Appendix A:

FINAL EVALUATION METHODOLOGY

Note: Evaluation Methodology Appendices are not included, focus group protocol and facility survey instrument can be found in Appendices C and E respectively.

IEc

EPA's WasteWise Program:

Final Evaluation Methodology

July 8, 2009

prepared for:

U.S. EPA OPEI Evaluation Support Division

prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

617/354-0074

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INTRODUCTION AND PURPOSE

The U.S. generates approximately 2.4 million tons of municipal solid waste (MSW) annually. Preventing and recycling these wastes conserves resources, reduces greenhouse gas emissions, and improves human and ecological health. In January 1994, EPA launched WasteWise—a partnership program designed to help businesses, government and non-profit organizations find practical methods for reducing municipal solid waste.

The WasteWise program has over 2,000 partners representing over 50 sectors, who commit to reduce and recycle MSW and select industrial and commercial wastes. Partners include large corporations, small and medium-sized businesses, schools, colleges, universities, hospitals, state and local governments, tribes, and other institutions. In addition, WasteWise has approximately 200 endorsers, mainly membership-based organizations, who recruit other organizations to become WasteWise partners and provide partners with ongoing information about WasteWise tools and events.

WasteWise uses a variety of approaches to encourage prevention, recycling, and use of recycled content municipal and industrial solid waste. WasteWise program activities include technical assistance (including calculation of the carbon benefits of avoided waste), public recognition and awards, and annual conferences. WasteWise partners have reported more than 120 million tons of waste reduced since the start of the program.

EPA's Office of Solid Waste (OSW) has initiated a program evaluation to assess WasteWise Program outcomes. The purpose of this evaluation is three-fold. A primary goal of the evaluation is to identify which WasteWise activities are most useful for improving waste management activities undertaken by different types of program partners. For example, partners in different sectors may find different types of information and program assistance more or less useful in meeting waste prevention and recycling goals, depending on the unique needs and challenges of their sector. This information will help EPA direct program resources toward activities with the greatest utility for different industry sectors.

A second purpose of this evaluation is to better understand the extent to which partner behavior regarding MSW management can be attributed to WasteWise participation. This involves first identifying factors outside of WasteWise that influence partner's waste management behavior, and then identifying and assessing changes in organizational behavior that can be linked to utilization of WasteWise approaches.

The third purpose of this evaluation is to identify potential methods for encouraging WasteWise partners to submit robust and consistent waste management tracking data. WasteWise partners are asked to submit baseline data and to report annually on achievement of their goals, but partners currently do not submit sufficient information to analyze with confidence. This evaluation will explore what EPA can do to encourage

WasteWise partners to submit sufficient environmental data for performance measurement and evaluation purposes.

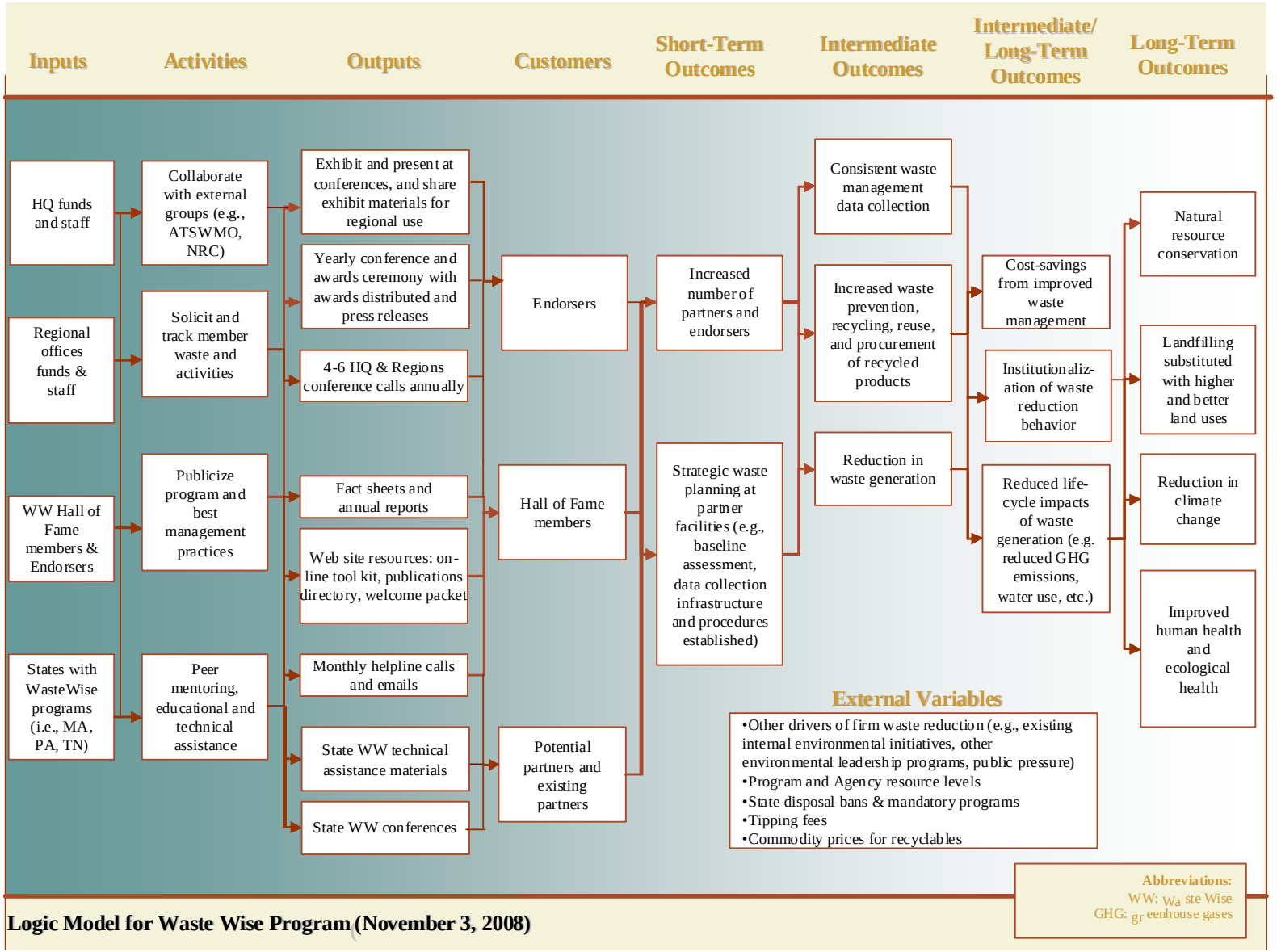
This report presents IEc's proposed methodology for evaluating the WasteWise Program. We begin by describing the components of the program, as illustrated through presentation of a program logic model. We then propose an overarching evaluation design and a series of tasks to gather and analyze data, interpret findings, and report results. The evaluation questions to be addressed are presented as key elements of our proposed methodology. Following this discussion, we propose a schedule for completing the evaluation. Draft focus group and survey materials are presented in the appendices.

PROGRAM LOGIC MODEL

To illustrate the various components of the WasteWise Program and to inform development of specific evaluation questions, EPA has developed a logic model (i.e., a graphical representation of the relationships between program inputs, outputs, and intended outcomes). As shown in Exhibit 1, the key components of the model include:

- **Resources** — the basic inputs of funds, staffing, and knowledge dedicated to the program.
- **Activities —** the specific procedures or processes used to achieve program goals. For example, WasteWise Program activities include technical assistance, collaboration with external groups, and publicity efforts.
- **Outputs —** the immediate products that result from activities and are often used to measure short-term progress. For example, EPA outputs include yearly conferences, fact sheets and reports, and WasteWise website resources.
- **Customers** — groups and individuals targeted by WasteWise Program activities and outputs. For example, EPA provides technical assistance and recognition to WasteWise partners and endorsers.
- **Short-Term Outcomes** — changes in awareness, attitudes, understanding, knowledge, and skills resulting from program outputs that are causally linked to the WasteWise Program. For example, EPA's outreach and publicity efforts result in recruitment of new partners and endorsers in the WasteWise program.
- **Intermediate Outcomes** — changes in behavior that are broader in scope than short-term outcomes. Intermediate outcomes often build upon the progress achieved in the short-term. For example, increased numbers of WasteWise partners and endorsers results in increased waste prevention, reuse, recycling, and procurement of recycled products.
- **Long-Term Outcomes** — the overarching goals of the program, which in this case include natural resource conservation, and better uses of land than as landfills.

EXHIBIT 1: WASTE WISE PROGRAM LOGIC MODEL



Logic Model for Waste Wise Program (November 3, 2008)

EVALUATION QUESTIONS

To develop and refine evaluation questions, IEc conducted an initial data and document review, and engaged in several discussions with EPA regarding the implications of our findings for scope of this evaluation. Subsequently, IEc and EPA finalized the evaluation questions that EPA seeks to answer through this project:

1. WasteWise uses a variety of approaches to influence the behavior of partners. Which approaches—for example technical assistance, information, awards and recognition—are most effective for which types of partners?
2. In addition to participation in WasteWise, what other factors may influence a partner organization's decisions to improve management of MSW (e.g., cost savings, consumer pressure, other voluntary program opportunities)?
3. What can be determined about how WasteWise participation contributes to partner behavior regarding MSW management (e.g., by effecting waste management improvements sooner, better incorporating waste management as a permanent feature of corporate culture, facilitating non-participant changes by providing information)?
4. What can EPA do to encourage WasteWise partners to submit sufficient environmental data for performance measurement and evaluation purposes?

PROPOSED STEPS IN CONDUCTING THE EVALUATION

The three broad steps anticipated for this evaluation involve: (1) collecting and analyzing data from *existing* WasteWise files and databases (2) collecting and analyzing information and data from literature review, focus groups, surveys, interviews, and best practices review (3) reporting results and conclusions. The discussion below describes our approach to each of these steps.

COLLECT AND ANALYZE DATA FROM EXISTING FILES AND DATABASES

Analysis of Files for Evaluation Question 1

EPA provided IEc with a variety of documents and data related to partners' use of WasteWise program activities and services, such as the WasteWise website, helpline, annual conference, and awards program. IEc reviewed these documents for relevance to Evaluation Question 1 (i.e., which program activities are most effective for which types of partners?). IEc evaluated each data source for evidence of utility to WasteWise partners, as well as information on who (i.e., what sectors) are looking for information provided by the resource.

Website Data

EPA tracks a variety of statistics, or "webstats" from the WasteWise website. EPA provided IEc with webstats from September 2007 through August 2008. One of the key statistics tracked in webstats is the number of times various files are download from the website. IEc identified the ten most commonly downloaded files between September 2007 and August 2008, as indicators of the most relevant content for WasteWise website users. Exhibit 1 displays the hyperlink for the ten most downloaded files, and the number of times each file was downloaded. The most popular file, "How to Start or Expand a Recycling Collection Program" indicates that this type of technical information is highly sought by website users. Not surprisingly, a large number of visitors downloaded the 2007 WasteWise Annual Report, the Assessment Form for reporting on WasteWise activities and progress, as well as the Partner Registration Form. This suggests that the website is an important resource for administrative and reporting information, in addition to technical assistance.

EXHIBIT 1: TEN MOST DOWNLOADED FILES FROM THE WASTEWISE WEBSITE

FILE NAME	HYPERLINK	DOWNLOADS
"How to Start or Expand A Recycling Collection Program"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/howtopdf.pdf	2,656
"WasteWise 2007 Annual Report"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/report07.pdf	2,177
"WasteWise Assessment Form"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/assess.pdf	1,763
"WasteWise Partner Registration Form"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/reg_part.pdf	1,296
"WasteWise Tip Sheet: Recycling Collection"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/collpdf.pdf	1,251
"WasteWise: Preserving Resources, Preventing Waste"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/fact-sheet.pdf	928
"WasteWise Update: Recovering Organic Wastes—Giving Back to Mother Nature"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/wwupda12.pdf	751
"WasteWise Update: The Measure of Success—Calculating Waste Reduction"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/wwupda11.pdf	536
"WasteWise 2006 Annual Report"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/report06.pdf	509
"WasteWise 2005 Annual Report"	http://www.epa.gov/epawaste/partnerships/wastewise/pubs/report05.pdf	407

Another useful statistic tracked by the WasteWise website is the most commonly used search phrases. By summing data on the number of times a search phrase was entered between September 2007 and August 2008, IEc identified the following most popular phrases:

EXHIBIT 2: MOST COMMONLY USED SEARCH PHRASES ON WASTEWISE WEBSITE

SEARCH PHRASE
assessment form (also, sample assessment form)
business/office cost savings
calculate waste
causes of global climate change
cost savings
cost savings for companies
crt glass
epa assessment form 1
food waste for the needy
going paperless
how to start a recycling program/company
logo for reduce
partner registration form
prioritizing activities
publication directory
recycle styrofoam foamed polystyrene fort worth
recycled content
recycled crt glass per ton prices
recycled logo download
recyclemania
recycling collection
sample baseline/baseline data questions
waste reduction
wastewise
wastewise logo
wastewise members
why measure

As shown in Exhibit 2, these phrases are a useful indicator of what web users are looking for on the website and more generally, what topics are of concern/interest to them. For example, several search terms relate to cost savings for businesses, suggesting that companies are interested in how participation in WasteWise can help them to save money. In addition, several search terms indicate that companies are looking for specific materials to download, such as WasteWise forms and various logos.

One key limitation of the WasteWise webstats is that they do not provide detail on the sectors that are using the various features of the WasteWise website. For this detail, we will rely on a focus group representing various WasteWise partner sectors.

WasteWise Conference Data

EPA provided IEc with a list of the 2007 WasteWise Annual Conference attendees, including sector information. Using this data, IEc identified the ten most represented industries at the 2007 conference as shown in Exhibit 3:

EXHIBIT 3: 2007 WASTEWISE CONFERENCE ATTENDEES BY INDUSTRY

INDUSTRY	NUMBER OF ATTENDEES
Federal Government	63
Local Government	27
Utilities	14
Consulting & Employment Services	12
Colleges and Universities	9
Motor Vehicles & Parts	9
State Government	7
Electronics & Electrical Equipment	6
Waste Management Services	5
Unknown	17

As shown in Exhibit 3, a large contingent of 2007 conference participants were federal and local government agencies. Utilities also had strong representation. Consulting services are primarily represented by EPA's WasteWise program support contractor, ICF Incorporated. In addition, the conference list shows that about 32 participants (~25% of all participants) were EPA employees, including 25 from EPA Headquarters. The majority of participants (about 95) were from the East (including the Mid-Atlantic, Northeast and Southeast), about 14 came from the Midwest, and about 23 were from Western states.

EPA also provided IEc with the 2007 conference evaluations, submitted by conference participants, as well as the minutes from the conference. IEc reviewed these documents for information on the types of WasteWise materials and activities that conference participants find useful (see discussion on Materials below). For example, the conference notes and evaluations indicate that the break-out session on building Wastewise communities was especially well-attended, and that it was useful to hear from community representatives who succeeded in establishing waste management programs. In addition, several participants stated that the opportunity to network with other partners, and learn about their experiences informally, was a valuable aspect of the conference. Several conference participants also indicated that the most useful WasteWise written materials are those that help quantify the economic and environmental benefits (especially GHG reductions) of WasteWise activities.

Helpline Data

EPA provided monthly correspondence logs in Excel format for May 2007 through August 2008. The monthly correspondence logs track the name and affiliation of the contact, the date of the inquiry, and the nature of the inquiry and response or action taken (for technical assistance inquiries only). All inquiries are coded as: program implementation question from a WasteWise member, data verification, program information request, technical assistance, request from WasteWise regional contacts, or a general waste/recycling inquiry.

At EPA's recommendation, IEc focused on assessing the technical assistance inquiries, and limited consideration to the past year (August 2007 to August 2008). In the past year, 43 technical inquiries were made. The technical inquiry log categorizes each inquiry by keyword. IEc grouped these keywords into categories to determine the subjects of the most frequent inquiries, as presented in Exhibit 4.

EXHIBIT 4: WASTEWISE HOTLINE TECHNICAL INQUIRIES BY ISSUE AREA (AUGUST 2007 TO AUGUST 2008)

KEYWORD/ ISSUE AREA	NUMBER OF TECHNICAL INQUIRIES
Inquiries on Specific Materials/Products	15
Recycling	14
Purchasing Recycled-Content Products	6
Other	6

As shown in Exhibit 4, the majority of inquiries relate to specific products (e.g., glass, paper, plastic, automobiles, etc.) and to recycling (in general and for specific products, especially plastics). A number of inquiries also related to purchasing recycled content product.

The technical inquiry logs also indicate whether the inquiry was made by a partner or non-partner. Of the 44 technical inquiries made in the past year, only 15 were made by WasteWise partners, while 29 were made by non-partners. This indicates that the hotline provides a useful service beyond the formal WasteWise membership base, and that the hotline facilitates information spillover into the non-member universe. Of the 15 inquiries made by WasteWise partners, half came from the federal government, the entertainment industry, and consulting and employment services:

EXHIBIT 5: WASTEWISE HOTLINE TECHNICAL INQUIRIES BY PARTNER INDUSTRY (AUGUST 2007 TO AUGUST 2008)

INDUSTRY	NUMBER OF INQUIRIES
Federal Government	3
Entertainment	3
Consulting & Employment Services	2
Rubber and Plastic Products	1
Retail & Mail Order	1
Restaurants & Food Service	1
Local Government	1
Industrial and Farm Equipment	1
Furniture Manufacturing	1
Building Materials	1

For all helpline inquiries, the monthly correspondence logs also indicate whether the inquiry was made via the helpline or through email. Tallying the data for the past year revealed that 1,272 inquiries were made via email, while 1,478 were made over the phone, indicating that both modalities are highly utilized.

Awards and Recognition

EPA provided IEc with data on all WasteWise award winners from 1997 to 2005. As an initial analysis, IEc tallied the number of award winners by industry in 2007 to determine the sectors that most actively participated in the awards program that year.

As shown in Exhibit 6, the most frequent recipients of WasteWise awards in 2007 were federal government partners, followed by the motor vehicles industry. Awards were widely distributed across other sectors.

EXHIBIT 6: WASTEWISE AWARD WINNERS BY INDUSTRY (2007)

INDUSTRY	NUMBER OF AWARDS IN 2007
Federal Government	5
Motor Vehicles	3
Electronics & Electrical Equipment	2
Schools K-12	2
Local Government	2
Furniture Manufacturing	2
Computers & Office Equipment	1
Restaurants & Food Service	1
Retail	1
Utility	1
Colleges and Universities	1
Printing	1
Entertainment	1
State Government	1

The 2007 WasteWise Conference evaluations provided additional information about the WasteWise awards program. For example, more than one participant in the conference reported in their evaluation that because the some of the same companies often win awards from year to year, it reduces the incentive for new companies to try to achieve recognition status. This is an issue that will be explored in more depth during subsequent phases of the evaluation.

Analysis of Existing Data to be Completed

The following tasks related to Evaluation Question 1 remain to be conducted using existing data:

- Conferences: Expanding our original analysis of 2007 conference attendees discussed above, IEc will analyze data on conference attendance in 2008. The

purpose of this analysis is to analyze attendee breakdown by sector over more than one year.

- Award Program: To discern trends in award recipients, IEc will analyze award recipients by sector and by company, from 1998 through 2008, using the WasteWise Award Winner spreadsheet provided to IEc.

Due to the lack of additional Helpline data, IEc will not conduct additional analyses of Helpline activity.

Analysis of Existing WasteWise Waste Data

Wastewise Databases

IEc reviewed WasteWise databases provided by EPA on CD. The Wastewise CD contained the wastewis.exe interface and the following five databases:

- Queries
- Reports
- Wiesprod
- WiesView
- Wiesweb

The interface spanning these five databases allows users to pull information for the entire universe of partners. However, the resulting reports only include a subset of information on each partner. Similarly, the query function is also based on pre-determined, and cannot be customized to answer new questions. Thus, the only way to create a customized query that contains information from multiple sources is to use the underlying MA Access databases, which is how IEc proceeded to analyze waste data.

The main database containing most of the relevant waste data is wiesprod. This database contains information on partners (in the WasteWise_COMP table), correspondence (in the WasteWise_CORR* tables), and baseline and annual data (in the wiesAssessment* tables). Partner information is frequently coded in the tables; therefore, extensive queries are often necessary to review partner information. For example, to determine if U.S. Postal Service - Seattle, WA Bulk Mail Center has reported any baseline or annual data, the user must first look in the WasteWise_COMP table to determine the company code, and then look in wiesAssessmentRoot to see if there are any records for the facility. Or, the user must create a query to link the WasteWise_COMP table to the wiesAssessmentRoot table so that the company code and facility name are both available.

In the wiesAssessmentRoot table, data are difficult to interpret. The distinction between baseline and annual data is made in the column "ThisDataIs." This column contains an explanation that an entry of "1" denotes annual reporting, and entry of "0" or "2" denotes baseline data. The majority of columns lack code explanations; therefore is difficult and sometimes impossible to decipher the types of information contained in the wiesAssessmentRoot table. For example, entries of "1" and "2" in the column "PoundsorTons" lacked descriptions to help users understand the information reported. Only by comparing Performance Track Annual Performance Reports to the Wastewise data were we able to decipher that "1" indicated pounds and "2" indicated tons.

Given the nebulous nature of the WasteWise databases, IEc cannot be completely confident of our assessments of data runs that we conducted to inform the development of this methodology. However, we are confident that we understand enough about these data to determine that they are not suitable for aggregation, as explained below.

Existing Waste Data Reported to WasteWise

As baseline reporting was not a mandatory component of the WasteWise program until 2005, and annual reporting remains voluntary, limited partner waste data have been reported to WasteWise. Moreover, for partners that are reporting, most have only began to report within the last couple of years, so trend data are not available for the vast majority of WasteWise partners. Exhibit 7 illustrates that 85 percent of all data reporting, including baseline and annual data, were reported in 2005 through 2008.

EXHIBIT 7: WASTEWISE TOTAL REPORTING BY YEAR— BASELINE AND ANNUAL REPORTING RECORDS

YEAR	COUNT OF RECORDS	% OF RECORDS
2000	1	0%
2003	1	0%
2004	170	14%
2005	249	20%
2006	217	18%
2007	443	36%
2008	138	11%
Total	**1,219**	**100%**
*Percents may not add to 100 due to rounding.		

A total of 663 partners, current and past, have reported data to WasteWise, generating the 1,219 records noted above. The number of records exceeds the number of partners because many of the same partners reported annually in multiple years. Of those 663 partners, 267 provided only baseline data, and 234 provided only annual data. It is not clear if these are partners are all current partners, or if some of these may have been partners that left the program; answering this question using the database would require significant effort to manually manipulate the data, and as such, IEc has not conducted this analysis.

WasteWise currently has 2,197 partners, as communicated on the program website. However, the database contains 11,835 records for current and former partners; if accurate, this would mean that WasteWise has 9,638 former partners. This number seems very high, and is likely a result of record keeping problems; the real number is likely far lower.

Given that we do not have complete information on the number of former WasteWise members, or the membership status of reporters, we can only estimate a range of the proportion of reporting partners. Only 162 partners reported both baseline and annual data necessary for trend analysis, which we estimate as between one and seven percent of the partner universe. Even the high end of this range, seven percent, is too low to enable extrapolation of these data to the entire WasteWise universe. As such, analysis of waste data is precluded by low frequency of reporting.

EXHIBIT 8: PROPORTION OF WASTEWISE PARTNERS REPORTING

REPORTING TYPE	NUMBER OF PARTNERS REPORTING	% OF 11,835 PAST AND PRESENT PARTNERS — LOW ESTIMATE	% OF 2,197 CURRENT PARTNERS - HIGH ESTIMATE
Baseline Only	267	2%	12%
Annual Only	234	2%	11%
Both	162	1%	7%
Total	663	N/A	N/A

In addition to low reporting rates overall and a concentration of reporting in recent years, WasteWise does not have standardized data reporting rules or impose rigorous data quality standards, MSW data reported to WasteWise are not of sufficiently high quality to be used with confidence in the context of a program evaluation. For example, WasteWise does not require reporting at standard increments of time, and does not require that partners report on a facility-wide basis. Hence, we suspect that waste data reported to WasteWise are incomplete in many cases.

Given the issues discussed above, IEc does not recommend further analysis of the general universe of WasteWise waste generation data to inform the evaluation.

Existing Waste Data for USPS facilities

The U.S. Postal Service is an important WasteWise member. Some USPS facilities joined the program in its earliest years. The earliest members to join in 1997 were U.S. Postal Service - Northeast Area, U.S. Postal Service - Greater Indiana District, and U.S. Postal Service - South Florida District. The majority USPS partners joined at the district level over the past few years. Due to their prominence in the program and the lack of

EPA restrictions on collecting additional data from USPS facilities, IEc investigated the potential to analyze existing USPS data reported to WasteWise, as well as to collect additional data from USPS members via survey.

While USPS partners have provided some waste data to WasteWise, the incomplete and inconsistent nature of these data preclude analysis. Also, WasteWise USPS partners have reported at varying scales; while most current data reported are currently at the district level, some current data are at the facility level and much of the historical data are at the facility level. Data on different scales cannot be aggregated, further limiting available data.

IEc researched whether existing data on USPS waste generation are available from other published sources. USPS's own online information about waste management are reported at a very broad scale, and are not broken down at a district or facility level.

Some USPS WasteWise partners are also members of EPA's Performance Track program, where they are required to report facility-level, comprehensive waste data. However, since Performance Track membership is on a facility basis, it is not possible to use Performance Track data as a proxy for WasteWise data in most cases (since most WasteWise partners report at the district level).

For a few facilities, IEc was able to compare USPS data reported to WasteWise and Performance Track, and found inconsistencies. For example, we found that the data provided for Seattle Bulk Mail Center does not match data reported to Performance Track. Data reported to WasteWise indicate that the Seattle Bulk Mail Center had 0 tons waste prevention and 640 tons of recycling in 2007, while data reported to EPA's Performance Track Program indicates that in 2007, 713 tons of non-hazardous waste were reused or recycled off-site. For 2006, WasteWise data indicate that Seattle Bulk Mail Center sent 776 tons of waste to a landfill or incineration, while the facility reported to Performance Track that 127 tons of non-hazardous waste was sent to landfill and 776 tons were reused or recycled off-site. It is unclear why these discrepancies exist.

Surveying USPS to Collect Waste Data

Given the limitations of existing data of WasteWise USPS facilities, IEc previously explored the potential for collecting comprehensive MSW data for USPS facilities by conducting a survey at the district level, the level at which most USPS partners currently enter at and submit baseline data. There are approximately 80 USPS districts, and all of them have now joined WasteWise. District-level staff could theoretically provide MSW generation and management trend data at the district level that they would aggregate from information at the facility level. Each district has several facilities included, ranging from post offices to processing and distribution facilities. Ideally, IEc would have access to the facility-level information underlying district data provided, for data quality review purposes.

This survey exercise would be daunting for any organization with so many facilities, but IEc is especially concerned with the ability of USPS to provide these data. USPS reporting for the Performance Track program has been a challenge, requiring extensive technical assistance from EPA and IEc to assist USPS facilities in reporting accurate and

consistent data on MSW generation and management. Examples include facilities that report all MSW in one year and selected MSW waste streams in other years; and facilities that have difficulties estimating quantities of waste sent to landfill, recycling, etc., particularly for specific waste streams (e.g., cardboard). Moreover, recent conversations with USPS WasteWise contacts indicate that the postal service is undergoing a time of severe stress and downsizing, and would not support any data collection efforts that imposed significant time burden on District staff, which this kind of survey would.

Additionally, IEc and EPA have raised questions about transferability of USPS data to the larger WasteWise universe. EPA was interested in collecting data from USPS because as a federal partner, ICR restrictions on data collection do not apply. However, in the context of characterizing the contribution of the WasteWise program to partner improvements in MSW management, the value of collecting extensive data from USPS is informed by the extent to which USPS data are transferable to the full universe of WasteWise partners. Given the large membership of WasteWise beyond USPS, and the diversity of industrial sectors in the WasteWise membership, extrapolating the findings of an analysis of USPS partners to the general universe of WasteWise partners would be speculative.

Given these circumstances, IEc and EPA have decided not to pursue a quantitative analysis of USPS MSW data. Alternatively, as discussed in the "USPS Survey" section below, IEc is proposing to conduct a survey of USPS that focuses on changes in waste management methods after entrance into WasteWise.

NEW DATA COLLECTION EFFORTS

In addition to using existing files and data sources, IEc will undertake new data collection efforts to support this evaluation. These new efforts will include:

- Literature review related to evaluation questions 2 and 3
- Focus group related to evaluation questions 1 and 3
- Surveys of USPS district and facility staff related to evaluation question 3
- Interviews with USPS HQ and area staff related to evaluation question 3
- Review of data collection and quality control practices related to evaluation question 4

Literature Review

Two separate targeted literature reviews will form a key part of the methodology for two of the evaluation questions:

- Question 2: In addition to participation in WasteWise, what other factors influence a partner organization's decisions to improve management of MSW (e.g., cost savings, consumer pressure, other voluntary program opportunities)? A literature review will form the central approach to addressing this question.

- Question 3: What can be determined about how WasteWise participation contributes to partner behavior regarding MSW management (e.g., by effecting waste management improvements sooner, better incorporating waste management as a permanent feature of corporate culture, facilitating non-participant changes by providing information)? A literature review focusing on measurable changes in materials and waste management in the air delivery and freight services sector will support the analysis of materials management changes at the United States Postal Service.

Below we discuss the literature review methodology in more detail for each of these questions.

Question 2 Literature Review

Evaluation Question 2 represents an initial step in the attribution of WasteWise benefits, or identifying beneficial impacts specifically resulting from WasteWise. It is important to identify and correct for external factors that are unrelated to WasteWise program design but may drive participation in WasteWise and program performance. These factors include, for example:

- Regulatory requirements in other markets (e.g., European Union directives or some State regulations);
- Participation in other voluntary programs;
- Changes in technical requirements by significant customers or suppliers; and
- Market volatility that changes production levels.

Some other external factors, such as corporate public image issues and cost savings, can also be external drivers. However, to the extent that program design effectively addresses a need (such as documenting change in practice to satisfy shareholders or identifying a cost savings opportunity that would have been overlooked) the WasteWise program could still provide significant value.

A significant body of literature exists on the reasons that companies join partnership programs, and the impact of external factors (e.g., threat of regulation) on program performance. As part of a separate project addressing attribution methodology, IEc recently developed a Draft Literature Review of Approaches to Estimating Attribution of Voluntary Program Benefits (Memorandum submitted to EPA Office of Solid Waste, February 25, 2008), attached here as Appendix A. To address Evaluation Question 2, IEc will update this literature search with information published in 2008, and will use the body of information to develop an inventory of the main external factors that influence organizational behavior related to MSW management. To identify recent publications pertinent to the evaluation, IEc will employ the following search engines: Dialog, EconLit, EPA, Environmental Valuation Reference Inventory (EVRI), Social Sciences Research Network (SSRN), National Bureau of Economic Research (NBER), EBSCOhost, and a targeted search for authors.

The inventory will identify key factors that affect program participation and achievement, and will provide the following information about each factor:

- A focused description of the specific type of impact it may have on WasteWise performance; and
- Examples, if available, of methods used to measure and adjust for the factor.

The outcome of this assessment will be a descriptive resource designed to assist EPA in isolating and measuring impacts due to the WasteWise program.

Question 3 Literature Review

Once the key external factors (e.g., other than WasteWise) that influence behavior are identified in Question 2, Question 3 is designed to consider the leverage points specific to WasteWise, and identify key questions for assessing the impacts specifically associated with WasteWise participation. We will look for evidence of changes in corporate culture tied to utilization of WasteWise approaches, such as:

- Analyzing the carbon footprint of facility waste using WatsteWise tools, and making changes to reduce waste to reduce that footprint.
- Increased employee awareness of MSW management, cost implications, and methods of improvement after utilizing WasteWise technical assistance.
- Faster and/or formalized communication of MSW management techniques within a partner company after WasteWise participation.
- Better inventory and tracking of MSW to report to WasteWise.
- Standardizing use of financial analysis techniques (i.e., net present value and internal rate of return) to systematically evaluate waste management opportunities, which can lead to faster improvements.
- Changing policy to mandate implementation of waste management projects that meet a net present value or payback threshold, which can lead to faster improvements, or to give higher priority to environmental projects overall.
- Transferring information on waste management provided by WasteWise to others in the industry (e.g. information spillover).

As part of this evaluation, IEc will implement a survey of USPS partners to collect information on these potential effects within USPS. An initial step in the survey design is completion of a two-pronged literature search identifying both reliable indicators of corporate cultural shifts, and empirical information about specific activities among corporations in the air transport and freight services sector:

- Using program evaluation and corporate responsibility literature (again building on the existing 2008 Draft Literature Review of Approaches to Estimating Attribution of Voluntary Program Benefits), we will identify the types of changes in corporate behavior that have been successfully used to document a significant beneficial change in materials and waste management; and

- Using a search of corporate and industry literature, we will document specific efforts to improve waste and materials management at individual companies in the air transport and freight services (e.g, FedEx, UPS), emphasizing articles and studies that feature measurement of specific impacts.

In addition to accessing the academic search engines and data sources considered in responding to Question 2, the literature search for Question 3 will search the following data sources:

- Company websites and publications, including FedEx, UPS, DHL, and USPS;
- Government websites, including EPA (e.g., the Smartway program); NTIS, and State transportation agencies;
- Trade associations, including Express Delivery and Logistics Association and Global Trade and Logistics; and
- Research organizations, including the Transportation Research Board, University Transportation Centers, and the Transit Cooperative Research Program

The results of this targeted literature search will serve two purposes in support of the survey.

First, an initial review of the literature will inform the development of questions both for a cross-sector focus group to solicit information on WasteWise contribution to improved waste management outside of USPS partners, and for questions on the survey developed to specifically identify corporate culture and process changes implemented at the USPS.

In addition, the detailed results of the literature review will provide a data source to support interpretation of the results of both the focus group exercise and the survey. We will compare survey and focus group results directly to results and patterns documented in the literature to enhance our ability to explain and validate the results. We will also use company specific materials qualitatively to provide contextual and anecdotal support for explanations and responses provided by participants in both the survey and the focus group.

Focus Groups

IEc will conduct a focus group to collect additional data for answering evaluation questions 1 and 3. We first discuss the criteria used to select sectors for participation in the focus group. We then discuss the criteria used to recommend specific companies from each sector for participation in the focus group. Finally, we describe the proposed focus group procedure and analysis of results.

Selection of Focus Group Members

IEc is recommending a set of eleven sectors for inclusion in the focus groups, with one company or organization to represent each sector, for a total of eleven participants. We make this recommendation because the Paperwork Reduction Act limit us to a total of nine non-federal participants (2 of the participants recommended are federal, for a total of

eleven participants). Moreover, larger focus groups can be unwieldy and are less likely to capture perspectives from all members.

We selected recommend sectors using a series of criteria. The primary criterion used to select the sectors is a high level of participation in WasteWise. To determine the highest participating sectors, we queried the online WasteWise Membership Listing to obtain a count of the number of WasteWise partners by sector.[1] We defined a high-participation sector as one with a minimum of 40 partners in the program. Of the 18 sectors that had 40 of more partners, we selected the top five for inclusion in the focus groups:

- Local Government
- Colleges & Universities
- Consulting & Employment Services
- Waste Management Services
- U.S. Postal Service[2]

We selected the remaining six sectors for inclusion in the focus groups using a blend of two additional criteria: sector type and average quantity of waste generated by facilities in each sector. We characterized each sector as belonging to one of the following sector types: government, institutional (e.g., schools and NGOs), services, or production/ manufacturing. In addition, we obtained data from the WasteWise database on the quantity of waste generated by each sector in 2007.[3] We then chose sectors with the highest average waste generation per facility (calculated as the total waste quantity per sector divided by the number of partners generating that waste). Finally, we aimed to ensure adequate representation of all sector types.[4] For example, if two sectors had roughly equal waste generation quantities but different sector types, we selected the sector type with less representation in the final set. In addition, we tried to achieve some diversity within sector types (e.g., if two production/manufacturing sectors made products in the same general category, such as automotive/vehicle parts, we selected only one of those sectors).

Exhibit 9 presents the eleven sectors selected for inclusion in the focus groups, the associated data for each sector, and a summary of the rationale for selection.

[1] Accessed at: http://wastewise.tms.icfi.com/wisesearch/search.asp on January 15, 2009.

[2] One sector, the Federal Government, contains a total of 146 partners; we divided this sector into the USPS (86 partners) and other Federal Government partners (60 partners).

[3] We analyzed data only for WasteWise partners that are flagged as currently active in the database.

[4] For each sector, we looked at average waste generation per facility instead of total waste generation by sector to normalize the reported waste generation data. Not all partners reported waste generation in 2007, so straight sector totals would not have been easily comparable. By diving sector waste totals by the number of reporting partners, we account for the variability between sectors in the number of partners reporting waste generation.

EXHIBIT 9: SECTORS RECOMMENDED FOR INCLUSION IN FOCUS GROUPS

SECTOR	NO. OF PARTNERS	SECTOR TYPE	AVG MSW QUANTITY REPORTED PER PARTNER (LBS)	RATIONALE FOR SELECTION
Local Government	174	Government	3,680,658	Very high participation in WasteWise
Colleges & Universities	131	Institution	1,117,365	Very high participation in WasteWise; provides an example of the institution sector type
Consulting & Employment Services	126	Service Sector	36,060	Very high participation in WasteWise
Waste Management Services	94	Service Sector	10,819,119	Very high participation in WasteWise
US Postal Service	86	Service Sector*	41,945,333	Very high participation in WasteWise
Electronics & Electrical Equipment	67	Production/ Manufacturing	1,084,962	Provides another example of a private production/ manufacturing sector type; provides diversity within production/ manufacturing sector type
Printing & Publishing	64	Production/ Manufacturing	10,559,959	Large quantity waste generator; provides diversity within production/manufacturing sector type
Federal Government (Other)**	60	Government	4,766,288	Provides another example of government sector type
Utilities	53	Production/ Manufacturing	16,247,978	Very large quantity waste generator; provides diversity within production/manufacturing sector type
Entertainment	45	Service Sector	46,848,591	Very large quantity waste generator; provides another example of a private service sector type
Motor Vehicle & Parts	42	Production/ Manufacturing	69,513,940	Very large quantity waste generator; provides diversity within production / manufacturing sector type

Source:
EPA, "WasteWise Membership Listing," accessed at: http://wastewise.tms.icfi.com/wisesearch/search.asp

Notes:
*More closely represents a service sector than government sector
**Excludes the U.S. Postal Service

From the eleven sectors selected for the focus groups, IEc recommends using the following criteria for selecting specific companies/facilities to participate in the focus groups:

1. High-quantity waste generators
2. A diversity of recent and long-time WasteWise members
3. Diversity in awards and recognition (e.g., some companies that have received one or more awards and others that have not)
4. Diversity in reporting behavior (e.g., some companies/facilities that regularly report to WasteWise and some that do not).

Recommended Focus Group Participants

IEc used information from the Waste Wise database to identify a set of companies/facilities from each sector to participate in the focus group. Each set includes the highest quantity (reporting) waste generators from each sector, with both long and short membership durations.[5] In addition, each set includes three companies that have long membership durations but have never reported to WasteWise. Exhibit 10 presents IEc's company/facility recommendations for each sector.

[5] Depending on the number of reporting partners in each sector, each set includes a minimum of five and a maximum of eight recommendations.

