

Evaluation of the Environmentally Preferable Purchasing Program

Promoting Environmental Results



Through Evaluation

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EXECUTIVE SUMMARY

EPA's Environmentally Preferable Purchasing (EPP) Program was established in 1993 by Executive Order 12873, "Federal Acquisition, Recycling and Waste Prevention." It has been reaffirmed and expanded by subsequent Executive Orders, most recently Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," in 2009. EPP is administered by EPA's Office of Pollution Prevention and Toxics (OPPT), and is a high-priority area for the office. EPP activities include taking a leadership role or participating in the development of product and service standards, creating procurement guidance, developing model contract language, and developing tools to help buyers assess specific products and services. The program's objectives are to achieve significant reductions in the environmental footprint of federal purchasing, and to make the overall consumer marketplace more environmentally sustainable through federal leadership.

OPPT requested a program evaluation to better understand EPP outcomes, in terms of quantitative changes in spending on environmentally preferable products and services, resulting environmental benefits, and the influence and utility of EPP activities and resources within the federal government and in the broader marketplace. EPA's Evaluation Support Division (ESD) awarded funding to OPPT under EPA's Program Evaluation Competition (PEC) to support the evaluation. ESD contracted with Industrial Economics, Incorporated (IEc) to conduct the evaluation.

The evaluation was guided by 14 questions (see the text box on the next page). These include questions on EPP outcomes specific to the federal government (questions 1-9) and beyond the federal realm (questions 10-13). Question 14 inquires about recommendations for the program moving forward. Given the breadth of topics covered by the evaluation, and the range of activities undertaken by the EPP Program, we were not able to examine EPP's activities in every product and service sector that the program has worked on. IEc worked with EPA to select three sectors to focus on for this evaluation: electronics, building and construction products, and hospitality and travel services. **Chapter 1** describes EPP's activities and the criteria for selecting the sectors.

IEc used several research methods to answer the evaluation questions, detailed in **Chapter 2**. First, IEc conducted an exhaustive search for a comprehensive, cross-sector data source for federal environmentally preferable purchasing data. As discussed in Chapter 2, no comprehensive source of federal purchasing data exists. Experts in the federal acquisition community interviewed for this evaluation concur that the government's current inability to track environmentally preferable purchasing information in a uniform manner is a major challenge facing the federal procurement community. As such, IEc relied on a mix of methods for this evaluation, including existing data at the sector level, a survey effort, and interviews. IEc surveyed more than 2,500 purchasers from across the federal government, and studied differences in purchasing attitudes and behaviors for purchasers with low exposure to EPP Program resources versus those with high exposure, hypothesizing that those with higher exposure would demonstrate more environmentally preferable attitudes and behaviors. Moreover, we compared the results of our survey to

EPP EVALUATION QUESTIONS

Questions on EPP Outcomes Specific to the Federal Government

1. How has federal purchaser awareness of green products and services changed since the 2001 baseline assessment?
2. How have federal agencies changed purchasing of green products and services since the 2001 baseline assessment, including incorporating green criteria into specifications and contract language?
3. What are the outcomes of these purchasing changes in terms of changes in the proportion of green products and services purchased by federal agencies?
4. Is EPA leading by example in terms of purchasing behavior for green products and services?
5. What are the outcomes of federal green purchases in terms of reduced energy use and associated greenhouse gas emissions, reduced water use, and reduced use of hazardous materials?
6. How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by federal agencies?
 - a. How have EPP activities contributed to purchasing changes at federal agencies?
7. How effective is the EPP Program in coordinating with green purchasing programs at other federal agencies?
8. The Federal Electronics Challenge (FEC), a key EPP priority area, has reported an apparent decline in energy savings from 2009 to 2010. Is this decline in reported energy savings indicative of backsliding on energy savings behavior reported to FEC?
 - a. If yes, why has backsliding occurred?
 - b. If yes, what changes are needed within FEC to address backsliding?
9. How effective is the FEC's voluntary approach in promoting purchases of EPEAT-labeled electronics among federal agencies?

Broader Evaluation Questions (Beyond the Federal Government Realm)

10. How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by purchasers outside of the federal government, including state and institutional purchasers?
11. To what extent are manufacturers using the voluntary consensus standards that EPA has helped to develop?
12. What factors influence the extent to which the voluntary consensus standard approach is successful in designating and promoting green products and services?
13. How has EPP affected the availability of green goods and services in the marketplace?
14. Should EPA consider changes in EPP's future approach to promoting green products and services?
 - a. If yes, what changes may be appropriate given resource constraints, changing regulatory requirements, and other external factors?

results of a 2001 baseline assessment that addressed similar topics; we describe changes in federal purchaser awareness, attitudes, and behaviors between 2001 and 2013. In addition, we conducted interviews with more than 40 individuals, including EPP staff, hospitality and travel stakeholders, EPA’s Office of Acquisition Management, federal purchasing managers, non-federal purchasing managers, General Services Administration (GSA) procurement contacts, and standards stakeholders. The mix of methods used for each sector is summarized below:

- **Electronics:** Rich existing data sources are available for the electronics sector, which includes EPP activities on the Electronic Product Environmental Assessment Tool (EPEAT) and the Federal Electronics Challenge. Therefore, we rely heavily on existing data for quantifying the impacts of the EPP Program on the electronics sector, and we also collect information on use of the EPEAT standard and other green electronics purchasing attitudes and behavior through a survey effort described below, and through interviews.
- **Building and construction products:** For the building and construction product sector, we use a mix of methods to explore EPP impacts, including survey questions on purchaser attitudes and behaviors relative to purchases in this sector, interviews, and case studies of manufacturers.
- **Hospitality and travel:** IEC was not able to identify a robust source of existing purchasing data for hospitality and travel services, and the sector does not have mature outcomes that we were able to survey purchasers about; therefore, we relied primarily on qualitative research to answer the evaluation questions for this sector.

The report organizes findings by evaluation question in **Chapter 3**; we provide key findings by evaluation question below.¹

QUESTION 1: CHANGES IN FEDERAL PURCHASER ATTITUDES TOWARD GREEN PURCHASING

- **We found clear evidence of a broad shift among federal purchasers toward greater awareness and more positive attitudes toward EPP.** A strong majority of purchasers report having positive views toward EPP in general (see Exhibit ES-1) and purchasers appear to be accepting a greater degree of responsibility for bringing environmental considerations into their purchasing decisions. Both of these findings represent distinct differences from the results of the 2001 study. Furthermore, individuals who have been purchasers for three or more years report becoming more knowledgeable and more favorably inclined toward EPP over that time.

EXHIBIT ES-1. CHANGES IN ATTITUDE OVER THE PAST THREE YEARS

Over the PAST THREE YEARS, has your attitude towards environmentally preferable purchasing become more favorable, less favorable, or stayed the same?	LESS FAVORABLE	STAYED THE SAME	MORE FAVORABLE	DON'T KNOW
	4.9%	49.7%	42.8%	2.6%

¹ As IEC’s response to Question 13 summarizes information provided in findings for Questions 10-12, we omit Question 13 findings from the Executive Summary.

- **Purchasers today identify higher cost and several factors related to a lack of information as the key disadvantages of EPP.** In contrast, the 2001 study indicated that the key problems at that time were a perceived lack of quality for environmentally friendly products and a lack of support from top management; these are no longer major concerns for most purchasers.
- **Purchasers are giving more importance to environmental considerations in their purchasing decisions than they did in the 2001 study.** At that time, it was rare for purchasers to explicitly consider environmental factors when purchasing goods or services. Now, most purchasers say that environmental characteristics are an important consideration. While most purchasers do not give particularly high priority to environmental factors compared to other product attributes, neither do they ignore them.

QUESTION 2: CHANGES IN FEDERAL PURCHASER BEHAVIOR REGARDING GREEN PURCHASING

- **Environmentally preferable purchasing activity is much more widespread now than it was at the time of the 2001 baseline assessment.** Similarly, many individuals who have been federal purchasers for at least three years indicate that their levels of environmentally preferable purchases have increased over that time. Thus, consistent with the shift in attitudes described in Evaluation Question 1, we found that federal purchasers as a group have changed their behavior to engage in more environmentally preferable purchasing.
- Nonetheless, **EPP activity is still not routine.** Most purchasers consider environmental factors occasionally, but do not buy environmentally preferable products or services at particularly high rates.
- **Purchasers rely heavily on materials developed by their own agencies and departments and on the Federal Acquisition Regulation (FAR) to guide their purchasing decisions.** This underscores the need for interagency collaboration if the EPP Program is to maximize its impact on federal purchasing behavior.
- Interviews with a small number of purchasing policy managers indicate that **GSA and the Department of Energy (DOE) have taken substantial actions to incorporate environmental criteria into their own purchasing,** including many of the standards the EPP Program helped to develop. These agencies are leaders in this field; other agencies' efforts appear less robust.

QUESTION 3: FEDERAL PURCHASES OF GREEN PRODUCTS AND SERVICES

- **Comprehensive trend data on federal purchases are available for the electronics sector only and specifically for purchases of EPEAT products.** Comparable data are not available for the products certified to the building and construction standards reviewed in this evaluation, and we cannot extrapolate the limited information available for building and construction product sales to the federal government as a whole. No purchasing data are available on changes in federal hospitality and travel associated with EPP activities.
- **Total EPEAT sales to the federal government increased 50% from 2008 – 2010,** as shown in Exhibit ES-2 below.

EXHIBIT ES-2. EPEAT UNIT PURCHASES BY THE FEDERAL GOVERNMENT

	2008	2009	2010
Desktops	577,260	1,156,682	515,184
Monitors	181,141	1,134,811	unknown
Laptops	213,275	644,564	561,852
Integrated Systems	0	4	111,187
Total	971,676	2,936,061	unknown
Source: data originally collected by the Information Technology Industry Council and reported to the Green Electronics Council. Provided to IEc through personal correspondence with Cate Beard, EPA, Dec. 14, 2011.			

Total EPEAT purchases by the federal government increased from 2008 to 2010, but the pattern of growth was not steady over that period. Purchases tripled from 2008 to 2009: laptops, desktops, and monitors all showed a substantial increase. Desktop purchases fell sharply in 2010, while the decline for laptops was more modest; notably, laptops accounted for a higher number of EPEAT purchases than desktops in 2010. This mirrors a more general market-wide shift away from desktops and toward laptops.

- **Data on non-EPEAT computer sales to the federal government are not available, which precludes estimating the overall proportion of federal EPEAT sales.** EPEAT purchases by the federal government decreased by about 36% from 2009 to 2010 (excluding monitors, for which data was not available in 2010). We suspect this drop may have been driven by broader trends in agency budgets (i.e., a sharp increase in purchasing due to the stimulus of the American Recovery and Reinvestment Act, followed by subsequent cutbacks). However, analysis of data on non-EPEAT computer sales would be required to confirm this suspicion.

QUESTION 4: EPA LEADING BY EXAMPLE

- **EPA does not track its proportion of environmentally preferable versus conventional purchases.** This seriously hinders the ability to evaluate EPA’s performance compared to other agencies. Reliable purchasing data is a critical need for any future efforts to evaluate EPA’s performance in this area.
- **Survey data are somewhat mixed, but on the balance, indicate that EPA purchasers buy more environmentally preferable products and services than non-EPA purchasers.** This appears to be due to a small group of EPA purchasers, rather than a widespread Agency-wide effect.
- **While we have limited interview data, our interviews indicate that EPA has taken some steps to green its own purchasing,** and is using purchasing tools to promote procurement of environmentally preferable electronics, building and construction products, and office supplies.
- **Many EPP staff view leading by example as a secondary concern for the program** compared to efforts to develop standards and other resources that could have a broader impact on the market.
- **EPA offices participate in the FEC at rates well above the federal government as a whole.** EPA FEC partners’ performance is also well above other FEC partners with respect to EPEAT purchases and enabling rates of Energy Star power management settings.

QUESTION 5: ENVIRONMENTAL BENEFITS OF FEDERAL GREEN PURCHASES

- **The environmental benefits of federal EPEAT purchases are substantial.** In 2010, the benefits of federal EPEAT purchases were roughly equivalent to eliminating: the annual electricity consumption of 25,000 average U.S. homes; the greenhouse gas emissions of 40,000 U.S. cars for one year; and the solid waste generation of 252 U.S. households for one year. See Exhibit ES-3 below for more details on environmental benefits.

EXHIBIT ES-3. ENVIRONMENTAL BENEFITS FROM FEDERAL GOVERNMENT EPEAT PURCHASES

BENEFIT CATEGORY	UNIT	YEAR		
		2008	2009	2010 ¹
Electricity	Megawatt-hours	203,175	885,263	293,234
Primary Materials	Metric tons	359,004	1,572,906	525,582
Air Emissions (including greenhouse gases)	Metric tons	829,300	3,565,784	1,212,922
Greenhouse Gas Emissions	Metric tons carbon equivalent	38,140	165,919	56,081
Water Emissions	Metric tons	1,737	7,556	2,548
Toxic Materials	Metric tons	24	91	31
Solid Waste	Metric tons	328	1,379	503
Hazardous Waste	Metric tons	987	3,439	1,308

¹ 2010 figures do not include any benefits from monitor purchases and thus understate actual benefits.

- **There is substantial year-to-year variability in the benefits of federal EPEAT purchases.** These fluctuations are driven by the number of products purchased, the type of products purchased (especially laptops versus desktops), and assumptions on the per-unit environmental benefits of each product type.
- Because of the nature of the assumptions used to calculate environmental benefits, these estimates should be viewed as approximations rather than precise measurements.
- Due to a lack of purchasing data and tools to quantify benefits, estimates of the environmental benefits of federal purchases are not available for the building and construction products or travel and hospitality sectors.

QUESTION 6: USE AND INFLUENCE OF EPP PROGRAM OUTPUTS

- **Direct use of EPP outputs such as model contract language and EPP policies by federal purchasers is limited. However, all EPP outputs tested in the survey were rated moderately helpful or very helpful by a majority of purchasers who have used them.** Purchasers rely heavily on agency-specific purchasing policies and guidelines in their purchasing decisions. Thus, the EPP Program may have an indirect influence on purchasers through contract language and other EPP outputs adopted by agencies and incorporated in agency-specific purchasing policies. The survey was unable to explore indirect relationships.

- **In general, higher exposure to EPP outputs is statistically associated with *current* greener purchasing behavior.** There is a statistically significant relationship between the level of exposure to EPP outputs and the percent of purchases that are environmentally preferable. However, we found no relationship between exposure to EPP outputs and *changes* in purchasing behavior over the last 3 years.
- **Federal buyer use of standards that EPP helped to develop has mixed findings from the survey.** EPP staff helped develop voluntary consensus standards in several sectors. On one hand, a high percent of purchasers who regularly purchase building and construction products looks for the carpet, floor coverings, and gypsum board standards that EPP helped to develop. Also, respondents with higher exposure to EPP outputs were more likely to consider environmental factors in determining “best value” (59.6% versus 49.5%); this difference is statistically significant. On the other hand, only 33% of electronics purchasers report looking for EPEAT, and about half of purchasers cannot estimate the percent of their spending on products certified to EPEAT or to the building and construction standards. Importantly, purchasers who use these standards are loyal users. In other words, once purchasers start using a “green” standard, they generally use it for the majority of relevant purchases.
- **Interviewees indicate that EPP made meaningful and significant contributions to the voluntary consensus standards featured in this evaluation – a key output of the EPP Program.** EPP catalyzed the development of the standards and brought credibility and rigor to the process. EPP’s participation also resulted in more environmentally protective standards.

QUESTION 7: EPP PROGRAM COORDINATION WITH OTHER FEDERAL AGENCIES

- **Interviewees indicate that EPP played a key role in moving the electronics, building products, and travel and hospitality sectors toward multi-stakeholder, multi-attribute standards.** Interviewees also report that EPP’s involvement in standard development processes resulted in these standards being more protective of the environment.
- **EPP worked effectively with other agencies on several green purchasing efforts** including: EPEAT through the Federal Electronics Stewardship Workgroup; green building products through the Federal Green Construction Guide; and green travel and hospitality through the Region 9 Green Meetings and Conference Policy (GCMP). Interviewees noted EPP’s strategic guidance and leadership in these initiatives.
- More collaboration with GSA is needed to incorporate travel standards that EPP supported into the Federal Travel Regulations.

QUESTION 8: FEDERAL ELECTRONICS CHALLENGE

In 2010, the program results that FEC submitted to the Pollution Prevention Division (PPD) showed a 35% downturn in energy savings and greenhouse gas emissions reductions between 2009 and 2010. Our analysis probed the extent to which this decline is attributable to backsliding versus other factors.

- **We found that of the 35% decrease reported, only 6.1% was due to backsliding,** i.e., FEC partners engaging in less environmentally-friendly activity. The downturn in FEC’s results as reported to PPD is due to a number of factors including anomalous data points, likely caused by human error in the reporting process; variations in the overall number of electronics products in the

system; and fluctuations in which partners reported in a given year (i.e., high numbers of partners reporting in 2009 relative to 2010).

QUESTION 9: FEDERAL ELECTRONICS CHALLENGE AND EPEAT PURCHASES

- **Overall, we found strong, albeit indirect, evidence that FEC partners purchase EPEAT electronics at higher rates than the rest of the federal government.**
 - FEC partners had relatively high rates of EPEAT purchases in all years, from a low of 80.9% in 2007 to a high of 96.4% in 2009.
 - The data indicate that FEC purchased EPEAT products at higher rates than the rest of the federal government in the early years of the program. This suggests that FEC partners were early adopters of EPEAT. However, the disparity between the FEC and the rest of the federal government has lessened over time.
- A relatively high number of federal facilities participate in the FEC program compared to other voluntary environmental programs. FEC partners also account for a significant fraction of all federal EPEAT purchases. Thus, FEC has also been successful in terms of its overall reach.

QUESTION 10: USE OF EPP OUTPUTS OUTSIDE OF THE FEDERAL GOVERNMENT

- Looking across all purchasers, **EPEAT's reach has grown markedly** since the program's inception. EPEAT's total sales and market share of laptop computers, in particular, have grown dramatically. More than 50 million EPEAT certified products were purchased in the U.S. in 2010, and nearly 100 million worldwide.
- **The environmental benefits of EPEAT purchases are substantial.** As an example, worldwide EPEAT purchases in 2010 produced greenhouse gas reductions equivalent to eliminating the annual emissions from over 1 million cars in the U.S.
- **EPEAT has achieved significant success among state purchasers.** At least 11 states have adopted EPEAT as a purchasing criterion for computers and monitors. Further, the State Electronics Challenge – which was modeled after the Federal Electronics Challenge, and draws heavily on tools developed by EPP – has expanded from the northeastern U.S. to the entire country. Third-party surveys of state procurement officials confirm the widespread adoption of EPEAT.
- **At least 13 states have adopted the NSF 140 carpet standard**, and at least two states are specifying to the BIFMA e3/Level furniture standard. Starting in January 2010, NSF 140 Platinum superseded California Gold as the required standard for all State of California government agency carpet purchases. As of January 2012, GSA specifies the NSF 140 standard (minimum of gold level) for carpet; this means that five states also specify the standard by default, as these states mirror the GSA schedule: Florida, Louisiana, Ohio, New Mexico, and Texas.
- **Two states report using hospitality and travel tools developed by EPP.** One state reports using the ASTM Green Meetings and Events standards, and two states report using the Convention Industry Council's (CIC) *Green Meetings Report*, which was developed by EPP. Several stakeholders who participated in developing the ASTM Green Meetings and Events standards predict the standards will achieve greater adoption over time. At least one large supplier of hospitality services is already incorporating the standards in their training and operations.

- **A number of universities have adopted EPEAT as a purchasing criterion, and at least two universities are specifying the NSF 140 carpet standard.** IEc did not identify any universities that are using other building and construction product standards and tools, or travel and hospitality standards and tools, developed by EPP. However, we did not conduct a comprehensive review of purchasing specifications.
- **Many cities, businesses, and other non-federal purchasers have adopted EPEAT.** Uptake of other EPP tools by non-federal purchasers, outside of states and universities, has been limited. However, the current draft of the 2012 Edition of the *ICC 700 National Green Building Standard* – a consensus-based standard that received ANSI approval – includes references to NSF 140 carpet, NSF 332 resilient flooring, and ULE 100 gypsum board.
- **IEc did not identify any states that are specifying to the NSF 332 resilient flooring standard or the ULE 100 gypsum board standard.** However, we did not conduct a comprehensive review of all state purchasing specifications.

QUESTION 11: USE OF VOLUNTARY CONSENSUS STANDARDS BY MANUFACTURERS

- **The Institute of Electrical and Electronics Engineers (IEEE) 1680.1 standard (which underpins the EPEAT product registry) is widely used.** As of December 2010, 54 manufacturers, including all of the largest producers of personal computers, had products certified under the standard. There were a total of 2,830 unique EPEAT-registered products at that time. In another sign of the importance of the EPEAT program, when Apple briefly withdrew from EPEAT in mid-2012, it faced a strong backlash from its customers and immediately re-joined.
- **In the building products sector, two sustainability standards in particular have enjoyed widespread adoption by manufacturers, the NSF 140 carpet standard and BIFMA-e3 furniture standard.** While only two manufacturers are using the ULE 100 gypsum board standard, they represent the two largest players in the industry, with 50% market share in the U.S.; thus, the gypsum board standard has also seen success with respect to uptake by manufacturers. In contrast, the NSF 332 floor covering standard has had limited uptake.
- **There is not sufficient information available to determine the extent to which industry participants are using the ASTM Green Meetings and Events standards.** We found some anecdotal evidence of meetings planners utilizing the standards, but they mostly seem to be using them as a menu of environmentally preferable actions, rather than a firm set of criteria leading toward certification.

QUESTION 12: SUCCESS FACTORS FOR VOLUNTARY CONSENSUS STANDARDS

- **Several market success factors influence the success of voluntary consensus standards.** These include market demand drivers; the history and dynamics within specific sectors; extent of market clarity and awareness; Executive Orders and Federal Acquisition Regulation that specify standards; and promotion by EPP. Promoting voluntary standards is important for raising awareness and increasing adoption; however, EPP generally lacks the authority to promote standards. Market success factors are cross walked with specific standards in Exhibit ES-4 below.

EXHIBIT ES-4. STANDARDS AND MARKET SUCCESS FACTORS

Success Factors	IEEE/EPEAT Computers and Monitors	NSF 140 Carpet	NSF 332 Resilient Flooring	BIFMA e3/Level Office Furniture	ULE 100 Gypsum Board	APEX/ASTM Meetings and Events
Market demand drivers	Strong factor presence	Strong factor presence	Factor not present	Weak factor presence	Factor not present	Insufficient data/too early to judge
History and dynamics within sectors	Strong factor presence	Strong factor presence	Weak factor presence	Weak factor presence	Factor not present	Weak factor presence
Market clarity and awareness	Strong factor presence	Weak factor presence	Factor not present	Factor not present	Factor not present	Insufficient data/too early to judge
Executive Orders and Federal Acquisition Regulation	Strong factor presence	Factor not present	Factor not present	Factor not present	Factor not present	Factor not present
Promotion by EPP	Strong factor presence	Factor not present	Factor not present	Factor not present	Factor not present	Factor not present

Strong factor presence
 Weak factor presence
 Factor not present
 Insufficient data/too early to judge

Other findings on success factors for voluntary consensus standards include the following:

- Cost may not be as much of a barrier as is widely perceived.
- The nature of voluntary consensus standards means that EPP does not control the process. This, in turn, often requires compromise on substance.
- Developing standards requires effective coordination across multiple parties with competing interests and perspectives.
- Stakeholders agree that the standards are more environmentally protective with EPP’s involvement, but some question whether they are environmental “leadership” standards.
- Seemingly minor procedural details can influence the substance and content of the standards. For example, standard development organizations’ rules on membership or voting help determine the relative influence given to different stakeholders. This in turn may affect the provisions that can be included in a draft standard and garner sufficient support to ultimately be approved.
- EPP needs to remain continuously engaged to ensure ongoing standards improvement.

