Executive Summary

Introduction

The Voluntary Reporting of Greenhouse Gases Program, required by Section 1605(b) of the Energy Policy Act of 1992, records the results of voluntary measures to reduce, avoid, or sequester greenhouse gas emissions. A total of 228 U.S. companies and other organizations reported to the Energy Information Administration (EIA) that, during 2002, they had undertaken 2,027 projects to reduce or sequester greenhouse gases. The reported greenhouse gas emission reductions for the projects reported included 265 million metric tons carbon dioxide equivalent of direct reductions, 79 million metric tons of indirect reductions, 7 million metric tons of reductions from carbon sequestration, and 17 million metric tons of unspecified reductions (Table ES1).

For definitional purposes, direct reductions are emission reductions from sources owned or leased by the reporting entity, indirect reductions are emission reductions from sources not owned or leased by the reporting entity but that occur as a result of the entity's activities, carbon sequestration reductions represent the removal of atmospheric carbon to a carbon sink, and unspecified reductions represent emission reductions reported on Form EIA-1605EZ, on which the reporting entity cannot specify whether the emission reduction was a direct or indirect reduction. To calculate reported emission reductions, reporters are allowed to use a "basic" reference case or a "modified" reference case. A reference case is an emissions or sequestration level against which actual emissions are compared in order to estimate emission reductions. In a "basic" reference case, actual

Table ES1. Reporting Indicators for the Voluntary Reporting of Greenhouse Gases Program, Data Years 1994-2002

Indicator	1994	1995	1996	1997	1998	1999	2000	2001(R)	2002
Number of Entities Reporting	108	142	150	162	207	207	236	232	228
Number of Projects Reported	634	960	1,040	1,288	1,549	1,722	2,089	1,897	2,027
Number of Entity-Level Reports Received	40	51	56	60	76	83	108	114	114
Project-Level Reductions Reported (Million Metric Tons Carbon Dioxide Equivalent)									
Direct[a]	63	88	90	95	148	155	211	247	265
Modified Reference Case[b]	59	76	75	88	127	126	176	209	256
Basic Reference Case[c]	4	13	15	7	21	29	35	38	8
Indirect[d]	5	52	53	38	43	57	62	72	79
Modified Reference Case[b]	5	52	51	36	38	51	57	61	78
Basic Reference Case[b]	0	1	3	2	5	6	5	11	2
Sequestration[e]	1	1	9	10	12	10	9	8	7
Unspecified[f]	4	6	6	9	19	13	12	15	17

[a]"Direct" emission reductions are reductions in 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 the reporting entity.

[b]In a "modified reference case," actual emissions (or sequestration) are compared to an estimate of what emissions (or sequestration) would have been in the absence of the project.

[c]In a "basic reference case," actual emissions (or sequestration) are compared with an estimate of historical emissions (or sequestration) in a particular base year or average of years.

[d]"Indirect" emission reductions are reductions in emissions from sources not owned or leased by the reporting entity but that occur, wholly or in part, as a result of the entity's activities (for example, an automobile manufacturer's investment in increased automotive fuel economy can result in decreased emissions from vehicles owned by individuals or managed fleets).

[e]"Sequestration" is the fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes, such as photosynthesis.

[f]"Unspecified" emission reductions represent quantities reported on the short form (Form EIA-1605EZ), on which the reporting entity cannot specify whether the emission reduction was a direct or indirect reduction.

(R) = revised.

Notes: 2001 data have been revised to include 2001 reports that were submitted after the filing deadline. It is expected that the 2002 data will also be revised in next year's report with the inclusion of late 2002 reports. Totals for direct and indirect reductions may not equal sum of components due to independent rounding.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

historical emissions (or sequestration) in a specific year, or an average of a range of years, are used as the reference case. In a "modified" reference case, an estimate is made of what emissions or sequestration would have been in the absence of the project, and that estimate serves as the reference case.

Generally, as illustrated in Table ES1, most reductions are reported relative to a modified reference case. For 2002, 256 million metric tons, or 97 percent, of the total 265 million metric tons carbon dioxide equivalent of reported direct reductions was based on modified reference cases. Similarly, for reported indirect reductions, 77.5 million metric tons, or 98 percent, of the total 79 million metric tons carbon dioxide equivalent of reported indirect reductions was based on modified reference cases.

