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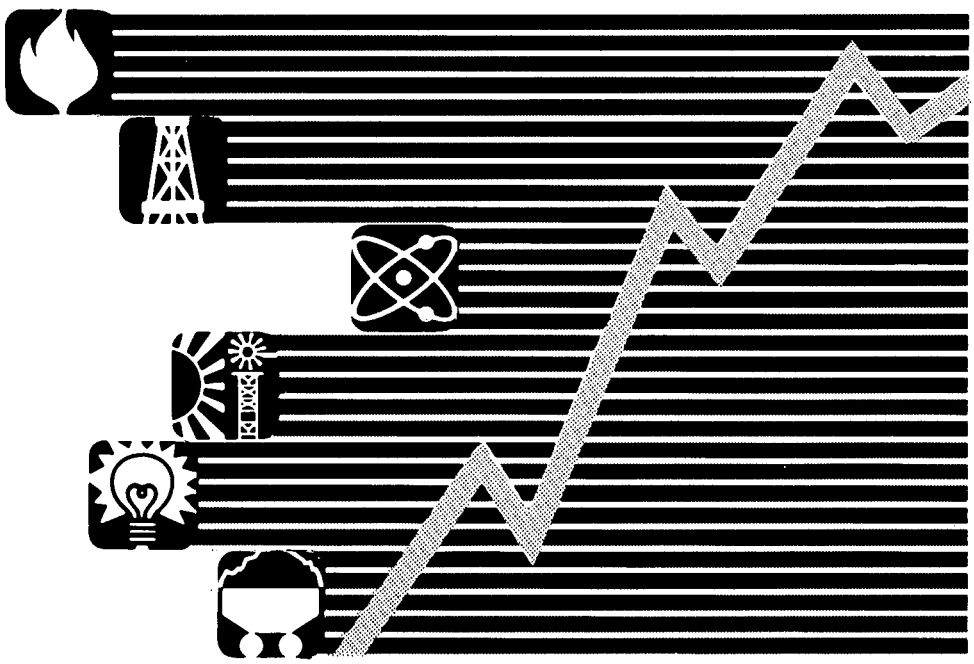
Energy Information Administration

Annual Energy Outlook 1987

With Projections to 2000



Administrator's Message

In the ever-moving world of energy markets even the best projections need to be revised in the light of new and changing patterns. The *Annual Energy Outlook* of the Energy Information Administration (EIA) is no exception. This year's adjustments from the 1986 issue are discussed in some detail in the body of this report, and it suffices here to point out that the revisions reflect in general a slightly softer price path. The world surplus of crude oil seems now to be more tenacious than it appeared a year ago; yet the overall outlook for energy that is projected here tends to reinforce elements of the earlier projections, while at the same time it incorporates results of the analytical studies EIA has done during the past 12 months.

As the independent statistical and analytical agency of the United States Government for energy data, EIA continually carries on three distinct tasks:

First, it collects, assimilates, publishes and archives domestic and foreign energy information in historical form. In fact, it seems only appropriate that this highly industrialized nation, which produces and consumes more energy than any other free-market nation on earth, should have developed and put in place one of the most accurate and timely systems in the world for the recording and publishing of energy data.

In addition, EIA participates in the process of energy planning worldwide--by projecting energy supplies and demands, domestic and foreign. This 1987 issue of the *Annual Energy Outlook (AEO)* is one such projection, dealing as it does with U.S. supplies and demands to the year 2000.

Finally, EIA contributes to (but does not directly participate in) the U.S. energy policy debate--by analyzing specific issues of national interest. Most requests for such analyses come to this agency from the U.S. Congress, but the White House and the Departments and other Agencies of the Executive Branch have also asked EIA for policy analyses.

The cost to U.S. taxpayers for EIA to perform all of these three tasks--collection/publication, projection, and analysis--amounts to less than 2 cents per barrel of crude oil produced in this country.

It is often assumed in political circles that information is power, so the creators of EIA went to extraordinary lengths to make sure that such critical information functions would not be abused. To maintain the essentially technical character of EIA, its Administrator is given a considerable degree of statutory independence. This means, however, that the judgments and opinions embodied in EIA's forecasts and analyses (including, of course, any errors) are those of EIA--not the Department of Energy or its Secretary.

During the ten years it has existed, the Energy Information Administration has matured as an institution and has developed considerable credibility in a political environment that is sometimes highly charged. It probably takes ten years to produce an institution like EIA and to weld its professionals into a cohesive and experienced force on its climb up the learning curve, but by now it is certainly close to the top. On its way up, to the best of my knowledge, EIA never deviated from its commitment to absolute political neutrality. It never should.

Dr. H. A. Merklein
Administrator
Energy Information Administration

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Energy Information Administration
Office of Energy Markets and End Use
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Contacts

This report was prepared by the Energy Information Administration (EIA), Office of Energy Markets and End Use (EMEU). General information about the report may be obtained from W. David Montgomery (202/586-1617), Director of EMEU, or from John D. Pearson (202/586-6160), Director of the Energy Analysis and Forecasting Division. The demand analysis in these projections was directed by Mark Rodekohr (202/586-5209). The supply analysis and forecast integration were directed by Edward J. Flynn (202/586-5748). Detailed questions may be addressed to the following authors by section:

International Energy Markets:	Mark Rodekohr (202/586-5209)
Petroleum and Natural Gas Markets:	Richard Farmer (202/586-1466)
Coal and Electricity Markets:	Scott Sitzer (202/586-5206) Linda Barber (202/586-4815)
End-Use Consumption:	Mark Rodekohr (202/586-5209)
Comparison With Other Forecasts:	Linda Barber (202/586-4815)

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The projections in this year's *Annual Energy Outlook* were prepared with a set of spreadsheet models of the U.S. energy economy. Inquiries concerning the availability and documentation of the models should be directed to EIA's National Energy Information Center (202/586-8800).

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An Overview

Except for greater promise from both domestic crude oil and natural gas, the long-term trends depicted in this year's *AEO* are essentially unchanged from the 1986 view. In the latest base-case projections, the economy is assumed to grow at an average rate of 2.2 percent per year from 1987 through 2000--somewhat below the 2.4 percent growth assumed last year; and real oil prices on the world market (expressed in 1987 dollars) remain below $20 per barrel until 1994. Thereafter, increasing world oil demand is expected to begin absorbing excess supply, so that oil prices should then increase more rapidly--reaching $31 by the year 2000.

In the near term, most energy markets--including those for natural gas, coal, and electricity, as well as oil--must continue to cope with excess production capacity. In the longer term, as this excess capacity is diminished, prices are expected to rise moderately. Such price movement will reflect the increasing need to develop resources as an expanding economy produces greater demand that must be anticipated and met.

U.S. petroleum demand, estimated at 16.5 million barrels per day in 1987, is projected in the base case to rise to 17.7 million barrels per day by 1995 and 18.3 by the year 2000. Petroleum production (including natural gas liquids as well as oil) was estimated at 10.6 million barrels per day in 1987, but it is seen falling to 8.8 million barrels per day by 1995 and 8.4 by 2000. As a result, net imports (estimated at 5.8 million barrels per day for 1987) rise steadily to 9 million barrels per day by 1995 and 10 million by the year 2000. Consequently, U.S. dependence on imports is projected in the base case as rising from 35 percent in 1987 to 55 percent by the year 2000.

One of the most striking changes in this year's forecast is in regard to natural gas. Compared with the projections of the 1986 *AEO*, natural gas supplies are expected to be relatively abundant at lower prices, leading to increased consumption. This year's view is based on the flexibility gas producers have demonstrated recently in meeting competition, both from other gas suppliers and from suppliers of other fuels. Increasing volumes of gas are being handled in spot sales instead of through rigid long-term contracts, or else are being sold on the basis of flexible pricing. Natural gas consumption, estimated at 16.8 trillion cubic feet in 1987, is expected to rise to about 19.7 trillion cubic feet in the year 2000. Wellhead prices are expected to bottom out in 1987 at about $1.80 per thousand cubic feet and then rise smoothly to about $4.00 by 2000, matching the increases in oil prices to large end-users.

The outlook for domestic crude oil production has also changed significantly, with a smaller decline by the end of this century now being forecast than in recent *AEO's*. Total U.S. production in 2000 is expected to drop from the 1987 level of about 8.3 million barrels per day to around 6.0 million barrels per day in the base case--a decrease about 10 percent less than had been forecast last year. This reflects a more optimistic assessment of the future potential for older producing regions within the Lower 48 States.

Domestic coal is expected to contribute more and more to meeting the Nation's energy needs. Electricity is the only form of energy showing continued penetration for non-transportation use, and coal is the dominant provider of that electricity. Coal production, estimated at about 917 million tons for 1987, is expected to rise to slightly more than 1 billion tons by 1995 and to exceed 1.1 billion tons by 2000.

The outlook for the electric utility industry shows the current surplus of generating capability declining by the early 1990's. Demand for electricity is projected to grow slightly more rapidly than the growth in real Gross National Product (GNP) between now and 2000; and (if this projection materializes) additional capacity will be required by the late 1990's, beyond what is under construction or now planned. It is likely that much of this additional generation requirement will be met by combined-cycle units that use natural gas as their major fuel source. As a consequence of lower capital outlays and better utilization of capacity, real electricity prices to all sectors are expected to decline slightly over the projection period.

In addition to the base-case forecast, the *AEO* also deals with two combinations of variant oil price and economic growth, leading to projections of oil imports that are respectively higher and lower than those in the base case. Lower world oil prices reduce U.S. petroleum production, but simultaneously increase domestic demand for the fuel; at the same time, higher macroeconomic growth also spurs petroleum demand. Thus, the combined results mutually reinforce a higher level of petroleum imports. The reverse of these

assumptions -- *higher* prices and *lower* macroeconomic growth -- would clearly lead to *lower* petroleum imports.

Exploration of these two alternative sets of assumptions, along with the base case, leads to a wide range of potential values for net imports--as shown in Table 1. In 1995, imports are estimated to vary somewhere between a low of 7.4 million barrels per day and a high of 10.5 million. By 2000, this range widens to a low of 7.6 million barrels per day and a high of 11.7.

The International Picture

World Oil Markets Likely to Remain Volatile for Next Several Years

Despite the relative stability of oil prices in 1987, the world oil market could easily experience large swings in prices over the next several years. Excess capacity and international tensions will exert conflicting market pressures.

Despite the large drop in crude oil prices during 1986 (about 50 percent in the United States, and even more abroad because of exchange rate changes), the demand for oil from the Organization of Petroleum Exporting Countries (OPEC) rose only slightly. Thus, excess oil production capacity continues to be the major problem facing OPEC in the near term (Figure 1).

There are several reasons why lower prices have brought only a modest rise in the demand for OPEC oil:

- The intensity of oil use in the market economies is declining.
- Consumers outside the United States have been able to take advantage of only part of the price drop (especially in their use of gasoline), because some countries increased taxes to offset part of the decline in prices for crude oil.
- Several oil-producing countries that are not members of OPEC (including Canada and the United Kingdom) adjusted their tax regimes in such a way as to preserve economic incentives for domestic oil production. This helped to maintain their production levels, even in the face of falling prices.

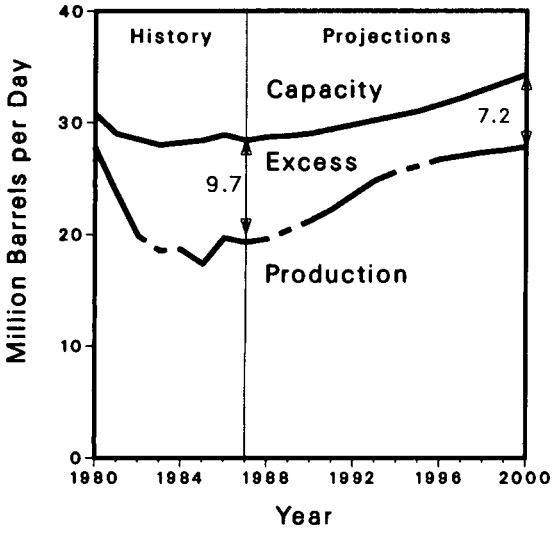
Overall, significant excess production capacity within OPEC is expected to persist well into the 1990's, until an anticipated increase in worldwide demand (particularly in the developing countries) and a falloff in oil output from outside that organization combine to call upon OPEC production at levels that are closer to capacity. Past experience suggests that projections like these often involve uncertainties, yet most of the free world's oil reserves are located in the Middle East (Figure 2), and it seems inevitable in the long run that

Table 1. Petroleum Supply, Demand, and Imports Under Alternative Assumptions
(Million Barrels per Day)

Supply, Demand, and Imports	1985	1986	1987	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 (1987 dollars per barrel)	28.50	14.40	18.10	18.30	22.40	27.30	24.90	30.80	40.20
Real GNP Growth, 1987-2000 (average annual percent)	--	--	--	--	--	--	2.5	2.2	1.9
Production									
Crude Oil	9.0	8.7	8.3	6.0	6.5	7.1	5.5	6.0	6.9
Other Liquids [a]	2.2	2.2	2.3	2.3	2.3	2.2	2.4	2.4	2.2
Total	11.2	10.9	10.6	8.3	8.8	9.3	7.9	8.4	9.1
Consumption	15.7	16.3	16.5	18.7	17.7	16.6	19.5	18.3	16.7
Net Imports	4.3	5.4	5.8	10.5	9.0	7.4	11.7	10.0	7.6

-- = Not applicable.
[a] Includes natural gas liquids, processing gain, and other domestic production.
Sources: **History:** Energy Information Administration, *Annual Energy Review 1986*, DOE/EIA-0384(86) (Washington, DC, February 1987). **Projections:** Tables A8, B8, and C8.

Figure 1. Excess OPEC Petroleum Production Capacity, 1980-2000



Note: Oil Production capacity includes crude oil, natural gas liquids, and refinery gain.
Source: Energy Information Administration, Office of Energy Markets and End Use.

the world will become more dependent on OPEC supplies.

Although excess capacity may keep prices low for the next several years, continuing tensions in the Persian Gulf would have the opposite effect on the market--by maintaining the threat that free world supplies can be squeezed down suddenly. About 6 to 8 million barrels per day are now being exported through the Persian Gulf via the Strait of Hormuz, and this is a significant portion of OPEC's total production of about 19 to 20 million barrels per day. While the United States receives a relatively small amount of this oil, a sharp reduction in these supplies could force prices up wherever petroleum is consumed. That would affect national economies all over the world--including ours.

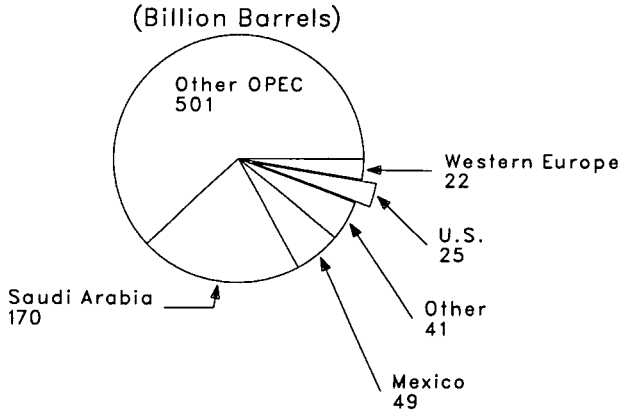
Even though the United States and many other countries have developed strategic petroleum reserves to draw upon during a disruption, a prolonged disturbance could have significant market impacts. An escalation of hostilities between Persian Gulf countries over a prolonged period would be bound to increase oil prices as excess capacity was effectively reduced. If prices increased rapidly, the market economies could face economic dislocations--especially if governments of the major importing nations resorted to price controls and allocation policies.

In the Long Run, Oil Prices Depend on the Costs of Substitutes and on OPEC Capacity

The wide range of world oil prices for the year 2000 considered by EIA in these sets of projections (between $25 and $40 per barrel in 1987 dollars) reflects many uncertainties (Figure 3). The point where prices actually wind up will be determined by factors such as:

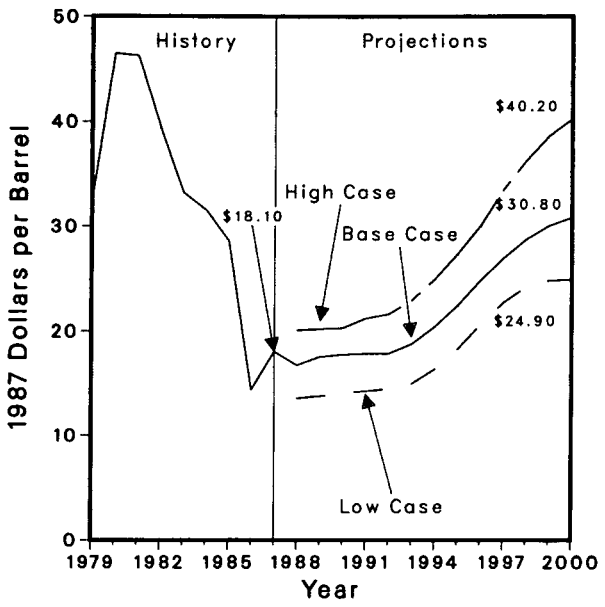
- *Consumer and government expectations.* If consumers and governments believe that prices will rise, they will tend to make investments that restrain demand growth and stimulate production. On the other hand, these actions introduce a countervailing influence in themselves, because they encourage lower prices.
- *The cost in real resources of developing alternative energy sources.* If alternatives to oil (most likely natural gas and, to some extent, coal) can be developed at a relatively low real resource cost, there will be pressure to keep oil prices low. Attempts to raise oil prices will be met by fuel-switching and reduced demand.

Figure 2. Oil Reserves in the Market Economies, 1987



Note: Reserve estimates vary among publications. Estimated data for 1986 published in *World Oil* were : U.S., 27; Mexico, 55; Saudi Arabia, 170; Other OPEC, 320; Western Europe, 19; Other, 45; and Total, 636.
Source: *Oil and Gas Journal*, December 28, 1987.

Figure 3. World Oil Prices, 1979-2000



Source: History: Energy Information Administration, *Annual Energy Review 1986*, DOE/EIA-0384(86) (Washington, DC, 1987).
Projections: Tables A1, B1, and C1.

- *Prospects for non-OPEC supply.* Much of the world outside the United States has not yet been explored extensively for oil. Many non-OPEC regions have favorable geology, and new production from those areas would tend to keep oil prices lower than would otherwise be the case.
- *OPEC's willingness to increase capacity.* At present, certain OPEC countries that are rich in oil reserves could increase production dramatically and rapidly at essentially no additional cost. Such nations might perceive it to be in their own best interest to do so, because this could help ensure a long-term future market for their low-cost oil by preventing significant price increases.

In short, any action by consumers or governments that limits growth in demand for oil will tend to limit increases in its price. For example, if consumers are concerned about the possibility or even the likelihood that oil prices will escalate, the investments that are prompted in equipment that uses alternative fuels or is more efficient in its use of oil will moderate growth in oil demand. Likewise, government policies of any sort to promote alternate energy sources among the market economies would constrain oil demand.

In this country, most oil is used by the transportation sector, where substitution is difficult. Outside the United States, however, significant volumes of oil are used for other purposes--such as heating and boiler fuel (Figure 4). As a boiler fuel, oil can be replaced easily by natural gas. Therefore, if natural gas supplies (both here and abroad) remain relatively inexpensive to develop, use of this fuel should help to curb oil price increases through 2000. Beyond that date, coal gasification and other processes to produce liquid or gaseous fuels will become more important in limiting rises in oil price.

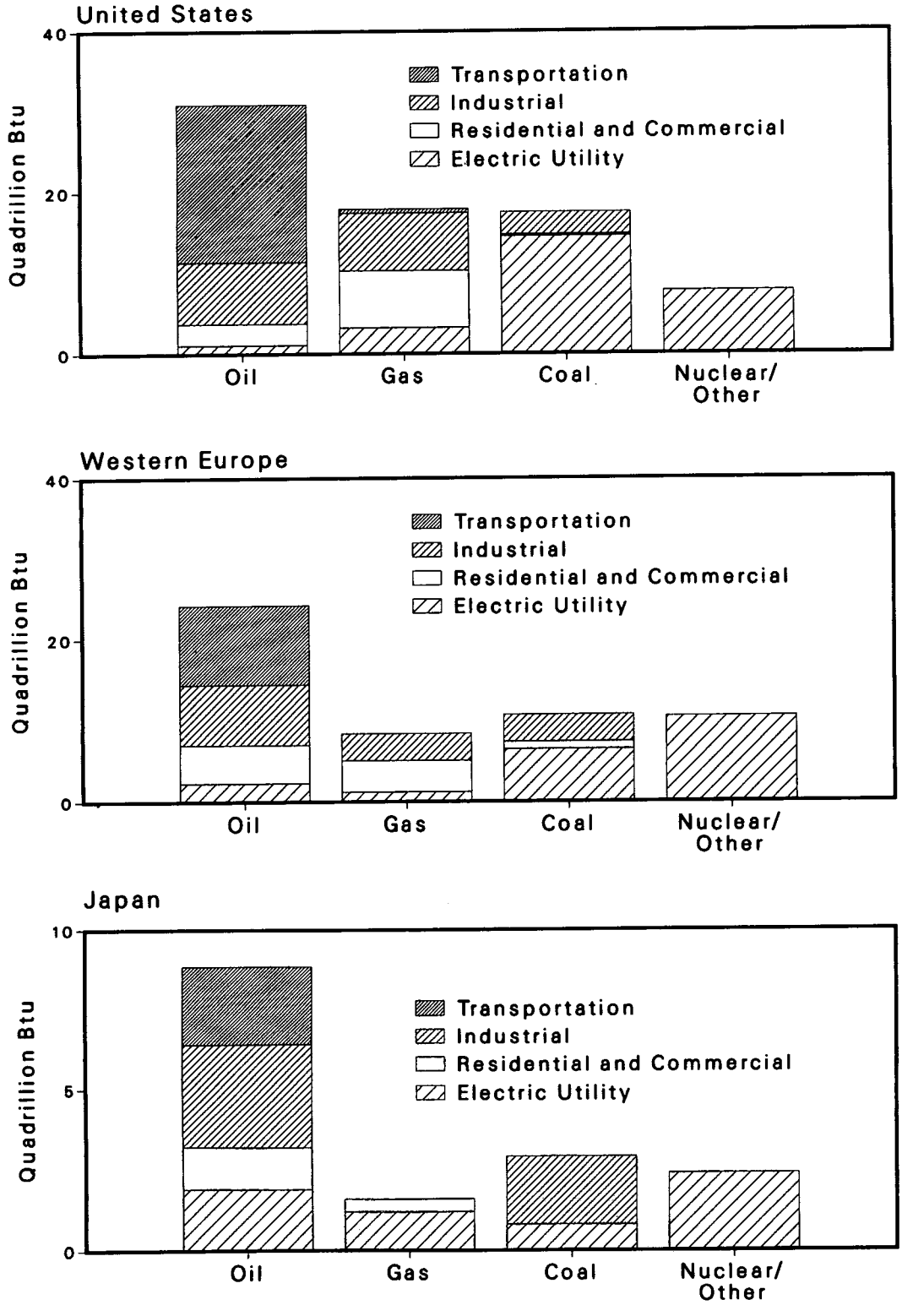
U.S. Vulnerability to Interruptions in Supply Expected to Increase

U.S. oil imports are projected to increase in all the cases considered by this analysis. Moderate growth in demand, combined with falling domestic production, will increase the need for such imports (Figure 5). In addition, the free world as a whole is projected to increase its dependence on OPEC oil (Figure 6). This dependence is a key measure of oil-supply vulnerability, because the economic impact of any supply disruption will be shared (though not necessarily equally) by all consuming nations as oil prices increase.

The earlier increase in oil imports by the United States resumed in 1986, when domestic production began to drop off in response to falling oil prices. Such production should continue to decline over the projection period, because prices are not expected to be high enough (even in the "high price case") to foster the levels of drilling that are deemed necessary to sustain domestic oil output at current levels. At the same time, although EIA projects that significant conservation efforts will cause the intensity of U.S. oil use to diminish, it foresees an increase in demand of 1.8 million barrels per day between 1987 and 2000 in the base-case scenario. In fact, this demand growth is moderate when compared to an increase of about 5.5 million barrels per day that would result if the intensity of oil consumption (measured as oil use per dollar of GNP) remained at 1987 levels throughout the projection period.

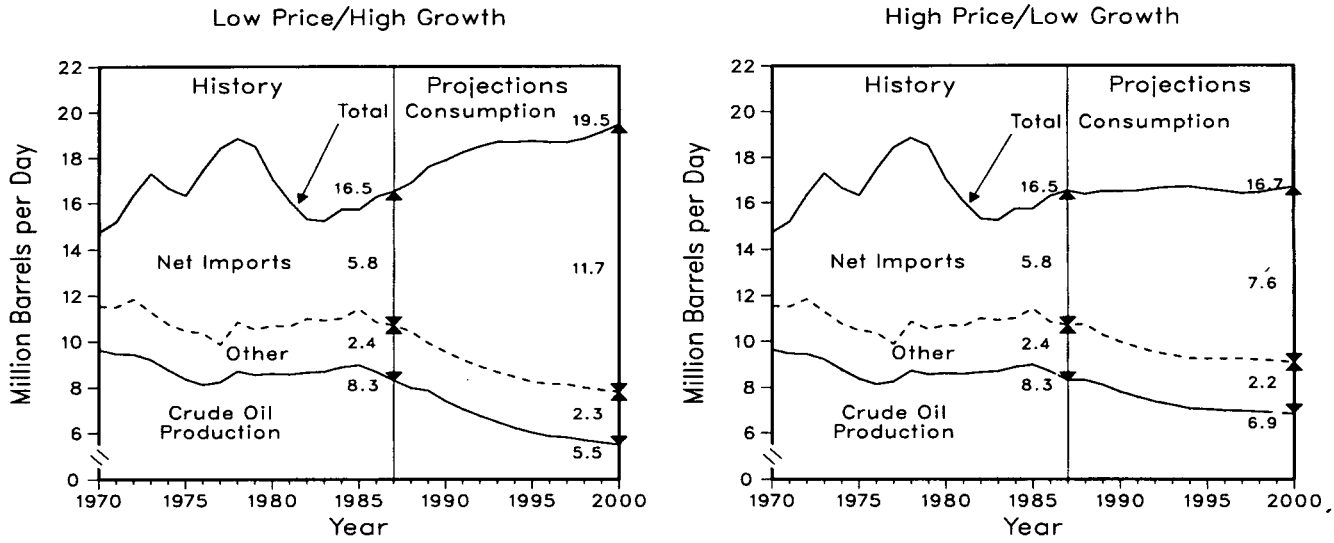
One factor that tends to moderate oil vulnerability, of course, is the U.S. Strategic Petroleum Reserve. This reserve already contains more than 540 million barrels, and it is assumed that it will reach 750 million barrels by the mid-1990's. Nations outside the United States also maintain emergency oil stocks that could be used during emergency shortages. These stocks are large enough to provide a cushion in the event of a short-term supply disruption, significantly reducing the adverse effects that might otherwise be felt by the market economies.

Figure 4. Patterns of Energy Use in 1985 for the United States, Western Europe, and Japan



Sources: International Energy Agency, *Energy Balances of OECD Countries, 1970/1985* (Paris, 1987). Energy Information Administration, *Annual Energy Review 1986*, DOE/EIA-0384(86) (Washington, DC, 1987).

Figure 5. Petroleum Supply and Consumption Under Alternative Assumptions, 1970-2000



Notes: Production includes crude oil purchased for the SPR. Other includes natural gas plant liquids, other hydrocarbons, refinery processing gain, and primary stock withdrawals.
Sources: History: Energy Information Administration, *Annual Energy Review 1986*, DOE/EIA-0384(86) (Washington, DC, 1987). Projections: Tables B8 and C8.

U.S. Petroleum Markets

No Major Growth in Demand Expected, Even if Oil Prices Remain Low

During the past two years, U.S. demand for oil has barely responded to downward price movements. In 1986 crude oil prices fell by almost 50 percent, while oil demand increased only by about 3.5 percent. During 1987, demand increased by less than half this rate. Furthermore, a substantial segment of the 1987 increase in petroleum consumption was related to economic growth--particularly with the stimulus provided to export industries by the falling U.S. dollar.

Even with the assumptions in the low price case, petroleum demand is not projected to grow very rapidly over the forecast period. In that case, demand would grow to 19.5 million barrels per day by 2000, or at a rate of 1.3 percent per year between now and then. In the base case, petroleum demand is seen as growing from 16.5 million barrels per day in 1987 to only 18.3 in 2000--so that it would still be well below the 18.8 million barrels per day of the peak consumption year, 1978. In both the base case and the low price case, the annual growth in demand is still well below the GNP growth rate of 2.2 percent per year. Two basic arguments support projections of such low growth in petroleum demand:

- *Technological Improvements.* Years of relatively high prices induced a variety of oil-saving technological improvements that are essentially irreversible. These will continue to influence fuel choices in the future, even in a low-oil-price environment.

- *Consumer Expectations.* The lack of response over several years among some consumer groups to persistently low oil prices prompts the speculation that future investments related to certain types of energy use (such as home heating) will continue to be based on the assumption that oil prices will eventually increase again--as they do, indeed, in this forecast.

Increases in the consumption of gasoline nationwide have been relatively small (in the range of 1 to 2 percent per year recently), even though the real fuel cost per mile of driving is now at its lowest point in three decades. Despite some evidence that new-car efficiency (defined as average miles per gallon) is no longer improving as rapidly as it did a few years ago, total gasoline demand has grown only slightly. Older, less efficient cars have been replaced inexorably with new, fuel-efficient models, so average fleet efficiency

has increased steadily and this has limited increases in gasoline demand.

Use for Transportation Continues to Dominate U.S. Oil Consumption

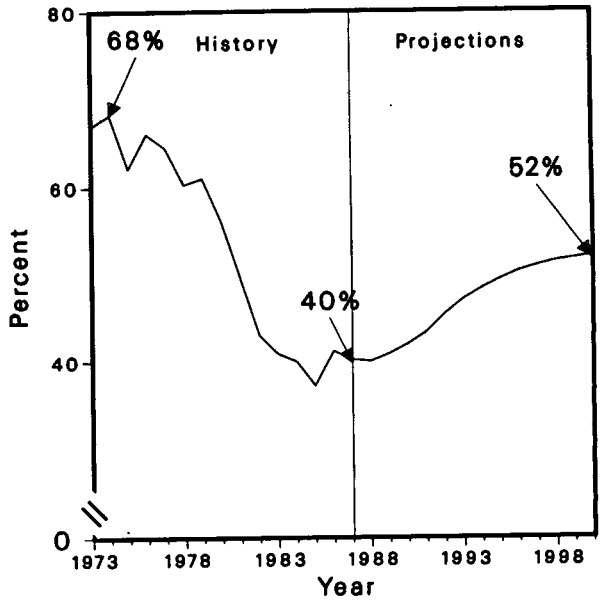
Use of petroleum in the U.S. transportation sector (where few energy alternatives exist) has been increasing, and this sector is projected to remain the largest single user of petroleum in the United States (Figure 7). Much of the remaining oil use is in sectors where other fuels (such as natural gas and nuclear power) can more easily substitute for oil. In 1973, transportation use accounted for about 50 percent of total oil demand; by 1986 this figure increased to slightly more than 60 percent. Apart from transportation, the use of petroleum has fallen in response to higher prices; but transportation's demand for oil has increased. This tends to increase the vulnerability of the United States to price shocks, because no significant substitutes for petroleum in motor vehicles are readily available for the short run, and none are even considered likely on a massive scale over the next 10 to 15 years. In the short run, the only market response to higher prices involves reductions in driving. Additional improvements in the efficiency of automobiles and trucks must take longer because of the slow rate of turnover in the existing stock.

The projections in this analysis assume that new-car efficiency will increase from 27 miles per gallon (mpg) in 1985 to 34 mpg by 2000--for an average annual improvement of about 1.5 percent. The efficiency of new heavy trucks is assumed to increase by 0.5 percent per year during the same period.

The other prime consideration in determining transportation's requirements for fuel is the amount of driving, as measured by vehicle miles. Total vehicle miles for personal travel (which accounts for about 45 percent of transportation fuel use) are projected to grow by 1.8 percent per year--slightly less than the rate at which real GNP is increasing. This projection reflects the fact that after 1990 the U.S. population of driving age will be growing at a significantly slower rate. Nevertheless, the increases in driving observed recently have surprised many analysts, who assumed that the country was nearing a point where individual consumers might even reduce driving. In fact, mileage per vehicle has remained relatively unchanged; and continuing growth in vehicle ownership has increased the total of vehicle miles over the past 10 years. Consumer demand for automobiles in the United States may still be far from saturated.

Historically, there have been three major theories concerning the saturation of vehicle ownership: (1) that ownership would peak at one vehicle per household, (2) that ownership would not exceed one vehicle per worker, and (3) that ownership would not exceed one vehicle per licensed driver. The first milestone was surpassed in 1955, the second in 1965, and the third is rapidly being approached. In 1985, there were about 1.5 vehicles per household, 1.2 vehicles per worker, and 0.8 vehicles per licensed driver.

Figure 6. OPEC Oil as a Percentage of Market Economy Consumption, 1973-2000



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

Outside the automobile sector, there has been strong growth in the use of both freight fuel (mainly diesel) and, to an even greater extent, jet fuel. The United States now uses more jet fuel than residual fuel oil--an amazing turnaround relative to 1978, when the use of residual fuel was about three times higher than jet fuel use. The principal explanation for this change lies in the fact that electric utilities have cut their use of residual oil so sharply.