RECOMMENDATIONS

Based on the findings of the evaluation, IEC presents recommendations below. For recommendation areas where the proposed actions are less dependent on actors or events outside of EPP, we frame recommendations as EPP “should” undertake activities that the evaluation findings suggest are critical; we say that EPP “should consider” undertaking activities that are not critical. However, several of the recommendations below address challenges that the EPP Program has limited control over, including 1) advancing the implementation and use of EPA’s proposed guidelines for evaluating environmental

standards and ecolabels, which may potentially result in a list of select voluntary consensus standards recommended for use in federal procurement, and 2) updating procurement systems used by other federal agencies to track green purchasing. We make recommendations in these two areas because they are very important to fulfilling EPP's mission and demonstrating the program's impact. Although EPP has limited control over outcomes in these two areas, we think that limited, if any, progress will be made in these areas without EPP's involvement. In these two areas, we often frame recommendations as EPP working with other agencies, playing a leadership role, and advocating for change. This work can entail different activities depending on the context, but in general we are referring to EPP leading the coordination of interagency work on these issues, and EPP regularly communicating about the importance of these issues with decision-makers within EPA and outside of the Agency. EPP is already demonstrating this type of leadership in advancing the guidelines for evaluating standards and ecolabels; we suggest that EPP engage in similar work to overcome procurement data challenges.

EPP Standards Development and Promotion

- The federal government should develop a list of recommended environmental standards and ecolabels for use in federal procurement to: overcome informational barriers to green purchasing among federal buyers by identifying recognized standards and certified products on federal procurement sites; clarify the landscape of standards for non-federal buyers and subsequently reduce greenwashing; and to allow EPP to promote the voluntary consensus standards that it helps to develop. As such, **EPP should continue its leadership role in discussions of formal guidelines for evaluating environmental standards and ecolabels** that can lead to the development of the above list.
- **If the guidelines process moves ahead in 2013,² and leads to the development of a widely utilized and referenced list of environmental standards and ecolabels, then EPP should continue to participate in the development of new voluntary consensus standards on the same scale as in recent years, resources permitting.** Given the lessons learned from the evaluation regarding successful standards, we recommend that EPP apply the following factors when selecting future product categories and standards development processes to engage in:
 - Positive market success factors identified in this evaluation;
 - Potentially high environmental benefit relative to other product categories; and
 - Availability of a standards development organization appropriate for the particular standard being considered (in terms of relevance, policies and procedures, etc.).
- **If the guidelines process is not finalized in 2014, or results in a list that is not widely used or referenced outside of EPA, then EPP should narrow its participation in new voluntary consensus standards development moving forward.** Specifically, EPP should focus on product categories that have positive market success factors as listed in the first three rows of Exhibit ES-4, and have a consumer audience. These product categories are most likely to have green standards succeed, in terms of market penetration, without federal recognition and promotion. EPP may want to consider developing federal standards (i.e., such as Energy Star and WaterSense) for product categories that do not meet these criteria.

² EPA published draft guidelines for public comment (<http://www.epa.gov/epd/draftGuidelines/>) on November 20, 2013, as this report was being finalized.

- **If the guidelines are finalized, EPP should develop and execute a promotion campaign for federally recognized standards that emerge from the process and that EPP supports,** perhaps in collaboration with GSA and other federal partners. Survey results from this evaluation indicate that EPEAT registered products and building and construction standards are utilized by less than one-third of federal purchasers that report buying relevant products. We would expect that more purchasers would procure more certified products once they are clearly identified in federal procurement systems, but promotion may also be necessary to make substantial progress toward the 95% green procurement requirement.
- **EPP should continue to remain engaged with standards that it has worked on to date, to ensure that environmental considerations are appropriately addressed as standards are revised.** Stakeholders have raised concerns about the potential for standards to be weakened over time with respect to environmental protectiveness if EPP does not stay involved.
- **Given that inclusion in the EO 13514 and FAR were key to EPEAT’s success, EPP should work with GSA, CEQ, OFEE, and other relevant agencies to advocate for including federally recognized standards in the FAR.**
- In future standards development processes, **EPP should ensure that all EPA staff involved in developing the standard, and ideally all federal staff, engage in an upfront dialog to ensure a shared understanding of how the process will work and the federal goals for the standard.** Lack of upfront agreement hindered travel and hospitality standards processes in particular.
- **EPP should continue to work to include building and construction standards in GSA Schedules and in the USGBC LEED family of standards, which are key market drivers for this product category.** Currently, only the NSF 140 carpet standard is included in a GSA Schedule, and LEED has not incorporated any of the building and construction standards that EPP has substantially contributed to.

Other EPP Resources for Purchasers

- Given that purchasers rely more on resources developed by their own agencies than on EPP resources, **EPP should consider reviewing other agencies’ purchasing policies and procedures to see if they generally comport with EPP’s model policies, contract language, and specifications.** If not, EPP should reach out to agencies to inform them about EPP tools and how they may be beneficial in helping agencies reach the 95% green procurement requirement contained in EO 13514. If EPP undertakes this review, it should prioritize agencies according to their level of purchasing (i.e., focus on the largest purchasers) and extent of purchasing in sectors for which EPP has developed standards, tools, and resources.
- **EPP should update its website to ensure that content is current, and to provide information on federally recognized standards that it has helped to develop.** The survey found that EPP’s website is the EPP resource that federal purchasers report using the most.

Additional Research

- Currently, no existing methodology or calculator exists to quantify the environmental benefits of purchasing greener building and construction products, which limits understanding of EPP’s impact

in this area. Thus, we recommend that **EPP should develop environmental benefits calculators for building and construction products that the program works on.**

- Similarly, no existing methodology or calculator existing to quantify the environmental benefits of purchasing greener travel and hospitality services, which will limit understanding of EPP’s impact in this area in the future. Thus, we recommend that **EPP should work to develop a methodology or calculator for travel and hospitality, in particular for capturing the energy savings and GHG emission reductions associated with greener air travel (or avoided air travel).** The work already developed by EPP under the City Pairs program may provide a foundation for developing a methodology or calculator.
- Federal purchasers are generally instructed to purchase goods and services that provide the “best value” to the government. Factors included in making a best value determination can include initial price and several other factors including past performance, product lifespan, product warranties, and environmental and energy efficiency considerations.³ To analyze price and energy efficiency together, the purchaser would need to know the lifecycle cost of the product, factoring in energy use. Most simply, a lifecycle cost analysis would entail adding the initial price of the product to the projected cost of energy use of the product over the product’s lifespan. The survey results for this evaluation found that approximately one-third of purchasers emphasize first costs over lifecycle costs in purchasing decisions. It can be difficult and time-consuming for purchasers to estimate lifecycle costs; purchases may need to research product energy use and lifespans, and perform some mathematical calculations. Thus, **to address the issue of lifecycle costs and simplify the process for purchasers, EPP should consider supporting analyses designed to develop a recommended price premium allowance for first costs, for product categories such as electronics where significant energy use occurs during the use of the product.** Ultimately, these allowances could be programmed into procurement systems so they are clearly visible to purchasers.
- **EPP should consider supporting additional research to better understand the market penetration in the domestic private sector of standards that EPP helped to develop.** Existing data and literature provide good insights only for market penetration among states and institutions of higher learning (with the exception of EPEAT).
- **EPP should consider supporting additional research to understand if and/or how the building and construction standards that it helped to develop could be marketed internationally** (researching international markets was out of the scope of this evaluation).
- **EPP should consider conducting limited additional research to understand the limited use of the BIFMA standard among federal purchasers, despite generally positive market factors, and to investigate whether the use of this standard is higher in the private sector.** We hypothesize that BIFMA may have higher uptake in the private sector because furniture is the least commoditized of all products included in this evaluation, and BIFMA may be more popular among higher-end commercial buyers and consumers.

EPP should consider conducting additional research to understand the program’s indirect influence and spillover effects. This evaluation was not able to probe the indirect or spillover effects

³ Federal Acquisition Regulation, Section 8.405-1, available at: <http://www.acquisition.gov/far/current/pdf/FAR.pdf>

of EPP’s activities, although we have indications that these effects may be substantial. EPP’s diverse audiences – including federal agencies, purchasing managers, procurement staff, state and institutional buyers, manufacturers, suppliers, vendors, and the public – constitute a “network” through which EPP disseminates information and tools beyond the confines of the program. Innovative evaluation techniques, such as Social Network Analysis (SNA), may help EPP understand how information flows from the program to its intended audiences.⁴

- The Federal Acquisition Institute (FAI), which administered the federal purchaser survey used for this evaluation, provides training for federal procurement staff that covers incorporating green criteria into purchasing. **EPP should work with FAI to ensure that FAI’s training reflects the barriers identified in the federal purchaser survey.**

Procurement Data Recommendations

- **EPP should work with OARM and other federal agencies to facilitate tracking of green product and service sales to the federal government via comprehensive systems updating. Barring this change, the federal government will not be able to fully assess its performance against the 95% green procurement requirement included in EO 13514, and EPP will not be able to assess its own impact in a comprehensive manner, outside of EPEAT.**
 - EPP should work with OARM to update EPA’s EAS procurement system, and any other relevant procurement systems, to facilitate tracking of green product sales to the Agency.
 - EPP should advocate for updating federal procurement systems to facilitate tracking of green product sales, and specifically tracking of all green standards and ecolabels recognized by the federal government.⁵ Although all procurement systems should be updated, EPP should prioritize working with agencies with high levels of purchasing: GSA Advantage!; DOD EMALL; and internal procurement systems within DHS, HHS, DOE, and other agencies with relatively high levels of purchasing.
 - EPP should work with GSA to update the Federal Procurement Data System (FPDS-NG), which stores all federal procurements over \$3000, to store green attributes associated with purchasing data (i.e., the environmental standard or ecolabel that purchased products or services are certified to). Updating FPDS will enable the federal government to manage green purchasing data from all of the government’s procurement systems in one central database, facilitating analysis of green purchasing data moving forward.

⁴ SNA maps relationships and flows of information and knowledge between people, groups, or organizations. (Presentation by Chris Ellis, National Oceanic and Atmospheric Administration (NOAA), “Social Network Analysis and Evaluation,” 2010 Environmental Networking Evaluators Forum, Washington D.C.) SNA typically relies on surveys of individuals within a network to understand with whom they are collaborating, on whom they rely for information, and what types of information they have gathered. The information gathered through the surveys is then mapped to show the pattern and strength of information flows through a network. This analysis can then be repeated after a period of time to assess how information flows have changed. Applying SNA over time allows a series of “snapshots” of network structure, which could logically be related to immediate program outcomes and be correlated with program activities and outputs. (However SNA does not prove that changes in network structure are the result of program impacts.)

⁵ See recommendation on Section 13 for discussion on the need to expand standards and ecolabels recognized by the federal government to include third-party standards and ecolabels.

- EPP should inform OMB about problems encountered with their data on government EPEAT and non-EPEAT purchases, which are used for official reporting purposes. IEc does not have enough information about OMB’s data collection and QA/QC process to diagnose the root cause of the problems, but our review of the OMB data in conjunction with manufacturer-supplied sources of EPEAT data indicates that several of OMB’s data points do not accurately reflect actual government purchases. If the above procurement data recommendations are implemented, OMB will have access to comprehensive federal purchasing data on EPEAT and non-EPEAT products, directly from federal procurement systems, and will no longer need to ask agencies to self-report EPEAT and non-EPEAT purchases. As an interim measure, OMB and EPP could consider asking the Green Electronics Council (GEC) to gather data on sales of non-EPEAT purchases to the federal government, along with the EPEAT sales data that GEC already collects in collaboration with the Information Technology Industry Council (ITI). However, a potential barrier to this approach may be GEC/ITI’s ability to gather data that is not covered by manufacturers’ agreements with EPEAT.

MEASUREMENT RECOMMENDATION

- Evaluation Question 8 asked about the cause of apparent “backsliding” by FEC partners. IEc’s analysis showed that actual backsliding was minimal, and the apparent backsliding was actually due to reporting fluctuations and changes in the number of monitors in use. Using proportions as part of FEC metrics would prevent this false appearance of backsliding. Thus, FEC should track and report proportion-based annual metrics to PPD, in addition to the estimated energy savings it has been reporting:
 - The percentage of computers and monitors, across all FEC partner facilities, that is Energy Star-enabled.
 - The percentage of computers, monitors, and printers, across all FEC partner facilities, that is disposed of through reuse, recycling, landfilling, and unknown disposition.
 - For the new life extension area, the average lifespan of computers, monitors, and printers across all FEC partner facilities.

We recommend that PPD use only proportion-based measures to assess FEC’s performance because absolute energy savings are driven by several factors in addition to performance of FEC facilities, including the number of FEC reporters in a given year and annual fluctuations in equipment use. However, we understand that FEC and PPD must continue to report FEC data on existing measures because FEC data are aggregated with data from other programs to assess progress on specific measures included in EPA’s Strategic Plan.⁶

⁶ After IEc completed this evaluation, EPA decided to undertake substantial changes to the FEC program model. As a result, some of the recommendations regarding the FEC appearing in this report may no longer be applicable to the program in its current form. Nonetheless, we have left the recommendations in our report unchanged in order to more accurately document our evaluation of the FEC as it existed at the time of our analysis.

CHAPTER 1 | INTRODUCTION

INTRODUCTION TO EPP PROGRAM AND PURPOSE OF EVALUATION

EPA's Environmentally Preferable Purchasing (EPP) Program was established in 1993 by Executive Order 12873, "Federal Acquisition, Recycling and Waste Prevention." It has been reaffirmed and expanded by subsequent Executive Orders, most recently Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," in 2009. EPP is administered by EPA's Office of Pollution Prevention and Toxics (OPPT), and is a high-priority area for the office. EPP activities include taking a leadership role or participating in the development of product and service standards, creating procurement guidance, developing model contract language, and developing tools to help buyers assess specific products and services. The program's objectives are to achieve significant reductions in the environmental footprint of federal purchasing, and to make the overall consumer marketplace more environmentally sustainable through federal leadership.

Although EPP is considered a stand-alone program, it is actually comprised of several distinct efforts for various product and service categories, led by different individuals within OPPT. EPP also engages in cross-cutting efforts that address multiple product and service categories, such as the *Federal Green Construction Guide for Specifiers* (FGCG). Moreover, the work of the EPP Program is intertwined with EPA's broader sustainability efforts, which involve other offices at EPA beyond OPPT.

OPPT requested a program evaluation to better understand EPP outcomes, in terms of quantitative changes in spending on environmentally preferable products and services, resulting environmental benefits, and the influence and utility of EPP activities and resources within the federal government and in the broader marketplace. EPA's Evaluation Support Division (ESD) awarded funding to OPPT under the Office of Policy's Program Evaluation Competition (PEC) to support the evaluation. ESD contracted with Industrial Economics, Incorporated (IEc) to conduct the evaluation.

REPORT ORGANIZATION

This report presents the evaluation findings, conclusions, and recommendations. The report is organized as follows:

- The remainder of **Chapter 1** presents the EPP logic model, describes the scoping challenges inherent in evaluating the EPP Program, introduces the EPP product and service sectors selected for evaluation, and presents the evaluation questions.
- **Chapter 2** presents the evaluation methodology. IEc used several methods to assess EPP Program outcomes. Existing data sources include: EPEAT computer and monitor sales; GSA Schedule data; sales data collected from manufacturers; Federal Electronics Challenge (FEC) data; and FGCG website data. IEc also collected primary data from a survey of federal purchasers and interviews with EPP stakeholders.
- **Chapter 3** presents the evaluation findings organized by evaluation question.

- **Chapter 4** presents recommendations for the EPP Program moving forward.

A series of appendices is attached, including: a summary table of EPP Program activities; survey instrument; results for each survey question; interview guides; and interview list.

EPP PROGRAM LOGIC MODEL

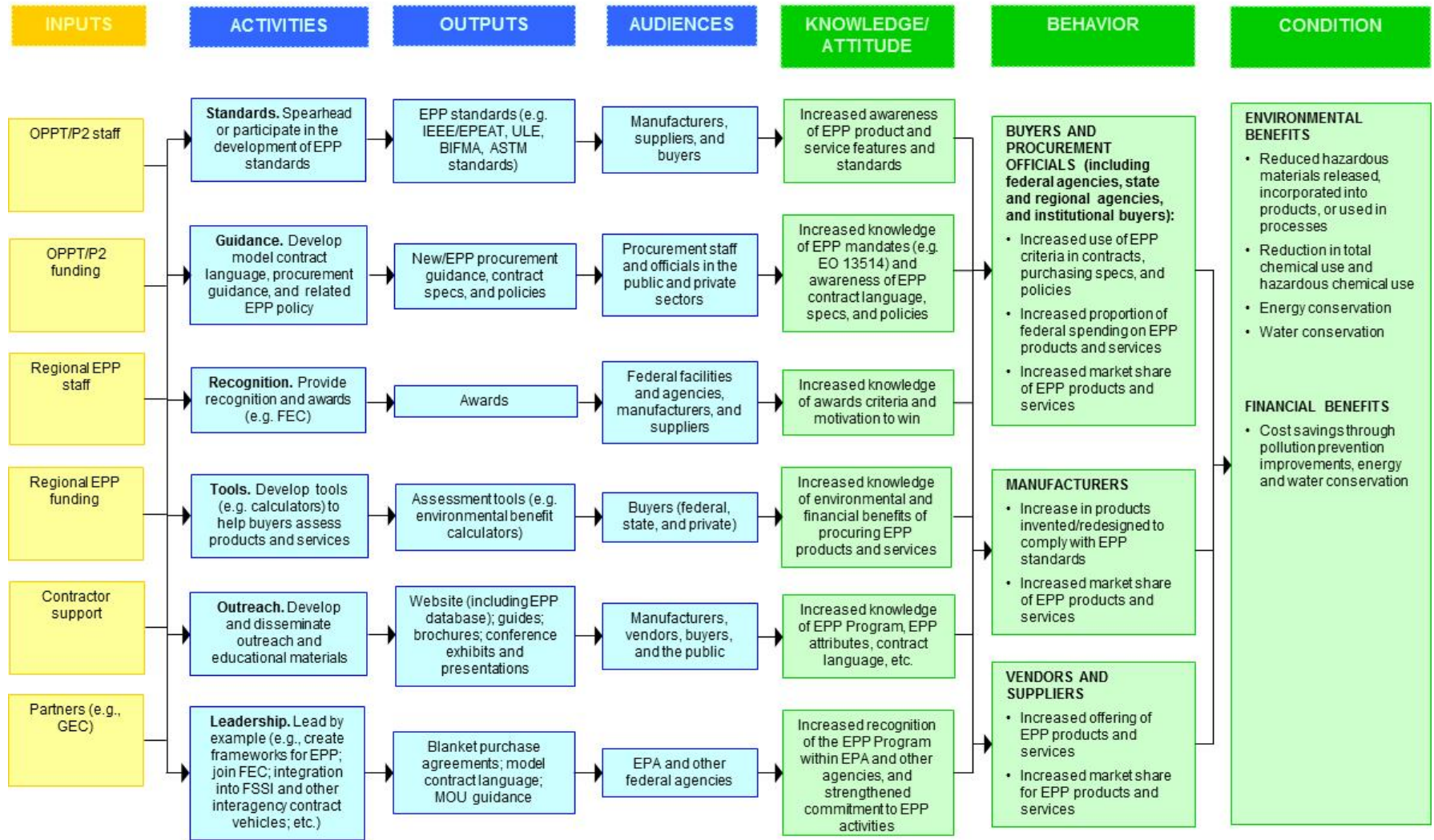
To illustrate the various components of the EPP Program and to inform development of specific evaluation questions, EPA and IEC developed a logic model for the program. A logic model is a graphical representation of the relationships between program inputs, outputs, and intended changes in knowledge/attitude, behavior, and condition. As shown in Exhibit 1-1, the key components of the model include:

- **Mission** — to reduce the environmental footprint of the federal government and broadly influence the marketplace towards more sustainable products and services.
- **Inputs** — resources and programmatic investments dedicated to the program: staff, contractor support, partners, and funds.
- **Activities** — the specific procedures or processes used to achieve program goals. EPP Program activities are broad and include work on standards, guidance, recognition, technical tool development, outreach, and leadership.
- **Outputs** — the immediate products that result from activities and are often used to measure short-term progress. For example, EPP outputs include environmentally preferable product standards; procurement guidance, contract specifications, and model contract language; awards; technical assessment tools; and the EPP website.
- **Audiences** — groups and individuals that EPP seeks to influence through the program's activities and outputs. For example, EPP interfaces with procurement staff and buyers at federal agencies and outside of the federal realm, manufacturers and suppliers, and the public.
- **Knowledge/attitude (short-term outcome)** — changes in knowledge, awareness, attitudes, understanding, and skills resulting from program outputs that are designed to result from the EPP Program. For example, EPP's procurement guidance and specifications are designed to lead to increased awareness of environmentally preferable purchasing mandates among the purchasing community.
- **Behavior (intermediate outcome)** — changes in behavior resulting from changes in knowledge and attitudes. For example, EPP's procurement guidance and specifications are designed to first lead to increased awareness of environmentally preferable purchasing mandates among the purchasing community, and then lead to behavioral changes including an increased use of environmentally preferable criteria in contracts and purchasing specifications; an increased proportion of federal spending on environmentally preferable products and services; and ultimately an increased market share of environmentally preferable products and services.
- **Condition (long-term outcome)** — the overarching goals of the program, which in EPP's case include environmental benefits (reduction in hazardous materials incorporated into products or used during production processes, energy conservation, and water conservation), and cost savings through pollution prevention and energy and water savings.

Finally, the logic model makes note of external factors that are beyond the direct control of the EPP Program, but may influence program outcomes – e.g., political and economic circumstances, available EPA budget to promote EPP, availability of federal agency budgets to buy EPP products and services, and level of participation of standards-setting organizations in the development of voluntary consensus standards for environmentally preferable purchasing. In addition, we list an assumption that monitoring and evaluation activities inform learning, knowledge capture and dissemination, and programmatic improvements.

EXHIBIT 1-1. ENVIRONMENTALLY PREFERABLE PURCHASING (EPP) PROGRAM LOGIC MODEL

MISSION: To reduce the environmental footprint of the federal government and broadly influence the marketplace towards more sustainable products and services.



External factors: Political and economic circumstances; available EPA budget to promote EPP; availability of federal agency budgets to buy EPP products and services; level of participation of standards-setting organizations in the development of voluntary consensus standards for EPP.

Assumptions: Monitoring and evaluation activities inform learning, knowledge capture and dissemination, and programmatic improvements.

EVALUATION SCOPING CHALLENGES

IEc aimed to conduct a focused, informative, and cost-effective evaluation of the EPP Program. To accomplish this, we conducted initial research to address some scoping challenges posed by the EPP Program, discussed below.

Defining the Boundaries of the EPP Program

The first evaluation scoping challenge was to determine the boundaries of the EPP Program. Although EPP is a stand-alone program, its structure resembles a group of conceptually linked activities more than an administratively distinct program with its own staff and funding. Activities related to promoting environmentally preferable purchasing (broadly defined) take place in various EPA offices (including EPA Regional offices as well as Headquarters) and in other federal government agencies. For evaluation purposes, it is necessary to define the EPP “program” in terms that are readily understandable and easily applied. Thus, it is important to distinguish between activities relating to environmentally preferable purchasing in general, and specific activities undertaken by EPA EPP staff.

IEc relied on EPA’s management structures and mechanisms to create boundaries for the EPP Program. For purposes of reporting contributions toward meeting EPA’s Strategic Goals, EPP is considered part of the Pollution Prevention Program, which is housed within OPPT. Other parts of the Pollution Prevention Program include Green Chemistry, Green Engineering, and Design for the Environment. This evaluation focuses on activities conducted only by the EPP Program, as illustrated in the logic model. We further define the EPP Program as utilizing only OPPT staff that 1) focus on environmentally preferable product and service issues, and 2) are not affiliated with one of the other EPA Pollution Prevention areas. Thus, the evaluation does not focus on activities that occur in other OPPT offices – such as the Design for the Environment Program – or in other EPA offices – such as the development of Energy Star specifications – except to the extent that EPP contributes to or promotes these activities. We also exclude activities undertaken by third parties with funding obtained from Pollution Prevention Resource Exchange (P2RX) grants, which are administered by OPPT’s Pollution Prevention Program, but not by EPP specifically.

