

1. Voluntary Reporting 1999: An Overview

Introduction

The Energy Policy Act of 1992 (EPACT) directed the U.S. Department of Energy (DOE), with the Energy Information Administration (EIA) as the implementing agency, to develop a program to document voluntary actions that reduce emissions of greenhouse gases or remove greenhouse gases from the atmosphere (see box on page 2).¹ The Voluntary Reporting of Greenhouse Gases Program was developed in cooperation with DOE's Office of Policy and the U.S. Environmental Protection Agency (EPA). In addition to providing recognition for entities that reduce greenhouse gas emissions or sequester carbon voluntarily, this program serves to identify innovative and effective ways to reduce greenhouse gas emissions.

To date, U.S. policy initiatives aimed at reducing greenhouse gas emissions have relied on voluntary approaches. President Clinton's Climate Change Action Plan² sought to identify and implement actions that could reduce emissions of greenhouse gases through an array of government/industry partnerships. Most of the reporters to the Voluntary Reporting Program are affiliated with one or more government-sponsored voluntary programs.

This report presents information on the sixth reporting cycle of the Voluntary Reporting Program, which accepted reports including information on emissions, emission reductions, and carbon sequestration activities through 1999. The report is divided into seven chapters. This chapter provides an overview of participation in the Voluntary Reporting Program, a perspective on the composition of activities reported, and a review of some key issues in interpreting and evaluating achievements associated with reported emission mitigation initiatives. Chapters 2 through 6 provide a more detailed review of project-level emission reduction initiatives reported to the program. Chapter 2 examines projects in the electricity sector that reduce carbon dioxide emissions through thermal efficiency improvements or switching to lower

emitting fossil fuels. Chapter 3 considers improvements in end-use efficiency and fuel switching in the residential, commercial, industrial, and transportation sectors. Efforts to improve or expand carbon sinks through such activities as reforestation, afforestation, and forest preservation are the subject of Chapter 4. Emission reduction initiatives associated with methane and halogenated substances are examined in Chapters 5 and 6, respectively. Chapter 7 reviews emissions reports from participants who provided data on aggregate entity emissions. Appendixes (available on web site www.eia.doe.gov/oiaf/1605/vrrpt/index.html), provide information on the development and structure of the data collection instrument, a discussion of issues in the interpretation of the data, and summary lists of reporters and projects.

The reports submitted to EIA are compiled into a database that can be obtained on CD-ROM by contacting the Voluntary Reporting of Greenhouse Gases Program Communications Center at 1-800-803-5182 or downloaded from EIA's Internet site at <http://www.eia.doe.gov/oiaf/1605/database.html>.

Benefits of the Voluntary Reporting Program

The Voluntary Reporting Program is unique among the many voluntary programs initiated during the early 1990s in its diversity of project types, participation, and approaches. The Voluntary Reporting Program's database provides abundant examples of the types of concrete actions that organizations can undertake to reduce greenhouse gas emissions. Some of the most important benefits of the Voluntary Reporting Program are:³

- The program has served to teach staff at many of the largest corporations in the United States how to estimate greenhouse gas emissions and has educated them on a range of possible measures to limit emissions.

¹Title XVI of the Energy Policy Act, Public Law 102-486 (October 24, 1992), in Section 1605(a) called for an annual report on national aggregate emissions of greenhouse gases. EIA has issued the report—*Emissions of Greenhouse Gases in the United States*—every year since 1993. Section 1605(b) called for the establishment of a database on annual reductions of emissions as reported on a voluntary basis.

²U.S. Department of State, *Climate Action Report*, Publication 10496 (Washington, DC, July 1997), http://www.state.gov/www/global/oes/97climate_report/index.html.

³Testimony of Jay Hakes, former EIA Administrator, on March 30, 2000, before the Senate Committee on Energy and Natural Resources on Senate Bills S.882 and S.1776 and their potential impacts on EIA's Programs. The full text of the testimony is available on EIA's web site at <http://www.eia.doe.gov/neic/speeches/hrtest3-30-00/testimony3.htm>.

The Energy Policy Act of 1992, Sections 1605(b) and (c)

(b) Voluntary Reporting.—

(1) ISSUANCE OF GUIDELINES.—Not later than 18 months after the date of the enactment of this Act, the Secretary shall, after opportunity for public comment, issue guidelines for the voluntary collection and reporting of information on sources of greenhouse gases. Such guidelines shall establish procedures for the accurate voluntary reporting of information on—

(A) greenhouse gas emissions—

- (i) for the baseline period of 1987 through 1990; and
- (ii) for subsequent calendar years on an annual basis;

(B) annual reductions of greenhouse gas emissions and carbon fixation achieved through any measures, including fuel switching, forest management practices, tree planting, use of renewable energy, manufacture or use of vehicles with reduced greenhouse gas emissions, appliance efficiency, methane recovery, cogeneration, chlorofluorocarbon capture and replacement, and power plant heat rate improvement;

(C) reductions in greenhouse gas emissions achieved as a result of—

- (i) voluntary reductions;
- (ii) plant or facility closings; and
- (iii) State or Federal requirements; and

(D) an aggregate calculation of greenhouse gas emissions by each reporting entity.

Such guidelines shall also establish procedures for taking into account the differential radiative activity and atmospheric lifetimes of each greenhouse gas.

(2) REPORTING PROCEDURES.—The Administrator of the Energy Information Administration shall develop forms for voluntary reporting under the guidelines established under paragraph (1), and shall make such forms available to entities wishing to report such information. Persons reporting under this subsection shall certify the accuracy of the information reported.

(3) CONFIDENTIALITY.—Trade secret and commercial or financial information that is privileged or confidential shall be protected as provided in section 552(b)(4) of title 5, United States Code.

