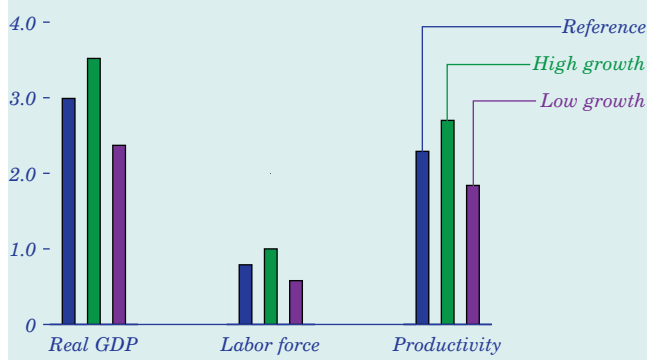


## Trends in Economic Activity

### Strong Economic Growth Is Expected To Continue Through 2030

**Figure 24. Average annual growth rates of real GDP, labor force, and productivity in three cases, 2004-2030 (percent per year)**

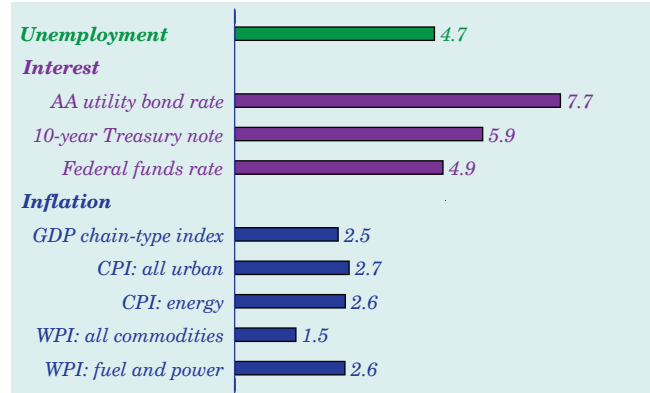


*AEO2006* presents three views of economic growth for the forecast period from 2004 through 2030. Although probabilities are not assigned, the reference case reflects the most likely view of how the economy will unfold over the period. In the reference case, the Nation's economic growth, measured in terms of real GDP based on 2000 chain-weighted dollars, is projected to average 3.0 percent per year (Figure 24). The labor force is projected to grow by 0.8 percent per year on average; labor productivity growth in the nonfarm business sector is projected to average 2.3 percent per year; and investment growth is projected to average 4.0 percent per year. Disposable income grows by 3.1 percent per year in the reference case and disposable income per capita by 2.2 percent per year. Nonfarm employment grows by 1.1 percent per year, while employment in manufacturing shrinks by 0.5 percent per year.

The high and low economic growth cases show the effects of alternative growth assumptions on the energy market projections. The high growth case assumes higher growth rates for population (1.2 percent per year), nonfarm employment (1.4 percent), and productivity (2.7 percent). With higher productivity gains and employment growth, projected inflation and interest rates are lower than in the reference case. The low growth case assumes lower growth rates for population (0.5 percent per year), nonfarm employment (0.7 percent per year), and productivity (1.8 percent per year), resulting in higher projections for prices and interest rates and lower projections for industrial output growth.

### Unemployment, Interest, and Inflation Rates Near Historical Norms

**Figure 25. Average annual unemployment, interest, and inflation rates, 2004-2030 (percent per year)**

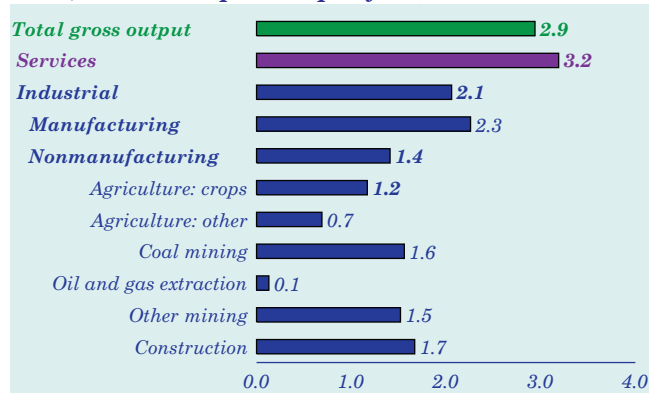


In the reference case, U.S. economic indicators generally are projected to follow historical trends, on average, from 2004 through 2030. Economic factors that are widely viewed as barometers for conditions in the markets for labor, credit, and goods and services include: the average annual unemployment rate; yields on Federal funds, 10-year U.S. Treasury notes, and AA utility corporate bonds; and average annual inflation rates as measured by various wholesale and retail price indexes (Figure 25). For *AEO2006*, unemployment and interest rates are calculated as annual averages over the 2004-2030 period, and inflation rates are calculated as average annual percent changes in the price indexes.