Another key issue concerned the role of Regional EPA staff in EPP activities. Based on our research, including conversations with staff and management from the EPP Headquarters team and the Regions, it appears that Region 9 is the Regional office with the most robust EPP Program. Region 9’s EPP activity has included:

- Active, ongoing participation with Headquarters in the development of voluntary consensus standards for electronics products;
- Working with the State of California to insert language specifying EPEAT-registered electronics products into the state’s procurement policy; and
- Development of a *Green Meetings and Conference Policy*, completed in 2009, and subsequent collaboration with the General Services Administration (GSA) to create new federal guidelines for environmentally preferable meetings based on Region 9’s policy.

The *Green Meetings and Conference Policy* is particularly significant, since it is one of the only EPP Program outcomes in this sector that is sufficiently mature to be included in a retrospective evaluation (details are provided in the EPP Product and Service Sectors Selected for Evaluation/Hospitality and

Travel section).⁷ While Region 9 developed this policy without input from Headquarters EPP staff, there was strong interest among EPP management in exploring the impacts of this activity further. Thus, we included Region 9 activities within the boundaries of the EPP Program for purposes of this evaluation. No other region reported engaging in EPP activities at the same scale as Region 9.

Identifying EPP's Major Program Activities

Aside from the issue of defining boundaries, IEC needed to develop a clear understanding of the nature and extent of the EPP Program's major activities. The process of developing voluntary consensus standards demonstrates the difficulties involved in teasing out EPP-specific activities. While EPA has developed product standards and guidelines through its Energy Star, WaterSense, and Design for the Environment programs, the EPP Program itself does not have an explicit mandate to independently develop any product standards. Indeed, EPA is restricted in its ability to develop its own standards by the National Technology Transfer and Advancement Act (NTTAA). The NTTAA directs federal agencies to participate in voluntary consensus standards development and use technical standards that are developed in this fashion.

EPP staff has played key roles in developing numerous third-party standards, including standards developed by NSF International, Underwriters Laboratory (UL), the Institute of Electrical and Electronics Engineers (IEEE), ASTM International, and other groups. Due to the inherently collaborative nature of the consensus standard development process, it was difficult to precisely define the EPP Program's involvement in voluntary standards development through a cursory examination of available information. Thus, we conducted initial research to assess the extent to which the EPP Program can be credited with environmental benefits that may have resulted from standards developed through a voluntary consensus process, a challenge we refer to as an "attribution challenge."

To address this challenge, IEC considered several aspects of EPP's involvement in standard development processes. First, we considered the general level of involvement of EPP staff involved in developing standards. EPP made significant contributions to the development of several product and service standards by virtue of its EPP staff leadership positions on standards development committees. In addition, we considered whether the standard would have been as protective of the environment in the absence of EPP staff involvement. While our scoping research provided some insight into these various considerations, IEC conducted additional investigation into these questions as part of the evaluation, to characterize the contribution of the EPP Program to the environmental benefits produced from voluntary consensus standards. We gathered this information primarily through interviews with EPP staff and other standards stakeholders. IEC did not consider the impetus behind the development of the standard as a defining criterion for EPP's contribution. Many of the standards that members of the EPP staff were involved in were initially advanced by manufacturers or trade associations; our charge was to investigate whether the standard would have been as protective without EPP's involvement.

IEC also needed to better understand EPP's program activities beyond standard development. Because the total scope of EPP's program activities was not clear from publicly available information, we spoke with staff members working in key areas to gain deeper insight into the program's past and current efforts. As shown on the logic model, other activities include:

⁷ With the exception of the Region 9 Green Meetings and Conference Policy and the Headquarters Green Meetings Report, the travel and hospitality sector meets the criterion for an emerging category as described below in the section on EPP Product and Service Sectors Selected for Evaluation.

- Developing model specifications and contract language for environmentally preferable purchasing (e.g., the *Federal Green Construction Guide for Specifiers*);
- Promoting environmentally preferable purchasing through outreach mechanisms such as awards, presentations, etc. (e.g., the Federal Electronics Challenge);
- Developing tools to help buyers assess products and services (e.g., environmental benefit calculators);
- Developing and disseminating outreach and educational materials (e.g., EPP website, guides, brochures, and conference exhibits); and
- Disseminating information on environmentally preferable product standards and procurement resources developed by other EPA programs (e.g., the Office of Resource Conservation and Recovery’s Comprehensive Procurement Guidelines). The activity of disseminating information developed by other programs is particularly nebulous from an evaluation perspective, because it is difficult to assess how much “credit” for outcomes should be given to EPP versus the program that developed the information. This is another attribution issue that complicated this evaluation. We explored this issue during interviews, and this report describes, to the extent possible, EPP’s dissemination of other programs’ materials. However, we were not able to *quantitatively* assign any environmental benefits from these activities to EPP.

Based on our scoping research, IEC compiled a summary table with the major activities undertaken by the EPP Program (Appendix A). Note that Appendix A is current as of January 2012.

Data Availability

A third challenge in our scoping research was to identify quantitative data available to support the evaluation. Because the EPP Program is focused on changing purchasing behavior, we were particularly interested in identifying data sources on actual procurement of environmentally preferable products and services, although we were also interested in locating data on other EPP Program results. The availability of robust, relevant data helped to inform the selection of sectors for the evaluation. Data availability also influenced the evaluation methodology by illustrating where further research and data development were needed. For product or service categories without purchasing data, the evaluation focused on interim program impacts, such as changes to procurement policies and contract language, and changes in knowledge and attitudes.

IEC was able to identify a comprehensive data source for one sector (electronics); data are available on federal and non-federal purchases of EPEAT products (which is discussed further in Chapter 2 under the section on “Existing Data”). However, no comprehensive data source exists for federal purchases of other environmentally preferable products or services within EPP’s purview. A full discussion of existing data is contained in Chapter 2.

EPP PRODUCT AND SERVICE SECTORS SELECTED FOR EVALUATION

The EPP Program is active in several different product and service sectors. As discussed above, it was not possible to address all of these areas in the program evaluation. IEC therefore consulted with EPP and ESD staff to develop criteria to use in recommending sectors to include in the evaluation. The criteria for inclusion were as follows:

- **A significant level of EPP Program activity**, either currently or in the past. Simply put, sectors where EPP has had only minimal action do not reflect the EPP Program’s impact as much as sectors where EPP has been more heavily involved. We considered EPP to be heavily involved in sectors for which there is a designated contact person within EPP; sectors that are promoted on the EPP website; and sectors in which EPP has developed or contributed to concrete program outputs in the recent past (sustainability standards, model contract language, etc.). Also, as discussed above, we limited this evaluation to EPP work that is managed by OPPT staff rather than other EPA offices, since OPPT is charged with implementing the EPP Program and is accountable for its progress. As such, we excluded the landscaping sector from the evaluation because EPA’s green landscaping work is administered by ORCR, not OPPT. Other sectors that were excluded for this reason include: vehicles; paper products (governed by the Comprehensive Procurement Guidelines covering recycled content, administered by ORCR); food; and whole buildings (as distinct from building products).
- **Purchasing data availability:** At a minimum, the evaluation had to focus on at least one product or service category that has federal government purchasing data available.
- **Engagement with voluntary consensus standards:** A key question among EPP Program management is whether voluntary consensus standards represent an effective approach to making products and services more sustainable. Thus, the evaluation examined sectors in which EPP staff has led or substantially contributed to the development of voluntary consensus standards.
- **Mix of mature and emerging categories:** Given that this is a retrospective evaluation focused on program outcomes, the evaluation had to include sectors where EPP has been working for several years. However, EPP was also interested in including at least one sector where the program’s efforts are in earlier stages.
- **Interest of EPP management and staff:** EPP management and staff identified certain sectors as particular priorities. One effect of this criterion was that product categories where EPP was formerly active, but no longer has significant activities, were excluded from the evaluation. For instance, due to a shift in program emphasis and the absence of a clear contact person, our initial scoping review did not thoroughly examine the information available on office supplies, even though EPP had previously worked in this area. In addition, IEC did not conduct research into fleets or food services because of a shift in program emphasis and lack of an available contact.

Based on these criteria, IEC recommended the following sectors for inclusion: electronics, building and construction products, and hospitality and travel services.⁸

Electronics

The electronics category comprises several distinct product types. The EPP Program website on electronics includes information on computers, monitors/displays, optical and imaging equipment, and printers/plotters, and a generic “electronics” category covering numerous products. Members of the EPP staff have also worked on standards for televisions, servers, and mobile devices. Despite this wide range, program activities to date have focused mainly (though not exclusively) on computers and monitors. Until recently, the Electronic Product Environmental Assessment Tool (EPEAT), Federal Electronics Challenge

⁸ IEC also included the cleaning sector among the original list of sectors to be included in the evaluation; however, after discussion with EPA, we removed this sector from the evaluation due to resource constraints.

(FEC), the existing IEEE standards, and the Electronic Environmental Benefits Calculator (EEBC) all addressed computers and monitors, and nothing else. As such, IEC recommended focusing on computers and monitors specifically. Below, we discuss the electronics product category in relation to the selection criteria.

- **EPP Program activity:** There is significant EPP activity on electronics. The two most important areas of activity center on the EPEAT product registry and the FEC voluntary program.
 - EPEAT is a listing of computer and monitor models designated as “green” by virtue of meeting defined criteria; it bills itself as “the definitive global registry for greener electronics.” At present, to be included in EPEAT, products must be certified under the relevant IEEE 1680 standard. EPP staff was instrumental in developing these IEEE standards for computers and monitors; two EPP staff served as co-chairs of the sponsoring IEEE committee and also led various sub-groups. EPP also provided funding for facilitating meetings during the standard development process, as well as start-up funding for the Green Electronics Council (GEC), which is now self-sufficient and manages the EPEAT program.
 - EPP staff is currently involved in the development of other electronics standards, including a ULE standard for mobile devices and an IEEE standard for servers, which may be incorporated into the EPEAT program in the future. EPP staff was also engaged in IEEE standards development efforts for televisions and imaging equipment; these standards were adopted in early 2013.
 - In another effort closely tied to EPEAT, the EPP Program also funded the development of the Electronics Environmental Benefits Calculator (EEBC), created by Abt Associates but currently managed by EPA. The EEBC is used to calculate the net benefits of the entire EPEAT program (i.e., the benefits of all EPEAT-registered product sales worldwide as compared to non-EPEAT products).
 - FEC is a voluntary partnership program for federal agencies and facilities. It encourages purchases of EPEAT and Energy Star products, implementation of energy-saving measures (i.e., sleep mode), and reuse and recycling at end of life. FEC uses a reporting framework, where partners are asked to provide data regarding their electronics purchases, use, and end-of-life efforts on an annual basis. Through 2010, reporting was strictly voluntary, with the result being that reporting rates fluctuated from year to year.
- **Data availability:** Quantitative data exist for both the EPEAT and FEC programs, as discussed in Chapter 2 (see the “Existing Data” section). More quantitative data are readily available for electronics than for any other product or service sector that EPP has worked on.
- **Maturity:** FEC began as a pilot effort in 2003, and was launched in its present form in 2004. The EPEAT program was launched in 2006. Electronics therefore represents a fairly mature area of EPP activity, at least with respect to computers and monitors.
- **Voluntary consensus standards:** As noted above, the EPP Program played a major role in developing the IEEE 1680 standards on computers and monitors. Members of the EPP staff have served as co-chairs of the standard development committee; led several sub-committees; and funded facilitation efforts during the stakeholder consensus process. This experience provided a solid foundation for an exploration of the effectiveness of the voluntary consensus standard approach.

- **Staff and management interest:** Interest in the electronics sector was very high; the draft evaluation questions developed by EPP staff included specific references to the IEEE electronics standards and the FEC program.

Building Products

- **EPP Program activity:** The EPP Program has expended significant effort on environmentally preferable building products. There are two major components of this effort.
 - The first component is involvement in the development of a number of voluntary consensus standards for product sustainability. One EPP staff member is the co-chair of the ASTM sustainability working group, which oversees product sustainability standards for that organization; EPP staff members have played major roles in other standards organizations as well. Building product standards that EPP staff members have worked on or are currently working on include:
 - NSF/BIFMA e-3 Business and Institutional Furniture Sustainability Standard (initially finalized 2008, revised 2010)
 - NSF/ANSI 140 Sustainability Assessment for Carpet (initially finalized 2007, revised 2010)
 - NSF/ANSI 332 Sustainability Assessment for Resilient Floor Coverings (draft 2007, finalized 2010)
 - NSF/ANSI 336 Sustainability Assessment for Commercial Furnishings Fabric (draft 2007, finalized 2011)
 - NSF/ANSI 342 Sustainability Assessment for Wallcoverings (finalized 2010)
 - NSF/ANSI 347 Sustainability Assessment for Single Ply Roofing Membranes (draft 2011)
 - ULE 100 Standard for Sustainability of Gypsum Board (finalized 2010)
 - ULE 105 Standard for Sustainability of Suspended Ceiling Panels and Boards (draft 2010)
 - ULE 115 Standard for Sustainability of Thermal Insulation (draft 2011)
 - Numerous standards that do not relate to individual product categories, such as ASTM standards on life cycle assessment, terminology, and data collection.
 - The EPP Program's second major effort in the building and construction product sector is the *Federal Green Construction Guide for Specifiers* (FGCG). The aim of the FGCG is to “address the need for a comprehensive guide for procuring environmentally preferable building products and construction/renovation services within the Federal government,” in effect providing a one-stop shop for information on environmentally preferable building techniques and materials for decision makers overseeing building construction projects. This document features model specifications addressing environmental concerns for numerous building products that can be incorporated directly into construction contracts. Work on the project commenced in 2000; the Guide was most recently updated in 2011. Although it is intended primarily for a governmental audience, because the Guide is publicly available, it is possible that it has been taken up by users in the broader marketplace as well.

- It is also important to note that EPP disseminates information on the efforts of other EPA programs to develop environmentally preferable building products, including WaterSense, Energy Star, and SNAP (Significant New Alternatives Program, concerning non-ozone depleting chemicals), among others. Also, ORCR’s Comprehensive Procurement Guidelines database has hundreds of building products listed that meet environmentally preferable procurement guidelines. EPP’s role as an information clearinghouse may have resulted in more widespread awareness and adoption of these environmentally preferable products. However, as noted above, this evaluation was not able to quantitatively attribute environmental benefits to these activities.
- **Data availability:** Data availability for sales of building and construction products to the federal government is limited. GSA provided limited data on sales of certified carpet through GSA Schedules, but those data have several important limitations (see Chapter 2 – “Existing Data”). As discussed in Chapter 2 (see the section on “New Data Collections”), IEC attempted to collect data on sales of environmentally preferable building and construction products to federal agencies through a “mini-market analysis” of manufacturers that sell certified products to the federal government. However, the number of companies that provided data – and the total market share of these participating companies – was too small to draw any general conclusions about federal sales of environmentally preferable building and construction products.
- **Maturity:** For certain product categories, EPP Program activities were sufficiently mature to allow for retrospective evaluation. Most notably, the NSF carpet standard (NSF/ANSI 140), which EPP played a major role in developing, was first released in 2007, while the NSF/BIFMA furniture standard was released in 2008. The FGCG was first developed in 2000 and has since gone through multiple revisions.
- **Voluntary consensus standards:** EPP has done more work on consensus standards for building and construction products than in any other area. Members of the EPP staff have participated in the development of standards for carpet, furniture, flooring, gypsum board, wallcoverings, commercial furnishings fabric, roofing membrane, ceiling panels, and thermal insulation, as well as standards for environmentally preferable buildings that can include product requirements. Building products therefore represented an excellent opportunity to evaluate the effectiveness of the voluntary consensus standard approach.
- **Staff and management interest:** Again, initial conversations indicated a high level of interest in this area from EPP staff and management. It is our understanding that EPP staff working on building products helped develop some of the language used in OPPT’s application for Program Evaluation Competition funding. The emphasis on voluntary consensus standards also means that EPP staff and management have a particular interest in evaluating the building products sector.

Building products represents an extremely diverse sector, covering dozens of product types from basic construction materials (e.g., concrete, lumber), to finished products regularly purchased by individual consumers (carpet and flooring), to services (building construction and commissioning). Limited evaluation resources restricted IEC’s ability to address each of the building products that EPP has worked on. Thus, IEC worked with EPA to identify four building products to include in the evaluation: carpet, floor coverings, furniture, and gypsum board. We identified these four products based on their inclusion in the FGCG, the maturity of the standard associated with each product, and the role of EPP staff in developing the standard. Also, it is important to note that given the scope of EPP activities, the evaluation

focused on building *products*, rather than architectural and engineering techniques used to develop green and energy efficient buildings (see sidebar).

Hospitality and Travel

The environmentally preferable hospitality and travel sector is a very broad service sector, encompassing environmentally preferable meetings and conferences, environmentally preferable hotels, and environmentally preferable travel (and in particular, less carbon intensive aviation).

- **EPP Program activity:** EPP has worked with a variety of stakeholders to develop standards and guidelines for environmentally preferable hospitality and travel. Activities have been carried out at the federal level and in a few regions:

- At the federal level, the EPP Program worked with the Convention Industry Council and the Green Meeting Industry Council (GMIC), as well as a range of other stakeholders, to develop a suite of nine ANSI-accredited ASTM standards for environmentally preferable hospitality, meetings, and events. Eight of the nine standards were approved in February 2012;

the ninth standard (Accommodations) was published in April 2013.⁹ According to the EPP Environmentally Preferable Hospitality/Travel lead, the language appearing in the final ASTM standards – though incorporating much of the substance, language, and ideas provided by the EPP Program – differs significantly from the language and substance that the EPP Program originally recommended. We explored this issue further during our interview with EPP staff to understand how EPP contributed to developing the ASTM standards (see Chapter 3).

The EPP Program has also been working with GSA and several other federal agencies (as well as other participating EPA programs) to amend federal travel guidelines and related procurement rules, with EPP staff sitting on the steering committee for the inter-agency effort. The proposed revisions include, for example, changes in RFP procurement language for contract airline routes to include “GHG emissions” as one of the scoring criteria. This is a work in progress on several fronts. While EPP has assisted GSA in developing language for some of the proposed revisions

EPA'S GREEN BUILDING WORK

EPA also works to strengthen green building standards and certification systems, which are used to design and construct buildings that use less energy, water, and toxic materials; and protect indoor air quality. EPA works with the U.S. Green Building Council to increase the environmental protectiveness of its LEED rating systems, which are the most common green building systems used in the U.S., and are recognized and recommended by GSA for use in federal green construction. EPA provides formal comments on draft LEED standards, and works to develop LEED pilot credits. EPA has also worked to develop and improve the International Green Construction Code, and works to strengthen other green building approaches including ASHRAE 189 and the ICC-700 National Green Building Standard.

It is important to note that while EPP staff regularly contribute to the above activities, and in particular provide leadership in the area of strengthening toxics provisions of green building standards, official purview for green building efforts at EPA rests within the Office of Policy and its Office of Sustainable Communities. This was one consideration in excluding green buildings from the scope of this evaluation.

⁹ “Sustainable Meeting Standards Now Available for Purchase as a Bundle,” April 23, 2012; and “APEX/ASTM Standard on Accommodations Published,” April 12, 2013. Convention Industry Council website: <http://www.conventionindustry.org/Newsroom/headlines.aspx>.

(such as the revisions to the conference planning provisions of the Federal Travel Regulation), the proposed revisions have not yet been published.¹⁰

- Region 9 developed a *Green Meetings and Conference Policy*, which was published in 2009.¹¹ According to Region 9's Environmentally Preferable Lodging and Hospitality lead, the Region developed the policy on its own, without funding or technical support from EPA Headquarters.¹² Subsequently, Region 9 distributed the policy to federal facility partners in the region, and posted the policy on its website.¹³
- Subsequent to developing the policy, the EPP HQ Hospitality and Travel Lead recruited a Region 9 PPD staff person to participate on the interagency committee advising GSA on developing guidelines for environmentally preferable meetings and events. GSA has decided to create a new version of the federal guidelines based on Region 9's *Green Meetings and Conference Policy*.

In addition, the Region 9 staff person has been involved in the development of ASTM standards for environmentally preferable hospitality. She stated that she has worked on a different standard than the HQ contact, but the two have coordinated their activities as needed.

- Region 5 has taken steps to green at least three large meetings/conferences, including the 2006 and 2007 National Community Involvement Conferences hosted by ORCR. Environmentally preferable activities included ensuring availability of recycling bins, promoting the hotels' environmentally preferable features, reducing paper associated with the conference, and eliminating the bags for conference materials. At EPA's National Brownfields Conference that was held in Detroit in 2008, EPA Region 5 led the greening efforts via a green team, which included establishing a comprehensive recycling program at the conference center.
- In 2003-2004, a former EPP staffer served on the Convention Industry Council's Green Meetings Task Force, and helped to develop the Task Force's resulting *Green Meetings Report*. The report identifies best practices for event suppliers and event organizers.
- **Data availability:** Existing retrospective data are not available on the EPP's hospitality and travel activities. Region 9 is in the process of developing a database to track the use of the Region's *Green Meetings and Conference Policy*, but this is still a work in progress.
- **Maturity:** While EPP has been working on hospitality and travel for some time, key milestones such as adopting standards and policies are just now occurring. Region 9's *Green Meetings and Conference Policy* and the Convention Industry Council's *Green Meetings Report* are the only specific activities that were mature enough for a retrospective evaluation. However, IEC conducted

¹⁰ In addition to the activities discussed in the main text, it should be noted that the EPP Green Meetings website (www.epa.gov/oppt/greenmeetings/) includes a link to a "meetings assistance planning tool." It is IEC's understanding that GMIC developed the tool independently, without technical assistance or funding from the EPP Program. See BlueGreen Meetings, <http://www.bluegreenmeetings.org/>; accessed October 26, 2011.

¹¹ US Environmental Protection Agency Region 9, *Sustainable Region 9 Green Meetings and Conference Policy*, 2009.

¹² Green Lodging and Hospitality Lead and Pollution Prevention Coordinator, U.S. Environmental Protection Agency Region 9; telephone interview, October 26, 2011.

¹³ According to one Region 10 contact, that Region is using the policy. Email communication from Robert Drake, EPA Region 10, February 23, 2012.

interviews with hospitality and travel contacts that inquired more broadly about outcomes from activities to date.

- **Voluntary consensus standards:** Standards have been a major focus of EPP activities in this sector. As noted above, the EPP Program played a significant role in developing a suite of ANSI-accredited ASTM standards for Green Meetings and Events, and previously worked with GMIC and the Convention Industry Council to develop a standard. This experience provided a foundation for assessing the effectiveness of the voluntary consensus standard approach.
- **Staff and management interest:** EPP Program staff and management expressed significant interest in including environmentally preferable hospitality and travel in the evaluation.

EVALUATION QUESTIONS

The evaluation questions that guided this evaluation effort are below. At the beginning of this evaluation, EPP staff provided five initial questions, many of which contained several questions in one. IEC subsequently disaggregated the original evaluation questions, and worked with EPA to develop the following list of 14 evaluation questions.

Questions on EPP Outcomes Specific to the Federal Government

1. How has federal purchaser awareness of green products and services changed since the 2001 baseline assessment?
2. How have federal agencies changed purchasing of green products and services since the 2001 baseline assessment, including incorporating green criteria into specifications and contract language?
3. What are the outcomes of these purchasing changes in terms of changes in the proportion of green products and services purchased by federal agencies?
4. Is EPA leading by example in terms of purchasing behavior for green products and services?
5. What are the outcomes of federal green purchases in terms of reduced energy use and associated greenhouse gas emissions, reduced water use, and reduced use of hazardous materials?
6. How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by federal agencies?
 - a. How have EPP activities contributed to purchasing changes at federal agencies?
7. How effective is the EPP Program in coordinating with green purchasing programs at other federal agencies?
8. The Federal Electronics Challenge (FEC), a key EPP priority area, has reported an apparent decline in energy savings from 2009 to 2010. Is this decline in reported energy savings indicative of backsliding on energy savings behavior reported to FEC?
 - a. If yes, why has backsliding occurred?
 - b. If yes, what changes are needed within FEC to address backsliding?

9. How effective is the FEC's voluntary approach in promoting purchases of EPEAT-labeled electronics among federal agencies?¹⁴

Broader Evaluation Questions (Beyond the Federal Government Realm)

10. How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by purchasers outside of the federal government, including state and institutional purchasers?
11. To what extent are manufacturers using the voluntary consensus standards that EPA has helped to develop?¹⁵
12. What factors influence the extent to which the voluntary consensus standard approach is successful in designating and promoting green products and services?
13. How has EPP affected the availability of green goods and services in the marketplace?
14. Should EPA consider changes in EPP's future approach to promoting green products and services?
 - a. If yes, what changes may be appropriate given resource constraints, changing regulatory requirements, and other external factors?