(4) ESTABLISHMENT OF DATA BASE.—Not later than 18 months after the date of the enactment of this Act, the Secretary through the Administrator of the Energy Information Administration shall establish a data base comprised of information voluntarily reported under this subsection. Such information may be used by the reporting entity to demonstrate achieved reductions of greenhouse gases.

(c) Consultation.—

In carrying out this section, the Secretary shall consult, as appropriate, with the Administrator of the Environmental Protection Agency.

- The program has helped to provide concrete evidence for the evaluation of activities reported to the many government voluntary programs launched since 1993.
- Reporters have been able to learn about innovative emission reduction activities from the experiences of their peers.
- The program has created a “test” database of approaches to emission reductions that can be used to evaluate future policy instruments aimed at limiting emissions.

- The program has helped to illuminate many of the poorly appreciated emissions accounting issues that must be addressed in designing any future approaches to emission limitations.

Who Reported?

Reports for the 1999 data year were received from 201 participants in 24 different industries or services, representing a continuing increase in both the number and diversity of participants.⁴ In comparison, reports for the

⁴Twenty entities submitted late reports for the 1998 data year, bringing the total number of reporters for 1998 to 207. The late reports were not among the 187 reports in the 1998 Public Use Database and were not included in the statistics presented in the annual report for data year 1998. It is expected that the number of 1999 data year reports will be revised upward next year with the inclusion of reports received after the 1999 database was closed.

1994 data year—the first year of the program—were received from 108 participants in 9 different industries or services (Table 1).

With 100 of the 201 reporters for 1999 actively engaged in the production and distribution of electricity, this is the first reporting cycle in which more than 50 percent of the reporters to the Voluntary Reporting Program have come from outside the electric power industry (Figure 1). In the first year of the program (data year 1994), the 95 submissions from the electric power producers

represented 88 percent of the 108 reports received. The absolute number of electric power sector reporters has also declined from a high of 115 reporting for 1995 and 1997 to 100 reporting for 1999. The decline is attributed in part to the ongoing restructuring of the industry, which has been accompanied by several mergers and acquisitions involving reporters to the program.

Although other industries are not as well represented as the electric power industry, in many cases reports were received from key companies in those other industries:

Table 1. Forms Filed by Standard Industrial Classification, Data Years 1994-1999
(Number of Reports)

SIC Code ^a	Description	Data Year					
		1994	1995	1996	1997	1998 ^(R)	1999
01	Agricultural Production: Crops	0	0	0	0	1	0
08	Forestry	1	2	1	1	3	3
12	Coal Mining	1	2	2	1	4	2
14	Nonmetallic Minerals, except fuels	0	0	0	0	1	1
20	Food and Kindred Products	0	0	0	0	1	1
27	Printing and Publishing	0	1	0	1	0	1
28	Chemical and Allied Products	1	3	2	3	8	5
29	Petroleum Refining and Other Related Industries . .	0	0	2	3	8	9
32	Stone, Clay, Glass, and Concrete Products	0	0	2	4	12	13
33	Primary Metals	2	2	4	4	5	5
34	Fabricated Metal Products, Except Machinery and Transportation Equipment	0	2	1	1	4	2
36	Electronic Equipment	1	1	2	4	4	4
37	Transportation Equipment	1	1	1	2	3	5
38	Instruments and Related Products	0	0	0	0	2	0
39	Miscellaneous Manufacturing Industries	0	1	1	0	2	2
48	Communications	0	0	0	0	0	1
49	Electric, Gas, and Sanitary Services	98	123	125	129	138	134
57	Furniture and Home Furnishings Stores	0	0	0	0	2	1
65	Real Estate	0	1	1	1	1	1
67	Holding and Other Investment Offices	0	0	1	1	1	1
80	Health Services	0	0	0	0	1	0
82	Educational Services	1	2	2	2	0	2
86	Membership Organizations	0	0	0	1	1	1
87	Engineering and Management Services	0	0	2	2	2	1
88	Private Households	2	1	1	1	1	1
89	Services Not Elsewhere Classified	0	0	0	1	1	3
91	Executive, Legislative, and General	0	0	0	0	1	2
Total		108	142	150	162	207^b	201^b

(R) = Revised.

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

^bIncludes 20 late reports for the 1998 data year. It is expected that the 1999 total will also be revised upward in next year's report with the inclusion of late 1999 reports. As of December 2000, EIA had received two late 1999 reports, which are not included in this report's 1999 database.

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

for example, General Motors in the automotive products industry; Noranda and an operating division of Alcan in the metals industry; Sunoco, Inc., in the petroleum industry; DuPont, Johnson & Johnson, and The Dow Chemical Company in the chemicals industry; Rolls Royce in the aerospace industry; Pharmacia & Upjohn in the pharmaceuticals industry; AT&T in communications; IBM and Motorola in the electronic equipment industry; and Clairol in the consumer products industry.

Most reporters indicated that their projects were affiliated with one or more government-sponsored voluntary programs. Of the 1,715 projects reported for 1999, 990 were affiliated with the Climate Challenge Program, 130 with the Climate Wise Recognition Program, 122 with the Landfill Methane Outreach Program, 30 with the U.S. Initiative on Joint Implementation, 24 with Energy Star Buildings, 23 with EPA's Green Lights Program, 11 with the Coalbed Methane Outreach Program, and 8 with the Natural Gas STAR Program. Other voluntary programs cited included Energy Star Computers, Energy Star Transformers, the Voluntary Aluminum Industrial Partnership, Motor Challenge, WasteWiSe, Compressed Air Challenge, Rebuild America, and the Sulfur Hexafluoride Emissions Reduction Partnership. Not all participants in the various voluntary programs provided information to the Voluntary Reporting Program.

