



U.S. ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF INSPECTOR GENERAL

*Catalyst for Improving the Environment*

## Evaluation Report

# Voluntary Greenhouse Gas Reduction Programs Have Limited Potential

Report No. 08-P-0206

July 23, 2008



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## Abbreviations

C2P2	Coal Combustion Partnership Program
CBI	Confidential Business Information
CCAP	Climate Change Action Plan
CFR	Code of Federal Regulations
CH <sub>4</sub>	Methane
CMOP	Coalbed Methane Outreach Program
CO <sub>2</sub>	Carbon Dioxide
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
GWP	Global Warming Potential
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
LMOP	Landfill Methane Outreach Program
MAC	Marginal Abatement Curve
MMTCE	Million Metric Tons of Carbon Equivalent
MMTCO <sub>2</sub> eq	Million Metric Tons of CO <sub>2</sub> Equivalent
MOU	Memorandum of Understanding
OAR	Office of Air and Radiation
OIG	Office of Inspector General
OMB	Office of Management and Budget
OSWER	Office of Solid Waste and Emergency Response
PART	Program Assessment Rating Tool
PFC	Perfluorocarbon
SF <sub>6</sub>	Sulfur Hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change
VAIP	Voluntary Aluminum Industrial Partnership

**Cover:** Logos of some of the programs examined (from EPA).



# At a Glance

*Catalyst for Improving the Environment*

## Why We Did This Review

We did this review to evaluate the extent to which the U.S. Environmental Protection Agency's (EPA's) Greenhouse Gas (GHG) voluntary programs can significantly reduce future GHG emissions, and whether their data is complete and reliable.

## Background

Concerns about human-caused global warming and the potential impacts of GHG emissions were first raised in the 1960s. In 1992, the United States signed and Congress ratified the United Nations Framework Convention on Climate Change Treaty in Rio de Janeiro. The "Rio" Treaty requires the United States to implement programs to reduce GHG emissions. The United States decided to achieve this goal through implementing voluntary programs.

For further information, contact our Office of Congressional and Public Liaison at (202) 566-2391.

To view the full report, click on the following link:  
[www.epa.gov/oig/reports/2008/20080723-08-P-0206.pdf](http://www.epa.gov/oig/reports/2008/20080723-08-P-0206.pdf)

## ***Voluntary Greenhouse Gas Reduction Programs Have Limited Potential***

### **What We Found**

The set of voluntary GHG programs we reviewed use outreach efforts to recruit program partners and reduce GHG emissions. We found the greatest barriers to participation were the perceived emission reduction costs and reporting requirements. We also found that it is unlikely these voluntary programs can reduce more than 19 percent of the projected 2010 GHG emissions for their industry sectors. From this, we determined that if EPA wishes to reduce GHG emissions beyond this point, it needs to consider additional policy options.

We recognize that data collection can be challenging for voluntary programs. However, 8 of the 11 programs in our review showed weaknesses in their current data collection and reporting systems – caused by limited, unverified, and anonymous data reporting. These systems are neither transparent nor verifiable, and are limited by anonymous reporting and use of third party industry data. Further, none of the programs' memoranda of understanding establish consequences for failure to report, and generally provided little assurance that firms are actively participating in the program. EPA has been a leader in developing protocols to produce estimates for greenhouse gas sources and sinks categories in the United States. However, data uncertainty has continued to be a concern the voluntary programs have struggled to address. As a result, the reported accomplishments of these voluntary programs may be based on unreliable data.

### **What We Recommend**

We recommend EPA review emission reduction cost analyses annually and update as needed. For programs that recruit and enroll participants, EPA should adopt written partnership agreements that require stronger data quality provisions and details on how Confidential Business Information (CBI) will be handled. For programs that do not recruit and enroll participants, EPA should develop a policy or procedure that specifically identifies how these voluntary GHG programs link their reported outcomes to program efforts.

The Agency concurred with most of the recommendations, but expressed concern with developing emission reduction cost analyses for programs that serve multiple industry sectors, and about their ability to safeguard CBI data. The OIG believes that developing analyses for individual sectors and specifying in partnership agreements how CBI data will be handled will meet the intent of these recommendations.



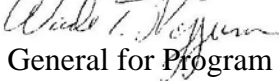
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF  
INSPECTOR GENERAL

July 23, 2008

**MEMORANDUM**

**SUBJECT:** Voluntary Greenhouse Gas Reduction Programs Have Limited Potential  
Report No. 08-P-0206

**FROM:** Wade T. Najjum   
Assistant Inspector General for Program Evaluation

**TO:** Robert J. Meyers  
Principal Deputy Assistant Administrator  
Office of Air and Radiation

Susan Bodine  
Assistant Administrator  
Office of Solid Waste and Emergency Response

This is our report on the subject evaluation conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). This report contains findings that describe the problems the OIG has identified and corrective actions the OIG recommends. This report represents the opinion of the OIG and does not necessarily represent the final EPA position. Final determinations on matters in this report will be made by EPA managers in accordance with established audit resolution procedures.

The estimated cost of this report – calculated by multiplying the project's staff days by the applicable daily full cost billing rates in effect at the time – is \$445,318.

**Action Required**

In accordance with EPA Manual 2750, you are required to provide a written response to this report within 90 calendar days. You should include a corrective actions plan for agreed upon actions, including milestone dates. We have no objections to the further release of this report to the public. If you or your staff has any questions regarding this report, please contact me at 202-566-0827; or Jeffrey Harris, Director of Special Studies, at 202-566-0831 or [harris.jeffrey@epa.gov](mailto:harris.jeffrey@epa.gov).

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# Chapter 1

## Introduction

### Purpose

The purpose of this evaluation was to determine whether our selected set of EPA's Greenhouse Gas (GHG) voluntary programs are effectively managed, and whether these programs have the potential to make significant reductions in GHG emissions. Our specific goals for these programs were to determine:

- (1) The extent to which the voluntary GHG programs in our review can contribute to further GHG emission reductions; and
- (2) Whether outcome data for the voluntary GHG programs in our review are accurate and complete.

### Background

Concerns about human-caused global warming and the potential impacts of GHG emissions were first raised in the 1960s. By the mid-1980s, governments decided that this complex issue needed to be addressed impartially by an independent body and in 1988 established the United Nations Intergovernmental Panel on Climate Change (IPCC). Establishing the IPCC led to creating the United Nations Framework Convention on Climate Change (UNFCCC).

At the 1992 meeting in Rio de Janeiro, Brazil, the United States signed the UNFCCC "Rio" Treaty, and it was ratified by Congress in October 1992. The signatory governments to this treaty agreed to:

- gather and share information on greenhouse gas emissions, national policies, and best practices;
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and
- cooperate in preparing for adaptation to the impacts of climate change.

After Congress ratified the Rio Treaty, the Clinton Administration developed the 1993 Climate Change Action Plan (CCAP), which implemented voluntary GHG emission reduction programs to meet the treaty goals. Nine of the 11 programs included in this evaluation were included in the 1993 CCAP (Table 1.1 below). The HFC-23 program was not included as part of the CCAP but began in 1993. The Coal Combustion Partnership Program (C2P2) began in 2003.

**Table 1.1: Selected Voluntary GHG Programs included in the CCAP**

Program	Industry Sector Served	Year Begun
WasteWise	Numerous sectors	1992
AgSTAR	Manure management	1993
Natural Gas STAR	Natural gas systems	1993
SF <sub>6</sub> Emission Reduction Program for the Magnesium Industry* (SF <sub>6</sub> -Magnesium)	Magnesium production and processing	1994
SF <sub>6</sub> Emission Reduction Program for the Electrical Power Systems* (SF <sub>6</sub> -Electric Power)	Electrical transmission and distribution	1994
PFC Reduction / Climate Partnership for the Semiconductor Industry* (PFC-Semiconductor)	Semiconductor manufacturing	1994
Coalbed Methane Outreach Program (CMOP)	Coal mining	1994
Landfill Methane Outreach Program (LMOP)	Landfills	1994
Voluntary Aluminum Industrial Partnership (VAIP)	Aluminum production	1995

Source: 1993 U.S. Climate Change Action Plan.

\* From 1994 to 1997, emissions from these three industry sectors were addressed under an initiative called Environmental Stewardship.

The current Administration has pledged to reduce GHG intensity by 18 percent by 2012.<sup>1</sup> The programs in our evaluation set are among the tools being used to meet that initiative. Other EPA voluntary programs focus on reducing GHG emissions from fossil fuel combustion for energy and transportation. The voluntary programs in our sample target a wide variety of GHGs, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and several high global warming potential (GWP) gases. The industry sectors and emission sources addressed by these programs had the potential to emit a total of 547<sup>2</sup> million metric tons of CO<sub>2</sub> equivalent (MMTCO<sub>2</sub>eq.<sup>3</sup>) in 2005. Our sample set represents about 7.5 percent of the total U.S. GHG emissions. Most programs target specific industry sectors and GHGs.

<sup>1</sup> GHG intensity is a comparative ratio that divides the total annual U.S. GHG emissions by the annual U.S. economic output expressed in Gross Domestic Product. The voluntary programs do not report in GHG intensity, rather programs report quantities of GHGs reduced.

<sup>2</sup> Source: *Global Anthropogenic Non-CO<sub>2</sub> Greenhouse Gas Emissions, 1990 – 2020, June 2006*. This emission volume reflects the 2005 year data for No-Action Baseline (which removes the impacts of voluntary GHG programs outcomes) for these programs' industry sectors. According to the most recent *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006 (April 15, 2008, EPA 430-R-08-005)*, which includes the impacts of reported outcomes from voluntary GHG programs, the total emissions from these sectors is estimated at 422 MMTCO<sub>2</sub>eq. Because WasteWise addresses numerous sectors, the program's GHG emission volumes are not included in the 2005 potential GHG emissions volumes. See Appendix D for additional program details.

