

Market Trends

The projections in *AEO2008* are not statements of what will happen but of what might happen, given the assumptions and methodologies used. The projections are business-as-usual trend estimates, given known technology and technological and demographic trends. *AEO2008* assumes that current laws and regulations are maintained throughout the projections. Thus, the projections provide a policy-neutral reference case that can be used to analyze policy initiatives. EIA does not propose, advocate, or speculate on future legislative and regulatory changes. Unless otherwise noted, laws and regulations are assumed to remain as currently enacted. Further, future laws and regulatory actions are not anticipated.

Because energy markets are complex, models are simplified representations of energy production and consumption, regulations, and producer and consumer behavior. Projections are highly dependent on the data, methodologies, model structures, and assumptions used in their development. Behavioral characteristics are indicative of real-world tendencies rather than representations of specific outcomes.

Energy market projections are subject to much uncertainty. Many of the events that shape energy

markets are random and cannot be anticipated, including severe weather, political disruptions, strikes, and technological breakthroughs. In addition, future developments in technologies, demographics, and resources cannot be foreseen with certainty. Many key uncertainties in the *AEO2008* projections are addressed through alternative cases.

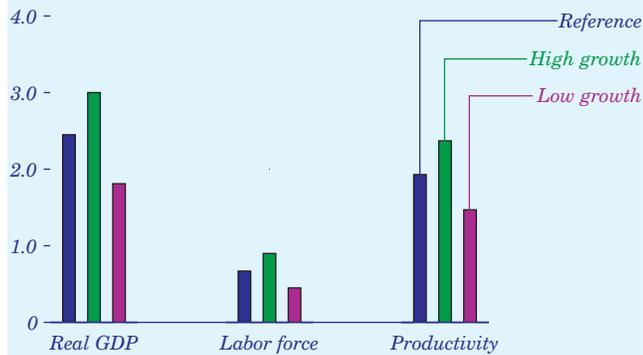
EIA has endeavored to make these projections as objective, reliable, and useful as possible; however, they should serve as an adjunct to, not a substitute for, a complete and focused analysis of public policy initiatives.

The *AEO* production process was somewhat different this year. After EIA published an early-release version of the *AEO2008* reference case in December 2007, EISA2007 was enacted later that month. EIA decided to update the reference case to reflect the provisions of EISA2007. The *AEO2008* reference case, released in March 2008, also includes additional revisions that reflect historical data issued after the *AEO2008* early-release reference case was completed, as well as new data from EIA's January 2008 *Short-Term Energy Outlook (STEO)*, a more current economic outlook, and technical updates to the version of NEMS used to produce the early release.

Trends in Economic Activity

AEO2008 Presents Three Views of Economic Growth

Figure 32. Average annual growth rates of real GDP, labor force, and productivity, 2006-2030 (percent per year)

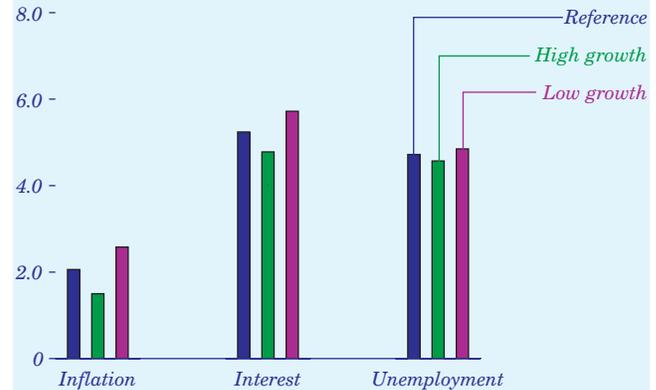


AEO2008 presents three views of economic growth for the 2006-2030 projection period. Economic growth depends mainly on growth in the labor force and productivity. In the reference case, the labor force grows by an average of 0.7 percent per year; labor productivity in the nonfarm business sector grows by 1.9 percent per year; and growth in real GDP averages 2.4 percent per year (Figure 32). In line with the labor and output trends, nonfarm employment grows by 0.9 percent per year, while employment in manufacturing shrinks by 1 percent per year. Investment growth averages 2.8 percent per year in the reference case; disposable income available to households grows by 2.8 percent per year; and disposable income per capita increases by 1.9 percent per year.

