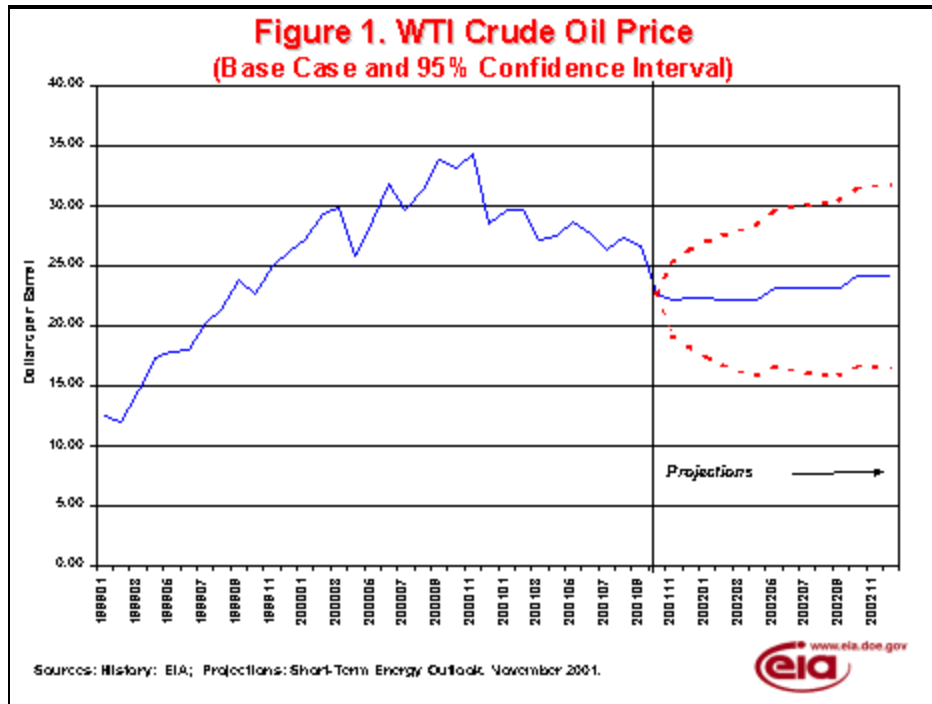


## Short-Term Energy Outlook

November 2001



### Overview

The precarious worldwide economic situation has generally dampened expectations for strong energy demand growth in the near term. Energy prices have (with the exception of natural gas) drifted lower over the last month. We expect monthly average crude oil prices to stabilize near current levels until next spring with some upward drift in the second half of 2002 if U.S. and world oil demand growth recovers.

**World Oil Markets.** The West Texas Intermediate (WTI) crude oil spot price averaged \$22.60 per barrel in October, \$4 below the September average and nearly \$11 below the estimated average for October 2000 (Figure 1). Although we believe that the downward

momentum of oil prices (enhanced lately by weakening world oil demand) is likely to be arrested by efforts by OPEC to restrain output, average prices are expected to be about \$2 per barrel lower through the forecast period than anticipated last month. World oil demand is now expected to average 75.7 million barrels per day in 2001, up only 400,000 barrels per day from the revised 2000 average of 75.3 million barrels per day. Demand growth in 2002 is currently expected to be about 800,000 barrels per day, slightly less growth than anticipated in last month's Outlook. Commercial oil stocks in OECD countries are expected to fall well within the average range throughout the forecast.

**U.S. Natural Gas Markets.** U.S. natural gas spot prices, having fallen to lows near \$1.90 per thousand cubic feet (mcf) during the first week of October, have rallied to above \$3 in late October and early November. Relatively low storage injections in recent weeks, steady reductions in drilling activity since July and intimations about below-normal temperatures this fall from the Weather Service have apparently engendered a generally bullish sentiment among gas market participants. It is our view that, assuming normal weather and taking into account the very weak condition of the U.S. industrial manufacturing sector, fundamental rationale for prices above \$3 per mcf is lacking. Therefore, we believe that some correction is likely and that prices over the next 5 months should remain in the \$2-\$3 range, with prices easing toward the lower end of that range during the off-season in 2002. Continued steady reductions in drilling effort, however, are likely to produce conditions favorable to substantial strengthening of natural gas prices going into 2003, especially if the U.S. economy stages a solid economic recovery beginning by mid 2002.