¹⁴ An earlier version of this question asked about FEC's "voluntary reporting approach." We subsequently deleted the word "reporting" to clarify that we are asking about the efficacy of the program itself rather than the voluntary data collection method specifically.

¹⁵ An earlier version of this question referred to "manufacturers and purchasers"; we subsequently dropped "purchasers" from this question. Purchaser use of standards is addressed in evaluation questions 6, 10, and 12.

CHAPTER 2 | METHODS

This chapter presents the methods used in the EPP evaluation. We first discuss use of existing data, and then discuss new data collections including the survey, interviews, and mini-market analysis. A summary table of methods by evaluation question is presented at the end of the chapter in Exhibit 2-7.

USE OF EXISTING DATA

Existing data were necessary to address evaluation question 3 regarding changes in purchasing outcomes, and subsequently evaluation question 5 on the environmental impacts of those changes, because it was not feasible for IEc or for federal agencies to attempt to collect new data, retrospectively, on actual purchases. In addition, existing data were needed to address questions 8 and 9 on the FEC.

IEc conducted a search for a comprehensive, cross-sector data source for federal environmentally preferable purchasing data, and contacted experts in GSA and the Department of Defense (DOD) to inquire about the availability of such a data source. GSA and DOD experts confirmed our research that such a source does not exist, and added that the government’s current inability to track environmentally preferable purchasing information in a uniform manner is a key challenge facing the federal procurement community. In this section, we first document sources reviewed and their shortcomings. Then, we discuss IEc’s strategy of using data sources specific to product sectors to support the evaluation. Finally, we discuss existing data sources that IEc identified on environmentally preferable purchasing trends outside of the federal government.

Cross-Sector Federal Data Sources Reviewed

GSA Advantage

IEc researched the availability of environmentally preferable purchasing data from GSA Advantage (www.gsadvantage.gov/), an online procurement tool that GSA offers to all federal agencies.¹⁶ GSA Advantage offers a variety of products in multiple categories, including building and construction products and electronics. Federal buyers shop online using various search filters, including the following “green” icons: BioPreferred, CPG, Energy Star, EPA Primary Metals Free, EPEAT, FEMP, Low VOC, NESHAP, PRIME, SNAP, and WaterSense.¹⁷ Although many of the standards that EPP has worked on

¹⁶ In certain circumstances, state and local governments may also use GSA Advantage. For purposes of this evaluation, our data request was restricted to federal purchasing data.

¹⁷ When IEc prepared the data request in October 2011, the following green icons were also listed on GSA Advantage: Biodegradable, Forest Stewardship Council, Green Guard, and Green Seal. GSA had these icons on the site but removed them promptly after receiving some criticism that GSA needed a transparent process for selecting non-governmental ecolabels for inclusion in GSA Advantage. This was one impetus behind the work to develop guidelines for evaluating non-governmental standards and ecolabels for federal purchasing; see the sidebar in Chapter 3 on p. 3-2 for more detail.

are not captured in GSA Advantage, we had intended to use some of the green icons in GSA Advantage as proxies for EPP's influence.

We requested GSA to provide purchasing data for the electronics and building and construction products covered by this evaluation, including the quantity purchased and dollars spent through GSA Advantage, broken out by the year of purchase and the agency making the purchase, and the green icons, if any, associated with each product.¹⁸ Unfortunately, the GSA Advantage data have significant limitations, including the following:

The total volume of purchases in our product categories that is directed through GSA Advantage is too low to extrapolate to the total universe of federal purchases. Use of GSA Advantage is not mandatory, and it appears that most federal purchases do not go through GSA Advantage. IEC initially planned to estimate the portion of federal purchases that goes through GSA Advantage, by agency and product category, by comparing the purchasing data in GSA Advantage to total federal purchases as reported in the Federal Procurement Data System – Next Generation (see below). However, this was not possible because the total volume of agency purchases in our product categories that goes through GSA Advantage is too small to extrapolate to the total universe of federal purchases.

There are substantial discrepancies in the GSA Advantage data, including inconsistent use of the relevant green icons for our product categories. IEC found substantial discrepancies in the electronics data and building and construction product data that we received from GSA, including low volumes of purchases, sharp year-on-year fluctuations in purchasing volumes, unit prices that do not look plausible, missing data for several building and construction product categories, and internal inconsistencies in the dataset. The dataset also contains very low volumes of “green” purchases. Regarding the latter point, some of the green icons on GSA Advantage were added as recently as March 2011. GSA did not update the “green” status of products that were sold on GSA Advantage before the green icons were added. Also, manufacturers are responsible for tagging their items with the applicable green icons; the information is not entered automatically and seems to have been updated inconsistently. These factors likely explain the substantial discrepancies in the data.

IEC worked with GSA over a period of several months in an attempt to resolve the data issues. All told, we received three different versions of the dataset. Finally, we held a teleconference with the Director of the Program Analysis Division in GSA's Office of Acquisition Management, who confirmed that the data would not be useable for our purposes for the EPP evaluation.

Federal Procurement Data System - Next Generation (FPDS-NG)

Established by the Office of Management and Budget (OMB) and managed by GSA through a private contractor, the Federal Procurement Data System – Next Generation (FPDS-NG) provides a relatively comprehensive database of federal purchases. As specified in the Federal Acquisition Regulation (FAR), federal agencies are required to report contract actions (including purchases) in the amount of \$3,000 and above to FDPS-NG, and all contract modifications regardless of the amount.¹⁹ Federal agencies reported more than \$532 billion in contract actions for CY 2010.²⁰

¹⁸ GSA Advantage classifies products according to the United Nations Standard Products and Services Code (UNSPSC) classification system.

¹⁹ FAR, Subpart 4.6 - Contract Reporting, www.acquisition.gov/far/current/html/Subpart%204.6.html#wp1089036. Accessed on November 9, 2011.

²⁰ FPDS-NG, <https://www.fpds.gov/common/jsp/FPDS.jsp>. Report generated on November 9, 2011.

The FPDS-NG database contains comprehensive data from FY 2004 through the present; in addition, over 12 million legacy contract actions (dating back to 1979) were migrated from an older data system and are now available in FPDS-NG.²¹ For each purchasing transaction in the system, FPDS-NG includes the product or service code (PSC), PSC description, description of purchase requirements, federal agency, and date of purchase. However, FPDS-NG has no historical data (prior to October 2011) on environmentally preferable attributes, with the exception of products designated as meeting the requirements of the Comprehensive Procurement Guidelines (CPG), which certifies the use of recovered materials from solid waste in new products.²² CPG is not an appropriate proxy for standards that EPP helped to develop because CPG is an OSWER program, implemented independently of EPP, and because there is little overlap between designated CPG products and the products associated with standards that EPP helped to develop. Therefore, we were not able to use FPDS-NG as a source of environmentally preferable purchasing data.

Other Federal Sources of Comprehensive EPP Purchasing Data

IEc conducted an exhaustive search for other federal sources of comprehensive, cross-sector environmentally preferable purchasing data. Specifically, we investigated more than 25 data leads identified by EPA and IEC, including other GSA data sources, OMB reports, government-wide acquisition contracts (GWACs), and agency-specific data sources. The rest of this section describes the major categories of federal data sources that we investigated and their limitations.

Other GSA data sources. IEC explored the potential for using other GSA data sources, including GSA Global Supply, but we confirmed that Global Supply was included in the dataset that we already received from GSA. Another data source, GSA Advantage Spend Analysis Program (ASAP), was not publicly available, but we understand that it uses the same dataset and has the same limitations as GSA Advantage. We also looked at GSA’s Comprehensive Professional Energy Services Blanket Purchase Agreement; however, this is for energy services only, and does not cover the products that are the focus of the EPP evaluation.

OMB/OFPP. OMB’s Office of Federal Procurement Policy (OFPP) submits biennial reports to Congress on federal agencies’ compliance with requirements to buy recycled and bio-based products. IEC reviewed the November 2011 report and related guidance materials issued by OMB.²³ The report includes: a summary of sustainable acquisition practices across 22 federal agencies in FY09; trends in OMB/OFEE Environmental Stewardship Scorecard’s “environmentally preferable purchasing score” for 22 agencies at three points in time (2006, 2008, and 2010); percent of agency purchases in FY08 and FY09 that contained recycled material (for DOD and six large civilian agencies); and whether or not DOD and the six large civilian agencies purchased bio-based products in FY08 and FY09. While the report mentions environmentally preferable product standards that EPP helped to develop or standards that could potentially serve as proxies for EPP’s influence, these standards are not the report’s focus, and the report

²¹ FPDS-NG Home Page, “Welcome to Federal Procurement Data System - Next Generation,” https://www.fpds.gov/common/html/public_welcome_text.html.

²² As of October 2011, “recovered materials” was updated to “recovered materials/sustainability,” and now includes other environmental attributes. The change is not retroactive to purchases reported before October 2011.

²³ *Report to Congress on Implementation of the Resource Conservation and Recovery Act (RCRA), Farm Security and Rural Investment Act of 2002 and the Food, Conservation, and Energy Act of 2008*, November 2011.

does not include any purchasing data for the products and standards that our evaluation covers. Therefore, although the report provided useful context for the evaluation, we were not able to use it as a source of federal purchasing data.

Government-wide acquisition contracts (GWACs). GWACs are contracts for information technology (IT) products and services that are established by one federal agency for use by all federal agencies. Each GWAC is operated by an executive agent designated by OMB. While we have data from 2008-2010 for EPEAT (see discussion below), we thought that GWACs might provide us with 2006 and 2007 data on EPEAT sales. IEC reviewed two lists of GWACs – *Report on the Use of Interagency Contracting* (OMB, August 2010) and the OFPP master list. A number of the GWACs did not cover the products that we looked at for our evaluation, but a few GWACs – GSA’s IT GWACs, NASA’s Solutions for Enterprise Wide Procurement (SEWP) IV GWAC, and HHS/NIH’s Electronic Commodities Store (ECS III) GWAC – held promise as potential data sources. However, we ultimately learned during discussions with the GWAC offices that the GWACs would not provide useable data because the offices are unable to disaggregate sales of products versus services. Furthermore, in the case of SEWP and ECS III, the GWAC offices do not have comprehensive sales data on products with specific environmental attributes (e.g., EPEAT) that were sold through the GWAC.

Individual agency data. Given the lack of comprehensive federal sources of environmentally preferable purchasing data, we looked at data sources maintained by individual agencies, including: EPA’s EPEAT federal sales data and the FEC annual reports; the DOD Green Procurement Report and DOD EMALL; and the Department of Energy’s (DOE) *Sustainable Acquisition, Recycling, and Pollution Prevention Practices, Fiscal Year 2008 Report* (February 2009), *2011 Strategic Sustainability Performance Plan* (May 31, 2011), Pollution Prevention Tracking and Reporting System, Strategic Integrated Procurement Enterprise System, and Strategic Petroleum Reserve: Buy It Green (BIG) initiative. EPEAT and the FEC annual reports provide rich quantitative data for the electronics sector that we used for the evaluation (see the discussion under the next heading – Electronics Purchases Data Sources and Analytic Approaches). We also submitted a request to EPA’s OARM for green purchasing data, but OARM confirmed that such a data set does not exist.

Given our relatively complete data for the electronics sector, we focused on obtaining building and construction product data from the DOD and DOE data sources. Unfortunately, the DOD sources that we identified did not work out; DOD EMALL does not include acceptable proxies for the environmentally preferable standards that EPP helped to develop for the building and construction products of interest, and we had indications that the Green Procurement Report would have similar limitations, although we were not able to obtain the data from the DOD/Defense Logistics Agency (see the discussion below under Agency-Specific Sources for Building and Construction Purchasing Data /DOD). Similarly, the DOE data sources do not include green purchasing data for the product standards that EPP helped to develop for building and construction products of interest.²⁴ Given the lack of comprehensive data available from EPA, DOD, and DOE, IEC determined that it was very unlikely that other agencies had comprehensive sources of EPP data, which was later verified through interviews.

²⁴ IEC reviewed five separate DOE green purchasing data leads. Only one of these sources included the volume or quantity of green purchases, and only for electronics, but not building and construction products.

Electronics Purchases Data Sources and Analytic Approaches

Rich data sources are available for the electronics sector, which includes EPP activities on EPEAT and FEC. These data were used to address evaluation questions 2, 3, 4, 5, 8, 9, and 11 for the electronics sector.

EPEAT

EPEAT is a listing of computer and monitor models designated as “green” by virtue of meeting defined criteria; it bills itself as “the definitive global registry for greener electronics.” The Green Electronics Council (GEC), which manages the EPEAT program, produces annual reports on the environmental benefits of all sales of EPEAT-registered products. The reports use aggregate sales data (i.e., sales to *all* purchasers) reported by manufacturers of EPEAT-registered computers and monitors. Because the reports also track sales of non-EPEAT products, they can also be used as a data source to determine the total market share of EPEAT certified products. Reports are available dating back to 2007, the year after the EPEAT program began. In addition, EPP Program staff provided IEC with aggregate data on sales of EPEAT products to the federal government, covering 2008 – 2010.

The EPP Program also funded the development of the Electronics Environmental Benefits Calculator (EEBC), created by Abt Associates and currently managed by EPA. The EEBC is an Excel-based model that compares the environmental characteristics of EPEAT products, by registration tier (gold, silver, bronze), to the characteristics of non-EPEAT products, to calculate the net environmental benefits attributable to the EPEAT program. The calculator estimates benefits on a number of dimensions, including materials use, toxic chemicals and hazardous waste, air and water pollution, and energy use and greenhouse gases. EPEAT’s annual environmental benefits reports use this calculator to estimate the net benefits of the entire EPEAT program. Based on IEC’s review, the EEBC is a reputable and robust calculator, and we used the calculator when discussing the environmental impact of the EPEAT program.

FEC

FEC, a voluntary program for federal facilities, has additional quantitative data available. FEC encourages purchases of EPEAT and Energy Star products, implementation of energy-saving measures (i.e., sleep mode), and reuse and recycling at end-of-life. The program uses a reporting framework, where partners are asked to provide data regarding their electronics purchases, use, and end-of-life efforts on an annual basis. The FEC data are available in electronic form back to 2005, with paper records available for another two years before that.²⁵ Raw data on individual facilities are available in addition to summary results.

FEC uses the same calculator as EPEAT, the EEBC, to translate direct program results into environmental impacts. IEC used the EEBC to calculate the environmental impact of the FEC. While the FEC’s publicly-released annual “Accomplishments Surveys” do not allocate the results reported by FEC partners among different EPA programs (EPEAT, Region 9, Energy Star, FEC), program staff do apportion these environmental benefits for internal reporting. IEC used the same allocation method used by FEC staff.²⁶

²⁵ Because FEC was in a pilot phase prior to 2005, IEC did not analyze data from paper-based reporting available for the pilot, which would have required extensive resources for data entry and QA/QC.

²⁶ FEC excludes all benefits of the EPEAT program in reporting its results. This ensures that these benefits are not double-counted in the EPP evaluation.

One important issue to note is that in the period covered by our analysis, FEC partners' reporting was strictly voluntary, with the result being that reporting rates have fluctuated from year to year. FEC's reported results also have not been contextualized within the broader trends of electronics purchases at federal facilities. IEC hypothesized that both of these phenomena may have contributed to the apparent decline in FEC program effectiveness from 2009 to 2010; they may have masked or distorted the program's actual impact in other years as well. Thus, in addition to discussing the overall results reported by the FEC, IEC normalized these results with respect to 1) the total number of electronics products (whether environmentally preferable or not environmentally preferable) being purchased by the reporting FEC facilities, and 2) to the extent possible, the specific FEC facilities reporting or not reporting results in any given year. See evaluation question 8 for the results of this analysis.

The FEC model uses transparency (public reporting) and recognition (awards) to encourage purchases of EPEAT computers and other environmentally preferable behavior. IEC compared data on EPEAT purchases among FEC participants and non-participants to explore the effectiveness of FEC's voluntary approach (evaluation question 9). If the FEC approach is effective, we would expect to see proportionately more EPEAT purchases among FEC participants compared to non-participants.

A key limitation of this analysis is that IEC was not able to control for self-selection bias, which could contribute to positive results. That is, because agencies and facilities voluntarily join the FEC, those predisposed to more environmentally preferable behavior may be drawn to the program. Hence, it is possible that these agencies and facilities may have increased purchases of EPEAT computers even if they had not joined FEC. However, given the fact that promoting EPEAT purchases is one of FEC's core goals, it seems likely that at least some of the observed difference between FEC partners and other federal facilities is attributable to the influence of the FEC program (this issue is further explored in Chapter 3, under evaluation question 9).

Building and Construction Product Data Sources and Analytic Approaches

Existing purchasing data for building and construction products were intended to be used primarily to address evaluation questions 2, 3, 4, and 5. However, IEC was not able to identify a robust source of existing purchasing data for this sector. Therefore, we pursued other options for collecting building and construction product data, including a "mini-market" analysis of companies that sell certified products to the federal government. The following sections describe our attempts to obtain existing purchasing data, and our methodology for the mini-market analysis.

Agency-Specific Sources for Building and Construction Purchasing Data

Initially, IEC considered obtaining purchasing data directly from individual agencies. Given resource constraints, we would not have been able to contact every agency. Instead, we planned to select up to four agencies (plus EPA), based on their share of total purchases in our selected product categories. However, as described below, we were unable to obtain useable environmentally preferable building and construction purchasing data from any federal agency that we contacted.²⁷

²⁷ It is important to note that even if we had been able to follow through with the "agency-specific" data collection approach, this approach would have had several limitations. First, it would not have provided a broad picture of federal purchases that spans multiple agencies. As such, it would likely not have been appropriate to quantitatively extrapolate findings from a small subset of agencies to the federal government as a whole. Second, different agencies may use different definitions of "environmentally preferable" products, which may have posed difficulties in analyzing

DOD. DOD was a clear choice for the above approach, because the agency is a large purchaser and has been implementing environmentally preferable purchasing initiatives for many years. IEC worked with the Defense Logistics Agency (DLA) to obtain environmentally preferable and non-environmentally preferable sales data for building and construction products managed by DLA. Unfortunately, DLA does not manage the products of interest and had no sales for those products from 2004 to 2011. Therefore, we did not obtain any sales data from DLA.

Besides the products that DLA manages directly, DLA managed the Green Procurement Report (GPR) – an online environmentally preferable procurement tracking system for DOD. GPR was decommissioned in October 2011. Moreover, we had indications that building products of interest were not covered in the GPR and data in the GPR were not reported at a sufficient level of detail for our analysis. Hence, we did not pursue this avenue further.

We also considered DOD EMALL as a potential data source for DOD purchases of building and construction products. DOD EMALL tracks environmentally preferable attributes using environmental attribute codes (ENACs). Working with our DLA contacts, we specified the environmental attributes of interest for our specific product categories. Unfortunately, the ENACs that DOD EMALL tracks do not include acceptable proxies for the environmentally preferable standards that EPP helped to develop for the building and construction products of interest.²⁸ Therefore, we were not able to use DOD EMALL as a data source for this evaluation.

EPA. IEC requested EPP spending data from EPA OAM covering the Agency’s electronics, building and construction product, and meetings and travel purchases from FY 2001 through FY 2011. OAM confirmed that these data are not available.

GSA Schedule Data

As discussed in the previous section, GSA Advantage data could not be used to support the evaluation. However, IEC researched data for building and construction products that may be available through GSA’s Multiple Award Schedules. Multiple Award Schedules are long-term, government-wide contracts with commercial firms that provide access to a wide range of commercial products and services at volume discount prices. The contracts are managed by GSA. Four GSA Schedules offer the building and construction products covered by the evaluation: Schedules 71 (Furniture), 72 (Furnishings and Floor Coverings), 51V (Hardware SuperStore), and 56 (Buildings and Building Materials, Industrial Services and Supplies). We requested GSA to provide purchasing data for the four Schedules.

GSA provided purchasing data for all of the requested schedules except Schedule 71. The data show annual federal purchases through each Schedule, broken out by Special Item Number (SIN). GSA mandates all manufacturers on specific SINs to offer environmentally preferable products. For example, since January 2011, all manufacturers that sell carpet through SINs 31-301 and 31-304 (Schedule 72) are

data and aggregating data across agencies. Third, this approach would have required significant evaluation resources, as it would have required working directly with different agencies to coordinate on a data request, and would have entailed agency-specific analyses of data.

²⁸ The ENACs include the following environmental attributes: asbestos alternative products, biobased, FEMP, Energy Star, EPEAT, non-cadmium, non-mercury, CPG, and low VOC. Low VOC is the only attribute that we identified as an acceptable proxy for building and construction products, but the ENACs for low VOC do not cover our product categories. See *Federal Logistics Information System: FLIS Procedures Manual Multiple Application References/Instructions / Tables and Grids*, DoD 4100.39-M, Volume 10, October 2010.

required to sell NSF 140 certified carpet at the gold level or higher. GSA maintains data sales that went through “green mandate” SINs (e.g., 31-301 and 31-304).

Although we used the GSA Schedule data to provide some sense of the magnitude of environmentally preferable carpet sales to the government, the Schedule 72 data have a number of limitations. First, federal agencies can still buy non-environmentally preferable carpet through Schedule 72 if they buy from a small business SIN, or if they are buying specialty carpet (again through a separate SIN). Second, manufacturers on other (non-“green mandate”) SINs may opt to sell environmentally preferable products, but we do not know the relative mix of environmentally preferable versus non-environmentally preferable sales through those SINs. Third, the GSA Schedules do not account for all sales to the federal government; federal agencies can purchase building and construction products outside of the GSA Schedules. Fourth, GSA was unable to provide a breakdown of GSA Schedule purchases by federal agency; therefore, we do not know which agencies account for the majority of purchases through the Schedules.

Given these limitations, we sought to supplement the GSA Schedule data by requesting sales data directly from manufacturers that sell environmentally preferable building and construction products through the GSA Schedules. Our approach to this “mini-market” analysis is described below.

Mini-Market Analysis

Given the limitations of the federal purchasing data, IEc sought to obtain data directly from manufacturers that sell select environmentally preferable building and construction products to the federal government. Specifically, we were interested in sales data for products that are certified to environmentally preferable standards that EPP helped to develop.

IEc cross-walked publicly available lists of manufacturers that sell certified building and construction products to the list of manufacturers on the relevant GSA Multiple Award Schedules, including:

- Thirty manufacturers that sell BIFMA e3 certified furniture through Schedule 71;
- Eleven manufacturers that sell NSF 140 certified carpet through Schedule 72;
- Two manufacturers that sell NSF 332 certified flooring through Schedule 72; and
- One manufacturer that sells ULE 100 certified gypsum board through Schedule 51V.²⁹

As a first step, IEc sent a “screening” email to all of the above manufacturers. The email explained the intent of our query and provided substantial context. The email also indicated that participation was completely voluntary, and that IEc would not identify manufacturers in reporting data to EPA. The email included a brief series of screening questions:

- Do you have existing data on sales (\$ value sold) to the federal government of [product] certified to the [x] standard?
- Is this information readily available? Are you able to provide it to the public upon request?
- If yes, can you please send it to us?

²⁹ Because our analysis did not look at all manufacturers in the product categories being evaluated, but only at the manufacturers selling through the Multiple Award Schedules, this was a smaller undertaking than a full-fledged market analysis.

- If these data are available online or in an existing report, can you identify where the information might be found? If yes, can you provide us the location?

After sending the screening email, IEC followed up with every manufacturer by telephone and/or email to ascertain if they had the information and were willing to participate in the evaluation.³⁰ We contacted each manufacturer at least three times. Four furniture manufacturers and one carpet manufacturer provided sales data; we did not receive data from any resilient flooring companies or the gypsum board company. To ensure consistency in reporting and to facilitate aggregation of sales data across the manufacturers, we sent a standardized data request to participating manufacturers (Exhibit 2-1) and asked them to fill in a standardized data collection template (Exhibit 2-2). In addition, we conducted telephone interviews with all but one participating manufacturer. The interviews probed their reasons for selling certified products to the federal government, and asked about any changes in their products or production processes that were required to obtain certification.