The number of entities reporting to the Voluntary Reporting Program for the 2002 reporting cycle (228) is the same as the number that had reported for 2001 when the database was closed in July 2002 for preparation of the 2001 annual report. After the 2001 database was closed in July 2002, EIA received 4 additional reports, bringing the total number of entities reporting for the 2001 data year to 232. As of January 5, 2004, EIA had received 3 additional 2002 reports since the database was closed for preparation of the 2002 annual report.[1]

The number of entities reporting to the program has grown by 111 percent from its inception in 1994, when 108 entities reported. The number of projects reported has grown at a more rapid rate than the number of reporters, because the number of projects reported by repeat reporters has increased. The 2,027 projects reported for 2002 represent an increase of 220 percent over the 634 projects reported in 1994 and a 7-percent increase from the final tally of 1,897 projects reported for 2001.

Of the 228 organizations reporting for 2002, 114 provided estimates of emissions and/or emission reductions for the entire organization—the same as the number that provided entity-wide estimates for 2001. Seventy-nine of the reporters for 2002 recorded commitments to take action to reduce emissions, mostly during the 2000 to 2005 time frame.

Of the 114 organizations reporting at the entity level, 109 calculated their 2002 entity-wide greenhouse gas emissions. These entities reported direct greenhouse gas emissions of 870 million metric tons carbon dioxide equivalent, equal to about 13 percent of total U.S. greenhouse gas emissions in 2002.[2] Also reported by these organizations was 111 million metric tons carbon dioxide equivalent of indirect emissions, equal to 2 percent of total U.S. greenhouse gas emissions in 2002. One hundred eight entity-level reporters also reported emission reductions, including 209 million metric tons carbon dioxide equivalent of direct emission reductions, 36 million metric tons carbon dioxide equivalent of indirect emission reductions, and 7 million metric tons carbon dioxide equivalent of emission reductions resulting from carbon sequestration projects.

Reports for the 2002 data year were received from 228 participants in 29 different industries or services, as compared with the 26 different industries represented among 2001 reporters. The number of different industries represented continues to be higher than it was in the first year of the program (1994 data year), when the 108 reports received included participants in 9 different industries or services (Table ES2). In the early years of the program, reporting was dominated by the electric power sector. In the first reporting year, the 95 submissions from electric power producers represented 88 percent of the 108 reports received (Figure ES1). Since then, the program has seen an influx of new participants from outside the electric power sector, representing a diverse set of other industries. In addition, several mergers and acquisitions involving reporters to the program have accompanied the ongoing restructuring of the electric power industry. Many of these merged entities have submitted single, consolidated reports, thus reducing the number of reports received from electricity producers. As a result, only 43 percent of the organizations reporting to the program for data year 2002 were from the electric power sector.

Although the number of reporters from other individual industries remains relatively small, in many cases, reports were received from key companies in those other industries: for example, DaimlerChrysler Corporation, General Motors, the Ford Motor Company, and Toyota North America in the automotive products industry; Noranda and Alcan's Primary Metals Group in the metals industry; Sunoco, Inc., and ChevronTexaco Corporation in the petroleum industry; Johnson & Johnson and The Dow Chemical Company in the chemicals industry; Rolls Royce in the aerospace industry;

[1]The deadline for submitting reports to EIA for inclusion in each annual edition of the Public Use Database is June 1. EIA typically grants reporters extensions to the deadline, usually until early July, before closing the database to new reports to allow analysis of the information for the annual report. EIA includes reports received after the database has been closed in the next annual edition of the Public Use Database and revises the data for that reporting year in the corresponding annual report, to reflect the addition of late reports.

[2]Based on total emissions from Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2002*, DOE/EIA-0573(2002) (Washington, DC, October 2003), web site www.eia.doe.gov/oiaf/1605/1605a.html.