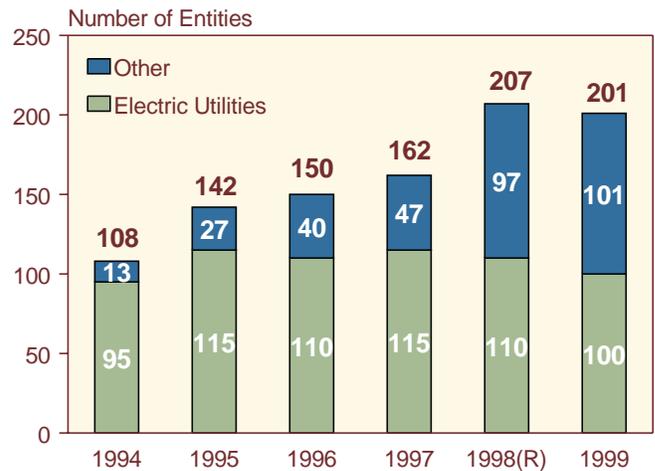
What Was Reported?

The Voluntary Reporting Program permits three distinct types of reporting:

- 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.

Most reporters (184 or 92 percent) reported project-level reductions, and 82 reported entity-level emissions and/or reductions. As these numbers imply, most (66) of the reporters that reported entity-level emissions also reported project-level emissions. One hundred eighteen organizations submitted only project-level reports, whereas 16 reported only entity-level information.

Figure 1. Electric Power Sector and Other Entities Submitting Reports to the Voluntary Reporting of Greenhouse Gases Program, Data Years 1994-1999



(R) = revised.

Note: 1998 data year includes 20 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.

Sixty-five reporters provided information on their commitments to reduce emissions or increase sequestration in the future. One reporter's submission consisted of a project commitment describing an ongoing activity that did not reduce emissions in 1999 but which is projected to reduce emissions in future years.

Project Level

Reporters provided information on a total of 1,715 projects (Table 2). The total number of projects reported increased by 158, or 10 percent, compared with the previous reporting cycle.⁵ Most of the 1,715 projects reported for 1999 were also among the 1,557 projects reported for 1998, because they continued to yield emission reductions. Projects often yield emission reductions over an extended period of time; a lighting improvement project may involve the replacement of light fixtures and bulbs that, once installed, will continue to reduce electricity consumption, and thus emissions, over a multi-year period. A project may even involve no new activity. The reforestation of an area in one year can 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.

⁵The number of projects reported for 1998 has increased from the 1,507 cited in the annual report for data year 1998 to 1,557 due to the receipt of several additional reports after, and revision of reports that had not been accepted by, the time the database was used to prepare the annual report and Public Use Database for 1998. See note to Table 3.

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 3 and Figure 2). Fifty-three of the 87 foreign projects represent shares in two forestry programs in Belize and Malaysia sponsored by the U.S. electric utility industry through the Edison Electric Institute's UtiliTree Carbon Company.

The principal objective of the majority of projects reported for 1999 was to reduce carbon dioxide emissions (Table 2). Most of these projects reduced carbon

dioxide either by reducing fossil fuel consumption or by switching to lower emitting sources of energy. Many also achieved small reductions in emissions of other gases. A total of 905 projects reduced primarily carbon dioxide emissions either through electricity supply initiatives or energy end use measures affecting stationary or mobile combustion sources. Other projects that also primarily reduced carbon dioxide emissions included the 103 "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

Table 2. Distribution of Projects by Reduction Objective and Project Type, Data Year 1999

Reduction Objective and Project Type	Number of Projects	Number of Reporters
Reducing Carbon Dioxide Emissions	905	129
Electricity Generation, Transmission, and Distribution.....	435	92
Cogeneration and Waste Heat Recovery.....	18	11
Energy End Use.....	379	98
Transportation and Offroad Vehicles.....	73	43
Reducing Methane and Nitrous Oxide Emissions	228	67
Waste Treatment and Disposal (Methane).....	193	47
Agriculture (Methane and Nitrous Oxide).....	4	3
Oil and Natural Gas Systems and Coal Mining (Methane).....	31	21
Carbon Sequestration	443	71
Halogenated Substances	36	27
Other Emission Reductions	103	58
Entity-Level Reporting Only (No Projects)	0	16
Commitment Reporting Only (No Projects)	0	1
Total	1,715	201

Note: The total number of reporters for a specific reduction objective is smaller than the sum of the number of reporters for each project type within a specific reduction objective, because most reporters provided information on more than one project type.

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

Table 3. Geographic Scope of Reports Received and Location of Emission Reduction Projects, Data Years 1994-1999

Year	Reports Received				Projects Reported		
	U.S. Only	Foreign Only	Both U.S. and Foreign	Total	U.S.	Foreign	Total
1994.....	102	2	4	108	636	9	645
1995.....	124	2	16	142	931	36	967
1996.....	125	1	24	150	1,007	33	1,040
1997.....	130	1	31	162	1,216	72	1,288
1998.....	166 ^(R)	1	40 ^(R)	207^(R)	1,472 ^(R)	85 ^(R)	1,557^(R)
1999.....	160	4	37	201	1,628	87	1,715