U.S. Oil Production Almost Certain to Continue Declining

Over the past 20 years, U.S. production of crude oil has varied from a high of 9.6 million barrels per day in 1970 to a low of 8.1 million barrels per day in 1976 (Figure 8). After 1980, production crept upward again gradually--until it reached almost 9.0 million barrels per day in 1985, largely on the strength of increases

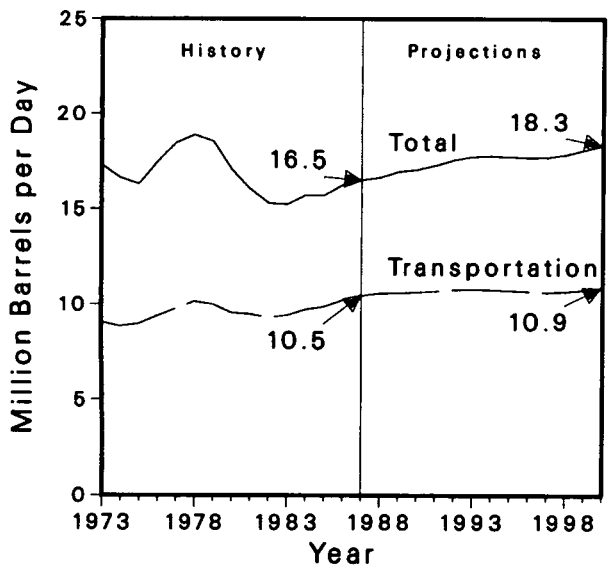
from Alaska, but also as a result of an unexpected reversal in the decline of production from the Lower 48 States. Following the price collapse of 1986, production started another substantial decline. It is estimated that production for 1988 will average about 8.2 million barrels per day, or about 0.8 million barrels per day below the 1985 level.

Given the assumptions of this study on world oil prices and recognizing that the costs of discovering and developing oil resources in the United States will increase, domestic production is expected to decline to 6.0 million barrels per day by 2000 in the base case (Figure 8). The falloff between 1987 and 2000 is projected to be split about evenly between Alaska and the Lower 48 States.

The projected drop in production from the Lower 48 States is smaller than that envisioned in earlier EIA forecasts, based on a reevaluation of the industry's ability to step up its drilling rate in response to the anticipated gradual increases in oil price and to stabilize its finding rate (barrels of oil discovered per foot of exploratory drilling) through an emphasis on extensions of existing fields. The potential resilience of producing areas in the Lower 48 States in response to sufficient price incentives was demonstrated by the production experience of the early 1980's. Also, the reluctance of oil companies to abandon older reservoirs, despite slackening of production in 1986, adds to the future inventory of exploitable resources.

This combination of factors should dominate U.S. production for the next 10 years. The outlook for this time-frame does not take into account any large new discoveries in the Arctic National Wildlife Refuge or offshore along the West Coast.

Figure 7. Total and Transportation Petroleum Demand, 1973-2000



Sources: History: Energy Information Administration, *Annual Energy Review 1986*, DOE/EIA-0384(86) (Washington, DC, 1987). Projections: Table A8.

Changing Product Demand and Environmental Policy Can Affect Future Refinery Investment and Costs

The domestic petroleum refining industry faces major challenges during the next decade from the operational and capital investment requirements that will be imposed by a continuing shift in the mix of petroleum products demanded, as well as by increasingly stringent environmental requirements on product quality.

Through much of the late 1970's and early 1980's, refiners had to make many adjustments: changing and growing product demand, changing sources and qualities of crude oil, new environmental restrictions (placed both on the quality of final products and on refinery operations), and the end of price controls on crude oil and products. The profitability of the industry may have been affected even more during this period by changes in the level and volatility of crude oil prices (with price increases leading to lower refinery profits, while decreases led to higher profits). Thus, with the exception of price controls, future challenges facing the industry are largely outgrowths of past developments.

On the environmental front, the industry is completing its phaseout of octane-enhancing lead additives (octane is a key measure of the anti-knock performance of gasoline). In December 1987, maximum lead levels were set by the Environmental Protection Agency (EPA) at 0.1 grams per gallon of leaded gasoline. The agency is not planning to reduce the lead limit to zero at this time, although total lead use will continue to decline under the current standard as older vehicles (which still use leaded gasoline) are retired. Apart from replacement of lead, however, refineries will still have to meet increasing octane requirements; new, higher-performance engines will boost the demand for premium fuels. At the same time, separate EPA proposals to limit the vapor pressure of finished gasoline will limit the use of low-cost, high-octane blending components such as butane and thus increase the cost of producing gasoline. New limits on vapor pressure could also constrain the use of alcohol blendstocks (ethanol and methanol), which are a partial substitute for petroleum-based transportation fuels.

The quality of diesel fuel (a middle distillate) is coming under greater environmental scrutiny too. Beyond current standards and goals for particulate emissions from

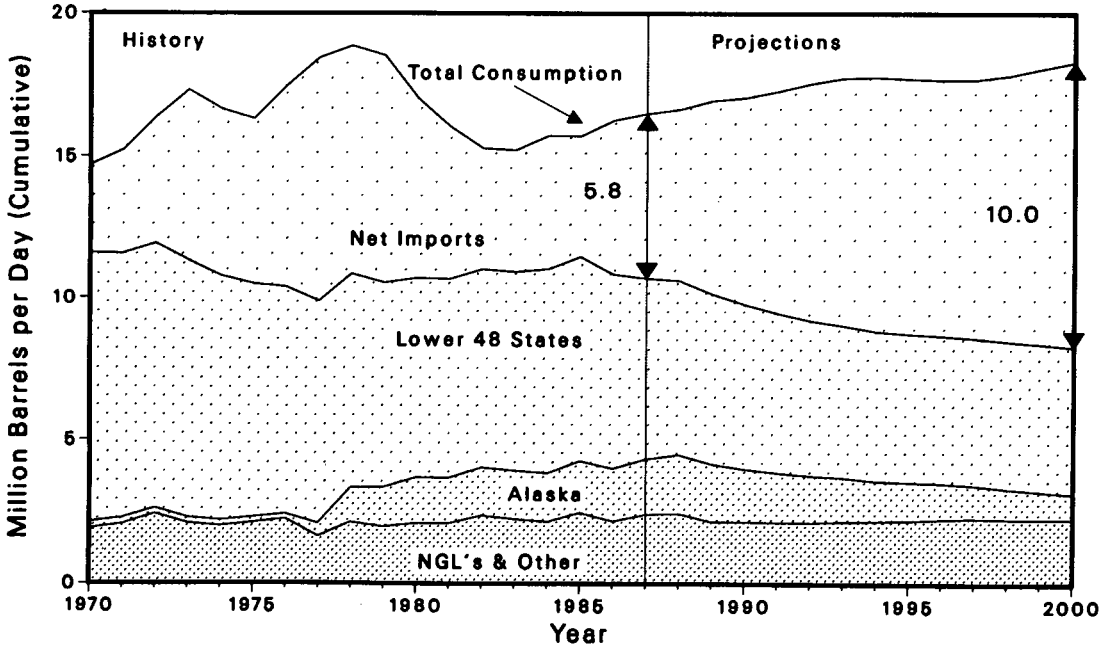
diesel fuel, EPA is studying the costs and benefits of further restrictions on the sulfur and aromatic content of diesel. (Current limits on sulfur are set at 0.25 grams per gallon.) Sulfur content is related to the formation of sulfur dioxide, a principal atmospheric pollutant; and aromatics (including benzene) are associated with other health risks. Sulfur compounds may be removed at the refinery or by modifying diesel engines. Doing the job at the refinery would increase the cost of fuel production; but at the same time it would help vehicles meet other particulate standards, thus reducing the need for efficiency-dampening traps on diesel engines. Reducing the content of aromatics would entail a shift in downstream processes, and this would add further to the cost of diesel fuel.

Refiners will also have to reexamine the use of various downstream processes, catalysts and additives in the light of changes in the mix and quality requirements for all products. In particular, this study foresees relatively stable demand for gasoline (a consequence of improving fuel efficiency in autos), but an increase in distillate demand (primarily for diesel use). However, relative changes in product costs could change this outlook. Furthermore, increased refining activity overall (which could result in a greater requirement for crude oil inputs--and, ultimately, in imports) due to changes in product quality are not fully represented here.

Domestic Oil and Gas Producers Face Brighter Financial Outlook Over the Next 10 Years

The gradual decline in real oil prices during the early 1980's and the collapse of prices in 1986 sharply reduced the profitability of oil and gas exploration and production. Although it was less apparent, there also has been a shift in the share of domestic oil and gas activity undertaken by independent producers as opposed to major integrated companies. ("Majors" are defined to include the 22 large energy companies that report to EIA's Financial Reporting System; "independents" include all other oil and gas companies.) Table 2 provides an overview of developments in the financial picture for the domestic oil and gas industry.

Figure 8. U.S. Petroleum Consumption and Sources of Supply, 1970-2000



Note: Net Imports includes imports for the Strategic Petroleum Reserve. NGL's & Other includes stock changes, crude oil losses, and unaccounted for.
Sources: History: Energy Information Administration, *Annual Energy Reveiw 1986*, DOE/EIA-0398(86)(Washington, DC, 1987). Projections: Table A8.

Generally, the part of this domestic industry devoted to exploration and production was in poor financial health in 1986, as measured by the ratio of internal cash flow to fixed assets (net income plus noncash charges, divided by net property, plant, and equipment). Independent producers registered large reductions in cash flow, and the worst instances simply resulted in the dissolution of many companies. As stubbornly high costs and sagging prices squeezed the operating margins for independents, perhaps the most intractable part of their costs has been interest expense--which became a growing burden in relation to earnings. To a lesser extent, the pinch was also felt by the majors, as witnessed by the unprecedented number of leveraged mergers and acquisitions and takeover defenses involving several of the biggest oil companies.

In general, the increasing debt burden among independents appears to have resulted from heavy borrowing during the drilling boom, followed by significant reductions in earnings due to lower prices. Independents have tended historically to be less profitable than the majors in domestic oil and gas production, largely because of the independents' greater relative debt burden. For the majors, much of the increased debt burden now has arisen from corporate consolidation.

Table 2. Income and Investment in the U.S. Oil and Gas Industry

	1985	1986	1987	1988	1989	1990	1995	2000
Revenues and Cash Flow								
Revenues								
Billion 1987 Dollars	142.4	80.0	90.4	86.1	89.0	100.7	123.1	168.5
Index (1985 = 1.00)	1.00	0.56	0.64	0.60	0.63	0.71	0.86	1.18
Ratio of Internal Cash Flow to Net PP&E [a]								
FRS Companies [b]	0.26	0.11	0.14	0.14	0.15	0.19	0.19	0.20
Independents [c]	0.20	0.05	0.09	0.07	0.08	0.12	0.17	0.19
Total	0.23	0.08	0.12	0.11	0.12	0.16	0.18	0.20
Oil and Gas Investment								
Total Spending on Oil and Gas Drilling/Equipping of Wells (billion 1987 dollars)								
FRS Companies [b]	12.4	6.0	5.8	7.4	8.3	10.3	18.3	27.5
Independents [c]	12.0	5.0	4.5	5.3	5.7	7.1	12.6	21.2
Total	24.3	11.1	10.2	12.7	14.0	17.4	30.9	48.7
Total Capitalized Exploration and Development Spending [d] (billion 1987 dollars)								
FRS Companies [b]	23.6	12.1	10.8	13.8	15.5	19.3	34.2	51.4
Independents [c]	24.4	10.6	8.3	9.9	10.6	13.2	23.6	39.7
Total	48.0	22.7	19.1	23.7	26.1	32.5	57.8	91.1

[a] Net income plus noncash charges divided by net value (original cost less accumulated depreciation) of property, plant, and equipment (PP&E).

[b] FRS companies are those major energy companies reporting financial information to the Energy Information Administration on Form EIA-28. These include the major U.S. integrated oil companies and the major U.S.-based multinational oil companies. The results for FRS companies shown here represent information on their domestic oil and gas extraction segment, and profitability measures include allocated corporate-wide interest expense.

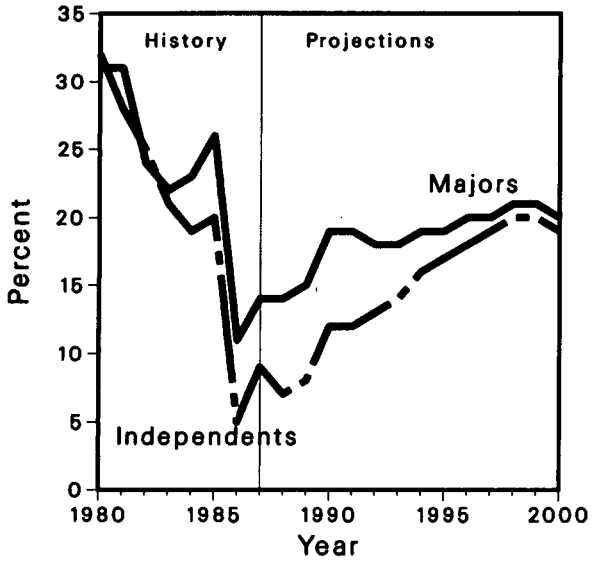
[c] Independents represent all companies engaged in domestic oil and gas extraction other than the FRS companies. The financial results for this group are derived from published financial information on publicly traded companies belonging to the Standard Industrial Classification (SIC) industry 1311.

[d] Includes expenditures capitalized for financial reporting purposes associated with drilling oil and gas wells, oil and gas lease and support equipment, unproved lease acquisition, and other capitalized exploration and development spending including production equipment.

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

Sources: **History:** Energy Information Administration, Form EIA-28; and Compustat, Inc. **Projections:** Based on run 304; file creation date, March 3, 1988; report date, March 3, 1988.

Figure 9. Ratio of Cash Flow to Fixed Assets for Domestic Oil and Gas Extraction, 1980-2000



Note: The ratio of cash flow to fixed assets is defined as net income plus noncash charges divided by net value (original cost less accumulated depreciation) of property, plant and equipment (PP&E).
Source: Table 2.

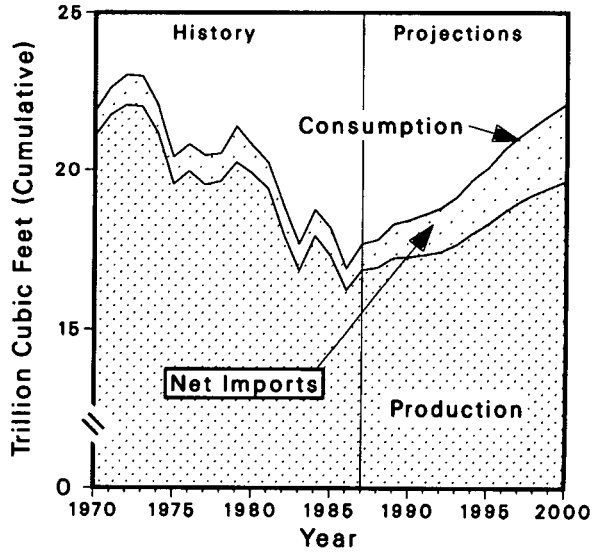
Table 2 indicates that in the base case real revenues for domestic oil and gas production will not reach 1985 levels again until the late 1990's. Returns in the domestic oil and gas industry overall (as measured by the ratio of internal cash flow to net property, plant, and equipment) are not expected to exceed 1985 levels throughout the forecast horizon (Figure 9). However, real investment spending on oil and gas may recover in somewhat less than 10 years after the "crash" of 1986.

As the domestic industry recovers from the recent oil price collapse, a major assumption underlying the forecasts in Table 2 is that restructuring and regrouping among the independents will involve attempts to reduce debt burden and to use profits increasingly as the main source of investment spending. This somewhat more conservative approach to growth implies that it may be some time before the independents, as a group, regain their historical share of domestic oil and gas activity. Spending on oil and gas drilling by the independents as a share of the U.S. total is expected to remain depressed until the early to mid-1990's, but it is expected to reach about 44 percent by 2000 in the base case. This would still be far below their share in the early 1980's, which was 60 percent or higher.

U.S. Consumption Expected to Gain Steadily After Years of Decline

The use of natural gas in the United States has trended downward since 1973. Although there were small increases in some years, the demand for natural gas demand dropped from about 22 trillion cubic feet in 1973 to 16.2 trillion cubic feet in 1986 (Figure 10). Over the same period, the contribution to the Nation's total energy requirements from natural gas declined as well--from about 30 percent of total primary consumption in 1973 to 23 percent in 1986. Consumption of natural gas is estimated to have increased during 1987, however; and this trend is expected to continue throughout the projection period, despite a short-term decrease in utility demand. Increases after 1995 are likely to be especially significant, as competitive natural gas prices and the increased use of combined-cycle units by electric utilities push demand for this fuel upward.

Figure 10. Natural Gas Consumption and Sources of Supply, 1970-2000



Note: Production includes supplemental gas, stock change, and unaccounted for.
Sources: History: Energy Information Administration, *Annual Energy Review* 1986, DOE/EIA-0384(86)(Washington, DC, 1987). Projections: Table A9.

By 2000, natural gas consumption in this country is projected to have climbed back to about 19.7 trillion cubic feet annually, or about the same as it was in 1978. Most of the rise (about 1.8 trillion cubic feet of the total increase of 2.8 trillion cubic feet between 1987 and 2000) is expected to come from increased use by electric utilities. Much of this increase seems destined for the late 1990's, when low-capital-cost combined-cycle units, using natural gas, will probably be used to meet increased generation needs. An increase of about 0.6 trillion cubic feet in annual usage by the industrial sector is also expected by the end of this century, due mainly to higher industrial output and an increase in cogeneration. In the residential and commercial sectors, consumption of natural gas should grow at roughly the same rates as the housing stock and the square footage of commercial buildings, respectively. As a fraction of total primary energy use, the overall market share for natural gas is projected to remain close to 23 percent through 2000.

The assumptions chosen for the two alternative *AEO* scenarios (low oil price combined with high economic growth, and high oil price combined with low economic growth) were designed to highlight the uncertainty underlying future net imports of petroleum. However, these combinations of assumptions engender countervailing elasticities of demand and supply for natural gas--so that forecasts of prices and consumption totals for this fuel fall within a narrow range. The outlook for U.S. gas markets reflects the interaction of four basic economic forces--namely, the effects on gas supply arising from oil production, the competitiveness of Canadian gas, effects on demand from potential fuel substitution, and demand effects from economic growth. Changes across the scenarios in natural gas prices and in consumption depend on which of these effects tend to dominate.

The results are complex and mixed. In the scenario of low world oil prices and high growth, a decrease in domestic oil production also lowers the production of "associated-dissolved" gas (gas from oil reservoirs), although another effect is to lower drilling costs for nonassociated gas. At the same time, lower prices for oil reduce the *demand* for gas, because energy users have a new incentive to switch away from gas--to oil products that are now lower in cost. Nevertheless, this same low-oil-price scenario involves higher economic growth; and this assumption tends to *increase* the demand for gas, as it does for all forms of energy. Obviously, the opposite combination occurs in the high-oil-price and low-economic-growth scenario: higher associated-dissolved gas supply, but also higher costs for nonassociated gas; an increase in gas demand (based on its substitutability for oil), but lowered gas demand because of sluggish economic growth. (This forecast did not address the potential differences in Canadian gas supply under the two scenarios.) As EIA calculates all these various market forces, natural gas prices would wind up lower in the low oil price case, but net consumption of gas would differ little from the base case.

Changes in gas markets relative to other fuels are even more complicated, because gas competes with coal as well as oil in the important industrial and utility sectors. While gas prices generally move in the same direction as oil prices, coal prices are basically constant across the scenarios. Because coal-use decisions in the near term are dictated largely by the existing capital stock, however, competition between oil and gas dominates industrial and utility fuel choices through 1995. In the longer term, decisions about fuel substitution are influenced by relative capital costs as well as by fuel costs. As a result, competition between coal and gas should begin to become increasingly important after 1995--especially as electric utilities consider low-capital-cost, gas-consuming, combined-cycle systems as a means of meeting new requirements for generating capacity. The incentive to move to combined-cycle units could be significant in all scenarios, in fact--even in the low price case--as a shift to using gas comes at the expense of both oil and coal.

Gas Supply Outlook Reflects Increasingly Market-Sensitive Pricing

The long-term outlook for natural gas markets reflects a heightened competition among natural gas suppliers--and also between them and the suppliers of alternative fuels. This increasingly competitive market structure reflects not only the relative growth in the supply of gas that is not subject to price controls and the important policy changes implemented by the Federal Energy Regulatory Commission (FERC), but also--and probably more importantly--the fact that natural gas users are ever more ready and willing to switch around among energy suppliers.

In the past, the regulatory framework and contracting practices for natural gas have meant that different producers received significantly different prices for products of essentially the same quality. However, interstate pipelines (acting as both transporters and merchants of gas) based their selling prices on their average purchase price at any given time; and when demand dropped the average user had to pay a higher price for gas than would have been the case with competitive pricing. Because the average cost of gas was higher than the price being paid for incremental supplies, the demand for natural gas was depressed still further.

In recent years the specification of prices on new gas under provisions of the Natural Gas Policy Act has effectively been eliminated, the price ceiling on old gas has been raised by FERC Order 451 (price controls still exist on "old gas"), and steps have been taken to facilitate open access to interstate pipelines. The move toward open access--which separates transportation services from the merchant services offered by pipelines and makes it easier for end users and producers

to contract directly with one another--is supported by FERC Order 436 and its successor, FERC Order 500. Natural gas contracts in this country were once priced almost exclusively under long-term, inflexible pricing arrangements; but today's market is also characterized increasingly by spot sales, short-term supply agreements, and long-term supply agreements in which price terms have more flexibility. Of course, the move toward flexible pricing that FERC's initiatives envisioned still depends on the willingness of the involved parties to renegotiate contracts. Yet the growing responsiveness of natural gas prices to developments in the crude oil market indicates how much the structure of the interstate natural gas market has changed during the past few years. Whereas average gas prices (both at the wellhead and to end-users) continued to rise for three years after crude oil prices had reached their peak in 1981, the oil market collapse in 1986 was followed almost immediately by a downturn in gas prices.

One factor that made gas prices more responsive in 1986 was the "gas bubble" (a significant excess in deliverable interstate supplies), which had accumulated as gas purchases fell after the big relative price hikes for this fuel in the early 1980's. By 1985, growing competition among gas suppliers was already exercising some downward pressure on average wellhead prices; but constant-dollar gas prices still did not fall as far in 1986 as did prices for the competitive oil products (33 percent for gas, versus 45 percent for residual fuel oil delivered to utilities). It seems clear that some impediments to a fully competitive market structure remain--as evidenced by the differences that still exist in the average prices different pipelines pay for gas.

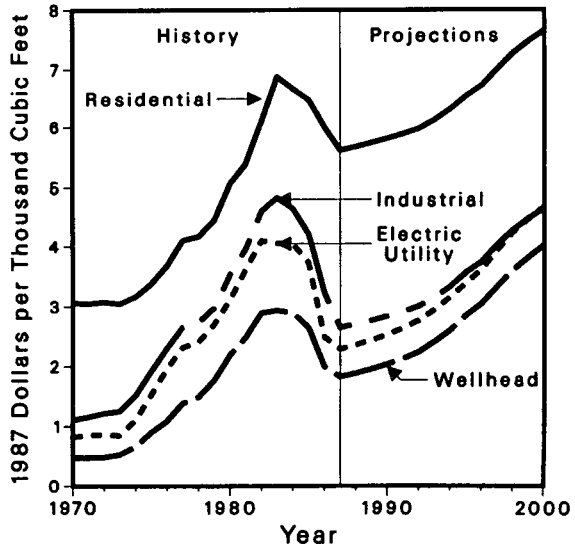
As gas becomes more competitive, its price should track the energy-equivalent prices for alternative fuels more closely in end-use markets. It will never be precisely equivalent on the basis of Btu content, however, because prices for different fuels should continue to reflect relative convenience and some differences in environmental controls, supply risks, capital requirements for storage, and contract practices.

Although demand for natural gas should continue to grow after 1986, the production, consumption, and prices of this fuel will probably change relatively little between 1987 and 1990, as compared with movements in the past decade (Figures 10 and 11). Production by 1990 is projected to be only slightly greater than the 1987 level of about 16.2 trillion cubic feet; average wellhead prices are projected to increase from $1.83 per thousand cubic feet to just over $2.00 per thousand cubic feet (in 1987 dollars) over the same period; and total consumption is projected to increase by only 2 percent--to 17.3 trillion cubic feet. The persistence of low oil prices, along with the "gas bubble" (which is expected to dissipate by the early 1990's), should keep all these elements relatively stable during the rest of this decade.

After 1990, the changes in oil price and macroeconomic growth that are assumed will begin to influence the forecast more sharply. As utilities use more natural gas after 1995, its total demand will increase--expanding to 19.6 trillion cubic feet by the year 2000 in the base case. Correspondingly, real wellhead prices should increase to just over $4.00 per thousand cubic feet (Figure 11).

Over the long-term forecast horizon, U.S. consumption of natural gas will exceed domestic production by an additional 1.5 trillion cubic feet or more. It is assumed in the EIA model that this difference will be made up from an increase in net imports (mainly from Canada), which are projected to grow from 0.84 trillion cubic feet in 1987 to 2.50 trillion cubic feet in 2000. Such an increase is consistent with the view that Canadian gas suppliers will become increasingly competitive in the U.S. market in coming years--not only as a result of the changes in the U.S. market, but also of the recent deregulation in the Canadian gas industry. The pending U.S.-Canada Free Trade Agreement would further commit both countries to open competition in energy markets.

Figure 11. Natural Gas Prices, 1970-2000



Sources: History: Energy Information Administration, *Annual Energy Review 1986*, DOE/EIA-0384(86) (Washington, DC, 1987).
Projections: Table A9.

U.S. Coal Outlook

Increased Nuclear Capability, Concerns About Acid Rain Moderate Growth in Coal's Use

Coal, the largest source of domestic energy production in the 1980's, is expected to continue its growth for the rest of this century. By the year 2000, coal's share of total U.S. energy production should exceed 37 percent--up from 31 percent in 1987. In addition, coal will account for a slightly larger share of domestic consumption, up from 24 percent in 1987 to more than 25 percent. Nevertheless, there are some factors that might impede future growth:

- If certain current proposals to control acid rain are implemented, the cost of generating electricity from coal would rise--particularly in the industrial Midwest, which is most dependent upon coal for its power requirements. Whether the controls take the form of a tax on sulfur dioxide emissions, a ban on emissions beyond certain levels, or some combination of these and other measures, the coal market is likely to be affected adversely. These projections do not consider the specifics in this regard, but the very possibility of future action along these lines adds to the uncertainty that coal producers face generally. On the optimistic side, however, clean coal technology could emerge as an economically attractive alternative to current generating technologies--thus helping to solve the emissions problem in a way that permits this country to rely more heavily on its most plentiful domestic resource.
- No new orders for nuclear plants are expected within the forecast horizon. Nevertheless, the additions to nuclear capacity that are already in the pipeline and scheduled to come on line over the next 5 years are expected to reduce the share of coal in supplying baseload electricity during that time. Coal will continue to be the major supplier of baseload electricity demand, however; and, as the planned additions to nuclear capacity end after 1995, coal's chief competition will begin to come from natural gas in combined-cycle units. Even though gas units are expected to provide the majority of new capacity in the post-1995 period, existing coal plants are expected to be utilized even more fully as demand for electricity increases to the year 2000.
- Lack of growth in U.S. heavy industry (such as steel and automobile manufacturing) is expected to have a depressing effect on the growth rate for coal. These industries have lagged during the 1980's, and their chances of resurgence over the next 15 years will depend on this Nation's ability to regain a measure of competitiveness in world markets against other countries with high industrial growth--particularly in the Pacific Rim. While some improvement in heavy industrial output is assumed in this *AEO*, the consumption of coal in industrial and coke plants is shown as trailing overall economic growth. This will make U.S. coal even more dependent in the future on electric utility markets--where growth in electricity consumption has failed to match GNP growth for the past several years.

Coal production in this country should rise at an annual rate of 1.8 percent between 1987 and 2000, growing to about 1,150 million tons annually. By far the most important impetus for such a rise is demand for coal at utilities, which should increase by about 2 percent annually over this time period. Meanwhile, consumption at coke plants will continue its recent decline because of reduced domestic demand for steel and increased imports of steel and steel products. Despite a recent recovery in the domestic steel industry, improving technology is reducing the requirement for coke in the production process. Other industrial demand, while growing, will probably fail to keep pace with GNP. The industrial demand for energy in general is likely to follow a similar pattern, as energy-intensive industries move abroad and the domestic economy continues its transformation from one based on heavy manufacturing to one that is oriented more toward service and light industry. There seems to be no reason why residential and commercial demand for coal will not continue its slow decline.

The minemouth price of coal is expected to increase modestly between 1987 and 2000, at an annual rate of 1.4 percent. This contrasts with the sharp declines between 1980 and 1986, when excess production capacity caused real prices to drop at an annual rate of more than 5 percent. Actually, real minemouth prices peaked in 1975, and they have been dropping ever since. The bulk of the predicted increases occur in the 1990's, when excess coal production capacity should finally fade. The prices of coal to end-users (especially electric utilities) are expected to climb somewhat more rapidly than the minemouth price. End-use prices will increase primarily because of higher transportation costs, which are fueled in turn by higher world oil prices. Nevertheless, coal prices should rise less than those of any other major fuel between 1987 and 2000--widening the cost advantage of coal over petroleum and natural gas, especially for electric utilities.

U.S. coal exports are expected to grow between 1987 and 2000, but at a rate of just over 1 percent (far less than during the high-growth era of the early 1980's). Such growth as does develop will be due principally to the anticipated rise in foreign demand for steam coal to produce electricity. Coal-fired electricity generation may spurt everywhere because of the slowdown of nuclear power programs in many countries, as well as the general increase in worldwide applications of electricity. However, because of continued competition from other coal-exporting countries, the U.S. share of world coal trade is likely to decline from recent levels.

Newly developed suppliers of low-cost export coal (such as Colombia, Venezuela, and China) will gain greater shares of the market to 2000. Such traditional players in the world coal market as Australia, South Africa, and Canada will continue to export large quantities of coal too, and this will put further pressure on U.S. producers and exporters. Coal imports by this country are a minor factor, supplying less than 1 percent of all the coal consumed here. Still, those imports may increase substantially in percentage terms--moving up from only 2 million tons in 1987 to around 7 million tons by 2000, mainly due to increases from Colombia and Canada.

Electric Utilities

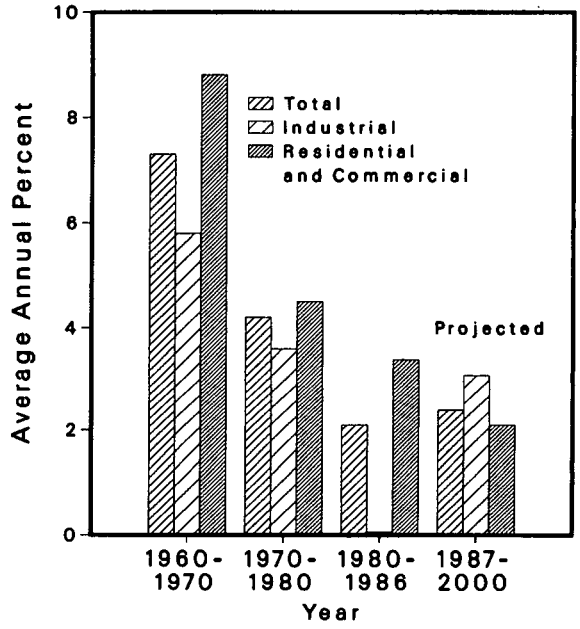
Electricity markets in the 1980's have been characterized by changing expectations of how rapidly demand would grow, the gradual development of excess capacity, denials of rate increases by public utility commissions over questions of "prudence" in making additions to capacity, and uncertainty about future sources of supply. Taken with other signs (symbolized by a major utility's filing for Chapter 11 protection), utilities face an increasingly difficult task in planning to meet the demand for electricity to the end of the century.

Given the financial difficulties of adding large new plants for generating baseload electricity, industry is likely to increase electricity supplies in the future via relatively new methods. These will include newer, more efficient technologies--such as combined-cycle units, which are both smaller and less capital-intensive than the traditional coal-fired and nuclear plants of the past. In addition, more electricity will be supplied by nonutility generators, as growth in sales under the Public Utility Regulatory Policies Act (PURPA) become a more significant source of supply. The operating lifetimes of existing capacity are expected to be extended (through planned life-extension programs), because in many instances investments to delay plant retirements will be cost-effective in comparison with building new capacity. There will be continued emphasis on conservation and demand management. The general assumption behind combining all of the smaller scale efforts is that demand for electricity will not grow significantly faster than overall growth in the economy. If this assumption turns out to be incorrect, however, conservation (coupled with selective purchases from smaller scale suppliers) will have to augment more strategically timed new construction of major units to meet the growth in electricity demand.

Slow Demand Growth of the 1980's Should Speed Up during the 1990's

During the 1960's, sales of electricity grew at an average of about 7.3 percent per year. In the 1970's this growth fell to 4.2 percent per year, and between 1980 and 1986 it fell even further--to an annual rate of 1.9 percent. Electricity growth of the 1960's was based largely on the increased use of appliances in the residential and commercial sectors, where growth was higher than the average (Figure 12). In the 1970's, growth in the residential and commercial sectors was still above the average, but it was slowing--as most households had acquired most of the basic electrical appliances. Between 1980 and 1986, growth in total electricity sales slowed even further; but this was due primarily to a decline in sales to the industrial sector. Industrial growth fell during this period because of conservation and the relatively poor performance of the energy-intensive industries.

Figure 12. Changes in Growth Rate for Electricity Sales, 1960-2000



Note: Projections begin with 1988.
Sources: History: Energy Information Administration, *Annual Energy Review 1986*, DOE/EIA-0384(86) (Washington, DC, 1987). Projections: Table A7.

Between 1987 and 2000, electricity sales are projected to increase following the low growth experienced between 1980 and 1986; and this time it will be due mainly to an increase in industrial sector growth. Total electricity sales will grow by about 2.4 percent per year, led by a growth rate of 3.1 percent per year in the industrial sector. Residential demand growth should be slower (only about 1.9 percent per year) as additions of air conditioners and other electricity-intensive products slacken because of market saturation. Commercial sector growth is likely to be slow in relation to its rate for 1980 through 1986, averaging 2.2 percent per year. This will be due primarily to a slowdown in new commercial building construction. The increase of intensity in the use of electricity by existing buildings is expected to flatten out somewhat, at least as compared to trends over the past several years. Industrial sector demand is projected to grow as such electricity-intensive industries as primary metals, food, paper, and metal fabrication increase their output in response to growth in international trade.

