Instructions for

Form EIA-1605

Voluntary Reporting of Greenhouse Gases

For Data Through 2002

U.S. Department of Energy
Voluntary Reporting of Greenhouse Gases
Energy Information Administration, EI-81
1000 Independence Avenue, SW
Washington, DC 20585

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Introduction

What Is the Purpose of Form EIA-1605?

Form EIA-1605 provides the means for the voluntary reporting of greenhouse gas emissions, reductions, and sequestration under Section 1605(b) of the Energy Policy Act (EPAct) of 1992 (Public Law 102-486). This form allows you to provide information on greenhouse gas emissions for the baseline period of 1987 through 1990 and for subsequent calendar years. The form also provides the opportunity for reporting annual reductions of greenhouse gas emissions and increases in carbon fixation achieved through any measures.

Form EIA-1605 and these instructions are designed to help the reporter participate fully in the voluntary reporting program outlined in the guidelines issued under Section 1605(b)(1), *Voluntary Reporting of Greenhouse Gases under Section 1605(b) of the Energy Policy Act of 1992: General Guidelines and Supporting Documents*, DOE/PO-0028. Use these instructions in conjunction with the *General Guidelines and Supporting Documents*.

Why Report?

This voluntary reporting program gives you the opportunity to create a public record of your emissions, emission reductions, or sequestration achievements. It provides a mechanism for initiating an informed public debate on greenhouse gases and reduction efforts. Reporting will facilitate educational exchanges on the most effective methods to reduce greenhouse gases and will allow you to demonstrate support for achieving environmental policy goals through voluntary efforts. Form EIA-1605 is being used as the official reporting mechanism for a number of voluntary greenhouse gas reduction programs including Climate Challenge, Climate Wise, and the Landfill Methane Outreach Program. Form EIA-1605 is designed to serve each of these aims when completed thoroughly and comprehensively.

Which Form Should You Use?

A short reporting form, Form EIA-1605EZ, is also available as an alternative to the long Form EIA-1605. You may use either form. Choose the form that best meets your objectives for participating in the Voluntary Reporting of Greenhouse Gases Program.

Note: Electronic versions of both forms are available. For details, see *Can You Report Electronically?* (page 7).

Use the long form if you wish to...

- create an in-depth public record of your emission reduction efforts that will be useful for information exchange purposes
- report emissions, reductions, or carbon sequestration for your entire organization
- report information for years prior to 2002
- include information on activities conducted outside the United States
- report a commitment to reduce future greenhouse gas emissions

Use the short form if you wish to...

- provide a ***brief summary*** of your greenhouse gas reduction projects
- report ***only*** on specific projects reducing emissions or sequestering carbon in the United States in 2002

How Will Your Report Be Used?

All reports submitted to the Energy Information Administration on Form EIA-1605 will be entered into an electronic database designed to preserve data on emissions, emission reductions, and sequestration achievements. All information reported under this voluntary program will be publicly available on a reporter-specific basis, except confidential information. Public access to these data will support information exchanges about effective ways to reduce emissions, inform public policy development, and encourage public recognition of your efforts.

If there is information included in your report that, if released to the public, would cause substantial harm to your organization's competitive position, you may request that the information be kept confidential by checking the box on Schedule I of Form EIA-1605 indicating "This report contains confidential information." In addition, you may submit a letter accompanying your report that details, on an element-by-element basis, the information you deem confidential and the reasons why disclosure would be damaging to your organization's competitive position. A letter is not required at this time. However, at a later date, if someone requests your report, you may be asked to submit a letter.

The rulings, regulations, and procedures governing the Energy Information Administration's handling of requests for confidentiality can be found on page 6 of these instructions (*Can the Information You Report Be Kept Confidential?*).

What Are Greenhouse Gases?

Greenhouse gases, found in trace quantities in the atmosphere, absorb infrared energy and prevent it from leaving the atmosphere. Increasing levels of greenhouse gases in the atmosphere may contribute to an increase in average global temperatures resulting in adverse climate changes. Although many gases found in the atmosphere exhibit these properties, this reporting program focuses on the gases most affected by human activity: carbon dioxide, methane, nitrous oxide, and halogenated substances.

What Are Emissions, Reductions, and Sequestration?

Emissions are anthropogenic (human-caused) releases of greenhouse gases into the atmosphere. A reduction is a decrease in greenhouse gas emissions. Sequestration is the fixation of atmospheric carbon dioxide in a sink such as vegetation or soil.

How Is this Reporting Package Organized?

This complete reporting package contains Form EIA-1605 and these instructions. The instructions are divided into three main parts:

1. General Instructions
2. Specific Instructions for Completing Form EIA-1605
3. Appendices

The reporting form itself is contained in a separate document.

General Instructions

Who Can Report?

You can submit a report if you initiate, control, or in some other way participate in a domestic or foreign activity that results in the emission of greenhouse gases or increases carbon sequestration. A reporter must also be a legal U.S. person: a U.S. citizen or resident alien; a company, organization, or group recognized by U.S. law; or a Federal, state, or local government agency.

Joint Projects

You may report on an emission reduction or carbon sequestration project undertaken in association with others, provided you identify the other potential reporters of that project. You may enter into an agreement with the other parties to report all or part of the emission reductions or sequestration achieved.

Third-Party Reporting

A report can be filed by a third party who is not directly involved in the reduction activity but is authorized to represent those who are involved. For example, a third-party reporter may be a trade association reporting on behalf of members who have undertaken reduction projects.

What Can You Report?

Your activities can be reported at either or both of two levels: project-level and entity-level. Form EIA-1605 also allows you to record your commitments to reduce future greenhouse gas emissions.

Project-Level Reporting

You can report emissions, emission reductions, or sequestration achieved after the baseline period (1987 through 1990) as a result of one or more individual activities. Project-level reporting encourages educational exchanges on the most effective methods for reducing greenhouse gas emissions and facilitates an informed public debate on greenhouse gases and reduction efforts.

Entity-Level Reporting

You can report emissions, emission reductions, and increases in sequestration for your entire entity. Entity-level reporting allows you to establish a comprehensive public record of your entity's achievements regarding greenhouse gases. Specifically, you can report the following information:

- Greenhouse gas emissions on an annual basis for the baseline period of 1987 through 1990 and subsequent calendar years.
- Annual reductions of greenhouse gas emissions and increased sequestration achieved through any measure after the baseline period.

Future Commitments

You can report commitments to reduce your emissions of greenhouse gases in the future. This will allow recognition of any commitments you have established through various local and national voluntary programs such as those in the *Climate Change Action Plan*.

What Gases Can You Report?

Your report should cover only the following greenhouse gases:

- Carbon Dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- Halogenated Substances (See Appendix A on page 45 for a list of these substances)
- Other radiatively enhancing gases: Carbon Monoxide (CO), Nitrogen Oxides (NO_x) and Nonmethane Volatile Organic Compounds (NMVOCs)

Can You Report Foreign Activities?

Yes, achievements from foreign activities can be reported. All activities outside of the United States, its territories, and trusts are considered foreign activities and should be reported separately from domestic activities on Form EIA-1605. Participation in the United States Initiative on Joint Implementation (USIJI) is not a prerequisite for participation in this program, nor does participation in this program guarantee credit under USIJI.

Are There Minimum Reporting Requirements?

This voluntary program allows considerable flexibility in defining the activities you report and estimating the effects of those activities on greenhouse gas emissions and sequestration. Form EIA-1605 is designed to minimize reporting burden while meeting the minimum information requirements as defined in the *General Guidelines and Supporting Documents*. To meet these minimum information requirements, the reporter should answer all applicable questions on Schedule I and at least one other schedule.

How Is Form EIA-1605 Organized?

Form EIA-1605 consists of four schedules, which allow you to describe different aspects of your emission reduction efforts. The schedules are:

I. Entity Information and Certification.
II. Project-Level Emissions and Reductions.
III. Entity-Level Emissions and Reductions.
IV. Commitments to Reduce Greenhouse Gases.

How Can You Calculate Emissions, Reductions, and Sequestration?

When reporting at the entity level, provide a comprehensive estimate of the emissions, emission reductions, and increases in sequestration that occur as a result of your entity's activities. When reporting at the project level, report only emissions, emission reductions, and sequestration associated with the project. Before deciding how to calculate the emissions, emission reductions, and sequestration data that you intend to report, carefully review the *General Guidelines and Supporting Documents.* These instructions explain only the generic aspects of the calculation procedure.

Because participation in this program is voluntary, you are not expected to collect extensive new data. This reporting system relies on data that you are likely to have already. For your convenience, Appendix B (page 47) contains standard coefficients for converting fuel consumption to emission estimates. Specific emissions coefficients for electricity consumption are found in Appendix C (page 49). However, if you have identified or developed coefficients more applicable to your specific project, feel free to use them in your estimation procedure.

Emissions

Emissions may be characterized as either direct or indirect.

Direct Emissions - The *General Guidelines and Supporting Documents* describe direct emissions as releases of greenhouse gases **on site.** For the purpose of completing Form EIA-1605, on site is defined as any source owned (wholly or in part) or leased by your entity.

Indirect Emissions are emissions from sources not owned or leased by your entity that occur, wholly or in part, as a result of your activities. For example, your consumption of electricity purchased from a utility causes a power plant owned by the utility (or some other entity) to emit greenhouse gases.

Joint Ownership of Emissions Sources - If an emissions source is only partially owned by your entity, the emissions from the source should be allocated to the direct and indirect categories based on your entity's ownership share. For example, if your entity owns ten percent of the source, then ten percent of the emissions from the source should be allocated to the direct category, and the remaining 90 percent should be treated as indirect emissions. Allocation of emissions between direct and indirect should always be based on ownership, unless the owners have agreed to divide the greenhouse gas emissions

among themselves according to some other scheme. Such agreements take precedence for the purposes of allocating emissions between the direct and indirect categories.

When calculating emissions, include all direct emissions and, to the extent possible, indirect emissions.

What Units of Measure Should You Use?

Report all emissions, emission reductions, and sequestration in units of mass rather than volume. Select the most convenient units of measure from those listed in Appendix D (page 51) and use them consistently. Indicate clearly the units chosen, using the standard abbreviations in Appendix D. Conversion factors for units of measure are provided in Appendix E (page 53).

Reductions and Sequestration

Reductions and sequestration can be quantified using the following four basic steps:

1. ***Define the Boundary of the Entity or Project.***

2. ***Estimate Actual Emissions or Sequestration within Your Entity or Project Boundary.*** **Note:** When reporting at the entity level, sequestration refers to annual increases in the amount of carbon sequestered. Actions that preserve an existing carbon sink may be reported at the project level.

3. ***Estimate Reference Case Emissions or Sequestration***. Reference case emissions are the emissions levels that would have occurred in the absence of the emission reduction measure. Reference case may also apply to sequestration.

4. ***Calculate the Reduction or Sequestration***. Subtract actual emissions (or sequestration) from reference case emissions (or sequestration).

Boundary definition and reference case emissions are discussed in more detail below.

Entity Boundaries

Conceptually, an entity boundary is a line drawn to encompass the emissions sources and sinks to be evaluated in an entity-level report. At a minimum, your entity boundary should include all direct emission sources — that is, all emissions sources and sinks owned (wholly or in part) or leased by your entity. In addition, other emission sources and sinks that are affected by your entity's activities may be included within your entity's boundary.

Project Boundaries

In defining your project boundaries, follow these steps:

1. ***Decide what action (or group of actions) comprises a project.*** You are encouraged to aggregate similar actions with similar effects into a single project. For example, replacing incandescent light bulbs with high efficiency fluorescent bulbs in several buildings should be reported as a single project.
   Note: Reductions achieved by similar activities in the United States and foreign countries cannot be combined into a single project. Domestic and foreign emission reductions are to be reported separately.

2. ***Identify all the effects of your project.*** The project boundary should encompass all the significant and quantifiable effects of the project. Project effects are the consequences of a project on direct and indirect emissions as well as sequestration. In addition to the project's obvious, immediate, and intended effects on direct and indirect emissions or sequestration, the boundary should include any unintended effects.

Because any individual effect may increase or decrease emissions or sequestration, it is important to consider all effects together to

determine the net result of the project. Thus, in the above example of replacing incandescent light bulbs with more efficient fluorescent bulbs, the effects may include:

a. ***Reduced indirect emissions from less electricity consumption***. The power plant does not need to burn as much coal or other fossil fuels to generate electric Reductions are indirect because the source of the emissions is neither owned nor leased by the reporter.

b. ***Increased direct emissions in winter.*** The old incandescent bulbs gave off heat which helped heat the building. With fluorescent lighting, additional natural gas must be burned in the building's furnace to keep the building at the same temperature.

c. ***Reduced indirect emissions in summer.*** The decrease in heat from the fluorescent light bulbs reduces air conditioning requirements resulting in further electricity savings.

In this case, effects (a) and (c) lead to reduced emissions while effect (b) results in increased emissions. All of these effects should be considered when calculating the net effect of the reduction measure.

The Energy Information Administration recognizes that quantifying effects such as (b) and (c) may be very difficult. Thus, reporters are not required to quantify all project effects but should clearly indicate, when describing the estimation method used, which project effects were analyzed.

Reference Case Emissions and Sequestration

A reference case is an emissions or sequestration level against which actual emissions are compared to determine reductions. **Note:** This differs from baseline emissions, which represent actual emissions for 1987 through 1990. However, a portion or all of the baseline emissions data may be used to develop a reference case emissions level.

Use either a basic or modified reference case to estimate the emissions or sequestration that would have occurred in the absence of emissions-reducing activities.

Basic Reference Case. Actual historical emissions (or sequestration) are used as the reference case. You may select any year, or an average of a range of years, from 1987 on, for the reference case. For example, you might select a period that is representative of conditions and operations during the years for which you are reporting reductions. Alternatively, you may wish to use the year 1990, particularly if you are participating in a voluntary program, that was established with the objective of assisting the United States meet its commitment under the United Nations Framework Convention on Climate Change.

Modified Reference Case. An estimate is made of what emissions or sequestration would have been in the absence of the project (or group of projects in the case of entity-level reporting). For example, models can be used to account for the effects of changes in production, weather, and other factors on emissions. Alternatively, a unit-of-production approach can be used. A unit-of-production reference case is one that has been adjusted to reflect changes in production levels. In some cases, such as capturing methane from landfill gas, it may be impossible to develop a credible reference case. For the purpose of completing Form EIA-1605, you should define the absence of a credible reference case as a "modified reference case."

Who Must Certify Your Report?

You are required to certify the accuracy of the information you report with the signature of an individual authorized to act on your entity's behalf. A third-party reporter is required to certify the accuracy of aggregated information submitted on behalf of other entities.

Can the Information You Report Be Kept Confidential?

The Energy Information Administration is governed by the following rulings, regulations, and procedures when handling requests for confidentiality:

The Office of Legal Counsel of the Department of Justice concluded on March 20, 1991, that the

Federal Energy Administration Act requires the Energy Information Administration to provide company-specific data to the Department of Justice, or to any other Federal agency when requested for official use, which may include enforcement of Federal law. The information contained on this form may also be made available, upon request, to another component of the Department of Energy (DOE), to any Committee of Congress, the General Accounting Office, or other Congressional agencies authorized by law to receive such information. A court of competent jurisdiction may obtain this information in response to an order.

The information contained on this form will be kept confidential and not disclosed to the public to the extent that it satisfies the criteria for exemption under the Freedom of Information Act (FOIA), 5 USC §552; the DOE regulations, 10 CFR §1004.11, implementing the FOIA; and the Trade Secrets Act, 18 USC §1905.

Upon receipt of a request for this information under FOIA, the DOE shall make a final determination whether the information is exempt from disclosure in accordance with the procedures and criteria provided in the regulations. To assist us in this determination, reporters should demonstrate to the DOE that, for example, their information contains trade secrets or commercial or financial information whose release would be likely to cause substantial harm to their company's competitive position. A letter accompanying the submission that explains (on an element-by-element basis) the reasons why the information would be likely to cause the respondent substantial competitive harm if released to the public would aid in this determination.

Can You Report Electronically?

