DOE/EIA-0383(86)

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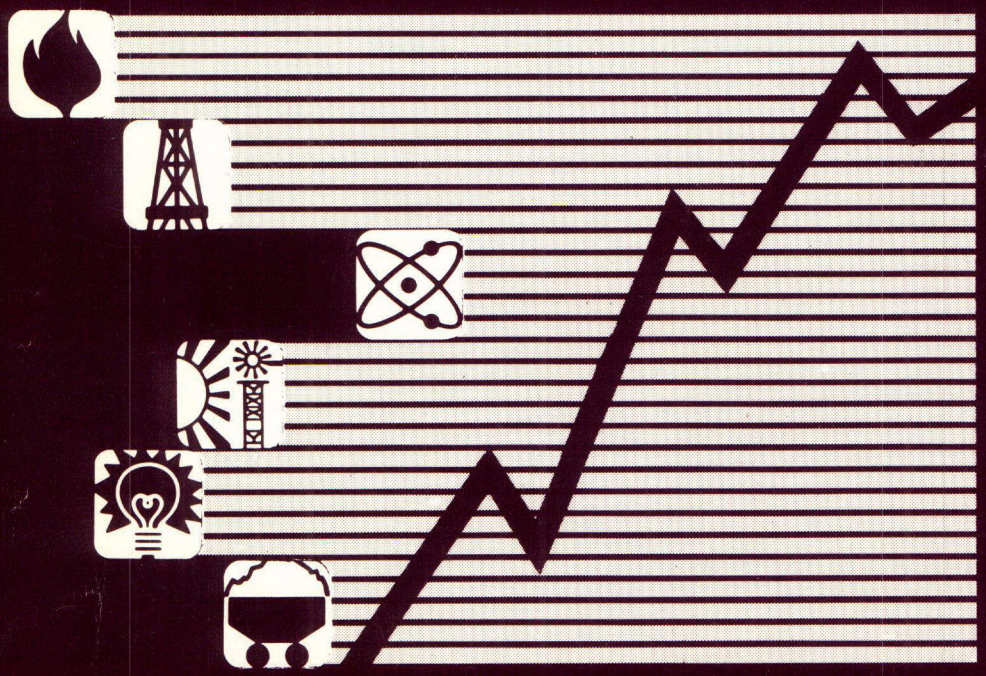
Energy Information Administration

Annual Energy Outlook 1986

With Projections to 2000



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Released for Printing February 11, 1987

DOE/EIA-0383(86)
Distribution Category UC-98

Annual Energy Outlook 1986

With Projections to 2000

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

Administrator's Foreword

1986 was the year that demonstrated the fragility of energy forecasting. At the time EIA's 1985 Annual Energy Outlook (1985 AEO) was being prepared (in mid-and late 1985), the signals were unmistakable: there was a glut of crude oil in the world markets, and prices were not likely to remain in the $27.00-range. In fact, the 1985 AEO had projected in its base case that prices would decline by $2.00 per barrel in 1986, and by a like amount in the following year; in its low-price case, EIA contemplated a price decline to $21.00 per barrel in 1986, followed by a further one-dollar drop in 1987. What EIA did not project was the most dramatic decline of world crude oil prices in history.

These are trying times for forecasters and policymakers. In its progression from a price taker, in the pre-embargo era, to a price maker, until December 1985, OPEC continues to be engaged in the tatonnement process of finding its proper niche on the economic power continuum. Until it does, uncertainty will be the only thing one can project with confidence. As EIA put it last year: "No one can responsibly claim to know precisely what will happen in energy markets over the next 10 years."

Dr. H. A. Merklein
Administrator
Energy Information Administration

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Overview

The forecast summary highlights the principal components of the Energy Information Administration's projections of energy supply, demand, and prices. Key issues are addressed for each of the major energy markets (petroleum, natural gas, coal, and electricity), along with the developments anticipated for end-use energy consumption and new technologies. The overview lists the principal conclusions followed by discussions of the important elements of the projections.

Despite the steep decline in energy prices experienced in 1986, the long-term trends remain essentially unchanged from EIA's 1985 view. In this year's base case projections, the economy is assumed to maintain an average growth of 2.5 percent per year through 2000 and real world oil prices, expressed in 1986 dollars, remain below $20 until 1992; thereafter, increasing world oil demand begins to absorb the current excess of world supply, and oil prices rise at a faster rate, reaching $33 by the year 2000.

In 1986, the United States experienced a new, more competitive natural gas industry. During the year as oil prices fell, natural gas prices followed and even coal prices fell slightly. While a boon to most consumers, this price decline confronts producers with the depressing effects of the energy surplus brought about by the last decade of higher prices.

Consumption trends in 1986 appear to show that price declines do not cause demand to increase as rapidly as it declined when energy prices jumped. The anticipated trend of moderately rising oil prices is expected to produce only modest increases in demand, in the range of about 0.6 percent per year. This evidently stems from the technological improvements now in the marketplace (most obviously in cars) and the structural changes in the U.S. economy that continue to deemphasize the role of energy-intensive industries.

Petroleum demand, estimated at 16.1 million barrels per day for 1986, is projected to rise to 16.5 by 1995 and 17.4 by the year 2000, in the AEO base case. Production levels for crude oil and natural gas liquids, estimated at 10.4 million barrels per day in 1986, fall to 7.6 million barrels per day by 1995 and 7.0 by 2000. Exploration and development costs in the industry are down sharply and should make possible an expansion of drilling from current lows, despite this year's lower overall price outlook. As a result, net imports, estimated at 5.2 million barrels per day in 1986, rise steadily to just over 8.2 million barrels per day by 1995 and 9.8 by the year 2000, increasing U.S. dependence on imports from 32 percent in 1986 to 56 percent by the year 2000.

Recent end-of-year production estimates appear to indicate a larger than anticipated fall in oil production due to lower prices. From December 1985 to December 1986, production fell by approximately 700 thousand barrels per day. Of this drop, 400 thousand barrels per day appear to be due principally to delayed work-overs and temporary shut-ins of producing wells. This drop reflects a substantial decline in servicing activity which is needed to maintain production rates. The lower prices also contributed to significantly lower drilling activity and, as a result, lower well completion levels which caused a loss of approximately 300 thousand barrels per day. Considerably less than 100,000 barrels per day of the loss is due to wells being permanently plugged and abandoned.

This information revises production forecasts for 1986, 1987, and 1988, but its effect on later years should be much less, because some portion of the production fall amounts to production delays (Table 1). Lower well completions and delayed work-overs remove production from significantly sized wells, but little of this production is lost permanently. To the extent that higher prices encourage higher development activity, well completions and work-overs should resume at a more normal level. In the short run, shut-in wells, which are mostly marginal stripper wells, can also be returned to production. With the liberalization of State and Federal regulations on when shut-in wells must be permanently abandoned, a window of about one year exists during which these stripper wells can be restored. Some of these wells will never resume production, but with prices in the $18 plus range, most will again be economic.

Table 1. Annual Energy Outlook 1986 and Revised U.S. Crude Oil Production, 1986-1988

(Million Barrels per Day)

Year	AEO-86 Crude Oil Production	Revised* Crude Oil Production
1986	8.80	8.67
1987	8.63	8.23
1988	8.30	7.99

*Energy Information Administration, January 1987, Short-Term Energy Outlook, Base Case Projections (forthcoming). 1988 is an estimate.

In the base case scenario, production is likely to be about 400,000 barrels per day less in 1987 than projected. However, real prices rise steadily from the low point in 1986 and should promote a recovery in production to the projected levels in the early 1990's. In the low price scenario, however, prices fall to $11 per barrel by 1987 and remain below $17 through 1993. If this scenario promotes an expectation of low prices and thus low returns on investment, many of the marginal wells currently shut in will be abandoned permanently. However, these wells would have ceased production in any event in the early years of the forecast. In the low price case, therefore, taking the shut-ins as permanent would justify a larger downward revision in production in the early years of the forecast, but production would still recover slowly with prices to a zero revision by the mid-1990's. This loss of production would increase U.S. imports correspondingly.

OPEC significantly strengthened its policy in December 1986 when it adopted fixed oil prices and more strict production quotas. As a result, 1986, 1987, and 1988 short-term oil prices have also been revised upwards but still within the range of the alternatives considered here. The ultimate long-term effect of this latest move by OPEC will be to strengthen non-OPEC production response and encourage oil conservation slightly more than considered in the base case.

The *Annual Energy Outlook (AEO)* is a long-term forecast of the fundamental trends in the data. Much as we would like it, the AEO cannot reflect the short-term trends, including seasonal variations and inventory changes, followed in the *Short-Term Energy Outlook* from which these updates were taken and which should be studied for more timely updates in the next six quarters.

World oil and domestic natural gas supplies appear more than sufficient to meet current demand as the current surplus of domestic gas production capability and the world surplus of oil production capability are gradually absorbed. Projected gas prices start to rise after 1986 and this, together with the expected rise in oil prices, should produce the stable environment that the domestic oil and gas industry needs for renewed investment in exploration and development.

The natural gas outlook appears favorable for consumers, and ultimately for the market, as new Federal Energy Regulatory Commission (FERC) initiatives come into place. In the absence of the FERC initiatives, it is clear that gas prices would be higher than otherwise would be the case in the near term. As a result, gas consumption, estimated at 16.5 trillion cubic feet in 1986, rises in this forecast to 18.0 trillion cubic feet and stays at that level until 2000. Wellhead prices will bottom out in 1986 at $1.70 per thousand cubic feet and then rise smoothly to $5.50 by 2000, keeping pace with oil prices to the end user.

The outlook for the electric utility industry shows the current surplus of generating capability declining by the early 1990's. Demand growth, which was high in the past, has remained lower than GNP growth for 1986 and leaves the industry with continued medium term surplus generation capability. However, if forecasted demand materalizes, additional capacity beyond that now planned or under construction will be needed in the late 1990's.

Residential electricity prices are expected to decline in real terms in 1986, and this trend is projected to continue for all sectors until 1994, while other energy prices increase. With longer term demand growth projected at around 2.6 percent per year, the industry should improve its financial position steadily. By the year 2000, the remainder of the scheduled and delayed nuclear construction projects will be completed.

Coal continues to increase its contribution to the Nation's energy utilization. Electricity is the only form of energy showing continued positive penetration for nontransportation use, and coal is the dominant provider of that electricity. Production, estimated at 890 million tons for 1986, is anticipated to rise to 1.1 billion tons by 1995 and to 1.2 billion tons by the year 2000.

In addition to the mid-case forecast considered so far, the AEO also deals with two likely combinations of oil price and economic growth leading to a high and low set of oil import projections.

As shown in Table 2, these alternative assumptions lead to a wide range of import values even by 1990. In 1995, imports are estimated to vary from a low of 6.4 million barrels pay day to a high of 9.6 million barrels per day. By the year 2000, this range widens to a low of 7.3 million barrels per day and a high of 11.9 million barrels per day.

Table 2. Petroleum Supply, Demand, and Imports Under Alternative Assumptions, 1985-1986 and 1995-2000

(Million Barrels per Day, except where noted)

Supply, Demand, and Imports	1985	1986	1995			2000		
			Low Price/ High Growth	Base Case	High Price/ Low Growth	Low Price/ High Growth	Base Case	High Price/ Low Growth
World Oil Price (1986 dollars per barrel)	27.70	14.60	21.20	26.60	33.00	26.80	32.90	41.50
Production								
Crude	9.0	8.8	5.6	6.0	6.8	4.6	5.4	6.9
Other Liquids	2.2	2.2	2.4	2.3	2.3	2.3	2.3	2.2
Total	11.2	11.0	8.0	8.3	9.1	6.9	7.7	9.1
Consumption	15.6	16.1	17.5	16.5	15.5	18.7	17.4	16.3
Net Imports	4.3	5.2	9.6	8.2	6.4	11.9	9.8	7.3

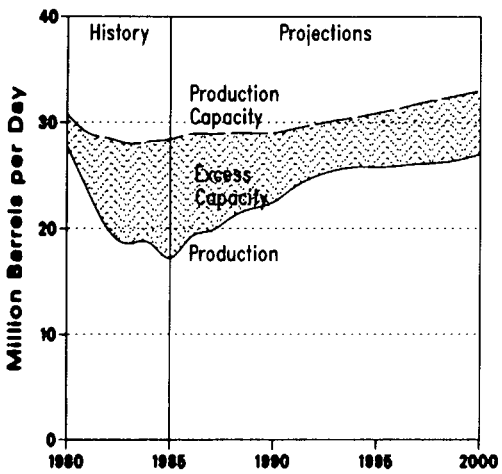
Petroleum Markets

Oil Prices Are Expected to Remain Below $20 per Barrel Until After 1990

The market forces that produced the unprecedented drop in oil prices in early 1986 include a substantial reduction in world demand since 1979 , the development of 12 million barrels per day of additional crude oil production outside the Organization of Petroleum Exporting Countries (OPEC) since 1973 and the displacement of 15 million barrels per day of OPEC crude in world markets. The resulting excess production capacity in OPEC is expected to dominate the petroleum market over the next 5 years. The price decline observed in early 1986 could have happened any time since 1982, when significant excess production capacity of 8 to 9 million barrels per day was first apparent inside OPEC (Figure 1). Another measure of the severity of the excess production capacity is the production levels for Saudi Arabia, the country with the world's largest oil reserves, which peaked at about 9.9 million barrels per day in 1980, but fell to 2.3 million barrels per day by August 1985. Excess OPEC production capacity is projected to decline from 10 to 12 million barrels per day in 1985 to 5 to 8 million barrels per day by 1990 and then continue declining through the mid-1990's as lower prices reduce non-OPEC production and raise worldwide demand.

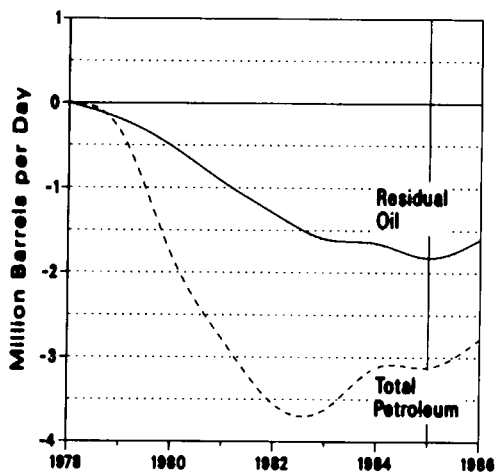
The reason for the current excess oil production capacity relates to price changes that occurred in the 1970's. Following the sharp increase in the world oil prices in 1973 and 1974, and again in 1979 and 1980, strong market forces were unleashed in the petroleum market. In the United States and the rest of the free world, demand for petroleum products began to decline following the second price shock. Most of the U.S. demand decrease occurred in residual fuel oil used by electric utilities and heavy industry (Figure 2). Some of this decrease was the result of switching to other fuels (which at lower oil prices could reverse in the future), but much of the decrease was due to other factors, including increased use of nuclear and coal-fired generation equipment by electric utilities and decreased output from heavy industries in the United States such as steel and chemicals. Many of these changes in the petroleum market brought on by high prices are not likely to reverse quickly at current low prices because they require a recovery of domestic heavy industry and because of improved technologies which are now in place.

Figure 1. Excess OPEC Production Capacity, 1980-2000



Source: (1980-1985): Energy Information Administration, Office of Energy Markets and End Use.

Figure 2. Change in U.S. Oil Demand, 1978-1986



Source: (1978-1985): Energy Information Administration, Annual Energy Review 1985, DOE/EIA-0384(85), (1986).

On the supply side, the oil price increases in the 1970's caused record drilling in the United States and worldwide, and steady increases in production from non-OPEC sources through 1985. As mentioned, the combination of a demand reduction and a non-OPEC supply increase led to greater and greater excess oil production capacity, which ultimately brought on the price collapse of 1986. Before oil prices can increase again, either demand must significantly increase (in response to the now lower price) or OPEC must succeed in withholding production.

In the AEO base case, oil prices (in constant 1986 dollars) are expected to remain below $20 per barrel until 1992, when they are projected to increase by about 6 percent per year in real terms, reaching $33 per barrel in 2000 (Figure 3). However, considerable uncertainty surrounds the major determinants of the projected oil price paths including factors such as OPEC's ability to manage its excess capacity problem, non-OPEC production in response to lower prices, and demand fluctuations with respect to price and macroeconomic growth. These uncertainties are the basis for the fairly wide range of prices assumed in the low and high price AEO cases. In the low oil price case, prices drop to about $11 per barrel in 1987 but return to $15 per barrel by 1992 and then increase to $27 per barrel by the year 2000. Oil prices are likely to remain volatile for the next few years and, in any given year, might even lie outside this range. The two price paths were constructed to create a reasonable range of uncertainty around the base case price path, and do not themselves represent a trend that could be sustained by the market over the next 15 years. Examination of alternative scenarios indicates that prices as low as $10 per barrel could not be sustained very long, and even if prices were to fall that low in the near term, the market would return relatively soon to prices near the base case level. In the high oil price case, prices rise to $22 per barrel by 1990 and then to nearly $41 per barrel in 2000.

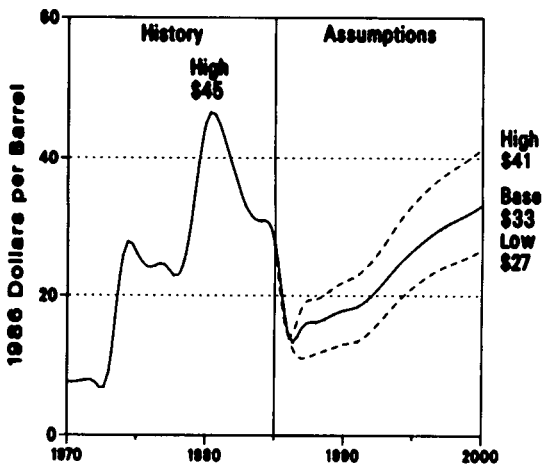
Even With Low Oil Prices Over the Next Five Years, Oil Demand Should Not Increase Sharply by 2000

Even with oil prices assumed to remain below $20 per barrel between now and 1992, oil demand in the United States is expected to grow slowly. Over that period, oil demand is projected to increase by about 300,000 barrels per day, or about 0.3 percent per year. Growth is projected to be modest because of several factors:

- Past investments in oil-saving equipment that will continue to be used, thereby depressing demand. One of the largest such investments is in more efficient automobiles that will enter the fleet and increase fleet efficiency over the projection period.
- Continued growth in nuclear and coal-fired electricity generation capacity over the next 15 years, which will limit the need for oil-based generation.
- Competitive natural gas pricing, particularly to electric utilities.

Between 1986 and 1992, decreases in gasoline use are projected to partially offset increases in diesel, jet fuel, and liquefied petroleum gas (LPG) uses. Over this period, gasoline use is projected to decrease by about 440,000 barrels per day as increases in efficiency more than offset increases in driving. Over the same period, diesel fuel use is projected to increase by about 200,000 barrels per day, mainly due to increased use of heavy trucks associated with the growing economy. Heavy truck use is highly correlated with manufacturing sector growth and typically grows faster than the manufacturing sector during periods of economic expansion. In addition, the increased penetration of diesel engines in light trucks adds to the growing demand for diesel fuel. Growth in demand for other fuels, mainly LPG's (used by industry as feedstocks) and jet fuel, account for the remainder of the modest growth projected over the period of relatively low oil prices.

Figure 3. World Oil Prices in Constant 1986 Dollars, 1970-2000



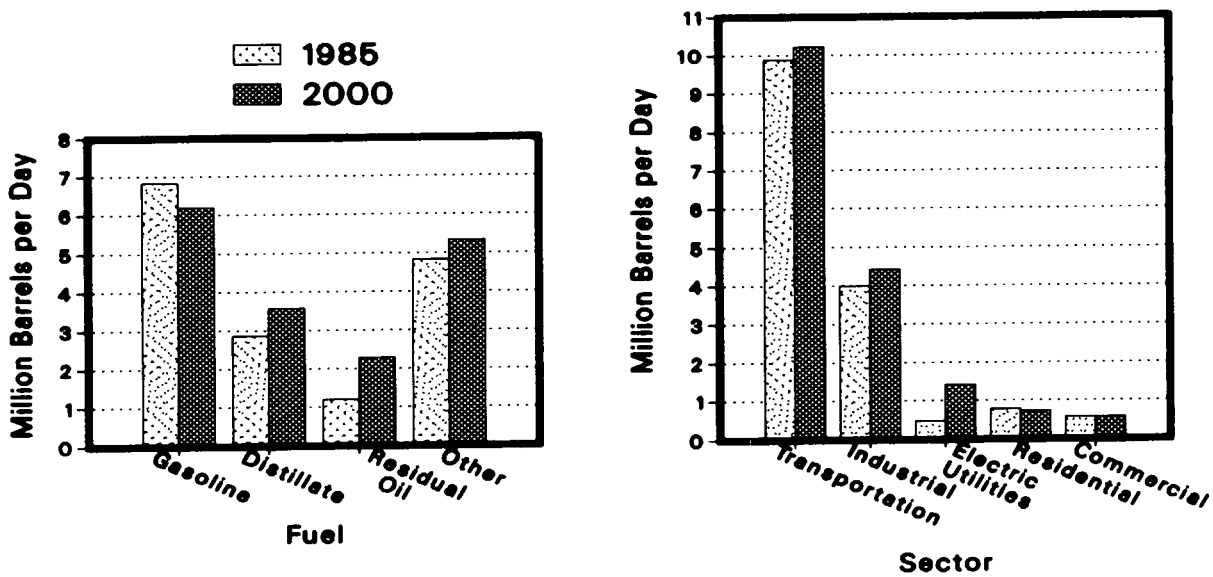
Source: (1970-1985): Energy Information Administration, Annual Energy Review 1985, DOE/EIA-0384(85), (1986).

After 1992, oil prices are projected to increase moderately in the base case, dampening demand growth slightly. Over the entire projection period, demand should rise moderately from about 16.1 million barrels per day in 1986 to 17.4 million barrels per day in 2000. Most of this growth in demand is expected to come from increased use of oil by electric utilities (amounting to about 780,000 barrels per day) late in the projection period, as oil-fired generation capacity is needed to meet some of the projected growth in electricity demand (Figure 4). Should electric utilities decide to build more generation capacity, or should electricity demand growth be lower than projected, the forecast increase in oil demand would be lower. As mentioned, other areas of demand growth are expected to be diesel fuel, LPG's, and jet fuel. Later in the projection period, the expected slowing in overall population growth, particularly for the driving age population, combined with increased fuel efficiency should lead to declines in gasoline demand.

The Rate of Decline in Domestic Crude Oil Production is Expected to Rise With Lower Oil Prices

The impact of lower oil prices on domestic oil production through the year 2000 could be very significant. In the short term, some slight amount of production will be lost from the shutting in and abandoning of high-cost, low-volume wells, with the long-established oil fields of the Midwest and Southwest likely to show the biggest production declines. In the event that the currently depressed oil prices are perpetuated over several years, a return to the pre-embargo number of 350,000 stripper wells, down from the 1985 high of 460,000 wells, would entail the loss of no more than 300,000 barrels per day.

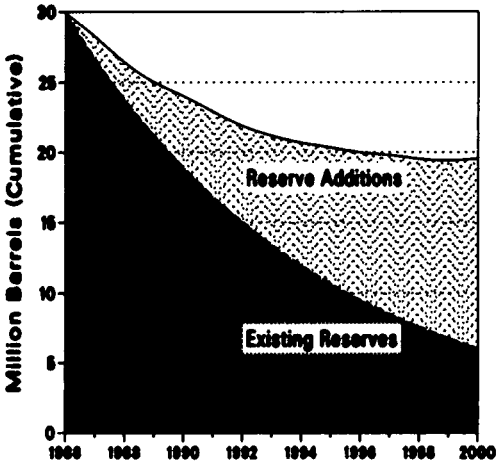
Figure 4. Petroleum Use by Fuel and by Sector, 1985 and 2000



Note: Other includes jet fuel.
Source: (1985): Energy Information Administration, Annual Energy Review 1985, DOE/EIA-0384(85), (1986).

The more serious and longer term effect of lower oil prices will come from a reduced level of investment in exploration and development, which will result in a rate of production in excess of the rate of reserve replacement. Because current production levels are largely determined by the level of total developed reserves, the rate of decline in domestic oil production will accelerate through 1995 (Figure 5).

Figure 5. Crude Oil Reserves, 1986-2000



Source: (1986): Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, DOE/EIA-0216(85), (1986).

Total domestic crude oil production (including lease condensates), which averaged 8.8 million barrels per day in 1986, is projected to decline by 1.4 million barrels per day in 1990, by 2.8 million barrels per day in 1995, and by 3.4 million barrels per day in 2000. The percentage decline in Alaskan production is even greater than that for the lower 48 States. Alaskan production, which averaged 1.9 million barrels per day in 1986, is projected to be 160,000 barrels per day lower by 1990. It will be 640,000 barrels per day lower by 1995 and about 1 million barrels per day lower by 2000, unless new reserves are found on the Arctic Slope, where the Arctic National Wildlife Refuge currently has the highest U.S. resource potential. Most of the Alaskan decline reflects the natural depletion of the Prudhoe Bay field and had been expected even before the drop in oil prices.

An immediate consequence of falling oil prices in 1986 was a drop of 65 percent in the number of active oil and gas drilling rigs, from 1,915 at the end of 1985 to 663 by the middle of July 1986. Total oil and gas drilling is projected to be 207 million feet in 1990, 285 million feet in 1995, and 304 million feet in 2000. This compares to an all-time high in 1981 of 409 million feet. Accompanying these lower drilling levels should also be a considerably lower demand for and cost of drilling support activities (including seismic work, well logging services, and tubular goods). Because the least productive drilling crews and rigs have been retired first, there has also been a significant improvement in the average number of wells drilled per rig. The expected profitability of the remaining exploration and development prospects will be further enhanced by this increase in efficiency.

The smaller independent firms that search for and produce crude oil are the hardest hit by low oil prices, since they generally carry a heavier debt burden and are associated more closely with marginal producing wells: low prices jeopardize both current operations and their ability to generate financial capital for new projects.

The tax reform legislation passed by the U.S. Congress in October 1986 is expected to be neutral to oil producers. The one major advantage eliminated was the investment tax credit, which had allowed the immediate use of up to 10 percent of new capital costs to offset tax liabilities. Dry hole exploration and development costs are expensed immediately and, therefore, do not qualify for the investment tax credit in any case. In the case of a successful project, immediate expensing of most intangible drilling and development costs are still permitted by the new law. The reduction in corporate income tax rates to 34 percent should increase the direct profitability of oil properties, and since the special treatment of oil and natural gas under the passive investment rules makes it one of the only remaining tax shelters available to investors, financing for such projects should be available.

The Search for Oil is Projected to Move Increasingly Outside the United States

The period of rising oil prices from 1974 through 1981 provided the incentive for a wide range of domestic energy investments, encouraging new supplies of conventional energy, new sources of energy, and new ways of saving energy. Even after oil prices had peaked in mid-1981, the search for and development of domestic oil resources remained a very profitable activity. The development of new petroleum resources, which continued through 1985, and the success of conservation and fuel-switching measures created the excess crude oil production capacity that now hangs over the world oil market.

A further incentive to the investment in U.S. oil supplies during the past decade, at least by the integrated oil companies, was the general perception that there was considerable risk associated with the continuity of supplies from the prolific oil producing regions of the Middle East. With the identification of major new oil deposits outside the politically unstable Middle East and the recent fall in oil prices, many oil companies are rethinking their previous assessment of the risk/return tradeoff that had originally brought them back to the United States in their search for oil.

It is no secret that the United States is one of the most expensive places in the world to produce oil. Most of the current production in the lower 48 States comes from fields initially developed long before the major deposits of the Middle East were discovered. The success of OPEC pricing policies has been exemplified best by the degree to which exploration efforts in the past 10 years have concentrated on the low-potential fields of the Midwest and Southwest United States, on the high-cost offshore regions of the Arctic and North Sea, and on remote Third World locations far from the infrastructure of established producing regions and markets.

The free-market supply curve for oil has effectively been turned upside down, as higher cost oil is produced long before the low-cost oil of the Middle East. A major consequence of the increased market awareness demonstrated by OPEC in its 1986 pricing policies might well be the emergence of a more efficient, cost-based ordering of petroleum development priorities. Excluding royalties and production taxes, which are set at the discretion of the producing country, the Middle East has the lowest direct costs and should be the last region to reduce production because of insufficient cash flow alone. Except in the event of a successful effort on the part of OPEC to restrain production and maintain prices at levels significantly above costs, a larger portion of world oil supplies should be expected to come from the Middle East in the next decade. This return to lower cost oil sources has already started in 1986.

In general, however, major changes in the production levels of other important suppliers to the United States (Canada, Mexico, the United Kingdom, and Venezuela) will appear only gradually, since these areas will still experience positive earnings from their currently developed fields under the oil prices projected in this outlook. On the basis of total costs, production levels from these regions are expected to be influenced by lower world oil prices mainly to the extent that costs for specific oil fields within each region significantly exceed the reported averages. Total petroleum production in Canada (including crude oil, lease condensates, and natural gas liquids) is projected to increase from 1.5 million barrels per day in 1986 to a high of 1.7 million barrels per day in 1993, before declining again later in the forecast. Production from Western Europe is projected to peak at 4.4 million barrels per day in 1986, and then decline throughout the forecast period. Production from the OPEC group of nations is projected to increase throughout the forecast period, from 19.2 million barrels per day in 1986 to 27 million barrels per day by the year 2000.

Natural Gas Markets

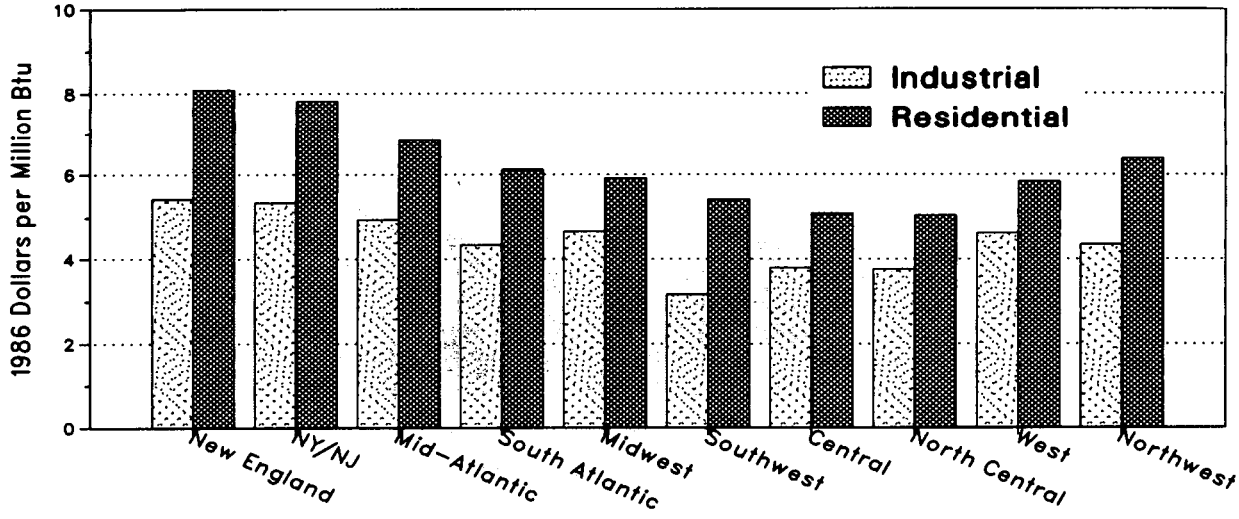
Lower Oil Prices, the "Gas Bubble", and Increased Market Flexibility Should Act to Restrain Wellhead Natural Gas Prices

Between 1986 and 1988, real *end-use* natural gas prices are expected to decline slightly because of the assumed low world oil prices, the existence of excess gas production capacity, and increased market responsiveness of natural gas contracts. Wellhead prices are expected to increase moderately starting in 1987 and at a faster rate after 1992, as domestic supplies will require higher prices to bring forth needed production. End-use natural gas prices are expected to follow a similar pattern: decline slightly in real terms through 1988 followed by moderate increases which accelerate in the later years. In 1986, the average Btu price of natural gas is projected to be above the price of oil in the electric utility market, although by 1990 these prices are projected to be almost identical.