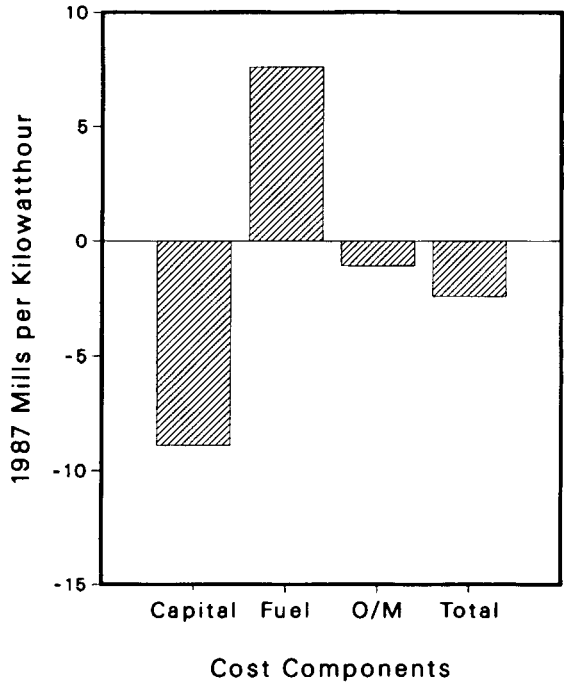
Inevitably, long-term forecasts of electricity demand leave a great deal of uncertainty. Variation in growth rates during the past few years alone illustrate the range of future paths that are feasible. These projections are based on detailed evaluations of the key factors that underlie electricity demand, but these themselves are subject to substantial uncertainty. The most useful way to look at these projections is as the most likely path of a wide range of possible outcomes.

Real Electricity Prices Should Decrease as Rising Fuel Costs Are Offset by Declining Capital Component

Despite substantial increases in the prices of natural gas and residual fuel oil, together with somewhat smaller increases in the price of coal, real electricity prices should be somewhat lower in 2000 than they were in 1987 (Figure 13). Offsetting the increases in fuel costs will be a large decrease in the capital component, mainly due to reduced capacity additions during the forecast period and a diminution of rate bases as existing plants depreciate. Average fuel costs are projected to increase by about 3.2 percent annually from 1987 to 2000--with oil and gas increasing at annual rates of 3.7 and 5.5 percent, respectively, and coal at about 1.8 percent.

From an average price of 6.6 cents per kilowatthour in 1987, average electricity prices fall to 6.2 cents per kilowatthour by 1994 (all prices in 1987 dollars), largely due to the falling capital component of electricity prices. Between 1994 and 2000, however, increased reliance on natural gas (particularly in combined-cycle units) and petroleum, together with assumed increases in world oil prices, causes fossil fuel costs to utilities to increase at the rate of 4.9 percent per year, leading to growth in average electricity prices of 0.5 percent per year.

Figure 13. Changes in Components of Average Electricity Prices Between 1987 and 2000



Note: O/M Represents operations and maintenance.
Source: Table A7.

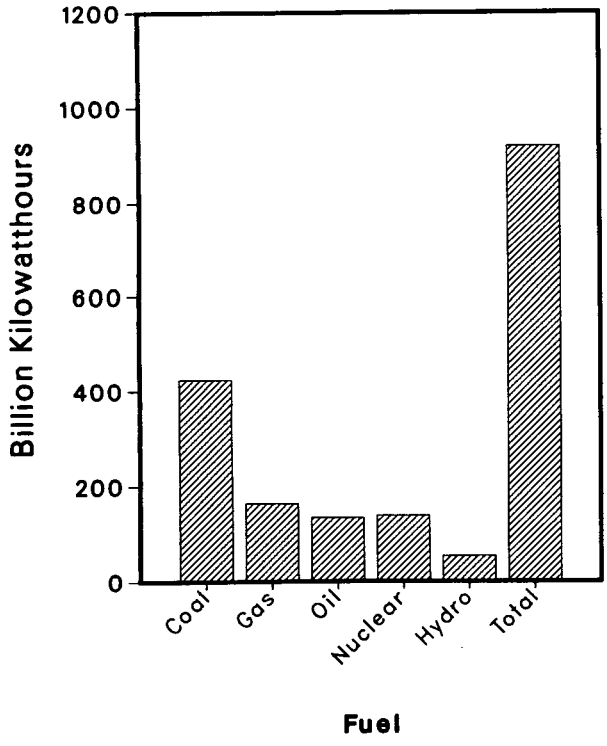
Gas-Fired, Combined-Cycle Generation Will Gain Market Share as Barriers in Fuel Use Act Fall

Combined-cycle generating capability should emerge as a significant portion of the electric utility system between now (1987) and the year 2000. The 1987 amendment to the Powerplant and Industrial Fuel Use Act, repealing restrictions on gas use, removed the legal barrier to construction of new gas-fired generation capability. Combined-cycle units, which are more efficient and can be built in smaller increments than traditional large-scale baseload facilities, will primarily burn natural gas. If rising natural gas prices ever make coal gasification an economically viable technology, these plants can be converted to take advantage of it. By the year 2000, the total capability of combined-cycle units at utilities should be about 33 gigawatts, compared with only 5 gigawatts even as late as 1995. Although oil prices are becoming more competitive relative to natural gas, there will be a significant increase in gas-fired generation (from steam, turbine, and combined-cycle plants) by 2000, from 276 billion kilowatthours in 1987 to 441 billion kilowatthours by

the year 2000 (Figure 14); however, the ratio of gas to oil consumption in traditional steam units is projected to decline, as gas prices begin to approach parity with oil prices.

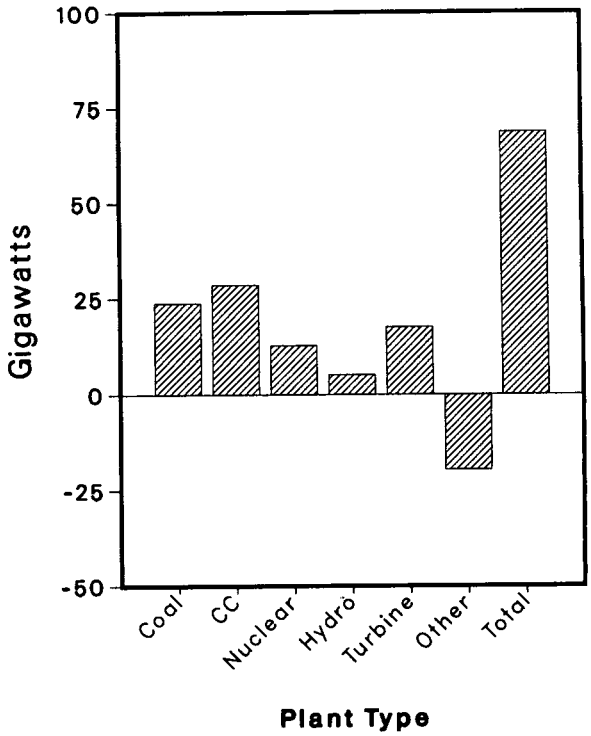
Coal and nuclear, which together in 1987 made up some 57 percent of all generating capability and almost 75 percent of total generation, should grow at a much slower rate over the forecast horizon than in recent years. Utilities are expected to add about 24 gigawatts (net, after accounting for retirements) of coal-fired baseload generating capability over the next 13 years, as increased construction and site acquisition costs lead utilities to shy away from the large baseload plants constructed in the past, in favor of smaller facilities such as combined-cycle units (Figure 15). Similarly, net additional nuclear capability is expected to total only about 13 gigawatts through 2000. This estimate includes only nuclear generating units that are currently under construction. The current status of each of these units has been evaluated, and completion dates have been estimated on the basis of recent progress or forward movement in licensing or construction. As a means of accommodating increased demand with modest capacity additions, utilities must increase their utilization of both coal and nuclear plants by some 10 percentage points from 1987 rates.

Figure 14. Increases in Generation from Various Fuel Sources Between 1987 and 2000



Source: Table A5.

Figure 15. Changes in Summer Capability by Generating Plant Type Between 1987 and 2000



Notes: CC: Combined-cycle units; Turbine includes diesel; Other represents other fossil-fired units.
Source: Table A6.

Turbine and diesel facilities are expected to grow from some 44 gigawatts in 1987 to almost 62 gigawatts of generating capability by 2000, because of peaking requirements. As a result, consumption of distillate fuel oil will increase for peak electricity generation, rising from about 40,000 barrels per day in 1987 to just under 80,000 barrels per day by 2000. These units also burn significant quantities of natural gas.

Looking again at Figure 14, which shows changes in sources of electricity supply over the forecast period, it can be seen that the major source of increasing supplies will continue to be fossil fuel generation. From 1987 to 2000, while total generating capability is growing by only 10 percent, total electricity generation is growing by more than 35 percent, implying significant improvement in utilization. Besides coal, nuclear, and natural gas, oil-fired generation more than doubles over the forecast period. Except for turbine and diesel,

however, virtually no additions are planned for oil-burning facilities for the rest of the century. In fact, due to retirements, total capability for non-coal steam generating plants is projected to be only 127 gigawatts by 2000, down from 147 gigawatts in 1987. Consequently, with electricity demand growth of about 2.4 percent annually from 1987 to 2000 (higher than that of GNP), capacity utilization at generating facilities will have to grow. One of the proposals to assist in capacity planning is increased competition within the utility industry, currently being studied by the FERC and others.

Increased Competition Has Potential to Change the Structure of the Electricity Industry

Considerable momentum is building to change the current regulatory process in ways that can further promote competition and efficiency among suppliers of electricity. Much of the attention now is focused on regulations affecting electricity markets, with the FERC's announcement of three notices of proposed rulemakings related to cogeneration and independent power production. One of the rulemakings addresses the process of establishing a competitive bidding system for potential power producers, including opening the bidding to nonqualifying facilities. The second addresses the issue of relaxing regulations under the Federal Power Act for nonqualifying independent producers whose rates are determined through competitive bidding or negotiation. The third focuses on how to determine administratively the most appropriate measure of "avoided cost."

Competitive Bidding

Some segments of the industry, as well as the FERC, believe that some form of competitive bidding system could provide a more efficient means of implementing the PURPA. In an effort to encourage investment in alternative power sources, the PURPA offers a market for cogenerated power from qualifying facilities. A qualifying cogenerator is a facility less than 50 percent owned by a utility which meets fuel efficiency standards established by the FERC. A qualifying small power producer is a nonutility facility with a capacity not exceeding 80 megawatts, which limits its level of consumption of fossil fuels to no more than 25 percent of total input fuels. This generally means electricity in the form of hydroelectric, wind, waste, or biomass generation.

The implementation of this law has been so successful in encouraging licensing applications for cogeneration that some utilities have been faced with larger volumes of cogenerated power than are needed to meet current demand. Furthermore, the price paid for this power, as set by the State commissions, has in some cases exceeded the cost of generating the power from existing capacity, ultimately resulting in higher rates to the final consumer in these instances.

The concept of competitive bidding for new generating capacity is not new, as a number of States faced with excess capacity have already taken matters into their own hands and set up their own bidding systems. The FERC rulemaking would allow States to establish a competitive system that would provide the means for utilities to select the most appropriate cogenerating facilities to accommodate their needs. Selection of the facilities would involve such factors as price, location, and reliability and could enable utilities to place certain limits on their purchases of cogenerated power, depending upon the terms of individual agreements.

Nonqualifying Facilities

The bidding rulemaking would authorize States to allow utilities and any other independent power suppliers to compete against qualifying facilities as defined by the PURPA. Independent power production has the potential to be an important source of supplemental power, given the current trend away from utilities undertaking major new construction projects. For example, the current projection in this *AEO* is for PURPA purchases by utilities to triple between 1987 and 2000, from about 30 billion kilowatthours in 1987 to some 90 billion kilowatthours by 2000. In addition, the North American Electric Reliability Council forecasts that over 100 gigawatts of current generating capability will be more than 30 years old by 1995, a point after which maintenance, repairs, and downtime tend to increase in frequency and cost.

If nonqualifying facilities are included in the bidding process it could raise key issues of concern relating to who would choose among competitors. For example, utilities might no longer be considered to be objective in the selection process if their subsidiary interests were involved. On the other hand, utilities object to the possibility of regulators making decisions that will affect day-to-day operations.

Increased Wheeling for Workable Competition

Enhanced competition in some electricity markets could involve increased "power wheeling" across utility service areas, which enables utilities and their customers to buy power directly from alternative sources. There are two types of transmission access in electricity markets: supplier (or wholesale) access and customer (or retail) access. Voluntary wholesale wheeling is already common practice among utilities, redistributing resources to employ available capacity in one area to serve another. In a few instances, utilities have already started to cooperate with major customers by bringing power from a distant, cheaper source. But for the most part, the electric utility industry is vehemently opposed

to mandatory retail wheeling. The utilities are primarily concerned that they will lose their major customers to other suppliers, forcing them to allocate the same fixed charges over a smaller customer base. Raising rates could lose even more customers. Utilities are also concerned about the potential for overloading the system. Finally, there are concerns about how the fixed cost burdens of existing power plants would be allocated if wheeling to consumers increased.

On the other side of the issue, proponents of open retail access argue that open transmission lines are necessary to ensure a competitive market. The Electricity Consumers Resource Council has focused public attention on this issue by claiming that a competitive bidding system would be ineffective without open access to wheeling services, at least at the wholesale level. In the absence of wholesale access, major industrial users claim that their products are at an unfair price advantage with respect to other parts of the country. Some free market proponents also support this view, based on the concept that wholesale access to wheeling services is prerequisite to an efficient allocation of resources. The FERC has not proposed any rulemakings pertaining strictly to transmission. However, the proposed bidding rulemaking seeks comments on the appropriateness of conditioning utility participation in bidding on certain wholesale transmission requirements.

Potential Impacts

The proposed FERC rulings, combined with freer access to wholesale transmission services, would dramatically change the electric utility industry. Serious issues such as obligation to serve, reliability, stability of transmission systems, and other technical problems must be addressed before a successful move to increased competition can be made. Even without these actions, however, the industry is already making major changes in the way it does business. Faced with the potential for significant losses in their customer base due to cogeneration, many utilities have started to lower their rates to industrial users to prevent further losses. There has also been discussion about utilities charging for the different components of service, again in an effort to discourage industrial users from switching to cogeneration. State commissions have made some fundamental changes as well, and with some liberal interpretations of the PURPA and the existing FERC rules, have revised the basis for estimating avoided costs and have started to implement their own bidding systems.

The focus of the proposed FERC rules is efficiency. Some utilities claim that they have been forced to buy more cogenerated power than they need at a price that is too high. A competitive bidding system could help to alleviate some of these problems by giving utilities the flexibility to determine how much cogeneration is appropriate to their needs. Opening the bidding process to nonqualifying facilities should also act to increase supplies and the level of competition.

On the other hand, the current system of localized monopoly in electricity generation has provided a reliable source of power for decades. There is a risk that the creation of new sources of electricity supply by revising longstanding relationships between producers and consumers could have unforeseen consequences.

End-Use Energy Consumption

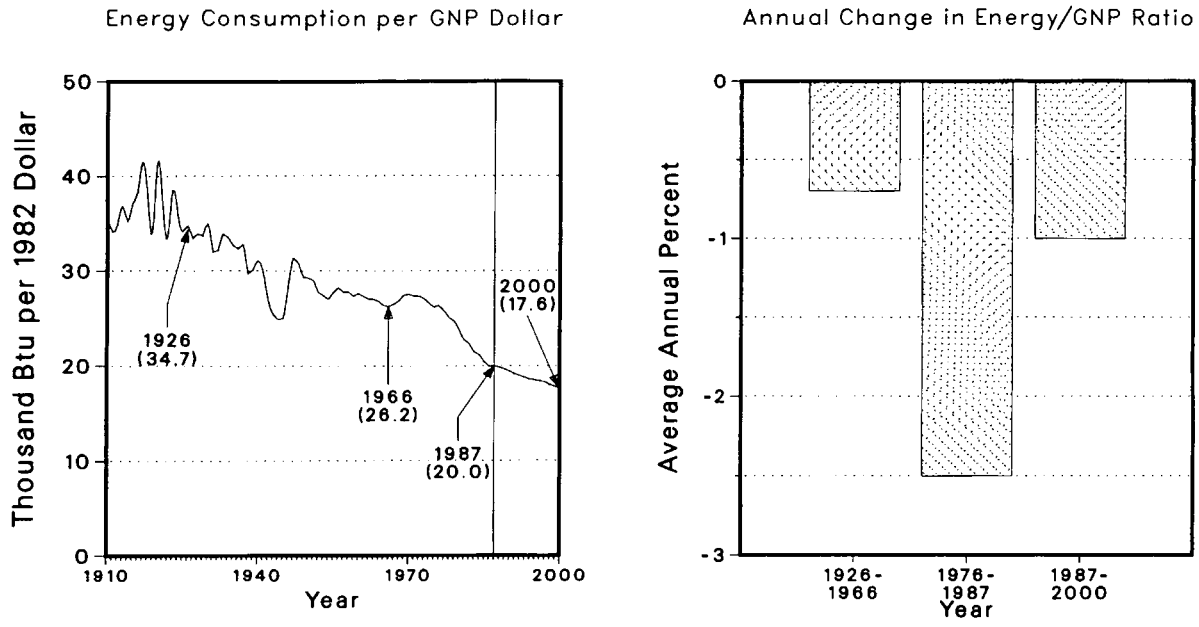
Conservation Trends May Slacken in Comparison With the Past Decade, Yet Be Pivotal in Limiting Demand

Energy conservation, as defined most broadly, has long been an important factor in determining energy use. Since the early 1900's, energy use per unit of GNP has been declining (Figure 16). Much of this decline was due to the expanded use of new, more efficient fuels (such as oil and natural gas) and to general technological improvements which increased the efficiency of fuel use in all facets of production. Starting in the early to mid-1970's, increased energy prices accelerated conservation trends. For example, between 1926 and 1966, energy use per GNP dollar decreased at a rate of less than 1 percent per year. From 1976 to 1986, however, energy use per dollar of GNP decreased by slightly more than 2.5 percent per year. It is projected that energy use per GNP dollar will decrease by about 1 percent per year between 1987 and 2000. This decrease in the rate of improvement of the energy-to-GNP ratio is mainly the result of three factors, including smaller price increases, reduced improvements in miles per gallon, and increased industrial production.

Energy prices are not projected to increase nearly as fast as they did during the middle-to-late 1970's. For example, between 1975 and 1980, real oil prices increased worldwide by about 11 percent per year, real prices for residential natural gas increased by about 8 percent per year, and the real residential electricity price increased on average by about 1 percent per year. Between 1987 and 2000, real oil prices are expected to increase globally by about 4 percent per year (with most of this increase expected in the late 1990's), real residential natural gas prices should increase by 2 percent per year, and real electricity prices are not projected to show any significant change.

In response to higher gasoline prices and existing Corporate Average Fleet Efficiency (CAFE) standards, the miles per gallon of new cars increased from 17.5 in 1976 to 27.9 in 1986, causing the fleet average miles per gallon to increase by 3 percent per year over this period; fleet efficiency is expected to increase by 2.5 percent per year between 1987 and 2000. More importantly, the shift from purchases of passenger cars to light trucks, which are not as efficient, is expected to continue. This, along with increased industrial output,

Figure 16. U.S. Energy Intensity, 1910-2000



Note: Projections begin with 1988.
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 1986*, DOE/EIA-0384(86) (Washington, DC, 1987).

is expected to increase total transportation use of oil by about 0.3 percent per year between 1987 and 2000.

In the early 1980's, heavy manufacturing industries in the United States were severely impacted by a recession and by a very substantial increase (a near-doubling over the period 1980-1985) in the international value of the U.S. dollar. This led to relatively low output from these industries, which account for a major fraction of U.S. industrial energy use. As a result, many of these industries greatly reduced their older, less efficient capacity. The recent turnaround of the dollar and the improved efficiency of production has led to signs of improvement from these industries. This trend is expected to continue, leading to greater energy use in the industrial sector. Between 1980 and 1986, industrial energy use declined by 2.4 percent per year; however, the expected turnaround in industrial output is projected to lead to a growth rate of about 1.2 percent per year in industrial energy use over the forecast period.

The experience of the chemical industry can be thought of as being fairly typical for much of U.S. heavy industry. The rapid increase in the dollar exchange rate during the early 1980's placed the chemical industry at a cost disadvantage relative to overseas producers. With the loss in export market sales and a slack domestic demand, plus a capital stock considered inefficient, the chemical industry went through an extensive period of restructuring. Excess capacity was slashed and remaining plant facilities were modernized. With the fall in the dollar over the past two years, the industry now finds itself much more competitive in world markets. Export sales are up significantly in 1987, and profits are healthy.

The projections in this report implicitly assume that renewable energy sources other than hydroelectric power 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 for conventional energy use would be too high.

In 1985, renewable energy sources accounted for about 12 percent of electric utility generation 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. Less traditional energy sources (such as wind and active solar heating systems) did not account for a significant portion of total energy supply.

Canadian Free Trade Agreement May Alter the Long-Term Outlook

On January 2, 1988, President Reagan signed and forwarded to Congress a comprehensive trade agreement negotiated with the Canadian government during the preceding year. Generally, the accord aims at giving Canada secure access to U.S. markets and giving the United States secure access to Canadian markets--including energy markets.

Subject to legislative approval, both countries have agreed to prohibit restrictions on imports or exports, including quantitative restrictions, taxes, minimum import or export price requirements, and any other equivalent measures. The very limited exceptions to this prohibition are related to supply shortages and national security. In the event of a supply shortfall for any fuel, Canada has agreed to provide the United States access to Canadian energy that is proportional to its pre-shortfall share. If approved by the U.S. Congress and the Canadian Parliament, the U.S.-Canada Free Trade Agreement could influence the long-term outlook for U.S. energy markets in electricity, coal, uranium, oil, and natural gas.

Electricity and Coal

For its part, Canada has agreed to drop a discriminatory pricing test on its electricity exports. Currently, exported electricity cannot be priced below the least-cost alternative source for the purchasing U.S. utility. (Canadian-generated electricity accounts for about 2 percent of total U.S. sales, but confusion as to the actual cost base for Canadian power has acted to complicate export agreements.) The New York/New Jersey region, which already uses imports from Quebec and Ontario to meet about 13 percent of its total electricity requirements, will likely gain the most from this agreement. Specifically, earlier forecasts that exports to the United States would decline because of increasing Canadian domestic demand may have to be revised, as future cross-border sales are determined increasingly by the relative construction and generating costs in each country.

The agreement provides encouragement for ongoing negotiations between the U.S. Bonneville Power Administration (BPA) and British Columbia (B.C.) Hydro on the expansion of water controls in the Columbia River basin. The BPA will also modify its Intertie Access Policy to grant B.C. Hydro "most favorable" treatment. These measures could result in increased competition between surplus-capacity Northwest U.S. utilities and B.C. utilities for sales to the large California market. The expansion of transmission lines between Washington Water Power and B.C. Hydro would also result in increased trade with utilities in the Northwest and California. (The U.S. Federal Government will continue to review and approve the construction of new transmission lines across the border.)

To the extent that exported Canadian power is generated by coal, any boost provided to electricity trade by the agreement could also stimulate U.S. coal exports to Canada. Canada currently takes about 20 percent of U.S. coal exports.

Uranium

Canada has agreed to eliminate its requirement that uranium exports be "upgraded" to the maximum extent possible by processing in Canada prior to export, and the United States has agreed to eliminate legislative restrictions on the enrichment of imported Canadian uranium. Canada is a major supplier of uranium to the U.S. utility industry, so that exemptions from import restrictions would be significant. In 1986, U.S. utilities and suppliers imported 13.5 million pounds of uranium concentrate (representing 53 percent of domestic requirements in that year), of which 59 percent came from Canada. From 1987 through 2000, 56 percent of the imports already committed for delivery are of Canadian origin.

Oil and Gas

As a consequence of the broad agreement to prohibit tariffs, the trade agreement could generate legislation to exempt Canada from import duties on their petroleum product sales to this country. Removal of the 1.25-cents-per-gallon duty on finished gasoline imports, for example, could confer a marginally significant advantage to Eastern Canadian refineries vis-a-vis European and Caribbean suppliers. However, it is unlikely that such a small sum would greatly alter the sources of U.S. product imports.

The United States has agreed to immediately permit the export of up to 50,000 barrels per day of North Alaskan oil to Canada, so long as that oil is transported by U.S. flag vessels. Exports of North Alaskan oil from Federal lands, currently prohibited by law, would most likely be transported to British Columbia refineries via Washington State terminals. Although not a great amount when compared to the 2 million barrels per day moving through the Trans Alaskan Pipeline System, this volume could increase competition in refined product markets in the Northwest and possibly influence the competitive price established for Alaskan oil in the California and Gulf Coast markets.

Also of significance, both countries have agreed to retain existing and allow for new incentives for oil and gas exploration and development and related activities aimed at maintaining their reserve bases for these energy resources. In the United States the most important of these incentives are related to the tax treatment of oil and gas expenditures and revenues. In Canada,

incentives by both the federal and provincial governments are related to the royalty rate structure (which includes lower royalty rates for low-productivity wells and new production, as well as limited royalty holidays), tax writeoffs, reductions in federal corporate taxes, drilling incentives, and special incentives for production from unconventional sources.

The role played by production incentives in determining market prices for petroleum resources will likely receive increasing scrutiny, especially as the United States and Canada both proceed with the major efforts of recent years to deregulate their respective domestic petroleum industries. The issue for producers will be one of achieving a "level playing field" for their cross-border competition. More immediate attention is likely to focus on impediments to trade associated with the remaining regulatory structure.

Prices for U.S. and Canadian crude oil are no longer subject to domestic controls, and--except for the restriction on Alaskan exports--oil and refined petroleum products are completely free now to move both ways across the border. Decontrol of natural gas, however, is proceeding more slowly.

With the deregulation of interprovincial gas sales (in 1985) and termination of the condition that gas sales to the United States not be priced below the level in comparable sales to the domestic Canadian market (in late 1986), Canada has removed its most important regulatory impediments to gas exports. During this same period, the United States acted to remove price limits on new gas (under provisions of the Natural Gas Policy Act), to consolidate and increase the price limit for most old gas (FERC Order 451), and to encourage interstate pipelines to grant open access to their transportation networks (FERC Orders 436 and 500). Also, the U.S. Economic Regulatory Administration (the agency responsible for authorizing all imports and exports of gas) began issuing short-term blanket authorizations for imports in advance, to facilitate the involvement of U.S. importers in the growing spot market for gas. (Currently, most imports from Canada flow under long-term contracts.)

2. Comparisons With Other Forecasts

The projections presented in the *Annual Energy Outlook 1987* 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 1987* (1987 *AEO*) with the base case from the *Annual Energy Outlook 1986* (1986 *AEO*) and with two other recently published forecasts.

Three comprehensive energy supply and demand projections are considered for this analysis. The forecasts were prepared by Data Resources, Inc. (DRI) and Wharton Econometric Forecasting Associates (WEFA). 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.

The following sections discuss the principal similarities and differences among the alternative forecasts for the year 2000, starting with the key assumptions of economic growth and the path of the 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 prices and domestic economic activity. Projections for some of the principal economic determinants of U.S. energy demand are presented in Table 3, along with estimates of the world oil price. (Price comparisons are cited in 1986 dollars in order to reference alternative forecasts presented in these units.)

Table 3. Comparison of Principal Determinants of U.S. Energy Demand in 2000

Determinant	1986 *AEO*	1987 *AEO*	DRI	WEFA
Real GNP (billion 1982 dollars)	5,183	5,090	5,142	5,343
Real GNP Growth, 1987-2000 (average annual percent)	2.4	2.2	2.3	2.7
New, High-Grade Bond Rate (percent)	8.7	9.7	9.3	9.6
Industrial Production (index, 1987 = 1.0)	2.6	2.6	2.8	2.4
World Oil Price (1986 dollars per barrel)	33	30	29	22

Sources: **1986 AEO:** Energy Information Administration, *Annual Energy Outlook 1986*, DOE/EIA-0383(86) (Washington, DC, February 1987). **DRI:** Data Resources, Inc., *Energy Review* (Lexington, MA, Winter 1987-88). **WEFA:** Wharton Econometric Forecasting Associates, *Energy Analysis Quarterly* (Bala Cynwyd, PA, Fall 1987).

The 1987 *AEO* assumes that world oil prices will be relatively constant between 1987 and 1992, and then rise to $30 per barrel (1986 dollars) by 2000. The DRI price forecast is similar to EIA's, while WEFA projects world oil prices to reach only $22 barrel by 2000. WEFA's low price forecast corresponds to a high growth forecast for GNP. EIA and DRI are more conservative in their estimates of economic activity; they estimate 2.2- and 2.3-percent growth in GNP between 1987 and 2000, respectively.

The EIA has lowered its forecast for the world oil price by $3 per barrel from the previous *AEO*. This change reflects slightly slower GNP growth, more domestic production, and more ample supplies relative to demand throughout the world.

Demand Projections

Comparison With Other Projections

The 1987 *AEO* projects a decline in the energy-to-GNP ratio from 20.0 thousand Btu per 1982 dollar of GNP in 1987 to 17.6 thousand Btu per dollar by 2000. This drop can be attributed, in 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 1987 *AEO* energy-to-GNP ratio is slightly higher than DRI's and considerably higher than WEFA's. The WEFA forecast for a high level of GNP with low energy demand may be attributable to the strong growth projected for the services sector of the economy, with much slower growth anticipated for industrial output, particularly in many of the energy-intensive sectors.

The forecasts presented in Table 4 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 17 quadrillion Btu in 2000, compared to just over 15 quadrillion Btu in 1987.

For the industrial sector, the 1987 *AEO* projects energy demand to rise to 24 quadrillion Btu in 2000, up from 21 quadrillion Btu in 1987. Rising electricity use accounts for a significant portion of this increase, along with greater use of petroleum and natural gas relative to 1987. In contrast, DRI foresees total industrial energy demand rising to only 22 quadrillion Btu, with no growth anticipated for fuel and power demands aside from electricity.

The 1987 *AEO* projects modest growth in transportation demand through 2000, with growing demands for distillate and jet fuel more than offsetting declines in motor gasoline use. DRI's high transportation demand forecast reflects much smaller efficiency gains.

The alternative projections for electric utility fuel consumption all indicate substantial increases in energy inputs. Projected demands for 2000 range from 32 to 38 quadrillion Btu, up from 28 quadrillion Btu in 1987. The 1987 *AEO* forecast for electric fuel inputs is higher than all the others, particularly with respect to the amount of oil- and natural-gas-fired generation.

1987 AEO Compared to 1986 AEO

The 1987 *AEO* forecast for total end-use energy consumption of 63.4 quadrillion Btu in the year 2000 exceeds the 1986 *AEO* forecast by about 2.6 quadrillion Btu. This increase is due to an increase of 1.3 quadrillion Btu in the transportation sector plus 1.7 quadrillion Btu in the industrial sector, offset slightly by a decrease of 0.4 quadrillion Btu in the residential and commercial sector. Most of the increased demand in the transportation sector can be attributed to a decrease in the projected level of vehicle efficiency, as well as an increase in the total amount of miles traveled. The assumed decrease in vehicle efficiency is based on more recent data, while the increase in vehicle miles traveled is a result of lower oil prices and a higher level of manufacturing output (relating to freight truck travel). Increased consumption in the industrial sector is primarily in natural gas and petroleum products. This demand forecast has increased over the 1986 *AEO* level partly due to lower prices, but primarily due to an increase in feedstock use because of a significantly higher level of output in the chemical industry. This changed outlook for the chemical industry is based on more recent readings of the condition of the industry. The total end-use electricity consumption forecast is relatively unchanged between the 1987 *AEO* and the 1986 *AEO*.

The 1987 *AEO* forecast for total electric utility generation in the year 2000 is close to that in the 1986 *AEO*. However, there are some significant changes in the consumption levels for individual fuels. The forecast includes higher growth rates for natural gas than petroleum, as projected gas prices remain below the residual oil price (in the 1986 *AEO*, gas prices rose above the residual oil price). Gas-fired capability is further augmented by changes in the mix of new (unplanned) additions to capacity, favoring combined cycle over coal due to the repeal of the restrictions on gas use in the Fuel Use Act. This increases the share of gas-consuming combined-cycle plants. A small decrease in nuclear generation is due to a downward revision in capacity additions resulting from nuclear plant postponements.

Table 4. Projections of U.S. Energy Demand by Sector for 2000

(Quadrillion Btu)

Sector	1986 *AEO*	1987 *AEO*	DRI	WEFA
End-Use Consumption				
Residential and Commercial				
Oil and LPG	2.3	2.4	2.0	NA
Natural Gas	7.3	7.2	6.7	7.0
Electricity	7.4	7.2	7.1	7.0
Other [a]	0.4	0.2	0.4	NA
Total [b]	17.4	17.0	16.2	NA
Industrial				
Oil and LPG	8.5	9.4	9.3	NA
Natural Gas	6.7	7.7	5.9	7.0
Coal	3.1	2.8	3.1	3.0
Electricity	4.1	4.3	3.6	3.1
Total [b]	22.5	24.2	21.9	NA
Transportation				
Total	21.0	22.3	23.7	NA
Electric Utility				
Oil	3.2	2.8	2.2	1.8
Natural Gas	4.0	4.8	4.4	2.2
Coal	20.3	19.6	17.8	18.6
Nuclear Power	6.7	6.4	6.4	6.1
Other [c]	3.9	4.1	4.3	3.9
Total	38.1	37.6	35.4	32.4
Total End-Use Consumption	60.8	63.4	61.8	NA
Primary Energy Consumption	87.3	89.6	86.5	85.9
Primary Energy/GNP Ratio (thousand Btu per 1982 dollar)	16.8	17.6	16.8	15.7

NA = Not available.

[a] Includes residential kerosene and steam coal consumption plus commercial kerosene, liquefied petroleum gas, and steam coal consumption.