**Home Heating Costs Update.** Some rearrangement of relative price expectations since last month has shifted the winter home heating cost calculations slightly. In terms of total winter (October-March) 2001-2002 heating expenditures for households, the updated breakdown is as follows (Figure 2): Natural Gas: \$626, down 32 percent from last winter; Heating Oil: \$786, down 21 percent from year ago; Propane: \$1,002, down 23% from 2000-2001. In the important case of electric-heated homes, relatively little change is expected for the national average, as power requirements for heating should fall slightly while average residential electricity prices are expected to rise by about 2 percent.

## International Oil Markets

**Crude Oil Prices.** World oil prices fell on average by \$4-\$5 per barrel in October, depending upon the particular oil price being tracked. The U.S. average imported crude oil price in October was estimated at \$19 per barrel, while the U.S. benchmark West Texas Intermediate crude oil price fell by \$4 per barrel in "October to about \$22 per barrel ([Figure 1](#)). The OPEC "basket price", which generally tracks closely with the average imported crude oil price, averaged about \$19.50 per barrel. World oil prices are expected to firm in the fourth quarter with the onset of seasonal increases in world oil demand expected OPEC production quota reduction.

**International Oil Supply.** World oil markets have been expecting some sort of OPEC action to stem the decline in crude oil prices since mid-September. EIA estimates that OPEC overproduced by 900,00 barrels per day in October. Statements by OPEC that compliance with existing quotas has been improving have been insufficient to prevent prices from sliding. As a result, EIA's Outlook assumes that OPEC will agree to some sort of production cut when they meet this month to reassure markets and reduce supply. History suggests that OPEC generally achieves 60% - 70% of its agreed quota reductions in the months following the decision to cut, and EIA's Outlook assumes a real production cut of over 600,000 barrels per day, consistent with a quota cut of about 1 million barrels per day. It is assumed that OPEC will make a further cut in output in spring of 2002.

OPEC has requested that non-OPEC members join in its efforts to support world oil prices by cutting back on production. However, two key countries - Mexico and Norway - have indicated that they would not be cutting back, while Russia has indicated that it would support OPEC when it determined that it was in its own national interests. As a result, EIA's Outlook assumes that, while there may be some public statements of support from non-OPEC members, no substantial cutbacks from non-OPEC members will occur.

Non-OPEC production is expected to increase by about 1.1 million barrels per day in 2002, greater than the projected growth in demand. Russian oil production is expected to rise again as well workovers continue, although the projected growth of 300,000 barrels per day is less than the 500,000 barrels per day growth seen in 2001. Other large production increases are expected to result from new developments in Angola and Canada. As a result, the call on OPEC oil is expected to decline.

**International Oil Demand.** Economic forecasts for the United States, viewed as the engine for global economic and oil market growth, have been revised downwards again ([Figure 3](#)). As a result, global economic and oil market projections have been lowered. EIA's global oil demand growth projections for 2002 declined to 800,000 barrels per day, down from 1 million barrels per day in its previous Outlook ([Figure 4](#)).

The Outlook assumes that global jet fuel demand will decline by 10 percent during fourth quarter 2001. Following the initial stages of the terrorist crisis, commercial jet fuel use is projected to recover somewhat, with global jet fuel demand down by roughly 5 percent in 2002.

**World Oil Inventories.** OECD commercial oil stocks rose in August and September to the middle of their normal range, ending about 70 million barrels higher than last year's extremely low levels. The recent high level of OPEC above quota production, as well as the further decline in world oil demand following the events of September 11, are expected to result in continued increases in inventory levels relative to historical norms during fourth quarter 2001. With the expected cutbacks in OPEC production and seasonal increases in oil demand, OECD commercial stocks are projected to move back through the middle of their historical range by mid-2002, and slide toward the lower end of the range toward the end of 2002 ([Figure 5](#)).