Yes. EIA has developed a personal computer version of Form EIA-1605 that is an easy-to-use Windows™ application. You may file your completed form on diskette or by e-mail. The electronic form is available on CD-ROM or can be downloaded from the Voluntary Reporting of Greenhouse Gases web-site on the Internet. To obtain a copy of the electronic form, call **1-800-803-5182** or see EIA's greenhouse gas web site at **http://www.eia.doe.gov/oiaf/1605/frntvrgg.html.**

If you wish to submit a confidential report electronically, you can upload the file for your report to a secure Internet site using secure hypertext transfer protocol (HTTPS). HTTPS is a communication protocol designed to transfer this encrypted information between computers over the World Wide Web. You will need to use a secure browser that supports 128-bit encryption, such as Microsoft Internet Explorer 5.5 or Netscape 4.77 or later. The website for the secure transfer is **https://idc.eia.doe.gov/upload/notice1605.jsp.**

How Do You Proceed From Here?

1. Familiarize yourself with the Guidelines, instructions, and the reporting form.
2. Define the scope of your report.
   a. Decide which projects, if any, you wish to report.
   b. Decide if you wish to complete a comprehensive report at the entity level.
   c. Decide if you wish to report commitments to future reduction or sequestration activities.
3. Estimate the emissions, emission reductions, or sequestration for your projects and at the entity level.
4. Gather all of the other information/data needed to complete Form EIA-1605, including information on your organization's participation in any voluntary Federal, state or local greenhouse gas reduction programs.
5. Complete Form EIA-1605.
6. Submit your report to EIA to the following address:

   Voluntary Reporting of Greenhouse Gases
   Energy Information Administration, EI-81
   U.S. Department of Energy
   1000 Independence Avenue, SW
   Washington, DC 20585

How Long Is the Reporting Period?

The next edition of the voluntary reporting program database will include all reports received prior to **June 2, 2003**. Reports received after this date will be included in the following annual update of this database.

Should You Report in Future Years?

After you have submitted your first report, you will be provided an opportunity to continue reporting on an annual basis. Since many projects will continue to generate emission reductions over long periods of time, you are encouraged to update your Form EIA-1605 on an annual basis even if you have not undertaken any new projects.

Do You Have Questions or Comments?

If you have questions about the forms and instructions or would like assistance in quantifying your emissions reductions, please contact the Voluntary Reporting of Greenhouse Gases Program at the above mailing address or at:

Telephone: 1-800-803-5182

Facsimile: (202) 586-3045

E-mail: infoghg@eia.doe.gov

Internet: http://www.eia.doe.gov/oiaf/1605/frntvrgg.html

Do You Have Any Suggestions?

You are invited to provide suggestions for improving the form and these instructions. Please limit comments and suggestions to one page and include them with your submission.

Instructions for Completing Form EIA-1605

Instructions for Schedule I. Entity Identification and Certification

All reporters should complete this schedule. You must certify the accuracy of the entire report by signing this schedule.

1. **Entity Information:** Provide your entity's legal name and complete address. Provide the name and contact information of a person who can answer questions regarding the content of the submitted form. If you are a third party completing the report on behalf of multiple entities, provide: 1) Schedule I completed with information about your organization, and 2) an attached sheet with the name and address of each entity represented in your report.

2. **Entity Type:** Check the box that best describes your entity.

3. **Geographic Scope of Activities:** Please check the box that identifies the location of all your entity's activities. If your entity has foreign activities, indicate in which countries these activities take place using the country codes in Appendix F (page 55).

4. **SIC Code:** Please identify the two-digit Standard Industrial Classification (SIC) code that best describes your entity's primary activities. See Appendix G (page 57) for a list of the codes. **Note:** The SIC code for private households is 88.

5. **Confidentiality**: Your report will be included in a publicly accessible database. If your report contains information you deem confidential and wish to exclude from this database, please check "This report contains confidential information" and follow the procedures described in *How Will Your Report Be Used?* on page 2 and *Can the Information You Report Be Kept Confidential?* on page 6.

6. **Certification:** Please provide the name, title, and telephone number of the person certifying your report. This person must be an authorized representative of your entity and must certify that the information in the entire report is accurate by signing and dating Schedule I.

Instructions for Schedule II. Project-Level Emissions and Reductions

Use this schedule to report individual projects that have achieved reductions in greenhouse gas emissions or that have sequestered carbon.

Reporting Projects Using Schedule II Sections

Use the following five-step procedure to analyze and report your projects:

Step 1. Identify all emission reduction and sequestration projects.

Step 2. Sort each project into its corresponding project category. Schedule II contains a separate section for each of the following project categories (see box on next page for description of each category):

- Electricity Generation, Transmission and Distribution (Section 1)
- Cogeneration and Waste Heat Recovery (Section 2)
- Energy End Use (Section 3)
- Transportation and Off-road Vehicles (Section 4)
- Waste Treatmnet and Disposal - Methane (Section 5)
- Agriculture - Methane and Nitrous Oxide (Section 6)
- Oil and Natural Gas Systems and Coal Mining - Methane (Section 7)
- Carbon Sequestration (Section 8)
- Halogenated Substances (Section 9)
- Other Emission Reduction Projects (Section 10)

Step 3. Locate the corresponding section(s) and instructions for each project.

Step 4. Evaluate the results of each project.

Step 5. Complete one section for each project. Make additional copies of the appropriate section if you are reporting more than one project in a category. **Note:** When reporting on an Urban Forestry project, record energy efficiency effects on Section 3, Energy End Use, and sequestration effects on Section 8, Carbon Sequestration.

Schedule II uses a standard layout to ease reporting and collection of common information for different types of projects. Each section of Schedule II is composed of the following parts:

Part I. General Project Information
Part II. Specific Project Information
Part III. Greenhouse Gas Emissions and Reductions or Sequestration
Part IV. Project Evaluation

The line-by-line instructions for Parts I, III, and IV, which are common to all sections of Schedule II, are given below in *Reporting Information Common to All Projects on Parts I, III, and IV of Schedule II* (page 15). The category-specific questions (Part II) are explained separately in *Reporting Information Specific to Project Type on Part II of Schedule II* (page 19).

Project Categories

Section 1. Electricity Generation, Transmission, and Distribution. Includes all projects involving the generation, transmission, or distribution of electricity, **except** cogeneration projects. Examples of projects to be reported in this category include the following: fuel switching; repowering; increases in low-emitting capacity (e.g., renewables plants); dispatching changes that result in overall emission reductions; and installation of high efficiency transformers.

Section 2. Cogeneration and Waste Heat Recovery. Includes all projects involving cogeneration and waste heat recovery. These technologies achieve more efficient use of a primary energy source through either (1) the sequential use of energy to generate electricity and another form of useful thermal energy such as heat or steam, or (2) the recovery of heat that was previously wasted or lost from the system.

Section 3. Energy End Use. Includes all projects involving reductions in end-use demand for energy, increased end-use energy efficiency, or fuel switching in the industrial, residential, and commercial sectors. This does not include projects in the transportation sector or efficiency improvements in the generation, transmission, and distribution of electricity. Examples of projects to be reported in this category include: utility- and non-utility-sponsored demand-side management programs (DSM), substitution of low-emitting fuel/energy sources for higher emitting fuel/energy sources (e.g., natural gas for oil), manufacture or use of high-efficiency appliances, and improvements in industrial processes that result in reductions in energy demand. **Note:** The energy efficiency effects of urban forestry projects are included in this category.

Section 4. Transportation and Off-road Vehicles. Includes all projects involving emission reductions from mobile sources. Examples of projects to be included in this category include the manufacture or use of more efficient vehicles, the manufacture or use of alternative fuel vehicles (fuel switching), carpooling, telecommuting, and infrastructure improvements.

Section 5. Waste Treatment and Disposal — Methane. Includes all projects undertaken to reduce methane emissions from landfills and wastewater treatment plants. Examples of projects to be reported in this category are landfill gas-to-energy recovery projects; the flaring of recovered methane at landfills; reductions or modifications in the waste stream, such as the elimination of yard waste from landfills or pulp and paper wastes from wastewater; and the recovery of methane from sewage treatment.

Section 6. Agriculture — Methane and Nitrous Oxide. Includes all projects undertaken to reduce methane emissions from livestock and rice fields, and all projects involving reductions in nitrous oxide emissions from the cultivation of crops. Examples of projects to be reported in this category include increased livestock productivity, recovery of methane from livestock manure, rice field drainage, and reductions in nitrogenous fertilizer application.

Section 7. Oil and Natural Gas Systems and Coal Mining — Methane. Includes all projects with the primary goal of recovering or reducing methane emissions from oil and natural gas production and distribution systems and coal mines. Examples of natural gas production, transmission, and distribution system projects to be reported in this category include improvements in operation and maintenance, equipment upgrades, and reductions in gas vented. Examples of coal mining projects to be reported in this category include the recovery of methane via pre-mining degasification, gob wells, or in-mine horizontal boreholes.

Section 8. Carbon Sequestration. Includes all projects undertaken to increase or maintain carbon sequestration. Examples of projects to be reported in this category include afforestation, forest preservation, conservation tillage, and the sequestration effects of urban forestry. **Note:** The energy effects of urban forestry projects are to be included in Section 3, Energy End Use.

Section 9. Halogenated Substances. Includes all projects undertaken to reduce the emissions of halogenated substances. Examples of projects to be reported in this category include substitution of halogenated substances, recycling, improved leakage control, and changes in aluminum production processes.

Section 10. Other Emission Reduction Projects. Includes all projects not included in the preceding categories.

Reporting Information Common to All Projects on Parts I, III, & IV of Schedule II

Use these instructions to complete Parts I, III, and IV on **any** section of Schedule II that you complete. See page 19 for the instructions for Part II.

Part I. General Project Information

1. **Name of Entity:** Provide the name of your entity (as entered in Question 1 of Schedule I). Record your entity name at the top of the second, third, and fourth pages of each section of Schedule II.

2. **Name of Project:** Provide the project name or, a brief, one-line description of the project. (**Note:** EIA will assign each project an ID number to enable us to track it over time.) Record the project name at the top of the second, third, and fourth pages of each section of Schedule II.

3. **Location:** If the project is located within the United States, check the "U.S. Only" box. For projects located at a specific facility or site, check the "Facility" box and provide the name and address of the facility in the spaces provided. If the project involves more than one location within the United States, check the "Dispersed" box and indicate the area covered (examples: "northern California," "New England," "dispersed throughout U.S.," etc.). For foreign projects, check the "Foreign Operations Only" box and list the country(ies) covered using the country codes in Appendix F (page 55). **Note:** Do not combine domestic and foreign emission reductions into a single project. A project that reduced emissions (or increased sequestration) in both the United States and in a foreign country(ies) should be reported as two separate projects.

4. **Date Project Became Operational:** Record the month and year in which the project first began to achieve emission reductions or sequester carbon.

5. **Reasons for Project:** Check all boxes that indicate the entity's reasons for undertaking the project. If the project was undertaken to satisfy a Federal, state, or local requirement, specify the requirement.

6. **Participation in Voluntary Programs:** If the project is associated with a voluntary Federal, state, or local program, identify the program(s) using codes in Appendix H (page 59). If you cannot find the program in Appendix H, provide the name of the program and the sponsoring organization in the space provided.

7. **Was this Project Reported Last Year?** Indicate "yes" if you included this project in last year's Form EIA-1605 report. If you did not include the project in last year's report, or you did not file a Form EIA-1605 report last year, indicate "no."

Part II. Specific Project Information

See pages 19 through 34 for instructions on how to complete the project-specific questions in Part II.

Part III. Greenhouse Gas Emissions and Reductions

Emissions, Emission Reductions, and Sequestration: Use the table to report the ***direct*** and ***indirect*** emissions you used to compute the reported emission reductions. Direct emissions are emissions from sources owned (wholly or in part) or leased by your entity. Indirect emissions are emissions from sources outside your entity that are affected by your entity's activities, e.g., the emissions of an electric utility resulting from your entity's electricity consumption. Report the **actual** direct and indirect emissions, not the reference case emissions.

Report the direct and indirect emission reductions achieved in any calendar year from 1991 through 2002 as a result of the project. Include all significant and quantifiable effects of

the project in the reduction estimates whenever possible.

Note 1: If the emissions sources affected by the project are only partially owned by your entity, the corresponding emissions and emission reductions should be allocated to the direct and indirect categories based on your entity's ownership share. For example, if your entity owns ten percent of the source, then ten percent of the emissions and emission reductions should be allocated to the direct category, and the remaining 90 percent should be treated as indirect emissions/reductions. Allocation of emissions and reductions between direct and indirect should always be based on ownership, unless the owners have agreed to divide the emissions/reductions among themselves according to some other scheme. Such agreements take precedence for the purposes of allocating emissions/reductions between the direct and indirect categories. If such an agreement exists, please include a description of it in your response to Question 4 (Estimation Method) of Part IV.

Note 2: For some types of projects, it is possible to derive an emission reduction estimate without computing a corresponding emissions estimate (e.g., emission reductions associated with methane recovery projects can be estimated simply by measuring the quantity of recovered gas). If you did not develop a project emissions estimate(s) as part of the procedure you used to compute emission reductions, you should leave the "Emissions" section of the table blank.

Note 3: In Sections 5, 6, and 7, the volume of methane emissions reduced or avoided often will not equal the volume of gas recovered or avoided. For example, biogas from landfills will often contain fifty percent or less methane, the remainder being other compounds. However, because most of the energy (heat content) in the gas is the result of the presence of methane, methane emissions reduced or avoided can be estimated from the volume (Mscf) and heat content (Btu/scf) of the gas recovered reported in the table in Part II of Sections 5, 6, and 7. To determine the volume of methane, multiply the volume of the gas recovered by a ratio of the heat content of the gas and the heat content of methane (1000 Btu/scf). Convert the volume of methane to mass units using one of the following conversion factors: 42.28 lbs/Mscf or 19.17 kg/Mscf.

Note 4: In Section 8, Carbon Sequestration, report sequestration rather than emissions in the first four rows of the table. Report carbon sequestered on the first two rows and the equivalent quantity of CO_2 on the next two rows. To determine the equivalent quantity of carbon dioxide, multiply the amount of carbon sequestered by 3.67. This factor represents the ratio of the molecular weight of carbon dioxide divided by the molecular weight of carbon. For projects that preserve existing carbon sinks, report the total mass of carbon sequestered in the row labeled "Total Storage." Annual increases in sequestration should be reported in the row labeled "Increase." Use the second four rows of the table ("Reductions") to report the project's emission reductions or offsetting emissions increases (e.g., reductions in nitrous oxide emissions associated with fertilizer use or increases in emissions from logging equipment). Report emission increases as negative reductions by using negative signs (-). To obtain a worksheet for estimating sequestration for urban forestry projects, call the Voluntary Reporting of Greenhouse Gases Communications Center at 1-800-803-5182.

Enter the following information in the appropriate columns of the table for each gas on which you are reporting:

Gas: In column (A), identify the gas using the appropriate code (if it has not already been provided). Use the following codes based on the chemical formulas for the principal greenhouse gases:

- CO2 (carbon dioxide)
- N2O (nitrous oxide)
- CH4 (methane)

For halogenated substances or other radiatively enhancing gases, use the codes in Appendix A (page 45).

Unit of Measure: In column (B), list the physical units of mass (e.g., metric tons, short tons) for the emissions or emission reductions using the standard abbreviations found in Appendix D (page 51).

Physical Quantities: In columns (C) through (F), report the total direct and indirect emissions and emission reductions for the project in each year. In the case of sequestration, record the total carbon storage and the increase in storage due to your project.

Emissions may increase from year to year, yet still represent a reduction if a modified reference case is used. On the other hand, emissions of one greenhouse gas may increase relative to the reference case while emissions of another greenhouse gas decrease. Similarly, reductions in direct emissions relative to the reference case may occur simultaneously with increases in indirect emissions.

If direct or indirect emissions of a particular greenhouse gas have increased rather than declined relative to the reference case, report the increase as a negative emission reduction in the reductions portion of the table. Indicate negative values by using a negative sign (-). For example, if a project results in a 10 ton reduction in methane emissions and a 27.5-ton increase in carbon dioxide emissions, report the methane emission reduction as 10 tons and the carbon dioxide emissions increase as -27.5 tons.