EXHIBIT 10: RECOMMENDED PARTNERS FOR INCLUSION IN FOCUS GROUPS

COMPANY NAME	WASTEWISE COMPANY CODE[a]	LENGTH OF MEMBERSHIP (YEARS)	QUANTITY MSW GENERATED IN 2007 (LBS)	EVER FILED ASSESSMENT REPORT?[b]	TOTAL AWARDS
LOCAL GOVERNMENT					
City of Newport News, VA	3935	12	24,236,001	Yes	0
Los Angeles World Airports - LAX	10170	4	23,676,485	Yes	0
Multnomah County, OR	10554	2	2,272,050	Yes	0
City of Clifton, NJ	3044	11	Not Reported	Yes	9
King County, WA	3031	12	Not Reported	Yes	5
Greenville County, SC	2357	12	Not Reported	No	1
City of Allentown, PA	136	12	Not Reported	No	0
City of Springfield, MO	5147	11	Not Reported	No	0
COLLEGES & UNIVERSITIES					
Eastern Illinois University	1681	12	2,550,927	Yes	4
Keene State College	2955	12	1,542,165	Yes	0
Youngstown State University	6193	7	2,675,330	Yes	2
Washington and Lee University	10285	3	1,783,486	Yes	0
University of West Florida	10822	2	2,016,575	Yes	0
University of Colorado at Boulder	5650	15	Not Reported	No	0
Seattle University	4921	13	Not Reported	No	7
Georgetown University	2232	13	Not Reported	No	0
CONSULTING & EMPLOYMENT SERVICES					
Management and Engineering Services	8901	7	104	Yes	0
PRIZIM Inc.	9346	6	2,507	Yes	0
Davis, Polk & Wardwell	11097	2	595,463	Yes	0
CDM	10802	2	152,418	Yes	0
Carlton Fields	10815	2	117,821	Yes	0
Patrick Engineering, Inc.	4268	15	Not Reported	No	0
The Sear-Brown Group, Inc.	5443	15	Not Reported	No	0
Kelly Services, Inc.	2981	13	Not Reported	No	0
WASTE MANAGEMENT SERVICES					
Kessler Consulting, Inc.	8147	9	5,838	Yes	3
California Recycles, Inc.	11464	2	27,210	Yes	0
Inland Empire Regional Composting Authority	11595	2	15,041	Yes	0
City Scrap and Salvage Company	1113	14	Not Reported	No	0
FBN Enterprises	1937	13	Not Reported	No	0
Steel Recycling Institute- Western Region Office	5202	12	Not Reported	No	0
US POSTAL SERVICE					
U.S. Postal Service - Northeast Area	5798	12	14,932,913	Yes	7
U.S. Postal Service - Atlanta District	6230	11	3,280,989	Yes	0

COMPANY NAME	WASTEWISE COMPANY CODE[a]	LENGTH OF MEMBERSHIP (YEARS)	QUANTITY MSW GENERATED IN 2007 (LBS)	EVER FILED ASSESSMENT REPORT? [b]	TOTAL AWARDS
U.S. Postal Service - Alabama District	6229	10	4,591,560	Yes	7
U.S. Postal Service - Sacramento District	7756	9	2,004,452	Yes	1
U.S. Postal Service - Southwest Area Office	11105	2	1,504,120,946	Yes	0
U.S. Postal Service - Headquarters	5796	12	Not Reported	No	0
U.S. Postal Service - San Francisco District	9706	5	Not Reported	No	0
U.S. Postal Service - Kentuckian District	9676	5	Not Reported	No	0
ELECTRONICS & ELECTRICAL EQUIPMENT					
Maytag Corp. - Jackson Dishwashing Products Division	6403	15	691,896	Yes	0
Micron Technology, Inc.	7868	9	3,224,835	Yes	0
Lexmark International, Inc.	9426	6	1,478,050	Yes	2
General Dynamics - Lincoln Operations	10874	2	156,850	Yes	0
Motorola, Inc.	3722	15	Not Reported	Yes	3
Mitsubishi Electric America, Inc.	3661	15	Not Reported	No	0
Sharp Electronics Corp.	4964	12	Not Reported	No	0
PRINTING & PUBLISHING					
FedEx Kinko's	3040	12	52,543,958	Yes	1
Crossroads Sign & Graphic	11179	2	28,195	Yes	0
Fetter Printing Company	11976	1	227,644	Yes	0
Welcome Wagon	2247	15	Not Reported	No	0
Buckley's Quality Print Center	744	14	Not Reported	No	1
R. R. Donnelley & Sons Company	4769	13	Not Reported	No	0
FEDERAL GOVERNMENT (OTHER)**					
Sandia National Laboratories - New Mexico	4829	12	3,068,919	Yes	7
The Presidio Trust	7733	9	8,473,215	Yes	2
Federal Correctional Institution - Fairton	7775	9	1,421,394	Yes	0
National Institutes of Health	11536	2	16,414,973	Yes	0
Maxwell Air Force Base	3442	12	Not Reported	No	0
Internal Revenue Service - Andover, MA	7185	10	Not Reported	No	0
Bureau of Land Management - OR District Office	7973	9	Not Reported	No	0
UTILITIES					
Public Service Enterprise Group (PSEG)	4492	15	17,975,048	Yes	9
Commonwealth Edison Company	1235	15	11,772,253	Yes	0

COMPANY NAME	WASTEWISE COMPANY CODE[a]	LENGTH OF MEMBERSHIP (YEARS)	QUANTITY MSW GENERATED IN 2007 (LBS)	EVER FILED ASSESSMENT REPORT? [b]	TOTAL AWARDS
Constellation Energy - Baltimore Gas & Electric Company	458	15	10,917,511	Yes	10
Chehalis Power	11578	2	11,431	Yes	0
Florida Power & Light Company	2033	15	Not Reported	No	0
Northern States Power Company	3987	15	Not Reported	No	0
PECO Energy	4281	15	Not Reported	No	0
ENTERTAINMENT					
The Walt Disney Company	5946	15	321,619,163	Yes	14
Kroenke Sports Enterprises	11256	2	1,923,390	Yes	0
Chumash Casino Resort	10728	1	2,841,116	Yes	0
Mission Ridge Mountain Corp.	3645	15	Not Reported	No	0
Sedgwick County Zoo	6714	10	Not Reported	No	0
MPD Inc.	3732	13	Not Reported	No	0
MOTOR VEHICLE & PARTS					
General Motors Corporation	2204	15	697,350,580	Yes	6
DaimlerChrysler Corp.	1042	15	48,323,067	Yes	1
Guardian Automotive - Ligonier Plant	2395	13	639,753	Yes	8
Eaton Corporation - Kearney	8515	8	14,550,829	Yes	0
Fitzgerald Auto Malls	11920	1	1,531,768	Yes	0
Nissan North America, Inc. - Corporate Training	7372	10	Not Reported	No	0
Shaull & Ullerich Body Shop	8113	9	Not Reported	No	0
Toyota Technical Center	8298	8	Not Reported	No	0

Notes:

a. WasteWise company code is a unique numerical identifier in the WasteWise database for each member company.

b. To determine if a WasteWise member had ever filed an assessment report, we queried the database table "wiesAssessmentRoot" for the company code. If it did not appear in this database table, we assume the member has never reported to WasteWise.

Focus Group Procedure and Analysis

From each sector presented in Exhibit 10 above, EPA has provided IEc with first and second choices to participate in the focus group. In general, IEc will use EPA's first choice for focus group participation; if the first choice is not available for a given sector, IEc will move onto the second choice. However, IEc will contact two or three of EPA's second choices first, as EPA did not select first choices that never submitted an assessment report.

EPA and IEc will work together to select a focus group date and secure meeting space. IEc will contact focus group representatives at least six weeks prior to the focus group date. IEc will explain that we are conducting an evaluation of the WasteWise program for EPA, and using a focus group as a means to collect information on how WasteWise activities and tools serve partner organizations. IEc has finalize the draft focus group protocol and information sheet for participants (attached here as Appendix B). The focus group protocol details the focus group procedure and includes focus group questions. IEc will develop a final list of focus group participants, name tags, and information sheets prior to the focus group. IEc Principal Andy Schwarz will moderate the focus group given his extensive facilitation experience. One or more members of the evaluation team from IEc will also attend. The focus group is designed be completed within two and a half hours.

IEc plans to record the focus group as well as take notes. After the focus group, IEc will synthesize responses to each question, and develop a focus group summary that identifies key findings. To the extent possible, we will summarize findings by sector or any other applicable category (e.g., findings by service sector versus manufacturing sector; newer partners versus established partners). When developing the final evaluation report, we will consider focus group findings within the context of results from the other methods employed for this evaluation (i.e., WasteWise data review, literature review, and findings from USPS survey and interviews), to draw conclusions on Evaluation Questions #1 and #3.

USPS Survey

As discussed above and in previous memoranda, current waste data collected by WasteWise are not robust enough to support performance measurement and program evaluation. Specifically, existing data do not provide enough information on the effects of the WasteWise program on changing waste management attitudes, behaviors, and outcomes with partner firms and facilities. As such, IEc plans to conduct a survey of WasteWise partners to provide information about these impacts.

Due to constraints under the Paperwork Reduction Act, EPA cannot survey most program participants without undertaking an ICR process. However, EPA can conduct surveys within the federal family. Because USPS is a very active partner in the WasteWise program, IEc recommends conducting a survey of USPS facility managers and district managers to attempt to qualitatively and quantitatively discern effects of WasteWise membership on waste management behavior within USPS. We will assess survey results in conjunction with the literature review and focus group feedback to make a qualitative assessment of the effects of WasteWise on partners overall.

Characterization of the USPS Universe in WasteWise

USPS entities began joining WasteWise in 1997. The majority of USPS WasteWise partners, however, joined in 2007 and 2008. Initially, USPS entities joined at many different levels within the organization. The range of partners initially included entities as diverse as individual post offices and processing facilities, as well as whole USPS

districts and even larger USPS areas. Now, most partners join WasteWise and report at the district level, and all USPS districts are now enrolled in WasteWise. As of late 2008, USPS WasteWise membership is organized into 86 USPS individual partners. Of those 87 partners, 75 partners report at the district level, 6 partners report at the area level, and 6 partners report at the individual facility level.

Survey Approach

After discussing the goals and intent of this survey with USPS, IEc determined that district staff members and managers at processing and distribution facilities (P&DCs) and bulk mail centers (BMCs) represent the most appropriate target universe. District staff members play a key role in organizing waste management activities and therefore are likely to have direct experience implementing WasteWise-related activities and other waste management strategies, and P&DCs and BMCs generate and manage large quantities of non-hazardous waste and are therefore able to identify the effectiveness of USPS efforts at a facility level.

The USPS organization includes 9 areas, 80 districts, and 460 processing and distribution centers (P&DC) and bulk mail centers (BMC). The Northeast area (which includes eight individual districts) and four districts (Alabama, Dallas, Sacramento, and South Florida) joined WasteWise several years before the other areas and districts. Thus, to discern the effects of WasteWise participation on USPS facilities and districts, we plan to survey all districts and facilities that joined early, as well as a statistically valid sample of facilities that joined later. We hypothesize that facilities and districts that joined WasteWise earlier than others will report higher utilization of "greener" waste management approaches and will be able to provide information about the role of WasteWise.

Sampling Procedure

As of February 2009, USPS contained 80 districts. IEc plans to survey a maximum of 80 district staff. Note, however, that the USPS is currently undergoing organizational consolidation; therefore the total number of districts surveyed may decrease if the number of districts is small at the time of the survey. Due to the limited number of districts, we plan to interview all districts instead of employing a sampling approach.

IEc also plans to survey all 55 P&DCs and BMCs that were early participants in WasteWise. We will call them "Group A." However, for P&DC and BMC facilities in districts that joined recently, the universe of 405 facilities is large enough to sample the population. We plan to survey 200 facilities. We will call them "Group B." Exhibit 11 summarizes the sampling plan, which is discussed in greater detail on the next few pages.

EXHIBIT 11: SAMPLE PLAN SUMMARY

FACILITY LEVEL GROUPS	POPULATION SIZE	EXPECTED RESPONSE RATE	INITIAL SAMPLE SIZE	EFFECTIVE SAMPLE SIZE
Group A (long-time members)	55	75%	55	41
Group B (newer members)	405	50%	200	100

IEc assumes response rates of 75 percent for Group A and 50 percent for Group B, which we think is conservative based on conversations with USPS and their offer of assistance to follow up with facilities. USPS survey activities may include: sending an initial email to subjects to explain the purpose of the survey (IEc will draft the email); sending a reminder approximately two weeks after the survey opens; and following up with those subjects that have not responded.

To ensure that the sample reflects a variety of geographic locations, we plan to stratify the sampling of P&DCs based on the area in which the center is located. The USPS organization contains nine areas. The entire Northeast Area joined early on; therefore all P&DCs and BMCs in the Northeast will be surveyed. Thus, the stratification will only occur across the remaining eight areas. See Exhibit 12 for the stratification of Group "B."

EXHIBIT 12: GROUP "B" STRATIFICATION

STRATUM	DESCRIPTION	POPULATION SIZE (N)	STRATUM RELATIVE PROPORTION	SQUARE OF STRATUM RELATIVE PROPORTION	INITIAL SAMPLE SIZE	EXPECTED RESPONSE RATE	EFFECTIVE SAMPLE SIZE (N)	ESTIMATED STRATUM PROPORTION	VARIANCE FOR ESTIMATED PROPORTION
1	BMCs	28	0.07	0.005	14	50%	7	0.5	0.032
2	Capital Metro	26	0.06	0.004	13	50%	6	0.5	0.035
3	Eastern	59	0.15	0.021	29	50%	15	0.5	0.014
4	Great Lakes	45	0.11	0.012	22	50%	11	0.5	0.019
5	New York Metro	18	0.04	0.002	9	50%	4	0.5	0.055
6	Pacific	23	0.06	0.003	11	50%	6	0.5	0.040
7	Southeast	42	0.10	0.011	21	50%	10	0.5	0.020
8	Southwest	53	0.13	0.017	26	50%	13	0.5	0.016
9	Western	111	0.27	0.075	55	50%	27	0.5	0.007
Total		405	1.00		200		100		

ASSUMPTIONS:

0.50	Estimated population proportion
0.0021	Variance of estimated population proportion
0.0019	Standard deviation of SRS (for comparison)

Exhibit 13 on the following page illustrates the projected margin of error for difference in proportions between the two different groups of facilities.

Assuming a 75 percent response rate from early joiners and a 50 percent response rate from later joiners, a simple random sample for this survey is predicted to result in a 11.5 percent margin of error for estimating difference in proportions between Group A and Group B at the 95 percent confidence level, and a 9.7 percent margin of error at the 90 percent confidence level. With the stratified sampling planned for this survey, the survey is predicted to have an 11.8 percent margin of error for estimating difference in proportions between Group A and Group B at the 95 percent confidence level, and a 9.9 percent margin of error at the 90 percent confidence level. The margin of error predicted is slightly larger under stratified random sampling because the assumed proportion is 50 percent in every single stratum. Stratified sampling does not provide much precision benefit when the strata are the same. However, once the data are collected, our actual margin of error calculation will reflect observed differences among the strata and will therefore (almost certainly) provide greater precision than simple random sampling.

In addition, stratified sampling has the added benefit of guaranteeing a geographic spread for the sample. The sampling plan assumes "proportional allocation." That is, the sample size for each stratum is proportional to the size of the stratum. IEc can deviate from the proportion allocation if the sample sizes are not appropriate in a particular stratum.

IEc chose a sample size of 200 for Group B in consideration of both the need for statistical validity as well the need to minimize survey burden on USPS staff. Regardless of random or stratified sampling, however, a survey with a total universe of only 450, and a likely response rate of less than 95 percent, is likely to have a margin of error that is higher than a few percent. For example, even if we surveyed all 405 facilities in Group B, and predicted an 80 percent response rate within both Group A and Group B, the predicted margin or error with a stratified or random sample would be 4.7 percent at the 95 percent confidence level, and 4.0 at the 90 percent confidence interval.

Having a margin of within the 10 percent range means that some observed differences in Group A and Group B may fall within the margin of error of the survey. For example, if the actual survey margin of error is 10 percent overall, and we learn that 60 percent of Group A and 52 percent of Group B recycles mixed paper, then this result would not be considered statistically significant.

EXHIBIT 13: USPS FACILITY-LEVEL SURVEY (PD&CS AND BMCS): MARGIN OF ERROR FOR DIFFERENCE IN PROPORTIONS

INPUTS:	
55	Population size for Group A: number of facilities that are long-time members (see "Group A" tab for details)
405	Population size for Group B: number of facilities that are not long-time members (see "Group B" tab for details)
75%	Expected response rate for Group A
50%	Expected response rate for Group B
55	Initial sample size for Group A (number of facilities randomly selected for the survey)
200	Initial sample size for Group B (number of facilities randomly selected for the survey)
0.5	Estimated proportion for Group A (use 0.5 for conservative estimate of margin of error)
0.5	Estimated proportion for Group B (use 0.5 for conservative estimate of margin of error)
Outputs:	
41	Effective sample size for Group A
100	Effective sample size for Group B
Simple Random Sample:	
11.5%	Margin of error for estimating difference in proportions between Group A and Group B (95% confidence level)
9.7%	Margin of error for estimating difference in proportions between Group A and Group B (90% confidence level)
Stratified Random Sample:	
11.8%	Margin of error for estimating difference in proportions between Group A and Group B (95% confidence level)
9.9%	Margin of error for estimating difference in proportions between Group A and Group B (90% confidence level)

Notes:

1. The interpretation of the margin of error presented above is that EPA will be able to report that there was an X% difference between Group A and Group B, plus or minus Y%, where Y is the margin of error.
2. All calculations assume that any survey non-response is random.

Draft Survey Instruments

IEc has finalized survey instruments for facility staff members and district staff members, which are available in Appendices C and D. We estimate that the survey will take individuals in both groups approximately 20 minutes to complete. Both surveys are designed to investigate:

- Waste management activities at the facility-level, including recycling of specific materials, and source reduction;
- Knowledge of waste management outcomes;
- Influences on waste management attitudes and behaviors (including WasteWise membership); and
- Use of WasteWise tools, and assessment of those tools.

The district survey also contains questions related to organizational culture, and WasteWise influence on culture, which are not applicable at the facility level.

Note that we are proposing to collect information on waste management outcomes (i.e., estimate of overall recycling rate) as a form of verification of waste management activities. We propose to ask these questions in lieu of site visits (which are resource-intensive and impose a time burden on facilities). We do not plan on aggregating environmental performance data provided on outcome questions, as the purpose of these questions is verification of activity, not accuracy in estimating outcomes.

If USPS is able to provide IEc with waste management data that the Northeast region has started to track through invoices, then we will compare these data to facility data as possible, to gage USPS staff's understanding of waste management outcomes, and potentially to correlate understanding with the length of membership in WasteWise.

IEc plans to pre-test the facility survey with approximately three facilities, and debrief with these facilities, to ensure that the questions are clear and that responses are in the range of expected outcomes. We advise pre-testing with facilities (as opposed to districts) because we think that facility staff, who are further removed from WasteWise implementation, are more likely than district staff to misunderstand survey questions. Based on responses to the pre-test, IEc may revise the facility and district surveys as needed.

Survey Mode

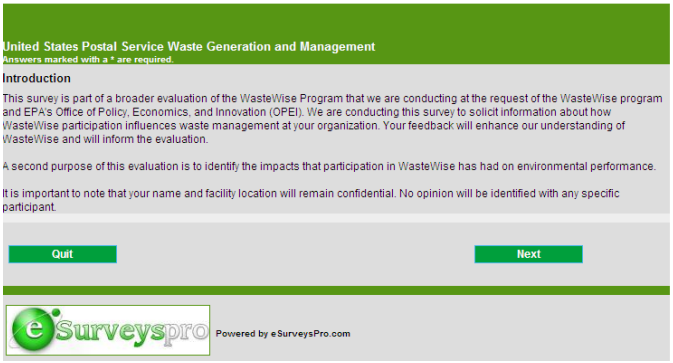
Based on conversations with USPS, IEc understands that USPS staff have ready Internet access and a familiarity with online surveys. As such, IEc plans to conduct surveys by Internet. We propose to use the ESurveyPro Basic online survey service because it offers the most cost-effective method for introducing "skip logic" to the surveys. The use of skip logic will avoid asking questions that do not apply to the subject. If the response to an initial question does not require a follow up question, then the survey will automatically skip subsequent questions in the series, thereby reducing burden to the respondent. ESurveyPro will also keep track of responses, which will help to

automatically determine the response rate and to identify contacts who have not completed the survey.

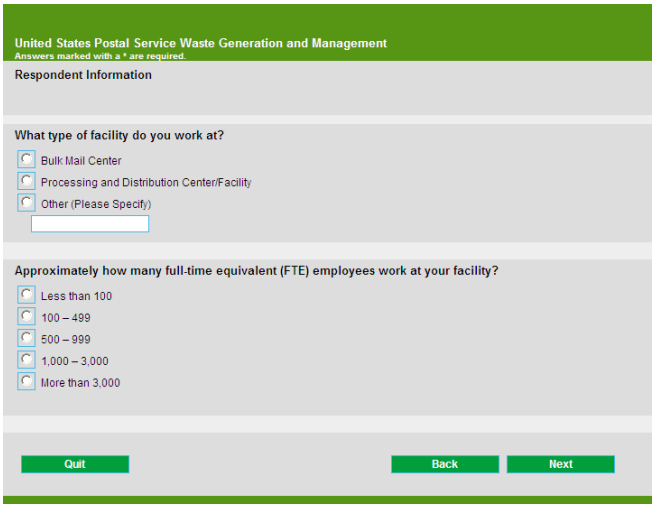
Exhibit 14 presents a screenshot of how some survey pages will look. Note that these images contain placeholder language.

EXHIBIT 14: EXAMPLES OF FACILITY SURVEY IN ESURVEYPRO

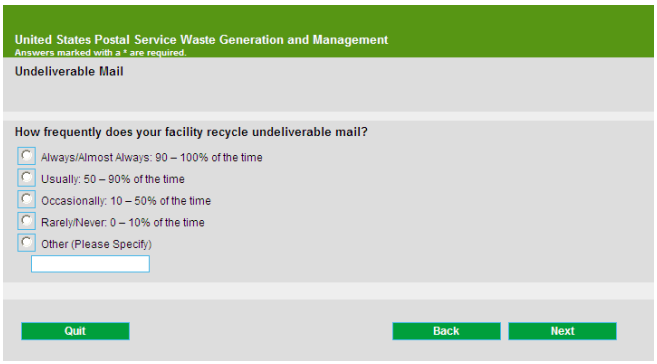
Introduction:



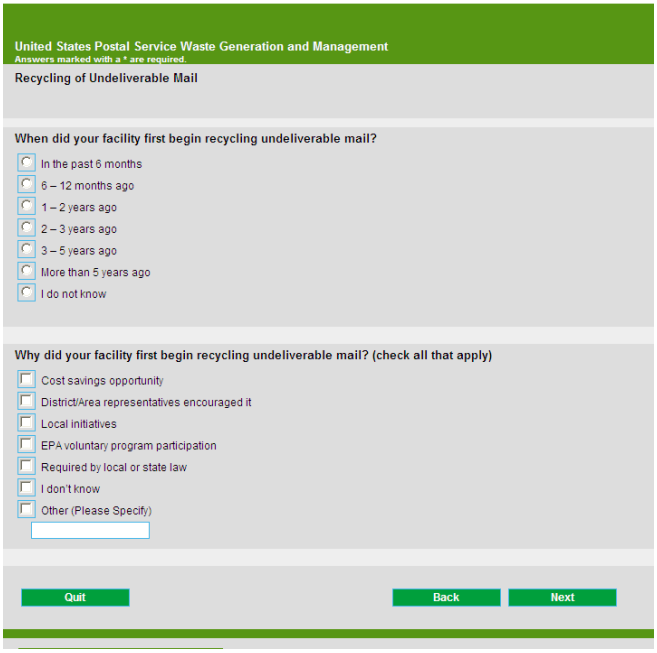
Respondent Information:



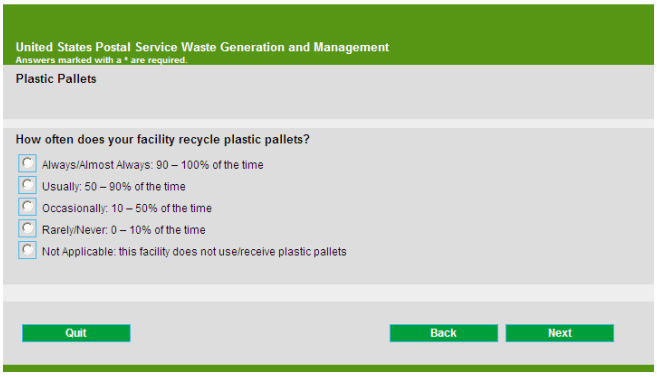
Beginning of Questions about Recycling of Specific Material: Undeliverable Mail:



If the respondent answers that the facility recycles the material at least 10 percent of the time, the next series of questions will inquire about when and why facility began recycling:



If rarely/never is selected, the survey will move to inquire about the next material:



Planned Analysis of Survey Data

To inform the answer to Evaluation Question 3, IEc will analyze survey results to provide insights into two issues:

- The extent to which statistically significant differences exist between long-term WasteWise partners and recent joiners (Group A and Group B) regarding waste management attitudes and behaviors, and if those differences can be partially attributed to WasteWise.
- The extent to which district staff identify WasteWise as an important factor in changes in waste management practices, corporate culture, and market strategy.

To this end, IEc will conduct analyses including:

- Average length of time since facilities in Group A and Group B began recycling materials, with an external comparison of responses to the official WasteWise entry date for each facility. This may show differences between Group A and B, and it is also one indicator of WasteWise's influence on any differences observed.
- Frequency of recycling of various waste streams in facilities Group A and Group B, and in districts with different WasteWise tenure.
- Frequency of participation in specific waste management activities at facilities in Group A and Group B (e.g., reverse hauling of undeliverable mail, take-bake initiatives).
- At the district and facility levels, proportion of respondents that identify changes in organizational culture or structure as a result of waste management activities undertaken under WasteWise.
- At the district level proportion of districts that identify WasteWise (from multiple choice questions) as one factor in informing recycling and source reduction activities, and the extent to which responses differ with length of tenure in WasteWise .

- At the district level, proportion of districts that identify changes in strategic relationships with other entities (e.g., regulators, suppliers, customers, and competitors) as a result of WasteWise participation.

Theoretically, we could treat length of time in WasteWise as a continuous variable, and run regressions that track the length of time in WasteWise to "greener" attitudes and behaviors. However, we doubt that a regression approach will yield better information than the types of analyses proposed above, because USPS participants essentially joined WasteWise in two distinct chunks of time—prior to 2000, and between 2006 through 2008. Moreover, district offices in the Northeast area became WasteWise participants when the area became a WasteWise partner. The experiences of these districts may therefore be inconsistent with and inapplicable to other districts.

Finally, we have no reason to believe that we could discern "greener" behavior from facilities that joined in, for example, 1997 versus 1999, and link any differences to WasteWise. Thus, we think this type of regression would cut the data too finely given the number of factors that play into waste management decisions, and the nuanced role of WasteWise tools and activities in affecting change.

A final step in the analysis will be an internal comparison of district and facility responses to specific survey questions to determine whether districts and facilities in those districts are providing consistent information about key WasteWise elements (e.g., tools used, programs implemented). Any areas of inconsistency identified in this qualitative assessment will be used to: a) identify potential survey question clarity issues in follow-up interviews; and b) identify potential communication barriers between districts and facilities.

In addition to using the survey to inform Evaluation Question 3, IEc will analyze responses to questions about use of WasteWise tools and rating of WasteWise tools to inform Evaluation Question 1. For example, we will develop a breakdown of ratings for each tool (i.e., the percent of responses that indicated a tool was very helpful, somewhat helpful, not helpful, or that indicated that the respondent had not used the tool or was not aware of the tool).

Environmental Behavior Index Communication

IEc plans to integrate the Environmental Behavior Index (EBI) communication approach to convey some survey findings. The EBI approach involves coding responses to communicate the environmental soundness of different actions (e.g., green indicates most environmentally sound action, brown indicates least environmentally sound). The EBI approach was successfully used in King County, Washington, to communicate survey results on the adoption of environmental behaviors among county residents. IEc plans to conduct similar coding as appropriate to communicate survey results. For example, we will analyze the proportion of facilities responding that they "always or almost always" recycle mixed paper, and this will be communicated as a "green" behavior; whereas the proportion of facilities that "usually" recycle mixed paper will be coded as "light green" and so forth. In addition, we may be able to aggregate results for all materials at the

facility level to give each facility a general rating on their overall recycling rate. Furthermore, may be able to develop similar coding for communicating responses to one or more cultural and organization change questions. Note that we will limit our implementation of the EBI approach to provide information on responses to specific individual questions; we will not attempt to normalize EBI categories across questions or develop a cumulative assessment of "green" behavior for specific respondents.

USPS Interviews

IEc will conduct up to four interviews with select USPS Headquarters and Area staff. IEc will identify interview participants in collaboration with WasteWise staff and Charlie Vidich, the WasteWise contact in the Northeast Area who has been a USPS point person for WasteWise and a key contact for this evaluation.

IEc proposes to use the USPS interviews to follow up on survey results, and specifically to clarify and expand upon findings. For example, interviewees may be able to clarify areas where survey respondents conflict wit one another in the information provided. Or, interviewees may be able to provide additional context and background information to help explain survey findings.

Because we propose to use the interviews as a follow up to the survey, we plan to wait until we have survey results available to develop an interview guide. At this time, IEc will draft the interview guide and produce a final guide based on EPA comments. IEc will schedule and conduct phone interviews with identified participants. IEc will produce interview summaries for each interview, summarizing interviewee responses to each interview question.

Review of Data Collection and Quality Control Practices

As discussed above and in previous memoranda, current waste data collected by WasteWise are not robust enough to support performance measurement and program evaluation. To increase the quality of data collected by WasteWise in the future, IEc suggests exploring potential methods for encouraging WasteWise partners to submit robust and consistent environmental data. This review will include a discussion of the resource requirements associated with these methods. The review will also explore the use of incentives to encourage reporting.

IEc recommends conducting a review of data collection best practices across select EPA partnership programs and non-EPA voluntary programs, focusing on a review of methods to increase data quality. To help identify programs that should be reviewed, we applied the following criteria:

- Voluntary participation (non-mandatory)
- Facility or firm-based (not product based)
- Program data collection and reporting responsibilities exist at the facility or firm level
- Some programs should have a follow-up component, for quality control
- Some programs included should have a waste reporting component
- Some programs should use electronic reporting

Using these criteria, IEc identified the following EPA partnership programs to include in the review:

- Hospitals for a Healthy Environment (H2E): A cursory examination indicated that reviewing the guidance and reporting forms from the Hospitals for a Healthy Environment (H2E) program, combined with a thorough review of the 2006 *Evaluation of the EPA Hospitals for a Healthy Environment Program*, will likely provide suggestions as to how to improve data quality and increase partner reporting. The H2E evaluation contains suggestions for collecting data for normalization purposes and increasing partner reporting.
- Laboratories for the 21st Century (Labs 21): Labs21 differs from WasteWise in that the program appears to be project-based and partners do not submit annual reports until after project is complete. However, the program provides useful materials on topics such as best practices, case studies, and benchmarking.
- National Environmental Performance Track: Performance Track program also has a strong focus on QA/QC. The program reviews all data submitted and conducts site visits at 5 – 10% of member facilities each year. Performance Track requires all members to submit baseline data and annual data. Thus, the program has been able to aggregate and publish results.

- Energy Star Buildings and Plants Program: At the request of EPA, we are adding this program to the original list. Many of the "Plants & Buildings" partners match WasteWise partner sectors. In addition, the program maintains a reporting database for partners that can also be used for benchmarking.
- Natural Gas Star: Natural Gas Star has also been able to aggregate and publish results. The Natural Gas Star program provides many sector-specific resources to partners, such as emission quantification guidance and information on cost-effectives technologies.
- National Partnership for Environmental Priorities (NPEP): NPEP also appears to be a project-based program with a unique reporting schedule. While partners are only requested to report their baseline quantities and their achievements, NPEP has a focus on Quality Assurance/Quality Control (QA/QC). Since 2006, NPEP has inquired about QA/QC for partner success stories.
- SmartWay: The SmartWay program has also developed sector-specific resources, including models to report baseline information. SmartWay released information on baseline data in 2005, but reports on annual data do not appear to be available.

Exhibit 15 provides a preliminary summary of data collection and QA/QC practices for these EPA programs.

As part of this evaluation, IEc is looking at benchmarking tools currently used for EPA voluntary programs. Benchmarking tools can be used to compare partners to one another. EPA's Labs 21 program offers a benchmarking tool to allow laboratories to compare their energy use to that of similar laboratories. This tool allows users to see how they are doing in terms of energy use and system efficiency, compared to other similar laboratories. The tool was designed to help laboratories understand how they compare to other laboratories. Therefore, data entered into the tool are not collected by EPA. Thus, it is not possible for EPA to compare laboratory partners.

In contrast to Labs 21, EPA's SmartWay program scores all carrier and logistics partners based on their environmental performance and relative fuel efficiency. This system allows EPA to identify the top performers based on comprehensive data provided in their baseline and annual data submissions. The scores are then posted on the SmartWay website (http://www.epa.gov/smartway/transport/partner-list/index.htm) to help EPA, the public, and other companies compare the performance of shippers and carriers. Those partners with the highest scores are awarded the SmartWay Transport Partner logo.

EXHIBIT 15: SUMMARY OF DATA COLLECTION AND QUALITY CONTROL PARAMETERS FOR SELECT EPA PARTNERSHIP PROGRAMS

PROGRAM NAME	UNIT OF MEMBERSHIP	SUMMARY OF REPORTING STANDARDS	REPORTING SCHEDULE	DOES PROGRAM UTILIZE ELECTRONIC REPORTING?	DOES PROGRAM CONDUCT QA/QC FOLLOW UP?	HAVE DATA BEEN AGGREGATED?	HAVE PROGRESS REPORTS BEEN DEVELOPED?	IS BENCHMARKING POSSIBLE?
Hospitals for a Healthy Environment (H2E)	Facility & Company	H2E Partners for Change participants complete and submit to EPA a standard, two-page Annual Facility Assessment Summary and Goals Form that describes the Partner's waste reduction goals and progress. Assessment form is due within six months of joining H2E (for new Partners) and by January 31 of each subsequent year, unless less than nine months have passed since submittal of the initial form. Assessment and baseline forms inquire about tonnage of waste generated, tonnage recycled, and recycling costs. The 2006 program evaluation indicates that program was not very successful at collecting data. As of January 2006, only 11% of facilities had submitted baseline and/or annual data.	Annual	Yes	No	No	No	No
Laboratories for the 21st Century (Labs 21)	Project-based	Partners are encouraged to report on the status of their projects. Once complete, annual reporting is required through life of project. Application asks for energy and water consumption, but it can be actual or expected. It is unclear if partners report only for one location or if they may report for more than one location.	Annual (once building is complete)	Yes	TBD	No, but case studies have been developed.	No	Yes

PROGRAM NAME	UNIT OF MEMBERSHIP	SUMMARY OF REPORTING STANDARDS	REPORTING SCHEDULE	DOES PROGRAM UTILIZE ELECTRONIC REPORTING?	DOES PROGRAM CONDUCT QA/QC FOLLOW UP?	HAVE DATA BEEN AGGREGATED?	HAVE PROGRESS REPORTS BEEN DEVELOPED?	IS BENCHMARKING POSSIBLE?
Energy Star Buildings and Plants	Building	Partners are asked to measure, track, and benchmark energy performance using Portfolio Manager. Partners must provide a Statement of Energy Performance letter showing that each building's rating met or exceeded a score of 75 on the Energy Star rating system. Parters must also submit a data checklist. Both must be signed by a currently licensed Professional Engineer.	TBD	Yes	EPA conducts periodic reviews on randomly selected ENERGY STAR labeled buildings to monitor that all standards are met.	Yes	Yes, but not specifically for Buildings and Plants. OAR developed "Energy Star Snapshot: Measuring Progress in the Commercial and Industrial Sectors."	Yes
Natural Gas Star	Company	Program provides emission quantification guide, a tool for researching cost-effective technologies and practices to reduce emissions, a web-based application for tracking and reporting emission reductions, and assistance identifying and implementing new reduction opportunities.	Annual	Yes	TBD	Yes	Yes	No
National Environmental Performance Track (NEPT)	Facility	Annual facility-wide reporting is required for all members. Baseline data is collected during application process.	Annual	Yes	Reports are reviewed for data quality issues.	Yes	Yes	No

PROGRAM NAME	UNIT OF MEMBERSHIP	SUMMARY OF REPORTING STANDARDS	REPORTING SCHEDULE	DOES PROGRAM UTILIZE ELECTRONIC REPORTING?	DOES PROGRAM CONDUCT QA/QC FOLLOW UP?	HAVE DATA BEEN AGGREGATED?	HAVE PROGRESS REPORTS BEEN DEVELOPED?	IS BENCHMARKING POSSIBLE?
National Partnership for Environmental Priorities (NPEP)	Project-based	Members are asked to provide baseline values during enrollment process. Members are encouraged to submit a success story when goal is achieved, or when the partner is interested in highlighting achievements without being eligible for an award. Members appear to include individual facilities as well as corporations (e.g., 3M). It seems that only baseline values are required, but progress report appears to reflect annual data. It is unclear if data in progress report data are derived from award applications and/or annual reporting.	Baseline and end of project (as a Success Story)	Yes	Prior to 2006, program did not inquire about QA/QC. After 2006, QA/QC information has been collected.	Yes	Yes	No
SmartWay	Company	Partners must submit model with application. Models and agreements are specific to type of business (e.g., shipper, carrier). A report of goals was issued at start of program in 2005, but annual progress reports do not appear to be available.	Annual	Yes	TBD	Yes, but only for baselines.	No	Yes

Review of Data Collection and Quality Control Practices for Non-EPA Programs

IEc found that the following non-EPA programs and initiatives contained reporting guidance or tools that could inform WasteWise data quality and increase reporting, and that we will also include in our review:

- Australia's Greenhouse Challenge Plus program requires a small number of companies to join, but the majority of partners have voluntarily joined. The program provides resources to help partners calculate their greenhouse gas emissions, and reporting is completed through a universal reporting system. To minimize reporting burden and data duplication, the reporting system shares data with various agencies and programs. IEc recommends an examination of how this reporting system has worked for Australia.
- Stewardship Ontario's Blue Box program is a mandatory program that offers a variety of calculators and guidance documents for waste/recycling reporting. IEc recommends a review of the guidance and calculators to determine if similar materials may improve data reported to WasteWise.

Synthesis of Data Collection and Quality Control Efforts

For each of the above programs (EPA and non-EPA), IEc proposes to conduct a comprehensive review the following materials to identify and compare practices across programs:

- Environmental reporting forms
- Environmental reporting instructions
- Reporting follow up and quality control procedures
- Reporting requirements and/or incentives for reporting
- Program data aggregation
- Program evaluations

As necessary, IEc will follow up with program contacts to clarify information, fill in information gaps, and collect additional information on the impact and effectiveness of different practices. We will follow up selectively to balance the desire for additional information with the need to minimize burden to program contracts.[6] At the conclusion of this review, IEc will compile a synthesis of best practices applicable to WasteWise.

[6] An OAR contact for partnership programs expressed concern to IEc about burden associated with interviewing program contacts.

REPORT RESULTS AND CONCLUSIONS

IEc will produce interim deliverables including: remaining analyses of existing data, literature review, focus group report, data quality best practices review, interview summaries, and preliminary survey results. IEc expects that EPA will provide feedback on interim deliverables as we submit them. Upon completion of interim deliverables, IEc will develop a draft evaluation report that incorporates EPA comments on interim deliverables, synthesizes findings across deliverables, and provides recommendations for improving the WasteWise program.

The following outline of the report is preliminary; the ultimate structure of the final report will likely evolve based on evaluation findings. The final report will be prepared and delivered in accordance with the Evaluation Support Division's report formatting and presentation guidelines.