<sup>3</sup> Scientists and policymakers use global warming potentials (GWPs) to compare the ability of each greenhouse gas to trap heat in the atmosphere in comparison to other gases. MMTCO<sub>2</sub> eq. is calculated by converting various gasses into an equivalent measure of CO<sub>2</sub> equivalent. CO<sub>2</sub> was chosen as the reference gas to be consistent with international guidelines. For example, CH<sub>4</sub> has a GWP of 21, meaning CH<sub>4</sub> has 21 times greater potential to trap

Table 1.2 below illustrates which GHG each program targets, their 2006 funding levels, and the number of participants that each program had in 2006.

**Table 1.2: Voluntary Program GHG Emission Targets, Funding, and Participants<sup>4</sup>**

Program	Target GHG Emission	2006 Funding Level*	2006 Participant Level
AgSTAR**	Methane (CH <sub>4</sub> )	\$700,000	n/a
Coal Combustion Partnership Program (C2P2)	Carbon Dioxide (CO <sub>2</sub> )	\$383,000	150
CMOP**	CH <sub>4</sub>	\$1,800,000	n/a
HFC-23 Program	Hydrofluorocarbon (HFC)-23	\$100,000	3
LMOP	CH <sub>4</sub>	\$1,900,000	604
Natural Gas STAR	CH <sub>4</sub>	\$3,600,000	107
PFC-Semiconductor	Perfluorocarbon (PFC)	\$480,000	17
SF <sub>6</sub> -Electric Power	Sulfur Hexafluoride (SF <sub>6</sub> )	\$300,000	80
SF <sub>6</sub> -Magnesium	SF <sub>6</sub>	\$480,000	15
VAIP	PFC	\$240,000	7
WasteWise	CO <sub>2</sub> , CH <sub>4</sub>	\$1,029,000	1900
<b>Total Funding and Participant Levels</b>		<b>\$11,012,000</b>	<b>2883</b>

Source: OIG program questionnaires and interviews with EPA program managers.

\* Includes salaries, travel, and extramural funds.

\*\*Program does not formally enroll participants.

## Noteworthy Achievements

In general, the EPA voluntary GHG programs we reviewed have processes in place to conduct planning, target outreach efforts, and implement the programs. Each program reports achieving annual emission reductions (see Appendix B for each program's 2003-2005 reported outcomes). Also, nearly all the programs create annual business plans and conduct detailed industry research to help target outreach activities.<sup>5</sup> The business plans are based on a program's knowledge of its specific industry sector, and help identify prospective participants that have the highest likelihood of reducing emissions. Most of the 10 business plans we

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heat in the atmosphere than CO<sub>2</sub>. Throughout this report, the reported quantities of various emitted GHGs were converted into quantities of CO<sub>2</sub> equivalent to allow us to speak to each of the programs in the same units.

<sup>4</sup> See Appendix D for voluntary program descriptions.

<sup>5</sup> HFC-23 does not create business plans because it has already enrolled all three of its potential partners.



reviewed also included historical and projected emission reductions, status and trends of industry sector, barriers to participation, program strategy and emission reduction targets, descriptions of outreach efforts, budget information, and program accomplishments.

## Scope and Methodology

Our selected evaluation set consists of 11 EPA voluntary programs that report GHG emission reductions from specific industry sectors. Nine of the programs in our evaluation set are operated by the Office of Air and Radiation (OAR), and two are operated by the Office of Solid Waste and Emergency Response (OSWER). We selected these particular voluntary GHG programs based on their ability to provide outcome data for the years 2003 through 2005. Further, because the OIG was already reviewing the ENERGY STAR program, this program was not included in this evaluation.

The total U.S. GHG emissions estimates for 2005 were 7,241.5 MMTCO<sub>2</sub>eq. The majority of these GHGs are CO<sub>2</sub> emissions that come from fossil fuel combustion for energy and transportation. The industry sectors and emission sources addressed by these 11 programs in 2005 (not taking into account the reductions attributed to EPA's voluntary programs) had the potential to emit a total of 547 MMTCO<sub>2</sub>eq. Therefore, our sample set represents about 7.5 percent of the total U.S. GHG emissions. While the two OSWER programs addressed in this evaluation are primarily waste reduction programs, they both report achieving secondary GHG emission reduction benefits, which is why they are included in this study. We also relied on EPA's program data. Shortcomings of the data are discussed in Chapter 3. (See Appendix A for a detailed scope and methodology.)

Previous OIG reports on EPA voluntary programs include report no. 2005-P-00007, *Ongoing Management Improvements and Further Evaluation Vital to EPA Stewardship and Voluntary Programs*, February 17, 2005; report no. 2007-P-00003, *Partnership Programs May Expand EPA's Influence*, November 14, 2006; report no. 2007-P-00028, *ENERGY STAR Program Can Strengthen Controls Protecting the Integrity of the Label*, August 1, 2007; and report no. 2007-P-00041, *Voluntary Programs Could Benefit from Internal Policy Controls and a Systematic Management Approach*, September 25, 2007. We also reviewed data collected from our 2006 report as they related to the findings discussed in this report.

We performed our evaluation between June 2007 and April 2008 in accordance with generally accepted government auditing standards issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient and appropriate evidence to provide a reasonable basis for our findings and conclusions based on our objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

## Chapter 2

### Emission Reduction Potential of Selected Voluntary Greenhouse Gas (GHG) Programs Is Limited

The voluntary GHG programs we reviewed rely on outreach to program partners and recruitment of new partners to reduce GHG emissions. We found the greatest barriers to participation were perceived emission reduction costs and reporting requirements. Because of emission reduction costs, as well as some barriers to participation, it is unlikely these voluntary programs can reduce more than 19 percent of the projected 2010 GHG emissions for their industry sectors.

#### Programs Focus on Outreach, But Barriers to Participation Remain

All of the programs under review in this evaluation conduct some form of outreach to their target industry or constituency. In fact, most programs stated that outreach, including technical assistance, is the primary service provided to their customers. Two general types of outreach efforts are recruitment of new partners, and ongoing services and technical assistance for current participants. The techniques used for both types of outreach are included in the programs' business plans, including detailed recruitment activities, ongoing services, and emissions reductions goals for the next fiscal year. However, several barriers prevent some participants from adopting emissions reductions processes or technologies.

Unlike traditional compliance programs, voluntary programs conduct outreach to persuade their participants to engage in voluntary efforts. However, some significant barriers and challenges exist to accomplishing this effort, some of which have been identified in Table 2.1 below. As shown below, the greatest challenge to getting new participants to become partners is the perceived cost of emission reduction. Of the 11 programs, 7 stated that cost was perceived a significant barrier. Program reporting requirements were the next most prevalent barrier. Even for programs that have a large number of current participants, getting them to provide data continues to be a challenge. This will be discussed further in Chapter 3.

**Table 2.1 Barriers That Impede Program Participant Enrollment**

Type of Barrier	AgSTAR	CMOP	C2P2	HFC-23	LMOP	Natural Gas STAR	PFC-Semiconductor	SF <sub>6</sub> -Electric Power	SF <sub>6</sub> -Magnesium	VAIP	WasteWise
Perceived cost of emission reduction technology	√	√		√	√	√			√	√	
Don't want to provide data, or getting data from participants is a challenge						√	√				√
Concerned about "working" with a regulatory Agency		√			√			√			
Size of industry sector						√		√			
Distance between facility and market		√	√								
Understanding of the problem/solution			√								

Source: OIG program questionnaires and interviews with EPA program managers.

Three of the programs experience barriers due to the participants being concerned about "working" with a regulatory agency, and two reported barriers related to the size of their industry sector. Further, C2P2 stated that it has challenges convincing its target industry sector (construction industry) that coal combustion byproducts are a quality substitute for Portland cement. Also, both the SF<sub>6</sub>-Electric Power and Natural Gas STAR stated that the sheer size of their targeted industry sector made outreach more difficult. Finally, CMOP stated that it has difficulty getting access to and convincing some companies in the coal mining industry to even meet with or have contact with the Agency.

In general, these programs engage in well-targeted outreach activities designed to enroll potential participants. Most programs develop business plans that discuss management challenges, such as non-reporting partners and other barriers to participation, as well as some strategies to overcome these barriers. However, because these programs are voluntary, the most significant barrier that impacts the success of these programs relates to convincing companies to spend money on activities that are entirely optional. This barrier presents a significant challenge to using voluntary programs as the current solution to reducing GHG emissions.

## Voluntary Programs Have Limited Potential to Reduce Additional GHG Emissions

The EPA, aware of the challenge of the perceived cost of emission reductions, has developed economic analyses that identify how much it would cost to reduce emissions in each industry sector. These analyses, called Marginal Abatement Curves (MACs), provide estimates of how much of an industry's total future emissions can be reduced at a given cost per ton of emissions reduction.

The MACs identify which industry sectors have economically feasible reductions that they can make. This information is one of the tools that helps EPA determine where to target these outreach efforts.