[b] Excludes renewable resource use in the residential, commercial, and industrial sectors.

[c] Includes electricity imports, hydroelectric, geothermal, and other (wood, wastes, solar, wind).

Sources: **1986 AEO:** Energy Information Administration, *Annual Energy Outlook 1986,* DOE/EIA-0383(86) (Washington, DC, February 1987). **DRI:** Data Resources, Inc., *Energy Review* (Lexington, MA, Winter 1987-88). **WEFA:** Wharton Econometric Forecasting Associates, *Energy Analysis Quarterly* (Bala Cynwyd, PA, Fall 1987).

Supply Projections

Comparison With Other Projections

The EIA projects total domestic energy production to rise slowly over the forecast period from 64 quadrillion Btu in 1987 to 68 quadrillion Btu in year 2000 (Table 5). This overall increase in total production is expected to occur despite a substantial reduction in crude oil production. The 1987 *AEO* projects natural gas production to increase from 16.7 quadrillion Btu in 1987 to 17.9 quadrillion Btu in 2000, in contrast to the other projections, which indicate a decline in natural gas output relative to 1987.

Domestic crude oil production is projected to fall from over 8 million barrels per day in 1987 to 6 million barrels per day in 2000 (Table 6). The DRI and WEFA forecasts both indicate lower levels of crude oil production. The oil import forecasts range from 10 to 11 million barrels a day, with the 1987 *AEO* falling on the low side of this range. DRI projects considerably higher imports of refined products, with lower crude oil imports, than the others.

Table 5. Comparison of Base Case Energy Supply and Demand Projections for 2000
(Quadrillion Btu)

Supply and Disposition	1986 *AEO*	1987 *AEO*	DRI	WEFA
Domestic Energy Production				
Oil	13.7	15.1	14.2	13.1
Natural Gas	16.7	17.9	15.3	14.8
Coal	26.4	25.2	23.7	25.1
Nuclear Power	6.7	6.4	6.4	6.1
Hydroelectric Power, Geothermal, and Other	3.2	3.4	4.3	3.7
Total	66.8	68.0	63.9	62.8
Net Imports				
Oil	20.6	21.2	22.9	23.3
Natural Gas	2.4	2.6	2.2	2.2
Coal, Coke, and Electricity	-2.0	-1.6	NA	-2.2
Total Available Supply [a]	87.3	89.6	86.5	85.9
Consumption				
Petroleum Products	34.7	36.3	36.9	36.2
Natural Gas	18.5	20.2	17.4	16.7
Coal	23.6	22.6	21.1	23.2
Nuclear Power	6.7	6.4	6.4	6.1
Hydroelectric Power and Other	3.9	4.1	4.6	3.7
Total	87.3	89.6	86.5	85.9

NA = Not available.

[a] Total available supply is defined to include domestic production plus net imports, stocks changes, and other adjustments involved in equating total available supply with consumption.

Sources: **1986 AEO:** Energy Information Administration, *Annual Energy Outlook 1986*, DOE/EIA-0383(86) (Washington, DC, February 1987). **DRI:** Data Resources, Inc., *Energy Review* (Lexington, MA, Winter 1987-88). **WEFA:** Wharton Econometric Forecasting Associates, *Energy Analysis Quarterly* (Bala Cynwyd, PA, Fall 1987).

1987 AEO Compared to 1986 AEO

The oil production forecast of 15.1 quadrillion Btu for the year 2000 in the 1987 *AEO* is considerably higher than the 13.7 quadrillion Btu in the 1986 *AEO,* primarily due to higher expectations concerning production in the Lower 48 States (Alaskan production is not changing significantly).

Natural gas production is also considerably higher in the year 2000 in the 1987 *AEO* than in the 1986 *AEO.* This is due to the same factors as for petroleum--a more recent reading of the industry indicates that it is performing better than previously anticipated.

Coal production is somewhat less in the 1987 *AEO* forecast as compared to the 1986 *AEO* primarily due to the decreased demand for coal for electricity generation. Nuclear generation is also somewhat decreased as nuclear plant postponements result in slightly smaller increases in capacity.

Table 6. Comparison of Petroleum Supply and Demand Projections for 2000

(Million Barrels per Day)

Projection	1986 *AEO*	1987 *AEO*	DRI	WEFA
Primary Supply				
Domestic Production				
Crude Oil	5.4	6.0	5.8	5.5
Natural Gas Liquids	1.6	1.7	1.4	1.0
Other/Processing Gain	0.7	0.7	0.6	0.7
Total	7.7	8.4	7.9	7.2
Net Imports				
Crude Oil	7.5	8.3	6.9	9.1
Refined Products	2.3	1.7	3.9	1.7
Total	9.8	10.0	10.8	10.8
Total Supply	17.4	18.3	18.6	18.1
Consumption by Fuel Type				
Motor Gasoline	6.2	6.8	7.9	7.9
Jet Fuel	1.5	1.6	1.8	1.9
Distillate Fuel Oil	3.6	3.7	3.0	3.1
Residual Fuel Oil	2.3	2.0	1.8	1.1
Other Petroleum Products	3.8	4.3	4.1	4.1
Total	17.4	18.3	18.6	18.1

Sources: **1986 AEO:** Energy Information Administration, *Annual Energy Outlook 1986,* DOE/EIA-0383(86) (Washington, DC, February 1987). **DRI:** Data Resources, Inc., *Energy Review* (Lexington, MA, Winter 1987-88). **WEFA:** Wharton Econometric Forecasting Associates, *Energy Analysis Quarterly* (Bala Cynwyd, PA, Fall 1987).

Price Projections

Comparison With Other Projections

The range in petroleum product price forecasts generally reflects the range of assumptions for the world oil price (Table 7). WEFA stands out with very low price expectations for crude oil and all the petroleum products.

For natural gas, prices are expected to rise substantially. There is a wide range of opinion, however, as to how much of an increase to expect in the wellhead price and to what extent relative prices among sectors will change. For example, DRI projects residential gas prices over $7 per thousand cubic feet (1986 dollars), while electric utilities are expected to enjoy a price as low as $3.40 per thousand cubic feet in 2000. The 1987 *AEO* projects a considerably higher price to electric utilities and industrial customers compared to DRI, but lower prices to residential and commercial users. WEFA's low natural gas prices reflect their projection of a low price for crude oil, as well as lower demand for energy overall.

The forecasts for electricity prices generally indicate a modest decline. The 1987 *AEO* projects fairly constant relative prices among sectors, while DRI and WEFA predict that the spread between residential and industrial prices will narrow substantially.

Table 7. Comparison of Price Projections for 2000
(1986 Dollars)

Projection	1986 *AEO*	1987 *AEO*	DRI	WEFA
World Oil Price (dollars per barrel)	33.00	30.00	29.00	22.00
Petroleum Products				
Motor Gasoline (dollars per gallon)	1.27	1.35	1.33	1.02
Heating Oil (dollars per gallon)	1.36	1.37	NA	0.73
Residual (dollars per barrel)	28.92	28.81	27.56	20.88
Natural Gas (dollars per Mcf)				
Average Wellhead	5.51	3.90	[a] 3.10	2.68
Residential	9.30	7.43	7.45	5.06
Commercial	8.36	6.02	6.62	4.65
Industrial	7.24	4.52	4.05	NA
Electric Utility	5.92	4.54	3.41	3.00
Electricity (dollars per kWh)				
Residential	0.064	0.073	0.058	0.075
Commercial	0.065	0.069	0.055	0.071
Industrial	0.056	0.046	0.043	0.057
Coal (dollars per short ton)				
Minemouth	29.45	26.67	NA	26.81
Delivered Electric Utility	39.67	38.47	31.21	33.12

NA = Not available.
[a] Average acquisition price.
Sources: **1986 AEO:** Energy Information Administration, *Annual Energy Outlook 1986*, DOE/EIA-0383(86) (Washington, DC, February 1987). **DRI:** Data Resources, Inc., *Energy Review* (Lexington, MA, Winter 1987-88). **WEFA:** Wharton Econometric Forecasting Associates, *Energy Analysis Quarterly* (Bala Cynwyd, PA, Fall 1987).

DRI's low prices for electric power correspond to their relatively low forecast for delivered coal and natural gas prices. The 1987 *AEO* coal price to electric utilities is considerably higher than DRI's and WEFA's, but close to that forecast in the 1986 *AEO*. The 1987 *AEO* forecast indicates a modest increase in the margin between minemouth and delivered prices over the forecast period, whereas the WEFA forecast indicates much lower real transportation costs for the year 2000.

1987 AEO Compared to 1986 AEO

The lower world oil price of $30 per barrel (1986 dollars) for the year 2000 in the 1987 *AEO* compared to the 1986 *AEO* is due to the changed supply/demand picture in the world petroleum economy. Higher projected production by non-OPEC countries (primarily Norway, Mexico, and the smaller non-OPEC countries) causes the world oil price to decrease. However, this is offset somewhat by a higher projected demand in the developing countries. The net result is that although the total demand in the year 2000 for OPEC oil remains about the same from the 1986 *AEO* to the 1987 *AEO*, the world oil price is expected to decrease.

The natural gas wellhead price of $3.90 per thousand cubic feet for the year 2000 in the 1987 *AEO* is considerably lower than the price of $5.50 per thousand cubic feet in the 1986 *AEO*. This is primarily attributable to increased competition in gas markets in recent years and in the forecast. Much of the increased competition stems from the increased flexibility that gas companies have shown in renegotiating contracts and users have in switching to other fuels. In other words, gas companies are more sensitive to price changes. This increased competition means that, in the 1987 *AEO*, the gas price forecast both begins at a lower level and increases much less rapidly.

The average price of electricity to all end users in 2000 in the 1987 *AEO* remains close to the 1986 *AEO* price of $0.06 per kilowatthour. The higher capital cost component is offset by a lower fuel price component. (Capital costs are higher due to increased expenses on existing assets.) However, the industrial sector price forecasts are lower in the 1987 *AEO* than in the 1986 *AEO*, while the residential and commercial sector prices are higher. This price reallocation is due to an update of the electricity price margins based on more recent data.

The minemouth price of coal is somewhat lower in the 1987 *AEO* than in the 1986 *AEO*. This lower price is due to the lower world oil price in the 1987 *AEO*, as well as lower net exports and less domestic coal use in the year 2000.

Appendix A

Base Case Forecasts

Appendix A

Base Case Forecasts

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

Supply and Disposition	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Production															
Crude Oil	19.0	18.4	17.6	17.3	16.9	16.1	15.5	15.0	14.5	14.1	13.8	12.8	-3.2	-2.3	-2.4
Natural Gas Plant Liquids	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	-.5	.6	.3
Natural Gas [1]	16.9	16.5	16.6	16.6	16.9	16.8	16.8	16.8	16.9	17.1	17.3	17.9	-.1	.6	.6
Coal	19.3	19.5	20.1	20.0	20.4	21.1	21.4	21.8	22.3	22.9	23.4	25.2	1.7	1.8	1.8
Nuclear Power	4.1	4.5	4.9	5.3	5.5	5.9	6.1	6.1	6.2	6.2	6.3	6.4	7.2	.9	2.1
Hydropower/Other [2]	3.2	3.3	2.9	3.1	3.3	3.3	3.3	3.3	3.3	3.4	3.4	3.4	.9	.4	1.4
Total Production	**64.8**	**64.2**	**64.3**	**64.5**	**65.2**	**65.4**	**65.3**	**65.3**	**65.6**	**65.9**	**66.5**	**68.0**	**.2**	**.4**	**.4**
Imports															
Crude Oil [3]	6.8	8.8	9.9	10.1	11.8	12.8	13.8	14.8	15.5	15.9	16.0	17.9	13.5	3.4	4.7
Petroleum Products	4.0	4.3	4.0	4.2	4.2	4.2	4.3	4.5	4.6	4.6	4.6	4.9	1.4	1.4	1.5
Natural Gas [4]	.9	.7	.9	.9	1.1	1.2	1.3	1.4	1.5	1.7	1.8	2.6	5.4	7.9	8.7
Other Imports [5]	.5	.4	.5	.4	.5	.6	.6	.6	.6	.6	.6	.8	4.9	3.7	3.6
Total Imports	**12.1**	**14.3**	**15.3**	**15.7**	**17.6**	**18.8**	**20.0**	**21.3**	**22.1**	**22.9**	**23.1**	**26.2**	**9.2**	**3.4**	**4.2**
Exports															
Coal	2.4	2.2	2.0	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4	-3.3	1.4	1.2
Petroleum	1.7	1.7	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	-.8	.0	.0
Total Exports	**4.1**	**3.9**	**3.6**	**3.5**	**3.6**	**3.7**	**3.7**	**3.8**	**3.8**	**3.9**	**4.0**	**4.0**	**-2.2**	**.8**	**.7**
Adjustments [6]	**1.2**	**-.3**	**.3**	**.5**	**-.5**	**-.6**	**-.6**	**-.6**	**-.6**	**-.6**	**-.6**	**-.6**			
Consumption															
Petroleum Products [7]	30.9	32.2	32.6	33.0	33.4	33.7	34.1	34.7	35.1	35.2	35.1	36.3	1.7	.7	.8
Natural Gas	17.9	16.7	17.4	17.4	17.8	17.8	17.9	18.0	18.2	18.6	18.9	20.2	-.1	1.3	1.2
Coal	17.5	17.3	18.0	18.0	18.3	18.6	19.2	19.5	19.9	20.4	20.8	22.6	1.4	1.8	1.8
Nuclear Power	4.1	4.5	4.9	5.3	5.5	5.9	6.1	6.1	6.2	6.2	6.3	6.4	7.2	.9	2.1
Hydropower/Other [8]	3.6	3.6	3.3	3.5	3.7	3.8	3.8	3.8	3.9	3.9	3.9	4.1	1.3	.7	1.6
Total Consumption	**74.0**	**74.2**	**76.2**	**77.2**	**78.8**	**79.9**	**81.0**	**82.2**	**83.3**	**84.2**	**85.0**	**89.6**	**1.6**	**1.1**	**1.3**
Net Imports - Petroleum	**9.0**	**11.5**	**12.3**	**12.8**	**14.4**	**15.4**	**16.6**	**17.7**	**18.4**	**18.9**	**19.0**	**21.2**	**11.2**	**3.2**	**4.3**
World Oil Price [9] (1987 dollars per barrel)	**28.52**	**14.40**	**18.11**	**16.80**	**17.61**	**17.81**	**17.91**	**17.90**	**18.77**	**20.37**	**22.40**	**30.76**	**-9.0**	**5.6**	**4.2**
Real GNP (billion 1982 dollars)	**3,607**	**3,713**	**3,815**	**3,885**	**3,990**	**4,098**	**4,211**	**4,332**	**4,438**	**4,524**	**4,593**	**5,090**	**2.6**	**2.2**	**2.2**

[1] Dry natural gas.
[2] Includes hydropower, geothermal power, wood, and waste.
[3] Includes imports of crude oil for the Strategic Petroleum Reserve.
[4] Represents net imports.
[5] Includes coal, net coal coke imports, and net electricity imports.
[6] Balancing item. Includes stock changes, unaccounted for supply, losses, and gains.
[7] Includes natural gas plant liquids and crude oil consumed as fuels.
[8] Includes industrial generation of hydroelectric power, net electricity imports, and electricity produced from geothermal, wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems. Also includes net coal coke imports.
[9] Represents the cost of imported crude oil to U.S. refiners.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecast: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88

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

Sector and Fuel	Base Case												Annual Percent Change		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Residential															
Distillate [1]	1.11	1.12	1.07	1.15	1.12	1.10	1.09	1.07	1.04	1.02	1.00	0.90	-0.2	-2.0	-1.3
Liquefied Petroleum Gas	.42	.40	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.7	.0	.0
Natural Gas	4.57	4.44	4.56	4.59	4.62	4.64	4.65	4.67	4.66	4.65	4.61	4.49	.3	-.3	-.1
Coal	.07	.07	.07	.07	.07	.07	.06	.06	.06	.06	.06	.05	-1.3	-1.8	-1.9
Electricity	2.70	2.79	2.95	3.03	3.10	3.17	3.24	3.32	3.39	3.46	3.52	3.78	3.3	1.8	1.9
Total	**8.88**	**8.82**	**9.09**	**9.28**	**9.34**	**9.42**	**9.49**	**9.55**	**9.60**	**9.63**	**9.63**	**9.67**	**1.2**	**.3**	**.5**
Commercial															
Distillate [1]	.67	.68	.65	.70	.71	.72	.73	.74	.75	.75	.75	.77	1.2	.7	1.2
Motor Gasoline	.10	.10	.10	.10	.10	.11	.11	.11	.11	.12	.12	.12	2.1	1.6	1.7
Residual Fuel	.19	.21	.18	.19	.19	.20	.20	.20	.20	.19	.18	.12	.6	-4.7	-3.1
Natural Gas	2.51	2.39	2.40	2.38	2.42	2.46	2.50	2.53	2.56	2.59	2.60	2.68	-.4	.9	.9
Other Commercial [2]	.18	.18	.19	.18	.18	.18	.18	.18	.18	.18	.18	.18	-.3	-.2	-.4
Electricity	2.36	2.46	2.58	2.59	2.66	2.73	2.81	2.88	2.96	3.03	3.10	3.43	3.0	2.3	2.2
Total	**6.01**	**6.01**	**6.10**	**6.14**	**6.26**	**6.39**	**6.52**	**6.65**	**6.76**	**6.85**	**6.93**	**7.30**	**1.2**	**1.3**	**1.4**
Industrial															
Distillate [1]	1.26	1.26	1.29	1.31	1.33	1.36	1.39	1.42	1.43	1.45	1.47	1.58	1.6	1.5	1.6
Liquefied Petroleum Gas	1.55	1.49	1.62	1.61	1.65	1.68	1.70	1.73	1.76	1.79	1.82	1.97	1.6	1.6	1.5
Motor Gasoline	.22	.22	.23	.23	.24	.24	.25	.25	.25	.26	.26	.28	2.2	1.3	1.5
Petrochemical Feedstocks	.82	.95	.93	.97	1.00	1.02	1.03	1.05	1.07	1.09	1.11	1.21	4.5	1.8	2.0
Residual Fuel	.75	.81	.72	.72	.75	.79	.81	.84	.85	.85	.83	.76	.8	-.3	.4
Natural Gas	7.11	6.69	6.90	7.14	7.39	7.54	7.63	7.68	7.77	7.80	7.82	7.67	1.2	.2	.8
Metallurgical Coal	1.10	.97	.98	1.01	1.01	1.01	.99	.97	.97	.96	.95	.89	-1.8	-1.2	-.8
Steam Coal	1.66	1.68	1.65	1.60	1.65	1.69	1.71	1.73	1.75	1.77	1.80	1.94	.4	1.4	1.3
Other Industrial [3]	3.09	3.16	3.37	3.38	3.49	3.53	3.59	3.66	3.69	3.66	3.61	3.59	2.7	.2	.5
Hydropower	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.1	.3	.3
Electricity	2.81	2.76	2.85	2.88	2.95	3.03	3.09	3.16	3.27	3.40	3.53	4.25	1.5	3.4	3.1
Total	**20.40**	**20.01**	**20.58**	**20.88**	**21.49**	**21.91**	**22.24**	**22.52**	**22.84**	**23.06**	**23.23**	**24.16**	**1.4**	**1.0**	**1.2**
Transportation															
Distillate [1]	3.20	3.26	3.43	3.42	3.55	3.67	3.77	3.86	3.95	4.04	4.14	4.47	2.8	2.0	2.1
Jet Fuel	2.50	2.68	2.79	2.90	2.98	3.01	3.05	3.11	3.14	3.13	3.11	3.18	3.8	.6	1.0
Motor Gasoline	12.78	13.16	13.39	13.56	13.42	13.32	13.28	13.26	13.19	13.05	12.87	12.68	.8	-.5	-.4
Residual Fuel	.82	.88	.84	.80	.82	.84	.86	.88	.90	.91	.93	1.01	.5	1.9	1.5
Natural Gas	.52	.50	.51	.52	.53	.53	.53	.54	.54	.56	.56	.61	.5	1.3	1.3
Other Transportation [4]	.27	.27	.29	.29	.30	.31	.31	.32	.33	.33	.33	.36	2.5	1.6	1.6
Total	**20.09**	**20.76**	**21.25**	**21.49**	**21.59**	**21.68**	**21.81**	**21.96**	**22.04**	**22.02**	**21.94**	**22.30**	**1.5**	**.3**	**.4**
Electric Utilities															
Distillate	.09	.08	.09	.09	.04	.04	.05	.07	.10	.11	.09	.17	-12.5	14.5	4.8
Residual Fuel	1.01	1.37	1.14	1.09	1.26	1.22	1.40	1.66	1.84	1.92	1.97	2.60	4.0	7.8	6.5
Natural Gas	3.16	2.69	2.99	2.80	2.80	2.62	2.54	2.53	2.65	2.97	3.26	4.79	-3.7	6.2	3.7
Steam Coal	14.58	14.44	15.15	15.18	15.46	15.95	16.30	16.64	17.04	17.48	17.91	19.57	1.8	2.1	2.0
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Hydropower/Other [5]	3.54	3.61	3.30	3.46	3.72	3.78	3.80	3.81	3.83	3.89	3.91	4.07	1.3	.7	1.6
Total	**26.52**	**26.67**	**27.56**	**27.90**	**28.79**	**29.49**	**30.15**	**30.85**	**31.67**	**32.56**	**33.41**	**37.61**	**2.1**	**2.5**	**2.4**
Primary Energy Consumption															
Distillate [1]	6.33	6.40	6.54	6.67	6.75	6.90	7.04	7.15	7.27	7.37	7.45	7.88	1.7	1.3	1.4
Jet Fuel	2.50	2.68	2.79	2.90	2.98	3.01	3.05	3.11	3.14	3.13	3.11	3.18	3.8	.6	1.0
Liquefied Petroleum Gas	2.10	2.01	2.19	2.18	2.22	2.25	2.27	2.30	2.34	2.36	2.39	2.55	1.4	1.2	1.2
Motor Gasoline	13.10	13.49	13.72	13.89	13.76	13.67	13.64	13.62	13.55	13.42	13.25	13.08	.9	-.4	-.4
Petrochemical Feedstocks	.82	.95	.93	.97	1.00	1.02	1.03	1.05	1.07	1.09	1.11	1.21	4.5	1.8	2.0
Residual Fuel	2.77	3.26	2.88	2.79	3.01	3.04	3.27	3.57	3.78	3.87	3.91	4.50	1.9	4.0	3.5
Natural Gas	17.87	16.70	17.36	17.43	17.76	17.79	17.86	17.96	18.19	18.56	18.86	20.24	-.1	1.3	1.2
Metallurgical Coal	1.10	.97	.98	1.01	1.01	1.01	.99	.97	.97	.96	.95	.89	-1.8	-1.2	-.8
Steam Coal	16.42	16.30	16.98	16.95	17.28	17.81	18.18	18.53	18.96	19.42	19.87	21.67	1.6	2.0	1.9
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Net Coal Coke Imports	-.01	-.02	.00	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-5.5	1.4	11.3
Hydropower/Misc [6]	6.87	7.01	6.93	7.10	7.48	7.58	7.66	7.75	7.80	7.84	7.81	7.96	2.0	.5	1.1
Total Consumption	**74.02**	**74.25**	**76.19**	**77.18**	**78.76**	**79.95**	**81.04**	**82.16**	**83.27**	**84.21**	**84.97**	**89.57**	**1.6**	**1.1**	**1.3**
Electricity (all sectors)	**7.88**	**8.02**	**8.39**	**8.51**	**8.72**	**8.95**	**9.16**	**9.38**	**9.63**	**9.90**	**10.16**	**11.48**	**2.6**	**2.5**	**2.4**
Industrial Electricity															
Gross Consumption	3.05	3.08	3.30	3.36	3.43	3.53	3.61	3.71	3.83	3.97	4.10	4.84	3.0	3.2	3.0
Self Generation - Own Use	.23	.32	.45	.48	.48	.50	.52	.54	.56	.56	.57	.59	16.6	1.8	2.2
Purchased Electricity	2.81	2.76	2.85	2.88	2.95	3.03	3.09	3.16	3.27	3.40	3.53	4.25	1.5	3.4	3.1

[1] Includes kerosene.
[2] Includes liquefied petroleum gas and coal.
[3] Includes still gas, lubricants, waxes, asphalt, special naphthas, petroleum coke, and net coal coke imports.
[4] Includes electricity, liquefied petroleum gas, lubricants, and waxes.
[5] Includes hydropower and electricity that is produced by renewable sources such as geothermal power, wood, waste, solar power, and wind power. Also includes net electricity imports.
[6] Includes hydropower and electricity that is produced by renewable sources such as geothermal power, wood, waste, solar power, and wind power. Also includes net electricity imports and minor petroleum products.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Data Report 1960-1985*, DOE/EIA-0214(85); values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88

Table A3. Price of Energy by Source and End-Use Sector
(1987 Dollars per Million Btu)

Sector and Fuel	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Residential	**12.07**	**11.30**	**11.41**	**11.26**	**11.43**	**11.48**	**11.58**	**11.66**	**11.80**	**12.01**	**12.29**	**13.71**	**-1.0**	**1.8**	**1.4**
Primary Energy	6.80	6.13	6.08	6.06	6.22	6.29	6.38	6.47	6.64	6.85	7.10	8.36	-1.5	2.9	2.5
Petroleum Products	8.53	7.16	8.18	7.83	8.30	8.43	8.58	8.71	8.96	9.29	9.69	11.68	-.2	3.3	2.8
Distillate Fuel	8.18	6.36	7.08	6.89	7.27	7.37	7.51	7.65	7.88	8.16	8.47	10.17	-2.1	3.3	2.8
Liquefied Petroleum Gas	9.44	9.38	10.87	10.32	10.96	11.11	11.22	11.30	11.55	11.95	12.46	14.79	3.3	2.9	2.4
Natural Gas	6.27	5.82	5.44	5.50	5.56	5.63	5.71	5.80	5.94	6.12	6.35	7.43	-2.1	2.8	2.4
Steam Coal	3.22	2.90	2.72	2.75	2.80	2.86	2.91	2.96	3.02	3.08	3.13	3.41	-2.4	1.8	1.8
Electricity	24.13	22.36	22.49	21.99	21.95	21.71	21.58	21.39	21.25	21.24	21.28	22.04	-2.1	.2	-.2
Commercial	**12.56**	**11.59**	**11.76**	**11.50**	**11.62**	**11.58**	**11.60**	**11.60**	**11.67**	**11.83**	**12.05**	**13.32**	**-1.6**	**1.4**	**1.0**
Primary Energy	5.75	4.75	4.66	4.63	4.77	4.81	4.86	4.92	5.05	5.23	5.45	6.53	-3.5	3.1	2.6
Petroleum Products	6.45	4.29	5.10	4.86	5.17	5.25	5.36	5.46	5.68	5.99	6.36	8.24	-4.0	4.6	3.8
Distillate Fuel	6.53	4.20	4.91	4.72	5.09	5.19	5.33	5.46	5.69	5.96	6.27	7.95	-4.5	4.4	3.8
Residual Fuel	4.43	2.38	2.93	2.67	2.78	2.78	2.80	2.81	2.94	3.16	3.45	4.67	-8.9	5.3	3.6
Other Petroleum [1]	8.39	6.99	8.02	7.68	8.04	8.16	8.24	8.30	8.54	8.94	9.44	11.54	-.6	3.5	2.8
Natural Gas	5.63	5.10	4.61	4.67	4.73	4.74	4.77	4.81	4.91	5.03	5.21	6.02	-3.4	2.4	2.1
Steam Coal	1.83	1.67	1.56	1.58	1.61	1.64	1.67	1.70	1.74	1.77	1.80	1.96	-2.2	1.8	1.8
Electricity	23.13	21.52	21.45	20.92	20.89	20.63	20.50	20.32	20.18	20.17	20.21	20.97	-2.3	.2	-.2
Industrial	**6.41**	**4.74**	**4.89**	**4.71**	**4.80**	**4.83**	**4.86**	**4.88**	**5.01**	**5.23**	**5.51**	**6.84**	**-5.5**	**3.5**	**2.6**
Primary Energy	4.88	3.20	3.35	3.23	3.36	3.41	3.46	3.50	3.63	3.85	4.12	5.32	-6.9	4.5	3.6
Petroleum Products	6.62	3.68	4.53	4.21	4.43	4.48	4.49	4.48	4.63	4.94	5.33	6.94	-7.5	4.5	3.3
Distillate Fuel	6.39	4.06	4.78	4.58	4.96	5.06	5.20	5.33	5.56	5.83	6.15	7.83	-4.6	4.5	3.9
Liquefied Petroleum Gas	6.62	6.54	8.02	7.47	8.11	8.27	8.37	8.46	8.71	9.11	9.62	11.95	4.5	3.8	3.1
Motor Gasoline	9.61	7.13	7.81	7.63	7.80	7.90	7.97	8.02	8.26	8.66	9.16	11.16	-3.8	3.5	2.8
Residual Fuel	4.52	2.42	2.98	2.72	2.84	2.84	2.86	2.87	3.00	3.23	3.51	4.73	-8.9	5.2	3.6
Other Petroleum [2]	6.94	2.59	3.22	2.95	3.00	3.00	2.94	2.86	2.95	3.20	3.54	4.71	-15.4	4.6	3.0
Natural Gas	4.08	3.14	2.57	2.63	2.69	2.75	2.83	2.92	3.06	3.24	3.46	4.52	-7.5	5.1	4.4
Metallurgical Coal	2.14	1.95	1.81	1.83	1.86	1.87	1.90	1.93	1.96	1.99	2.02	2.15	-2.6	1.4	1.3
Steam Coal	1.79	1.66	1.58	1.59	1.62	1.65	1.68	1.71	1.74	1.77	1.80	1.95	-1.6	1.7	1.7
Hydroelectric Power	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	.0	.0	.0
Electricity	15.98	14.79	14.44	13.94	13.90	13.67	13.55	13.37	13.24	13.23	13.26	13.97	-3.1	.2	-.3
Transportation	**8.66**	**6.27**	**6.95**	**6.76**	**6.94**	**7.02**	**7.08**	**7.13**	**7.34**	**7.68**	**8.10**	**9.89**	**-4.1**	**3.5**	**2.7**
Primary Energy	8.65	6.26	6.95	6.76	6.93	7.01	7.07	7.12	7.33	7.67	8.09	9.88	-4.1	3.5	2.7
Petroleum Products	8.65	6.26	6.95	6.76	6.93	7.01	7.07	7.12	7.33	7.67	8.09	9.88	-4.1	3.5	2.7
Distillate Fuel	7.41	4.85	5.57	5.37	5.75	5.85	5.99	6.12	6.35	6.62	6.94	8.62	-4.6	4.0	3.4
Jet Fuel	6.24	3.99	4.66	4.44	4.63	4.68	4.73	4.77	4.95	5.25	5.62	7.23	-5.6	4.4	3.4
Motor Gasoline	9.54	7.09	7.77	7.59	7.75	7.86	7.93	7.97	8.21	8.61	9.11	11.11	-3.8	3.5	2.8
Residual Fuel	4.66	2.40	2.96	2.70	2.83	2.82	2.85	2.86	2.99	3.22	3.50	4.72	-9.5	5.3	3.7
Other Petroleum [3]	16.03	18.50	19.18	18.89	18.96	18.95	18.88	18.78	18.87	19.12	19.48	20.69	3.4	.9	.6
Electricity	20.97	20.04	19.32	18.28	18.54	18.03	17.90	17.64	17.48	17.43	17.51	18.64	-3.0	.3	-.3
Total Energy															
Primary Energy - Four Sectors	6.77	5.01	5.34	5.21	5.34	5.40	5.45	5.50	5.66	5.92	6.24	7.68	-4.4	3.6	2.8
Electricity	20.91	19.38	19.43	18.94	18.89	18.65	18.53	18.35	18.20	18.16	18.16	18.73	-2.3	.0	-.3
Electric Utilities															
Fossil Fuel Average	**2.22**	**1.80**	**1.71**	**1.70**	**1.75**	**1.77**	**1.81**	**1.86**	**1.94**	**2.02**	**2.11**	**2.67**	**-4.5**	**4.2**	**3.5**
Petroleum Products	4.59	2.55	3.10	2.80	3.01	3.02	3.04	3.06	3.22	3.46	3.72	5.00	-8.1	5.2	3.7
Distillate Fuel	6.22	4.05	4.86	4.69	5.06	5.15	5.25	5.35	5.55	5.83	6.19	7.87	-3.7	4.3	3.8
Residual Fuel	4.46	2.46	2.96	2.64	2.94	2.94	2.96	2.96	3.10	3.33	3.60	4.82	-8.0	5.1	3.8
Natural Gas	3.62	2.42	2.22	2.29	2.36	2.45	2.56	2.69	2.86	3.07	3.30	4.54	-7.5	6.3	5.6
Steam Coal	1.74	1.63	1.52	1.51	1.54	1.56	1.58	1.61	1.65	1.68	1.71	1.89	-2.2	1.9	1.6
Hydroelectric Power	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.0	.0	.0
Nuclear Power	.74	.77	.77	.75	.73	.71	.68	.65	.63	.61	.60	.55	-1.1	-2.4	-2.5
Average Price to All Users															
Petroleum Products	7.92	5.44	6.20	5.97	6.15	6.22	6.25	6.25	6.42	6.74	7.13	8.77	-4.7	3.5	2.7
Distillate Fuel	7.23	4.88	5.59	5.40	5.77	5.86	5.99	6.12	6.33	6.60	6.91	8.55	-4.1	3.9	3.3
Jet Fuel	6.24	3.99	4.66	4.44	4.63	4.68	4.73	4.77	4.95	5.25	5.62	7.23	-5.6	4.4	3.4
Liquefied Petroleum Gas	7.21	7.13	8.62	8.07	8.69	8.84	8.94	9.02	9.26	9.66	10.16	12.46	4.2	3.5	2.9
Motor Gasoline	9.54	7.09	7.77	7.59	7.75	7.86	7.93	7.97	8.21	8.61	9.11	11.12	-3.8	3.5	2.8
Residual Fuel	4.53	2.43	2.96	2.68	2.88	2.87	2.90	2.91	3.04	3.27	3.55	4.78	-8.7	5.2	3.7
Other Petroleum Products	7.50	3.50	4.15	3.87	3.91	3.91	3.86	3.77	3.87	4.13	4.48	5.68	-12.2	3.8	2.5
Natural Gas	4.80	4.04	3.57	3.64	3.69	3.76	3.84	3.93	4.06	4.21	4.41	5.39	-4.7	3.7	3.2
Coal [4]	1.78	1.66	1.53	1.54	1.57	1.59	1.61	1.64	1.68	1.71	1.74	1.91	-2.3	1.9	1.7
Electricity	20.91	19.38	19.43	18.94	18.89	18.65	18.53	18.35	18.20	18.16	18.16	18.73	-2.3	.0	-.3