Preliminary Outline of the Final Report

1) Executive Summary

2) Introduction

   a) Background on EPA's WasteWise program

   b) Logic Model

   c) Purpose/Objectives of the Evaluation

   d) Evaluation questions and rationale for the questions

   e) Structure of the Report

3) Methods

For each method, we will discuss the rationale for the method, the evaluation question(s) that the method is designed to support, data collection technique(s) and instruments employed.

   a) Analysis of Existing Data

   b) Literature Review

   c) Focus Group

   d) Surveys

   e) Interviews

   f) Data Quality Best Practice Review

   e) Strengths and Weaknesses of Methodology

4) Findings

We expect to have several findings for each evaluation question. For each finding, we will discuss the method(s) that produced the data, analytical techniques employed, and any limitations to our analyses. We will use tables and graphs to communicate findings as appropriate.

a) Findings on Evaluation Question 1

b) Findings on Evaluation Question 2

c) Findings on Evaluation Question 3

d) Findings on Evaluation Question 4

5) Recommendations

OMB Paper

IEc understands that EPA needs to use the results of this program evaluation to address institutional mandates specified by the Office of Management and Budget (OMB). As such, in addition to the final report, IEc will develop a draft paper to inform EPA's response to OMB's ICR Terms of Clearance for the WasteWise program. The paper will cover the findings of the evaluation as they relate to the Terms of Clearance. The paper will discuss the challenges of applying a "gold standard" research design to an evaluation of the WasteWise program (and to partnership programs in general). Subsequently, the paper will identify Terms of Clearance provisions that the evaluation could not address, in full or in part, and may include discussion of what EPA and the WasteWise program would require to meet these terms (e.g.., increased resources, an expanded ICR, et cetera).

Appendix B:

LITERATURE REVIEW

MEMORANDUM | December 14, 2009

TO Terrell Lasane, EPA

FROM Kelsey Rioux and Cynthia Manson, IEc

SUBJECT Literature Review and Response to WasteWise Evaluation Question 2

BACKGROUND AND CONTEXT

The U.S. Environmental Protection Agency (EPA) is undertaking a program evaluation of the WasteWise program in the Office of Resource Conservation and Recovery (ORCR). WasteWise is one of the most well-established of EPA's partnership programs, with more than 2000 partners. The program encourages partners to undertake projects that improve materials management processes by reducing the generation of solid waste and/or improving the recovery and recycling of wastes.

In recent years, ORCR has been working to document accomplishments of the WasteWise program by identifying specific changes in materials management that are directly related to partners' participation. It is difficult to isolate program outcomes, because WasteWise provides a number of different incentives and tools to partners, and because companies and institutions frequently have multiple reasons for participating in partnership programs. The program's limited ability to collect data from partners and non-partners further complicates the task of documenting outcomes.

WasteWise Evaluation Question 2 examines one aspect of the challenge of measuring outcomes, by examining the factors and motives that may complicate measurement. Specifically, Question 2 asks:

> *In addition to participation in WasteWise, what other factors may influence a partner organization's decisions to improve management of MSW (e.g., cost savings, consumer pressure, other voluntary program opportunities)?*

To address this question, Industrial Economics (IEc) has conducted a targeted review and analysis of recent literature related to partnership programs, with the aim of identifying the key factors that may influence decisions to participate in the WasteWise program and to change management practices. These factors in some cases represent complementary forces that can provide opportunities for WasteWise to assist companies in meeting emerging needs (e.g., industry "best practices" goals) and optimizing their processes. In other cases external market forces may complicate the ability to identify and measure program outcomes.

The purpose of this literature review and analysis is to highlight current academic thought on the measurement of beneficial impacts of partnership programs, and to identify the key external factors that are unrelated to WasteWise program design but may affect participation in WasteWise and program performance. In the evaluation final report, IEc will use the findings of this literature review to help interpret the results across methods used for this evaluation, including the survey and focus group.

This literature review represents, in part, an update of prior literature reviews addressing the significant body of literature on company motivations for joining partnership programs, and the impact of external factors (e.g., threat of regulation) on program performance.[1] In addition, this memorandum categorizes key external factors by the impact they are likely to have on WasteWise program outcomes. Finally, the memorandum identifies, where possible, the methodologies documented in the literature for addressing these factors.

OVERVIEW OF RECENT LITERATURE ON VOLUNTARY PROGRAM OUTCOMES

In recent years, EPA and other federal agencies have increased their focus on performance-based approaches that incorporate voluntary activities and agreements, referred to in the literature broadly as "Public Voluntary Programs" (PVPs).[2] The recent increase in the number of PVPs has led many within the academic community to examine the effectiveness of these programs, which include partnership programs such as WasteWise along with other types of voluntary efforts. With more than 7,000 organizations now participating in these programs, the measurement of program achievements has been increasingly scrutinized (Morgenstern 2007).

However, researchers have found that measurement of such achievements using traditional statistical analysis to be difficult due to a lack of formal reporting requirements for many programs. A key aspect of the effort to document statistical causality for environmental results is controlling for external factors that will induce an organization to actively work to reduce or eliminate waste even in the absence of the program. This proves difficult without a control group or baseline data. Determining the "business as usual" scenario often requires data that PVPs (and researchers) cannot access. While several studies have attempted to measure program outcomes, the strength of their conclusions is affected by these data limitations.

While a general consensus exists that limited baseline data and inconsistent data recording impede conclusions about the effectiveness of PVPs, some authors have used available data to identify and examine factors that may influence a firm's waste management practices either independently of a PVP or as a motivation to participate. Common categories of external factors that emerge from the research include:

- **External regulation:** including current or pending non-federal regulations (e.g., in specific markets or states) or court rulings;
- **Public image: i**ncluding pressure from local communities and environmental groups to improve citizenship;
- **External economic activity:** including a need to reduce costs, alter production, or reformulate products to remain competitive; and
- **Stakeholder pressure:** including demands from suppliers, stockholders, or customers to improve environmental performance of products or production.

[1] See Draft Literature Review of Approaches to Estimating Attribution of Voluntary Program Benefits (Memorandum submitted to EPA Solid Waste, February 25,2008) and Nash, Jennifer and Larson, Tim. "Performance-Based Environmental Programs: Literature Review." *Report for EPA's Office of Policy, Economics, and Innovation.*

[2] While EPA refers to these programs as partnership programs, the academic literature uses the term "voluntary," which is how we refer to them in here, as we are summarizing academic literature on the subject.

In addition, researchers including Anna Alberini and Kathleen Segerson, Madhu Khanna, and Magali A Delmas and Maria J. Montes have investigated the impact of the "threat of regulation" on the interest in undertaking and publicizing voluntary efforts among companies. Alberini and Segerson write, "The most obvious negative inducement is to use an explicit or implicit threat to impose a policy (for example, a regulation or a tax) that is more costly to the firm if an environmental quality target is not met 'voluntarily.'"(Alberini and Segerson 2002) While the threat of Federal regulation does appear to be a motivating factor for PVP participation in some cases, in the case of WasteWise, EPA's does not have the authority under the Resource Conservation and Recovery Act to mandate recycling or minimization of non-hazardous waste.

More broadly, emerging literature on voluntary programs and human behavior is raising questions about the limits of traditional economic theory and analysis in evaluating the specific market failures that PVPs are designed to address. In their recent book *Nudge*, Thaler and Sunstein address what they identify as a failure of current economic theory to appropriately address the effectiveness of non-regulating mechanisms. The authors propose an alternative model of "Libertarian Paternalism" that is designed to address a world in which information is limited and decision-makers do not always make the best rational choices. The Libertarian Paternalism approach combines freedom of choice with subtle clues or "nudges" to steer individuals towards choices that will improve their overall well-being. In this context, nudges can correct for market failures such as lack of information, and can also allow governments and companies to steer citizens, employees, and consumers towards better decisions, whether those decisions help improve quality of life or the bottom line. The authors argue that voluntary programs are an effective tool to improve environmental decision-making and performance in many contexts, by improving information (e.g., about cost saving opportunities or lower-toxicity materials) and aligning good decisions with positive outcomes. In this context, the most effective environmental programs may be those that build carefully on existing "external" factors. This suggests that efforts to measure program outcomes may in some cases incorporate, rather than correct for, external factors.

The current literature incorporates consideration of external factors into two general avenues of investigation: (1) evaluation of the effectiveness of voluntary environmental programs (in which external factors hinder the examination of program impacts in some cases), and (2) determination of motivating factors for voluntary environmental compliance (that can, in some cases, signal effective program design). Both issues must address the need to isolate and account for external factors to clarify decisions and measure program benefits.

FACTORS AFFECTING PROGRAM PERFORMANCE

The most comprehensive recent publication to examine the effectiveness of voluntary programs using conventional economic theory and statistical approaches is *Reality Check*, a compilation of articles on case studies examining the PVP effectiveness and how to measure direct effects associated with these programs. The book attempts to better define the role and successes associated with voluntary programs, and to identify external factors that may be contributing to the apparent success of voluntary initiatives. The authors' general conclusion is that the research conducted when data allow reveals only

modest program outcomes. Moreover, in some cases outcomes are significantly affected when authors corrected for factors identified as external to the program. For example:

Madhu Khanna performed a meta-analysis of existing studies to identify achievements of EPA's 33/50 program.[3] Her analysis concludes that the 33/50 voluntary program reduced the levels of toxic chemical releases, but she notes that a separate study which excluded two chemicals that were being phased out as part of the Montreal Protocol found limited impacts. This indicates that at least some of the changes tracked in the 33/50 program may have been driven by mandatory reductions associated with the Montreal Protocol.

Masayo Wakabayashi and Taishi Sugiyama similarly found that the effectiveness of Japan's Keidanren Voluntary Action Plan on the Environment was likely affected by a large governmental presence and the threat of a cap and trade system for CO_2 emissions. The authors conclude that the program was fairly successful, though editors Morgenstern and Pizer note that the baseline (during the economic downturn experienced in Japan in the 1990s) may also have affected overall program results.

Finally, Morgenstern, Pizer, and Shih's examination of the EPA Climate Wise program illustrates the challenges of evaluating PVPs using traditional economic approaches.[4] The authors compared participant and non-participant carbon dioxide (CO_2) emissions, as well as participant emissions before and after joining the program. They concluded that the program had a temporary effect on CO_2 emissions from fuel use, and note that their study did not address chemical companies' interest in reducing CO_2 emissions through chemical use reduction. In this context, available data (e.g., fuel use information) may not have been adequate to characterize full program impacts.

In spite of this limitation, the authors conclude that their study did not reveal any significant long-term effect on participants CO_2 emission levels when compared to non-participants, and write, "Even if participants genuinely believe that a voluntary program is influencing their behavior and can point to actions they attribute to the program, the only legitimate benchmark is what other, similar, non-participating facilities are doing at the same time" (Morgenstern, Pizer, and Shih 2007). This final assertion, however, has been the subject of some discussion. For example, subsequent literature on the "spillover effect," in which non-participants can receive information and adopt approaches similar to PVP participants, suggests that even this benchmark may be inadequate, and a model considering the impact of improved information among both participants and non-participants may be necessary (Lyon and Maxwell, 2007).

The research documented in *Reality Check* highlights the link between external factors and program performance, and provides examples of some of the methods used to isolate and measure the contribution of these factors. The case studies further illustrate that effective quantitative analysis has been limited by lack of data. More recent research by Magali A. Delmas and Maria J. Montes also examined the impact of external factors, and illustrates data limitations. The authors assessed the effectiveness of voluntary programs between early adopters and late joiners. The authors examined participation of utilities in the Department of Energy's Climate Challenge Program. To control for reduction due to

[3] The 33/50 program was the first EPA voluntary program started in 1991 aimed at reducing 17 high-priority chemicals by 33% by the end of 1992 and 50% by the end of 1995. The program was ended in 1995.

[4] The Climate Wise program focuses on the reduction of non-utility, industrial sector carbon dioxide emissions. The program was created in 1993 and was renamed the Climate Wise Energy Star program in 2000.

external factors, the authors considered the role of renewable portfolio standards (RPS).[5] The authors postulated that utilities located within states with RPS's should have lower emissions, and thus the authors created a dummy variable to control for the presence of an RPS. They found no statistically significant relationship between emissions levels and the presence of an RPS, though they expect that any impact associated with RPS presence will become easier to identify as more data become available over time.

MOTIVATING FACTORS

While the literature addressing program effectiveness addresses the confounding nature of some external factors, the other branch of PVP measurement literature has focused on the factors that encourage participation by companies and organizations. For example, recent studies address issues that could influence a firm participation in a voluntary environmental program, including studies by Nicole Darnall, Irene Henriques and Perry Sadorsky in their paper, "Do environmental management systems improve business performance in an international setting?" and Madhu Kahnna, Particia Koss, Cody Jones and David Ervin in their paper "Motivations for Voluntary Environmental Management."

Both studies identified several common themes regarding motivation; including public pressure, market or stakeholder pressure, regulatory pressure, and existing internal focus on environmental issues within the firm. Darnall et al. control for regulatory and market pressure by surveying firm managers. Managers were asked to gauge the level of influence each institutional actor had on the firm's environmental practices. Institutional actors that were considered include "regulators, customers, community, labor unions, environmental interest groups and trade associations."(Darnall et al.). The authors conclude that institutional factors influence a firm's adoption of an environmental management system (EMS). Khanna et al. measured a firm's environmental effort through surveys, asking firm managers to rate the importance of environmental issues. They found that a firm's environmental effort had a statistically significant positive relationship with the adoption of the Climate Challenge program. Darnall et al. determined environmental effort through the presence of an environmental R&D budget, and concluded similar results. While these factors are external to the WasteWise program, their relationship to the program may in some cases be complementary or even supportive, if, for example, the WasteWise program is designed to respond to an emerging market or strategic concern.

In addition, Thaler and Sunstein find that public disclosure laws can serve as a "nudge" for companies to join voluntary programs. The Toxic Release Inventory (TRI) mandate created incentives for companies to voluntarily reduce chemical use and improve management. While economic theory dismisses the possibility that firms would reduce waste unless it is profitable to do so, TRI's public notification better aligns incentives for firms to better manage wastes beyond immediate profitability, because firms – and customers – have access to better information. In addition, because firms know that TRI information could lead to PR issues if negative information is disclosed, then TRI creates a forward-looking incentive to avoid emissions (e.g., through source reduction).

[5] Determined at the state level, renewable portfolio standards dictate a specific level of renewable energy production that must be achieved by utilities within that state.

Thaler and Sunstein find voluntary programs provide the tools necessary to help these firms improve environmental performance. While public image may prompt firms to reevaluate their waste management, public disclosure laws do not provide the types of tools or incentives that voluntary programs do. Thaler and Sunstein therefore view voluntary programs working in tandem with public disclosure laws to move firms towards voluntary waste reduction.

Overall, the recent literature highlights the challenges of documenting achievements of partnership programs such as WasteWise. The remainder of this section provides a more detailed summary of the specific factors that have been examined in recent studies, and outlines potential priorities and methods for considering these factors in the context of an assessment of WasteWise outcomes.

EXAMINATION OF KEY EXTERNAL FACTORS AFFECTING PARTNERSHIP PROGRAM PERFORMANCE

As noted above, recent literature identifies several factors as being potential influences on a firm's waste management practices and program participation. IEc reviewed and compiled a list of key external factors identified in several recent publications. Exhibit 1 identifies the publications used to derive the list of factors.

EXHIBIT 1: KEY PUBLICATIONS USED TO IDENTIFY EXTERNAL FACTORS

SOURCES LISTED IN REVERSE CHRONOLOGICAL ORDER
Thaler and Sunstein. *Nudge: Improving Decisions About Health, Wealth, and Happiness* (2008).
Darnall et al. "Do Environmental management systems improve business performance in an international setting?" (2008)
Darnall and Sides. "Assessing the Performance of Voluntary Environmental Programs: Does Certification Matter?" (2008)
Madhu et al. "Motivations for Voluntary Environmental Management." (2007)
Delmas and Montes "Institute for Social, Behavioral, and Economic Research." (2007)
Morgenstern, Pizer, and Shih. "Evaluating Voluntary U.S. Climate Programs: The Case of Climate Wise." (2007)
Khanna. "The U.S. 33/50 Voluntary Program: Its Design and Effectiveness." (2007)
Morgenstern and Pizer. "Reality Check: The Nature and Performance of Voluntary Environmental Programs in the United States, Europe, and Japan." (2007)
Alberini and Segerson. "Assessing Voluntary Programs to Improve Environmental Quality." (2002)

The publications listed in Exhibit 1 identify 12 separate factors that can complicate the measurement of waste management impacts associated with a partnership program such as WasteWise. These include both incentives for joining the program, and variables that can have an independent impact on waste generation and management. They include:

- **International Regulations, State Regulations, Political Pressure, and Court Rulings:** Firms that face significant regulation or oversight as a result of foreign market requirements, stringent local regulations, or high profile political or court agreements may join partnership programs to appease officials and demonstrate compliance with regulations that already govern the waste management practices. Many environmental policies and regulations are determined at the state level, indicating that firms may be under more pressure depending on their location.

- **Public Disclosure Law:** Firms that reside in states with Public Disclosure Laws may implement additional environmental requirements and may be more inclined to participate in voluntary environmental programs to demonstrate beyond compliance activities to their communities. Public disclosure laws encourage firms to participate in partnership programs without imposing specific reduction requirements. Partnership programs provide the information and tools necessary to help firms respond to public disclosure laws through voluntary reduction. While the public disclosure law may prompt companies to voluntarily reduce waste, partnership programs can provide the necessary tools and information to make such reductions possible.
- **Production Level/Market Trends:** Decreases in waste generation may be the direct result of a decrease in production levels to respond to broader market forces. Broader market or sector trends can have a direct effect on the changes in waste generation and waste management reported by existing partners, and should be considered when evaluating total program impacts over time.
- **Firm Size:** Firms of different sizes may have different motivations for joining partnership programs. For example, larger firms that are more likely to have sophisticated waste management approaches may focus on recognition, while smaller companies may find technical assistance more important. This may affect the extent to which WasteWise activities directly result in operational changes.
- **Customer/Supply Chain Pressure:** Internal pressure from other firms within a firm's supply chain, or from its customers, may induce a higher level of environmental performance. To the extent that this pressure encourages participation in WasteWise, it is important to ensure that the planned changes in waste management practices were not already required by customer or supplier agreements.
- **Community Pressure and Public Image:** Firms invest time and resources to maintain a positive public image. Waste reduction and pollution abatement are often a direct result of organizations trying to maintain or improve public appeal, particularly with surrounding communities. Partnership programs such as WasteWise can provide opportunities to identify projects that will improve performance, and publicize pollution and waste reduction efforts.
- **Environmental Culture of Company:** A firm with a strong environmental ethic may be more likely to voluntary reduce waste or pollution, and thus may enter into a voluntary program to ensure credit for ongoing achievements related to existing practices. A firm with a strong environmental ethic may result from stakeholders who are inclined towards reducing pollution or waste to control the negative effects on stock prices associated with poor environmental performance. Considering this, it is important to clarify what additional value the program adds to an already strong environmental ethic.
- **Cost Savings:** Pollution and waste represent inefficient use of inputs and materials, and thus pollution abatement and waste reduction can represent a direct cost savings. The opportunity to reduce costs can sometimes indicate that a

project would have occurred even without participation in a partnership program, but in some cases partnership programs are instrumental in helping companies identify, analyze, and communicate cost saving opportunities.

- **Future Regulations and Threat of Regulations:** Threat of future or impending regulations related to waste or pollution can lead companies to proactively reduce waste in an attempt to reduce the both the likelihood and impact of proposed legislation; the more "real" the likelihood of regulation is, the more difficult it is to credit partnership programs with changes in industry practice.
- **Environmental/Pressure Groups:** The presence of environmental and pressure groups can have an impact on a firm's choice to implement waste and pollution reduction programs. Research has noted that states with larger numbers of environmental groups also have more pollution reduction (Maxwell et al in Khanna 2007). In some cases, companies may therefore seek out partnership programs to help proactively identify environmental improvement projects to ward off attacks from environmental groups; in other cases, pressure groups may represent an existing "requirement" for companies that then seek recognition through partnership programs.
- **Industry Pressure and Regulations:** Firms belonging to highly organized trade associations may be under added pressure to adopt voluntary environmental improvements to position the industry for negotiations on regulatory matters. Again, this can result in companies seeking assistance through partnership programs in some cases; in other cases, companies may seek additional recognition for existing projects.
- **Participation in Other Voluntary Programs:** Firms may reduce waste or pollution levels as required by other voluntary agreements or partnership programs, including government, industry, and internal programs that were in place prior to the firm's participation in a partnership program (e.g., WasteWise). Evaluation of participation in other programs to address "double counting" can be important to tease out the impact of individual programs.

IEc categorized each of the above factors into one of four categories to reflect its potential impact on the evaluation of WasteWise impacts, and to suggest the type of action needed to ensure accurate characterization of WasteWise achievements. The four categories are as follows:

- **Pre-existing Requirements:** In situations where partners have separate, pre-existing requirements associated with other regulatory or legally-binding agreements, these requirements are typically likely to the driver of documented waste management changes, in which case WasteWise participation would have little or no impact. Changes in waste generation at companies that, for example, are subject to state-level waste bans for certain wastes, should not be considered the result of WasteWise activities.
- **External Market Factors:** Factors such as changes in the global economy or other larger market shifts can sometimes have a broad and significant impact on

waste generation and management unrelated to WasteWise; these issues should be examined to identify uncertainty in the achievements reported by partners to WasteWise.

- **Potentially Complementary Factors:** Factors such as cost savings or a corporate-level strategic emphasis on improved materials management can, in some cases, influence waste management independent of the WasteWise program. A potential example is the "zero waste" goal shared by many American auto plants, some of which are WasteWise partners. However, WasteWise outreach materials and technical assistance activities can also aid members in identifying cost savings opportunities that they may not be aware. Therefore, the ability of WasteWise to meet the particular need through a specific program resource or activity can represent real program achievement. To evaluate the impact of these factors, it is important to clarify the role of WasteWise and the extent to which the program's tools, resources, and activities contributed to the waste reduction or management outcomes.
- **Uncertain Impacts:** Some factors, such as pressure from communities and stakeholders, could act as incentives to join WasteWise, or could represent *de facto* existing requirements. These factors are likely to require case-by-case evaluation to determine the role of WasteWise.

While each category represents a certain factor that needs to be identified to accurately calculate WasteWise program benefits, the level of correction needed varies, and in some cases may be minimal. Existing Requirements and External Market Factors are typically the factors most clearly requiring correction via exclusion to accurately identify program achievements attributable to WasteWise. In contrast, outcomes complicated by Potentially Complimentary Factors and Uncertain Impacts should not be automatically excluded; although they may be difficult to quantify with limited resources, they may able to be addressed qualitatively in some cases. IEc will consider these factors when analyzing information collected through the focus groups and surveys on the contributions of WasteWise to partner waste management and reduction initiatives.

Exhibit 2 provides an overview of the 12 key external factors. For each factor, the exhibit identifies the category of impacts, defines the specific issues and any methods used to address the issue in existing studies, and notes the key literature sources relied on to identify and describe the factor.

As shown in Exhibit 2, several of key external factors identified are potentially complimentary in nature with the WasteWise program goals, tools, and benefits, assuming that that program is providing features and tools that further the ability of companies to meet their identified priorities. The factors that most clearly indicate that other forces are responsible for performance (Pre-Existing Requirements and External Market Factors) are in many cases readily identifiable and can be addressed using available data.

The most recent literature adopts standard surveying techniques to understand the impact of all of these factors, and several studies conclude that PVPs have a measurable (if limited) impact on pollution and waste generation when external factors are corrected. Many studies also note that findings are limited by data and sampling bias. Most studies

conclude with calls for more standardized data collection to better facilitate a statistical analyses of PVPs, though some authors (e.g., Lyon and Maxwell, 2007) also suggest that the analytic approaches need to be expanded beyond standard comparison of participants and non-participants to accurately characterize impacts of PVPs.

TABLE 1: INFLUENCING FACTORS AND NECESSARY ADJUSTMENTS

FACTOR	DESCRIPTION OF ISSUE	CATEGORY OF IMPACT AND IMPLICATION FOR WASTEWISE ACHIEVEMENTS	KEY SOURCES
International Regulations, State Regulations, Political Pressure, and Court Rulings	• Delmas and Montes (2007) controlled for state regulations in regards to utility power generation by including a variable that considered a firm's location in a state with a renewable portfolio standard. The variable was found to be insignificant; however, the authors explain that RPS's are only represented in later years of their data, and more time may be necessary to show the effect of these requirements.	• Pre-Existing Requirements • Where this factor is present, indicates that factors other than WasteWise likely account for changes in practice; should not be included in WasteWise achievements.	Delmas and Montes (2007)
Production Level/Market Trends	• External economic factors can affect waste levels completely independent of WasteWise program activities. Waste data needs to be adjusted to incorporate economic variability. • Khanna (2007) identifies production changes as a possible factor in pollution reduction in relation to the 33/50 program.	• External Market Factors • Could result in overstatement (or understatement) of WasteWise project achievements; results should be normalized to production or economic activity if significant changes at sector or economy-wide level have occurred.	Khanna (2007)
Firm Size	• Factor will vary with the level of utilization of WasteWise program by firms of different sizes • Several studies controlled for size. Darnall et al. controlled for facility size by number of employees at the facility. They found a statistically significant, positive relationship between firm size and EMS adoption and comprehensiveness.	• External Market Factors • May indicate that different types of program impacts are associated with different firms. Should be documented and at least qualitatively discussed.	Alberini and Segerson (2002) Khanna et al. (2007) Darnall et al (2008)
Customer/Supply Chain Pressure	• Darnall et al. controlled for customer and supply chain pressure through a survey that looked at the importance of household consumers, commercial buyers, and suppliers on the environmental practices of the firm; the authors assumed that these factors drive decisions rather than program participation. They find that institutional pressures, such as market pressures, exert an influence over implementation and comprehensiveness of a firm's EMS. • Alberini and Segerson identify several studies that examine the influence of consumers on a firm's environmental performance; however, they suggest that better relations with customers could rather be a benefit of the voluntary program and not a precursor for joining.	• Potentially Complementary Factors • Potentially consistent with WasteWise Program organization. Information on timing of projects in relation to WasteWise participation, and information about use of WasteWise Program tools, activities and resources would support analysis of WasteWise impacts.	Alberini and Segerson (2002) Darnall et al (2008) Delmas and Montiel (2008) Khanna et al (2007)

FACTOR	DESCRIPTION OF ISSUE	CATEGORY OF IMPACT AND IMPLICATION FOR WASTEWISE ACHIEVEMENTS	KEY SOURCES
Community Pressure and Public Image	• Factor can be promoted and supplemented using WasteWise Program tools. • Survey techniques were used by several authors to measure community pressure and public image. • Delmas and Magali accounted for community pressure by including the number of Sierra Club members in each state to measure the population's environmental awareness. They found no statistically significant relationship between this measure and program adoption.	• Potentially Complementary Factors • Potentially consistent with WasteWise Program organization. Information on the timing of projects in relation to WasteWise participation, and information about use of WasteWise Program tools, activities and resources would support analysis of WasteWise impacts.	Alberini and Segerson (2002) Delmas and Montes (2007) Khanna (2007) Darnall et al (2008) Darnall and Sides (2008) Prakash and Potoski (2007)
Environmental Ethic of Company	• Factor can be promoted, supplemented using WasteWise Program tools, resources, and activities. Companies that already have established waste reduction programs may use WasteWise tools to better publicize their activities. • Survey techniques were used to measure environmental effort of a firm. Delmas and Montes calculated environmental effort as a ratio of total environmental expenditures to total operating costs. They found a statistically significant, positive relationship between environmental effort and predicted program participation. • Thaler and Sunstein assert that voluntary programs can improve decision-making for managers who do not have time and information to optimize decisions, but require champions.	• Potentially Complementary Factors • Potentially consistent with WasteWise Program organization; timing of projects in relation to WasteWise participation, and information about use of WasteWise Program tools, resources, and activities would support analysis of WasteWise impacts.	Alberini and Segerson (2002) Delmas and Montes (2007) Darnall et al (2008) Khanna et al (2007)
Cost Savings	• Factor can be addressed using WasteWise Program tools. WasteWise tools may be used to implement further cost saving opportunities. • Alberini and Segerson argue that a firm will voluntarily reduce pollution or waste if the reduction represents a direct cost savings.	• Potentially Complementary Factors • Potentially consistent with WasteWise Program organization; timing of projects in relation to WasteWise participation, and information about use of WasteWise Program tools would support analysis of WasteWise impacts.	Alberini and Segerson (2002) Khanna (2007) Khanna et al (2007)
Public Disclosure Law	• Delmas and Montes (2007) controlled for Public Disclosure Laws with a dummy variable for the level of public disclosure required by states. The variable was found to be insignificant, but authors indicate that more time may be needed to show the impact of public disclosure laws. • Thaler and Sunstein find the Toxic Release Inventory to serve as a catalyst for firms to reduce their waste, but not to provide tools or incentives that are available through voluntary programs.	• Uncertain Impacts: Complementary, but sometimes pre-existing requirements. • Where this factor is present, may indicate that factors other than WasteWise account for changes in practice and should not be included in WasteWise achievements. However, if company is clear that WasteWise supported implementation, and/or projects begin well after public disclosure requirements, then may be WasteWise achievements.	Delmas and Montes (2007) Thaler and Sunstein (2008)

FACTOR	DESCRIPTION OF ISSUE	CATEGORY OF IMPACT AND IMPLICATION FOR WASTEWISE ACHIEVEMENTS	KEY SOURCES
Future Regulations and Threat of Regulations	• Firms joining program may still have other motivations (e.g., cost savings) and to the extent that program features address specific needs. A case may be made that the program contributes to achievement. • Aseem Prakash finds that firms' motivations could include not only an effort to pre-empt regulations, but also to gain clout in shaping future regulations. • Darnall et al accounted for the threat of legal sanction associated with poor environmental performance. They concluded that 'institutional pressures' including regulatory pressure, have a statistically significant impact on EMS adoption and comprehensiveness.	• Uncertain Impacts • Impact varies with strength of regulatory threat; stronger regulatory threat likely to be more important driver than partnership program. • Robust firm-specific or sector-level data may be necessary to identify role of WasteWise.	Alberini and Segerson (2002) Khanna (2007) Darnall et al (2007) Delmas and Montes (2007) Prakash (2002)
Environmental/ Pressure Groups	• Factor may provide greater incentive for a firm to participate in Wastewise, if program provides value to both company and environmental group, then case may be made that program contributes to achievement. • Darnall et al survey firm managers to determine effect of environmental or pressure groups on environmental management. They find that these pressures have a statistically significant positive impact on EMS adoption and comprehensiveness.	• Uncertain Impacts • Varies with level of pressure and publicity from environmental groups; formal agreements with groups may be more important driver of change than partnership program. • Robust firm-specific or sector-level data may be necessary to identify role of WasteWise.	Alberini and Segerson (2002) Darnall et at(2007) Darnall and Sides (2007) Delmas and Montes (2007) Khanna (2007)
Industry Pressure and Regulations	• Survey techniques were used to account for pressure from industry. Delmas and Montes (2007) looked specifically at members who belonged to trade organizations. They concluded that trade organization membership has a statistically significant positive relationship with program enrollment and early adoption.	• Uncertain Impacts • Factor may provide incentive for a firm to adopt waste or pollution reduction policies outside WasteWise; industry-wide efforts and agreements may be more important than partnership program. • Robust firm-specific or sector-level data may be necessary to identify role of WasteWise. • Factor may drive firm to use WasteWise resources to facilitate change in practice.	Darnall et al (2007) Delmas and Montes (2007) Thaler and Sunstein (2008)
Participation in Other Voluntary Programs	• The literature addresses commitment to other programs. However, an additional issue not addressed in the literature is the overlap with other *voluntary* programs.	• Uncertain Impacts • Important to verify that participation in other partnership programs does not double-count impacts. Case-by-case examination of participation effects on waste management outcomes may be required. • Robust firm-specific or sector-level data may be necessary to identify role of WasteWise.	Delmas and Montes (2007) Khanna (2007)

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Appendix C:

FOCUS GROUP PROTOCOL

FOCUS GROUP PROTOCOL

FOCUS GROUP INSTRUCTIONS

1. Prepare and distribute information sheet and pre-printed name tags to participants as they arrive (IEc will also email the information sheet to participants upon confirmation of their participation.)
2. Ask everyone to be seated.
3. Provide opening remarks and review procedure for the focus group. Ask for questions before starting.
4. Begin asking questions in order, facilitating a conversation about the topics at hand. *As necessary, use "prod" questions, as indicated with a bullet next to the question.* If participants desire, take a break between main topics.
5. At the end of the focus group, thank all the participants, answer any questions that they may have.

OPENING REMARKS AND PROCEDURES

Hello my name is Andy Schwarz and I am a Principal at Industrial Economics. (Andy will provide a couple of sentences about his background in evaluation, facilitation, etc). Thank you for joining us today. This panel discussion is part of a broader evaluation of the WasteWise Program that we are conducting at the request of the WasteWise program and EPA's Office of Policy, Economics, and Innovation (OPEI).

As you know, WasteWise is a partnership program that provides technical assistance and recognition to partners to assist and encourage them to reduce waste generation, increase waste reuse and recycling, and increase use of recycled content materials. One purpose of this evaluation is to identify the most effective WasteWise services and activities for increasing waste prevention by different types of program partners.

We are conducting this discussion to solicit information about how WasteWise services and activities serve your organization. Your feedback will enhance our understanding of WasteWise and will inform the evaluation.

We are interested in learning which of the following WasteWise program elements have supported your organization's waste prevention efforts. We have provided you with an information sheet on program elements, but I will review them now:

- *Helpline:* The WasteWise Helpline provides free, tailored waste prevention assistance to Partners. The Helpline is staffed by WasteWise information specialists who can answer general program questions and specific technical questions on solid waste prevention and recycling. Helpline staff can be reached by phone or email.
- *WasteWise Website:* The WasteWise website provides a number of resources including welcome packet, an online waste management toolkit; fact sheets on waste management; waste reduction calculators, etc.

- *Greenhouse Gas calculations:* WasteWise provides estimates of greenhouse gas savings associated with waste management quantities provided on annual reports.
- *WasteWise Annual Conference:* The annual WasteWise conference provides opportunities for networking, information sharing, and celebrating the successes of WasteWise partners and endorsers.
- *WasteWise Awards:* The WasteWise program publically recognizes and rewards partners and endorsers for outstanding waste prevention and recycling achievements through such distinctions as the WasteWise Hall of Fame, Partner of the Year, Endorser of the Year, the Gold Achievement Award, and Honorable Mention.

A second purpose of this evaluation is to identify the impacts that participation in WasteWise has had on the environmental performance of different organizations. We are considering three different aspects of performance as it relates to WasteWise:

- *Incentive to Participate:* We are interested in the features of WasteWise that led to your decision to join the program.
- *Accomplishments:* We are interested in changes in waste generation and management practices, and broader changes in environmental performance, that you link to participation in WasteWise.
- *Organizational Changes:* We are interested in the relationship between WasteWise and specific changes you have implemented on an organizational level to improve or highlight environmental decision-making.

Before I go any further, a very important point I want to stress about today's discussion is that CONFIDENTIALITY IS ASSURED. While the opinions you express will be communicated in evaluation deliverables, your names will remain confidential. No opinion will be identified with any specific participant.

Do you have any questions so far?

I will now explain today's procedure. We have some questions about how well each of the WasteWise activities described above serve your organization's waste prevention and recycling efforts. We will pose our questions about each activity separately.

Please note that there are no right or wrong answers and most likely there will be a number of points of view. It is not necessary to agree with one another, and all opinions or ideas are valid. Your role is to participate. We are interested in everyone's ideas and viewpoint. Please share your opinions with the group like you would with colleagues.

While we want each participant's view, if your view has already been well presented, just say so. It's not necessary to repeat your idea in detail. On the other hand, if your idea has only been partially discussed, it is important for you to speak up.

My role as moderator is to steer conversation and see that everyone participates. While I may have opinions, I am not here to give them.

You will notice that there is a recorder and microphone in the room. We will record the discussion so we don't miss anything. The digital audio file will remain with IEc and will be kept confidential

Are there any questions or comments you would like to make before we begin our discussion?

We will begin our conversation with introductions and then proceed with a discussion of your experiences with various WasteWise program elements, per the questions below.

1. First, how did you learn about WasteWise?
    - Did conversations with EPA encourage you to join?
    - Did competitors/business organizations identify the program or participate in it?
    - Did participation in/coordination with other programs help you identify WasteWise?
2. What aspects of WasteWise contributed to your decision to become a partner?
    - Did specific waste-related challenges or projects, or specific features of the program, stand out as a reason to join?

Discussion questions about wastewise program elements

3. Which of the WasteWise tools on the information sheet has your organization used?
4. For what purpose(s) has your organization used these tools?
    - For example, have you used the tools to better measure waste?
    - To learn about different management options or the costs and benefit of those options?
    - To communicate about waste management to higher ups?
5. How often does your organization use these tools?
6. How have these tools helped your organization?
7. What additional tools or services, or refinements to existing tools, would be helpful to your organization?

At this point we have the option of a short break. Our remaining questions will focus on the impacts of the WasteWise program on your organization. Note that you are welcome to provide additional insights on any prior question if the discussion raises them.

The following questions relate to the contribution of WasteWise to environmental performance at your organization.

8. Please identify specific waste prevention or recycling achievements since joining WasteWise.
    - Decreased waste generation (e.g., source reduction)
    - Increased recycling rate
    - Started to recycle waste from waste streams that were previously disposed
9. How did WasteWise affect these achievements?
    - Help identify opportunities to improvement management/conserve resources?
    - Help design programs/projects at your organization?
    - Improve tracking, reporting of results?

- Encourage additional efforts (e.g., after an initial success)?

10. Would you have achieved these things even if you weren't in WasteWise?
11. (Assuming that some of the answers to #10 are "yes) Would you have made these achievements on the same schedule?

These questions relate to the contribution of WasteWise changes in the culture of your organization.

12. Have you changed the way you evaluate environmental projects as a result of your WasteWise experience?
    - Longer "payback" periods allowed for environmental projects
    - Higher priority for environmental projects vs. non-environmental
    - Greater buy-in on environmental projects across the organization
13. Did your participation in WasteWise lead to you joining other partnership programs? If yes, which ones?
    - Other EPA programs
    - NGO programs (e.g., Ceres)

14. How has your experience with WasteWise affected your relationships with other organizations and/or your market position?
    - Community/customer image
    - Expansion of program or similar projects to other facilities/companies
    - Industry-wide initiatives/best practices
    - Supplier initiatives or agreements
    - EPA/State regulators

WASTEWISE INFORMATION SHEET FOR PANEL PARTICIPANTS

We are interested in several facets of your organization's participation in WasteWise:

1) Incentives to Participate: We are interested in the features of WasteWise that led to your decision to join the program.

2) We are interested in learning which of the following WasteWise program elements have supported your organization's waste prevention and recycling efforts:

- *Helpline:* The WasteWise Helpline provides free, tailored waste prevention and recycling assistance to Partners. The Helpline is staffed by WasteWise information specialists who can answer general program questions and specific technical questions on solid waste prevention and recycling. Helpline staff can be reached by phone or email.
- *WasteWise Website:* The WasteWise website provides a number of resources including welcome packet, an online waste management toolkit; fact sheets on waste management; waste reduction calculators, etc.
- *Greenhouse Gas calculations:* WasteWise provides estimates of greenhouse gas savings associated with waste management quantities provided on annual reports.
- *WasteWise Annual Conference:* The annual WasteWise conference provides opportunities for networking, information sharing, and celebrating the successes of WasteWise partners and endorsers.
- *WasteWise Awards:* The WasteWise program publically recognizes and rewards partners and endorsers for outstanding waste prevention and recycling achievements through such distinctions as the WasteWise Hall of Fame, Partner of the Year, Endorser of the Year, the Gold Achievement Award, and Honorable Mention.

3) We want to identify the impacts of participation on your organization. We are considering two different aspects:

- *Accomplishments:* We are interested in changes in waste generation and management practices, and broader changes in environmental performance, that you link to participation in WasteWise.
- *Organizational Changes:* We are interested in the relationship between WasteWise and specific changes you have implemented on an organizational level to improve or highlight environmental decision-making.