These average prices disguise the fact that in some regions of the country the price of natural gas to electric utilities could be well below the oil price, especially in regions, such as the Gulf Coast, that are near producing areas. However, in regions farther away from the main producing areas, prices of natural gas may rise to a point higher than oil prices. For example, in 1985 the national average price for residential natural gas was about $6.30 per million Btu (1986 dollars), but the low was $4.80 per million Btu in the North Central and the high was $7.70 per million Btu in New England (Figure 6). The North Central region price is not an anomaly because of the availability of relatively large quantities of price controlled natural gas in this region. Figure 6 also shows the distribution of prices for industrial users. While this distribution is similar to that of the residential prices, most industrial natural gas users are concentrated in the Southwest where prices are relatively low.

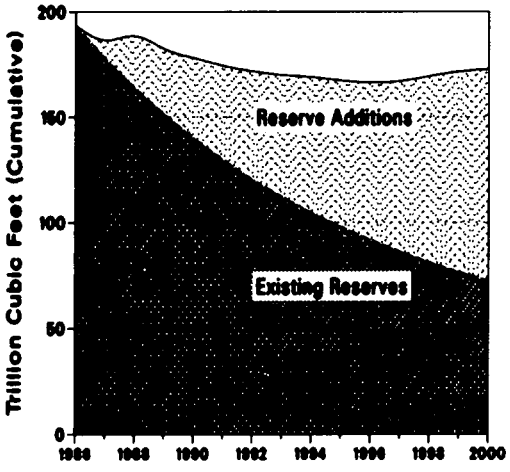
The competitively priced import volumes assumed for the forecast period act to moderate U.S. gas prices by putting additional competitive pressure on U.S. markets. The relatively low wellhead prices (particularly in the early years of the forecast) have a large impact on reserves which have been roughly constant since 1979. These prices act to reduce the incentives for drilling; this, in turn, results in reserve additions that are insufficient to replace the volumes of gas that are produced each year (Figure 7). Lower-48 reserves are projected to decline from 160 trillion cubic feet in 1986 to 141 trillion cubic feet in 2000 as the effect of reduced drilling becomes more evident.

Figure 6. Residential and Industrial Natural Gas Prices by Federal Region, 1985



Source: Energy Information Administration, Office of Oil and Gas.

Figure 7. Natural Gas Reserves, 1986-2000



Source: (1986): Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, DOE/EIA-0216(85), (1986).

The gas "bubble" will continue to dominate natural gas pricing in the United States and, to some extent, in Canada for the next few years. Current estimates of the annual surplus production capability vary between about 3.0 and 4.6 trillion cubic feet depending upon the time of year. This represents natural gas production capacity that has no buyer at current prices. However, as demand depletes current reserves, this excess gas capacity will be absorbed. In this forecast, it is estimated that this will happen sometime during the next 1 to 4 years. In the meantime, the current surplus of natural gas enables distributors and pipelines to meet the competition from fuel oil by promoting cut-throat price competition in the western and southwestern States. Increased natural gas demand, primarily from the industrial sector (which has shown no increase in demand since 1984), will be needed to eliminate the current excess supply in less than 4 years.

Federal Regulatory Changes Should Increase Competition in Natural Gas Markets

The development of gas resources has been greatly stimulated by the high oil prices of the past decade, by special provisions of the Natural Gas Policy Act (NGPA) that provided for above-average prices for certain new high-cost gas, and by the ability of natural gas pipelines to average high cost gas with low-cost, price-controlled gas in setting their sales price.

Since 1982, however, the gas industry has been characterized by a severe market-ordering problem, as higher cost gas often made it to market before lower cost gas. Widely different pricing provisions in producer/pipeline gas contracts have resulted in significant differences in the prices producers received for essentially the same quality product. In addition, because of "take or pay" provisions contained in many of the producer/pipeline contracts for this new gas, some older, lower priced gas production was shut in. One effect of this regulatory/contract structure was that all users effectively paid a higher price for natural gas. Higher prices then constrained the growth in demand for natural gas but encouraged expansion in production--a fundamental market imbalance, given the existence of excess production capacity. The outlook for relatively stable natural gas demand, in combination with downward pressure on gas production due to lower prices, should alleviate the generally perceived excess gas supply situation, or "bubble," of the last few years. The regulatory structure of the gas market, however, has also undergone a number of changes in 1986 that may have a significant longer term influence on the supply-demand balance.

One particularly important development has been the Federal Energy Regulatory Commission (FERC) Order 436, proposed in October 1985 and issued in February 1986. By providing a mechanism of nondiscriminatory access to interstate pipelines, FERC Order 436 has the potential of greatly increasing the number of buyers in wellhead gas markets. This situation would enhance competition by allowing local distributors and major end users of gas to contract directly with gas producers.

On June 6, 1986, the FERC also issued Order 451, which establishes a single maximum lawful price for a large and diversely priced number of old interstate and intrastate gas categories under the NGPA. The order also establishes negotiation rules to encourage the renegotiation of contract terms covering natural gas that is priced below market, while at the same time, offering purchasers the opportunity to renegotiate terms covering higher priced gas flowing under the same contracts covering old gas. Although staying within the framework of the NGPA, Order 451 is intended to make natural gas prices more sensitive to the market. Under the combined impact of FERC Orders 436 and 451, natural gas prices and supplies in the next few years should become more responsive to changing demand conditions, such as those created by the fall in oil prices this year. The near-term outlook for gas markets is not expected to be significantly affected by these changes.

Coal Markets

The Relatively Low Prices for Oil and Natural Gas Should Have Little Impact on the Coal Market in the Long Term

Although coal and oil do not generally compete directly, lower oil prices appear to have lowered coal prices marginally in 1986. There was a limited amount of coal-to-oil or gas switching in 1986 that consisted principally of reducing "coal by wire" sales between various electric utilities. This, plus generally slack demand and substantial surplus coal mine capacity, lowered spot coal prices slightly and, as a result, lowered average coal prices for 1986.

Between 1986 and 2000, the projected oil and natural gas prices should have little further impact on the coal market. With real coal prices forecast to rise by about 1 percent per year over that period, the assumed oil and natural gas prices are sufficiently high to warrant continued use of coal at electric utility plants. This projection assumes that future proposals for acid rain legislation will not significantly increase the cost of using coal for electricity generation.

Over the next 4 to 5 years, coal prices are projected to increase by about 1 percent per year in the electric utility sector. If very low oil prices persist for several years, however, even more pressure would be put on coal prices in regions where burning coal would be less economical than burning oil, such as along the East Coast. In this situation, where the market for coal could be reduced as contracts expire, pressure to lower minemouth prices and transportation rates would be intense.

Even though 1985 minemouth prices were below the minimum acceptable price for justifying new mines, they are expected to recover in the 1990's as excess mine capacity is reduced. The assumed increase in labor productivity in the coal industry of 1 percent per year, and rising prices, imply that rates of return on new mines will rise to acceptable levels before the end of the forecast period.

Because of increased coal demand in the electric utility, industrial, and export sectors, coal production is expected to increase by about 330 million short tons over the forecast period reaching 1.2 billion short tons by the year 2000 from a combination of existing and new mines. Electric utility coal consumption is projected to increase by about 270 million short tons between 1986 and 2000. Recent sales of fluidized bed, coal-fired boilers suggest that nonutility coal demand for such applications as on-site cogeneration and steam production may be forthcoming. This projection assumes significant amounts of coal-fired cogeneration and coal gasification in the later years of the forecast. Aided by these new technologies, industrial coal consumption rises from 77 million short tons in 1986 to 109 million tons by the year 2000. This increase greatly exceeds the projected 9-million-short-ton decrease in coking coal consumption.

U.S. exports are projected to expand from 89 million short tons in 1986 to 114 million short tons in 2000 in response to the increase in international coal trade. However, because of increased competition from other coal-exporting countries, the U.S. share of the world coal market is expected to decline from recent levels.

Electric Utilities

The Requirement for New Electric Utility Generating Capability by the Year 2000 is Clear

Although many electric utilities currently have excess generation capability, before 1990 utilities will have to address the need for additional electricity production.

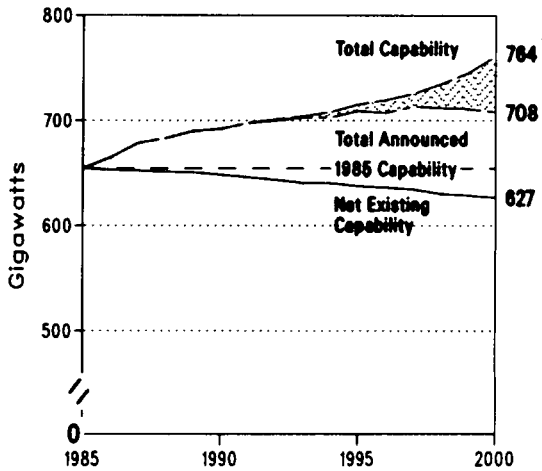
Growth of electricity sales in 1986 remains low relative to aggregate economic growth primarily because of the weak performance of segments of the more energy intensive industries, notably primary metals. Though potential requirements are higher in the future, utilities are reluctant to consider new capacity (or capability) additions until there is a clearly perceived need for it. Ratepayers and utility stockholders have both been affected adversely by the shocks of earlier price rises and Public Utility Commission (PUC) disallowance decisions following the construction of excess capability. The PUC's have given utilities clear signals to explore conservation, load management, and other alternatives before adding more capability.

Average electricity prices for most regions are falling in real terms and this will encourage demand growth. Some utilities, however, have yet to feel the effects of pending (but much delayed and, therefore, expensive) coal and nuclear additions at a time when demand has not kept pace with earlier expectations.

By the year 2000, demand increases are projected to exceed generation from announced capability increases (currently known only to 1995). Electric utilities will most likely undertake additional construction programs to meet expected demand growth. In the base case forecast, a total of 138 gigawatts of additional capability are needed from 1985 through the year 2000 to meet demand (Figure 8). Over 30 gigawatts of new nuclear capability are currently under construction and almost 64 gigawatts of new coal capability are projected to be needed. This includes 28 gigawatts of coal capability that have not been announced under current utility plans. On a regional basis, demand growth may exceed the national average growth rate of approximately 2.6 percent per year between 1986 and 2000.

There are several alternatives available to a utility anticipating a requirement for new capability: capacity additions, demand growth management, or the purchase (or import) of electricity from other utilities, cogenerators, or small power producers. The utility may also have the option of refurbishing existing, older units, thus postponing their retirement from service. In this forecast, an additional 60 gigawatts of capability are added in addition to the announced utility plans of 78 gigawatts, and 261 gigawatts of capability are refurbished rather than retired.

Figure 8. Estimated Electric Utility Generating Capability Requirements, 1985-2000



Source: (1985): Energy Information Administration, Electric Power Annual 1985, DOE/EIA-0348(85), (1986).

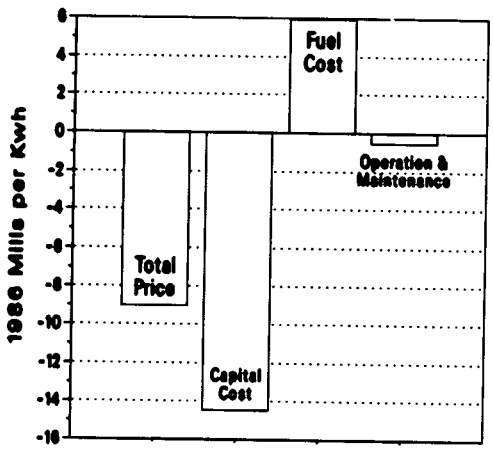
Given the difficulty of bringing new capacity additions online because of costs and environmental concerns, demand management has become an increasingly attractive alternative. These demand management strategies can take many forms and can range from special time-of-day rates to active conservation measures. Another alternative to capacity additions is to encourage self-generation or cogeneration by industry. This forecast assumes that cogeneration from gas-fired and fluidized bed, coal-fired cogeneration units will reduce industrial sector demand growth from 1985 to 2000 by about 0.4 percent per year. This effect from self-generation coupled with additional PURPA sales,[1] provides about 193 billion kilowatthours of internal industrial electricity demand and 63 billion kilowatthours of sales to utilities out of total industrial purchased electricity of 1,213 billion kilowatthours in the year 2000.

[1]Sales to electric utilities by industrial (and other) cogenerators qualified under the Public Utility Regulatory Policies Act (PURPA, PL 95-617).

Real Electricity Prices Should Fall Over Most of the Projection Period as Capability Expansion Slows

Between 1985 and 2000, real average U.S. electricity prices are expected to fall by about 0.9 percent per year. Almost all of this decline is attributed to declining capital charges, as the return on the rate base and Federal tax expenses decrease.[2] Increased utilization of the existing generating equipment as demand increases, further enhances this price decline since capital charges and taxes are fixed costs spread over a broader base. Between 1985 and 2000, the capital component of electricity prices is projected to decline by 4 percent per year, more than offsetting the price increase in the fuel component (Figure 9).

Figure 9. Change in Components of Electricity Costs, 1985-2000



Source: (1985): Energy Information Administration, Office of Energy Markets and End Use.

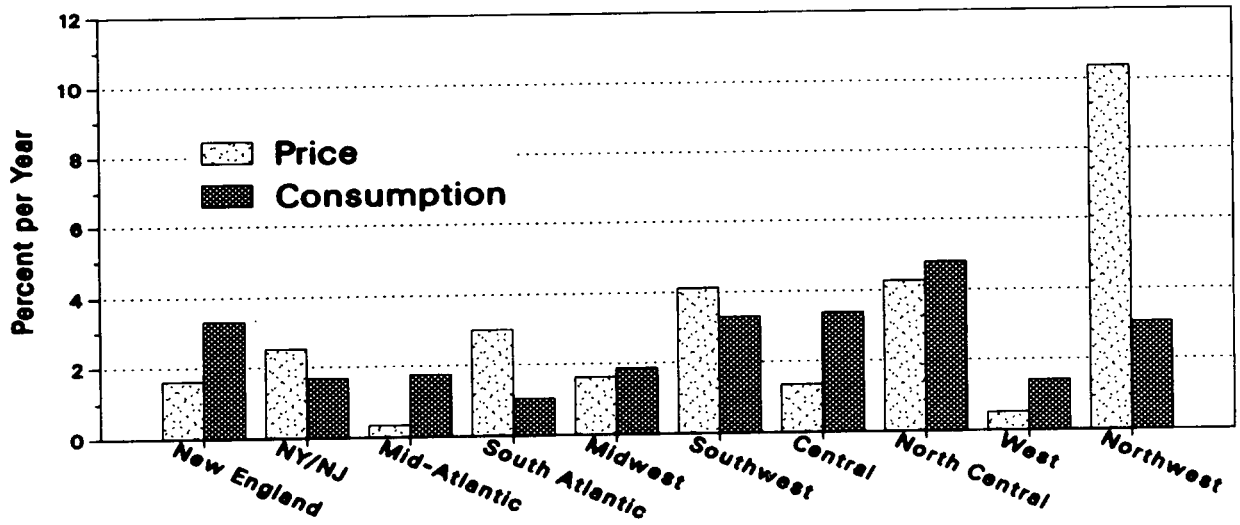
On a regional basis, however, prices vary considerably. The regional nature of electricity price changes can best be examined by observing Figure 10, where regional price changes over the last 4 years are shown. This figure shows that in both the Mid-Atlantic and West, price increases were less than 1 percent per year. However, in the Northwest, the region which still has by far the lowest prices, increases averaged almost 8 percent per year between 1980 and 1984.

In real terms (1986 dollars), the value of the rate base[3] for all privately and publicly owned electric utilities is projected to decline from $352 billion in 1985 to $296 billion in 2000. This change in the value of the rate base is attributable to three factors. First, the book value of electric plants in service is projected to grow by only $67 billion (much slower than in recent years), from $433 billion in 1985 to $500 billion in 2000, as new plants are completed and become operational. Second, accumulated depreciation, which represents a reduction in the value of the rate base, is projected to increase substantially, from $113 billion in 1985 to $221 billion in 2000. Accumulated depreciation reflects reductions in the value of both existing and new assets over time. The projected increases in accumulated depreciation are attributable to the diminished value of high-cost assets added in the middle to late 1980's. Third, the value of construction work in progress (CWIP), representing costs of new but incomplete construction included in the rate base, is projected to decrease from $43 billion in 1985 to $18 billion in 2000, indicating further slowdowns in new utility investment growth. Between 1985 and 1989, about 9 gigawatts of capital intensive, coal-fired and nuclear-powered plants are to be added each year to electric plants in service. For the period from 1990 through 2000, such additions average only about 5 gigawatts per year.

As a result of slowed growth of utility plant and CWIP along with a large increase in the value of accumulated depreciation, the projected value of the rate base declines and results in a lower value for the capital component of electricity prices. Even the addition of gas turbines, (which use relatively more fuel per unit of electricity generated and less capital than larger coal or nuclear plants) is not significant enough to counter the basic downward movement in real prices. This analysis assumes traditional ratemaking treatment on the part of the PUC's.

[2]Capital charges include all the components of electricity price except fuel charges and operating and maintenance costs.
[3]The rate base is defined as the dollar amount of capital invested in assets used to provide electricity minus depreciation.

Figure 10. Average Annual Percentage Change in Electricity Prices and Consumption by Federal Region, 1980-1984

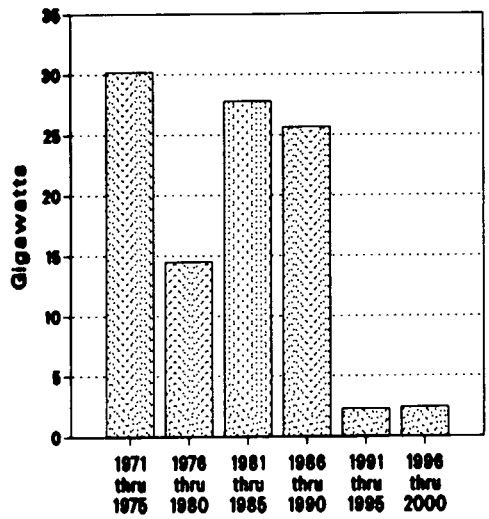


Source: (1980-1984): Energy Information Administration, State Energy Data Report 1960-1984, DOE/EIA-0214(84), (1986), and State Energy Price and Expenditure Report 1984, DOE/EIA-0376(84), (1986).

Additions to Nuclear Capacity Will Fall Dramatically After 1990

After 1990, additions of new nuclear capacity will drop off dramatically as the Nation's utilities approach completion of their construction programs (Figure 11). Between 1986 and 1990, over 25 gigawatts of new nuclear capacity are planned to provide power to the utility grid, while only 5 gigawatts of capacity are expected to be added between 1990 and 2000. Most of the capacity scheduled to be added after 1988 consists of units that were deferred in earlier years and are to be completed later as electricity demand increases. With the slowdown in additions to nuclear capacity, the share of total generation provided by nuclear energy is projected to increase from 16 percent in 1986 to 20 percent in 1990 and then decline to 17 percent in 2000.

Figure 11. Additions to Nuclear Generating Capability, 1971-2000



Source: (1971-1985): Energy Information Administration, Annual Energy Review 1985, DOE/EIA-0384(85), (1986).

End-Use Consumption

Energy Conservation Will Continue to be a Major Factor in Reducing Demand Requirements Relative to Economic Growth, Even With Lower Prices

Energy conservation, as measured by declining energy use per real GNP dollar, is forecast to continue but at a slower rate than in the recent past, as a result of lower energy prices. Energy conservation has long been an important factor in determining U.S. energy consumption trends. Over the long haul (1926 to 1966), the pre-embargo energy use per dollar of GNP has declined by about 0.7 percent per year (Figure 12). Between 1976 and 1985, total energy consumed per real GNP dollar declined at an average rate of 2.6 percent per year, following a sharp increase in oil and natural gas prices.

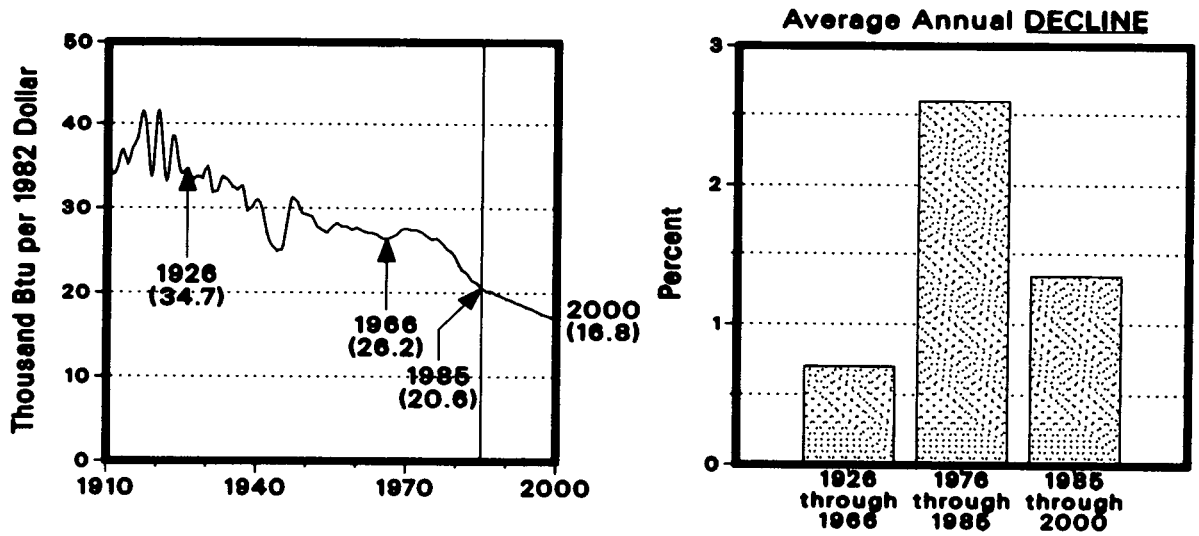
In the past, three factors have been key in determining this trend of increasing energy efficiency:

- Energy-intensive industries became less important relative to total economic output (GNP). This includes the substitution of imported goods for domestically produced goods.
- General technological change increased the productivity of many factors of production, including energy.
- From the mid-1970's to the early 1980's, increasing energy prices provided incentives to reduce energy use.

These same factors will be important in determining future energy efficiency. However, one factor which tends to counter these trends is increased electrification. As the share of electricity use increases, the energy/GNP ratio tends to increase (everything else constant) because of the larger energy losses associated with the generation and transmission of electricity. This is not completely compensated for by the increased end-use efficiency in electricity consumption.

In the base case of this forecast, oil and natural gas prices remain reasonably stable through 1990 and then increase moderately through 2000. The forecast for total energy consumption per real GNP dollar declines at an average annual rate of 1.3 percent between 1985 and 1990 and 1.4 percent between 1990 and 2000. Both of these decline rates are a little less than halfway between the long-term pre-embargo rate of 0.7 percent per year, and the cited post-embargo rate of 2.6 percent. Combined oil and natural gas consumption per r eal dollar of GNP is forecast to decline at an average rate of 2.0 percent between 1985 and 1990 and 1.8 percent between 1990 and 2000, compared to 4.0 percent during the post-embargo period of 1976 to 1985.

Figure 12. Energy Consumption and Average Annual Percentage Decline in Energy Consumption per Dollar of Gross National Product, 1910-2000



Sources: (1910-1948): U.S. Department of Commerce, Historical Statistics of the United States, Colonial Times to 1970, (1985); (1949-1985): Energy Information Administration, Annual Energy Review 1985, DOE/EIA-0384(85), (1986).

Another method of measuring the significance of energy in the economy is to examine energy expenditures as a percentage of total GNP. This measure represents the value of the energy input (as opposed to the quantity) and, therefore, represents the economic importance of energy used in the economy. In 1973, end-use energy expenditures accounted for 8.4 percent of total GNP but rose sharply in 1974 to 10.6 percent, and peaked in 1981 at 13.8 percent. By 1986, it will have declined to 8.8 percent of GNP. Between 1986 and 2000, energy expenditures as a percent of GNP are projected to rise again to 10.4 percent by the year 2000.

The Share of Electricity in the Residential and Commercial Sectors Should Continue to Increase

In 1986, consumption of electricity in the residential sector was about 2.8 quadrillion Btu or 32 percent of total residential energy consumption. In the commercial sector, it was about 2.4 quadrillion Btu or 39 percent of total commercial sector energy consumption. These shares and consumption levels resulted from a dramatic increase in electricity use in the residential and commercial sectors over the last quarter of the century. Since 1970 alone, the shares of electricity consumption have almost doubled (from just under 17 percent in the residential sector and from just over 22 percent in the commercial sector).

There are many reasons for these historically strong increases in the consumption of electricity. Foremost was the extension of a wide variety of electrical appliances into both residential and commercial structures. The use of electric appliances has shown dramatic increases because appliances are not only introduced with new housing but are added also to the existing housing stock. For example, from 1960 to 1980, the percentage of households using electric clothes dryers increased from 20 percent to 62 percent; those using color television increased from 0 to 90 percent; those using electric ranges increased from 37 to 69 percent; those using room air- conditioners increased from 15 to 56 percent; and those using dishwashers increased from 7 to 43 percent. Electric heating and central air-conditioning have grown also, but their growth is generally limited by the level of new building construction and some turnover in existing equipment. In 1985, the share of houses using electricity for heating was about 19 percent, but the percentage of new houses being built with electric heating was 56 percent. The share of existing homes with central air-conditioning was about 30 percent, but the percentage of new homes being built with central air- conditioning installed was 76 percent. In addition, the average size of the housing stock has steadily increased.

A further reason for the movement to electricity for heating and cooling is that new residential and commercial buildings are being built increasingly in the South and West regions of the United States. Although about 53 percent of existing houses were in the South and West Census regions in 1985, some 75 percent of all new units were constructed in those same regions that year. Traditionally, electric heating is used more intensively in those regions, and air-conditioning is considered almost a necessity (94 percent of all new housing built in the South had central air-conditioning). In the commercial sector, there has also been a movement towards buildings that use electricity more intensively, such as office and service buildings.

In the residential sector, electricity consumption is forecast to increase from 2.8 quadrillion Btu in 1986 to about 4 quadrillion Btu in 2000. This represents an increase in the share of electricity consumption in the residential sector from 31 to 39 percent, a considerably slower increase than in the previous 15 years. Between 1985 and 2000, commercial sector electricity consumption is forecast to increase from 2.4 quadrillion Btu to 3.4 quadrillion Btu, again a slower increase than in the previous 15 years.

Although some electric appliance markets are reaching high saturation levels, many have considerable room for expansion and others are just now introducing products (for example, microwave ovens, audio and video equipment, and computer equipment). Electric heating is being installed in new buildings at a high rate. Because of the popularity of electric heat pumps, it is expected that this trend will continue. The relative building boom in the South and West regions is expected to continue over the long run, leading to increased reliance on electricity for heating. Although the percentage of buildings and homes with central air-conditioning is already becoming large, there is still a lot of room for expansion. Furthermore, the price of electricity relative to natural gas is forecast to decrease considerably, although not as rapidly as it did in the recent past.

Industrial Output is Key to Future Energy Consumption Growth

In the past, energy consumption by the industrial sector has been the key in determining total energy use. The residential, commercial, and transportation sectors all have shown relatively stable energy use, while energy demand in the industrial sector has changed dramatically. Between 1979 (the year of peak energy use) and 1985, total energy use declined by 5.1 quadrillion Btu. The industrial sector accounted for more than the total decline as consumption in the residential and commercial sectors increased. This decline in industrial energy use was caused by two major factors. First, increasing technological change made the use of energy more efficient, so less energy was needed to produce the same amount of output. Second, and perhaps the more important, was the relative decline in output from the energy-intensive industries, such as primary metals; chemicals; stone, clay, and glass; paper; and food. The strong U.S. dollar and increasing commodity imports over this period also explain a large part of this decline.

Future demand for the output from these industries is likely to be the key to determining aggregate energy growth.

There are basically two views of the future for the energy-intensive industries. The first view is that output from these industries will remain static and that the United States will never return to a competitive role in these areas. The alternative view is that, after another year or two of consolidation, the energy-intensive industries in the United States will recover and long-term increases in output can be expected. In this report, the base case projections for energy use in the industrial sector lie somewhere between these two positions: slow but steady growth is assumed for all industries except for primary metals, which are assumed to continue to decline after 1990. These assumptions imply that the industrial sector will account for 40 percent of the growth in end-use energy consumption from 1985 to 2000. Substituting a higher annual growth rate (of 2.1 percent per year) in output for the energy intensive industries rather than the 1.5 percent assumed in the base case, would cause total industrial energy use to grow by 1.3 percent per year between 1985 and 2000, compared to the 0.7 percent in the base case.

New Technologies

Most New Technologies are Unlikely to be Adversely Affected by Low World Oil Prices Unless These Prices Persist for Many Years

Higher oil prices in the early 1970's triggered a flurry of research activity into how producers and consumers could use energy more efficiently. The result of this activity is starting to have some impact on new consumer goods, appliances, and industrial and commercial machinery. This summary presents a brief survey of the changes made in the forecast due to new technology assumptions.

Since most of the new technologies appearing today are the result of research and development (R&D) investment from many years ago and are genuine design improvements over existing equipment, they are not likely to be removed readily from the market place as a result of the 5 years of low oil prices assumed in this analysis. In many cases, the new appliances and machinery that dominate the current market (for example, residential and commercial heating and cooling equipment) are much more efficient than existing equipment. The current low prices will more likely affect the adoption of the "super high efficiency" appliances as opposed to the now standard "high efficiency" appliances. In all cases, however, the efficiency improvements of the new models over existing models is significant and it is anticipated that the present period of lower energy prices will not adversely affect their sales.

The most dramatic change in coal technology in the early 1990's will be the introduction of fluidized bed and gasified combined-cycle systems. Combined-cycle systems burn natural gas or petroleum fuels and coal to produce electricity and steam at high levels of efficiency. Combined-cycle units designed for coal can be purchased in two stages: first, a gas-fired unit, and then a simple form of coal gasifier. Low natural gas prices may encourage many plants to wait a few years before adding the coal gasifier, but by the year 2000 some efficient coal-based systems may be in place. Both of these new technologies have been demonstrated and may penetrate the market place in the 1990's. The effect of these two technologies is that industrial self-generation of electricity could rise from about 9 percent of industrial electricity use at present to 14 percent by the year 2000, the same percentage that existed in 1974. The AEO forecast for the year 2000 is a mid-point relative to alternative estimates.[4]

Looking to the year 2000, however, lower oil prices now may have a serious impact on future technologies capable of reducing oil imports. Methanol-powered vehicles could have a big effect, in principle, on future oil imports. The transportation sector accounts for over 60 percent of oil use in the United States, and much of the oil use in industry is for vehicles such as tractors and bulldozers. Low oil prices will certainly delay the introduction of vehicles powered by energy sources other than oil.

New technological developments in the automotive area are extensive and encouraging. However, changes in this forecast reflect improvements in current gasoline-using technologies only, largely because of the difficulties of introducing the infrastructure for a significantly different technology to the current market place.

Electrical technologies both for managing demand and for increasing use of electricity continue to produce innovations. Recent studies of demand management suggest that there is the potential for a peak load reduction of 3 to 25 percent, with a 6-percent reduction most likely.[5] However, comparisons of aggregate load curves over the last few years show that increases in peak load are imperceptible when examined at the regional level; consequently, this forecast assumes that

[4]Dun & Bradstreet Technical Economic Services, *Industrial Cogeneration Potential*,, DOE/CS/40403-1, August 1984. *EMF8 Summary Report*, Energy Modeling Forum, Stanford University, Palo Alto, CA, forthcoming.

