810*	*3,908*
Percentage Change from Prior Year	**2.6**	**2.2**	**2.0**	**2.4**	**3.0**	Low	*3.0*	*3.1*	*3.1*	*2.4*	*2.5*	–	*2.6*	*2.8*
						Base	*3.0*	*3.1*	*3.0*	*2.4*	*2.4*	**2.9**	*2.6*	*2.7*
						High	*3.0*	*3.1*	*2.9*	*2.2*	*2.2*	–	*2.6*	*2.6*
GNP Implicit Price Deflator (index, 1982 = 1.000)	**1.147**	**1.149**	**1.161**	**1.171**	**1.181**	Low	*1.192*	*1.200*	*1.210*	*1.222*	*1.232*	–	*1.176*	*1.216*
						Base	*1.192*	*1.201*	*1.211*	*1.223*	*1.234*	**1.141**	*1.176*	*1.217*
						High	*1.192*	*1.201*	*1.213*	*1.226*	*1.238*	–	*1.176*	*1.219*
Percentage Change from Prior Year	**2.8**	**2.2**	**2.8**	**3.0**	**3.0**	Low	*3.8*	*3.4*	*3.3*	*3.5*	*3.3*	–	*3.1*	*3.4*
						Base	*3.7*	*3.4*	*3.4*	*3.6*	*3.5*	**2.6**	*3.1*	*3.5*
						High	*3.7*	*3.4*	*3.6*	*3.8*	*3.8*	–	*3.1*	*3.7*
Real Disposable Personal Income[b] (billion 1982 dollars)	**2,653**	**2,657**	**2,675**	**2,646**	**2,673**	Low	*2,702*	*2,740*	*2,750*	*2,763*	*2,773*	–	*2,674*	*2,757*
						Base	*2,698*	*2,734*	*2,743*	*2,756*	*2,765*	**2,645**	*2,673*	*2,749*
						High	*2,695*	*2,726*	*2,731*	*2,742*	*2,751*	–	*2,672*	*2,738*
Percentage Change from Prior Year	**4.5**	**3.5**	**2.5**	**–.5**	**.8**	Low	*1.7*	*2.4*	*3.9*	*3.4*	*2.6*	–	*1.1*	*3.1*
						Base	*1.5*	*2.2*	*3.6*	*3.1*	*2.5*	**4.1**	*1.1*	*2.8*
						High	*1.4*	*1.9*	*3.2*	*2.6*	*2.1*	–	*1.0*	*2.5*
Index of Industrial Production (Mfg.) (index, 1977 = 1.000)	**1.294**	**1.304**	**1.318**	**1.332**	**1.351**	Low	*1.360*	*1.373*	*1.381*	*1.388*	*1.395*	–	*1.340*	*1.384*
						Base	*1.359*	*1.370*	*1.377*	*1.383*	*1.389*	**1.292**	*1.340*	*1.380*
						High	*1.359*	*1.368*	*1.373*	*1.376*	*1.379*	–	*1.340*	*1.374*
Percentage Change from Prior Year	**2.1**	**2.4**	**2.6**	**3.7**	**4.4**	Low	*4.3*	*4.2*	*3.7*	*2.7*	*2.5*	–	*3.7*	*3.3*
						Base	*4.2*	*3.9*	*3.4*	*2.4*	*2.2*	**2.2**	*3.7*	*3.0*
						High	*4.2*	*3.8*	*3.1*	*1.9*	*1.4*	–	*3.7*	*2.5*
Oil Price														
Imported Crude Oil Price[c] (U.S. dollars/barrel)	**11.88**	**13.47**	**16.88**	**18.28**	**19.00**	Low	*16.00*	*16.00*	*16.00*	*16.00*	*16.00*	–	*17.50*	*16.00*
						Base	*18.50*	*18.50*	*18.50*	*18.50*	*18.50*	**13.98**	*18.20*	*18.50*
						High	*22.00*	*22.00*	*22.00*	*22.00*	*22.00*	–	*19.00*	*22.00*
U.S. Refiners' Cost[d] (U.S. dollars/barrel)	**12.18**	**13.40**	**16.67**	**17.91**	**18.83**	Low	*15.80*	*15.80*	*15.80*	*15.80*	*15.80*	–	*17.30*	*15.80*
						Base	*18.30*	*18.30*	*18.30*	*18.30*	*18.30*	**14.55**	*17.90*	*18.30*
						High	*21.80*	*21.80*	*21.80*	*21.80*	*21.80*	–	*18.80*	*21.80*
Weather[e]														
Heating Degree Days	**103**	**1,657**	**2,266**	**449**	**89**		*1,668*	*2,401*	*538*	*88*	*1,668*	**4,429**	*4,472*	*4,695*
Cooling Degree Days	**744**	**74**	**24**	**385**	**776**		*62*	*28*	*328*	*754*	*62*	**1,210**	*1,247*	*1,172*

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

[b] Seasonally adjusted at annual rates.

[c] Cost of imported crude oil to U.S. refiners.

[d] U.S. Refiner Acquisition Cost of foreign and domestic crude oil.

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

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

Sources: Historical data: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(87/07); Bureau of Economic Analysis, U.S. Department of Commerce, *Survey of Current Business,* September 1987; National Oceanic and Atmospheric Administration, U.S. Department of Commerce, *Monthly State, Regional, and National Heating/Cooling Degree Days Weighted by Population;* Federal Reserve System, *Statistical Release G.12.3,* October 1987. Macroeconomic projections are based on modifications to Data Resources, Inc., Forecast CONTROL0987.

