

Preface

From December 1 through 11, 1997, more than 160 nations met in Kyoto, Japan, to negotiate binding limitations on greenhouse gases for the developed nations, pursuant to the objectives of the Framework Convention on Climate Change of 1992. The outcome of the meeting was the Kyoto Protocol, in which the developed nations agreed to limit their greenhouse gas emissions, relative to the levels emitted in 1990. The United States agreed to reduce emissions from 1990 levels by 7 percent during the period 2008 to 2012.

The analysis in this report was undertaken at the request of the Committee on Science of the U.S. House of Representatives. In its request, the Committee asked the Energy Information Administration (EIA) to analyze the Kyoto Protocol, “focusing on U.S. energy use and prices and the economy in the 2008-2012 time frame,” as noted in the first letter in Appendix D. The Committee specified that EIA consider several cases for energy-related carbon reductions in its analysis, with sensitivities evaluating some key uncertainties: U.S. economic growth, the cost and performance of energy-using technologies, and the possible construction of new nuclear power plants.

The energy projections and analysis in this report were conducted using the National Energy Modeling System (NEMS), an energy-economy model of U.S. energy markets designed, developed, and maintained by EIA. NEMS is used each year to provide the projections in the *Annual Energy Outlook (AEO)*. In its second letter, in Appendix D, the Committee requested that the analysis use the same general methodologies and assumptions underlying the *Annual Energy Outlook 1998 (AEO98)*, published in December 1997; however, some minor modifications were made to allow greater flexibility in NEMS in response to higher energy prices and to incorporate some methodologies that were formerly represented offline. These differences are outlined in Appendix A. The macroeconomic analysis used the Data Resources, Inc. (DRI) Macroeconomic Model of the U.S. Economy, which is also used for the economic analysis in the *AEO*.

Chapter 1 of this report provides background discussion of the Kyoto Protocol and the framework and methodology of the analysis. Chapter 2 summarizes the energy market results from the various carbon reduction cases. Chapters 3, 4, and 5 analyze in more detail the issues and

results for the end-use demand sectors, the electricity generation sector, and the fossil fuel supply markets, respectively. Chapter 6 provides the results of EIA’s analysis of the macroeconomic impacts of carbon reduction under different monetary and fiscal policy assumptions. Chapter 7 compares the results of this study with those from other studies of the costs of carbon reduction, with accompanying tables in Appendix C. Appendix B includes the detailed energy market results from the carbon reduction cases.

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Other EIA reports on the topic of greenhouse gases include the following annual reports:

- *Annual Energy Outlook 1998*, published in December 1997, with projections of domestic energy carbon emissions through 2020
- *International Energy Outlook 1998*, published in April 1998, with projections of international energy carbon emissions through 2020
- *Emissions of Greenhouse Gases in the United States 1996*, published in October 1997, with an inventory of all domestic greenhouse gas emissions
- *Mitigating Greenhouse Gas Emissions: Voluntary Reporting*, published in October 1997, reporting voluntary actions in 1995 to reduce greenhouse gases in the United States
- *Greenhouse Gases, Global Climate Change, and Energy*, an information brochure on greenhouse gases.