Accuracy: In column (H), estimate the level of accuracy of the emissions or emission reduction estimates reported in columns (C) through (G). Record either "Highly accurate" (±10 percent error) or "Moderately accurate" (between ±10 percent and ±50 percent error) for each gas and type of emission or reduction. If you cannot estimate accuracy, specify "Not determined." **Note:** You need not conduct an uncertainty analysis in order to complete column (H); simply provide your opinion as to the approximate accuracy level.

Emission Reductions and Sequestration in Future Years: Future reductions and sequestration *may* be provided, if available and if the project has a finite lifetime. Future reductions or sequestration should be reported as the average annual emission reduction or sequestration, calculated by dividing the total projected emission reduction/sequestration estimate for the duration of the project by the remaining project years. Record the average annual emission reductions or sequestration in column (I) and the expected duration of the project in column (J). Quantities in column (I) are **not** considered achieved reductions/ sequestration.

Part IV. Project Evaluation

1. **Reference Case:** Indicate the type of reference case used to estimate the project's emission reductions or sequestration. The reference case represents your estimate of the emissions or sequestration level that would have occurred in the absence of the project. The reference case may be either "basic" (i.e., equal to actual historical emissions or sequestration for one year or a range of years) or "modified" (i.e., a projection of the emissions or sequestration that would have occurred in the absence of the project). In some cases, such as capturing methane from landfill gas, it may not be necessary to develop a reference case. For the purpose of completing Form EIA-1605, when no reference case is developed, you should check the box "Modified."

2. **Reports to Other Agencies:** If you report information on this project to other government agencies, such as a state public utility commission or the Environmental Protection Agency (EPA), please identify them in the space provided and reference the reported information by report name or docket number.

3. **Multiple Reporting:** If you are aware of other entities that might report on the same project, identify them in the space provided or identify them generically (e.g., "appliance manufacturers" or "utility customers"). In Section 3, Energy End Use, indicate whether the project is part of a utility-sponsored program and, if so, provide the utility's name.

   Entities involved in a joint venture project might agree to report only their share of the total emission reductions or sequestration. Indicate whether or not the emission reduction or sequestration estimate reported in Part III represents the total for the entire project or a portion of the project total by checking the appropriate box. If the reported reduction or sequestration estimate is less than the total emission reduction or sequestration for the project, specify the

percentage of the total represented by the reported estimate in the space provided.

4. **Estimation Method:** Describe the procedure(s) used to develop the emission reduction or sequestration estimate(s), including:

   a. Descriptions of data sources such as measurements or engineering estimates.
   b. Estimation methods such as equations and emissions coefficients used to estimate the emission reductions.
   c. A description of how the reference case was developed.
   d. The method used to allocate emission reductions between the direct and indirect categories.
   e. A description of the scope of the emission reduction or sequestration estimate (e.g., indicating whether fuel cycle or other upstream or downstream, effects are considered).
   f. Other key assumptions such as demand growth, population growth, available technology, tree species composition, etc.

Reporting Information Specifics to Project Type on Part II of Schedule II

Use these instructions to complete Part II of each section of Schedule II that you submit (see page 15 for instructions on completing Parts I, III, and IV).

Section 1. Electricity Generation, Transmission, and Distribution

1. **Project Type:** Check the box(es) that best describe(s) the nature of the project. The project types are defined below:

   Heat rate or other efficiency improvement - An improvement in the efficiency of a generating unit(s), resulting in a decrease in the amount of fuel consumed per kilowatt hour generated.

   Availability improvement - Improvements (e.g., in maintenance procedures) that lead to an increase in the capacity factor (or utilization) for a low-emitting plant(s).

   Fuel switching - A change in the type of fuel used at a power plant.

   Increase in low-emitting capacity - The addition of generating capacity that has relatively low emissions rates (e.g., through the updating and/or addition of units with low emissions rates).

   Decrease in high-emitting capacity - A reduction in generating capacity that had relatively high emissions rates (e.g., through the derating and/or retirement of units with high emission rates).

   Zero/Low emitting power purchases - A purchase of power that has been generated from a non-emitting or low-emitting power source.

   Dispatching changes only - Any project which involves <u>only</u> a change in the order in which power plants are dispatched. **Note:** Many types of projects (e.g., heat rate improvement, availability improvement, etc.) have an effect on dispatching; however, check this box **only** if the project was limited **exclusively** to a change in dispatching.

   High efficiency transformers - Installation of improved transformers that reduce energy losses.

   Reconductoring - The replacement of an existing conductor segment(s) with a new lower-resistance segment(s).

   Distribution voltage upgrade - An increase in the voltage of the distribution system.

   Other Transmission and Distribution Improvements **-** Any other transmission and distribution improvements not included in the above categories. Provide a brief description of the project in the space provided.

   Other **-** If the project does not fall within any of the project types described above, check "Other" and provide a brief description of the project in the space provided.

2. **Project Scale:** Indicate whether the project is full-scale (i.e., commercial) or less than full-scale (i.e., pilot or demonstration).

3. **Total Fuel/Energy Consumption:** If this is **not** a transmission and distribution or dispatching project, report the **total** fuel consumption of the generating units included in the project. Report this information by year for each fuel type used by the generating units included in the project. *For projects involving nuclear or renewable power generation, report the* ***total*** *megawatt hours generated.* Identify the type(s) of fuel used with the codes in Appendix B (page 47). Use the abbreviations for units of measure found in Appendix D (page 51). (This question can be omitted for transmission and distribution projects.) For a joint venture project, report the portion of the total fuel/energy

consumption corresponding to the share of emissions or reductions reported in Part III.

4. **Change in Total Fuel/Energy Consumption Due to Project:** Report the estimated total net change in fuel/energy consumption (relative to the reference case) resulting from the project in each year. Provide this information for each fuel/energy type affected by the project. Report increases in fuel/energy consumption relative to the reference case as positive values and decreases as negative values. Indicate a negative value by using a negative sign (-). For example, if a project involved a switch from coal to natural gas, report the estimated decrease in coal consumption as a negative value and report the estimated increase in natural gas consumption as a positive value. *For projects involving nuclear or renewable power generation, report the **increase** in megawatt hours generated and the **decrease** in consumption of fuel(s) displaced.* Identify the type(s) of fuel affected by the project using the codes in Appendix B (page 47). If the project was a transmission and distribution project, indicate the specific type(s) and quantity of fuel saved, if known; otherwise, you may report "EL" (for electricity) as the energy source saved. Be sure to indicate the units used in the "Unit of Measure" column, using the standard abbreviations found in Appendix D (page 51). For a joint venture project, report the portion of the change in the total fuel/energy consumption corresponding to the share of emissions or reductions reported in Part III.

5. **List of Generating Units:** If this is a generation project, list all generating units involved. (If this project is a transmission and distribution project, leave the table blank.) For each generating unit, identify:
   - The operator of the unit (if different from the reporting entity),
   - The power plant where the unit is located,
   - The number or name of the generating unit, and
   - The nameplate capacity of the unit.

   Again, do not include units that were affected by the project solely as a result of dispatching changes.

6. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 2. Cogeneration and Waste Heat Recovery

Use these instructions to complete Part II of Section 2. See page 15 for instructions to Parts I, III, and IV.

1. **Fuel Consumption:** Complete the table for all applicable years. Indicate the fuel or energy source(s) of the cogeneration system in the first column using the fuel type codes provided in Appendix B (page 47). *Reference* refers to the types of fuels you used or would have used (in the absence of the project) in constructing your reference case. *Actual* refers to fuels that were combusted during the years for which the project is being reported. Be sure to include the unit of measure for the reported fuel usage. Use the abbreviations for units of measure found in Appendix D (page 51). For a joint venture project, report the portion of the fuel consumption corresponding to the share of emissions or reductions reported in Part III.

2. **Project Size:** Complete those rows of the table which apply to your project. In the row labeled *Generation Nameplate Capacity* enter the total generation capacity of all generators included in the project for each year on which the project is reported. For *Total Energy Savings* provide your best estimate of the total amount of energy saved due to the increased efficiency of cogeneration (in millions of Btu) for each reporting year. Provide your best estimate (in millions of Btu) of the waste heat recovered in each year in the row marked *Quantity of Waste Heat Recovered*. For a joint venture project, report the portion of the project size corresponding to the share of emissions or reductions reported in Part III.

3. **Electricity Metering Configuration:** Please check all boxes which describe the metering configuration of your cogeneration system. In *Gross Energy Metering*, separate meters measure electricity generated on site, and electricity consumed on site. *Surplus Energy Metering* refers to separate meters measuring (1) net consumption (purchased power) whenever the amount consumed on site exceeds the amount generated, and (2) electricity delivered to the utility (sales to the grid). In *Net Energy Metering*, one watthour meter measures watthours purchased from the utility. The meter flows in reverse when generated on-site power exceeds on-site demand. In this case, the utility controls frequency, voltage, and lagging kvars. *Time-of-day Metering* is a configuration with a magnetic tape recorder or other recording or transmitting device which monitors watthour/vhar readings over time.

4. **End-Use of Thermal Energy:** Please check all processes that consume thermal energy (steam, hot water, or heat) generated by the cogeneration system.

5. **Source of Waste Heat Energy Recovered:** Check the energy sources that apply. If you indicate "Other," please specify.

6. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 3. Energy End Use

Use these instructions to complete Part II of Section 3. See page 15 for instructions to Parts I, III, and IV.

1. **Project Type:** Indicate all applicable energy end-use categories. Project types are defined below:

   Equipment and Appliances - Projects dealing with refrigeration equipment, water heaters, food preparation equipment, dishwashers, clothes washers and dryers, process and fabrication equipment, manufacturing support equipment, energy management systems, and power conditioning equipment.

   Lighting and Lighting Control - Projects dealing with efficient lamps, efficient fixtures, improved ballasts, lighting control systems, delamping, decorative lighting, and security lighting.

   Load Control - Projects involving utility direct, distributed, or local control of end-use demand.

   Heating, Ventilating, and Air Conditioning - Projects dealing with space heating, space cooling, and ventilation equipment.

   Building Shell Improvement - Projects dealing with home or facility audits, new building standards, low-cost weatherization measures, and thermal integrity improvements for buildings.

   Motor and Motor Drive - Projects dealing with efficient motors, motor systems, and adjustable speed drives.

   Fuel Switching - Projects involving a change from one fuel to another for a particular end use.

   Industrial Power Systems - Projects that reduce emissions from systems providing energy for industrial processes through efficiency improvements.

   Urban Forestry (Energy Effects Only) - Projects involving the planting of trees to provide shade or windbreaks, changing the space heating or cooling requirements of buildings. **Note:** Only the energy efficiency effects of urban forestry should be reported in Section 3 (Energy End Use). If you wish to report the carbon sequestration effects of an urban forestry project, report these effects as a separate project using Section 8 (Carbon Sequestration) and check the box indicating that sequestration effects are reported in Section 8.

   Other Energy End-use Projects - A residual category to capture the effects of energy end-use projects that cannot be meaningfully included in any other category. Provide a brief description of the project in the space provided.

2. **Load Shape Effects:** If this project was undertaken as part of an electric utility-sponsored demand-side management (DSM) program, check the box(es) that best describe(s) the load shape effects of the project. *Select "Not applicable" if this project was not part of an electric utility-sponsored demand-side management (DSM) program.* Energy end-use activities can have more than one effect. For example, thermal storage programs can shift electric load from on-peak to off-peak periods (load shifting) and increase off-peak consumption (valley filling). Check all boxes that apply. Load shape effects are defined below:

   Energy Efficiency - Projects that improve the energy efficiency of specific end-use devices and systems. Such projects usually reduce overall energy consumption, often without regard for the timing of project-induced savings. Generally, energy savings are achieved through the substitution of technically more efficient measures (i.e., equipment, systems, or operating procedures) to produce the same level of end-use service (e.g., lighting or warmth) with less energy use.

   Load Building - Projects that increase energy consumption, generally without regard to the timing of the increase. Promotion of residential electric space heating systems and promotion of new industrial electrotechnologies are examples of electricity load-building projects.

   Load Shifting - Projects that move energy consumption from one time to another

(usually during a single day). For example, water-heater timers typically turn off the units during the daytime (when an electric utility experiences peak demands) and allow the units to operate at night (during the utility's off-peak period).

Peak Clipping - Projects that reduce energy demand at certain critical times, typically when the utility experiences system peaks. These projects generally have only small effects on overall energy use but focus sharply on reducing energy use at these critical times. Load-shifting and peak-clipping differ because the former shifts much of the energy use from one time to another, while the latter eliminates a load without shifting it to another time period.

Valley Filling - Projects that increase off-peak energy consumption (without necessarily reducing on-peak demands). Replacement of a natural gas-fired furnace with an electric heat pump (with backup heat provided by natural gas) is an example of valley filling. Such projects can aim to fill daily or seasonal valleys.

3. **Sector(s) of End User(s) Affected by the Project:** Indicate the economic sector(s) of the end user(s) participating in the project. *Complete this question only if you are reporting on a utility-sponsored DSM program.*

4. **Project Scale:** Indicate whether the project is a full-scale (i.e., commercial) project or a less than full-scale (i.e., pilot or demonstration) project.

5. **Net Change in Energy/Fuel Consumption Due to Project:** Report the estimated total net change in fuel/energy consumption (relative to the reference case) resulting from the project in each year. Provide this information for each fuel/energy type affected by the project. *Report increases in fuel/energy consumption relative to the reference case as positive values and decreases as negative values.* Indicate a negative value by using a negative sign (-). For example, if a project involved a switch from coal to electricity, report the estimated decrease in coal consumption as a negative value and report the estimated increase in electricity consumption as a positive value. Identify the type(s) of fuel affected by the project using the codes in Appendix B (page 47). Use the abbreviations for units of measure found in Appendix D (page 51). For a joint venture project, report the portion of the net change in energy/fuel consumption corresponding to the share of emissions or reductions reported in Part III.

6. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 4. Transportation and Off-Road Vehicles

Use these instructions to complete Part II of Section 4. See page 15 for instructions to Parts I, III, and IV.

1. **Project Type:** Check the box that best characterizes your project type. If you have combined several activities into a single project, check all boxes that apply. Transportation project types are defined below:

   Marketing or Manufacturing of More Efficient Vehicles - Production or sale of vehicles that are more fuel efficient than equivalent vehicles previously manufactured or sold.

   Marketing or Manufacturing of More Efficient Vehicle Components - Production or sale of vehicle components, such as tires, that are more fuel efficient than equivalent components previously manufactured or sold.

   Marketing or Manufacturing of Alternative Fuel Vehicles (AFVs) - Production or sale of vehicles that use a cleaner fuel or energy source than equivalent vehicles previously manufactured. Such fuels include natural gas, alcohol fuels, and, in some cases, electricity.

   Operation of More Efficient Vehicles - Operation of vehicles (purchased or leased by the reporter) that are more fuel efficient than the vehicles that were replaced or that would have otherwise been operated.

   Use of More Efficient Vehicle Components - Use of vehicle components, such as tires, that are more fuel efficient than components that were replaced or that would have otherwise been used.

   Operation of Alternative Fuel Vehicles (AFVs) - Operation of vehicles (purchased or leased by the reporter) that use a cleaner fuel or energy source than vehicles that were replaced or that would have otherwise been operated. Such fuels include natural gas, alcohol fuels, and, in some cases, electricity.

   Demand Modification - Includes the following types of projects that reduce demand for transportation services, which reduces vehicle miles traveled (VMT) and emissions:

   Carpooling/Vanpooling - Reduction of VMT by two or more commuters traveling together in a single vehicle.

   Mass Transit - Commuters switching from private vehicles to public transportation.

   Employee Parking Buyout - Employers providing cash incentives to employees to switch to alternative commuting modes such as carpooling or mass transit.

   Telecommuting - Reduction of VMT and related emissions by a commuter working at home, using telecommunications systems to interact with his or her employer.

   Other Demand Modification - Other projects that reduced demand for transportation services. (Indicate the type of demand modification project in the space provided.)

   Service Efficiency Improvements - Reduction of emissions through improving efficiency of a transportation service. For example, rerouting can reduce a delivery service's VMT without changing the level of service provided.

   Driver/Operator Training - Training of vehicle operators in techniques that improve fuel efficiency, resulting in reduced emissions.