## U. S. Energy Prices

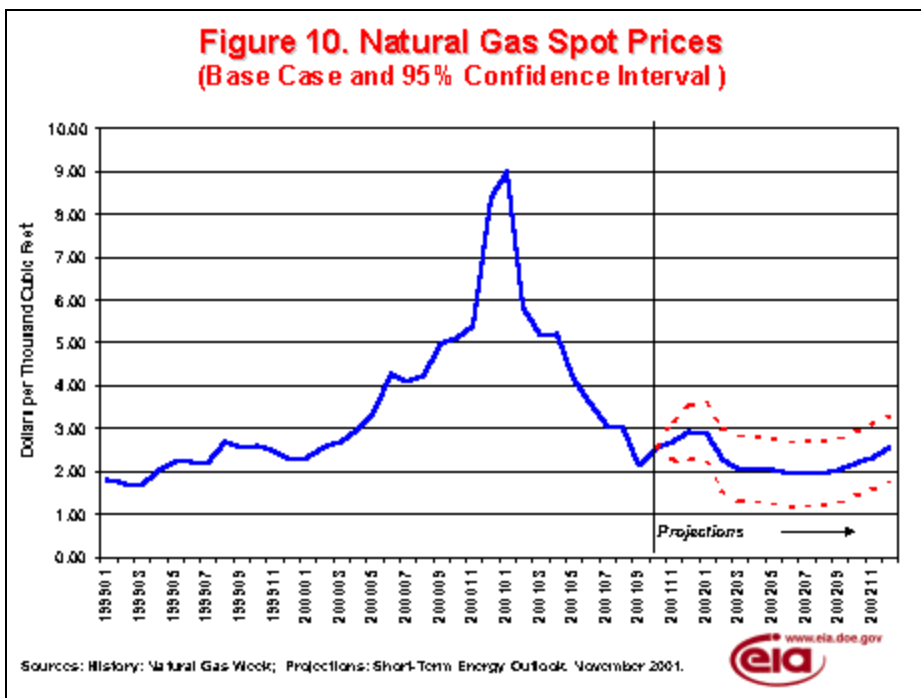
**Gasoline Prices:** Retail motor gasoline prices have fallen 6 weeks in a row since September 17. The pump price of regular gasoline averaged about \$1.53 per gallon in the period immediately preceding and after the terrorist attack of September 11. Since then, the price of gasoline has dropped an average of 29 cents per gallon. From September to October, the average monthly price fell by 20 cents per gallon ([Figure 6](#)). About 12 cents of this loss can be attributed to the drop in crude oil prices that transpired over the same period. An additional portion can be explained by the normal seasonal price dip that occurs with the end of the summer driving season. Finally, we are seeing the effects of rising gasoline inventories ([Figure 7](#)) and a slowing economy on refiner spreads (the difference between refiner price of gasoline and the price of crude oil). These spreads, which were fairly robust until recently, are starting to ease. With lower crude oil prices and a slowing economy, we expect prices to continue their decline through December, ending the year at \$1.15 per gallon. However, by next spring, prices should commence their usual seasonal rebound as the driving season begins. Assuming our base crude oil price paths holds without major production problems or other disruptions, we can expect to see pump prices gain about 22 cents per gallon from December to next June. Much of this gain will be due to the increase in gasoline demand that occurs during the

driving season. An estimated additional 4-5 cents per gallon price increase will be the result of the seasonal transition to reformulated gasoline. Nevertheless, assuming no major gasoline supply problems the projected retail price of gasoline during the next driving season is expected to be about 20 cents per gallon lower than last year's driving season prices.

**Distillate Fuel Oil (Diesel and Heating Oil):** Diesel fuel oil prices, like the price of gasoline, have also tumbled from September to October, falling by an average of 15 cents per gallon (Figure 8). Many of the same conditions that have lowered gasoline prices, namely lower crude costs and a relatively weak economy, have also lowered the price of the distillate fuels. Compared to the last winter, diesel prices are projected to be about 25 cents per gallon lower. Home heating oil prices are projected to be 21 cents per gallon lower during this quarter compared to the fourth quarter of last year. Much of this is due to the fact that U.S. crude oil costs are expected to be much lower this winter--around \$7.70 per barrel (about 30 percent) less than a year ago. Normally, around this time of year, diesel prices rise as overall demand for total distillate fuel oil increases during the heating season. However, with these reduced crude oil prices, an economic decline along with adequate distillate inventories, diesel prices are projected to dip over the next few months.