[5] "Impact of Demand Management on Future Customer Electricity Demand," Electric Power Research Institute, EPRI EM-4815-SR, October 1986.

demand management will be an effective tool in eliminating peak load growth (relative to total growth) rather than reducing peak loads.

New technology natural gas boilers are already the basis for significant improvements in residential heating equipment where the gas industry has fought a technological war with electric heat pumps for a number of years. Lower natural gas prices have given a welcome initial boost to a number of new gas technologies with applications to commercial refrigeration and cogeneration now being marketed. Finally, a significant proportion of the proposed PURPA cogeneration units already discussed are gas-fired and will provide high efficiency joint generation of electricity and steam to industry users.

Role of Renewable Energy in the Energy Forecasts

The projections in this report implicitly assume that renewable energy sources other than hydropower will meet about the same level of energy demand in the future as they have over the past decade. If the use of renewable energy sources exceeds past levels, the forecast of conventional energy use will be slightly too high.

In 1985, renewable energy sources accounted for about 12 percent of the electric utility and 5 percent of end-use energy demand. Most of this renewable energy use was in the form of hydroelectric generation and the use of wood and wood by-products in the paper industry (Table 3). Less traditional energy sources such as wind and active solar and heating systems, however, did not account for a significant portion of total energy supply.

There may be potential for the long-term growth of renewable energy, but the components are small and, as a result, difficult to quantify. This forecast explicitly assumes some growth in biomass-fueled, small power plant production for industry and in central station hydro plants.

Table 3. Estimates of Renewable Energy Consumption, 1985
(Quadrillion Btu)

Renewable Fuels	Consumption
Central Electricity Input	3.1
Hydro	2.9
Geothermal	.2
Dispersed*	2.9
Wood	2.6
Other Biomass	.3
Total	6.0

*Only 1984 estimates are available.
Note: Other Biomass includes such energy sources as sewer gas and alcohol fuels.
Source: Energy Information Administration, Office of Energy Markets and End Use, Assumptions of Annual Energy Outlook, 1985 (forthcoming).

2. Comparison With Other Forecasts

The projections presented in the ***Annual Energy Outlook 1986*** reflect EIA's current understanding of world and domestic energy markets and changes that are likely to evolve in the future. This chapter compares the base case in the ***Annual Energy Outlook 1986*** (AEO-86) with the base case from the ***Annual Energy Outlook 1985*** (AEO-85) and with several other recently published forecasts.

The two major energy supply and demand projections considered for this analysis are published by Data Resources, Inc. (DRI), and Chase Econometric Associates, Inc. (Chase). These forecasts were selected for comparison because they cover all the major energy supply and demand sectors, and they are widely circulated and well documented. A comparison of projected energy balances are presented for 1995 and 2000, with the exception of the ***AEO-85*** which only extends through 1995.

In addition to a comparison of forecasts for total energy supply and demand, a limited number of projections developed by industry groups are considered with respect to the ***AEO-86*** to provide additional perspective on market expectations. The sources for these other projections include the National Petroleum Council, the National Coal Association and the North American Electric Reliability Council. The fuel-specific comparisons focus on 1995 in order to encompass each of these industry-sponsored studies, as well as the ***AEO-85.***

The following section discusses the principal similarities and differences among the alternative forecasts, starting with the key assumptions of economic growth and the path of world oil price. Differences between EIA's base case energy projections and the others are addressed in the aggregate as well as on a sector-by-sector basis.

Economic and Price Assumptions

Differences in projections of energy supply and demand can be attributed, in large part, to differences in expectations concerning world oil markets, and thus prices and domestic economic activity. Projections for some of the principal economic determinants of U.S. energy demand are presented in Table 4. Mid-range estimates of the world oil price are presented in Table 5 for the aggregate energy/economy forecasts as well for the fuel-specific forecasts.

Table 4. Comparison of the Principal Determinants of U.S. Energy Demand as Projected for 1995 and 2000

Determinant	1995				2000		
	AEO-85 (last year's projections)	AEO-86	DRI	CHASE	AEO-86	DRI	CHASE
Real GNP (billion 1982 dollars)	4,763	4,597	4,642	4,693	5,183	5,229	5,355
Real GNP Growth (percent change per year, 1986-1995)	2.9	2.5	2.6	2.7	2.5	2.5	2.6
Real Disposable Income (billion 1982 dollars)	3,355	3,163	3,216	3,268	3,529	3,570	3,691
New, High Grade Bond Rate (percent per year)	9.9	8.8	8.8	NA	8.7	8.8	NA
Industrial Output-Manufacturing (percent change per year, 1985 base)	3.0*	2.7*	3.0	2.7	2.6*	3.0	2.7

*Based on gross output, where the other output measures the Federal Reserve Index.
NA = Not available.
Source: Energy Information Administration, "Annual Energy Outlook 1985," DOE/EIA-0383(85) (Washington, DC, 1986); Data Resources, Inc., "Energy Review" (Lexington, MA Autumn 1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986).

The *AEO-86* assumptions for economic growth have declined from the previous year's *Annual Energy Outlook*, with real GNP growth averaging about 2.5 percent per year over the forecast period. Most forecasters expect industrial output to grow faster than overall activity, with growth closer to 3 percent per year. The *AEO-86* economic assumptions appear to be slightly less optimistic than the DRI and Chase forecasts, which may be attributed to the different oil price path assumptions.

The world oil price forecasts presented in Table 5 indicate a general agreement that the real price of crude oil in the year 2000 will fall below $36 per barrel in real terms, although there is a wide range of opinion as to how much below. There are also some significant differences in expectations with respect to how fast prices will rise during the interim years, with DRI's base case forecast of only $22 per barrel in 1995 compared to the *AEO-86* mid-case assumption of a $27 per barrel price. By the year 2000, both EIA and DRI forecast the price to be $33 per barrel. The National Petroleum Council does not forecast a midprice case, basing their projections on a high and a low oil price path instead. Their uppper price trend case is based on the assumption that world oil prices will reach $36 per barrel in 2000, with the lower price trend case based on a price of only $21 per barrel.

Table 5. World Oil Price Projections for 1995 and 2000

(1986 Dollars per Barrel)

	1995	2000
AEO-85 (last year's projections)	31	--
AEO-86	27	33
DRI	22	33
Chase	20	24
NPC	17-28	21-36
NCA	29	35

Source: Energy Information Administration, "Annual Energy Outlook 1985" DOE/EIA-0383(85) (Washington, DC, 1986); Data Resources, Inc., "Energy Review" (Lexington, MA, Autumn 1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986); National Petroleum Council, "U.S. Oil and Gas Outlook, An Interim Report of the National Petroleum Council" (Washington, DC, October 1986); National Coal Association, "Coal 2000" (Washington, DC, March 1986).

Demand Projections

The *AEO-86* projects a decline in the energy-GNP ratio from 20.2 thousand Btu per 1982 dollar of GNP in 1986 to 18.1 thousand Btu per dollar by 1995 and 16.8 thousand Btu per dollar by 2000. This drop can be, attributed, in large part to changes in the composition of economic activity, as well as to expected efficiency improvements as energy-consuming equipment is retrofitted or replaced over time. The *AEO-86* energy-to-GNP ratio is higher than that published in the *AEO-85*, but still falls slightly below the others. (Table 6).

The forecasts presented in Table 6 indicate either stable demands or modest growth in energy use during the forecast period for each of the major consuming sectors. For the residential and commercial sectors together, the demand projections range from 16 to 18 quadrillion Btu in 1995, compared to just under 15 quadrillion Btu in 1986. Higher incomes, a larger population, and the projected slowdown in energy price increases appear to be primarily responsible for the anticipated growth in demand. For the year 2000, Chase forecasts significantly higher total residential and commercial demand, particularly for natural gas.

For the industrial sector, energy demand is projected to rise to between 22 and 24 quadrillion Btu in 2000, up from 20 quadrillion Btu in 1986. It is interesting to note that there is much more agreement in this area than there had been when the *AEO-85* was published; at that time, the non-EIA projections for industrial energy use in 1995 ranged from 20 to 27 quadrillion Btu, with the *AEO-85* projection below 23 quadrillion Btu.

The *AEO-86* projects little change in aggregate transportation demand over the next 10 to 15 years. DRI, on the other hand, projects an increase of over 2 quadrillion Btu between 1986 and 2000. In the EIA forecast, motor gasoline is projected to decline by 1.6 quadrillion Btu over the next 15 years, while other transportation petroleum consumption is projected to rise by compensating amounts. DRI projects close to a 1 quadrillion Btu increase in motor gasoline demand, along with increased demands for the other transportation fuels. Differences in expected automobile efficiency account for much of the difference between the two sets of projections; DRI and EIA both project close to 1.5 percent per year growth in automobile travel.

The alternative projections for electric utility fuel consumption all indicate substantial increases in energy inputs. Projected demands for 2000 average close to 38 quadrillion Btu, up from nearly 27 quadrillion Btu in 1986. The Chase forecast for electric utility fuel consumption is somewhat higher than the others, particularly with respect to coal use.

Table 6. Projections of U.S. Energy Demand by Sector for 1995 and 2000

(Quadrillion Btu per year)

Sector	1995				2000		
	AEO-85 (last year's projections)	AEO-86	DRI	CHASE	AEO-86	DRI	CHASE
End-Use Consumption							
Residential and Commercial							
Oil and LPG	2.2	2.5	2.2	2.6	2.3	2.2	2.7
Natural Gas	7.8	7.5	7.0	8.6	7.3	6.7	9.1
Electricity	6.5	6.6	6.4	6.5	7.4	6.9	7.5
Other*	0.3	0.4	0.4	0.2	0.4	0.4	0.2
Total	16.7	16.9	16.1	17.9	17.4	16.3	19.5
Industrial							
Oil and LPG	8.8	8.2	8.9	8.6	8.5	9.5	8.9
Natural Gas	7.3	6.9	6.9	6.4	6.7	6.4	6.5
Coal	2.8	2.9	3.5	3.3	3.1	3.9	3.6
Electricity	3.8	3.8	3.6	3.8	4.1	4.1	4.2
Total	22.7	21.9	22.9	22.1	22.5	23.9	23.2
Transportation							
Oil and LPG	19.8	19.8	21.6	20.5	20.5	22.2	21.0
Natural Gas	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total	20.3	20.3	22.2	21.0	21.0	22.7	21.5
Electric Utility							
Oil	1.7	1.9	1.6	1.4	3.2	1.7	1.5
Natural Gas	3.8	3.7	3.4	4.1	4.0	4.3	4.7
Coal	18.4	18.6	17.7	19.6	20.3	19.8	22.8
Nuclear Power	6.6	6.4	6.2	5.0	6.7	6.3	5.5
Other**	4.3	3.8	4.8	4.2	3.9	5.0	4.7
Total	34.9	34.4	33.7	34.3	38.1	37.1	39.1
Total End-Use Consumption	59.7	59.1	61.2	61.0	60.8	62.9	64.2
Primary Energy Consumption	84.3	83.1	85.0	85.0	87.3	89.0	90.6
Primary Energy/GNP Ratio (thousand Btu per 1982 dollar)	17.7	18.1	18.3	18.1	16.8	17.0	16.9

*Includes residential kerosene and steam coal consumption plus commercial kerosene, liquefied petroleum gas, and steam coal consumption.

**Includes hydroelectric, geothermal, and other (wood, wastes, solar, wind) and net imports.

Source: Energy Information Administration, "Annual Energy Outlook 1985", DOE/EIA-0338(85) (Washington, DC, 1986); Data Resources, Inc., "Energy Review" (Lexington, MA, Autumn 1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986).

Supply and Price Projections

The Energy Information Administration projects total domestic energy production to rise slowly over the forecast period from 65 quadrillion Btu in 1986 to 67 quadrillion Btu in year 2000 (Table 7). This overall increase in total production is expected to occur despite a substantial reduction in crude oil production, principally because of offsetting increases in coal output. DRI's domestic production forecast is similar to EIA's, while Chase stands apart with much lower oil supply estimates.

The comparison of projected petroleum supply and demand balances featured in Table 8 shows a broad range of opinion with respect to the composition of total oil supply for 1995. With domestic production projected to be as low as 6.5 million barrels per day (Chase) and as high as 9.1 million barrels per day (National Petroleum Council upper price trend case), the *AEO-86* falls on the higher side of the range. Projected dependence on petroleum imports varies inversely with the anticipated level of domestic production; the *AEO-86* projection of 8.2 million barrels per day of total net imports is lower than all but the National Petroleum Council's upper price case forecast for 1995. There is considerable disagreement as to the extent to which product imports will substitute for crude imports, with the petroleum product import projections ranging from less than 1 million barrels per day to close to 5 million barrels per day.

Crude oil prices are expected to recover slowly from the low levels hit in 1986. Petroleum product prices are expected to follow suit, although changes in the composition of refinery output are expected to result in varying rates of change for the different product prices. Specifically, the EIA forecasts real motor gasoline prices to remain well below the 1985 level of $1.15 (1986 dollars) per gallon through 1995, while distillate heating oil prices are expected to meet and exceed the 1985 price of $0.98 per gallon. This is

Table 7. Comparison of Base Case Energy Supply and Disposition Projections for 1995 and 2000

(Quadrillion Btu per Year)

Total Supply and Disposition	1995				2000		
	AEO-85 (last year's projections)	AEO-86	DRI	Chase	AEO-86	DRI	Chase
Domestic Energy Production							
Oil	15.3	15.0	15.8	11.6	13.7	13.9	11.4
Natural Gas	17.5	17.3	15.6	16.4	16.7	15.3	16.1
Coal	24.3	24.5	23.8	24.8	26.4	26.6	29.3
Nuclear Power	6.6	6.4	6.2	5.0	6.7	6.3	5.5
Hydroelectric/ Geothermal/Other	3.4	3.2	4.3	3.7	3.2	4.5	4.1
Total	68.3	66.4	65.7	61.5	66.8	66.6	66.3
Net Imports							
Oil	16.3	17.3	20.1	21.6	20.6	23.1	22.7
Natural Gas	2.5	1.8	2.5	2.0	2.4	2.8	2.2
Coal, Coke, and Electricity	(1.9)	(2.0)	(1.5)	(3.0)	(2.0)	(1.8)	(4.0)
Total Available Supply*	84.3	83.1	85.0	85.0	87.3	89.0	90.6
Consumption							
Petroleum Products	32.5	32.6	33.1		34.7	35.8	34.1
Natural Gas	19.4	18.6	19.6		18.5	17.8	19.8
Coal	21.5	21.7	23.1		23.6	23.9	26.6
Nuclear Power	6.6	6.4	5.0		6.7	6.3	5.5
Hydroelectric Power/Other	4.3	3.8	4.2		3.9	5.2	4.7
Total	84.3	83.1	85.0		87.3	89.0	90.6

*Total available supply is defined to include domestic production plus net imports, stocks changes, and other adjustments involved in equating total available

Source: Energy Information Administration, "Annual Energy Outlook 1985", DOE/EIA-0383(85) (Washington, DC, 1986); Data Resources, Inc., "Energy Review" (Lexington, MA, Autumn 1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986).

Table 8. Comparison of Petroleum Supply, Demand, and Price Projections for 1995

Supply, Demand, and Prices	AEO-85 (last year's projections)	AEO-86	DRI	Chase	NPC***
Primary Supply		(million barrels per day)			
Domestic Production					
Crude Oil	6.5	6.0	6.4	4.9	7.0-5.7
Natural Gas Liquids	1.7	1.7	1.1	0.9	2.1-2.5
Other/Processing Gain	0.6	0.6	0.5	0.7	*
Total	8.8	8.3	8.0	6.5	9.1-8.2
Net Imports					
Crude Oil	6.4	6.5	4.7	9.4	NA
Refined Products	1.3	1.7	4.8	0.8	NA
Total	7.7	8.2	9.5	10.2	7.9-11.4
Total Supply	16.5	16.5	17.5	15.5	17.0-19.0
Consumption by Fuel Type		(million barrels per day)			
Motor Gasoline	7.0	6.3	7.3	7.5	NA
Jet Fuel	1.2	1.4	1.5	1.6	NA
Distillate Fuel Oil	3.4	3.3	3.2	3.2	NA
Residual	1.0	1.7	1.7	1.3	NA
All Other	3.9	3.7	3.8	2.5	NA
Total	16.5	16.5	17.5	15.5	NA
Petroleum Prices		(1986 dollars)			
Motor gasoline (all grades) (dollars per gallon)	1.20	1.08	1.11	0.63	NA
Distillate (residential heating) (dollars per gallon)	1.16	1.00	0.82**	0.77	NA
Residual Fuel Oil (industrial) (dollars per barrel)	30.71	23.90	21.34**	17.84	NA

*Included under natural gas liquids.
**Adjusted for differences in prices series based on reported history.
***Upper price trend to lower price trend range.
Source: Energy Information Administration, "Annual Energy Outlook 1985", DOE/EIA-0383(85) (Washington, DC, 1986); Data Resources, Inc., "Energy Review" (Lexington, MA, Autumn 1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986); National Petroleum Council, U.S. Oil and Gas Outlook, An Interim Report of the National Petroleum Council (Washington, DC, October 1986).

consistent with EIA's projection that motor gasoline demand will be declining, while distillate demand will be rising. Differences between EIA's and DRI's petroleum product price projections can be attributed to differences in the assumed crude oil price path, as well as differences in the anticipated refinery slate. Chase's petroleum product prices are much lower, corresponding to an anticipated $20 per barrel crude oil price for 1995.

The range of forecasts for natural gas supply and demand, presented in Table 9, generally indicates a decline, or a constant level at best, in domestic natural gas output. EIA's production forecast is higher and import forecast lower than the other projections, corresponding to a higher natural gas wellhead price. The *AEO-86* also forecasts considerably higher end-use prices for 1995 compared to the other projections, but this does not result in commensurately lower end-use demand. The fact that both EIA's natural gas price and demand projections are higher than DRI's may be attributed, in part, to EIA's higher oil price forecast, which would act to discourage switching from natural gas to oil.

The *AEO-86* projection for total electricity generation in 1995 is similar to the current Chase forecast, and essentially unchanged from the *AEO-85,* as indicated in Table 10. The North American Electric Reliability Council projects a lower total generation forecast, as well as a different fuel use profile, compared to the other forecasts. The Council's projection, which represents the sum total of the forecasts developed by the individual utilities, suggests a significant increase in the share of nuclear power at the expense of the fossil fuels. In contrast, Chase forecasts essentially no change in the level of nuclear power generation compared to 1986; EIA and DRI forecast some growth in nuclear generation, but only a small increase in the share of nuclear power relative to the others. Electricity prices are projected to decline in real terms, with EIA, DRI, and Chase all forecasting the average price to consumers to fall below 6 cents per kilowatthour, compared to 6.7 cents per kilowatthour reported for 1986.

Coal production is projected to rise primarily in response to increasing demand from electric utilities. Table 11 shows that the EIA, DRI, and Chase production forecasts all exceed 1100 million tons, up from 890 million tons in 1986. In contrast, the National Coal Association forecasts less growth; their outlook for coal markets is based on lower anticipated growth rates for total electricity generation. Specifically, the National Coal Association forecasts a 2.3-percent-per-year rise in electricity output between 1986 and 1995, while EIA forecasts a 2.9-percent-per-year increase.

Table 9. Comparison of Natural Gas Demand, Supply, and Price Projections for 1995

Supply, Demand, and Prices	AEO-85 (last year's projections)	AEO-86	DRI	Chase	NPC*
		(trillion cubic feet)			
Supply					
Domestic Production	16.6	16.8	15.1	15.9	13.3-15.2
Net Imports	2.9	1.8	2.6	2.0	2.2
Total**	19.4	18.6	17.7	17.9	15.5-17.3
		(trillion cubic feet)			
End-Use Consumption					
Residential	4.8	4.6	4.1	5.3	NA
Commercial	2.7	2.7	2.6	3.3	NA
Industrial***	7.0	6.7	6.7	6.4	NA
Electric Utility	3.7	3.6	3.3	4.1	NA
Total****	18.3	17.6	16.7	19.1	15.5-17.3
		(1986 dollars per thousand cubic feet)			
Natural Gas Prices					
Average Wellhead Price	4.13	3.93	2.37*****	2.05	NA
End-Use Prices					
Residential	7.90	7.58	5.75	4.61	NA
Commercial	7.18	6.76	5.16	4.28	NA
Industrial	6.14	5.47	3.49	3.55	NA
Electric Utility	5.23	4.60	3.23	3.02	NA
Average End-Use	6.60	6.07	4.31	3.85	NA

*Lower price trend to upper price range.
**Total supply defined was dry gas production plus supplemental supplies, net imports, and net stock withdrawals.
***Consumption by industrial sector includes lease and plant fuel.
****Natural gas used as pipeline compressor fuel excluded from end-use demands.
*****Average acquisition price from producer to pipeline. In 1986, the average acquisition price was $1.57 per thousand cubic feet (1986 dollars) compared to $1.73 for the average wellhead price.
NA = Not available.
Sources: Data Resources, Inc., "Energy Review" (Lexington, MA, Autumn 1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986); National Petroleum Council, U.S. Oil and Gas Outlook, An Interim Report of the National Petroleum Council (Washington, DC, October 1986).

Table 10. Comparison of Electricity Supply, Demand, and Price Projections for 1995

Supply, Demand, and Prices	AEO-85 (last year's projections)	AEO-86	DRI	Chase	NERC
		(billion kilowatthours per year)			
Generation by Fuel Type					
Coal	1,790	1,805	1,699	1,870	1,588
Natural Gas	340	334	311	374	253
Oil	161	174	149	151	125
Nuclear	606	586	571	397	636
Hydropower/Other	328	307	397	426	254
Total	3,225	3,207	3,126	3,218	2,979
		(billion kilowatthours per year)			
Sales by End-Use Sector					
Residential	1,022	1,050	1,001	1,083	NA
Commercial/Other	891	886	868	886	NA
Industrial	1,113	1,112	1,069	1,049	NA
Total	3,026	3,048	2,952	3,012	NA
		(1986 dollars per kilowatthour)			
Price by End-Use Sector					
Residential	0.064	0.062	0.064	0.078	NA
Commercial	0.066	0.062	0.060	0.074	NA
Industrial	0.054	0.054	0.044	0.054	NA
All Sectors	0.061	0.059	0.055	0.069	NA

NA = Not available.

Source: Energy Information Administration, "Annual Energy Outlook 1985" DOE/EIA-0383(85) (Washington, DC, 1986); Data Resources, Inc., "Energy Review" (Lexington, MA, Autumn 1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986); North American Electric Reliability Council, 1986 Electricity Supply and Demand, (Princeton, NJ, October 1986).

Table 11. Comparison of Coal Supply, Demand, and Price Projections for 1995

Supply, Demand, and Prices	AEO-85 (last year's projections)	AEO-86	DRI	Chase	NCA
			(million short tons)		
Production					
Total	1,116	1,126	1,103	1,138	1,051
Net Exports	102	100	91	87	92
			(million short tons)		
Domestic Consumption					
Electric Utilities	882	887	844	934	821
Industrial					
Metallurgical	32	31	42	33	43
Steam	87	95	110	100*	99*
Residential/Commercial	7	7	8	NA	NA
Total**	1,008	1,021	1,004	1,073	963
			(1986 dollars per short ton)		
Average Delivered Price	40.93	39.64	34.63	33.71	NA

*Includes synthetic gas manufacture.
NA = Not available.
Source: Energy Information Administration, "Annual Energy Outlook 1985", DOE/EIA-0383(85) (Washington, DC, 1986); Data Resources, Inc., "Energy Review" (Lexington, MA, Autumn (1986); Chase Econometric Associates, Inc., "Energy Analysis Quarterly" (Bala Cynwyd, PA, Third Quarter 1986); National Coal Association, Coal 2000(Washington, DC, March 1986).

Appendix A

Base Case Forecasts

Base Case Forecasts

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

Total Supply and Disposition	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production											
Crude Oil and Lease Condensate	20.4	17.7	18.2	19.0	18.6	18.3	17.6	16.7	15.7	12.7	11.5
Natural Gas Plant Liquids	2.5	2.4	2.3	2.2	2.2	2.2	2.4	2.3	2.4	2.3	2.2
Natural Gas[1]	21.7	19.6	20.1	17.1	17.0	16.9	17.7	17.2	17.5	17.3	16.7
Coal[2]	14.6	15.0	18.6	19.3	19.5	20.1	20.9	21.1	21.5	24.5	26.4
Nuclear Power	.2	1.9	2.7	4.2	4.4	4.9	5.4	5.7	6.0	6.4	6.7
Hydropower/Other[3]	2.6	3.2	3.0	3.1	3.2	3.4	3.1	3.1	3.1	3.2	3.2
Total Production	**62.1**	**59.9**	**64.9**	**64.9**	**65.0**	**65.8**	**67.1**	**66.2**	**66.2**	**66.4**	**66.8**
Imports											
Crude Oil[4]	2.8	8.7	11.2	6.8	8.6	8.7	9.2	10.0	11.1	14.2	16.3
Petroleum Products[5]	4.7	4.2	3.5	3.8	3.8	4.1	3.9	3.9	4.0	4.7	5.9
Natural Gas[6]	.8	.9	1.0	.9	.7	.9	.6	1.0	1.0	1.8	2.4
Other Imports[7]	.0	.1	.3	.5	.5	.5	.5	.6	.6	.7	.9
Total Imports	**8.3**	**14.0**	**15.9**	**12.0**	**13.6**	**14.2**	**14.2**	**15.6**	**16.8**	**21.3**	**25.4**
Exports											
Coal	1.9	1.8	2.4	2.4	2.3	2.3	2.4	2.4	2.5	2.7	2.9
Crude Oil and Petroleum Products	.5	.4	1.2	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Other[8]	.1	.0	.1	NA	NA	NA	NA	NA	NA	NA	NA
Total Exports	**2.5**	**2.2**	**3.6**	**4.1**	**3.9**	**3.9**	**4.0**	**4.0**	**4.1**	**4.3**	**4.5**
Net Stock Withdrawals	**-.9**	**-1.2**	**-.8**	**1.0**	**-.1**	**.0**	**-.2**	**-.1**	**-.2**	**-.2**	**-.2**
Adjustments[9]	-.4	.1	-.4	.2	-.3	-.1	-.1	-.1	-.1	-.1	-.1
Consumption											
Petroleum Products[10]	29.5	32.7	34.2	30.9	31.8	32.2	31.7	31.7	31.8	32.6	34.7
Natural Gas	21.8	19.9	20.4	17.9	17.1	17.4	17.9	17.8	18.1	18.6	18.5
Coal	12.3	12.7	15.4	17.5	17.4	17.8	18.5	18.7	19.1	21.7	23.6
Nuclear Power	.2	1.9	2.7	4.2	4.4	4.9	5.4	5.7	6.0	6.4	6.7
Hydroelectric Power/Other[11]	2.6	3.3	3.2	3.5	3.7	3.8	3.5	3.6	3.6	3.8	3.9
Total Consumption	**66.5**	**70.6**	**76.0**	**73.9**	**74.3**	**76.1**	**77.0**	**77.5**	**78.6**	**83.1**	**87.3**

[1] Net dry marketed production after removal of nonhydrocarbon gases, plus supplemental natural gas.
[2] Historical coal production includes anthracite, bituminous, and lignite. Projected coal production (1986-2000) includes bituminous and lignite, with anthracite included in bituminous.
[3] Includes hydropower, geothermal power, and wood waste.
[4] Includes imports of crude oil for the Strategic Petroleum Reserve.
[5] Includes imports of unfinished oils and natural gas plant liquids.
[6] Includes dry natural gas imports from Canada and Mexico, and liquefied natural gas imports from Algeria. In both the historical and forecast periods, natural gas imports are net imports.
[7] Includes electricity, coal, and coal coke imports.
[8] Includes electricity and coal coke exports. Gas exports are not included.
[9] Balancing item that includes stock changes, gains, losses, miscellaneous blending components, unaccounted for supply, anthracite shipped overseas to U.S. Armed Forces, and certain secondary stock withdrawals.
[10] Includes natural gas plant liquids and crude oil consumed as a fuel.
[11] Includes industrial generation of hydroelectric power, net electricity imports, and electricity produced from geothermal, wood, waste, wind, photovoltaic, solar thermal sources connected to electric utility distribution systems. Also includes net coke imports.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical quantities are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 5-13, Tables 1, 2, 3, and 5. Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 16, 1987.

Table A2. Consumption of Energy by Source and End-Use Sectors
(Quadrillion Btu per Year)

Sector and Fuel	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Residential											
Distillate Fuel	1.88	1.81	1.32	0.97	0.98	1.02	1.06	1.09	1.10	1.02	0.87
Liquefied Petroleum Gas	.58	.53	.33	.38	.38	.40	.40	.40	.40	.40	.40
Natural Gas	4.99	5.02	4.87	4.58	4.47	4.56	4.64	4.71	4.76	4.75	4.56
Other Residential[1]	.45	.25	.17	.14	.14	.14	.14	.14	.13	.13	.12
Electricity	1.59	2.01	2.45	2.70	2.76	2.82	2.91	3.00	3.09	3.58	4.02
Total	**9.49**	**9.61**	**9.12**	**8.77**	**8.73**	**8.94**	**9.15**	**9.33**	**9.48**	**9.87**	**9.96**
Commercial											
Distillate Fuel	.59	.59	.52	.69	.69	.73	.74	.75	.75	.74	.68
Motor Gasoline	.09	.09	.11	.11	.11	.11	.11	.11	.11	.11	.10
Residual Fuel	.71	.49	.56	.19	.20	.20	.20	.20	.20	.20	.20
Natural Gas[2]	2.47	2.56	2.67	2.51	2.45	2.49	2.54	2.56	2.60	2.74	2.73
Other Commercial[3]	.38	.27	.19	.28	.28	.28	.28	.28	.28	.27	.26
Electricity	1.20	1.60	1.91	2.36	2.41	2.46	2.51	2.54	2.59	3.01	3.42
Total	**5.44**	**5.59**	**5.95**	**6.13**	**6.15**	**6.28**	**6.38**	**6.44**	**6.53**	**7.07**	**7.39**
Industrial[4]											
Distillate Fuel	1.23	1.34	1.32	1.19	1.20	1.26	1.26	1.27	1.29	1.41	1.56
Liquefied Petroleum Gas	.98	1.15	1.58	1.60	1.58	1.65	1.69	1.71	1.74	1.89	2.02
Motor Gasoline	.29	.22	.16	.16	.17	.17	.17	.17	.18	.18	.20
Petrochemical Feedstocks[5]	.56	.65	1.43	.75	.76	.77	.77	.76	.75	.68	.60
Residual Fuel	1.62	1.51	1.35	.76	.80	.81	.78	.78	.79	.79	.86
Natural Gas[6]	9.54	8.53	8.39	7.09	6.97	7.16	7.29	7.19	7.22	6.92	6.70
Metallurgical Coal	2.59	2.24	1.79	1.10	1.02	1.02	1.01	.98	.96	.84	.71
Steam Coal	2.08	1.43	1.37	1.65	1.70	1.74	1.81	1.87	1.93	2.10	2.41
Other Industrial[7]	3.07	3.30	3.66	3.22	3.19	3.37	3.33	3.30	3.30	3.21	3.22
Hydropower	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
Purchased Electricity	1.95	2.35	2.78	2.81	2.88	2.94	3.03	3.10	3.21	3.79	4.14
Total	**23.93**	**22.74**	**23.85**	**20.38**	**20.29**	**20.92**	**21.18**	**21.17**	**21.40**	**21.87**	**22.46**
Transportation											
Distillate Fuel	1.57	2.12	2.79	3.16	3.19	3.34	3.39	3.42	3.45	3.77	4.23
Jet Fuel[8]	1.97	2.03	2.18	2.50	2.66	2.72	2.82	2.85	2.93	2.95	3.13
Motor Gasoline	10.72	12.49	12.38	12.83	13.20	13.14	12.95	12.70	12.61	11.75	11.60
Residual Fuel	.76	.71	1.40	.80	.84	.85	.89	.92	.95	1.08	1.23
Natural Gas[9]	.74	.59	.65	.52	.50	.50	.53	.52	.52	.51	.50
Other Transportation[10]	.29	.27	.26	.27	.11	.22	.23	.23	.24	.26	.28
Total	**16.05**	**18.22**	**19.67**	**20.09**	**20.50**	**20.79**	**20.80**	**20.64**	**20.70**	**20.33**	**20.98**
Electric Utilities											
Distillate Fuel	.14	.23	.17	.09	.05	.04	.00	.01	.01	.14	.26
Residual Fuel	1.98	2.94	2.46	1.00	1.42	1.11	.69	.78	.82	1.74	2.98
Natural Gas	4.05	3.24	3.81	3.16	2.68	2.67	2.93	2.86	2.98	3.72	4.02
Steam Coal	7.23	8.79	12.12	14.54	14.49	14.89	15.44	15.63	15.99	18.62	20.28
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.69	5.97	6.39	6.71
Hydropower/Other[11]	2.64	3.26	3.20	3.50	3.63	3.80	3.51	3.58	3.63	3.75	3.87
Total	**16.27**	**20.35**	**24.51**	**26.45**	**26.65**	**27.37**	**27.96**	**28.55**	**29.38**	**34.35**	**38.13**
Primary Energy Consumption[12]											
Distillate Fuel[13]	5.40	6.08	6.12	6.10	6.11	6.40	6.45	6.53	6.60	7.08	7.61
Jet Fuel	1.97	2.03	2.18	2.50	2.66	2.72	2.82	2.85	2.93	2.95	3.13
Liquefied Petroleum Gas	1.69	1.81	1.98	2.10	2.08	2.16	2.20	2.23	2.26	2.41	2.55
Motor Gasoline	11.09	12.80	12.65	13.10	13.48	13.42	13.23	12.99	12.90	12.04	11.90
Petrochemical Feedstocks	.56	.65	1.43	.82	.76	.77	.77	.76	.75	.68	.60
Residual Fuel[14]	5.08	5.65	5.78	2.77	3.26	2.97	2.57	2.68	2.76	3.82	5.27
Other Petroleum	3.75	3.72	4.08	3.62	3.42	3.71	3.67	3.64	3.64	3.57	3.59
Natural Gas	21.79	19.95	20.39	17.85	17.07	17.39	17.92	17.84	18.08	18.64	18.52
Metallurgical Coal	2.59	2.24	1.79	1.10	1.02	1.02	1.01	.98	.96	.84	.71
Steam Coal	9.68	10.42	13.64	16.38	16.37	16.81	17.44	17.68	18.10	20.88	22.84
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.69	5.97	6.39	6.71
Hydropower/Other[11]	2.67	3.29	3.23	3.53	3.67	3.83	3.54	3.61	3.66	3.78	3.90
Total Consumption	**66.44**	**70.55**	**75.95**	**73.94**	**74.26**	**76.06**	**77.02**	**77.48**	**78.60**	**83.09**	**87.33**
Electricity Consumption (all sectors)	**4.75**	**5.96**	**7.15**	**7.88**	**8.06**	**8.24**	**8.46**	**8.64**	**8.90**	**10.40**	**11.59**
Industrial Electricity											
Gross Consumption	1.95	2.35	2.78	3.08	3.15	3.22	3.33	3.42	3.56	4.29	4.80
Self-generation - Own Use[15]	NA	NA	NA	.27	.27	.28	.30	.32	.35	.50	.66
Purchased Electricity	1.95	2.35	2.78	2.81	2.88	2.94	3.03	3.10	3.21	3.79	4.14

See footnotes at end of Appendix C.