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

Product	1986 3rd	1986 4th	1987 1st	1987 2nd	1987 3rd	World Oil Price Case	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1986	Year 1987	Year 1988
Petroleum														
Imported Crude Oil Price[a]						Low	16.00	16.00	16.00	16.00	16.00	–	17.50	16.00
(dollars per barrel)	11.88	13.47	16.88	18.28	19.00	Base	18.50	18.50	18.50	18.50	18.50	13.98	18.20	18.50
						High	22.00	22.00	22.00	22.00	22.00	–	19.00	22.00
Gasoline[b]						Low	.95	.91	.93	.93	.90	–	.95	.92
(dollars per gallon)	.87	.83	.90	.95	.99	Base	.98	.97	1.00	1.02	.99	.93	.96	.99
						High	.99	1.03	1.10	1.13	1.10	–	.96	1.09
No. 2 Diesel Oil, Retail						Low	.89	.89	.91	.92	.92	–	.90	.91
(dollars per gallon)	.80	.82	.89	.91	.91	Base	.94	.95	.97	.99	.99	.88	.91	.98
						High	.96	1.03	1.06	1.08	1.08	–	.92	1.06
No. 2 Heating Oil, Wholesale						Low	.47	.47	.46	.46	.47	–	.50	.47
(dollars per gallon)	.39	.43	.50	.51	.52	Base	.53	.53	.53	.53	.54	.49	.51	.53
						High	.56	.62	.61	.61	.62	–	.52	.62
No. 2 Heating Oil, Retail						Low	.78	.77	.74	.75	.78	–	.77	.76
(dollars per gallon)	.67	.70	.79	.78	.78	Base	.83	.85	.81	.82	.85	.84	.79	.83
						High	.86	.93	.91	.92	.96	–	.80	.93
No. 6 Residual Fuel Oil[c]						Low	15.90	15.70	14.70	14.60	15.00	–	16.80	15.00
(dollars per barrel)	11.51	13.31	17.08	18.19	17.70	Base	18.30	18.60	17.60	17.60	18.00	14.41	17.80	18.00
						High	19.20	20.60	19.90	20.00	20.60	–	18.20	20.30
Electric Utility Fuels														
Coal						Low	1.54	1.53	1.53	1.53	1.53	–	1.54	1.53
(dollars per million Btu)	1.56	1.53	1.52	1.55	1.57	Base	1.58	1.59	1.59	1.59	1.59	1.58	1.56	1.59
						High	1.60	1.61	1.62	1.63	1.64	–	1.56	1.62
Heavy Oil[d]						Low	2.52	2.50	2.34	2.33	2.39	–	2.81	2.39
(dollars per million Btu)	1.98	2.32	2.92	2.98	2.81	Base	2.91	2.96	2.80	2.80	2.87	2.40	2.90	2.86
						High	3.06	3.27	3.17	3.19	3.28	–	2.94	3.23
Natural Gas						Low	2.40	2.37	2.28	2.27	2.32	–	2.37	2.31
(dollars per million Btu)	2.17	2.20	2.33	2.32	2.44	Base	2.51	2.52	2.44	2.42	2.50	2.34	2.40	2.48
						High	2.65	2.78	2.72	2.74	2.80	–	2.44	2.77
Other Residential														
Natural Gas						Low	5.23	5.22	5.70	6.50	5.20	–	5.46	5.37
(dollars per 1,000 cu. ft.)	6.85	5.47	5.35	5.83	6.65	Base	5.39	5.40	5.95	6.85	5.55	5.83	5.50	5.62
						High	5.55	5.58	6.15	7.12	5.78	–	5.55	5.83
Electricity						Low	7.66	7.41	7.93	8.30	7.91	–	7.74	7.89
(cents per kilowatthour)	8.18	7.58	7.33	7.85	8.14	Base	7.79	7.47	8.05	8.44	8.09	7.80	7.77	8.04
						High	7.93	7.71	8.26	8.65	8.25	–	7.82	8.22

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

Notes: Third quarter 1987 estimated for all fuels, except gasoline. All prices exclude taxes, except gasoline, residential natural gas, and diesel. Historical values are printed in **boldface,** forecasts in *italics.*

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07); and *Petroleum Marketing Monthly*, DOE/EIA-0380(87/07).

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

Supply and Disposition	1986		1987				1988				Year		
	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1986	1987	1988
Supply													
Crude Oil Supply													
Domestic Production [a]	8.46	8.39	8.38	8.33	8.20	8.27	8.24	8.14	8.06	8.01	8.68	8.30	8.11
Alaska	1.83	1.87	1.95	1.97	1.91	2.04	2.04	2.04	2.04	2.04	1.87	1.97	2.04
Lower 48	6.62	6.52	6.43	6.36	6.30	6.23	6.19	6.09	6.02	5.97	6.81	6.33	6.07
Net Imports (Including SPR)[b]	4.72	4.34	3.83	4.24	5.15	4.46	4.20	4.73	5.10	4.64	4.02	4.42	4.67
Gross Imports (Excluding SPR)	4.82	4.44	3.93	4.31	5.20	4.55	4.30	4.82	5.18	4.72	4.13	4.50	4.75
SPR Imports	.05	.04	.08	.07	.07	.09	.09	.09	.09	.09	.05	.08	.09
Exports	.15	.14	.18	.14	.13	.17	.18	.18	.17	.17	.15	.16	.18
SPR Stock Withdrawn or Added (-)	-.05	-.06	-.09	-.08	-.07	-.10	-.10	-.10	-.10	-.10	-.05	-.09	-.10
Other Stock Withdrawn or Added (-)	-.12	.07	-.02	.04	-.07	.05	.01	.02	-.05	.05	-.03	.00	.01
Products Supplied and Losses	-.05	-.04	-.04	-.04	-.04	-.06	-.06	-.06	-.06	-.06	-.05	-.05	-.06
Unaccounted-for Crude	.15	.04	.26	.30	.18	.14	.15	.14	.14	.14	.14	.22	.14
Crude Oil Input to Refineries	13.10	12.75	12.32	12.79	13.35	12.76	12.44	12.86	13.08	12.67	12.72	12.81	12.77
Other Supply													
NGL Production	1.47	1.54	1.61	1.59	1.58	1.62	1.62	1.56	1.58	1.62	1.55	1.60	1.60
Other Hydrocarbon and Alcohol Inputs	.06	.07	.07	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06
Crude Oil Product Supplied	.05	.04	.04	.04	.04	.06	.06	.06	.06	.06	.05	.05	.06
Processing Gain	.66	.59	.62	.63	.63	.62	.61	.62	.64	.62	.62	.62	.62
Net Product Imports[c]	1.59	1.41	1.21	1.18	1.39	1.47	1.57	1.27	1.35	1.44	1.41	1.31	1.41
Gross Product Imports [c]	2.20	2.09	1.87	1.76	1.91	2.04	2.15	1.81	1.85	2.02	2.05	1.90	1.96
Product Exports	.60	.68	.66	.59	.52	.58	.58	.54	.51	.58	.63	.59	.55
Product Stock Withdrawn or Added (-)[d]	-.64	.26	.46	.14	-.40	.17	.44	-.20	-.50	.24	-.12	.09	-.01
Total Product Supplied, Domestic Use	16.28	16.66	16.33	16.43	16.65	16.76	16.81	16.24	16.26	16.71	16.28	16.54	16.51
Disposition													
Motor Gasoline	7.25	7.09	6.70	7.44	7.33	7.18	6.85	7.33	7.27	7.12	7.03	7.16	7.14
Jet Fuel	1.33	1.37	1.36	1.30	1.39	1.40	1.41	1.37	1.43	1.46	1.31	1.36	1.42
Distillate Fuel Oil	2.58	3.04	3.20	2.82	2.67	3.14	3.46	2.83	2.65	3.17	2.91	2.96	3.02
Residual Fuel Oil	1.43	1.43	1.38	1.16	1.23	1.23	1.46	1.17	1.09	1.14	1.42	1.25	1.22
Other Oils Supplied [e]	3.68	3.73	3.70	3.70	4.02	3.81	3.62	3.54	3.82	3.83	3.61	3.81	3.70
Total Product Supplied	16.28	16.66	16.34	16.43	16.65	16.76	16.81	16.24	16.26	16.71	16.28	16.55	16.51
Total Petroleum Net Imports	6.31	5.75	5.04	5.41	6.54	5.93	5.78	6.00	6.44	6.08	5.44	5.73	6.08
Closing Stocks (million barrels)													
Crude Oil (Excluding SPR) [f]	337.8	331.2	333.4	329.8	335.9	331.3	330.3	328.2	333.2	328.8	331.2	331.3	328.8
Total Motor Gasoline	233.9	233.1	249.2	230.6	230.1	227.9	234.3	227.1	228.9	227.8	233.1	227.9	227.8
Finished Motor Gasoline	196.0	194.2	205.8	192.7	191.0	190.7	196.1	189.8	190.1	190.7	194.2	190.7	190.7
Blending Components	38.0	38.8	43.4	37.8	39.2	37.2	38.2	37.4	38.8	37.1	38.8	37.2	37.1
Jet Fuel	48.9	49.7	48.1	46.0	49.6	47.7	48.4	48.4	50.1	49.0	49.7	47.7	49.0
Distillate Fuel Oil	152.4	155.1	110.0	104.3	128.7	142.0	98.2	105.5	138.7	143.1	155.1	142.0	143.1
Residual Fuel Oil	44.0	47.4	39.6	41.3	45.1	47.4	39.9	40.3	46.5	48.3	47.4	47.4	48.3
Other Oils [g]	294.5	264.4	261.1	272.8	278.3	251.5	255.3	273.1	276.7	250.9	264.4	251.5	250.9
Total Stocks (Excluding SPR)	1111.6	1080.9	1041.4	1024.8	1067.7	1047.8	1006.3	1022.7	1074.1	1048.0	1080.9	1047.8	1048.0
Crude Oil in SPR	506.4	511.6	520.0	527.2	533.8	543.0	552.1	561.2	570.4	579.6	511.6	543.0	579.6
Total Stocks (Including SPR)	1618.0	1592.5	1561.4	1552.0	1601.6	1590.8	1558.4	1583.9	1644.5	1627.6	1592.5	1590.8	1627.6