Table ES2. Forms Filed by Standard Industrial Classification, Data Years 1994-2002
(Number of Reports)

SIC Code[a]	Description	Data Year								
		1994	1995	1996	1997	1998	1999	2000	2001[(R)]	2002
01	Agricultural Production: Crops	—	—	—	—	1	—	—	1	—
08	Forestry	1	2	1	1	3	3	1	—	1
12	Coal Mining	1	2	2	1	4	3	4	6	7
14	Nonmetallic Minerals, Except Fuels	—	—	—	—	1	1	—	—	—
20	Food and Kindred Products	—	—	—	—	1	2	6	4	4
22	Textile Mill Products	—	—	—	—	—	1	5	11	12
23	Apparel and Other Textile Products	—	—	—	—	—	—	1	1	2
24	Lumber and Wood Products	—	—	—	—	—	—	1	1	—
25	Furniture and Fixtures	—	—	—	—	—	—	1	1	1
26	Paper and Allied Products	—	—	—	—	—	1	1	—	—
27	Printing and Publishing	—	1	—	1	—	1	1	—	—
28	Chemical and Allied Products	1	3	2	3	8	5	11	9	10
29	Petroleum Refining and Other Related Industries	—	—	2	3	8	9	8	7	6
30	Rubber and Miscellaneous Plastic Products	—	—	—	—	—	—	2	2	2
32	Stone, Clay, Glass, and Concrete Products	—	—	1	4	12	13	7	5	2
33	Primary Metals Industries	2	2	4	4	5	5	5	11	11
34	Fabricated Metal Products, Except Machinery and Transportation Equipment	—	2	1	1	3	1	1	1	1
35	Industrial and Commercial Equipment and Components	—	—	—	—	—	—	1	1	1
36	Electronic and Other Electrical Equipment	1	1	2	4	4	4	9	9	8
37	Transportation Equipment	1	1	1	2	3	5	6	7	8
38	Instruments and Related Products	—	—	—	—	2	—	1	1	1
39	Miscellaneous Manufacturing Industries	—	1	1	—	2	2	1	1	1
48	Communications	—	—	—	—	—	1	—	—	1
49	Electric, Gas, and Sanitary Services	95	121	125	129	138	135	151	145	138
51	Wholesale Trade, Nondurable Goods	—	—	—	—	—	—	—	—	1
57	Furniture and Home Furnishings Stores	—	—	—	—	2	1	1	—	1
65	Real Estate	—	1	1	1	1	1	1	1	1
67	Holding and Other Investment Offices	—	—	1	1	1	1	1	1	1
72	Personal Services	—	—	—	—	—	—	1	1	1
80	Health Services	—	—	—	—	1	—	—	—	—
82	Educational Services	1	2	2	2	—	2	—	—	—
86	Membership Organizations	—	—	—	1	1	1	1	—	1
87	Engineering and Management Services	—	—	2	2	2	1	—	1	—
88	Private Households	2	1	1	1	1	1	1	1	1
89	Services Not Elsewhere Classified	—	—	—	1	1	3	2	1	1
91	Executive, Legislative, and General	—	—	—	—	1	2	2	2	1
97	National Security and International Affairs	—	—	—	—	—	—	1	—	—
99	Nonclassifiable Establishments	—	—	—	—	—	—	—	—	1
Total Number of Reporters[b]		**108**	**142**	**150**	**162**	**207**	**207**	**236**	**232[c]**	**228**
Number of 2-Digit SIC Codes Represented		**9**	**13**	**16**	**18**	**24**	**26**	**30**	**26[c]**	**29**

[a]The Voluntary Reporting of Greenhouse Gases database was designed in 1994-1995, when the Standard Industrial Classification (SIC) system was still in use. For the 2004 data year reporting cycle, EIA intends to modify the database to use the North American Industry Classification System (NAICS), which was introduced in 1997 by the United States, Canada, and Mexico to provide comparability in statistics about business activity across North America.

[b]Totals may be greater than the sum of reporters in each SIC code, because confidential reporters are excluded from the latter.

[c]Includes 4 late reports for the 2001 data year. The 2002 total will also be revised in next year's report with the inclusion of late 2002 reports. As of January 27, 2004, EIA had received 3 late 2002 reports, which are not included in this report's 2002 database.

(R) = Revised.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

Pharmacia & Upjohn Caribe, Inc., in the pharmaceuticals industry; and IBM and Motorola Austin in the electronic equipment industry.[3]

Projects Reported

Electric power sector reporters (including independent power producers) accounted for 1,414 (70 percent) of the projects reported. Also reporting were industrial concerns (161 projects), agriculture and forestry organizations (5 projects), and alternative energy providers (436 projects). Organizations in other sectors (government, commercial, and residential) submitted reports on 11 projects.