³⁰ If more than nine manufacturers had been willing and able to participate, we would have had to narrow our universe to nine participants, in keeping with the requirements of the Paperwork Reduction Act. However, this was not an issue because fewer than nine companies indicated that they were willing to participate.

EXHIBIT 2-1. MINI-MARKET ANALYSIS DATA REQUEST

1. Could you provide existing data on:
 - a. Sales to the federal government of carpet certified to the NSF/ANSI 140 standard, from when you started selling the product through 2011?
 - b. Sales to the federal government of carpet that is **not** certified to any green standard, from 2001 through 2011?
 - c. Sales to the federal government of carpet certified to any other third-party green standard (e.g., GreenGuard), from 2001 through 2011?
 - d. Sales to the federal government of carpet that your firm considers “green” or “low VOC,” but was not certified to any third party standard, from 2001 through 2011?
 - e. Can you provide the same data as requested in a-d above, but for **non-federal** customers?

We are providing a spreadsheet for you to provide available data [see Exhibit 2-2].

2. Why did your firm decide to certify carpet to the NSF/ANSI standard?
3. When you certified carpet to the standard, did you have to change any aspect of your manufacturing process? If yes, explain.
4. Did you previously manufacture green carpet prior to the availability of the NSF/ANSI 140 standard? If yes:
 - a. Did you have to change any aspect of your manufacturing process when you originally started to produce green carpet? If yes, explain.
 - b. When you certified carpet to the NSF/ANSI standard, did you have to make additional changes to your manufacturing process? If yes, explain.
5. Has selling NSF/ANSI 140 certified carpet to the federal government changed your business practices or marketing of certified carpet to non-federal customers (including any state or local government customers, in addition to the private sector)? If so, how?
6. What is the trend in demand for NSF/ANSI 140 certified carpet among federal customers?
 - a. State and local government customers?
 - b. Private sector customers?
7. Do you sell any carpet to the government through a distributor? If yes:
 - a. What is the name of the distributor?
 - b. What proportion of all of your carpet sales to the federal government go through this distributor?
 - c. What proportion of NSF/ANSI 140 certified carpet sales to the federal government go through this distributor?
8. Can you estimate your overall market share of NSF/ANSI 140 certified carpet?
9. Could you estimate your share of NSF/ANSI 140 sold to the federal government?

EXHIBIT 2-2. DATA COLLECTION TEMPLATE FOR THE MINI-MARKET SHARE ANALYSIS

CARPET SALE	CY 2001		CY 2002		CY 2003		CY 2004		CY 2005		CY 2006		CY 2007		CY 2008		CY 2009		CY 2010		CY 2011	
	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE	NO. OF UNITS SOLD	\$ VALUE
	Sales to Federal Government																					
No Green Standard Certification																						
NSF/ANSI 140 Certified	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A												
Other Green Certification, not NSF/ANSI 140 Certified																						
Green or Low VOC, but not certified to any green third-party standard																						
Sales to Non-Federal Customers																						
No Green Standard Certification																						
NSF/ANSI 140 Certified	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A												
Other Green Certification, not NSF/ANSI 140 Certified																						
Green or Low VOC, but not certified to any green third-party standard																						

The four furniture manufacturers account for approximately 10% of GSA Schedule sales of all furniture manufacturers that sold BIFMA e3 certified products to the federal government in FFY11. The one carpet manufacturer accounts for about 15% of GSA Schedule sales of manufacturers that sold NSF 140 certified carpet to the federal government in FFY11. Given the relatively low number of respondents, and the relatively low market share for these respondents, we cannot extrapolate to the universe of manufacturers as a whole. Therefore, we took a “case-based” approach to our analysis, characterizing environmentally preferable sales and motivations behind the decision to become certified for the participating manufacturers. The results of the analysis are presented in Chapter 3.

Other Building and Construction Product Data Sources

- **Federal Green Construction Guide for Specifiers (FGCG) web hit data.** EPP has developed detailed model contract language through the *Federal Green Construction Guide for Specifiers* (FGCG). Much of this language addresses environmental characteristics of specific products, such as carpets, doors, and ceiling panels. Because the Guide is available online, IEc requested data on downloads and page views. This would provide an idea of the first-order impacts of EPP activities in this area (i.e., information dissemination), but would not address the extent to which the Guide has actually been used or influenced procurement practices in the marketplace. Due to changes in the structure of the FGCG website, and migration to a new software application, historical web data on the use of the FGCG was limited. However, we obtained Google Analytics data on page views, average time on page, entrances, and bounce rate for 2010-2012, and the most commonly viewed documents (hits and visits) in 2012.³¹
- **Data from industry associations and standards organizations.** IEc searched for data from industry associations and standards organizations covering relevant products on rates of adoption by manufacturers and purchasers of environmentally preferable product standards. NSF and ULE do track and publicly list products certified under their standards, but they do not track any data on the use of the standards by major purchasers or on market share of certified products more generally. None of the trade associations that cover relevant product categories track data on the use of sustainability standards by manufacturers or purchasers.
- **McGraw Hill Construction Dodge SpecShare database.** The McGraw Hill database tracks specifications issued for current construction projects throughout the U.S. Theoretically, the database could be used to track the extent to which voluntary standards or the FGCG are being referenced in construction specifications, and by proxy, used in actual construction projects. However, a McGraw Hill representative informed us that acquiring data on five standards or other search terms over a 90-day period would cost at least \$15,000. The cost would be more for longer time horizons. The EPA evaluation team determined that such a report would be too costly for this evaluation, given the narrow coverage of the report.
- **Environmental benefits calculators.** EPA has not quantified the environmental contribution of environmentally preferable building and construction product purchases to date. The ability of IEc to quantify changes in environmental condition for these products with the available evaluation resources was dependent upon the availability of existing, reputable calculators that could be used,

³¹ We also received Google Analytics data for 2009, but we did not use the 2009 data in our analysis because we were advised that it was not comparable with the 2010-2012 data.

without adaption (or existing, reputable reports that perform such calculations themselves with respect to the available data). IEc searched for environmental benefits calculators for the building and construction products covered by the evaluation, including an extensive literature search and inquiries with standards stakeholders interviewed, but was not able to identify any relevant calculators. Notably, several stakeholders acknowledged the need for this type of tool.

Hospitality and Travel Data Sources

While EPP has been working on hospitality and travel for some time, key milestones such as adopting standards and policies are recent developments. Moreover, there are no existing datasets on the outcomes of EPP's hospitality and travel activities, partly because it is premature to measure outcomes from recent developments, such as adopting standards and policies. As noted earlier, Region 9 is in the process of developing a database to track the use of the Region's *Green Meetings and Conference Policy*, but this is still a work in progress and was not populated with information at the time that IEc conducted this analysis in 2012.

Given the absence of purchasing data, analysis of EPP's travel and hospitality sector was based on qualitative research. We interviewed current EPP Headquarters, and Region 9 staff, who have been actively involved in environmentally preferable hospitality and travel work. In addition, we interviewed a small number of individuals outside of EPA who are familiar with the hospitality and travel work and its impact.

It should be noted that IEc was not able to quantify the environmental benefits of the hospitality and travel sector because of the emerging nature of EPP outcomes in this sector and lack of existing data.

Existing Data Sources on Non-Federal Green Purchasing Trends

One aim of this evaluation is to understand the EPP Program's influence beyond the federal realm, including:

- If states, universities, and other non-federal institutional buyers are using EPP Program outputs, including standards that the EPP Program was instrumental in developing (evaluation question 10);
- The extent to which the voluntary consensus standard approach is successful in designating and promoting environmentally preferable products and services (evaluation question 12); and
- The availability and market share of products and services that are certified to those standards (evaluation question 13).

To address these questions, IEc relied on information gathered through interviews (discussed later in this document) and existing datasets. IEc identified several data sources, primarily surveys, which shed light on state and institutional purchasing trends.

States

The National Association of State Procurement Officials (NASPO), in partnership with the Responsible Purchasing Network (RPN), conducted a survey of NASPO-RPN members (i.e., purchasing officials) from each of the 50 states and the District of Columbia. The survey was first conducted in February 2009 and was repeated in March-May 2010. The NASPO-RPN Survey Reports (2009-2010) include information on annual procurement budgets; the prevalence of responsible purchasing policies; the importance of various social and environmental factors in purchasing decisions; percent of annual

spending actually influenced by social and environmental factors; allowable price premiums for goods and services with socially and environmentally preferable attributes; standards and certifications that are recognized and used; the extent of measuring and reporting on social and environmental impacts; and plans for responsible purchasing going forward.

We also reviewed a survey of northeastern states that was conducted by the Northeast Recycling Council for the Rhode Island Resource Recovery Corporation in 2009. The survey has limited data available, but it does indicate which northeastern states have implemented a formal environmentally preferable purchasing program; the years states began incorporating EPP into their purchasing decisions; the product and service categories in which states are considering EPP criteria; the nature of the criteria being used; and whether states are tracking their EPP purchases.

The Northeast Recycling Council also runs the State Electronics Challenge (SEC), a program modeled after the Federal Electronics Challenge.³² SEC's membership includes states in the Northeast and other regions throughout the U.S., as well as municipalities and other entities. SEC reports on total EPEAT purchases and end-of-life disposal of their participating partners, and translates these into environmental benefits using the EEBC. This source allowed us to gain more detailed quantitative information on electronics purchases by state and local entities.

Finally, IEc obtained some limited information from NSF on the prevalence of state governments specifying products certified under NSF sustainability standards (chiefly the NSF 140 carpet standard), which was useful for characterizing environmentally preferable procurement trends at the state level.³³

Universities

The National Association of Educational Procurement (NAEP) and SciQuest surveyed approximately 1,250 NAEP member institutions in 2009 and 2010; results were summarized in the Green Procurement Trends in Higher Education reports (2009-2010). These reports include questions on whether an institution has an environmentally preferable procurement policy; drivers of institutional sustainability; institutional priorities and challenges; and efforts to measure success. However, information on actual expenditures for environmentally preferable products and services is limited. Nonetheless, the NAEP/SciQuest survey was useful for characterizing general trends in environmentally preferable purchasing by universities.

Other Non-Federal Institutional Purchasers

In addition to the joint NASPO-RPN survey of state purchasing officials discussed above, RPN surveyed its broader membership in 2007-2010, including state purchasers plus other non-federal and federal buyers. Unfortunately, the RPN report does not separate state purchasers from other institutional purchasers. Further, respondents include federal agencies and non-federal purchasers (e.g., state agencies, municipal agencies, educational institutions, non-profit organizations, religious congregations, business membership organizations, and corporations); however, the RPN report does not disaggregate responses for federal purchasers versus non-federal purchasers. Finally, RPN respondents are not likely representative of mainstream procurement trends, since RPN is committed to sustainable procurement.

³² See <http://www.stateelectronicschallenge.net/>

³³ As noted previously, however, NSF and ULE do not maintain data on sales or market share of certified products.

Given these limitations, we were unable to characterize general trends for non-federal institutional purchasers, outside of states and universities.³⁴

Data on Use of EPP Website

As noted above, one potentially important function of the EPP Program is to serve as an information clearinghouse, providing information on a wide variety of resources relating to environmentally preferable purchasing. One way in which EPP does this is through its website, which includes information not just on the EPP Program's direct activities but also on related programs such as Energy Star, WaterSense, and non-EPA initiatives. IEC initially planned to analyze EPP website data, including web traffic trends over time, a profile of users (i.e., from within or outside of EPA and the federal government more generally), page views and downloads of particular pages and resources, etc. However, we subsequently learned that no historical web hit data is readily available, the archived records would be costly for EPA to retrieve, and the archived data has changed formats several times and so does not lend itself to trend analysis.^{35,36}

NEW DATA COLLECTIONS

Survey of Federal Purchasers

A 2001 baseline assessment, *Qualitative Measurement of Environmentally Preferable Purchasing (EPP) Among Federal Employees in 2000*, found only limited awareness of environmentally preferable purchasing options among federal purchasers. EPP staff suspects there have been substantial improvements in overall awareness of environmentally preferable purchasing options in the past decade as a result of EPP Program activities and strengthened environmentally preferable purchasing requirements. IEC conducted a survey of federal purchasing officials to examine current federal purchaser awareness and behaviors with respect to environmentally preferable purchasing, to compare to the baseline assessment. The survey included but was not limited to the product categories that are the focus of the evaluation.³⁷ This survey also assessed awareness and use of EPP Program outputs. As such, the survey was designed primarily to address evaluation questions 1, 2, and 6:

³⁴ We also identified a survey conducted by EcoMarkets, Center for a New American Dream, and the North American Green Purchasing Initiative (NAGPI) in 2007, 2008, and 2009. The survey was deployed to procurement professionals from governmental, non-governmental, and private organizations in the United States and Canada. However, the survey results have similar limitations as the RPN data, and the data is not current.

³⁵ Email correspondence from OPPT staff to IEC evaluation team, July 6, 2012.

³⁶ While IEC potentially could have conducted a limited analysis of "snapshot" website data, the data were not provided to IEC. Hence, we could not conduct any analysis of EPP website statistics.

³⁷ The 2001 study was conducted by NuStats - an Austin-based market research firm - and was based on qualitative research with 133 individuals, using a combination of one-on-one in-person and telephone interviews, focus groups, dyads, and triads. The study population included "doers" (actual federal purchasers) and "facilitators" (federal employees who set policy, conduct training, and provide information) who had been in their job position for at least six months. The results were presented in qualitative terms - e.g., "There is some indication that...", "a perception held by many respondents was...", etc. IEC's survey was limited to actual federal purchasers (not managers or facilitators) and we present the results quantitatively. Because the 2001 baseline study and IEC's survey employed different approaches, we were not able to draw direct quantitative comparisons between the two studies. However, IEC's survey included questions about awareness, attitudes, and behaviors similar to the 2001 baseline study, and we were able to explore general trends between 2001 and 2013 (e.g., increases in purchaser awareness of EPP). In addition, IEC's survey included questions that asked specifically about changes in the respondents' EPP knowledge, awareness, and behavior over the past three years.

1. How has federal purchaser awareness of green products and services changed since the 2001 baseline assessment?
2. How have federal agencies changed purchasing of green products and services since the 2001 baseline assessment, including incorporating green criteria into specifications and contract language?
6. How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by federal agencies?
 - a. How have EPP activities contributed to purchasing changes at federal agencies?

IEc developed a survey instrument with input from EPA; Appendix B contains the complete survey. The survey was designed to be completed in 15 minutes or less. The survey included general questions to measure attitudes and behaviors towards environmentally preferable purchasing, as well as specific questions related to selected electronics and building and construction products. Respondents were only asked questions relating to specific products if they indicated that they routinely purchased those products.

Identification of Survey Participants

We surveyed federal purchasers, defined as individuals who are employed by the federal government in a civilian or military agency or department (*excluding* contractors) and whose primary job responsibilities include the following: making purchasing decisions, identifying vendors or suppliers, conducting pre-purchase evaluations, and/or purchasing products and services. Our aim was to measure awareness and behaviors of individuals whose main responsibilities entail making actual purchases; as such, we *excluded* senior sustainability officers, chief acquisition officers, contract officers whose main responsibilities entail overseeing federal contractor workflow, and other individuals who set purchasing policy as opposed to conduct actual purchasing. In addition, we limited our target participants to individuals with at least one year of experience performing purchasing-related activities, as individuals with less than one year of experience may be too new to their role to offer an informed perspective.

Several factors complicated the effort to identify survey participants. First, we wanted to survey purchasers from across federal agencies and departments, but the evaluation team was not able to identify a comprehensive list of federal purchasers. Therefore, it was necessary to compile a list of contacts using multiple sources:

- **Contacts referred by purchasing managers.** As a first step, we identified two lists of senior procurement officials and chief acquisition officers using publicly available information on the Internet; one list was available through the Office of the Federal Environmental Executive (OFEE) and the other through the Chief Acquisition Officer's Council (CAOC).³⁸ Although these individuals were not in our target population of survey participants, we thought they might be able to provide the names and contact information of federal purchasers in their respective agencies. As a next step, we sent an email message to the 150 officials on the two lists requesting the names and contact information of federal purchasers. The Chief of the Prevention Integration Branch of OPPT's Pollution Prevention Division, followed up by sending an email to her colleagues requesting them to identify federal purchasers to take the survey. This effort yielded 189 survey contacts.

³⁸ Lists are available at: <http://caoc.gov/index.cfm?function=membersspe> and <http://www.ofee.gov/sso.asp>.

- **Commercial purchaser list.** IEC researched commercially available lists of federal purchasers. After exploring several options, the evaluation team purchased the “All Federal Buyers” list from Fedmarket.com. The list, which is updated once every three to four months, included the email addresses for approximately 44,000 federal purchasers from across civilian and military agencies. The list only includes email addresses; it does not identify the product and service categories that purchasers buy from, nor does it provide demographic information about the purchasers. However, the email extensions follow a consistent format – @[agency name].gov – that indicates the federal agency that each purchaser works for. As discussed below, IEC used this information to look for evidence of response bias in our survey respondents.
- **Federal Acquisition Institute (FAI) list.** FAI was created in 1976 under the Office of Federal Procurement Policy Act to promote and facilitate the development of the federal acquisition workforce. Among other activities, FAI provides training to acquisition professionals to support their career development. FAI maintains a list (FAITAS) of approximately 107,000 federal purchasers and other federal staff involved in purchasing and contracting. As discussed below, FAI agreed to distribute our survey directly to FAI’s list as well as the 44,000 federal purchasers on the commercial list and the 189 individuals referred by purchasing managers.³⁹

Another complicating factor was that once we identified the email addresses of federal purchasers, we did not know how long they had been in their position, what types of products or services they purchased, and what exposure (if any) they had to the EPP Program. For these reasons, we were not able to use statistical sampling or ensure that specific types of respondents (e.g., individuals who purchase a certain type of product or have had specific types of exposure to the EPP Program) were represented in our survey. Instead, we surveyed everyone who was identified to us as being a federal purchaser, including FAI’s list, the commercial list, and the individuals referred by purchasing managers. Although we do not know the exact number of federal purchasers, we are confident that we captured a substantial portion of the federal purchaser population.

Survey Mode

FAI administered the survey online on behalf of the evaluation team, using FAI’s in-house survey software. FAI’s survey tool includes advanced “skip logic,” which avoids asking questions that do not apply to the subject. If the response to an initial question does not require a follow-up question, the survey automatically skipped subsequent questions in the series, thereby reducing the burden to the respondent.

The survey was conducted as follows:

- **Pre-test the survey.** IEC pre-tested the survey with four randomly selected purchasers. We debriefed each purchaser by telephone to ensure that the survey questions were clear and interpreted as intended, and to ensure that respondents could complete the survey within the intended timeframe. The feedback from the pre-test did not indicate the need for any changes to the survey.
- **Engage senior management.** ESD coordinated with the Director of EPA’s OAM, who in turn briefed his colleagues on the Chief Acquisition Officers Council (CAOC), which includes senior acquisition officials from across federal agencies. In addition, OAM briefed the Office of

³⁹ FAI conducted a comparison of its FAITAS list and the commercial list of purchasers and noted little overlap between the two lists.

Management and Budget (OMB) about the survey effort. Based on OMB's suggestion, and subsequent conversations between EPA and FAI, it was agreed that FAI would administer the EPP federal purchasing survey.

- **Advertise the survey on FAI's website.** FAI posted an advertisement on the FAI.gov homepage approximately two weeks before the launch of the survey. The blurb included a brief overview of the purpose of the survey and the EPP Program evaluation, indicated that the survey would be open soon, and encouraged participation.
- **Send email invitation and survey link.** The survey launched on January 7, 2013. FAI sent an email invitation to everyone on the FAITAS list as well as the commercial purchaser list, including the 150 purchasers referred by purchasing managers.⁴⁰ The invitation was sent to more than 149,000 email addresses, including 105,048 FAITAS users and 44,265 commercial purchasers.⁴¹ The invitation explained the purpose of the survey, encouraged participation, ensured confidentiality, and included a link to the survey. The message also indicated that purchasers would receive one Continuous Learning Point (CLP) as an incentive for completing the survey.

Upon clicking the link, respondents were directed to FAI's EPP survey page with an introduction to the survey. The introduction reiterated the purpose of the survey and the fact that the survey was confidential. It emphasized that there were no "right" or "wrong" answers, and encouraged participants to be candid in their responses. It clearly stated that the purpose of the survey was to assess the impacts associated with EPA's EPP Program, not to assess purchasers' compliance with environmentally preferable purchasing mandates. It also reiterated that purchasers who completed the survey were eligible to receive one CLP.

- **Screen out individuals who are ineligible for the survey.** Following the introduction, participants were directed to a series of screening questions to ensure that they have been performing federal purchasing functions as a key part of their job for at least one year. Individuals who did not pass the screening questions were directed to a screen-out page, thanking them for their time and terminating the survey.⁴² Those who passed the screening questions were directed to the survey questionnaire.
- **Send template to purchasing policy managers.** During the month that the survey was open, FAI sent a template to purchasing policy managers on the CAOC to encourage staff to complete the survey.
- **Close the survey effort.** FAI closed the survey effort on February 6, 2013. Individuals were not able to complete the survey after it closed.

⁴⁰ IEc added the 150 emails that were referred to us by federal purchasing managers to the commercial list before forwarding the list to FAI. FAI subsequently cross-checked this list against its own proprietary FAITAS list before sending out the survey invitation.

⁴¹ FAI's tracking system indicated that 101,221 FAITAS users and 38,234 commercial purchasers successfully received the survey. The remainder had invalid email addresses, "bounced" back, or had other technical issues.

⁴² Twenty-five respondents clicked "none of the above" and at least one other option for the question asking which activities they perform on a routine basis. Of these 25, 22 clicked on another answer that let them continue with the survey. We include their responses in our analysis.

Overview of Respondents

All told, 2,539 respondents completed the survey.⁴³ This represents roughly 2% of the roughly 149,000 individuals who received the survey invitation; however, it is not clear what percent of *eligible respondents* is included in the 149,000. Because there is no comprehensive list of federal purchasers, as noted above, we used the FAITAS list, a commercial list, and individuals referred by purchasing managers. We know from the screen-outs (i.e., individuals who attempted to take the survey but did not pass the screening criteria) that these lists include individuals who were not eligible to take the survey, either because they do not perform the functions of a federal purchaser as defined in our survey, or because they have not been performing those functions for at least one year. However, we have no way of knowing how many individuals who received the survey invitation were in our target population.

If we use the commercial list as the “lower bound” and the FAITAS list as the “upper bound,” we can estimate a response rate between 2% and 6%.⁴⁴ While this is not a high response rate, our results may be representative of the federal purchasing population provided that there was no systematic response bias. In other words, if the portion of individuals who completed the survey is representative of the federal purchasing population as a whole, we can be reasonably confident in extrapolating our survey results to the population. On the other hand, if respondents are not typical of most federal purchasers – for example, if respondents have more favorable attitudes towards purchasing, or if purchasers from a small number of federal agencies dominated the survey results – we would be reluctant generalize our findings.

IEc looked for evidence of response bias by comparing the proportion of purchasers in each agency for the survey “population” versus survey respondents. We calculated the “population” of purchasers in each agency with information contained in the email addresses. Almost all addresses follow a similar format: [individual’s name]@[agency name].gov. By separating out the @[agency name].gov extension from the first part of the email address, we were able to count the number of recipients in each agency.⁴⁵ Then, we used the survey results, which included a mandatory question on which agency the respondents works for, to calculate the portion of respondents from each agency. By comparing the proportion of respondents from each agency to the population as a whole, we were able to test whether or not particular agencies were overrepresented or underrepresented in the survey results. Exhibit 2-3 presents the results of our analysis of potential response bias. As shown in the exhibit, there is generally little or no substantive difference (less than 5%) between the “population” proportion and the survey respondent proportion. The exception is DOD, which is underrepresented in the survey results (-11.5%). We find no evidence of response bias, with the exception of DOD, which suggests that the results are representative of civilian purchasers but may not be representative of military purchasers.