(R) = revised

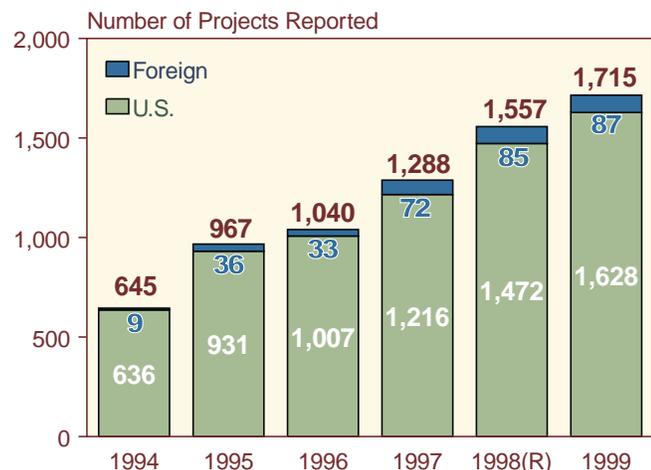
Note: The number of reports received and number of projects reported for 1998 were revised to reflect the receipt of 20 reports after the finalization of the Public Use Database for last year's annual report. For 1998, additional reports were received from ADVANE Heli-Welders, American Soils, Audros Corporation, BAYER Corporation, City Utilities of Springfield, County Sanitation Districts of Los Angeles County, DuPont Company, LAHD Energy, Inc., McNeil Generating Station, Municipal Electric Authority of Georgia, New York Power Authority, Sweeny Furniture, Tucson Electric Power Company, and separately from seven units of the Essroc Cement Corporation. The number of projects reported for 1998 has also been revised to reflect the additional projects reported, as well as revisions to reports that were not finalized in the 1998 Public Use Database.

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

dioxide emissions accounted for reported reductions of 155 million metric tons carbon dioxide equivalent, representing 68 percent of the total reductions reported for 1999 on a carbon dioxide equivalent basis (Table 4).

Two hundred twenty-eight (13 percent) of the reported projects reduced methane and nitrous oxide emissions from waste management systems, animal husbandry

Figure 2. Location of Emission Reduction and Sequestration Projects, Data Years 1994-1999



(R) = revised.

Note: 1998 data year includes 20 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.

operations, oil and gas systems, or coal mines. The reported reductions from these projects totaled 57 million metric tons carbon dioxide equivalent, representing 25 percent of the total reductions reported for 1999.

Almost all of the 443 carbon sequestration projects reported increased the amount of carbon stored in sinks through various forestry measures, including afforestation, reforestation, urban forestry, forest preservation and modified management techniques. These activities accounted for 26 percent of the projects reported for 1999; however, the total reported increase in carbon sequestration, at 10 million metric tons carbon dioxide equivalent, represented only 4 percent of the total reductions reported.

Thirty-six projects reduced emissions of halogenated substances, including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Reductions of these gases reported for 1999 exceeded 4 million metric tons carbon dioxide equivalent, representing 2 percent of the total reductions reported.

Reported emission reductions for 1999 increased by 3 percent over the reductions reported for 1998, to 226 million metric tons carbon dioxide equivalent (Table 5), and have tripled since the first year of the program (data year 1994). By gas, the largest increase in reductions reported for 1999 was a 55-percent increase in reductions of nitrous oxide emissions over the reductions reported for 1998, in large part because PECO Energy reported nitrous oxide reductions for the first time from 13 projects in 1999, totaling 160,946 metric tons carbon dioxide

Table 4. Summary of Project-Level Emission Reductions and Carbon Sequestration by Reduction Objective, Data Year 1999
(Metric Tons Carbon Dioxide Equivalent)

Gas	Reductions by Project Objective				Total Reductions
	Reduce Carbon Dioxide Emissions	Reduce Methane and Nitrous Oxide Emissions	Increase Carbon Sequestration	Reduce Emissions of Halogenated Substances	
Carbon Dioxide	154,124,991	8,392,219	9,698,053	—	172,215,263
Methane	206,230	48,614,437	—	—	48,820,667
Nitrous Oxide	246,933	101,442	—	—	348,375
HFCs	—	—	—	-1,738 ^a	-1,738
PFCs	6,306	—	—	3,691,507	3,697,813
SF ₆	5,149	—	—	641,058	646,208
Total	154,589,609	57,108,098	9,698,053	4,330,827	225,726,587

^aThe negative reductions for HFCs represent increases in emissions due to the use of these gases as substitutes for ozone-depleting CFCs and HCFCs that are being phased out under the Montreal Protocol.

Notes: Totals include all emissions reductions reported. No attempt has been made to correct for double counting, where more than one entity has (or may have) reported on the same emission reduction project. The "Reduce Carbon Dioxide Emissions" category includes all other emission reduction projects reported in Section 10 of Schedule II that may also reduce significant quantities of other gases. CFCs, HCFCs, and methyl chloroform are not included in the totals because of the uncertainty associated with estimates of net global warming potential for these gases. Their direct warming effects (radiative forcing) are offset by indirect cooling effects (destruction of stratospheric ozone, another greenhouse gas).

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

Table 5. Summary of Project-Level Emission Reductions and Carbon Sequestration, Data Years 1994-1999
(Metric Tons Carbon Dioxide Equivalent)

Year	Carbon Dioxide	Methane	Nitrous Oxide	HFCs	PFCs	Sulfur Hexafluoride	Total
1994 . . .	66,217,993	3,197,079	584,811	-29	3,448,668	89,979	73,538,501
1995 . . .	118,634,468	23,861,796	200,752	-43	3,192,463	208,893	146,098,329
1996 . . .	116,922,400 ^(R)	34,015,736	201,580	17,732	3,604,265	-75,344	154,686,370^(R)
1997 . . .	124,656,820 ^(R)	20,233,935	197,869	-42	3,673,641	556,388	149,318,610^(R)
1998 . . .	168,997,860 ^(R)	45,462,456 ^(R)	225,334	-1,738	3,777,097	672,717 ^(R)	219,133,726^(R)
1999 . . .	172,215,263	48,820,667	348,375	-1,738	3,697,813	646,208	225,726,587

(R) = revised.