[a] Includes lease condensate.
[b] Net Imports equals Gross Imports plus SPR Imports minus Exports.
[c] Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.
[d] Includes an estimate of minor product stock change based on monthly data.
[e] Includes crude oil product supplied, natural gas liquids, liquefied refinery gases, other liquids, and all finished petroleum products except motor gasoline, jet fuels, and distillate and residual fuel oils.
[f] Includes crude oil in transit to refineries.
[g] Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.
SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Jul. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41).

Table 7. Quarterly Supply and Disposition of Petroleum: Low World Oil Price Case
(Million Barrels per Day, Except Stocks)

Supply and Disposition	1986 3rd	1986 4th	1987 1st	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1986	Year 1987	Year 1988
Supply													
Crude Oil Supply													
Domestic Production [a]	8.46	8.39	8.38	8.33	8.20	8.21	8.14	8.01	7.91	7.84	8.68	8.28	7.98
Alaska	1.83	1.87	1.95	1.97	1.91	2.04	2.04	2.04	2.04	2.04	1.87	1.97	2.04
Lower 48	6.62	6.52	6.43	6.36	6.30	6.17	6.10	5.97	5.87	5.80	6.81	6.32	5.93
Net Imports (Including SPR) [b]	4.72	4.34	3.83	4.24	5.15	4.74	4.48	5.03	5.44	5.01	4.02	4.49	4.99
Gross Imports													
(Excluding SPR)	4.82	4.44	3.93	4.31	5.20	4.82	4.57	5.12	5.52	5.10	4.13	4.57	5.08
SPR Imports	.05	.04	.08	.07	.07	.09	.09	.09	.09	.09	.05	.08	.09
Exports	.15	.14	.18	.14	.13	.17	.18	.18	.17	.17	.15	.16	.18
SPR Stock Withdrawn or Added (-)	-.05	-.06	-.09	-.08	-.07	-.10	-.10	-.10	-.10	-.10	-.05	-.09	-.10
Other Stock Withdrawn or Added (-)	-.12	.07	-.02	.04	-.07	.01	-.01	.01	-.06	.05	-.03	-.01	.00
Products Supplied and Losses	-.05	-.04	-.04	-.04	-.04	-.06	-.06	-.06	-.06	-.06	-.05	-.05	-.06
Unaccounted-for Crude	.15	.04	.26	.30	.18	.14	.15	.13	.14	.13	.14	.22	.14
Crude Oil Input to Refineries	13.10	12.75	12.32	12.79	13.35	12.94	12.60	13.03	13.27	12.87	12.72	12.85	12.94
Other Supply													
NGL Production	1.47	1.54	1.61	1.59	1.58	1.62	1.62	1.56	1.58	1.62	1.55	1.60	1.60
Other Hydrocarbon and Alcohol Inputs	.06	.07	.07	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06
Crude Oil Product Supplied	.05	.04	.04	.04	.04	.06	.06	.06	.06	.06	.05	.05	.06
Processing Gain	.66	.59	.62	.63	.63	.63	.61	.63	.64	.63	.62	.63	.63
Net Product Imports [c]	1.59	1.41	1.21	1.18	1.39	1.54	1.62	1.32	1.41	1.49	1.41	1.33	1.46
Gross Product Imports [c]	2.20	2.09	1.87	1.76	1.91	2.12	2.19	1.86	1.91	2.07	2.05	1.92	2.01
Product Exports	.60	.68	.66	.59	.52	.58	.58	.54	.51	.58	.63	.59	.55
Product Stock Withdrawn or Added (-) [d]	-.64	.26	.46	.14	-.40	.04	.44	-.20	-.52	.22	-.12	.06	-.01
Total Product Supplied, Domestic Use	16.28	16.66	16.33	16.43	16.65	16.89	17.00	16.47	16.50	16.97	16.28	16.58	16.73
Disposition													
Motor Gasoline	7.25	7.09	6.70	7.44	7.33	7.19	6.89	7.39	7.34	7.19	7.03	7.17	7.20
Jet Fuel	1.33	1.37	1.36	1.30	1.39	1.41	1.42	1.39	1.44	1.47	1.31	1.37	1.43
Distillate Fuel Oil	2.58	3.04	3.20	2.82	2.67	3.14	3.47	2.84	2.66	3.18	2.91	2.96	3.04
Residual Fuel Oil	1.43	1.43	1.38	1.16	1.23	1.32	1.57	1.29	1.21	1.26	1.42	1.27	1.33
Other Oils Supplied [e]	3.68	3.73	3.70	3.70	4.02	3.83	3.64	3.57	3.85	3.86	3.61	3.81	3.73
Total Product Supplied	16.28	16.66	16.34	16.43	16.65	16.89	17.00	16.47	16.50	16.97	16.28	16.58	16.73
Total Petroleum Net Imports	6.31	5.75	5.04	5.41	6.54	6.28	6.09	6.35	6.85	6.51	5.44	5.82	6.45
Closing Stocks (million barrels)													
Crude Oil (Excluding SPR) [f]	337.8	331.2	333.4	329.8	335.9	334.5	335.1	333.7	339.0	334.4	331.2	334.5	334.4
Total Motor Gasoline	233.9	233.1	249.2	230.6	230.1	229.0	236.0	229.2	230.9	229.8	233.1	229.0	229.8
Finished Motor Gasoline	196.0	194.2	205.8	192.7	191.0	191.7	197.7	191.7	192.0	192.6	194.2	191.7	192.6
Blending Components	38.0	38.8	43.4	37.8	39.2	37.3	38.3	37.6	38.9	37.2	38.8	37.3	37.2
Jet Fuel	48.9	49.7	48.1	46.0	49.6	48.2	48.9	48.9	50.6	49.5	49.7	48.2	49.5
Distillate Fuel Oil	152.4	155.1	110.0	104.3	128.7	147.0	102.9	107.5	141.4	148.1	155.1	147.0	148.1
Residual Fuel Oil	44.0	47.4	39.6	41.3	45.1	50.4	42.5	44.3	51.9	53.1	47.4	50.4	53.1
Other Oils [g]	294.5	264.4	261.1	272.8	278.3	253.8	258.4	276.6	279.2	253.0	264.4	253.8	253.0
Total Stocks (Excluding SPR)	1111.6	1080.9	1041.4	1024.8	1067.7	1062.8	1023.7	1040.3	1093.1	1068.0	1080.9	1062.8	1068.0
Crude Oil in SPR	506.4	511.6	520.0	527.2	533.8	543.0	552.1	561.2	570.4	579.6	511.6	543.0	579.6
Total Stocks (Including SPR)	1618.0	1592.5	1561.4	1552.0	1601.6	1605.9	1575.8	1601.5	1663.5	1647.6	1592.5	1605.9	1647.6

