

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 2001, they had undertaken 1,705 projects to reduce or sequester greenhouse gases. The reported greenhouse gas emission reductions for the projects reported included 222 million metric tons carbon dioxide equivalent of direct reductions, 71 million metric tons of indirect reductions, 8 million metric tons of reductions from carbon sequestration, and 15 million metric tons of unspecified reductions (Table ES1).¹

The 228 entities reporting to the Voluntary Reporting Program for the 2001 reporting cycle represent a 3-percent decrease from the 236 entities reporting for 2000 (Table ES1); however, when the database was closed at the same time last year to allow preparation of the annual report, only 222 reports had been received for 2000. EIA received 14 reports after the 2000 database was closed last year. As of November 6, 2002, EIA has received 4 additional 2001 reports since the database was closed in early July 2002.

The number of entities reporting to the program has grown by 111 percent from its initiation when 108 entities reported in 1994. The number of projects reported has grown at a more rapid rate, because the number of projects reported by repeat reporters has increased. While the 1,705 projects reported for 2001 represents an increase of 169 percent over the 634 projects reported in 1994, the number of projects for 2001 has decreased significantly from the final tally of 2,089 projects reported for 2000, primarily as a result of the absence of two large reports from the 2001 database. American Forests (164 projects for 2000) did not submit a 2001 report, and Waste Management, Inc. (158 projects for 2000) submitted a 2001 report after the database was closed. The projects reported by these two entities are now included in the total reported for 2000 but not the total for 2001.

Of the 228 organizations reporting for 2001, 109 provided estimates of emissions and/or emission reductions for the entire organization—the same number as in 2000. Eighty-five of the reporters for 2001 recorded commitments to take action to reduce emissions, mostly during the 2000 to 2005 time frame.

Of the 109 organizations reporting at the entity level, 104 calculated their 2001 entity-wide greenhouse gas emissions. These entities reported direct greenhouse gas emissions of 903 million metric tons carbon dioxide equivalent, equal to about 15 percent of total U.S. greenhouse gas emissions in 2001. Also reported by these organizations were 147 million metric tons carbon dioxide equivalent of indirect emissions, equal to 2 percent of total U.S. greenhouse gas emissions in 2001. One hundred seven entity-level reporters also reported emission reductions, including 169 million metric tons carbon dioxide equivalent of direct emission reductions, 28 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.

Who Reported?

Reports for the 2001 data year were received from 228 participants in 25 different industries or services, which is fewer than the 30 different industries represented among 2000 reporters. The number of different industries represented still is 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

¹For 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.

Table ES1. Reporting Indicators for the Voluntary Reporting of Greenhouse Gases Program, Data Years 1994-2001

Indicator	1994	1995	1996	1997	1998	1999	2000 ^(R)	2001
Number of Entities Reporting								
Long Form (EIA-1605)	73	101	109	122	159	166	199	196
Short Form (EIA-1605EZ)	35	41	41	40	48	41	37	32
Total	108	142	150	162	207	207	236	228
Number of Projects Reported								
Long Form (EIA-1605)	509	796	861	1,087	1,297	1,484	1,860	1,495
Short Form (EIA-1605EZ)	125	164	179	201	252	237	229	210
Total	634	960	1,040	1,288	1,549	1,721	2,089	1,705
Project-Level Reductions and Sequestration Reported on the Long Form (Million Metric Tons Carbon Dioxide Equivalent)								
Direct ^a	63	88	90	95	148	155	211	222
Indirect ^b	5	52	53	38	43	57	62	71
Sequestration ^c	1	1	9	10	12	10	9	8
Project-Level Reductions and Sequestration Reported on the Short Form^d (Million Metric Tons Carbon Dioxide Equivalent)								
	4	6	6	9	19	13	12	15
Number of Entity-Level (Organization-Wide) Reports Received								
	39	50	55	60	76	83	109	109
Entity-Level Reductions and Sequestration Reported on the Long Form by Source (Million Metric Tons Carbon Dioxide Equivalent)								
Direct ^a	61	95	110	94	128	150	207	169
Basic Reference Case ^e	23	39	45	20	23	35	83	64
Modified Reference Case ^f	38	56	65	74	106	115	124	105
Indirect ^d	3	49	49	28	42	39	27	28
Basic Reference Case ^c	1	3	6	3	13	8	-8	-7
Modified Reference Case ^b	2	46	43	25	28	30	35	36
Sequestration ^e	0	1	8	7	11	8	7	7
Number of Entities Reporting Commitments for Future Reductions								
	42	60	64	72	72	66	70	85

^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"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).

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

^dThe short form does not allow reporters to distinguish among direct reductions, indirect reductions, and sequestration quantities.

^eIn 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.

^fIn 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.

(R) = revised.

Notes: 2000 data have been revised upward to include 2000 reports that were submitted after the filing deadline. It is expected that the 2001 data will also be revised upward in next year's report with the inclusion of late 2001 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.