Sources: Historical quantities are taken from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*, DOE/EIA-0214(84) (Washington, DC, 1986) and the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986). Historical quantities are through 1985. Projected quantities are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 21, 1987.

Table A3. Price of Energy by Source and End-Use Sectors
(1986 Dollars per Million Btu)

Sector and Fuel	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Residential	**5.78**	**7.39**	**10.07**	**11.03**	**10.04**	**10.01**	**9.97**	**10.00**	**10.08**	**11.30**	**13.02**
Primary Energy	3.36	4.10	6.07	6.41	5.27	5.24	5.26	5.40	5.58	7.43	9.14
Petroleum Products	4.23	5.85	9.68	7.78	4.49	4.74	4.94	5.19	5.44	7.94	9.86
Distillate Fuel	3.77	5.28	9.35	7.74	4.46	4.71	4.91	5.16	5.40	7.90	9.81
Kerosene	4.18	6.05	11.08	7.95	4.66	4.92	5.11	5.36	5.61	8.11	10.02
Liquefied Petroleum Gas	5.75	7.75	10.56	7.84	4.55	4.80	5.00	5.25	5.50	8.01	9.94
Natural Gas	2.89	3.22	4.80	6.08	5.57	5.45	5.41	5.52	5.68	7.35	9.01
Steam Coal[1]	3.06	4.74	3.88	1.99	1.97	2.00	2.01	2.02	2.05	2.23	2.31
Electricity	17.78	19.84	20.99	21.41	20.34	20.36	20.09	19.71	19.39	18.07	18.76
Commercial	**5.36**	**7.93**	**10.56**	**11.78**	**10.76**	**10.77**	**10.71**	**10.64**	**10.65**	**11.41**	**12.98**
Primary Energy	2.14	3.22	5.36	5.57	4.44	4.41	4.42	4.54	4.70	6.34	7.81
Petroleum Products	2.43	4.61	7.52	6.16	3.66	3.84	3.97	4.15	4.34	6.20	7.62
Distillate Fuel	3.00	4.68	8.60	6.14	3.62	3.82	3.97	4.17	4.37	6.34	7.88
Residual Fuel	1.21	3.67	5.49	4.21	2.53	2.57	2.59	2.70	2.80	3.98	4.85
Other Petroleum[2]	4.59	6.42	10.42	7.54	4.58	4.79	4.96	5.16	5.37	7.48	9.04
Natural Gas[3]	2.04	2.55	4.42	5.45	4.92	4.80	4.74	4.84	4.99	6.55	8.10
Steam Coal[4]	1.23	2.52	2.06	1.99	1.97	1.99	2.01	2.01	2.04	2.23	2.30
Electricity	16.72	19.68	21.61	21.73	20.56	20.62	20.42	20.03	19.70	18.25	18.99
Industrial	**2.15**	**4.19**	**6.17**	**6.67**	**5.41**	**5.55**	**5.60**	**5.72**	**5.85**	**7.12**	**8.33**
Primary Energy	1.51	3.11	4.85	4.32	2.95	3.15	3.22	3.38	3.53	5.02	6.22
Petroleum Products	2.24	4.44	7.06	5.83	3.34	3.78	3.95	4.15	4.32	6.07	7.38
Distillate Fuel	1.96	4.29	7.38	6.13	3.61	3.81	3.96	4.16	4.36	6.32	7.85
Kerosene	2.10	4.50	8.39	6.50	3.90	4.11	4.27	4.47	4.67	6.71	8.30
Liquefied Petroleum Gas	3.12	4.89	6.89	6.50	3.84	4.05	4.21	4.42	4.62	6.70	8.31
Motor Gasoline[5]	7.78	8.96	13.09	9.30	5.71	5.92	6.12	6.30	6.52	8.74	10.27
Residual Fuel	1.25	3.68	4.93	3.98	2.15	2.21	2.36	2.47	2.59	3.80	4.60
Other Petroleum[6]	1.96	4.29	7.38	5.49	3.03	3.89	4.07	4.28	4.43	5.88	6.93
Natural Gas[7]	1.04	1.82	3.35	3.96	3.07	3.09	3.09	3.27	3.47	5.31	7.03
Metallurgical Coal	1.23	3.17	2.80	2.08	2.07	2.09	2.11	2.12	2.16	2.38	2.45
Steam Coal	1.19	2.46	2.09	1.73	1.71	1.73	1.75	1.77	1.80	2.01	2.14
Electricity	8.16	11.67	14.42	18.95	17.93	17.95	17.72	17.35	17.04	15.68	16.36
Transportation	**6.31**	**7.77**	**11.48**	**8.64**	**5.19**	**5.44**	**5.62**	**5.81**	**6.02**	**8.19**	**9.75**
Primary Energy	6.31	7.76	11.48	8.64	5.18	5.44	5.62	5.80	6.01	8.19	9.75
Petroleum Products	6.31	7.76	11.48	8.64	5.18	5.44	5.62	5.80	6.01	8.19	9.75
Distillate Fuel[8]	3.57	5.39	9.58	8.60	4.91	5.18	5.40	5.68	5.95	8.70	10.79
Jet Fuel[9]	1.98	3.94	8.47	6.11	3.91	4.09	4.23	4.41	4.59	6.36	7.75
Motor Gasoline[5]	7.74	8.95	13.11	9.23	5.67	5.88	6.08	6.26	6.47	8.67	10.18
Residual Fuel[10]	1.04	3.33	4.41	4.09	2.03	2.11	2.36	2.49	2.62	3.98	4.82
Other Petroleum[11]	9.39	10.85	18.25	12.00	6.00	6.35	6.69	7.00	7.35	11.07	13.61
Electricity	12.53	23.24	19.75	21.15	19.90	19.92	19.77	19.36	19.03	17.52	18.32
Total Energy	**4.45**	**6.42**	**9.17**	**8.77**	**6.74**	**6.88**	**6.96**	**7.09**	**7.22**	**8.79**	**10.25**
Primary Energy -- Four Sectors	3.50	5.09	7.74	6.65	4.41	4.57	4.67	4.84	5.02	6.86	8.31
Electricity	13.62	16.66	18.67	20.63	19.54	19.57	19.33	18.95	18.63	17.26	17.98
Electric Utilities											
Fossil Fuel Average	**.87**	**2.02**	**2.60**	**2.16**	**1.81**	**1.84**	**1.80**	**1.83**	**1.88**	**2.42**	**2.86**
Petroleum Products	1.14	3.86	5.78	4.43	2.49	2.56	2.52	2.65	2.79	4.33	5.48
Distillate Fuel[12]	1.49	4.24	7.63	6.02	3.56	3.76	3.89	4.02	4.20	6.14	7.69
Residual Fuel	1.12	3.83	5.66	4.36	2.45	2.51	2.51	2.64	2.78	4.19	5.28
Natural Gas	.76	1.44	2.92	3.53	2.53	2.71	2.49	2.63	2.75	4.43	5.71
Steam Coal	.84	1.58	1.80	1.69	1.61	1.63	1.64	1.65	1.67	1.82	1.88
Average Price to All Users											
Petroleum Products	4.74	6.50	9.84	7.95	4.69	4.99	5.20	5.39	5.59	7.59	8.97
Distillate Fuel[8]	3.16	5.01	8.92	7.68	4.42	4.67	4.88	5.12	5.36	7.81	9.71
Jet Fuel	1.98	3.94	8.47	6.11	3.91	4.09	4.23	4.41	4.59	6.36	7.75
Kerosene	3.24	5.25	9.29	6.92	4.12	4.34	4.51	4.72	4.94	7.10	8.75
Liquefied Petroleum Gas	4.04	5.75	7.51	6.81	4.00	4.22	4.39	4.61	4.82	6.98	8.66
Motor Gasoline[5]	7.74	8.95	13.11	9.23	5.67	5.88	6.08	6.26	6.47	8.67	10.18
Residual Fuel	1.16	3.71	5.18	4.17	2.28	2.32	2.42	2.54	2.67	4.04	5.05
Other Petroleum Products[13]	4.59	6.26	8.80	10.18	4.19	6.81	7.11	7.57	7.92	11.14	14.03
Natural Gas	1.61	2.28	3.82	4.71	4.01	3.99	3.92	4.07	4.23	5.89	7.43
Coal	1.02	1.99	1.95	1.72	1.65	1.67	1.68	1.69	1.71	1.86	1.93
Electricity	13.62	16.66	18.67	20.63	19.54	19.57	19.33	18.95	18.63	17.26	17.98

See footnotes at end of Appendix C.

Sources: Historical prices through 1985 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986), pp. 5-6. Prices for 1985 are preliminary. Prices for 1986 are estimated. All other prices are forecasts from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 21, 1987.

Table A4. Electric Utility Fuel Consumption and Electricity Sales
(Quadrillion Btu per Year)

Fuel Consumption and Sales	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Fuel Inputs											
Oil											
Distillate	0.14	0.23	0.17	0.09	0.05	0.04	0.00	0.01	0.01	0.14	0.26
Residual	1.98	2.94	2.46	1.00	1.42	1.11	.69	.78	.82	1.74	2.98
Natural Gas	4.05	3.24	3.81	3.16	2.68	2.67	2.93	2.86	2.98	3.72	4.02
Steam Coal	7.23	8.79	12.12	14.54	14.49	14.89	15.44	15.63	15.99	18.62	20.28
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.69	5.97	6.39	6.71
Hydropower/Other[1]	2.61	3.19	2.98	3.08	3.21	3.36	3.06	3.10	3.11	3.18	3.18
Total Fuel Inputs	16.25	20.29	24.29	26.03	26.23	26.93	27.50	28.07	28.87	33.78	37.44
Net Imports	.02	.06	.22	.42	.42	.44	.46	.48	.51	.57	.69
Total Electricity Inputs	**16.27**	**20.35**	**24.51**	**26.45**	**26.65**	**27.37**	**27.96**	**28.55**	**29.38**	**34.35**	**38.13**
Disposition											
Total Electricity Inputs	16.27	20.35	24.51	26.45	26.65	27.37	27.96	28.55	29.38	34.35	38.13
Minus Conversion Losses[2]	11.05	13.81	16.71	18.02	18.15	18.66	19.00	19.40	19.98	23.41	26.01
Generation	5.23	6.54	7.80	8.43	8.50	8.71	8.96	9.15	9.40	10.94	12.12
Plus PURPA[3] Purchases	.00	.00	NA	.08	.09	.10	.11	.12	.14	.18	.21
Minus Transportation and Distribution Losses	.48	.58	.65	.63	.53	.56	.62	.63	.64	.73	.74
Electricity Sales	**4.75**	**5.96**	**7.15**	**7.88**	**8.06**	**8.24**	**8.46**	**8.64**	**8.90**	**10.40**	**11.59**
Electricity Sales by End-Use Sector											
Residential	1.59	2.01	2.45	2.70	2.76	2.82	2.91	3.00	3.09	3.58	4.02
Commercial/Other[4]	1.21	1.61	1.92	2.37	2.42	2.48	2.52	2.55	2.60	3.02	3.43
Industrial	1.95	2.35	2.78	2.81	2.88	2.94	3.03	3.10	3.21	3.79	4.14
Total Electricity Sales	**4.75**	**5.96**	**7.15**	**7.88**	**8.06**	**8.24**	**8.46**	**8.64**	**8.90**	**10.40**	**11.59**

[1] Includes renewable electric utility energy sources such as hydropower, geothermal power, wood, waste, solar power, and wind power.
[2] Conversion losses includes net imports.
[3] Electric utility purchases under the Public Utility Regulatory Policies Act of 1978 (PURPA) began after 1978 and are estimated only for 1985 and future years.
[4] Includes street lighting and sales to the transportation end-use sector.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical values are obtained or derived from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*, DOE/EIA-0214(84), (Washington, DC, 1986) and *Monthly Energy Review*, DOE/EIA-0035(86/04), (Washington, DC, 1986).
Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 16, 1987.

Table A5. Electric Utility Summer Capability and Generation

(Capability in Million Kilowatts)

(Generation in Billion Kilowatthours per Year)

Summer Capability and Generation	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Capability[1]											
Coal Steam	131.7	185.5	237.3	285.8	289.5	292.0	294.3	295.9	295.5	317.5	342.1
Other Fossil Steam	115.6	146.4	156.8	148.3	146.7	146.1	145.3	144.8	143.4	136.4	130.3
Combined Cycle	0.5	2.8	5.5	4.6	4.4	4.4	4.4	4.4	4.7	4.7	11.3
Turbine/Diesel	17.3	39.8	43.5	44.5	44.2	44.3	44.4	44.5	45.3	49.9	72.3
Nuclear Power	7.0	37.2	51.7	80.3	85.2	95.2	97.2	102.7	105.1	106.5	108.8
Hydropower/Other[2]	59.8	68.8	69.4	75.0	75.1	75.3	76.2	76.8	77.0	78.4	78.5
Pumped Storage Hydropower	4.4	10.8	14.5	17.7	17.5	17.7	17.7	17.7	18.0	19.1	20.7
Total Capability	**336.4**	**491.3**	**578.6**	**656.1**	**662.6**	**675.0**	**679.4**	**686.8**	**689.0**	**712.5**	**764.1**
Generation by Plant Type											
Coal Steam[3]	[4] 704	853	1,162	1,402	1,405	1,439	1,501	1,520	1,554	1,809	1,978
Other Fossil Steam	[4] 535	557	559	368	358	326	310	314	327	444	481
Combined Cycle	([4])	7	15	15	14	13	21	21	21	24	73
Turbine/Diesel	[4] 22	25	19	9	9	8	3	4	5	37	96
Nuclear Power	22	173	251	384	404	448	495	523	547	586	615
Hydropower/Other[2]	249	303	281	292	313	328	307	311	312	319	320
Pumped Storage Hydropower	NA	NA	NA	NA	-11	-11	-11	-11	-11	-11	-13
Total Generation	**1,532**	**1,918**	**2,286**	**2,470**	**2,492**	**2,551**	**2,627**	**2,681**	**2,756**	**3,207**	**3,551**
Generation by Fuel Type											
Coal	704	853	1,162	1,402	1,402	1,435	1,498	1,517	1,551	1,805	1,975
Natural Gas	372	300	346	292	246	245	271	266	276	334	354
Oil	184	289	246	100	137	105	67	76	80	174	299
Nuclear Power	22	173	251	384	404	448	495	523	547	586	615
All Hydropower/Other[5]	249	303	282	292	303	317	296	300	301	307	307
Total Generation	**1,532**	**1,918**	**2,286**	**2,470**	**2,492**	**2,551**	**2,627**	**2,681**	**2,756**	**3,207**	**3,551**

[1] Stock as of December 31. Net summer capability is the load carrying ability of a generator under summer (adverse) conditions for a specified time period. Historical values include capability out-of-service; projections exclude this capability. All capability is enumerated when units become operable, that is, available to provide power to the grid.

[2] Includes other renewable sources such as geothermal power, wood, waste, solar energy, and wind; historical pumped storage data for generation are not collected separately and are included among hydropower/other totals.

[3] Historical values (1970-1985) understate coal steam generation and overstate other steam generation because they attribute small amounts of oil and natural gas used for startup and flame stability in coal steam plants to other steam plant generation.

[4] For 1970, Combined Cycle generation data are not separately available but are included among steam and turbine/diesel data.

[5] Includes conventional and pumped storage hydropower and other renewable sources such as geothermal power, wood, waste, solar energy, and wind.

NA = Not available.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Generation data are from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035 (86/04), Washington, DC, 1986), p. 74, and the Energy Information Administration, Form EIA-759, "Monthly Power Plant Report." Capability values are from the Energy Information Administration Generating Unit Reference File (GURF), 1986. Historical quantities are through 1985.

Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 16, 1987.

Table A6. Electric Utility Summer Capability Additions
(Thousand Kilowatts)

Additions	Base Case							
	1985	1986	1987	1988	1989	1990	1991-1995	1996-2000
Total Additions								
Nuclear Power[1]	9,864	5,845	9,910	2,075	5,456	2,376	2,306	2,446
Coal Steam	5,975	4,027	2,667	2,287	1,837	217	23,638	28,837
Other Steam[2]	0	40	40	0	0	331	94	6,678
Turbines[3]	87	210	171	154	121	840	5,310	22,519
Pumped Storage Hydropower	2,100	0	205	0	0	304	1,083	1,636
Hydropower/Other[4]	1,373	326	195	858	693	293	1,387	125
Total New Capability	**19,399**	**10,448**	**13,189**	**5,374**	**8,108**	**4,361**	**33,818**	**62,241**
Announced/Planned Construction[5]								
Nuclear Power[1]	9,864	5,845	9,910	2,075	5,456	2,376	2,306	2,446
Coal Steam	5,975	4,027	2,667	2,287	1,837	217	19,638	5,336
Other Steam[2]	0	40	40	0	0	331	94	178
Turbines[3]	87	210	171	154	121	840	2,060	118
Pumped Storage Hydropower	2,100	0	205	0	0	304	1,083	1,636
Hydropower/Other[4]	1,373	326	195	858	693	293	1,387	125
Total Announced/Planned	**19,399**	**10,448**	**13,189**	**5,374**	**8,108**	**4,361**	**26,568**	**9,840**
Additional Needed Capability[6]								
Nuclear Power[1]	0	0	0	0	0	0	0	0
Coal Steam	0	0	0	0	0	0	4,000	23,501
Other Steam[2]	0	0	0	0	0	0	0	6,500
Turbines[3]	0	0	0	0	0	0	3,250	22,401
Pumped Storage Hydropower	0	0	0	0	0	0	0	0
Hydropower/Other[4]	0	0	0	0	0	0	0	0
Total Additional Needed	**0**	**0**	**0**	**0**	**0**	**0**	**7,250**	**52,401**

[1] Nuclear capability is as of the date the unit first delivers power to the grid; all other capability is as of the date the unit begins commercial service.
[2] Includes natural gas, oil, and dual-fired oil/natural gas steam and combined cycle capability.
[3] Includes all gas turbine and internal combustion capability.
[4] Includes conventional hydroelectric and other renewable sources of power such as geothermal, wood, waste, solar, and wind.
[5] Includes all new capability announced by the electric utility industry.
[6] Includes additional new capability considered necessary by the Energy Information Administration to meet electricity demands.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Input data file = IFFSMM.D1206862. Table printed on January 16, 1987.

Table A7. Electric Utility Sales, Prices, and Price Components
(Billion Kilowatthours per Year)
(1986 Dollars per Thousand Kilowatthours)

Sales, Prices and Price Components	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Electricity Sales by End-Use Sector											
Residential	466	588	717	791	809	827	853	878	905	1,050	1,178
Commercial/Other[1]	355	471	562	694	710	726	739	747	763	886	1,005
Industrial	571	688	815	825	843	863	887	908	941	1,112	1,213
Total Electricity Sales	**1,392**	**1,747**	**2,094**	**2,310**	**2,363**	**2,416**	**2,479**	**2,533**	**2,608**	**3,048**	**3,397**
Prices[2]											
Residential	60.67	67.68	71.61	73.05	69.40	69.47	68.54	67.25	66.17	61.65	64.02
Commercial[1]	56.92	67.22	73.70	74.12	70.14	70.34	69.67	68.31	67.21	62.27	64.78
Industrial	27.83	39.82	49.19	64.69	61.13	61.20	60.41	59.17	58.13	53.56	55.89
All Sectors	**46.48**	**56.83**	**63.70**	**70.40**	**66.71**	**66.81**	**66.00**	**64.70**	**63.60**	**58.90**	**61.37**
Price Components											
Capital Component[3]	NA	NA	NA	32.08	30.87	30.83	30.32	28.89	27.65	18.93	17.61
Fuel Component[4]	NA	NA	NA	21.00	18.17	18.22	17.99	18.16	18.49	23.03	26.95
O&M Component[5]	NA	NA	NA	17.32	17.67	17.75	17.69	17.64	17.47	16.94	16.80
Total Price[2]	**46.48**	**56.83**	**63.70**	**70.40**	**66.71**	**66.81**	**66.00**	**64.70**	**63.60**	**58.90**	**61.37**

[1] Includes consumption for street and highway lighting, other public authorities, and railroads and railways.
[2] Prices for 1985 to 2000 are estimated from model simulations and represent average revenues per kilowatthour of demand for the total electric utility industry. Revenue requirements are projected from the financial information contained on the Federal Energy Regulatory Commission Form FERC-1, Form FERC-1-M, and on the Energy Information Administration Form EIA-412.
[3] The capital component represents the cost to the utility of capital assets needed to provide reliable service. It includes plant depreciation, taxes, and sufficient return on invested capital to cover interest obligations on outstanding debt and to compensate stockholders.
[4] The fuel component includes only the direct costs of fuel inputs used to generate electricity required to meet demand.
[5] The operation and maintenance (O&M) component includes all nonfuel costs necessary to operate and maintain generation, transmission, and distribution capacity used to deliver electricity to end-use sectors.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical prices are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986). Historical demands are from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*.DOE/EIA-0214(84), (Washington, DC, 1986) and *Monthly Energy Review*, DOE/EIA-0035(86/04), (Washington, DC, 1986). Electricity prices representing both public and private utilities for 1985 are estimates. Projected prices are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 16, 1987.

Table A8. Petroleum Supply and Disposition Balance
(Million Barrels per Day)

Supply and Disposition	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
World Oil Price[1]	8.05	26.83	45.16	27.68	14.57	15.41	16.18	16.99	17.84	26.61	32.87
Production											
Crude Oil[2]	9.64	8.37	8.60	8.97	8.80	8.63	8.30	7.90	7.43	5.99	5.43
Alaska	.23	.19	1.62	1.83	1.86	1.90	1.85	1.82	1.70	1.22	.85
Lower 48	9.41	8.18	6.98	7.15	6.94	6.73	6.45	6.08	5.73	4.77	4.58
Natural Gas Plant Liquids	1.66	1.63	1.57	1.61	1.62	1.62	1.72	1.68	1.70	1.67	1.59
Other Domestic[3]	.02	.04	.04	.06	.05	.06	.05	.05	.05	.05	.05
Processing Gain[4]	.36	.46	.60	.56	.56	.56	.56	.56	.57	.58	.61
Total Production	**11.67**	**10.50**	**10.81**	**11.20**	**11.03**	**10.87**	**10.63**	**10.19**	**9.75**	**8.29**	**7.68**
Imports (Including SPR)											
Crude Oil[5]	1.32	4.10	5.26	3.20	4.03	4.11	4.31	4.73	5.24	6.66	7.64
Refined Products	2.10	1.95	1.65	1.87	1.88	2.02	1.90	1.94	1.97	2.29	2.87
Total Imports	3.42	6.06	6.91	5.07	5.90	6.13	6.21	6.67	7.21	8.95	10.52
Exports											
Crude Oil	.01	.01	.29	.20	.17	.19	.19	.19	.19	.19	.19
Refined Products	.25	.20	.26	.58	.59	.56	.56	.56	.56	.56	.56
Total Exports	.26	.21	.54	.78	.75	.75	.75	.75	.75	.75	.75
Net Imports (Including SPR)	**3.16**	**5.85**	**6.36**	**4.29**	**5.15**	**5.38**	**5.46**	**5.92**	**6.46**	**8.20**	**9.76**
Primary Stock Changes											
Net Withdrawals[6]	-.10	-.03	-.10	.22	-.14	.09	.00	.00	-.01	.00	-.03
SPR Fill Rate Additions (-) [7]	.00	.00	-.04	-.12	-.05	-.06	-.04	-.04	-.04	-.04	-.04
Total Primary Supply[8]	**14.73**	**16.32**	**17.04**	**15.60**	**15.99**	**16.28**	**16.05**	**16.07**	**16.15**	**16.46**	**17.38**
Refined Petroleum Products											
Motor Gasoline	5.78	6.67	6.58	6.83	7.03	7.00	6.88	6.77	6.73	6.28	6.19
Jet Fuel[9]	.97	1.00	1.07	1.22	1.30	1.33	1.37	1.39	1.43	1.44	1.53
Distillate Fuel	2.54	2.85	2.87	2.87	2.87	3.01	3.02	3.07	3.10	3.33	3.57
Residual Fuel	2.20	2.46	2.51	1.20	1.42	1.29	1.12	1.17	1.20	1.67	2.29
Other Petroleum Products[10]	3.20	3.33	4.04	3.61	3.45	3.66	3.66	3.67	3.69	3.74	3.80
Total Product Supplied	**14.70**	**16.32**	**17.06**	**15.73**	**16.07**	**16.29**	**16.05**	**16.07**	**16.15**	**16.46**	**17.38**
Refined Petroleum Products Supplied to Sectors											
Residential and Commercial	2.18	1.95	1.52	1.35	1.35	1.40	1.42	1.44	1.45	1.40	1.30
Industrial[11]	3.82	4.03	4.81	4.00	3.95	4.13	4.12	4.13	4.16	4.27	4.43
Transportation	7.77	8.95	9.55	9.88	10.11	10.24	10.20	10.14	10.17	9.95	10.22
Electric Utilities	.93	1.39	1.15	.48	.64	.50	.30	.34	.36	.82	1.42
Total Consumption	**14.70**	**16.31**	**17.03**	**15.71**	**16.06**	**16.27**	**16.04**	**16.06**	**16.14**	**16.44**	**17.37**
Discrepancy[12]	.03	.01	.01	-.12	-.07	.00	.01	.01	.01	.02	.01
Net Disposition[13]	**14.73**	**16.32**	**17.04**	**15.60**	**15.99**	**16.28**	**16.05**	**16.07**	**16.15**	**16.46**	**17.38**

[1] The cost of imported crude oil to U.S. refiners in 1986 dollars per barrel.
[2] Includes lease condensate.
[3] Other domestic prior to 1981 includes unfinished oils (net), hydrogen, and hydrocarbons not included elsewhere. After 1981, other domestic includes unfinished oils (net), motor gasoline blending components (net), aviation gasoline blending components (net), hydrogen, other hydrocarbons, alcohol, and synthetic crude production.
[4] Represents volumetric gain in refinery distillation and cracking processes.
[5] In 1977 and later years, crude oil imports include crude oil imported for the Strategic Petroleum Reserve.
[6] Net stock withdrawals for a given year, t, are defined as the change in end-of-year stock levels from period t-1 minus the end-of-year stock level from the year t. A minus is treated as a deletion from total supply and a plus is treated as an addition to total supply.
[7] SPR is the Strategic Petroleum Reserve.
[8] Total primary supply is defined as total production plus net imports plus net stock withdrawals minus SPR additions.
[9] Includes naphtha and kerosene type.
[10] Includes aviation gasoline, kerosene, liquefied petroleum gas, petrochemical feedstocks, miscellaneous petroleum products, lubricants, waxes, unfractionated stream, plant condensate, natural gasoline, asphalt, road oil, still gas, special naphthas, and petroleum coke.
[11] Includes total industrial demand for petroleum.
[12] Represents the difference between total primary supply and total consumption.
[13] Net disposition is the sum of total consumption and discrepancy.

Note: From 1983 onward, the product supplied data and stock data are on a new basis. The other product category is on a net basis, reclassified (petroleum products reprocessed into other categories) plus the other category of products supplied.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical data are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 101-121, Tables 45, 46, 47, and 55. Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 21, 1987.

Note: 1986 data are based on EIA's October 1986 issue of the Short-Term Energy Outlook. These data are, therefore, partial estimates. At press time, a revised estimate of the crude oil production for 1986 is 8.67 million barrels per day.