[a] Includes lease condensate.

[b] Net Imports equals Gross Imports plus SPR Imports minus Exports.

[c] Includes finished petroleum products, unfinished oils, gasoline blending components, and natural gas plant liquids for processing.

[d] Includes an estimate of minor product stock change based on monthly data.

[e] Includes crude oil product supplied, natural gas liquids, liquefied refinery gases, other liquids, and all finished petroleum products except motor gasoline, jet fuels, and distillate and residual fuel oils.

[f] Includes crude oil in transit to refineries.

[g] Includes stocks of all other oils such as aviation gasoline, kerosene, natural gas liquids (including ethane), aviation gasoline blending components, naphtha and other oils for petrochemical feedstock use, special naphthas, lube oils, wax, coke, asphalt, road oil, and miscellaneous oils.

SPR: Strategic Petroleum Reserve

NGL: Natural Gas Liquids

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

Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Jul. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41).

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

Supply and Disposition	1986 3rd	1986 4th	1987 1st	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1986	Year 1987	Year 1988
Supply													
Crude Oil Supply													
Domestic Production [a]	8.46	8.39	8.38	8.33	8.20	8.32	8.34	8.30	8.25	8.23	8.68	8.31	8.28
Alaska	1.83	1.87	1.95	1.97	1.91	2.04	2.04	2.04	2.04	2.04	1.87	1.97	2.04
Lower 48	6.62	6.52	6.43	6.36	6.30	6.28	6.30	6.25	6.21	6.19	6.81	6.34	6.24
Net Imports (Including SPR)[b]	4.72	4.34	3.83	4.24	5.15	4.29	3.90	4.37	4.68	4.18	4.02	4.38	4.28
Gross Imports (Excluding SPR)	4.82	4.44	3.93	4.31	5.20	4.38	4.00	4.46	4.76	4.26	4.13	4.46	4.37
SPR Imports	.05	.04	.08	.07	.07	.09	.09	.09	.09	.09	.05	.08	.09
Exports	.15	.14	.18	.14	.13	.17	.18	.18	.17	.17	.15	.16	.18
SPR Stock Withdrawn or Added (-)	-.05	-.06	-.09	-.08	-.07	-.10	-.10	-.10	-.10	-.10	-.05	-.09	-.10
Other Stock Withdrawn or Added (-)	-.12	.07	-.02	.04	-.07	.07	.03	.04	-.04	.05	-.03	.00	.02
Products Supplied and Losses	-.05	-.04	-.04	-.04	-.04	-.06	-.06	-.06	-.06	-.06	-.05	-.05	-.06
Unaccounted-for Crude	.15	.04	.26	.30	.18	.14	.15	.14	.14	.14	.14	.22	.14
Crude Oil Input to Refineries	13.10	12.75	12.32	12.79	13.35	12.66	12.27	12.68	12.88	12.44	12.72	12.78	12.57
Other Supply													
NGL Production	1.47	1.54	1.61	1.59	1.58	1.62	1.62	1.56	1.58	1.62	1.55	1.60	1.60
Other Hydrocarbon and Alcohol Inputs	.06	.07	.07	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06
Crude Oil Product Supplied	.05	.04	.04	.04	.04	.06	.06	.06	.06	.06	.05	.05	.06
Processing Gain	.66	.59	.62	.63	.63	.62	.60	.62	.63	.61	.62	.62	.61
Net Product Imports[c]	1.59	1.41	1.21	1.18	1.39	1.45	1.56	1.22	1.28	1.38	1.41	1.31	1.36
Gross Product Imports [c]	2.20	2.09	1.87	1.76	1.91	2.03	2.14	1.76	1.79	1.96	2.05	1.89	1.91
Product Exports	.60	.68	.66	.59	.52	.58	.58	.54	.51	.58	.63	.59	.55
Product Stock Withdrawn or Added (-)[d]	-.64	.26	.46	.14	-.40	.23	.48	-.19	-.49	.24	-.12	.11	.01
Total Product Supplied, Domestic Use	16.28	16.66	16.33	16.43	16.65	16.70	16.65	16.01	15.99	16.42	16.28	16.53	16.27
Disposition													
Motor Gasoline	7.25	7.09	6.70	7.44	7.33	7.17	6.82	7.26	7.19	7.04	7.03	7.16	7.08
Jet Fuel	1.33	1.37	1.36	1.30	1.39	1.39	1.40	1.36	1.41	1.43	1.31	1.36	1.40
Distillate Fuel Oil	2.58	3.04	3.20	2.82	2.67	3.13	3.45	2.81	2.63	3.14	2.91	2.96	3.00
Residual Fuel Oil	1.43	1.43	1.38	1.16	1.23	1.20	1.39	1.08	.99	1.03	1.42	1.24	1.12
Other Oils Supplied [e]	3.68	3.73	3.70	3.70	4.02	3.81	3.60	3.51	3.78	3.78	3.61	3.81	3.67
Total Product Supplied	16.28	16.66	16.34	16.43	16.65	16.70	16.65	16.01	15.99	16.42	16.28	16.53	16.27
Total Petroleum Net Imports	6.31	5.75	5.04	5.41	6.54	5.74	5.46	5.59	5.96	5.56	5.44	5.69	5.65
Closing Stocks (million barrels)													
Crude Oil (Excluding SPR) [f]	337.8	331.2	333.4	329.8	335.9	329.5	326.4	323.0	327.0	322.4	331.2	329.5	322.4
Total Motor Gasoline	233.9	233.1	249.2	230.6	230.1	226.5	232.3	224.8	226.5	225.1	233.1	226.5	225.1
Finished Motor Gasoline	196.0	194.2	205.8	192.7	191.0	190.0	194.6	188.1	188.2	188.6	194.2	190.0	188.6
Blending Components	38.0	38.8	43.4	37.8	39.2	36.6	37.7	36.8	38.3	36.4	38.8	36.6	36.4
Jet Fuel	48.9	49.7	48.1	46.0	49.6	47.3	47.7	47.7	49.3	48.1	49.7	47.3	48.1
Distillate Fuel Oil	152.4	155.1	110.0	104.3	128.7	141.8	97.3	103.8	136.4	140.7	155.1	141.8	140.7
Residual Fuel Oil	44.0	47.4	39.6	41.3	45.1	45.8	37.8	36.7	41.5	43.6	47.4	45.8	43.6
Other Oils [g]	294.5	264.4	261.1	272.8	278.3	249.5	252.5	272.2	276.4	250.7	264.4	249.5	250.7
Total Stocks (Excluding SPR)	1111.6	1080.9	1041.4	1024.8	1067.7	1040.4	994.0	1008.2	1057.1	1030.5	1080.9	1040.4	1030.5
Crude Oil in SPR	506.4	511.6	520.0	527.2	533.8	543.0	552.1	561.2	570.4	579.6	511.6	543.0	579.6
Total Stocks (Including SPR)	1618.0	1592.5	1561.4	1552.0	1601.6	1583.5	1546.1	1569.4	1627.5	1610.1	1592.5	1583.5	1610.1