**Table 2.2: Marginal Abatement Curves for Selected Industry Sectors**

Program	Projected 2010 Emissions (MMTCO <sub>2</sub> eq.)	Potential 2010 Emission Reductions at Various Abatement Costs per Ton CO <sub>2</sub> (Numbers Expressed in Percentages)				
		\$0	\$15	\$30	\$45	\$60
AgSTAR	41.3	6.40	9.40	17.20	21.40	21.40
Coal Combustion Products Partnership*	n/a	n/a	n/a	n/a	n/a	n/a
Coalbed Methane Outreach Program	51.1	49.22	85.97	85.97	85.97	85.97
HFC-23 Emission Reduction Program	26.3	0.00	95.06	95.06	95.06	95.06
Landfill Methane Outreach Program	125.4	10.00	42.14	42.14	80.71	87.31
Natural Gas STAR	138.6	14.52	19.24	28.14	35.47	54.76
PFC-Semiconductor	28.2	56.74	70.92	89.36	94.33	94.33
SF <sub>6</sub> -Electric Power	17.6	48.69	57.10	57.10	57.10	57.10
SF <sub>6</sub> -Magnesium	4.6	0.00	97.83	97.83	97.83	97.83
Voluntary Aluminum Industrial Partnership	14.7	7.76	42.04	50.88	50.88	50.88
WasteWise*	n/a	n/a	n/a	n/a	n/a	n/a
<b>Totals for Sampled Industry Sectors**</b>	<b>447.8</b>	<b>19.24</b>	<b>43.11</b>	<b>48.04</b>	<b>61.81</b>	<b>69.63</b>

Source: *Global Mitigation of Non-CO<sub>2</sub> Greenhouse Gases*, EPA Report, June 2006.

\* MACs not calculated for these industry sectors.

\*\* Emission reduction percentages for the total MAC percentage levels are calculated using emission-weighted averages.

Further, the MACs show how much potential (in projected 2010 emission levels) a voluntary program can have in reducing emissions in each industry sector, and can demonstrate to industry participants the net economic benefit of installing abatement technology.

For example, Table 2.2 above shows the range of net abatement costs for reducing GHG emissions in a given industry sector. These costs range from \$0/ton CO<sub>2</sub> eq. through \$60/ton CO<sub>2</sub> eq., and the table then shows the corresponding percentage

of all emissions that could be reduced at that cost. Note that EPA's current voluntary program effort is equivalent to the \$0/ton CO<sub>2</sub> eq. level. What Table 2.2 illustrates is that, on average, our selected voluntary GHG programs have the potential to reduce an additional 19 percent of projected emissions in 2010. However, this assumes that all economically feasible emission reductions will be reduced. This projected potential, however, does not take into account the various challenges to participation or other barriers discussed above. Further, the 19-percent potential is not a static level. It only shows the additional emission reduction potential for the voluntary programs in this study.

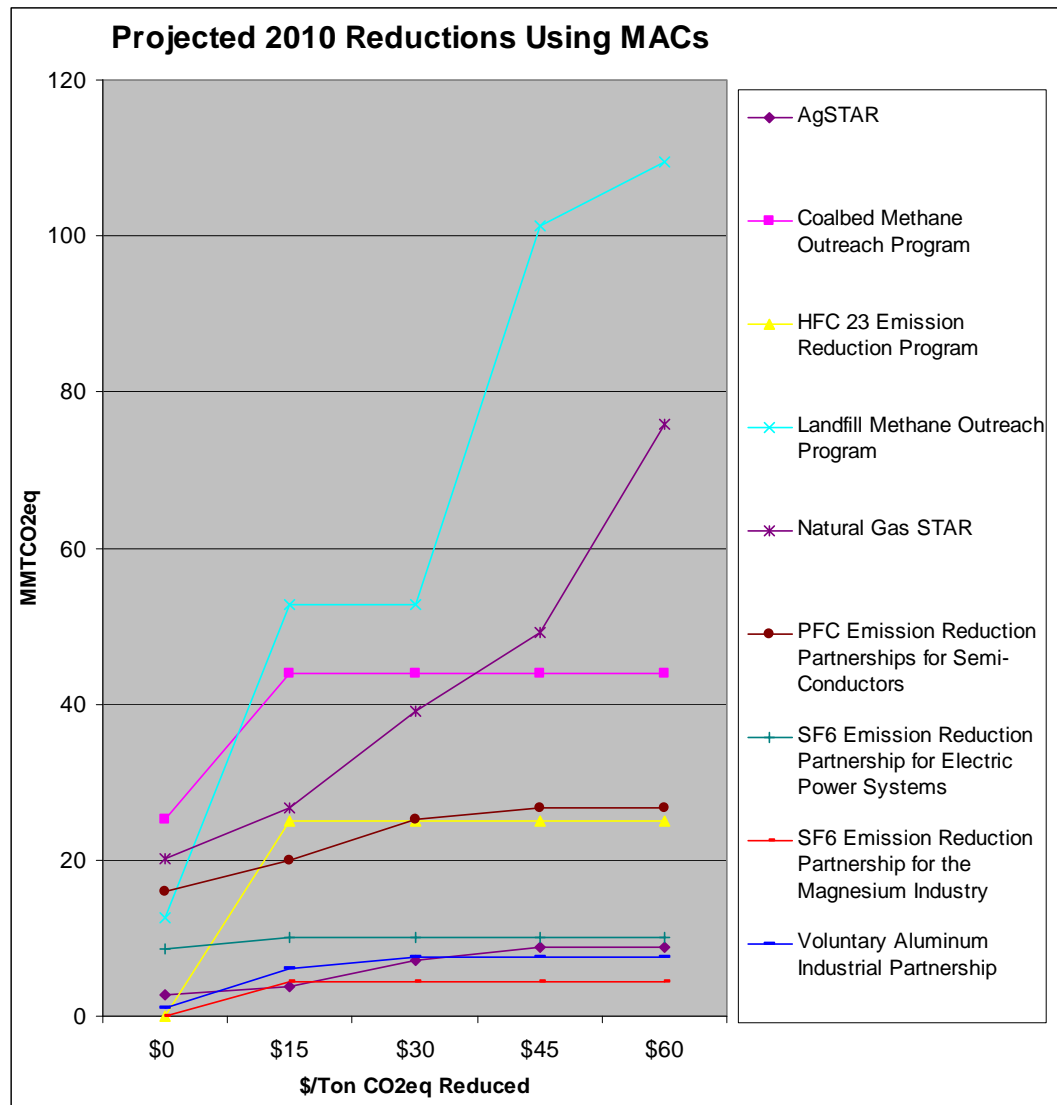
Figure 2.1 on the next page shows the potential emission reductions that could be achieved if additional abatement costs were reduced. For example, if abatement costs were offset or reduced up to \$15/tCO<sub>2</sub>eq., the potential economically feasible emissions reductions of these programs would increase from 86 tons of CO<sub>2</sub> eq. to 193 tons of CO<sub>2</sub> eq. in 2010.

The utility of MAC analyses is dependent upon the quality of the incorporated data.<sup>6</sup> For example, the MAC data in Table 2.2 above incorporates projected abatement technology costs and uses estimates for the total GHG emissions for each sector. These calculations are generally updated every other year, but sometimes only when new emission reduction technology has been developed. The existing MAC analyses calculate the abatement potential that can be achieved economically. However, the Coal Combustion Products Partnership and WasteWise programs do not have MACs. Without the most up-to-date MACs, EPA may not have the information that it needs to best target their resources to participants that have the highest likelihood of participating in the program.

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<sup>6</sup> These emission reductions are projections, and are not based on complete data because MACs do not exist for the Coal Combustion Partnership Program (C2P2) or the WasteWise program.

Figure 2.1: Emission reduction volumes per program for various MAC levels



Source: *Global Mitigation of Non-CO<sub>2</sub> Greenhouse Gases*, EPA Report, June 2006

## Conclusions

The EPA uses voluntary programs to reduce emissions in targeted industry sectors. However, ongoing participation and new partner recruitment is challenged by numerous barriers, including the perceived cost of abatement and reporting requirements. The overall MAC projections do not include all GHG sectors, and may not be updated as frequently as changes occur. If EPA determines a need for emissions reductions beyond the 19 percent identified in MAC projections, it will need to consider additional options beyond its current voluntary program approach.

## Recommendations

To ensure that EPA and potential program participants have the most up-to-date abatement cost data for each industry sector, we recommend that the Principal Deputy Assistant Administrator for the Office of Air and Radiation:

- 2-1 Review MAC analyses annually and update as needed based on the availability of updated cost and abatement technology information.

We also recommend that the Principal Deputy Assistant Administrator for the Office of Air and Radiation and the Assistant Administrator for the Office of Solid Waste and Emergency Response:

- 2-2 Develop applicable MAC analyses for GHG-emitting sectors where they do not exist, and/or work with EPA offices responsible for the corresponding voluntary GHG programs and share the methodologies and tools necessary for them to develop their own analyses.

## Agency Comments and OIG Evaluation

The Agency concurred with Recommendations 2-1 and 2-2 but expressed concerns in developing MACs for programs that serve more than one sector. OIG recognizes the concern. Analyses for individual industry sectors served by EPA voluntary programs will meet the intent of the recommendation. The Agency's complete written response, as well as our evaluation of Agency comments, is presented in Appendix E.

## Chapter 3

### Reporting and Data Limitations Impede Assessment of Voluntary GHG Programs

The 11 voluntary GHG programs we reviewed report program accomplishments using data that may be neither complete nor reliable. We do recognize that data collection can be challenging for these programs due to their voluntary nature. However, 8 of the 11 programs in our review showed weaknesses in their current data collection and reporting systems caused by limited, unverified, and anonymous data reporting. These programs' data collection systems are neither transparent nor verifiable, and are limited by anonymous reporting and use of third party industry data. Further, none of the programs' memoranda of understanding establish consequences for failure to report, and generally provided little assurance that firms are actively participating in the program. Data uncertainty has continued to be a concern the voluntary programs have struggled to address. As a result, the reported accomplishments of these voluntary programs may be based on unreliable data.