Appendix D:

FOCUS GROUP SUMMARY

MEMORANDUM | May 13, 2010

TO Terell Lasane, EPA

FROM Kelsey Rioux, Angela Helman, and Cindy Manson, IEc

SUBJECT WasteWise Evaluation Focus Group Summary

FOCUS GROUP SUMMARY AND FINDINGS

On September 29th 2009, IEc conducted a focus group addressing the potential benefits of WasteWise membership. The purpose of the focus group was to address evaluation questions one and three as proposed in the evaluation methodology. Question one looks at the relative effectiveness of WasteWise tools for influencing partners' waste management practices. Question three explores the contributions of WasteWise to partners' waste management practices. We explored both questions throughout the focus group and obtained information regarding members' opinions and views of the WasteWise Program.

Participant Selection

As discussed in the methodology, IEc selected participants based on a number of criteria including diversity among sectors, membership tenure, reporting experience, and award program participation. IEc first determined the sectors to be represented at the focus group based on participation rates, and identified a sample of less than ten companies in each sector. EPA selected two organizations within each sector as top choices, and IEc ranked these choices to ensure diversity. Of the eleven sectors, nine sectors participated. Eight of nine participants were IEc's first choices. IEc was unable to identify participants from the Motor Vehicle and Parts and the Federal Government sectors.[1] The sectors represented at the focus group were:

- Local Government
- Colleges and Universities
- Consulting and Employment Services
- Waste Management Services
- US Postal Service
- Electronic and Electrical Equipment[2]

[1] Contact information provided by WasteWise for the Motor Vehicles and Parts sector was outdated and resulted in IEc being unable to secure a participant from this sector in the time needed. IEc had booked a participant from the federal government sector, but he cancelled the day of the focus group.

[2] The partner from the Electronic and Electrical Equipment sector indicated that this designation was incorrect. However, this sector assignment was taken from the WasteWise database.

- Printing and Publishing
- Utilities
- Entertainment

Details about the organizations representing each sector are presented in Exhibit 1 at the end of this memo.

Focus Group Results

Andy Schwarz, a Principal at IEc, facilitated the focus group. IEc staff working on the WasteWise evaluation observed the focus group and helped to steer the conversation as necessary. The participants were, overall, receptive to the questions and eager to share their experiences with WasteWise. Several themes were prevalent throughout the discussion, including:

- A clear indication that WasteWise participation positively contributes to improvements in waste management behavior within most of the organizations represented at the focus group.
- The importance of awards and recognitions for continued participation in WasteWise, particularly for demonstrating the value of the program to corporate leaders.
- An extensive use of the WasteWise tools (website, calculations, Retrac) by most participants.
- A desire for additional training for participants who were unaware/unfamiliar with tools
- Areas of information disconnect between the WasteWise program and partners, which have become more apparent recently.
- Long-term members were, in general, more involved and enthusiastic about the program. New-joiners expressed a lack of knowledge about program offerings, annual reporting, and applying for awards.

These themes arose numerous times during the focus group and give a broad understanding of the opinions of the participants. The following summary, organized by focus group question, elaborates on these themes and provides additional detail.

Question #1: How did you learn about WasteWise?

Participant responses varied greatly depending on when they became involved with WasteWise. The responses included:

- The WasteWise conferences, teleconferences and cold calling were all mentioned as reasons for joining WasteWise and/or for actively participating. The promotional impact of both the conferences and teleconferences were commended and impressed those who attended.
- A few participants indicated that being involved in other voluntary programs made them more receptive to the WasteWise program.

- One participant whose predecessor was actively involved in the WasteWise program expressed difficulty in staying actively involved in the program today. The participant indicated that he received little information or updates that encouraged or offered assistance regarding activities as award applications or annual reporting.

Question #2: What aspects of WasteWise contributed to your decision to become a partner?

- Many participants indicated that the awards and recognition opportunities are a significant incentive for joining WasteWise, and for remaining a member. However, one participant indicated he was frustrated with the lack of information regarding submitting annual reports and applying for awards.
- Several participants indicated that their organizations joined to improve relationships with the EPA. Participants also indicated that they used WasteWise membership to promote and support voluntary programs in general within their corporate organizations.
- One participant discussed previous involvement in a local recycling coalition that was well suited for WasteWise membership. This same company later became involved in recruiting other organizations to the WasteWise program.
- One participant indicated that internal clout associated with WasteWise gave environmental projects related to materials a higher level of importance within their organization.
- One participant indicated public awareness provides less of an incentive to join WasteWise than industry and/or government awareness, as public awareness of the program is minimal.

Questions about WasteWise Program Elements

The following discussion covers focus group questions three through seven and looks at participants' use of the WasteWise tools and perceived effectiveness of the tools

Question #3: Which of the WasteWise tools on the information sheet has your organization used extensively?

Question #4: For what purpose(s) has your organization used these tools?

Question #5: How often does your organization use these tools?

Question #6: How have these tools helped your organization?

Question #7: What additional tools or services, or refinements to existing tools, would be helpful to your organization?

The responses to questions about tools were positive in general. Most participants have utilized these tools and gave them good reviews. One common theme that arose

throughout the conversation, however, was the perception that EPA's communication to WasteWise members on of the availability of these tools is lacking. Participants who did not utilize specific tools often cited their lack of knowledge about them. One participant suggested that EPA provide training sessions aimed at new members that would involve using the website, annual reporting, and the applicability of WasteWise tools.

Helpline: There were mixed responses regarding the overall helpfulness of the helpline. Those who knew about the helpline found it extremely helpful, especially with regard to seeking out information about annual reporting and award applications. However, some participants were completely unaware of the helpline, or unaware of the breadth of service that it provides.

WasteWise Website: Participants largely agreed about the overall helpfulness of the website. The website was commended for its great resources, calculators, and methodologies. In particular, participants found the waste reduction calculators to be beneficial to their organizations' waste management.

Greenhouse Gas Calculations: The calculators were one of the tools used extensively among the participants. Participants noted that the fact that the calculations come from EPA gave them credibility within their organizations. One participant went as far as to say that the use of the calculators were a key component of their continued involvement in the program. However, some questions were raised about how up-to-date the calculators are. One participant expressed concern that portions of the website have not been updated in several years and that the WARM model, in particular, was not reflective of current advancements in GHG calculations. Also, many participants expressed interest in syncing their internal greenhouse gas calculators with the calculators offered through the WasteWise program.

WasteWise Annual Conference: The annual conference received generally positive reviews from the participants. One participant who has participated since the mid-90's and whose organization is involved in many other voluntary programs, finds the WasteWise conference to be the overall best-run conference of its type. However, another participant thought the conference was too small and is limited because it is focused too narrowly as an awards ceremony. The networking opportunities provided by the conference were commended by most, and many participants expressed an interest in expanding the networking opportunities made available through WasteWise.

WasteWise Awards: WasteWise awards resonate with executives, and many participants find them helpful in promoting their participation in the WasteWise program, and for communicating their environmental programs to the public. One participant stated that if his organization had not received a WasteWise award, they would have stopped recycling marginal commodities three to four years ago. Because the organization received an award for their recycling program, however, recycling of the material became standard operating procedure and is now perceived as mandatory throughout the organization.

Re-TRAC: Participants find the Re-TRAC system to be extremely helpful, and were very enthusiastic about system's ability to assist with waste management and reporting. The ability to select different commodities was a popular component of Re-TRAC.

The discussion of WasteWise tools led to a broader discussion on the dissemination of information throughout the WasteWise program. There was a clear divide between long-term members and new joiners. One new joiner indicated that his involvement was minimal due to a lack of information and training. A long-term member indicated that, in the past, WasteWise information was much more prevalent and available. but in the past year, the level of information he received from WasteWise had dropped drastically. However, not all long-term members agreed with this sentiment. Participants did share general agreement that the WasteWise contact information is out of date and that information being sent out is not reaching all members. Participants are looking for several ways to become more informed including

- New tools, such as a tool that evaluates tenant space, and most notably, participants would like to see a reporting system that spans WasteWise and other voluntary programs.
- Training for using the WasteWise tools, annual reporting, and award applications.
- More frequent contact from WasteWise about annual reporting, award applications and other program announcements.
- An updated online directory of WasteWise members that *members* (but not the general public) could browse as opposed to the current system, which only allows for searching.
- Opportunities for newer members to network with older members who have won awards and who are more knowledgeable regarding annual reporting and other aspects of WasteWise.
- Greater involvement in WasteWise at the EPA regional and state level.

Participants also found the relationship between WasteWise and the Resource Conservation Challenge to be confusing. It was not clear to participants whether the Challenge, or tools provided by the challenge (such as recent webinars), are open to anyone or only members of WasteWise.

Questions about WasteWise Contributions to Environmental Performance

The following discussion covers focus group questions eight through eleven and looks at the contribution of WasteWise to environmental performance.

Question #8: Please identify specific waste prevention or recycling achievements since joining WasteWise.

Question #9: How did WasteWise affect these achievements?

Question #10: Would you have achieved these things even if you weren't in WasteWise?

Question #11: (Assuming that some of the answers to #10 are "yes") Would you have made these achievements on the same schedule?

Several participants identified tangible waste prevention or recycling achievements that they attributed to their involvement with the WasteWise program.

- Two participants indicated the technical assistance from WasteWise directly contributed to waste reductions; one of these participants cited cost savings attributable to these waste reductions as well.
- One organization created their waste management system and annual reporting around the WasteWise program, and credited WasteWise with the development of these systems. The same participant gave several examples of specific recycling projects initiated to meet goals set for WasteWise.
- For another participant, having the annual reports from WasteWise across their company made setting a goal to reach carbon neutrality an easier task. The addition of Re-TRAC also allowed for more complete and more organized waste reporting.

For other participants, directly attributing waste reduction to WasteWise was more difficult. However, a couple of participants indicated that WasteWise had a supporting role in their waste management successes. One of these participants indicated that WasteWise participation made waste reduction occur sooner than it would have otherwise. Another participant indicated that when the organization put a new a waste management system that spanned different business units, data reported to WasteWise were the only long-term trend data common to all of the units

Contribution of WasteWise to Culture Change

The following discussion covers focus group questions twelve through fourteen and looks at the contribution of WasteWise to organizational culture change.

Question #12: Have you changed the way you evaluate environmental projects as a result of your WasteWise experience?

Two main ideas circulated thorough this discussion:

- The use of WasteWise in achieving broader sustainability goals. One participant attributed the WasteWise program with his organization's goal to achieve LEED certification for their facilities. Recycling activities, buying recycled content materials, and better resource management all count towards LEED certification.
- Improved communication of waste reduction and recycling efforts internally. Although several participants cited WasteWise as helpful in internal communication, one participant indicated a desire for tools that would help promote the WasteWise program to employees.

Question #13: Did your participation in WasteWise lead to you joining other partnership programs? If yes, which ones?

Participants identified several other partnership programs they had joined as a result of WasteWise including:

- EPA's National Partnership for Environmental Priorities (NPEP)
- National Product Stewardship Initiative
- Leadership in Energy and Environmental Design (LEED)
- Association for the Advancement of Sustainability in Higher Education

Question #14: How has your experience with WasteWise affected your relationships with other organizations and/or your market position?

Some participants, specifically long-term members, noted that they been contacted by other members seeking help and/or information regarding WasteWise. However, participants indicated that EPA should work harder to "champion" the importance of the WasteWise partnership. Participants are looking for ways to establish closer and strategic relationships other WasteWise members through the auspices of the program, but none of the participants indicated that partnership had clearly provided this opportunity as of yet. Several participants noted that the exercise of participating in the focus group itself provided a valuable opportunity to interact with other members and improve understanding of the program. Participants did not address the market position aspect of this question.

EXHIBIT ONE: FOCUS GROUP PARTICIPANTS

SECTOR	ORGANIZATION	LENGTH OF MEMBERSHIP	EVER REPORTED?	REPORTED MSW GENERATED 2007 (TONS)	TOTAL AWARDS RECEIVED
Local Government	King County, Washington	12	Yes	Not Reported	5
Colleges and Universities	University of Colorado at Boulder	15	No	Not Reported	0
Consulting and Employment Services	CDM	2	Yes	152,418	0
Waste Management Services	Inland Empire Regional Composting Authority	2	Yes	15,041	0
US Postal Service	USPS Northeast Area	12	Yes	14,932,913	7
Electronics and Electrical Equipment	General Dynamics - Lincoln Operations	2	Yes	156,850	0
Printing and Publishing	FedEx Kinkos	12	Yes	52,543,958	1
Utilities	PSEG	15	Yes	17,975,048	9
Entertainment	The Walt Disney Company	15	Yes	321,619,163	14

Appendix E:

USPS WASTEWISE FACILITY SURVEY

SURVEY QUESTIONS FOR FACILITY REPRESENTATIVES

The survey will include an introduction that makes the following points:

- This survey is part of a broader program evaluation that IEc is conducting at the request of EPA's Office of Policy, Economics, and Innovation (OPEI) and EPA's Office of Resource Conservation and Recovery.
- We are conducting this survey to solicit information about waste management activities at your facility. We are interested in changes in waste generation and management practices over time.
- We are only interested in non-hazardous wastes (e.g., paper, cardboard).
- It is important to note that your name and facility location will remain confidential. No opinion will be identified with any specific participant.
- The survey should be filled out by the staff person who knows the most about waste management practices at the facility.
- We expect that the survey will take 20 minutes to fill out.

Section 1: Respondent Information

1. What Area is your facility located in?

2. What District in the (*prefilled*) Area is your facility located in?

3. What type of facility do you work at?
   - Bulk Mail Center
   - Processing and Distribution Center/Facility
   - Other (Please Specify): _____

4. Approximately how many full-time equivalent (FTE) employees work at your facility?
   - Less than 100
   - 100 – 499
   - 500 – 999
   - 1,000 – 3,000
   - More than 3,000

5. What is your position?

6. How long have you been in your position?
   - 0 – 6 months
   - 6 – 12 months
   - 1 – 3 years
   - 3 – 5 years
   - 5+ years

Section 2: Waste Management Survey

7. Who determines waste management methods (e.g., disposal, recycling, purchasing recycled content goods) for your facility? (check all that apply)
    - I do
    - District Staff
    - Area Staff
    - Headquarters Staff
    - Other (Please Specify): _____

8. What recycling activities do you undertake? (check all that apply)
    - Reverse hauling of undeliverable mail
    - Separate collection/contracts with recyclers in addition to waste haulers
    - Participate in specific recycling approach identified by local government
    - Work with post offices to collect waste materials from customers (e.g., unwanted mail from customer PO Boxes)
    - Reuse of recycled materials in-house
    - Other (Please Specify): _____

Series of Material-Specific Recycling Questions

9. How frequently does your facility recycle undeliverable mail?
    - Always/Almost Always: 90 – 100% of the time
    - Usually: 50 – 90% of the time
    - Occasionally: 10 – 50% of the time
    - Rarely/Never: 0 – 10% of the time
    - Other (Please Specify): _____

**If rarely/never is selected, the survey will skip the following two questions for the material.*

9a. When did your facility first begin recycling undeliverable mail?
    - In the past 6 months
    - 6 – 12 months ago
    - 1 – 2 years ago
    - 2 – 3 years ago
    - 3 – 5 years ago
    - More than 5 years ago
    - I do not know

9b. Why did your facility first begin recycling undeliverable mail? (check all that apply)
    - Cost savings opportunity
    - District/Area representatives encouraged it
    - District/Area representatives required it
    - Local initiatives
    - EPA voluntary program participation

- Required by local or state law
- Other (specify) _____
- I do not know

****

10. How frequently does your facility recycle plastic pallets?

**If rarely/never is selected, the survey will skip the following two questions for the material.*

10a. When did your facility first begin recycling plastic pallets?

10b. Why did your facility first begin recycling plastic pallets? (check all that apply)

****

11. How frequently does your facility recycle wooden pallets?

**If rarely/never is selected, the survey will skip the following two questions for the material.*

11a. When did your facility first begin recycling wooden pallets?

11b. Why did your facility first begin recycling wooden pallets? (check all that apply)

****

12. How frequently does your facility recycle corrugated cardboard?

**If rarely/never is selected, the survey will skip the following two questions for the material.*

12a. When did your facility first begin recycling corrugated cardboard?

12b. Why did your facility first begin recycling corrugated cardboard? (check all that apply)

****

13. How frequently does your facility recycle mixed paper generated from operations at your facility (e.g., printer paper, invoices, etc.)?

13a. When did your facility first begin recycling mixed paper?

13b. Why did your facility first begin recycling mixed paper? (check all that apply)

****

14. Approximately how frequently does your facility recycle any office supplies (e.g., toner, ink cartridges, etc.)?

14a. When did your facility first begin recycling office supplies (e.g., toner, ink cartridges, etc.)?

14b. Why did your facility first begin recycling office supplies? (check all that apply)

****

15. Approximately how frequently does your facility recycle any plastic (e.g., plastic beverage bottles, shrink wrap, and containers (other than pallets)?

15a. When did your facility first begin recycling plastic (e.g., plastic beverage bottles, shrink wrap, and containers (other than pallets))?

15b. Why did your facility first begin recycling plastic? (check all that apply)

****

16. Does your facility recycle any other materials that were not included in the previous questions (e.g., food wastes, metals, tires, etc.)?

16a. Please list any additional materials that your facility recycles.

- _____
- _____
- _____
- _____

16b. When did your facility first begin recycling these other materials (e.g., food wastes, metals, tires, etc.)? (check all that apply)

16c. Why did your facility first begin recycling these other materials? (check all that apply)

****

17. Do you know the approximate recycling rate for the materials your facility recycled in 2008?

- No, this metric is not tracked. (If no, survey will skip to next question)
- Yes, I roughly know the percentage of materials that were recycled.
- Yes, but I would need to research it. (If no, survey will skip to next question)
- I know or could research recycling rates for some of the materials we recycle, but not all. (If no, survey will skip to next question).

17a. Please indicate the approximate annual percentage of the total non-hazardous waste you recycled in 2008. Non-hazardous waste includes all undeliverable mail, pallets, corrugated cardboard, mixed paper, office supplies, and plastics.

- <25%
- 25–50%
- 50-75%
- 75 – 100%

17b. Do you know the approximate tonnage of the non-hazardous materials that your facility recycled in 2008?

- No, this metric is not tracked by our facility. (If checked, the survey will skip the next question)
- Yes, I roughly know how many tons of materials were recycled.
- Yes, but I would need to research it. (If checked, the survey will skip the next question)

17c. Please indicate the approximate tonnage of the non-hazardous waste you recycled in 2008, across all materials.

- _____ tons

18. Does your facility currently have projects or processes aimed at reducing the generation of nonhazardous waste (e.g., paper waste, cardboard, plastics)?

1. No (if no, the survey will skip the next question)
2. Yes

19. What actions has your facility taken to reduce the quantity of non-hazardous waste that your facility produces, otherwise known as source reduction? (check all that apply)

- Purchasing policies
- Use of digital instead of paper media (move toward a paperless facility)
- Upgrade equipment instead of purchasing new equipment
- Other?

20. Which voluntary program(s) encouraged your facility to begin reducing and/or recycling non-hazardous waste? (check all that apply)

- WasteWise
- National Environmental Performance Track (PTrack or Performance Track)
- State environmental partnership program
- Local environmental initiative
- Other (Please Specify) _____
- None of the Above

21. Do you believe that your facility may benefit from a software tool that would help track annual waste generation and management?

- No, my facility is not able to obtain information regarding generation and management of waste
- No, my facility does not have the time to use such a tool
- Yes, this might be somewhat helpful
- Yes, this would be very helpful
- I do not know; I would need more details.

Section 3: Design and Implementation of Programs

22. What types of tools influence waste management activities at your facility? (check all that apply)

- Fact sheets
- Information from other USPS facilities
- Direction from Area and/or District staff members
- Internal emails
- Staff/group meetings
- Training sessions
- Conferences (If respondent indicates conferences, this follow up question will appear: "Please briefly list conferences that have influenced waste management at your facility.")

22a. Please briefly list conferences that have influenced waste management at your facility.

23. The following is a set of tools available through EPA's WasteWise Program. Please rate your experience with the following tools:

	Very Helpful	Somewhat Helpful	Not Helpful	I am aware of tool, but have not used it.	I was not aware of this tool/.
EPA's Waste Reduction Model (WARM)	☐	☐	☐	☐	☐
WasteWise Conference	☐	☐	☐	☐	☐
WasteWise Fact Sheets	☐	☐	☐	☐	☐
WasteWise Technical Assistance Documents	☐	☐	☐	☐	☐
WasteWise Hotline	☐	☐	☐	☐	☐
WasteWise Website	☐	☐	☐	☐	☐

24. Is your facility currently considering the development of any new programs or initiatives to better manage waste?

- No
- Yes

Section 4: Cultural and Organizational Change

25. Has the operation/organization of your facility changed as a result of efforts to improve recycling/waste prevention? (check all that apply)

- Yes, staff responsibilities have changed to incorporate specific activities that ensure that recycling programs are implemented effectively
- Yes, some staff performance evaluations include effective operation of recycling/source reduction efforts
- Yes, facility-level performance measures include environmental projects
- No, operations have incorporated recycling/waste prevention without significant change in standard operating procedures or personnel changes

26. Have efforts to improve recycling/waste prevention changed your relationship with your regional/area management? (check all that apply)

- Yes, facility personnel generate project ideas and take the lead role in designing and implementing projects
- Yes, facilities take the lead in choosing how to implement regional/area project ideas
- Yes, facility personnel communicate with other facilities and regions about environmental projects and strategies
- No, recycling and waste prevention projects are designed and implemented using existing chains of authority

27. Has the attitude of personnel at your facility about waste management changed as a result of efforts to improve recycling/waste prevention? (check all that apply)

- Yes, personnel are conscientious about program implementation
- Yes, facility personnel identify new ideas for additional recycling/waste prevention efforts
- Yes, facility personnel identify new ideas for other environmental projects (e.g., energy projects)
- Yes, staff/facility management coordinate more effectively with public, EPA, and/or other agencies on waste management
- No, efficient management of resources has always been of great concern, and recycling/waste prevention are obvious parts of this
- No, most staff are not aware of waste management efforts.

28. Did your efforts to recycle and prevent waste lead to initiatives in these other environmental areas (check all that apply)?

- Yes, recycling and waste prevention efforts have led the facility to examine options for reducing other environmental impacts/costs
- Yes, success of recycling and waste prevention efforts have led the facility to seek participation in other environmental partnership programs
- No, the general focus on environmental performance has historically included waste and other efforts
- No, initiatives in other areas led to initiatives in recycling and waste prevention

29. Do you have any comments on waste management, WasteWise, or this survey?

Appendix F:

USPS SURVEY RESULTS

MEMORANDUM April 4, 2009

TO Terell Lasane, EPA

FROM Laurie Finne, Angela Helman, IEc[1]

SUBJECT Revised WasteWise Survey Results

BACKGROUND

The United States Postal Service (USPS) is a very active partner in the WasteWise program. IEc conducted a survey of USPS processing and distribution centers (PDC) and bulk mail centers (BMC) to investigate the effects of WasteWise membership on waste management behavior within USPS, by looking for differences in facilities that joined WasteWise many years ago and facilities that joined WasteWise relatively recently. We hypothesized that facilities and districts that joined WasteWise earlier than others would report higher utilization of greener waste management approaches**.**

USPS entities began joining WasteWise in 1997. The Northeast area (which includes eight individual districts) and four other districts (Alabama, Dallas, Sacramento, and South Florida) joined WasteWise several years before other USPS entities. Together, these 12 districts contain a total of 55 PDCs and BMCs; we defined this group of early joiners as "Group A" and surveyed the entire universe. The majority of USPS WasteWise partners, however, joined in 2007 and 2008. This universe contains 405 PDCs and BMCs. Instead of surveying the entire universe, IEc developed a sampling plan to survey 200 facilities. These newer partners are called "Group B."[2]

IEc developed the survey using the online software "esurveyspro." USPS Headquarters staff provided a contact for each facility to be surveyed. IEc emailed each facility to explain the survey, request their participation, and provide a link to the survey form. The survey remained open for approximately twelve weeks. During that time, IEc and USPS staff sent out email reminders to facility contacts to encourage them to participate in the survey.

This memo presents the results of IEc's analysis of survey data. First, we provide a summary of survey findings on the key issue at hand: are there statistically significant differences in waste management behavior of long-time and newer USPS WasteWise members? Then, we provide an overview of respondent characteristics and response rates, followed by a presentation of survey findings organized by evaluation question. Appendices present additional detail of our analyses.

SUMMARY OF SURVEY FINDINGS

The results for most survey questions indicated that early WasteWise joiners (Group A) reported greener approaches to waste management compared to later joiners (Group B).

We found statistically significant differences between the groups in responses to many questions. Specifically, facilities in Group A:

- Conduct more recycling activities than facilities in Group B.

[1] Chris Leggett provided targeted assistance with statistical analyses.
[2] See WasteWise evaluation methodology for detailed information about the survey approach.

- Have higher recycling frequencies for every material and a higher recycling frequency across materials.
- Have been recycling materials for a longer length of time than facilities in Group B.
- Are more aware of their recycling rates than Group B.

For some questions, results indicated that Group A has greener practices than Group B, but results were not statistically significant. These include:

- Frequency of changes to operations or to the facility's organization resulting from recycling and waste prevention.
- Number of waste prevention activities.

Differences between Group A and Group B on the following topics were mixed and/or marginal:

- Changes in attitudes of facility personnel about waste prevention.
- Waste prevention/recycling leading to other environmental initiatives.

Given the preponderance of questions where the results indicate greener activities for Group A, we conclude that Group A is, on the whole, measurably better in their waste management practices. This conforms to our hypothesis that facilities that joined WasteWise sooner, and benefited from information provided as part of membership before Group B, would demonstrate better waste management practices. However, early USPS WasteWise joiners may have also benefited from Area and District management that were proactive on environmental issues, and may have undertaken improvements to waste management in absence of WasteWise. Thus, we looked for evidence, beyond differences in Group A and Group B, that WasteWise contributed or did not contribute to waste management practices. We found some indications of WasteWise's direct influence from the survey responses:

- Although we did not expect respondents at the facility level to be familiar with WasteWise by name, some facilities directly cited WasteWise as a reason for originating recycling activities, including 27% of respondents in Group A and 14% from Group B.
- Many survey respondents from both Group A and Group B indicated that District and Area representatives either encouraged or (less frequently) required recycling of various materials. Given that District and Area representatives are a conduit for WasteWise information to facilities, these are potential proxy indicators for WasteWise influence. As Group A may have benefited from Area or District management that were more environmentally proactive, these are stronger proxy indicators for Group B in particular.
- For some facilities, the timing of when facilities started recycling is consistent with when facilities joined WasteWise. We found a statistically significant difference in the number of facilities that started recycling/improved waste management over five years ago between Group A and Group B, with many more facilities in Group A starting recycling earlier. Moreover, given that Group B joined WasteWise mostly in the 2007-2008 timeframe, we would expect to see more Group B recycling activity starting during this time if the activity was tied to joining WasteWise. Across all materials, the proportion of respondents in Group B that started recycling 2-3 years ago is 4% more than Group A respondents. However, this difference is larger for individual materials, including a 9% difference for undeliverable mail recycling, and a 6% difference in plastic pallet and

cardboard recycling. To the extent that WasteWise efforts have been directed at these materials over the last few years, this would be further evidence of causality.

Using interviews with USPS staff to follow up on survey results, we will further explore how WasteWise involvement influenced and/or supported changes in waste management practices at the facility level.

OVERVIEW OF RESPONDENTS

Of the 255 facilities contacted about the survey, 132, or 52%, responded. Thirty long-term partners responded to the survey, for a response rate of 54.5% from Group A. Similarly, Group B had a response rate was 51 %, with 102 of 200 facilities responding.[3] Exhibits 1 and 2 break down the response rates of Groups A and B by USPS area, and Exhibits 3 and 4 break them down by USPS district. See Appendix 1 for the stratified sampling plan for Group B.

EXHIBIT 1: USPS RESPONDENTS FROM GROUP A, BY AREA

USPS AREA	RESPONDED	DID NOT RESPOND	TOTAL
Northeast Area	16	15	31
Pacific Area	4	1	5
Southeast Area	6	4	10
Southwest Area	4	5	9
Total	**30**	**25**	**55**

EXHIBIT 2: USPS RESPONDENTS FROM GROUP B, BY AREA

GROUP B	RESPONDED	DID NOT RESPOND	TOTAL
Capital Metro Area	7	8	15
Eastern Area	14	17	31
Great Lakes Area	12	12	24
New York Metro Area	7	2	9
Pacific Area	5	7	12
Southeast Area	11	13	24
Southwest Area	12	14	26
Western Area	34	25	59
Total	**102**	**98**	**200**

[3] Two respondents left significant sections of the survey blank.

EXHIBIT 3: USPS RESPONDENTS FROM GROUP A, BY DISTRICT

DISTRICT	COUNT OF PDC AND BMC	#RESPONDENTS	RESPONSE RATE
8 districts in the Northeast Area (Albany, Western New York, Boston, Connecticut, Maine, Massachusetts, New Hampshire/Vermont, and Southern New England)	31	15	48.39%
Alabama District	7	5	71.43%
Sacramento District	5	4	80.00%
Dallas District	9	4	44.44%
South Florida District	3	2	66.67%
Total	**55**	**30**	**54.55%**

EXHIBIT 4: USPS RESPONDENTS FROM GROUP B, BY DISTRICT

DISTRICT	COUNT OF PDC AND BMC	SAMPLE SIZE	RESPONDENTS	RESPONSE RATE
Bulk Mail Centers (BMCs)	28	14	8	57.14%
Capital Metro	26	13	5	38.46%
Eastern	59	29	13	44.83%
Great Lakes	45	22	11	50.00%
New York Metro	18	9	7	77.78%
Pacific	23	11	4	36.36%
Southeast	42	21	10	47.62%
Southwest	53	26	12	46.15%
Western	111	55	32	58.18%
Total	**405**	**200**	**102**	51.00%

Exhibit 5 presents a breakdown of respondents by facility type. IEc worked with USPS staff to develop a list of bulk mail centers and processing and distribution centers/facilities. It is important to note, however, that some of the facilities labeled as processing and distribution centers are post offices that that contain or previously contained some processing equipment, and perform(ed) some PDC functions. Fifteen respondents selected "other," indicating that their facility is not a BMC, or PDC.. A comparison of these "other" facilities to respondent positions indicates that six "other" facilities appear to be post offices with some PDC functions, and the remaining nine facilities appear to be a sorting or processing centers (and thus, may have been miscategorized by respondents).

EXHIBIT 5: USPS TYPES OF FACILITIES RESPONDED

WHAT TYPE OF FACILITY DO YOU WORK AT?	TOTAL
Bulk Mail Center	9
Processing and Distribution Center	61
Processing and Distribution Facility	47
Other	15
Total	**132**

The survey asked respondents about the number of employees at their facilities. Almost half of respondents reported that their facility employs 100 – 499 full-time equivalent employees (FTEs), as shown in Exhibit 6. Most of the respondents were maintenance managers, as shown in Exhibit 7. As seen in Exhibit 8, about half of our respondents (73) indicate that they determine waste management methods at their facilities, either independently or in conjunction with others. However, many respondents indicated that someone else determined waste management methods, typically District or Area staff. Twenty-six facilities checked an "other" box, sometimes in conjunction with choices provided; most of the positions listed under "other" are facility-level positions (as opposed to positions at the district or area level).

EXHIBIT 6: FULL-TIME EQUIVALENT EMPLOYEES AT RESPONDING FACILITIES

APPROXIMATELY HOW MANY FULL-TIME EQUIVALENT (FTE) EMPLOYEES WORK AT YOUR FACILITY?	TOTAL
More than 1,000	22
500 – 999	27
100 - 499	54
50-99	16
10 - 49	10
Less than 10	1
Total	**130**

EXHIBIT 7: USPS RESPONDENT POSITIONS

WHAT IS YOUR POSITION?	TOTAL
Maintenance Manager	99
Postmaster	7
Facility/Plant Manager	3
Environmental Specialist	3
Environmental, Health, and Safety Manager	1
Other	17
Total	**130**

EHXIBIT8: DECISION-MAKING ON WASTE MANAGEMENT

WHO DETERMINES WASTE MANAGEMENT METHODS? (CHECK ALL THAT APPLY)	COUNT
I do	73
District Staff	55
Area Staff	33
Headquarters Staff	17
Other	26

Finally, the survey asked respondents about their tenure at USPS. Despite recent changes at USPS, most of the respondents have been in their positions for at least a year, and nearly half have been in their positions for over five years. Thus, we are confident that respondents are knowledgeable about waste management practices at their facilities.

EXHIBIT 9: TENURE OF RESPONDENT POSITIONS

HOW LONG HAVE YOU BEEN IN YOUR POSITION?	TOTAL
5+ years	63
3 – 5 years	23
1 – 3 years	34
6 – 12 months	9
0 – 6 months	3
Total	**132**

EVALUATION QUESTION #1: WASTEWISE USES A VARIETY OF APPROACHES TO INFLUENCE THE BEHAVIOR OF PARTNERS. WHICH APPROACHES—FOR EXAMPLE TECHNICAL ASSISTANCE, INFORMATION, AWARDS AND RECOGNITION—ARE MOST EFFECTIVE FOR WHICH TYPES OF PARTNERS?

Although Evaluation Question 1 was addressed by IEc's previous review of existing WasteWise data, and by the focus group, we asked a few survey questions related to Evaluation Question 1, as context for other USPS responses.

The survey asked facilities about influences on waste management activities. As seen in Exhibit 10, staff most frequently indicated that direction from Area and/or District staff members influence waste management activities at their facilities (95 respondents). This is not surprising, as USPS is a hierarchical organization in general, with much decision-making happening at levels above the facility-level. However, information from other USPS facilities (66 respondents) and fact sheets (64 respondents) were also noted at influencing waste management activities. Conferences were reported as the least influence tool. As shown in Exhibit 11, some differences between Group A and B are apparent, such as Group A cited Direction from Area/District staff, as far more influential than other tools, whereas responses were more mixed for Group B.

EXHIBIT 10: TOOLS THAT INFLUENCE WASTE MANAGEMENT ACTIVITIES AT FACILITIES

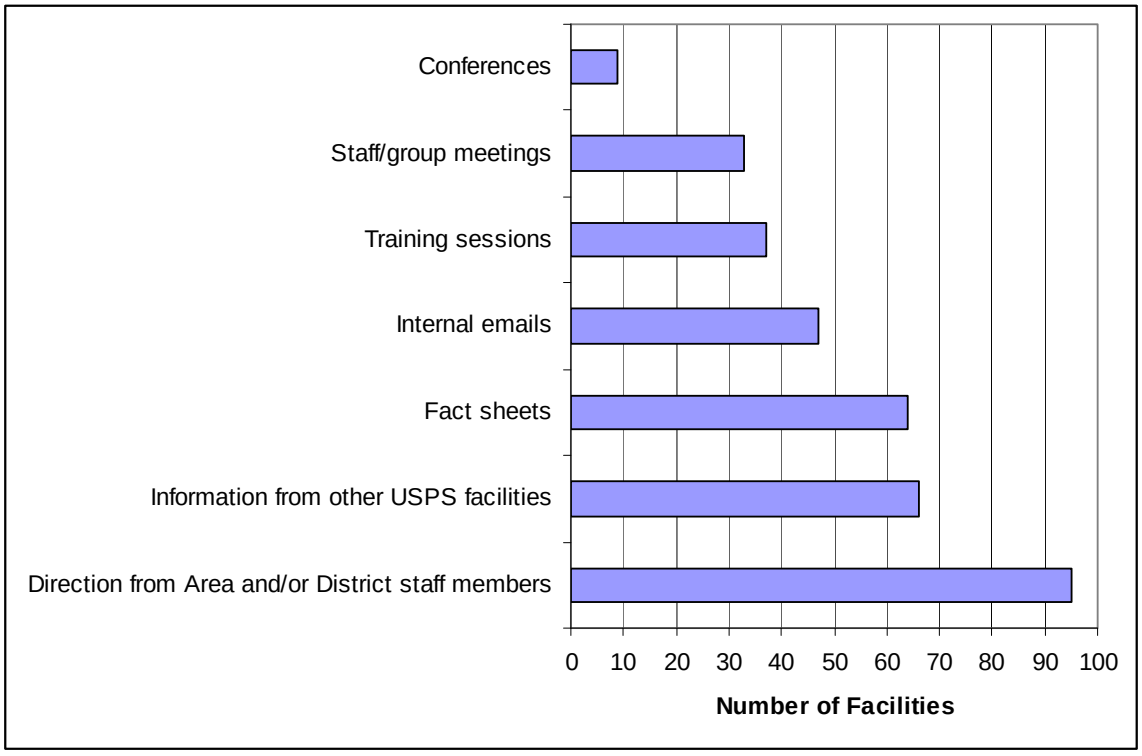


EXHIBIT 11: TOOLS THAT INFLUENCE WASTE PREVENTION ACTIVITIES AT FACILITIES

WHAT TYPES OF TOOLS INFLUENCE WASTE PREVENTION ACTIVITIES AT YOUR FACILITY? (CHECK ALL THAT APPLY)	GROUP A	GROUP B	OVERALL
Conferences	6.67%	6.86%	6.82%
Direction from Area and/or District staff members	83.33%	68.63%	71.97%
Fact sheets	36.67%	51.96%	48.48%
Information from other USPS facilities	46.67%	50.98%	50.00%
Internal emails	46.67%	32.35%	35.61%
Staff/group meetings	40.00%	20.59%	25.00%
Training sessions	30.00%	27.45%	28.03%
Note: Percentages do not add to 100% because the survey asked respondents to select all tools applicable to their facility.			

The survey asked respondents about their familiarity and assessment of WasteWise tools. As shown in Exhibit 12, USPS facilities are not generally familiar with WasteWise tools. This is consistent with our expectations with responses at the facility-level, where information originating from WasteWise may not be branded as such. Of respondents that indicated familiarity with particular tools, the most common response was that the tool was "somewhat helpful." Responses that tools were "not helpful" were quite rare. Of the six tools inquired about, the fact sheets and guidance documents received the highest ratings. As demonstrated in Exhibits 13 and 14, facilities in Group A tend to be more familiar with WasteWise tools than facilities in Group B.

EXHIBIT 12: EXPERIENCES WITH WASTEWISE TOOLS

ALL RESPONDENTS EXPERIENCES WITH WASTEWISE TOOLS	VERY HELPFUL	SOMEWHAT HELPFUL	NOT HELPFUL	I AM AWARE OF TOOL, BUT HAVE NOT USED IT	I AM NOT FAMILIAR WITH THIS TOOL
EPA'S Waste Reduction Model (WARM)	6	7	1	17	93
WasteWise Conference	2	4	1	16	101
WasteWise Fact Sheets	7	13	2	16	87
WasteWise Guidance Documents	7	11	1	12	90
WasteWise Hotline	1	3	0	16	103
WasteWise Website	4	9	0	19	92
TOTAL	**27**	**47**	**5**	**96**	**566**

EXHIBIT 13: EXPERIENCES WITH WASTEWISE TOOLS (GROUP A)

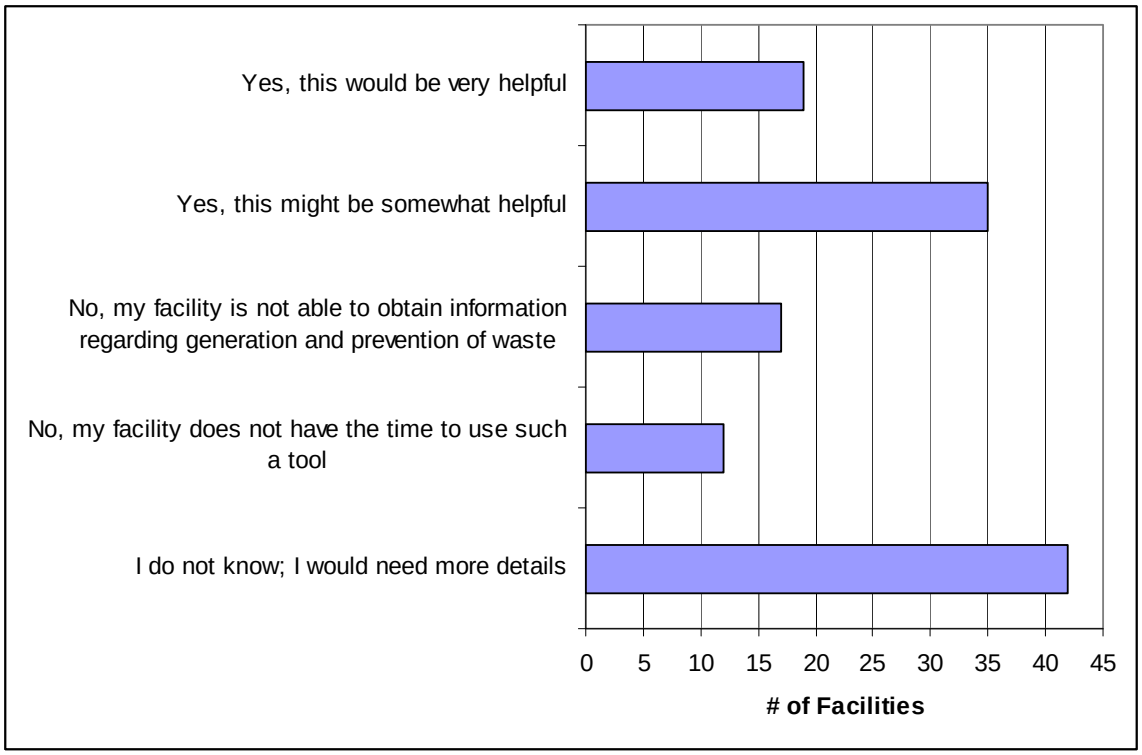
GROUP A EXPERIENCES WITH WASTEWISE TOOLS	VERY HELPFUL	SOMEWHAT HELPFUL	NOT HELPFUL	I AM AWARE OF TOOL, BUT HAVE NOT USED IT	I AM NOT FAMILIAR WITH THIS TOOL
EPA'S Waste Reduction Model (WARM)	6.67%	13.33%	0.00%	10.00%	63.33%
WasteWise Conference	3.33%	10.00%	0.00%	10.00%	66.67%
WasteWise Fact Sheets	6.67%	23.33%	3.33%	6.67%	53.33%
WasteWise Guidance Documents	10.00%	20.00%	0.00%	10.00%	53.33%
WasteWise Hotline	3.33%	6.67%	0.00%	13.33%	70.00%
WasteWise Website	6.67%	10.00%	0.00%	20.00%	60.00%
Note: Percentages do not add to 100% because some respondents did not select a response.					