Table ES2. Forms Filed by Standard Industrial Classification, Data Years 1994-2001
(Number of Reports)

SIC Code ^a	Description	Data Year							
		1994	1995	1996	1997	1998	1999	2000 ^(R)	2001
01	Agricultural Production: Crops	0	0	0	0	1	0	0	1
08	Forestry	1	2	1	1	3	3	1	0
12	Coal Mining	1	2	2	1	4	3	4	6
14	Nonmetallic Minerals, Except Fuels.	0	0	0	0	1	1	0	0
20	Food and Kindred Products	0	0	0	0	1	2	6	4
22	Textile Mill Products.	0	0	0	0	0	1	5	11
23	Apparel and Other Textile Products.	0	0	0	0	0	0	1	1
24	Lumber and Wood Products	0	0	0	0	0	0	1	1
25	Furniture and Fixtures	0	0	0	0	0	0	1	1
26	Paper and Allied Products	0	0	0	0	0	1	1	0
27	Printing and Publishing	0	1	0	1	0	1	1	0
28	Chemical and Allied Products	1	3	2	3	8	5	11	9
29	Petroleum Refining and Other Related Industries	0	0	2	3	8	9	8	7
30	Rubber and Miscellaneous Plastic Products	0	0	0	0	0	0	2	2
32	Stone, Clay, Glass, and Concrete Products	0	0	1	4	12	13	7	5
33	Primary Metals Industries	2	2	4	4	5	5	5	11
34	Fabricated Metal Products, Except Machinery and Transportation Equipment	0	2	1	1	3	1	1	1
35	Industrial and Commercial Equipment and Components	0	0	0	0	0	0	1	1
36	Electronic and Other Electrical Equipment	1	1	2	4	4	4	9	8
37	Transportation Equipment	1	1	1	2	3	5	6	6
38	Instruments and Related Products	0	0	0	0	2	0	1	1
39	Miscellaneous Manufacturing Industries	0	1	1	0	2	2	1	1
48	Communications	0	0	0	0	0	1	0	0
49	Electric, Gas, and Sanitary Services	95	121	125	129	138	135	151	143
57	Furniture and Home Furnishings Stores	0	0	0	0	2	1	1	0
65	Real Estate	0	1	1	1	1	1	1	1
67	Holding and Other Investment Offices.	0	0	1	1	1	1	1	1
72	Personal Services	0	0	0	0	0	0	1	1
80	Health Services	0	0	0	0	1	0	0	0
82	Educational Services	1	2	2	2	0	2	0	0
86	Membership Organizations	0	0	0	1	1	1	1	0
87	Engineering and Management Services	0	0	2	2	2	1	0	1
88	Private Households	2	1	1	1	1	1	1	1
89	Services Not Elsewhere Classified	0	0	0	1	1	3	2	1
91	Executive, Legislative, and General	0	0	0	0	1	2	2	2
97	National Security and International Affairs.	0	0	0	0	0	0	1	0
Total Number of Reporters^b		108	142	150	162	207	207	236^c	228
Number of 2-Digit SIC Codes Represented		9	13	16	18	24	26	30^c	26

^aThe Voluntary Reporting of Greenhouse Gases database was designed in 1994-1995, when the Standard Industrial Classification (SIC) system was still in use. For the 2003 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.

^bTotals may be greater than the sum of reporters in each SIC code, because confidential reporters are excluded from the latter.

^cIncludes 14 late reports for the 2000 data year. The 2001 total will also be revised upward in next year's report with the inclusion of late 2001 reports. As of November 15, 2002, EIA had received 4 late 2001 reports, which are not included in this report's 2001 database.

(R) = Revised.

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

submitted single, consolidated reports, thus reducing the number of reports received from electricity producers. As a result, only 45 percent of the organizations reporting to the program for data year 2001 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, General Motors and the Ford Motor Company in the automotive products industry; Noranda and an operating division of Alcan 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; Pharmacia & Upjohn Caribe, Inc., in the pharmaceuticals industry; and IBM and Motorola Austin in the electronic equipment industry.²

What Was Reported?

EIA collects information for the Voluntary Reporting Program on two forms: the long form (Form EIA-1605) and the short form (Form EIA-1605EZ). Three distinct types of reporting are permitted on Form EIA-1605:

- Project-level emissions and reductions, defined as the emission reduction consequences of a particular action

- Entity-level emissions and reductions, defined as the emissions and reductions of an entire organization, usually defined as a corporation
- Commitments to take action to reduce emissions in the future.

Form EIA-1605EZ accommodates reporting on project-level reductions and sequestration only.

Of the 228 reports received, 196 (86 percent) were submitted on Form EIA-1605 and 32 on Form EIA-1605EZ (Figure ES2). The proportion of reporters using the short form has declined from 32 percent for 1994 to 14 percent for 2001. EIA believes that reporters are choosing the long form in order to document their emission reductions more thoroughly. Also, for the same reason, several government-sponsored voluntary programs, such as the U.S. Environmental Protection Agency's Landfill Methane Outreach Program, require or encourage participants to use the long form.

Most reporters (179 or 79 percent) reported projects, and 109 reported entity-level emissions and/or reductions. As these numbers imply, most (61) of the reporters that reported entity-level emissions or reductions also reported at the project level. One hundred eighteen organizations submitted only project-level reports, whereas 48 reported only entity-level information. Eighty-five reporters provided information on their commitments to reduce emissions or increase sequestration in the future.

Figure ES1. Electric Power Sector and Other Entities Submitting Reports to the Voluntary Reporting of Greenhouse Gases Program, Data Years 1994-2001



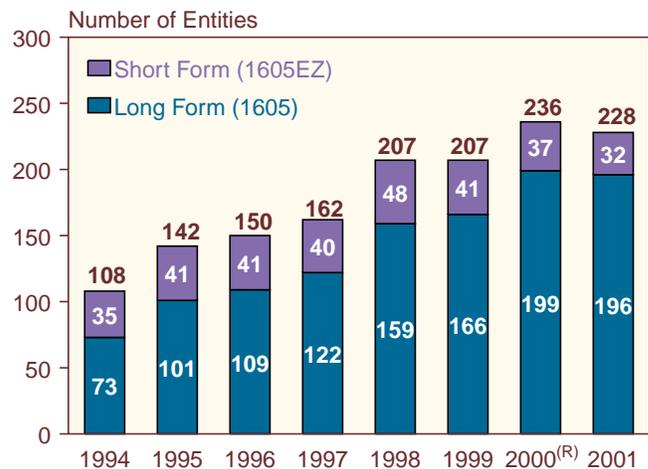
(R) = revised.