The first month (October) of the heating season has been completed with distillate stocks 11 million barrels above last year's levels (Figure 9). Most of this year-to-year gain has occurred on the East Coast, where 75 percent of the nation's residential heating oil is consumed. By the end of November, when distillate stocks normally peak, we expect total U.S. inventories to be over 132 million barrels, a number that lies within the "normal" range and is about 10 percent above last year's level. (However, this is still about 3 percent below the previous 5-year average.) Another factor favoring moderate distillate fuel prices this winter is the current and near-term natural gas price and supply situation. Low natural gas prices and above average inventories of natural gas will tend to keep pressure on distillate markets from fuel-switching activity to a minimum. Last winter, very high natural gas prices resulted in significant fuel switching, which caused upward pressure on all distillate product prices.

**Figure 10. Natural Gas Spot Prices  
(Base Case and 95% Confidence Interval)**



**Natural Gas:** Several weeks ago, for the first time since the spring of 1999, the spot price of natural gas actually dropped below \$2.00 per thousand cubic feet. A weakening economy, moderate summer weather, ample underground natural gas storage, and low world oil prices have all led to conditions that reduce natural gas prices. Interestingly, the spot prices have recently risen to over \$3.00 per thousand cubic feet. Concern within the industry about possible lagging production, coupled with regional spells of cold weather and perhaps a general kitchiness that resulted from the terrorist attacks in September, have caused uncertainty and price volatility within the spot and futures natural gas markets. However, the fundamentals are simply not there for a significant sustained rebound in prices, as indicated by prices bid in

the recent futures market. Although our current price projection for natural gas is a little higher than our previous month's projection, we continue to believe that natural gas wellhead prices will generally stay below \$3.00 per thousand cubic feet through 2002 (Figure 10). These relatively low natural gas prices should persist throughout the forecast period due to weak industrial demand and relatively high inventories that are likely to continue throughout the winter, assuming normal weather and barring any major supply disruptions. At the end of October, working gas in underground storage is estimated to have been about 17 percent above last year's level. This year-to-year percent difference is projected to grow (again, assuming normal weather) throughout the heating season. By the end of February 2002, working gas in underground storage is projected to be over 60 percent above the level experienced last February. Wellhead prices this winter are still projected to be less than half the price they were last winter. The average for 2001 is now projected to be about \$4.16 per thousand cubic feet. In 2002, we expect inventories to remain at relatively high levels and, therefore, we expect the average annual wellhead price to about \$2.20 per thousand cubic feet.

**Electric Utility Fuels:** In August, the delivered (to electric utilities) prices of natural gas and heavy oil had achieved parity on an average Btu basis, after a year-long situation of gas being the more expensive fuel. The following month, the price of delivered natural gas to electric utilities dropped to about 13 percent below the heavy fuel oil price. However, when the heating season began, the price differences once again narrowed. During this winter, it is expected that natural gas prices will experience a more pronounced uptick than oil prices ([Figure 11](#)). Thus, natural gas is not expected to return to its historical price advantage until the heating season is over. By next spring, natural gas prices are expected to once more decline, while oil prices gain slightly. In the first half of this year, the spot price of coal to electric utilities increased noticeably, because of pressures for coal substitution for expensive gas and also because of the very tight storage situation for coal at power generating stations. During this period, the composite price of coal to electric utilities also increased but to a lesser extent, as the composite price also includes long-term contracts. As the year ends, we see coal stocks rebounding. In addition, gas prices have moderated, particularly with respect to the prices seen last winter. Thus, coal prices have been retreating. Nevertheless, coal prices are expected to increase slightly this year, after years of annual price declines. Next year, coal prices should continue to recede as coal stocks gain and natural gas prices remain relatively low.

## U.S. Oil Demand

In this, our second Outlook issued after the September 11 terrorist attacks, we find it necessary to once again reduce the level of petroleum demand expected over the next few quarters. Obviously the attacks themselves have had profound general effects on economic activity and consumption patterns (due to lower consumer and business confidence levels, for example) as well as some very specific impacts on oil demand (particularly the reductions in airline travel and consumption of jet fuel). It is impossible to attribute specific proportions of change in activity levels to particular events, such as September 11, but it is of interest to recap where we think the U.S. demand picture is now compared to the view we presented just prior to the attacks.