   Infrastructure Improvement - Construction or renovation of transportation infrastructure such that traffic flow is improved and fuel consumption reduced.

   Accelerated Scrappage - Providing incentives to owners of old vehicles with low fuel efficiencies to replace them with new, fuel efficient vehicles.

Other - Other transportation and off-road vehicle projects. Indicate the project type in the space provided.

2. **Mode:** Indicate all transportation modes that your project involves.

3. **Quantity of Fuel Saved or Displaced:** Indicate by year the quantity of fuel saved or, in the case of fuel switching (use of alternative fuels), the quantity of fuel displaced. Be sure to specify the units you are using to report this quantity, using the abbreviations for units of measure found in Appendix D (page 51). Also, indicate the fuel type saved (or displaced) by your project, using the abbreviations in Appendix B (page 47). For a joint venture project, report the portion of the fuel saved or displaced corresponding to the share of emissions or reductions reported in Part III.

4. **Fuel Switching:** If the project achieves a reduction through the use of an alternative fuel, indicate the quantity and type of alternative fuel consumed by year. For a joint venture project, report the portion of the alternative fuel consumed corresponding to the share of emissions or reductions reported in Part III.

5. **Project Scale:** Indicate whether the project is a full-scale (i.e., commercial) project or a less than full-scale (i.e., pilot or demonstration) project.

6. **Project Size:** Select an appropriate measure to quantify the size of your project (e.g., number of vehicles or components, vehicle miles traveled) and enter quantities for each year as appropriate. For a joint venture project, report the portion of the project size corresponding to the share of emissions or reductions reported in Part III.

7. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 5. Waste Treatment and Disposal — Methane

Use these instructions to complete Part II of Section 5. See page 15 for instructions to Parts I, III, and IV.

1. **Type of Facility:** Check the box(es) that best describe(s) the facility affected by your project. Check "Other Waste Facility," and describe the facility in the space provided if your project does not result in emission reductions at either a landfill or a wastewater treatment plant.

2. **Type of Waste Handled:** Check all types of waste handled at the facility(ies) you identified in Question 1. If municipal solid waste is handled, indicate whether or not yard waste is included in the waste stream. If industrial wastewater is handled, indicate whether pulp and paper wastes are included. When checking "Other," specify the type of waste handled.

3. **Project Type:** Check the box(es) that describe(s) the type of project undertaken. Project types are defined below:

   Biogas Recovery - Projects that capture biogas (e.g., landfill gas or gas from an anaerobic digester) for use as energy or to be flared.

   Methane Emissions Avoided - Projects that avoid emissions by modifying the waste stream, altering wastewater treatment, or any other method. Modifications to the waste stream include recycling, waste bans (e.g., bans on yard waste in landfills), and the separation of pulp and paper wastes from wastewater. Alterations in wastewater treatment may be chemical or mechanical. Waste-to-energy projects should be defined as other, with the waste-to-energy descriptor entered in the space provided.

4. **Project Size:** Complete those rows of the table that apply to your project. For projects affecting landfills, project size may be indicated by acres affected, waste in place affected, number of vertical wells, or length of horizontal wells. For waste-to-energy projects, project size may be indicated by waste incinerated or processed. For wastewater treatment projects, size may be indicated by digester capacity or daily wastewater load. Provide data for each applicable size measure where available. If not already provided, record the units used for each size measure you report, using the abbreviations for units of measure found in Appendix D (page 51). For a joint venture project, report the portion of the project size corresponding to the share of emissions or reductions reported in Part III.

5. **Energy Recovery and Use:** If your project involves biogas recovery, indicate the total volume of biogas recovered annually and its average heat content. Please provide a breakdown of the annual volume of gas directed to each of the uses listed. (Electricity generated for sale off-site should be reported in kWh or MWh.) If your project involves combustion of waste for power generation, report the electricity generated. For a joint venture project, report the portion of the biogas recovered corresponding to the share of emissions or reductions reported in Part III. The uses are defined below:

   Gas Used On-Site - Gas is consumed to meet on-site energy demand.

   Gas Sold - Gas is sold to an end-use consumer, a natural gas transmission company, or to a utility through a pipeline.

   Electricity Generated - Gas is combusted on site and converted to electricity for sale to an off-site consumer such as a utility; or waste is combusted for the generation of electricity.

   Flared - Gas is flared on site for disposal.

   Other - Gas is disposed of in any other manner. Specify the method of disposal.

6. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 6. Agriculture — Methane and Nitrous Oxide

Use these instructions to complete Part II of Section 6. See page 15 for instructions to Parts I, III, and IV.

1. **Type of Facility:** Check the box which best describes the type of facility where the project is located. If you have checked "Livestock," indicate the type of livestock managed at that facility.

2. **Project Type:** Check the box(es) that describe(s) the type of project undertaken. If you check "Other," describe your project type. Project types are defined below:

   Methane Emissions Avoided - Projects that avoid emissions through such activities as rice field drainage, reduced livestock production, or improved livestock productivity.

   Note: If your project results in improved livestock productivity, report on the appropriate productivity measure in the accompanying table. Calving percentage, average weaning weight, and milk yield can be used for cow/calf operations, while average age and weight at slaughter can be used for cattle in feedlots.

   Biogas Recovery - Projects that capture biogas (e.g., gas from the decomposition of the solid waste of animals) for use as energy or to be flared. The use of an anaerobic digester in manure management is an example of this type of project.

   Note: If your project involves a change in the management of livestock manure, identify the system used in each of the years listed.

   Improved Nutrients Management - Involves reductions in the amount of nitrogenous fertilizers, more precise application of nutrients, or the use of nitrification inhibitors.

   Other - Any other agricultural project that reduces methane or nitrous oxide emissions. Please describe any such project in the space provided.

3. **Project Size:** Complete those rows of the table that apply to your project. If your project affected cropland, please describe the type of crop(s) involved and the acreage dedicated to their cultivation annually. For projects that reduced the number of livestock you manage, altered livestock productivity, or changed the livestock manure management system, indicate the number of animals managed or contributing waste (by type) for each of the years listed. You may also wish to provide the average daily volume of waste handled. For a joint venture project, report the portion of the project size corresponding to the share of emissions or reductions reported in Part III.

4. **Biogas Recovery and Use:** If your project involves biogas recovery, indicate the total volume of biogas recovered annually and its average heat content. Provide a breakdown of the annual volume of gas directed to each of the uses listed. (Electricity generated for sale off-site should be reported in kWh or MWh.) For a joint venture project, report the portion of the biogas recovered corresponding to the share of emissions or reductions reported in Part III.

   Gas Used On-Site - Gas is consumed to meet on-site energy demand.

   Gas Sold - Gas is sold to an end-use consumer, a natural gas transmission company, or to a utility through a pipeline.

   Electricity Generated for Sale Off-Site - Gas is combusted on site and converted to electricity for sale to an off-site consumer such as a utility.

   Flared - Gas is flared on site for disposal.

   Other - Gas is disposed of in any other manner. Specify the method of disposal.

5. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 7. Oil and Natural Gas Systems and Coal Mining — Methane

Use these instructions to complete Part II of Section 7. See page 15 for instructions to Parts I, III, and IV.

1. **Project Location:** Check all boxes that describe the stage(s) of the fuel extraction, storage, and delivery cycle affected by your project. If you check "Production," indicate whether oil wells, natural gas wells, or coal mines are involved. For projects relating to coal mining, indicate the type (i.e., surface or underground) and, if underground, the method (e.g., longwall or room and pillar).

2. **Project Type:** Check the box(es) that best describe(s) your project. Project types are defined below:

   Methane Emissions Avoided - Projects that avoid emissions through activities such as flaring rather than venting associated natural gas at oil wells, changing operation and maintenance procedures, replacing or upgrading equipment, reinjecting natural gas into reservoirs, decreasing coal production from "gassy" mines, or any other methods.

   Gas Recovery - Projects that capture gas for use as energy or to be flared. Such projects include the capture and sale or use of natural gas previously vented, the recovery and recycling of emissions from glycoldehydrators, and coal mine degasification.

   Note: If your project involved coal mine degasification, indicate the method used.

   Other - Projects to reduce emissions from oil and natural gas systems or coal mining that are not included in the above definitions.

3. **Project Size:** Complete those rows of the table that apply to your project. For projects involving oil and natural gas systems, characterize the size of your project by recording the number of wells affected, miles of pipeline affected, and/or gate or compressor stations affected. For projects involving coal mines, indicate the annual coal production in the mine and, for a degasification project, the number of wells utilized. If the project involves an equipment upgrade/replacement, indicate the number and type of devices altered. For a joint venture project, report the portion of the project size corresponding to the share of emissions or reductions reported in Part III.

4. **Gas Recovery and Use:** If your project involves gas recovery, indicate the total volume of gas recovered annually and its average heat content. Provide a breakdown of the annual volume of gas directed to each of the uses listed. (Electricity generated for sale off-site should be reported in kWh or MWh). For a joint venture project, report the portion of the biogas recovered corresponding to the share of emissions or reductions reported in Part III. The uses are defined below:

   Gas Used On-Site - Gas is consumed to meet on-site energy demand.

   Gas Sold - Gas is sold to an end-use consumer, a natural gas transmission company, or to a utility through a pipeline.

   Electricity Generated for Sale Off-Site - Gas is combusted on site and converted to electricity for sale to an off-site consumer such as a utility.

   Flared - Gas is flared on site for disposal.

   Other - Gas is disposed of in any other manner. Please specify the method of disposal in the space provided.

5. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 8. Carbon Sequestration

Use these instructions to complete Part II of Section 8. See page 15 for instructions to Parts I, III, and IV.

1. **Project Type:** Check the box that best describes the type of project undertaken. The project types are defined below:

   Afforestation - Planting trees in an area that has not recently been forested, thereby changing the land use from a non-forest use such as crop or pasture.

   Reforestation - Planting trees in a recently harvested forest area.

   Urban Forestry (Sequestration Effects Only) - Planting of trees in urban or suburban areas to sequester carbon. **Note:** Only the carbon sequestration effects of this type of project should be reported in this section. The energy impacts of urban forestry projects should be reported as a separate project in Section 3 (Energy End Use). Indicate whether you completed a copy of Section 3 for your urban forestry project by checking the appropriate box.

   Forest Preservation - Protecting an existing forest from harvest or conversion to another land use.

   Modified Forest Management - Improving the management regime of an existing forest to increase carbon storage in the forest or reduce the release of greenhouse gases resulting from forestry activities. Activities include treatments such as fertilization and prescribed fire, and site preparation techniques at the time of harvest and regeneration such as mechanical site preparation, site preparation burning, and chemical site preparation.

   Agroforestry - Combining agriculture and forestry on the same land area to provide agricultural products with less intensive energy uses and sequester more carbon than traditional agriculture.

   Woody Biomass Production - Planting and harvesting trees for the purpose of displacing fossil fuels as an energy source. **Note:** Only the carbon storage of this type of project should be reported in this section.

   Wood Products - Increased wood products usage so that carbon is stored over the long term in wood products that substitute for non-wood products such as steel, aluminum, and portland cement.

   Conservation Tillage - Adopting conservation tillage methods such as reduced till or no till that increase carbon storage on cropland compared to conventional tillage methods.

   Other- Activities not included in any of the previous project types. Provide a brief description of the project in the space provided.

2. **Forest Composition:** Indicate, using a percentage, the type of forest (or other crop type, if applicable) that the project involves. Enter "NA" if this question is not applicable.

   Example 1: If the project type is reforestation and loblolly pine is the planted forest type, indicate that the forest composition is 100% loblolly pine.

   Example 2: A forest preservation project occurs in two areas of 100 acres each. In one area, an oak-hickory forest was preserved. In the other, a white-red pine forest was preserved. The forest composition associated with this project should be reported as 50% oak-hickory, 50% white-red pine.

3. **Historic Land Use:** Check the boxes that describe what the land was previously used for, and, where applicable, specify the type of forest/crop in the area prior to the initiation of the project. If the historic land use was not forest, cropland, or pasture, check "Other" and describe the prior land use. For a "Wood Products" project, check "Not applicable."

   Example: If the previous land use of the afforestation project was growing corn, then the historic land use would be described by checking the box labeled cropland and entering "corn" for crop type.

4. **Reference Case Land Use**: Specify the type of forest/crop or land use that was assumed for the reference case. If the reference case is not forest, cropland, or pasture, indicate this by checking "Other" and specifying the reference case land use.
   Example: If you assumed that the land use would have been growing corn if your afforestation project had not occurred, then your reference case land use would be described by checking the box labeled cropland and entering "corn" for crop type.

5. **Project Characteristics:** Describe the characteristics of the project by completing the table. If a particular characteristic does not apply to your project, enter "NA." The information you report should be in annual increments for the project activity (e.g., the area planted in the reporting year). Do not report cumulative values, such as the number of trees planted from the start of the project through the reporting year. For each row, report the following:
   Note 1: If you are reporting an urban forestry project, you need only fill in the "Trees Planted During Year" row.
   Note 2: For a joint venture project, report the portion of the project characteristics corresponding to the share of sequestration or reductions reported in Part III.

   Area Affected During Year: Indicate the additional area planted (or otherwise affected) in each year. For projects involving activities other than tree planting, this area should reflect new activity only, e.g. for forest preservation, enter the additional area preserved in each year. Record this value in physical units such as acres, hectares, square feet, square meters, or square miles. Be sure to record the units used to express the area in the "Unit of Measure" column, using the abbreviations for units of measure found in Appendix D (page 51).

   Trees Planted During Year: Specify, per unit area, the ***average*** number of trees that were planted/grown in the project area, in each year. Also, indicate the unit of area used in the first column ("Unit of Measure"). Use the abbreviations for units of measure found in Appendix D (page 51). Alternately, report the total number of trees planted in each year.

   Timber Productivity: If relevant, provide an estimate of the increase in the total annual cubic-foot volume growth per acre that is a result of your project.

   Planned Harvest Age: If you are reporting on a forestry project in which the trees will ultimately be harvested, provide the age of the trees at the anticipated date of harvest.

   Mean Age of Trees (or Stands) During Year: If you are reporting on activities that affect a single existing forest stand, record the mean age of the trees in that stand. If you are reporting on activities that affect more than one stand, record the mean age of all the trees in the stands. For a project involving tree planting, enter the age of the trees or stands in the reporting year. For other projects, enter the age of the trees or stands affected by the activity, e.g., for forest preservation, enter the age of the stands being preserved in the year when preservation commences.

6. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it sequestered carbon or reduced emissions. Include all information important to understanding the project and its effects on emissions or sequestration, as well as any special conditions that would be necessary to replicate its achievements.

Section 9. Halogenated Substances

These instructions are for completing Part II of Section 9. See page 15 for instructions to Parts I, III, and IV.

1. **Project Type:** Check the box that best describes the project type. The project types are defined as:

   Reclamation - Activities that capture halogenated substances that would otherwise be vented to the atmosphere. The halogenated substance may be recovered from discarded equipment or recovered from a process which uses halogenated substances or produces them as a byproduct. Reclamation includes two subcategories:

   Recycling - Using the recovered halogenated substance in another application. If the halogenated substance is sold to another user, it can be reported here. However, to flag possible multiple reporting, clearly indicate that the halogenated substance was sold (see Part IV, Question 3).

   Destruction - This classification covers the destruction of any halogenated substance in a manner consistent with Environmental Protection Agency (EPA) rules and international agreements.

   Substitution - Any project that replaces a halogenated substance with another substance is classified as substitution. The substitute could be a non-halogenated substance, but is not required to be. Thus, an entity may desire to report an action that replaced a high global warming potential (GWP) chlorofluorocarbon (CFC) with a halogenated substance having a lower GWP. The avoided emissions of the high-GWP CFC would be reported as a reduction, and any emissions of the low-GWP halogenated substance substituted would be reported as a negative reduction (i.e., an offsetting emissions increase). This category includes the substitution of halogenated substances used in manufacturing processes and as working gases in appliances.

   Emission Avoidance - Projects that permanently avoid the emission of halogenated substances in any of three ways: (1) by altering a process, (2) by altering equipment, or (3) by improving maintenance and servicing procedures.