Notes: Electric power sector includes electric utilities and independent power producers. 2000 data year includes 14 late reports that were not included in the totals presented in last year's annual report and database.

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

²A complete listing of all 2001 reporters is provided in Appendix B, Table B1.

Figure ES2. Number of Reports Received by Form Type, Data Years 1994-2001



(R) = revised.

Notes: Electric power sector includes electric utilities and independent power producers. 2000 data year includes 14 late reports that were not included in the totals presented in last year's annual report and database.

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

Sources of greenhouse gas emissions and emission reductions reported to the Voluntary Reporting Program are characterized as direct, indirect, or unspecified. The unspecified category includes carbon sequestration reported on the long form and all reductions and sequestration reported on the short form. Because of concern about possible double counting, EIA does not aggregate reported emissions or emission reductions across the three categories.

Most reporters indicated that their projects were affiliated with one or more government-sponsored voluntary programs. Of the 1,705 projects reported for 2001, 1,041 were affiliated with the Climate Challenge Program, 180 with the Landfill Methane Outreach Program, 57 with the Climate Wise Recognition Program,³ 37 with the U.S. Initiative on Joint Implementation, 33 with various Energy Star programs (including Energy Star Buildings, Energy Star Computers, and Energy Star Transformers), 17 with the Green Lights Program, 16 with the Natural Gas Star Program, 9 with the Sulfur Hexafluoride Emissions Reduction Partnership, 9 with the Coalbed Methane Outreach Program, 7 with Compressed Air Challenge, and 6 with WasteWise. Other voluntary programs cited included the Voluntary Aluminum Industrial Partnership, Motor Challenge, Rebuild America,

and Steam Challenge. Not all participants in the various voluntary programs provided information to the Voluntary Reporting Program.

Projects Reported on the Long Form

Overview

Reporters provided detailed information on Form EIA-1605 on a total of 1,495 projects for 2001 (Table ES3). The total number of projects reported on the long form decreased by 365, or 20 percent, compared with the previous reporting cycle. A further 210 projects were reported on the short form, down 8 percent from the 229 projects reported for 2000.⁴ Most of the projects reported for 2001 were also among the 2,089 projects reported for 2000, because they continued to yield emission reductions. Projects often yield emission reductions over an extended period of time; for example, an availability improvement project at a nuclear power plant typically involves the adoption of new maintenance and refueling programs that, once in place, are followed over a multi-year period. A project may even involve no new activity. The reforestation of an area in one year can

Table ES3. Distribution of Projects by Reduction Objective, Project Type, and Form Type, Data Year 2001

Reduction Objective and Project Type	Number of Projects			Number of Reporters		
	Long Form	Short Form	Total	Long Form	Short Form	Total
Reducing Carbon Dioxide Emissions.	841	146	987	132	36	168
Electricity Generation, Transmission, and Distribution.	373	50	423	72	23	95
Cogeneration and Waste Heat Recovery	18	0	18	11	0	11
Energy End Use	329	64	393	66	18	84
Transportation and Offroad Vehicles	53	13	66	31	6	37
Other Projects.	68	19	87	40	9	49
Reducing Methane and Nitrous Oxide Emissions.	246	47	293	74	6	80
Waste Treatment and Disposal (Methane).	208	45	253	54	4	58
Agriculture (Methane and Nitrous Oxide)	3	0	3	3	0	3
Oil and Natural Gas Systems and Coal Mining (Methane).	35	2	37	20	2	22
Carbon Sequestration	369	14	383	51	12	63
Halogenated Substances.	39	3	42	27	2	29
Entity-Level Reporting Only (No Projects).	NA	NA	NA	48	NA	48
Commitment Reporting Only (No Projects or Entity-Level Data)	NA	NA	NA	0	NA	0
Total.	1,495	210	1,705	196	32	228

NA = not applicable.

Notes: The total number of reporters is smaller than the sum of the number of reporters for each project type, because most reporters provided information on more than one project. Table excludes projects submitted in confidential reports.

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

³In fall 2000, EPA's Climate Wise partnerships were fully integrated under the Energy Star name.

⁴The number of projects reported for 2000 has increased from 1,882 to 2,089 with the receipt of several additional reports after, and revision of reports that had not been accepted by, the time the database used to prepare the annual report and Public Use Database for 2000 was finalized.

result in the sequestration of carbon in many subsequent years, even if no additional trees are planted. Reporters continue to report the annual emission reductions and carbon sequestration achieved by such long-lived projects on a yearly basis.

Most projects involve actions within the United States; however, some are conducted in foreign countries, designed to test various concepts of joint implementation with other nations (Table ES4). Fifty-eight of the 89 foreign projects represent shares in two forestry programs in Belize and Malaysia sponsored by the electric utility industry.

The principal objective of the majority of projects reported for 2001 was to reduce carbon dioxide emissions (Table ES3). Most of these projects reduced carbon dioxide either by reducing fossil fuel consumption or by switching to less carbon-intensive sources of energy. Many also achieved small reductions in emissions of other gases. A total of 900 projects involved either efficiency improvements and switching to less carbon-intensive sources in the electric power industry or energy end-use measures affecting stationary or mobile combustion sources. Projects that primarily reduced carbon dioxide emissions also included the 87 “other” emission reduction projects, most of which involved either the reuse of fly ash as a cement substitute in concrete or the recycling of waste materials.

Projects that primarily affected carbon dioxide emissions accounted for reported direct reductions of 187

million metric tons carbon dioxide equivalent, representing 76 percent of the total direct reductions reported for 2001 on a carbon dioxide equivalent basis. In addition, indirect reductions totaling 31 million metric tons carbon dioxide equivalent were also reported for the projects that reduced carbon dioxide emissions.