Table A9. Natural Gas Supply, Disposition, and Prices

(Trillion Cubic Feet per Year)

(1986 Dollars per Thousand Cubic Feet)

Supply, Disposition, and Prices	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production											
Dry Gas Production[1]	21.01	19.24	19.40	16.38	16.30	16.27	17.15	16.68	16.90	16.62	16.12
Supplemental Natural Gas[2]	NA	NA	.15	.13	.14	.14	.00	.00	.00	.15	.00
Net Imports	.75	.88	.94	.89	.74	.88	.62	1.03	1.05	1.79	2.43
Net Storage Withdrawals[3]	-.40	-.34	.02	.23	-.09	.12	.00	.00	.00	.00	.00
Total Supply[4]	**21.37**	**19.77**	**20.51**	**17.63**	**17.09**	**17.41**	**17.77**	**17.71**	**17.95**	**18.57**	**18.55**
Consumption by Sector[5]											
Residential	4.84	4.92	4.75	4.43	4.33	4.42	4.50	4.56	4.61	4.60	4.42
Commercial[6]	2.40	2.51	2.61	2.43	2.37	2.41	2.46	2.48	2.52	2.66	2.64
Industrial	7.85	6.97	7.17	5.90	5.94	6.13	6.21	6.13	6.16	5.84	5.59
Lease & Plant Fuel[7]	1.40	1.40	1.03	.97	.81	.81	.85	.83	.84	.87	.91
Transportation[8]	.72	.58	.63	.50	.49	.49	.51	.50	.51	.49	.49
Electric Utilities	3.93	3.16	3.68	3.04	2.58	2.57	2.82	2.75	2.87	3.58	3.88
Total Consumption	**21.14**	**19.54**	**19.88**	**17.28**	**16.52**	**16.83**	**17.35**	**17.27**	**17.50**	**18.04**	**17.92**
Unaccounted for[9]	.23	.24	.64	.35	.57	.58	.41	.44	.45	.52	.64
Average Wellhead Price	**.46**	**.87**	**2.12**	**2.57**	**1.73**	**1.90**	**2.14**	**2.29**	**2.43**	**3.93**	**5.51**
Delivered Prices by Sectors											
Residential	2.98	3.29	4.92	6.27	5.75	5.63	5.58	5.70	5.87	7.58	9.30
Commercial[6]	2.10	2.60	4.53	5.63	5.08	4.95	4.90	5.00	5.15	6.76	8.36
Industrial	1.07	1.86	3.43	4.05	3.17	3.19	3.19	3.37	3.57	5.47	7.24
Electric Utilities	.79	1.48	3.03	3.66	2.63	2.81	2.58	2.73	2.86	4.60	5.92
Average to All Sectors[10]	**1.63**	**2.30**	**3.90**	**4.83**	**4.11**	**4.09**	**4.02**	**4.18**	**4.35**	**6.07**	**7.66**

[1] Net dry natural gas is defined as dry marketed production minus nonhydrocarbon gases removed.

[2] Prior to 1980, the amount of supplemental fuels included in the natural gas data cannot be determined. Supplemental natural gas includes synthetic natural gas (results from the manufacture, conversion, or the reforming of petroleum hydrocarbons), and propane air mixtures. After 1985, this quantity includes short-term spot market purchases that could include additional imports.

[3] Includes net storage withdrawals for dry natural gas from underground storage and liquefied natural gas. Net storage withdrawals are computed as the end-of-year stock levels from the current period subtracted from the end-of-year stock levels from the preceding period. A minus is treated as a deletion from total supply and a plus is treated as an addition to total supply.

[4] Total supply is computed as dry gas production plus supplemental natural gas, net imports, and net storage withdrawals.

[5] Consumption values include small amounts of supplemental gas, which are not reported as production prior to 1980.

[6] Commercial sector includes deliveries to municipalities and other public authorities for institutional heating, street lighting, etc.

[7] Lease and plant fuel natural gas represents natural gas used in the field gathering and processing plant machinery, usually totalled into the industrial sector for other consumption tables.

[8] Transportation natural gas is used to fuel the compressors in the pipeline pumping stations.

[9] Unaccounted for represents natural gas lost, the net result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure, and EIA's merger of different data reporting systems which vary in scope, format, definition, and respondent type.

[10] Weighted average price. Weights used are the sectoral consumption values excluding lease and plant fuel and the transportation sector.

NA = Not available.

Note: Implicit Gross National Product Price Deflator, rebased to 1986 = 1.00, was used to convert from nominal to real dollars. The natural gas prices in this table are average prices, total revenues divided by total sales for each customer class.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Historical data are taken from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986) and the Energy Information Administration, *Natural Gas Annual 1985*, Vol. 1 DOE/EIA-0131(85)/1 (Washington, DC, 1986). Historical quantities are through 1985. Historical prices through 1984 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986), p. 6. Projected values are based on preliminary estimates of 1985 prices, and on outputs from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 21, 1987.

Table A10. Coal Supply, Disposition, and Prices

(Million Short Tons per Year)

(1986 Dollars per Short Ton)

Supply, Disposition, and Price	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production[1]											
East of the Mississippi	568	544	579	559	568	595	624	626	637	703	757
West of the Mississippi	45	111	251	325	322	325	330	335	345	423	460
Total	**613**	**655**	**830**	**884**	**890**	**920**	**954**	**962**	**983**	**1,126**	**1,217**
Imports	(*)	1	1	2	2	2	2	3	3	5	7
Exports[2]	72	66	92	92	89	89	91	92	94	105	114
Net Imports	**-72**	**-65**	**-91**	**-90**	**-87**	**-87**	**-88**	**-89**	**-91**	**-100**	**-107**
Net Storage Withdrawals[3]	**-11**	**-32**	**-22**	**27**	**18**	**-7**	**-6**	**-2**	**-4**	**-5**	**-4**
Total Supply[4]	**530**	**558**	**717**	**820**	**821**	**826**	**860**	**870**	**888**	**1,021**	**1,105**
Consumption by Sector											
Residential and Commercial	16	9	6	8	8	8	8	8	8	7	7
Industrial	90	84	60	75	77	79	82	84	87	95	109
Coking Plants[5]	96	84	67	41	38	38	38	37	36	31	27
Electric Utilities	320	406	569	694	690	706	732	741	757	887	962
Total Consumption	**523**	**563**	**703**	**818**	**813**	**831**	**860**	**870**	**888**	**1,021**	**1,105**
Discrepancy[6]	7	-5	15	2	8	-5	(*)	(*)	(*)	(*)	(*)
Average Minemouth Price[7]	**17.02**	**37.03**	**32.67**	**25.81**	**25.46**	**25.69**	**25.81**	**25.85**	**26.27**	**28.63**	**29.45**
Delivered Prices by Sector											
Residential and Commercial[8]	46.97	75.86	63.91	45.89	45.53	46.03	46.59	46.79	47.48	51.69	53.37
Industrial	27.48	55.31	47.47	38.12	37.73	38.18	38.87	39.14	39.77	44.34	47.14
Coking Plants[5]	32.79	85.15	74.99	55.61	55.40	56.00	56.53	56.78	57.86	63.73	65.59
Electric Utilities[9]	19.03	34.18	38.31	35.38	33.76	34.38	34.64	34.70	35.19	38.18	39.67
Average to All Sectors[10]	**23.58**	**44.64**	**42.98**	**36.75**	**35.27**	**35.84**	**36.11**	**36.17**	**36.66**	**39.64**	**41.11**

[1] Historical coal production includes anthracite, bituminous coal, and lignite. In the projections, anthracite production was not separately identified, but included in bituminous coal production.

[2] Excludes small quantities of anthracite shipped overseas to U.S. Armed Forces.

[3] From (secondary) stocks held by end-use sectors (industrial plants, coke plants, and electric utilities). Positive numbers represent withdrawals from stocks, and negative numbers represent additions to stocks.

[4] Total supply equals production plus net imports plus net storage withdrawals.

[5] Coke plants consume small quantities of anthracite together with bituminous coal for metallurgical purposes. In the historical data, coking plant coal price is a weighted average of anthracite and bituminous coal prices. In the projections, anthracite was not separately identified, but included in bituminous coal.

[6] In the historical data, the discrepancy represents changes in producers (primary) stocks plus losses and unaccounted for coal. In the projections, the discrepancy represents errors due to independent rounding.

[7] Projected minemouth prices (1986-2000) are based on mining cost estimates, and assumed coal market conditions.

[8] Projected coal prices for the residential and commercial sector (1985-2000) do not include dealer markup.

[9] Electric utility price in historical years represents a weighted average of anthracite, bituminous coal, and lignite prices. In the projections, bituminous coal price was used for anthracite, since anthracite was not separately identified, but included in bituminous coal.

[10] Weighted average price. The quantity weights used are the sectoral consumption values.

(*) Greater than zero but less than .5.

Note: Implicit Gross National Product Price Deflator, rebased to 1986 = 1.00, was used to convert from nominal to real dollars.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Historical data on quantities and minemouth prices through 1984 are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 163-177, Tables 72, 73, 74, and 79. Historical 1985 quantities are from the Energy Information Administration, *Weekly Coal Production*, DOE/EIA-0218(86/45) (Washington, DC). The historical 1985 minemouth price is from the Energy Information Administration, *Coal Production 1985*,DOE/EIA-0118(85) (Washington, DC, 1986), Table 21. Historical data on delivered prices through 1984 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, December 1986), p. 6, and price data for 1985 (except for the residential and commercial sector) are from the Energy Information Administration, *Quarterly Coal Report*, DOE/EIA-0125(86/2Q) (Washington, DC, October, 1986). Projected coal imports are based on Energy Information Administration, *Outlook for U.S. Coal Imports*, DOE/EIA-0483 (Washington, DC, 1986), p. 14, Table 3. Projected quantities and prices are outputs from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 16, 1987.

Table A11. National Macroeconomic Indicators

Macroeconomic Indicators	Base Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
World Oil Price[1]	**8.05**	**26.83**	**45.16**	**27.68**	**14.57**	**15.41**	**16.18**	**16.99**	**17.84**	**26.61**	**32.87**
World Oil Price (nominal dollars)[2]	**2.96**	**13.93**	**33.89**	**27.03**	**14.57**	**15.88**	**17.30**	**18.86**	**20.64**	**39.91**	**64.40**
Economic Variables											
Real GNP (billion 1982 dollars)	2,416	2,695	3,187	3,585	3,680	3,770	3,883	3,955	4,066	4,597	5,183
Real Disposable Income (billion 1982 dollars)	1,668	1,932	2,214	2,528	2,617	2,665	2,729	2,767	2,839	3,163	3,529
Real Disposable Income per Capita (thousand 1982 dollars)	8.2	9.0	9.7	10.6	10.9	11.0	11.1	11.2	11.4	12.2	13.2
NIPA GNP Price Deflator (1982:1.00)	.420	.593	.857	1.115	1.142	1.176	1.221	1.268	1.321	1.713	2.238
Unemployment Rate, Civilian Workers (percent)	5.0	8.5	7.2	7.2	7.0	6.9	6.6	6.7	6.6	6.6	6.6
Population, Noninstitutional (million persons)	204.0	215.5	227.3	238.4	240.5	242.7	244.9	247.0	249.2	259.1	267.5
New, High Grade Bond Rate (percent per annum)	8.50	9.01	12.47	11.03	8.49	8.53	8.26	8.22	8.77	8.80	8.69
Home Mortgage Rate (percent per annum)	8.32	8.88	13.77	12.41	10.21	9.95	9.81	9.59	10.19	10.27	10.15
Housing Starts (million units)	1.44	1.16	1.30	1.74	1.89	1.74	1.74	1.75	1.70	1.62	1.60
Energy Usage Indicators											
Gross Energy Use per Capita (million Btu per person)	325.8	327.4	334.2	309.9	308.7	313.4	314.5	313.6	315.4	320.7	326.5
Gross Energy Use per Dollar of GNP (thousand Btu per 1982 dollar)	27.5	26.2	23.8	20.6	20.2	20.2	19.8	19.6	19.3	18.1	16.8

[1] The cost of imported crude oil to U.S. refiners in 1986 dollars per barrel.
[2] The cost of imported crude oil to U.S. refiners in current dollars per barrel.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical data are derived from the following sources: Data Resources, Inc., USMODEL database, (September, 1985) and the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986). Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSMM.D1206862. Table printed on January 28, 1987.

Appendix B

Low World Oil Price - High Growth Case Forecasts

Appendix B

Low World Oil Price - High Growth Case Forecasts

Table B1. Yearly Supply and Disposition Summary of Total Energy
(Quadrillion Btu per Year)

Total Supply and Disposition	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production											
Crude Oil and Lease Condensate	20.4	17.7	18.2	19.0	18.5	17.9	17.0	15.9	15.0	11.9	9.8
Natural Gas Plant Liquids	2.5	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2
Natural Gas[1]	21.7	19.6	20.1	17.1	17.0	16.9	17.2	16.8	17.0	16.7	16.6
Coal[2]	14.6	15.0	18.6	19.3	19.5	20.1	20.8	21.3	21.8	24.8	27.5
Nuclear Power	.2	1.9	2.7	4.2	4.4	4.9	5.4	5.7	6.0	6.4	6.7
Hydropower/Other[3]	2.6	3.2	3.0	3.1	3.2	3.4	3.1	3.1	3.1	3.2	3.2
Total Production	**62.1**	**59.9**	**64.9**	**64.9**	**64.8**	**65.4**	**65.8**	**65.1**	**65.2**	**65.4**	**66.0**
Imports											
Crude Oil[4]	2.8	8.7	11.2	6.8	8.6	8.7	11.4	12.5	13.5	16.4	19.7
Petroleum Products[5]	4.7	4.2	3.5	3.8	3.8	4.1	4.3	4.3	4.4	5.4	6.9
Natural Gas[6]	.8	.9	1.0	.9	.7	.9	.7	1.0	1.1	1.6	2.2
Other Imports[7]	.0	.1	.3	.5	.5	.5	.5	.6	.6	.7	.9
Total Imports	**8.3**	**14.0**	**15.9**	**12.0**	**13.6**	**14.2**	**17.0**	**18.3**	**19.6**	**24.1**	**29.7**
Exports											
Coal	1.9	1.8	2.4	2.4	2.3	2.4	2.4	2.5	2.5	2.8	3.3
Crude Oil and Petroleum Products	.5	.4	1.2	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Other[8]	.1	.0	.1	NA	NA	NA	NA	NA	NA	NA	NA
Total Exports	**2.5**	**2.2**	**3.6**	**4.1**	**3.9**	**3.9**	**4.0**	**4.0**	**4.1**	**4.4**	**4.9**
Net Stock Withdrawals	**-.9**	**-1.2**	**-.8**	**1.0**	**-.1**	**.0**	**-.3**	**-.2**	**-.2**	**-.2**	**-.3**
Adjustments[9]	-.4	.1	-.4	.2	-.1	1.5	-.1	-.2	-.2	.0	.1
Consumption											
Petroleum Products[10]	29.5	32.7	34.2	30.9	31.8	33.3	33.6	33.5	33.8	34.8	37.4
Natural Gas	21.8	19.9	20.4	17.9	17.1	17.4	17.4	17.4	17.6	17.9	18.3
Coal	12.3	12.7	15.4	17.5	17.4	17.9	18.3	18.8	19.2	22.0	24.2
Nuclear Power	.2	1.9	2.7	4.2	4.4	4.9	5.4	5.7	6.0	6.4	6.7
Hydroelectric Power/Other[11]	2.6	3.3	3.2	3.5	3.7	3.8	3.5	3.6	3.6	3.8	3.9
Total Consumption	**66.5**	**70.6**	**76.0**	**73.9**	**74.3**	**77.2**	**78.3**	**79.0**	**80.3**	**84.8**	**90.5**

[1] Net dry marketed production after removal of nonhydrocarbon gases, plus supplemental natural gas.
[2] Historical coal production includes anthracite, bituminous, and lignite. Projected coal production (1986-2000) includes bituminous and lignite, with anthracite included in bituminous.
[3] Includes hydropower, geothermal power, and wood waste.
[4] Includes imports of crude oil for the Strategic Petroleum Reserve.
[5] Includes imports of unfinished oils and natural gas plant liquids.
[6] Includes dry natural gas imports from Canada and Mexico, and liquefied natural gas imports from Algeria. In both the historical and forecast periods, natural gas imports are net imports.
[7] Includes electricity, coal, and coal coke imports.
[8] Includes electricity and coal coke exports. Gas exports are not included.
[9] Balancing item that includes stock changes, gains, losses, miscellaneous blending components, unaccounted for supply, anthracite shipped overseas to U.S. Armed Forces, and certain secondary stock withdrawals.
[10] Includes natural gas plant liquids and crude oil consumed as a fuel.
[11] Includes industrial generation of hydroelectric power, net electricity imports, and electricity produced from geothermal, wood, waste, wind, photovoltaic, solar thermal sources connected to electric utility distribution systems. Also includes net coke imports.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical quantities are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 5-13, Tables 1, 2, 3, and 5. Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 16, 1987.

Table B2. Consumption of Energy by Source and End-Use Sectors
(Quadrillion Btu per Year)

Sector and Fuel	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Residential											
Distillate Fuel	1.88	1.81	1.32	0.97	0.97	1.06	1.12	1.17	1.21	1.15	0.98
Liquefied Petroleum Gas	.58	.53	.33	.38	.38	.40	.40	.40	.40	.40	.40
Natural Gas	4.99	5.02	4.87	4.58	4.47	4.56	4.65	4.72	4.76	4.80	4.70
Other Residential[1]	.45	.25	.17	.14	.14	.14	.14	.14	.13	.13	.12
Electricity	1.59	2.01	2.45	2.70	2.76	2.82	2.91	3.01	3.10	3.63	4.11
Total	**9.49**	**9.61**	**9.12**	**8.77**	**8.72**	**8.98**	**9.22**	**9.43**	**9.60**	**10.11**	**10.31**
Commercial											
Distillate Fuel	.59	.59	.52	.69	.69	.73	.75	.77	.78	.78	.73
Motor Gasoline	.09	.09	.11	.11	.11	.11	.11	.11	.11	.11	.10
Residual Fuel	.71	.49	.56	.19	.20	.20	.20	.20	.20	.20	.20
Natural Gas[2]	2.47	2.56	2.67	2.51	2.45	2.49	2.54	2.57	2.60	2.77	2.81
Other Commercial[3]	.38	.27	.19	.28	.28	.28	.28	.28	.28	.27	.26
Electricity	1.20	1.60	1.91	2.36	2.41	2.47	2.52	2.55	2.60	3.05	3.48
Total	**5.44**	**5.59**	**5.95**	**6.13**	**6.15**	**6.29**	**6.41**	**6.47**	**6.57**	**7.18**	**7.58**
Industrial[4]											
Distillate Fuel	1.23	1.34	1.32	1.19	1.20	1.38	1.37	1.37	1.40	1.51	1.66
Liquefied Petroleum Gas	.98	1.15	1.58	1.60	1.58	1.71	1.73	1.76	1.79	1.94	2.09
Motor Gasoline	.29	.22	.16	.16	.17	.18	.18	.19	.19	.20	.21
Petrochemical Feedstocks[5]	.56	.65	1.43	.75	.76	.78	.78	.77	.76	.70	.63
Residual Fuel	1.62	1.51	1.35	.76	.80	.97	.93	.92	.94	.87	.91
Natural Gas[6]	9.54	8.53	8.39	7.09	6.97	7.16	7.09	7.01	7.01	6.99	6.86
Metallurgical Coal	2.59	2.24	1.79	1.10	1.02	1.03	1.03	1.00	.99	.87	.74
Steam Coal	2.08	1.43	1.37	1.65	1.70	1.76	1.84	1.90	1.97	2.17	2.52
Other Industrial[7]	3.07	3.30	3.66	3.22	3.19	3.40	3.44	3.42	3.42	3.33	3.35
Hydropower	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
Purchased Electricity	1.95	2.35	2.78	2.81	2.88	2.96	3.05	3.13	3.27	3.86	4.22
Total	**23.93**	**22.74**	**23.85**	**20.38**	**20.29**	**21.35**	**21.48**	**21.50**	**21.76**	**22.48**	**23.22**
Transportation											
Distillate Fuel	1.57	2.12	2.79	3.16	3.20	3.40	3.46	3.50	3.54	3.91	4.41
Jet Fuel[8]	1.97	2.03	2.18	2.50	2.67	2.79	2.91	2.96	3.06	3.12	3.33
Motor Gasoline	10.72	12.49	12.38	12.83	13.23	13.72	13.55	13.33	13.26	12.37	12.27
Residual Fuel	.76	.71	1.40	.80	.84	.88	.94	.99	1.04	1.26	1.43
Natural Gas[9]	.74	.59	.65	.52	.50	.50	.52	.51	.51	.51	.50
Other Transportation[10]	.29	.27	.26	.27	.11	.23	.23	.24	.24	.27	.30
Total	**16.05**	**18.22**	**19.67**	**20.09**	**20.55**	**21.52**	**21.62**	**21.53**	**21.66**	**21.43**	**22.24**
Electric Utilities											
Distillate Fuel	.14	.23	.17	.09	.05	.04	.00	.01	.01	.15	.27
Residual Fuel	1.98	2.94	2.46	1.00	1.42	1.11	1.26	1.16	1.26	2.30	3.93
Natural Gas	4.05	3.24	3.81	3.16	2.68	2.67	2.63	2.59	2.70	2.86	3.47
Steam Coal	7.23	8.79	12.12	14.54	14.49	14.89	15.27	15.70	16.09	18.76	20.74
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.70	5.97	6.39	6.71
Hydropower/Other[11]	2.64	3.26	3.20	3.50	3.63	3.80	3.51	3.58	3.63	3.75	3.87
Total	**16.27**	**20.35**	**24.51**	**26.45**	**26.65**	**27.37**	**28.08**	**28.73**	**29.66**	**34.21**	**38.98**
Primary Energy Consumption[12]											
Distillate Fuel[13]	5.40	6.08	6.12	6.10	6.12	6.61	6.71	6.82	6.94	7.51	8.05
Jet Fuel	1.97	2.03	2.18	2.50	2.67	2.79	2.91	2.96	3.06	3.12	3.33
Liquefied Petroleum Gas	1.69	1.81	1.98	2.10	2.08	2.23	2.25	2.27	2.31	2.46	2.62
Motor Gasoline	11.09	12.80	12.65	13.10	13.51	14.01	13.85	13.62	13.56	12.67	12.59
Petrochemical Feedstocks	.56	.65	1.43	.82	.76	.78	.78	.77	.76	.70	.63
Residual Fuel[14]	5.08	5.65	5.78	2.77	3.25	3.16	3.33	3.27	3.44	4.63	6.46
Other Petroleum	3.75	3.72	4.08	3.62	3.42	3.74	3.78	3.76	3.77	3.69	3.73
Natural Gas	21.79	19.95	20.39	17.85	17.07	17.38	17.44	17.39	17.59	17.93	18.33
Metallurgical Coal	2.59	2.24	1.79	1.10	1.02	1.03	1.03	1.00	.99	.87	.74
Steam Coal	9.68	10.42	13.64	16.38	16.37	16.84	17.29	17.78	18.24	21.09	23.41
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.70	5.97	6.39	6.71
Hydropower/Other[11]	2.67	3.29	3.23	3.53	3.67	3.83	3.54	3.61	3.66	3.78	3.90
Total Consumption	**66.44**	**70.55**	**75.95**	**73.94**	**74.30**	**77.24**	**78.30**	**78.95**	**80.27**	**84.84**	**90.49**
Electricity Consumption (all sectors)	**4.75**	**5.96**	**7.15**	**7.88**	**8.07**	**8.27**	**8.50**	**8.70**	**8.99**	**10.56**	**11.83**
Industrial Electricity											
Gross Consumption	1.95	2.35	2.78	3.08	3.16	3.24	3.36	3.46	3.62	4.37	4.89
Self-generation - Own Use[15]	NA	NA	NA	.27	.28	.28	.30	.32	.35	.51	.67
Purchased Electricity	1.95	2.35	2.78	2.81	2.88	2.96	3.05	3.13	3.27	3.86	4.22

See footnotes at end of Appendix C.

Sources: Historical quantities are taken from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*, DOE/EIA-0214(84) (Washington, DC, 1986) and the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986). Historical quantities are through 1985. Projected quantities are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 21, 1987.

Table B3. Price of Energy by Source and End-Use Sectors
(1986 Dollars per Million Btu)

Sector and Fuel	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Residential	**5.78**	**7.39**	**10.07**	**11.03**	**10.04**	**9.81**	**9.74**	**9.76**	**9.87**	**10.81**	**12.38**
Primary Energy	3.36	4.10	6.07	6.41	5.28	5.01	5.03	5.18	5.42	6.95	8.40
Petroleum Products	4.23	5.85	9.68	7.78	4.51	3.85	4.05	4.28	4.51	6.81	8.56
Distillate Fuel	3.77	5.28	9.35	7.74	4.48	3.81	4.02	4.25	4.48	6.77	8.51
Kerosene	4.18	6.05	11.08	7.95	4.69	4.03	4.23	4.46	4.70	6.99	8.74
Liquefied Petroleum Gas	5.75	7.75	10.56	7.84	4.57	3.91	4.12	4.35	4.59	6.89	8.65
Natural Gas	2.89	3.22	4.80	6.08	5.57	5.45	5.41	5.54	5.78	7.06	8.42
Steam Coal[1]	3.06	4.74	3.88	1.99	1.97	1.99	2.00	2.01	2.05	2.23	2.34
Electricity	17.78	19.84	20.99	21.41	20.33	20.24	19.92	19.54	19.20	17.68	18.38
Commercial	**5.36**	**7.93**	**10.56**	**11.78**	**10.77**	**10.60**	**10.50**	**10.43**	**10.46**	**10.95**	**12.39**
Primary Energy	2.14	3.22	5.36	5.57	4.44	4.19	4.21	4.34	4.54	5.88	7.16
Petroleum Products	2.43	4.61	7.52	6.16	3.68	3.15	3.30	3.47	3.64	5.35	6.64
Distillate Fuel	3.00	4.68	8.60	6.14	3.64	3.17	3.34	3.53	3.72	5.53	6.94
Residual Fuel	1.21	3.67	5.49	4.21	2.54	2.05	2.09	2.18	2.27	3.30	4.06
Other Petroleum[2]	4.59	6.42	10.42	7.54	4.60	3.90	4.06	4.23	4.42	6.35	7.76
Natural Gas[3]	2.04	2.55	4.42	5.45	4.92	4.80	4.75	4.86	5.09	6.26	7.55
Steam Coal[4]	1.23	2.52	2.06	1.99	1.97	1.99	2.00	2.01	2.04	2.23	2.33
Electricity	16.72	19.68	21.61	21.73	20.55	20.49	20.23	19.83	19.48	17.83	18.55
Industrial	**2.15**	**4.19**	**6.17**	**6.67**	**5.42**	**5.27**	**5.33**	**5.46**	**5.62**	**6.84**	**7.73**
Primary Energy	1.51	3.11	4.85	4.32	2.96	2.89	2.96	3.11	3.29	4.55	5.59
Petroleum Products	2.24	4.44	7.06	5.83	3.36	3.14	3.33	3.51	3.67	5.26	6.47
Distillate Fuel	1.96	4.29	7.38	6.13	3.63	3.16	3.33	3.52	3.71	5.51	6.92
Kerosene	2.10	4.50	8.39	6.50	3.92	3.44	3.62	3.81	4.01	5.88	7.33
Liquefied Petroleum Gas	3.12	4.89	6.89	6.50	3.86	3.37	3.54	3.74	3.94	5.85	7.33
Motor Gasoline[5]	7.78	8.96	13.09	9.30	5.72	4.68	4.82	4.96	5.12	7.17	8.48
Residual Fuel	1.25	3.68	4.93	3.98	2.17	1.59	1.71	1.80	1.89	2.98	3.68
Other Petroleum[6]	1.96	4.29	7.38	5.49	3.05	3.43	3.62	3.81	3.95	5.22	6.21
Natural Gas[7]	1.04	1.82	3.35	3.96	3.07	3.09	3.07	3.27	3.56	4.98	6.41
Metallurgical Coal	1.23	3.17	2.80	2.08	2.07	2.09	2.11	2.12	2.17	2.39	2.48
Steam Coal	1.19	2.46	2.09	1.73	1.71	1.73	1.75	1.76	1.79	2.01	2.16
Electricity	8.16	11.67	14.42	18.95	17.92	17.85	17.55	17.19	16.86	15.32	16.06
Transportation	**6.31**	**7.77**	**11.48**	**8.64**	**5.21**	**4.37**	**4.51**	**4.66**	**4.83**	**6.82**	**8.20**
Primary Energy	6.31	7.76	11.48	8.64	5.20	4.36	4.50	4.65	4.82	6.81	8.19
Petroleum Products	6.31	7.76	11.48	8.64	5.20	4.36	4.50	4.65	4.82	6.81	8.19
Distillate Fuel[8]	3.57	5.39	9.58	8.60	4.93	4.15	4.38	4.63	4.88	7.41	9.31
Jet Fuel[9]	1.98	3.94	8.47	6.11	3.93	3.56	3.71	3.89	4.06	5.69	6.97
Motor Gasoline[5]	7.74	8.95	13.11	9.23	5.69	4.65	4.79	4.93	5.09	7.11	8.41
Residual Fuel[10]	1.04	3.33	4.41	4.09	2.05	1.41	1.59	1.69	1.79	3.01	3.75
Other Petroleum[11]	9.39	10.85	18.25	12.00	6.03	4.29	4.51	4.75	5.02	8.43	10.62
Electricity	12.53	23.24	19.75	21.15	19.89	19.79	19.56	19.15	18.78	17.07	17.83
Total Energy	**4.45**	**6.42**	**9.17**	**8.77**	**6.75**	**6.29**	**6.36**	**6.47**	**6.62**	**7.97**	**9.29**
Primary Energy -- Four Sectors	3.50	5.09	7.74	6.65	4.42	3.95	4.04	4.19	4.38	6.00	7.26
Electricity	13.62	16.66	18.67	20.63	19.53	19.45	19.16	18.77	18.43	16.86	17.61
Electric Utilities											
Fossil Fuel Average	**.87**	**2.02**	**2.60**	**2.16**	**1.81**	**1.80**	**1.73**	**1.76**	**1.80**	**2.23**	**2.69**
Petroleum Products	1.14	3.86	5.78	4.43	2.51	1.95	1.97	2.12	2.25	3.58	4.57
Distillate Fuel[12]	1.49	4.24	7.63	6.02	3.58	3.13	3.28	3.41	3.59	5.38	6.78
Residual Fuel	1.12	3.83	5.66	4.36	2.47	1.91	1.97	2.12	2.23	3.45	4.42
Natural Gas	.76	1.44	2.92	3.53	2.53	2.71	2.18	2.29	2.43	3.75	5.18
Steam Coal	.84	1.58	1.80	1.69	1.61	1.62	1.63	1.64	1.67	1.82	1.89
Average Price to All Users											
Petroleum Products	4.74	6.50	9.84	7.95	4.71	4.01	4.16	4.33	4.50	6.33	7.55
Distillate Fuel[8]	3.16	5.01	8.92	7.68	4.44	3.78	3.99	4.21	4.44	6.69	8.42
Jet Fuel	1.98	3.94	8.47	6.11	3.93	3.56	3.71	3.89	4.06	5.69	6.97
Kerosene	3.24	5.25	9.29	6.92	4.14	3.61	3.79	3.99	4.20	6.18	7.69
Liquefied Petroleum Gas	4.04	5.75	7.51	6.81	4.03	3.49	3.67	3.88	4.09	6.07	7.60
Motor Gasoline[5]	7.74	8.95	13.11	9.23	5.69	4.65	4.79	4.93	5.09	7.11	8.41
Residual Fuel	1.16	3.71	5.18	4.17	2.29	1.68	1.80	1.90	2.01	3.24	4.16
Other Petroleum Products[13]	4.59	6.26	8.80	10.18	4.23	5.99	6.38	6.79	7.13	10.01	12.71
Natural Gas	1.61	2.28	3.82	4.71	4.01	3.99	3.89	4.06	4.29	5.60	6.92
Coal	1.02	1.99	1.95	1.72	1.65	1.67	1.67	1.68	1.71	1.86	1.94
Electricity	13.62	16.66	18.67	20.63	19.53	19.45	19.16	18.77	18.43	16.86	17.61

See footnotes at end of Appendix C.

Sources: Historical prices through 1985 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986), pp. 5-6. Prices for 1985 are preliminary. Prices for 1986 are estimated. All other prices are forecasts from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 21, 1987.