[1] Includes liquefied petroleum gas and motor gasoline.
[2] Includes petrochemical feedstocks, still gas, lubricants, waxes, asphalt, special naphthas, and petroleum coke.
[3] Includes liquefied petroleum gas, lubricants, and waxes.
[4] Includes steam coal and metallurgical coal.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Price and Expenditure Report 1985*, DOE/EIA-0376(85); values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88

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

Fuel Consumption and Sales	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Fuel Inputs															
Oil															
Distillate	0.09	0.08	0.09	0.09	0.04	0.04	0.05	0.07	0.10	0.11	0.09	0.17	-12.5	14.5	4.8
Residual	1.01	1.37	1.14	1.09	1.26	1.22	1.40	1.66	1.84	1.92	1.97	2.60	4.0	7.8	6.5
Natural Gas	3.16	2.69	2.99	2.80	2.80	2.62	2.54	2.53	2.65	2.97	3.26	4.79	-3.7	6.2	3.7
Steam Coal	14.58	14.44	15.15	15.18	15.46	15.95	16.30	16.64	17.04	17.48	17.91	19.57	1.8	2.1	2.0
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Hydropower/Other [1]	3.12	3.24	2.82	3.07	3.24	3.26	3.28	3.29	3.30	3.35	3.36	3.38	.9	.4	1.4
Total Fuel Inputs	**26.10**	**26.30**	**27.08**	**27.51**	**28.31**	**28.97**	**29.63**	**30.33**	**31.14**	**32.03**	**32.87**	**36.92**	**2.1**	**2.5**	**2.4**
Net Imports (fuel input equiv.)	.42	.37	.48	.39	.49	.52	.52	.52	.53	.53	.55	.69	4.2	2.8	2.8
Total Electricity Inputs	**26.52**	**26.67**	**27.56**	**27.90**	**28.79**	**29.49**	**30.15**	**30.85**	**31.67**	**32.56**	**33.41**	**37.61**	**2.1**	**2.5**	**2.4**
Disposition															
Total Electricity Inputs	26.52	26.67	27.56	27.90	28.79	29.49	30.15	30.85	31.67	32.56	33.41	37.61	2.1	2.5	2.4
Minus Conversion Losses	18.09	18.18	18.80	19.03	19.65	20.13	20.58	21.06	21.62	22.24	22.83	25.71	2.2	2.5	2.4
Generation	**8.43**	**8.49**	**8.76**	**8.87**	**9.15**	**9.37**	**9.57**	**9.79**	**10.05**	**10.32**	**10.58**	**11.90**	**2.1**	**2.4**	**2.4**
Plus PURPA Purchases [2]	.07	.09	.10	.12	.14	.16	.18	.20	.22	.23	.25	.31	18.6	6.8	8.8
Plus Net Imports (electricity equiv.)	.14	.12	.16	.13	.16	.17	.17	.17	.17	.18	.18	.23	4.2	2.8	2.8
Minus Trans. & Dist. Losses [3]	.75	.67	.63	.61	.73	.75	.77	.79	.81	.83	.85	.96	-.1	2.5	3.3
Electricity Sales	**7.88**	**8.02**	**8.39**	**8.51**	**8.72**	**8.95**	**9.16**	**9.38**	**9.63**	**9.90**	**10.16**	**11.48**	**2.6**	**2.5**	**2.4**
Electricity Sales by End-Use Sector [4]															
Residential	2.70	2.79	2.95	3.03	3.10	3.17	3.24	3.32	3.39	3.46	3.52	3.78	3.3	1.8	1.9
Commercial/Other [5]	2.37	2.47	2.59	2.60	2.67	2.75	2.82	2.90	2.97	3.04	3.11	3.44	3.0	2.3	2.2
Industrial	2.81	2.76	2.85	2.88	2.95	3.03	3.09	3.16	3.27	3.40	3.53	4.25	1.5	3.4	3.1
Total Electricity Sales	**7.88**	**8.02**	**8.39**	**8.51**	**8.72**	**8.95**	**9.16**	**9.38**	**9.63**	**9.90**	**10.16**	**11.48**	**2.6**	**2.5**	**2.4**

[1] Includes renewable electric utility energy sources such as hydropower, geothermal power, wood, waste, solar power, and wind power.
[2] Electric utility purchases under the Public Utility Regulatory Policies Act of 1978 (PURPA).
[3] Transmission and distribution losses for 1987 and 1988 are based on the January 1988 *Short-Term Energy Outlook*, which does not explicitly account for PURPA purchases in its balance. For 1989 and later years, losses explicitly exclude estimated PURPA purchases.
[4] Sales data for 1985 correspond to the *Monthly Energy Review* old series. New series values for 1985 are: Residential - 2.71, Commercial/Other - 2.38, Industrial - 2.85, and Total - 7.94 quadrillion Btu.
[5] Includes street lighting and sales to the transportation sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Data Report 1960-1985*, DOE/EIA-0214(85); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Forecast Run 304; File Creation Date 03/01/88; Report Date 03/01/88

Table A5. Electric Utility Summer Capability and Generation
(Capability in Million Kilowatts)
(Generation in Billion Kilowatthours)

Fuel Consumption and Sales	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Net Capability [1]															
Coal Steam	285.6	290.5	292.4	294.2	296.3	295.2	298.5	300.2	300.9	301.7	303.4	316.2	0.7	0.7	0.6
Other Fossil Steam	147.9	147.0	146.6	146.0	145.7	142.4	141.3	140.1	137.2	135.1	133.1	127.0	-.8	-1.1	-1.1
Combined Cycle	4.7	4.7	4.7	4.7	4.7	5.1	5.1	5.1	5.2	5.3	5.4	33.3	1.6	20.7	16.2
Turbine/Diesel	44.5	44.1	44.2	44.7	44.9	45.2	44.9	45.4	46.8	48.5	50.3	61.8	.3	3.2	2.6
Nuclear Power	79.5	85.3	93.7	96.1	100.5	103.9	105.1	105.1	105.1	104.2	105.5	106.5	5.5	.2	1.0
Hydropower/Other [2]	93.1	93.2	93.7	94.3	94.7	95.4	96.7	97.0	97.2	98.5	98.6	98.9	.5	.4	.4
Total Capability	**655.3**	**664.9**	**675.3**	**680.1**	**686.9**	**687.1**	**691.6**	**692.8**	**692.3**	**693.3**	**696.4**	**743.8**	**1.0**	**.8**	**.7**
Generation by Plant Type															
Coal Steam	1,402	1,386	1,463	1,456	1,489	1,537	1,570	1,603	1,643	1,685	1,725	1,887	1.8	2.1	2.0
Other Fossil Steam	369	363	369	346	359	338	343	360	381	408	431	510	-1.7	4.2	2.5
Combined Cycle	15	14	16	15	14	15	15	15	15	16	16	107	-.1	21.6	16.0
Turbine/Diesel	9	8	8	8	6	7	11	17	23	31	35	76	-3.9	26.9	18.5
Nuclear Power	384	414	452	489	511	543	560	568	574	573	581	593	7.2	.9	2.1
Hydropower/Other [2]	292	302	261	285	302	305	306	307	308	313	314	315	.9	.3	1.5
Total Generation	**2,470**	**2,487**	**2,568**	**2,598**	**2,681**	**2,745**	**2,806**	**2,869**	**2,944**	**3,025**	**3,102**	**3,488**	**2.1**	**2.4**	**2.4**
Generation by Fuel Type															
Coal	1,402	1,386	1,463	1,456	1,489	1,537	1,570	1,603	1,643	1,685	1,725	1,887	1.8	2.1	2.0
Natural Gas	292	249	276	258	260	244	235	233	242	269	293	441	-3.6	6.1	3.7
Oil	100	137	116	111	119	116	134	158	177	185	189	252	3.0	8.0	6.2
Nuclear Power	384	414	452	489	511	543	560	568	574	573	581	593	7.2	.9	2.1
Hydropower/Other [3]	292	302	261	285	302	305	306	307	308	313	314	315	.9	.3	1.5
Total Generation	**2,470**	**2,487**	**2,568**	**2,598**	**2,681**	**2,745**	**2,806**	**2,869**	**2,944**	**3,025**	**3,102**	**3,488**	**2.1**	**2.4**	**2.4**

[1] Net summer capability is the steady hourly output that generating equipment is expected to supply to system load (exclusive of auxiliary power), as demonstrated by tests during summer peak demand.

[2] Includes other renewable sources such as geothermal power, wood, waste, solar power, and wind power.

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

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88

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

Additions	Base Case												
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996-2000	1986-2000
Total Additions													
Nuclear Power [1]	9,880	5,803	8,422	2,425	4,594	3,442	1,137	0	0	0	1,255	1,223	28,301
Coal Steam	6,468	4,868	2,098	1,851	2,269	588	3,632	2,037	1,343	2,295	3,102	18,346	42,429
Combined Cycle [2]	0	0	0	20	0	423	0	0	63	102	102	27,984	28,694
Turbines [3]	126	211	216	503	166	416	57	590	1,501	1,725	1,974	11,760	19,120
Hydropower/Other	3,488	169	427	642	404	767	1,345	245	225	1,316	105	250	5,895
Total New Capability	**19,962**	**11,051**	**11,163**	**5,441**	**7,433**	**5,636**	**6,171**	**2,872**	**3,132**	**5,438**	**6,538**	**59,563**	**124,439**
Announced/Planned Construction [4]													
Nuclear Power [1]	9,880	5,803	8,422	2,425	4,594	3,442	1,137	0	0	0	1,255	1,223	28,301
Coal Steam	6,468	4,868	2,098	1,851	2,269	588	3,632	2,037	1,343	2,295	3,102	7,708	31,791
Combined Cycle [2]	0	0	0	20	0	423	0	0	63	102	102	204	914
Turbines [3]	126	211	216	503	166	416	57	54	159	159	188	919	3,048
Hydropower/Other	3,488	169	427	642	404	767	1,345	245	225	1,316	105	250	5,895
Total Announced/Planned	**19,962**	**11,051**	**11,163**	**5,441**	**7,433**	**5,636**	**6,171**	**2,336**	**1,790**	**3,872**	**4,752**	**10,304**	**69,949**
Additional Needed Capability [5]													
Nuclear Power [1]	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal Steam	0	0	0	0	0	0	0	0	0	0	0	10,638	10,638
Combined Cycle [2]	0	0	0	0	0	0	0	0	0	0	0	27,780	27,780
Turbines [3]	0	0	0	0	0	0	0	536	1,342	1,566	1,786	10,841	16,072
Total Additional Needed	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**536**	**1,342**	**1,566**	**1,786**	**49,259**	**54,490**

[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 combined cycle capability.
[3] Includes all gas turbine and internal combustion capability.
[4] Includes all new capability announced by the electric utility industry.
[5] Includes additional new capability considered necessary by the Energy Information Administration to meet electricity demands.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88

Table A7. Electric Utility Sales, Prices, and Price Components
(Billion Kilowatthours)
(1987 Dollars per Thousand Kilowatthours)

Sales, Prices, and Price Component	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Electricity Sales by End-Use Sector [1]															
Residential	791	818	865	887	907	929	951	973	994	1,013	1,031	1,109	3.3	1.8	1.9
Commercial/Other [2]	694	725	759	763	783	805	826	849	871	891	912	1,009	3.0	2.3	2.2
Industrial	825	808	835	844	865	887	906	926	958	998	1,035	1,245	1.5	3.4	3.1
Total Electricity Sales	**2,310**	**2,351**	**2,460**	**2,494**	**2,555**	**2,622**	**2,683**	**2,748**	**2,823**	**2,902**	**2,977**	**3,363**	**2.6**	**2.5**	**2.4**
Prices [3]															
Residential	81.87	76.74	76.74	75.04	74.88	74.07	73.62	72.98	72.52	72.48	72.62	75.20	-2.0	.2	-.2
Commercial/Other [2]	78.45	73.11	73.16	71.33	71.23	70.36	69.92	69.28	68.82	68.79	68.92	71.53	-2.2	.2	-.2
Industrial	54.03	49.09	49.26	47.56	47.41	46.64	46.24	45.63	45.19	45.15	45.25	47.67	-2.9	.2	-.3
All Sectors	**70.90**	**66.11**	**66.31**	**64.61**	**64.46**	**63.65**	**63.23**	**62.62**	**62.10**	**61.95**	**61.98**	**63.91**	**-2.1**	**.0**	**-.3**
Price Components															
Capital Component [4]	35.52	33.31	34.26	33.03	32.73	32.18	31.59	30.68	29.64	28.76	28.03	25.36	-2.0	-2.4	-2.3
Fuel Component [5]	18.50	15.57	15.06	14.72	15.04	14.99	15.27	15.67	16.26	17.01	17.80	22.65	-4.1	4.2	3.2
O&M Component [6]	16.89	17.24	16.98	16.86	16.70	16.48	16.37	16.28	16.20	16.18	16.15	15.90	-.5	-.4	-.5
Total Price [3]	**70.90**	**66.12**	**66.31**	**64.61**	**64.47**	**63.65**	**63.23**	**62.62**	**62.11**	**61.95**	**61.98**	**63.91**	**-2.1**	**.0**	**-.3**

[1] Sales data for 1985 correspond to the *Monthly Energy Review* old series. New series values for 1985 are: Residential - 794, Commercial/Other - 697, Industrial - 835, and Total - 2,326 billion kilowatthours.
[2] Includes consumption for street and highway lighting, other public authorities, and railways.
[3] Prices for 1985 to 2000 are estimated from model simulations and represent average revenues per kilowatthour of demand for the total electric utility industry.
[4] Represents the cost to the utility of capital assets needed to promote reliable service. It includes plant depreciation, taxes, and sufficient return on invested capital to cover interest obligations on outstanding debt and to compensate stockholders.
[5] Includes only the direct costs of fuel inputs used to generate electricity required to meet demand.
[6] 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.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Forecast Run 304; File Creation Date 03/01/88; Report Date 03/01/88

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

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

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

Table A9. Natural Gas Supply, Disposition, and Prices
(Trillion Cubic Feet)
(1987 Dollars per Thousand Cubic Feet)

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

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

Table A10. Coal Supply, Disposition, and Prices
(Million Short Tons)
(1987 Dollars per Short Ton)

Supply, Disposition, and Prices	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Total Production [1]	**884**	**890**	**917**	**914**	**932**	**962**	**978**	**996**	**1,020**	**1,043**	**1,068**	**1,149**	**1.7**	**1.8**	**1.8**
Imports	2	2	2	2	3	3	4	4	4	5	5	7	9.0	8.8	10.4
Exports [2]	93	86	78	74	76	79	81	83	86	88	91	91	-3.3	1.4	1.2
Net Imports	**-91**	**-83**	**-76**	**-72**	**-73**	**-76**	**-77**	**-79**	**-82**	**-83**	**-86**	**-84**	**-3.6**	**1.0**	**.7**
Net Storage Withdrawals [3]	28	-4	-3	-5	-5	-7	-5	-5	-6	-6	-6	-6			
Total Supply [4]	**821**	**803**	**838**	**837**	**853**	**879**	**896**	**912**	**932**	**954**	**975**	**1,059**	**1.4**	**1.9**	**1.8**
Consumption by Sector															
Residential/Commercial	8	8	8	8	7	7	7	7	7	7	7	7	-1.4	-.7	-1.2
Industrial	75	76	74	74	74	76	77	78	79	80	81	87	.2	1.4	1.3
Coking Plants	41	36	36	38	38	38	37	36	36	36	36	33	-1.8	-1.2	-.7
Electric Utilities	694	685	719	717	735	758	775	791	810	831	852	931	1.8	2.1	2.0
Total Consumption	**818**	**804**	**837**	**837**	**854**	**879**	**896**	**912**	**932**	**954**	**975**	**1,059**	**1.4**	**1.9**	**1.8**
Discrepancy [5]	3	-1	1	0	-1	0	0	0	0	0	0	0			
Average Minemouth Price [6]	**26.63**	**24.50**	**22.99**	**23.21**	**23.47**	**23.88**	**24.21**	**24.57**	**24.95**	**25.31**	**25.66**	**27.47**	**-2.2**	**1.4**	**1.4**
Delivered Price by Sector															
Residential/Commercial	53.80	50.43	45.25	44.29	48.50	49.37	50.15	50.95	51.82	52.67	53.48	57.53	-1.7	1.5	1.9
Industrial	39.31	36.91	35.42	34.61	36.03	36.71	37.34	37.98	38.69	39.37	40.01	43.42	-1.4	1.7	1.6
Coking Plants	57.38	52.34	48.75	48.13	49.79	50.25	50.98	51.74	52.57	53.37	54.05	57.49	-2.6	1.4	1.3
Electric Utilities	36.49	34.29	31.63	31.99	32.37	32.74	33.34	33.97	34.66	35.31	36.01	39.62	-2.1	1.9	1.7
Average to All Sectors [7]	**37.97**	**35.51**	**32.84**	**33.08**	**33.59**	**33.97**	**34.55**	**35.16**	**35.83**	**36.46**	**37.13**	**40.61**	**-2.2**	**1.8**	**1.6**

[1] Includes anthracite, bituminous coal, and lignite.
[2] Excludes small quantities of anthracite shipped overseas to U.S. Armed Forces.
[3] From all stocks held by industrial plants, coke plants, electric utilities, and producers/distributors. A negative (-) result represents an increase to inventories. A positive result represents a withdrawal from inventories.
[4] Represents the sum of production, net imports, and net storage withdrawals.
[5] Represents the difference between total supply and total consumption.
[6] Free on board (F.O.B.) mines.
[7] Weighted average prices. The weights used are consumption values by sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Price and Expenditure Report 1985*, DOE/EIA-0376(85); *Quarterly Coal Report*, DOE/EIA-0121(87/2Q); values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88

Table A11. National Macroeconomic Indicators

Macroeconomic Indicators	Base Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
World Oil Price [1]															
1987 dollars per barrel	28.52	14.40	18.11	16.80	17.61	17.81	17.91	17.90	18.77	20.37	22.40	30.76	-9.0	5.6	4.2
Nominal dollars per barrel	26.99	13.98	18.11	17.30	18.91	19.93	20.90	21.77	24.00	27.49	32.02	57.72	-5.9	11.2	9.3
1982 dollars per barrel	24.27	12.25	15.42	14.29	14.99	15.15	15.24	15.23	15.98	17.34	19.06	26.18	-9.0	5.6	4.2
Economic Variables															
Real GNP (billion 1982 dollars)	3,607	3,713	3,815	3,885	3,990	4,098	4,211	4,332	4,438	4,524	4,593	5,090	2.6	2.2	2.2
Real Disposable Income (billion 1982 dollars)	2,542	2,645	2,671	2,726	2,786	2,848	2,911	2,976	3,039	3,090	3,134	3,419	2.3	1.8	1.9
Real Disposable Income per Capita (thousand 1982 dollars)	10.6	11.0	11.0	11.1	11.2	11.4	11.5	11.7	11.9	12.0	12.1	12.7	1.4	1.1	1.2
GNP Implicit Price Deflator (1982=1.00)	1.112	1.141	1.175	1.210	1.262	1.315	1.371	1.429	1.502	1.586	1.680	2.205	3.4	5.3	5.0
Unemployment Rate (percent)	7.2	7.0	6.2	6.0	5.8	5.5	5.3	5.1	5.1	5.4	5.7	6.2			
Population, Noninstitutional (million persons)	239.0	241.3	243.5	245.6	247.8	250.0	252.1	254.2	256.2	258.1	259.9	268.4	.9	.7	.8
New AA Bond Rate (percent per annum)	11.79	8.94	9.49	9.31	9.43	9.55	9.66	9.76	9.88	9.99	10.08	9.74			
Energy Usage Indicators															
Gross Energy Use (quadrillion Btu)	74.0	74.2	76.2	77.2	78.8	79.9	81.0	82.2	83.3	84.2	85.0	89.6	1.6	1.1	1.3
Gross Energy Use per Capita (million Btu per person)	309.7	307.7	312.9	314.2	317.8	319.8	321.4	323.2	325.1	326.3	326.9	333.7	.6	.4	.5
Gross Energy Use per Dollar of GNP (thousand Btu per 1982 dollar)	20.5	20.0	20.0	19.9	19.7	19.5	19.2	19.0	18.8	18.6	18.5	17.6	-1.0	-1.0	-1.0
Energy/GNP Rate of Change (percent)															
1985-1990	-1.0														
1985-1995	-1.0														
1985-2000	-1.0														
1990-1995	-1.1														
1995-2000	-1.0														
1987-2000	-1.0														

[1] Represents the cost of imported crude oil to U.S. refiners.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Data Resources, Inc. USMODEL database (January 1988); Enery Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 304; File Creation Date 03/01/88; Report Date 03/01/88

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)

Supply and Disposition	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Production															
Crude Oil	19.0	18.4	17.6	16.9	16.7	15.7	15.0	14.3	13.7	13.2	12.8	11.6	-3.7	-2.9	-3.1
Natural Gas Plant Liquids	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	-.8	.8	.4
Natural Gas [1]	16.9	16.5	16.6	16.6	16.5	16.6	16.6	16.8	17.0	17.1	17.3	18.1	-.4	.9	.7
Coal	19.3	19.5	20.1	20.1	20.4	21.2	21.6	22.0	22.5	23.0	23.6	25.9	1.8	2.0	2.0
Nuclear Power	4.1	4.5	4.9	5.3	5.5	5.9	6.1	6.1	6.2	6.2	6.3	6.4	7.2	.9	2.1
Hydropower/Other [2]	3.2	3.3	2.9	3.1	3.3	3.3	3.3	3.3	3.3	3.4	3.4	3.4	.9	.4	1.4
Total Production	**64.8**	**64.2**	**64.3**	**64.2**	**64.5**	**64.7**	**64.7**	**64.7**	**64.9**	**65.1**	**65.5**	**67.9**	**.0**	**.5**	**.4**
Imports															
Crude Oil [3]	6.8	8.8	9.9	11.0	13.4	14.7	16.0	17.1	17.9	18.3	18.8	21.0	16.8	3.6	6.0
Petroleum Products	4.0	4.3	4.0	4.2	4.5	4.6	4.7	4.8	4.9	5.0	5.0	5.2	3.1	1.3	2.1
Natural Gas [4]	.9	.7	.9	.9	1.1	1.2	1.3	1.4	1.5	1.7	1.8	2.6	5.4	7.9	8.7
Other Imports [5]	.5	.4	.5	.4	.5	.6	.6	.6	.6	.6	.6	.8	4.9	3.7	3.6
Total Imports	**12.1**	**14.3**	**15.3**	**16.5**	**19.5**	**21.1**	**22.7**	**23.9**	**24.9**	**25.6**	**26.2**	**29.7**	**11.7**	**3.5**	**5.2**
Exports															
Coal	2.4	2.2	2.0	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4	-3.3	1.4	1.2
Petroleum	1.7	1.7	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	-.8	.0	.0
Total Exports	**4.1**	**3.9**	**3.6**	**3.5**	**3.6**	**3.7**	**3.7**	**3.8**	**3.8**	**3.9**	**4.0**	**4.0**	**-2.2**	**.8**	**.7**
Adjustments [6]	**1.2**	**-.3**	**.3**	**.4**	**-.6**	**-.6**	**-.6**	**-.5**	**-.5**	**-.5**	**-.5**	**-.7**			
Consumption															
Petroleum Products [7]	30.9	32.2	32.6	33.5	34.9	35.5	36.2	36.7	37.1	37.1	37.2	38.7	2.8	.9	1.3
Natural Gas	17.9	16.7	17.4	17.4	17.4	17.5	17.7	17.9	18.2	18.5	18.8	20.4	-.4	1.5	1.3
Coal	17.5	17.3	18.0	18.0	18.3	18.9	19.3	19.7	20.1	20.5	21.0	23.2	1.5	2.1	2.0
Nuclear Power	4.1	4.5	4.9	5.3	5.5	5.9	6.1	6.1	6.2	6.2	6.3	6.4	7.2	.9	2.1
Hydropower/Other [8]	3.6	3.6	3.3	3.5	3.7	3.8	3.8	3.8	3.9	3.9	3.9	4.1	1.3	.7	1.6
Total Consumption	**74.0**	**74.2**	**76.2**	**77.7**	**79.9**	**81.6**	**83.1**	**84.3**	**85.5**	**86.3**	**87.2**	**92.8**	**2.0**	**1.3**	**1.5**
Net Imports - Petroleum	**9.0**	**11.5**	**12.3**	**13.7**	**16.3**	**17.7**	**19.2**	**20.3**	**21.2**	**21.7**	**22.2**	**24.7**	**14.3**	**3.4**	**5.5**
World Oil Price [9] (1987 dollars per barrel)	**28.52**	**14.40**	**18.11**	**13.61**	**13.84**	**14.07**	**14.28**	**14.51**	**15.02**	**16.40**	**18.25**	**24.93**	**-13.2**	**5.9**	**2.5**
Real GNP (billion 1982 dollars)	**3,607**	**3,713**	**3,815**	**3,892**	**4,012**	**4,149**	**4,288**	**4,421**	**4,529**	**4,604**	**4,685**	**5,254**	**2.8**	**2.4**	**2.5**

[1] Dry natural gas.
[2] Includes hydropower, geothermal power, wood, and waste.
[3] Includes imports of crude oil for the Strategic Petroleum Reserve.
[4] Represents net imports.
[5] Includes coal, net coal coke imports, and net electricity imports.
[6] Balancing item. Includes stock changes, unaccounted for supply, losses, and gains.
[7] Includes natural gas plant liquids and crude oil consumed as fuels.
[8] Includes industrial generation of hydroelectric power, net electricity imports, and electricity produced from geothermal, wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems. Also includes net coal coke imports.
[9] Represents the cost of imported crude oil to U.S. refiners.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecast: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

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

Sector and Fuel	Low World Oil Price - High Growth Case												Annual Percent Change		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Residential															
Distillate [1]	1.11	1.12	1.07	1.17	1.14	1.12	1.09	1.07	1.05	1.03	1.01	0.91	0.0	-2.0	-1.2
Liquefied Petroleum Gas	.42	.40	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.7	.0	.0
Natural Gas	4.57	4.44	4.56	4.60	4.65	4.66	4.68	4.68	4.68	4.68	4.66	4.55	.4	-.2	.0
Coal	.07	.07	.07	.07	.07	.07	.06	.06	.06	.06	.06	.05	-1.3	-1.8	-1.9
Electricity	2.70	2.79	2.95	3.03	3.11	3.18	3.26	3.33	3.41	3.48	3.54	3.82	3.4	1.8	2.0
Total	**8.88**	**8.82**	**9.09**	**9.32**	**9.39**	**9.46**	**9.53**	**9.59**	**9.64**	**9.69**	**9.70**	**9.78**	**1.3**	**.3**	**.6**
Commercial															
Distillate [1]	.67	.68	.65	.71	.72	.73	.74	.75	.76	.76	.77	.79	1.5	.9	1.5
Motor Gasoline	.10	.10	.10	.10	.11	.11	.11	.11	.12	.12	.12	.13	2.5	1.8	2.0
Residual Fuel	.19	.21	.18	.20	.22	.23	.24	.24	.24	.23	.22	.15	3.8	-4.2	-1.5
Natural Gas	2.51	2.39	2.40	2.39	2.43	2.47	2.51	2.54	2.57	2.61	2.63	2.73	-.3	1.0	1.0
Other Commercial [2]	.18	.18	.19	.18	.18	.18	.18	.18	.18	.18	.18	.18	-.2	-.2	-.3
Electricity	2.36	2.46	2.58	2.60	2.67	2.74	2.81	2.89	2.96	3.03	3.11	3.44	3.1	2.3	2.2
Total	**6.01**	**6.01**	**6.10**	**6.19**	**6.32**	**6.46**	**6.59**	**6.71**	**6.83**	**6.93**	**7.02**	**7.42**	**1.5**	**1.4**	**1.5**
Industrial															
Distillate [1]	1.26	1.26	1.29	1.32	1.36	1.40	1.43	1.46	1.47	1.49	1.51	1.64	2.2	1.6	1.8
Liquefied Petroleum Gas	1.55	1.49	1.62	1.61	1.67	1.73	1.77	1.80	1.83	1.85	1.89	2.08	2.1	1.9	1.9
Motor Gasoline	.22	.22	.23	.23	.24	.25	.26	.26	.26	.26	.27	.29	2.7	1.4	1.8
Petrochemical Feedstocks	.82	.95	.93	.97	1.01	1.05	1.07	1.10	1.12	1.13	1.15	1.28	5.1	2.1	2.5
Residual Fuel	.75	.81	.72	.80	.83	.88	.92	.95	.98	.96	.94	.89	3.2	.1	1.7
Natural Gas	7.11	6.69	6.90	7.10	7.44	7.68	7.84	7.92	7.99	8.01	8.09	8.06	1.6	.5	1.2
Metallurgical Coal	1.10	.97	.98	1.01	1.03	1.05	1.05	1.04	1.03	1.01	1.00	.96	-1.0	-.9	-.2
Steam Coal	1.66	1.68	1.65	1.61	1.67	1.72	1.75	1.77	1.78	1.80	1.82	1.97	.7	1.4	1.4
Other Industrial [3]	3.09	3.16	3.37	3.42	3.65	3.71	3.78	3.85	3.88	3.85	3.80	3.81	3.7	.3	.9
Hydropower	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.1	.3	.3
Electricity	2.81	2.76	2.85	2.87	2.98	3.10	3.20	3.29	3.40	3.51	3.65	4.47	1.9	3.7	3.5
Total	**20.40**	**20.01**	**20.58**	**20.99**	**21.91**	**22.58**	**23.11**	**23.46**	**23.77**	**23.89**	**24.15**	**25.48**	**2.1**	**1.2**	**1.7**
Transportation															
Distillate [1]	3.20	3.26	3.43	3.43	3.58	3.74	3.87	3.97	4.05	4.13	4.24	4.64	3.2	2.2	2.3
Jet Fuel	2.50	2.68	2.79	2.94	3.04	3.10	3.17	3.24	3.27	3.25	3.24	3.39	4.4	.9	1.5
Motor Gasoline	12.78	13.16	13.39	13.78	13.78	13.76	13.78	13.77	13.72	13.55	13.40	13.35	1.5	-.3	.0
Residual Fuel	.82	.88	.84	.80	.82	.85	.87	.89	.91	.93	.94	1.04	.8	2.1	1.7
Natural Gas	.52	.50	.51	.52	.52	.53	.53	.54	.55	.56	.56	.61	.2	1.5	1.4
Other Transportation [4]	.27	.27	.29	.30	.30	.31	.32	.33	.33	.34	.34	.37	2.9	1.7	1.8
Total	**20.09**	**20.76**	**21.25**	**21.78**	**22.05**	**22.29**	**22.54**	**22.73**	**22.84**	**22.76**	**22.73**	**23.40**	**2.1**	**.5**	**.7**
Electric Utilities															
Distillate	.09	.08	.09	.09	.04	.04	.05	.07	.10	.11	.09	.17	-12.4	14.5	4.9
Residual Fuel	1.01	1.37	1.14	1.09	1.84	1.94	2.19	2.37	2.53	2.63	2.78	3.22	14.1	5.2	8.3
Natural Gas	3.16	2.69	2.99	2.80	2.40	2.20	2.12	2.24	2.42	2.68	2.87	4.46	-7.0	7.3	3.1
Steam Coal	14.58	14.44	15.15	15.18	15.43	15.95	16.36	16.70	17.10	17.54	18.01	20.15	1.8	2.4	2.2
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Hydropower/Other [5]	3.54	3.61	3.30	3.46	3.72	3.78	3.80	3.81	3.83	3.89	3.91	4.07	1.3	.7	1.6
Total	**26.52**	**26.67**	**27.56**	**27.90**	**28.95**	**29.79**	**30.58**	**31.35**	**32.18**	**33.04**	**33.94**	**38.48**	**2.4**	**2.6**	**2.6**
Primary Energy Consumption															
Distillate [1]	6.33	6.40	6.54	6.73	6.83	7.03	7.19	7.32	7.43	7.52	7.62	8.15	2.1	1.5	1.7
Jet Fuel	2.50	2.68	2.79	2.94	3.04	3.10	3.17	3.24	3.27	3.25	3.24	3.39	4.4	.9	1.5
Liquefied Petroleum Gas	2.10	2.01	2.19	2.18	2.24	2.30	2.34	2.38	2.41	2.43	2.46	2.66	1.8	1.5	1.5
Motor Gasoline	13.10	13.49	13.72	14.12	14.12	14.12	14.15	14.15	14.10	13.93	13.79	13.77	1.5	-.3	.0
Petrochemical Feedstocks	.82	.95	.93	.97	1.01	1.05	1.07	1.10	1.12	1.13	1.15	1.28	5.1	2.1	2.5
Residual Fuel	2.77	3.26	2.88	2.90	3.71	3.90	4.22	4.46	4.66	4.75	4.88	5.30	7.1	3.1	4.8
Natural Gas	17.87	16.70	17.36	17.41	17.44	17.54	17.68	17.93	18.21	18.53	18.81	20.42	-.4	1.5	1.3
Metallurgical Coal	1.10	.97	.98	1.01	1.03	1.05	1.05	1.04	1.03	1.01	1.00	.96	-1.0	-.9	-.2
Steam Coal	16.42	16.30	16.98	16.96	17.27	17.85	18.29	18.64	19.05	19.50	20.00	22.28	1.7	2.2	2.1
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Net Coal Coke Imports	-.01	-.02	.00	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-5.0	1.8	11.9
Hydropower/Misc [6]	6.87	7.01	6.93	7.14	7.65	7.76	7.87	7.95	8.01	8.03	8.01	8.19	2.5	.5	1.3
Total Consumption	**74.02**	**74.25**	**76.19**	**77.65**	**79.86**	**81.56**	**83.08**	**84.32**	**85.49**	**86.27**	**87.23**	**92.81**	**2.0**	**1.3**	**1.5**
Electricity (all sectors)	**7.88**	**8.02**	**8.39**	**8.52**	**8.76**	**9.03**	**9.28**	**9.52**	**9.78**	**10.04**	**10.31**	**11.75**	**2.8**	**2.7**	**2.6**
Industrial Electricity															
Gross Consumption	3.05	3.08	3.30	3.36	3.48	3.62	3.74	3.85	3.98	4.09	4.25	5.08	3.5	3.5	3.4
Self Generation - Own Use	.23	.32	.45	.49	.50	.52	.54	.56	.58	.58	.59	.62	17.5	1.7	2.4
Purchased Electricity	2.81	2.76	2.85	2.87	2.98	3.10	3.20	3.29	3.40	3.51	3.65	4.47	1.9	3.7	3.5