   The process alteration may include modifying the handling procedures for a halogenated substance or changing a process that produces a halogenated substance as a byproduct (e.g., reducing perfluorocarbon emissions from aluminum production through process monitoring).

   Equipment alteration may refer to one of two actions: (1) projects that reduce the quantity of the halogenated substance used by the piece of equipment being reported, or (2) projects that reduce the rate of leakage of halogenated substance-using equipment. Improved operating practice and maintenance of equipment that uses halogenated substances may also lead to reduced fugitive emissions.

   Use of Improved Appliances - The use of improved appliances that use halogenated substances. Such appliances may use a more environmentally benign halogenated substance, use less of a particular halogenated substance to achieve the same output, or be less likely to leak halogenated substances over the course of their lifetimes. Such appliances include but are not limited to refrigerators and air conditioners.

   Other - Any project not fitting into one of the above categories. Please specify the type of project in the space provided.

2. **Source of Halogenated Substance:** Check all boxes that apply.

3. **Use of Halogenated Substance:** Check all boxes that apply. If the halogenated substance is a byproduct in the production of another material, check "None."

4. **Type of Emissions Affected:** Check the box that best describes the reported halogenated substances. Fugitive emissions are unintentional losses of halogenated substances. Nonfugitive emissions are uncontrolled emissions. Nonfugitive emissions include venting halogenated substances produced as a byproduct of another process and intentional venting of substances used in production processes.

5. **Project Size:** In the "Size Measure" column, identify the measure of project size you have chosen. Include the units for this size measure in the appropriate column. For example, a project that involves the sale of automotive air conditioners and a project that reduces emissions of PFCs in aluminum production might be entered as follows:

Size Measure	Unit of Measure	Quantity					
		1997	1998	1999	2000	2001	2002
Air Conditioners	N	50	60	65	70	70	65
Aluminum Production	Kst	1,023	1,205	1,120	1,104	1,104	1,120

For a joint venture project, report the portion of the project size corresponding to the share of emissions or reductions reported in Part III.

6. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Section 10. Other Emission Reduction Projects

Use these instructions to complete Part II of Section 10. See page 15 for instructions to Parts I, III, and IV.

1. **Project Type:** Check the box that best describes the type of project undertaken. The project types are defined below:

   Coal Ash Reuse - Use of coal ash as a substitute for Portland cement in concrete, which reduces emissions from calcining limestone to produce lime, a major constituent of Portland cement.

   Other Materials Recycling/Reuse - Recycling or reuse of other waste materials that reduces emissions associated with the virgin materials that are displaced.

   Waste/Source Reduction - Reduction in waste generation resulting in reduced emissions associated with waste processing and disposal and emissions associated with virgin materials that are displaced.

   Underground Injection of Carbon Dioxide - Injection of carbon dioxide into wells, resulting in the storage or sequestration of the gas underground. This includes enhanced oil recovery techniques that use carbon dioxide injection to improve recovery of crude oil.

   Reduction of Process Emissions - Reduction in emissions of greenhouse gases from industrial processes.

   Research and Development Programs - Research and development programs aimed at reducing emissions of greenhouse gases.

   Education and Training Programs - Education and training programs aimed at reducing emissions of greenhouse gases.

   Other - Activities not included in any of the previous project types. Please specify the type of project in the space provided.

2. **Project Scale:** Indicate whether the project is a full-scale (i.e., commercial) project or a less than full-scale (i.e., pilot or demonstration) project.

3. **Project Size:** Provide a measure of the size of your project. For example, if the project is a neighborhood recycling program, indicate the number of people involved and the amount of material(s) being collected for recycling. Where possible, use the abbreviations for units of measure found in Appendix D (page 51). For a joint venture project, report the portion of the project size corresponding to the share of emissions or reductions reported in Part III.

4. **Project Description:** Describe the project in the space provided, explaining its basic nature and general characteristics, and the manner in which it reduced emissions. Include all information important to understanding the project and its effects on emissions, as well as any special conditions that would be necessary to replicate its achievements.

Instructions for Schedule III. Entity-Level Emissions and Reductions

Use Schedule III to establish a record of your entity's greenhouse gas emissions, emission reduction, and sequestration achievements. Use Schedule III to report the following information at the entity level:

- Actual emissions for the baseline period of 1987 through 1990,
- Actual emissions for the subsequent years 1991 through 2002,
- Emission reductions for the years 1991 through 2002,
- Increases in sequestration achieved for the years 1991 through 2002, and
- Causes of changes in the level of your emissions.

While Schedule III allows you considerable flexibility regarding the scope of activities you may report, you are encouraged to provide a comprehensive accounting of all greenhouse gas emissions resulting from your entity's activities.

Schedule III is divided into six categories to assist you in performing a comprehensive evaluation of your entity-level activities and to delineate clearly the sources of your entity's emissions and emission reductions. These categories differentiate between direct and indirect emissions. They are grouped under three headings which correspond to Parts within Schedule III:

Part Ia. Direct Emissions *and*
Part Ib. Reductions in Direct Emissions
1. Stationary Combustion
2. Transportation
3. Other Direct

Part IIa. Indirect Emissions *and*
Part IIb. Reductions in Indirect Emissions
1. Power Transactions
2. Other Sources

Part III. Sinks and Sequestration
1. Sinks and Sequestration

General Instructions for Completing Schedule III

Please enter the name of your entity as reported on Schedule I on each page of your Schedule III submission.

Parts I through IV are presented on the form in a tabular format. In Parts I and II, you will find the category of emissions or reductions in the first column of these tables. For each category, indicate the gases on which you are reporting. For gases other than carbon dioxide, use the codes listed in Appendix A (page 45). If you need space for additional gases, make and complete an additional copy(ies) of the appropriate Parts of Schedule III.

If your entity had both foreign and domestic activities, submit a separate copy of Schedule III, Parts I through III for each. At the top of each page of the form are check boxes to indicate whether that page is representative of foreign or domestic emissions and reductions. In Part IV, you will determine the total emissions and reductions for your entity. These totals should include both foreign and domestic activities.

Part I. Direct Emissions and Reductions in Direct Emissions

Parts Ia and Ib collect information on direct emissions and reductions in direct emissions, respectively, from the following sources:

1. ***Stationary Combustion:*** Your entity's direct emissions and emission reductions resulting from the combustion of fuel (coal, oil, gas, etc.) at stationary sources (e.g., power plants, industrial boilers, etc.) owned (wholly or in part) or leased by your entity.

2. ***Transportation:*** Your entity's direct emissions and emission reductions resulting from the combustion of fuel (diesel fuel, gasoline, jet fuel, etc.) by mobile sources

owned (wholly or in part) or leased by your entity. In addition to emissions from automobiles, aircraft, trains, and other transportation vehicles, this category includes emissions from non-transportation mobile equipment such as construction, mining, and farm equipment (e.g., bulldozers, front-end loaders, and tractors).

3. ***Other Direct Sources:*** Your entity's direct emissions and emission reductions not caused by the combustion of fuels at stationary or mobile sources owned (wholly or in part) or leased by your entity. Examples of emissions to be included in this category are methane emissions from coal mines, oil and natural gas systems, and landfills; nitrous oxide emissions from adipic acid production; and carbon dioxide emissions from cement production.

Note: Emissions from sources that are only partially owned by your entity should be allocated to the direct and indirect categories based on your entity's ownership share. For example, if your entity owns ten percent of a particular source, then ten percent of the emissions from that source should be allocated to the direct category (and reported in Part I), and the remaining 90 percent should be treated as indirect emissions (and reported in Part II). Allocation of emissions between direct and indirect should always be based on ownership, unless the owners have agreed to divide the greenhouse gas emissions among themselves according to some other scheme. Such agreements take precedence for the purposes of allocating emissions between the direct and indirect categories. (If such an agreement exists, please include a description of it in your response to Question 1 [Estimation Method] of Part IV.)

Completing Part Ia. Direct Emissions

The table in Part Ia has been designed for emissions data in the three categories outlined above.

(A) Source of Emissions: The list of sources on which you may report is provided. For each source, indicate the gases on which you are reporting. For gases other than carbon dioxide use the codes provided in Appendix A (page 45).

(B) Unit of Measure: Select the most convenient unit of measure (e.g., short tons, metric tons, pounds, kilograms) from those listed in Appendix D (page 51), and indicate the unit chosen using the standard abbreviations also shown in Appendix D. Because you will be asked to total your emissions and reductions for each gas in Part IV, it would be prudent to use consistent units of measure across all parts of Schedule III for each reported gas.

(C) Baseline Emissions: Record your baseline emissions of greenhouse gases for any of the years 1987 through 1990.

(D) Annual Emissions: Record your emissions of greenhouse gases for any of the years 1991 through 2002.

Completing Part Ib. Reductions in Direct Emissions

The table in Part Ib is designed for reductions in your entity-level emissions of greenhouse gases from stationary combustion, transportation, and other direct emissions.

(A) Source of Reduction: The list of sources on which you may report is provided. For each source, indicate the gases on which you are reporting. For gases other than carbon dioxide use the codes provided in Appendix A (page 45).

(B) Reference Case Type: Record the reference case type used to determine the emission reductions within the corresponding category. "Basic" or "Modified" are sufficient responses. Page 6 of the General Instructions includes a discussion of reference cases. **Note:** Part V will request additional information on your reference case.

(C) Unit of Measure: Indicate the unit of measure used for the corresponding reductions using the standard abbreviations in Appendix D (page 51).

(D) Annual Reductions: Record your reductions under the appropriate years. **Note:** Reporting emissions in Part Ia is not a prerequisite to reporting reductions in Part Ib; however, it would greatly increase the value of your report if you are able to report both. If your emissions increased relative to your reference case and you are completing Part Ib, use a negative sign (-) to indicate that it is a negative value.

Part II. Indirect Emissions and Reductions in Indirect Emissions

Parts IIa and IIb collect information on indirect emissions and reductions in indirect emissions, respectively, from the following sources:

1. ***Power Transactions:*** Your entity's emissions and emission reductions associated with purchases and sales of electricity, steam, and hot water. Purchases of power result in indirect emissions because the source is not owned by your entity, while power wholesales may be associated with either direct emissions from your own sources or with indirect emissions from power you purchased.

   Note: "Indirect CO_2 from Purchased Power" asks for all indirect emissions resulting from the purchase or use of electricity, steam, and hot water generated by other entities. "CO_2 Associated with Electricity Wholesaling" asks for emissions associated with your sale of electricity, steam, and hot water to other entities for resale. This pertains to power **wholesales** and not to retail sales. (Emissions from your own sources associated with both wholesale and retail sales should still be included in "Direct Emissions from Stationary Combustion" in Part Ia.) "Net CO_2 from Power Transactions" is the difference between "Indirect CO_2 from Purchased Power" and "CO_2 Associated with Electricity Wholesaling." A positive result indicates that the emissions consequences of your power purchases are greater than those of your power sales.

2. ***Other Sources:*** All other indirect emissions and indirect emission reductions from activities affecting the emissions of another entity or entities.

Completing Part IIa. Indirect Emissions

(A) Source of Emissions: The list of sources on which you may report is provided. For each source, indicate the gases on which you are reporting. For gases other than carbon dioxide use the codes provided in Appendix A (page 45).

(B) Unit of Measure: Indicate the corresponding unit of measure. Select the most convenient unit of measure (e.g., short tons, metric tons, pounds, kilograms) from those listed in Appendix D (page 51), and indicate the unit chosen using the standard abbreviations also shown in Appendix D. Because you will be asked to total your emissions and reductions for each gas in Part IV, it would be prudent to use consistent units of measure across all Parts of Schedule III for each reported gas.

(C) Baseline Emissions: Record your baseline emissions of greenhouse gases for any of the years 1987 through 1990 corresponding to the appropriate source of emissions.

(D) Annual Emissions: Record your emissions of greenhouse gases for any of the years 1991 through 2002 corresponding to the appropriate source of emissions.

Completing Part IIb. Reductions in Indirect Emissions

(A) Source of Reduction: The list of sources on which you may report is provided. For each source, indicate the gases on which you are reporting. For gases other than carbon dioxide use the codes provided in Appendix A (page 45).

(B) Reference Case Type: Record the reference case type used to determine the emission reductions within the corresponding category. "Basic" or "Modified" are sufficient responses. Page 6 of the General Instructions includes a discussion of reference cases. **Note:** Part V will request additional information on your reference case.

(C) Unit of Measure: Indicate the unit of measure used for the corresponding reductions. Use the standard abbreviations in Appendix D (page 51).

(D) Annual Reductions: Record your reductions under the appropriate years. **Note:** Reporting emissions in Part IIa is not a prerequisite to reporting reductions in Part IIb; however, it would greatly increase the value of your report if you are able to report both. If your emissions increased relative to your reference case and you are completing Part IIb, use a negative sign (-) to indicate that it is a negative value.

Part III. Sinks and Sequestration

Part III of the form allows you to report on your sequestration activities. Include your entity's annual increases in the sequestration of carbon for the years from 1991 through 2002. Do not report the total quantity of carbon sequestered in forests that you own. If you wish to report projects that preserve an existing carbon sink, you are encouraged to report on Schedule II, Section 8, Carbon Sequestration.

Completing Part III. Sinks and Sequestration

(A) Substance: The list of substances on which you may report is provided.

(B) Unit of Measure: Indicate the unit of measure used for the corresponding increases in annual sequestration using the standard abbreviations in Appendix D (page 51).

(C) Annual Sequestration: Record your annual increases in the sequestration of carbon dioxide. The first row of the table has been designed for the amount of carbon sequestered, and the second row for the equivalent quantity of carbon dioxide. To determine the equivalent quantity of carbon dioxide, multiply the amount of carbon sequestered by 3.67. This factor represents the ratio of the molecular weight of carbon dioxide divided by the molecular weight of carbon.

Part IV. Total Emissions and Reductions

When you have completed Parts I through III for both foreign (if applicable) and domestic activities, complete Part IV. Your results for Part IV represent the combined totals of your activities and, as such, include both foreign and domestic results.

Completing Part IVa. Total Emissions

Your total emissions are the sum of your emissions from Part Ia and Part IIa. These summations are performed by gas and include both foreign and domestic activities. In computing your total carbon dioxide emissions, you should use the values entered in the row labeled "Indirect CO_2 from Purchased Power" of Part IIa, "Power Transactions," and not the values from "Net CO_2 from Power Transactions."

(A) Greenhouse Gas: For gases other than carbon dioxide, indicate the reported gas in the space provided. Codes for these gases are found in Appendix A (page 45).

(B) Unit of Measure: Indicate the corresponding unit of measure using the standard abbreviations in Appendix D (page 51). Be sure to use consistent units for each gas.

(C) Baseline Emissions: Record your total baseline emissions for corresponding greenhouse gases for any of the years 1987 through 1990.

(D) Annual Emissions: Record your total annual emissions for corresponding greenhouse gases for any of the years 1991 through 2002.

Completing Part IVb. Total Reductions

Your total reductions are the sum of your reductions from Part Ib, Part IIb, and Part III.

These summations are performed by gas and include both foreign and domestic activities. In determining your total reductions of carbon dioxide, you will use the values in the line labeled "Indirect CO_2 from Purchased Power" in Part IIb, "Power Transactions," (not "Net CO_2 from Power Transactions"), and the values recorded in the line labeled "Carbon Dioxide Equivalent" from Part III. If your emissions increased relative to your reference case and you are completing Part IVb, use a negative sign (-) to indicate that it is a negative value.

(A) Greenhouse Gas: For gases other than carbon dioxide, indicate the reported gas in the space provided. Codes for these gases are found in Appendix A (page 45).

(B) Unit of Measure: Indicate the corresponding unit of measure using the standard abbreviations in Appendix D (page 51). Be sure to use consistent units for each gas.

(C) Annual Reductions: Record your total annual reductions for corresponding greenhouse gases for any of the years 1991 through 2002.

Part V. Additional Information

1. **Estimation Method.** In the space provided, please describe the methods used to determine your emissions and reductions. Include all data sources and coefficients used to determine both actual and reference case emissions. If reporting reductions, be sure to identify the reference case used for each category and to include the assumptions used in developing these reference cases. Also, please explain the method(s) used to allocate emissions and reporting between the direct and indirect categories.