Almost all of the 369 carbon sequestration projects reported on the long form increased the amount of carbon stored in sinks through various forestry measures, including afforestation, reforestation, urban forestry, forest preservation, and modified forest management techniques. These activities accounted for 25 percent of the projects reported on the long form for 2001; 243 of the reported carbon sequestration projects represented 27 participating electric utilities’ shares in 9 projects conducted by the UtiliTree Carbon Company. The sequestration reported for carbon sequestration projects on the long form for 2001 totaled 8 million metric tons carbon dioxide equivalent. Direct emission reductions totaling 1,114 metric tons carbon dioxide equivalent were also reported for a few carbon sequestration projects in which changes in forest management practices reduced fuel consumption. A further 14 carbon sequestration projects reported on the short form sequestered or avoided emissions of a reported 9,088 metric tons carbon dioxide equivalent.

A variety of efforts to reduce emissions of gases with high global warming potentials (GWPs) were also reported. Two hundred ninety-three of the reported projects (17 percent) reduced methane and nitrous oxide

Table ES4. Geographic Scope of Reports Received and Location of Emission Reduction Projects, Data Years 1994-2001

Year	Reports Received					Projects Reported			
	U.S. Only		Foreign Only	Both U.S. and Foreign	Total ^a	U.S. Only			Total ^a
	Long Form	Short Form				Long Form	Short Form	Foreign Only	
1994	65	34	2	4	108	500	125	9	634
1995	82	40	2	16	142	760	164	36	960
1996	83	41	1	24	150	828	179	33	1,040
1997	90	40	1	31	162	1,017	201	70	1,288
1998	118	47	1	40	207	1,212	252	85	1,549
1998	125	39	4	37	207	1,397	237	87	1,721
2000 ^(R) . .	153	36	1	45	236	1,761	229	99	2,089
2001	153	32	1	41	228	1,405	210	90	1,705

^aTotals are greater than the sum of the components because the latter exclude information from confidential reports.

(R) = revised

Notes: The number of report received for 2000 was revised to reflect the receipt of 14 reports after the finalization of the Public Use Database for last year’s annual report. For 2000, additional reports were received from Branson Ultrasonics Corporation; CDX Gas, Inc.; City Utilities of Springfield; DuPont Company; Eaton Corporation – Commercial Controls Division; GeoMet, Inc.; Kansas City Power & Light Company; Naval Air Engineering Station Lakehurst; Pratt & Whitney, Middletown; Rochester Gas and Electric Corporation; Sikorsky Aircraft Corporation; Tacoma Public Utilities; Vermont Yankee Nuclear Power Corp.; and Waste Management, Inc. The number of projects reported for 2000 has also been revised to reflect the projects included in those reports. Table excludes projects submitted in confidential reports.

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

emissions from waste management systems, animal husbandry operations, oil and gas systems, or coal mines. The direct emission reductions for these projects totaled 29 million metric tons carbon dioxide equivalent, representing 13 percent of the total direct reductions reported for 2001. Indirect reductions reported for projects that reduced methane and nitrous oxide emissions totaled 40 million metric tons carbon dioxide equivalent. The 47 projects reported on the short form reduced emissions from unspecified sources by a reported 4 million metric tons carbon dioxide equivalent.

Forty-two projects reduced emissions of halogenated substances, including perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆). For the second consecutive year, no offsetting increases in emissions of hydrofluorocarbons (HFCs)—which are used as substitutes for chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) being phased out under the Montreal Protocol—were reported for 2001. Direct reductions of PFC and SF₆ emissions totaled 6 million metric tons carbon dioxide equivalent, representing more than 99 percent the PFC and SF₆ emission reductions reported for 2001. Reductions of other gases, including carbon monoxide (CO), nonmethane volatile organic compounds (NMVOCs), CFCs, and HCFCs, were reported, but these gases do not have reliable GWP values and are not included in the carbon dioxide equivalent data presented in this report.

Overall, direct project-level emission reductions reported for 2001 increased by 5 percent over those reported for 2000, to 222 million metric tons carbon dioxide equivalent, and were more than triple the reductions reported in the first year of the program (data year 1994). Reported reductions of indirect emissions for 2001 increased by 14 percent, to 71 million metric tons carbon dioxide equivalent. The sequestration reported peaked at 12 million metric tons for 1998 and fell to 8 million metric tons for 2001. The decline was caused by the absence of sequestration reported in previous years for several large forest preservation initiatives. Those projects avoided carbon releases associated with logging over the time period that the forests would have been harvested, which were reported as increased carbon sequestration over the same period. Unspecified emission reductions or sequestration reported on the short form increased from 12 million metric tons carbon dioxide equivalent for 2000 to 15 million metric tons carbon dioxide equivalent for 2001.

Project-Level Reference Cases

EIA has broken out project-level data by the reference case employed in calculating project-specific emission reductions. 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 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.

The use of modified reference cases was reported for 90 percent of the projects reported for 2001 on Form EIA-1605 (Table ES5). A modified reference case is generally preferred for project-level analysis, because this approach attempts to isolate the effect of the action taken by the reporter from other factors that may have affected the reporter’s emissions since the action was taken. The reported use of basic reference cases for 2001 was greatest for projects that involved reducing emissions of halogenated substances (56 percent), because the techniques for evaluating reductions are particularly suited to the use of basic reference cases. Emissions of a given halogenated substance are determined using inventory management data, with emissions of a particular substance being equal to the amount purchased during the year to replace quantities emitted. Reductions can be calculated by subtracting the emissions in the years after emission abatement measures have been instituted from the emissions in the year before the measures were instituted.

For the emission reductions and sequestration reported on the long form for 2001, 184 million metric tons carbon dioxide equivalent of direct reductions (83 percent of total direct reductions), 60 million metric tons carbon dioxide equivalent of indirect reductions (84 percent of total indirect reductions), and 7 million metric tons carbon dioxide equivalent of sequestration (93 percent of total sequestration reductions) were reported as having been estimated using modified reference cases (Table ES6).