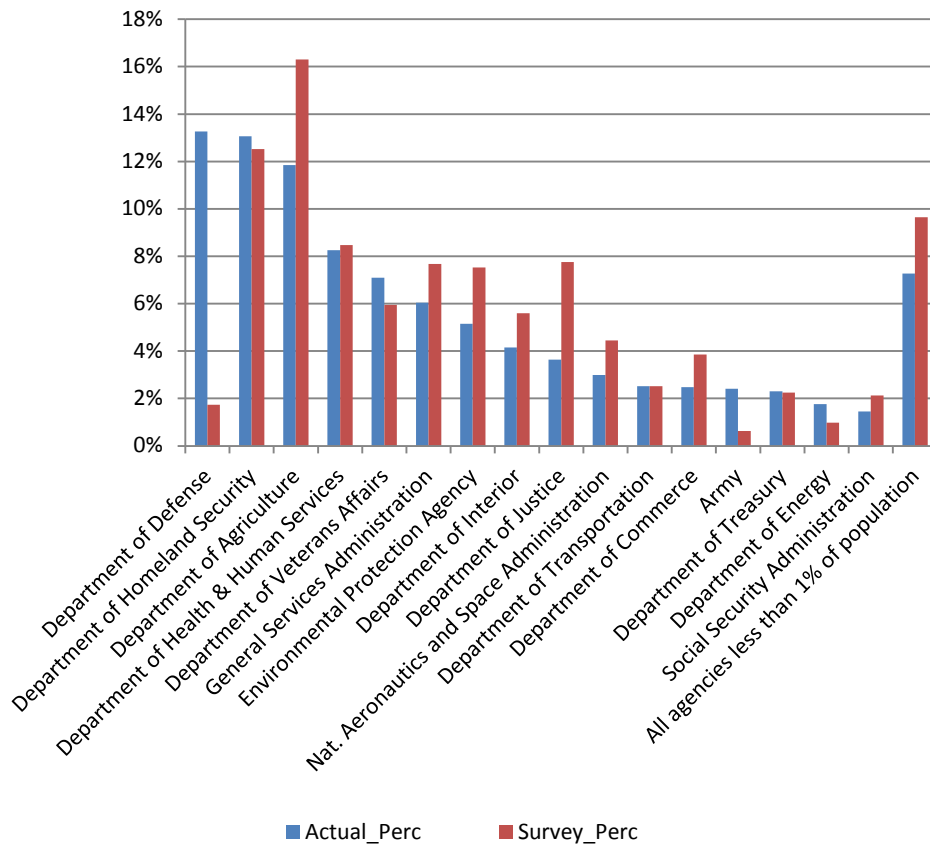
⁴³ This includes 31 “incompletes” who answered all survey questions and provided an email address, but did not click “submit.” Another 2,472 individuals partially answered the survey questions (without providing an email address) or were ineligible to take the survey based on their answers to the screening questions. Due to the following technical issues with the survey tool, IEC was not able to use incomplete responses from individuals who did not provide an email address: (i) The survey tool records responses in such a way that there can be overlap between the “complete” dataset and the “incomplete” dataset, and duplicates cannot be identified and removed without an email address (this is necessary to avoid double counting); and (ii) The survey tool has the potential to record “false no’s” – in certain situations, the tool does not distinguish between an actual “no” versus no answer. False “no’s” were corrected in the completed surveys based on the answers to subsequent questions; however, this method could not be consistently applied to incomplete responses.

⁴⁴ Counting incompletes and screen-outs, the response rate would be between 5% and 11%.

⁴⁵ Neither EPA nor IEC had access to the FAITAS list. Instead, FAI provided a count of the total number of FAITAS users belonging to each agency.

Given the almost complete lack of demographic information about the purchasers on our lists, we were not able to look for other potential sources of response bias, such as years on the job, purchase size, etc. However, we see diversity among the types of products and services purchased, number of years on the job, and level of familiarity with EPP Program resources among our survey respondents. Similarly, the results do not indicate a positive bias toward environmentally preferable purchasing. Furthermore, we note that the incentive of one CLP for completing the survey may have reduced response bias by attracting respondents beyond those who are normally interested in EPP.

EXHIBIT 2-3. COMPARISON OF “POPULATION” TO SURVEY RESPONDENTS



Survey Analysis

The survey aimed to measure changes in federal purchaser awareness and behaviors with respect to environmentally preferable purchasing since the 2001 baseline assessment. The survey also attempted to document the influence of the EPP Program versus other factors (e.g., purchasing mandates) in driving changes in awareness and behaviors. In addressing these key questions, the survey also attempted to shed light on a number of related topics, including:

- The role of environmental considerations versus other factors in federal purchasing decisions;
- The perceived advantages and perceived disadvantages of environmentally preferable purchasing;

- How purchasers evaluate “cost” and define “best value;”
- Barriers to environmentally preferable purchasing;
- Variations in attitudes and behaviors between purchasers of products and purchasers of services, and across our specific product categories (electronics and building and construction products);
- Potential outcomes of buying more environmentally preferable products, including both positive (e.g., pride in compliance with mandates, external recognition) and negative (e.g., higher cost, poorer product performance) outcomes; and
- The relative usefulness of various EPP tools and resources.

We conducted the following analyses using the survey data:

- We calculated descriptive statistics, including the number and percentage of purchasers who responded in various ways to each question, overall and broken out for purchasers of products versus services, purchasers of products within our specific product categories, and EPA purchasers versus other federal purchasers, as appropriate. A complete set of survey results by survey question is included in Appendix C.
- We analyzed changes in environmentally preferable purchasing awareness, attitudes, and behaviors over time. We did this in two ways:
 - We conducted a qualitative comparison of responses to questions about awareness, attitudes, and purchasing behavior from our survey to the 2001 baseline assessment; and
 - We summarized self-reported changes in knowledge, attitudes, and behaviors related to environmentally preferable purchasing over the past three years, for survey respondents who indicated that they have been performing federal purchasing activities for at least three years.
- We analyzed the contribution of EPP resources and other factors to changes in attitudes and behaviors. Specifically, we constructed a weighted index to measure survey respondents’ level of exposure to EPP Program resources (“exposure index”). The index was calculated as the number of EPP Program resources that survey respondents checked off, weighted by the intensity of each resource (1 = low, 3 = high), using the weights shown in Exhibit 2-4.

EXHIBIT 2-4. EXPOSURE INDEX WEIGHTINGS

EXPOSURE ACTIVITY	WEIGHT
Accessed information on EPA’s EPP website	1
Used EPP’s tools/environmental benefits calculators	2
Used EPP’s guidance documents	2
Attended a seminar or conference where EPP staff made a presentation	2
Used EPP’s model policy, contract language, and/or specifications	3
Attended a training event offered by EPP staff	3
Participated in a working group with EPP staff	3
Engaged in regular (informal) interactions with EPP staff	3
Received direct technical assistance from EPP staff	3

Using the exposure index, we constructed comparison groups for individuals with high versus low exposure to EPP Program resources, using five and below as “low” and six and above as “high.” This gave us 412 respondents in the low exposure group and 500 respondents in the high exposure group.

This particular analysis did not include individuals who reported *no* exposure to the EPP Program (exposure index score = 0). The reason is that if we compared individuals with no exposure to the program to those with high exposure, we might unduly bias the results in favor of EPP, due to possible self-selection bias among those with no exposure. That is, individuals who have not used *any* EPP resources may be disinclined towards environmentally preferable purchasing irrespective of their contact with the EPP Program. As such, any difference that we observed between purchasers with no exposure and other purchasers would likely reflect fundamental differences in the attitudes and behaviors of the two groups, not the influence of the EPP Program. By limiting our analysis to individuals who have used *at least one* EPP Program resource, we are testing the hypothesis that *higher* exposure to EPP Program resources is associated with “greener” purchasing attitudes and behaviors, while partially controlling for self-selection bias. This is a conservative approach for probing the influence of the EPP Program because we are excluding individuals whose attitudes and behaviors are very likely less “green” than those who have used EPP Program resources.

Using our “comparison groups” for high versus low exposure, we conducted statistical tests to examine whether or not higher exposure to the EPP Program is statistically associated with “greener” purchasing attitudes and behaviors. To test for this statistically significant association, we ran chi-squared tests for independence. Chi-squared tests are useful when working with qualitative data (i.e., data with categorical rather than numerical responses), and are based on counts that represent the number of items in the sample falling into each category. As a first step, we created a contingency table, which lists the observed counts of observation for a given criterion. Exhibit 2-5 shows an example of a contingency table.

EXHIBIT 2-5. SAMPLE CONTINGENCY TABLE

PURCHASE ENVIRONMENTALLY PREFERABLE PRODUCTS?	EXPOSURE TO EPP PROGRAM RESOURCES?		TOTAL
	Yes	No	
Yes	45	13	58
No	15	27	42
TOTAL	60	40	100

Next, we calculated the expected counts for each category, as follows:

$$Expected\ count = Column\ total * \left(\frac{Row\ total}{n} \right)$$

where n= total observations.

If there is no association between exposure to EPP Program resources and environmentally preferable purchasing, we would expect the same proportion of respondents to purchase environmentally preferable

products regardless of whether or not they have exposure to EPP resources. To calculate the *expected* counts, we first found the overall proportion in each category ((Row total /n) in the above equation). We found that overall, 58 of the 100 respondents in our hypothetical example purchase environmentally preferable products (58%). If exposure to EPP resources had no association with purchasing environmentally preferable products, we would expect to see 58% of participants *with and without exposure* to EPP resources purchasing environmentally preferable products. Thus, the expected count of environmentally preferable purchasers with exposure to EPP resources would be 58% of 60 (or 35), and the expected count of those without would be 58% of 40 (or 23). However, we see that the *actual* counts are 45 and 13, respectively. To test whether the difference between the expected and actual values is statistically significant, we first calculated the chi-squared statistic:

$$Chi - Squared\ Statistic = \sum \frac{(Observed\ count - Expected\ count)^2}{Expected\ count}$$

We then compared the chi-squared statistic to the critical value from the chi-squared table (which can be found in statistics textbooks) to test whether we can reject the null hypothesis that the variables have no relationship to each other. If the chi-squared statistic is larger than the critical value, the finding is statistically significant. If the chi-squared statistic is smaller than the critical value, the finding is not statistically significant.

There was one more step in our analysis. Specifically, while the chi-squared test tells us if there is a statistically significant association between two variables, it does not tell us the *strength* of that association. To assess the strength of the association between two variables, we needed to calculate the Cramer's V statistic as follows:

$$Cramer's\ V = \sqrt{\frac{chi - squared\ statistic}{n(q - 1)}}$$

where:

n = total observations

q = smaller number of rows or columns

Specifically, Cramer's V gives us the association between two variables as a percentage of their maximum possible variation. A Cramer's V of one would denote a perfect relationship, while a Cramer's V of zero would indicate that the two variables are statistically independent. The Cramer's V statistic also lets us compare the relative strength of relationships between different variables. In other words, variables with a larger Cramer's V than others have a stronger relationship to each other than variables with a lower Cramer's V. In Chapter 3, we present the results of our analysis and use Cramer's V to rank the EPP resources by strongest association with greener purchasing behavior.

Interviews

IEc's second major data collection effort consisted of a series of one-on-one telephone interviews with individuals who interacted with EPP staff or used EPP Program outputs, as well as with EPP staff members themselves. The interviews were intended to address several evaluation questions in part or in full, including 2, 3, 4, 6, 7, 10, 11, and 12.

For some evaluation questions, and for some sectors, existing quantitative data were not available, and interviews provided the main source of information. This was particularly true with the travel and hospitality sector. We explored the following travel and hospitality topics through the interviews:

- Changes in contract language used for hospitality, meetings, and/or business travel services resulting from Region 9's *Green Meetings and Conference Policy*
- Outcomes of the Convention Industry Council's *Green Meetings Report*
- EPP's contribution to the process of developing the suite of ASTM Green Meetings and Events standards
- Changes in procurement language to include greenhouse gas emissions as a criterion for contract airline routes

In other cases, interviews supplemented existing data. IEc chose interviews for questions 10 and 11, which focus on non-federal impacts, because conducting a survey would have been infeasible due to Information Collection Request (ICR) requirements. For other evaluation questions, interviews were preferable to a survey because of the nature of the question (questions 4, 7, and 12).

IEc identified a number of potential interview participants among the contacts we made in the course of our scoping work. Other potential interviewees were recommended to us by our initial contacts. Finally, we identified some interviewees through a review of several reports on environmentally preferable purchasing and through targeted Internet searches.

We made initial contact through an introductory email and followed up as necessary with unresponsive individuals. If the interview target remained unresponsive to repeated requests or declined to be interviewed, we used an alternate. A list of interviewees is included in Appendix E; only position and affiliation are included. To encourage candor, IEc committed to maintain confidentiality and not disclose any individual's responses to EPA without interviewee consent.

IEc organized interviewees into several categories:

- **EPP Staff:** We interviewed all current EPP staff.⁴⁶ We confirmed the staff list with the EPP members of the evaluation team and with the other EPP staff members already identified. These interviews allowed us to confirm our understanding of the EPP Program's activities in the sectors being evaluated and gauge EPP staff members' perceptions of the division's interactions with other federal agencies. Also, several members of the EPP staff have been involved in creating or promoting voluntary consensus standards, and we asked additional questions for this group concerning standards issues.

⁴⁶ This excludes EPA staff at Regional offices working on environmentally preferable purchasing issues, with the exception of Region 9 staff working on green hospitality and travel.

- **Hospitality and Travel Contacts:** We interviewed all current EPP Headquarters, and Region 9 staff, who have been actively involved in that office’s environmentally preferable hospitality and travel work. In addition, we interviewed a small number of individuals outside of EPA who are familiar with the hospitality and travel work and its impact, including contacts at GSA (which is developing its own environmentally preferable hospitality and travel rule amendments and policy guidance based in part on input from EPP staff, as well as Region 9’s past efforts) and stakeholders in the development of the new ASTM Green Meetings and Events suite of standards. We revised our list of interviewees based on recommendations from the EPP Headquarters lead for this area.
- **EPA OAM:** We interviewed one individual from EPA’s Office of Acquisition Management (OAM). This interview primarily addressed changes to EPA’s procurement policies and processes, and the contribution of EPP Program outputs on OAM activity.
- **Federal Environmentally Preferable Purchasing Managers:** We interviewed environmentally preferable purchasing program managers at other agencies. In addition to questions about changes in procurement policies and processes, these interviews probed EPP’s interactions with other agencies and the use of EPP’s outputs.
- **Non-federal Environmentally Preferable Purchasing Managers:** Looking beyond the federal realm, we interviewed environmentally preferable purchasing managers at non-federal organizations, including state governments and universities. Due to ICR limitations, we were limited to nine interviews of this type. These interviews provided information on environmentally preferable purchasing practices outside the federal government, the extent to which EPP has influenced these practices, and the impact of voluntary consensus standards that EPP has been instrumental in developing. We used this information in conjunction with the other sources noted here to characterize state purchasing trends.
- **Standards Stakeholders:** We interviewed key stakeholders in the voluntary consensus standard development process. This included representatives from the standards organizations themselves (NSF, ULE, IEEE), manufacturers, trade associations, government agencies (aside from EPA), and NGOs. We targeted individuals that were heavily involved in the development of the standards, such as committee co-chairs, and we covered all of the standards addressed in this evaluation. We aimed to talk with at least two individuals outside of EPA involved in each standard that EPP participated in.
- **GSA Procurement Contacts and Multiple Award Schedule (MAS) Managers:** During our scoping research, we spoke with GSA MAS managers for carpet and furniture. We had also planned to interview the managers of other key GSA MASs for building and construction products. These conversations would have focused on changes to procurement policies and processes and any resulting changes in environmentally preferable procurement done through the GSA schedules. However, despite repeated attempts, we were unable to secure an interview with any additional MAS managers.

IEc developed a series of interview guides to ensure consistency in conducting interviews. The guides are included in Appendix D.

As shown in Exhibit 2-6, IEC conducted interviews with 44 individuals in eight categories.

EXHIBIT 2-6. INTERVIEWS

CATEGORY	NUMBER
EPP Staff	8
Hospitality and Travel Contacts	7
EPA OAM	1
Federal Environmentally Preferable Purchasing Managers	5
Non-federal Environmentally Preferable Purchasing Managers	9
Standards Stakeholders	8
GSA Procurement Contacts	4
Other *	2
Total	44

* Includes one interview for the State Electronics Challenge and one interview for the Federal Green Challenge.

IEc compiled the interview data into one consolidated file; this was the first step in conducting the analysis. The file was organized by evaluation question, and arrayed each interview question in rows, with each interviewee’s response in columns. This organization enabled us to look across interviews for patterns in the data and conduct a thematic analysis. Due to the relatively small number of interviews conducted, and the small number of people that answered the same interview question, formal coding of interview responses was unnecessary to discern trends. Our analysis focused on identifying broad trends, such as areas of consensus or sharp disagreement between interviewees. We looked for such trends both within and between interviewee categories, with a particular view to any differences between EPA staff and individuals outside the agency. Our analysis also highlighted any areas in which interviewee responses diverged significantly from our expectations. Where there were significant points of disagreement between interviewees, or between our expectations and the overall results, we explored potential contributing factors.

Due to the small sample size, it was not possible to assign any statistical significance to the interview results, and thus we did not conduct any statistical analysis of interviewee data. Yet even in the absence of statistical analysis, information obtained through interviews provided useful insights into how well the EPP Program is functioning and achieving its aims. Interviews frequently provide deeper and more nuanced understanding than other evaluation methods,⁴⁷ which can be particularly valuable in situations where the interplay of various dynamics may be unclear or complicated. We found this to be true in the interviews that we conducted for this evaluation.

⁴⁷ See “2011 Program Evaluation Competition Workshop: Introduction to Program Evaluation.” August 17-18, 2011. Presented by the EPA Evaluation Support Division, John McLaughlin, McLaughlin Associates, and Tracy Dyke-Redmond, Industrial Economics, Inc. See also Bamberger, Michael and Jim Rugh. “Real World Evaluation: Working Under Budget, Time, Data, and Political Constraints.” American Evaluation Association Professional Development Workshop Session 21, November 5, 2008.

EXHIBIT 2-7. SUMMARY CROSSWALK OF EVALUATION QUESTIONS AND METHODS UTILIZED

EVALUATION QUESTION	ENVIRONMENTALLY PREFERABLE ELECTRONICS	ENVIRONMENTALLY PREFERABLE BUILDING PRODUCTS	ENVIRONMENTALLY PREFERABLE HOSPITALITY/TRAVEL
1. How has federal purchaser awareness of green products and services changed since the 2001 baseline assessment?	<ul style="list-style-type: none"> Federal purchaser survey 		N/A
2. How have federal agencies changed purchasing of green products and services since the 2001 baseline assessment, including incorporating green criteria into specifications and contract language?	<ul style="list-style-type: none"> Federal purchaser survey Analysis of existing EPEAT and FEC data Interviews with federal purchasing managers, EPP staff, OAM 	<ul style="list-style-type: none"> Federal purchaser survey Interviews with federal purchasing managers, EPP staff, OAM Review FGCG web hit and download data 	<ul style="list-style-type: none"> Interviews with EPA Regional contacts and GSA hospitality contacts
3. What are the outcomes of these purchasing changes in terms of changes in the proportion of green products and services purchased by federal agencies?	<ul style="list-style-type: none"> Analysis of existing EPEAT and FEC data 	<ul style="list-style-type: none"> Mini-market analysis 	<ul style="list-style-type: none"> Interviews with EPA Regional contacts and GSA hospitality contacts
4. Is EPA leading by example in terms of purchasing behavior for green products and services?	<ul style="list-style-type: none"> Analysis of EPA's EPEAT and FEC data Interviews with EPP staff and OAM Federal purchaser survey 	<ul style="list-style-type: none"> Interviews with EPP staff and OAM Federal purchaser survey 	<ul style="list-style-type: none"> Interviews with EPP staff and OAM
5. What are the outcomes of federal green purchases in terms of reduced energy use and associated greenhouse gas emissions, reduced water use, and reduced use of hazardous materials?	<ul style="list-style-type: none"> Application of the EEBC to findings from Question 3 	N/A	N/A
6. How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by federal agencies? a. How have EPP activities contributed to purchasing changes at federal agencies?	<ul style="list-style-type: none"> Federal purchaser survey Interviews with federal purchasing managers, EPP staff, OAM, federal hospitality contacts, and standards stakeholders 		
7. How effective is the EPP Program in coordinating with green purchasing programs at other federal agencies?	<ul style="list-style-type: none"> Interviews with federal purchasing managers, EPP staff, OAM, federal hospitality contacts 		

EVALUATION QUESTION	ENVIRONMENTALLY PREFERABLE ELECTRONICS	ENVIRONMENTALLY PREFERABLE BUILDING PRODUCTS	ENVIRONMENTALLY PREFERABLE HOSPITALITY/TRAVEL
8. The Federal Electronics Challenge (FEC), a key EPP priority area, has reported an apparent decline in energy savings from 2009 to 2010. Is this decline in reported energy savings indicative of backsliding on energy savings behavior reported to FEC? a. If yes, why has backsliding occurred? b. If yes, what changes are needed within FEC to address backsliding?	<ul style="list-style-type: none"> Analysis of FEC facility data 	N/A	N/A
9. How effective is the FEC's voluntary approach in promoting purchases of EPEAT-labeled electronics among federal agencies?	<ul style="list-style-type: none"> Analysis of data from FEC participants and non-participants 	N/A	N/A
BROADER EVALUATION QUESTIONS (BEYOND THE FEDERAL GOVERNMENT REALM)			
10. How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by purchasers outside of the federal government, including state and institutional purchasers?	<ul style="list-style-type: none"> Existing reports on environmentally preferable purchasing trends in non-federal sectors Interviews with environmentally preferable purchasing program managers at states and universities Interviews with EPP staff 	<ul style="list-style-type: none"> Same as electronics sector, and review FGCG web hit data 	<ul style="list-style-type: none"> Interviews with environmentally preferable purchasing program managers at states Interviews with hospitality and travel stakeholders
11. To what extent are manufacturers using the voluntary consensus standards that EPA has helped to develop?	<ul style="list-style-type: none"> Review of existing EPEAT manufacturer data Interviews with standards stakeholders 	<ul style="list-style-type: none"> Review of existing ULE and NSF data on manufacturers Interviews with standards stakeholders 	N/A
12. What factors influence the extent to which the voluntary consensus standard approach is successful in designating and promoting green products and services?	<ul style="list-style-type: none"> Interviews with non-federal environmentally preferable purchasing managers (same as Question 10), EPP staff, and standards stakeholders 	<ul style="list-style-type: none"> Interviews with non-federal environmentally preferable purchasing managers (same as Question 10), EPP staff, and standards stakeholders 	<ul style="list-style-type: none"> Interviews with EPA and GSA hospitality contacts, EPP staff, and standards stakeholders
13. How has EPP affected the availability of green goods and services in the marketplace?	<ul style="list-style-type: none"> Synthesis of information collected for Questions 10-12 		
14. Should EPA consider changes in EPP's future approach to promoting green products and services? a. If yes, what changes may be appropriate given resource constraints, changing regulatory requirements, and other external factors?	<ul style="list-style-type: none"> Synthesis of information collected for all evaluation questions, to develop findings Discussion of findings, and exploration of associated recommendations, with evaluation team 		

STRENGTHS AND WEAKNESSES OF THE METHODOLOGY

The strengths and weaknesses of the methodology are summarized below.

Strengths

Multiple methods and triangulation: This evaluation relied on multiple data collection and analytical methods, including a survey, interviews, and analyses of existing data. IEC analyzed interview findings in conjunction with findings from analysis of existing data sources, and in limited cases (e.g., for evaluation question 2), in conjunction with findings from the federal purchaser survey. Triangulating across multiple sources of information to address the same question provides the opportunity for findings from one source to validate or contradict findings from another source. As a general rule, if we see consistent themes across methods, it bolsters the strength and confidence of evaluation findings. As discussed in Chapter 3, several evaluation findings are supported by validation from more than one source.

Comparison groups: Comparison groups provide an alternative to experimental designs for attributing benefits to the program. By comparing entities that did and did not receive program services, it may be possible to infer the extent to which the program resulted in observed outcomes. We used comparison groups to discern statistically significant differences between purchasers with low versus high exposure to EPP Program resources regarding environmentally preferable purchasing attitudes and behaviors. Specifically, we had a sufficiently high number of respondents, and sufficient variation in their responses, to construct comparison groups of individuals with high versus low exposure to EPP resources. Similarly, we were able to apply statistical methods to rank the EPP resources that are most strongly correlated with greener purchasing behavior.