It has become clear that the near-term weaknesses in petroleum demand are likely to be even more significant than those posited in the previous Outlook. The third quarter turned out to be weaker than previously estimated, and the current quarter is now likely to witness a year-over-year decline of over 300,000 barrels per day and substantial year-to-year declines during the first half of 2002. Summarized below is a comparison of current projections of total petroleum demand in million barrels per day with Outlooks preceding the events of September 11:

	Current	September	Change
2001Q3	19.721	20.059	-0.338
2001Q4	19.691	19.975	-0.284
2002Q1	19.900	20.142	-0.242
2002Q2	19.703	20.002	-0.269
2002Q3	20.158	20.451	-0.293
2002Q4	20.249	20.539	-0.290

For the current year, total petroleum demand is projected to average 19.717 million barrels per day, up just 16,000 barrels per day, or less than 0.1 percent, from the previous year ([Figure 12](#)). (The year-to-year change, in the absence of strong weather-related demand in the first quarter, would have been slightly negative, even if the events of September 11 had not occurred). In the year 2002, demand is projected to average 20.004 million barrels per day, up 287,000 barrels per day, or 1.5 percent, above the 2000 average.

Weakness in petroleum demand is most evident in the jet fuel and distillate fuel oil markets. Jet fuel demand is projected to decline in response to the substantial reduction in revenue ton-miles, which precipitated announcements by air carriers of almost immediate capacity curtailments ranging from 15 to 30 percent. The reduction in capacity is estimated to be 20 percent in October. Although air activity is expected to recover gradually during the forecast interval, both capacity and utilization are still expected to be 5 percent less than what was projected prior to the events of September 11. As a result, commercial jet fuel demand is projected to decline more than 3 percent in 2001 and remain flat in 2002. Partly offsetting the decline in commercial jet fuel demand, however, is a slight increase in military jet fuel demand. Nonetheless, jet fuel accounts for more than one quarter of the terrorist-related decline in petroleum products demand in the above table.

**Distillate fuel oil** demand is also expected to shrink in response to the projected decline in industrial production throughout the forecast interval. It accounts for half of the decline in petroleum products demand summarized above. Nonetheless, total distillate demand in 2001 is projected to climb 3.0 percent, largely as a result of heating-oil demand in the first quarter of the year and continued, but slower, growth in transportation diesel. In 2002, total demand is projected to decline 1.6 percent, due

to weak industrial and commercial activity levels. The assumption of normal weather is also expected to contribute to the demand shrinkage.

**Motor gasoline** demand is also expected to show the effects of the weakened economic outlook, but that fuel accounts for about only 10 percent of the total change in demand outlook that has developed over the last two months. The effects of slowing personal disposable income growth are expected to be mitigated by a preference for automobile travel over aircraft and a continued reduction in retail pump prices. For 2001, motor gasoline demand is projected to increase 1.4 percent followed by a 2.4-percent increase in 2002.

## **U.S. Oil Supply**

Average domestic oil production is expected to increase by 11,000 barrels per day or 0.2 percent in 2001, to a level of 5.83 million barrels of oil per day. For 2002, a 1.6 percent decrease is expected and results in a production rate of 5.74 million barrels of oil per day average for the year ([Figure 13](#)).

Lower-48 States oil production is expected to increase by 8,000 barrels per day to a rate of 4.86 million barrels per day in 2001, followed by a decrease of 66,000 barrels per day in 2002. Shell's Brutus platform started production in the third quarter of 2001 with peak oil production expected at 100,000 in 2002. Oil production from the Mars, Troika, Ursa, Diana-Hoover, and Brutus Federal Offshore fields is expected to account for about 10.0 percent of the lower-48 oil production by the 4th quarter of 2002.

Alaska is expected to account for 16.5 percent of the total U.S. oil production in 2002. Alaska oil production is expected to increase by 0.4 percent in 2001 and again decrease by 2.9 percent in 2002. The increase in 2001 is the result of adding two new satellite fields, Colville River (Alpine) and Prudhoe Bay (Aurora), which contributed to the Alaska North Slope production. The initial rate from Alpine averaged 74,000 barrels per day during March 2000, increasing to an average 97,000 barrels per day in September 2000. Another satellite field, North Star, is expected to come on in early to mid 2002 and will peak at a rate of 65,000 barrels per day later that year. Production from the Kuparuk River field plus like production from West Sak, Tabasco and Tarn fields is expected to stay at an average of 217,000 barrels per day in the 2001 and 2002 forecast periods.