#### Current Guidelines Do Not Address Voluntary Reporting Issues

While the Agency has actively managed voluntary programs since the mid 1990s, EPA has not developed adequate guidance to ensure that data received from participants are reliable. Specifically, in 2006, a guidance document titled *Guidelines for Measuring the Performance of EPA Partnership Programs* was developed for EPA managers and staff and their contractors to use when developing Partnership Programs. However, it does not address issues relating to developing program-specific reporting requirements, developing written agreements, providing guidance to address data quality issues in a voluntary approach, or addressing failure to report. As a result, the guidance provides limited benefits to programs currently operating.

Program managers told us they generally utilized the reporting requirements of the *Voluntary Reporting of Greenhouse Gases Program* under Section 1605(b) of the 1992 Energy Act as the framework for developing the reporting requirements for their programs. These requirements were available when most of the programs were initiated. The 1992 Act provides a method for participants to document their emission reduction efforts and disclose their commitment to voluntarily achieving environmental policy goals. However, critics of the 1605(b) program warn that this mechanism is very flexible and weaknesses have been identified, including:



- voluntarily submitted GHG reduction is based on wide discretion in calculating emission reductions;
- data are self-certified and generally no outside verification is required; and
- supporting documentation is not required and the potential exists for double-counting reductions.

EPA told us it agreed that the reporting protocols for the 1605(b) program lacked the rigor necessary to ensure a robust accounting of accomplishments. It further advised that each program has developed its own more rigorous and comprehensive methods and protocols that are specific to the target industry.

## Voluntary Program Data Are Often Incomplete

EPA's voluntary GHG programs provide influential data and need to have sufficient, accurate, and reliable data collection systems to track progress toward meeting UNFCCC<sup>7</sup> treaty and administration goals. This information must also be supportable, transparent, and verifiable. The inherent weakness of a voluntary program is that the decision to report is solely left up to the participant. Voluntary program managers rely on participants' discretion to report timely and accurately. In theory, failure to report can result in termination from the program with specific conformance requirements established in a written agreement. In practice, EPA program managers told us their goals are to obtain the data, not eliminate non-compliant participants.

Issues relating to data quality have beset the EPA voluntary programs designed to address greenhouse gas reductions. For example, the programs we reviewed for this evaluation were included in a 2004 Office of Management and Budget (OMB) PART (Program Assessment Rating Tool) review. The review examined 20 of EPA's Climate Change Programs and, in the area of data collection, the programs received a collective score of zero. EPA also acknowledged that its data have weaknesses. Specifically, within the *2007 Greenhouse Gas Inventory*,<sup>8</sup> EPA stated, "Emissions calculated for the U.S. Inventory reflect current best estimates; in some cases, however, estimates are based on approximate methodologies, assumptions, and incomplete data."

Various barriers limit these voluntary programs' ability to report reliable, complete, and accurate data on GHG emissions reductions. For example, many programs receive data not directly from the participant. The PFC-Semiconductors Industry program and HFC-23 are two examples of programs that receive data from a third party firm. In this case, third parties compile program results, and because the results are considered Confidential Business Information (CBI), the data are transmitted to EPA blindly. Anonymous reporting reduces data transparency and prevents the program from verifying individual participants'

<sup>7</sup> As noted in Chapter 1 above, the United States joined other countries in signing the United Nations Framework Convention on Climate Change (UNFCCC), an international treaty to address the danger of global climate change.

<sup>8</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*, April 15, 2008, EPA 430-R-08-005.

GHG emissions reductions. Even though EPA has the ability to protect and safeguard CBI, the Agency told us that some industries still do not trust the security of data submitted to EPA.

Often, programs with fewer numbers of partners seemed to have better results in obtaining annual reports. For example, all partners in the Voluntary Aluminum Industry Program reported annual outcomes, whereas only 12 percent of WasteWise partners reported annual outcomes. Limited incentives exist for participants to report--primarily recognition in EPA publications and awards; generally, there are not consequences for not reporting.

## Memoranda of Understanding Lack Consequences for Not Reporting

As shown in Table 3.1, many of the programs we reviewed use a memorandum of understanding (MOU) as their written agreement between the participating firm and EPA.<sup>9</sup> This document generally establishes the requirements relating to participation in many of the programs we reviewed. The MOUs we reviewed outline expectations for both EPA and the partner entity, including annual reporting. However, none of the MOUs establish consequences for failure to report, and generally provided little assurance that firms are actively participating in the program. Further, the MOUs do not provide provisions for EPA to independently verify data that are reported. As a result, limited assurance exists that the reported program accomplishments, which are influential both inside and outside of EPA, are reliable and accurate.

**Table 3.1: Programs That Use a Memorandum of Understanding (MOU)**

Program	Use MOUs	Do Not Use MOUs
AgSTAR		X
Coal Combustion Products Partnership		X
Coalbed Methane Outreach Program		X
HFC-23 Emission Reduction Program	X	
Landfill Methane Outreach Program	X	
Natural Gas STAR	X	
PFC-Semiconductor	X	
SF <sub>6</sub> -Electric Power	X	
SF <sub>6</sub> -Magnesium	X	
Voluntary Aluminum Industrial Partnership	X	
WasteWise		X

Source: OIG program questionnaires, interviews, and business plans from EPA program managers.

Program managers told us more rigorous requirements, such as specific environmental emission reduction goals, baseline and historical data, or the Agency's ability to verify the accuracy of data currently reported would result in loss of participants. They stated that their goal was to add and maintain the

<sup>9</sup> See Appendix C for an example of an MOU that EPA's voluntary programs use.

current participants in their programs. Since their programs address GHGs that are not regulated, they were limited in dealing with non-participating partners.

These programs do not have a written policy on what program managers can do when the reporting requirements are not followed. The MOUs do not have oversight or monitoring provisions within their written agreements with participants. The program manager for the WasteWise program told us that WasteWise maintains a database of all partners, including those that do not report. The program recently purged its database of all partners no longer interested in participating in the program and is contacting nonreporting partners to encourage them to track their progress and submit reports.

Some programs, such as AgSTAR and CMOP, do not have MOUs because they do not have formal participants. The EPA does not take credit for AgSTAR reductions in methane emissions. The program generally serves as a technical assistance and best practices clearinghouse. CMOP utilizes data from the U.S. Mine Safety and Health Administration, State oil and gas commission reports, and the coal mining industry. CMOP does collect mine-specific data annually and estimates the total methane emitted from coal mines and the quantity of methane gas recovered and utilized. Although CMOP does not have formal partners, the program asserts that methane emissions from coal mines have decreased 34 percent from 1990 levels, and takes credit for a percentage of these reductions based on the program's coal mine-specific interactions and activities.

## Conclusions

The EPA's voluntary GHG programs report achieving emissions reductions. However, current data collection processes lack transparency, and some programs allow anonymous reporting or use third-party industry data. Also, some industries still do not trust the security of data submitted to EPA, which prevents the Agency from getting data directly from some participants. Further, program MOUs do not require specific emission reduction goals and lack consequences for not reporting. As a result, the reported accomplishments of these voluntary programs may be based on unreliable data.

## Recommendations

To ensure rigorous data collection and reporting for their GHG emission reductions, we recommend that the Principal Deputy Assistant Administrator for the Office of Air and Radiation and the Assistant Administrator for the Office of Solid Waste and Emergency Response implement the following:

- 3-1 For programs that recruit and enroll participants, implement written partnership agreements that require accurate data reporting and verification, include consequences for not reporting, and provide partners with information on how CBI will be handled.

- 3-2 For those programs that do not recruit and enroll participants, EPA should develop a policy or procedure that specifically identifies how voluntary GHG programs link their reported outcomes to the efforts of the program.

## **Agency Comments and OIG Evaluation**

The Agency generally concurred with Recommendation 3-1. It stated that, as directed under the FY08 Omnibus Appropriations bill signed into law on December 22, 2007, it is drafting a proposed rule concerning mandatory reporting of greenhouse gas emissions which will help improve data accuracy of these voluntary programs. With respect to consequences for not reporting, the Agency agreed to review and amend processes that address nonreporters in the programs as appropriate. The Agency did not fully concur with the portion of the recommendation relating to CBI assurances but recognized the importance of the issue. The Agency noted that for the two OSWER programs, CBI is protected consistent with the Resource Conservation and Recovery Act's CBI regulations. However, the Agency stated that it cannot offer blanket assurances to safeguard and protect CBI data to its partners under the Clean Air Act. We amended our recommendation and ask the Agency to include a section on how CBI will be handled in its partnership agreements.

The Agency concurred with Recommendation 3-2. It acknowledged the importance of having robust, meaningful policies for reporting outcomes, especially for programs without formal participant/partner status.

The Agency's complete written response as well as our evaluation of Agency comments is presented in Appendix E.

## **Status of Recommendations and Potential Monetary Benefits**

RECOMMENDATIONS						POTENTIAL MONETARY BENEFITS (in \$000s) <sup>2</sup>	
Rec. No. <sup>3</sup>	Page No.	Subject	Status <sup>1</sup>	Action Official	Planned Completion Date	Claimed Amount	Agreed To Amount
2-1	10	Review MAC analyses annually and update as needed based on the availability of updated cost and abatement technology information	O	Principal Deputy Assistant Administrator, Office of Air and Radiation			
2-2	10	Develop applicable MAC analyses for GHG-emitting sectors where they do not exist, and/or work with EPA offices responsible for the corresponding voluntary GHG programs and share the methodologies and tools necessary for them to develop their own analyses.	O	Principal Deputy Assistant Administrator, Office of Air and Radiation and Assistant Administrator, Office of Solid Waste and Emergency Response			
3-1	14	For programs that recruit and enroll participants, implement written partnership agreements that require accurate data reporting and verification, include consequences for not reporting, and provide partners with information on how CBI will be handled.	O	Principal Deputy Assistant Administrator, Office of Air and Radiation and Assistant Administrator, Office of Solid Waste and Emergency Response			
3-2	15	For those programs that do not recruit and enroll participants, EPA should develop a policy or procedure that specifically identifies how voluntary GHG programs link their reported outcomes to the efforts of the program.	O	Principal Deputy Assistant Administrator, Office of Air and Radiation and Assistant Administrator, Office of Solid Waste and Emergency Response			

<sup>1</sup> O = recommendation is open with agreed-to corrective actions pending;  
C = recommendation is closed with all agreed-to actions completed;  
U = recommendation is undecided with resolution efforts in progress

<sup>2</sup> Identification of potential monetary benefits was not an objective of this evaluation.