EXHIBIT 14: EXPERIENCES WITH WASTEWISE TOOLS (GROUP B)

GROUP B EXPERIENCES WITH WASTEWISE TOOLS	VERY HELPFUL	SOMEWHAT HELPFUL	NOT HELPFUL	I AM AWARE OF TOOL, BUT HAVE NOT USED IT	I AM NOT FAMILIAR WITH THIS TOOL
EPA'S Waste Reduction Model (WARM)	3.92%	2.94%	0.98%	13.73%	72.55%
WasteWise Conference	0.98%	0.98%	0.98%	12.75%	79.41%
WasteWise Fact Sheets	4.90%	5.88%	0.98%	13.73%	69.61%
WasteWise Guidance Documents	3.92%	4.90%	0.98%	8.82%	72.55%
WasteWise Hotline	0.00%	0.98%	0.00%	11.76%	80.39%
WasteWise Website	1.96%	5.88%	0.00%	12.75%	72.55%
Note: Percentages do not add to 100% because some respondents did not select a response.					

Finally, the survey asked facilities if they would benefit from a software tool that would track waste generation and disposition (e.g., ReTRAC). While many facilities indicated that it would be "very helpful" or "somewhat helpful," many other facilities indicated that they would need more information before commenting (see Exhibit 15).

EXHIBIT 15: PERCEPTIONS OF A SOFTWARE TOOL FOR TRACKING WASTE



EVALUATION QUESTION # 2 - IN ADDITION TO PARTICIPATION IN WASTEWISE, WHAT OTHER FACTORS MAY INFLUENCE A PARTNER ORGANIZATION'S DECISIONS TO IMPROVE MANAGEMENT OF MSW (E.G., COST SAVINGS, CONSUMER PRESSURE, OTHER VOLUNTARY PROGRAM OPPORTUNITIES)?

The survey asked USPS staff why they started to recycle various materials, including:

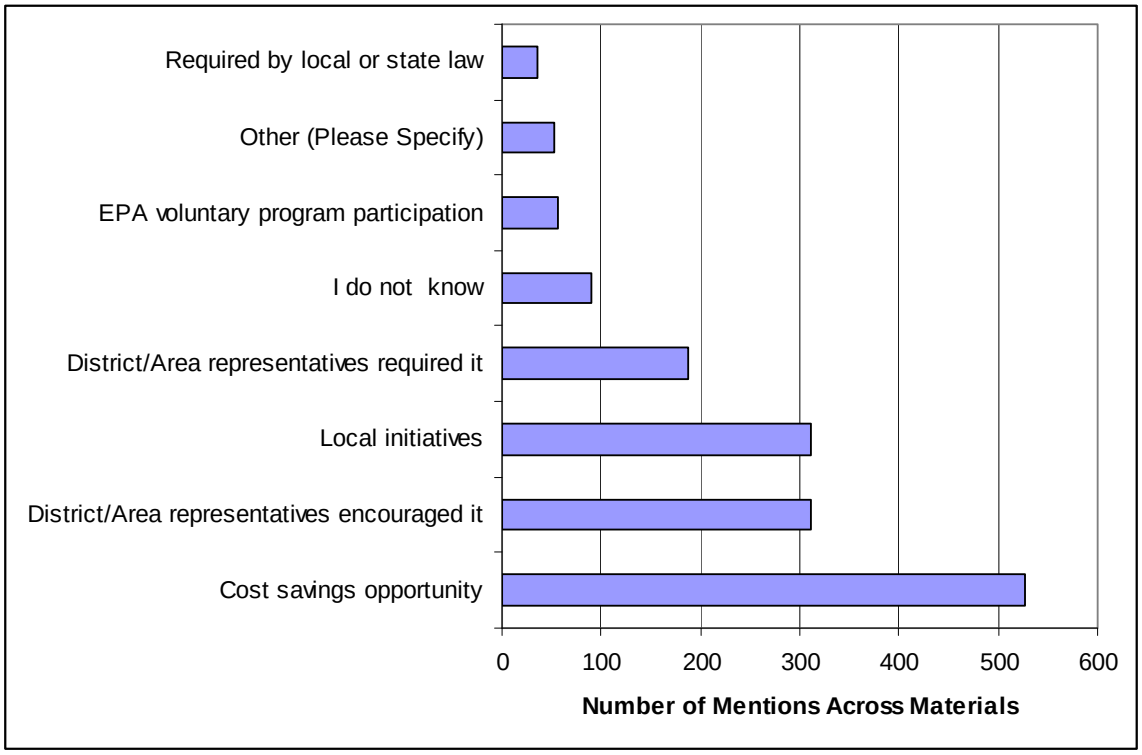
- undeliverable mail
- plastic pallets
- wooden pallets
- corrugated cardboard
- mixed paper
- office supplies
- mixed plastics

The survey provided several potential responses, and asked respondents to choose all that applied. Cost savings opportunity was the most common response, being cited 527 times reason across all materials. Encouragement from District/Area representatives was the second most common response with 312 responses (tied with "I don't know). Requirement of District/Area representatives was the fourth most frequently cited reason for first recycling materials with 188 responses. Given that District and Area representatives are a conduit for WasteWise information to the facility level, we view these responses as proxy indicates for WasteWise influence at the facility level. EPA voluntary program participation, another proxy for WasteWise, was citied 57 times. We see that proxies for WasteWise are common across Group A and Group B. See Appendix 2 for a breakdown of why facilities started to recycle, with results by material.

EXHIBIT 16: REASONS CITIED FOR WHY FACILITIES STARTED RECYCLING (ACROSS MATERIALS,CHECK ALL THAT APPLY)

	REASON FOR RECYCLING	GROUP A (N=30)	GROUP B (N=102)	TOTAL (N=132)
POTENTIAL PROXIES FOR WASTEWISE INFLUENCE	District/Area representatives encouraged it	98	214	312
	District/Area representatives required it	76	112	188
	EPA voluntary program participation	19	38	57
	Total Potential Proxies for WasteWise	**193**	**364**	**557**
OTHER RESPONSES	REASON FOR RECYCLING	GROUP A (N=30)	GROUP B (N=102)	TOTAL (N=132)
	Cost savings opportunity	133	394	527
	Local initiatives	26	64	90
	I do not know	65	247	312
	Other	7	46	53
	Required by local or state law	15	21	36
	Total Other Responses	**246**	**772**	**1018**

EXHIBIT 17: REASONS WHY FACILITIES FIRST STARTED RECYCLING



The survey asked USPS facility staff about which voluntary programs encouraged the facility to begin reducing and/or recycling non-hazardous waste, and asked them to check all that applied. The most common response was "none of the above." This correlates with the findings of the above question, as does the mention of local environmental initiatives by 37 facilities. However, as shown in Exhibit 18, 22 facilities did mention WasteWise. Moreover, 27% of respondents from Group A noted that WasteWise encouraged their facility to begin reducing and/or recycling non-hazardous waste compared to 14% of partners from Group B. This difference is statistically significant at the 10% level (z = 1.67). In general, it appears as though the early joiners were more influenced by EPA and state voluntary programs.

EXHIBIT 18: INFLUENCE OF VOLUNTARY PROGRAMS

WHICH VOLUNTARY PROGRAM(S) ENCOURAGED YOUR FACILITY TO BEGIN REDUCING AND/OR RECYCLING NON-HAZARDOUS WASTE? (CHECK ALL THAT APPLY)	RESPONSES FROM GROUP A	% OF PARTNERS FROM GROUP A	RESPONSES FROM GROUP B	% OF PARTNERS FROM GROUP B	TOTAL	OVERALL
WasteWise	8	25.81%	14	13.59%	22	16.42%
National Environmental Performance Track	5	16.13%	5	4.85%	10	7.46%
State environmental partnership program	3	9.68%	4	3.88%	7	5.22%
Local environmental initiative	9	29.03%	28	27.18%	37	27.61%
None of the Above	12	38.71%	45	43.69%	57	42.54%
Other	4	12.90%	14	13.59%	18	13.43%

EVALUATION QUESTION #3 - WHAT CAN BE DETERMINED ABOUT HOW WASTEWISE PARTICIPATION CONTRIBUTES TO PARTNER BEHAVIOR REGARDING MSW MANAGEMENT (E.G., BY EFFECTING WASTE MANAGEMENT IMPROVEMENTS SOONER, BETTER INCORPORATING WASTE MANAGEMENT AS A PERMANENT FEATURE OF CORPORATE CULTURE, FACILITATING NON-PARTICIPANT CHANGES BY PROVIDING INFORMATION)?

The survey yielded several statistically significant results that long-time WasteWise in Group A, on the whole, have more established, robust, and effective waste management programs than newer members in Group B. This section first presents survey data supporting this conclusion, and then discusses data where no statistically significant difference between the two groups is evident.

First, the survey asked respondents about the recycling activities that are undertaken at their facility. As shown in Exhibit 19, on average, participants in Group A reported 2.77 recycling activities per facility, versus 2.00 activities for participants in Group B. This difference is statistically significant at the 1% level (t = 3.13).

EXHIBIT 19: RECYCLING ACTIVITIES DO USPS FACILITIES UNDERTAKE?

WHAT RECYCLING ACTIVITIES DO YOU UNDERTAKE? (CHECK ALL THAT APPLY)	GROUP A	GROUP B	TOTAL
Reverse hauling of undeliverable mail	19	48	67
Separate collection/contracts with recyclers in addition to waste haulers	19	61	80
Participate in specific recycling approach identified by local government	6	15	21
Work with post offices to collect waste materials from customers (e.g., unwanted mail from customer PO Boxes)	21	31	52
Reuse of recycled materials in-house	14	30	44
Other	4	19	23
Total number of recycling activities	**83**	**204**	**287**
Average number of recycling activities per facility	**2.77**	**2.00**	**2.17**

The survey then asked a series of questions about the frequency of recycling for a variety of materials (undeliverable mail, plastic pallets, wooden pallets, corrugated cardboard, mixed paper, office supplies, and plastic). For each material, we asked facilities if the material is recycled:

- Always or almost always (90-100% of the time)
- Usually (50-90% of the time)
- Occasionally (10-50% of the time)
- Rarely or never (0-10% of the time)

For communication purposes, we color coded results of the recycling frequency question using King County's Environmental Behavior Index (EBI)[4]. The EBI classification we used is presented in Exhibit 20.

EXHIBIT 20: ENVIRONMENTAL BEHAVIOR INDEX CLASSIFICATION

ENVIRONMENTAL BEHAVIOR INDEX	COLOR CODING
Always/Almost Always: 90 – 100% of the time	Green
Usually: 50 – 90% of the time	Light Green
Occasionally: 10 – 50% of the time	Yellow
Rarely/Never: 0 – 10% of the time	Brown
Other	White
Not Applicable: this facility does not use/receive the material	White

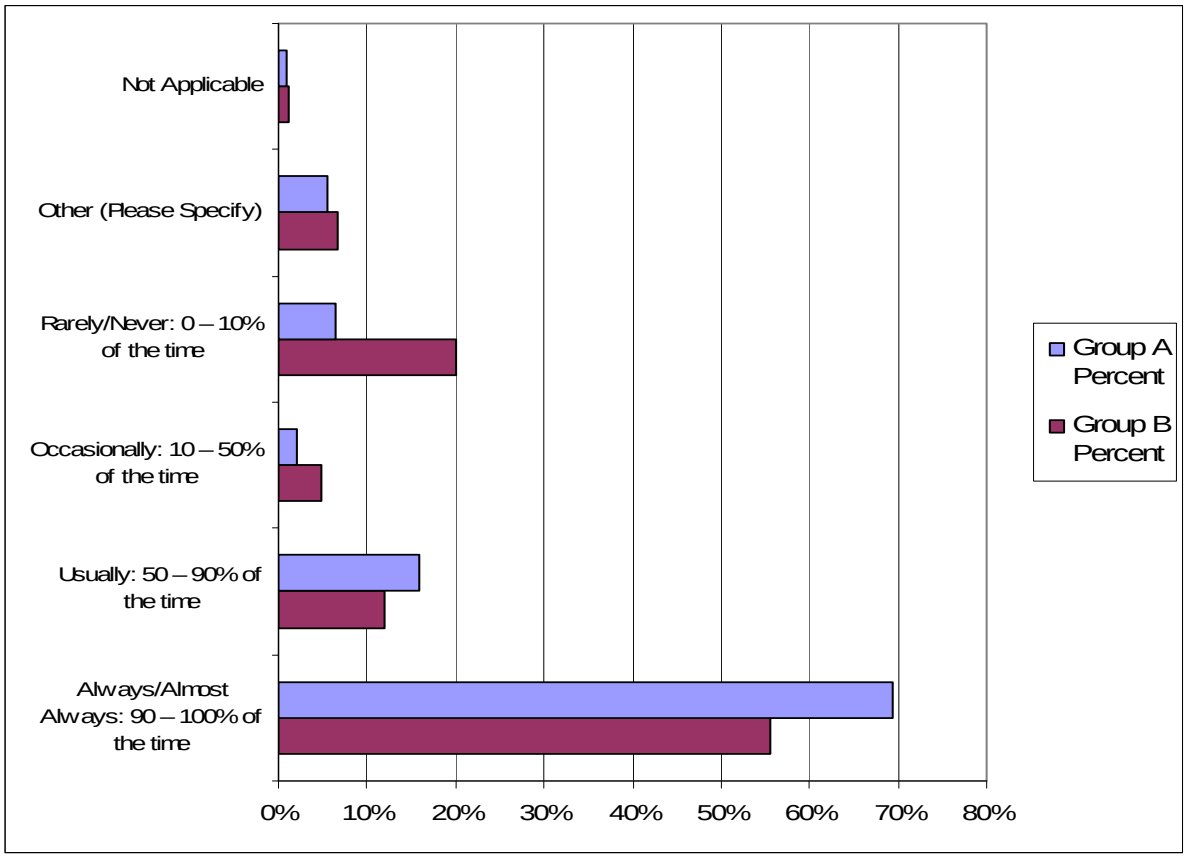
IEc analyzed material specific results (presented in Appendix 3) and rolled up results across materials. Exhibit 21 presents a rollup of recycling frequency across all materials. As shown in Exhibit 21, Group A more frequently indicated that materials are always or almost always recycled, and Group B more frequently indicated that materials are rarely or never recycled. Exhibit 22 presents the same information as Exhibit 21, in graphical form.

EXHIBIT 21: RECYCLING FREQUENCY ACROSS ALL MATERIALS

HOW FREQUENTLY DO FACILITIES RECYCLE?	GROUP A	GROUP B	OVERALL
Always/Almost Always: 90 – 100% of the time	69.31%	55.46%	58.57%
Usually: 50 – 90% of the time	15.84%	11.93%	12.81%
Occasionally: 10 – 50% of the time	1.98%	4.74%	4.12%
Rarely/Never: 0 – 10% of the time	6.44%	19.97%	16.93%
Other	5.45%	6.75%	6.46%
Not Applicable	0.99%	1.15%	1.11%
Total	**100.00%**	**100.00%**	**100.00%**

[4] The EBI approach involves coding responses to communicate the environmental soundness of different actions (e.g., green indicates most environmentally sound action, brown indicates least environmentally sound). King County, Washington, used the EBI approach to communicate survey results on the adoption of environmentally preferable behaviors among County residents.

EXHIBIT 22: RECYCLING FREQUENCIES ACROSS ALL MATERIALS (ROLLUP ANALYSIS)



We conducted a statistical analysis of the difference in recycling frequency of Group A and Group B for always/almost always recycle and rarely/never recycle. On average, participants in Group A reported always/almost always recycling 4.7 materials, versus 3.8 materials for participants in Group B. This difference is statistically significant at the 5% level (t = 2.52). Participants in Group A rarely/never recycle an average of .4 materials, while Group B reported rarely/never recycling and average of 1.4 materials. This difference is statistically significant at the 1% level (t = 3.24). These results are presented in Exhibit 23. We did not conduct statistical analyses for the usually and occasionally frequencies as those two categories were very broad, accounting for frequencies ranging from 10 to 90 %.

EXHIBIT 23: STATISTICAL ANALYSES OF RECYCLING FREQUENCIES ACROSS ALL MATERIALS (ROLL UP ANALYSIS)

COMPARISON OF RECYCLING RATES	AVERAGE # MATERIALS GROUP A	AVERAGE # MATERIALS GROUP B	TEST STATISTIC[5]
Always/Almost Always: 90 – 100% of the time	4.8	3.8	2.5214**
Rarely/Never: 0 – 10% of the time	0.4	1.4	3.1846***

[5] *** denotes 99% significance level, ** 95% significance level, * 90% significance level.

As shown in Exhibit 24, recycling frequency B varied by material. Cardboard was the material most frequently cited as being recycled always or almost always, with 97 % of respondents from Group A reporting that cardboard always or almost always recycled. Cardboard was also the most frequently reported material for Group B with 81 % of respondents indicating that cardboard is always or almost always recycled. Undeliverable mail was second most recycled material.

Group A reported higher recycling rates than Group B for every individual material. Differences in recycling rates between Group A and Group B ranged from a small difference of 3 % for office supplies, to a larger difference of 20 % for recycling plastic pallets. In general, the difference in responses ranged from 10 – 15 %. Appendix 3 provides details on recycling rates by material for Group A and Group B.

EXHIBIT 24: FREQUENCY OF ALWAYS/ALMOST ALWAYS RECYCLING RESPONSES BY MATERIAL

ALWAYS/ALMOST ALWAYS RECYCLING FREQEUNCY	GROUP A	GROUP B	DIFFERENCE
Corrugated Cardboard	96.55%	81.00%	15.55%
Undeliverable Mail	89.66%	71.43%	18.23%
Mixed Paper	75.00%	58.59%	16.41%
Office Supplies	68.97%	66.00%	2.97%
Wooden Pallets	62.07%	48.51%	13.55%
Plastic Pallets	58.62%	38.38%	20.24%
Plastics	34.48%	24.24%	10.24%
Average	**69.33%**	**55.45%**	**13.88%**
Note: Percentages cannot be aggregated because this table presents only the frequency of selecting always/almost always recycles; Appendix 3 contains detailed results for the response options provided for this question.			

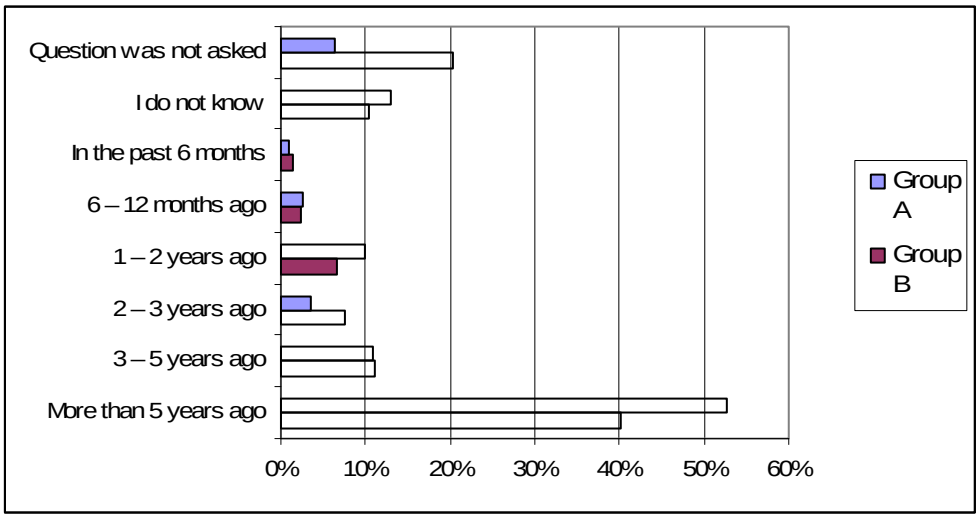
The survey asked about the tenure of recycling activities. IEc analyzed material specific results (presented in Appendix 4) and rolled up results across materials. As shown in Exhibit 25 and in the graph in Exhibit 26, respondents most frequently indicated a recycling tenure of more than five years, across all materials. However, 53 % of respondents from group A reported first recycling materials more than five years ago, compared to 40 % in group B. Group A reported that facilities started recycling an average of 3.7 materials more than five years ago. Group B reported first recycling an average of 2.7 materials more than five years ago. This difference is statistically significant at the 5% level ($t = 2.13$).

Moreover, there are differences at the 2-3 year tenure as well. Across all materials, the proportion of respondents in Group B that started recycling 2-3 years ago is 4% more than Group A respondents. However, this difference is larger for individual materials, including a 9% difference for undeliverable mail recycling, and a 6% difference in plastic pallet and cardboard recycling. See Appendix 4 for material-specific information on recycling tenure. The question for tenure was not asked if facility reported rarely or never recycling the material. Therefore the question was not asked approximately 5% of the time for respondents in Group A and 20 % for Group B.

EXHIBIT 25: TENURE OF RECYCLING ACROSS ALL MATERIALS (ROLL UP ANALYSIS)

RECYCLING OF MATERIALS	GROUP A	GROUP B	OVERALL
More than 5 years ago	52.74%	40.18%	43.09%
3 – 5 years ago	10.95%	11.09%	11.06%
2 – 3 years ago	3.48%	7.50%	6.57%
1 – 2 years ago	9.95%	6.60%	7.37%
6 – 12 months ago	2.49%	2.40%	2.42%
In the past 6 months	1.00%	1.50%	1.38%
I do not know	12.94%	10.49%	11.06%
Question was not asked (material is rarely/never recycled)	6.47%	20.24%	17.05%
Total	**100.00%**	**100.00%**	**100.00%**

EXHIBIT 26: TENURE OF RECYCLING ACROSS ALL MATERIALS (ROLL UP ANALYSIS)

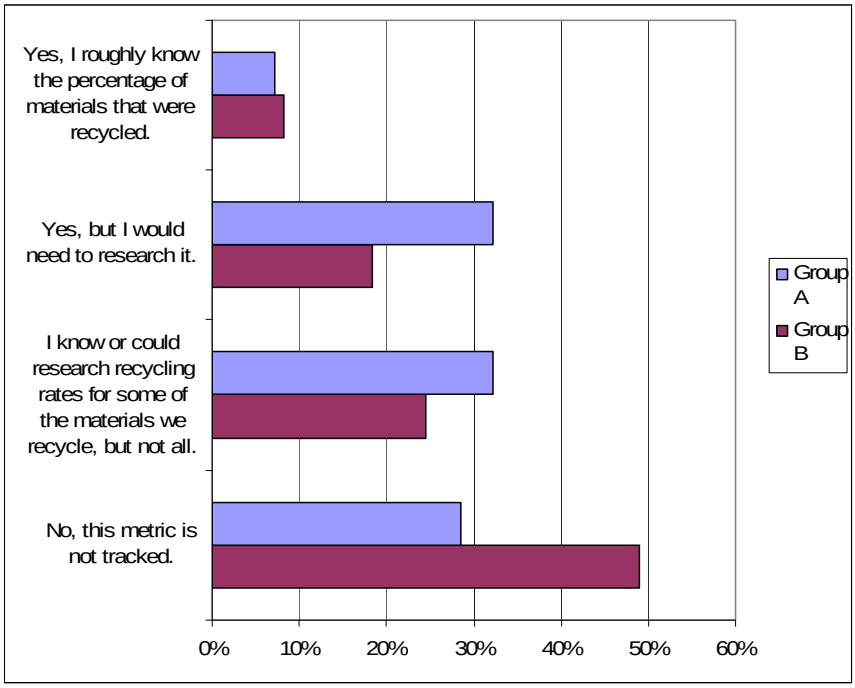


The survey asked about awareness of the facility's recycling rate across materials. As shown in Exhibit 27 and in the graph in Exhibit 28, over 70% of respondents from group A are indicated that they know or could figure out their recycling rates for the all or some materials if they researched it, while just over 50 % from group B reported an awareness of the recycling rates. This difference is statistically significant at the 10% level (z = 1.92). Very few facilities in either group knew the overall recycling rate off-hand.

EXHIBIT 27: AWARENESS OF RECYCLING RATE ACROSS ALL MATERIALS

DO YOU KNOW THE APPROXIMATE RECYCLING RATE FOR THE MATERIALS YOUR FACILITY RECYCLED IN 2008?	GROUP A	GROUP B	OVERALL
No, this metric is not tracked.	28.57%	48.98%	44.44%
I know or could research recycling rates for some of the materials we recycle, but not all.	32.14%	24.49%	26.19%
Yes, but I would need to research it.	32.14%	18.37%	21.43%
Yes, I roughly know the %age of materials that were recycled.	7.14%	8.16%	7.94%
Total	**100.00%**	**100.00%**	**100.00%**

EXHIBIT 28: AWARENESS OF RECYCLING RATES ALL MATERIALS



The survey asked if the attitude of personnel at the facility about waste prevention changed as a result of efforts to improve recycling/waste prevention. As shown in Exhibit 29, results to this survey question are mixed. Respondents who indicated that personnel are conscientious about program implementation are 4% higher in Group A. Nineteen Respondents from Group B indicated that most staff are not aware of waste prevention efforts, which is much greater than the 6% from Group A. And the number that answered "efficient management of resources has always been a great concern…" are much higher in Group A. However, Group B scored higher in "facility personnel identify new additional recycling/waste prevention efforts" and "facility personnel identify new ideas for other environmental projects. Some of these differences are statistically significant at the 10% level, while other differences were not found to be statistically significant. Findings that are not statistically significant are shaded in Exhibit 29.

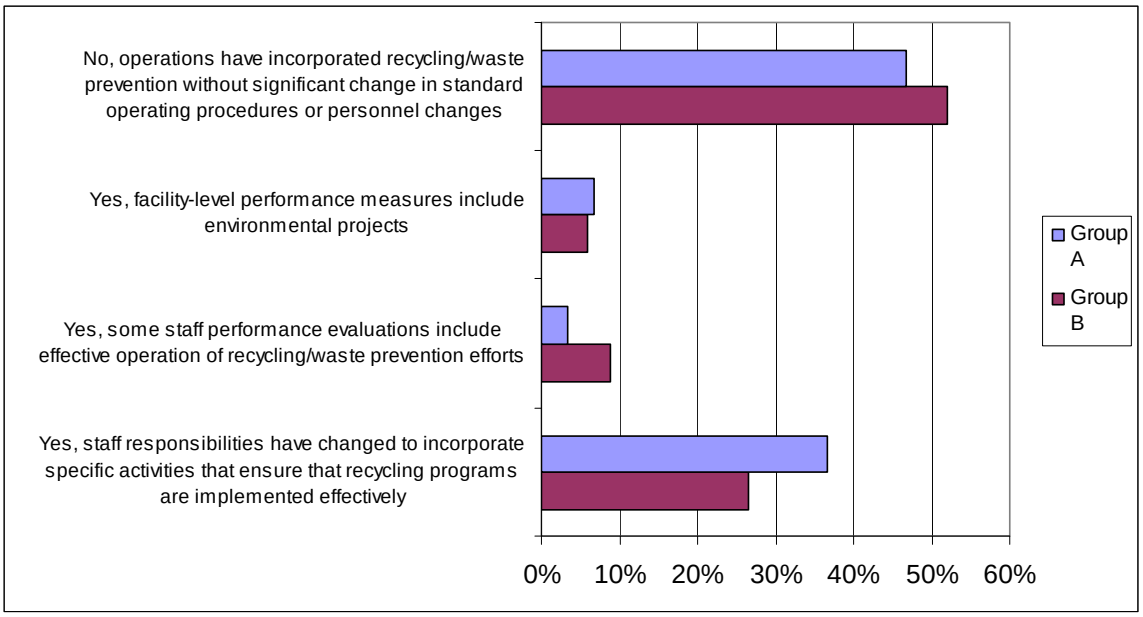
EXHIBIT 29: CHANGES IN ATTITUDE OF FACILITY PERSONNEL

HAS THE ATTITUDE OF PERSONNEL AT YOUR FACILITY ABOUT WASTE PREVENTION CHANGED AS A RESULT OF EFFORTS TO IMPROVE RECYCLING/WASTE PREVENTION? (CHECK ALL THAT APPLY)	GROUP A	GROUP B	OVERALL	Z STATISTIC
Yes, personnel are conscientious about program implementation	46.67%	41.18%	42.42%	0.5349
Yes, facility personnel identify new ideas for additional recycling/waste prevention efforts	6.67%	20.59%	17.42%	-1.767
Yes, facility personnel identify new ideas for other environmental projects (e.g., energy projects)	13.33%	14.71%	14.39%	-0.1883
Yes, staff/facility management coordinate more effectively with public, EPA, and/or other agencies on waste prevention	6.67%	5.88%	6.06%	0.1583
No, efficient management of resources has always been of great concern, and recycling/waste prevention are obvious parts of this	30.00%	14.71%	18.18%	1.909
No, most staff are not aware of waste prevention efforts	6.67%	19.61%	16.67%	-1.672
Note: Percentages do not add to 100% because the survey asked respondents to check all that apply.				

We found no statistically significant differences between Group A and Group B in the following questions:

The survey asked if the operations or organization the facility changed as a result of efforts to improve recycling/waste prevention. As shown in Exhibit 30, 37% of respondents from Group A noted that staff responsibilities have changed to incorporate specific activities that ensure that recycling programs are implemented effectively. Twenty-six percent from Group B indicated that staff responsibilities have changed. This difference is not statistically significant ($z = 1.08$). In contrast, 47 % of respondents from group A noted that operations have incorporated recycling/waste prevention without significant change in standard operating procedures or personnel changes. Fifty-two percent from Group B indicated that operations have incorporated recycling/waste prevention without significant change in standard operating procedures or personnel changes. This result is not statistically significant ($z = -0.5099$). A low number of respondents in both groups linked improvements to recycling/waste prevention to staff performance evaluations and facility-level performance measures.

EXHIBIT 30: CHANGES TO OPERATION OR ORGANIZATION OF FACILITIES RESULTING FROM RECYLING/WASTE PREVENTION ACTIVITIES



We asked about actions facilities have taken to reduce the quantity of non-hazardous waste produced at facilities (waste prevention). As shown in Exhibit 31, Group A reported an average of 1.50 actions taken while Group B reported 1.26 actions. However, this difference is not statistically significant ($t = 1.27$). Four respondents from Group A and 16 respondents from Group B did not select any waste prevention actions. For most questions, we removed blanks the total population "n" for calculating and analyzing responses. However, we left in the blanks for this to this question because it lacked an option to indicate that no waste prevention activities are undertaken or that the respondent is unaware of any waste prevention activities. Thus, we do not know if these facilities have not undertaken any waste prevention activities or if the question was skipped for unknown reasons.

EXHIBIT 31: WASTE PREVENTION ACTIVITIES

WHAT ACTIONS HAS YOUR FACILITY TAKEN TO REDUCE THE QUANTITY OF NON-HAZARDOUS WASTE THAT YOUR FACILITY PRODUCES, OTHERWISE KNOWN AS WASTE PREVENTION? (CHECK ALL THAT APPLY)	GROUP A	GROUP B	OVERALL
Purchasing policies	66.67%	53.92%	66.67%
Use of digital instead of paper media (move toward a paperless facility)	53.33%	37.25%	53.33%
Upgrade equipment instead of purchasing new equipment	26.67%	14.71%	26.67%
Other	3.33%	20.59%	3.33%
Average number of actions per respondent	**1.50**	**1.26**	**1.32**
Note: Percentages do not add to 100% because the survey asked respondents to check all that apply.			

The survey asked about efforts to recycle and prevent waste leading to initiatives in other environmental areas. The results in Group A and Group B are quite similar, as seen in Exhibit 32.

EXHIBIT 32: INITIATIVES FROM WASTE PREVENTION EFFORTS

DID YOUR EFFORTS TO RECYCLE AND PREVENT WASTE LEAD TO INITIATIVES IN THESE OTHER ENVIRONMENTAL AREAS (CHECK ALL THAT APPLY)	GROUP A	GROUP B	OVERALL
Yes, recycling and waste prevention efforts have led the facility to examine options for reducing other environmental impacts/costs	25.81%	27.18%	26.87%
Yes, success of recycling and waste prevention efforts have led the facility to seek participation in other environmental partnership programs	9.68%	10.68%	10.45%
No, the general focus on environmental performance has historically included waste and other efforts	41.94%	41.75%	41.79%
No, initiatives in other areas led to initiatives in recycling and waste prevention	9.68%	15.53%	14.18%
Note: Percentages do not add to 100% because the survey asked respondents to select all responses applicable to their facility.			

Finally, the survey inquired about whether improving recycling/waste prevention has changed the facility relationship with your regional/area management. As seen in Exhibit 33, results from Group A and Group B were similar overall, with the exception that Group A indicated that facility personnel communicate with other facilities and regions about environmental projects and strategies as a result of efforts to improve waste management. Given the similar responses, we did not conduct statistical test on the results of this question.

EXHIBIT 33: CHANGE OF RELATIONSHIP WITH REGIONAL/AREA MANAGEMENT

HAVE EFFORTS TO IMPROVE RECYCLING/WASTE PREVENTION CHANGED YOUR RELATIONSHIP WITH YOUR REGIONAL/AREA MANAGEMENT? (CHECK ALL THAT APPLY)	GROUP A	GROUP B	TOTAL
Yes, facility personnel generate project ideas and take the lead role in designing and implementing projects	9.68%	9.71%	9.70%
Yes, facilities take the lead in choosing how to implement regional/area project ideas	6.45%	9.71%	8.96%
Yes, facility personnel communicate with other facilities and regions about environmental projects and strategies	25.81%	12.62%	15.67%
No, recycling and waste prevention projects are designed and implemented using existing chains of authority	61.29%	63.11%	62.69%
Note: Percentages do not add to 100% because the survey asked respondents to select all responses applicable to their facility.			