## **Natural Gas Demand and Supply**

While price conditions have now swung back in favor of using natural gas as a result of lower demand, the depressed natural gas demand situation is not expected to improve appreciatively until 2002 due to lowered assumptions about economic growth for this year. Natural gas demand in 2001 is expected to fall by 3.3 percent as the economic outlook has been revised downward since October. This drop in natural gas demand in 2001 is based on lower projections of demand by the industrial and utility sectors, which are projected to fall by 3.8 and 13.5 percent, respectively, compared with 2000 ([Figure 14](#)).

Based on EIA survey data and recent information from the American Gas Association on early-season storage additions, we estimate that, on an EIA survey basis, working gas in storage at the end of October was 3,143 billion cubic feet. Storage is well above last year's level and also above the previous 6-year seasonal range ([Figure 15](#)). As storage levels have risen, spot natural gas prices have fallen. In October, spot wellhead gas prices averaged about \$2.58 per thousand cubic feet (mcf).

Heating degree-days this winter are assumed to be normal, or 7.8 percent lower than last winter. Thus, winter demand for natural gas is projected to decline by 2.9 percent compared with growth of 6.3 percent last winter. Residential and commercial demand for natural gas is expected to be 6.6 and 5.5 percent, respectively, lower than last winter. In the case of the residential sector, the assumption of normal weather is the primary factor, while in the commercial sector the flat economy is an additional factor. Electric utility demand for natural gas is expected to be down this winter, as is industrial gas demand in the fourth quarter of 2001. In the first quarter of 2002, industrial demand is projected to begin to rise as a result of the gradually reviving economy and also the reversal of significant fuel substitution away from natural gas that occurred as a result of the gas market squeeze that developed last winter.

Thus, spot wellhead prices, which averaged \$6.49 per thousand cubic feet last winter, are expected to be almost two-thirds lower this winter at about \$2.58 per thousand cubic feet.

Domestic natural gas production is expected to grow by 1.4 percent in 2001 and by 1.3 percent in 2002. After reaching a high of 1,058 rigs drilling during the month of July, the rig count has been falling since then due to the drop in natural gas prices and falling industrial demand. Net imports of natural gas are projected to rise by about 3.1 percent in 2001 and by 3.3 percent

in 2002.

## Electricity Demand and Supply

Total annual electricity demand growth (retail sales plus industrial generation for own use and other direct sales) is projected to be flat in 2001, but to revive somewhat to 1.6 percent in 2002. This is compared with estimated demand growth in 2000 of 2.8 percent over 1999's level. Electricity demand growth is expected to be slower in the forecast years than it was in 2000 ([Figure 16](#)) mainly because the economy is growing much more slowly than it was in 2000.

Electricity demand in the industrial sector has been adversely affected by the overall economic slowdown. Growth in the demand for electricity in the industrial sector is expected to be negative in 2001 compared to its 2000 level, falling by 68 billion kilowatt hours (6.4 percent). Industrial demand is expected to stabilize in 2002 along with the economy. In 2001, growth in residential and commercial demand for electricity is expected to be 2.7 percent and 3.3 percent, respectively, due mainly to continued expansion of the customer base and weather effects. The commercial sector is expected to be weaker next year because of the lack of weather effects and very slow growth in commercial employment.

This winter, total electricity demand growth is expected to be negative (down 1.8 percent) compared with last winter's demand growth of 4.6 percent due both to a weaker industrial economy and the assumption of normal weather.