Electric Power

In 2001, total emission reductions from electric power projects reported on the long form included 150 million metric tons carbon dioxide equivalent from direct sources and 18 million metric tons from indirect sources. Two hundred twenty-five projects that reduced the carbon content of fuels used to generate electricity were reported, with emission reductions totaling 138 million metric tons carbon dioxide equivalent from direct sources and 15 million metric tons from indirect sources. Reported emission reductions for projects increasing energy efficiency in generation, transmission, and distribution included 14 million metric tons carbon dioxide equivalent from direct sources and 3 million metric tons from indirect sources.

Table ES5. Number of Projects Reported on Form EIA-1605 by Reduction Objective, Project Type, and Reference Case Employed, Data Year 2001
(Number of Projects)

Reduction Objective and Project Type	Type of Reference Case				Total Number of Projects
	Modified		Basic		
	Number of Projects	Percent	Number of Projects	Percent	
Reducing Carbon Dioxide Emissions.	737	88	102	12	839
Electricity Generation, Transmission, and Distribution	335	90	37	10	372
Cogeneration and Waste Heat Recovery	18	100	0	0	18
Energy End Use	279	85	50	15	329
Transportation and Offroad Vehicles	48	91	5	9	53
Other Projects.	57	85	10	15	67
Reducing Methane and Nitrous Oxide Emissions.	239	97	7	3	246
Waste Treatment and Disposal (Methane).	203	98	5	2	208
Agriculture (Methane and Nitrous Oxide)	3	100	0	0	3
Oil and Natural Gas Systems and Coal Mining (Methane)	33	94	2	6	35
Carbon Sequestration	347	94	22	6	369
Halogenated Substances.	17	44	22	56	39
Total.	1,340	90	153	10	1,493

Notes: Excludes projects reported on the short form (Form EIA-1605EZ), which does not collect information on the reference case employed. Excludes two projects reported on the long form (Form EIA-1605) for which no reference case was specified because reductions were not estimated. Table excludes projects submitted in confidential reports.

Source: Energy Information Administration, Forms EIA-1605.

Table ES6. Reported Emission Reductions and Sequestration for Projects Reported on Form EIA-1605 by Reduction Objective, Project Type, Source, and Reference Case Employed, Data Year 2001
(Metric Tons Carbon Dioxide Equivalent)

Reduction Objective and Project Type	Direct Reductions		Indirect Reductions		Sequestration	
	Modified	Basic	Modified	Basic	Modified	Basic
Reducing Carbon Dioxide Emissions	154,982,618	32,197,213	21,770,401	9,690,390	0	0
Electricity Generation, Transmission, and Distribution	115,529,789	31,540,675	7,490,690	8,996,412	0	0
Cogeneration and Waste Heat Recovery	2,596,231	0	1,120,865	0	0	0
Energy End Use	18,819,086	620,054	7,466,440	134,316	0	0
Transportation and Offroad Vehicles	8,511	36,484	86,152	1,871	0	0
Other Projects	18,029,000	0	5,606,255	557,790	0	0
Reducing Methane and Nitrous Oxide Emissions	28,184,515	412,038	38,125,541	1,448,065	0	0
Waste Treatment and Disposal (Methane)	13,065,760	401,981	38,084,338	1,448,065	0	0
Agriculture (Methane and Nitrous Oxide)	148	0	22,478	0	0	0
Oil and Natural Gas Systems and Coal Mining (Methane)	15,118,607	10,057	18,724	0	0	0
Carbon Sequestration.	1,114	0	0	0	7,423,920	532,904
Halogenated Substances	631,268	5,448,794	81	0	0	0
Total	183,799,514	38,058,045	59,896,022	11,138,454	7,423,920	532,904

Note: Excludes reductions and sequestration for projects reported on the short form (Form EIA-1605EZ), which does not collect information on the reference case employed. Excludes projects submitted in confidential reports.

Source: Energy Information Administration, Form EIA-1605.

Energy End Use

Reported reductions for the 329 energy end-use projects reported on the long form included 19 million metric tons carbon dioxide equivalent from direct sources and 8 million metric tons from indirect sources. 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 53 transportation projects reported on the long form, including 45 thousand metric tons carbon dioxide equivalent from direct sources and 88 thousand metric tons from indirect sources.

Carbon Sequestration

Sequestration or avoided emissions of 8 million metric tons carbon dioxide equivalent were reported for 369 carbon sequestration projects reported on the long form for 2001. Most of the reported reductions resulted from afforestation, reforestation, urban forestry, forest management, and forest preservation efforts.

Methane Emissions

In 2001, emission reductions for the 246 methane abatement projects reported on the long form included 29 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 (198 projects), natural gas systems (19 projects), and coal mines (16 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.

HFCs, PFCs, and Sulfur Hexafluoride

More than 99 percent of the reductions for the 39 projects reducing emissions of HFCs, PFCs, and SF₆ in 2001 reported on the long form were direct. The reported reductions from direct sources totaled 6.1 million metric tons carbon dioxide equivalent, compared with only 81 metric tons carbon dioxide equivalent in reported reductions from indirect sources. The largest reported reductions were direct reductions in perfluoromethane (3.0 million metric tons carbon dioxide equivalent), SF₆ (2.5 million metric tons carbon dioxide equivalent), and perfluoroethane (0.6 million metric tons carbon dioxide equivalent).