Table B4. Electric Utility Fuel Consumption and Electricity Sales
(Quadrillion Btu per Year)

Fuel Consumption and Sales	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Fuel Inputs											
Oil											
Distillate	0.14	0.23	0.17	0.09	0.05	0.04	0.00	0.01	0.01	0.15	0.27
Residual	1.98	2.94	2.46	1.00	1.42	1.11	1.26	1.16	1.26	2.30	3.93
Natural Gas	4.05	3.24	3.81	3.16	2.68	2.67	2.63	2.59	2.70	2.86	3.47
Steam Coal	7.23	8.79	12.12	14.54	14.49	14.89	15.27	15.70	16.09	18.76	20.74
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.70	5.97	6.39	6.71
Hydropower/Other[1]	2.61	3.19	2.98	3.08	3.21	3.36	3.06	3.10	3.11	3.18	3.18
Total Fuel Inputs	16.25	20.29	24.29	26.03	26.23	26.93	27.62	28.25	29.15	33.64	38.29
Net Imports	.02	.06	.22	.42	.42	.44	.46	.48	.51	.57	.69
Total Electricity Inputs	**16.27**	**20.35**	**24.51**	**26.45**	**26.65**	**27.37**	**28.08**	**28.73**	**29.66**	**34.21**	**38.98**
Disposition											
Total Electricity Inputs	16.27	20.35	24.51	26.45	26.65	27.37	28.08	28.73	29.66	34.21	38.98
Minus Conversion Losses[2]	11.05	13.81	16.71	18.02	18.15	18.66	19.07	19.52	20.17	23.10	26.61
Generation	5.23	6.54	7.80	8.43	8.50	8.71	9.01	9.21	9.49	11.11	12.37
Plus PURPA[3] Purchases	.00	.00	NA	.08	.09	.10	.11	.12	.14	.18	.21
Minus Transportation and Distribution Losses	.48	.58	.65	.63	.53	.54	.62	.63	.64	.73	.75
Electricity Sales	**4.75**	**5.96**	**7.15**	**7.88**	**8.07**	**8.27**	**8.50**	**8.70**	**8.99**	**10.56**	**11.83**
Electricity Sales by End-Use Sector											
Residential	1.59	2.01	2.45	2.70	2.76	2.82	2.91	3.01	3.10	3.63	4.11
Commercial/Other[4]	1.21	1.61	1.92	2.37	2.42	2.49	2.53	2.56	2.62	3.06	3.50
Industrial	1.95	2.35	2.78	2.81	2.88	2.96	3.05	3.13	3.27	3.86	4.22
Total Electricity Sales	**4.75**	**5.96**	**7.15**	**7.88**	**8.07**	**8.27**	**8.50**	**8.70**	**8.99**	**10.56**	**11.83**

[1] Includes renewable electric utility energy sources such as hydropower, geothermal power, wood, waste, solar power, and wind power.
[2] Conversion losses includes net imports.
[3] Electric utility purchases under the Public Utility Regulatory Policies Act of 1978 (PURPA) began after 1978 and are estimated only for 1985 and future years.
[4] Includes street lighting and sales to the transportation end-use sector.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical values are obtained or derived from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*, DOE/EIA-0214(84), (Washington, DC, 1986) and *Monthly Energy Review*, DOE/EIA-0035(86/04), (Washington, DC, 1986).
Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 16, 1987.

Table B5. Electric Utility Summer Capability and Generation

(Capability in Million Kilowatts)

(Generation in Billion Kilowatthours per Year)

Summer Capability and Generation	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Capability[1]											
Coal Steam	131.7	185.5	237.3	285.8	289.5	292.0	294.3	295.9	295.5	318.5	345.6
Other Fossil Steam	115.6	146.4	156.8	148.3	146.7	146.1	145.3	144.8	143.4	136.4	130.3
Combined Cycle	0.5	2.8	5.5	4.6	4.4	4.4	4.4	4.4	4.7	4.7	12.8
Turbine/Diesel	17.3	39.8	43.5	44.5	44.2	44.3	44.4	44.5	45.3	51.1	80.7
Nuclear Power	7.0	37.2	51.7	80.3	85.2	95.2	97.2	102.7	105.1	106.5	108.8
Hydropower/Other[2]	59.8	68.8	69.4	75.0	75.1	75.3	76.2	76.8	77.0	78.4	78.5
Pumped Storage Hydropower	4.4	10.8	14.5	17.7	17.5	17.7	17.7	17.7	18.0	19.1	20.7
Total Capability	**336.4**	**491.3**	**578.6**	**656.1**	**662.6**	**675.0**	**679.4**	**686.8**	**689.0**	**714.7**	**777.5**
Generation by Plant Type											
Coal Steam[3]	[4] 704	853	1,162	1,402	1,405	1,439	1,484	1,526	1,565	1,823	2,024
Other Fossil Steam	[4] 535	557	559	368	358	326	339	326	343	469	482
Combined Cycle	([4])	7	15	15	14	13	21	20	21	25	79
Turbine/Diesel	[4] 22	25	19	9	9	8	4	4	5	45	118
Nuclear Power	22	173	251	384	404	448	495	523	548	586	615
Hydropower/Other[2]	249	303	281	292	313	328	307	311	312	319	320
Pumped Storage Hydropower	NA	NA	NA	NA	-11	-11	-11	-11	-11	-11	-13
Total Generation	**1,532**	**1,918**	**2,286**	**2,470**	**2,492**	**2,551**	**2,640**	**2,699**	**2,783**	**3,255**	**3,626**
Generation by Fuel Type											
Coal	704	853	1,162	1,402	1,402	1,435	1,481	1,523	1,561	1,819	2,021
Natural Gas	372	300	346	292	246	245	245	242	251	315	298
Oil	184	289	246	100	137	105	121	111	120	227	385
Nuclear Power	22	173	251	384	404	448	495	523	548	586	615
All Hydropower/Other[5]	249	303	282	292	303	317	296	300	301	307	307
Total Generation	**1,532**	**1,918**	**2,286**	**2,470**	**2,492**	**2,551**	**2,640**	**2,699**	**2,783**	**3,255**	**3,626**

[1] Stock as of December 31. Net summer capability is the load carrying ability of a generator under summer (adverse) conditions for a specified time period. Historical values include capability out-of-service; projections exclude this capability. All capability is enumerated when units become operable, that is, available to provide power to the grid.

[2] Includes other renewable sources such as geothermal power, wood, waste, solar energy, and wind; historical pumped storage data for generation are not collected separately and are included among hydropower/other totals.

[3] Historical values (1970-1985) understate coal steam generation and overstate other steam generation because they attribute small amounts of oil and natural gas used for startup and flame stability in coal steam plants to other steam plant generation.

[4] For 1970, Combined Cycle generation data are not separately available but are included among steam and turbine/diesel data.

[5] Includes conventional and pumped storage hydropower and other renewable sources such as geothermal power, wood, waste, solar energy, and wind.

NA = Not available.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Generation data are from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035 (86/04), Washington, DC, 1986), p. 74, and the Energy Information Administration, Form EIA-759, "Monthly Power Plant Report." Capability values are from the Energy Information Administration Generating Unit Reference File (GURF), 1986. Historical quantities are through 1985.

Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 16, 1987.

Table B6. Electric Utility Summer Capability Additions
(Thousand Kilowatts)

Additions	Low World Oil Price - High Growth Case							
	1985	1986	1987	1988	1989	1990	1991-1995	1996-2000
Total Additions								
Nuclear Power[1]	9,864	5,845	9,910	2,075	5,456	2,376	2,306	2,446
Coal Steam	5,975	4,027	2,667	2,287	1,837	217	24,638	31,337
Other Steam[2]	0	40	40	0	0	331	94	8,178
Turbines[3]	87	210	171	154	121	840	6,560	29,669
Pumped Storage Hydropower	2,100	0	205	0	0	304	1,083	1,636
Hydropower/Other[4]	1,373	326	195	858	693	293	1,387	125
Total New Capability	**19,399**	**10,448**	**13,189**	**5,374**	**8,108**	**4,361**	**36,068**	**73,391**
Announced/Planned Construction[5]								
Nuclear Power[1]	9,864	5,845	9,910	2,075	5,456	2,376	2,306	2,446
Coal Steam	5,975	4,027	2,667	2,287	1,837	217	19,638	5,336
Other Steam[2]	0	40	40	0	0	331	94	178
Turbines[3]	87	210	171	154	121	840	2,060	118
Pumped Storage Hydropower	2,100	0	205	0	0	304	1,083	1,636
Hydropower/Other[4]	1,373	326	195	858	693	293	1,387	125
Total Announced/Planned	**19,399**	**10,448**	**13,189**	**5,374**	**8,108**	**4,361**	**26,568**	**9,840**
Additional Needed Capability[6]								
Nuclear Power[1]	0	0	0	0	0	0	0	0
Coal Steam	0	0	0	0	0	0	5,000	26,001
Other Steam[2]	0	0	0	0	0	0	0	8,000
Turbines[3]	0	0	0	0	0	0	4,500	29,551
Pumped Storage Hydropower	0	0	0	0	0	0	0	0
Hydropower/Other[4]	0	0	0	0	0	0	0	0
Total Additional Needed	**0**	**0**	**0**	**0**	**0**	**0**	**9,500**	**63,552**

[1] Nuclear capability is as of the date the unit first delivers power to the grid; all other capability is as of the date the unit begins commercial service.
[2] Includes natural gas, oil, and dual-fired oil/natural gas steam and combined cycle capability.
[3] Includes all gas turbine and internal combustion capability.
[4] Includes conventional hydroelectric and other renewable sources of power such as geothermal, wood, waste, solar, and wind.
[5] Includes all new capability announced by the electric utility industry.
[6] Includes additional new capability considered necessary by the Energy Information Administration to meet electricity demands.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Input data file = IFFSLH.D1209861. Table printed on January 16, 1987.

Table B7. Electric Utility Sales, Prices, and Price Components
(Billion Kilowatthours per Year)
(1986 Dollars per Thousand Kilowatthours)

Sales, Prices and Price Components	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Electricity Sales by End-Use Sector											
Residential	466	588	717	791	809	828	854	881	909	1,065	1,205
Commercial/Other[1]	355	471	562	694	711	729	742	750	767	897	1,026
Industrial	571	688	815	825	845	868	894	919	958	1,133	1,236
Total Electricity Sales	**1,392**	**1,747**	**2,094**	**2,310**	**2,364**	**2,424**	**2,490**	**2,550**	**2,634**	**3,095**	**3,467**
Prices[2]											
Residential	60.67	67.68	71.61	73.05	69.37	69.07	67.98	66.68	65.53	60.33	62.73
Commercial[1]	56.92	67.22	73.70	74.12	70.12	69.89	69.00	67.63	66.45	60.81	63.26
Industrial	27.83	39.82	49.19	64.69	61.11	60.85	59.85	58.61	57.51	52.30	54.85
All Sectors	**46.48**	**56.83**	**63.70**	**70.40**	**66.68**	**66.41**	**65.40**	**64.09**	**62.92**	**57.57**	**60.12**
Price Components											
Capital Component[3]	NA	NA	NA	32.08	30.85	30.85	30.35	28.92	27.60	18.84	17.77
Fuel Component[4]	NA	NA	NA	21.00	18.16	17.84	17.40	17.60	17.94	21.91	25.67
O&M Component[5]	NA	NA	NA	17.32	17.66	17.72	17.65	17.57	17.37	16.82	16.68
Total Price[2]	**46.48**	**56.83**	**63.70**	**70.40**	**66.68**	**66.41**	**65.40**	**64.09**	**62.92**	**57.57**	**60.12**

[1] Includes consumption for street and highway lighting, other public authorities, and railroads and railways.
[2] Prices for 1985 to 2000 are estimated from model simulations and represent average revenues per kilowatthour of demand for the total electric utility industry. Revenue requirements are projected from the financial information contained on the Federal Energy Regulatory Commission Form FERC-1, Form FERC-1-M, and on the Energy Information Administration Form EIA-412.
[3] The capital component represents the cost to the utility of capital assets needed to provide reliable service. It includes plant depreciation, taxes, and sufficient return on invested capital to cover interest obligations on outstanding debt and to compensate stockholders.
[4] The fuel component includes only the direct costs of fuel inputs used to generate electricity required to meet demand.
[5] The operation and maintenance (O&M) component includes all nonfuel costs necessary to operate and maintain generation, transmission, and distribution capacity used to deliver electricity to end-use sectors.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical prices are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986). Historical demands are from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*.DOE/EIA-0214(84), (Washington, DC, 1986) and *Monthly Energy Review*, DOE/EIA-0035(86/04), (Washington, DC, 1986). Electricity prices representing both public and private utilities for 1985 are estimates. Projected prices are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 16, 1987.

Table B8. Petroleum Supply and Disposition Balance
(Million Barrels per Day)

Supply and Disposition	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
World Oil Price[1]	8.05	26.83	45.16	27.68	14.57	11.12	11.75	12.42	13.13	21.20	26.76
Production											
Crude Oil[2]	9.64	8.37	8.60	8.97	8.75	8.44	8.01	7.49	7.10	5.61	4.60
Alaska	.23	.19	1.62	1.83	1.86	1.79	1.67	1.60	1.58	1.14	.65
Lower 48	9.41	8.18	6.98	7.15	6.89	6.65	6.34	5.89	5.52	4.47	3.95
Natural Gas Plant Liquids	1.66	1.63	1.57	1.61	1.62	1.62	1.68	1.64	1.65	1.67	1.58
Other Domestic[3]	.02	.04	.04	.06	.05	.06	.05	.05	.05	.05	.05
Processing Gain[4]	.36	.46	.60	.56	.56	.56	.59	.59	.60	.61	.65
Total Production	**11.67**	**10.50**	**10.81**	**11.20**	**10.98**	**10.68**	**10.33**	**9.77**	**9.41**	**7.94**	**6.88**
Imports (including SPR)											
Crude Oil[5]	1.32	4.10	5.26	3.20	4.03	4.11	5.37	5.86	6.36	7.72	9.24
Refined Products	2.10	1.95	1.65	1.87	1.88	2.02	2.13	2.09	2.16	2.64	3.38
Total Imports	3.42	6.06	6.91	5.07	5.90	6.13	7.50	7.95	8.52	10.35	12.62
Exports											
Crude Oil	.01	.01	.29	.20	.17	.19	.19	.19	.19	.19	.19
Refined Products	.25	.20	.26	.58	.59	.56	.56	.56	.56	.56	.56
Total Exports	.26	.21	.54	.78	.75	.75	.75	.75	.75	.75	.75
Net Imports (Including SPR)	**3.16**	**5.85**	**6.36**	**4.29**	**5.15**	**5.38**	**6.75**	**7.20**	**7.77**	**9.60**	**11.87**
Primary Stock Changes											
Net Withdrawals[6]	-.10	-.03	-.10	.22	-.14	.09	-.09	.00	-.03	.01	-.03
SPR Fill Rate Additions (-)[7]	.00	.00	-.04	-.12	-.05	-.06	-.04	-.04	-.04	-.04	-.04
Total Primary Supply[8]	**14.73**	**16.32**	**17.04**	**15.60**	**15.94**	**16.09**	**16.96**	**16.94**	**17.11**	**17.51**	**18.68**
Refined Petroleum Products											
Motor Gasoline	5.78	6.67	6.58	6.83	7.05	7.31	7.20	7.10	7.07	6.61	6.55
Jet Fuel[9]	.97	1.00	1.07	1.22	1.30	1.36	1.42	1.45	1.50	1.52	1.62
Distillate Fuel	2.54	2.85	2.87	2.87	2.88	3.11	3.14	3.21	3.26	3.53	3.77
Residual Fuel	2.20	2.46	2.51	1.20	1.42	1.37	1.44	1.42	1.49	2.02	2.81
Other Petroleum Products[10]	3.20	3.33	4.04	3.61	3.45	3.72	3.75	3.76	3.79	3.84	3.93
Total Product Supplied	**14.70**	**16.32**	**17.06**	**15.73**	**16.10**	**16.87**	**16.96**	**16.94**	**17.11**	**17.52**	**18.68**
Refined Petroleum Products Supplied to Sectors											
Residential and Commercial	2.18	1.95	1.52	1.35	1.35	1.42	1.46	1.49	1.51	1.48	1.37
Industrial[11]	3.82	4.03	4.81	4.00	3.95	4.32	4.32	4.34	4.38	4.45	4.62
Transportation	7.77	8.95	9.55	9.88	10.13	10.62	10.62	10.60	10.65	10.50	10.85
Electric Utilities	.93	1.39	1.15	.48	.64	.50	.55	.51	.55	1.08	1.83
Total Consumption	**14.70**	**16.31**	**17.03**	**15.71**	**16.08**	**16.86**	**16.95**	**16.93**	**17.10**	**17.50**	**18.67**
Discrepancy[12]	.03	.01	.01	-.12	-.14	-.77	.01	.01	.01	.01	.01
Net Disposition[13]	**14.73**	**16.32**	**17.04**	**15.60**	**15.94**	**16.09**	**16.96**	**16.94**	**17.11**	**17.51**	**18.68**

[1] The cost of imported crude oil to U.S. refiners in 1986 dollars per barrel.
[2] Includes lease condensate.
[3] Other domestic prior to 1981 includes unfinished oils (net), hydrogen, and hydrocarbons not included elsewhere. After 1981, other domestic includes unfinished oils (net), motor gasoline blending components (net), aviation gasoline blending components (net), hydrogen, other hydrocarbons, alcohol, and synthetic crude production.
[4] Represents volumetric gain in refinery distillation and cracking processes.
[5] In 1977 and later years, crude oil imports include crude oil imported for the Strategic Petroleum Reserve.
[6] Net stock withdrawals for a given year, t, are defined as the change in end-of-year stock levels from period t-1 minus the end-of-year stock level from the year t. A minus is treated as a deletion from total supply and a plus is treated as an addition to total supply.
[7] SPR is the Strategic Petroleum Reserve.
[8] Total primary supply is defined as total production plus net imports plus net stock withdrawals minus SPR additions.
[9] Includes naphtha and kerosene type.
[10] Includes aviation gasoline, kerosene, liquefied petroleum gas, petrochemical feedstocks, miscellaneous petroleum products, lubricants, waxes, unfractionated stream, plant condensate, natural gasoline, asphalt, road oil, still gas, special naphthas, and petroleum coke.
[11] Includes total industrial demand for petroleum.
[12] Represents the difference between total primary supply and total consumption.
[13] Net disposition is the sum of total consumption and discrepancy.

Note: From 1983 onward, the product supplied data and stock data are on a new basis. The other product category is on a net basis, reclassified (petroleum products reprocessed into other categories) plus the other category of products supplied.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical data are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 101-121, Tables 45, 46, 47, and 55. Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 21, 1987.

Note: 1986 data are based on EIA's October 1986 issue of the Short-Term Energy Outlook. These data are, therefore, partial estimates. At press time, a revised estimate of the crude oil production for 1986 is 8.67 million barrels per day.

Table B9. Natural Gas Supply, Disposition, and Prices

(Trillion Cubic Feet per Year)

(1986 Dollars per Thousand Cubic Feet)

Supply, Disposition, and Prices	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production											
Dry Gas Production[1]	21.01	19.24	19.40	16.38	16.30	16.27	16.68	16.30	16.45	16.21	16.06
Supplemental Natural Gas[2]	NA	NA	.15	.13	.14	.14	.00	.00	.00	.00	.00
Net Imports	.75	.88	.94	.89	.74	.88	.66	.99	1.08	1.64	2.24
Net Storage Withdrawals[3]	-.40	-.34	.02	.23	-.09	.12	.00	.00	.00	.00	.00
Total Supply[4]	**21.37**	**19.77**	**20.51**	**17.63**	**17.09**	**17.41**	**17.33**	**17.29**	**17.52**	**17.85**	**18.30**
Consumption by Sector[5]											
Residential	4.84	4.92	4.75	4.43	4.33	4.42	4.50	4.57	4.62	4.66	4.55
Commercial[6]	2.40	2.51	2.61	2.43	2.37	2.41	2.46	2.49	2.52	2.68	2.72
Industrial	7.85	6.97	7.17	5.90	5.94	6.13	6.04	5.97	5.96	5.90	5.70
Lease & Plant Fuel[7]	1.40	1.40	1.03	.97	.81	.81	.84	.82	.83	.87	.94
Transportation[8]	.72	.58	.63	.50	.49	.48	.50	.49	.50	.49	.48
Electric Utilities	3.93	3.16	3.68	3.04	2.58	2.57	2.54	2.50	2.60	2.75	3.34
Total Consumption	**21.14**	**19.54**	**19.88**	**17.28**	**16.52**	**16.83**	**16.88**	**16.84**	**17.02**	**17.36**	**17.74**
Unaccounted for[9]	.23	.24	.64	.35	.57	.58	.45	.45	.50	.49	.56
Average Wellhead Price	**.46**	**.87**	**2.12**	**2.57**	**1.73**	**1.90**	**2.14**	**2.29**	**2.52**	**3.73**	**5.00**
Delivered Prices by Sectors											
Residential	2.98	3.29	4.92	6.27	5.75	5.63	5.59	5.71	5.97	7.28	8.69
Commercial[6]	2.10	2.60	4.53	5.63	5.08	4.95	4.90	5.02	5.25	6.46	7.79
Industrial	1.07	1.86	3.43	4.05	3.17	3.19	3.16	3.37	3.67	5.13	6.60
Electric Utilities	.79	1.48	3.03	3.66	2.63	2.81	2.26	2.38	2.52	3.89	5.38
Average to All Sectors[10]	**1.63**	**2.30**	**3.90**	**4.83**	**4.11**	**4.09**	**3.99**	**4.16**	**4.41**	**5.76**	**7.13**

[1] Net dry natural gas is defined as dry marketed production minus nonhydrocarbon gases removed.

[2] Prior to 1980, the amount of supplemental fuels included in the natural gas data cannot be determined. Supplemental natural gas includes synthetic natural gas (results from the manufacture, conversion, or the reforming of petroleum hydrocarbons), and propane air mixtures. After 1985, this quantity includes short-term spot market purchases that could include additional imports.

[3] Includes net storage withdrawals for dry natural gas from underground storage and liquefied natural gas. Net storage withdrawals are computed as the end-of-year stock levels from the current period subtracted from the end-of-year stock levels from the preceding period. A minus is treated as a deletion from total supply and a plus is treated as an addition to total supply.

[4] Total supply is computed as dry gas production plus supplemental natural gas, net imports, and net storage withdrawals.

[5] Consumption values include small amounts of supplemental gas, which are not reported as production prior to 1980.

[6] Commercial sector includes deliveries to municipalities and other public authorities for institutional heating, street lighting, etc.

[7] Lease and plant fuel natural gas represents natural gas used in the field gathering and processing plant machinery, usually totalled into the industrial sector for other consumption tables.

[8] Transportation natural gas is used to fuel the compressors in the pipeline pumping stations.

[9] Unaccounted for represents natural gas lost, the net result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure, and EIA's merger of different data reporting systems which vary in scope, format, definition, and respondent type.

[10] Weighted average price. Weights used are the sectoral consumption values excluding lease and plant fuel and the transportation sector.

NA = Not available.

Note: Implicit Gross National Product Price Deflator, rebased to 1986 = 1.00, was used to convert from nominal to real dollars. The natural gas prices in this table are average prices, total revenues divided by total sales for each customer class.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Historical data are taken from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986) and the Energy Information Administration, *Natural Gas Annual 1985*, Vol. 1 DOE/EIA-0131(85)/1 (Washington, DC, 1986). Historical quantities are through 1985. Historical prices through 1984 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986), p. 6. Projected values are based on preliminary estimates of 1985 prices, and on outputs from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 21, 1987.

Table B10. Coal Supply, Disposition, and Prices

(Million Short Tons per Year)

(1986 Dollars per Short Ton)

Supply, Disposition, and Price	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production[1]											
East of the Mississippi	568	544	579	559	568	595	619	634	647	714	791
West of the Mississippi	45	111	251	325	322	325	330	337	347	428	471
Total	**613**	**655**	**830**	**884**	**890**	**920**	**949**	**971**	**993**	**1,142**	**1,262**
Imports	(*)	1	1	2	2	2	2	3	3	5	7
Exports[2]	72	66	92	92	89	89	92	94	97	109	129
Net Imports	**-72**	**-65**	**-91**	**-90**	**-87**	**-87**	**-89**	**-91**	**-94**	**-105**	**-123**
Net Storage Withdrawals[3]	**-11**	**-32**	**-22**	**27**	**18**	**-7**	**-4**	**-4**	**-4**	**-6**	**-7**
Total Supply[4]	**530**	**558**	**717**	**820**	**821**	**825**	**856**	**876**	**896**	**1,032**	**1,132**
Consumption by Sector											
Residential and Commercial	16	9	6	8	8	8	8	8	8	7	7
Industrial	90	64	60	75	77	80	83	86	89	98	114
Coking Plants[5]	96	84	67	41	38	39	39	37	37	33	28
Electric Utilities	320	406	569	694	690	706	726	744	762	893	983
Total Consumption	**523**	**563**	**703**	**818**	**813**	**833**	**856**	**875**	**896**	**1,031**	**1,131**
Discrepancy[6]	7	-5	15	2	8	-7	(*)	(*)	(*)	(*)	(*)
Average Minemouth Price[7]	**17.02**	**37.03**	**32.67**	**25.81**	**25.44**	**25.69**	**25.70**	**25.92**	**26.39**	**28.76**	**30.11**
Delivered Prices by Sector											
Residential and Commercial[8]	46.97	75.86	63.91	45.89	45.53	45.89	46.33	46.78	47.55	51.76	54.07
Industrial	27.48	55.31	47.47	38.12	37.72	38.07	38.64	38.99	39.64	44.31	47.83
Coking Plants[5]	32.79	85.15	74.99	55.61	55.44	55.97	56.35	56.85	57.99	63.86	66.46
Electric Utilities[9]	19.03	34.18	38.31	35.38	33.74	34.26	34.33	34.66	35.17	38.15	39.97
Average to All Sectors[10]	**23.58**	**44.64**	**42.98**	**36.75**	**35.25**	**35.74**	**35.85**	**36.14**	**36.66**	**39.65**	**41.50**

[1] Historical coal production includes anthracite, bituminous coal, and lignite. In the projections, anthracite production was not separately identified, but included in bituminous coal production.

[2] Excludes small quantities of anthracite shipped overseas to U.S. Armed Forces.

[3] From (secondary) stocks held by end-use sectors (industrial plants, coke plants, and electric utilities). Positive numbers represent withdrawals from stocks, and negative numbers represent additions to stocks.

[4] Total supply equals production plus net imports plus net storage withdrawals.

[5] Coke plants consume small quantities of anthracite together with bituminous coal for metallurgical purposes. In the historical data, coking plant coal price is a weighted average of anthracite and bituminous coal prices. In the projections, anthracite was not separately identified, but included in bituminous coal.

[6] In the historical data, the discrepancy represents changes in producers (primary) stocks plus losses and unaccounted for coal. In the projections, the discrepancy represents errors due to independent rounding.

[7] Projected minemouth prices (1986-2000) are based on mining cost estimates, and assumed coal market conditions.

[8] Projected coal prices for the residential and commercial sector (1985-2000) do not include dealer markup.

[9] Electric utility price in historical years represents a weighted average of anthracite, bituminous coal, and lignite prices. In the projections, bituminous coal price was used for anthracite, since anthracite was not separately identified, but included in bituminous coal.

[10] Weighted average price. The quantity weights used are the sectoral consumption values.

(*) Greater than zero but less than .5.

Note: Implicit Gross National Product Price Deflator, rebased to 1986 = 1.00, was used to convert from nominal to real dollars.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Historical data on quantities and minemouth prices through 1984 are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 163-177, Tables 72, 73, 74, and 79. Historical 1985 quantities are from the Energy Information Administration, *Weekly Coal Production*, DOE/EIA-0218(86/45) (Washington, DC). The historical 1985 minemouth price is from the Energy Information Administration, *Coal Production 1985*,DOE/EIA-0118(85) (Washington, DC, 1986), Table 21. Historical data on delivered prices through 1984 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, December 1986), p. 6, and price data for 1985 (except for the residential and commercial sector) are from the Energy Information Administration, *Quarterly Coal Report*, DOE/EIA-0125(86/2Q) (Washington, DC, October, 1986). Projected coal imports are based on Energy Information Administration, *Outlook for U.S. Coal Imports*, DOE/EIA-0483 (Washington, DC, 1986), p. 14, Table 3. Projected quantities and prices are outputs from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 16, 1987.

Table B11. National Macroeconomic Indicators

Macroeconomic Indicators	Low World Oil Price - High Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
World Oil Price[1]	**8.05**	**26.83**	**45.16**	**27.68**	**14.57**	**11.12**	**11.75**	**12.42**	**13.13**	**21.20**	**26.76**
World Oil Price											
(nominal dollars)[2]	**2.96**	**13.93**	**33.89**	**27.03**	**14.57**	**11.42**	**12.47**	**13.66**	**15.03**	**31.34**	**51.61**
Economic Variables											
Real GNP											
(billion 1982 dollars)	2,416	2,695	3,187	3,585	3,686	3,792	3,915	3,997	4,116	4,700	5,343
Real Disposable Income											
(billion 1982 dollars)	1,668	1,932	2,214	2,528	2,622	2,682	2,753	2,797	2,876	3,231	3,633
Real Disposable Income per Capita											
(thousand 1982 dollars)	8.2	9.0	9.7	10.6	10.9	11.1	11.2	11.3	11.5	12.5	13.6
NIPA GNP Price Deflator											
(1982:1.00)	.420	.593	.857	1.115	1.142	1.173	1.212	1.256	1.307	1.688	2.202
Unemployment Rate, Civilian Workers											
(percent)	5.0	8.5	7.2	7.2	7.0	6.8	6.5	6.6	6.5	6.4	6.4
Population, Noninstitutional											
(million persons)	204.0	215.5	227.3	238.4	240.5	242.7	244.9	247.0	249.2	259.1	267.5
New, High Grade Bond Rate											
(percent per annum)	8.50	9.01	12.47	11.03	8.49	8.51	8.20	8.12	8.66	8.70	8.57
Home Mortgage Rate											
(percent per annum)	8.32	8.88	13.77	12.41	10.21	9.93	9.75	9.50	10.09	10.16	10.03
Housing Starts											
(million units)	1.44	1.16	1.30	1.74	1.90	1.75	1.75	1.77	1.73	1.69	1.69
Energy Usage Indicators											
Gross Energy Use per Capita											
(million Btu per person)	325.8	327.4	334.2	309.9	308.9	318.2	319.8	319.6	322.1	327.5	338.3
Gross Energy Use per Dollar of GNP											
(thousand Btu per 1982 dollar)	27.5	26.2	23.8	20.6	20.2	20.4	20.0	19.8	19.5	18.1	16.9

[1] The cost of imported crude oil to U.S. refiners in 1986 dollars per barrel.
[2] The cost of imported crude oil to U.S. refiners in current dollars per barrel.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical data are derived from the following sources: Data Resources, Inc., USMODEL database, (September, 1985) and the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986). Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSLH.D1209861. Table printed on January 28, 1987.