<sup>3</sup> In accordance with EPA Manual 2750, the Agency is required to provide a written response to this report within 90 calendar days that will include a corrective actions plan for agreed upon actions, including milestone dates.

## Appendix A

## Detailed Scope and Methodology

Our evaluation set consists of 11 EPA voluntary programs that report GHG emission reductions from specific industry sectors. This sample set represents approximately 7.5 percent of the total U.S. GHG emissions. For 2005, the total U.S. GHG emissions estimates were 7,241.5 MMTCO<sub>2</sub> eq. The industry sectors served by these programs had the potential to emit 547 MMTCO<sub>2</sub>eq. in 2005. We selected these particular voluntary GHG programs based on their ability to provide outcome data for the years 2003 through 2005. Because the OIG was already reviewing the ENERGY STAR programs, those programs were not included in this evaluation. The majority of U.S. GHG emissions come from motor vehicles and fossil fuel combustion for energy, but neither of these emission sources falls within the scope of this evaluation.

Greenhouse gases are expressed in a common metric so the emission reductions can be accurately compared. Some gases have higher global warming potential (GWP) than others and therefore have greater impacts on global warming overall. The international standard practice is to express the potential impacts of gases in CO<sub>2</sub> equivalents. See Table A.1 below for the various GWPs of most of the gases represented by the programs in our evaluation.

**Table A.1: Global Warming Potential of Various GHGs**

Greenhouse Gas	GWP
CO <sub>2</sub>	1
CH <sub>4</sub>	21
CF <sub>4</sub> (Perfluorocarbon, PFC)	6,500
C <sub>2</sub> F <sub>6</sub> ( Perfluorocarbon, PFC)	9,200
Hydrofluorocarbon – 23 (HFC-23)	11,700
Sulfur Hexafluoride (SF <sub>6</sub> )	23,900

Source: *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2005*, EPA Report, April 2007

Programs can report outcomes in either MMTCO<sub>2</sub> or in million metric tons of carbon equivalent (MMTCE). The difference in these two measures relates to the molecular weights of carbon and oxygen. Outcomes in MMTCE are converted to million metric tons of CO<sub>2</sub> equivalent by multiplying the MMTCE by 3.667.

During field work, we reviewed and assessed EPA’s guidance documents and publications related to voluntary programs, stewardship opportunities, partnership programs, and innovation activities. We collected each program’s background and implementation information through questionnaires. We conducted follow-up interviews with all program officers to verify reported information.

We reviewed annual business plans for all programs, with the exception of the HFC-23 program. The business plans had information on the program achievements and emissions reductions, outreach efforts (such as technical guidance, workshops, and conferences), potential program

participants, barriers to participation, program funding requests, and program objectives and goals.

We also reviewed the Office of Atmospheric Programs report titled *Global Mitigation of Non-CO<sub>2</sub> Greenhouse Gases*. This report provides Marginal Abatement Curves (MACs) for non-CO<sub>2</sub> industry sectors which show the costs of reducing an additional ton of carbon emissions. These analyses assess the various levels of mitigation options that an industry sector can apply, and determine the potential reductions that industries can adopt. We used this information to calculate the additional potential to reduce GHG emissions by voluntary programs, at \$0/ton of MMTCO<sub>2</sub> eq.

The outcome reports for these programs lagged by about 2 years. When we contacted these voluntary programs in our evaluation set, in July 2007, they had just completed compiling the 2005 data. They were able to give us projected outcomes for 2006, but most programs did not have final data for that year. As a result, the OIG decided that it was appropriate to use the reported outcomes for 2003-2005 in the report.

Previous OIG reports on EPA voluntary programs include *Ongoing Management Improvements and Further Evaluation Vital to EPA Stewardship and Voluntary Programs*, report no. 2005-P-00007, February 17, 2005; *Partnership Programs May Expand EPA's Influence*, report no. 2007-P-00003, November 14, 2006; and *Voluntary Programs Could Benefit from Internal Policy Controls and a Systematic Management Approach*, report no. 2007-P-00041, September 25, 2007. We also reviewed data collected from our 2006 report as it related to the findings discussed in this report.

We reviewed management controls of the Agency-wide guidance regarding designing and measuring voluntary programs.

## Appendix B

## ***Reported Program Outcomes***

Table B.1 below discusses the emissions reductions data reported by EPA's voluntary GHG programs from 2003 through 2005. With the exception of WasteWise, which reported the same reductions in 2004 and 2005, and the HFC-23 program, which reported fewer reductions from 2004 to 2005, the programs we reviewed reported greater GHG emissions reductions in each succeeding year.

**Table B.1: EPA Reported Program Outcomes, 2003-2005**

Program	2003	2004	2005
	in MMTCO <sub>2</sub> Equivalents		
AgSTAR	0.37	1.03	1.10
Coal Combustion Products Partnership	11.11	12.80	13.60
Coalbed Methane Outreach Program	6.23	6.60	7.70
HFC-23 Emission Reduction Program	22.44	23.47	22.73
Landfill Methane Outreach Program	15.03	16.13	16.50
Natural Gas STAR	21.27	24.35	29.92
PFC Reduction / Climate Partnership for Semiconductors	2.93	5.13	7.70
SF <sub>6</sub> Emission Reduction Program for Electric Power Systems	3.30	4.11	5.13
SF <sub>6</sub> Emission Reduction Program for the Magnesium Industry	0.07	0.59	0.81
Voluntary Aluminum Industrial Partnership	6.34	7.55	8.07
WasteWise	10.63	12.10	12.10
<b>Total MMTCO<sub>2</sub> eq. Reductions per Year</b>	<b>99.73</b>	<b>113.85</b>	<b>125.36</b>

Source: OIG program questionnaires, interviews, and business plans from EPA program managers. Totals may not sum exactly due to rounding.



**Appendix C*****Example of a Voluntary Program MOU***

The MOU shown in this Appendix is an example that would be applicable to most EPA voluntary greenhouse gas programs.

**VOLUNTARY ALUMINUM INDUSTRIAL PARTNERSHIP****I. PREAMBLE**

A. This is a voluntary agreement between the [company] \_\_\_\_\_ (hereinafter, the partner company) and the United States Environmental Protection Agency (EPA) by which the partner company and EPA build on the progress already achieved through the Voluntary Aluminum Industrial Partnership from 1995 through 2000.

B. The purpose of this agreement is to avoid emissions of CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub> (perfluorocarbons – PFCs) from primary aluminum manufacturing. As of 2000, the Partner Companies had cumulatively reduced emissions by 30%-60% from the 1990 baseline, the stated goal of VAIP. This agreement seeks to make further reductions by expanding the opportunity for technically feasible, cost-effective emission reductions by 2005. The partnership believes such reductions help protect the climate.

**II. COMMON AGREEMENTS AND PRINCIPLES**

A. The partner company and EPA agree that only technically feasible and cost effective efforts to reduce or maintain emissions of PFCs are sought.

B. The partner company and EPA agree that consistent measurement methods for PFCs, knowledge of the relationships between PFC generation and process and design variables, and the development of emission factors for these gases are critical to the overall success of the partnership.

C. The partner company and EPA recognize that while there should be no expectation of zero emissions of PFCs from aluminum smelting operations, there is some minimum level of emissions that reflect the best facility-specific control possible.

D. EPA and the partner company will work together to ensure that the record of the reductions is at a high level of quality. EPA and the partner company expect that companies that possess high quality emissions reductions records will be in a preferred position to participate in any future program that provides appropriate rewards and recognition for early action.

E. Either the partner company or EPA can discontinue this agreement 30 days after the receipt of written notice by the other party with no penalties or continuing obligations. If either party ends the MOU, both parties will refrain from representing that the partner company is participating in the partnership.

### III. EPA RESPONSIBILITIES

- A. EPA will work to improve the availability of information on the generation of PFCs and on techniques to reduce emissions.
- B. EPA will encourage other aluminum producing countries to include PFC emission reductions in their respective climate protection strategies and to share information on successful emission reduction strategies.
- C. EPA will coordinate with the Department of Energy with respect to reporting under this program and Section 1605(b)1 of the Energy Policy Act of 1992.
- D. EPA will provide the partner company with recognition for its achievements in reducing PFC emissions and for its public service in protecting the environment. EPA will publicize the success of the partnership and/or sponsor meetings/conferences on issues relating to the partnership.
- E. EPA will hold confidential any information designated as confidential business information by the Partner in accordance with applicable regulations at 40 CFR Part 2.
- F. This MOU is not a fund-obligating document. All of EPA's activities are subject to the availability of appropriations.
- G. EPA will continue to provide a single representative for the partnership. EPA will notify the partner company within 30 days of any change in the representative's identity.