Projects Reported on the Short Form

Two hundred ten projects were reported by 32 entities on the short form (Table ES3), 127 of which (60 percent) were efforts that affected emissions of carbon dioxide from electricity generation, transmission, and distribution, energy end use, and transportation. Such projects reduced emissions by a reported 10 million metric tons carbon dioxide. Reductions totaling 4 million metric tons carbon dioxide equivalent were reported for 47 projects involving waste treatment and disposal and oil and natural gas systems and coal mining. Carbon sequestration or avoided emissions of carbon dioxide were reported for 14 projects and totaled 9 thousand metric tons carbon dioxide equivalent. Three projects reported reductions of halogenated substances, including PFCs and SF₆, totaling 11 thousand metric tons carbon dioxide equivalent. Nineteen other projects reported on the short form included recycling and fly ash reuse, for which reductions of 1 million metric tons carbon dioxide equivalent were reported.

Entity-Level Reporting

Most of the 109 reporters providing entity-level information included data on emissions as well as emission reductions or sequestration. Three reporters provided entity-level data on emissions only, and another 5 reporters provided entity-level data on emission reductions or sequestration only.

Total direct entity-level emissions of greenhouse gases reported for 2001 were 903 million metric tons, representing a 15-percent decrease from the 1,068 million metric tons reported for 2000 (Table ES7). Direct emission reductions reported at the entity level totaled 169 million metric tons carbon dioxide equivalent for 2001, 18 percent less than the 207 million metric tons carbon dioxide equivalent reported for 2000. For 2001, 105 million metric tons carbon dioxide equivalent (62 percent) of the reported direct reductions were estimated using modified reference cases, and 38 percent were estimated with basic reference cases.

Reported indirect entity-level emission reductions for 2001 totaled 28 million metric tons carbon dioxide equivalent. Reported indirect reductions of 36 million metric tons carbon dioxide equivalent calculated with modified reference cases were offset by -7 million metric tons carbon dioxide equivalent reported for indirect reductions (i.e., a net emission increase) calculated with basic

reference cases. Up until the 2000 data year, the total of reported indirect emission reductions calculated using basic reference cases was a positive number. The shift to a negative total occurred in the 2000 data year when two reports, which previously had incorrectly reported reductions using basic reference cases, were corrected to reported increases. Entity-level sequestration reported for 2001 remained at 7 million metric tons carbon dioxide equivalent, unchanged from the amount reported for 2000.

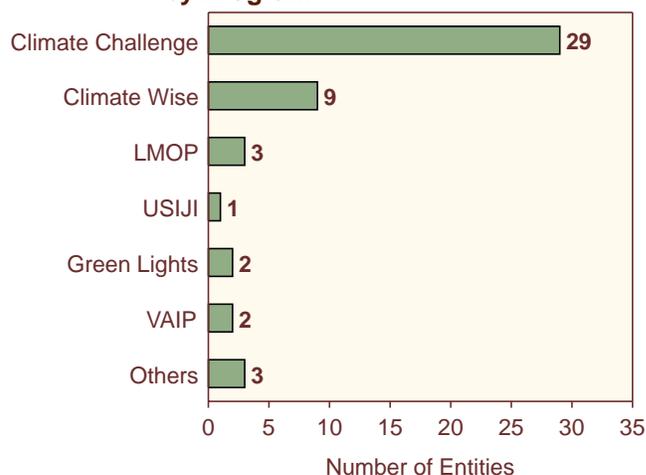
Commitments

Eighty-five entities reported formal commitments to reduce future emissions, to take action to reduce emissions in the future, or to provide financial support for activities related to greenhouse gas reductions.⁵ More than one-third (34 percent) of these entities are electricity generators participating in the Climate Challenge Program (Figure ES3). Fifty-six other entities also reported commitments. Other voluntary programs represented among the commitments reported for 2001 included Climate Wise, the Voluntary Aluminum Industrial Program, the U.S. Initiative on Joint Implementation, the Green Lights Program, the Landfill Methane Outreach Program, the Coalbed Methane Outreach Program, Motor Challenge, and the Sulfur Hexafluoride Emissions Reduction Partnership for Electric Power Systems.

There are three forms of future commitment in the Voluntary Reporting Program: entity commitments, financial commitments, and project commitments.

Entity and project commitments roughly parallel the entity and project aspects of emissions reporting: an entity commitment is a commitment to reduce the

Figure ES3. Number of Entities Reporting Commitments Associated with Voluntary Programs in Data Year 2001, by Program



Notes: LMOP = Landfill Methane Outreach Program, USIJI = United States Initiative on Joint Implementation, VAIP = Voluntary Aluminum Industry Partnership. Others include Coalbed Methane Outreach Program, Cool Communities Program, Motor Challenge Program, and Sulfur Hexafluoride Emissions Reduction Partnership for Electric Power Systems. The sum of entities reporting commitments associated with each program exceeds the total number of entities reporting commitments because several entities reported commitments associated with more than one program.

Source: Energy Information Administration, Form EIA-1605.

Table ES7. Number of Entities Reporting at the Entity Level, Reported Emissions by Source, Emission Reductions by Source and Type of Reference Case Employed, and Sequestration, Data Years 1994-2001

(Million Metric Tons Carbon Dioxide Equivalent)

Year	Number of Entities Reporting	Emissions		Emission Reductions by Type of Reference Case						Sequestration
		Direct	Indirect	Direct			Indirect			
				Modified	Basic	Total	Modified	Basic	Total	
1994	39	752.7	494.9	38.2	22.6	60.8	1.6	1.2	2.8	0.5
1995	50	875.8	499.6	56.0	39.3	95.3	46.0	2.7	48.6	0.8
1996	55	1,183.1	461.5	65.4	44.6	110.0	42.9	5.7	48.6	7.9
1997	60	1,006.6	525.8	73.7	20.3	94.0	24.8	3.4	28.2	7.1
1998	76	1,110.7	473.5	105.8	22.6	128.4	28.3	13.2	41.6	11.2
1999	83	967.9	481.0	114.7	35.3	150.0	30.3	8.4	38.7	8.4
2000 ^(R) . .	109	1,068.2	111.7	123.6	83.0	206.7	34.8	-7.8	27.0	7.5
2001	109	902.9	146.7	104.9	64.3	169.2	35.7	-7.3	28.4	7.5

(R) = revised.