[1] Includes kerosene.
[2] Includes liquefied petroleum gas and coal.
[3] Includes still gas, lubricants, waxes, asphalt, special naphthas, petroleum coke, and net coal coke imports.
[4] Includes electricity, liquefied petroleum gas, lubricants, and waxes.
[5] Includes hydropower and electricity that is produced by renewable sources such as geothermal power, wood, waste, solar power, and wind power. Also includes net electricity imports.
[6] Includes hydropower and electricity that is produced by renewable sources such as geothermal power, wood, waste, solar power, and wind power. Also includes net electricity imports and minor petroleum products.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Data Report 1960-1985*, DOE/EIA-0214(85); values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

Table B3. Price of Energy by Source and End-Use Sector
(1987 Dollars per Million Btu)

Sector and Fuel	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Residential	**12.07**	**11.30**	**11.41**	**11.07**	**11.23**	**11.31**	**11.43**	**11.54**	**11.66**	**11.81**	**12.05**	**13.35**	**-1.3**	**1.7**	**1.2**
Primary Energy	6.80	6.13	6.08	5.89	6.03	6.13	6.23	6.36	6.51	6.65	6.86	7.98	-2.1	2.7	2.1
Petroleum Products	8.53	7.16	8.18	7.28	7.86	8.05	8.27	8.43	8.61	8.86	9.25	10.95	-1.1	3.1	2.3
Distillate Fuel	8.18	6.36	7.08	6.48	6.97	7.14	7.36	7.54	7.71	7.92	8.25	9.75	-2.7	3.2	2.5
Liquefied Petroleum Gas	9.44	9.38	10.87	9.44	10.18	10.36	10.52	10.63	10.77	11.08	11.57	13.46	1.9	2.6	1.7
Natural Gas	6.27	5.82	5.44	5.45	5.46	5.53	5.62	5.74	5.88	6.01	6.17	7.15	-2.5	2.6	2.1
Steam Coal	3.22	2.90	2.72	2.72	2.77	2.84	2.90	2.96	3.02	3.07	3.13	3.44	-2.5	1.9	1.8
Electricity	24.13	22.36	22.49	21.79	21.75	21.54	21.43	21.26	21.09	21.02	21.07	21.73	-2.2	.1	-.3
Commercial	**12.56**	**11.59**	**11.76**	**11.27**	**11.37**	**11.34**	**11.38**	**11.40**	**11.45**	**11.55**	**11.74**	**12.89**	**-2.0**	**1.3**	**.7**
Primary Energy	5.75	4.75	4.66	4.45	4.56	4.62	4.69	4.78	4.89	5.01	5.20	6.16	-4.3	2.9	2.2
Petroleum Products	6.45	4.29	5.10	4.35	4.71	4.83	4.98	5.11	5.27	5.51	5.88	7.53	-5.6	4.5	3.0
Distillate Fuel	6.53	4.20	4.91	4.31	4.79	4.96	5.18	5.35	5.52	5.72	6.05	7.53	-5.3	4.3	3.3
Residual Fuel	4.43	2.38	2.93	2.19	2.33	2.35	2.39	2.42	2.49	2.68	2.94	3.84	-11.9	5.0	2.1
Other Petroleum [1]	8.39	6.99	8.02	6.93	7.24	7.36	7.46	7.56	7.70	8.05	8.50	10.21	-2.6	3.3	1.9
Natural Gas	5.63	5.10	4.61	4.62	4.62	4.65	4.68	4.75	4.85	4.92	5.03	5.75	-3.8	2.1	1.7
Steam Coal	1.83	1.67	1.56	1.57	1.59	1.63	1.67	1.70	1.74	1.77	1.80	1.98	-2.3	2.0	1.8
Electricity	23.13	21.52	21.45	20.70	20.69	20.46	20.36	20.19	20.02	19.96	20.00	20.67	-2.4	.1	-.3
Industrial	**6.41**	**4.74**	**4.89**	**4.40**	**4.45**	**4.49**	**4.53**	**4.59**	**4.68**	**4.86**	**5.10**	**6.27**	**-6.9**	**3.4**	**1.9**
Primary Energy	4.88	3.20	3.35	2.92	2.99	3.05	3.11	3.18	3.28	3.45	3.68	4.69	-9.0	4.4	2.6
Petroleum Products	6.62	3.68	4.53	3.56	3.70	3.76	3.80	3.82	3.90	4.16	4.52	5.80	-10.7	4.4	1.9
Distillate Fuel	6.39	4.06	4.78	4.18	4.66	4.83	5.05	5.22	5.39	5.59	5.92	7.41	-5.4	4.4	3.4
Liquefied Petroleum Gas	6.62	6.54	8.02	6.59	7.34	7.52	7.68	7.79	7.93	8.24	8.73	10.62	2.6	3.5	2.2
Motor Gasoline	9.61	7.13	7.81	6.99	6.98	7.06	7.14	7.23	7.39	7.76	8.20	9.83	-6.0	3.4	1.8
Residual Fuel	4.52	2.42	2.98	2.24	2.39	2.41	2.46	2.49	2.56	2.74	3.01	3.91	-11.8	4.9	2.1
Other Petroleum [2]	6.94	2.59	3.22	2.33	2.19	2.17	2.10	2.05	2.07	2.30	2.59	3.43	-20.8	4.7	.5
Natural Gas	4.08	3.14	2.57	2.58	2.59	2.66	2.74	2.86	3.00	3.13	3.28	4.25	-8.2	4.8	3.9
Metallurgical Coal	2.14	1.95	1.81	1.82	1.84	1.87	1.90	1.93	1.96	1.99	2.02	2.17	-2.7	1.5	1.4
Steam Coal	1.79	1.66	1.58	1.58	1.60	1.64	1.68	1.71	1.74	1.77	1.80	1.97	-1.7	1.9	1.7
Hydroelectric Power	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	.0	.0	.0
Electricity	15.98	14.79	14.44	13.75	13.71	13.51	13.41	13.25	13.09	13.03	13.06	13.71	-3.3	.2	-.4
Transportation	**8.66**	**6.27**	**6.95**	**6.18**	**6.26**	**6.34**	**6.42**	**6.51**	**6.66**	**6.96**	**7.35**	**8.83**	**-6.1**	**3.4**	**1.9**
Primary Energy	8.65	6.26	6.95	6.17	6.25	6.33	6.42	6.51	6.65	6.96	7.35	8.82	-6.1	3.4	1.9
Petroleum Products	8.65	6.26	6.95	6.17	6.25	6.33	6.42	6.51	6.65	6.96	7.35	8.82	-6.1	3.4	1.9
Distillate Fuel	7.41	4.85	5.57	4.97	5.45	5.62	5.84	6.01	6.18	6.38	6.71	8.20	-5.4	3.8	3.0
Jet Fuel	6.24	3.99	4.66	3.90	4.01	4.08	4.16	4.24	4.36	4.62	4.97	6.29	-8.1	4.4	2.3
Motor Gasoline	9.54	7.09	7.77	6.94	6.93	7.02	7.09	7.18	7.35	7.71	8.16	9.79	-6.0	3.4	1.8
Residual Fuel	4.66	2.40	2.96	2.22	2.38	2.40	2.44	2.48	2.55	2.73	3.00	3.90	-12.4	5.0	2.1
Other Petroleum [3]	16.03	18.50	19.18	18.22	18.11	18.06	17.98	17.92	17.93	18.16	18.46	19.28	2.4	.7	.0
Electricity	20.97	20.04	19.32	17.75	18.22	17.80	17.69	17.46	17.25	17.13	17.19	18.16	-3.2	.2	-.5
Total Energy															
Primary Energy - Four Sectors	6.77	5.01	5.34	4.81	4.88	4.94	5.00	5.08	5.20	5.42	5.71	6.91	-6.1	3.4	2.0
Electricity	20.91	19.38	19.43	18.74	18.69	18.46	18.34	18.16	17.98	17.90	17.90	18.36	-2.5	-.1	-.4
Electric Utilities															
Fossil Fuel Average	**2.22**	**1.80**	**1.71**	**1.63**	**1.71**	**1.73**	**1.78**	**1.83**	**1.89**	**1.96**	**2.06**	**2.54**	**-4.8**	**3.9**	**3.1**
Petroleum Products	4.59	2.55	3.10	2.31	2.52	2.55	2.60	2.65	2.75	2.95	3.18	4.18	-11.1	5.1	2.3
Distillate Fuel	6.22	4.05	4.86	4.28	4.76	4.92	5.10	5.24	5.38	5.59	5.96	7.46	-4.6	4.2	3.3
Residual Fuel	4.46	2.46	2.96	2.15	2.47	2.49	2.53	2.57	2.65	2.84	3.09	4.00	-11.0	4.9	2.4
Natural Gas	3.62	2.42	2.22	2.10	2.26	2.36	2.48	2.55	2.65	2.84	3.09	4.16	-8.2	5.8	4.9
Steam Coal	1.74	1.63	1.52	1.49	1.52	1.55	1.58	1.62	1.65	1.68	1.71	1.90	-2.3	2.1	1.7
Hydroelectric Power	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.0	.0	.0
Nuclear Power	.74	.77	.77	.75	.73	.71	.68	.65	.63	.61	.60	.55	-1.1	-2.4	-2.5
Average Price to All Users															
Petroleum Products	7.92	5.44	6.20	5.38	5.43	5.49	5.54	5.60	5.70	5.97	6.33	7.67	-7.1	3.4	1.7
Distillate Fuel	7.23	4.88	5.59	5.00	5.47	5.63	5.84	6.00	6.16	6.36	6.68	8.13	-4.9	3.7	2.9
Jet Fuel	6.24	3.99	4.66	3.90	4.01	4.08	4.16	4.24	4.36	4.62	4.97	6.29	-8.1	4.4	2.3
Liquefied Petroleum Gas	7.21	7.13	8.62	7.18	7.91	8.08	8.23	8.33	8.46	8.77	9.25	11.11	2.3	3.2	2.0
Motor Gasoline	9.54	7.09	7.77	6.94	6.94	7.02	7.09	7.18	7.35	7.72	8.16	9.79	-6.0	3.4	1.8
Residual Fuel	4.53	2.43	2.96	2.20	2.43	2.44	2.49	2.53	2.60	2.79	3.05	3.96	-11.6	4.9	2.3
Other Petroleum Products	7.50	3.50	4.15	3.25	3.07	3.05	2.98	2.93	2.96	3.20	3.50	4.37	-16.5	3.7	.4
Natural Gas	4.80	4.04	3.57	3.57	3.62	3.70	3.78	3.87	3.99	4.09	4.24	5.10	-5.1	3.3	2.8
Coal [4]	1.78	1.66	1.53	1.52	1.55	1.58	1.61	1.65	1.68	1.70	1.74	1.92	-2.4	2.0	1.8
Electricity	20.91	19.38	19.43	18.74	18.69	18.46	18.34	18.16	17.98	17.90	17.90	18.36	-2.5	-.1	-.4

[1] Includes liquefied petroleum gas and motor gasoline.
[2] Includes petrochemical feedstocks, still gas, lubricants, waxes, asphalt, special naphthas, and petroleum coke.
[3] Includes liquefied petroleum gas, lubricants, and waxes.
[4] Includes steam coal and metallurgical coal.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Price and Expenditure Report 1985*, DOE/EIA-0376(85); values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

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

Fuel Consumption and Sales	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Fuel Inputs															
Oil															
Distillate	0.09	0.08	0.09	0.09	0.04	0.04	0.05	0.07	0.10	0.11	0.09	0.17	-12.4	14.5	4.9
Residual	1.01	1.37	1.14	1.09	1.84	1.94	2.19	2.37	2.53	2.63	2.78	3.22	14.1	5.2	8.3
Natural Gas	3.16	2.69	2.99	2.80	2.40	2.20	2.12	2.24	2.42	2.68	2.87	4.46	-7.0	7.3	3.1
Steam Coal	14.58	14.44	15.15	15.18	15.43	15.95	16.36	16.70	17.10	17.54	18.01	20.15	1.8	2.4	2.2
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Hydropower/Other [1]	3.12	3.24	2.82	3.07	3.24	3.26	3.28	3.29	3.30	3.35	3.36	3.38	.9	.4	1.4
Total Fuel Inputs	**26.10**	**26.30**	**27.08**	**27.51**	**28.46**	**29.27**	**30.06**	**30.82**	**31.66**	**32.50**	**33.39**	**37.79**	**2.3**	**2.6**	**2.6**
Net Imports (fuel input equiv.)	.42	.37	.48	.39	.49	.52	.52	.52	.53	.53	.55	.69	4.2	2.8	2.8
Total Electricity Inputs	**26.52**	**26.67**	**27.56**	**27.90**	**28.95**	**29.79**	**30.58**	**31.35**	**32.18**	**33.04**	**33.94**	**38.48**	**2.4**	**2.6**	**2.6**
Disposition															
Total Electricity Inputs	26.52	26.67	27.56	27.90	28.95	29.79	30.58	31.35	32.18	33.04	33.94	38.48	2.4	2.6	2.6
Minus Conversion Losses	18.09	18.18	18.80	19.03	19.75	20.33	20.88	21.40	21.98	22.57	23.19	26.28	2.4	2.6	2.6
Generation	**8.43**	**8.49**	**8.76**	**8.87**	**9.20**	**9.46**	**9.71**	**9.95**	**10.21**	**10.47**	**10.75**	**12.19**	**2.3**	**2.6**	**2.6**
Plus PURPA Purchases [2]	.07	.09	.10	.12	.14	.16	.18	.20	.22	.23	.25	.31	18.6	6.8	8.8
Plus Net Imports (electricity equiv.)	.14	.12	.16	.13	.16	.17	.17	.17	.17	.18	.18	.23	4.2	2.8	2.8
Minus Trans. & Dist. Losses [3]	.75	.67	.63	.60	.74	.76	.78	.80	.82	.84	.87	.99	.1	2.7	3.5
Electricity Sales	**7.88**	**8.02**	**8.39**	**8.52**	**8.76**	**9.03**	**9.28**	**9.52**	**9.78**	**10.04**	**10.31**	**11.75**	**2.8**	**2.7**	**2.6**
Electricity Sales by End-Use Sector [4]															
Residential	2.70	2.79	2.95	3.03	3.11	3.18	3.26	3.33	3.41	3.48	3.54	3.82	3.4	1.8	2.0
Commercial/Other [5]	2.37	2.47	2.59	2.61	2.68	2.75	2.83	2.90	2.98	3.05	3.12	3.46	3.1	2.3	2.2
Industrial	2.81	2.76	2.85	2.87	2.98	3.10	3.20	3.29	3.40	3.51	3.65	4.47	1.9	3.7	3.5
Total Electricity Sales	**7.88**	**8.02**	**8.39**	**8.52**	**8.76**	**9.03**	**9.28**	**9.52**	**9.78**	**10.04**	**10.31**	**11.75**	**2.8**	**2.7**	**2.6**

[1] Includes renewable electric utility energy sources such as hydropower, geothermal power, wood, waste, solar power, and wind power.
[2] Electric utility purchases under the Public Utility Regulatory Policies Act of 1978 (PURPA).
[3] Transmission and distribution losses for 1987 and 1988 are based on the January 1988 *Short-Term Energy Outlook*, which does not explicitly account for PURPA purchases in its balance. For 1989 and later years, losses explicitly exclude estimated PURPA purchases.
[4] Sales data for 1985 correspond to the *Monthly Energy Review* old series. New series values for 1985 are: Residential - 2.71, Commercial/Other - 2.38, Industrial - 2.85, and Total - 7.94 quadrillion Btu.
[5] Includes street lighting and sales to the transportation sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Data Report 1960-1985*, DOE/EIA-0214(85); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Forecast Run 305; File Creation Date 03/01/88; Report Date 03/01/88

Table B5. Electric Utility Summer Capability and Generation
(Capability in Million Kilowatts)
(Generation in Billion Kilowatthours)

Fuel Consumption and Sales	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Net Capability [1]															
Coal Steam	285.6	290.5	292.4	294.2	296.3	295.2	298.5	300.2	300.9	301.7	303.4	324.0	0.7	0.9	0.8
Other Fossil Steam	147.9	147.0	146.6	146.0	145.7	142.4	141.3	140.1	137.2	135.1	133.1	127.0	-.8	-1.1	-1.1
Combined Cycle	4.7	4.7	4.7	4.7	4.7	5.1	5.1	5.1	5.2	5.3	5.4	38.7	1.6	22.5	17.6
Turbine/Diesel	44.5	44.1	44.2	44.7	44.9	45.2	45.0	45.6	47.3	49.0	51.1	63.8	.3	3.5	2.9
Nuclear Power	79.5	85.3	93.7	96.1	100.5	103.9	105.1	105.1	105.1	104.2	105.5	106.5	5.5	.2	1.0
Hydropower/Other [2]	93.1	93.2	93.7	94.3	94.7	95.4	96.7	97.0	97.2	98.5	98.6	98.9	.5	.4	.4
Total Capability	**655.3**	**664.9**	**675.3**	**680.1**	**686.9**	**687.1**	**691.7**	**693.0**	**692.8**	**693.8**	**697.1**	**758.9**	**1.0**	**1.0**	**.9**
Generation by Plant Type															
Coal Steam	1,402	1,386	1,463	1,456	1,486	1,537	1,576	1,609	1,647	1,690	1,735	1,943	1.9	2.4	2.2
Other Fossil Steam	369	363	369	346	376	365	377	399	424	446	469	518	-.2	3.6	2.6
Combined Cycle	15	14	16	15	14	15	15	15	15	16	16	126	.0	23.5	17.4
Turbine/Diesel	9	8	8	8	6	7	11	17	23	31	36	80	-3.9	27.4	18.9
Nuclear Power	384	414	452	489	511	543	560	568	574	573	581	593	7.2	.9	2.1
Hydropower/Other [2]	292	302	261	285	302	305	306	307	308	313	314	315	.9	.3	1.5
Total Generation	**2,470**	**2,487**	**2,568**	**2,598**	**2,695**	**2,772**	**2,846**	**2,915**	**2,992**	**3,069**	**3,151**	**3,574**	**2.3**	**2.6**	**2.6**
Generation by Fuel Type															
Coal	1,402	1,386	1,463	1,456	1,486	1,537	1,576	1,609	1,647	1,690	1,735	1,943	1.9	2.4	2.2
Natural Gas	292	249	276	258	223	205	196	206	221	242	258	414	-6.9	7.3	3.1
Oil	100	137	116	111	173	183	207	225	241	251	263	309	12.8	5.4	7.8
Nuclear Power	384	414	452	489	511	543	560	568	574	573	581	593	7.2	.9	2.1
Hydropower/Other [3]	292	302	261	285	302	305	306	307	308	313	314	315	.9	.3	1.5
Total Generation	**2,470**	**2,487**	**2,568**	**2,598**	**2,695**	**2,772**	**2,846**	**2,915**	**2,992**	**3,069**	**3,151**	**3,574**	**2.3**	**2.6**	**2.6**

[1] Net summer capability is the steady hourly output that generating equipment is expected to supply to system load (exclusive of auxiliary power), as demonstrated by tests during summer peak demand.

[2] Includes other renewable sources such as geothermal power, wood, waste, solar power, and wind power.

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

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

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

Additions	Low World Oil Price - High Growth Case												
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996-2000	1986-2000
Total Additions													
Nuclear Power [1]	9,880	5,803	8,422	2,425	4,594	3,442	1,137	0	0	0	1,255	1,223	28,301
Coal Steam	6,468	4,868	2,098	1,851	2,269	588	3,632	2,037	1,343	2,295	3,102	26,175	50,258
Combined Cycle [2]	0	0	0	20	0	423	0	0	63	102	102	33,303	34,013
Turbines [3]	126	211	216	503	166	416	97	731	1,880	1,700	2,189	12,950	21,059
Hydropower/Other	3,488	169	427	642	404	767	1,345	245	225	1,316	105	250	5,895
Total New Capability	**19,962**	**11,051**	**11,163**	**5,441**	**7,433**	**5,636**	**6,211**	**3,013**	**3,511**	**5,413**	**6,753**	**73,901**	**139,526**
Announced/Planned Construction [4]													
Nuclear Power [1]	9,880	5,803	8,422	2,425	4,594	3,442	1,137	0	0	0	1,255	1,223	28,301
Coal Steam	6,468	4,868	2,098	1,851	2,269	588	3,632	2,037	1,343	2,295	3,102	7,708	31,791
Combined Cycle [2]	0	0	0	20	0	423	0	0	63	102	102	204	914
Turbines [3]	126	211	216	503	166	416	57	54	159	159	188	919	3,048
Hydropower/Other	3,488	169	427	642	404	767	1,345	245	225	1,316	105	250	5,895
Total Announced/Planned	**19,962**	**11,051**	**11,163**	**5,441**	**7,433**	**5,636**	**6,171**	**2,336**	**1,790**	**3,872**	**4,752**	**10,304**	**69,949**
Additional Needed Capability [5]													
Nuclear Power [1]	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal Steam	0	0	0	0	0	0	0	0	0	0	0	18,467	18,467
Combined Cycle [2]	0	0	0	0	0	0	0	0	0	0	0	33,099	33,099
Turbines [3]	0	0	0	0	0	0	40	677	1,721	1,541	2,001	12,031	18,011
Total Additional Needed	**0**	**0**	**0**	**0**	**0**	**0**	**40**	**677**	**1,721**	**1,541**	**2,001**	**63,597**	**69,577**

[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 combined cycle capability.
[3] Includes all gas turbine and internal combustion capability.
[4] Includes all new capability announced by the electric utility industry.
[5] Includes additional new capability considered necessary by the Energy Information Administration to meet electricity demands.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

Table B7. Electric Utility Sales, Prices, and Price Components
(Billion Kilowatthours)
(1987 Dollars per Thousand Kilowatthours)

Sales, Prices, and Price Component	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Electricity Sales by End-Use Sector [1]															
Residential	791	818	865	889	910	933	954	977	999	1,019	1,037	1,120	3.4	1.8	2.0
Commercial/Other [2]	694	725	759	765	785	807	828	850	872	894	914	1,013	3.1	2.3	2.2
Industrial	825	808	835	842	872	908	938	963	995	1,029	1,070	1,310	1.9	3.7	3.5
Total Electricity Sales	**2,310**	**2,351**	**2,460**	**2,496**	**2,568**	**2,647**	**2,720**	**2,790**	**2,867**	**2,942**	**3,022**	**3,443**	**2.8**	**2.7**	**2.6**
Prices [3]															
Residential	81.87	76.74	76.74	74.35	74.22	73.50	73.13	72.54	71.96	71.74	71.88	74.13	-2.1	.1	-.3
Commercial/Other [2]	78.45	73.11	73.16	70.57	70.55	69.78	69.42	68.83	68.27	68.04	68.18	70.48	-2.3	.1	-.3
Industrial	54.03	49.09	49.26	46.92	46.77	46.09	45.77	45.22	44.67	44.45	44.57	46.79	-3.1	.2	-.4
All Sectors	**70.90**	**66.11**	**66.31**	**63.94**	**63.77**	**62.97**	**62.57**	**61.98**	**61.36**	**61.07**	**61.09**	**62.65**	**-2.3**	**-.1**	**-.4**
Price Components															
Capital Component [4]	35.52	33.31	34.26	32.95	32.39	31.74	31.10	30.21	29.19	28.26	27.49	25.04	-2.2	-2.3	-2.4
Fuel Component [5]	18.50	15.57	15.06	14.16	14.70	14.78	15.13	15.51	15.98	16.64	17.46	21.71	-4.4	3.9	2.9
O&M Component [6]	16.89	17.24	16.98	16.84	16.68	16.45	16.34	16.25	16.19	16.17	16.14	15.90	-.5	-.3	-.5
Total Price [3]	**70.90**	**66.12**	**66.31**	**63.94**	**63.77**	**62.97**	**62.57**	**61.98**	**61.37**	**61.07**	**61.09**	**62.66**	**-2.3**	**-.1**	**-.4**

[1] Sales data for 1985 correspond to the *Monthly Energy Review* old series. New series values for 1985 are: Residential - 794, Commercial/Other - 697, Industrial - 835, and Total - 2,326 billion kilowatthours.
[2] Includes consumption for street and highway lighting, other public authorities, and railways.
[3] Prices for 1985 to 2000 are estimated from model simulations and represent average revenues per kilowatthour of demand for the total electric utility industry.
[4] Represents the cost to the utility of capital assets needed to promote reliable service. It includes plant depreciation, taxes, and sufficient return on invested capital to cover interest obligations on outstanding debt and to compensate stockholders.
[5] Includes only the direct costs of fuel inputs used to generate electricity required to meet demand.
[6] 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.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Forecast Run 305; File Creation Date 03/01/88; Report Date 03/01/88

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

Supply and Disposition	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
World Oil Price [1] (1987 dollars per barrel)	28.52	14.40	18.11	13.61	13.84	14.07	14.28	14.51	15.02	16.40	18.25	24.93	-13.2	5.9	2.5
Production															
Crude Oil [2]	8.97	8.68	8.31	7.99	7.87	7.41	7.06	6.76	6.49	6.23	6.03	5.50	-3.7	-2.9	-3.1
Alaska	1.83	1.87	1.96	2.07	2.05	1.83	1.71	1.59	1.47	1.32	1.19	.78	.1	-8.2	-6.9
Lower 48	7.15	6.81	6.34	5.92	5.82	5.58	5.36	5.17	5.02	4.91	4.84	4.72	-4.8	-1.7	-2.2
Natural Gas Liquids	1.61	1.55	1.60	1.60	1.55	1.55	1.56	1.57	1.59	1.60	1.62	1.69	-.7	.8	.4
Other Domestic	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	1.0	.0	-.5
Processing Gain [3]	.56	.62	.63	.65	.65	.64	.65	.64	.64	.63	.62	.62	2.9	-.3	-.1
Total Production	11.19	10.90	10.60	10.30	10.13	9.67	9.32	9.03	8.78	8.53	8.33	7.87	-2.9	-2.0	-2.3
Imports (Including SPR [4])															
Crude Oil	3.20	4.18	4.66	5.18	6.32	6.94	7.58	8.08	8.46	8.65	8.87	9.92	16.8	3.6	6.0
Refined Products	1.87	2.05	1.89	2.01	2.12	2.17	2.23	2.29	2.33	2.34	2.36	2.48	3.1	1.3	2.1
Total Imports	5.07	6.22	6.55	7.18	8.44	9.11	9.81	10.36	10.79	10.99	11.24	12.40	12.5	3.1	5.0
Exports															
Crude Oil	.20	.15	.14	.17	.19	.19	.19	.19	.19	.19	.19	.19	-1.2	.0	2.4
Refined Products	.58	.63	.61	.55	.56	.56	.56	.56	.56	.56	.56	.56	-.6	.0	-.6
Total Exports	.78	.78	.75	.72	.75	.75	.75	.75	.75	.75	.75	.75	-.8	.0	.0
Net Imports	4.29	5.44	5.81	6.46	7.69	8.36	9.06	9.61	10.04	10.24	10.49	11.65	14.3	3.4	5.5
Primary Stock Changes [5]															
Net Withdrawals	.22	-.15	-.01	.07	-.15	-.05	-.06	-.05	-.03	.01	.00	-.06			
SPR [4] Fill Rate (-)	-.12	-.05	-.08	-.04	-.05	-.08	-.08	-.08	-.08	-.08	-.08	.00			
Total Primary Supply [6]	15.58	16.14	16.31	16.79	17.62	17.91	18.25	18.52	18.71	18.70	18.74	19.46	2.8	.8	1.4
Refined Petroleum Products															
Motor Gasoline	6.83	7.03	7.16	7.37	7.37	7.36	7.38	7.38	7.36	7.27	7.19	7.18	1.5	-.3	.0
Jet Fuel [7]	1.22	1.31	1.36	1.43	1.48	1.51	1.54	1.58	1.60	1.58	1.58	1.65	4.4	.9	1.5
Distillate Fuel [8]	2.98	3.01	3.08	3.17	3.22	3.31	3.38	3.44	3.50	3.54	3.59	3.84	2.1	1.5	1.7
Residual Fuel	1.20	1.42	1.25	1.26	1.61	1.69	1.83	1.94	2.02	2.06	2.12	2.30	7.1	3.1	4.8
Other Petroleum Products [9]	3.49	3.51	3.67	3.67	3.94	4.03	4.11	4.18	4.24	4.24	4.26	4.48	2.9	1.1	1.5
Total Product Supplied	15.73	16.28	16.52	16.90	17.62	17.91	18.26	18.52	18.71	18.70	18.74	19.46	2.6	.8	1.3
Refined Petroleum Products Supplied by Sector															
Residential/Commercial	1.35	1.34	1.33	1.42	1.41	1.41	1.41	1.41	1.40	1.39	1.38	1.32	.8	-.7	-.1
Industrial	4.01	4.08	4.18	4.23	4.54	4.66	4.78	4.87	4.94	4.94	4.96	5.23	3.1	1.1	1.7
Transportation	9.88	10.22	10.46	10.73	10.86	10.97	11.09	11.18	11.22	11.17	11.14	11.43	2.1	.4	.7
Electric Utilities	.48	.63	.54	.52	.82	.86	.98	1.07	1.15	1.19	1.25	1.48	12.6	5.5	8.1
Total Consumption	15.73	16.28	16.52	16.90	17.62	17.91	18.26	18.52	18.71	18.70	18.74	19.46	2.6	.8	1.3
Discrepancy [10]	-.15	-.14	-.21	-.11	.00	.00	-.01	.00	.00	.00	.00	.00			
Net Disposition [11]	15.58	16.14	16.31	16.79	17.62	17.91	18.25	18.52	18.71	18.70	18.74	19.46	2.8	.8	1.4

[1] Represents the cost of imported crude oil to U.S. refiners.
[2] Includes lease condensate.
[3] Represents volumetric gain in refinery distillation and cracking processes.
[4] SPR is the Strategic Petroleum Reserve.
[5] A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[6] Equals total production plus net imports plus net stock withdrawals minus SPR fill rate.
[7] Includes naphtha and kerosene type.
[8] Includes kerosene.
[9] Includes aviation gasoline, liquefied petroleum gas, petrochemical feedstocks, lubricants, waxes, plant condensate, pentanes plus, asphalt and road oil, still gas, special naphthas, petroleum coke, unfinished oils, and miscellaneous petroleum products.
[10] Represents the difference between total primary supply and total consumption.
[11] Represents the sum of total consumption and discrepancy.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

Table B9. Natural Gas Supply, Disposition, and Prices
(Trillion Cubic Feet)
(1987 Dollars per Thousand Cubic Feet)

Supply, Disposition, and Prices	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Production															
Dry Gas Production	16.38	15.99	16.21	16.10	16.06	16.09	16.14	16.28	16.47	16.59	16.76	17.60	-0.4	0.9	0.6
Supplemental Gas [1]	.13	.11	.15	.14	.14	.14	.14	.14	.14	.14	.14	.14	2.1	.0	-.5
Net Imports	.89	.69	.84	.89	1.07	1.16	1.26	1.36	1.46	1.65	1.75	2.50	5.5	7.9	8.7
Net Storage Withdrawals [2]	.23	-.12	.03	.12	.00	-.01	-.01	-.01	-.02	-.02	-.02	-.02			
Total Supply [3]	**17.63**	**16.67**	**17.23**	**17.25**	**17.27**	**17.39**	**17.53**	**17.76**	**18.05**	**18.36**	**18.63**	**20.23**	**-.3**	**1.5**	**1.2**
Consumption by Sector															
Residential	4.43	4.31	4.43	4.47	4.51	4.53	4.54	4.55	4.54	4.54	4.52	4.42	.5	-.2	.0
Commercial [4]	2.43	2.32	2.33	2.32	2.36	2.40	2.44	2.47	2.50	2.53	2.56	2.65	-.2	1.0	1.0
Industrial	5.90	5.58	5.76	5.88	6.21	6.44	6.60	6.67	6.72	6.73	6.80	6.72	1.8	.4	1.2
Lease & Plant Fuel [5]	.97	.92	.95	1.01	1.01	1.01	1.01	1.02	1.03	1.04	1.05	1.11	.9	.9	1.1
Transportation [6]	.50	.49	.50	.51	.51	.51	.51	.52	.53	.54	.55	.59	.3	1.5	1.4
Electric Utilities	3.04	2.60	2.89	2.72	2.33	2.13	2.06	2.18	2.35	2.60	2.79	4.33	-6.8	7.3	3.2
Total Consumption	**17.28**	**16.22**	**16.85**	**16.91**	**16.93**	**17.03**	**17.17**	**17.41**	**17.68**	**17.99**	**18.27**	**19.82**	**-.3**	**1.5**	**1.3**
Unaccounted for [7]	.35	.43	.38	.34	.34	.36	.37	.36	.37	.37	.37	.40			
Average Wellhead Price	**2.65**	**2.00**	**1.83**	**1.84**	**1.85**	**1.94**	**2.04**	**2.18**	**2.34**	**2.49**	**2.66**	**3.74**	**-6.0**	**6.8**	**5.6**
Average Price by Sector															
Residential	6.47	6.00	5.51	5.61	5.62	5.70	5.78	5.91	6.06	6.19	6.36	7.37	-2.5	2.6	2.3
Commercial [4]	5.81	5.23	4.75	4.75	4.76	4.79	4.82	4.89	4.99	5.07	5.18	5.92	-3.8	2.1	1.7
Industrial	4.17	3.33	2.65	2.65	2.66	2.74	2.82	2.95	3.10	3.22	3.38	4.37	-8.1	4.8	3.9
Electric Utilities	3.75	2.50	2.34	2.16	2.32	2.43	2.56	2.63	2.73	2.92	3.19	4.28	-8.3	5.8	4.8
Average to All Sectors [8]	**4.99**	**4.25**	**3.73**	**3.74**	**3.80**	**3.88**	**3.96**	**4.05**	**4.17**	**4.28**	**4.43**	**5.31**	**-4.9**	**3.2**	**2.8**