### IV. PARTNER COMPANY RESPONSIBILITIES

- A. The partner company will provide, on the basis of best available information and to the degree technically and economically feasible, necessary data for calculating annual PFC emissions including: annual production, anode effect frequency, anode effect duration; anode effect minutes per cell day (the product of frequency and duration); and slope coefficients for both CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub>. The partner will provide annual data by March 31 each year, using the reporting form in Attachment B.
- B. The Partner Company will update its emissions reduction goal(s). The year 1990 will still be used as the base year for the partnership. If the partner so chooses, it can provide emissions data for years prior to 1990. At a minimum the partner will strive to maintain reductions achieved since between 1990 and 2000. The partner will submit its PFC emissions reduction goal in conjunction with the signed MOU. The goal should include reducing one or more of the following key factors:

- \* Anode Effect Minutes per cell day
- \* Anode effect frequency
- \* Anode effect duration
- \* PFC Emissions

C. The partner company agrees that the activities it undertakes connected with this MOU are not intended to provide services to the Federal government, and that the Partner will not submit a claim for compensation to any Federal agency.

D. The partner company agrees to appoint a single representative for the partnership (designated in attachment A of this MOU). The partner will notify EPA within 30 days of any change in the representative's identity.

V. Signatories

The undersigned do hereby execute this Memorandum of Understanding on the latter of the dates indicated below.

For the United States Environmental Protection Agency:

\_\_\_\_\_  
Brian J. McLean, Acting Director  
Office of Atmospheric Programs

On: \_\_\_\_\_

For the Partner

\_\_\_\_\_

On: \_\_\_\_\_

## Appendix D

## ***Selected Voluntary GHG Program Descriptions***

Program Name	Program Description
AgSTAR	The AgSTAR Program is a voluntary effort jointly sponsored by EPA, the U.S. Department of Agriculture, and the U.S. Department of Energy. The program encourages the use of methane recovery (biogas) technologies at the confined animal feeding operations that manage manure as liquids or slurries. These technologies reduce methane emissions while achieving other environmental benefits.
Coal Combustion Partnership Program	The Coal Combustion Products Partnership (C2P2) program is a cooperative effort between EPA, the American Coal Ash Association, the Utility Solid Waste Activities Group, the U.S. Department of Energy, the U.S. Department of Agriculture-Agricultural Research Service, the U.S. Federal Highway Administration, and the Electric Power Research Institute to help promote the beneficial use of Coal Combustion Products and the environmental benefits that result from their use.
Coalbed Methane Outreach Program	The Coalbed Methane Outreach Program (CMOP) is a voluntary program whose goal is to reduce methane emissions from coal mining activities. The mission is to promote the profitable recovery and use of coal mine methane, a greenhouse gas more than 20 times as potent as carbon dioxide. By working cooperatively with coal companies and related industries, CMOP helps to address barriers to using coal mine methane instead of emitting it to the atmosphere. In turn, these actions mitigate climate change, improve mine safety and productivity, and generate revenues and cost savings.
HFC-23 Program	The purpose of the program is to work with the producers of HCFC (hydrochlorofluorocarbon)-22 refrigerant to help them reduce the byproduct HFC-23 emissions. The program works to "maintain low levels of Hydrofluorocarbon [HFC]-23 through production process optimization, and the adoption of thermal destruction processes."
Landfill Methane Outreach Program	EPA's Landfill Methane Outreach Program (LMOP) is a voluntary assistance and partnership program that promotes the use of landfill gas as a renewable, green energy source. Landfill gas is the natural byproduct of the decomposition of solid waste in landfills and is composed primarily of carbon dioxide and methane. By preventing emissions of methane (a powerful greenhouse gas) through developing landfill gas energy projects, LMOP helps businesses, States, energy providers, and communities protect the environment and build a sustainable future.
Natural Gas STAR	The Natural Gas STAR Program is a flexible, voluntary partnership between EPA and the oil and natural gas industry. Through the program, EPA works with companies that produce, process, and transmit and distribute natural gas to identify and promote implementing cost-effective technologies and practices to reduce emissions of methane, a potent greenhouse gas.

Program Name	Program Description
PFC Reduction / Climate Partnership for Semiconductors	EPA's PFC Reduction/Climate Partnership for the Semiconductor Industry supports the industry's voluntary efforts to reduce high global warming potential (GWP) greenhouse gas emissions by following a pollution prevention strategy. The greenhouse gas emissions of primary concern are perfluorocarbons, trifluoromethane, nitrogen trifluoride, and sulfur hexafluoride, collectively termed perfluorocarbons (PFCs). EPA's partners have committed to reduce PFC emissions 10 percent below their 1995 baseline by 2010.
SF <sub>6</sub> Emission Reduction Partnership for Electric Power Systems	The SF <sub>6</sub> Emission Reduction Partnership for Electric Power Systems is a collaborative effort between EPA and the electric power industry to identify and implement cost-effective solutions to reduce sulfur hexafluoride (SF <sub>6</sub> ) emissions. SF <sub>6</sub> is a highly potent greenhouse gas used in the industry for insulation and current interruption in electric transmission and distribution equipment. The most common use for SF <sub>6</sub> , both domestically and internationally, is as an electrical insulator in high voltage equipment that transmits and distributes electricity.
SF <sub>6</sub> Emission Reduction Partnership for the Magnesium Industry	The SF <sub>6</sub> Emission Reduction Partnership for the Magnesium Industry is a cooperative effort between EPA and the U.S. magnesium industry to better understand and reduce emissions of SF <sub>6</sub> , a potent greenhouse gas, from magnesium production and casting processes. In February 2003, EPA's Partners and the International Magnesium Association, committed to eliminate SF <sub>6</sub> emissions by year-end 2010. EPA's voluntary partnership with the magnesium industry is facilitating remarkable progress towards eliminating SF <sub>6</sub> emissions by identifying, evaluating, and implementing cost-effective climate protection strategies and technologies including alternative cover gases.
Voluntary Aluminum Industrial Partnership	The Voluntary Aluminum Industrial Partnership (VAIP) is an innovative pollution prevention program developed jointly by EPA and the primary aluminum industry. Participating companies (partners) work with EPA to improve aluminum production efficiency while reducing perfluorocarbon (PFC) emissions, potent greenhouse gases that remain in the atmosphere for thousands of years. PFCs are potent greenhouse gases, characterized by strong infrared radiation absorption and relative inertness in the atmosphere. Primary aluminum production is a major source of global PFC emissions.
WasteWise	WasteWise is a free, voluntary, EPA program through which organizations eliminate costly municipal solid waste and select industrial wastes, benefiting their bottom line and the environment. WasteWise is a flexible program that allows partners to design their own waste reduction programs tailored to their needs. Large and small businesses from any industry sector are welcome to participate. Institutions, such as hospitals and universities, nonprofits, and other organizations, as well as State, local, and tribal governments, are also eligible to participate in WasteWise.

Source: OIG program questionnaires, interviews with EPA program managers and, Websites of EPA Partnership Programs: [www.epa.gov/partners/programs](http://www.epa.gov/partners/programs).

## Appendix E

## ***Agency Comments and OIG Evaluation***

### **MEMORANDUM**

**SUBJECT:** Comments on the Office of Inspector General (OIG) Evaluation Report, “Voluntary Greenhouse Gas (GHG) Reduction Programs Have Limited Potential”

**FROM:** Robert J. Meyers  
Principal Deputy Assistant Administrator  
Office of Air and Radiation

Susan Parker Bodine  
Assistant Administrator  
Office of Solid Waste and Emergency Response

**TO:** Jeffrey K. Harris  
Director of Special Studies  
Office of Inspector General

The EPA Offices of Air and Radiation and Solid Waste and Emergency Response appreciate the opportunity to review and comment on OIG’s draft evaluation report “*Voluntary Greenhouse Gas Reduction Programs Have Limited Potential*” (Assignment No. 2007-000748). We appreciate OIG’s input on the important hurdles EPA faces in our efforts to address global climate change.

While we acknowledge the inherent challenges in implementing partnership programs, we also recognize that these programs have played a significant role in addressing climate change. Through these programs, EPA has been able to establish a substantial understanding of the policy, technical, and economic issues surrounding this multi-faceted problem, while achieving real, tangible greenhouse gas (GHG) emission reductions.

For all of the methane and high global warming potential (GWP) gas programs covered in this evaluation, OAR has been able to quantify baseline emissions and reduction opportunities, define and analyze available mitigation technologies and costs, formulate emission projections and define emission reduction targets, and quantify the outputs and outcomes of our efforts. In addition, OAR is doing this in a systematic and transparent way through our business planning process. For the two OSWER programs (WasteWise and the Coal Combustion Partnership Program (C2P2)), which achieve GHG reductions indirectly through source reduction, recycling, and more effective materials management, we also have been able to quantify GHG reduction benefits. We believe that our approach and rigor on these issues are not only unique within EPA, but also are rarely observed in government.

Most importantly, these programs have demonstrated that achieving greenhouse gas emission reductions is not only achievable, but can be cost-effective and realized in the near-term. In the U.S. today, methane emissions are 11 percent below 1990 levels and EPA expects that they will remain below 1990 levels through 2020. For the High-GWP gases, these partnership programs have also achieved significant emission reductions and industry partners are expected to maintain emissions below 1990 levels beyond the year 2010. In the case of our OSWER programs, in 2006, WasteWise partners who reported indicated a reduction in GHG emissions of 40.7 MMTCO<sub>2</sub>E and the C2P2 program recycling rate resulted in GHG emission reductions of 13.6 MMTCO<sub>2</sub>E. These are impressive achievements given the potential for sizable expansion in many of these industries.

Below are EPA's responses to OIG's specific recommendations.