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

SPR: Strategic Petroleum Reserve
NGL: Natural Gas Liquids
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Jul. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41).

Table 9. Quarterly Supply and Disposition of Motor Gasoline: Base Case

(Million Barrels per Day, Except Stocks)

Supply and Disposition	1986 3rd	1986 4th	1987 1st	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1986	Year 1987	Year 1988
Supply													
Domestic Production[a]	6.98	6.83	6.54	6.98	6.94	6.86	6.59	6.91	6.95	6.81	6.75	6.83	6.81
Imports	.31	.31	.32	.36	.39	.33	.33	.36	.34	.33	.33	.35	.34
Exports	.04	.06	.03	.05	.03	.01	.01	.01	.01	.01	.03	.03	.01
Net Imports	.27	.25	.29	.32	.37	.32	.32	.35	.32	.32	.29	.32	.33
Net Withdrawals	.00	.02	-.13	.14	.02	.00	-.06	.07	.00	-.01	-.01	.01	.00
Total Primary Supply	7.25	7.09	6.70	7.44	7.33	7.18	6.85	7.33	7.27	7.12	7.03	7.16	7.14
Disposition													
Leaded	2.20	2.03	1.73	1.89	1.71	1.71	1.60	1.70	1.60	1.48	2.18	1.76	1.59
Unleaded	5.05	5.07	4.97	5.55	5.62	5.47	5.26	5.63	5.67	5.64	4.85	5.40	5.55
Total Product Supplied	7.25	7.09	6.70	7.44	7.33	7.18	6.85	7.33	7.27	7.12	7.03	7.16	7.14
Stocks													
Primary Finished Stock Levels[b] (million barrels)													
Opening	195.8	196.0	194.2	205.8	192.7	191.0	190.7	196.1	189.8	190.1	190.3	194.2	190.7
Closing	196.0	194.2	205.8	192.7	191.0	190.7	196.1	189.8	190.1	190.7	194.2	190.7	190.7

[a] Refinery Production plus production at natural gas processing plants.
[b] Includes stocks at natural gas processing plants. Excludes stocks of reclassified motor gasoline blending components.
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface**, forecasts in *italics*.
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Jul. 1987; *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41).

Table 10. Quarterly Supply and Disposition of Distillate Fuel Oil: Base Case

(Million Barrels per Day, Except Stocks)

Supply and Disposition	1986		1987				1988				Year		
	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1986	1987	1988
Supply													
Refinery Output	**2.83**	**2.86**	**2.58**	**2.60**	**2.72**	*2.97*	*2.78*	*2.72*	*2.79*	*2.92*	**2.80**	*2.72*	*2.80*
Imports	**.32**	**.28**	**.23**	**.21**	**.28**	*.38*	*.29*	*.25*	*.28*	*.36*	**.25**	*.27*	*.30*
Exports	**.08**	**.07**	**.10**	**.06**	**.06**	*.07*	*.09*	*.06*	*.07*	*.07*	**.10**	*.07*	*.07*
Net Imports	**.24**	**.21**	**.12**	**.16**	**.22**	*.32*	*.20*	*.19*	*.21*	*.29*	**.15**	*.20*	*.23*
Net Withdrawals	**-.48**	**-.03**	**.50**	**.06**	**-.27**	*-.14*	*.48*	*-.08*	*-.36*	*-.05*	**-.03**	*.04*	*.00*
Disposition													
Electric Utility Consumption	**.04**	**.03**	**.04**	**.04**	**.06**	*.04*	*.05*	*.04*	*.05*	*.04*	**.04**	*.05*	*.04*
Utility Stock Additions	**.00**	**.00**	**.00**	**.00**	**.00**	*.00*	*.00*	*.00*	*.00*	*.00*	**.00**	*.00*	*.00*
Electric Utility Shipments	**.05**	**.03**	**.04**	**.04**	**.06**	*.04*	*.05*	*.04*	*.05*	*.04*	**.04**	*.04*	*.04*
Nonutility Shipments	**2.54**	**3.01**	**3.16**	**2.78**	**2.61**	*3.10*	*3.42*	*2.79*	*2.60*	*3.13*	**2.88**	*2.91*	*2.98*
Total Product Supplied	**2.58**	**3.04**	**3.20**	**2.82**	**2.67**	*3.14*	*3.46*	*2.83*	*2.65*	*3.17*	**2.91**	*2.96*	*3.02*
Stocks													
Electric Utility Stock Levels													
(million barrels)													
Opening	**16.3**	**16.7**	**16.3**	**16.0**	**15.7**	*15.7*	*15.4*	*15.2*	*15.0*	*14.9*	**16.4**	*16.3*	*15.4*
Closing	**16.7**	**16.3**	**16.0**	**15.7**	**15.7**	*15.4*	*15.2*	*15.0*	*14.9*	*14.8*	**16.3**	*15.4*	*14.8*
Primary Stock Levels													
(million barrels)													
Opening	**107.9**	**152.4**	**155.1**	**110.0**	**104.3**	*128.7*	*142.0*	*98.2*	*105.5*	*138.7*	**143.7**	*155.1*	*142.0*
Closing	**152.4**	**155.1**	**110.0**	**104.3**	**128.7**	*142.0*	*98.2*	*105.5*	*138.7*	*143.1*	**155.1**	*142.0*	*143.1*

Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Jul. 1987; *Monthly Energy Review*, DOE/EIA-0035(87/07); *Electric Power Monthly*, DOE/EIA-0226(87/07); *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41).

