

## Performance of Past *IEO* Forecasts for 1990 and 1995

In an attempt to measure how well the *International Energy Outlook (IEO)* projections have estimated future energy consumption trends over its 13-year history, we present a comparison of *IEO* forecasts produced for years 1990 and 1995. The forecasts can be compared with actual data published in EIA's *International Energy Annual 1996 (IEA96)*. This comparison was undertaken as part of EIA's commitment to provide users of the *IEO* with a set of performance measures to assess the forecasts produced by this agency.<sup>24</sup>

EIA has published the *IEO* since 1985. In *IEO85*, mid-term projections were derived only for the world's market economies. That is, no projections were produced for the centrally planned economies (CPE) of the Soviet Union, Eastern Europe, Cambodia, China, Cuba, Laos, Mongolia, North Korea, and Vietnam. The *IEO85* projections extended to 1995 and included forecasts of total energy consumption for 1990 and 1995 and primary consumption of oil, natural gas, coal, and "other fuels." *IEO85* projections were also presented for several individual countries and subregions: the United States, Canada, Japan, the United Kingdom, France, West Germany, Italy, the Netherlands, other OECD Europe, other OECD (Australia, New Zealand, and the U.S. Territories), OPEC, and other developing countries. Beginning with *IEO86*, nuclear power projections were published separately from the "other fuel" category.

The regional aggregation has changed from report to report. In 1990, the report coverage was expanded to include projections for China, the former Soviet Union, and other CPE countries, making *IEO90* the first edition to represent the entire world in the energy consumption forecast.

The data for total regional energy consumption in 1990 show that the *IEO* projections were—with few exceptions—lower than the actual data for the market economies. For the four editions of the *IEO* printed between 1985 and 1989 (no *IEO* was published in 1988) in which 1990 projections were presented, total projected energy consumption in the market economies ran between 2 and 5 percent lower than the actual consumption number published in the *IEA96* (Figure G1).

**Figure G1. Comparison of *IEO* Forecasts with 1990 Energy Consumption in Market Economies**



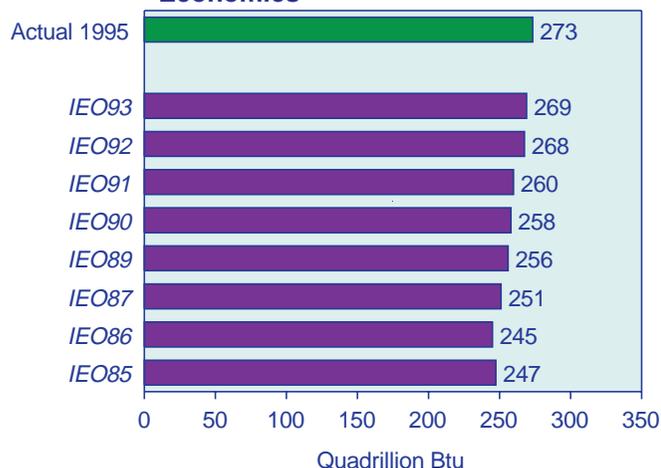
Sources: **1990:** Energy Information Administration (EIA), Office of Energy Markets and End Use, *International Energy Annual 1996*, DOE/EIA-0219(96) (Washington, DC, February 1998). **1990 Projections:** EIA, *International Energy Outlook*, DOE/EIA-0484 (Washington, DC, various years).

In addition, market economy projections for 1995 in the 1985 through 1993 outlook reports (EIA did not release an international forecast for 1995 in either the 1994 or 1995 edition of the report) were consistently lower than the actual 1995 data (Figure G2). Most of the difference was for countries outside the OECD. Through the years, EIA's economic growth assumptions for OPEC and other market economy countries outside the OECD have been low. The 1993 forecast, which was, as might be expected, the closest to the actual 1995 number, still was more than 10 percent lower than the actual value.