APPENDIX 1: STRATIFIED SAMPLING PLAN FOR GROUP B

STRATUM	DESCRIPTION	POPULATION SIZE (N)	STRATUM RELATIVE PROPORTION	SQUARE OF STRATUM RELATIVE PROPORTION	INITIAL SAMPLE SIZE	EXPECTED RESPONSE RATE	EFFECTIVE SAMPLE SIZE (N)	ESTIMATED STRATUM PROPORTION	VARIANCE FOR ESTIMATED PROPORTION	RESPONDENTS	RESPONSE RATE
1	BMCs	28	0.07	0.00	13.83	50.00%	6.91	0.5	0.03	8	57.14%
2	Capital Metro	26	0.06	0.00	12.84	50.00%	6.42	0.5	0.03	5	38.46%
3	Eastern	59	0.15	0.02	29.14	50.00%	14.57	0.5	0.01	13	44.83%
4	Great Lakes	45	0.11	0.01	22.22	50.00%	11.11	0.5	0.02	11	50.00%
5	New York Metro	18	0.04	0.00	8.89	50.00%	4.44	0.5	0.05	7	77.78%
6	Pacific	23	0.06	0.00	11.00	50.00%	5.50	0.5	0.04	4	36.36%
7	Southeast	42	0.10	0.01	20.74	50.00%	10.37	0.5	0.02	10	47.62%
8	Southwest	53	0.13	0.02	26.17	50.00%	13.09	0.5	0.02	12	46.15%
9	Western	111	0.27	0.08	54.81	50.00%	27.41	0.5	0.01	32	58.18%
Total	**All**	**405**	**1.00**	**N/A**	**199.64**	**50.00%**	**99.82**	**0.5**	**N/A**	**102**	51.00%

APPENDIX 2: REASONS FOR FIRST RECYCLING MATERIALS

WHY FACILITIES FIRST STARTED RECYCLING UNDELIVERABLE MAIL (QUESTION 9B)

WHY DID YOUR FACILITY FIRST BEGIN RECYCLING UNDELIVERABLE MAIL? (CHECK ALL THAT APPLY)	TOTAL
Cost savings opportunity	77
District/Area representatives encouraged it	49
District/Area representatives required it	34
Local initiatives	43
EPA voluntary program participation	10
Required by local or state law	4
I do not know	10
Other	4

WHY FACILITIES FIRST STARTED RECYCLING PLASTIC PALLETS (QUESTION 10B)

WHY DID YOUR FACILITY FIRST BEGIN RECYCLING PLASTIC PALLETS? (CHECK ALL THAT APPLY)	TOTAL
Cost savings opportunity	45
District/Area representatives encouraged it	24
District/Area representatives required it	31
Local initiatives	15
EPA voluntary program participation	3
Required by local or state law	2
I don't know	18
Other	12

WHY FACILITIES FIRST STARTED RECYCLING WOODEN PALLETS (QUESTION 11B)

WHY DID YOUR FACILITY FIRST BEGIN RECYCLING WOODEN PALLETS? (CHECK ALL THAT APPLY)	TOTAL
Cost savings opportunity	59
District/Area representatives encouraged it	28
District/Area representatives required it	24
Local initiatives	34
EPA voluntary program participation	6
Required by local or state law	2
I do not know	9
Other	2

WHY FACILITIES FIRST STARTED RECYCLING CORRUGATED CARDBOARD(QUESTION 12B)

WHY DID YOUR FACILITY FIRST BEGIN RECYCLING CORRUGATED CARDBOARD? (CHECK ALL THAT APPLY)	TOTAL
Cost savings opportunity	86
District/Area representatives encouraged it	53
District/Area representatives required it	24
Local initiatives	49
EPA voluntary program participation	9
Required by local or state law	6
I do not know	12
Other	7

WHY FACILITIES FIRST STARTED RECYCLING MIXED PAPER (QUESTION 13B)

WHY DID YOUR FACILITY FIRST BEGIN RECYCLING MIXED PAPER? (CHECK ALL THAT APPLY)	TOTAL
Cost savings opportunity	76
District/Area representatives encouraged it	52
District/Area representatives required it	25
Local initiatives	45
EPA voluntary program participation	11
Required by local or state law	5
I do not know	13
Other	6

WHY FACILITIES FIRST STARTED RECYCLING OFFICE SUPPLIES (QUESTION 14B)

WHY DID YOUR FACILITY FIRST BEGIN RECYCLING OFFICE SUPPLIES? (CHECK ALL THAT APPLY)	TOTAL
Cost savings opportunity	75
District/Area representatives encouraged it	49
District/Area representatives required it	28
Local initiatives	48
EPA voluntary program participation	8
Required by local or state law	4
I do not know	13
Other	8

WHY FACILITIES FIRST STARTED RECYCLING PLASTIC (QUESTION 15B)

OTHER	TOTAL
Funds for Social and Welfare Committee	1
Increase Revenue	1
Facility does not recycle plastics	2
Paper recycler said they could take them	1
Recyclers will not take	1
Trying to reduce landfill	1
September 2009	1

WHY FACILITIES FIRST STARTED RECYCLING OTHER MATERIALS (QUESTION 16C)

WHY DID YOUR FACILITY FIRST BEGIN RECYCLING THESE OTHER MATERIALS? (CHECK ALL THAT APPLY)	TOTAL
Cost savings opportunity	63
District/Area representatives encouraged it	29
District/Area representatives required it	11
Local initiatives	46
EPA voluntary program participation	6
Required by local or state law	10
I do not know	5
Other	3

APPENDIX 3: ANALYSIS OF RECYCLING RATES (QUESTIONS 9 - 15)

RECYCLING OF UNDELIVERABLE MAIL (QUESTION 9)

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE UNDELIVERABLE MAIL?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	26	70	96
Usually: 50 – 90% of the time	1	10	11
Occasionally: 10 – 50% of the time	1	3	4
Rarely/Never: 0 – 10% of the time	0	14	14
Other (Please Specify)	1	1	2
Grand Total	**29**	**98**	**127**

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE UNDELIVERABLE MAIL?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
Always/Almost Always: 90 – 100% of the time	89.66%	71.43%	75.59%
Usually: 50 – 90% of the time	3.45%	10.20%	8.66%
Occasionally: 10 – 50% of the time	3.45%	3.06%	3.15%
Rarely/Never: 0 – 10% of the time	0.00%	14.29%	11.02%
Other	3.45%	1.02%	1.57%
Total	**100%**	**100%**	**100%**

RECYCLING OF PLASTIC PALLETS (QUESTION 10)

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE PLASTIC PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	17	38	55
Usually: 50 – 90% of the time	0	6	6
Occasionally: 10 – 50% of the time	0	3	3
Rarely/Never: 0 – 10% of the time	7	18	25
Not Applicable: this facility does not use/receive plastic pallets	2	28	30
Other	3	6	9
Total	**29**	**99**	**128**

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE PLASTIC PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
Always/Almost Always: 90 – 100% of the time	58.62%	38.38%	42.97%
Usually: 50 – 90% of the time	0.00%	6.06%	4.69%
Occasionally: 10 – 50% of the time	0.00%	3.03%	2.34%
Rarely/Never: 0 – 10% of the time	24.14%	18.18%	19.53%
Not Applicable: this facility does not use/receive plastic pallets	6.90%	28.28%	23.44%
Other	10.34%	6.06%	7.03%
Total	**100%**	**100%**	**100%**

RECYCLING OF WOODEN PALLETS (QUESTION 11)

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE WOODEN PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	18	49	67
Usually: 50 – 90% of the time	4	13	17
Occasionally: 10 – 50% of the time	0	3	3
Rarely/Never: 0 – 10% of the time	3	26	29
Other	2	8	10
Not Applicable: this facility does not use/receive wooden pallets	2	2	4
Total	**29**	**101**	**130**

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE WOODEN PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
Always/Almost Always: 90 – 100% of the time	62.07%	48.51%	51.54%
Usually: 50 – 90% of the time	13.79%	12.87%	13.08%
Occasionally: 10 – 50% of the time	0.00%	2.97%	2.31%
Rarely/Never: 0 – 10% of the time	10.34%	25.74%	22.31%
Other	6.90%	7.92%	7.69%
Not Applicable: this facility does not use/receive wooden pallets	6.90%	1.98%	3.08%
Total	**100%**	**100%**	**100%**

RECYCLING OF CORRUGATED CARDBOARD (QUESTION 12)

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE CORRUGATED CARDBOARD?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	28	81	109
Usually: 50 – 90% of the time	1	5	6
Occasionally: 10 – 50% of the time	0	1	1
Rarely/Never: 0 – 10% of the time	0	10	10
Other	0	3	3
Total	**29**	**100**	**129**

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE CORRUGATED CARDBOARD?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
Always/Almost Always: 90 – 100% of the time	96.55%	81.00%	84.50%
Usually: 50 – 90% of the time	0.00%	1.00%	0.78%
Occasionally: 10 – 50% of the time	0.00%	3.00%	2.33%
Rarely/Never: 0 – 10% of the time	0.00%	10.00%	7.75%
Other	3.45%	5.00%	4.65%
Total	**100%**	**100%**	**100%**

RECYCLING OF MIXED PAPER (QUESTION 13)

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE MIXED PAPER GENERATED FROM OPERATIONS AT YOUR FACILITY (E.G., PRINTER PAPER, INVOICES, ETC.)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	21	58	79
Usually: 50 – 90% of the time	7	16	23
Occasionally: 10 – 50% of the time	0	7	7
Rarely/Never: 0 – 10% of the time	0	12	12
Other	0	6	6
Total	**28**	**99**	**127**

HOW FREQUENTLY DOES YOUR FACILITY RECYCLE MIXED PAPER GENERATED FROM OPERATIONS AT YOUR FACILITY (E.G., PRINTER PAPER, INVOICES, ETC.)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
Always/Almost Always: 90 – 100% of the time	75.00%	58.59%	62.20%
Usually: 50 – 90% of the time	25.00%	16.16%	18.11%
Occasionally: 10 – 50% of the time	0.00%	7.07%	5.51%
Rarely/Never: 0 – 10% of the time	0.00%	12.12%	9.45%
Other	0.00%	6.06%	4.72%
Total	**100%**	**100%**	**100%**

RECYCLING OF OFFICE SUPPLIES (QUESTION 14)

APPROXIMATELY HOW FREQUENTLY DOES YOUR FACILITY RECYCLE ANY OFFICE SUPPLIES (E.G., TONER, INK CARTRIDGES, ETC.)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	20	66	86
Usually: 50 – 90% of the time	9	19	28
Occasionally: 10 – 50% of the time	0	5	5
Rarely/Never: 0 – 10% of the time	0	6	6
Other	0	4	4
Total	**29**	**100**	**129**

APPROXIMATELY HOW FREQUENTLY DOES YOUR FACILITY RECYCLE ANY OFFICE SUPPLIES (E.G., TONER, INK CARTRIDGES, ETC.)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
Always/Almost Always: 90 – 100% of the time	68.97%	66.00%	66.67%
Usually: 50 – 90% of the time	31.03%	19.00%	21.71%
Occasionally: 10 – 50% of the time	0.00%	5.00%	3.88%
Rarely/Never: 0 – 10% of the time	0.00%	6.00%	4.65%
Other	0.00%	4.00%	3.10%
Total	**100%**	**100%**	**100%**

RECYCLING OF PLASTICS (QUESTION 15)

APPROXIMATELY HOW FREQUENTLY DOES YOUR FACILITY RECYCLE ANY PLASTIC (E.G., PLASTIC BEVERAGE BOTTLES, SHRINK WRAP, AND CONTAINERS (OTHER THAN PALLETS)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	10	24	34
Usually: 50 – 90% of the time	7	14	21
Occasionally: 10 – 50% of the time	3	11	14
Rarely/Never: 0 – 10% of the time	8	43	51
Other	1	7	8
Total	**29**	**99**	**128**

APPROXIMATELY HOW FREQUENTLY DOES YOUR FACILITY RECYCLE ANY PLASTIC (E.G., PLASTIC BEVERAGE BOTTLES, SHRINK WRAP, AND CONTAINERS (OTHER THAN PALLETS)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
Always/Almost Always: 90 – 100% of the time	34.48%	24.24%	26.56%
Usually: 50 – 90% of the time	24.14%	14.14%	16.41%
Occasionally: 10 – 50% of the time	10.34%	11.11%	10.94%
Rarely/Never: 0 – 10% of the time	27.59%	43.43%	39.84%
Other	3.45%	7.07%	6.25%
Total	**100%**	**100%**	**100%**

APPENDIX 4: RECYCLING TENURE

RECYCLING OF UNDELIVERABLE MAIL

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING UNDELIVERABLE MAIL?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
More than 5 years ago	20	42	62
3 – 5 years ago	2	11	13
2 – 3 years ago	0	9	9
1 – 2 years ago	2	6	8
6 – 12 months ago	2	4	6
In the past 6 months	0	3	3
I do not know	3	11	14
Question was not asked (facility rarely/never recycles)	0	14	14
Total	**29**	**100**	**129**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING UNDELIVERABLE MAIL?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
More than 5 years ago	68.97%	42.00%	48.06%
3 – 5 years ago	6.90%	11.00%	10.08%
2 – 3 years ago	0.00%	9.00%	6.98%
1 – 2 years ago	6.90%	6.00%	6.20%
6 – 12 months ago	6.90%	4.00%	4.65%
In the past 6 months	0.00%	3.00%	2.33%
I do not know	10.34%	11.00%	10.85%
Question was not asked (facility rarely/never recycles)	0.00%	14.00%	10.85%
Total	**100.00%**	**100.00%**	**100.00%**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING PLASTIC PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
More than 5 years ago	10	20	30
3 – 5 years ago	2	6	8
2 – 3 years ago	0	6	6
1 – 2 years ago	4	6	10
6 – 12 months ago	1	2	3
In the past 6 months	0	1	1
I do not know	10	24	34
Question was not asked (facility rarely/never recycles)	2	28	30
Total	**29**	**93**	**122**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING PLASTIC PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
More than 5 years ago	34.48%	21.51%	24.59%
3 – 5 years ago	6.90%	6.45%	6.56%
2 – 3 years ago	0.00%	6.45%	4.92%
1 – 2 years ago	13.79%	6.45%	8.20%
6 – 12 months ago	3.45%	2.15%	2.46%
In the past 6 months	0.00%	1.08%	0.82%
I do not know	34.48%	25.81%	27.87%
Question was not asked (facility rarely/never recycles)	6.90%	30.11%	24.59%
Total	**100.00%**	**100.00%**	**100.00%**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING WOODEN PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
More than 5 years ago	16	36	52
3 – 5 years ago	2	8	10
2 – 3 years ago	1	5	6
1 – 2 years ago	0	9	9
6 – 12 months ago	0	2	2
In the past 6 months	0	0	0
I do not know	5	11	16
Question was not asked (facility rarely/never recycles)	3	26	29
Total	**27**	**97**	**124**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING WOODEN PALLETS?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
More than 5 years ago	59.26%	37.11%	41.94%
3 – 5 years ago	7.41%	8.25%	8.06%
2 – 3 years ago	3.70%	5.15%	4.84%
1 – 2 years ago	0.00%	9.28%	7.26%
6 – 12 months ago	0.00%	2.06%	1.61%
In the past 6 months	0.00%	0.00%	0.00%
I do not know	18.52%	11.34%	12.90%
Question was not asked (facility rarely/never recycles)	11.11%	26.80%	23.39%
Total	**100.00%**	**100.00%**	**100.00%**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING CORRUGATED CARDBOARD?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
More than 5 years ago	23	65	88
3 – 5 years ago	3	7	10
2 – 3 years ago	0	6	6
1 – 2 years ago	1	3	4
6 – 12 months ago	0	1	1
In the past 6 months	0	0	0
I do not know	2	8	10
Question was not asked (facility rarely/never recycles)	0	10	10
Total	**29**	**100**	**129**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING CORRUGATED CARDBOARD?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
More than 5 years ago	79.31%	65.00%	68.22%
3 – 5 years ago	10.34%	7.00%	7.75%
2 – 3 years ago	0.00%	6.00%	4.65%
1 – 2 years ago	3.45%	3.00%	3.10%
6 – 12 months ago	0.00%	1.00%	0.78%
In the past 6 months	0.00%	0.00%	0.00%
I do not know	6.90%	8.00%	7.75%
Question was not asked (facility rarely/never recycles)	0.00%	10.00%	7.75%
Total	**100.00%**	**100.00%**	**100.00%**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING MIXED PAPER?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
More than 5 years ago	17	44	61
3 – 5 years ago	3	17	20
2 – 3 years ago	1	10	11
1 – 2 years ago	5	5	10
6 – 12 months ago	1	4	5
In the past 6 months	2	4	6
Question was not asked (facility rarely/never recycles)	0	12	12
Total	**29**	**96**	**125**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING MIXED PAPER?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
More than 5 years ago	58.62%	45.83%	48.80%
3 – 5 years ago	10.34%	17.71%	16.00%
2 – 3 years ago	3.45%	10.42%	8.80%
1 – 2 years ago	17.24%	5.21%	8.00%
6 – 12 months ago	3.45%	4.17%	4.00%
In the past 6 months	6.90%	4.17%	4.80%
Question was not asked (facility rarely/never recycles)	0.00%	12.50%	9.60%
Total	**100.00%**	**100.00%**	**100.00%**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING OFFICE SUPPLIES (E.G., TONER, INK CARTRIDGES, ETC.)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
More than 5 years ago	14	47	61
3 – 5 years ago	7	16	23
2 – 3 years ago	4	9	13
1 – 2 years ago	1	7	8
6 – 12 months ago	0	1	1
In the past 6 months	0	1	1
I do not know	3	13	16
Question was not asked (facility rarely/never recycles)	0	6	6
Total	**29**	**100**	**129**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING OFFICE SUPPLIES (E.G., TONER, INK CARTRIDGES, ETC.)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
More than 5 years ago	48.28%	47.00%	47.29%
3 – 5 years ago	24.14%	16.00%	17.83%
2 – 3 years ago	13.79%	9.00%	10.08%
1 – 2 years ago	3.45%	7.00%	6.20%
6 – 12 months ago	0.00%	1.00%	0.78%
In the past 6 months	0.00%	1.00%	0.78%
I do not know	10.34%	13.00%	12.40%
Question was not asked (facility rarely/never recycles)	0.00%	6.00%	4.65%
Total	**100.00%**	**100.00%**	**100.00%**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING PLASTIC (E.G., PLASTIC BEVERAGE BOTTLES, SHRINK WRAP, AND CONTAINERS (OTHER THAN PALLETS)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	TOTAL
More than 5 years ago	6	16	22
3 – 5 years ago	3	9	12
2 – 3 years ago	1	5	6
1 – 2 years ago	7	8	15
6 – 12 months ago	1	2	3
In the past 6 months	0	4	4
I do not know	3	10	13
Question was not asked (facility rarely/never recycles)	8	43	51
Total	**29**	**97**	**126**

WHEN DID YOUR FACILITY FIRST BEGIN RECYCLING PLASTIC (E.G., PLASTIC BEVERAGE BOTTLES, SHRINK WRAP, AND CONTAINERS (OTHER THAN PALLETS)?	RESPONSES FROM GROUP A	RESPONSES FROM GROUP B	OVERALL
More than 5 years ago	20.69%	16.49%	17.46%
3 – 5 years ago	10.34%	9.28%	9.52%
2 – 3 years ago	3.45%	5.15%	4.76%
1 – 2 years ago	24.14%	8.25%	11.90%
6 – 12 months ago	3.45%	2.06%	2.38%
In the past 6 months	0.00%	4.12%	3.17%
I do not know	10.34%	10.31%	10.32%
Question was not asked (facility rarely/never recycles)	27.59%	44.33%	40.48%
Total	**100.00%**	**100.00%**	**100.00%**

Appendix G:

BEST PRACTICES REVIEW FOR DATA COLLECTION AND DATA QUALITY CONTROL

IEc

MEMORANDUM | 19 April 2010

TO Terrell Lasane, EPA

FROM Laurie Finne and Angela Helman, IEc

SUBJECT Final Best Practices Review

Early in the process of developing a program evaluation methodology for the WasteWise program, IEc determined that partner environmental data previously collected by EPA for WasteWise are not robust enough to support performance measurement and program evaluation. As such, EPA developed the following question to include as part of this evaluation:

- *What can EPA do to encourage WasteWise partners to submit sufficient environmental data for performance measurement and evaluation purposes?*

To address this evaluation question, IEc conducted a review of data collection and QA/QC best practices across select EPA partnership programs and voluntary programs outside of EPA. The focus of this best practices review is to identify practices that encourage program partners to submit robust and consistent environmental data, which could be utilized for ongoing performance measurement and future program evaluation. We also compare best practices identified to current WasteWise practices, and identify where WasteWise has implemented or not implemented the practice, as well as areas where WasteWise goes beyond what other partnership programs are doing.

Since the time that IEc commenced this evaluation, WasteWise has instituted new data reporting requirements. For example, WasteWise requires partners to sign a Partnership Agreement when registering and the program has developed a Partnership Assurance Protocol that requires partners to report baseline and annual data in order to remain in active status. In addition, WasteWise has transitioned to a fully online reporting system in July 2009 through Re-TRAC. The best practices review takes these recent program changes into account.

It would be unrealistic to expect WasteWise or any other EPA partnership program to implement all of the data collection and QA/QC best practices indentified in this review. Some of the best practices are resource intensive, and cannot be implemented in the absence of staff that could dedicate much of their time to performance measurement. In addition, trade-offs arise between ideal data collection and participant reporting burden; some data collection best practices identified would impose too high of a reporting burden for some programs.

PROGRAMS REVIEWED

As discussed in the WasteWise Evaluation Methodology, IEc identified seven EPA partnership programs to include in the review. Below, we list each program, and describe the rationale for including them.

- *Hospitals for a Healthy Environment (H2E):* The H2E evaluation suggested that EPA collect data for normalization purposes and require baseline and annual reporting for new partners, as well as annual reporting for existing partners. H2E implemented the suggestions and now partners required to submit annual reports. In addition, the H2E toolbox (cms.h2e-online.org/partners/toolbox/) contains useful guidance for current and prospective partners, including steps for getting started, sample partner goals, data collection practices, and normalizing guidance to account for changes in activities across different types of facilities (e.g., # of patients seen, # of patient beds occupied). *Laboratories for the 21st Century (Labs 21):* Labs21 differs from WasteWise and many other EPA voluntary programs in that the partnership is project-based and partners do not submit annual reports until after project is complete. However, Labs21 is included in this review as the program provides useful materials on topics such as best practices, case studies, and benchmarking.
- *National Environmental Performance Track:* Performance Track required all members to submit baseline data and annual data, and aggregated and published performance measurement results. : Performance Track had a strong focus on QA/QC. The program reviewed all data submitted, followed up with members to ensure accuracy in reporting, and conducted site visits at 5 – 10% of member facilities each year.
- *Natural Gas Star:* The Natural Gas Star program provides many sector-specific resources to partners, such as emission quantification guidance and information on cost-effectives technologies. Natural Gas Star has also been able to aggregate and publish results.
- *National Partnership for Environmental Priorities (NPEP):* NPEP was identified as a project-based program with a unique reporting schedule. Partners report their baseline quantities and associated achievements. NPEP has a focus on QA/QC. Since 2006, NPEP has inquired about QA/QC for data associated with partner success stories.
- *SmartWay:* The SmartWay program has also developed sector-specific resources, including models and standards for reporting baseline and performance measurement data.
- *Energy Star Buildings and Plants:* At the request of EPA, IEc added this program to the original list. Many of the "Plants & Buildings" partners match WasteWise partner sectors. In addition, the program maintains a reporting database for partners that can also be used for benchmarking.

IEc found that the following non-EPA programs and initiatives contained reporting guidance or tools that could inform WasteWise data quality and increase reporting; as such, we included them in this review:

- *Australia's Greenhouse Challenge Plus:* This program requires a small number of companies to join, but the majority of partners join voluntarily. The program

provides resources to help partners calculate their greenhouse gas emissions, and reporting is completed through a universal reporting system. To minimize reporting burden and data duplication, the reporting system shares data with various agencies and programs.

- *Stewardship Ontario's Blue Box*: This mandatory program offers a variety of calculators and guidance documents for waste/recycling reporting.

INFORMATION COLLECTED

IEc asked the following data collection and QA/QC questions of each program reviewed. We answered these questions by reviewing program documents and, when needed, by following up with program staff.

- Baseline: How does the program establish a credible baseline?
- Reporting standards: What reporting standards does the program use to ensure consistent and accurate data collection? (Examples could include: standard reporting frequency, mandating absolute data, mandating facility-wide and providing definitions of program indicators, asking for text to provide context on reported data.)
- Reporting materials: How does the program use reporting materials to encourage adherence to reporting standards? (Examples could include: providing clear reporting instructions; using standard reporting forms; using advanced forms such as those Excel, PDF, or online forms to minimize reporting confusion or mistakes; using innovative reporting methods or materials to assist reporters in providing quality information.)
- Reporting compliance: How does the program encourage or require compliance with reporting standards? (e.g., by making reporting a condition of program participation, or by providing incentives for reporting?)
- Reporting quality control: How does the program ensure the quality of reported data? (Examples could include: using a standard review guide to review all submissions, comparing data to previously submitted data, comparing data to other data sets like TRI, following up with members on questionable numbers, site visits, reference checks)
- Data normalization: Does the program encourage or require members to normalize environmental data to account for external factors, such as economic conditions?
- Data aggregation: If the program aggregates data, how does the program ensure that data are fit for aggregation? Does the program systematically exclude data that should not be aggregated?
- Double counting: How does the program address potential double counting within its own reporting, and across programs?

- Transparency: How does the program ensure transparency of data limitations in its communication of program results? (Examples could be noting existence or potential effects of: external conditions, double counting, missing data, excluded data, or other quality control issues.)
- Benchmarking: Does the program's data collection facilitate benchmarking, and if so, how?

BEST PRACTICES

Below, we summarize lessons learned from data collection and QA/QC practices for these EPA programs, organized by questions we asked of each program. Exhibits 1 through 9 provide detailed information for each program reviewed.

Establishing A Credible Baseline

- Baseline data are critical for facilitating assessment of progress over time. Most programs reviewed require applicants to provide baseline performance data in a standardized format upon program entry. For example:
    - Energy Star Buildings and Plants applicants must provide baseline energy performance. Baseline performance may reflect a base-year or an average from several previous years, whichever provides the most complete and accurate performance.
    - National Environmental Performance Track required all applicants to provide baseline data for their proposed goals. Baseline data was requested for the most recent calendar year.
    - National Partnership for Environmental Priorities (NPEP) requested baseline quantities associated with submitted action plans.
    - Natural Gas STAR has tracked baseline and annual quantities since the program launched in 1993.
    - SmartWay collects baseline information using EPA's FLEET Performance Model.

  WasteWise has requested baseline data from new partners since 2005, although most partners did not provide baseline data on a voluntary basis. WasteWise recently developed a Partnership Agreement that requires partners to register in the program and submit baseline and annual data. In addition, the program has also implemented a Partnership Assurance Protocol that ties partnership to the submission of baseline and annual data. Partners must provide the requisite data in order to remain in an active status in the program. Upon registering for WasteWise, the "Welcome to WasteWise" email generated by Re-TRAC communicates that prospective partners need to report baseline information within 60 days of joining the program. Partnership is activated by submitting baseline data; for example, EPA lists the entity as a partner and distributes an electronic logo once the data are submitted. If EPA does not receive data within 60 days, the Re-TRAC account is deactivated, and partnership is never

established. An extension to this reporting schedule can be made on a case-by-case basis depending on partner circumstances. This is a clear process for collecting baseline data and is in line with best practices. One additional step that other programs have taken is to combine new member registration with baseline reporting, to make a one-step process for prospective members. This has the potential to reduce transaction costs for both members and WasteWise staff.

EPA has also implemented a best practice with the well-designed forms that Re-TRAC uses to collect baseline data. IEc reviewed WasteWise's Re-TRAC system and found that the online forms are standardized; clearly distinguish quantities of waste, recycling/reuse, and purchases of recycled materials; and organize data on recycling and reuse at the commodity level. This is a clear improvement from the previous WasteWise reporting forms, which were too open-ended to generate data in standard categories.

Implementing Reporting Standards to Ensure Consistent and Accurate Data Collection

- Most programs reviewed require partners to provide annual data on a regularly scheduled basis. For example:
    - H2E requires their Partners for Change submit annual assessment forms by January 31st of each year.
    - Performance Track required partners to submit annual data by April 1st of each year.
    - Natural Gas STAR partners are required to begin submitting annual reports after one full year of participation.
    - SmartWay partners are required to prepare annual progress reports.

  EPA previously encouraged annual WasteWise reporting through incentives including provision of a GHG report on waste, and most recently, access to the Re-TRAC system. Historically, however, WasteWise annual reporting ranged from 2-11% of partners, with only 7% of partners providing both baseline and annual data. The new WasteWise Partnership Assurance Protocol reflects a best practice by requiring annual reporting, by March 31st for the previous calendar year. WasteWise partnership will be deactivated for partners who do not submit annual data within 60 days of the deadline, unless EPA staff grants an extension for extenuating circumstances.
- Most programs reviewed specify data reporting requirements. For example:
    - Labs21 prefers that partners report measured data, but the program accepts data estimates in the absence of measured quantities.
    - Natural Gas STAR developed the Emissions Quantification Reference Guide to highlight calculations and methods for measuring and quantifying emissions.

- Performance Track members were required to report facility-wide environmental impacts for their selected goals (e.g., all NOx emissions across all sources).
- In addition, Performance Track required members to provide absolute quantities for all indicators and normalizing factors for indicators that were related to facility operations (e.g., water use, waste, etc.). Some indicators did not require normalizing (e.g., noise, land and habitat conservation).

Re-TRAC provides instructions for providing data but does not indicate what, if any, data fields are required for submitting an annual report. IEc was able to submit a blank test annual report through the Re-TRAC system. As part of ongoing Re-TRAC enhancements, EPA may want to require key fields to make sure that sufficient data are included in annual reports. We understand that EPA reviews Re-TRAC submissions for data quality and correct reporting problems (discussed below) before any data is finalized and formally entered into the system, but requiring fields would help to clarify reporting rules and improve first time quality.

- Some programs reviewed collect supplemental information to verify compliance with reporting standards:
  - Performance Track requested qualitative and quantitative data. The information was then reviewed for consistency and data quality issues. In addition, Performance Track inquired about how the process for quantifying reported data (e.g., utility bills, application of formulas).
  - Natural Gas STAR forms inquire about the basis for calculations and estimates provided by partners.
  - Australia's GHG Challenge Plus requested details on calculation methodologies and assumptions.
  - NPEP began inquiring about members' QA/QC process for data reported in 2006.

WasteWise may want to consider collecting supplemental information on *how* partners measure or estimate reported quantities. For example, recycling data are typically of high quality because recyclers have an incentive to calculate the exact quantity of materials collected from suppliers. However, data on waste disposed can be subject to some errors from conversions, or from questionable methods of estimating tonnage disposed (as some waste hauling contracts, especially those that are based on a waste hauling schedule for emptying a set number of dumpsters, do not generate invoices that specify tonnage disposed). Also, data on waste prevention typically needs to be estimated and often involves a series of calculations to do so.

Using Reporting Guidance to Encourage Adherance to Reporting Standards

- Most programs reviewed provide clear program guidance to outline data collection practices and available resources. For example:
    - Energy Star developed the Portfolio Manager to help partners track, analyze, and report their energy use. The program also includes features to track water use, estimate a facility's carbon footprint, and to identify potential investment priorities.
    - Natural Gas STAR's website includes reporting tips, organized by partner type, as well tools such as STARtracker, a web-based application to track and report methane emissions, and the GHG Equivalency Calculator to translate common units of measurement to everyday terms (e.g., pounds of methane reduced is equivalent to taking *x* cars off the road). Natural Gas STAR also provides a Partner Challenge Service to develop estimates of a partner' methane emissions and then assist partners in identifying and implementing improvements.
    - Performance Track provided resources including sample reporting forms, instructions, and teleseminars to review the reporting process. In addition, Performance Track also provided a "?" help icon next to each question in reporting forms. The help icons provided guidance via pop-ups. Performance Track also offered a hotline that provided assistance with reporting questions.
    - SmartWay developed the FLEET Performance Model to help partners calculate emissions from on-site impacts, including equipment, as well as emissions from off-site haulers.
    - Labs 21 and Performance Track operate program hotlines to assist partners with reporting.
    - The website for Stewardship Ontario's (Canada) Blue Box Program includes a unit based calculator with eight supplements to help members collect and quantify data for entry into their online data entry system.
    - Several programs provide model applications and annual reports to members.

  Re-TRAC provides guidance on data collection practices, and provides links to FAQs and other resources. In addition, WasteWise advertises on its reporting page that the program hotline can provide assistance with data reporting; hotlines can be very effective tools for ensuring partner understanding of program requirements and compliance with them. In addition, WasteWise has a library of on-line documents to assist partners with everything from setting up recycling programs; to conducting waste audits; to monitoring program effectiveness and communicating program results. As such, EPA has implemented a best practice in providing reporting guidance and assistance. EPA may want to consider developing additional guidance materials, such as more detailed model baseline and annual reports. In addition, EPA may want to provide direct link from Re-

TRAC to the WasteWise lookup of common volume to weight conversions, to avoid conversion errors.

Encouraging Compliance with Reporting Requirement and Schedule

- Most programs reviewed require reporting on a predetermined schedule to get partners into the habit of reporting. For example:
    - Natural Gas Star achieved high levels of reporting by requiring the submission of annual reports after one full year of participation.
    - Performance Track required partners to submit annual progress reports by April 1st of each year.

  WasteWise has maintained a consistent reporting season. Partners are required to submit annual reports by March 31st of each year for the previous calendar year. In addition, WasteWise has gone beyond this best practice in that Re-TRAC facilitates incremental reporting, so facilities can enter data weekly or monthly, or at intervals customized by a partner. Re-TRAC automatically sums data reported across time at the end of the year to develop annual quantities.

- Some programs reviewed offer incentives for reporting. For example:
    - Energy Star Buildings and Plants selects award winners solely from the universe of partners that submitted their annual data.
    - H2E also only considers reporting partners for awards.
    - NPEP encouraged partners to prepare Success Stories to document their progress and accomplishments. Success Stories are then highlighted on NPEP's website.

  WasteWise goes beyond this best practice by offering incentives for reporting in the form of access to Re-TRAC, which focus group members indicate is very helpful for tracking waste minimization and recycling efforts. WasteWise provides a GHG report on waste and recycling data reported, which focus group members also identified as a valuable service provided by the program. Finally, EPA decides on WasteWise award winners by reviewing data reported by partners through the annual reporting process.

- Many programs reviewed strive to be consistent with other reporting standards, particularly across EPA programs. For example:
    - Energy Star and Performance Track both developed emissions guidance that was consistent with EPA's Climate Leaders program.
    - H2E accepts forms from other programs in lieu of their Annual Facility Assessment Summary and Goals Form.
    - Greenhouse Gas Challenge Plus (Australia) utilized the Online System for Comprehensive Activity Reporting (OSCAR) to allow for electronic reporting system across multiple programs. GHG Challenge Plus was a hybrid program that was voluntary for companies that received less than

$3 million in fuel credits and mandatory for companies that received $3 million or more. OSCAR was innovative in that it was used by voluntary and mandatory partners across climate programs.

- In addition, reporting for GHG Plus was designed to be consistent with *The Greenhouse Gas Protocol* and the *ISO 14064 Standard for Entity-Level Greenhouse Reporting*.

WasteWise has implemented this best practice by using EPA's WARM model to generate a GHG report for partners, consistent with ORCR policy. In addition, EPA WasteWise staff have also met with EnergyStar to explore the potential for including energy savings from waste management in EnergyStar's reporting.

Validating Data Reporting

- Several programs take steps to validate data reported For example:
  - Performance Track reviewed all data upon submission. Prior to aggregation, Performance Track also reviewed data outliers to check for potential data issues. In addition, Performance Track developed review guides to assist EPA and contractors in reviewing application and annual reports. Review guides contained guidance for each question in each form as well as overarching common issues.
  - Performance Track conducted annual site visits at up to 10 percent of member facilities. One factor in selecting facilities for site visits was the likelihood for having data quality issues as evidenced by multiple data change requests, high variation in quantities, or unusually large or small reported quantities.
  - Natural Gas STAR reviews reports and provides post-reporting feedback to partners via individual summary reports.
  - Australia's GHG Challenge Plus required partners to participate in independent verification of annual progress reports. The program also reviewed a sample of participants' reports, consistent with verification guidelines.

WasteWise staff review data before it is published, using ad-hoc logic tests to assess the plausibility of data reported. For example, if a partner reports a waste quantity that appears to conflict with previous reporting, or be out of step with the type and scale of operations, WasteWise staff note the issue and follow up with the partner. EPA will not finalize the data for aggregation until staff are satisfied with the quality of the data.

EPA does not conduct site visits or require third-party certification to verify WasteWise data. It should be noted that conducting site-visits to verify data would be very resource intensive for EPA, while requiring third-party certification would be similarly resource intensive for WasteWise partners. As such, most EPA partnership programs do not utilize site visits or require third- party data certification.

While logic tests are helpful, programs benefit from developing clear guides for reviewing data submitted. Guides typically cover appropriate responses to each question and data field, as well as data quality problems to be on the lookout for, such as common pitfalls in estimating waste disposal and prevention (discussed above), and assessing changes in quantities from year to year. Guides can also include information on the range of impacts (in this case, waste) typical for various industries and scale of operations. Given that WasteWise relies solely on self-reported data, and the Re-TRAC forms do not ask partners for information on *how* they develop reported data, EPA may want to consider developing guidance for systematically reviewing WasteWise partner data.

Encouraging Normalization of Environmental Data

- Many programs reviewed encourage or require partners to provide normalized data, to factor out external factors when reviewing progress (most commonly, economic impacts). External factors include changes in economic conditions (or other measure of an organization's activity). Absolute data do not indicate if reductions or increases in waste are due to economic conditions as opposed to partner environmental initiatives, which is important context for understanding individual facility progress. Programs that collect normalized data also should provide clear guidance on how to normalize, as well as targeted examples. For example:
    - Portfolio Manager for Energy Star Plants and Buildings program normalizes for weather and building specific operations. Portfolio Manager suggests that industrial facilities incorporate normalizing bases such as inputs, product type, and production/output while non-industrial facilities should use factors that best reflect variations in their operations (e.g., facility size, weather, occupancy levels).
    - Performance Track required member to normalize for economic conditions or other measures of facility activity where economic conditions did not apply. Performance Track developed normalizing guidance to help facilities select appropriate normalizing bases for their goals. The program also developed a normalizing calculator to help facilities determine their normalizing factor. Reporting forms then automatically calculated the normalized quantity, adjusted to the baseline year.
    - H2E requires facilities to normalize to account for fluctuations in patient load (e.g., adjusted patient days).
    - Labs 21 collects normalized data and provides suggested normalizing factors, including gross area, weather, and lab use.

    In the process of EPA coordinating with OMB on ICR approval for the WasteWise program in 2007, OMB raised background economic conditions as a factor that WasteWise should account for when they are attributing

partner improvements to the program. Thus, OMB included background economic conditions among the list including cost savings, state and local laws, and customer expectations that are commonly cited as other factors that influence firm behavior.[1] Given OMB's inclusion of economic conditions as an attribution factor, EPA has not pursued collection of normalized data from WasteWise partners. EPA is awaiting the results of this evaluation to engage in a comprehensive discussion of WasteWise attribution issues with OMB. It is not clear why OMB did not raise similar concerns within the ICRs for the other EPA partnership programs that collect data normalized for economic conditions.

Data Aggregation

Several programs take quality control steps specific to ensuring that data to be aggregated as part of program-wide assessments are suitable for this purpose. These steps include:

- Develop guidance for reviewing and analyzing reported data. For example:
    - Performance Track documented the Indicator Definitions, Data Quality Management Plan, Data Aggregation Plan, and Review Guides to promote consistency among reporting, reviewing reports, and data aggregation.
        - Performance Track's data aggregation plan highlighted formulas and unit conversions to prepare aggregated results.
    - Data reported to Labs21 is manually reviewed prior to data aggregation.

WasteWise has implemented a best practice for data aggregation. Data aggregation for WasteWise is conducted automatically through Re-TRAC once data are approved, eliminating the potential for human error. Automation of analyses is possible for WasteWise because of the capabilities of the Re-TRAC system.

Addressing Potential Instances of Double Counting

- Some programs reviewed developed guidance to address potential issues related to double counting. For example:
    - The 2007 Annual Report for Energy Star and Other Climate Partnerships specifies EPA's process for measuring results across climate programs. The report indicates that EPA climate programs strive to "address data quality, potential double counting with other EPA programs, free ridership, the efforts of third-party actors, and other program-specific market effects." To minimize the likelihood of double counting across climate programs, the report does not provide aggregated results for Climate Leaders.

[1] See the previous literature review conducted for this evaluation for a discussion of influences on firms that join partnership programs, dated December 14, 2009.

- When H2E was managed by EPA, H2E and other EPA staff coordinated to avoid duplication of data collect efforts.
- Performance Track discouraged facilities from including goals that overlap with one other (e.g., energy use and GHG emissions).
- Performance Track also inquired as to whether or not members reported data to any other programs. However, this information was not used by EPA, and the question was dropped in 2007

WasteWise has implemented a best practice to avoid double-counting. For example, EPA created the Recycled Content (ReCon) Tool to help companies estimate life-cycle greenhouse gas (GHG) emissions and energy impacts from purchasing and/or manufacturing materials with varying degrees of post-consumer recycled content. However, this tool, when used in conjunction with Re-TRAC, could lead to double-counting in WasteWise reporting and GHG estimation. As such, EPA does not use the ReCon tool in the context of WasteWise reporting.[2]

Ensuring Transparency In Communication of Results

- Some programs that aggregate program data to demonstrate results provide information on data limitations, For example:
  - The 2007 Annual Report for Energy Star and Other Climate Partnerships specifies EPA's process for measuring results across climate programs. The report indicates that EPA climate programs strive to "address data quality, potential double counting with other EPA programs, free ridership, the efforts of third-party actors, and other program-specific market effects." To minimize the likelihood of double counting across climate programs, the report does not provide aggregated results for Climate Leaders.
  - Natural Gas STAR and Performance Track noted that EPA does not attribute all reported environmental improvements reported to these programs.
  - Each year Performance Track analyzed results and published them in an annual progress report. The progress reports included caveats in their progress reports. Caveats noted potential data issues such as the possibility that some data may have been rounded and that some members may not have provided facility-wide values (less than 10 percent).

[2] Attribution of program results is related to double-counting. EPA previously conducted an indexing analysis to investigate the level of "credit" that WasteWise should take for reported results (ERG, Program *Evaluation of the Impact of the WasteWise Program on Partner Waste Reduction Activities,* Draft, November 17, 2004). This study was never used by EPA. However, if EPA revisits this method for apportioning credit, the Agency should revisit issues raised by peer reviewers to ensure that WasteWise's current data collection plan satisfies their concerns. Also, EPA should update the analysis with new data because the previous analysis used a highly incomplete data set.

WasteWise has implemented a transparency best practice by including a disclaimer on reported results that the program does not take credit for all improvements found, given other factors that influence partner behavior.

Benchmarking

- Some programs reviewed encourage the use of benchmarking tools, particularly for companies within the same sector. For example:
    - H2E offered a teleseminar in February 2007 to introduce Energy Star's benchmarking tool and encourage H2E partners to use the tool.
    - Labs 21 and Energy Star both developed benchmarking tools to help EPA and partners track and understand annual progress.
    - SmartWay uses a benchmarking tool to assign facilities a performance score, and publishes partner scores on their public website (http://www.epa.gov/smartway/transport/partner-list/index.htm).

In the past, EPA has experimented with benchmarking for WasteWise, however, benchmarking is a sophisticated, difficult, and resource-intensive undertaking. EPA has no formal plans to conduct benchmarking analyses using WasteWise data at this time, although in the future, the program may explore benchmarking with industry sectors that are well-represented in WasteWise.