Notes: 2000 data year includes late reports that were not included in the number of entities submitting 2000 data reports in time to be included in last year's annual report and database. Negative reductions represent increases in emissions.

Source: Energy Information Administration, Form EIA-1605.

⁵Fifty companies reported formal commitments in one or more of the entity-level, project-level, or financial categories accommodated by Form EIA-1605. Thirty-five companies provided only descriptions of future activities in the Additional Information section of Schedule IV.

emissions of an entire organization; a project commitment is a commitment to take a particular action that will have the effect of reducing the reporter's emissions through a specific project. A financial commitment is a pledge to spend a particular sum of money on activities related to emission reductions, without a specific promise as to the emissions consequences of the expenditure.

Twenty-five firms made 32 specific promises to reduce, avoid, or sequester future emissions at the entity level. Some of these entity-level commitments were to reduce emissions below a specific baseline, others to limit the growth of emissions per unit of output, and others to limit emissions by a specific amount relative to a baseline emissions growth trend. In their reports for 2001, companies committed to reducing future entity-level emissions by a total of 94.4 million metric tons carbon dioxide equivalent. Forty-four percent of entity-level emission reduction commitments were for the year 2000, with an additional 31 percent falling within the 2001 to 2005 time horizon.

Twenty-nine companies reported on commitments to undertake 182 individual emission reductions projects. Some of the commitments were linked to future results from projects already underway and forming part of the reporters' submissions. Others were for projects not yet begun. Reporters indicated that the projects were expected to reduce future emissions by 151 million metric tons carbon dioxide equivalent, most of which (90 million metric tons carbon dioxide equivalent, or 60 percent) would be reductions of methane emissions.

Twenty-one firms made 39 separate financial commitments. The total amount of funds promised was \$51 million, of which \$7 million was reported to have been spent in 2001.

Climate Change Policy Developments

Several policy initiatives were introduced in the United States over the past year to address the issue of global climate change. In 2002, the White House announced the Global Climate Change Initiative, which included enhancement of the Voluntary Reporting of Greenhouse Gases Program; Congress proposed new energy legislation; and States and other organizations continued to develop innovative greenhouse gas registry and trading programs. The policy developments in 2002 would not have affected the reported emissions and emission reductions for activities in 2001 discussed in this report; however, each of these policy efforts may play a significant role in the future of the Voluntary Reporting of Greenhouse Gases Program.

Global Climate Change Initiative

On February 14, 2002, President George W. Bush announced the Administration's Global Climate Change Initiative, which includes new emission intensity reduction goals, incentives for clean technology development, added support for scientific research, an agenda for expanded collaboration with foreign governments, and a framework for the enhancement of the Voluntary Reporting of Greenhouse Gases Program.

A primary goal of the Global Climate Change Initiative is to slow the growth rate of greenhouse gas emissions while sustaining economic growth, using market mechanisms and energy technology development. In the proposal, the President established a national goal of reducing the greenhouse gas intensity of the U.S. economy by 18 percent over the next 10 years. Emissions intensity is a measure of the ratio of emissions to economic output (gross domestic product). To achieve the goal, the Initiative focuses on fossil fuel energy conservation, methane recovery, and carbon sequestration in the short term and development of advanced energy technologies in the longer term.

As the Global Climate Change Initiative will rely on voluntary measures to achieve emission reduction goals, enhancing the Voluntary Reporting of Greenhouse Gases Program is an important part of the initiative (see below). The Initiative also includes several other domestic and international elements, such as expanded funding for basic scientific research and advanced technology development; tax incentives; challenges for business to undertake voluntary initiatives and commit to greenhouse gas intensity goals; fuel economy standards; carbon sequestration programs; economic incentives to encourage developing countries to participate in climate change initiatives; and technology transfer and capacity building in the developing world.

The Global Climate Change Initiative includes a future progress check, through which the United States, in 2012, will evaluate whether its greenhouse gas emissions reduction progress is sufficient and whether scientific understanding at that time will justify further action. If further action is deemed necessary, the Initiative proposes to accelerate technology development and deployment using additional market-based mechanisms, voluntary measures, and incentive programs.

Enhanced 1605(b) Voluntary Emissions Reduction Registry

Pursuant to a key objective of the Global Climate Change Initiative, the Department of Energy, in conjunction with the Departments of Agriculture and Commerce and the Environmental Protection Agency, is

working to improve and expand the 1605(b) Voluntary Reporting of Greenhouse Gases Program. The primary goal is to create a credible and transparent program to report real reductions that support the President's goal of reducing greenhouse gas intensity by 18 percent over the next 10 years. In addition, the enhanced 1605(b) Program envisioned by the Initiative will allow businesses and individuals to record their reductions and ensure that those reporters are not penalized under a future climate policy. The objective of improving the registry and providing transferable credits for reductions is to help motivate firms to take cost-effective, voluntary actions to reduce greenhouse gas emissions, which would be necessary to achieve the Global Climate Change Initiative's greenhouse gas intensity goal.