Notes: Totals include all emission reductions reported. No attempt has been made to correct for double counting, where more than one entity has (or may have) reported on the same emission reduction project. Reductions of CFCs, HCFCs, and methyl chloroform are not included in the totals because of the uncertainty associated with estimates of their net global warming potential. Their direct warming effects (positive radiative forcing) are offset by indirect cooling effects (destruction of stratospheric ozone, another greenhouse gas). Totals may not equal sum of components due to independent rounding.

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

equivalent. PECO reported projects that reduced the demand for power from its plants or from the PJM grid, resulting in reduced fossil fuel combustion at power plants in the region. In addition to reducing carbon dioxide emissions, the decreased fossil fuel consumption at these plants also reduced emissions of small but, on a GWP-adjusted basis, significant quantities of nitrous oxide.

Entity Level

Most of the 82 reporters providing entity-level information included data on emissions as well as emission reductions or sequestration. Four reporters provided entity-level data on emissions only, and another four reporters provided entity-level data on emission reductions or sequestration only.

Total entity-level emissions of carbon dioxide reported for 1999 were 1,425 million metric tons, which represents a 2-percent increase over the emissions reported for 1998. Reported emissions of other gases, including methane, nitrous oxide, HFCs, PFCs, and SF₆, totaled 30.7 million metric tons carbon dioxide equivalent for 1999. Total entity-level emissions of these gases reported for 1999 were 65 percent lower than those reported for 1998.

Emission reductions and sequestration reported at the entity level for 1999 totaled 181.6 million metric tons carbon dioxide equivalent, an increase of 1.5 percent over the 178.9 million metric tons reported for 1998. Ninety-one percent of the reductions reported for 1999 were for carbon dioxide, 8 percent were for methane, and the remaining 1 percent included nitrous oxide, HFCs, PFCs, and SF₆.

Commitments

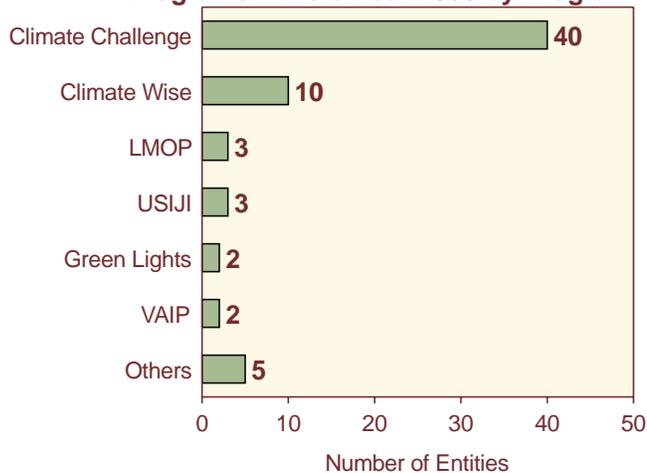
Fifty-seven entities reported formal commitments to reduce future emissions, to take action to reduce emissions in the future, or to provide financial support for activities related to greenhouse gas reductions.⁶ Most (70 percent) of these entities are electric utilities participating in the Climate Challenge Program (Figure 3). Seventeen non-Climate Challenge reporters also reported commitments. Other voluntary programs represented among the commitments reported for 1999 included Climate Wise, the Voluntary Aluminum Industrial Program, the U.S. Initiative on Joint Implementation, Green Lights, the Landfill Methane Outreach Program, the Coalbed Methane Outreach Program, Cool Communities, Motor Challenge, the Sulfur Hexafluoride Emissions Reduction Partnership for Electric Power Systems, and WasteWiSe.

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 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-eight firms made 42 specific promises to reduce, avoid, or sequester future emissions at the entity level. Some of these entity-level commitments were to reduce

⁶Fifty-seven companies reported formal commitments in one or more of the entity-level, project-level, or financial categories accommodated by Form EIA-1605. Eight companies provided descriptions of future activities only in the Additional Information section of Schedule IV.

Figure 3. Number of Entities Reporting Commitments Associated with Voluntary Programs in Data Year 1999 by Program



Notes: LMOP = Landfill Methane Outreach Program, USJI = United States Initiative on Joint Implementation, VAIP = Voluntary Aluminum Industry Partnership. Others include Coalbed Methane Outreach Program, Cool Communities Program, Motor Challenge Program, Sulfur Hexafluoride Emissions Reduction Partnership for Electric Power Systems, and WasteWi\$e Program. 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, Forms EIA-1605 and EIA-1605EZ.

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 1999, companies committed to reducing future entity-level emissions by a total of 92.2 million metric tons carbon dioxide equivalent. Currently, about 50 percent of future emission reduction commitments are for the year 2000, with an additional 45 percent falling within the 2000 to 2005 time horizon.

Thirty-five companies reported on commitments to undertake 236 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 161 million metric tons carbon dioxide equivalent, most of which (90 million metric tons) would be reductions of methane. This large increase in future project-level reductions of

methane emissions is the result of a single commitment reported by Redstone Gas Partners, LLC, which expects that its gas recovery operations from yet-to-be-mined surface coal deposits in Montana and Wyoming will avoid methane emissions totaling about 80 million metric tons carbon dioxide equivalent over the next 10 years. Last year, the reported commitments to reduce future emissions totaled 92 million metric tons carbon dioxide equivalent, 90 percent of which was for carbon dioxide.

Twenty-seven firms made financial commitments. The total amount of funds promised was \$42.5 million, of which \$10.6 million was reported to have been expended in 1999.