EXHIBIT 1: ENERGY STAR BUILDINGS AND PLANTS

PROGRAM INFORMATION	
Unit of Membership	Facility-based
Current Number of Members[3]	2,817 partners, encompassing 8,062 buildings and plants
Year of Inception	Energy Star launched in 1992; the Buildings and Plants component launched in 1995.
Reporting Schedule	Partners agree to measure, track, and benchmark their energy performance through EPA's Portfolio Manager. Partners can use Portfolio Manager to share data with EPA and earn recognition for energy performance within a building or across an entire portfolio. Annual reporting is not required; however, partners who wish to display the Energy Star label must reapply each year in order to display the current year's plaque.
Unit of Measurement	Standard reporting units include: Energy Star benchmark score, Btu/square foot, Btu/product, total energy cost/square foot.
Progress Reports	Energy Star publishes bi-annual snapshots to highlight reported achievements.

BASELINE: HOW DOES THE PROGRAM ESTABLISH A CREDIBLE BASELINE?
Energy Star Buildings and Plants requires applicants to submit baseline energy performance from a base year or an average of several previous years, whichever provides the most complete and accurate information. Participants must gather at least two years of monthly energy data, or may use a more frequent basis if available. Baseline data must be normalized to account for variations in weather. Participants must account for energy in terms of physical units and on a cost basis.

REPORTING STANDARDS: WHAT REPORTING STANDARDS DOES THE PROGRAM USE TO ENSURE CONSISTENT AND ACCURATE DATA COLLECTION? (EXAMPLES ARE: STANDARD REPORTING FREQUENCY, MANDATING ABSOLUTE DATA, MANDATING FACILITY-WIDE AND PROVIDING DEFINITIONS OF PROGRAM INDICATORS, ASKING FOR TEXT TO PROVIDE CONTEXT ON REPORTED DATA.)
Energy Star Buildings and Plants requires reporting via Portfolio Manager, an interactive energy management tool that allows users to track and assess energy and water consumption across their entire portfolio of buildings in a secure online environment. Portfolio Manager uses standard categories and units for reporting. Energy Star encourages the use of complete and accurate data whenever possible. Data should represent actual energy use and not estimated figures. While annual reporting is not required, Energy Star requires participants to establish a baseline goal and continually work towards energy improvement. The program provides two databases to help companies track energy improvements. There is a wide range of reporting options open to program participants and Energy Star encourages participants to use the method that best fits their purpose. To be considered for an award, industrial partners must submit a written explanation of their energy efficiency improvements to accompany data provided in Portfolio Manager.

[3] Membership information for all programs received was current as of Fall 2009.

REPORTING MATERIALS: HOW DOES THE PROGRAM USE REPORTING MATERIALS TO ENCOURAGE ADHERENCE TO REPORTING STANDARDS? (EXAMPLES COULD BE: PROVIDING CLEAR REPORTING INSTRUCTIONS; USING STANDARD REPORTING FORMS; USING ADVANCED FORMS SUCH AS THOSE EXCEL, PDF, OR ONLINE FORMS TO MINIMIZE REPORTING CONFUSION OR MISTAKES; USING INNOVATIVE REPORTING METHODS OR MATERIALS TO ASSIST REPORTERS IN PROVIDING QUALITY INFORMATION.)
Energy Star provides an online system to help members report, track and analyze their energy use. Energy Star's Portfolio Manager also provides a rating system that helps participants create benchmarks. The rating system provides industry averages for partners to compare with their energy reduction goals. The Portfolio Manager provides several specific tracking devices to help partners better understand their total energy use these include: helping members track their water and energy consumption, estimate carbon footprints, help set investment priorities, and help gain EPA recognition. The Portfolio Manager is specifically designed for commercial and industrial facilities to share best practices, become a leader in energy improvement or top energy performance, or simply gain exposure through development of success stories or showcasing a directory of achievements for clients. Energy Star also offers Target Finder, a tool to help users establish an energy performance target for design projects and major building renovations. EPA is currently working with a variety of industries to develop additional benchmarks of plant energy performance. These indicators are currently available for auto assembly, cement, and corn refining plants.

REPORTING COMPLIANCE: HOW DOES THE PROGRAM ENCOURAGE OR REQUIRE COMPLIANCE WITH REPORTING STANDARDS? (e.g., BY MAKING REPORTING A CONDITION OF PROGRAM
Energy Star Buildings and Plants encourages reporting through the use of incentives and awards. To be considered for the Energy Star Leader designation, participants must track efficiency data using EPA's Portfolio Manager. Participants also qualify for the Energy Star label by tracking efficiency data using Portfolio Manager. Participants that achieve a rating of 75 or better (as calculated by Portfolio Manager) qualify for the Energy Star label. Energy Star also offers several awards which must be supplemented with data tracked through Portfolio Manager.

REPORTING QUALITY CONTROL: HOW DOES THE PROGRAM ENSURE THE QUALITY OF REPORTED DATA? (EXAMPLES COULD BE: USING A STANDARD REVIEW GUIDE TO REVIEW ALL SUBMISSIONS, COMPARING DATA TO PREVIOUSLY SUBMITTED DATA, COMPARING DATA TO OTHER DATA SETS LIKE TRI, FOLLOWING UP WITH MEMBERS ON QUESTIONABLE NUMBERS, SITE VISITS, REFERENCE CHECKS)
Portfolio Manager compares participant energy usage and efficiency improvements to similar facility US averages. The program encourages members to complete either self-audits or third-party audits. The Department of Energy offers audit assistance to industrial Energy Star members. Portfolio Manager calculates building greenhouse gas emissions (including carbon dioxide, methane, and nitrous oxide) from on-site fuel combustion and purchased electricity and district heating and cooling. Portfolio Manager also enables tracking of avoided emissions from Renewable Energy Certificates. The methodology for calculating greenhouse gas emissions in Portfolio Manager was designed to be consistent with the Greenhouse Gas Protocol developed by the World Resources Institute and World Business Council for Sustainable Development, and is compatible with the accounting, inventory and reporting requirements of EPA's Climate Leaders program, as well as other state and NGO registry and reporting programs. Detailed information on emissions calculations is available in the Technical Description of Greenhouse Gas Emission Calculations.

DATA NORMALIZATION: DOES THE PROGRAM ENCOURAGE OR REQUIRE MEMBERS TO NORMALIZE ENVIRONMENTAL DATA TO ACCOUNT FOR EXTERNAL FACTORS, SUCH AS ECONOMIC CONDITIONS?
Portfolio Manager normalizes data based on the building designation. The program normalizes for weather and building specific operations. The program suggests several other factors that participants should normalize for including: climate zone, facility size, fuel choice, price/cost of energy, actual weather history, hours of operation, occupancy levels, and any special features for commercial and institutional buildings. For industrial facilities, common normalizing factors include: inputs, product type, and output and production processes.

DATA AGGREGATION: IF THE PROGRAM AGGREGATES DATA, HOW DOES THE PROGRAM ENSURE THAT DATA ARE FIT FOR AGGREGATION? DOES THE PROGRAM SYSTEMATICALLY EXCLUDE DATA THAT SHOULD NOT BE AGGREGATED?
Program does not focus on providing aggregated data. Instead, program provides information on trends (e.g., the amount of floor space rated each year and the types of facilities that are rating their floor spaces). The semi-annual snapshot provides a statement on the cost savings in utilities and prevented greenhouse gas emissions, but the overall focus is on trends.

DOUBLE COUNTING: HOW DOES THE PROGRAM ADDRESS POTENTIAL DOUBLE COUNTING WITHIN ITS OWN REPORTING, AND ACROSS PROGRAMS?
Program methods address data quality, potential double counting with other EPA programs, free ridership, the efforts of third-party actors, and other program-specific market effects. For example, the 2007 Annual Report for Energy Star and Other Climate Partnerships does not include results from Climate Leaders as it is presumed that Climate Leaders' reductions are reflected in the data shown for other programs

TRANSPARENCY: HOW DOES THE PROGRAM ENSURE TRANSPARENCY OF DATA LIMITATIONS IN ITS COMMUNICATION OF PROGRAM RESULTS? (EXAMPLES COULD BE NOTING EXISTENCE OR POTENTIAL EFFECTS OF: EXTERNAL CONDITIONS, DOUBLE COUNTING, MISSING DATA, EXCLUDED DATA, OR OTHER QUALITY CONTROL ISSUES.)
Energy Star's Annual Report outlines EPA's process for measuring results of climate programs, including Energy Star's Plants and Buildings program. The annual report notes that program methods address data quality, potential double counting with other EPA programs, free ridership, the efforts of third-party actors, and other program-specific market effects.

BENCHMARKING: DOES THE PROGRAM'S DATA COLLECTION FACILITATE BENCHMARKING, AND IF SO, HOW?
Many partners can rate their energy performance on a scale of 1–100 relative to similar buildings nationwide. The buildings are *not* compared to the other buildings entered into Portfolio Manager to determine the ENERGY STAR rating. Instead, statistically representative models are used to compare partner buildings against similar buildings from a national survey conducted by the Department of Energy's Energy Information Administration. EPA's energy performance rating system accounts for the impact of weather variations as well as changes in key physical and operating characteristics of each building. Buildings rating 75 or greater may qualify for the ENERGY STAR label. Benchmarking data is available for many, but not all, sectors.

EXHIBIT 2: HOSPITALS FOR A HEALTHY ENVIRONMENT (H2E) (NOW PRACTICE GREENHEALTH)

PROGRAM INFORMATION	
Unit of Membership	Facility & Company
Current Number of Members	616 member facilities; 51 business members; 31 members of the Strategic Resource Network; 4 clinic members; 3 Greenhealth Professional members
Year of Inception	1998. In 2006, H2E became an independent not-for-profit organization under the name Practice Greenhealth.
Reporting Schedule	Prior to becoming part of Practice Greenhealth, H2E required Partners for Change, Champions of Change, and Environmental Leadership Circle Partners to submit annual reports.
Unit of Measurement	Tons of waste, percentage of waste, waste management costs
Progress Reports	H2E does not appear to have developed progress reports.

BASELINE: HOW DOES THE PROGRAM ESTABLISH A CREDIBLE BASELINE?
H2E encourages partners to collect baseline data to track their progress and apply for awards. Baseline information is only required for Partner for Change award applications.

REPORTING STANDARDS: WHAT REPORTING STANDARDS DOES THE PROGRAM USE TO ENSURE CONSISTENT AND ACCURATE DATA COLLECTION? (EXAMPLES ARE: STANDARD REPORTING FREQUENCY, MANDATING ABSOLUTE DATA, MANDATING FACILITY-WIDE AND PROVIDING DEFINITIONS OF PROGRAM INDICATORS, ASKING FOR TEXT TO PROVIDE CONTEXT ON REPORTED DATA.)
When H2E was run by EPA, annual reporting was required. H2E Partners for Change were required to complete and submit to EPA a standard, two-page Annual Facility Assessment Summary and Goals Form that describes the goals and progress toward those goals. The assessment form was due within six months of joining H2E (for new Partners) and by January 31 of each subsequent year, unless less than nine months have passed since submittal of the initial form. Reporting is now only required for partners that are submitting a Partner for Change award application. Recurrent data collection only occurs if a partner reapplies for the Partner of Change award

REPORTING MATERIALS: HOW DOES THE PROGRAM USE REPORTING MATERIALS TO ENCOURAGE ADHERENCE TO REPORTING STANDARDS? (EXAMPLES COULD BE: PROVIDING CLEAR REPORTING INSTRUCTIONS; USING STANDARD REPORTING FORMS; USING ADVANCED FORMS SUCH AS THOSE EXCEL, PDF, OR ONLINE FORMS TO MINIMIZE REPORTING CONFUSION OR MISTAKES; USING INNOVATIVE REPORTING METHODS OR MATERIALS TO ASSIST REPORTERS IN PROVIDING QUALITY INFORMATION.)
H2E's toolbox included sample partner goals and an H2E Assessment Guide. Practice Greenhealth also offers Greenhealth Tracker, an environmental data tracking tool to help facilities understand how waste disposal dollars are being spent and it organizes information by each type of waste to allow facilities to see where to prioritize goals for waste minimization and justify addressing the specific contracts that contribute to particular waste streams. Webinars are also routinely offered.

REPORTING COMPLIANCE: HOW DOES THE PROGRAM ENCOURAGE OR REQUIRE COMPLIANCE WITH REPORTING STANDARDS? (e.g., BY MAKING REPORTING A CONDITION OF PROGRAM PARTICIPATION, OR BY PROVIDING INCENTIVES FOR REPORTING?)
Only reporters are eligible for awards. A 2006 evaluation of H2E found that approximately 10% of partners reported data, with the majority of reports coming from award applicants. Clear guidance is available regarding normalizing bases. For example, an "In-Patient/Hospital" facility would use number of adjusted patient days, number of beds, or number of staff. Guidance also specifies how to address universal waste (reported under recycling/reuse) and construction and demolition waste (reported in a separate table).

REPORTING QUALITY CONTROL: HOW DOES THE PROGRAM ENSURE THE QUALITY OF REPORTED DATA? (EXAMPLES COULD BE: USING A STANDARD REVIEW GUIDE TO REVIEW ALL SUBMISSIONS, COMPARING DATA TO PREVIOUSLY SUBMITTED DATA, COMPARING DATA TO OTHER DATA SETS LIKE TRI, FOLLOWING UP WITH MEMBERS ON QUESTIONABLE NUMBERS, SITE VISITS, REFERENCE CHECKS)
Data Collection section of website outlined common issues such as converting volume to weight, normalizing, and important metrics such as total waste generated, disposal cost per ton or pound, and pounds of Regulated Medical Waste (RMW)/solid waste/hazardous waste per adjusted patient day. H2E also provided information regarding the strengths and limitations associated with each Waste Assessment method (e.g., examination of hauler records).

DATA NORMALIZATION: DOES THE PROGRAM ENCOURAGE OR REQUIRE MEMBERS TO NORMALIZE ENVIRONMENTAL DATA TO ACCOUNT FOR EXTERNAL FACTORS, SUCH AS ECONOMIC CONDITIONS?
H2E requires facilities to develop and track an internal metric to account for fluctuations in patient load. The website includes information on how to calculate or find adjusted patient days for various types of facilities.

DATA AGGREGATION: IF THE PROGRAM AGGREGATES DATA, HOW DOES THE PROGRAM ENSURE THAT DATA ARE FIT FOR AGGREGATION? DOES THE PROGRAM SYSTEMATICALLY EXCLUDE DATA THAT SHOULD NOT BE AGGREGATED?
N/A. Program does not appear to aggregate data.

DOUBLE COUNTING: HOW DOES THE PROGRAM ADDRESS POTENTIAL DOUBLE COUNTING WITHIN ITS OWN REPORTING, AND ACROSS PROGRAMS?
Practice Greenhealth does not appear to report aggregated results nor did H2E. When operated by EPA, H2E recognized that several health care-related organizations were members of EPA's WasteWise Program and EPA's ENERGY STAR program. EPA coordinated H2E with these programs to ensure non-duplication of information collection and where appropriate, EPA accepted other programs' reporting forms in lieu of the H2E Annual Facility Assessment Summary and Goals Form.

TRANSPARENCY: HOW DOES THE PROGRAM ENSURE TRANSPARENCY OF DATA LIMITATIONS IN ITS COMMUNICATION OF PROGRAM RESULTS? (EXAMPLES COULD BE NOTING EXISTENCE OR POTENTIAL EFFECTS OF: EXTERNAL CONDITIONS, DOUBLE COUNTING, MISSING DATA, EXCLUDED DATA, OR OTHER QUALITY CONTROL ISSUES.)
Program does not appear to report program results.

BENCHMARKING: DOES THE PROGRAM'S DATA COLLECTION FACILITATE BENCHMARKING, AND IF SO, HOW?
H2E does not appear to conduct benchmarking. However, H2E highlighted Energy Star's Portfolio Manager to encourage partners to conduct benchmarking. H2E held a teleseminar in February 2007 to introduce Energy Star's benchmarking tool to the H2E audience.

EXHIBIT 3: LABORATORIES FOR THE 21ST CENTURY (LABS 21)

PROGRAM INFORMATION	
Unit of Membership	Public and Private Sector Laboratories
Current Number of Members	65
Year of Inception	2002
Reporting Schedule	Project evaluation at end of first year and project progress for subsequent years is required.
Unit of Measurement	Standard reporting units include: kBTU's, kWh, CCF, Therms, Thousand Lbs, Gallons
Progress Reports	Labs21 does not appear to have developed progress reports.

BASELINE: HOW DOES THE PROGRAM ESTABLISH A CREDIBLE BASELINE?
Labs21 requires participants to provide energy use and water use data, as well as the square footage for the facility and lab space, at the time of application. Partners may provide current or expected energy use and water use. Labs21 requests that participants conduct a project evaluation at the end of the first year of program membership using the Environmental Performance Criteria developed by the program. Labs21 encompasses retrofits and new construction. Thus, it is difficult to establish a baseline for the program as some data reflect projections and not actual measurements.

REPORTING STANDARDS: WHAT REPORTING STANDARDS DOES THE PROGRAM USE TO ENSURE CONSISTENT AND ACCURATE DATA COLLECTION? (EXAMPLES ARE: STANDARD REPORTING FREQUENCY, MANDATING ABSOLUTE DATA, MANDATING FACILITY-WIDE AND PROVIDING DEFINITIONS OF PROGRAM INDICATORS, ASKING FOR TEXT TO PROVIDE CONTEXT ON REPORTED DATA.)
Once the laboratory renovation/construction is complete, Labs21 encourages partners to provide annual reports throughout the life of each project. Reporting is done via the Labs21 Energy Benchmarking Tool. Labs21 prefers measured data; however, data estimates are accepted in the absence of real data.

REPORTING MATERIALS: HOW DOES THE PROGRAM USE REPORTING MATERIALS TO ENCOURAGE ADHERENCE TO REPORTING STANDARDS? (EXAMPLES COULD BE: PROVIDING CLEAR REPORTING INSTRUCTIONS; USING STANDARD REPORTING FORMS; USING ADVANCED FORMS SUCH AS THOSE EXCEL, PDF, OR ONLINE FORMS TO MINIMIZE REPORTING CONFUSION OR MISTAKES; USING INNOVATIVE REPORTING METHODS OR MATERIALS TO ASSIST REPORTERS IN PROVIDING QUALITY INFORMATION.)
Labs 21 developed their Energy Benchmarking Tool for partners to submit their data and to help analyze the project effectiveness at reducing energy usage and increasing energy efficiency. The program has developed a Tool Kit of resources to support the design, construction, and operation of high-performance laboratories. Tools include design guides, case studies, a performance rating (benchmarking) system, and a video.

REPORTING COMPLIANCE: HOW DOES THE PROGRAM ENCOURAGE OR REQUIRE COMPLIANCE WITH REPORTING STANDARDS? (e.g., BY MAKING REPORTING A CONDITION OF PROGRAM PARTICIPATION, OR BY PROVIDING INCENTIVES FOR REPORTING?)
Participants are asked to complete annual project progress data; however, there does not appear to be penalties for failing to comply with reporting requirements.

REPORTING QUALITY CONTROL: HOW DOES THE PROGRAM ENSURE THE QUALITY OF REPORTED DATA? (EXAMPLES COULD BE: USING A STANDARD REVIEW GUIDE TO REVIEW ALL SUBMISSIONS, COMPARING DATA TO PREVIOUSLY SUBMITTED DATA, COMPARING DATA TO OTHER DATA SETS LIKE TRI, FOLLOWING UP WITH MEMBERS ON QUESTIONABLE NUMBERS, SITE VISITS, REFERENCE CHECKS)
All reporting data are manually reviewed before being included in data that others use for benchmarking. Labs21 offers technical assistance with setting performance goals, benchmarking performance, and researching technical issues related to improving laboratory performance.

DATA NORMALIZATION: DOES THE PROGRAM ENCOURAGE OR REQUIRE MEMBERS TO NORMALIZE ENVIRONMENTAL DATA TO ACCOUNT FOR EXTERNAL FACTORS, SUCH AS ECONOMIC CONDITIONS?
Labs 21 suggests a number of normalizing factors that should be considered when collecting and analyzing data. These include: gross area, lab area, weather, lab type, lab use, occupancy schedule, required ventilation rates, and equipment loads.

DATA AGGREGATION: IF THE PROGRAM AGGREGATES DATA, HOW DOES THE PROGRAM ENSURE THAT DATA ARE FIT FOR AGGREGATION? DOES THE PROGRAM SYSTEMATICALLY EXCLUDE DATA THAT SHOULD NOT BE AGGREGATED?
Data is manually reviewed for accuracy reasonableness before being included in the benchmarking data. However, the program does not appear to aggregate results.

DOUBLE COUNTING: HOW DOES THE PROGRAM ADDRESS POTENTIAL DOUBLE COUNTING WITHIN ITS OWN REPORTING, AND ACROSS PROGRAMS?
N/A. Program does not appear to aggregate data.

TRANSPARENCY: HOW DOES THE PROGRAM ENSURE TRANSPARENCY OF DATA LIMITATIONS IN ITS COMMUNICATION OF PROGRAM RESULTS? (EXAMPLES COULD BE NOTING EXISTENCE OR POTENTIAL EFFECTS OF: EXTERNAL CONDITIONS, DOUBLE COUNTING, MISSING DATA, EXCLUDED DATA, OR OTHER QUALITY CONTROL ISSUES.)
N/A. Program does not appear to aggregate data.

BENCHMARKING: DOES THE PROGRAM'S DATA COLLECTION FACILITATE BENCHMARKING, AND IF SO, HOW?
Labs21 offers an Energy Benchmarking Tool, a Web-based database tool that contains energy use information from more than 170 laboratory facilities. It allows users to benchmark energy performance in terms of whole-building metrics (e.g., BTU/sf-yr) as well as system-level metrics (e.g., ventilation W/cfm).

EXHIBIT 4: NATIONAL ENVIRONMENTAL PERFORMANCE TRACK

PROGRAM INFORMATION	
Unit of Membership	Facility-based
Current Number of Members	547[4]
Year of Inception	2000
Reporting Schedule	Baseline data was required at time of application. Annual facility-wide reporting was required for all members.
Unit of Measurement	Standard reporting units included: pounds, tons, kWh, MMBtu. Standard units were defined for each indicator included in the Environmental Performance Table.
Progress Reports	Annual progress reports were published from 2003 – 2009.

BASELINE: HOW DOES THE PROGRAM ESTABLISH A CREDIBLE BASELINE?
Performance Track required applicants to provide baseline data associated with their proposed goals. The standard baseline year was the most recently completed calendar year prior to the date of the application. The program offered some flexibility in establishing a baseline quantity, so long as the baseline reflected at least 12 months of data and at least 6 of those months fell within the previous calendar year. Thus, initial applicants in 2000 provided baseline data for 1999. Members were encouraged to provide baseline data and propose goals from a standard list of categories and indicators, allowing the program to measure results by indicator (e.g., NOx emissions).

[4] Performance Track had 547 members when the program ceased operations.

REPORTING STANDARDS: WHAT REPORTING STANDARDS DOES THE PROGRAM USE TO ENSURE CONSISTENT AND ACCURATE DATA COLLECTION? (EXAMPLES ARE: STANDARD REPORTING FREQUENCY, MANDATING ABSOLUTE DATA, MANDATING FACILITY-WIDE AND PROVIDING DEFINITIONS OF PROGRAM INDICATORS, ASKING FOR TEXT TO PROVIDE CONTEXT ON REPORTED DATA.)

Performance Track required members to submit Annual Performance Reports (APRs) to demonstrate environmental performance and achievements. Members were required to report on facility-wide environmental performance for those goals that were selected during the application process. To promote consistency and data aggregation, indicator definitions were developed to specify what should, or should not, be reported under each indicator. For example, the definition for hazardous waste specifically included universal wastes, which were excluded from non-hazardous waste reporting.

APR forms requested both qualitative and quantitative information to demonstrate environmental progress. Qualitative information included a description of how improvements were achieved, and if relevant, circumstances that delayed progress. Quantitative baseline information was provided and if applicable, previously reported quantities were also provided. Facilities were then asked to provide quantities for the most recently completed calendar year. This allowed for comparison from the baseline year. The combination of quantitative and qualitative information across all available years allowed members and EPA to look for inconsistencies and potential data quality issues.

Absolute quantities were required for all indicators and information on changes from the baseline activity level were required for the majority of indicators. Changes in the annual activity level were accounted for by adjusting environmental performance measurements by the amount of change in activity levels that has occurred since the baseline year.

REPORTING MATERIALS: HOW DOES THE PROGRAM USE REPORTING MATERIALS TO ENCOURAGE ADHERENCE TO REPORTING STANDARDS? (EXAMPLES COULD BE: PROVIDING CLEAR REPORTING INSTRUCTIONS; USING STANDARD REPORTING FORMS; USING ADVANCED FORMS SUCH AS THOSE EXCEL, PDF, OR ONLINE FORMS TO MINIMIZE REPORTING CONFUSION OR MISTAKES; USING INNOVATIVE REPORTING METHODS OR MATERIALS TO ASSIST REPORTERS IN PROVIDING QUALITY INFORMATION.)

Performance Track provided reporting information including sample reporting forms and reporting instructions. Member applications and APRs included a "?" icon next to each individual question with specific information available for each question. Members were encouraged to call the Performance Track hotline with reporting questions and the program also offered online workshops to walk new users through the reporting process.

REPORTING COMPLIANCE: HOW DOES THE PROGRAM ENCOURAGE OR REQUIRE COMPLIANCE WITH REPORTING STANDARDS? (e.g., BY MAKING REPORTING A CONDITION OF PROGRAM PARTICIPATION, OR BY PROVIDING INCENTIVES FOR REPORTING?)

Facilities were required to submit annual performance reports. Failure to submit within 30 days of the due date (April 1st of each year) resulted in a termination letter.

REPORTING QUALITY CONTROL: HOW DOES THE PROGRAM ENSURE THE QUALITY OF REPORTED DATA? (EXAMPLES COULD BE: USING A STANDARD REVIEW GUIDE TO REVIEW ALL SUBMISSIONS, COMPARING DATA TO PREVIOUSLY SUBMITTED DATA, COMPARING DATA TO OTHER DATA SETS LIKE TRI, FOLLOWING UP WITH MEMBERS ON QUESTIONABLE NUMBERS, SITE VISITS, REFERENCE CHECKS)
Applications and APRs were reviewed using review guides. Review guides provided guidance on how to review each individual question as well as overall issues to watch for (e.g., inconsistent responses across questions, sections, etc.). Questions arising from reviews were addressed using review forms to document questions and facility responses to those questions. Program staff conducted annual site visits at up to 10 percent of facilities. One factor in selecting facilities for site visits was the likelihood for having data quality issues as evidenced by multiple data change requests, high variation in quantities, or unusually large or small reported quantities.

DATA NORMALIZATION: DOES THE PROGRAM ENCOURAGE OR REQUIRE MEMBERS TO NORMALIZE ENVIRONMENTAL DATA TO ACCOUNT FOR EXTERNAL FACTORS, SUCH AS ECONOMIC CONDITIONS?
Members were required to provide normalizing bases and annual normalizing factors for all applicable goals to account for increases or decreases in the activity level from the baseline year (goals addressing land and habitat conservation, noise, odor, vibration, or indicators that are not quantitatively measured did not require normalization). The appropriate normalizing basis for most facilities was a measurement of production (e.g., gallons of paint produced). Normalizing guidance provided examples of appropriate normalizing bases for various types of facilities. The guidance also explained how the normalizing calculator contained in the reports worked by dividing the current year activity level by the activity level for the baseline year and then dividing the environmental performance measurements by the normalizing factor for the year of performance.

DATA AGGREGATION: IF THE PROGRAM AGGREGATES DATA, HOW DOES THE PROGRAM ENSURE THAT DATA ARE FIT FOR AGGREGATION? DOES THE PROGRAM SYSTEMATICALLY EXCLUDE DATA THAT SHOULD NOT BE AGGREGATED?
Performance Track's Data Quality Management Plan outlined EPA's plan to scrub all data prior to aggregation through a process called "data cleaning." All quantities provided in accepted applications and APRs were reviewed in accordance with data cleaning guidelines. Those data that did not meet data quality standards were excluded from aggregation. Data cleaning guidelines specified standard reporting years, appropriate units, and double counting issues. To promote consistency across years, the Data Quality Management Plan summarized the process for aggregating data, including formulas and unit conversions.

DOUBLE COUNTING: HOW DOES THE PROGRAM ADDRESS POTENTIAL DOUBLE COUNTING WITHIN ITS OWN REPORTING, AND ACROSS PROGRAMS?
Performance Track addresses double counting within the program through standards that discourage facilities from setting goals that overlap (e.g., non-transportation energy use and GHG emissions) and by excluding those goals that do overlap from analyses. Through 2006, facilities were asked if data was reported to any other programs, but EPA did not use the information to quantitatively adjust for double counting across programs.

TRANSPARENCY: HOW DOES THE PROGRAM ENSURE TRANSPARENCY OF DATA LIMITATIONS IN ITS COMMUNICATION OF PROGRAM RESULTS? (EXAMPLES COULD BE NOTING EXISTENCE OR POTENTIAL EFFECTS OF: EXTERNAL CONDITIONS, DOUBLE COUNTING, MISSING DATA, EXCLUDED DATA, OR OTHER QUALITY CONTROL ISSUES.)
Performance Track caveated results to note that although EPA asked for exact figures, some facilities may have submitted rounded data, and that the accuracy of the normalized figures depended on both the accuracy of the reported actual results and the reported normalizing factors. The program also noted that while most member facilities' goals are facility-wide, a few members (less than 10 percent) may have based their current goals on a specific process rather than on the facility as a whole. While such process-specific results were excluded from the aggregate results whenever possible, the annual results likely included a small percentage of process-specific results. EPA began requiring facility-wide data in 2004; therefore, the cumulative program results likely included data that are not facility-wide. Lastly, facilities' goals may relate to one "component" of an environmental indicator rather than to the indicator as a whole. For example, a facility may commit to reducing or eliminating one particular toxic air emission rather than to reducing all toxic air releases.

BENCHMARKING: DOES THE PROGRAM'S DATA COLLECTION FACILITATE BENCHMARKING, AND IF SO, HOW?
Performance Track did not conduct benchmarking, but all member reports were available for other members and the general public to see and review.

EXHIBIT 5: NATIONAL PARTNERSHIP FOR ENVIRONMENTAL PRIORITIES (NPEP)

PROGRAM INFORMATION	
Unit of Membership	Facility
Current Number of Members	253
Year of Inception	1994
Reporting Schedule	Members are asked to provide baseline values during enrollment process. Members may submit a success story when goal is achieved, or when partner is interested in highlighting achievements prior to project completion. However, only completed projects are eligible to receive awards.
Unit of Measurement	Success stories are qualitative. No standard units are used.
Progress Reports	NPEP does not appear to have developed progress reports or formal publications. Instead, NPEP prepared quarterly bulletins highlighting individual partner achievements. Bulletins were issued from 2005 to 2007.

BASELINE: HOW DOES THE PROGRAM ESTABLISH A CREDIBLE BASELINE?
NPEP focuses on individual projects that reduce Priority Chemical within a member's laboratories. Members must submit an action plan that defines the goals of the project and a timeline for achieving that goal. NPEP asks for a baseline quantity and baseline year. Facilities appear to have flexibility in selecting their baseline and future dates.

REPORTING STANDARDS: WHAT REPORTING STANDARDS DOES THE PROGRAM USE TO ENSURE CONSISTENT AND ACCURATE DATA COLLECTION? (EXAMPLES ARE: STANDARD REPORTING FREQUENCY, MANDATING ABSOLUTE DATA, MANDATING FACILITY-WIDE AND PROVIDING DEFINITIONS OF PROGRAM INDICATORS, ASKING FOR TEXT TO PROVIDE CONTEXT ON REPORTED DATA.)
While annual reporting is not required, NPEP encourages members to submit updates on their progress. The program also encourages members with long-term goals to create shorter annual goals and report the results of these endeavors as Success Stories, which consist of qualitative descriptions of project results.

REPORTING MATERIALS: HOW DOES THE PROGRAM USE REPORTING MATERIALS TO ENCOURAGE ADHERENCE TO REPORTING STANDARDS? (EXAMPLES COULD BE: PROVIDING CLEAR REPORTING INSTRUCTIONS; USING STANDARD REPORTING FORMS; USING ADVANCED FORMS SUCH AS THOSE EXCEL, PDF, OR ONLINE FORMS TO MINIMIZE REPORTING CONFUSION OR MISTAKES; USING INNOVATIVE REPORTING METHODS OR MATERIALS TO ASSIST REPORTERS IN PROVIDING QUALITY INFORMATION.)
NPEP provides a standard enrollment form for members to outline their goals and timeline for achievement. However, NPEP allows members to establish their own method for reporting their progress and results; thus, reporting is not standardized.

REPORTING COMPLIANCE: HOW DOES THE PROGRAM ENCOURAGE OR REQUIRE COMPLIANCE WITH REPORTING STANDARDS? (e.g., BY MAKING REPORTING A CONDITION OF PROGRAM PARTICIPATION, OR BY PROVIDING INCENTIVES FOR REPORTING?)
NPEP provides achievement awards to members who have successfully completed their project and reached their goal(s). Members can apply for an award by describing their methods in reaching their goal and any measurable results via the Success Story form.

REPORTING QUALITY CONTROL: HOW DOES THE PROGRAM ENSURE THE QUALITY OF REPORTED DATA? (EXAMPLES COULD BE: USING A STANDARD REVIEW GUIDE TO REVIEW ALL SUBMISSIONS, COMPARING DATA TO PREVIOUSLY SUBMITTED DATA, COMPARING DATA TO OTHER DATA SETS LIKE TRI, FOLLOWING UP WITH MEMBERS ON QUESTIONABLE NUMBERS, SITE VISITS, REFERENCE CHECKS)
NPEP's current accomplishment reporting form and Success Story form inquire about data QA/QC process. Prior to 2006 program did not inquire about QA/QC.

DATA NORMALIZATION: DOES THE PROGRAM ENCOURAGE OR REQUIRE MEMBERS TO NORMALIZE ENVIRONMENTAL DATA TO ACCOUNT FOR EXTERNAL FACTORS, SUCH AS ECONOMIC CONDITIONS?
NPEP does not appear to encourage or require normalizing.

DATA AGGREGATION: IF THE PROGRAM AGGREGATES DATA, HOW DOES THE PROGRAM ENSURE THAT DATA ARE FIT FOR AGGREGATION? DOES THE PROGRAM SYSTEMATICALLY EXCLUDE DATA THAT SHOULD NOT BE AGGREGATED?
NPEP does not appear to publish aggregated data. However, EPA's National Center for Environmental Innovation Partnership site indicates that NPEP partners have reduced or eliminated 3.6 million pounds of Priority Chemicals and 6.8 million pounds of other hazardous chemicals, totaling more than 10.4 million pounds.[5]

DOUBLE COUNTING: HOW DOES THE PROGRAM ADDRESS POTENTIAL DOUBLE COUNTING WITHIN ITS OWN REPORTING, AND ACROSS PROGRAMS?
NPEP does not appear to aggregate data. However, the Success Story form inquires if partners participate in any other environmental or partnership programs.

[5] http://www.epa.gov/NCEI/collaboration/Partnerships%20for%20Pollution%20Prevention%20and%20Waste%20Minimization/NationalPartnershipforEnvironmentalPriorities.htm

TRANSPARENCY: HOW DOES THE PROGRAM ENSURE TRANSPARENCY OF DATA LIMITATIONS IN ITS COMMUNICATION OF PROGRAM RESULTS? (EXAMPLES COULD BE NOTING EXISTENCE OR POTENTIAL EFFECTS OF: EXTERNAL CONDITIONS, DOUBLE COUNTING, MISSING DATA, EXCLUDED DATA, OR OTHER QUALITY CONTROL ISSUES.)
NPEP does not appear to aggregate data.

BENCHMARKING: DOES THE PROGRAM'S DATA COLLECTION FACILITATE BENCHMARKING, AND IF SO, HOW?
NPEP does not appear to conduct benchmarking. However, Success Stories are posted online for partners and the public to view.

EXHIBIT 6: NATURAL GAS STAR

PROGRAM INFORMATION	
Unit of Membership	Company-based, National and International
Current Number of Members	144 partners, plus 20 endorsers
Year of Inception	1993
Reporting Schedule	Annual
Unit of Measurement	Program provides emission quantification guide as well as tools for reviewing
Progress Reports	Annual reports include annual and cumulative emissions reductions.

BASELINE: HOW DOES THE PROGRAM ESTABLISH A CREDIBLE BASELINE?
Natural Gas STAR's baseline consists of data reported via annual reports. Partners are required to begin reporting achievements after one full year of participation. Annual reports reflect the previous year's methane emission reduction activities. However, partners are also encouraged to report all previous activities that resulted in methane emissions reductions, including the year and quantitative value. Natural Gas Star reports progress annually to reflect annual achievements as well as cumulative reductions since program inception in 1993.

REPORTING STANDARDS: WHAT REPORTING STANDARDS DOES THE PROGRAM USE TO ENSURE CONSISTENT AND ACCURATE DATA COLLECTION? (EXAMPLES ARE: STANDARD REPORTING FREQUENCY, MANDATING ABSOLUTE DATA, MANDATING FACILITY-WIDE AND PROVIDING DEFINITIONS OF PROGRAM INDICATORS, ASKING FOR TEXT TO PROVIDE CONTEXT ON REPORTED DATA.)
Annual reporting is a key requirement to remain a partner in Natural Gas STAR. After one full year of participation, EPA requires partners to submit an annual report documenting the previous year's methane emission reduction activities, as well as any additional past activities that have not yet been reported to EPA. The program notes that all reported emission reduction activities must be voluntary and not driven by regulatory requirements. Partners can choose between submitting data through the Natural Gas STAR Online Reporting System, via hardcopy annual reporting forms, or using their own custom format. There are Natural Gas STAR Program Managers and STAR Service Representatives assigned to partner companies to assist in reporting, provide implementation assistance, facilitate access to Program information, and enhance the overall participation experience. Robust quantification of methane emissions reductions are an important component to annual reporting. To assist Natural Gas STAR partners in better quantifying emissions reductions achieved through implementation of recommended technologies and practices, EPA developed an Emissions Reduction Quantification Reference Guide with widely-used calculation options for direct measurement, engineering calculations, and/or emission factors for Natural Gas STAR recommended technologies and practices.

REPORTING MATERIALS: HOW DOES THE PROGRAM USE REPORTING MATERIALS TO ENCOURAGE ADHERENCE TO REPORTING STANDARDS? (EXAMPLES COULD BE: PROVIDING CLEAR REPORTING INSTRUCTIONS; USING STANDARD REPORTING FORMS; USING ADVANCED FORMS SUCH AS THOSE EXCEL, PDF, OR ONLINE FORMS TO MINIMIZE REPORTING CONFUSION OR MISTAKES; USING INNOVATIVE REPORTING METHODS OR MATERIALS TO ASSIST REPORTERS IN PROVIDING QUALITY INFORMATION.)

The website includes online reporting tips organized by partner type, Natural Gas STAR Recommended Technologies and Practices, and the Emissions Reduction Quantification Reference Guide. The Guide provides assistance in quantifying the methane emissions reductions achieved by a particular technology or practice. Where applicable, the Emissions Reduction Quantification Reference Guide provides viable calculation options for direct measurement, engineering calculation, and/or emission factors for Natural Gas STAR recommended technologies and practices.

The website also includes:

- The ON TIME Tool, which provides information on cost-effective technologies and practices that reduce methane emissions in the oil and natural gas industry.
- STARtracker, a Web-based application for tracking and reporting methane emissions reductions across companies.
- The Greenhouse Gas Equivalency Calculator to translate common units of measure, such as pounds of methane or metric tons of carbon dioxide, to everyday terms including greenhouse gas (GHG) emissions from passenger cars or carbon sequestered by pine forests.

The Partner Challenge Service assists partners in identifying and implementing new methane emission reduction opportunities by developing estimates of a partner's methane emissions, identifying key emission sources, and proposing economically and environmentally beneficial mitigation activities. The end product is a detailed report that quantifies methane emissions volumes by source and provides detailed economic and emissions analyses for implementing targeted emission reduction opportunities.