**2-1. Review MAC analyses annually and update as needed based on the availability of updated cost and abatement technology information.**

- **Response:** OAR's current policy is to update the marginal abatement curve (MAC) analyses every two years. This decision was arrived at over the last decade based on our evaluation of the rate of technological change, the rate of change in other drivers of emissions, and the required resources. Our experience indicates that the underlying factors do not change significantly on an annual basis and that our industry sectors and mitigation technologies do not evolve at a rate faster than reflected in our MAC curves. We do agree, however, that it is prudent to continue to monitor this situation, and are prepared to act more frequently in specific situations where it is clear that our analyses are not providing accurate information. Therefore, OAR concurs with the OIG recommendation and will review our analyses annually and update them as needed and appropriate.

**OIG Response:** The Agency has accepted this recommendation.

**2-2. Develop applicable MAC analyses for GHG-emitting sectors where they do not exist, and/or work with EPA offices responsible for the corresponding voluntary GHG programs and share the methodologies and tools necessary for them to develop their own analyses.**

- **Response:** MAC analyses have not been developed for the two OSWER programs mentioned in the report – C2P2 and WasteWise. With respect to the C2P2 program, certain elements of this partnership program may be appropriate for the development of MAC analyses. Thus, OSWER will work with OAR to develop a MAC curve for this partnership program. (EPA notes that C2P2, like WasteWise, is different from other GHG programs, in that it does not directly seek reduced emissions from targeted sectors. Instead, C2P2 efforts are aimed, among other things, at substitution of coal ash for Portland cement, leading to less Portland cement production. In developing this MAC, we will focus on the costs associated with this substitution.)
- On the other hand, a MAC analysis is not feasible for the WasteWise program because of the

wide array of sectors and materials covered by the program. WasteWise addresses multiple sectors, including manufacturers, retailers, governments, and academic institutions. When WasteWise promotes source reduction and recycling in these sectors, it can lead to GHG savings in a wide range of industries, including mining, forestry, agriculture, transportation, manufacturing, and waste management. The materials targeted include metals, wood, paper, plastic, food, electronics, and similar materials. It is simply not possible to conduct a MAC analysis for such a wide range of materials, not the least because the curve will differ markedly from one part of the country to another (for example, because of differences in local markets, collection infrastructure, and disposal rates). Therefore, EPA strongly disagrees with the recommendation that it develop a MAC analysis for the WasteWise program. The task would not yield useful or meaningful information for managing the program.

**OIG Response:** The Agency concurred with Recommendation 2-2, but expressed concerns in developing MACs for programs, like WasteWise, that serve more than one sector. OIG recognizes the concern. Analyses for individual industry sectors served by EPA voluntary programs will meet the intent of the recommendation.

**3-1. For programs that recruit and enroll participants, implement written partnership agreements that require accurate data reporting and verification, assure participants that CBI data will be safe guarded and protected, and include consequences for non-reports.**

- **Response:** The Agency recognizes the critical importance of accurate data reporting and verification. Currently, as directed by Congress under the FY08 Omnibus Appropriations bill signed into law on December 26, 2007, OAR is in the process of developing a rule to require mandatory reporting of greenhouse gas emissions across all sectors of the economy. Pending publication of the draft rule and following the public comment period, the final rule will require these data to be submitted on at least an annual basis, according to methodologies to be specified for each sector. Requirements for data quality assurance / quality control and verification will also be included in the rule. The outcome of the rulemaking process will help to inform all of the voluntary programs' efforts to improve data accuracy. The Agency plans to review and amend our program requirements in light of what is learned from the mandatory rulemaking process
- On the specific question of partnership agreements, we agree with the recommendation that these programs have written partnership agreements, and we agree on the importance of accurate reporting within EPA's programs. As discussed later in this response, we believe the programs under review already require accurate data reporting and verification.
- Regarding the recommendation to "assure participants that CBI will be safeguarded and protected," EPA cannot offer blanket assurances to partners under the Clean Air Act given the complex legal issues surrounding the determination of CBI data. EPA's ability to protect information that partner companies may consider "business sensitive" is limited due to the Clean Air Act's requirement to disclose "emissions data" to the public. We recognize the importance of this issue, however, and have developed mechanisms to address issues related



to CBI as they are brought up by partners in our programs. For example, in situations where disclosure of company-specific data may inform competitors about a unique production process or level of activity, OAR's partnership programs may establish a mutually acceptable third party to act as a data repository and provide an increased level of confidentiality. OAR acknowledges that such third party reporting mechanisms can increase EPA's administrative burden, and may hamper its review of data quality, and these types of arrangements are uncommon in our programs. With respect to the two OSWER Programs, the Agency rarely receives information that is claimed as CBI, but when such information is submitted, we will protect it consistent with the Resource Conservation and Recovery Act's (RCRAs) CBI regulations.

- With respect to the importance of consequences for non-reporters, EPA programs have processes in place if partners do not report. For instance, the Gas STAR program has a clear, documented, three-step process to deal with late or non-reporters. The program follows this process rigorously and removes non-compliant Partners from the program. EPA does not accept new members to the WasteWise program who don't give baseline information, and WasteWise partners who don't report are not eligible for awards, recognition, or climate profiles. However, while EPA's voluntary partnerships have removed non-reporting partner companies on occasion, the programs typically exercise patience recognizing the firms' varying business challenges and the value of maintaining an industry sector network through which to share information on emission reduction technologies. EPA will review and amend our processes in these programs as appropriate.

**OIG Response:** The Agency generally concurred with Recommendation 3-1. It stated that, as directed under the FY08 Omnibus Appropriations bill signed into law on December 22, 2007, it is drafting a proposed rule concerning mandatory reporting of greenhouse gas emissions which will help improve data accuracy of these voluntary programs. With respect to consequences for not reporting, the Agency agreed to review and amend processes that address nonreporters in the programs as appropriate. The Agency did not fully concur with the portion of the recommendation relating to CBI assurances but recognized the importance of the issue. The Agency noted that for the two OSWER programs, CBI is protected consistently with CBI-RCRA regulations. However, the Agency stated that it cannot offer blanket assurances to safeguard and protect CBI data to its partners under the Clean Air Act. We amended our recommendation and ask the Agency to include a section on how CBI will be handled in its partnership agreements.

**3-2. For those programs that do not recruit and enroll participants, EPA should develop a policy or procedure that specifically identifies how voluntary GHG programs link their reported outcomes to the efforts of the program.**

- **Response:** The Agency acknowledges the importance of having robust, meaningful policies for reporting outcomes, especially for programs without formal participant / partner status. Many of the programs which fall into this category, such as the Coalbed Methane Outreach Program (CMOP), have in fact developed a standardized, documented procedure that

specifies how the program's annual reported outcomes are linked to the program's efforts. For example, CMOP's annual business plan documents the methodology by which the program assesses the emission reductions associated with coal mines on a mine-specific basis, linked to the extent of the program's historical association with and level of effort to promote particular coal mine methane recovery projects.

- We concur that having policies and procedures to link program results and outcomes is important. Therefore, EPA concurs with this recommendation, and we will review our programs that do not recruit and enroll participants in light of this recommendation and develop a procedure, or document existing procedures, as appropriate. Also, while C2P2 does enroll partners, partners do not make specific commitments (C2P2 members are generally not users of coal ash themselves; instead, C2P2 works to reduce barriers to coal ash reuse, or to increase opportunities for reuse). However, EPA will include C2P2 in this recommendation.

**OIG Response:** The Agency has accepted this recommendation.

Attached to this document are additional comments.

Thank you again for the opportunity to comment on the draft evaluation report. If you have questions, please contact Dina Kruger, Director of the Climate Change Division, at (202) 343-9039 or Vern Myers, Acting Associate Director of the Municipal and Industrial Solid Waste Division, at 703-308-8660.

## ATTACHMENT

*Additional Comments on OIG Report "Voluntary Greenhouse Gas Reduction Programs Have Limited Potential" Assignment No. 2007-000748*

### **General Comments**

- The study states that its focus is on voluntary programs that report GHG emissions reductions from (a) specific industry sectors that (b) do not release emissions from motor vehicles and fossil fuel combustion. However, the WasteWise program targets multiple sectors, and the C2P2 and WasteWise programs do not target direct emissions from fossil fuel combustion. Thus, we suggest that the report be revised by making note of this and expanding the criteria for including programs accordingly.

**OIG Response:** We believe our descriptions of the programs are adequate. On page 2 of the draft report, the WasteWise program is noted as serving multiple industry sectors. On page 4, the first paragraph under Scope and Methodology explains that programs were chosen because they report GHG emissions reductions. The second paragraph under Scope and Methodology states that C2P2 and WasteWise programs report achieving secondary GHG emissions reductions benefits.

- The report in other respects mischaracterizes the C2P2 and WasteWise programs. For example, the C2P2 program is not designed to sign up partners and measure the progress those partners have made. Rather, the C2P2 program was designed to increase the amount of coal combustion products that are reused/recycled, by reducing barriers to and increasing opportunities for coal ash recycling, which would have the benefit of reducing GHG emissions. (For example, as part of its contributions to C2P2, EPA works with state materials reuse programs to foster the beneficial use of coal ash, it provides technical advice on coal ash use to construction projects and engineers, and it works with the Federal Highway Administration (FHWA) and state DOTs to foster the use of coal ash in highway construction.)<sup>10</sup> Therefore, we suggest that the report more accurately characterize these programs.

**OIG Response:** Based on the data that OIG collected, we believe that we have appropriately characterized these programs in the report.

- WasteWise, C2P2, and several of the climate change programs in OAR have additional benefits besides reducing GHG emissions, such as resource conservation, air and water quality improvements, and energy benefits. In the case of the OSWER programs, however, the report only briefly mentions that the main purpose of these programs is resource conservation and not GHG emission reductions. The report would be improved by acknowledging these additional benefits.

**OIG Response:** We believe that the report adequately addressed this topic. The second paragraph under Scope and Methodology states that the C2P2 and WasteWise programs report achieving secondary GHG emissions reductions benefits and provides that the two programs are primarily waste reduction programs.