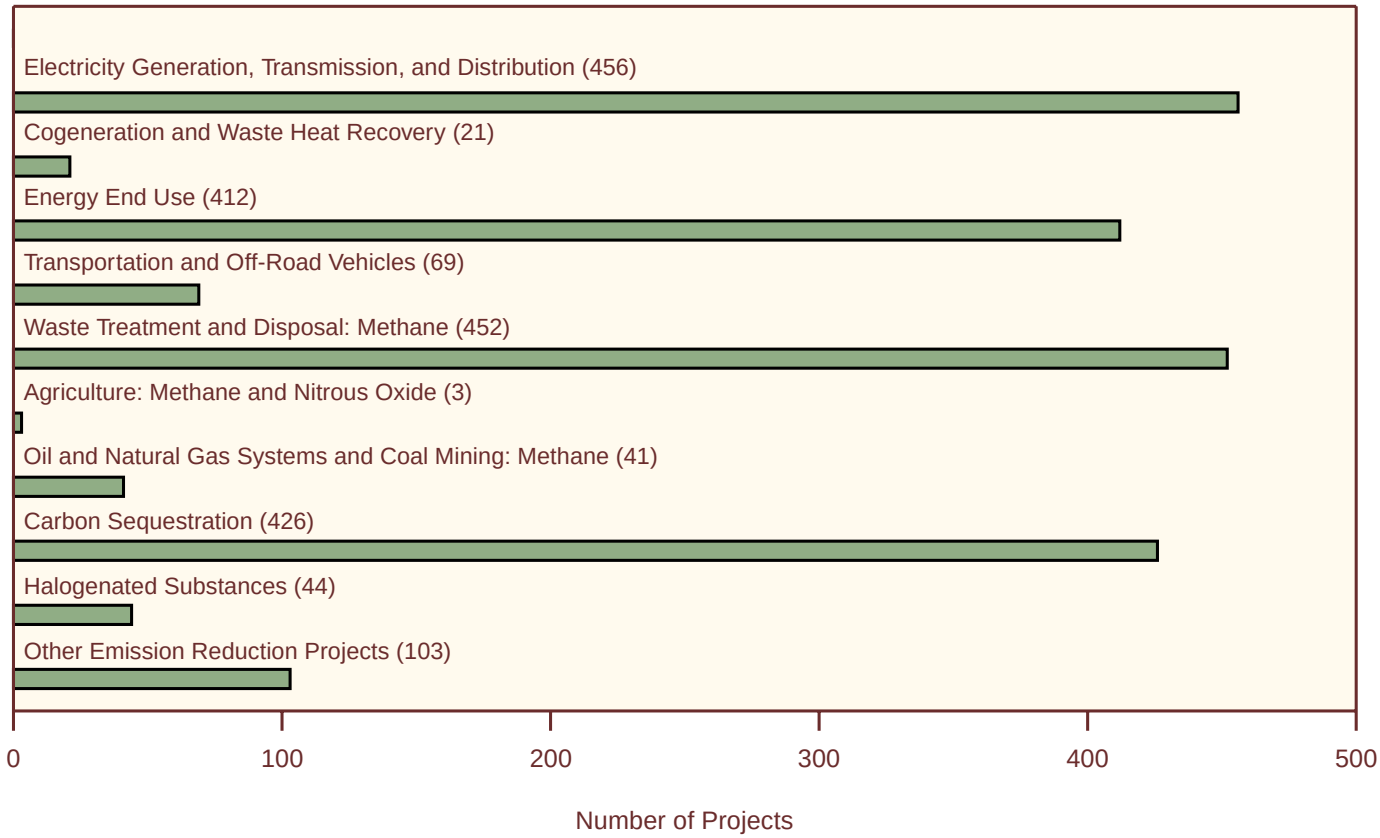
Most of the projects reported for 2002 affected energy supply or use. Some 456 of the projects were related to the generation, transmission, or distribution of electricity, almost all of which were reported by electric power sector reporters (Figure ES1). Another 412 were related to energy end use, 21 were cogeneration projects, and 69 were transportation projects. Other projects reduced emissions of methane from waste treatment and disposal facilities (452 projects), agriculture (3 projects), and from oil and natural gas systems and coal mines (41 projects), many of which included the displacement of fossil fuels through the use of methane as a fuel. Other projects (103) included the reuse of fly ash in concrete and materials recycling , which reduce emissions in part by reducing energy consumption. The largest reductions were reported for projects that improved the performance of nuclear power plants. The non-energy-related projects reported fell into two major categories: sequestration of carbon, usually in forests (426 projects), and recycling, reuse, or destruction of halogenated substances, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (44 projects).