REPORTING COMPLIANCE: HOW DOES THE PROGRAM ENCOURAGE OR REQUIRE COMPLIANCE WITH REPORTING STANDARDS? (e.g., BY MAKING REPORTING A CONDITION OF PROGRAM PARTICIPATION, OR BY PROVIDING INCENTIVES FOR REPORTING?)

Annual reporting is a key requirement to remain a partner in the Natural Gas STAR Program. After one full year of participation in the program, EPA requires partners to submit an annual report documenting the previous year's methane emission reduction activities. It is important to note that all reported emission reduction activities must be voluntary and not driven by a regulatory requirement.

REPORTING QUALITY CONTROL: HOW DOES THE PROGRAM ENSURE THE QUALITY OF REPORTED DATA? (EXAMPLES COULD BE: USING A STANDARD REVIEW GUIDE TO REVIEW ALL SUBMISSIONS, COMPARING DATA TO PREVIOUSLY SUBMITTED DATA, COMPARING DATA TO OTHER DATA SETS LIKE TRI, FOLLOWING UP WITH MEMBERS ON QUESTIONABLE NUMBERS, SITE VISITS, REFERENCE CHECKS)
Each year, EPA provides post-reporting feedback to partners through individual detailed summary reports that highlight their participation and accomplishments within the program. Annual reporting forms also inquire about the basis for calculations and estimates provided by members.

DATA NORMALIZATION: DOES THE PROGRAM ENCOURAGE OR REQUIRE MEMBERS TO NORMALIZE ENVIRONMENTAL DATA TO ACCOUNT FOR EXTERNAL FACTORS, SUCH AS ECONOMIC CONDITIONS?
Natural Gas Star does not appear to encourage or require normalizing.

DATA AGGREGATION: IF THE PROGRAM AGGREGATES DATA, HOW DOES THE PROGRAM ENSURE THAT DATA ARE FIT FOR AGGREGATION? DOES THE PROGRAM SYSTEMATICALLY EXCLUDE DATA THAT SHOULD NOT BE AGGREGATED?
As a condition of partnership, program partners submit implementation plans to EPA describing the emissions reduction practices they plan to implement and evaluate. In addition, partners submit progress reports detailing specific emissions reduction activities and accomplishments each year. EPA notes that it does not attribute all reported emissions reductions to Natural Gas STAR.

DOUBLE COUNTING: HOW DOES THE PROGRAM ADDRESS POTENTIAL DOUBLE COUNTING WITHIN ITS OWN REPORTING, AND ACROSS PROGRAMS?
Partners submit progress reports detailing specific emissions reduction activities and accomplishments each year. EPA does not attribute all reported emissions reductions to Natural Gas STAR. EPA Climate Program methods address data quality, potential double counting with other EPA programs, free ridership, the efforts of third-party actors, and other program-specific market effects. In consideration of double counting issues, EPA does not Climate Leaders' accomplishments in the Overview of EPA's Climate Partnership Programs as it is presumed that Climate Leaders' reductions are reflected in the data shown for other programs, such as Natural Gas STAR.

TRANSPARENCY: HOW DOES THE PROGRAM ENSURE TRANSPARENCY OF DATA LIMITATIONS IN ITS COMMUNICATION OF PROGRAM RESULTS? (EXAMPLES COULD BE NOTING EXISTENCE OR POTENTIAL EFFECTS OF: EXTERNAL CONDITIONS, DOUBLE COUNTING, MISSING DATA, EXCLUDED DATA, OR OTHER QUALITY CONTROL ISSUES.)
Energy Star's Annual Report outlines EPA's process for measuring results of climate programs, including Natural Gas STAR. The annual report notes that program methods address data quality, potential double counting with other EPA programs, free ridership, the efforts of third-party actors, and other program-specific market effects.

BENCHMARKING: DOES THE PROGRAM'S DATA COLLECTION FACILITATE BENCHMARKING, AND IF SO, HOW?
Natural Gas Star does not appear to facilitate benchmarking.

EXHIBIT 7: SMARTWAY

PROGRAM INFORMATION	
Unit of Membership	Shippers, Truck and Rail Carriers, Logistics Companies, and Truck Stops
Current Number of Members	2113
Year of Inception	2004
Reporting Schedule	Annually
Unit of Measurement	Truck carriers, shippers, and logistics companies use FLEET 2.0 to calculate tons of CO2, PM, and NOx emitted. Rail partners report fuel consumption,
Progress Reports	A progress report was issued at start of program in 2005 highlighting goals, but there do not appear to been any progress reports developed since 2005.

BASELINE: HOW DOES THE PROGRAM ESTABLISH A CREDIBLE BASELINE?
SmartWay requires truck carriers, shippers, and logistics partners to provide baseline values as part of the application process. For rail carriers, SmartWay appears to use data on energy use and miles traveled that has been reported Surface Transportation Board. There does not appear to be a mechanism for establishing baseline values for truck stops.

REPORTING STANDARDS: WHAT REPORTING STANDARDS DOES THE PROGRAM USE TO ENSURE CONSISTENT AND ACCURATE DATA COLLECTION? (EXAMPLES ARE: STANDARD REPORTING FREQUENCY, MANDATING ABSOLUTE DATA, MANDATING FACILITY-WIDE AND PROVIDING DEFINITIONS OF PROGRAM INDICATORS, ASKING FOR TEXT TO PROVIDE CONTEXT ON REPORTED DATA.)
Truck carriers, shippers, and logistic partners are required to submit quantitative data using EPA's FLEET model. Rail carriers agree to report progress on an annual basis. The rail carrier format for reporting is unknown and may be under development as FLEET is currently undergoing enhancements. Truck stops must submit an annual update of efforts to promote the SmartWay partnership.

REPORTING MATERIALS: HOW DOES THE PROGRAM USE REPORTING MATERIALS TO ENCOURAGE ADHERENCE TO REPORTING STANDARDS? (EXAMPLES COULD BE: PROVIDING CLEAR REPORTING INSTRUCTIONS; USING STANDARD REPORTING FORMS; USING ADVANCED FORMS SUCH AS THOSE EXCEL, PDF, OR ONLINE FORMS TO MINIMIZE REPORTING CONFUSION OR MISTAKES; USING INNOVATIVE REPORTING METHODS OR MATERIALS TO ASSIST REPORTERS IN PROVIDING QUALITY INFORMATION.)
The SmartWay Program uses the EPA's Fleet Performance Model to help partners submit data and track performance. If the Fleet Performance Model is not an effective tool for the partner, a representative from SmartWay Transport Partnership will contact the partner and provide them with guidance and the necessary tools to report and track their performance.

REPORTING COMPLIANCE: HOW DOES THE PROGRAM ENCOURAGE OR REQUIRE COMPLIANCE WITH REPORTING STANDARDS? (e.g., BY MAKING REPORTING A CONDITION OF PROGRAM PARTICIPATION, OR BY PROVIDING INCENTIVES FOR REPORTING?)
All partners are required to submit annual reporting, as described above. Truck carriers, shippers, logistic partners, and rail carriers must submit quantitative data while truck stops agree to submit an annual update to summarize SmartWay Partnership promotion efforts.

REPORTING QUALITY CONTROL: HOW DOES THE PROGRAM ENSURE THE QUALITY OF REPORTED DATA? (EXAMPLES COULD BE: USING A STANDARD REVIEW GUIDE TO REVIEW ALL SUBMISSIONS, COMPARING DATA TO PREVIOUSLY SUBMITTED DATA, COMPARING DATA TO OTHER DATA SETS LIKE TRI, FOLLOWING UP WITH MEMBERS ON QUESTIONABLE NUMBERS, SITE VISITS, REFERENCE CHECKS)
SmartWay uses the FLEET model to walk users through the data entry process. The model appears to be designed to collect standardized data. Thus, there does not appear to be any post-reporting standards in place.

DATA NORMALIZATION: DOES THE PROGRAM ENCOURAGE OR REQUIRE MEMBERS TO NORMALIZE ENVIRONMENTAL DATA TO ACCOUNT FOR EXTERNAL FACTORS, SUCH AS ECONOMIC CONDITIONS?
SmartWay requests information regarding miles traveled, which is used to develop partner scores to indicate the relative fuel efficiency and environmental performance of carriers and logistics companies.

DATA AGGREGATION: IF THE PROGRAM AGGREGATES DATA, HOW DOES THE PROGRAM ENSURE THAT DATA ARE FIT FOR AGGREGATION? DOES THE PROGRAM SYSTEMATICALLY EXCLUDE DATA THAT SHOULD NOT BE AGGREGATED?
Program does not appear to provide aggregated results. SmartWay developed projected improvements based on the first year of membership, but there is no indication of data aggregation since that initial projection was developed.

DOUBLE COUNTING: HOW DOES THE PROGRAM ADDRESS POTENTIAL DOUBLE COUNTING WITHIN ITS OWN REPORTING, AND ACROSS PROGRAMS?
SmartWay published projected improvements in their first annual report. Initial report did not address double counting and SmartWay has not released any publications or figures since that initial report.

TRANSPARENCY: HOW DOES THE PROGRAM ENSURE TRANSPARENCY OF DATA LIMITATIONS IN ITS COMMUNICATION OF PROGRAM RESULTS? (EXAMPLES COULD BE NOTING EXISTENCE OR POTENTIAL EFFECTS OF: EXTERNAL CONDITIONS, DOUBLE COUNTING, MISSING DATA, EXCLUDED DATA, OR OTHER QUALITY CONTROL ISSUES.)
SmartWay published projected improvements in their first annual report. Initial report did not address data limitations and SmartWay has not released any publications or figures since that initial report.

BENCHMARKING: DOES THE PROGRAM'S DATA COLLECTION FACILITATE BENCHMARKING, AND IF SO, HOW?
Partners receive a fuel efficiency/environmental performance score. Smartway lists partner performance scores, which range from 0 – 1.25 for truck carriers, logistics companies, and rail carriers.

EXHIBIT 8: STEWARDSHIP ONTARIO'S BLUE BOX PROGRAM

HOW DOES THE PROGRAM ENCOURAGE ADHERENCE TO REPORTING STANDARDS AND REQUIREMENTS?

Participation and reporting under the Blue Box Program is mandatory for many partners. Ontario's Waste Diversion Act specifies that resident brand owners or first importers, whose products' packaging and/or printed material end up in Ontario residential Blue Boxes or in the municipal residential waste system, must register as Stewards with Stewardship Ontario. Many of these companies are ultimately designated as Obligated Stewards, which requires submission of annual Stewards' Reports. Non-resident brand owners of companies with Ontario sales greater than $2 million and generation greater than 15,000 kgs of Designated Blue Box Waste may elect to become Voluntary Stewards.

Stewardship Ontario provides access to a Unit Based Calculator (UBC) for food and eight supplements (e.g., Clothing and Footwear). Stewards may use these calculators to develop an estimate of the weight of materials for which they are obligated to report. Stewards enter the volume of sales under specific material categories and then average packaging weights are applied. The summary table automatically calculates and displays the corresponding obligated material tonnages that stewards must manually enter into the online data entry system.

Stewardship Ontario includes the Retail Council of Canada (RCC) Composite Based Calculators in the Stewardship Ontario online reporting system. Users enter unit volume sales for a specified data year to generate packaging weight estimates.

In addition to the calculators, the BlueBox program offers four guidebooks:

- Guidebook #1 explains basic program features and it provides information stewards need to pre-register.
- Guidebook #2 provides guidance for stewards to develop data for Steward's Reports; covers designated materials, what to report on, the "de minimis" threshold, and packaging exemptions and deductions.
- Guidebook #3 contains a step-by-step guide for stewards to create and submit their Steward's Report.
- Guidebook #4 consists of a quick-guide that simplifies 2009 reporting updates for returning stewards.

EXHIBIT 9: GREENHOUSE CHALLENGE PLUS (AUSTRALIA)

HOW DOES THE PROGRAM ENCOURAGE ADHERENCE TO REPORTING STANDARDS AND REQUIREMENTS?
Australia's Online System for Comprehensive Activity Reporting (OSCAR) standardized collection of greenhouse gas emission data for Greenhouse Challenge Plus and other Australian climate programs. OSCAR was designed to standardize reporting to allow for benchmarking and comparison across comparable datasets. Under the Fuel Tax Credit Act (2006) companies that received more than $3 million (AUD) in fuel tax credits were required to join the Greenhouse Challenge Plus program. Greenhouse Challenge Plus ceased operation, but tools included energy audit tools for lighting, boilers, office equipment, etc. The program included standard approaches to monitor and report: • Energy consumption and production • Greenhouse gas emissions • Energy audits • Energy and greenhouse gas emissions action plans • Energy savings • Greenhouse gas reductions • Energy and greenhouse gas emissions intensity indicators • Energy and greenhouse gas emissions projections To ensure high quality data, the program requested details on calculation methodologies and assumptions and required partners to participate in independent verification of annual progress reports. Officials provided independent verification of a sample of participants' reports, consistent with verification guidelines. Reporting for GHG Plus was designed to be consistent with *The Greenhouse Gas Protocol* and the *ISO 14064 Standard for Entity-Level Greenhouse Reporting*.

Appendix H:

QUALITY ASSURANCE PLAN

Quality Assurance Plan

Evaluating the Effectiveness of the WasteWise Program

EPA Contract No. EP-W-07-028, Work Assignment No. 1-14

Prepared by
Industrial Economics, Incorporated

Draft: July 10, 2009, Version 1.0

QUALITY ASSURANCE PLAN

Title: Evaluating the Effectiveness of the WasteWise Program

Contractor: Industrial Economics, Incorporated (IEc)

Plan Summary: Industrial Economics, Incorporated (IEc) is currently conducting an evaluation for EPA's WasteWise Program. WasteWise is a partnership program that provides technical assistance and recognition to organizations of all types (e.g., industrial facilities, government facilities, office-based businesses), to assist and encourage them to reduce waste generation, increase waste reuse recycling, and increase use of recycled content materials. WasteWise has over 2000 partners, as well as an endorser network of trade associations and other organizations committed to improving waste management. Accountability offices including OMB and EPA's Inspector General have raised concerns that data on WasteWise partner performance is not adequate to assess partner accomplishments, or the impact of program activities on partner environmental performance.

The purpose of this evaluation is three-fold. A primary goal of the evaluation is to identify which WasteWise activities are most useful for improving waste management activities undertaken by different types of program partners. This information will help EPA direct program resources toward activities with the greatest utility for different industry sectors.

A second purpose of this evaluation is to better understand the extent to which partner behavior regarding MSW management can be attributed to WasteWise participation. This involves first identifying factors outside of WasteWise that influence partner's waste management behavior, and then identifying and assessing changes in organizational behavior that can be linked to utilization of WasteWise approaches.

The third purpose of this evaluation is to identify potential methods for encouraging WasteWise partners to submit robust and consistent waste management tracking data. WasteWise partners are asked to submit baseline data and to report annually on achievement of their goals, but partners currently do not submit sufficient information to analyze with confidence. This evaluation will explore what EPA can do to encourage WasteWise partners to submit sufficient environmental data for performance measurement and evaluation purposes.

In designing the evaluation methodology, IEc collaborated extensively with ORCR. Key sources of data include:

- Existing data and documentation on the WasteWise program, including data and documents related to partners' use of WasteWise program activities and services, such as the WasteWise website, helpline, annual conference, and awards program.
- To review and update the *Draft Literature Review of Approaches to Estimating Attribution of Voluntary Program*, IEc will employ the following search engines to identify new literature: Dialog, EconLit, EPA, Environmental Valuation Reference Inventory (EVRI), Social Sciences Research Network (SSRN), National Bureau of Economic Research (NBER), EBSCOhost, and a targeted search for authors.
- For the literature search related to Evaluation Question 3, we will use the following data sources: company websites and publications, including FedEx, UPS, DHL, and USPS; and government websites, including EPA (e.g., the Smartway program); NTIS, and state transportation agencies.

- A focus group with representatives from a set of eleven sectors participating in WasteWise.
- A survey of USPS district managers (one manager per district for all districts) and USPS facility staff. IEc plans to survey one manager at all 55 Processing and Distribution Centers (P&DCs) and Bulk Mail Centers (BMCs) that were early participants in WasteWise, and conduct a stratified sample to randomly select 200 out of the recently joined 405 P&DCs and BMCs.
- Interviews with select USPS HQ and area staff to follow up on survey results, and specifically to clarify and expand upon findings.
- Review of data collection best practices across select EPA partnership programs and non-EPA voluntary programs, focusing on a review of documented methods utilized by programs to increase data quality, specifically:
    - Environmental reporting instructions
    - Reporting follow up and quality control procedures
    - Reporting requirements and/or incentives for reporting
    - Program reports that include data aggregation
    - Program evaluations

Analytical Rigor: IEc designed the analyses in the context of the project's overarching evaluation questions and the program logic model. Steps we are taking to ensure a high degree of analytical rigor are discussed by method below:

Survey: IEc is surveying the entire universe of USPS districts and USPS facilities that joined WasteWise in the distant past. For new joiners to WasteWise, IEc is employing a sampling methodology for the survey that is designed to minimize the margin of error by surveying a large portion of the universe, and by making conservative assumptions about response rate. In addition, USPS has agreed to conduct follow up with survey respondents to encourage them to participate, thereby reducing non-response bias.

IEc is using carefully designed survey instruments to collect information from participants that address the evaluation questions. IEc will collect survey responses online using software that automatically populates a database with responses, eliminating the possibility of data entry errors. IEc will conduct a variety of analyses of survey data to assess whether the two groups exhibit differences in waste management attitudes and behaviors. We will apply statistical tests to determine if differences observed between survey groups are significant. We will report the margin of error and confidence level for each findings tested for statistical significance.

Interviews: IEc will use interviews to follow up on survey findings, to collect more information on findings that are difficult to explain on their own. IEc will take notes during interviews, and produce interview summaries for each interview. As interviews are qualitative, and their purpose is to further explain survey results as opposed to compare findings across interviews, we will analyze and interpret information from interviews using a qualitative approach.

Focus Group: IEc is using a carefully designed focus group protocol to collect information from participants that addressed the evaluation questions. For accuracy, IEc will record the focus group as well as take notes. After the focus group, IEc will synthesize responses to each question, and develop a focus group summary that identifies key findings. To the extent possible, we will summarize findings by sector

or any other applicable category (e.g., findings by service sector versus manufacturing sector; newer partners versus established partners).

Literature Review: IEc will carefully document literature review findings, and will use the literature review to support interpretation of the results, and to provide contextual and anecdotal support for explanations and responses provided by participants in both the survey and the focus group.

Best Practices Review: IEc will review all program materials relevant to the best practices review as noted above, to answer the same set of questions for each program, and will follow up with program staff to clarify any areas where a program's practices are unknown or unclear.

IEc will qualitatively integrate results from all of the above to assess of the effects of WasteWise on partners, and answer the evaluation questions.

Consistency: IEc will ensure consistent data collection in a number of ways. The survey will be administered online via ESurveyspro.com so that each group of individuals will be asked the same set of questions. All focus group participants will receive the same information about the focus group prior to participation. We will use a standard set of criteria when assessing each program's practices for the best practices review. Finally, when developing the final evaluation report, we will consider the findings from each analysis within the context of results from the other methods employed for this evaluation (i.e., WasteWise data review, literature review, and findings from USPS survey and interviews).

Data Limitations: IEc cannot solicit the same information from more than nine non-federal entities because of Information Collection Request (ICR) restrictions. Accordingly, IEc plans to survey representatives from USPS, a very active federal partner in the WasteWise program. For the facility-level survey of new participants, IEc developed a plan to use a stratified sample to ensure that survey respondents represent a variety of geographic locations. IEc will also conduct a focus group consisting of nine individuals from non-federal entities and two individuals from federal entities. For the focus group, IEc identified a diverse cross-section of potential participants from each of the eleven sectors using the following criteria:

1. High-quantity waste generators
2. A diversity of recent and long-time WasteWise members
3. Diversity in awards and recognition (e.g., some companies that have received one or more awards and others that have not)
4. Diversity in reporting behavior (e.g., some companies/facilities that regularly report to WasteWise and some that do not).

EPA provided IEc with first and second choices to participate in the focus group. In general, IEc will use EPA's first choice for focus group participation; if the first choice is not available for a given sector, or if the second choice is preferable to ensure coverage of the criteria above, IEc will move onto the second choice.

Audience: EPA's Office of Resource Conservation and Recovery (ORCR) will be the primary audience for this evaluation. Other interested parties include the Office of Policy, Economics, and Innovation (OPEI), and the Partnership Programs office in particular.

Organization: EPA's Office of Resource Conservation and Recovery (ORCR)

EPA Project Leader: Terell Lasane (ESD) and John Cross (ORCR)

EPA ESD Quality Manager: Terell Lasane (ESD)

Appendix I:

OMB WHITE PAPER

IEc

MEMORANDUM | May 21, 2010

TO Terell Lasane, EPA

FROM Cynthia Manson, IEc

SUBJECT Recent EPA Efforts to Address Attribution of Partnership Program Benefits

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On June 24, 2008, the White House Office of Management and Budget (OMB) published Terms of Clearance for the renewal of the Information Collection Request (ICR) for the WasteWise program in EPA's Office of Solid Waste (now Office of Resource Conservation and Recovery, or ORCR). The Terms of Clearance specifically focuses on the issue of "attribution," or measuring specific benefits or changes in practice that result directly from the WasteWise program.

Specifically, the Terms of Clearance outlines requirements for the development and peer review of an econometric-based methodology for assessing WasteWise program impacts. OMB describes a methodology development process to support the development of statistically sound quantitative estimates of program impacts, with attention to baseline development and sample development from participants and non-participants. The language in the Terms of Clearance indicates that a statistical analysis addressing causal links, using a randomized controlled trial (RCT) or equivalent method, is a desired approach.

IEc's evaluation of the WasteWise program examines the program in the context of these Terms of Clearance, and the evaluation includes a statistical investigation of the potential impacts of the program on materials management behavior at the United States Postal Service, by examining the waste management behavior for early WasteWise joiners versus later WasteWise joiners. While it would have been ideal to conduct this investigation with broader sample of WasteWise members, this was precluded by the need to seek additional ICR clearance for such a survey, as well as the resources available for this evaluation. The evaluation also uses a focus group and survey follow up interviews with USPS staff to collect information on potential WasteWise impacts among other WasteWise partners. As described in the evaluation report, results from the survey are validated by results from the focus group and interviews.

While this program evaluation is not designed to address the complete, detailed methodological requirements described in the 2008 Terms of Clearance, the evaluation is only one part of a broader set of investigations by ORCR into the development of appropriate methods for assessing partnership program benefits.[1] This appendix provides a brief overview of ORCR's recent efforts to explore the data and methods available. These efforts have included:

- A targeted peer review of WasteWise options for assessing benefits. This July 25, 2007 memorandum, prepared by Industrial Economics, Incorporated with input from Dr. Anna Alberini and Dr. Thomas Lyon, addressed key OMB questions about using available WasteWise data to estimate program impacts.[2]
- Three separate literature searches conducted for ORCR and OPEI projects and focusing on different aspects of the question of attribution, with an overarching aim to identify defensible methods for identifying causal relationships between programs and outcomes.
- A 2008 examination of the feasibility of using an RCT and Toxics Release Inventory (TRI) data to support an econometric analysis of the National Partnership for Environmental Priorities (NPEP);
- A 2009 series of interviews with NPEP participants to discuss impacts that they attribute to program participation; and
- The ongoing development of a white paper with Resources for the Future economist Dr. James Boyd to establish a theoretical and methodological framework for evaluating the extent to which partnership programs address market failures, and how to effectively document their achievements.

A key focus of these efforts is the extent to which it is feasible and appropriate to use a statistical methodology such as a randomized controlled trial (RCT) to assess the WasteWise program and other partnership programs. An RCT typically represents the most robust statistical approach for isolating and documenting the impacts of a specific intervention or program. RCTs are commonly used in health studies, and are designed to compare differences in randomly selected but comparable participant and non-participant groups over a specified period of time. RCTs also typically attempt to examine key features of participants (i.e., two-stage models) to consider participant selection bias and variables that drive participation in programs.

[1] Note that WasteWise is considered a "partnership program" – a non-regulatory, or voluntary, program with participant requirements (as opposed to, for example, voluntary labeling programs such as Energy Star and broader voluntary efforts such as recycling of specific materials). The literature and analyses cited in this document variously refer to this type of program as partnership programs, public voluntary programs (PVPs), and voluntary programs, but the focus is on programs with the same general membership-based structure as WasteWise.

[2] This effort expanded on a 2006 formal peer review effort conducted to examine the WasteWise Measurement Tool, a statistical tool that attempted to evaluate the impacts of WasteWise using participant data, a probability-based selection model, and a tobit approach. Reviewers concluded that the absence of non-participant data prevented the effective use of the methodology.

EPA has examined the use of RCTs and other methods in the ORCR context both empirically (in the NPEP case study and the WasteWise methodologies) and in the literature. These efforts, which rely on available program data, reinforce the well-established conclusion that a significant data collection effort would be necessary to obtain baseline and non-participant data for WasteWise and other similar programs. Such an effort may not even be feasible given the "rolling admission" of the program across time, and the complexity of isolating industry trends for the large number of sectors and facilities involved. Moreover, EPA could be required to undertake a separate ICR clearance process to collect environmental data from non-participants.

In addition, emerging literature and empirical evidence suggest that RCTs may not be appropriate in the context of partnership programs. Specifically, non-participants may, by design, "free ride" by using program publications without joining, and therefore confound comparative analysis. In addition, emerging assessments of the variables that affect participation suggest that firm motivations to join partnership programs, and their impacts, are complex, and simple metrics such as quantity of materials recycled may not capture the impacts of the programs.

Finally, interviews with participants of NPEP, literature reviews, and the focus group information collected for the current WasteWise program evaluation also suggest that the value of joining partnership programs may not be well captured by simple metrics (e.g., waste generation quantities). Participants and researchers note that partnership programs are often one of several motivations to undertake an action, and isolating the role of these programs is not possible. Moreover, membership in partnership programs can change the timing and scope of environmental improvement projects, and can alter the broader methods that corporations use to pursue changes in operations. These changes are firm-specific and require extensive internal firm data to document and isolate. As a result, statistical analyses focusing on a single dependent variable may not capture the impacts of these programs.

The following sections provide a brief description of each of the key efforts by ORCR to identify methods for identifying accurately the specific impacts of WasteWise and other partnership programs.

Memorandum: Potential Approaches to Improve Performance Measurement for the WasteWise Program
July 25, 2007
Contributors: Dr. Anna Alberini and Dr. Thomas P. Lyon

This memorandum supported discussions between EPA and OMB during the development of the 2008 Terms of Clearance. The memorandum briefly outlines four options for attributing specific benefits to WasteWise:

- ***The Ideal Approach:*** This approach requires collection of partner and non-partner data before and after program initiation to estimate recycling and waste reduction attributable to the program by using propensity score matching. This is an approach often used to estimate the impact of a policy by comparing individuals or organizations subject to a policy to similar individuals or

organizations not subject to the policy (the untreated group).[3] Because data are likely to be available only for who have reported regularly to the program, this approach likely only addresses a subset of WasteWise partners.

- ***Estimation of Impacts for Late-joining Members:*** This approach is similar to the ideal approach but would focus on firms that joined WasteWise recently.
- ***Value of Information***: As an alternative to estimating the recycling and waste reduction impacts of the program, EPA could estimate the value of information that members obtain through the WasteWise Help Line. The benefits of this information would include reduced materials and waste management costs, but the approach would not verify causality.
- ***Benefits Transfer:*** In the absence of sufficient data to develop a statistically sound estimate of program impacts, EPA could estimate WasteWise impacts using estimated impacts of other partnership programs, if sufficient relevant literature examples exist.

The memorandum then provides discussion by Dr. Alberini and Dr. Lyon, who note that defensible statistical analysis would require significant data collection, and that the availability of needed information for non-partners could confound even the ideal approach. While the Value of Information and Benefits Transfer approaches are more feasible (pending available data) they would not address causality specific to the WasteWise program.

OPEI and ORCR Literature Reviews:
2007 - 2010

- *Performance-based Environmental Programs (PBEPs): Literature Review* (2007); prepared by Jennifer Nash and Tim Larson. This literature review was developed for EPA's Office of Policy, Economics, and Innovation (now Office of Policy), and provides an overview of the literature addressing partnership and other voluntary programs. The review identifies four key areas: program taxonomy, incentives for joining programs, program results, and approaches to measuring program outcomes. The authors note that the literature measuring program results is limited due to the short lifespan of most programs, limited scope of analyses, and a lack of attention to measurement at the outset of many programs. They also note that the results that have been developed suggest mixed performance by partnership programs. The need for more data to support rigorous analyses is a broad theme that emerges in the discussion of methods for quantitatively documenting program impacts.
- *Draft Literature Review of Approaches to Estimating Attribution of Voluntary Program Benefits* (2008); prepared by Industrial Economics for ORCR. This

[3] Description of propensity score matching based on Bowen Garret, "Propensity Score Matching," The Urban Institute, http://www.urban.org/toolkit/data-methods/propensity.cfm.

literature review builds on the PBEP literature review and focuses specifically on the use and limitations of the "two stage model" (a modified RCT approach) for program evaluation, and on efforts by other U.S. government agencies to assess the impacts of their voluntary programs. Highlights of the literature review include:

  - Efforts by researchers in EPA's National Center for Environmental Economics (NCEE) to use TRI data to address a range of participant and non-participant programs, and the outcomes and limitations of these efforts.
  - A extensive evaluation of the U.S. Department of Agriculture's Conservation Reserve Program by the Economics Research Service (ERS). ERS's evaluation documents significant differences in sediment before and after the program in areas where the program was implemented, but researchers determined that it was cost-prohibitive to evaluate causality.
  - A summary of ongoing research efforts by EPA to document the effectiveness of environmental management systems (EMS's) and other quantitative program measurement efforts.

- *Literature Review prepared in response to Evaluation Question 2 of the current WasteWise Program evaluation* (2010). This literature review identifies the key external factors that affect participation in and achievements of partnership programs. A review of recent literature identified 12 key factors that affect program performance. Of these, one (pre-existing regulations or requirements) clearly limits the direct impact of voluntary efforts because the action would have been taken even without the program. Others include two broad external factors (production level and firm size), four potentially complementary factors (e.g., supply chain or customer pressure; community pressure/public image; cost savings; and the environmental ethic of the company) that both encourage firms to consider voluntary actions and complicate the measurement of these decisions, and five factors with uncertain impacts (e.g., threat of future regulation; public disclosure laws; environmental pressure group campaigns; industry pressure and regulation; and participation in other voluntary or partnership programs) that may in some cases limit the effectiveness of partnership programs and in other cases may increase it. The literature review identifies the methodological options for addressing each of the factors, noting that most options require significant data collection which could be cost prohibitive.

These reviews together provide a general overview of available literature that could help frame or support an assessment of partnership program benefits. As noted in the reviews, the number and extent of quantitative partnership program impact analyses is limited, due to both data availability and to the short time span in which these programs have been active. The reviews also reveal a pattern of mixed program results, and limited success

by researchers in addressing complex interactions among the variables that drive program participation and impacts.

Analysis of the Feasibility of Statistical Approaches for Performance Evaluation for the NPEP program
2008

ORCR, supported by Industrial Economics, conducted a case study focusing on measuring the impacts of the NPEP program. A key part of this case study was an investigation of TRI data on participants and non-participants to determine whether the data set could support a robust statistical analysis of NPEP member achievements. The analysis examined four key aspects of TRI data that affect the applicability of the data set to NPEP:

- TRI coverage of the NPEP universe;
- Comparability of NPEP participants and non-participants in TRI;
- Measurement of appropriate NPEP-relevant outcomes in TRI; and
- Appropriate time frame for analysis.

The TRI data review concluded that a statistical analysis of NPEP performance with available data would be impractical, for several reasons. Specifically, TRI data provides comparative information for only a portion of the NPEP universe (roughly 50 percent of both facilities and chemical reporting). It is not clear that results of this analysis would be able to be extrapolated, because TRI data addresses only larger facilities in certain sectors, and the extent to which these are representative of all NPEP partners is unclear. TRI also addresses only a subset of NPEP chemicals, and operates with a significant time lag for data release (up to two years).

In addition, TRI does not provide information on all NPEP-related activities, including source reduction efforts that affect the quantities of chemicals used in products. While some data limitations (e.g., characterization of non-TRI reporting NPEP facilities, and impacts of time lags) could be addressed with additional data collection, other issues – most importantly the lack of non-NPEP participant information for non-TRI facilities – could only be resolved with a large-scale, formal collection of specific information for a statistically appropriate sample of facilities. Even a partial analysis of the NPEP universe using currently available data would require significant resources and would likely be inconclusive.

This analysis has implications for other ORCR programs because a TRI-based analysis of the NPEP program represented the "best" chance to use existing data for an RCT-equivalent evaluation of a partnership program. TRI data and NPEP focus on many of the same chemicals, and TRI's required reporting provided baseline and non-participant data. Nevertheless, the TRI data set was inadequate for addressing the full scope of NPEP facilities and activities. This strongly suggests that RCTs and other statistical analyses for other ORCR programs would not be feasible without extensive data collection.

NPEP Interview Synthesis
2009

As part of the case-study examination of NPEP impacts, ORCR, with Ross & Associates, conducted nine interviews with NPEP participants who had exhibited varying levels of reporting commitment to the program. The interviews examined the extent to which NPEP participation had resulted in changes in company environmental practices.

While results were anecdotal, several themes emerged, including two that complicate the simple measurement of program impacts. First, participants noted that in several cases, ideas for process improvements existed, but participation in the NPEP program provided the focus needed to ensure that projects were successfully and rapidly implemented. NPEP therefore contributed to the scale and timing of projects, but was not the only source of inspiration. This suggests that estimation of NPEP impacts would require "parsing" projects at individual sites differently to reflect site-specific impacts.

Second, participants noted that participation in NPEP and other voluntary programs sometimes led to adoption of other, unrelated environmental improvements at the same facility, and/or expansion of projects to other facilities. Results of these improvements, though clearly related to NPEP program participation, would not be evident in TRI or in other NPEP reporting, and would be difficult to track and isolate without obtaining detailed new information from participants. This finding also suggests that a key difficulty in adopting statistical approaches would be the identification of the correct dependent variable. In the case of NPEP, reductions in chemical use were not the only impact of the program, even though the program's documentation of progress was limited to changes in target chemical use.

The current program evaluation methodology included a focus group of WasteWise participants that provided information similar to the NPEP exercise. The impacts of WasteWise participants, while evident to participants, occur within complex organizations and do not represent isolated causes for specific, isolated changes in practice.

Attributing Benefits to Voluntary Programs in EPA's Office of Resource Conservation and Recovery: Challenges and Options
White paper – under development for 2010 publication

For ORCR, Dr. James Boyd, an economist at Resources for the Future, and Cynthia Manson, at Industrial Economics, Incorporated, are developing a white paper that outlines methods for assessing the benefits of voluntary programs. The draft paper outlines the types of market failures that could theoretically be addressed by non-regulatory (PVP) "interventions." The first is an information failure in which the "public good" of research and development is not efficiently communicated; partnership programs address this through information exchanges, help lines, and other technical assistance (i.e., information "spillover"). The second is a "signaling failure' in which consumers are not able to judge appropriate environmental quality due to information asymmetry. Partnership programs address this type of failure through formalized recognition and awards program for partners who achieve specific successes.

The paper then considers appropriate methods for identifying partnership program impacts, and outlines a set of threshold tests, accounting frameworks, and targeted analyses that could be used in a data poor environment to provide information about program achievements. Specifically, the methods would indicate whether a program is designed to address market failures, and would document the activities at EPA and by reporting partners that are consistent with improvements in practice. The paper also describes several data-driven analyses that could be used to document correlations between program activities and environmental improvements, though none of these approaches addresses causality. One recent analysis highlighted is an internal analysis by EPA's Office of Solid Waste and Emergency Response (OSWER) that identifies changes in the use of fly ash in concrete that occurred after the kickoff of the Coal Combustion Partnership Program (C2P2).

In considering appropriate methods, the white paper discusses the limitations of RCTs and other methods that compare participants with non-participants. Because virtually all of ORCR's partnership programs are designed to provide platforms for information sharing, information "spillover," and broadly-defined "technical assistance," one planned outcome of these programs (including WasteWise) is to encourage behavior changes among non-participants. The white paper concludes that "non-participants" are not therefore a useful control group for identifying the impacts of ORCR voluntary program. Instead, the analysis of changes over time is likely to be a more promising method for documenting program impacts, though strict causality would not be addressed.

GENERAL FINDINGS

Since 2007, ORCR and OPEI have examined the feasibility of various methods for estimating the benefits attributable to partnership programs. With the assistance of a range of academic experts and empirical investigations, including the current WasteWise program evaluation, ORCR has developed a portfolio of work on the topic of attribution that suggests the following:

- RCTs and other statistical methodologies that compare participants to non-participants do not appear to be either feasible or theoretically valid approaches for estimating the benefits of partnership programs. These methods are problematic due both to the extensive resources required and to the confounding impact of program designs that emphasize dissemination of information to non-participants.
- The literature suggests that links exist between certain external factors and decisions by firms to enter partnership programs, but the specific impact of these factors is difficult to predict. Input from partners in literature reviews, evaluations, and case studies suggest that partnership programs may in some cases be complementary with existing strategies. In these cases, the programs may not be the root cause of new behaviors in organizations, but may help advance or broaden the adoption of new behaviors in non-linear ways. This further complicates efforts to isolate "program" impacts, even when it appears that program participation has provided significant value.

- Limited available data and the limited applicability of RCT methods suggest that robust trend analysis considering behavior changes over time among participants may be the most tractable method for estimating program impacts. Examples of analyses that provide robust results showing changes in behavior among participants include USDA's analysis of the Conservation Operations program, OSWER's analysis of the potential impacts of the C2P2 effort, and the analysis in the current program evaluation examining differences in practice among long-term and recent WasteWise participants in the U.S. Postal Service.

In the context of the 2008 OMB Terms of Clearance, this portfolio of analysis, including the WasteWise program evaluation, comprise a broad effort to identify methods for estimating the benefits of the WasteWise program (and similar programs) that are both robust and practical. Collectively, the conclusions of the various explorations are that randomized controlled trials and other econometric approaches are unlikely to be either practical or robust, due to data limitations and the complexity of the program interventions. The Terms of Clearance indicate that EPA should devise a method that enables baseline and non-participant comparisons, but EPA's findings from its investigations do not support the use of these methods.

Consistent with OMB's emphasis on peer review, EPA has directly consulted with external economics experts, including Anna Alberini, James Boyd, and Tom Lyon, to obtain insights about appropriate methods for assessing benefits, and these experts' insights are reflected in various work products and literature reviews. While these interactions are not formal peer reviews, the insights obtained indicate the difficulties that EPA might have in formulating a defensible method for assigning causality.

The literature and expert input do suggest that some data collection and statistical evaluation of time trends and other tests of correlation could be used to assess program benefits. These methods would not fully address causality, and it is not clear whether they would be consistent with the methods indicated in the Terms of Clearance. The analysis preformed within the current WasteWise program evaluation provides an example of a robust analysis of statistically significant differences in practice; results of this analysis are consistent with both the literature and the focus group input.

CONCLUSIONS

In recent years, EPA has undertaken an extensive review of the literature and has evaluated methodologies for measuring benefits of WasteWise and other EPA programs. These efforts indicate that existing methods and data do not support a statistical, causal analysis of the direct impacts of WasteWise across all sectors and members. Moreover, the structure of WasteWise, which encourages exchange of information with non-participants, suggests that the type of statistical approach suggested by OMB in the 2008 Terms of Clearance (i.e., a randomized control trial) may not be appropriate because it is not possible to isolate a control group. The quasi-experimental analysis included in this evaluation represents a rigorous approach to identifying temporal differences, but it

cannot definitely prove causality. In addition, the analysis is not replicable in other sectors due to the "rolling admissions" nature of WasteWise and the difficulty in isolating waste management changes from different industry and company trends.

The broader review of literature and case studies conducted by EPA suggest that these data and methodology limitations are not limited to WasteWise; rather, they are significant barriers to the broad application of randomized controlled trials in assessing voluntary efforts. Thus, EPA and OMB should consider existing alternative approaches to documenting the benefits of voluntary programs.