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

Supply and Disposition	1986		1987				1988				Year		
	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1986	1987	1988
Supply													
Refinery Output	0.87	0.93	0.87	0.84	0.91	0.83	0.88	0.83	0.80	0.78	0.89	0.86	0.82
Imports	.70	.71	.61	.51	.53	.63	.70	.53	.52	.59	.67	.57	.58
Exports	.13	.17	.19	.16	.17	.20	.20	.18	.16	.20	.15	.18	.19
Net Imports	.58	.54	.42	.34	.36	.43	.49	.35	36	.39	.52	.39	.40
Net Withdrawals	-.01	-.04	.09	-.02	-.04	-.02	.08	.00	-.07	-.02	.01	.00	.00
Disposition													
Electric Utility Consumption	.73	.56	.57	.45	.64	.47	.51	.42	.51	.44	.59	.53	.47
Utility Stock Additions	.00	-.01	-.08	-.02	.03	.00	-.01	.00	-.01	.00	.00	-.02	.00
Electric Utility Shipments	.73	.55	.49	.43	.67	.48	.50	.42	.50	.43	.59	.52	.46
Nonutility Shipments	.70	.88	.89	.73	.56	.76	.96	.75	.60	.71	.83	.73	.75
Total Product Supplied	1.43	1.43	1.38	1.16	1.23	1.23	1.46	1.17	1.09	1.14	1.42	1.25	1.22
Stocks													
Electric Utility Stock Levels (million barrels)													
Opening	57.6	57.5	56.8	50.0	47.9	50.6	50.8	50.1	50.4	49.5	57.3	56.8	50.8
Closing	57.5	56.8	50.0	47.9	50.6	50.8	50.1	50.4	49.5	49.4	56.8	50.8	49.4
Primary Stock Levels (million barrels)													
Opening	42.8	44.0	47.4	39.6	41.3	45.1	47.4	39.9	40.3	46.5	50.4	47.4	47.4
Closing	44.0	47.4	39.6	41.3	45.1	47.4	39.9	40.3	46.5	48.3	47.4	47.4	48.3

Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Jul. 1987; *Monthly Energy Review*, DOE/EIA-0035(87/07); *Electric Power Monthly*, DOE/EIA-0226(87/07); *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41).

Table 12. Quarterly Supply and Disposition of Other Petroleum Products: Base Case[a]

(Million Barrels per Day, Except Stocks)

Supply and Disposition	1986 3rd	1986 4th	1987 1st	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1986	Year 1987	Year 1988
Supply													
Net Refinery Output[b]	3.08	2.73	2.95	3.01	3.40	2.73	2.80	3.04	3.17	2.79	2.89	3.02	2.95
Natural Gas Plant Output	1.47	1.54	1.61	1.59	1.58	1.62	1.62	1.56	1.58	1.62	1.55	1.60	1.59
Other Domestic[c]	.06	.07	.07	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06
Net Imports	.51	.41	.38	.36	.44	.41	.56	.38	.45	.44	.45	.40	.46
Net Withdrawals	-.15	.31	.00	-.04	-.11	.33	-.06	-.19	-.07	.31	-.09	.05	.00
Total Primary Supply	4.97	5.05	5.01	4.96	5.37	5.15	4.98	4.85	5.19	5.22	4.87	5.13	5.06
Disposition													
Jet Fuel	1.33	1.37	1.36	1.30	1.39	1.40	1.41	1.37	1.43	1.46	1.31	1.36	1.42
Liquefied Petroleum Gas[d]	.86	1.32	1.29	.92	.99	1.26	1.25	.83	.90	1.23	1.02	1.12	1.05
Petrochemical Feedstocks[e]	.95	.91	.93	.96	.96	.97	.99	.99	1.01	1.02	.96	.96	1.00
Miscellaneous[f]	1.83	1.45	1.44	1.78	2.03	1.52	1.33	1.65	1.85	1.51	1.58	1.69	1.59
Total Product Supplied	4.97	5.05	5.02	4.96	5.37	5.15	4.98	4.85	5.19	5.22	4.87	5.13	5.06
Stock													
Primary Stocks (million barrels)													
Opening	368.0	381.4	352.9	352.6	356.6	367.1	336.4	341.8	358.9	365.6	320.2	352.9	336.4
Closing	381.4	352.9	352.6	356.6	367.1	336.4	341.8	358.9	365.6	337.0	352.9	336.4	337.0

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

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

[c] Field production of other hydrocarbons and alcohol.

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

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

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

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

Sources: Historical data: Energy Information Administration, *Petroleum Supply Annual 1986*, DOE/EIA-0340(86)/1; *Petroleum Supply Monthly*, DOE/EIA-0109, Jan. 1987 to Jul. 1987; and *Weekly Petroleum Status Report*, DOE/EIA-0208(87-37,41).

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

Sensitivities	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1987	Year 1988
Demand in 50 States							
Low Price	16.89	16.99	16.46	16.49	16.93	16.58	16.72
Base Case	16.76	16.81	16.24	16.26	16.71	16.55	16.51
High Price	16.71	16.66	16.03	16.02	16.45	16.53	16.29
Weather Sensitivity							
Adverse Weather	.11	.19	.03	.00	.11	.03	.08
Favorable Weather	-.10	-.20	-.03	-.01	-.11	-.03	-.09
Economic Sensitivity							
High Economic Activity	.00	.01	.02	.02	.02	.00	.02
Low Economic Activity	.00	.00	-.01	-.02	-.03	.00	-.02
Combined Sensitivity Differentials[a] (excl. price)							
Upper Range	.11	.19	.04	.02	.11	.03	.09
Lower Range	.10	.20	.03	.02	.11	.03	.09
Range of Projected Demand							
High Demand[b]	17.00	17.18	16.50	16.51	17.04	16.61	16.81
Low Demand[c]	16.61	16.46	16.00	16.00	16.34	16.51	16.20

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

Supply and Disposition	1986		1987				1988				Year		
	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1986	1987	1988
Supply													
Total Dry Gas Production[a]	3.77	4.13	4.27	3.93	3.78	3.65	4.32	3.97	3.54	3.74	15.99	15.63	15.57
Net Imports	.14	.21	.25	.17	.17	.26	.28	.18	.17	.26	.69	.86	.89
Supplemental Gaseous Fuels	.02	.03	.05	.03	.03	.03	.04	.03	.03	.03	.11	.14	.13
Total New Supply	3.93	4.37	4.57	4.13	3.99	3.94	4.64	4.18	3.74	4.03	16.79	16.63	16.59
Underground Working Gas Storage													
Opening	2.32	3.07	2.75	1.88	2.43	3.04	2.89	1.69	2.29	3.04	2.61	2.75	2.89
Closing	3.07	2.75	1.88	2.43	3.04	2.89	1.69	2.29	3.04	2.89	2.75	2.89	2.89
Net Withdrawals[b]	-.71	.30	.88	-.56	-.62	.15	1.20	-.60	-.75	.15	-.15	-.15	.00
Total Primary Supply[a]	3.22	4.67	5.45	3.58	3.37	4.09	5.84	3.58	2.99	4.18	16.64	16.49	16.59
Consumption													
Lease and Plant Fuel	.22	.24	.25	.23	.19	.24	.34	.21	.17	.24	.91	.90	.96
Pipeline Use	.11	.12	.14	.12	.10	.12	.17	.10	.09	.12	.48	.47	.49
Residential	.37	1.13	2.03	.78	.39	1.17	2.14	.82	.38	1.17	4.10	4.36	4.52
Commercial	.27	.60	.99	.43	.27	.59	1.03	.43	.27	.59	2.32	2.28	2.32
Industrial	1.18	1.28	1.42	1.16	1.10	1.29	1.53	1.26	1.13	1.35	5.80	4.97	5.26
Electric Utilities	.82	.58	.53	.73	.94	.58	.52	.66	.85	.61	2.60	2.78	2.65
Subtotal	2.98	3.96	5.35	3.45	2.98	3.99	5.74	3.48	2.89	4.08	16.22	15.78	16.19
Total Disposition	3.22	4.67	5.45	3.58	3.37	4.09	5.84	3.58	2.99	4.18	16.64	16.49	16.59
Unaccounted for	.24	.71	.10	.13	.39	.10	.10	.10	.10	.10	.42	.71	.40