We were also able to conduct a comparative analysis to test the impact of the FEC program. EPEAT started in 2006; we have data for EPEAT sales to the government from 2008 through 2010;⁴⁸ and we have annual EPEAT sales data for FEC participants from 2007 through 2010. We were able to compare trends in EPEAT sales over time for FEC participants and non-participants, which provided insight into whether FEC participation is correlated with greater rates of increased EPEAT purchases than non-FEC participants. Our methods do not establish causality, and it is likely that selection bias may be a factor in FEC's influence. Nonetheless, our analysis suggests an influence of the FEC program in promoting EPEAT purchases.

Longitudinal analysis: The survey provided longitudinal data on changes in knowledge, attitudes, and behaviors with respect to environmentally preferable purchasing over the past three years, and further enabled us to conduct a high-level analysis of changes between the 2001 baseline assessment and the present. As far as we know, this was the first survey of its kind of federal purchasers to be conducted on such a wide scale. We also conducted longitudinal analysis in the electronic sector using EPEAT data.

Limitations

Limited coverage: Due to resource constraints, this evaluation covered three important sectors that EPP has worked. However, we cannot address EPP impacts specific to other sectors.

⁴⁸ We do not know how many, *if any*, products would have qualified for EPEAT before EPEAT existed. However, despite strong economic incentive to register for the successful EPEAT standard, it took years before many computers and monitor models qualified for EPEAT Gold. The absence of a perfect counterfactual is another limitation in assessing the impact of EPP.

Could not apply an experimental design: We were not able to apply an experimental design (namely, a randomized controlled trial) to attribute benefits to the EPP Program. As with most of EPA’s voluntary programs, it was not possible to conduct a randomized controlled trial for the EPP Program, because doing so would have required the program to randomly assign individuals to a treatment group and a control group prior to delivering services. This was not done, nor would it have been feasible or desirable, since the program is designed to cause spillovers: to share information with wide and diverse audiences beyond the boundaries of the program. For example, the FGCG provides procurement language designed to be incorporated into federal agencies’ purchasing policies. If the language of the Guide is incorporated in agency purchasing policies, it could indirectly influence the purchasing behaviors of purchasing staff without the EPP Program or the purchasers themselves knowing it. A related limitation of the methodology is that we were unable to systematically probe these types of spillover effects (see below).

Inability to quantify indirect influence and spillover effects. The EPP Program is designed to disseminate information, and influence purchasing behavior, beyond the boundaries of the program. As illustrated by the FGCG example in the previous paragraph, agencies may incorporate model contract language developed by the EPP Program into agency purchasing policies that influence the behavior of purchasers at those agencies. Similarly, EPA’s blanket purchase agreement (BPA) for information technology (IT) products incorporates EPEAT, a standard that was heavily influenced by the EPP Program. However, because EPP does not “brand” its outputs, purchasers may not be aware that they are using standards that EPP helped to develop. Therefore, our survey of federal purchasing staff was not able to quantify the program’s indirect influence.

A related challenge is that the federal government does not centrally track the purchases of its contractors. This may have several implications for understanding EPP influences. For example, many federal facilities are government-owned but contractor-operated (GOCOs), including 19 federal laboratories and several DOD facilities.⁴⁹ GOCOs may conduct their own procurements outside of federal contracting mechanisms. As such, purchases of EPEAT computers and monitors by GOCOs, as well as other types of green purchases, may not be captured in federal data. This issue also comes into play with federal facility construction and renovation projects. For example, the Leadership in Energy & Environmental Design (LEED) standard includes a provisional credit for the NSF 140 carpet standard, a product standard which EPP helped to develop. Federal construction projects must meet sustainability standards, and GSA officially recognizes LEED as the certification system to use to meet these standards.⁵⁰ Thus, if private contractors buy NSF 140 carpet for LEED-certified federal buildings, or any other green building or construction product, these purchases would not be captured in a federal procurement system.

Inability to quantify changes in federal purchases of environmentally preferable products and services or the resulting environmental benefits, beyond the electronics sector: This limitation is the result of an absence of green purchasing data and lack of environmental benefits calculators outside the electronics sector. As discussed in Chapter 4, key recommendations that stem from this evaluation include improving the government’s tracking of environmental attributes of federal purchases and developing calculators to estimate the environmental benefits of these purchases.

⁴⁹ Information about GOCO labs can be found at: <http://www.sandia.gov/about/history/goco.html>

⁵⁰ US DOE, Pacific Northwest National Laboratory, *Green Building Certification System Review*, prepared for GSA, March 2012.

Inability to precisely define survey universe: We were not able to precisely define the survey universe because we did not have a single master list of all federal purchasers. This limitation, as well as the lack of information about the target population, precluded statistical sampling. However, we are confident that between the FAITAS list of 107,000 purchasers and the commercial list of 44,000 purchasers, most if not all of the total population received the invitation to complete the survey. Furthermore, we do not find evidence of response bias in terms of the agencies represented in the survey results, with the exception of DOD, which is underrepresented. We also see wide variation in respondents' knowledge, attitudes, and behaviors with respect to environmentally preferable purchasing, which does not suggest the presence of "green bias" on the part of survey respondents. In this regard, the continuous learning credit offered to all respondents who completed the survey may have encouraged participation from a more diverse group of purchasers. Although we cannot definitively rule out the possibility of response bias, the available data does not provide any evidence that this was a significant problem in our survey.

CHAPTER 3 | FINDINGS

This chapter presents evaluation findings, organized by evaluation question. For each evaluation question, we provide a short introduction and key findings, followed by detailed findings.⁵¹

QUESTION 1: CHANGES IN FEDERAL PURCHASER ATTITUDES TOWARD GREEN PURCHASING

Introduction

This question explores changes in federal purchasers' perceptions of green products and services over time. Evaluation Question 1 asks, "How has federal purchaser awareness of green products and services changed since the 2001 baseline assessment?" For purposes of this question, we have interpreted "awareness" to include attitudes toward green products and services as well as familiarity. This evaluation question does *not* concern awareness of or attitudes toward the EPP *Program* specifically, but rather environmentally preferable purchasing in general. Thus, when we refer to "EPP" in the discussion of Evaluation Question 1, we are referring to environmentally preferable purchasing in general, and not to the EPP Program.

Our main baseline for this comparison is a report prepared for the Pollution Prevention Division (PPD) in 2001, "Qualitative Measurement of Environmentally Preferable Purchasing (EPP) Among Federal Employees in 2000."⁵² This study, undertaken by NuStats, was aimed at developing a baseline characterization of environmentally preferable purchasing (EPP) in the federal realm (see text box on next page for details). We also included questions in the 2013 survey that asked respondents to compare their views on green purchasing today to their views three years ago.

To describe current attitudes and awareness toward EPP, we analyzed responses to several key questions from our survey of federal purchasers, discussed in detail in Chapter 2. We compared our findings from relevant survey questions to the corresponding results of the 2001 baseline assessment. This approach presents two main challenges:

- Unlike our current effort, the 2001 study did not include a quantitative survey, nor did it provide quantitative analysis of its interview or focus group findings.
- Not all of the relevant questions on attitudes and awareness posed in the 2013 federal purchaser survey correspond precisely to the particular topics discussed in the 2001 assessment.

⁵¹ Question 13 is addressed by the findings from Questions 10-12, and question 14 is addressed by the recommendations in Chapter 4.

⁵² "Qualitative Measurement of Environmentally Preferable Purchasing (EPP) Among Federal Employees in 2000." Prepared for Julie Winters, Pollution Prevention Division, Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency. EPA742-R-01-001. February 2001.

Both of these factors limit our ability to draw precise comparisons between the two data sources, and as a result, we therefore can only compare the 2013 survey data to the baseline study results in general terms. Nonetheless, the results of the 2001 baseline assessment relevant to this evaluation question were generally quite unambiguous, and the results for applicable survey questions were similarly clear. As a result, we have a fairly high degree of confidence in our findings.

Key Findings

- We found clear evidence of a broad shift among federal purchasers toward greater awareness and more positive attitudes toward EPP. A strong majority of purchasers report having positive views toward EPP in general, and purchasers appear to be accepting a greater degree of responsibility for bringing environmental considerations into their purchasing decisions. Both of these findings represent distinct differences from the results of the 2001 study. Furthermore, individuals who have been purchasers for three or more years report becoming more knowledgeable and more favorably inclined toward EPP over that time.
- Purchasers today identify higher cost and several factors related to a lack of information as the key disadvantages of EPP. In contrast, the 2001 study indicated that the key problems at that time were a perceived lack of quality for environmentally friendly products and a lack of support from top management; these are no longer major concerns for most purchasers.
- Finally, purchasers are giving more importance to environmental considerations in their purchasing decisions than they did in the 2001 study. At that time, it was rare

OVERVIEW OF THE 2001 BASELINE ASSESSMENT

In February 2001, NuStats produced a report for PPD entitled “Qualitative Measurement of Environmentally Preferable Purchasing (EPP) Among Federal Employees in 2000.” It was the first phase of a larger research project aimed at evaluating current efforts relating to environmentally preferable purchasing and determining what led people to integrate environmental considerations into their purchasing decisions.

The assessment was guided by five broad “learning questions”:

- What are the general attitudes, behaviors, and perceived information needs regarding purchasing?
- What are the attitudes, behaviors, and perceived information needs in defining environmental preferability?
- What is the general awareness of the “Greening of Government” initiative?
- What are the awareness levels and opinions about EPP outreach materials?
- Are there opportunities to fit EPP into day-to-day procurement activities?

NuStats’ research was qualitative in nature, using interviews, focus groups, and other small group sessions to generate data. 130 participants took part in the study, including federal staff involved in all aspects of the purchasing process, from the individuals requesting products and services to those overseeing procurement, contracting, and purchasing.

The researchers summarized their results in eight key findings:

1. Executive Order provisions on the “Greening of Government” are not perceived as mandates.
2. Agency- or department-specific mandates motivate purchasers more than government-wide Executive Orders.
3. Study participants consider different factors when evaluating products versus services.
4. Few study participants recognized the term “environmentally preferable purchasing.”
5. Some federal purchasers and requesters consider the environment in a purchase decision.
6. Study participants believe the responsibility for doing EPP lies elsewhere.
7. Federal purchasers and requesters rarely mention environmental factors as a primary consideration.
8. Awareness of EPA’s EPP tools and resources is low among study participants.

for purchasers to explicitly consider environmental factors when purchasing goods or services. Now, most purchasers say that environmental characteristics are an important consideration. While most purchasers do not give particularly high priority to environmental factors compared to other product attributes, neither do they ignore them.

We discuss these findings in more detail below.

General Awareness of and Attitudes Toward Environmentally Preferable Purchasing

The 2001 baseline assessment found very low levels of awareness of the term “environmentally preferable purchasing” or what it entailed. While buyers readily understood the concept once it was defined for them, it was not something that most had any familiarity with, and they had no grasp of the specifics of EPP.⁵³

The introductory language of the survey provided survey takers with a working definition of EPP, thereby guaranteeing at least a minimal level of familiarity. Nonetheless, survey data provides indications that federal purchasers have higher levels of awareness of EPP now than in 2001. One survey question asked purchasers whether they had considered environmental attributes at least once in the past year when making purchasing decisions; 62% of respondents indicated that they had done so. While this is a measure of *behavior*, it also indicates purchasers’ awareness of EPP, since awareness of environmentally preferable purchasing is a precondition for behavior incorporating environmental factors into purchasing decisions. Thus, the 62% of survey respondents indicating that they had considered environmental factors in the past year represents a *minimum* level of purchasers that have familiarity with the concept of EPP. This is a dramatic change from the 2001 baseline assessment.

Attitudes towards EPP have also changed markedly since the baseline assessment. While that study did not directly report findings on purchasers’ general attitudes, it appears that most purchasers at that time had at best neutral and at worst negative views toward EPP.⁵⁴ Several participants in the 2001 study reported “that they or others in their agency do not make environmental purchasing considerations because it has little or no relevance to their agency’s mission or what they purchase.”⁵⁵ The baseline study also identified a widely-shared belief among purchasers that environmentally preferable products were inferior to conventional products. Finally, most participants in the study indicated that they would not integrate EPP more fully into their routine procurement activities unless they were required to do so, stating that “it’s not my job.”⁵⁶ These responses paint a picture of a procurement workforce that, on the whole, took a dim view of EPP.

The 2013 survey asked purchasers directly about their views toward EPP and yielded much more favorable results (Exhibit 3-1). Over 80% of purchasers described their attitude toward EPP as “somewhat positive” or “very positive,” compared to less than 8% choosing “very negative or somewhat negative.” Twelve percent (12%) indicated that they did not know or had not made up their mind. Service purchasers appeared to have somewhat more favorable views than product purchasers, but the difference was not

⁵³ Ibid, p. 10.

⁵⁴ Ibid, p. 17.

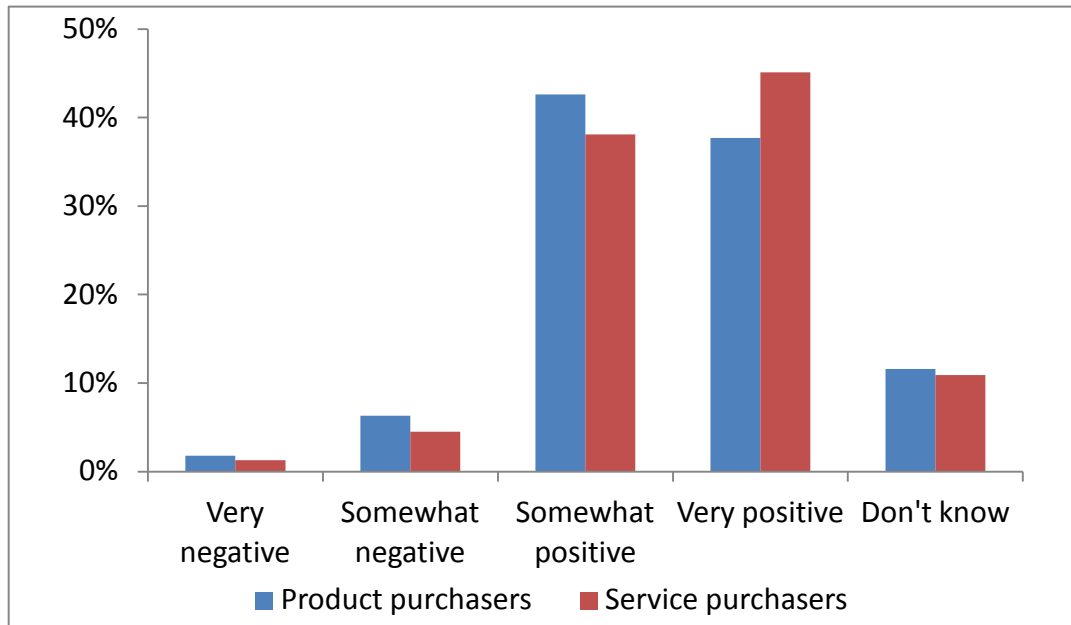
⁵⁵ Ibid, p. 16.

⁵⁶ Ibid, p. 21.

statistically significant (and in addition, other survey questions provide a contradictory view of the differences between the two groups). Clearly, a strong majority of current federal purchasers has positive attitudes toward EPP.

EXHIBIT 3-1. VIEWS TOWARD ENVIRONMENTALLY PREFERABLE PURCHASING

In general, how would you describe your view towards environmentally preferable purchasing?



One way in which negative attitudes toward EPP were manifested in the 2001 study was that purchasers did not take responsibility for bringing environmental considerations into purchasing decisions. The report describes “finger pointing regarding when the decision making should occur,” with many buyers arguing that environmental considerations “would be best handled at the beginning of the purchase process (i.e., when the need is identified or the specifications are written), before it gets to procurement.”⁵⁷ NuStats identified as one of their key findings the belief among study participants that responsibility for EPP lay elsewhere.⁵⁸

Like awareness of EPP, we did not test the question of a sense of responsibility directly in our survey of federal procurement staff. However, once again, there is data available to address the issue. The survey asked purchasers of electronics and building and construction products (separately) about the proportion of their purchases in these product areas that were certified to certain specific sustainability standards. Purchasers indicating that less than 50% of their purchases were certified to these standards were given a follow-up question on their reasons for not buying more certified products. A very low proportion indicated that their reason for not buying more certified products was that they were not required to do so: 18% of purchasers with low rates of EPEAT certified electronics purchases, and 7% of purchasers with

⁵⁷ Ibid, p. 12.

⁵⁸ Ibid, p. 8.

low rates of certified building and construction product purchases. It should also be noted that, because the subsample of survey takers that were asked this question was already low, the *absolute* numbers of purchasers citing this reason for not buying more certified products are extremely low, just 13 electronics purchasers and 14 building and construction product purchasers. The fact that very few purchasers are using the lack of a requirement as a justification for low rates of environmentally preferable purchases suggests that most purchasers have internalized at least some degree of a sense of responsibility for integrating environmental considerations into their purchasing decisions.

Although it does not provide a direct comparison to the baseline study, the survey also asked respondents who had been federal purchasers for at least three years about changes in their attitudes and awareness regarding EPP over that time. Consistent with the findings outlined above, the results for these survey questions show that the procurement workforce as a whole has become more knowledgeable and more favorably disposed toward EPP over time (Exhibit 3-2). A majority of respondents indicated that they felt more knowledgeable than they did three years ago; most of the rest felt equally knowledgeable. Similarly, 43% of respondents reported more favorable attitudes toward EPP, while most of the rest thought their attitudes had stayed the same. Less than 5% reported feeling less knowledgeable or having less favorable attitudes toward EPP than they did three years ago.

EXHIBIT 3-2. CHANGES IN AWARENESS AND ATTITUDES OVER THE PAST THREE YEARS

Do you feel more knowledgeable, less knowledgeable, or equally knowledgeable about environmentally preferable purchasing today than you did THREE YEARS AGO?	LESS KNOWLEDGEABLE	EQUALLY KNOWLEDGEABLE	MORE KNOWLEDGEABLE	DON'T KNOW
	4.9%	38.5%	52.9%	3.7%
Over the PAST THREE YEARS, has your attitude towards environmentally preferable purchasing become more favorable, less favorable, or stayed the same?	LESS FAVORABLE	STAYED THE SAME	MORE FAVORABLE	DON'T KNOW
	4.9%	49.7%	42.8%	2.6%

Advantages and Disadvantages of Environmentally Preferable Purchasing

In addition to the general attitudes and awareness discussed above, we also analyzed several specific aspects of purchasers’ views toward EPP. One of these is the relative advantages and disadvantages of EPP. The 2001 baseline assessment did not discuss the advantages of EPP beyond a passing comment that among the small group of purchasers who did engage in EPP, their reason for doing so was a personal interest or sense of civic duty.⁵⁹ The lack of a discussion of EPP benefits is significant in its own right; evidently, the benefits of EPP were not seen as sufficiently important to warrant further consideration.

The 2013 survey asked purchasers directly about the key advantages of considering environmental factors in purchasing decisions (Exhibit 3-3). As one might expect, the most frequently chosen responses were “environmental benefits” (76%) and “fulfill obligations/mandates” (63%). However, purchasers also listed several other advantages; more than 40% identified “improve worker health and safety” and “best value” as key advantages of considering environmental factors in purchasing decisions. Only 5% chose

⁵⁹ Ibid, p. 17.

“none of the above,” which implies that the other 95% of purchasers felt that EPP had at least one major advantage.

EXHIBIT 3-3. PERCEIVED ADVANTAGES OF EPP

WHAT DO YOU SEE AS THE KEY ADVANTAGES OF CONSIDERING ENVIRONMENTAL FACTORS IN YOUR PURCHASING DECISIONS? (CHECK ALL THAT APPLY)	
Environmental benefits	76.4%
Fulfill obligations/mandates	62.9%
Improve worker health and safety	44.7%
Best value	43.4%
Sense of pride	22.0%
Positive image/recognition and awards	12.7%
None of the above	5.2%
Other	3.0%

The baseline assessment identified three key disadvantages or barriers to EPP.

- First, the study indicated that many purchasers did not buy environmentally preferable products due to a perceived lack of quality. This was a widespread attitude. However, purchasers’ impressions of inferior product quality were rarely based on recent firsthand experience. Thus, “nearly everyone said their ‘experience’ was based on a product that was used several years ago (some 10 or more years ago), or they explained that they did not have personal experience but rather their knowledge was based upon ‘hearsay’ from other colleagues.”⁶⁰
- Second, there was a lack of buy-in from upper management across most federal agencies to buy greener products. Several study participants “felt that they needed stronger leadership from their upper management in making [EPP] more of a priority in their agency.”⁶¹
- Third, purchasers cited a lack of information. Many purchasers felt that it would take too much time for them to research specific products to meet environmental criteria, and suggested that they needed easier ways to identify products that would meet environmental criteria, perhaps through a green label or something similar.⁶²

We asked participants in the 2013 survey directly about the key disadvantages of EPP. The results were straightforward (Exhibit 3-4). The most commonly cited disadvantage was higher cost, chosen by 62% of respondents. Only 24% of survey takers identified inferior product/service quality as a disadvantage of EPP, and 11% listed lack of management support, making these the least-cited of all options listed in the survey; thus, the two most serious problems from the 2001 baseline study are no longer major concerns for most purchasers. In contrast, lack of information remains a challenge. Thirty-eight percent of survey respondents identified lack of information as a key disadvantage of EPP, and furthermore, a closely related consideration, unclear definition of “green,” was chosen by an even higher number (56%). Sixty-

⁶⁰ Ibid, p. 17.

⁶¹ Ibid, p. 18.

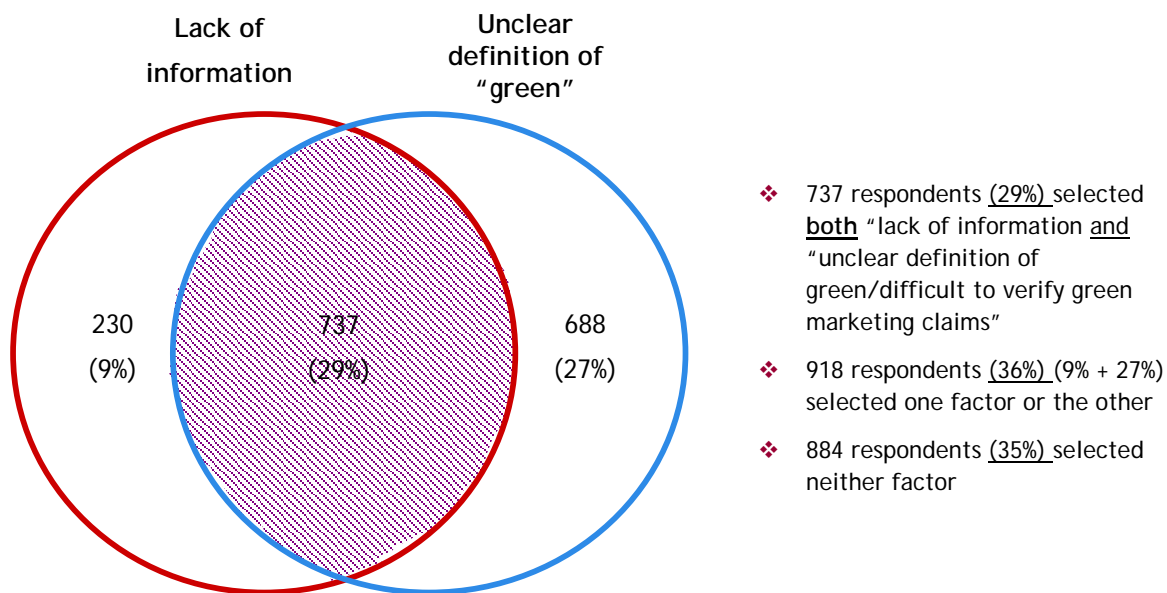
⁶² Ibid, pp. 8-9.

five percent of respondents identified lack of information and/or unclear definition of “green” as disadvantages of EPP (Exhibit 3-5).