The high and low economic growth cases show the effects of alternative economic growth assumptions on the energy market projections (see Appendix E for descriptions of all the alternative cases). In the high growth case, real GDP growth averages 3.0 percent per year, as a result of higher assumed growth rates for the labor force (0.9 percent per year), nonfarm employment (1.2 percent), and nonfarm labor productivity (2.4 percent). With higher productivity gains and employment growth, inflation and interest rates are lower than in the reference case. In the low growth case, growth in real GDP is 1.8 percent per year, as a result of lower assumed growth rates for the labor force (0.4 percent per year), nonfarm employment (0.5 percent per year), and labor productivity (1.5 percent per year). Consequently, the low growth case shows higher inflation and interest rates and slower growth in industrial output and employment than are projected in the reference case.

Projected Gains in Labor Productivity Are Higher Than Historical Averages

Figure 33. Average annual inflation, interest, and unemployment rates, 2006-2030 (percent per year)

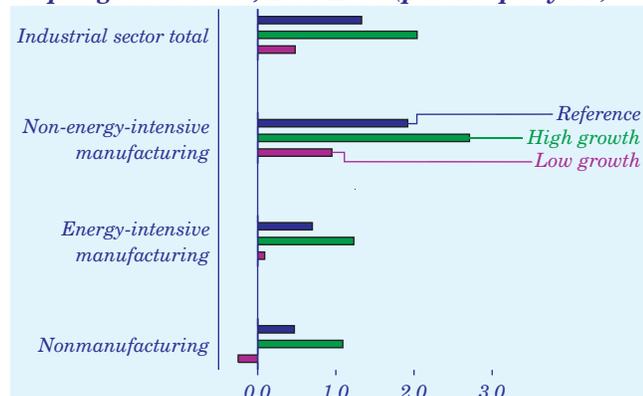


Common indicators for inflation, interest rates and employment are, respectively, the all-urban consumer price index, the interest rate (yield) on 10-year U.S. Treasury notes, and the nonfarm unemployment rate, which are widely viewed as barometers of conditions in the markets for goods and services, credit, and labor, respectively. Historically, from 1982 to 2006, inflation has averaged 3.1 percent per year, the average yield on 10-year Treasury notes has been 7.2 percent per year, and the unemployment rate has averaged 6.1 percent. In the AEO2008 reference case, as well as in the high and low economic growth cases, projected gains in nonfarm labor productivity—although lower than those seen during the 1990s—are generally higher than the historical averages of the 1980s, leading to more optimistic projections for inflation, interest, and unemployment rates.

In AEO2008, the projected average annual inflation rate over the 2006-2030 period is 2.1 percent in the reference case, 1.5 percent in the high economic growth case, and 2.6 percent in the low growth case (Figure 33). Annual yields on the 10-year Treasury note are projected to average 5.2 percent in the reference case, 4.8 percent in the high growth case, and 5.7 percent in the low growth case. The projections for average unemployment rates are 4.7 percent in the reference case, 4.6 percent in the high growth case, and 4.9 percent in the low growth case. Relative to the reference case, the higher inflation, interest, and unemployment rates in the low growth case and the lower rates in the high growth case depend on different assumptions about labor productivity and population growth rates.

Output Growth for Energy-Intensive Industries Is Expected To Slow

Figure 34. Sectoral composition of industrial output growth rates, 2006-2030 (percent per year)