[a] Excludes nonhydrocarbon gases removed.
[b] Net withdrawals may vary from the difference between opening and closing stocks of gas in working gas storage due to book transfers between base and working gas categories, and other storage operator revisions of working gas inventories.
Notes: Minor discrepancies with other EIA published historical data are due to rounding. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(87/07); *Natural Gas Monthly,* DOE/EIA-0130(87/07); and *Electric Power Monthly,* DOE/EIA-0226(87/07).

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

Supply and Disposition	1986 3rd	1986 4th	1987 1st	1987 2nd	1987 3rd	1987 4th	1988 1st	1988 2nd	1988 3rd	1988 4th	Year 1986	Year 1987	Year 1988
Supply													
Production	b 219	b 224	b 222	b 218	c 228	236	219	228	221	238	b 890	903	906
Primary Stock Levels[a]													
Opening	38	34	32	37	35	35	35	33	31	30	33	32	35
Closing	34	32	b 37	b 35	c 35	35	33	31	30	30	b 32	35	30
Net Withdrawals	4	2	b -4	b 2	c 0	0	2	2	1	0	b 1	-3	5
Imports	1	1	b 0	b 0	c 0	0	0	0	0	0	b 2	2	2
Exports	24	20	b 17	b 20	c 21	20	17	20	22	21	b 86	78	80
Total New Domestic Supply	b 200	b 206	b 201	b 200	c 207	216	204	211	200	217	b 808	825	832
Secondary Stock Levels[d]													
Opening	176	165	175	173	176	162	176	168	183	165	170	175	176
Closing	165	175	b 173	b 176	c 162	176	168	183	165	176	b 175	176	176
Net Withdrawals	11	-10	b 2	b -3	c 14	-14	7	-15	18	-11	b -5	-1	-1
Total Indicated Consumption	b 211	b 195	b 203	b 198	c 221	202	211	196	218	206	b 803	824	832
Consumption													
Coke Plants	8	8	b 8	b 9	c 9	9	9	10	9	8	b 36	35	36
Electric Utilities	186	167	b 171	b 171	c 192	171	179	165	190	175	b 685	706	709
Retail and General Industry[e]	19	22	b 21	b 19	c 20	22	23	21	20	22	b 83	82	86
Subtotal	213	197	b 199	b 200	c 221	202	211	196	218	206	b 804	822	832
Total Disposition	b 211	b 195	b 203	b 198	c 221	202	211	196	218	206	b 803	824	832
Discrepancy[f]	-2	-1	4	-2	0	0	0	0	0	0	-1	2	0

[a] Primary stocks are held at the mines, preparation plants, and distribution points.
[b] Preliminary.
[c] Estimated.
[d] Secondary stocks are held by users. Most of the secondary stocks are held by electric utilities.
[e] Includes consumption at coal gasification plants of 4.8 million tons for 1985. For the first half of 1986 and for the forecast, synfuels account for 1.5 million tons per quarter.
[f] Historical period discrepancy reflects unaccounted for shipper and receiver reporting discrepancies.
Notes: Rows and columns may not add due to independent rounding. Zeros indicate amounts of less than 500,000 tons. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Monthly Energy Review,* DOE/EIA-0035(87/07); and *Quarterly Coal Report,* DOE/EIA-0121(87/2Q).

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

Supply and Disposition	1986		1987				1988				Year		
	3rd	4th	1st	2nd	3rd[a]	4th	1st	2nd	3rd	4th	1986	1987	1988
Net Generation													
Coal	374.2	336.0	348.2	349.8	388.5	345.6	363.8	336.0	382.5	354.2	1385.8	1432.2	1436.5
Petroleum	42.4	32.2	32.4	26.7	38.0	28.0	29.9	24.4	30.0	25.8	136.6	125.1	110.1
Natural Gas	78.5	55.8	51.3	69.9	89.5	55.3	49.8	63.1	81.3	57.7	248.5	266.0	251.9
Nuclear Power	110.0	110.6	113.9	104.4	121.1	122.5	124.8	116.3	128.8	122.7	414.0	461.8	492.7
Hydropower	66.4	70.5	69.9	67.1	60.4	65.9	73.4	80.1	65.9	67.6	290.8	263.2	287.0
Geothermal Power and Other[b]	3.0	2.7	3.0	3.0	3.1	3.1	3.0	3.0	3.2	3.2	11.5	12.2	12.5
Total Generation	674.5	607.7	618.6	621.0	700.6	620.4	644.7	623.1	691.7	631.3	2487.3	2560.5	2590.7
Net Imports	10.1	9.1	9.9	9.0	11.6	10.4	10.2	9.3	11.9	10.7	35.9	41.0	42.0
Total Supply	684.7	616.9	628.5	630.0	712.2	630.8	654.9	632.3	703.5	642.0	2523.2	2601.5	2632.7
Losses and Unaccounted for[c]	47.1	44.4	27.1	48.7	66.1	50.7	40.6	58.4	39.3	46.0	172.4	192.6	184.3
Total Consumption (sales)	637.6	572.5	601.4	581.3	646.1	580.1	614.3	573.9	664.3	595.9	2350.8	2408.9	2448.4

[a] Estimated.
[b] Includes wind, wood, and waste.
[c] Balancing item, mainly transmission losses.
Notes: Minor discrepancies with other EIA published historic data are due to rounding. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07); and *Electric Power Monthly*, DOE/EIA-0226(87/07).