Status of Policy Initiatives

The experience of the past year highlights the uncertainty surrounding climate change policy initiatives. The 106th Congress did not pass any of the legislation introduced after the Administration announced a proposal to reward organizations taking early, voluntary action to reduce greenhouse emissions (see box on page 9). In addition, international negotiations on a final agreement for implementing the Kyoto Protocol to the United Nations Framework Convention on Climate Change—the sixth Conference of the Parties (COP-6), held in The Hague, Netherlands—were suspended in November 2000 without agreement on a number of issues, including the appropriate amount of credit for carbon sinks, such as forests and farmlands, and the use of flexible mechanisms, such as international emissions trading and the Clean Development Mechanism (CDM), to reduce the cost of meeting the global emissions targets.⁷ COP-6 is scheduled to resume in May 2001 in Bonn, Germany.⁸

Several U.S. States have undertaken legislative initiatives under the EPA's State and Local Outreach Program. Twenty-five States and Puerto Rico have developed or are developing State action plans to identify feasible and effective policies for reducing greenhouse gas emissions at the State level.⁹ At least three States have taken the step of establishing emission reduction registries. The New Hampshire and California registries are explicitly intended to ensure that organizations voluntarily reducing their emissions receive appropriate consideration for emission reductions made before the implementation of any mandatory program.^{10,11}

⁷“U.N. Conference Fails to Reach Accord on Global Warming,” *New York Times* (November 26, 2000).

⁸“Odd Culprits in Collapse of Climate Talks,” *New York Times* (November 28, 2000).

⁹U.S. Environmental Protection Agency, “Action Plans,” <http://yosemite.epa.gov/globalwarming/ghg.nsf/actions/StateActionPlans?Open>.

¹⁰State of New Hampshire, Senate Bill 159, Chapter 220:1(II), <http://www.state.nh.us/gencourt/bills/99bills/sb0159.html>.

¹¹State of California, Senate Bill 1771, Chapter 6, Article 1, Section 42801(b).

Legislation Relevant to Voluntary Reporting Introduced in the 106th Congress

Several bills dealing with credit for early action, voluntary reporting, or related topics were introduced in the 106th Congress (see web site <http://thomas.loc.gov/> for details). In March 1999, Senators Chafee (R-RI), Lieberman (D-CT), and Mack (R-FL) reintroduced the Credit for Voluntary Reductions Act (S. 547) with several additional cosponsors. This bill would authorize the President to enter into agreements to provide regulatory credit, usable in a possible future domestic regulatory program limiting greenhouse gas emissions, for voluntary actions taken before such a regulatory program comes into effect. Rep. Lazio (R-NY) and 12 other representatives introduced H.R. 2520, a modified version of the Chafee bill in the House of Representatives.

The initiatives to give credit for early or voluntary action were countered by proposed legislation that would continue to rely on purely voluntary initiatives to reduce emissions and sequester carbon. Senators Murkowski (R-AK), Hagel (R-NE), Byrd (D-WV), and seven others introduced the Energy and Climate Policy Act of 1999 (S. 882). This bill would amend the Energy Policy Act of 1992 to: develop a program of public recognition for those entities that have achieved certified greenhouse gas reductions; conduct a review of potential changes to the guidelines for the Voluntary Reporting Program addressing verification, reference cases, double reporting, and participation of farmers and small businesses; and revise the guidelines for the Program to incorporate changes found by this review to be beneficial and cost-effective in improving the accuracy and reliability of the reported greenhouse gas reductions and related information. Rep. Barton

(R-TX) introduced a version of the Murkowski bill in the House of Representatives as two separate bills (H.R. 3384 and H.R. 3385).

In July 1999, Sen. Wyden (D-OR) introduced the Forest Resources for the Environment and the Economy Act (S. 1457) to “amend the Energy Policy Act of 1992 to assess opportunities to increase carbon storage on national forests derived from the public domain and to facilitate voluntary and accurate reporting of forest projects that reduce atmospheric carbon dioxide concentrations, and for other purposes.”

The Climate Change Energy Response Act (S. 1776), introduced by Sen. Craig (R-ID) in October 1999, was similar to the Murkowski bill (S. 882) in that it would direct the Secretary of Energy to revise the Voluntary Reporting Program guidelines, with specific requirements to address issues of verification, use of reference cases, and avoidance of duplicate reporting. The bill differed from S. 882 in that it would direct the Secretary to develop best practices for estimation of emission reductions and to review previously reported reductions to determine whether they are in conformance with these practices. The bill also includes provisions for a public awareness campaign to encourage participation of all appropriate persons (especially farmers and small businesses).

In July 2000, Rep. Lazio introduced the Clean Power Act (H.R. 4861), which proposed the creation of a carbon dioxide allowance trading program for electric utilities similar to one already established for sulfur dioxide.

In July 1999, the New Hampshire legislature passed a bill establishing a registry for greenhouse gas emission reductions and directing the Commissioner of the Department of Environmental Services to adopt rules governing reporting procedures, methods for estimating and verifying greenhouse gas emission reductions, and determination of ownership of reductions in order to prevent double counting. For accounting purposes, the proposed rules issued in October 2000 require greenhouse gas voluntary emission reductions (VERs) to be computed “in accordance with the general guidelines for the voluntary reporting of GHGs under section 1605(b) of the Energy Policy Act of 1992”¹² The draft rules also identify specific protocols for use in quantifying VERs, including Forms EIA-1605 and EIA-1605EZ; however, reporters are permitted to use alternative

protocols with the approval of the Department of Environmental Services.

In May 2000, Wisconsin enacted Senate Bill 287, which directs the Department of Natural Resources to “establish and operate a system under which the department registers reductions in emissions of greenhouse gases if the reductions are made before the reductions are required by law.”¹³ The bill authorizes the Department of Natural Resources to establish systems for registering reductions in greenhouse gases, fine particulate matter, mercury, and other air contaminants. The Department of Natural Resources is currently developing rules for the system.