[1] Includes synthetic natural gas (results from the manufacture, conversion, or the reforming of petroleum hydrocarbons), and propane-air mixtures.
[2] Includes net withdrawals of dry natural gas from underground storage and liquefied natural gas. A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[3] Total supply represents the sum of dry gas production, supplemental gas, net imports, and net storage withdrawals.
[4] Includes deliveries to municipalities and other public authorities for use in schools and other institutions.
[5] Represents natural gas used in gathering systems and processing plants.
[6] Represents natural gas used to fuel compressors in pipeline pumping stations.
[7] Represents the difference between total supply and total consumption.
[8] Weighted average price. The weights used are the sectoral consumption values excluding lease and plant fuel and the transportation sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

Table B10. Coal Supply, Disposition, and Prices
(Million Short Tons)
(1987 Dollars per Short Ton)

Supply, Disposition, and Prices	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Total Production [1]	**884**	**890**	**917**	**916**	**930**	**965**	**986**	**1,004**	**1,026**	**1,049**	**1,076**	**1,182**	**1.8**	**2.0**	**2.0**
Imports	2	2	2	2	3	3	4	4	4	5	5	7	9.0	8.8	10.4
Exports [2]	93	86	78	74	76	79	81	83	86	88	91	91	-3.3	1.4	1.2
Net Imports	**-91**	**-83**	**-76**	**-72**	**-73**	**-76**	**-77**	**-79**	**-82**	**-83**	**-86**	**-84**	**-3.6**	**1.0**	**.7**
Net Storage Withdrawals [3]	28	-4	-3	-5	-3	-8	-6	-5	-6	-6	-7	-8			
Total Supply [4]	**821**	**803**	**838**	**839**	**854**	**882**	**903**	**919**	**938**	**959**	**983**	**1,090**	**1.5**	**2.1**	**2.0**
Consumption by Sector															
Residential/Commercial	8	8	8	7	7	7	7	7	7	7	7	7	-1.4	-.7	-1.2
Industrial	75	76	74	72	75	77	79	80	80	81	82	89	.6	1.4	1.5
Coking Plants	41	36	36	38	38	39	39	39	38	38	37	36	-1.0	-.9	-.2
Electric Utilities	694	685	719	722	733	759	778	794	813	834	857	959	1.8	2.4	2.2
Total Consumption	**818**	**804**	**837**	**839**	**854**	**882**	**903**	**920**	**939**	**959**	**983**	**1,090**	**1.5**	**2.1**	**2.1**
Discrepancy [5]	3	-1	1	0	0	0	0	0	0	0	0	0			
Average Minemouth Price [6]	**26.63**	**24.50**	**22.99**	**22.88**	**23.25**	**23.75**	**24.19**	**24.59**	**24.96**	**25.29**	**25.68**	**27.71**	**-2.3**	**1.6**	**1.4**
Delivered Price by Sector															
Residential/Commercial	53.80	50.43	45.25	47.30	48.05	49.12	50.09	50.99	51.83	52.62	53.52	58.08	-1.8	1.7	1.9
Industrial	39.31	36.91	35.42	35.04	35.65	36.49	37.27	38.00	38.68	39.31	40.03	43.83	-1.5	1.8	1.6
Coking Plants	57.38	52.34	48.75	48.65	49.39	50.05	50.97	51.83	52.63	53.37	54.14	58.07	-2.7	1.5	1.4
Electric Utilities	36.49	34.29	31.63	31.40	32.00	32.50	33.25	33.97	34.63	35.23	36.01	39.98	-2.3	2.1	1.8
Average to All Sectors [7]	**37.97**	**35.51**	**32.84**	**32.64**	**33.23**	**33.76**	**34.51**	**35.20**	**35.84**	**36.41**	**37.16**	**41.00**	**-2.3**	**2.0**	**1.7**

[1] Includes anthracite, bituminous coal, and lignite.
[2] Excludes small quantities of anthracite shipped overseas to U.S. Armed Forces.
[3] From all stocks held by industrial plants, coke plants, electric utilities, and producers/distributors. A negative (-) result represents an increase to inventories. A positive result represents a withdrawal from inventories.
[4] Represents the sum of production, net imports, and net storage withdrawals.
[5] Represents the difference between total supply and total consumption.
[6] Free on board (F.O.B.) mines.
[7] Weighted average prices. The weights used are consumption values by sector.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Price and Expenditure Report 1985*, DOE/EIA-0376(85); *Quarterly Coal Report*, DOE/EIA-0121(87/2Q); values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

Table B11. National Macroeconomic Indicators

Macroeconomic Indicators	Low World Oil Price - High Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
World Oil Price [1]															
1987 dollars per barrel	28.52	14.40	18.11	13.61	13.84	14.07	14.28	14.51	15.02	16.40	18.25	24.93	-13.2	5.9	2.5
Nominal dollars per barrel	26.99	13.98	18.11	14.00	14.71	15.50	16.35	17.28	18.77	21.61	25.41	44.98	-10.5	11.2	7.2
1982 dollars per barrel	24.27	12.25	15.42	11.59	11.78	11.97	12.16	12.35	12.79	13.96	15.53	21.22	-13.2	5.9	2.5
Economic Variables															
Real GNP (billion 1982 dollars)	3,607	3,713	3,815	3,892	4,012	4,149	4,288	4,421	4,529	4,604	4,685	5,254	2.8	2.4	2.5
Real Disposable Income (billion 1982 dollars)	2,542	2,645	2,671	2,729	2,802	2,877	2,952	3,022	3,088	3,133	3,183	3,498	2.5	2.0	2.1
Real Disposable Income per Capita (thousand 1982 dollars)	10.6	11.0	11.0	11.1	11.3	11.5	11.7	11.9	12.1	12.1	12.2	13.0	1.6	1.3	1.3
GNP Implicit Price Deflator (1982=1.00)	1.112	1.141	1.175	1.208	1.249	1.295	1.345	1.399	1.468	1.548	1.636	2.120	3.1	5.1	4.6
Unemployment Rate (percent)	7.2	7.0	6.2	6.0	5.7	5.3	5.0	4.8	4.9	5.3	5.6	5.9			
Population, Noninstitutional (million persons)	239.0	241.3	243.5	245.6	247.8	250.0	252.1	254.2	256.2	258.1	259.9	268.4	.9	.7	.8
New AA Bond Rate (percent per annum)	11.79	8.94	9.49	9.26	9.05	9.05	9.10	9.21	9.30	9.32	9.32	8.68			
Energy Usage Indicators															
Gross Energy Use (quadrillion Btu)	74.0	74.2	76.2	77.7	79.9	81.6	83.1	84.3	85.5	86.3	87.2	92.8	2.0	1.3	1.5
Gross Energy Use per Capita (million Btu per person)	309.7	307.7	312.9	316.1	322.2	326.2	329.5	331.7	333.7	334.3	335.6	345.8	1.0	.6	.8
Gross Energy Use per Dollar of GNP (thousand Btu per 1982 dollar)	20.5	20.0	20.0	20.0	19.9	19.7	19.4	19.1	18.9	18.7	18.6	17.7	-.9	-1.1	-.9
Energy/GNP Rate of Change (percent)															
1985-1990	-.9														
1985-1995	-1.0														
1985-2000	-1.0														
1990-1995	-1.1														
1995-2000	-1.0														
1987-2000	-.9														

[1] Represents the cost of imported crude oil to U.S. refiners.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Data Resources, Inc. USMODEL database (January 1988); Enery Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 305; File Creation Date 03/01/88; Report Date 03/01/88

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)

Supply and Disposition	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Production															
Crude Oil	19.0	18.4	17.6	17.6	17.2	16.5	16.1	15.6	15.3	15.0	14.9	14.5	-2.7	-1.3	-1.5
Natural Gas Plant Liquids	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	-.4	.5	.3
Natural Gas [1]	16.9	16.5	16.6	16.6	17.0	16.8	16.8	16.8	17.0	17.1	17.3	17.7	-.1	.5	.5
Coal	19.3	19.5	20.1	20.1	20.3	20.9	21.2	21.6	22.1	22.6	23.1	24.3	1.6	1.5	1.5
Nuclear Power	4.1	4.5	4.9	5.3	5.5	5.9	6.1	6.1	6.2	6.2	6.3	6.4	7.2	.9	2.1
Hydropower/Other [2]	3.2	3.3	2.9	3.1	3.3	3.3	3.3	3.3	3.3	3.4	3.4	3.4	.9	.4	1.4
Total Production	**64.8**	**64.2**	**64.3**	**64.9**	**65.5**	**65.6**	**65.7**	**65.7**	**66.1**	**66.5**	**67.2**	**68.7**	**.3**	**.5**	**.5**
Imports															
Crude Oil [3]	6.8	8.8	9.9	9.2	10.7	11.3	11.8	12.5	12.8	13.1	13.0	13.3	10.9	1.6	2.3
Petroleum Products	4.0	4.3	4.0	4.2	4.1	4.1	4.1	4.1	4.2	4.2	4.2	4.4	.5	.7	.6
Natural Gas [4]	.9	.7	.9	.9	1.1	1.2	1.3	1.4	1.5	1.7	1.8	2.6	5.4	7.9	8.7
Other Imports [5]	.5	.4	.5	.4	.5	.6	.6	.6	.6	.6	.6	.8	5.0	3.7	3.7
Total Imports	**12.1**	**14.3**	**15.3**	**14.8**	**16.4**	**17.2**	**17.8**	**18.6**	**19.1**	**19.7**	**19.6**	**21.1**	**7.3**	**2.1**	**2.5**
Exports															
Coal	2.4	2.2	2.0	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4	-3.3	1.4	1.2
Petroleum	1.7	1.7	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	-.8	.0	.0
Total Exports	**4.1**	**3.9**	**3.6**	**3.5**	**3.6**	**3.7**	**3.7**	**3.8**	**3.8**	**3.9**	**4.0**	**4.0**	**-2.2**	**.8**	**.7**
Adjustments [6]	**1.2**	**-.4**	**.3**	**.4**	**-.4**	**-.5**	**-.5**	**-.5**	**-.5**	**-.5**	**-.5**	**-.5**			
Consumption															
Petroleum Products [7]	30.9	32.2	32.6	32.4	32.5	32.5	32.5	32.8	32.9	32.9	32.7	33.0	1.0	.1	.1
Natural Gas	17.9	16.7	17.4	17.5	17.9	17.8	17.9	18.0	18.2	18.6	18.9	20.1	.0	1.2	1.1
Coal	17.5	17.3	18.0	18.0	18.2	18.7	19.0	19.3	19.7	20.1	20.5	21.8	1.3	1.6	1.5
Nuclear Power	4.1	4.5	4.9	5.3	5.5	5.9	6.1	6.1	6.2	6.2	6.3	6.4	7.2	.9	2.1
Hydropower/Other [8]	3.6	3.6	3.3	3.5	3.7	3.8	3.8	3.8	3.9	3.9	3.9	4.1	1.3	.7	1.6
Total Consumption	**74.0**	**74.2**	**76.2**	**76.6**	**77.8**	**78.7**	**79.3**	**80.0**	**80.9**	**81.8**	**82.4**	**85.3**	**1.2**	**.8**	**.9**
Net Imports - Petroleum	**9.0**	**11.5**	**12.3**	**11.9**	**13.2**	**13.8**	**14.3**	**15.0**	**15.4**	**15.8**	**15.6**	**16.1**	**8.8**	**1.5**	**2.1**
World Oil Price [9] (1987 dollars per barrel)	**28.52**	**14.40**	**18.11**	**20.10**	**20.19**	**20.30**	**21.19**	**21.62**	**22.94**	**24.88**	**27.29**	**40.19**	**-6.6**	**7.1**	**6.3**
Real GNP (billion 1982 dollars)	**3,607**	**3,713**	**3,815**	**3,878**	**3,969**	**4,055**	**4,146**	**4,248**	**4,341**	**4,426**	**4,482**	**4,892**	**2.4**	**1.9**	**1.9**

[1] Dry natural gas.
[2] Includes hydropower, geothermal power, wood, and waste.
[3] Includes imports of crude oil for the Strategic Petroleum Reserve.
[4] Represents net imports.
[5] Includes coal, net coal coke imports, and net electricity imports.
[6] Balancing item. Includes stock changes, unaccounted for supply, losses, and gains.
[7] Includes natural gas plant liquids and crude oil consumed as fuels.
[8] Includes industrial generation of hydroelectric power, net electricity imports, and electricity produced from geothermal, wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems. Also includes net coal coke imports.
[9] Represents the cost of imported crude oil to U.S. refiners.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecast: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

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

Sector and Fuel	High World Oil Price - Low Growth Case												Annual Percent Change		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Residential															
Distillate [1]	1.11	1.12	1.07	1.13	1.11	1.10	1.08	1.06	1.04	1.01	0.99	0.88	-0.3	-2.2	-1.5
Liquefied Petroleum Gas	.42	.40	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.7	.0	.0
Natural Gas	4.57	4.44	4.56	4.59	4.61	4.64	4.65	4.66	4.65	4.63	4.59	4.42	.3	-.5	-.2
Coal	.07	.07	.07	.07	.07	.07	.06	.06	.06	.06	.06	.05	-1.3	-1.8	-1.9
Electricity	2.70	2.79	2.95	3.03	3.09	3.17	3.24	3.31	3.38	3.45	3.51	3.75	3.3	1.7	1.9
Total	**8.88**	**8.82**	**9.09**	**9.25**	**9.32**	**9.40**	**9.47**	**9.53**	**9.57**	**9.59**	**9.59**	**9.54**	**1.2**	**.1**	**.4**
Commercial															
Distillate [1]	.67	.68	.65	.69	.70	.71	.72	.73	.73	.74	.74	.73	1.0	.3	.8
Motor Gasoline	.10	.10	.10	.10	.10	.10	.11	.11	.11	.11	.11	.12	1.7	1.1	1.2
Residual Fuel	.19	.21	.18	.17	.17	.18	.18	.17	.17	.16	.15	.09	-1.5	-6.4	-5.2
Natural Gas	2.51	2.39	2.40	2.38	2.41	2.45	2.49	2.53	2.55	2.57	2.59	2.61	-.4	.6	.7
Other Commercial [2]	.18	.18	.19	.18	.18	.18	.18	.18	.18	.18	.18	.18	-.3	-.3	-.4
Electricity	2.36	2.46	2.58	2.59	2.66	2.73	2.80	2.88	2.96	3.03	3.10	3.42	3.0	2.3	2.2
Total	**6.01**	**6.01**	**6.10**	**6.11**	**6.22**	**6.36**	**6.48**	**6.59**	**6.70**	**6.78**	**6.86**	**7.14**	**1.1**	**1.2**	**1.2**
Industrial															
Distillate [1]	1.26	1.26	1.29	1.29	1.32	1.34	1.36	1.38	1.38	1.40	1.42	1.50	1.3	1.1	1.1
Liquefied Petroleum Gas	1.55	1.49	1.62	1.60	1.63	1.65	1.65	1.67	1.69	1.71	1.73	1.82	1.1	1.0	.9
Motor Gasoline	.22	.22	.23	.23	.23	.24	.24	.24	.25	.25	.25	.26	1.8	.9	1.0
Petrochemical Feedstocks	.82	.95	.93	.97	.98	.99	1.00	1.01	1.02	1.04	1.05	1.11	4.0	1.1	1.4
Residual Fuel	.75	.81	.72	.65	.69	.72	.73	.74	.75	.74	.73	.63	-.8	-1.4	-1.0
Natural Gas	7.11	6.69	6.90	7.19	7.36	7.44	7.48	7.49	7.54	7.57	7.57	7.24	.9	-.3	.4
Metallurgical Coal	1.10	.97	.98	1.01	1.00	.98	.95	.91	.91	.90	.89	.79	-2.4	-2.0	-1.6
Steam Coal	1.66	1.68	1.65	1.60	1.64	1.67	1.67	1.68	1.70	1.73	1.75	1.88	.1	1.2	1.0
Other Industrial [3]	3.09	3.16	3.37	3.19	3.24	3.27	3.29	3.31	3.31	3.29	3.24	3.14	1.1	-.4	-.5
Hydropower	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.1	.3	.3
Electricity	2.81	2.76	2.85	2.88	2.92	2.96	3.00	3.04	3.13	3.27	3.37	3.95	1.0	2.9	2.5
Total	**20.40**	**20.01**	**20.58**	**20.64**	**21.04**	**21.29**	**21.40**	**21.52**	**21.72**	**21.94**	**22.03**	**22.36**	**.9**	**.5**	**.6**
Transportation															
Distillate [1]	3.20	3.26	3.43	3.41	3.52	3.62	3.69	3.76	3.84	3.93	4.01	4.25	2.5	1.6	1.7
Jet Fuel	2.50	2.68	2.79	2.86	2.92	2.94	2.95	2.98	3.00	2.98	2.95	2.92	3.3	-.1	.4
Motor Gasoline	12.78	13.16	13.39	13.34	13.18	13.02	12.87	12.77	12.64	12.50	12.29	11.79	.4	-1.0	-1.0
Residual Fuel	.82	.88	.84	.80	.81	.83	.84	.86	.88	.89	.90	.97	.3	1.6	1.2
Natural Gas	.52	.50	.51	.52	.53	.53	.54	.54	.55	.56	.57	.60	.5	1.2	1.2
Other Transportation [4]	.27	.27	.29	.29	.30	.30	.31	.31	.32	.32	.32	.34	2.3	1.3	1.2
Total	**20.09**	**20.76**	**21.25**	**21.22**	**21.27**	**21.24**	**21.19**	**21.23**	**21.21**	**21.18**	**21.04**	**20.87**	**1.1**	**-.2**	**-.1**
Electric Utilities															
Distillate	.09	.08	.09	.09	.04	.04	.05	.07	.09	.10	.09	.16	-12.6	13.6	4.1
Residual Fuel	1.01	1.37	1.14	1.09	1.02	.93	.97	1.07	1.18	1.25	1.28	1.75	-1.5	6.5	3.3
Natural Gas	3.16	2.69	2.99	2.80	2.94	2.76	2.73	2.79	2.95	3.26	3.55	5.20	-2.7	6.5	4.4
Steam Coal	14.58	14.44	15.15	15.18	15.43	15.87	16.20	16.53	16.92	17.34	17.73	18.97	1.7	1.8	1.7
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Hydropower/Other [5]	3.54	3.61	3.30	3.46	3.72	3.78	3.80	3.81	3.83	3.89	3.91	4.07	1.3	.7	1.6
Total	**26.52**	**26.67**	**27.56**	**27.90**	**28.67**	**29.26**	**29.80**	**30.42**	**31.17**	**32.05**	**32.83**	**36.55**	**2.0**	**2.3**	**2.2**
Primary Energy Consumption															
Distillate [1]	6.33	6.40	6.54	6.62	6.69	6.81	6.90	7.00	7.08	7.18	7.24	7.51	1.5	1.0	1.1
Jet Fuel	2.50	2.68	2.79	2.86	2.92	2.94	2.95	2.98	3.00	2.98	2.95	2.92	3.3	-.1	.4
Liquefied Petroleum Gas	2.10	2.01	2.19	2.17	2.20	2.21	2.22	2.24	2.26	2.29	2.31	2.40	1.0	.8	.7
Motor Gasoline	13.10	13.49	13.72	13.67	13.51	13.36	13.22	13.12	13.00	12.86	12.65	12.17	.4	-.9	-.9
Petrochemical Feedstocks	.82	.95	.93	.97	.98	.99	1.00	1.01	1.02	1.04	1.05	1.11	4.0	1.1	1.4
Residual Fuel	2.77	3.26	2.88	2.71	2.70	2.66	2.71	2.85	2.97	3.04	3.05	3.45	-.8	2.6	1.4
Natural Gas	17.87	16.70	17.36	17.48	17.85	17.83	17.89	18.01	18.24	18.60	18.87	20.06	.0	1.2	1.1
Metallurgical Coal	1.10	.97	.98	1.01	1.00	.98	.95	.91	.91	.90	.89	.79	-2.4	-2.0	-1.6
Steam Coal	16.42	16.30	16.98	16.95	17.24	17.70	18.04	18.38	18.79	19.24	19.65	21.01	1.5	1.7	1.6
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Net Coal Coke Imports	-.01	-.02	.00	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-.01	-6.3	.6	10.3
Hydropower/Misc [6]	6.87	7.01	6.93	6.91	7.22	7.32	7.36	7.40	7.42	7.46	7.43	7.51	1.3	.3	.6
Total Consumption	**74.02**	**74.25**	**76.19**	**76.61**	**77.83**	**78.67**	**79.28**	**80.04**	**80.89**	**81.79**	**82.36**	**85.33**	**1.2**	**.8**	**.9**
Electricity (all sectors)	**7.88**	**8.02**	**8.39**	**8.51**	**8.68**	**8.88**	**9.05**	**9.25**	**9.49**	**9.75**	**9.99**	**11.15**	**2.4**	**2.3**	**2.2**
Industrial Electricity															
Gross Consumption	3.05	3.08	3.30	3.35	3.40	3.46	3.51	3.57	3.68	3.81	3.93	4.53	2.6	2.7	2.5
Self Generation - Own Use	.23	.32	.45	.47	.47	.49	.51	.53	.55	.55	.56	.58	16.2	1.6	1.9
Purchased Electricity	2.81	2.76	2.85	2.88	2.92	2.96	3.00	3.04	3.13	3.27	3.37	3.95	1.0	2.9	2.5

[1] Includes kerosene.
[2] Includes liquefied petroleum gas and coal.
[3] Includes still gas, lubricants, waxes, asphalt, special naphthas, petroleum coke, and net coal coke imports.
[4] Includes electricity, liquefied petroleum gas, lubricants, and waxes.
[5] Includes hydropower and electricity that is produced by renewable sources such as geothermal power, wood, waste, solar power, and wind power. Also includes net electricity imports.
[6] Includes hydropower and electricity that is produced by renewable sources such as geothermal power, wood, waste, solar power, and wind power. Also includes net electricity imports and minor petroleum products.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Data Report 1960-1985*, DOE/EIA-0214(85); values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

Table C3. Price of Energy by Source and End-Use Sector
(1987 Dollars per Million Btu)

Sector and Fuel	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Residential	**12.07**	**11.30**	**11.41**	**11.39**	**11.52**	**11.54**	**11.65**	**11.74**	**11.90**	**12.14**	**12.41**	**14.18**	**-0.9**	**2.1**	**1.7**
Primary Energy	6.80	6.13	6.08	6.20	6.31	6.36	6.47	6.58	6.77	7.01	7.29	8.95	-1.3	3.5	3.0
Petroleum Products	8.53	7.16	8.18	8.36	8.59	8.65	8.86	9.02	9.31	9.72	10.17	12.93	.3	4.1	3.6
Distillate Fuel	8.18	6.36	7.08	7.31	7.49	7.52	7.69	7.83	8.08	8.42	8.77	10.98	-1.7	3.9	3.4
Liquefied Petroleum Gas	9.44	9.38	10.87	11.09	11.38	11.50	11.75	11.90	12.24	12.74	13.35	16.84	4.0	3.9	3.4
Natural Gas	6.27	5.82	5.44	5.52	5.60	5.65	5.74	5.85	6.02	6.22	6.44	7.83	-2.1	3.3	2.8
Steam Coal	3.22	2.90	2.72	2.76	2.81	2.86	2.90	2.96	3.01	3.07	3.12	3.37	-2.4	1.7	1.7
Electricity	24.13	22.36	22.49	22.08	22.02	21.74	21.61	21.42	21.27	21.28	21.30	22.24	-2.1	.2	-.1
Commercial	**12.56**	**11.59**	**11.76**	**11.67**	**11.75**	**11.68**	**11.72**	**11.74**	**11.83**	**12.02**	**12.24**	**13.86**	**-1.5**	**1.7**	**1.3**
Primary Energy	5.75	4.75	4.66	4.79	4.89	4.90	4.98	5.06	5.22	5.42	5.66	7.11	-3.2	3.8	3.3
Petroleum Products	6.45	4.29	5.10	5.36	5.50	5.53	5.71	5.84	6.11	6.49	6.90	9.43	-3.0	5.5	4.8
Distillate Fuel	6.53	4.20	4.91	5.13	5.31	5.34	5.51	5.64	5.89	6.22	6.57	8.76	-3.9	5.1	4.5
Residual Fuel	4.43	2.38	2.93	3.16	3.12	3.09	3.20	3.25	3.44	3.72	4.07	6.02	-7.0	6.9	5.7
Other Petroleum [1]	8.39	6.99	8.02	8.40	8.55	8.65	8.90	9.06	9.39	9.87	10.47	13.64	.6	4.7	4.2
Natural Gas	5.63	5.10	4.61	4.68	4.76	4.76	4.80	4.86	4.98	5.12	5.30	6.42	-3.3	3.0	2.6
Steam Coal	1.83	1.67	1.56	1.59	1.61	1.64	1.67	1.70	1.73	1.77	1.79	1.94	-2.2	1.7	1.7
Electricity	23.13	21.52	21.45	21.04	20.97	20.67	20.55	20.35	20.21	20.22	20.24	21.19	-2.2	.2	-.1
Industrial	**6.41**	**4.74**	**4.89**	**4.98**	**5.02**	**5.02**	**5.11**	**5.18**	**5.34**	**5.59**	**5.89**	**7.66**	**-4.8**	**4.3**	**3.5**
Primary Energy	4.88	3.20	3.35	3.51	3.57	3.62	3.73	3.82	4.00	4.25	4.56	6.28	-5.8	5.7	4.9
Petroleum Products	6.62	3.68	4.53	4.86	4.92	4.95	5.11	5.19	5.43	5.80	6.27	8.77	-5.7	5.9	5.2
Distillate Fuel	6.39	4.06	4.78	5.00	5.18	5.21	5.37	5.51	5.76	6.09	6.44	8.64	-4.0	5.2	4.7
Liquefied Petroleum Gas	6.62	6.54	8.02	8.24	8.54	8.66	8.91	9.06	9.40	9.90	10.51	14.01	5.5	4.9	4.4
Motor Gasoline	9.61	7.13	7.81	8.31	8.35	8.46	8.72	8.87	9.22	9.68	10.27	13.26	-2.5	4.6	4.2
Residual Fuel	4.52	2.42	2.98	3.22	3.18	3.15	3.26	3.32	3.51	3.79	4.13	6.08	-7.0	6.8	5.6
Other Petroleum [2]	6.94	2.59	3.22	3.59	3.54	3.55	3.68	3.71	3.90	4.21	4.63	6.70	-12.5	6.6	5.8
Natural Gas	4.08	3.14	2.57	2.64	2.72	2.78	2.87	2.97	3.14	3.33	3.55	4.92	-7.4	5.9	5.1
Metallurgical Coal	2.14	1.95	1.81	1.84	1.86	1.87	1.90	1.93	1.95	1.98	2.01	2.12	-2.6	1.2	1.2
Steam Coal	1.79	1.66	1.58	1.60	1.63	1.65	1.68	1.71	1.74	1.77	1.79	1.93	-1.6	1.6	1.6
Hydroelectric Power	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	11.92	.0	.0	.0
Electricity	15.98	14.79	14.44	14.03	13.97	13.70	13.59	13.41	13.26	13.27	13.28	14.12	-3.0	.3	-.2
Transportation	**8.66**	**6.27**	**6.95**	**7.37**	**7.41**	**7.47**	**7.68**	**7.80**	**8.09**	**8.49**	**8.98**	**11.60**	**-2.9**	**4.5**	**4.0**
Primary Energy	8.65	6.26	6.95	7.37	7.40	7.46	7.67	7.79	8.08	8.49	8.98	11.59	-2.9	4.5	4.0
Petroleum Products	8.65	6.26	6.95	7.37	7.40	7.46	7.67	7.79	8.08	8.49	8.98	11.59	-2.9	4.5	4.0
Distillate Fuel	7.41	4.85	5.57	5.79	5.97	6.00	6.17	6.30	6.55	6.89	7.23	9.43	-4.1	4.6	4.1
Jet Fuel	6.24	3.99	4.66	5.01	5.05	5.08	5.25	5.35	5.61	5.96	6.40	8.77	-4.0	5.6	5.0
Motor Gasoline	9.54	7.09	7.77	8.27	8.31	8.42	8.67	8.83	9.17	9.64	10.23	13.22	-2.5	4.6	4.2
Residual Fuel	4.66	2.40	2.96	3.20	3.16	3.13	3.25	3.30	3.49	3.77	4.12	6.07	-7.6	6.8	5.7
Other Petroleum [3]	16.03	18.50	19.18	19.56	19.51	19.52	19.65	19.67	19.87	20.19	20.64	22.85	4.0	1.6	1.4
Electricity	20.97	20.04	19.32	18.90	18.71	18.13	18.02	17.75	17.61	17.59	17.69	19.30	-2.9	.6	.0
Total Energy															
Primary Energy - Four Sectors	6.77	5.01	5.34	5.61	5.65	5.69	5.84	5.94	6.16	6.46	6.83	8.90	-3.4	4.6	4.0
Electricity	20.91	19.38	19.43	19.03	18.99	18.72	18.62	18.45	18.29	18.26	18.26	19.03	-2.2	.2	-.2
Electric Utilities															
Fossil Fuel Average	**2.22**	**1.80**	**1.71**	**1.75**	**1.77**	**1.78**	**1.82**	**1.88**	**1.95**	**2.04**	**2.13**	**2.81**	**-4.4**	**4.7**	**3.9**
Petroleum Products	4.59	2.55	3.10	3.30	3.35	3.35	3.48	3.56	3.77	4.06	4.38	6.37	-6.1	6.6	5.7
Distillate Fuel	6.22	4.05	4.86	5.11	5.29	5.30	5.43	5.53	5.75	6.09	6.48	8.68	-3.1	5.1	4.6
Residual Fuel	4.46	2.46	2.96	3.14	3.27	3.25	3.37	3.42	3.61	3.90	4.23	6.16	-6.1	6.6	5.8
Natural Gas	3.62	2.42	2.22	2.32	2.41	2.48	2.61	2.75	2.94	3.17	3.41	4.93	-7.2	7.1	6.3
Steam Coal	1.74	1.63	1.52	1.52	1.55	1.56	1.58	1.61	1.64	1.67	1.71	1.87	-2.2	1.8	1.6
Hydroelectric Power	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.0	.0	.0
Nuclear Power	.74	.77	.77	.75	.73	.71	.68	.65	.63	.61	.60	.55	-1.1	-2.4	-2.5
Average Price to All Users															
Petroleum Products	7.92	5.44	6.20	6.59	6.65	6.70	6.88	6.97	7.23	7.61	8.07	10.55	-3.3	4.7	4.2
Distillate Fuel	7.23	4.88	5.59	5.82	5.99	6.01	6.17	6.30	6.54	6.87	7.21	9.38	-3.6	4.5	4.1
Jet Fuel	6.24	3.99	4.66	5.01	5.05	5.08	5.25	5.35	5.61	5.96	6.40	8.77	-4.0	5.6	5.0
Liquefied Petroleum Gas	7.21	7.13	8.62	8.84	9.13	9.24	9.49	9.64	9.96	10.46	11.07	14.54	5.1	4.6	4.1
Motor Gasoline	9.54	7.09	7.77	8.27	8.31	8.42	8.67	8.83	9.17	9.64	10.23	13.22	-2.5	4.6	4.2
Residual Fuel	4.53	2.43	2.96	3.18	3.21	3.18	3.29	3.35	3.54	3.83	4.17	6.12	-6.9	6.8	5.7
Other Petroleum Products	7.50	3.50	4.15	4.54	4.49	4.51	4.65	4.68	4.88	5.20	5.64	7.76	-9.7	5.6	4.9
Natural Gas	4.80	4.04	3.57	3.65	3.72	3.78	3.87	3.98	4.13	4.30	4.50	5.78	-4.6	4.3	3.8
Coal [4]	1.78	1.66	1.53	1.55	1.58	1.59	1.61	1.64	1.67	1.70	1.73	1.89	-2.3	1.7	1.6
Electricity	20.91	19.38	19.43	19.03	18.99	18.72	18.62	18.45	18.29	18.26	18.26	19.03	-2.2	.2	-.2

[1] Includes liquefied petroleum gas and motor gasoline.
[2] Includes petrochemical feedstocks, still gas, lubricants, waxes, asphalt, special naphthas, and petroleum coke.
[3] Includes liquefied petroleum gas, lubricants, and waxes.
[4] Includes steam coal and metallurgical coal.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Price and Expenditure Report 1985*, DOE/EIA-0376(85); values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