Since February, when the President announced his new initiative, an interagency working group has undertaken several actions to improve the Voluntary Reporting Program, including outreach efforts, solicitation of public comments, and a review of the existing program. On July 8, 2002, the Secretary of Energy, joined by the Secretary of Commerce, the Secretary of Agriculture, and the Administrator of the Environmental Protection Agency, submitted recommendations to the White House that will guide the process over the coming months to improve and expand the Voluntary Reporting Program.⁶

Specifically, the Secretaries and Administrator recommended the following improvements to the 1605(b) program:

- Develop fair, objective, and practical methods for reporting baselines, reporting boundaries, calculating real results, and awarding transferable credits for actions that lead to real reductions
- Standardize widely accepted, transparent accounting methods
- Support independent verification of registry reports
- Encourage reporters to report greenhouse gas intensity (emissions per unit of output) as well as emissions or emission reductions
- Encourage corporate or entity-wide reporting
- Provide credits for actions to remove carbon dioxide from the atmosphere (e.g., sequestration activities) as well as for actions to reduce emissions
- Develop a process for evaluating the extent to which past reductions may qualify for credits

- Ensure that the voluntary reporting program is an effective tool for reaching the goal of an 18-percent reduction in greenhouse gas intensity
- Factor in international strategies as well as State-level efforts
- Minimize transactions costs for reporters and administrative costs for the Government, where possible, without compromising the foregoing recommendations.

The Secretaries and the Administrator proposed a process, to culminate in new guidelines by January 2004 (for reporting 2003 data), that includes: several stakeholder workshops; revision of the technical guidelines based on analysis and workshops; public comment periods to review the revised guidelines; and development of reporting forms, software, and a database.

Legislation Relevant to Voluntary Greenhouse Gas Reporting Introduced in the 107th U.S. Congress

The Energy Policy Act of 2002, which did not clear a House-Senate conference before the 107th Congress recessed for the elections in November 2002, was the product of the House energy bill, H.R. 4, introduced in 2001 amended to include text from the Senate energy bill, S. 517, reintroduced by Senators Daschle and Bingaman in March 2002. S. 517 contained provisions that called for an enhanced voluntary reporting program and incentives for emission reductions. The relevant language was taken from S. 517, because H.R. 4 did not contain any greenhouse gas registry provisions.

In April 2002, before the merging of the Title XI language from S. 517 into H.R. 4, Representative Olver introduced H.R. 4611, The National Greenhouse Gas Emissions Inventory Act of 2002, which contained provisions that responded to the President's climate change proposal. Both S. 517 and H.R. 4611, using much of the same language, would establish greenhouse gas registries. Both bills would establish mandatory reporting for entities that exceed an emissions threshold (e.g., 10,000 metric tons carbon dioxide equivalent per year). In addition, both bills would allow voluntary reporting of emission reductions, but neither would require third-party verification. One difference between the bills is that H.R. 4611 specifies that a purpose of the mandatory greenhouse gas inventory, registry, and information system is to avoid penalizing early action to reduce emissions, whereas S. 517 does not identify that purpose.

⁶See U.S. Department of Energy, Office of Policy and International Affairs, "Enhancing the Department of Energy's Registry of Greenhouse Gas Emissions and Emission Reductions," web site www.pi.energy.gov/enhancingGHGregistry/index.html (December 31, 2002).

Other U.S., State, and International Greenhouse Gas Registry Programs

Voluntary greenhouse gas emissions reporting programs and other State initiatives, such as emissions targets, emissions inventorying and monitoring, and emissions mitigation strategies, are gaining momentum as States investigate the most cost-effective policies to address climate change. California, New Hampshire, Wisconsin, New Jersey, Maine, Oregon, and the coordinated New England States and Canadian Provinces have continued separate efforts to develop greenhouse gas registry programs by enacting legislation and establishing rules and guidance.

At the national level, on February 12, 2003, the U.S. Department of Energy, on behalf of President Bush, launched the President's "Climate VISION" (Voluntary Innovative Sector Initiatives: Opportunities Now)—a voluntary public-private partnership to pursue cost-effective initiatives to reduce the projected growth in U.S. greenhouse gas emissions. Climate VISION, to be administered through the Department of Energy, is intended to help meet the President's goal of reducing U.S. greenhouse gas intensity—the ratio of emissions to economic output—by 18 percent by 2012.

Climate VISION involves Federal agencies, including the Department of Energy, the U.S. Environmental Protection Agency, and the Departments of Agriculture and Transportation, working with industry partners to reduce greenhouse gas emissions voluntarily over the next decade. Industry groups making commitments include the Alliance of Automobile Manufacturers, Aluminum Association, American Chemistry Council, American Forest and Paper Association, American Iron and Steel Institute, American Petroleum Institute, American Public Power Association, Association of American Railroads, Business Roundtable, Edison Electric Institute, Electric Power Supply Association,

Magnesium Coalition and International Magnesium Association, National Mining Association, National Rural Electric Cooperative Association, Nuclear Energy Institute, Portland Cement Association, and Semiconductor Industry Association.

The Environmental Protection Agency (EPA) has also established Climate Leaders, a new voluntary industry-government partnership to encourage companies to establish clear greenhouse gas reduction targets and develop long-term comprehensive climate change strategies. The EPA published several draft Greenhouse Gas Inventory Protocol documents in 2002 and is soliciting public feedback.

Finally, a number of groups internationally and within the private sector are setting up greenhouse gas protocols, registries, and trading exchanges:

- The World Resources Institute and the World Business Council for Sustainable Development are collaborating on the Greenhouse Gas Protocol Initiative, which is an international program for developing universal accounting and reporting standards for greenhouse gas emissions and reductions that can be adopted by other reporting programs and registries. A similar effort is taking place within the International Standards Organization (ISO).
- The American Petroleum Institute has developed a protocol for estimating greenhouse gas emissions in the oil and gas industry.
- Voluntary greenhouse gas registries have emerged in Canada, the United Kingdom, Australia, and the Netherlands.
- The Chicago Climate Exchange (CCX) is targeted to open in the spring of 2003. CCX is a voluntary cap-and-trade program. Participating members will be able to buy and sell greenhouse gas credits to assist in achieving their emission reduction commitments.