In June 2000, New Jersey expanded its Open Market Trading Program to include emissions of greenhouse

¹²State of New Hampshire, Chapter Env-3800, Voluntary Greenhouse Gas Emissions Reductions Registry.

¹³Section 285.78 Wisconsin Statutes.

gases.¹⁴ Through an EPA grant, the New Jersey Department of Environmental Protection (NJDEP) is also developing protocols to provide reliable methods for calculating and verifying greenhouse gas reductions.¹⁵ The development of these protocols is intended to help support the development of greenhouse gas reduction credits and a trading program for the credits, which in turn will support NJDEP's goal of reducing the State's greenhouse emissions by 3.5 percent below 1990 levels by 2005.¹⁶

In September 2000, California enacted Senate Bill 1771 to establish the California Climate Action Registry.¹⁷ Unlike New Hampshire and Wisconsin, where the legislatures delegated the authority for fleshing out the details of their respective programs to State agencies, the California law includes many specific requirements. In particular, the legislature requires that organizations report on an entity-wide basis and that emission baselines and annual emissions be expressed using various metrics depending on the organization type reporting—for example, carbon dioxide per dollar of revenue for private corporations, carbon dioxide per kilowatt hour for electricity generators, and carbon dioxide per dollar of budgetary expenditure plus amortized capital expenditures for nonprofit corporations and government agencies. The law also contains provisions for adjusting baselines to reflect any changes in the entity or its activities, including mergers, acquisitions, divestitures, and outsourcing. Verification of reported reductions by a third-party organization approved by the registry is also to be required.

Accounting Issues for Voluntary Reporting and Beyond

The Voluntary Reporting of Greenhouse Gases Program was designed primarily to serve as a mechanism by which entities could report voluntary actions intended to reduce greenhouse gas emissions and sequester carbon.¹⁸ EIA has the responsibility, among other things, for establishing and maintaining a database of reported greenhouse reductions that also serves as a national registry of reported reductions. While the information in the database may be used by the reporting entity to

demonstrate achieved reductions of greenhouse gases, the program was not designed to support credit for early reductions or emissions trading programs. The program guidelines did not attempt to resolve the issues that arise in constructing the required reporting rules that would create a set of comparable, verifiable, auditable emission and reduction reports. Such rules would also be required for the flexible mechanisms, such as the Clean Development Mechanism, Activities Implemented Jointly, and Joint Implementation, included in the United Nations Framework Convention on Climate Change and its Kyoto Protocol.

The Voluntary Reporting of Greenhouse Gases Program allows reporters considerable flexibility in the scope and content of their reports. As a result, companies can report their emissions and reductions in several different ways, and potentially more than one reporter can claim the same reduction. Some commentators on the program have characterized this aspect as a defect: a problem needing a solution. A more restrictive program, however, could limit the number of entities reporting, as well as the types of activities reported. Therefore, because it tends to increase participation in voluntary reporting, flexibility can be viewed as a useful attribute of the program for the following reasons:

- The educational and public recognition aspects of the program are enhanced by maximizing the participation and do not necessarily require a complete and fully-defined system of property rights to a reported emission reduction.
- The Voluntary Reporting Program can be viewed as a survey of emission accounting methods and theories actually in use, and a set of illustrations of the potential accounting and baseline problems that must be confronted in designing future policy instruments. A more structured approach might have been less useful for identifying and analyzing these emissions accounting issues.
- The Voluntary Reporting database illustrates the range and diversity of concrete actions that firms can undertake to limit greenhouse gas emissions, including many not imagined by the designers of the program. A more structured approach might have excluded some of the more original and innovative projects reported to the program.

¹⁴Center for Clean Air Policy, "Highlights of State Initiatives on Global Climate Change" (November 2000), <http://www.ccap.org>.

¹⁵New Jersey Department of Environmental Protection, Sustainability Greenhouse Action Plan, Addendum (January 2000), <http://www.state.nj.us/dep/dsr/gcc/gcc-download.htm>.

¹⁶"Sustainability Initiatives Underway in New Jersey; Corporate & Environmental Leaders Support State's Plan," New Jersey Department of Environmental Protection News Release (April 17, 2000), http://www.state.nj.us/dep/newsrel/releases/00_0030.htm.

¹⁷California Health and Safety Code, Section 1, Chapter 6, Sections 42800 through 42870.

¹⁸This discussion of accounting issues is based on testimony given by Jay Hakes, former EIA Administrator, on March 30, 2000, before the Senate Committee on Energy and Natural Resources on Senate Bills S. 882 and S. 1776 and their potential impacts on EIA's Programs. The full text of the testimony is available on EIA's web site at <http://www.eia.doe.gov/neic/speeches/hrtest3-30-00/testimony3.htm>.

These features make the Voluntary Reporting Program useful in evaluating the design and consequences of any proposed credit for early action program as well as the Kyoto Protocol's flexible mechanisms. By creating a database of real-world emission reduction actions and actors, the data reported to the Voluntary Reporting Program can be used to gain insight into the incentive effects and beneficiaries of various credit for early action and related proposals. The Voluntary Reporting of Greenhouse Gases database has provided a mechanism for identifying some of the issues that would have to be resolved in developing an accounting system for quantifying emissions, emission reductions, and sequestration. Such an accounting system will have to answer the following questions:

- Who can report?
- What is a reduction?
- Who owns the reduction?
- Would the reduction have happened anyway?
- How does one verify reports?

Who Can Report?