2. **Scope of the Report.** Please describe what this entity-level report covers. This description should identify all emission sources and sinks included in your emission and reduction estimates. Furthermore, you should identify all facilities which are included in the reported estimates.

3. **Supplementary Information.** If you have reported reductions at the entity-level or wish to explain any year-to-year changes in your entity emissions, you may submit a one page summary of the causes for these reductions or changes. This submission should include a listing of the projects you reported under Schedule II and the reductions attributed to these projects. You may also describe how these actions are accounted for under other voluntary programs. For example, Climate Challenge participants may wish to indicate which projects are considered offsets. It is not expected that the sum of the reductions attributed to projects will equal the net reduction reported in Part IV, consequently you may wish to identify any other factors that may have contributed to changes in entity-level emissions. Such factors might include changes in weather from year-to-year, changes in overall production levels, outsourcing of emissions, closings of plants, and changes in operational and maintenance procedures.

Instructions for Schedule IV. Commitments to Reduce Greenhouse Gases

Many national and local voluntary programs such as those in the *Climate Change Action Plan* ask participants to make commitments to reduce greenhouse gas emissions. This schedule provides you with the opportunity to report your commitments made under any of these voluntary programs.

Depending on the program, these commitments may take several forms. Schedule IV provides flexibility to record a variety of commitments. Similar to the reporting framework for achieved reductions in Schedules II and III, this schedule separates commitments to undertake specific emission reduction or sequestration projects from commitments to reduce overall or entity emissions. In addition, you may report financial commitments at the entity- or project-level that may eventually lead to reduced emissions or increased sequestration.

Additional space is provided so that you can report any other information regarding your commitments to reduce greenhouse gases or sequester carbon.

Section 1. Entity Commitments

Use Section 1 to describe your entity-level commitments to reduce emissions of greenhouse gases. If you are reporting a commitment that references an historic level of emissions such as "Returning to a 1990 level of emissions by the year 2000," complete Schedule III, Entity-Level Emissions and Reductions, to record that historic emission level.

(A) Description of Commitment: Provide a brief description of the commitment that you are attempting to fulfill. Examples of commitment descriptions can include: "returning to 1990 emissions levels by the year 2000," "permanently reducing greenhouse gas emissions below the 1990 level," or "offsetting all new emissions with new sequestration." **Note:** If you need additional space to describe your commitment, attach an additional page.

(B) Type of Reference Case: Check the appropriate box which corresponds to the commitment in column (A). A basic reference case compares your commitment to an historic level of actual emissions, whereas a modified reference case compares your commitment to a projected level of emissions that would have existed had you not undertaken the planned activities.

(C) Voluntary Program: If this commitment is part of a voluntary Federal, state, or local program(s), identify the principal program using codes in Appendix H (page 59). If you cannot find your program in Appendix H, provide the name of the program and the sponsoring organization on an attached page.

(D) Greenhouse Gas: Indicate which greenhouse gas will be affected by your commitment. Use the following codes based on the chemical formulas for the principal greenhouse gases: CO2 for carbon dioxide, N2O for nitrous oxide, and CH4 for methane. If your commitment will affect other gases (e.g., halogenated substances), use the codes provided in Appendix A (page 45). If your commitment will affect more than one gas, use the additional rows that are provided.

(E) and (F) Unit of Measure and Quantity of Entity Emission Reduction Commitment: Record the total projected emission reduction or sequestration achievement from the current reporting year through the horizon year. Exclude reductions that have already been achieved. These reductions should be reported on Schedule III. Do **not** report annual averages. Indicate the unit of measure for the quantity reported using the standard abbreviations in Appendix D (page 51).

(G) Horizon Year: Record the year when you expect to meet your emission reduction or sequestration commitments.

Section 2. Financial Commitments

Your commitment may not necessarily be expressed in terms of a greenhouse gas emission reduction. Section 2 allows you to report your commitment in terms of a financial commitment or dollars pledged toward emission reduction or sequestration activities or research.

(A) Description of Expenditure: Within the space allowed, provide a brief description of the expenditure; e.g., meeting growing energy demand with renewable energy sources, investigating offset projects, researching global warming, or conducting education and outreach programs.

(B) Voluntary Program: If this financial commitment is part of (a) voluntary Federal, state, or local program(s), identify the principal program using the codes in Appendix H (page 59). If you cannot find your program in Appendix H, provide the name of the program and the sponsoring organization on an attached page.

(C) Project Type: Use the codes in Appendix I (page 61) to assign a project type code to your project.

(D) Total Financial Commitment or Specific Expenditure: Express in terms of dollars the total amount pledged toward activities or research to reduce greenhouse gas emissions or to increase sequestration.

(E) Year Expenditure Complete: Record the year by which the financial commitment reported in Column D will be spent (e.g., $200,000 through the year 2002).

(F) 2002 Expenditures: Record the amount spent on this program during the calendar year 2002.

Section 3. Projects to Reduce Greenhouse Gases

Use Section 3 to report your commitments to undertake specific projects or actions.

(A) Description of Project: Describe within the space provided the project or actions to be undertaken.

(B) Voluntary Program: If this project is part of (a) voluntary Federal, state, or local program(s), identify the principal program using the codes in Appendix H (page 59). If you cannot find your program in Appendix H, provide the name of the program and the sponsoring organization on an attached page.

(C) Project Type: Use the codes in Appendix I (page 61) to assign a project type code to your project.

(D) Reported on Schedule II?: If your specified commitment has been partially realized via a project that has already been initiated and is reported in Schedule II, indicate “Y” for yes. For commitments that represent actions to be undertaken in the future or that have yet to achieve emission reductions, indicate “N" for no. **Note:** If your commitment corresponds to a project reported in Schedule II, you should describe the project using the same name as reported in Schedule II.

Emission Reduction Commitments

Complete columns (E) through (G) if you are able to estimate the projected greenhouse gas reduction associated with your project over the project's entire lifetime.

(E) Greenhouse Gas: Indicate which greenhouse gas will be affected by your commitment. The codes for the principal greenhouse gases are CO2 (carbon dioxide), N2O (nitrous oxide), and CH4 (methane). If your commitment will affect halogenated substances, use the codes provided in Appendix A (page 45). If your commitment will affect more than one gas, use the additional rows that are provided.

(F) and (G) Unit of Measure and Quantity of Specific Emission Reduction Project Commitments: Record the total emission reduction or sequestration commitments from the present through the horizon year. Do **not** report annual averages. Indicate the unit of measure for the amount reported using the standard abbreviations in Appendix D (page 51). Example 1 on the form demonstrates a commitment to convert a fleet of vehicles to natural gas.

Other Commitments

Complete columns (H) and (I) if your commitment is expressed in terms other than an emission reduction or sequestration amount.

(H) and (I) Unit of Measure and Quantity of Other Specific Emission Reduction Commitments: Provide a quantitative measure of your emission reduction commitment. For example, reporting under "Other Commitments" may represent the amount of fuel to be saved, energy to be saved, or quantity of equipment to be installed. Example 2 on the form shows how a commitment to undertake a tree planting project can be recorded even though you may not know the ultimate effect of this project on greenhouse gas emissions or sequestration levels. Where possible, use the standard abbreviations for units of measure found in Appendix D (page 51).

(J) Horizon Year: Record the year when you expect to meet your emission reduction or sequestration commitments.

Appendix A. Codes for Greenhouse Gases

Code	Name	Formula	Principal Uses
CO2	Carbon dioxide	CO_2	
CH4	Methane	CH_4	
CAR	Carbon	C	
N2O	Nitrous Oxide	N_2O	
24	Carbon tetrachloride	CCl_4	CFC feedstock, solvents
1	CFC-11 (trichlorofluoromethane)	CCl_3F	Blowing agents, chillers
2	CFC-12 (dichlorodifluoromethane)	CCl_2F_2	Auto air conditioners, chillers, blowing agent
56	CFC-13 (monochlorotrifluoromethane)	$CClF_3$	Refrigerant
3	CFC-113 (Freon 113)	CCl_2FCClF_2	Solvent
4	CFC-114 (dichlorotetrafluoroethane)	$CClF_2CClF_2$	Solvent
5	CFC-115 (monochloropentafluoroethane)	CF_3CClF_2	Solvent, refrigerant
27	Chloroform	$CHCl_3$	HCFC feedstock
32	FIC-1311 (fluoroiodocarbon)	CF_3I	Refrigerant
6	HBFC-22B1 (hydrobromofluorocarbon)	$CHBrF_2$	Fire suppressant
7	HCFC-22 (chlorodifluoromethane)	$CHClF_2$	Residential air conditioners
8	HCFC-123 (dichlorotrifluoroethane)	CF_3CHCl_2	CFC replacement, foam blowing agent
9	HCFC-124 (monochlorotetrafluoroethane)	CF_3CHClF	CFC replacement
10	HCFC-141b (dichlorofluoroethane)	CH_3CCl_2F	CFC replacement
11	HCFC-142b (chlorodifluoroethane)	CH_3CClF_2	CFC replacement
12	Halon-1211 (bromochlorodifluoromethane)	$CClF_2Br$	Fire suppressant
13	Halon-1301 (bromotrifluoromethane)	CF_3Br	Fire suppressant
14	Halon-2402 (dibromotetrafluoroethane)	$C_2F_4Br_2$	Fire suppressant
15	HFC-23 (trifluoromethane)	CHF_3	CFC byproduct
16	HFC-32 (difluoromethane)	CH_2F_2	Refrigerant
43	HFC-41 (monofluoromethane)	CH_3F	Refrigerant
17	HFC-125 (pentafluoroethane)	CHF_2CF_3	Fire suppressant, refrigerant
44	HFC-134 (1,1,2,2-tetrafluoroethane)	CHF_2CHF_2	Refrigerant
18	HFC-134a (1,1,1,2-tetrafluoroethane)	CH_2FCF_3	CFC-12 replacement
45	HFC-143 (1,1,2-trifluoroethane)	CHF_2CH_2F	Refrigerant
46	HFC-143a (1,1,1-trifluorethane)	CF_3CH_3	Refrigerant
47	HFC-152 (1,2-difluorethane)	CH_2FCH_2F	Foam blowing agent
19	HFC-152a (1,1-difluoroethane)	CH_3CHF_2	CFC-12 replacement (refrigerant, aerosol propellant)
48	HFC-161 (ethyl fluoride)	CH_3CH_2F	Aerosol propellant, blowing agent

Code	Name	Formula	Principal Uses
20	HFC-227ea (heptafluoropropane)	CF_3CHFCF_3	Refrigerant, medicine propellant
49	HFC-236cb (1,1,1,2,2,3-hexafluoropropane)	$CH_2FCF_2CF_3$	Refrigerant
50	HFC-236ea (1,1,1,2,3,3-hexafluoropropane)	CHF_2CHFCF_3	Refrigerant, foam blowing agent
41	HFC-236fa (1,1,1,3,3,3-hexafluoropropane)	$CF_3CH_2CF_3$	Refrigerant, fire suppressant
21	HFC-245ca (1,1,2,2,3-pentafluoropropane)	$CH_2FCF_2CHF_2$	Refrigerant, blowing agent
51	HFC-245fa (1,1,1,3,3-pentafluoropropane)	$CHF_2CH_2CF_3$	Foam blowing agent, refrigerant
52	HFC-365mfc (pentafluorobutane)	$CF_3CH_2CF_2CH_3$	Refrigerant, blowing agent
53	HFC-45-10mee (decafluoropentane)	$CF_3CHFCHFCF_2CF$	Cleaning solvent
29	Methyl bromide	CH_3Br	Fumigant
25	Methyl chloroform	CH_3CCl_3	Solvent
26	Methylene chloride	CH_2Cl_2	Solvent
22	Perfluoromethane	CF_4	Byproduct, etchant, cleaning agent
23	Perfluoroethane	C_2F_6	Byproduct, etchant, cleaning agent
42	Perfluoropropane	C_3F_8	Etchant, cleaning agent
54	Perfluorocyclobutane	$c\text{-}C_4F_8$	Cleaning agent, etchant
30	Perfluorobutane (FC 3-1-10)	C_4F_{10}	Fire suppressant
55	Perfluoropentane	C_5F_{12}	Contrast imaging agent for ultrasonics
31	Perfluorohexane (FC 5-1-14)	C_6F_{14}	Fire suppressant, cleaning solvent
28	Sulfur hexafluoride	SF_6	Electrical insulator
CO	Carbon monoxide	CO	
NOX	Nitrogen Oxides	NO_x	
NVOC	Nonmethane Volatile Organic Compounds		
99	Other		

Appendix B. Fuel and Energy Source Codes and Emission Coefficients

Fuel	Code	Emission Coefficients		
		Pounds CO_2 per Unit Volume or Mass		Pounds CO_2 per Million Btu
Petroleum Products				
Aviation Gasoline	AV	18.355 770.916	per gallon per barrel	152.717
Distillate Fuel (No. 1, No. 2, No. 4 Fuel Oil and Diesel)	DF	22.384 940.109	per gallon per barrel	161.386
Jet Fuel	JF	21.095 885.98	per gallon per barrel	156.258
Kerosene	KS	21.537 904.565	per gallon per barrel	159.535
Liquified Petroleum Gases (LPG)	LG	12.805 537.804	per gallon per barrel	139.039
Motor Gasoline	MG	19.564 822.944	per gallon per barrel	156.425
Petroleum Coke	PC	32.397 1356.461 6768.667	per gallon per barrel per short ton	225.130
Residual Fuel (No. 5 and No. 6 Fuel Oil)	RF	26.033 1,093.384	per gallon per barrel	173.906
Natural Gas and Other Gaseous Fuels				
Methane	ME	116.376	per 1000 ft^3	115.258
Landfill Gas	LF	[a]	per 1000 ft^3	115.258
Flare Gas	FG	133.759	per 1000 ft^3	120.721
Natural Gas (Pipeline)	NG	120.593	per 1000 ft^3	117.080
Propane	PR	12.669 532.085	per gallon per barrel	139.178
Electricity	EL	Varies depending on fuel used to generate electricity[b]		
Electricity Generated from Landfill Gas	LE	Varies depending on heat rate of the power generating facility		
Coal	CL			
Anthracite	AC	3,852.16	per short ton	227.400
Bituminous	BC	4,931.30	per short ton	205.300

Fuel	Code	Emission Coefficients		
		Pounds CO_2 per Unit Volume or Mass		Pounds CO_2 per Million Btu
Subbituminous	SB	3,715.90	per short ton	212.700
Lignite	LC	2,791.60	per short ton	215.400
Renewable Sources				
Biomass	BM	Varies depending on the composition of the biomass		
Geothermal Energy	GE	0		0
Wind	WN	0		0
Photovoltaic and Solar Thermal	PV	0		0
Hydropower	HY	0		0
Tires/Tire-Derived Fuel	TF	6160	per short ton	189.538
Wood and Wood Waste[c,d]	WW	3120	per short ton	195.000
Municipal Solid Waste[e]	MS	1999	per short ton	199.854
Nuclear	NU	0		0
Other	ZZ	-		-

[a] For a landfill gas coefficient per thousand standard cubic foot, multiply the methane factor by the share of the landfill gas that is methane.
[b] For average electric power emission coefficients by state, see Appendix C (next page).
[c] For as-fired dry wood
[d] Wood and wood waste contain "biogenic" carbon. Under international greenhouse gas accounting methods developed by the Intergovernmental Panel on Climate Change, biogenic carbon is considered to be part of the natural carbon balance and does not add to atmospheric concentrations of carbon dioxide.[1] Reporters may wish to use an emission factor of zero for wood, wood waste, and other biomass fuels in which the carbon is entirely biogenic.
[e] The emissions coefficient provided by EIA is for the organic portion of waste and may be treated as biogenic carbon. Under international greenhouse gas accounting methods developed by the Intergovernmental Panel on Climate Change, biogenic carbon is considered to be part of the natural carbon balance and it does not add to atmospheric concentrations of carbon dioxide. Municipal solid waste, however, normally contains inorganic materials—principally plastics—that contain carbon that is not biogenic. The proportion of plastics in municipal solid waste varies considerably depending on climate, season, socio-economic factors, and waste management practices. As a result, EIA does not estimate a non-biogenic carbon dioxide emission factor for municipal solid waste. The U.S. Environmental Protection Agency estimates that, in 1997, municipal solid waste in the United States contained 15.93 percent plastics and the carbon dioxide emission factor for these materials was 5,771 lbs per ton.[2] Using this information, a proxy for a national average non-biogenic emission factor of 919 lbs carbon dioxide per short ton of municipal solid waste can be derived. This represents 91.9 lbs carbon dioxide per million Btu, assuming the average energy content of municipal solid waste is 5,000 Btu/lb.

