

Preface

This report presents international energy projections through 2030, prepared by the Energy Information Administration, including outlooks for major energy fuels and associated carbon dioxide emissions.

The *International Energy Outlook 2009 (IEO2009)* presents an assessment by the Energy Information Administration (EIA) of the outlook for international energy markets through 2030. U.S. projections appearing in *IEO2009* are consistent with those published in EIA's *Annual Energy Outlook 2009 (AEO2009)*, in March 2009. A revised, updated *AEO2009* reference case projection was released on April 17, 2009. It reflects the impact of provisions in the American Recovery and Reinvestment Act of 2009 (ARRA2009), enacted in mid-February 2009, on U.S. energy markets. The revised *AEO2009* reference case includes updates for the U.S. macroeconomic outlook, which has been changing at an unusually rapid rate in recent months. Throughout *IEO2009*, significant changes to the U.S. outlook relative to the published *AEO2009* reference case are noted for the reader's reference.

IEO2009 is provided as a service to energy managers and analysts, both in government and in the private sector. The projections are used by international agencies, Federal and State governments, trade associations, and other planners and decisionmakers. They are published pursuant to the Department of Energy Organization Act of 1977 (Public Law 95-91), Section 205(c).

Projections in *IEO2009* are divided according to Organization for Economic Cooperation and Development members (OECD) and non-members (non-OECD). There are three basic country groupings in the OECD: North America (United States, Canada, and Mexico); OECD Europe; and OECD Asia (Japan, South Korea, and Australia/New Zealand) (see Appendix K for

complete regional definitions). Non-OECD is divided into five separate regional subgroups: non-OECD Europe and Eurasia, non-OECD Asia, Africa, Middle East, and Central and South America. Russia is represented in non-OECD Europe and Eurasia; China and India are represented in non-OECD Asia; and Brazil is represented in Central and South America.

IEO2009 focuses exclusively on marketed energy. Non-marketed energy sources, which continue to play an important role in some developing countries, are not included in the estimates. The *IEO2009* projections are based on U.S. and foreign government laws in effect on January 1, 2009. The potential impacts of pending or proposed legislation, regulations, and standards are not reflected in the projections, nor are the impacts of legislation for which the implementing mechanisms have not yet been announced.

The report begins with a review of world trends in energy demand and the major macroeconomic assumptions used in deriving the *IEO2009* projections, along with the major sources of uncertainty in the forecast. The time frame for historical data begins with 1980 and extends to 2006, and the projections extend to 2030. High economic growth and low economic growth cases were developed to depict a set of alternative growth paths for the energy projections. The two cases consider higher and lower growth paths for regional gross domestic product (GDP) than are assumed in the reference case. *IEO2009* also includes a high oil price case and, alternatively, a low oil price case. The resulting projections—and the uncertainty associated with international energy

Objectives of the *IEO2009* Projections

The projections in *IEO2009* are not statements of what will happen, but what might happen given the specific assumptions and methodologies used. The projections provide an objective, policy-neutral reference case that can be used to analyze international energy markets. As a policy-neutral data and analysis organization, EIA does not propose, advocate, or speculate on future legislative and regulatory changes.

Models are abstractions of energy production and consumption activities, regulatory activities, and producer and consumer behavior. The projections are highly dependent on the data, analytical methodologies, model structures, and specific assumptions used in their development. Trends depicted in the analysis are indicative of tendencies in the real world rather than representations of specific real-world outcomes. Even where trends are stable and well understood, the projections are subject to uncertainty. Many events that shape energy markets are random and cannot be anticipated, and assumptions concerning future technology characteristics, demographics, and resource availability are necessarily uncertain.

projections in general—are discussed in Chapter 1, “World Energy Demand and Economic Outlook.”

Regional projections for energy consumption by fuel—liquids (primarily petroleum), natural gas, and coal—are presented in Chapters 2, 3, and 4, along with reviews of the current status of each fuel on a worldwide basis. Chapter 5 discusses the projections for world electricity markets—including nuclear power, hydropower, and other commercial renewable energy resources—and presents forecasts of world installed generating capacity. Chapter 6 provides a discussion of industrial sector energy use. Chapter 7 includes a detailed look at the world’s transportation energy use. Finally, Chapter 8 discusses the outlook for global energy-related carbon dioxide emissions.

Appendix A contains summary tables for the *IEO2009* reference case projections of world energy consumption, GDP, energy consumption by fuel, carbon dioxide

emissions, and regional population growth. Summary tables of projections for the high and low economic growth cases are provided in Appendixes B and C, respectively, and projections for the high and low oil price cases are provided in Appendixes D and E, respectively. Reference case projections of delivered energy consumption by end-use sector and region are presented in Appendix F. Appendix G contains summary tables of projections for world liquids production in all cases. Appendix H contains summary tables of reference case projections for installed electric power capacity by fuel and regional electricity generation by fuel. Appendix I includes a set of comparisons of projections from the International Energy Agency’s *World Energy Outlook 2008* with the *IEO2009* projections. Comparisons of the *IEO2009* and *IEO2008* projections are also presented in Appendix I. Appendix J describes the models used to generate the *IEO2009* projections, and Appendix K defines the regional designations included in the report.