In *IEO90*, energy consumption forecasts for the entire world were first released. Since then, the *IEO* forecasts of world energy consumption for 1995 have been consistently higher than the amount actually consumed (Figure G3), primarily because of the unanticipated collapse of the Soviet Union economies. *IEO90* projected that the FSU would consume 66 quadrillion Btu, whereas 40 quadrillion Btu of energy was actually consumed. The "other CPE" countries—driven mainly

<sup>24</sup>For an analysis of EIA's record for world oil price forecasts, see S.H. Holte, "Annual Energy Outlook Forecast Evaluation," in Energy Information Administration, *Issues in Midterm Analysis and Forecasting 1997*, DOE/EIA-0607(97) (Washington, DC, July 1997), pp. 100-101.

**Figure G2. Comparison of IEO Forecasts with 1995 Energy Consumption in Market Economies**



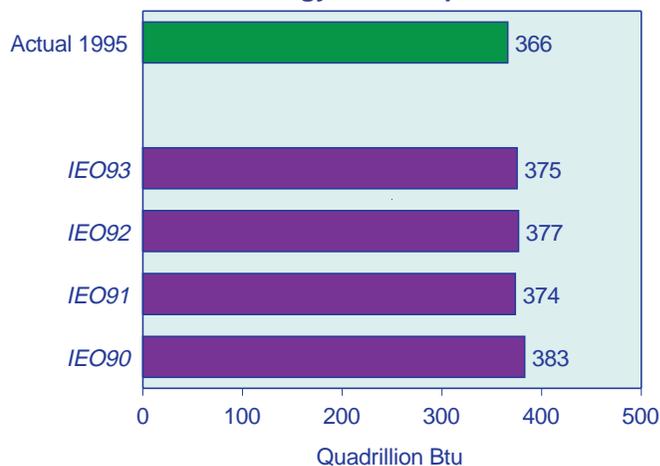
Sources: **1995:** Energy Information Administration (EIA), Office of Energy Markets and End Use, *International Energy Annual 1996*, DOE/EIA-0219(96) (Washington, DC, February 1998). **1995 Projections:** EIA, *International Energy Outlook*, DOE/EIA-0484 (Washington, DC, various years).

by consumption in the countries of Eastern Europe but also including Cambodia, Cuba, Laos, Mongolia, North Korea, and Vietnam—showed a similar pattern. The magnitude and duration of the economic declines in the FSU were not anticipated, and projections for the region ran about 30 percent higher than actual consumption.

As might be expected, the *IEO* projections for the use of specific fuels reflect the tendency of the total regional consumption projections to underestimate energy use in the market economies outside the OECD and overestimate energy use in the FSU and “other CPE.” For instance, *IEO85* underestimated 1995 oil use in the “other developing market economies” by more than 40 percent, and *IEO90* overestimated 1995 oil use in the FSU by 84 percent.

It is interesting to consider the forecasts in the historical context that certainly influenced the analytical thinking of the day. For example, *IEO85*, published after the oil price shocks of the 1973-1974 Arab embargo and the 1979-1980 Iranian revolution but before the Chernobyl nuclear accident of 1986, projected that oil would lose share of total energy consumption in the market

**Figure G3. Comparison of IEO Forecasts with 1995 World Energy Consumption**



Sources: **1995:** Energy Information Administration (EIA), Office of Energy Markets and End Use, *International Energy Annual 1996*, DOE/EIA-0219(96) (Washington, DC, February 1998). **1995 Projections:** EIA, *International Energy Outlook*, DOE/EIA-0484 (Washington, DC, various years).

economies over the 1985-1995 decade, declining by as much as 5 percentage points as natural gas, coal, and “other fuels” all gained share. Nuclear was expected to be the fastest growing energy source, with a projected growth rate of nearly 4 percent per year.

In reality, the *IEO85* forecast for nuclear energy turned out to be fairly accurate. Nuclear power consumption did increase more rapidly than any other energy source in the market economies, at a rate of nearly 5 percent per year between 1985 and 1995. On the other hand, oil use did not decline as projected but maintained a 45-percent share of energy consumption. The natural gas share grew more slowly than projected, reaching 21 percent of energy consumption in the market economies by 1995, rather than the projected 22-percent share. The largest divergence between projected and actual trends was for coal, which in *IEO85* was expected to see increasing use for electricity generation and industrial applications in Western Europe. Those expectations did not materialize. Coal’s share of energy consumption in the market economies declined from 21 percent in 1985 to 18 percent in 1995, whereas *IEO85* had projected an increase to a 22-percent share in 1995.