[1]Intergovernmental Panel on Climate Change. *Greenhouse Gas Inventory Reference Manual: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, Vol. 3, Pg. 6.28, (Paris France 1997).

[2]U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1998*, EPA 236-R-00-001, Washington, DC, April 2000.

Appendix C. Adjusted Electricity Emission Factors by State and Region

Region/State	Carbon Dioxide			Methane	Nitrous Oxide
	lbs/kWh	short tons/ MWh	metric tons/ MWh	lbs/MWh	lbs/MWh
New England	**0.98**	**0.491**	**0.446**	**0.0207**	**0.0146**
Connecticut	0.94	0.471	0.427	0.0174	0.0120
Maine	0.85	0.426	0.386	0.0565	0.0270
Massachusetts	1.28	0.639	0.579	0.0174	0.0159
New Hampshire	0.68	0.341	0.310	0.0172	0.0141
Rhode Island	1.05	0.526	0.477	0.0068	0.0047
Vermont	0.03	0.014	0.013	0.0096	0.0039
Mid Atlantic	**1.04**	**0.520**	**0.471**	**0.0093**	**0.0145**
New Jersey	0.71	0.353	0.320	0.0077	0.0079
New York	0.86	0.429	0.389	0.0081	0.0089
Pennsylvania	1.26	0.632	0.574	0.0107	0.0203
East-North Central	**1.63**	**0.815**	**0.740**	**0.0123**	**0.0257**
Illinois	1.16	0.582	0.528	0.0082	0.0180
Indiana	2.08	1.038	0.942	0.0143	0.0323
Michigan	1.58	0.790	0.717	0.0146	0.0250
Ohio	1.80	0.900	0.817	0.0130	0.0288
Wisconsin	1.64	0.821	0.745	0.0138	0.0260
West-North Central	**1.73**	**0.864**	**0.784**	**0.0127**	**0.0269**
Iowa	1.88	0.941	0.854	0.0138	0.0298
Kansas	1.68	0.842	0.764	0.0112	0.0254
Minnesota	1.52	0.762	0.691	0.0157	0.0247
Missouri	1.84	0.920	0.835	0.0126	0.0288
Nebraska	1.40	0.700	0.635	0.0095	0.0219
North Dakota	2.24	1.121	1.017	0.0147	0.0339
South Dakota	0.80	0.399	0.362	0.0053	0.0121
South Atlantic	**1.35**	**0.674**	**0.612**	**0.0127**	**0.0207**
Delaware	1.83	0.915	0.830	0.0123	0.0227
Florida	1.39	0.697	0.632	0.0150	0.0180
Georgia	1.37	0.683	0.619	0.0129	0.0226
Maryland*	1.37	0.683	0.620	0.0118	0.0206
North Carolina	1.24	0.621	0.563	0.0105	0.0203
South Carolina	0.83	0.417	0.378	0.0091	0.0145
Virginia	1.16	0.582	0.528	0.0137	0.0192
West Virginia	1.98	0.988	0.897	0.0137	0.0316
East-South Central	**1.49**	**0.746**	**0.677**	**0.0128**	**0.0240**
Alabama	1.31	0.656	0.595	0.0137	0.0223
Kentucky	2.01	1.004	0.911	0.0140	0.0321
Mississippi	1.29	0.647	0.587	0.0132	0.0165
Tennessee	1.30	0.648	0.588	0.0105	0.0212

Region/State	Carbon Dioxide			Methane	Nitrous Oxide
	lbs/kWh	short tons/ MWh	metric tons/ MWh	lbs/MWh	lbs/MWh
West-South Central	**1.43**	**0.714**	**0.648**	**0.0087**	**0.0153**
Arkansas	1.29	0.643	0.584	0.0125	0.0203
Louisiana	1.18	0.589	0.534	0.0094	0.0112
Oklahoma	1.72	0.861	0.781	0.0110	0.0223
Texas	1.46	0.732	0.664	0.0077	0.0146
Mountain	**1.56**	**0.781**	**0.709**	**0.0108**	**0.0236**
Arizona	1.05	0.525	0.476	0.0068	0.0154
Colorado	1.93	0.963	0.873	0.0127	0.0289
Idaho	0.03	0.014	0.013	0.0080	0.0033
Montana	1.43	0.717	0.650	0.0108	0.0227
Nevada	1.52	0.759	0.688	0.0090	0.0195
New Mexico	2.02	1.009	0.915	0.0131	0.0296
Utah	1.93	0.967	0.878	0.0134	0.0308
Wyoming	2.15	1.073	0.973	0.0147	0.0338
Pacific Contiguous	**0.45**	**0.224**	**0.203**	**0.0053**	**0.0037**
California	0.61	0.303	0.275	0.0067	0.0037
Oregon	0.28	0.141	0.127	0.0033	0.0034
Washington	0.25	0.123	0.111	0.0037	0.0040
Pacific Non-contiguous	**1.56**	**0.780**	**0.707**	**0.0161**	**0.0149**
Alaska	1.38	0.690	0.626	0.0068	0.0089
Hawaii	1.66	0.831	0.754	0.0214	0.0183
United States	**1.34**	**0.668**	**0.606**	**0.0111**	**0.0192**

Note: These state- and regional-level electricity emission factors represent average emissions per kWh or MWh generated by utility and nonutility electric generators for the 1998-2000 time period. The Voluntary Reporting of Greenhouse Gases Program believes these factors provide reasonably accurate default values for power generated in a given state or region (U.S. Census Division). However, reporters should use these state- and regional-level factors only if utility-specific or power pool-specific emission factors are not available.

*Includes the District of Columbia

Source: Energy Information Administration, *Updated State- and Regional-level Greenhouse Gas Emission Factors for Electricity* (March 2002), http:/www.eia.doe.gov/oiaf/1605/e-factor.html.

Appendix D. Units of Measure

When specifying units on the form, select your choice of units from the following list, and use the corresponding abbreviation. You may combine these units as needed, e.g., use MMBtu/hr for million British thermal units per hour.

UNIT OF MEASURE	ABBREVIATION
Weight	
pounds	lbs
short tons	st
thousand short tons	Kst
million short tons	MMst
kilograms	kg
metric tons	mt
thousand metric tons	Kmt
million metric tons	MMmt
Energy	
British thermal units*	Btu
million British thermal units*	MMBtu
joules*	J
gigajoules	GJ
megajoules*	MJ
watthours	Wh
kilowatthours	kWh
megawatthours	MWh
Power	
watts	W
kilowatts	kW
megawatts	MW
Length	
feet	ft
yards	yd
miles	mi
meters	m
kilometers	km

UNIT OF MEASURE	ABBREVIATION
Area	
square feet	sq ft
square yards	sq yd
acres	a
hectares	ha
square miles	sq mi
square meters	sq m
square kilometers	sq km
Volume	
gallons	gal
thousand gallons	Kgal
million gallons	MMgal
barrels	bbl
thousand barrels	Mbbl
million barrels	MMbbl
liters	l
kiloliters	kl
standard cubic feet	scf
thousand standard cubic feet	Mscf
million standard cubic feet	MMscf
cubic yards	cu yd
cubic meters	cm
board feet	bf
cord	cd
Time	
hours	hr
days	d
years	yr
Money	
dollars	$

* Report the higher heating value, not the lower heating value. The higher heating value is the total amount of heat released when a fuel is burned. Coal, crude oil, and natural gas all include chemical compounds of carbon and hydrogen. When those fuels are burned, the carbon and hydrogen combine with oxygen in the air to produce carbon dioxide and water. Some of the energy released in burning goes into transforming the water into steam and is usually lost. The amount of heat spent in transforming the water into steam is counted as part of the higher heating value but is not counted as part of the lower heating value.

Appendix E. Conversion Factors for Units of Measure

SI Prefixes

Prefix	Symbol	Factor
peta	P	10^{15}
tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
milli	m	10^{-3}
micro	μ	10^{-6}

Conversion Factors

To convert:	to:	multiply by:
feet	meters	0.3048
miles	kilometers	1.6093
square feet	acres	2.2957×10^{-5}
hectares	acres	2.47
cubic feet	liters	28.32
pounds	grams	453.6
British thermal units (Btu)	joules	1055.1
Foot pounds	Btu	1.285×10^{-5}
kilowatt hours (kWh)	Btu	3413
quads (quadrillion Btu)	kWh	2.93×10^{11}
tons	metric tons	0.9071848
barrels	gallons	42
quadrillion Btu	Btu	10^{15}
pounds	tons	5×10^{-4}
million metric tons CO_2 per quadrillion Btu	pounds CO_2 per Btu	2.2046×10^{-6}
lb/MWh	lb/kWh	0.001
therms	Btu	1×10^{5}

Appendix F. Country Codes

Code	Country	Code	Country
001	Afghanistan	049	Dominica
002	Albania	050	Dominican Republic
003	Algeria	051	Ecuador
004	Andorra	052	Egypt
005	Angola	053	El Salvador
006	Antiqua and Barbuda	054	Equatorial Guinea
007	Argentina	055	Eritrea
008	Armenia	056	Estonia
009	Australia	057	Ethiopia
010	Austria	058	Fiji
011	Azerbaijan	059	Finland
012	Bahamas, The	060	France
013	Bahrain	061	Gabon
014	Bangladesh	062	Gambia, The
015	Barbados	063	Georgia
016	Belarus	064	Germany
017	Belgium	065	Ghana
018	Belize	066	Greece
019	Benin	067	Grenada
020	Bhutan	068	Guatemala
021	Bolivia	069	Guinea
022	Bosnia and Herzegovina	070	Guinea-Bissau
023	Botswana	071	Guyana
024	Brazil	072	Haiti
025	Brunei	073	Holy See
026	Bulgaria	074	Honduras
027	Burkina	075	Hungary
028	Burma	076	Iceland
029	Burundi	077	India
030	Cambodia	078	Indonesia
031	Cameroon	079	Iran
032	Canada	080	Iraq
033	Cape Verde	081	Ireland
192	Cayman Islands	082	Israel
034	Central African Republic	083	Italy
035	Chad	084	Jamaica
036	Chile	085	Japan
037	China	086	Jordan
038	Colombia	087	Kazakhstan
039	Comoros	088	Kenya
040	Congo	089	Kiribati
041	Costa Rica	090	Korea, North
042	Cote d'Ivoire (Ivory Coast)	091	Korea, South
043	Croatia	092	Kuwait
044	Cuba	093	Kyrgyzstan
045	Cyprus	094	Laos
046	Czech Republic	095	Latvia
187	Democratic Republic of Congo (Zaire)	096	Lebanon
		097	Lesotho
047	Denmark	098	Liberia
048	Djibouti	099	Libya

Code	Country	Code	Country
100	Liechtenstein	146	Sao Tome and Principe
101	Lithuania	147	Saudi Arabia
102	Luxembourg	148	Senegal
103	Macedonia	191	Serbia (including Montenegro)
104	Madagascar	149	Seychelles
105	Malawi	150	Sierra Leone
106	Malaysia	151	Singapore
107	Maldives	152	Slovakia
108	Mali	153	Slovenia
109	Malta	154	Solomon Islands
110	Marshall Islands	155	Somalia
111	Mauritania	156	South Africa
112	Mauritius	157	Spain
113	Mexico	158	Sri Lanka
114	Micronesia	159	Sudan
115	Moldova	160	Suriname
116	Monaco	161	Swaziland
117	Mongolia	162	Sweden
118	Morocco	163	Switzerland
119	Mozambique	164	Syria
120	Namibia	190	Taiwan
121	Nauru	165	Tajikistan
122	Nepal	166	Tanzania
123	Netherlands	167	Thailand
124	New Zealand	168	Togo
125	Nicaragua	169	Tonga
126	Niger	170	Trinidad and Tobago
127	Nigeria	171	Tunisia
128	Norway	172	Turkey
129	Oman	173	Turkmenistan
130	Pakistan	174	Tuvalu
131	Panama	175	Uganda
132	Papua New Guinea	176	Ukraine
133	Paraguay	177	United Arab Emirates
134	Peru	178	United Kingdom
135	Philippines	180	Uruguay
136	Poland	181	Uzbekistan
137	Portugal	182	Vanuatu
138	Qatar	183	Venezuela
139	Romania	184	Vietnam
140	Russia	185	Western Samoa
141	Rwanda	186	Yemen
142	Saint Kitts and Nevis	188	Zambia
143	Saint Lucia	189	Zimbabwe
144	Saint Vincent and the Grenadines	999	Unspecifiable
145	San Marino		

Appendix G. Standard Industrial Classification (SIC) Codes

Agriculture, Forestry, and Fishing
01 Agricultural Production - Crops
02 Agricultural Production - Livestock
07 Agricultural Services
08 Forestry
09 Fishing, Hunting, and Trapping

Mining
10 Metal Mining
12 Coal Mining
14 Nonmetallic Minerals, except fuels

Construction
15 General Building Contractors
16 Heavy Construction except building
17 Special Trade Contractors

Manufacturing
20 Food and Kindred Products
21 Tobacco Products
22 Textile Mill Products
23 Apparel and Other Textile Products
24 Lumber and Wood Products
25 Furniture and Fixtures
26 Paper and Allied Products
27 Printing and Publishing
28 Chemicals and Allied Products
29 Petroleum Refining and Other Related Industries
30 Rubber and Miscellaneous Plastic Products
32 Stone, Clay, Glass, and Concrete Products
33 Primary Metals Industries
34 Fabricated Metal Products except machinery and transportation equipment
35 Industrial and Commercial Equipment and Components
36 Electronic and Other Electrical Equipment
37 Transportation Equipment
38 Instruments and Related Products
39 Miscellaneous Manufacturing Industries

Transportation and Public Utilities
40 Railroad Transportation
41 Local and Interurban Passenger Transit
42 Trucking and Warehousing
43 U.S. Postal Service
44 Water Transportation
45 Transportation by Air
46 Pipelines except natural gas
47 Transportation Services
48 Communications
49 Electric, Gas, and Sanitary Services

Wholesale Trade
50 Wholesale Trade - Durable Goods
51 Wholesale Trade - Nondurable Goods

Retail Trade
52 Building Materials and Garden Supplies
53 General Merchandise Stores
54 Food Stores
55 Automotive Dealers and Service Stations
56 Apparel and Accessory Stores
57 Furniture and Homefurnishings Stores
58 Eating and Drinking Places
59 Miscellaneous Retail

Finance, Insurance, and Real Estate
60 Depository Institutions
61 Nondepository Institutions
62 Security and Commodity Brokers
63 Insurance Carriers
64 Insurance Agents, Brokers, and Service
65 Real Estate
67 Holding and Other Investment Offices

Services
70 Hotels and Other Lodging Places
72 Personal Services
73 Business Services
75 Auto Repair, Services, and Parking
76 Miscellaneous Repair Services
78 Motion Pictures
79 Amusement and Recreation Services
80 Health Services
81 Legal Services
82 Educational Services
83 Social Services
84 Museums, Botanical, Zoological Gardens
86 Membership Organizations
87 Engineering and Management Services
88 Private Households
89 Services, not elsewhere classified

Public Administration
91 Executive, Legislative, and General
92 Justice, Public Order, and Safety
93 Finance, Taxation, and Monetary Policy
94 Administration of Human Resources
95 Environmental Quality and Housing
96 Administration of Economic Programs
97 National Security and International Affairs

99 Nonclassifiable Establishments

Appendix H. List of Voluntary Programs

Code	Program Name	Program Sponsor
AGS	AgSTAR	DOE, EPA, USDA
AHP	Affordable Homes Partnership	DOE
CAC	Compressed Air Challenge	DOE
CC	Climate Challenge	DOE
CCP	Cool Communities Program	DOE
CCTY	Clean Cities Program	DOE
CMOP	Coalbed Methane Outreach Program	EPA
CWP	Climate Wise Recognition Program	DOE, EPA
EADS	Energy Analysis and Diagnostic Centers	DOE
EEP	Energy Efficiency and Renewable Energy Information and Training Programs	DOE
EFP	Energy Fitness Program	DOE
ESB	Energy Star Buildings and Green Lights Partnership*	DOE, EPA
ESC	Energy Star Computers Program	DOE, EPA
ESSB	Energy Star Small Business Program	DOE, EPA
EST	Energy Star Transformers	DOE, EPA
ESP	Other Energy Star Programs	DOE, EPA
FSP	Forest Stewardship Program	USDA
ICHP	Industrial Combined Heat and Power Initiative	DOE
LMOP	Landfill Methane Outreach Program	EPA
MCP	Motor Challenge Program	DOE
NGS	Natural Gas STAR	EPA
NIPP	NICE^3 Industrial Pollution Prevention Grants Program	DOE, EPA, USDA
OTH	Other Federal, state and local programs	(Specify)
PTI	Partnerships for Technology Introduction	DOE
RBA	Rebuild America	DOE
REC	Renewable Energy Commercialization	DOE
RFAP	Rural Forestry Assistance Program	USDA
RLMP	Ruminant Livestock Methane Program	EPA, USDA
SC	Steam Challenge	DOE
SFERP	Sulfur Hexafluoride (SF_6) Emissions Reduction Partnership for Electric Power Systems	EPA
USIJI	United States Initiative on Joint Implementation	DOE, EPA
VAIP	Voluntary Aluminum Industrial Partnership	EPA
WWP	Waste Wise Program	EPA

DOE = U.S. Department of Energy EPA = U.S. Environmental Protection Agency USDA = U.S. Department of Agriculture
* The Green Lights Program has been incorporated into the Energy Star Buildings and Green Lights Partnership.