From 2004 through 2010, the economy (in terms of real GDP) is projected to grow more rapidly than its projected long-term average growth rate in the reference case. Over the same period, the unemployment rate is projected to decline from 5.5 percent in 2004 to 4.7 percent in 2010. After an initial rise through 2015, the Federal funds rate is projected to decline to its historical norm of 5 percent. Longer term rates are expected to be higher than the Federal funds rate, with the 10-year Treasury note yielding 6 percent and AA utility corporate bonds yielding approximately 8 percent per year, on average, for the entire forecast period. The reference case projects an average annual inflation rate of 2.7 percent, as measured by all urban CPI—slightly higher than the CPI for energy commodities and services or the wholesale price index (WPI) for fuel and power.

### Output Growth for Energy-Intensive Industries Is Expected To Slow

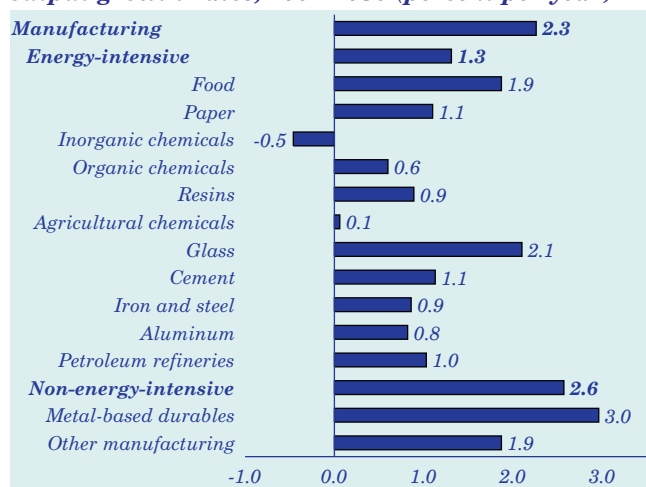
Figure 26. Sectoral composition of output growth rates, 2004-2030 (percent per year)



The industrial sector (all non-service industries) has shown slower output growth than the economy as a whole in recent decades, with imports meeting a growing share of demand for industrial goods. That trend is expected to continue in the reference case projections.

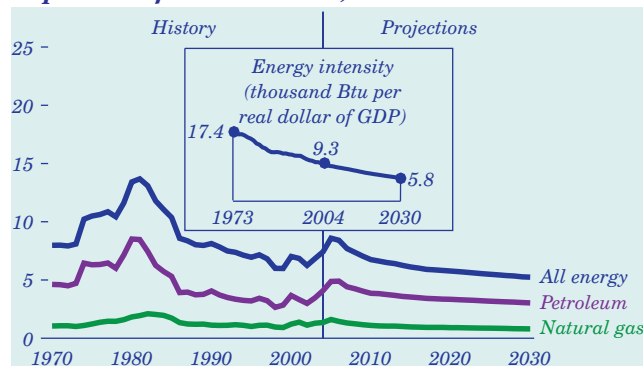
Within the industrial sector, the output of manufacturing industries is projected to grow more rapidly than that of nonmanufacturing industries, which include agriculture, mining, and construction (Figure 26). With higher energy prices and more foreign competition expected, however, the energy-intensive manufacturing sectors [84] are projected to grow by only 1.3 percent per year from 2004 through 2030, compared with a projected 2.6-percent average annual rate of growth for non-energy-intensive manufacturing output (Figure 27).

Figure 27. Sectoral composition of manufacturing output growth rates, 2004-2030 (percent per year)



### Energy Expenditures Relative to GDP Are Projected To Decline

Figure 28. Energy expenditures as share of gross domestic product, 1970-2030 (nominal expenditures as percent of nominal GDP)



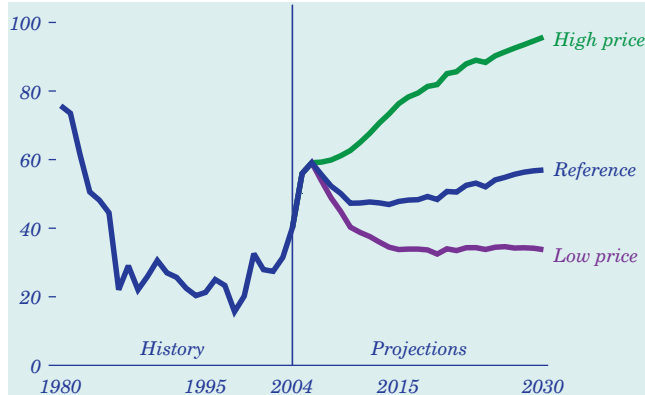
The ratio of total expenditures for energy relative to total GDP (both in nominal dollars) provides an indication of the importance of energy expenditures in the aggregate economy. Before the oil embargo of 1973-74, total energy expenditures were equal to 8 percent of U.S. GDP, petroleum expenditures just under 5 percent, and natural gas expenditures 1 percent. Following the price shocks of the 1970s and early 1980s, those shares rose dramatically—to 14 percent, 8 percent, and 2 percent, respectively, in 1981. Since then they have fallen consistently, to 2004 levels of about 7 percent for total energy expenditures, 4 percent for petroleum expenditures, and just over 1 percent for natural gas expenditures. Although recent developments in the world oil market have pushed the shares upward, they are projected to decline from current levels in the reference case. In 2030, total nominal energy expenditures are projected to equal 5 percent of nominal GDP, petroleum expenditures 3 percent, and natural gas expenditures less than 1 percent (Figure 28).