Appendix C

High World Oil Price - Low Growth Case Forecasts

Appendix C

High World Oil Price - Low Growth Case Forecasts

Table C1. Yearly Supply and Disposition Summary of Total Energy
(Quadrillion Btu per Year)

Total Supply and Disposition	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production											
Crude Oil and Lease Condensate	20.4	17.7	18.2	19.0	18.7	18.4	18.1	17.5	16.7	14.5	14.6
Natural Gas Plant Liquids	2.5	2.4	2.3	2.2	2.2	2.2	2.4	2.4	2.4	2.3	2.2
Natural Gas[1]	21.7	19.6	20.1	17.1	17.0	16.9	17.7	17.5	17.6	17.4	16.3
Coal[2]	14.6	15.0	18.6	19.3	19.5	20.1	20.7	20.8	21.2	23.9	25.6
Nuclear Power	.2	1.9	2.7	4.2	4.4	4.9	5.4	5.7	6.0	6.4	6.7
Hydropower/Other[3]	2.6	3.2	3.0	3.1	3.2	3.4	3.1	3.1	3.1	3.2	3.2
Total Production	**62.1**	**59.9**	**64.9**	**64.9**	**65.0**	**66.0**	**67.4**	**67.0**	**67.0**	**67.8**	**68.6**
Imports											
Crude Oil[4]	2.8	8.7	11.2	6.8	8.6	8.7	7.8	8.3	9.0	10.9	11.5
Petroleum Products[5]	4.7	4.2	3.5	3.8	3.8	4.1	3.6	3.6	3.7	4.1	5.4
Natural Gas[6]	.8	.9	1.0	.9	.7	.9	.8	1.1	1.2	1.8	2.5
Other Imports[7]	.0	.1	.3	.5	.5	.5	.5	.6	.6	.7	.9
Total Imports	**8.3**	**14.0**	**15.9**	**12.0**	**13.6**	**14.2**	**12.6**	**13.4**	**14.4**	**17.6**	**20.3**
Exports											
Coal	1.9	1.8	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.7
Crude Oil and Petroleum Products	.5	.4	1.2	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Other[8]	.1	.0	.1	NA	NA	NA	NA	NA	NA	NA	NA
Total Exports	**2.5**	**2.2**	**3.6**	**4.1**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**	**4.0**	**4.3**
Net Stock Withdrawals	**-.9**	**-1.2**	**-.8**	**1.0**	**-.1**	**.0**	**-.1**	**-.1**	**-.2**	**-.2**	**-.2**
Adjustments[9]	-.4	.1	-.4	.2	-.4	-1.1	-.1	-.1	-.2	-.1	-.1
Consumption											
Petroleum Products[10]	29.5	32.7	34.2	30.9	31.7	31.4	30.6	30.3	30.4	30.6	32.5
Natural Gas	21.8	19.9	20.4	17.9	17.1	17.4	18.2	18.2	18.3	18.7	18.2
Coal	12.3	12.7	15.4	17.5	17.4	17.8	18.4	18.5	18.9	21.5	23.0
Nuclear Power	.2	1.9	2.7	4.2	4.4	4.9	5.4	5.7	6.0	6.4	6.7
Hydroelectric Power/Other[11]	2.6	3.3	3.2	3.5	3.7	3.8	3.5	3.6	3.6	3.8	3.9
Total Consumption	**66.5**	**70.6**	**76.0**	**73.9**	**74.2**	**75.3**	**76.0**	**76.3**	**77.3**	**81.0**	**84.3**

[1] Net dry marketed production after removal of nonhydrocarbon gases, plus supplemental natural gas.
[2] Historical coal production includes anthracite, bituminous, and lignite. Projected coal production (1986-2000) includes bituminous and lignite, with anthracite included in bituminous.
[3] Includes hydropower, geothermal power, and wood waste.
[4] Includes imports of crude oil for the Strategic Petroleum Reserve.
[5] Includes imports of unfinished oils and natural gas plant liquids.
[6] Includes dry natural gas imports from Canada and Mexico, and liquefied natural gas imports from Algeria. In both the historical and forecast periods, natural gas imports are net imports.
[7] Includes electricity, coal, and coal coke imports.
[8] Includes electricity and coal coke exports. Gas exports are not included.
[9] Balancing item that includes stock changes, gains, losses, miscellaneous blending components, unaccounted for supply, anthracite shipped overseas to U.S. Armed Forces, and certain secondary stock withdrawals.
[10] Includes natural gas plant liquids and crude oil consumed as a fuel.
[11] Includes industrial generation of hydroelectric power, net electricity imports, and electricity produced from geothermal, wood, waste, wind, photovoltaic, solar thermal sources connected to electric utility distribution systems. Also includes net coke imports.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical quantities are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 5-13, Tables 1, 2, 3, and 5. Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 16, 1987.

Table C2. Consumption of Energy by Source and End-Use Sectors
(Quadrillion Btu per Year)

Sector and Fuel	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Residential											
Distillate Fuel	1.88	1.81	1.32	0.97	0.97	1.01	1.03	1.03	1.03	0.91	0.76
Liquefied Petroleum Gas	.58	.53	.33	.38	.38	.40	.40	.40	.40	.40	.40
Natural Gas	4.99	5.02	4.87	4.58	4.47	4.56	4.64	4.70	4.76	4.74	4.40
Other Residential[1]	.45	.25	.17	.14	.14	.14	.14	.14	.13	.13	.12
Electricity	1.59	2.01	2.45	2.70	2.76	2.82	2.90	2.99	3.07	3.54	3.92
Total	**9.49**	**9.61**	**9.12**	**8.77**	**8.72**	**8.92**	**9.10**	**9.26**	**9.39**	**9.71**	**9.60**
Commercial											
Distillate Fuel	.59	.59	.52	.69	.69	.72	.73	.73	.73	.70	.64
Motor Gasoline	.09	.09	.11	.11	.11	.11	.11	.11	.11	.11	.10
Residual Fuel	.71	.49	.56	.19	.20	.20	.20	.20	.20	.20	.20
Natural Gas[2]	2.47	2.56	2.67	2.51	2.45	2.49	2.53	2.55	2.59	2.73	2.65
Other Commercial[3]	.38	.27	.19	.28	.28	.28	.28	.28	.28	.27	.26
Electricity	1.20	1.60	1.91	2.36	2.41	2.46	2.50	2.53	2.58	2.97	3.34
Total	**5.44**	**5.59**	**5.95**	**6.13**	**6.14**	**6.27**	**6.36**	**6.41**	**6.49**	**6.99**	**7.19**
Industrial[4]											
Distillate Fuel	1.23	1.34	1.32	1.19	1.20	1.20	1.19	1.20	1.21	1.34	1.50
Liquefied Petroleum Gas	.98	1.15	1.58	1.60	1.58	1.62	1.66	1.68	1.71	1.84	1.95
Motor Gasoline	.29	.22	.16	.16	.17	.16	.16	.16	.17	.17	.19
Petrochemical Feedstocks[5]	.56	.65	1.43	.75	.76	.77	.77	.75	.74	.66	.58
Residual Fuel	1.62	1.51	1.35	.76	.79	.74	.72	.71	.71	.73	.86
Natural Gas[6]	9.54	8.53	8.39	7.09	6.97	7.16	7.34	7.26	7.29	6.95	6.51
Metallurgical Coal	2.59	2.24	1.79	1.10	1.02	1.01	1.00	.96	.94	.81	.67
Steam Coal	2.08	1.43	1.37	1.65	1.70	1.71	1.79	1.83	1.89	2.02	2.28
Other Industrial[7]	3.07	3.30	3.66	3.22	3.19	3.35	3.28	3.23	3.21	3.09	3.08
Hydropower	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
Purchased Electricity	1.95	2.35	2.78	2.81	2.87	2.93	3.01	3.07	3.18	3.72	4.07
Total	**23.93**	**22.74**	**23.85**	**20.38**	**20.26**	**20.68**	**20.94**	**20.90**	**21.07**	**21.37**	**21.72**
Transportation											
Distillate Fuel	1.57	2.12	2.79	3.16	3.19	3.34	3.37	3.39	3.42	3.70	4.11
Jet Fuel[8]	1.97	2.03	2.18	2.50	2.66	2.68	2.74	2.75	2.81	2.79	2.91
Motor Gasoline	10.72	12.49	12.38	12.83	13.19	12.71	12.46	12.17	12.03	11.07	10.77
Residual Fuel	.76	.71	1.40	.80	.84	.83	.86	.88	.91	1.00	1.12
Natural Gas[9]	.74	.59	.65	.52	.50	.50	.53	.52	.52	.51	.49
Other Transportation[10]	.29	.27	.26	.27	.11	.22	.23	.23	.23	.25	.27
Total	**16.05**	**18.22**	**19.67**	**20.09**	**20.49**	**20.27**	**20.19**	**19.94**	**19.92**	**19.32**	**19.68**
Electric Utilities											
Distillate Fuel	.14	.23	.17	.09	.05	.04	.00	.01	.01	.12	.24
Residual Fuel	1.98	2.94	2.46	1.00	1.42	1.11	.46	.47	.57	1.30	2.63
Natural Gas	4.05	3.24	3.81	3.16	2.68	2.67	3.11	3.12	3.15	3.81	4.18
Steam Coal	7.23	8.79	12.12	14.54	14.49	14.89	15.39	15.57	15.90	18.47	19.87
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.69	5.96	6.39	6.71
Hydropower/Other[11]	2.64	3.26	3.20	3.50	3.63	3.80	3.51	3.58	3.63	3.75	3.87
Total	**16.27**	**20.35**	**24.51**	**26.45**	**26.65**	**27.37**	**27.88**	**28.43**	**29.22**	**33.84**	**37.50**
Primary Energy Consumption[12]											
Distillate Fuel[13]	5.40	6.08	6.12	6.10	6.11	6.30	6.32	6.36	6.40	6.78	7.25
Jet Fuel	1.97	2.03	2.18	2.50	2.66	2.68	2.74	2.75	2.81	2.79	2.91
Liquefied Petroleum Gas	1.69	1.81	1.98	2.10	2.07	2.13	2.17	2.20	2.23	2.36	2.48
Motor Gasoline	11.09	12.80	12.65	13.10	13.47	12.98	12.73	12.44	12.31	11.35	11.07
Petrochemical Feedstocks	.56	.65	1.43	.82	.76	.77	.77	.75	.74	.66	.58
Residual Fuel[14]	5.08	5.65	5.78	2.77	3.25	2.88	2.24	2.27	2.39	3.23	4.81
Other Petroleum	3.75	3.72	4.08	3.62	3.42	3.69	3.61	3.57	3.55	3.44	3.45
Natural Gas	21.79	19.95	20.39	17.85	17.07	17.39	18.16	18.16	18.31	18.75	18.22
Metallurgical Coal	2.59	2.24	1.79	1.10	1.02	1.01	1.00	.96	.94	.81	.67
Steam Coal	9.68	10.42	13.64	16.38	16.37	16.79	17.37	17.59	17.97	20.66	22.31
Nuclear Power	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.69	5.96	6.39	6.71
Hydropower/Other[11]	2.67	3.29	3.23	3.53	3.67	3.83	3.54	3.61	3.66	3.78	3.90
Total Consumption	**66.44**	**70.55**	**75.95**	**73.94**	**74.21**	**75.29**	**76.04**	**76.33**	**77.26**	**81.00**	**84.34**
Electricity Consumption (all sectors)	**4.75**	**5.96**	**7.15**	**7.88**	**8.05**	**8.22**	**8.43**	**8.60**	**8.84**	**10.25**	**11.35**
Industrial Electricity											
Gross Consumption	1.95	2.35	2.78	3.08	3.15	3.21	3.31	3.39	3.52	4.21	4.72
Self-generation - Own Use[15]	NA	NA	NA	.27	.27	.28	.30	.32	.34	.49	.65
Purchased Electricity	1.95	2.35	2.78	2.81	2.87	2.93	3.01	3.07	3.18	3.72	4.07

See footnotes at end of Appendix C.

Sources: Historical quantities are taken from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*, DOE/EIA-0214(84) (Washington, DC, 1986) and the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986). Historical quantities are through 1985. Projected quantities are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 21, 1987.

Table C3. Price of Energy by Source and End-Use Sectors
(1986 Dollars per Million Btu)

Sector and Fuel	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Residential	**5.78**	**7.39**	**10.07**	**11.03**	**10.04**	**10.15**	**10.13**	**10.16**	**10.26**	**11.59**	**14.23**
Primary Energy	3.36	4.10	6.07	6.41	5.27	5.39	5.43	5.59	5.78	7.78	10.52
Petroleum Products	4.23	5.85	9.68	7.78	4.50	5.38	5.68	6.02	6.36	9.36	11.82
Distillate Fuel	3.77	5.28	9.35	7.74	4.47	5.34	5.65	5.98	6.33	9.32	11.77
Kerosene	4.18	6.05	11.08	7.95	4.67	5.55	5.85	6.18	6.53	9.51	11.96
Liquefied Petroleum Gas	5.75	7.75	10.56	7.84	4.56	5.43	5.74	6.07	6.42	9.42	11.88
Natural Gas	2.89	3.22	4.80	6.08	5.57	5.45	5.41	5.51	5.66	7.39	10.26
Steam Coal[1]	3.06	4.74	3.88	1.99	1.97	1.99	2.01	2.01	2.04	2.22	2.30
Electricity	17.78	19.84	20.99	21.41	20.35	20.45	20.17	19.77	19.47	18.24	19.60
Commercial	**5.36**	**7.93**	**10.56**	**11.78**	**10.77**	**10.90**	**10.86**	**10.80**	**10.82**	**11.70**	**14.10**
Primary Energy	2.14	3.22	5.36	5.57	4.44	4.57	4.59	4.73	4.90	6.68	9.05
Petroleum Products	2.43	4.61	7.52	6.16	3.68	4.33	4.54	4.79	5.05	7.28	9.09
Distillate Fuel	3.00	4.68	8.60	6.14	3.63	4.29	4.52	4.78	5.05	7.39	9.33
Residual Fuel	1.21	3.67	5.49	4.21	2.54	2.94	3.03	3.18	3.35	4.78	5.94
Other Petroleum[2]	4.59	6.42	10.42	7.54	4.60	5.41	5.68	5.97	6.27	8.84	10.90
Natural Gas[3]	2.04	2.55	4.42	5.45	4.92	4.80	4.74	4.82	4.96	6.60	9.29
Steam Coal[4]	1.23	2.52	2.06	1.99	1.97	1.99	2.01	2.01	2.04	2.22	2.29
Electricity	16.72	19.68	21.61	21.73	20.57	20.72	20.52	20.11	19.81	18.47	19.92
Industrial	**2.15**	**4.19**	**6.17**	**6.67**	**5.42**	**5.74**	**5.80**	**5.93**	**6.08**	**7.52**	**9.38**
Primary Energy	1.51	3.11	4.85	4.32	2.95	3.33	3.43	3.60	3.78	5.47	7.28
Petroleum Products	2.24	4.44	7.06	5.83	3.35	4.23	4.46	4.72	4.97	7.07	8.73
Distillate Fuel	1.96	4.29	7.38	6.13	3.62	4.28	4.51	4.77	5.04	7.36	9.30
Kerosene	2.10	4.50	8.39	6.50	3.91	4.59	4.83	5.10	5.37	7.78	9.78
Liquefied Petroleum Gas	3.12	4.89	6.89	6.50	3.85	4.54	4.79	5.06	5.34	7.79	9.83
Motor Gasoline[5]	7.78	8.96	13.09	9.30	5.73	6.75	7.07	7.40	7.74	10.58	12.70
Residual Fuel	1.25	3.68	4.93	3.98	2.17	2.65	2.85	3.03	3.21	4.75	5.85
Other Petroleum[6]	1.96	4.29	7.38	5.49	3.04	4.26	4.47	4.71	4.94	6.71	8.08
Natural Gas[7]	1.04	1.82	3.35	3.96	3.07	3.09	3.12	3.27	3.46	5.35	8.28
Metallurgical Coal	1.23	3.17	2.80	2.08	2.07	2.09	2.11	2.11	2.15	2.37	2.43
Steam Coal	1.19	2.46	2.09	1.73	1.71	1.74	1.75	1.76	1.79	2.01	2.13
Electricity	8.16	11.67	14.42	18.95	17.94	18.03	17.78	17.40	17.10	15.83	17.19
Transportation	**6.31**	**7.77**	**11.48**	**8.64**	**5.21**	**6.18**	**6.47**	**6.77**	**7.08**	**9.81**	**11.92**
Primary Energy	6.31	7.76	11.48	8.64	5.20	6.17	6.46	6.77	7.08	9.81	11.92
Petroleum Products	6.31	7.76	11.48	8.64	5.20	6.17	6.46	6.77	7.08	9.81	11.92
Distillate Fuel[8]	3.57	5.39	9.58	8.60	4.92	5.90	6.24	6.62	7.00	10.31	13.00
Jet Fuel[9]	1.98	3.94	8.47	6.11	3.92	4.49	4.69	4.92	5.16	7.24	8.98
Motor Gasoline[5]	7.74	8.95	13.11	9.23	5.69	6.71	7.02	7.35	7.68	10.49	12.59
Residual Fuel[10]	1.04	3.33	4.41	4.09	2.05	2.62	2.92	3.13	3.34	5.13	6.32
Other Petroleum[11]	9.39	10.85	18.25	12.00	6.04	7.75	8.29	8.83	9.39	14.13	17.68
Electricity	12.53	23.24	19.75	21.15	19.91	20.03	19.89	19.48	19.15	17.78	19.32
Total Energy	**4.45**	**6.42**	**9.17**	**8.77**	**6.75**	**7.28**	**7.41**	**7.57**	**7.76**	**9.60**	**11.74**
Primary Energy -- Four Sectors	3.50	5.09	7.74	6.65	4.42	5.00	5.15	5.37	5.60	7.77	9.90
Electricity	13.62	16.66	18.67	20.63	19.55	19.66	19.42	19.02	18.72	17.44	18.84
Electric Utilities											
Fossil Fuel Average	**.87**	**2.02**	**2.60**	**2.16**	**1.81**	**1.87**	**1.84**	**1.86**	**1.91**	**2.48**	**3.19**
Petroleum Products	1.14	3.86	5.78	4.43	2.51	2.98	3.10	3.29	3.48	5.26	6.75
Distillate Fuel[12]	1.49	4.24	7.63	6.02	3.57	4.22	4.37	4.60	4.85	7.12	9.06
Residual Fuel	1.12	3.83	5.66	4.36	2.47	2.94	3.09	3.28	3.46	5.08	6.54
Natural Gas	.76	1.44	2.92	3.53	2.53	2.71	2.61	2.71	2.83	4.64	6.98
Steam Coal	.84	1.58	1.80	1.69	1.61	1.63	1.65	1.65	1.67	1.82	1.88
Average Price to All Users											
Petroleum Products	4.74	6.50	9.84	7.95	4.70	5.66	6.01	6.30	6.59	9.09	10.91
Distillate Fuel[8]	3.16	5.01	8.92	7.68	4.43	5.31	5.62	5.95	6.29	9.23	11.65
Jet Fuel	1.98	3.94	8.47	6.11	3.92	4.49	4.69	4.92	5.16	7.24	8.98
Kerosene	3.24	5.25	9.29	6.92	4.13	4.87	5.13	5.41	5.70	8.27	10.38
Liquefied Petroleum Gas	4.04	5.75	7.51	6.81	4.01	4.75	5.01	5.29	5.58	8.15	10.27
Motor Gasoline[5]	7.74	8.95	13.11	9.23	5.69	6.71	7.02	7.35	7.68	10.49	12.60
Residual Fuel	1.16	3.71	5.18	4.17	2.29	2.78	2.94	3.14	3.33	5.01	6.35
Other Petroleum Products[13]	4.59	6.26	8.80	10.18	4.22	7.44	7.79	8.29	8.78	12.53	16.08
Natural Gas	1.61	2.28	3.82	4.71	4.01	3.99	3.93	4.05	4.21	5.97	8.64
Coal	1.02	1.99	1.95	1.72	1.65	1.67	1.68	1.69	1.71	1.86	1.93
Electricity	13.62	16.66	18.67	20.63	19.55	19.66	19.42	19.02	18.72	17.44	18.84

See footnotes at end of Appendix C.

Sources: Historical prices through 1985 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986), pp. 5-6. Prices for 1985 are preliminary. Prices for 1986 are estimated. All other prices are forecasts from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 21, 1987.

Table C4. Electric Utility Fuel Consumption and Electricity Sales
(Quadrillion Btu per Year)

Fuel Consumption and Sales	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Fuel Inputs											
Oil	0.14	0.23	0.17	0.09	0.05	0.04	0.00	0.01	0.01	0.12	0.24
Distillate	1.98	2.94	2.46	1.00	1.42	1.11	.46	.47	.57	1.30	2.63
Residual	4.05	3.24	3.81	3.16	2.68	2.67	3.11	3.12	3.15	3.81	4.18
Natural Gas	7.23	8.79	12.12	14.54	14.49	14.89	15.39	15.57	15.90	18.47	19.87
Steam Coal	.24	1.90	2.74	4.16	4.38	4.86	5.39	5.69	5.96	6.39	6.71
Nuclear Power	2.61	3.19	2.98	3.08	3.21	3.36	3.06	3.10	3.11	3.18	3.18
Hydropower/Other[1]	16.25	20.29	24.29	26.03	26.23	26.93	27.42	27.95	28.71	33.28	36.80
Total Fuel Inputs	.02	.06	.22	.42	.42	.44	.46	.48	.51	.57	.69
Net Imports	**16.27**	**20.35**	**24.51**	**26.45**	**26.65**	**27.37**	**27.88**	**28.43**	**29.22**	**33.84**	**37.50**
Total Electricity Inputs											
Disposition											
Total Electricity Inputs	16.27	20.35	24.51	26.45	26.65	27.37	27.88	28.43	29.22	33.84	37.50
Minus Conversion Losses[2]	11.05	13.81	16.71	18.02	18.15	18.66	18.95	19.33	19.88	23.06	25.63
Generation	5.23	6.54	7.80	8.43	8.50	8.71	8.93	9.10	9.34	10.79	11.86
Plus PURPA[3] Purchases	.00	.00	NA	.08	.09	.10	.11	.12	.14	.18	.21
Minus Transportation and Distribution Losses	.48	.58	.65	.63	.54	.59	.62	.62	.63	.72	.72
Electricity Sales	**4.75**	**5.96**	**7.15**	**7.88**	**8.05**	**8.22**	**8.43**	**8.60**	**8.84**	**10.25**	**11.35**
Electricity Sales by End-Use Sector											
Residential	1.59	2.01	2.45	2.70	2.76	2.82	2.90	2.99	3.07	3.54	3.92
Commercial/Other[4]	1.21	1.61	1.92	2.37	2.42	2.47	2.51	2.54	2.59	2.99	3.36
Industrial	1.95	2.35	2.78	2.81	2.87	2.93	3.01	3.07	3.18	3.72	4.07
Total Electricity Sales	**4.75**	**5.96**	**7.15**	**7.88**	**8.05**	**8.22**	**8.43**	**8.60**	**8.84**	**10.25**	**11.35**

[1] Includes renewable electric utility energy sources such as hydropower, geothermal power, wood, waste, solar power, and wind power.
[2] Conversion losses includes net imports.
[3] Electric utility purchases under the Public Utility Regulatory Policies Act of 1978 (PURPA) began after 1978 and are estimated only for 1985 and future years.
[4] Includes street lighting and sales to the transportation end-use sector.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical values are obtained or derived from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*, DOE/EIA-0214(84), (Washington, DC, 1986) and *Monthly Energy Review*, DOE/EIA-0035(86/04), (Washington, DC, 1986).
Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 16, 1987.

Table C5. Electric Utility Summer Capability and Generation

(Capability in Million Kilowatts)

(Generation in Billion Kilowatthours per Year)

Summer Capability and Generation	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Capability[1]											
Coal Steam	131.7	185.5	237.3	285.8	289.5	292.0	294.3	295.9	295.5	316.5	332.6
Other Fossil Steam	115.6	146.4	156.8	148.3	146.7	146.1	145.3	144.8	143.4	136.4	130.3
Combined Cycle	0.5	2.8	5.5	4.6	4.4	4.4	4.4	4.4	4.7	4.7	5.3
Turbine/Diesel	17.3	39.8	43.5	44.5	44.2	44.3	44.4	44.5	45.3	49.1	70.1
Nuclear Power	7.0	37.2	51.7	80.3	85.2	95.2	97.2	102.7	105.1	106.5	108.8
Hydropower/Other[2]	59.8	68.8	69.4	75.0	75.1	75.3	76.2	76.8	77.0	78.4	78.5
Pumped Storage Hydropower	4.4	10.8	14.5	17.7	17.5	17.7	17.7	17.7	18.0	19.1	20.7
Total Capability	**336.4**	**491.3**	**578.6**	**656.1**	**662.6**	**675.0**	**679.4**	**686.8**	**689.0**	**710.7**	**746.4**
Generation by Plant Type											
Coal Steam[3]	[4] 704	853	1,162	1,402	1,405	1,439	1,497	1,514	1,546	1,795	1,936
Other Fossil Steam	[4] 535	557	559	368	358	326	304	306	316	414	494
Combined Cycle	([4])	7	15	15	14	13	22	21	21	26	30
Turbine/Diesel	[4] 22	25	19	9	9	8	3	3	4	34	94
Nuclear Power	22	173	251	384	404	448	495	522	547	586	615
Hydropower/Other[2]	249	303	281	292	313	328	307	311	312	319	320
Pumped Storage Hydropower	NA	NA	NA	NA	-11	-11	-11	-11	-11	-11	-13
Total Generation	**1,532**	**1,918**	**2,286**	**2,470**	**2,492**	**2,551**	**2,617**	**2,666**	**2,736**	**3,161**	**3,477**
Generation by Fuel Type											
Coal	704	853	1,162	1,402	1,402	1,435	1,494	1,511	1,543	1,791	1,933
Natural Gas	372	300	346	292	246	245	288	288	290	344	358
Oil	184	289	246	100	137	105	44	45	55	133	264
Nuclear Power	22	173	251	384	404	448	495	522	547	586	615
All Hydropower/Other[5]	249	303	282	292	303	317	296	300	301	307	307
Total Generation	**1,532**	**1,918**	**2,286**	**2,470**	**2,492**	**2,551**	**2,617**	**2,666**	**2,736**	**3,161**	**3,477**

[1] Stock as of December 31. Net summer capability is the load carrying ability of a generator under summer (adverse) conditions for a specified time period. Historical values include capability out-of-service; projections exclude this capability. All capability is enumerated when units become operable, that is, available to provide power to the grid.

[2] Includes other renewable sources such as geothermal power, wood, waste, solar energy, and wind; historical pumped storage data for generation are not collected separately and are included among hydropower/other totals.

[3] Historical values (1970-1985) understate coal steam generation and overstate other steam generation because they attribute small amounts of oil and natural gas used for startup and flame stability in coal steam plants to other steam plant generation.

[4] For 1970, Combined Cycle generation data are not separately available but are included among steam and turbine/diesel data.

[5] Includes conventional and pumped storage hydropower and other renewable sources such as geothermal power, wood, waste, solar energy, and wind.

NA = Not available.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Generation data are from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035 (86/04), Washington, DC, 1986), p. 74, and the Energy Information Administration, Form EIA-759, "Monthly Power Plant Report." Capability values are from the Energy Information Administration Generating Unit Reference File (GURF), 1986. Historical quantities are through 1985.

Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 16, 1987.

Table C6. Electric Utility Summer Capability Additions
(Thousand Kilowatts)

Additions	High World Oil Price - Low Growth Case							
	1985	1986	1987	1988	1989	1990	1991-1995	1996-2000
Total Additions								
Nuclear Power[1]	9,864	5,845	9,910	2,075	5,456	2,376	2,306	2,446
Coal Steam	5,975	4,027	2,667	2,287	1,837	217	22,638	20,337
Other Steam[2]	0	40	40	0	0	331	94	678
Turbines[3]	87	210	171	154	121	840	4,560	21,069
Pumped Storage Hydropower	2,100	0	205	0	0	304	1,083	1,636
Hydropower/Other[4]	1,373	326	195	858	693	293	1,387	125
Total New Capability	**19,399**	**10,448**	**13,189**	**5,374**	**8,108**	**4,361**	**32,068**	**46,291**
Announced/Planned Construction[5]								
Nuclear Power[1]	9,864	5,845	9,910	2,075	5,456	2,376	2,306	2,446
Coal Steam	5,975	4,027	2,667	2,287	1,837	217	19,638	5,336
Other Steam[2]	0	40	40	0	0	331	94	178
Turbines[3]	87	210	171	154	121	840	2,060	118
Pumped Storage Hydropower	2,100	0	205	0	0	304	1,083	1,636
Hydropower/Other[4]	1,373	326	195	858	693	293	1,387	125
Total Announced/Planned	**19,399**	**10,448**	**13,189**	**5,374**	**8,108**	**4,361**	**26,568**	**9,840**
Additional Needed Capability[6]								
Nuclear Power[1]	0	0	0	0	0	0	0	0
Coal Steam	0	0	0	0	0	0	3,000	15,000
Other Steam[2]	0	0	0	0	0	0	0	500
Turbines[3]	0	0	0	0	0	0	2,500	20,951
Pumped Storage Hydropower	0	0	0	0	0	0	0	0
Hydropower/Other[4]	0	0	0	0	0	0	0	0
Total Additional Needed	**0**	**0**	**0**	**0**	**0**	**0**	**5,500**	**36,451**

[1] Nuclear capability is as of the date the unit first delivers power to the grid; all other capability is as of the date the unit begins commercial service.
[2] Includes natural gas, oil, and dual-fired oil/natural gas steam and combined cycle capability.
[3] Includes all gas turbine and internal combustion capability.
[4] Includes conventional hydroelectric and other renewable sources of power such as geothermal, wood, waste, solar, and wind.
[5] Includes all new capability announced by the electric utility industry.
[6] Includes additional new capability considered necessary by the Energy Information Administration to meet electricity demands.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Input data file = IFFSHL.D0107871. Table printed on January 16, 1987.

Table C7. Electric Utility Sales, Prices, and Price Components
(Billion Kilowatthours per Year)
(1986 Dollars per Thousand Kilowatthours)

Sales, Prices and Price Components	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Electricity Sales by End-Use Sector											
Residential	466	588	717	791	809	826	851	875	901	1,038	1,150
Commercial/Other[1]	355	471	562	694	709	724	737	744	759	876	984
Industrial	571	688	815	825	842	859	882	901	931	1,090	1,194
Total Electricity Sales	**1,392**	**1,747**	**2,094**	**2,310**	**2,360**	**2,409**	**2,470**	**2,520**	**2,590**	**3,004**	**3,328**
Prices[2]											
Residential	60.67	67.68	71.61	73.05	69.44	69.77	68.80	67.46	66.42	62.24	66.88
Commercial[1]	56.92	67.22	73.70	74.12	70.19	70.70	70.02	68.62	67.57	63.02	67.96
Industrial	27.83	39.82	49.19	64.69	61.17	61.47	60.65	59.36	58.35	54.06	58.75
All Sectors	**46.48**	**56.83**	**63.70**	**70.40**	**66.75**	**67.12**	**66.27**	**64.93**	**63.88**	**59.51**	**64.28**
Price Components											
Capital Component[3]	NA	NA	NA	32.08	30.88	30.83	30.28	28.85	27.63	18.96	17.76
Fuel Component[4]	NA	NA	NA	21.00	18.19	18.51	18.26	18.39	18.71	23.50	29.68
O&M Component[5]	NA	NA	NA	17.32	17.68	17.78	17.73	17.69	17.54	17.06	16.84
Total Price[2]	**46.48**	**56.83**	**63.70**	**70.40**	**66.75**	**67.12**	**66.27**	**64.93**	**63.88**	**59.51**	**64.28**

[1] Includes consumption for street and highway lighting, other public authorities, and railroads and railways.
[2] Prices for 1985 to 2000 are estimated from model simulations and represent average revenues per kilowatthour of demand for the total electric utility industry. Revenue requirements are projected from the financial information contained on the Federal Energy Regulatory Commission Form FERC-1, Form FERC-1-M, and on the Energy Information Administration Form EIA-412.
[3] The capital component represents the cost to the utility of capital assets needed to provide reliable service. It includes plant depreciation, taxes, and sufficient return on invested capital to cover interest obligations on outstanding debt and to compensate stockholders.
[4] The fuel component includes only the direct costs of fuel inputs used to generate electricity required to meet demand.
[5] The operation and maintenance (O&M) component includes all nonfuel costs necessary to operate and maintain generation, transmission, and distribution capacity used to deliver electricity to end-use sectors.
NA = Not available.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical prices are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986). Historical demands are from the Energy Information Administration, *State Energy Data Report, 1960 to 1984*.DOE/EIA-0214(84), (Washington, DC, 1986) and *Monthly Energy Review*, DOE/EIA-0035(86/04), (Washington, DC, 1986). Electricity prices representing both public and private utilities for 1985 are estimates. Projected prices are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 16, 1987.