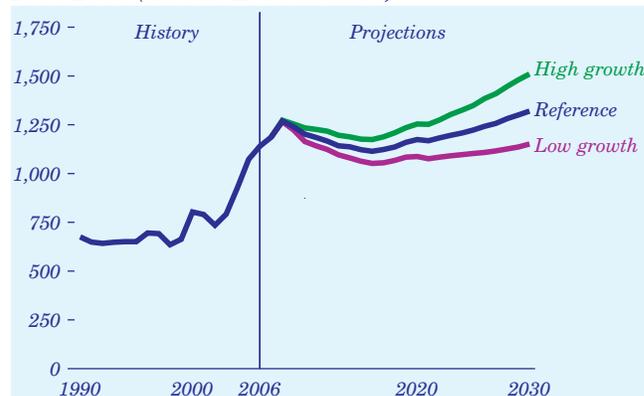
With imports meeting a growing share of demand for industrial goods, the industrial sector has shown slower output growth than the economy as a whole in recent decades. That trend is expected to continue in the *AEO2008* projections. The average annual growth rate for real GDP from 2006 to 2030 is 2.4 percent in the reference case, whereas the industrial sector averages 1.3 percent. With higher energy prices and greater foreign competition, the energy-intensive manufacturing sectors [78] grow by only 0.7 percent per year from 2006 through 2030, compared with a 1.9-percent average annual rate of growth for the remaining industrial sectors (Figure 34).

AEO2008 projects relatively slow growth in construction, chemicals, and transportation equipment. High interest rates affect the construction and transportation equipment sectors. Increased foreign competition, slow expansion of domestic production, and higher energy prices exert competitive pressure on the chemicals industry, with growth slowing substantially after 2020.

In the high economic growth case, output from the industrial sector grows by an annual average of 2.0 percent, still below the annual growth of real GDP (3.0 percent). In the low economic growth case, real GDP and industrial output grow by 1.8 and 0.5 percent per year, respectively. In both cases, the non-energy-intensive manufacturing industries show higher growth than the rest of the industrial sector.

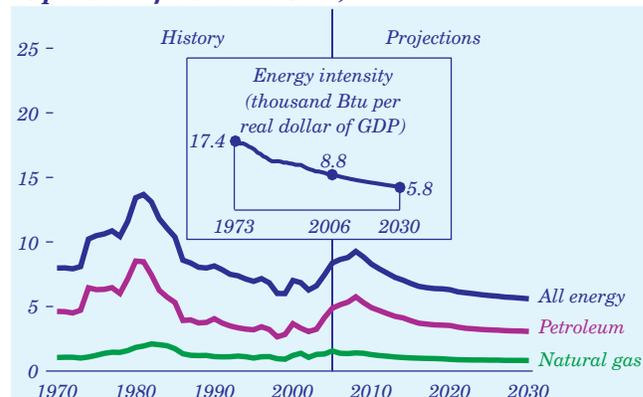
Energy Expenditures Relative to GDP Are Projected To Decline

Figure 35. Energy expenditures in the U.S. economy, 1990-2030 (billion 2006 dollars)



Total U.S. energy expenditures were \$1.1 trillion in 2006. Energy expenditures rise to \$1.3 trillion (2006 dollars) in 2030 in the *AEO2008* reference case and to \$1.5 trillion in the high economic growth case (Figure 35). For the economy as a whole, ratios of energy expenditures to GDP in 2006 were 8.6 percent for all energy, 5.1 percent for petroleum, and 1.4 percent for natural gas. Recent developments in the world oil market have pushed the energy expenditure shares upward, and in the reference case they are expected to increase from current levels until 2010. After 2010 expenditures fall, as the energy intensity of the U.S. economy—measured in terms of energy consumption (thousand Btu) per dollar of real GDP—continues to decline and world oil prices stabilize. Total energy expenditures are projected to equal 5.6 percent of GDP in 2030, petroleum expenditures 3.1 percent, and natural gas expenditures less than 1 percent (Figure 36).

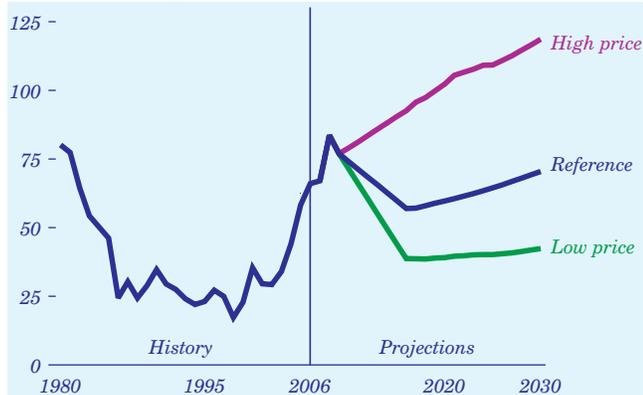
Figure 36. Energy expenditures as a share of gross domestic product, 1970-2030 (nominal expenditures as percent of nominal GDP)