Reductions Reported

Electric Power

For 2002, 418 electric power and cogeneration projects were reported on Form EIA-1605. Total emission

Figure ES1. Number of Projects Reported to the Voluntary Reporting of Greenhouse Gases Program by Project Type, Data Year 2002



Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

[3]A complete listing of all 2002 reporters is provided in Appendix B, Table B1, of the full report, *Voluntary Reporting of Greenhouse Gases 2002*, which is available from web site www.eia.doe.gov/oiaf/1605/vrrpt/index.html. Table B8 in Appendix B lists reporters by sector and standard industrial classification (SIC) code.

reductions from electric power and cogeneration projects reported on the long form included 163 million metric tons carbon dioxide equivalent from direct sources and 15 million metric tons from indirect sources. Two hundred thirty projects that reduced the carbon content of fuels used to generate electricity were reported, with emission reductions totaling 152 million metric tons carbon dioxide equivalent from direct sources and 11 million metric tons from indirect sources. Reported emission reductions for projects increasing energy efficiency in generation, transmission, and distribution included 16 million metric tons carbon dioxide equivalent from direct sources and 4 million metric tons from indirect sources. Fifty-nine electric power and cogeneration projects were reported on Form EIA-1605EZ for 2002. These projects reduced emissions from unspecified sources by a reported 12 million metric tons carbon dioxide equivalent.[4]

Energy End Use and Transportation

Three hundred seventy-five energy end use and transportation projects were reported on Form EIA-1605 for 2002. Reported reductions for the 315 energy end-use projects reported on the long form included 25 million metric tons carbon dioxide equivalent from direct sources and 9 million metric tons from indirect sources. Nearly all (97 percent) of the energy end-use reductions were reported for stationary-source applications, such as building shell improvements, lighting and lighting control, appliance improvement or replacement, and heating, ventilation and air conditioning (HVAC) improvements. Much smaller reductions were reported for the 60 transportation projects reported on the long form, including 42 thousand metric tons carbon dioxide equivalent from direct sources and 161 thousand metric tons from indirect sources. One hundred six energy end-use and transportation projects were reported for 2002 on Form EIA-1605EZ, accounting for about 0.4 million metric tons carbon dioxide equivalent.

Carbon Sequestration

Sequestration or avoided emissions of 7 million metric tons carbon dioxide equivalent were reported for 412 carbon sequestration projects on the long form for 2002. Most of the reported reductions resulted from afforestation, reforestation, urban forestry, forest management, and forest preservation efforts. Fourteen carbon sequestration projects were reported on Form EIA-1605EZ, for which about 11,000 metric tons carbon dioxide equivalent of sequestered carbon was reported for 2002.

Methane and Nitrous Oxide Emissions

In 2002, emission reductions for the 445 methane and nitrous oxide abatement projects reported on the long form included 67 million tons carbon dioxide equivalent from direct sources and 40 million metric tons from indirect sources. The three most frequently reported sources of methane reductions were municipal waste landfills (390 projects), natural gas systems (21 projects), and coal mines (18 projects). In addition to reducing methane emissions, projects that involved the recovery and use of methane for energy also reduced carbon dioxide emissions by displacing fossil fuels, such as oil and coal that have higher carbon contents and thus produce more carbon dioxide when burned. Fifty-one methane or nitrous oxide reduction projects were also reported on Form EIA-1605EZ for 2002. These projects reduced methane or nitrous oxide emissions in 2002 by a reported 4 million metric tons carbon dioxide equivalent.

Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride

Reductions reported on Form EIA-1605 for 42 projects reducing emissions of hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride in 2002 included 6.6 million metric tons carbon dioxide equivalent from direct sources and 127 metric tons from indirect sources. The largest reported reductions were direct reductions in perfluoromethane (3.0 million metric tons carbon dioxide equivalent), sulfur hexafluoride (3.0 million metric tons carbon dioxide equivalent), and perfluoroethane (0.5 million metric tons carbon dioxide equivalent). Reductions of perfluorocarbons and sulfur hexafluoride totaling 0.1 million metric tons carbon dioxide equivalent were reported for two projects on Form EIA-1605EZ for 2002.

[4]The emission reductions reported on Form EIA-1605EZ are unspecified, because the form does not ask the reporter to distinguish between direct and indirect emission reductions.