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

Fuel Consumption and Sales	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Fuel Inputs															
Oil															
Distillate	0.09	0.08	0.09	0.09	0.04	0.04	0.05	0.07	0.09	0.10	0.09	0.16	-12.6	13.6	4.1
Residual	1.01	1.37	1.14	1.09	1.02	.93	.97	1.07	1.18	1.25	1.28	1.75	-1.5	6.5	3.3
Natural Gas	3.16	2.69	2.99	2.80	2.94	2.76	2.73	2.79	2.95	3.26	3.55	5.20	-2.7	6.5	4.4
Steam Coal	14.58	14.44	15.15	15.18	15.43	15.87	16.20	16.53	16.92	17.34	17.73	18.97	1.7	1.8	1.7
Nuclear Power	4.15	4.48	4.89	5.28	5.52	5.87	6.05	6.14	6.21	6.20	6.27	6.41	7.2	.9	2.1
Hydropower/Other [1]	3.12	3.24	2.82	3.07	3.24	3.26	3.28	3.29	3.30	3.35	3.36	3.38	.9	.4	1.4
Total Fuel Inputs	**26.10**	**26.30**	**27.08**	**27.51**	**28.19**	**28.74**	**29.28**	**29.90**	**30.65**	**31.51**	**32.29**	**35.86**	**1.9**	**2.2**	**2.2**
Net Imports (fuel input equiv.)	.42	.37	.48	.39	.49	.52	.52	.52	.53	.53	.55	.69	4.2	2.8	2.8
Total Electricity Inputs	**26.52**	**26.67**	**27.56**	**27.90**	**28.67**	**29.26**	**29.80**	**30.42**	**31.17**	**32.05**	**32.83**	**36.55**	**2.0**	**2.3**	**2.2**
Disposition															
Total Electricity Inputs	26.52	26.67	27.56	27.90	28.67	29.26	29.80	30.42	31.17	32.05	32.83	36.55	2.0	2.3	2.2
Minus Conversion Losses	18.09	18.18	18.80	19.03	19.56	19.97	20.34	20.77	21.28	21.89	22.43	25.01	2.0	2.3	2.2
Generation	**8.43**	**8.49**	**8.76**	**8.87**	**9.11**	**9.29**	**9.46**	**9.66**	**9.89**	**10.16**	**10.40**	**11.54**	**2.0**	**2.2**	**2.1**
Plus PURPA Purchases [2]	.07	.09	.10	.12	.14	.16	.18	.20	.22	.23	.25	.31	18.6	6.8	8.8
Plus Net Imports (electricity equiv.)	.14	.12	.16	.13	.16	.17	.17	.17	.17	.18	.18	.23	4.2	2.8	2.8
Minus Trans. & Dist. Losses [3]	.75	.67	.63	.61	.73	.75	.76	.78	.80	.82	.84	.94	-.2	2.3	3.1
Electricity Sales	**7.88**	**8.02**	**8.39**	**8.51**	**8.68**	**8.88**	**9.05**	**9.25**	**9.49**	**9.75**	**9.99**	**11.15**	**2.4**	**2.3**	**2.2**
Electricity Sales by End-Use Sector [4]															
Residential	2.70	2.79	2.95	3.03	3.09	3.17	3.24	3.31	3.38	3.45	3.51	3.75	3.3	1.7	1.9
Commercial/Other [5]	2.37	2.47	2.59	2.60	2.67	2.75	2.82	2.89	2.97	3.04	3.11	3.44	3.0	2.3	2.2
Industrial	2.81	2.76	2.85	2.88	2.92	2.96	3.00	3.04	3.13	3.27	3.37	3.95	1.0	2.9	2.6
Total Electricity Sales	**7.88**	**8.02**	**8.39**	**8.51**	**8.68**	**8.88**	**9.05**	**9.25**	**9.49**	**9.75**	**9.99**	**11.15**	**2.4**	**2.3**	**2.2**

[1] Includes renewable electric utility energy sources such as hydropower, geothermal power, wood, waste, solar power, and wind power.
[2] Electric utility purchases under the Public Utility Regulatory Policies Act of 1978 (PURPA).
[3] Transmission and distribution losses for 1987 and 1988 are based on the January 1988 *Short-Term Energy Outlook*, which does not explicitly account for PURPA purchases in its balance. For 1989 and later years, losses explicitly exclude estimated PURPA purchases.
[4] Sales data for 1985 correspond to the *Monthly Energy Review* old series. New series values for 1985 are: Residential - 2.71, Commercial/Other - 2.38, Industrial - 2.85, and Total - 7.94 quadrillion Btu.
[5] Includes street lighting and sales to the transportation sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Data Report 1960-1985*, DOE/EIA-0214(85); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Forecast Run 826; File Creation Date 03/01/88; Report Date 03/01/88

Table C5. Electric Utility Summer Capability and Generation
(Capability in Million Kilowatts)
(Generation in Billion Kilowatthours)

Fuel Consumption and Sales	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Net Capability [1]															
Coal Steam	285.6	290.5	292.4	294.2	296.3	295.2	298.5	300.2	300.9	301.7	303.4	309.3	0.7	0.5	0.4
Other Fossil Steam	147.9	147.0	146.6	146.0	145.7	142.4	141.3	140.1	137.2	135.1	133.1	127.0	-.8	-1.1	-1.1
Combined Cycle	4.7	4.7	4.7	4.7	4.7	5.1	5.1	5.1	5.2	5.3	5.4	24.9	1.6	17.2	13.7
Turbine/Diesel	44.5	44.1	44.2	44.7	44.9	45.2	44.9	45.2	46.3	47.9	49.7	59.7	.3	2.8	2.3
Nuclear Power	79.5	85.3	93.7	96.1	100.5	103.9	105.1	105.1	105.1	104.2	105.5	106.5	5.5	.2	1.0
Hydropower/Other [2]	93.1	93.2	93.7	94.3	94.7	95.4	96.7	97.0	97.2	98.5	98.6	98.9	.5	.4	.4
Total Capability	**655.3**	**664.9**	**675.3**	**680.1**	**686.9**	**687.1**	**691.6**	**692.7**	**691.8**	**692.8**	**695.7**	**726.4**	**1.0**	**.6**	**.6**
Generation by Plant Type															
Coal Steam	1,402	1,386	1,463	1,456	1,486	1,529	1,561	1,593	1,630	1,672	1,709	1,828	1.7	1.8	1.7
Other Fossil Steam	369	363	369	346	351	324	320	330	348	374	395	495	-2.5	4.3	2.3
Combined Cycle	15	14	16	15	14	15	15	15	15	15	16	79	-.2	18.0	13.3
Turbine/Diesel	9	8	8	8	6	7	11	16	22	30	34	73	-3.9	26.3	18.0
Nuclear Power	384	414	452	489	511	543	560	568	574	573	581	593	7.2	.9	2.1
Hydropower/Other [2]	292	302	261	285	302	305	306	307	308	313	314	315	.9	.3	1.5
Total Generation	**2,470**	**2,487**	**2,568**	**2,598**	**2,670**	**2,723**	**2,773**	**2,830**	**2,899**	**2,978**	**3,048**	**3,383**	**2.0**	**2.2**	**2.1**
Generation by Fuel Type															
Coal	1,402	1,386	1,463	1,456	1,486	1,529	1,561	1,593	1,630	1,672	1,709	1,828	1.7	1.8	1.7
Natural Gas	292	249	276	258	273	257	253	257	270	296	320	473	-2.5	6.3	4.2
Oil	100	137	116	111	98	90	93	105	116	124	125	173	-2.2	6.8	3.1
Nuclear Power	384	414	452	489	511	543	560	568	574	573	581	593	7.2	.9	2.1
Hydropower/Other [3]	292	-302	261	285	302	305	306	307	308	313	314	315	.9	.3	1.5
Total Generation	**2,470**	**2,487**	**2,568**	**2,598**	**2,670**	**2,723**	**2,773**	**2,830**	**2,899**	**2,978**	**3,048**	**3,383**	**2.0**	**2.2**	**2.1**

[1] Net summer capability is the steady hourly output that generating equipment is expected to supply to system load (exclusive of auxiliary power), as demonstrated by tests during summer peak demand.
[2] Includes other renewable sources such as geothermal power, wood, waste, solar power, and wind power.
[3] Includes conventional and pumped storage hydropower and other renewable sources such as geothermal power, wood, waste, solar power, and wind power.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

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

Additions	High World Oil Price - Low Growth Case												
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996-2000	1986-2000
Total Additions													
Nuclear Power [1]	9,880	5,803	8,422	2,425	4,594	3,442	1,137	0	0	0	1,255	1,223	28,301
Coal Steam	6,468	4,868	2,098	1,851	2,269	588	3,632	2,037	1,343	2,295	3,102	11,525	35,608
Combined Cycle [2]	0	0	0	20	0	423	0	0	63	102	102	19,564	20,274
Turbines [3]	126	211	216	503	166	416	57	443	1,138	1,687	1,892	10,247	16,976
Hydropower/Other	3,488	169	427	642	404	767	1,345	245	225	1,316	105	250	5,895
Total New Capability	**19,962**	**11,051**	**11,163**	**5,441**	**7,433**	**5,636**	**6,171**	**2,725**	**2,769**	**5,400**	**6,456**	**42,808**	**107,053**
Announced/Planned Construction [4]													
Nuclear Power [1]	9,880	5,803	8,422	2,425	4,594	3,442	1,137	0	0	0	1,255	1,223	28,301
Coal Steam	6,468	4,868	2,098	1,851	2,269	588	3,632	2,037	1,343	2,295	3,102	7,708	31,791
Combined Cycle [2]	0	0	0	20	0	423	0	0	63	102	102	204	914
Turbines [3]	126	211	216	503	166	416	57	54	159	159	188	919	3,048
Hydropower/Other	3,488	169	427	642	404	767	1,345	245	225	1,316	105	250	5,895
Total Announced/Planned	**19,962**	**11,051**	**11,163**	**5,441**	**7,433**	**5,636**	**6,171**	**2,336**	**1,790**	**3,872**	**4,752**	**10,304**	**69,949**
Additional Needed Capability [5]													
Nuclear Power [1]	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal Steam	0	0	0	0	0	0	0	0	0	0	0	3,817	3,817
Combined Cycle [2]	0	0	0	0	0	0	0	0	0	0	0	19,360	19,360
Turbines [3]	0	0	0	0	0	0	0	389	979	1,528	1,704	9,328	13,928
Total Additional Needed	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**389**	**979**	**1,528**	**1,704**	**32,504**	**37,104**

[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 combined cycle capability.
[3] Includes all gas turbine and internal combustion capability.
[4] Includes all new capability announced by the electric utility industry.
[5] Includes additional new capability considered necessary by the Energy Information Administration to meet electricity demands.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

Table C7. Electric Utility Sales, Prices, and Price Components
(Billion Kilowatthours)
(1987 Dollars per Thousand Kilowatthours)

Sales, Prices, and Price Component	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Electricity Sales by End-Use Sector [1]															
Residential	791	818	865	887	906	928	949	971	992	1,010	1,028	1,100	3.3	1.7	1.9
Commercial/Other [2]	694	725	759	762	782	805	826	848	870	891	912	1,007	3.0	2.3	2.2
Industrial	825	808	835	844	856	869	878	892	918	957	988	1,159	1.0	2.9	2.6
Total Electricity Sales	**2,310**	**2,351**	**2,460**	**2,494**	**2,545**	**2,602**	**2,653**	**2,711**	**2,781**	**2,858**	**2,928**	**3,266**	**2.4**	**2.3**	**2.2**
Prices [3]															
Residential	81.87	76.74	76.74	75.32	75.14	74.18	73.75	73.09	72.59	72.61	72.69	75.89	-2.0	.2	-.1
Commercial/Other [2]	78.45	73.11	73.16	71.76	71.51	70.48	70.06	69.41	68.91	68.94	69.02	72.26	-2.1	.2	-.1
Industrial	54.03	49.09	49.26	47.87	47.67	46.75	46.37	45.74	45.25	45.26	45.32	48.18	-2.9	.3	-.2
All Sectors	**70.90**	**66.11**	**66.31**	**64.94**	**64.78**	**63.88**	**63.54**	**62.94**	**62.41**	**62.31**	**62.31**	**64.94**	**-2.1**	**.2**	**-.2**
Price Components															
Capital Component [4]	35.52	33.31	34.26	33.02	32.90	32.38	31.88	30.98	29.91	29.05	28.33	25.49	-1.8	-2.4	-2.3
Fuel Component [5]	18.50	15.57	15.06	15.06	15.18	15.02	15.28	15.67	16.29	17.07	17.83	23.54	-4.1	4.6	3.5
O&M Component [6]	16.89	17.24	16.98	16.86	16.70	16.49	16.39	16.29	16.21	16.19	16.15	15.92	-.5	-.4	-.5
Total Price [3]	**70.90**	**66.12**	**66.31**	**64.94**	**64.78**	**63.88**	**63.54**	**62.94**	**62.41**	**62.31**	**62.31**	**64.94**	**-2.1**	**.2**	**-.2**

[1] Sales data for 1985 correspond to the *Monthly Energy Review* old series. New series values for 1985 are: Residential - 794, Commercial/Other - 697, Industrial - 835, and Total - 2,326 billion kilowatthours.
[2] Includes consumption for street and highway lighting, other public authorities, and railways.
[3] Prices for 1985 to 2000 are estimated from model simulations and represent average revenues per kilowatthour of demand for the total electric utility industry.
[4] Represents the cost to the utility of capital assets needed to promote reliable service. It includes plant depreciation, taxes, and sufficient return on invested capital to cover interest obligations on outstanding debt and to compensate stockholders.
[5] Includes only the direct costs of fuel inputs used to generate electricity required to meet demand.
[6] 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.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Calculated from the Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); Office of Coal, Nuclear, Electric and Alternate Fuels; values for 1987 are estimates. Forecasts: Based on Forecast Run 826; File Creation Date 03/01/88; Report Date 03/01/88

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

Supply and Disposition	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
World Oil Price [1] (1987 dollars per barrel)	**28.52**	**14.40**	**18.11**	**20.10**	**20.19**	**20.30**	**21.19**	**21.62**	**22.94**	**24.88**	**27.29**	**40.19**	**-6.6**	**7.1**	**6.3**
Production															
Crude Oil [2]	8.97	8.68	8.31	8.31	8.11	7.81	7.59	7.38	7.24	7.08	7.05	6.85	-2.7	-1.3	-1.5
Alaska	1.83	1.87	1.96	2.07	2.05	1.89	1.82	1.71	1.65	1.52	1.50	1.13	.7	-5.0	-4.2
Lower 48	7.15	6.81	6.34	6.24	6.06	5.91	5.77	5.66	5.59	5.56	5.55	5.72	-3.7	-.3	-.8
Natural Gas Liquids	1.61	1.55	1.60	1.60	1.59	1.58	1.58	1.58	1.59	1.61	1.62	1.66	-.3	.5	.3
Other Domestic	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	1.0	.0	-.5
Processing Gain [3]	.56	.62	.63	.63	.61	.60	.60	.59	.59	.58	.57	.54	1.6	-1.0	-1.1
Total Production	**11.19**	**10.90**	**10.60**	**10.60**	**10.37**	**10.05**	**9.82**	**9.61**	**9.48**	**9.32**	**9.30**	**9.11**	**-2.1**	**-1.0**	**-1.2**
Imports (Including SPR [4])															
Crude Oil	3.20	4.18	4.66	4.35	5.05	5.36	5.59	5.90	6.06	6.21	6.12	6.30	10.9	1.6	2.3
Refined Products	1.87	2.05	1.89	2.01	1.92	1.92	1.93	1.95	1.97	1.99	1.99	2.06	.5	.7	.6
Total Imports	**5.07**	**6.22**	**6.55**	**6.36**	**6.97**	**7.27**	**7.52**	**7.86**	**8.03**	**8.20**	**8.11**	**8.35**	**7.5**	**1.4**	**1.9**
Exports															
Crude Oil	.20	.15	.14	.17	.19	.19	.19	.19	.19	.19	.19	.19	-1.2	.0	2.4
Refined Products	.58	.63	.61	.55	.56	.56	.56	.56	.56	.56	.56	.56	-.6	.0	-.6
Total Exports	**.78**	**.78**	**.75**	**.72**	**.75**	**.75**	**.75**	**.75**	**.75**	**.75**	**.75**	**.75**	**-.8**	**.0**	**.0**
Net Imports	**4.29**	**5.44**	**5.81**	**5.63**	**6.22**	**6.52**	**6.77**	**7.10**	**7.28**	**7.45**	**7.36**	**7.60**	**8.8**	**1.5**	**2.1**
Primary Stock Changes [5]															
Net Withdrawals	.22	-.15	-.01	.07	-.04	.00	.00	-.02	-.01	.00	.02	-.02			
SPR [4] Fill Rate (-)	-.12	-.05	-.08	-.04	-.05	-.08	-.08	-.08	-.08	-.08	-.08	.00			
Total Primary Supply [6]	**15.58**	**16.14**	**16.31**	**16.26**	**16.50**	**16.50**	**16.51**	**16.62**	**16.68**	**16.69**	**16.60**	**16.69**	**1.2**	**.1**	**.2**
Refined Petroleum Products															
Motor Gasoline	6.83	7.03	7.16	7.13	7.05	6.97	6.89	6.84	6.78	6.71	6.60	6.35	.4	-.9	-.9
Jet Fuel [7]	1.22	1.31	1.36	1.39	1.43	1.43	1.44	1.45	1.46	1.45	1.44	1.42	3.3	-.1	.4
Distillate Fuel [8]	2.98	3.01	3.08	3.11	3.15	3.21	3.25	3.29	3.33	3.38	3.41	3.53	1.5	1.0	1.1
Residual Fuel	1.20	1.42	1.25	1.18	1.17	1.16	1.18	1.24	1.29	1.32	1.33	1.50	-.8	2.6	1.4
Other Petroleum Products [9]	3.49	3.51	3.67	3.56	3.70	3.74	3.76	3.79	3.81	3.83	3.83	3.89	1.4	.4	.4
Total Product Supplied	**15.73**	**16.28**	**16.52**	**16.37**	**16.50**	**16.50**	**16.51**	**16.62**	**16.68**	**16.70**	**16.60**	**16.69**	**1.0**	**.1**	**.1**
Refined Petroleum Products Supplied by Sector															
Residential/Commercial	1.35	1.34	1.33	1.37	1.37	1.37	1.36	1.36	1.35	1.34	1.32	1.24	.2	-1.0	-.6
Industrial	4.01	4.08	4.18	4.04	4.22	4.27	4.30	4.35	4.38	4.40	4.40	4.46	1.3	.4	.5
Transportation	9.88	10.22	10.46	10.44	10.45	10.43	10.40	10.41	10.39	10.37	10.29	10.16	1.1	-.3	-.2
Electric Utilities	.48	.63	.54	.52	.46	.43	.45	.50	.56	.59	.60	.83	-2.3	7.0	3.4
Total Consumption	**15.73**	**16.28**	**16.52**	**16.37**	**16.50**	**16.50**	**16.51**	**16.62**	**16.68**	**16.70**	**16.60**	**16.69**	**1.0**	**.1**	**.1**
Discrepancy [10]	**-.15**	**-.14**	**-.21**	**-.11**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**			
Net Disposition [11]	**15.58**	**16.14**	**16.31**	**16.26**	**16.50**	**16.50**	**16.51**	**16.62**	**16.68**	**16.69**	**16.60**	**16.69**	**1.2**	**.1**	**.2**

[1] Represents the cost of imported crude oil to U.S. refiners.
[2] Includes lease condensate.
[3] Represents volumetric gain in refinery distillation and cracking processes.
[4] SPR is the Strategic Petroleum Reserve.
[5] A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[6] Equals total production plus net imports plus net stock withdrawals minus SPR fill rate.
[7] Includes naphtha and kerosene type.
[8] Includes kerosene.
[9] Includes aviation gasoline, liquefied petroleum gas, petrochemical feedstocks, lubricants, waxes, plant condensate, pentanes plus, asphalt and road oil, still gas, special naphthas, petroleum coke, unfinished oils, and miscellaneous petroleum products.
[10] Represents the difference between total primary supply and total consumption.
[11] Represents the sum of total consumption and discrepancy.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

Table C9. Natural Gas Supply, Disposition, and Prices
(Trillion Cubic Feet)
(1987 Dollars per Thousand Cubic Feet)

Supply, Disposition, and Prices	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Production															
Dry Gas Production	16.38	15.99	16.21	16.16	16.49	16.35	16.32	16.35	16.48	16.63	16.79	17.21	0.0	0.5	0.5
Supplemental Gas [1]	.13	.11	.15	.14	.14	.14	.14	.14	.14	.14	.14	.14	2.1	.0	-.5
Net Imports	.89	.69	.84	.89	1.07	1.16	1.26	1.36	1.46	1.65	1.75	2.50	5.5	7.9	8.7
Net Storage Withdrawals [2]	.23	-.12	.03	.12	-.02	.00	.00	-.01	-.01	-.02	-.02	-.01			
Total Supply [3]	**17.63**	**16.67**	**17.23**	**17.31**	**17.67**	**17.65**	**17.72**	**17.84**	**18.06**	**18.40**	**18.67**	**19.84**	**.0**	**1.2**	**1.1**
Consumption by Sector															
Residential	4.43	4.31	4.43	4.45	4.48	4.50	4.51	4.52	4.51	4.50	4.46	4.29	.3	-.5	-.2
Commercial [4]	2.43	2.32	2.33	2.31	2.34	2.38	2.42	2.45	2.48	2.50	2.51	2.53	-.4	.6	.7
Industrial	5.90	5.58	5.76	5.97	6.11	6.20	6.24	6.25	6.29	6.31	6.30	5.94	1.0	-.4	.2
Lease & Plant Fuel [5]	.97	.92	.95	1.01	1.03	1.02	1.02	1.02	1.03	1.04	1.05	1.09	1.1	.6	1.0
Transportation [6]	.50	.49	.50	.51	.52	.52	.52	.52	.53	.54	.55	.58	.6	1.2	1.2
Electric Utilities	3.04	2.60	2.89	2.72	2.85	2.68	2.65	2.71	2.86	3.17	3.45	5.05	-2.5	6.5	4.4
Total Consumption	**17.28**	**16.22**	**16.85**	**16.97**	**17.33**	**17.31**	**17.37**	**17.48**	**17.71**	**18.06**	**18.32**	**19.47**	**.0**	**1.2**	**1.1**
Unaccounted for [7]	.35	.43	.38	.34	.34	.34	.35	.35	.35	.34	.35	.36			
Average Wellhead Price	**2.65**	**2.00**	**1.83**	**1.91**	**1.99**	**2.06**	**2.17**	**2.30**	**2.48**	**2.70**	**2.94**	**4.43**	**-4.9**	**7.9**	**7.0**
Average Price by Sector															
Residential	6.47	6.00	5.51	5.68	5.76	5.82	5.91	6.03	6.20	6.40	6.64	8.07	-2.1	3.3	3.0
Commercial [4]	5.81	5.23	4.75	4.82	4.90	4.91	4.95	5.01	5.13	5.28	5.46	6.61	-3.3	3.0	2.6
Industrial	4.17	3.33	2.65	2.72	2.81	2.86	2.95	3.06	3.23	3.43	3.66	5.07	-7.3	5.9	5.1
Electric Utilities	3.75	2.50	2.34	2.39	2.48	2.56	2.69	2.83	3.03	3.26	3.51	5.08	-7.4	7.1	6.1
Average to All Sectors [8]	**4.99**	**4.25**	**3.73**	**3.83**	**3.90**	**3.96**	**4.06**	**4.16**	**4.32**	**4.49**	**4.69**	**6.01**	**-4.5**	**4.3**	**3.7**

[1] Includes synthetic natural gas (results from the manufacture, conversion, or the reforming of petroleum hydrocarbons), and propane-air mixtures.
[2] Includes net withdrawals of dry natural gas from underground storage and liquefied natural gas. A negative (-) result represents an increase to inventories and a decrease to total supply. A positive result represents a withdrawal from inventories and an increase to total supply.
[3] Total supply represents the sum of dry gas production, supplemental gas, net imports, and net storage withdrawals.
[4] Includes deliveries to municipalities and other public authorities for use in schools and other institutions.
[5] Represents natural gas used in gathering systems and processing plants.
[6] Represents natural gas used to fuel compressors in pipeline pumping stations.
[7] Represents the difference between total supply and total consumption.
[8] Weighted average price. The weights used are the sectoral consumption values excluding lease and plant fuel and the transportation sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

Table C10. Coal Supply, Disposition, and Prices
(Million Short Tons)
(1987 Dollars per Short Ton)

Supply, Disposition, and Prices	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
Total Production [1]	**884**	**890**	**917**	**915**	**928**	**954**	**969**	**986**	**1,008**	**1,032**	**1,054**	**1,111**	**1.5**	**1.5**	**1.5**
Imports	2	2	2	2	3	3	4	4	4	5	5	7	9.0	8.8	10.4
Exports [2]	93	86	78	74	76	79	81	83	86	88	91	91	-3.3	1.4	1.2
Net Imports	**-91**	**-83**	**-76**	**-72**	**-73**	**-76**	**-77**	**-79**	**-82**	**-83**	**-86**	**-84**	**-3.6**	**1.0**	**.7**
Net Storage Withdrawals [3]	28	-4	-3	-5	-3	-6	-5	-5	-5	-6	-6	-4			
Total Supply [4]	**821**	**803**	**838**	**838**	**851**	**872**	**887**	**902**	**921**	**942**	**962**	**1,024**	**1.2**	**1.6**	**1.6**
Consumption by Sector															
Residential/Commercial	8	8	8	7	7	7	7	7	7	7	7	7	-1.4	-.7	-1.2
Industrial	75	76	74	72	74	75	75	76	77	78	79	85	-.1	1.2	1.1
Coking Plants	41	36	36	38	37	36	35	34	34	34	33	30	-2.4	-2.0	-1.6
Electric Utilities	694	685	719	721	733	754	770	785	804	824	843	903	1.7	1.8	1.8
Total Consumption	**818**	**804**	**837**	**838**	**851**	**873**	**887**	**902**	**921**	**943**	**962**	**1,024**	**1.3**	**1.6**	**1.6**
Discrepancy [5]	3	-1	1	0	0	0	0	0	0	0	0	0			
Average Minemouth Price [6]	**26.63**	**24.50**	**22.99**	**23.25**	**23.56**	**23.89**	**24.19**	**24.52**	**24.88**	**25.24**	**25.55**	**27.17**	**-2.1**	**1.3**	**1.3**
Delivered Price by Sector															
Residential/Commercial	53.80	50.43	45.25	48.01	48.67	49.39	50.10	50.85	51.67	52.52	53.25	56.88	-1.7	1.4	1.8
Industrial	39.31	36.91	35.42	35.66	36.18	36.74	37.32	37.92	38.59	39.27	39.85	42.93	-1.3	1.6	1.5
Coking Plants	57.38	52.34	48.75	49.26	49.90	50.23	50.89	51.60	52.38	53.18	53.79	56.79	-2.6	1.2	1.2
Electric Utilities	36.49	34.29	31.63	32.05	32.53	32.77	33.34	33.94	34.59	35.23	35.87	39.21	-2.1	1.8	1.7
Average to All Sectors [7]	**37.97**	**35.51**	**32.84**	**33.27**	**33.74**	**33.98**	**34.51**	**35.07**	**35.70**	**36.34**	**36.94**	**40.14**	**-2.2**	**1.7**	**1.6**

[1] Includes anthracite, bituminous coal, and lignite.
[2] Excludes small quantities of anthracite shipped overseas to U.S. Armed Forces.
[3] From all stocks held by industrial plants, coke plants, electric utilities, and producers/distributors. A negative (-) result represents an increase to inventories. A positive result represents a withdrawal from inventories.
[4] Represents the sum of production, net imports, and net storage withdrawals.
[5] Represents the difference between total supply and total consumption.
[6] Free on board (F.O.B.) mines.
[7] Weighted average prices. The weights used are consumption values by sector.
Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.
Sources: Historical data: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); *State Energy Price and Expenditure Report 1985*, DOE/EIA-0376(85); *Quarterly Coal Report*, DOE/EIA-0121(87/2Q); values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88

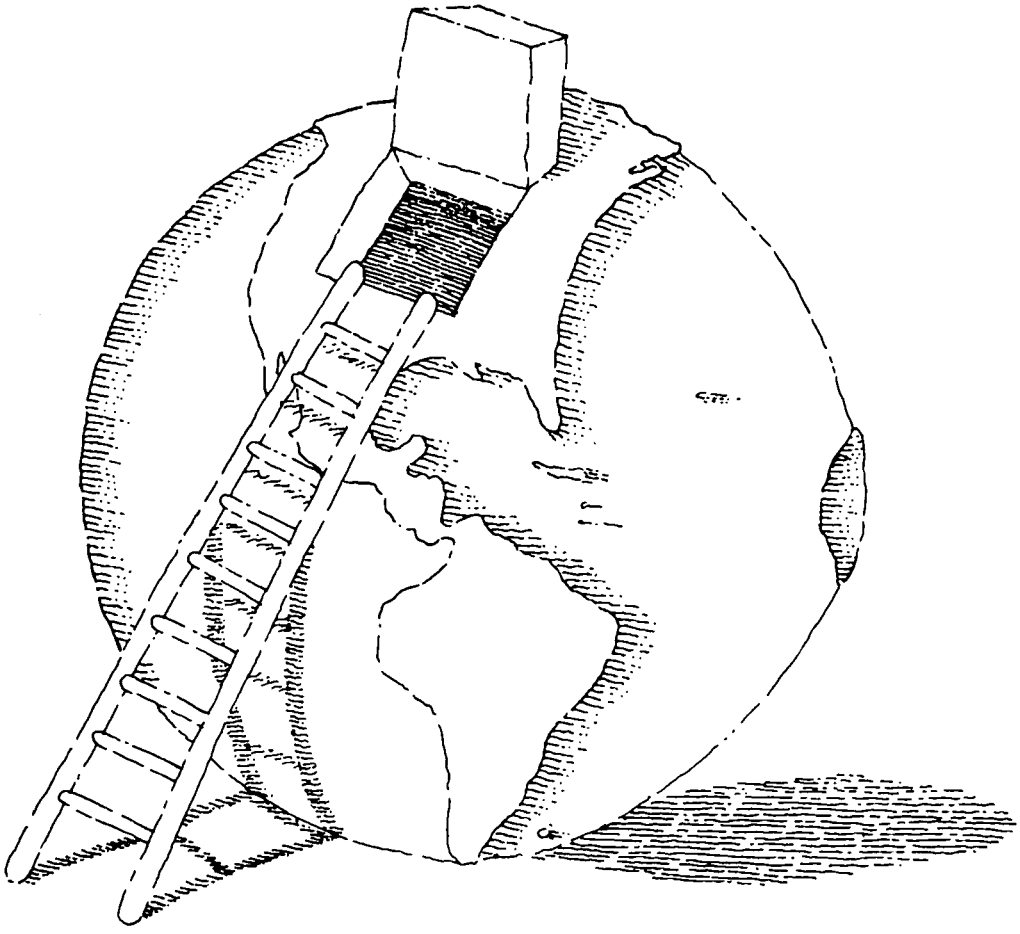
Table C11. National Macroeconomic Indicators

Macroeconomic Indicators	High World Oil Price - Low Growth Case												Annual Percent Growth		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	1985-1990	1990-2000	1987-2000
World Oil Price [1]															
1987 dollars per barrel	28.52	14.40	18.11	20.10	20.19	20.30	21.19	21.62	22.94	24.88	27.29	40.19	-6.6	7.1	6.3
Nominal dollars per barrel	26.99	13.98	18.11	20.80	21.98	23.20	25.43	27.21	30.54	35.15	41.06	81.93	-3.0	13.4	12.3
1982 dollars per barrel	24.27	12.25	15.42	17.11	17.19	17.27	18.04	18.40	19.53	21.17	23.23	34.21	-6.6	7.1	6.3
Economic Variables															
Real GNP (billion 1982 dollars)	3,607	3,713	3,815	3,878	3,969	4,055	4,146	4,248	4,341	4,426	4,482	4,892	2.4	1.9	1.9
Real Disposable Income (billion 1982 dollars)	2,542	2,645	2,b71	2,722	2,772	2,822	2,873	2,927	2,982	3,032	3,068	3,304	2.1	1.6	1.6
Real Disposable Income per Capita (thousand 1982 dollars)	10.6	11.0	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	12.3	1.2	.9	.9
GNP Implicit Price Deflator (1982=1.00)	1.112	1.141	1.175	1.216	1.279	1.343	1.410	1.479	1.564	1.660	1.768	2.395	3.8	6.0	5.6
Unemployment Rate (percent)	7.2	7.0	6.2	6.0	5.8	5.7	5.6	5.4	5.4	5.6	6.0	6.6			
Population, Noninstitutional (million persons)	239.0	241.3	243.5	245.6	247.8	250.0	252.1	254.2	256.2	258.1	259.9	268.4	.9	.7	.8
New AA Bond Rate (percent per annum)	11.79	8.94	9.49	9.37	9.77	10.00	10.26	10.46	10.67	10.89	11.07	11.37			
Energy Usage Indicators															
Gross Energy Use (quadrillion Btu)	74.0	74.2	76.2	76.6	77.8	78.7	79.3	80.0	80.9	81.8	82.4	85.3	1.2	.8	.9
Gross Energy Use per Capita (million Btu per person)	309.7	307.7	312.9	311.9	314.0	314.7	314.5	314.9	315.7	316.9	316.8	317.9	.3	.1	.1
Gross Energy Use per Dollar of GNP (thousand Btu per 1982 dollar)	20.5	20.0	20.0	19.8	19.6	19.4	19.1	18.8	18.6	18.5	18.4	17.4	-1.1	-1.1	-1.0
Energy/GNP Rate of Change (percent)															
1985-1990	-1.1														
1985-1995	-1.1														
1985-2000	-1.1														
1990-1995	-1.1														
1995-2000	-1.0														
1987-2000	-1.0														

[1] Represents the cost of imported crude oil to U.S. refiners.

Notes: Historical values are through 1986. Totals may not equal sum of components due to independent rounding.

Sources: Historical data: Data Resources, Inc. USMODEL database (January 1988); Enery Information Administration, *Monthly Energy Review*, DOE/EIA-0035(87/10); values for 1987 are estimates. Forecasts: Based on Run 826; File Creation Date 03/01/88; Report Date 03/01/88



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