## Chapter 1 – Introduction

- On page 2, the report states that the industry sectors and emission sources addressed by these 11 programs had the potential to emit 547 MMTCO<sub>2</sub>E. However, this does not acknowledge that WasteWise targets many industry and commercial sectors, as well as governmental and academic institutions. It also addresses emissions indirectly. As a result, this figure may be an underestimate. The report could be strengthened by providing information on how this number was derived, as well as the limitations in deriving this value. Additionally, here and elsewhere in the report where the 11 sectors are mentioned, it should state that there are 10 specific sectors covered and acknowledge that WasteWise is a broad program targeting multiple sectors.

<sup>10</sup> EPA notes that C2P2 is part of a broader EPA effort with FHWA, USDA, states, and the Industrial Resources Council to increase the beneficial use of secondary materials from industrial processes, including coal ash, foundry sands, iron and steel slag, and construction and demolition debris.

**OIG Response:** We have removed the number “11” from the text of this section and in the footnote have added the following: "Because WasteWise addresses numerous sectors, the program's GHG emission volumes are not included in the 2005 potential GHG emissions volumes."

- On page 4, the report acknowledges that the majority of U.S. GHG emissions come from fossil fuel combustion for energy and transportation, and states that neither of these emission sources falls within the scope of this evaluation. However, many of the GHG benefits attributable to both WasteWise and C2P2 are attributable to reduced energy demand as a result of displacing virgin material extraction and manufacturing with recycled feedstocks. Therefore, it may be misleading to state that the report does not address energy and transportation emission sources. It does so at least indirectly, by evaluating the results of the WasteWise and C2P2 programs.

**OIG Response:** The statement indicating that GHG emissions from fossil fuel combustion are outside the scope of this study has been removed.

### **Chapter 3 – Reporting and Data Limitations Impede Assessment of Voluntary GHG Programs.**

- We strongly assert that all of OAR’s Non-CO<sub>2</sub> GHG programs have robust, transparent reporting methods, protocols, and systems in place to ensure the accuracy of our reported outcomes. Due to the inherent nature of voluntary programs, EPA *cannot mandate* that the companies or entities we are partnering with report comprehensive data to EPA. However, EPA can, and does for all of the Non-CO<sub>2</sub> Programs, strongly encourage participating entities to report detailed information and data on their activities to ensure that we are accurately accounting for their efforts and for the outcomes of our programs. In addition to auditing data for completeness and other QA/QC checks, training in some programs is routinely offered on data collection methods to better ensure consistency and accuracy of reporting. To this end, our Non-CO<sub>2</sub> programs have actually been world leaders in developing methodologies for calculating and reporting emissions and emission reductions.

**OIG Response:** Our report demonstrates that the Agency needs to strengthen weaknesses in data collection and reporting activities to ensure the reliability and accuracy of information provided to the public. We did not review the Agency’s methodology for calculating emissions levels. However, 8 out of 11 programs reviewed had specific weaknesses relating to the data used to report accomplishments, the sources, reliability, and transparency of data as it relates to specific programs. While our report acknowledges the inherent challenges of voluntary programs, we believe that the areas of data collection and reporting are critical to demonstrate the progress of these programs. As such, reporting that is anonymous and unverifiable in some cases in our opinion is not transparent. Additionally, when a program only receives annual reports from 12 percent of its participants, or when programs report results, without participants, or without the ability to verify third party data, the credibility of the data reported becomes an issue.

- OSWER’s partnership programs have similar approaches. WasteWise relies on direct reports from partners, which are not anonymous. EPA reviews reports from partners, and believes that our current approach to collection of data is appropriate for partnership programs. It allows us to demonstrate program results without creating a burdensome and intrusive process that might drive down participation while running up costs for partners and the Agency. With regard to the C2P2 program, the national data are a result of an extensive survey by the American Coal Ash Association and supplemental work by the Department of Energy. This information developed on a yearly basis, has been in the public domain for over a decade, and EPA is not aware of any significant challenges to the extent or soundness of this data.

**OIG Response:** Based on the information OIG collected, OSWER does not verify the accuracy of the data submitted at the participant level or provided by third parties. See our response to OAR's comment above.

- The first paragraph on page 12 begins with “EPA told us it agreed that...” Other sections of the narrative contain similar text (i.e., page 13: “the Agency told us...”). These give the mistaken impression that the authors are not also part of EPA. Thus, we suggest that the report would be strengthened by an editorial correction here.

**OIG Response:** The document indicates the author of the report is the EPA Office of Inspector General. The OIG is a part of the Agency; however, the OIG was created by Congress as an independent oversight organization.

- Also on page 12, the report states that “The inherent weakness of a voluntary program is that the decision to report is solely left up to the participant.” The report would be strengthened by a balancing statement, acknowledging the inherent strength of a voluntary program (e.g., implementation of environmentally beneficial strategies at a significant reduction in transactional costs to U.S. industry).

**OIG Response:** Our statement refers to the challenges of voluntary program data collection, and does not address the overall transaction costs of the participants.

- On page 12, the report also implies that these voluntary programs utilize the 1605(b) reporting requirements of the 1992 Energy Act and highlights some of the weaknesses of that approach. OAR emphasizes that the Non-CO<sub>2</sub> voluntary programs have long believed that the 1605(b) reporting protocols lacked the rigor necessary to ensure a robust accounting of our accomplishments. As such, none of the Non-CO<sub>2</sub> programs use the 1605(b) system. Each program has developed its own more rigorous and comprehensive methods and protocols that are specific to our target industry and greenhouse gas. WasteWise does not use the voluntary reporting under 1605(b). Rather, since 2005, EPA has required every new WasteWise partner joining the program to submit baseline data.

**OIG Response:** As a result of previous communication with the Agency, the OIG refocused its discussion of the Section 1605b requirements. We believe that we have been clear regarding the Agency's use of the 1605b requirements as a reporting framework. The report also mentions that EPA determined the inadequacies of the 1605b reporting format, and that the Agency has made improvements beyond the minimum requirements of 1605b.

- The IG report cites “a recent” review by the Office of Management and Budget (OMB) Program Assessment Rating Tool (PART) of EPA Climate Change Programs, which scored a zero for “data collection.” The report quotes the PART: “While EPA collects a lot of data ... on progress for certain programs / sectors and in those cases the programs / sectors clearly use the data to make resource and planning decisions this is not the case for all programs / sectors reviewed in this PART.” OAR strongly disagrees with this statement as it applies to the current performance of its programs under review by the IG in this report.
  - The PART assessment of EPA’s climate change programs covers 20 different programs. The assessment does not specify which of the 20 programs it reviewed are deficient in this regard, and cites no evidence to support this statement. Thus, OAR believes that it is impossible to say whether there is in fact any overlap between the PART critique of 20 climate change programs and the programs under IG review in this case.
  - Furthermore, the OMB PART review cited was conducted in 2004, and to OAR’s knowledge, has not been revised or updated since then. OAR is not aware of any recent review that scored these programs “zero” on data collection. In response to the 2004 report, OAR has provided annual updates of aggregate program metrics, as requested by OMB, and OAR has not received any communication from OMB that these annual updates are insufficient.

**OIG Response:** We revised the report to reflect the change from “recent” to “2004.” We have revised the report to read, “...the programs we reviewed for this evaluation were included in a 2004 Office of Management and Budget (OMB) PART (Program Assessment Rating Tool) review. The review examined 20 of EPA’s Climate Change Programs and, in the area of data collection, the programs received a collective score of zero.”

- The IG also cites the 2007 Greenhouse Gas Inventory in support of its conclusion that voluntary program data are incomplete. The scope of the U.S. Inventory is national greenhouse gas emissions from all sources. The IG report implies that deficiencies in data collection apply to the US emissions inventory and are relevant to the voluntary programs as well, citing the 2007 report in part: “in some cases, estimates are based on approximate methodologies, assumptions, and incomplete data.” OAR believes that this comment is misleading and inaccurate. The national inventory is far broader in scope than the 11 voluntary programs under review in this report, which represent only about 7.5% of national emissions. The U.S. Inventory is completed annually in accordance with treaty obligations under the UN Framework Convention on Climate Change. Prior to 2008, EPA did not have

legislative authority to compel reporting on emissions. Nonetheless, the U.S. Inventory is completed using methods prescribed by the Intergovernmental Panel on Climate Change to address incomplete data, and other challenges associated with estimating emissions across numerous sectors. Per the inventory reporting requirements under the UN Framework Convention on Climate Change, the U.S. Inventory is subject to annual peer reviews by panels of international greenhouse gas inventory experts. In February 2008, an international team of experts convened in Washington DC to peer review the 2007 Greenhouse Gas Inventory, and the experts' review findings complimented the excellent quality of the U.S. Inventory.

**OIG Response:** The report cites an example of how EPA results were qualified within the Annual Inventory as having data collection issues. This is an example of a data collection issue cited by the Agency. The statement in the draft report did not cite or project deficiencies to the total U.S. Greenhouse Inventory or its processes or collection methodologies as these were not in the scope of this review.

- On page 14, the report states that “The program manager for the WasteWise program told us that they have recently purged their program of non-reporting participants.” That sentence should be revised to read as follows: “WasteWise maintains a database of all partners, including those that do not report. The program recently purged its database of all partners no longer interested in participating in the program and is contacting non-reporting partners to encourage them to track their progress and submit reports.”

**OIG Response:** We modified the report to read, "The program manager for the WasteWise program told us that WasteWise maintains a database of all partners, including those that do not report. The program recently purged its database of all partners no longer interested in participating in the program and is contacting nonreporting partners to encourage them to track their progress and submit reports."

**Appendix F**

***Distribution***

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