Table C8. Petroleum Supply and Disposition Balance
(Million Barrels per Day)

Supply and Disposition	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
World Oil Price[1]	8.05	26.83	45.16	27.68	14.57	18.25	19.46	20.72	22.01	33.00	41.48
Production											
Crude Oil[2]	9.64	8.37	8.60	8.97	8.81	8.71	8.53	8.25	7.90	6.83	6.89
Alaska	.23	.19	1.62	1.83	1.86	1.90	1.85	1.82	1.70	1.27	.95
Lower 48	9.41	8.18	6.98	7.15	6.95	6.81	6.68	6.43	6.20	5.57	5.94
Natural Gas Plant Liquids	1.66	1.63	1.57	1.61	1.62	1.62	1.73	1.71	1.71	1.69	1.57
Other Domestic[3]	.02	.04	.04	.06	.05	.06	.05	.05	.05	.05	.05
Processing Gain[4]	.36	.46	.60	.56	.56	.56	.54	.54	.54	.54	.57
Total Production	**11.67**	**10.50**	**10.81**	**11.20**	**11.04**	**10.95**	**10.85**	**10.54**	**10.21**	**9.11**	**9.08**
Imports (including SPR)											
Crude Oil[5]	1.32	4.10	5.26	3.20	4.03	4.11	3.64	3.89	4.24	5.15	5.40
Refined Products	2.10	1.95	1.65	1.87	1.88	2.02	1.76	1.76	1.81	2.04	2.66
Total Imports	3.42	6.06	6.91	5.07	5.90	6.13	5.40	5.65	6.05	7.18	8.06
Exports											
Crude Oil	.01	.01	.29	.20	.17	.19	.19	.19	.19	.19	.19
Refined Products	.25	.20	.26	.58	.59	.56	.56	.56	.56	.56	.56
Total Exports	.26	.21	.54	.78	.75	.75	.75	.75	.75	.75	.75
Net Imports (including SPR)	**3.16**	**5.85**	**6.36**	**4.29**	**5.15**	**5.38**	**4.65**	**4.89**	**5.29**	**6.43**	**7.31**
Primary Stock Changes											
Net Withdrawals[6]	-.10	-.03	-.10	.22	-.14	.09	.05	.02	.00	.00	-.03
SPR Fill Rate Additions (-)[7]	.00	.00	-.04	-.12	-.05	-.06	-.04	-.04	-.04	-.04	-.04
Total Primary Supply[8]	**14.73**	**16.32**	**17.04**	**15.60**	**16.00**	**16.36**	**15.51**	**15.42**	**15.46**	**15.52**	**16.33**
Refined Petroleum Products											
Motor Gasoline	5.78	6.67	6.58	6.83	7.02	6.77	6.62	6.49	6.42	5.92	5.76
Jet Fuel[9]	.97	1.00	1.07	1.22	1.30	1.31	1.33	1.34	1.37	1.36	1.42
Distillate Fuel	2.54	2.85	2.87	2.87	2.87	2.96	2.96	2.99	3.01	3.19	3.40
Residual Fuel	2.20	2.46	2.51	1.20	1.41	1.26	.98	.99	1.04	1.41	2.08
Other Petroleum Products[10]	3.20	3.33	4.04	3.61	3.45	3.63	3.61	3.61	3.62	3.64	3.68
Total Product Supplied	**14.70**	**16.32**	**17.06**	**15.73**	**16.06**	**15.92**	**15.51**	**15.42**	**15.46**	**15.52**	**16.33**
Refined Petroleum Products Supplied to Sectors											
Residential and Commercial	2.18	1.95	1.52	1.35	1.35	1.39	1.40	1.41	1.41	1.33	1.23
Industrial[11]	3.82	4.03	4.81	4.00	3.94	4.03	4.00	4.00	4.02	4.11	4.27
Transportation	7.77	8.95	9.55	9.88	10.10	9.98	9.89	9.79	9.77	9.44	9.58
Electric Utilities	.93	1.39	1.15	.48	.64	.50	.20	.21	.25	.62	1.25
Total Consumption	**14.70**	**16.31**	**17.03**	**15.71**	**16.04**	**15.90**	**15.49**	**15.41**	**15.45**	**15.50**	**16.33**
Discrepancy[12]	.03	.01	.01	-.12	-.04	.45	.01	.01	.01	.01	.01
Net Disposition[13]	**14.73**	**16.32**	**17.04**	**15.60**	**16.00**	**16.36**	**15.51**	**15.42**	**15.46**	**15.52**	**16.33**

[1] The cost of imported crude oil to U.S. refiners in 1986 dollars per barrel.
[2] Includes lease condensate.
[3] Other domestic prior to 1981 includes unfinished oils (net), hydrogen, and hydrocarbons not included elsewhere. After 1981, other domestic includes unfinished oils (net), motor gasoline blending components (net), aviation gasoline blending components (net), hydrogen, other hydrocarbons, alcohol, and synthetic crude production.
[4] Represents volumetric gain in refinery distillation and cracking processes.
[5] In 1977 and later years, crude oil imports include crude oil imported for the Strategic Petroleum Reserve.
[6] Net stock withdrawals for a given year, t, are defined as the change in end-of-year stock levels from period t-1 minus the end-of-year stock level from the year t. A minus is treated as a deletion from total supply and a plus is treated as an addition to total supply.
[7] SPR is the Strategic Petroleum Reserve.
[8] Total primary supply is defined as total production plus net imports plus net stock withdrawals minus SPR additions.
[9] Includes naphtha and kerosene type.
[10] Includes aviation gasoline, kerosene, liquefied petroleum gas, petrochemical feedstocks, miscellaneous petroleum products, lubricants, waxes, unfractionated stream, plant condensate, natural gasoline, asphalt, road oil, still gas, special naphthas, and petroleum coke.
[11] Includes total industrial demand for petroleum.
[12] Represents the difference between total primary supply and total consumption.
[13] Net disposition is the sum of total consumption and discrepancy.

Note: From 1983 onward, the product supplied data and stock data are on a new basis. The other product category is on a net basis, reclassified (petroleum products reprocessed into other categories) plus the other category of products supplied.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical data are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 101-121, Tables 45, 46, 47, and 55. Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 21, 1987.

Note: 1986 data are based on EIA's October 1986 issue of the Short-Term Energy Outlook. These data are, therefore, partial estimates. At press time, a revised estimate of the crude oil production for 1986 is 8.67 million barrels per day.

Table C9. Natural Gas Supply, Disposition, and Prices

(Trillion Cubic Feet per Year)

(1986 Dollars per Thousand Cubic Feet)

Supply, Disposition, and Prices	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production											
Dry Gas Production[1]	21.01	19.24	19.40	16.38	16.30	16.27	17.16	16.97	17.03	16.12	15.81
Supplemental Natural Gas[2]	NA	NA	.15	.13	.14	.14	.00	.00	.00	.76	.00
Net Imports	.75	.88	.94	.89	.74	.88	.77	1.05	1.16	1.80	2.48
Net Storage Withdrawals[3]	-.40	-.34	.02	.23	-.09	.12	.00	.00	.00	.00	.00
Total Supply[4]	**21.37**	**19.77**	**20.51**	**17.63**	**17.09**	**17.41**	**17.94**	**18.02**	**18.19**	**18.68**	**18.28**
Consumption by Sector[5]											
Residential	4.84	4.92	4.75	4.43	4.33	4.42	4.49	4.56	4.61	4.59	4.26
Commercial[6]	2.40	2.51	2.61	2.43	2.37	2.41	2.45	2.48	2.51	2.65	2.56
Industrial	7.85	6.97	7.17	5.90	5.94	6.13	6.27	6.20	6.23	5.87	5.44
Lease & Plant Fuel[7]	1.40	1.40	1.03	.97	.81	.81	.85	.84	.84	.87	.87
Transportation[8]	.72	.58	.63	.50	.49	.49	.51	.51	.51	.50	.48
Electric Utilities	3.93	3.16	3.68	3.04	2.58	2.57	3.00	3.01	3.03	3.67	4.03
Total Consumption	**21.14**	**19.54**	**19.88**	**17.28**	**16.52**	**16.83**	**17.58**	**17.58**	**17.72**	**18.14**	**17.64**
Unaccounted for[9]	.23	.24	.64	.35	.57	.58	.36	.44	.47	.54	.65
Average Wellhead Price	**.46**	**.87**	**2.12**	**2.57**	**1.73**	**1.90**	**2.14**	**2.26**	**2.40**	**3.99**	**6.62**
Delivered Prices by Sectors											
Residential	2.98	3.29	4.92	6.27	5.75	5.63	5.58	5.68	5.84	7.63	10.58
Commercial[6]	2.10	2.60	4.53	5.63	5.08	4.95	4.89	4.98	5.12	6.81	9.59
Industrial	1.07	1.86	3.43	4.05	3.17	3.19	3.21	3.37	3.56	5.51	8.53
Electric Utilities	.79	1.48	3.03	3.66	2.63	2.81	2.71	2.81	2.94	4.81	7.25
Average to All Sectors[10]	**1.63**	**2.30**	**3.90**	**4.83**	**4.11**	**4.09**	**4.03**	**4.16**	**4.33**	**6.14**	**8.92**

[1] Net dry natural gas is defined as dry marketed production minus nonhydrocarbon gases removed.

[2] Prior to 1980, the amount of supplemental fuels included in the natural gas data cannot be determined. Supplemental natural gas includes synthetic natural gas (results from the manufacture, conversion, or the reforming of petroleum hydrocarbons), and propane air mixtures. After 1985, this quantity includes short-term spot market purchases that could include additional imports.

[3] Includes net storage withdrawals for dry natural gas from underground storage and liquefied natural gas. Net storage withdrawals are computed as the end-of-year stock levels from the current period subtracted from the end-of-year stock levels from the preceding period. A minus is treated as a deletion from total supply and a plus is treated as an addition to total supply.

[4] Total supply is computed as dry gas production plus supplemental natural gas, net imports, and net storage withdrawals.

[5] Consumption values include small amounts of supplemental gas, which are not reported as production prior to 1980.

[6] Commercial sector includes deliveries to municipalities and other public authorities for institutional heating, street lighting, etc.

[7] Lease and plant fuel natural gas represents natural gas used in the field gathering and processing plant machinery, usually totalled into the industrial sector for other consumption tables.

[8] Transportation natural gas is used to fuel the compressors in the pipeline pumping stations.

[9] Unaccounted for represents natural gas lost, the net result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure, and EIA's merger of different data reporting systems which vary in scope, format, definition, and respondent type.

[10] Weighted average price. Weights used are the sectoral consumption values excluding lease and plant fuel and the transportation sector.

NA = Not available.

Note: Implicit Gross National Product Price Deflator, rebased to 1986 = 1.00, was used to convert from nominal to real dollars. The natural gas prices in this table are average prices, total revenues divided by total sales for each customer class.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Historical data are taken from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986) and the Energy Information Administration, *Natural Gas Annual 1985*, Vol. 1 DOE/EIA-0131(85)/1 (Washington, DC, 1986). Historical quantities are through 1985. Historical prices through 1984 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, 1986), p. 6. Projected values are based on preliminary estimates of 1985 prices, and on outputs from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 21, 1987.

Table C10. Coal Supply, Disposition, and Prices
(Million Short Tons per Year)
(1986 Dollars per Short Ton)

Supply, Disposition, and Price	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
Production[1]											
East of the Mississippi	568	544	579	559	568	595	617	618	626	683	730
West of the Mississippi	45	111	251	325	322	325	330	334	344	421	449
Total	**613**	**655**	**830**	**884**	**890**	**920**	**947**	**952**	**970**	**1,104**	**1,179**
Imports	(*)	1	1	2	2	2	2	3	3	5	7
Exports[2]	72	66	92	92	89	87	87	88	88	93	103
Net Imports	**-72**	**-65**	**-91**	**-90**	**-87**	**-85**	**-85**	**-85**	**-85**	**-89**	**-97**
Net Storage Withdrawals[3]	**-11**	**-32**	**-22**	**27**	**18**	**-7**	**-5**	**-2**	**-3**	**-5**	**-2**
Total Supply[4]	**530**	**558**	**717**	**820**	**821**	**828**	**857**	**865**	**882**	**1,010**	**1,080**
Consumption by Sector											
Residential and Commercial	16	9	6	8	8	8	8	8	8	7	7
Industrial	90	64	60	75	77	78	81	83	86	92	104
Coking Plants[5]	96	84	67	41	38	38	37	36	35	30	25
Electric Utilities	320	406	569	694	690	706	731	738	754	880	945
Total Consumption	**523**	**563**	**703**	**818**	**813**	**830**	**856**	**865**	**882**	**1,010**	**1,080**
Discrepancy[6]	7	-5	15	2	8	-2	(*)	(*)	(*)	(*)	(*)
Average Minemouth Price[7]	**17.02**	**37.03**	**32.67**	**25.81**	**25.46**	**25.65**	**25.69**	**25.68**	**26.06**	**28.29**	**29.07**
Delivered Prices by Sector											
Residential and Commercial[8]	46.97	75.86	63.91	45.89	45.53	46.02	46.50	46.65	47.42	51.50	53.14
Industrial	27.48	55.31	47.47	38.12	37.74	38.22	38.84	39.04	39.64	44.24	46.95
Coking Plants[5]	32.79	85.15	74.99	55.61	55.39	55.99	56.37	56.58	57.63	63.36	65.05
Electric Utilities[9]	19.03	34.18	38.31	35.38	33.76	34.44	34.68	34.73	35.20	38.21	39.61
Average to All Sectors[10]	**23.58**	**44.64**	**42.88**	**36.75**	**35.26**	**35.89**	**36.12**	**36.15**	**36.62**	**39.60**	**40.99**

[1] Historical coal production includes anthracite, bituminous coal, and lignite. In the projections, anthracite production was not separately identified, but included in bituminous coal production.

[2] Excludes small quantities of anthracite shipped overseas to U.S. Armed Forces.

[3] From (secondary) stocks held by end-use sectors (industrial plants, coke plants, and electric utilities). Positive numbers represent withdrawals from stocks, and negative numbers represent additions to stocks.

[4] Total supply equals production plus net imports plus net storage withdrawals.

[5] Coke plants consume small quantities of anthracite together with bituminous coal for metallurgical purposes. In the historical data, coking plant coal price is a weighted average of anthracite and bituminous coal prices. In the projections, anthracite was not separately identified, but included in bituminous coal.

[6] In the historical data, the discrepancy represents changes in producers (primary) stocks plus losses and unaccounted for coal. In the projections, the discrepancy represents errors due to independent rounding.

[7] Projected minemouth prices (1986-2000) are based on mining cost estimates, and assumed coal market conditions.

[8] Projected coal prices for the residential and commercial sector (1985-2000) do not include dealer markup.

[9] Electric utility price in historical years represents a weighted average of anthracite, bituminous coal, and lignite prices. In the projections, bituminous coal price was used for anthracite, since anthracite was not separately identified, but included in bituminous coal.

[10] Weighted average price. The quantity weights used are the sectoral consumption values.

(*) Greater than zero but less than .5.

Note: Implicit Gross National Product Price Deflator, rebased to 1986 = 1.00, was used to convert from nominal to real dollars.

Note: Totals may not equal sum of components because of independent rounding.

Sources: Historical data on quantities and minemouth prices through 1984 are from the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986), pp. 163-177, Tables 72, 73, 74, and 79. Historical 1985 quantities are from the Energy Information Administration, *Weekly Coal Production*, DOE/EIA-0218(86/45) (Washington, DC). The historical 1985 minemouth price is from the Energy Information Administration, *Coal Production 1985*,DOE/EIA-0118(85) (Washington, DC, 1986), Table 21. Historical data on delivered prices through 1984 are from the Energy Information Administration, *State Energy Price and Expenditure Report*, DOE/EIA-0376(84) (Washington, DC, December 1986), p. 6, and price data for 1985 (except for the residential and commercial sector) are from the Energy Information Administration, *Quarterly Coal Report*, DOE/EIA-0125(86/2Q) (Washington, DC, October, 1986). Projected coal imports are based on Energy Information Administration, *Outlook for U.S. Coal Imports*, DOE/EIA-0483 (Washington, DC, 1986), p. 14, Table 3. Projected quantities and prices are outputs from the Intermediate Future Forecasting System.

Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 16, 1987.

Table C11. National Macroeconomic Indicators

Macroeconomic Indicators	High World Oil Price - Low Growth Case										
	1970	1975	1980	1985	1986	1987	1988	1989	1990	1995	2000
World Oil Price[1]	**8.05**	**26.83**	**45.16**	**27.68**	**14.57**	**18.25**	**19.46**	**20.72**	**22.01**	**33.00**	**41.48**
World Oil Price (nominal dollars)[2]	**2.96**	**13.93**	**33.89**	**27.03**	**14.57**	**18.85**	**20.92**	**23.17**	**25.70**	**50.19**	**83.09**
Economic Variables											
Real GNP (billion 1982 dollars)	2,416	2,695	3,187	3,585	3,674	3,751	3,855	3,917	4,018	4,495	5,018
Real Disposable Income (billion 1982 dollars)	1,668	1,932	2,214	2,528	2,613	2,650	2,708	2,739	2,805	3,094	3,421
Real Disposable Income per Capita (thousand 1982 dollars)	8.2	9.0	9.7	10.6	10.9	10.9	11.1	11.1	11.3	11.9	12.8
NIPA GNP Price Deflator (1982:1.00)	.420	.593	.857	1.115	1.142	1.179	1.228	1.277	1.333	1.737	2.288
Unemployment Rate, Civilian Workers (percent)	5.0	8.5	7.2	7.2	7.0	7.0	6.7	6.8	6.7	6.7	6.8
Population, Noninstitutional (million persons)	204.0	215.5	227.3	238.4	240.5	242.7	244.9	247.0	249.2	259.1	267.5
New, High Grade Bond Rate (percent per annum)	8.50	9.01	12.47	11.03	8.49	8.55	8.30	8.29	8.85	8.91	8.86
Home Mortgage Rate (percent per annum)	8.32	8.88	13.77	12.41	10.21	9.96	9.85	9.66	10.28	10.38	10.32
Housing Starts (million units)	1.44	1.16	1.30	1.74	1.89	1.74	1.73	1.73	1.67	1.55	1.49
Energy Usage Indicators											
Gross Energy Use per Capita (million Btu per person)	325.8	327.4	334.2	309.9	308.5	310.2	310.5	309.0	310.0	312.6	315.3
Gross Energy Use per Dollar of GNP (thousand B:u per 1982 dollar)	27.5	26.2	23.8	20.6	20.2	20.1	19.7	19.5	19.2	18.0	16.8

[1] The cost of imported crude oil to U.S. refiners in 1986 dollars per barrel.
[2] The cost of imported crude oil to U.S. refiners in current dollars per barrel.
Note: Totals may not equal sum of components because of independent rounding.
Sources: Historical data are derived from the following sources: Data Resources, Inc., USMODEL database, (September, 1985) and the Energy Information Administration, *Annual Energy Review 1985*, DOE/EIA-0384(85) (Washington, DC, 1986). Historical quantities are through 1985. Projected values are outputs from the Intermediate Future Forecasting System.
Input data file: Historical = D1212861, Projected = IFFSHL.D0107871. Table printed on January 28, 1987.

Supplementary Footnotes for Appendix Tables

Footnotes for Tables A2, B2, and C2

1. Includes kerosene and steam coal.
2. Includes deliveries to municipalities and other public authorities for institutional heating, street lighting, etc.
3. Includes kerosene, liquefied petroleum gas, and steam coal.
4. Includes all fuels consumed for heat and power, including natural gas used as lease and plant fuel and for industrial feedstock and raw material uses; also, all fuels consumed by refineries.
5. Includes still gas used for feedstock purposes, naphthas less than 400 degrees F, and other oils greater than 400 degrees F.
6. Includes lease and plant fuel consumption of natural gas.
7. Includes kerosene, still gas used in refineries, other raw material oil, and net coke imports. Other raw material oil consists of asphalt, special naphthas, lubricants, waxes, petroleum coke, road oil, and small amounts of other petroleum and net blending oil.
8. Includes naphtha and kerosene types.
9. Consists of natural gas used as pipeline compressor fuel.
10. Includes aviation gasoline, liquefied petroleum gas, lubricants and waxes, steam coal, and electricity.
11. Includes renewable facilities such as hydropower, geothermal power, wood, waste, solar power, and wind power.
12. Totals contained in this summary section include all sectoral components including those not displayed individually in sectoral breakouts. For example, motor gasoline includes consumption in the commercial, industrial, and transportation sectors.
13. In the historical period (1970-1985), includes small quantities of kerosene and jet fuel consumed by electric utilities.
14. In the historical period (1970-1985), includes small quantities of petroleum coke consumed by electric utilities.
15. Includes conventional cogeneration, generation from wood by-products in the paper industry, new technologies such as combined cycle and fluidized bed combustors as well as industrial use of electricity generated by small power plants. The values for 1985-2000 are estimated.

NA = Not available.

Note. Totals may not equal sum of components because of independent rounding.

Footnotes for Tables A3, B3, C3

1. Projected residential coal prices (1985-2000) are delivered-to-dealer prices and do not include dealer markup.
2. Commercial other petroleum price is a weighted average price for kerosene, liquefied petroleum gas, and motor gasoline.
3. Commercial natural gas price is a weighted average of the commercial and other category.
4. Historical price for commercial steam coal is the price of industrial steam coal at the State level. Projected prices do not include dealer markup, where applicable.
5. Projected motor gasoline prices are averages for all grades. Federal and State taxes are included, but county and local taxes are not included.
6. Industrial other petroleum price is a weighted average price for road oil, asphalt, lubricants, waxes, petroleum coke, special naphthas, petrochemical feedstocks, and miscellaneous petroleum products.
7. Industrial natural gas price in this table excludes uses for refinery fuel and for lease and plant fuel.
8. The projected price of transportation distillate includes Federal and State taxes on diesel fuel, but does not include county and local taxes.
9. Jet fuel price is for kerosene type jet fuel at retail.
10. Residual fuel price is for marine bunker fuel.
11. Transportation other petroleum price is a weighted average price for aviation gasoline, liquefied petroleum gas, and lubricants and waxes.
12. Historical price for electric utility distillate fuel oil is the price of electric utility kerosene.
13. Other petroleum products price is a weighted average price for aviation gasoline, lubricants and waxes, and petrochemical feedstocks.

Note. Electricity and natural gas prices are average prices, revenue divided by sales. Also, the electricity prices are averages for class A and B private electric utilities and public power authorities.

Note. Implicit Gross National Product Price Deflator, rebased to 1986 = 1.00, was used to convert from nominal to real dollars.

Note. Totals may not equal sum of components because of independent rounding.

Note. Weighted average of end-use fuel prices derived from the prices shown in each sector and the corresponding sectoral consumption, following the conventions of the State Energy Price and Expenditure Report.

Appendix D

Summary of Energy Projections

Appendix D

Summary of Energy Projections

Table D1. AEO86 Summary of Energy Projections

	1985	1986	1995	2000	Annual Percent Growth 1986-1995	1986-2000	1985-1995	1985-2000
Table A1								
Total Production								
Midcase	64.90	65.00	66.40	66.80	.24	.20	.23	.19
High Price Case	64.90	65.00	67.80	68.60	.47	.39	.44	.37
Low Price Case	64.90	64.80	65.40	66.00	.10	.13	.08	.11
Total Consumption								
Midcase	73.90	74.30	83.10	87.30	1.25	1.16	1.18	1.12
High Price Case	73.90	74.20	81.00	84.30	.98	.92	.92	.88
Low Price Case	73.90	74.30	84.80	90.50	1.48	1.42	1.39	1.36
Table A2								
Industrial Consumption								
Midcase	20.38	20.29	21.87	22.46	.84	.73	.71	.65
High Price Case	20.38	20.26	21.37	21.72	.59	.50	.48	.43
Low Price Case	20.38	20.29	22.48	23.22	1.15	.97	.99	.87
Electric Utility Inputs								
Midcase	26.45	26.65	34.35	38.13	2.86	2.59	2.65	2.47
High Price Case	26.45	26.65	33.84	37.50	2.69	2.47	2.49	2.35
Low Price Case	26.45	26.65	34.21	38.98	2.81	2.75	2.61	2.62
Table A8								
Crude Oil Production								
Midcase	8.97	8.80	5.99	5.43	-4.18	-3.39	-3.96	-3.29
High Price Case	8.97	8.81	6.83	6.89	-2.79	-1.74	-2.69	-1.74
Low Price Case	8.97	8.75	5.61	4.60	-4.82	-4.49	-4.58	-4.35
Net Imports								
Midcase	4.29	5.15	8.20	9.76	5.30	4.67	6.69	5.63
High Price Case	4.29	5.15	6.43	7.31	2.50	2.53	4.13	3.62
Low Price Case	4.29	5.15	9.60	11.87	7.16	6.15	8.39	7.02
Total Product Supplied								
Midcase	15.73	16.07	16.46	17.38	.27	.56	.45	.67
High Price Case	15.73	16.06	15.52	16.33	-.38	.12	-.13	.25
Low Price Case	15.73	16.10	17.52	18.68	.94	1.07	1.08	1.15
Table A9								
Dry Gas Production								
Midcase	16.38	16.30	16.62	16.12	.22	-.08	.15	-.11
High Price Case	16.38	16.30	16.12	15.81	-.12	-.22	-.16	-.24
Low Price Case	16.38	16.30	16.21	16.06	-.06	-.11	-.10	-.13
Total Gas Consumption								
Midcase	17.28	16.52	18.04	17.92	.98	.58	.43	.24
High Price Case	17.28	16.52	18.14	17.64	1.04	.47	.49	.14
Low Price Case	17.28	16.52	17.36	17.74	.55	.51	.05	.18
Average Wellhead Price								
Midcase	2.57	1.73	3.93	5.51	9.55	8.63	4.34	5.22
High Price Case	2.57	1.73	3.99	6.62	9.73	10.06	4.50	6.51
Low Price Case	2.57	1.73	3.73	5.00	8.91	7.88	3.80	4.54
Average End-Use Gas Price								
Midcase	4.83	4.11	6.07	7.66	4.43	4.55	2.31	3.12
High Price Case	4.83	4.11	6.14	8.92	4.56	5.69	2.43	4.17
Low Price Case	4.83	4.11	5.76	7.13	3.82	4.01	1.78	2.63

See footnotes at end of table.

Table D1. AEO86 Summary of Energy Projections (Continued)

	1985	1986	1995	2000	Annual Percent Growth 1986-1995	1986-2000	1985-1995	1985-2000
Table A10								
Coal Consumption								
Midcase	818	813	1,021	1,105	2.56	2.22	2.24	2.03
High Price Case	818	813	1,010	1,080	2.44	2.05	2.13	1.87
Low Price Case	818	813	1,031	1,131	2.67	2.39	2.34	2.18
Average Minemouth Price								
Midcase	25.81	25.46	28.63	29.45	1.31	1.05	1.04	.88
High Price Case	25.81	25.46	28.29	29.07	1.18	.95	.92	.80
Low Price Case	25.81	25.44	28.76	30.11	1.37	1.21	1.09	1.03
Table A11								
World Oil Price								
Midcase	27.68	14.57	26.61	32.87	6.92	5.98	-.39	1.15
High Price Case	27.68	14.57	33.00	41.48	9.51	7.76	1.77	2.73
Low Price Case	27.68	14.57	21.20	26.76	4.26	4.44	-2.63	-.23
Real GNP								
Midcase	3,585	3,680	4,597	5,183	2.50	2.48	2.52	2.49
High Price Case	3,585	3,674	4,495	5,018	2.27	2.25	2.29	2.27
Low Price Case	3,585	3,686	4,700	5,343	2.74	2.69	2.75	2.70
Energy Use per $ of GNP								
Midcase	20.6	20.2	18.1	16.8	-1.21	-1.31	-1.29	-1.35
High Price Case	20.6	20.2	18.0	16.8	-1.27	-1.31	-1.34	-1.35
Low Price Case	20.6	20.2	18.1	16.9	-1.21	-1.27	-1.29	-1.31

Source: Historical Data: Energy Information Administration, Annual Energy Review 1985, (DOE/EIA-0384(85), Short-Term Energy Outlook, October 1986, DOE/EIA-0202(86/4Q).
Scenarios: IFFSMM.D1206862, IFFSHL.D0107871, IFFSLH.D1209861

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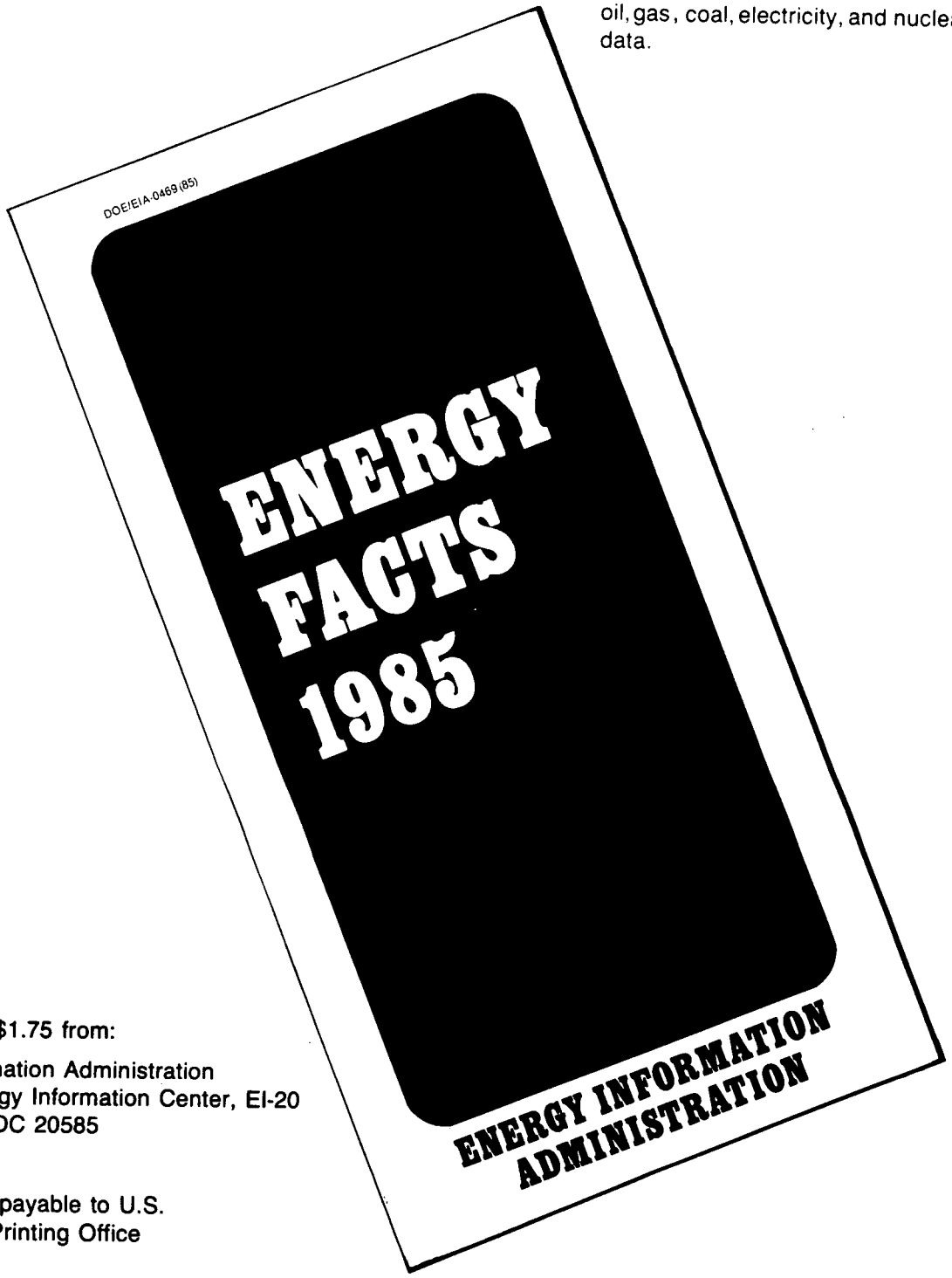

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