The overall decline in energy expenditures relative to GDP has resulted in large part from a decline in world oil prices (in real dollar terms) from their peak in 1981. And although oil prices have risen recently, their long-term trajectory in the AEO2006 reference case is relatively flat in real terms. Another reason for the declining share of energy expenditures has been a steady decline in the energy intensity of the U.S. economy, measured as energy consumption (thousand Btu) per dollar of real GDP. Structural shifts in the economy and improvements in energy efficiency have allowed for the decline in energy intensity, which is projected to continue through 2030.

## International Oil Markets

### Oil Price Cases Show Uncertainty in Prospects for World Oil Markets

**Figure 29. World oil prices in three cases, 1980-2030 (2004 dollars per barrel)**



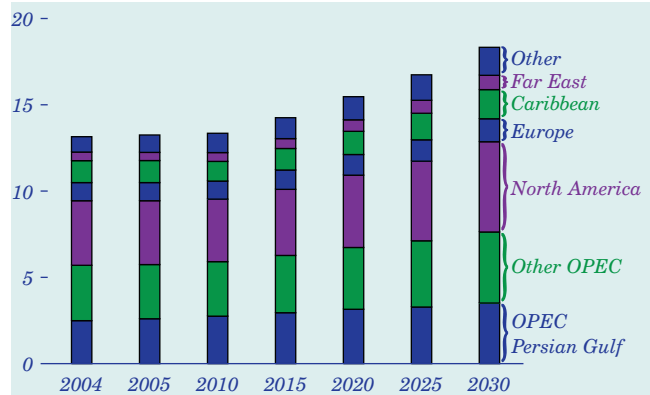
World oil price projections in the *AEO2006* reference case, in terms of the average price of imported low-sulfur crude oil to U.S. refiners, are considerably higher than those presented in the *AEO2005* reference case. The higher price path in the reference case does not result from different assumptions about the ultimate size of world oil resources but rather anticipates a lower level of future investment in production capacity in key resource-rich regions and a reassessment of the willingness of OPEC to produce at higher rates than projected in last year's outlook.

The historical record shows substantial variability in world oil prices, and there is arguably even more uncertainty about future prices in the long term. *AEO2006* considers three price cases, allowing an assessment of alternative views on the course of future oil prices (Figure 29). In the reference case, world oil prices moderate from current levels to \$47 per barrel in 2014, before rising to \$57 per barrel in 2030 (2004 dollars). The low and high price cases define a wide range of potential world oil price paths, which in 2030 range from \$34 to \$96 per barrel. This variability is meant to show the uncertainty about prospects for future world oil resources and economics.

In all three price cases, non-OPEC suppliers produce to capacity. Thus, the variation in price paths has the greatest impact on the need for OPEC supply in the long term. In 2030, the call on OPEC is 46.8 million barrels per day in the reference case and 51.3 million barrels per day in the low price case, but only 31.7 million barrels per day in the high price case—not much more than current OPEC production levels.

### Oil Imports Reach More Than 18 Million Barrels per Day by 2030

**Figure 30. U.S. gross petroleum imports by source, 2004-2030 (million barrels per day)**



Total U.S. gross petroleum imports increase in the reference case, from 13.1 million barrels per day in 2004 to 18.3 million in 2030 (Figure 30), deepening U.S. reliance on imported oil in the long term. In 2030, gross petroleum imports account for 64 percent of total U.S. petroleum supply.

More than one-half of the increase in U.S. gross imports comes from OPEC suppliers. Crude oil imports from the North Sea decline as production ebbs, and West Coast refiners import small volumes of crude oil from the Far East to replace a decline in supplies of Alaskan crude oil. Canada and Mexico continue to be important sources of U.S. petroleum supply. Much of the future Canadian contribution comes from the development of its enormous oil sands resource base; however, the availability of such nonconventional oil supplies is linked to world oil prices. In the high price case, nonconventional supplies are more competitive with conventional sources, rising to about 21.1 million barrels per day worldwide in 2030. In the low price case, nonconventional production totals only 7.1 million barrels per day in 2030.

U.S. imports of refined petroleum products also increase. Most of the increase comes from refiners in the Caribbean Basin, North Africa, and the Middle East, where refining capacity is expected to expand significantly. Vigorous growth in demand for lighter petroleum products in developing countries means that U.S. refiners are likely to import smaller volumes of light, low-sulfur crude oils.