Section 1605(b) of the Energy Policy Act of 1992 mentioned only "entities" and "persons" as prospective reporters. Several overlapping concepts of "who can report" surfaced at the public hearings for the guidelines for the Voluntary Reporting Program, all of which were accommodated. These included:

- **A legal person: i.e., an individual, household, corporation, or trade association.** In this approach, emissions and reductions are calculated and reported at the corporate level.
- **A facility or group of facilities.** Emissions and reductions are calculated as those of a particular facility, defined as a single plant in a specified location, or perhaps even a single stack within a plant. A corporation or legal person acquires responsibility for emissions and reductions through ownership of one or more specified facilities.
- **A "project" or activity.** Reductions are defined by comparing the emissions from some set of sources deemed relevant with an estimate of what emissions would have been if a particular action or bundle of actions had not been undertaken.

What is a Reduction?

Perhaps the most intuitive definition of a reduction is one measured against an historical baseline, which represents the use of a "basic reference case." In this approach, the reduction is defined as the difference between the emissions of an entity or facility in a prior, baseline year, usually 1990, and in the current year. This

approach is best suited to reporters whose activities have not appreciably changed since the baseline year. It presents particular problems for firms that have participated in mergers, acquisitions, or divestitures, or have made significant changes in the composition of their business. Startup companies or new facilities that have no history cannot use historical baselines. The historical baseline approach is also not well suited to measuring the reductions achieved by projects, because projects are often entirely new activities with no history.

Alternatively, many reporters define their reductions by comparison with what would have happened in the absence of a specified set of actions. Thus, corporate emissions may have risen, but they are less than they would have been in the absence of corporate action. This approach is called, in the Voluntary Reporting Program, a "modified reference case" or a "hypothetical baseline." It is important to point out, however, that a hypothetical baseline is a best guess of what the future would have been in the absence of a project, and there is no way *per se* to prove or disprove it. Most of the projects reported to the Voluntary Reporting Program use a hypothetical baseline to calculate emission reductions or sequestration.

The "unit of production" approach is a variant of the fixed historical baseline, where the reporter normalizes baseline emissions to reflect changes in production. If emissions per unit of output have declined, by comparison either with levels in a prior year or with what they would have been in the absence of some actions, then the reporter has a reduction. This approach works reasonably well for organizations that have a well-defined product that is homogeneous across companies and over time: for example, kilowatthours generated or sold, tons of steel, or barrels of crude oil. As products increase in complexity, this approach gradually breaks down. Tons of semiconductors, for example, is a meaningless measure of output.

The alternative measures of reductions have their advantages and disadvantages. Basic reference cases are objective and relatively easily verifiable. On the other hand, absolute reductions are often the product of circumstance rather than action, while modified reference cases (which are more difficult to verify) explicitly measure the results of actions. Unit-of-production reference cases are useful only in a limited number of cases, and they can combine some of the disadvantages of both basic and modified reference cases.

Who Owns the Reduction?

Two theories of emissions ownership coexist in the Voluntary Reporting Program. The most intuitive, and commonplace, is called "direct emissions" and "direct reductions." If a reporter owns or uses (e.g., leases) the

emission source, that reporter owns the emission as well as any reductions from this source. The advantage of limiting ownership to direct emissions is that it generally prevents multiple ownership of the same emission or reduction. However, this approach excludes many important emission reduction methods, including all activities that tend to reduce electricity consumption, the activities of energy service companies, and the provision of energy-efficient or emission reducing capital goods.

The alternative theory of ownership is based on causation: if an organization causes an emission or reduction, it is responsible for that emission, even if it does not own the emission source. Emissions or reductions from sources not owned by the reporter are referred to as “indirect.” The most important example of indirect emissions is those produced through the consumption of electricity. If entities reduce their consumption of electricity, they cause their electric utility to reduce its emissions. This approach permits reporting of any action that has an influence on national emissions. However, the concept of “causing an emission” is inherently more ambiguous than “owning the smoke stack,” and in many cases more than one firm may credibly claim to have helped cause an emission reduction.

EIA requires that reporters explicitly identify all emissions and reductions as either direct or indirect so that potentially double-counted reductions can be identified.

Would the Reduction Have Happened Anyway?

This issue is often discussed in other contexts under the term “additionality.” It has been suggested that many emission reduction projects do not represent “real” reductions because they would have been undertaken “anyway” in the normal course of business. However, creating an operational definition of additionality is

difficult, because the “normal course of business” is a hypothetical concept. For the purposes of voluntary reporting—which include publicizing the types of actions that limit national greenhouse gas emissions and providing recognition for the companies that undertake those actions voluntarily—determining the additionality of projects is unnecessary. For the purposes of a credit for early reduction program, however, additionality is an issue that needs to be considered.

How Does One Verify Reports?

The Department of Energy decided not to require verification by an independent third party after considering this issue during the development of the guidelines for the Voluntary Reporting Program. However, reporters must certify the accuracy of their 1605(b) reports. Also, filing a false statement on a U.S. Government form is illegal. EIA reviews each report received for comprehensiveness, arithmetic accuracy, internal consistency, and plausibility and makes suggestions for improving the accuracy and clarity of reports; however, the reporter is ultimately responsible for the accuracy of any report submitted to the Voluntary Reporting Program.

In general, reports submitted to EIA are factually accurate. Meaningful verification of the accuracy of 1605(b) reporting would require putting in place common baselines and accounting standards that would limit the scope for the application of judgment in preparing and reviewing claims of emission reductions. For example, if the accounting treatment for indirect emissions from electricity purchases is undefined, then a particular set of facts about a reporter could result in two different estimates of emissions: one including electricity purchases and one excluding electricity purchases. A third-party verifier can verify the facts about the reporter but cannot determine whether or not indirect emissions from electricity purchases ought to be included and, consequently, cannot determine whether the total emissions reported are correct or not.