## Table HL1. U. S. Energy Supply and Demand

(Energy Information Administration/Short-Term Energy Outlook -- November 2001)

	Year				Annual Percentage Change		
	1999	2000	2001	2002	1999-2000	2000-2001	2001-2002
<b>Real Gross Domestic Product (GDP)</b> (billion chained 1996 dollars)	8857	9224	9315	9493	4.1	1.0	1.9
<b>Imported Crude Oil Price <sup>a</sup></b> (nominal dollars per barrel)	17.22	27.72	22.54	19.92	61.0	-18.7	-11.6
<b>Petroleum Supply (million barrels per day)</b>							
Crude Oil Production <sup>b</sup>	5.88	5.82	5.83	5.74	-1.0	0.2	-1.5
<b>Total Petroleum Net Imports</b> (including SPR)	9.91	10.42	10.60	10.94	5.1	1.7	3.2
<b>Energy Demand</b>							
<b>World Petroleum</b> (million barrels per day)	74.9	75.3	75.7	76.4	0.5	0.5	0.9
<b>Petroleum</b> (million barrels per day)	19.52	19.70	19.72	20.00	0.9	0.1	1.4
<b>Natural Gas</b> (trillion cubic feet)	21.70	22.76	22.02	23.00	4.9	-3.3	4.5
<b>Coal <sup>c</sup></b> (million short tons)	1045	1082	1095	1111	3.5	1.2	1.5
<b>Electricity (billion kilowatthours)</b>							
Retail Sales <sup>d</sup>	3312	3413	3411	3476	3.0	-0.1	1.9
Nonutility Use/Sales <sup>e</sup>	189	187	187	179	-1.1	0.0	-4.3
<b>Total</b>	<b>3501</b>	<b>3600</b>	<b>3597</b>	<b>3655</b>	<b>2.8</b>	<b>-0.1</b>	<b>1.6</b>
<b>Total Energy Demand <sup>f</sup></b> (quadrillion Btu)	97.2	99.5	98.5	101.0	2.4	-1.0	2.5
<b>Total Energy Demand per Dollar of GDP</b> (thousand Btu per 1996 Dollar)	10.97	10.79	10.58	10.64	-1.6	-1.9	0.6
<b>Renewable Energy as Percent of Total <sup>g</sup></b>	7.2	6.9	6.4	7.0			

<sup>a</sup>Refers to the refiner acquisition cost (RAC) of imported crude oil.

<sup>b</sup>Includes lease condensate.

<sup>c</sup>Total Demand includes estimated Independent Power Producer (IPP) coal consumption.

<sup>d</sup>Total of retail electricity sales by electric utilities and power marketers. Utility sales for historical periods are reported in EIA's *Electric Power Monthly* and *Electric Power Annual*. Power marketers' sales for historical periods are reported in EIA's Electric Sales and Revenue, Appendix C. Data for 2000 are estimates.

<sup>e</sup>Defined as the sum of nonutility facility use of onsite net electricity generation plus direct sales of power by nonutility generators to third parties, reported annually in Table 7.5 of the Monthly Energy Review (MER). Data for 2000 are estimates.

<sup>f</sup>The conversion from physical units to Btu is calculated by using a subset of conversion factors used in the calculations performed for gross energy consumption in Energy Information Administration, *Monthly Energy Review (MER)*. Consequently, the historical data may not precisely match those published in the *MER* or the *Annual Energy Review (AER)*.

<sup>g</sup>Renewable energy includes minor components of non-marketed renewable energy, which is renewable energy that is neither bought nor sold, either directly or indirectly, as inputs to marketed energy. The Energy Information Administration does not estimate or project total consumption of non-marketed renewable energy.

SPR: Strategic Petroleum Reserve.

Notes: Minor discrepancies with other published EIA historical data are due to independent rounding. Historical data are printed in bold; forecasts are in italics. The forecasts were generated by simulation of the Short-Term Integrated Forecasting System.

Sources: Historical data: Latest data available from Bureau of Economic Analysis and Energy Information Administration; latest data available from EIA databases supporting the following reports: *Petroleum Supply Monthly*, DOE/EIA-0109; *Petroleum Supply Annual*, DOE/EIA-0340/2; *Natural Gas Monthly*, DOE/EIA-0130; *Electric Power Monthly*, DOE/EIA-0226; and *Quarterly Coal Report*, DOE/EIA-0121; *International Petroleum Statistics Report* DOE/EIA-0520; *Weekly Petroleum Status Report*, DOE/EIA-0208. Macroeconomic projections are based on DRI/McGraw-Hill Forecast CONTROL1001.