International Oil Markets

Oil Price Cases Show Uncertainty in Prospects for World Oil Markets

Figure 37. World oil prices, 1980-2030 (2006 dollars per barrel)

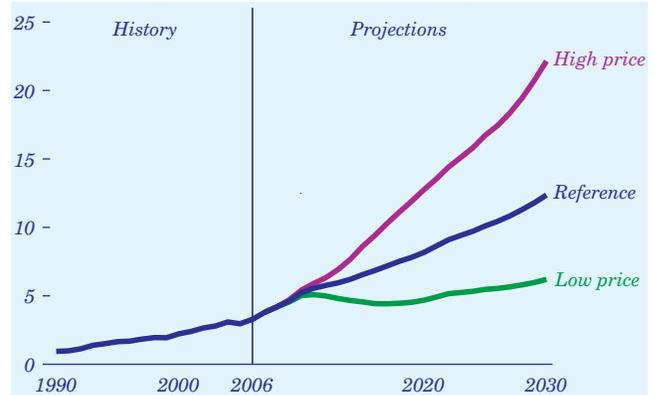


World oil price projections in *AEO2008*, in terms of the average price of imported low-sulfur, light crude oil to U.S. refiners, are higher for 2006-2030 than those presented in *AEO2007*. The higher price path reflects lower estimates of oil consumers' sensitivity to higher prices, an anticipation of lower additions to production capacity in key non-OPEC regions, and a reassessment of OPEC producers' willingness and ability to expand production and production capacity aggressively.

The historical record shows substantial variation in world oil prices, and there is arguably even more uncertainty about future prices when longer time periods are examined. As in previous outlooks, *AEO2008* considers three price cases to illustrate the uncertainty of prospects for future world oil resources. In the reference case, world oil prices moderate from current levels to about \$57 per barrel in 2016, start rising again as production in non-OPEC regions peaks, and continue rising to \$70 per barrel in 2030 (all prices in 2006 dollars). The low and high price cases reflect a wide band of potential world oil price paths, ranging from \$42 to \$119 per barrel in 2030 (Figure 37), but they do not bound the set of all possible future outcomes. The high and low oil price cases are predicated on assumptions about access to and costs of non-OPEC oil, OPEC supply decisions, and the supply potential of unconventional liquids. Combining those assumptions with different assumptions about the demand for oil would produce a wider range of oil price paths.

Unconventional Resources Gain Market Share as Prices Rise

Figure 38. Unconventional resources as a share of the world liquids market, 1990-2030 (percent)



The world's total production of liquid fuels from unconventional resources in 2006 was 2.8 million barrels per day, equal to about 3 percent of total liquids production. Production from unconventional sources included 1.2 million barrels per day from oil sands in Canada, 600,000 barrels per day from very heavy oils in Venezuela, and 320,000 barrels of ethanol per day in the United States. In the *AEO2008* reference case, unconventional production makes up 12 percent (14 million barrels per day) of total liquids production in 2030 (Figure 38).

Depending on price assumptions, world unconventional production is projected to be 5.4 to 18.9 million barrels per day higher in 2030 than it was in 2006, accounting for between 6 and 22 percent of the world's total production of liquids. Production of unconventional liquids depends heavily on prices, being more competitive with conventional sources when market prices are high. Not all unconventional liquids respond to price changes in the same manner, however, because the sources of unconventional liquids differ with regard to resource constraints, political backing, available technologies, and other characteristics.

The composition of world unconventional liquids production does not vary significantly between the reference and low price cases, with biofuels and oil sands combined accounting for about 60 percent of unconventional supply. In the high price case, the economic viability of and need for unconventional liquids supply increase, and 34 percent of total projected unconventional liquids production in 2030 is accounted for by CTL, one-half of which will be produced by China.