Appendix I. Project Type Codes

Project Category	Code	Project Type
1. Electricity Generation, Transmission, and Distribution	100	General generation, transmission & distribution projects
	110	General generator improvements
	111	Heat rate or other efficiency improvement
	112	Availability improvement
	113	Fuel switching
	114	Increase in low-emitting capacity
	115	Decrease in high-emitting capacity
	120	Dispatching changes only
	121	Zero/low emitting power purchases
	130	General transmission and distribution
	131	High-efficiency transformers
	132	Reconductoring
	133	Distribution voltage upgrade
	139	Other transmission & distribution improvements
	199	Other electricity generation, transmission, and distribution projects/activities
2. Cogeneration and Waste Heat Recovery	200	Cogeneration and waste heat recovery
3. Energy End Use	300	General energy use
	310	Equipment and appliances improvement or replacement
	320	Lighting and lighting control
	330	Load control
	340	Heating, ventilation, and air conditioning
	350	Building shell improvement
	360	Motor and motor drive
	370	Fuel switching
	380	Industrial power systems
	390	Urban forestry (energy effects only)

Project Category	Code	Project Type
	399	Other energy end-use projects/activities
4. Transportation and Off-Road Vehicles	400	General transportation
	411	Marketing/manufacturing of more efficient vehicles
	412	Marketing/manufacturing of more efficient vehicle components
	413	Marketing/manufacturing of alternative fuel vehicles
	421	Operation of more efficient vehicles
	422	Use of more efficient vehicle components
	423	Operation of alternative fuel vehicles
	430	General trip reduction (demand modification)
	431	Demand Modification: Carpooling/Vanpooling
	432	Demand Modification: Mass transit
	433	Demand Modification: Employee parking buyout
	434	Demand Modification: Telecommuting
	439	Demand Modification: Other
	440	Service efficiency improvements
	450	Driver/operator training
	460	Infrastructure improvement
	470	Accelerated scrappage
	499	Other transportation and off-road vehicle projects/activities
5. Waste Treatment and Disposal — Methane	500	General Waste Treatment and Disposal: Methane emissions avoidance or recovery
	510	Landfills: General methane emissions avoidance or recovery
	511	Landfills: Landfill gas recovery for energy use
	512	Landfills: Flaring landfill gas
	513	Landfills: Modification of waste stream (e.g., yard waste bans)
	514	Landfills: Other
	520	Wastewater Treatment: General methane emissions avoidance or recovery
	521	Wastewater Treatment: Biogas recovery for energy use

Project Category	Code	Project Type
	522	Wastewater Treatment: Flaring biogas
	523	Wastewater Treatment: Modification of waste stream (e.g. elimination of pulp and paper wastes)
	524	Wastewater Treatment: Altered waste treatment (may be mechanical or chemical)
	525	Wastewater Treatment: Other
	599	Other waste treatment and disposal activities reducing emissions of methane
6. Agriculture — Methane and Nitrous Oxide	600	General Agriculture: Methane and nitrous oxide emissions avoidance or recovery
	610	General Livestock: General methane emissions avoidance or recovery
	611	Livestock: Reduced livestock production
	612	Livestock: Improved livestock productivity
	613	Livestock: Recovery of biogas from manure for energy use
	614	Livestock: Recovery and flaring of biogas from manure
	621	Cropland: Rice field drainage
	622	Cropland: Improved nutrients management
	699	Other agricultural projects reducing emissions of methane or nitrous oxide
7. Oil and Natural Gas Systems and Coal Mining — Methane	700	General oil and natural gas systems and coal mining
	710	Oil and Natural Gas Systems: General methane emissions avoidance or recovery
	711	Oil and Natural Gas Systems: Reduction in gas vented due to increased flaring
	712	Oil and Natural Gas Systems: Reduction in gas vented due to recovery for energy
	713	Oil and Natural Gas Systems: Changes in operation and maintenance practices
	714	Oil and Natural Gas Systems: Equipment replacement and upgrade
	715	Oil and Natural Gas Systems: Natural gas reinjection

Project Category	Code	Project Type
	716	Oil and Natural Gas Systems: Reduced production
	717	Oil and Natural Gas Systems: Recovery of glycol dehydrator emissions
	719	Oil and Natural Gas Systems: Other methane emissions avoidance or recovery
	720	Coal Mining: General methane emissions avoidance or recovery
	721	Coal Mining: Decreased production
	722	Coal Mining: Change in operation and maintenance procedures
	723	Coal Mining: Equipment replacement and upgrade
	724	Coal Mining: Pre-mining degasification
	725	Coal Mining: Gas recovery using in-mine horizontal boreholes
	726	Coal Mining: Gas recovery using gob wells
	727	Coal Mining: Recovery of mine ventilation air
	728	Coal Mining: Gas recovery from inactive mines
	729	Coal Mining: Other methane emissions avoidance or recovery
	799	Other projects reducing methane emissions from oil and natural gas systems and coal mining
8. Carbon Sequestration	800	General carbon sequestration
	810	General tree planting
	811	Afforestation
	812	Reforestation
	813	Urban Forestry (sequestration effects only)
	821	Forest preservation
	822	Modified forest management
	830	Woody biomass production and other agroforestry
	840	Wood products
	851	Conservation tillage
	899	Other carbon sequestration projects/activities

Project Category	Code	Project Type
9. Halogenated Substances	900	General halogenated substances
	911	Reclamation: Recycling
	912	Reclamation: Destruction
	920	Substitution
	930	Emission avoidance
	940	Use of improved appliances
	999	Other halogenated substances projects/activities
10. Other Emission Reduction Projects	000	General projects
	011	Other materials recycling/reuse
	012	Waste/source reduction
	013	Coal ash reuse
	014	Underground injection of carbon dioxide
	020	Reduction of process emissions
	081	Research and development programs
	082	Education and training programs
	099	All other projects not included in the above categories

Selected Terms

Afforestation: Planting of new forests on lands that have not been recently forested.

Anaerobic lagoon: A liquid-based manure management system characterized by waste residing in water to a depth of at least six feet for a period ranging between 30 and 200 days.

Associated natural gas: See associated-dissolved natural gas.

Associated-dissolved natural gas: Natural gas that occurs in crude oil reservoirs either as free gas (associated) or as gas in solution with crude oil (dissolved gas).

Baseline period: The years 1987 through 1990 for which entity-level emissions may be reported.

Biofuels: Liquid fuels and blending components produced from biomass (plant) feedstocks, used primarily for transportation.

Biogas: A mixture of carbon dioxide and methane produced through bacterial action.

Biomass: Organic nonfossil material of biological origin constituting a renewable energy source.

British thermal unit: The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Carbon Sequestration: The fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes.

Carbon sink: A reservoir that absorbs or takes up released carbon from another part of the carbon cycle. The four sinks, which are regions of the Earth within which carbon behaves in a systematic manner, are the atmosphere, terrestrial biosphere (usually including freshwater systems), oceans, and sediments (including fossil fuels).

Chlorofluorocarbon (CFC): Any of various compounds consisting of carbon, hydrogen, chlorine, and flourine used as refrigerants. CFCs are now thought to be harmful to the earth's atmosphere.

Cogeneration: The production of electrical energy and another form of useful energy (such as heat or steam) through the sequential use of energy.

Commercial-scale: Application of a demonstrated technology at a cost-effective scale.

Commitment: An expressed intention to undertake an action or actions that will reduce greenhouse gas emissions, increase carbon sequestration, or achieve a stated emissions goal.

Conversion factor: A number that translates units of one measurement system into corresponding values of another measurement system. *Note:* For specific conversion factors, see EIA data products.

Deforestation: The net removal of trees from forested land.

Emission coefficient/factor: A unique value for scaling emissions to activity data in terms of a standard rate of emissions per unit of activity (e.g., pounds of carbon dioxide emissions per barrel of fossil fuel consumed).

Emissions: Anthropogenic releases of gases to the atmosphere. In the context of global climate change, they consist of radiatively important greenhouse gases (e.g., the release of carbon dioxide during fuel combustion).

Emissions, direct: Emissions from sources owned (wholly or in part) or leased by an entity.

Emissions, fugitive: Unintended leaks of gas from the processing, transmission, and/or transportation of fossil fuels.

Emissions, indirect: Emissions from sources not owned or leased by an entity that occur, wholly or in part, as a result of its activities.

Emission reduction: A decrease in annual greenhouse gas emissions.

Energy conservation: Activities that reduce end-use demand for energy by reducing the service demanded.

Entity: For the purposes of the Voluntary Reporting Program, an individual or organization that is a legal U.S. person (e.g., a U.S. citizen, resident alien, company, organization or group incorporated under or recognized by U.S. law; or a Federal, state, or local government agency).

Entity boundary: Conceptually, a line drawn to encompass the emissions sources and sinks to be evaluated in an entity-level report. An entity boundary should include all the emissions sources and sinks owned (wholly or in part) or leased by the entity, and, to the extent possible, other emissions sources and sinks affected by the entity's activities.

Entity-level reporting: The reporting of greenhouse gas emissions, emission reductions, and carbon sequestration for an entire entity.

Estimation method: The techniques, including key assumptions and data sources, used by the reporter to derive the reported emissions, emission reductions, or sequestration.

Foreign activities: All actions outside of the United States, its territories, and trusts.

Fossil fuel: An energy source formed in the Earth's crust from decayed organic material. The common fossil fuels are petroleum, coal, and natural gas.

Fuel cycle: The entire set of sequential processes or stages involved in the utilization of fuel, including extraction, transformation, transportation, and combustion. Emissions generally occur at each stage of the fuel cycle.

Fuel switching: The substitution of one type of fuel for another. The fuel substitution may be either temporary (as in the case of a power plant that temporarily switches from coal to natural gas) or permanent (as in the case of a fleet operator who replaces gasoline powered automobiles with electric cars).

Fugitive emissions: See Emissions, fugitive.

Global warming potential (GWP): An index used to compare the relative radiative forcing of different gases without directly calculating changes in their atmospheric concentrations. GWPs are calculated as the ratio of the radiative forcing that would result from the emission of one kilogram of a greenhouse gas to that from the emission of one kilogram of carbon dioxide over a fixed period of time, such as 100 years.

Gob: A zone of rubble created when the roof of a coal mine collapses behind the mining operations.

Greenhouse effect: The result of water vapor, carbon dioxide, and other atmospheric gases trapping radiant (infrared) energy, thereby keeping the Earth's surface warmer than it would otherwise be. Greenhouse gases within the lower levels of the atmosphere trap infrared radiation that would otherwise escape into space, and subsequent re-radiation of some of the energy back to the Earth maintains higher surface temperatures than would occur if the gases were absent. See Greenhouse gases.

Greenhouse gases: Those gases, such as water vapor, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

Halogenated substance: A volatile compound containing halogens, such as chlorine, fluorine or bromine. See Appendix A for a list of halogenated substances.

Horizon year: The year in which a commitment to reduce greenhouse gas emissions or increase sequestration (reported on Schedule IV) is expected to be met.

Intergovernmental Panel on Climate Change (IPCC): A panel established jointly in 1988 by the World Meteorological Organization and the United Nations Environment Program to assess the scientific information relating to climate change and to formulate realistic response strategies.

Life cycle: The progression of a product through its service life. For most products, emissions and energy-consuming characteristics will be altered as they age.

Longwall mining: An automated form of underground coal mining characterized by high recovery and extraction rates, feasible only in relatively flat-lying, thick, and uniform coalbeds. A high-powered cutting machine is passed across the exposed face of coal, shearing away broken coal, which is continuously hauled away by a floor-level conveyor system. Longwall mining extracts all machine-minable coal between the floor and ceiling within a contiguous block of coal, known as a panel, leaving no support pillars within the panel area. Panel dimensions vary over time and with mining conditions but currently average about 900 feet wide (coal face width) and more than 8,000 feet long (the minable extent of the panel, measured in direction of mining). Longwall mining is done under movable roof supports that are advanced as the bed is cut. The roof in the mined-out area is allowed to fall as the mining advances.

Manure management: The method used to dispose of the solid waste produced by livestock and poultry.

Municipal solid waste: Residential solid waste and some non-hazardous commercial, institutional and industrial wastes.

Ozone: A molecule made up of three atoms of oxygen. In the stratosphere, it occurs naturally and provides a protective layer shielding the Earth from harmful ultraviolet radiation. In the troposphere, it is a chemical oxidant and major component of photochemical smog.

Photosynthesis: The manufacture of carbohydrates and oxygen from carbon dioxide and water in the presence of chlorophyll, with sunlight as the energy source. Carbon is sequestered and oxygen and water are released in the process.

Pilot project: A small-scale trial designed to test or demonstrate the efficiency or efficacy of the same kind of project at a larger scale.

Project: An action undertaken to reduce greenhouse gas emissions or sequester carbon.

Project boundary: Conceptually, a line drawn to encompass the emissions sources and sinks affected by a project. A project boundary should include all the significant and quantifiable effects of the project.

Project ID code: A unique code assigned by the Energy Information Administration to a reported project for tracking purposes.

Project-level reporting: Reporting on emission reductions or carbon sequestration achieved as a result of a specific action or group of actions.

Reference case: The emissions level to which current actual emissions levels are compared when emission reductions are calculated.

Reference case, basic: A reference case using actual historical emissions or sequestration values.

Reference case, modified: A reference case using projected emissions or sequestration values, representing the emissions level that would have occurred in the absence of reduction or sequestration efforts.

Reforestation: Replanting of forests on lands which have recently been harvested or otherwise cleared of trees.

Reporter: An entity (see definition above) completing either Form EIA-1605 or Form EIA-1605EZ and submitting it to the Energy Information Administration.

Room and pillar mining: The most common method of underground coal mining in which the mine roof is supported by coal pillars left at regular intervals. Rooms are places where the coal is mined; pillars are areas of coal left between the rooms. Room-and-pillar mining is done either by conventional or continuous mining.

Sequestered carbon: Carbon which is removed from the atmosphere and retained in a carbon sink (such as a growing tree) or in soil.

Sequestration: See *Carbon Sequestration.*

Sink: See carbon sink.

Third-party reporter: An authorized party that submits a report on behalf of two or more entities which have engaged in emission-reducing or sequestration-increasing activities. Possible third-party reporters include trade associations reporting on behalf of members who have undertaken reduction projects.

Vhar metering: Phase shifters on watthour meters that measure reactive volt ampere hours or varhours.

Watt (W): The unit of electrical power equal to one ampere under a pressure of one volt. A watt is equal to 1/746 horsepower.