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

Supply and Disposition	1986		1987				1988				Year		
	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1986	1987	1988
Supply													
Production													
Petroleum[a]	5.03	5.02	4.93	4.95	4.93	4.98	4.91	4.84	4.85	4.84	20.52	19.78	19.44
Natural Gas[b]	3.89	4.25	4.40	4.04	3.90	3.76	4.45	4.09	3.65	3.85	16.47	16.10	16.03
Coal	4.79	4.90	4.86	4.79	4.99	5.16	4.79	5.00	4.84	5.21	19.51	19.80	19.85
Nuclear Power	1.19	1.20	1.23	1.13	1.31	1.32	1.35	1.26	1.39	1.33	4.48	4.99	5.33
Hydropower[c]	.69	.74	.73	.70	.63	.69	.77	.84	.69	.71	3.04	2.75	3.00
Geothermal Power and Other[d]	.06	.05	.06	.06	.06	.06	.06	.06	.06	.07	.23	.24	.25
Subtotal	15.65	16.15	16.21	15.67	15.82	15.98	16.32	16.09	15.48	16.00	64.26	63.68	63.90
Net Imports													
Crude Oil	2.56	2.36	2.04	2.28	2.80	2.43	2.26	2.54	2.77	2.52	8.68	9.54	10.09
Other Petroleum	.81	.72	.60	.59	.71	.75	.79	.64	.69	.73	2.85	2.65	2.86
Natural Gas	.14	.21	.25	.17	.17	.26	.28	.18	.17	.26	.68	.85	.89
Coal and Coke	-.62	-.53	-.43	-.51	-.54	-.52	-.44	-.52	-.57	-.54	-2.21	-2.01	-2.07
Electricity	.10	.09	.10	.09	.12	.11	.11	.10	.12	.11	.37	.42	.43
Subtotal	3.00	2.85	2.56	2.62	3.25	3.02	3.00	2.94	3.18	3.08	10.38	11.45	12.20
Primary Stocks													
Net Withdrawals	-.98	.48	1.04	-.44	-.87	.22	1.52	-.64	-1.02	.25	-.35	-.05	.11
SPR Fill Rate Additions(-)	-.03	-.03	-.05	-.04	-.04	-.05	-.05	-.05	-.05	-.05	-.11	-.19	-.22
Secondary Stocks[e]													
Net Withdrawals	.24	-.21	.09	-.05	.28	-.26	.09	-.28	.40	-.21	-.12	.06	.00
Total Supply[f]	17.88	19.24	19.85	17.75	18.45	18.91	20.88	18.06	17.99	19.06	74.05	74.96	75.99
Disposition													
Nonutility Uses													
Petroleum	7.66	7.95	7.62	7.81	7.89	8.05	7.96	7.74	7.78	8.05	30.73	31.37	31.54
Natural Gas[g]	2.22	3.48	4.96	2.79	2.10	3.51	5.37	2.90	2.09	3.57	14.01	13.37	13.94
Coal[h]	.64	.69	.68	.67	.69	.74	.75	.70	.70	.73	2.82	2.78	2.88
Industrial Hydropower	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.03	.03	.03
Subtotal	10.52	12.13	13.27	11.29	10.69	12.31	14.09	11.36	10.58	12.37	47.59	47.56	48.39
Electric Utility Inputs													
Petroleum	.45	.34	.35	.28	.40	.30	.32	.26	.32	.27	1.45	1.33	1.17
Natural Gas	.85	.60	.55	.76	.97	.60	.54	.69	.88	.63	2.69	2.88	2.74
Coal	3.93	3.53	3.61	3.62	4.06	3.61	3.80	3.51	3.99	3.70	14.46	14.89	14.99
Nuclear Power	1.19	1.20	1.23	1.13	1.31	1.32	1.35	1.26	1.39	1.33	4.48	4.99	5.33
Hydropower[i]	.79	.82	.82	.79	.74	.79	.86	.92	.80	.81	3.38	3.15	3.40
Geothermal Power and Other	.06	.05	.06	.06	.06	.06	.06	.06	.06	.07	.23	.24	.25
Subtotal	7.27	6.55	6.62	6.64	7.55	6.68	6.93	6.70	7.45	6.80	26.69	27.48	27.88
Gross Energy Consumption[f]	17.80	18.68	19.89	17.92	18.24	18.99	21.02	18.05	18.04	19.17	74.28	75.04	76.27
Electrical System Energy Losses[j]	5.10	4.59	4.57	4.65	5.34	4.70	4.83	4.74	5.19	4.77	18.67	19.26	19.53
Total Net Energy	12.70	14.08	15.32	13.27	12.90	14.29	16.18	13.32	12.85	14.40	55.62	55.78	56.75
Total Disposition	17.88	19.24	19.85	17.75	18.45	18.91	20.88	18.06	17.99	19.06	74.05	74.96	75.99
Unaccounted for	.08	.56	-.04	-.17	.21	-.08	-.14	.00	-.04	-.10	-.24	-.08	-.29

[a] Includes crude oil and lease condensate, natural gas liquids, hydrogen, etc., input to oil refineries.
[b] Total dry gas production excluding nonhydrocarbon gases removed.
[c] Includes industrial production.
[d] Includes wood and waste used to generate electricity.
[e] Primarily electric utility stocks.
[f] This total excludes approximately 2 quadrillion Btu of wood.
[g] Includes natural gas used as refinery fuel.
[h] Includes net imports of coal coke.
[i] Includes net imports of electricity.
[j] Includes plant use and transmission and distribution losses.
SPR: Strategic Petroleum Reserve.
Notes: The conversion from physical units to Btu is calculated by STIFS using a subset of *Monthly Energy Review* conversion factors. Consequently, the historical data will not precisely match that published in the *Monthly Energy Review*. In addition, minor discrepancies with EIA published historical data are due to rounding. Historical values are printed in **boldface,** forecasts in *italics.*
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/07); and *Electric Power Monthly*, DOE/EIA-0226(87/07).

Table 18. Conversion Factors

Product	Unit	Heat Content (million Btu per unit)
		Heat Content of Fuels
Coal		
Production	Short ton	21.918
Consumption	Short ton	21.485
Coke Plants	Short ton	26.800
Industrial and Retail	Short ton	22.198
Electric Utilities	Short ton	21.110
Imports	Short ton	25.000
Exports	Short ton	26.292
Coal Coke	Short ton	24.800
Crude Oil		
Production	Barrel	5.800
Imports	Barrel	5.903
Petroleum Products		
Consumption	Barrel	5.415
Motor Gasoline	Barrel	5.253
Jet Fuel	Barrel	5.621
Distillate Fuel Oil	Barrel	5.825
Residual Fuel Oil	Barrel	6.287
LPG (excluding ethane)	Barrel	3.912
Ethane	Barrel	3.082
Unfinished Oils	Barrel	5.825
Imports	Barrel	5.624
Exports	Barrel	5.839
Natural Gas Plant Liquids		
Production	Barrel	3.797
Natural Gas		
Production, Dry	Cubic foot	1,030
Consumption	Cubic foot	1,030
Non-electric Utilities	Cubic foot	1,029
Electric Utilities	Cubic foot	1,034
Imports	Cubic foot	997
Exports	Cubic foot	1,008

Component	Heat Rate (Btu per kilowatthour)
	Heat Rates for Electricity
Plant Generation Efficiency	
Coal	10,435
Petroleum	
Distillate Fuel Oil	11,988
Residual Fuel Oil	10,553
Natural Gas	10,828
Nuclear Energy	10,809
Hydropower	10,339
Geothermal and Other Energy	21,263
Electricity Consumption	3,412

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