EXHIBIT 3-4. PERCEIVED DISADVANTAGES OF EPP

WHAT DO YOU SEE AS THE KEY DISADVANTAGES OF CONSIDERING ENVIRONMENTAL FACTORS IN YOUR PURCHASING DECISIONS? (CHECK ALL THAT APPLY)	
Higher cost	61.5%
Unclear definition of "green"/difficult to verify "green" marketing claims	56.1%
Lack of available environmentally preferable products/services that meet requirements	46.1%
Lack of information	38.1%
Time-consuming/inconvenient to purchase	28.7%
Inferior product/service quality	24.1%
Lack of management support	10.8%
None of the above	9.8%
Other	3.4%

EXHIBIT 3-5. PURCHASERS CITING LACK OF INFORMATION AND/OR UNCLEAR DEFINITION OF “GREEN” AS KEY DISADVANTAGES OF EPP



Importance of Environmental Attributes in Purchasing Decisions

One critical way in which purchasers’ attitudes toward EPP influences their behavior is in the relative weight that they assign to environmental attributes when making purchasing decisions. Both the 2001 baseline assessment and the 2013 survey probed this issue and found that cost and performance were the most important factors driving purchase decisions. The 2001 study indicated that cost was paramount,

followed by quality, vendor reputation, and performance.⁶³ Similarly, in the more recent survey, more than 95% of all purchasers considered quality, cost, and best value to be either “very important” or “moderately important.”

While these factors have shown little change over time, there has been a more marked shift on the importance of environmental attributes. When NuStats conducted the 2001 baseline assessment, they found that purchasers would rarely mention environmental factors unprompted as a consideration in their purchasing decisions. Even when asked specifically about environmental attributes, purchasers made it clear that they did not routinely consider environmental issues when making purchase decisions.⁶⁴ The survey data shows a very different situation today. Seventy-eight percent (78%) of product purchasers and 67% of service purchasers consider environmental attributes “very important” or “moderately important.”⁶⁵ This places environmental attributes in the middle of the factors evaluated, above such considerations as easiest to purchase, small business set-asides, mandatory sources, and even brand reputation (Exhibit 3-6). In other words, most purchasers do not give environmental attributes particularly high priority when ranked against other factors, but neither do they give the environment particularly low priority – and most purchasers *do* consider environmental factors to be important in the abstract. Clearly, this represents a significant change from the 2001 study.

EXHIBIT 3-6. CHANGES IN AWARENESS AND ATTITUDES OVER THE PAST THREE YEARS

How important is each of the following factors in your purchasing decisions for products?	NOT AT ALL IMPORTANT	SLIGHTLY IMPORTANT	MODERATELY IMPORTANT	VERY IMPORTANT	DON'T KNOW/ NO OPINION/ NOT APPLICABLE
Cost	0.2%	1.7%	17.3%	80.5%	0.4%
Quality	0.4%	1.0%	10.5%	87.9%	0.5%
Best Value	0.4%	1.5%	12.3%	84.8%	1.0%
Brand Reputation	7.5%	22.8%	41.5%	24.8%	3.4%
Past Experience with the Product	1.0%	4.7%	31.6%	61.2%	1.4%
Meeting exact specifications	0.6%	3.6%	24.0%	70.2%	1.7%
Environmental attributes	4.8%	13.2%	38.3%	39.9%	3.7%
Easiest to purchase of all available choices	8.8%	21.6%	40.0%	26.0%	3.6%
Small business set-asides	6.4%	14.3%	30.9%	41.6%	6.8%
Mandatory sources (e.g., AbilityOne, NIB/NISH, UNICOR)	4.8%	8.4%	22.5%	56.4%	7.9%
Other	8.7%	2.2%	6.3%	7.5%	75.3%

⁶³ Ibid, p. 9.

⁶⁴ Ibid, p. 10.

⁶⁵ The implication that product purchasers have more favorable attitudes toward EPP than service purchasers contradicts the other survey results comparing these two groups, discussed above. As such, we do not believe there is a clear difference in attitudes between these two groups.

QUESTION 2: CHANGES IN FEDERAL PURCHASER BEHAVIOR REGARDING GREEN PURCHASING

Introduction

Following our analysis of changes in federal purchasers' attitudes in Evaluation Question 1, we turn next to changes in their behavior. Evaluation Question 2 asks, "How have federal agencies changed purchasing of green products and services since the 2001 baseline assessment, including incorporating green criteria into specifications and contract language?" Similar to Evaluation Question 1, this evaluation question does *not* examine the extent to which the EPA EPP Program contributed to any observed changes; rather, this analysis concerns environmentally preferable purchasing behavior in general. Also, it is important to note that the EPA EPP Program's *influence* on federal purchasers' behavior is addressed in Evaluation Question 6.

The data sources and methods for this analysis are similar to those used in Evaluation Question 1. Once again, the analysis draws heavily on a comparison between results reported in the 2001 baseline assessment, "Qualitative Measurement of Environmentally Preferable Purchasing (EPP) Among Federal Employees in 2000,"⁶⁶ and our 2013 survey of federal purchasers. As we noted in Evaluation Question 1, this approach poses two major challenges: the 2001 study did not include a survey or quantitative analysis of its interview or focus group findings, and not all of the relevant questions in the 2013 federal purchaser survey correspond precisely to research covered by the baseline assessment. Thus, we can make only general comparisons between these two sources. Unlike Evaluation Question 1, our analysis for Evaluation Question 2 is also informed by interviews and other data-gathering efforts undertaken in the course of this evaluation.

Key Findings

- Environmentally preferable purchasing activity is much more widespread now than it was at the time of the 2001 baseline assessment. Similarly, many individuals who have been federal purchasers for at least three years indicate that their levels of environmentally preferable purchases have increased over that time. Thus, consistent with the shift in attitudes described in Evaluation Question 1, we found that federal purchasers as a group have changed their behavior to engage in more environmentally preferable purchasing.
- Nonetheless, EPP activity is still not routine. Most purchasers consider environmental factors occasionally, but do not buy environmentally preferable products or services at particularly high rates.
- Purchasers rely heavily on materials developed by their own agencies and departments and on the Federal Acquisition Regulation (FAR) to guide their purchasing decisions. This underscores the need for interagency collaboration if the EPP Program is to maximize its impact on federal purchasing behavior.
- Interviews with a small number of purchasing policy managers indicate that GSA and the Department of Energy (DOE) have taken substantial actions to incorporate environmental criteria into their own purchasing, including many of the standards the EPP Program helped to develop. These agencies are leaders in this field; other agencies' efforts appear less robust.

⁶⁶ "Qualitative Measurement of Environmentally Preferable Purchasing (EPP) Among Federal Employees in 2000," February 2001, op. cit.

We discuss these findings in more detail below.

General Environmentally Preferable Purchasing Behavior

The 2001 baseline assessment found a low level of EPP activity among federal purchasers. Although some purchasers would occasionally purchase environmentally preferable products or services, this was not a widespread pattern of behavior. In general, purchasers did not consider environmental factors when making purchase decisions, and they indicated mandates from their managers were needed to bring EPP into their routine purchasing activities.⁶⁷

The 2013 survey of federal purchasers included several questions on purchasers' behavior in evaluating and choosing environmentally preferable versus conventional products and services. We discuss only a few of the most pertinent survey questions here, but a complete summary of the survey data is available in Appendix C. Overall, the survey data indicates that EPP is far more common among federal purchasers now than it was during the baseline assessment, but it is still not routine. As one basic measure, we asked purchasers whether they had made at least one purchase in the last year in which they considered environmental factors in their purchasing decision. Nearly two-thirds of survey respondents (62%) had incorporated environmental factors at least once, while the remainder had not. These data suggest that a broad segment of the procurement workforce addresses environmental concerns in their purchasing at least occasionally.

Perhaps the most critical measure of behavior in the survey is the percentage of total purchases made over the past year that was environmentally preferable (Exhibit 3-7). A third of purchasers indicated that 25% or less of their purchases were environmentally preferable, while another third did not know the proportion. Just 17% of purchasers reported that a majority of their purchases over the past year qualified as environmentally preferable. As we will discuss in more detail in Evaluation Question 4, GSA purchasers were well above average on this question, while EPA purchasers' performance was unremarkable compared to the performance of other agencies.

We asked similar questions for electronics purchasers and building and construction products purchasers specifically. Most building and construction product purchasers either did not know how many of the products they purchased were certified to specific sustainability standards (36%), or bought only a low number of certified products (24%) (Exhibit 3-7). The results for building and construction product purchasers were broadly similar to the pattern for all purchasers noted above, although building and construction purchasers demonstrate slightly greener behavior than other purchasers.

Electronics purchasers showed a somewhat different pattern (Exhibit 3-8). We asked these purchasers about their levels of EPEAT, Federal Energy Management Program (FEMP), and Energy Star purchases. The strong majority of purchasers could not estimate their level of EPEAT or FEMP certified purchases (65% and 73% respectively), but of those that could, most reported that more than 75% of their purchases met these criteria. Purchasers were far more aware of Energy Star: a majority of electronics purchasers reported that 75% or more of their electronics purchases were Energy Star certified, while just 28% chose "don't know." Evidently, Energy Star has far more visibility for purchasers than the other electronics standards (perhaps due to its much longer history), but for all of the standards, purchasers that are aware of them buy certified products at high rates.

⁶⁷ Ibid, pp. 10, 21.

EXHIBIT 3-7. ENVIRONMENTALLY PREFERABLE PURCHASING BEHAVIOR

In the past year, approximately what percentage of the products/services that you purchased was environmentally preferable? (Building and construction products purchasers: percentage of building and construction products purchased certified to one of the standards listed)

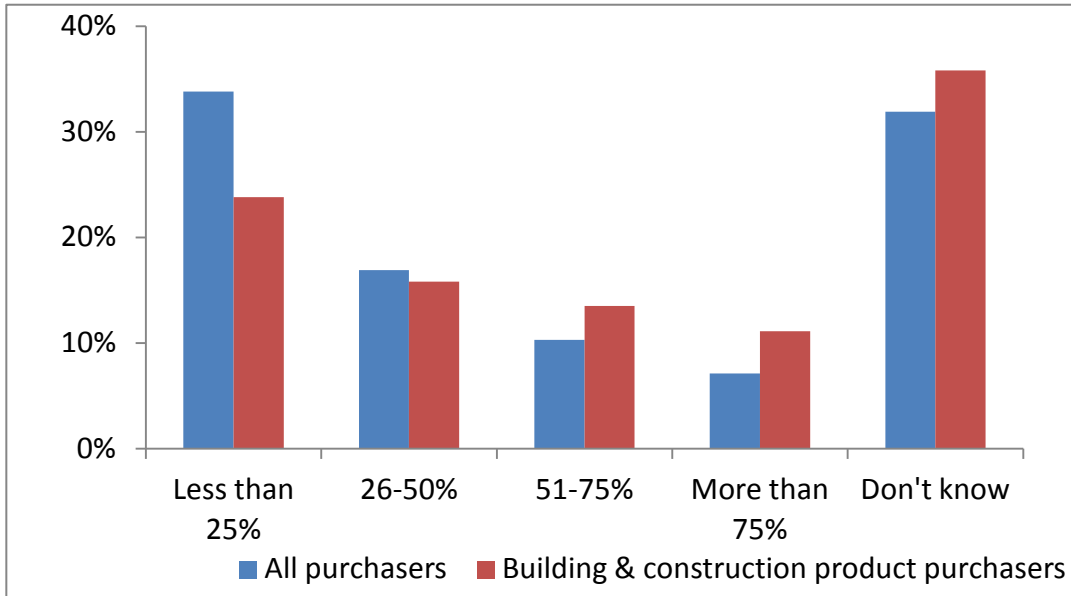
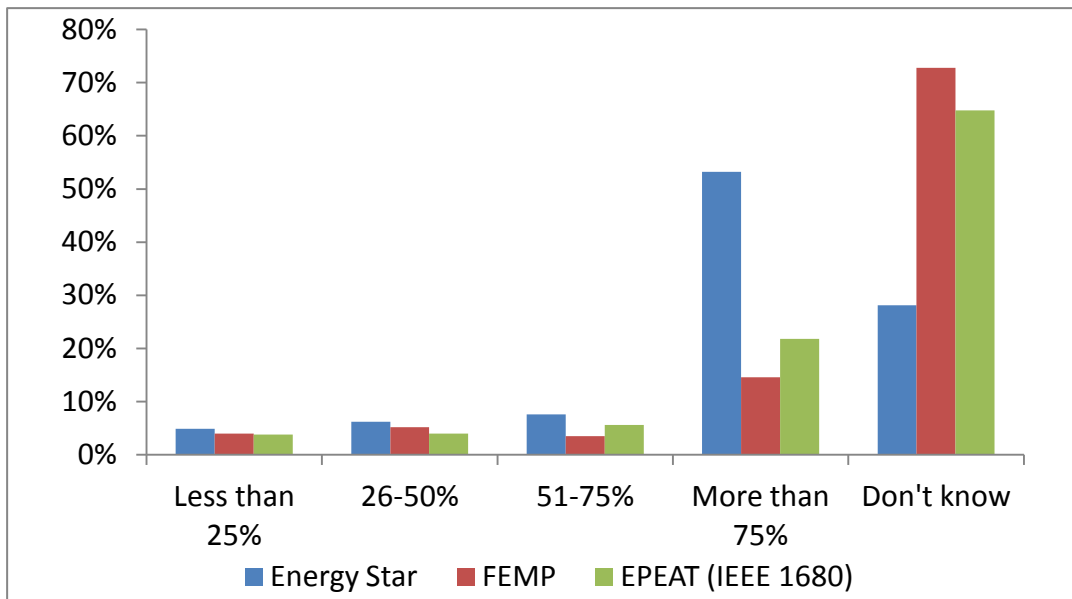


EXHIBIT 3-8. ENVIRONMENTALLY PREFERABLE PURCHASING AMONG ELECTRONICS PURCHASERS

In the past year, approximately what percentage of the computers and monitors that you purchased was certified under the following standards?



The survey also asked respondents who had been federal purchasers for at least three years about changes in their attitudes and awareness over that time. The results show a broad but not uniform shift towards more environmentally preferable purchasing (Exhibit 3-9); 42% of respondents reported that the proportion of products or services they purchased that was environmentally preferable had increased over the past three years, while an equal number felt it had stayed the same. Just 1.5% reported a lower rate of environmentally preferable purchases compared to three years ago.

EXHIBIT 3-9. CHANGES IN PURCHASING BEHAVIOR OVER THE PAST THREE YEARS

Over the PAST THREE YEARS, has the portion of products/services that you purchased that was environmentally preferable increased, decreased, or stayed the same?	DECREASED	STAYED THE SAME	INCREASED	DON'T KNOW
	1.5%	42.1%	42.0%	14.4%

To better understand purchasers' behavior, we asked them to identify which environmentally-related resources they used when making purchasing decisions. A strong majority of survey respondents indicated that they used resources produced by their own agency or department, as well as the Federal Acquisition Regulation (FAR) – 89% and 80% respectively. Thirty-nine percent (39%) reported using Presidential Executive Orders. At the bottom of the list were EPA's EPP website guidance and materials from EPA, and guidance and materials issued by other federal agencies, with less than 20% of purchasers using each resource. On its face, this would suggest rather limited influence for these resources. However, indirect effects cannot be captured by the survey question; for instance, agency-level procurement materials may have been influenced by EPA guidance without survey takers being aware of it. (For the same reason, purchasers' rates of buying certified products may be higher than reflected here, if the procurement systems they use incorporate green certifications such as EPEAT without the purchasers being aware of it.) Thus, these items may have had greater impact on federal purchasing than the results would indicate. Even so, these survey results point to the paramount importance of agency-level resources in guiding purchasers' behavior.

Incorporating Green Criteria Into Agency Purchasing

In addition to green purchasing behavior in general, Evaluation Question 2 also asks about the extent to which federal agencies have incorporated new green criteria into specifications and contract language since the 2001 baseline assessment. Because the 2013 survey was aimed primarily at federal purchasers and their activities rather than the managers that set purchasing policy, we have only limited survey data to address this question. However, we also conducted a limited number of interviews with federal purchasing policy managers, and additional research, that can also provide insight into this issue.

Perhaps the most basic step a federal agency can take to promote EPP is to adopt a formal EPP policy. The 2001 baseline study showed that purchasers considered agency policies to be more binding than Executive Orders, indicating that these instruments had greater weight in shaping their behavior. However, agency-level EPP policies were not common at that time; most purchasers indicated that they

were not required to make environmentally preferable purchases and that they had limited management support for EPP.⁶⁸

The survey indicates that EPP policies are now more widespread. Sixty percent (60%) of survey respondents stated that their agency or department had an EPP policy, with just 6% saying it did not (34% were not sure). Similarly, 62% of survey takers said that their agency or department gave environmentally preferable products and services some kind of preference, with just 9% saying there was no preference given and 29% reporting that did not know. Of those purchasers indicating their agency had an EPP policy, 55% indicated that the policy required EPP for some or all purchases.

We interviewed purchasing policy managers from GSA and DOE to better understand EPP activities in these agencies. These agencies were chosen because of their ties to EPA and their importance in federal procurement. According to the individuals interviewed, GSA and DOE have incorporated numerous sustainability standards and other criteria into their purchasing. DOE has made use of nearly all of the sustainability standards that EPA's EPP Program helped to develop, as well as recycled content guidelines and USDA's BioPreferred program.

GSA has incorporated several green criteria into GSA Schedules and GSA Advantage! GSA Advantage! is a major online purchasing system used throughout the federal government, in addition to agency-specific systems. Exhibit 3-10 reproduces a portion of the GSA Advantage! interface showing green criteria available for purchasers to use in product searches. GSA Advantage! did not have any searchable green criteria of this kind at the time of the 2001 baseline assessment; thus, all of the criteria shown have been added since that time.

It is notable that EPEAT is the only non-government certification currently represented in GSA Advantage!; the other criteria refer to federal programs (BioPreferred, Energy Star) or criteria that are unaffiliated with any specific environmental certification system (Low VOC). Exclusion from GSA Advantage! is a major factor hindering greater uptake of non-governmental product standards among federal purchasers. In fact, at one point GSA had included several other certifications in the GSA Advantage! system, including the NSF 140 carpet standard, Green Seal, GreenGuard, and Forest Stewardship Council certification for wood products. However, industry pressure from competing ecolabels and affiliated manufacturers led them to withdraw these standards. This was one of the factors that led to the creation of the current effort to address the federal use of environmental standards and ecolabels, which we discuss in Evaluation Question 6.

GSA has also incorporated the EPEAT and NSF 140 standards into its own purchasing, as well as several other green criteria not developed by the EPP Program (e.g., BioPreferred, Energy Star, and WaterSense, among others).⁶⁹ GSA's Public Building Service, which oversees federal buildings, also has policies in place requiring compliance with LEED and Energy Star (with different requirements applying to different types of buildings).

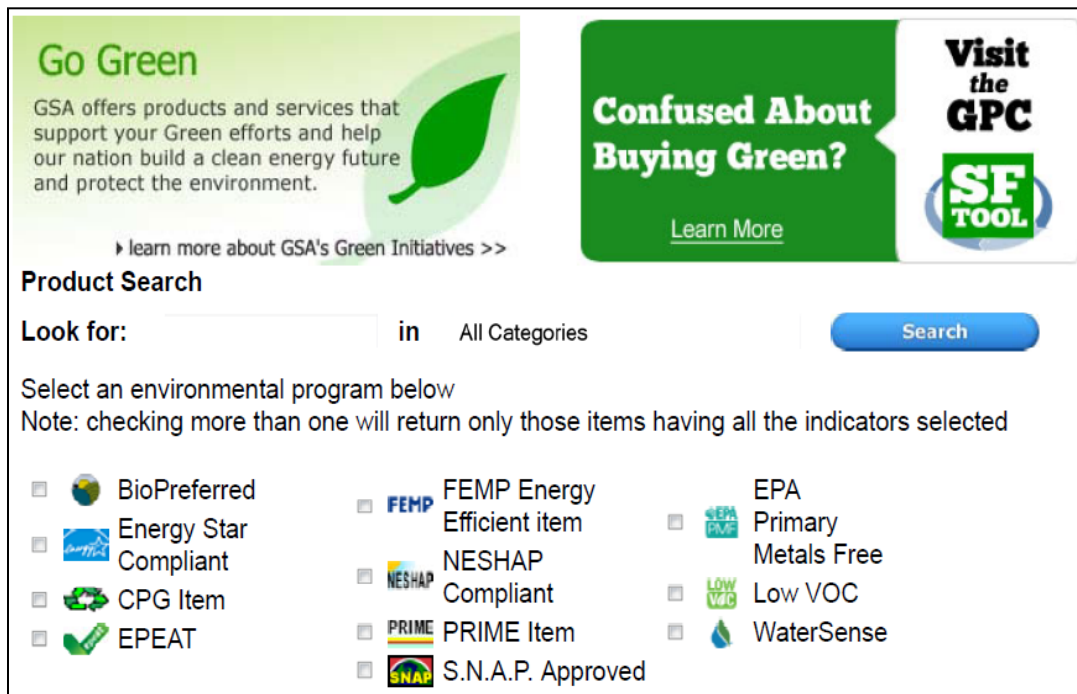
We also interviewed purchasing policy managers from the Department of Defense and the Office of Personnel Management; the interviews suggested that their efforts to incorporate green criteria into their

⁶⁸ Ibid, pp. 8, 9, 21.

⁶⁹ Industry representatives suggested that GSA may also be using the BIFMA e3 furniture standard for its own purchasing, but we did not corroborate this with GSA.

purchasing were not as robust as DOE's or GSA's.⁷⁰ The managers did not portray their agencies' efforts as particularly systematic, and they indicated that their policies were not aligned with the requirements of EO 13514. Other than EPEAT, the only other green criterion mentioned was the NSF 140 carpet standard, which was used by OPM. Given their particular missions, we expect that DOE and GSA are more likely the exception than the rule with respect to efforts to incorporate green criteria into agency purchasing.

EXHIBIT 3-10. GREEN ICONS IN GSA ADVANTAGE!



Responsiveness to Executive Orders

The final aspect of purchaser behavior that we analyze in this Evaluation Question is responsiveness to Presidential Executive Orders. At the time of the 2001 baseline assessment, the most recent Executive Order to address EPP was EO 13101, “Greening the Government through Waste Prevention, Recycling, and Federal Acquisition,” issued by President Clinton in September 1998. This EO was an area of particular emphasis in the baseline assessment; one of the five “learning questions” shaping the evaluation addressed the level of awareness of this EO in the federal procurement community. In fact, NuStats’ first ‘key finding’ from the baseline assessment was that most participants did not view the Greening the Government EO as imposing mandatory requirements.⁷¹

Our results from the 2013 survey are somewhat more difficult to interpret, but they indicate that at least a substantial minority of purchasers has altered its behavior in response to the recent EO 13514, “Federal Leadership in Environmental, Energy, and Economic Performance,” which President Obama signed in

⁷⁰ We also interviewed a purchasing policy manager from EPA; we address EPA’s green purchasing efforts under Evaluation Question 4.

⁷¹ Ibid, p. vi.

October 2009. Thirty-nine percent (39%) of purchasers indicated that they had changed their purchasing behavior following the EO; 32% had not, while the remaining 29% did not know. On its face, this would suggest that the EO had only a modest impact in actually changing federal behavior. However, it is possible that some of the purchasers who did not report any change in behavior were already purchasing environmentally preferable products and services at high levels, and thus were already in compliance with the requirements of the EO. In addition, as we noted above, it is possible that the EO may have had an indirect effect by prompting changes in agency purchasing policies and procedures that survey takers were unaware of.

QUESTION 3: FEDERAL PURCHASES OF GREEN PRODUCTS AND SERVICES

Introduction and Key Findings

Evaluation Question 3 asks: “What are the outcomes of these changes [in federal purchaser awareness and behavior] in the proportion of green products and services purchased by federal agencies?” As discussed in Chapter 2, comprehensive trend data on federal purchases are available for the electronics sector and specifically for purchases of EPEAT products. These data indicate that total EPEAT sales to the federal government increased 50% from 2008 – 2010. As discussed in Chapter 2, comparable data are not available for the products certified to the building and construction standards that EPP helped to develop. As such, this section describes the limited data that are available through GSA Schedules for building and construction product sales, and provides case study-level findings derived from the mini-market analysis. It is important to note that we cannot extrapolate the limited information available for building and construction product sales to the federal government as a whole. In addition, as noted in Chapter 2, no purchasing data are available on changes in federal hospitality and travel associated with EPP activities.

Electronics Sector

To address federal agencies’ purchases of environmentally preferable products in the electronics sector, our primary information source is data on federal purchases of EPEAT-registered electronics, including desktop computers, laptop computers, monitors, and integrated systems.

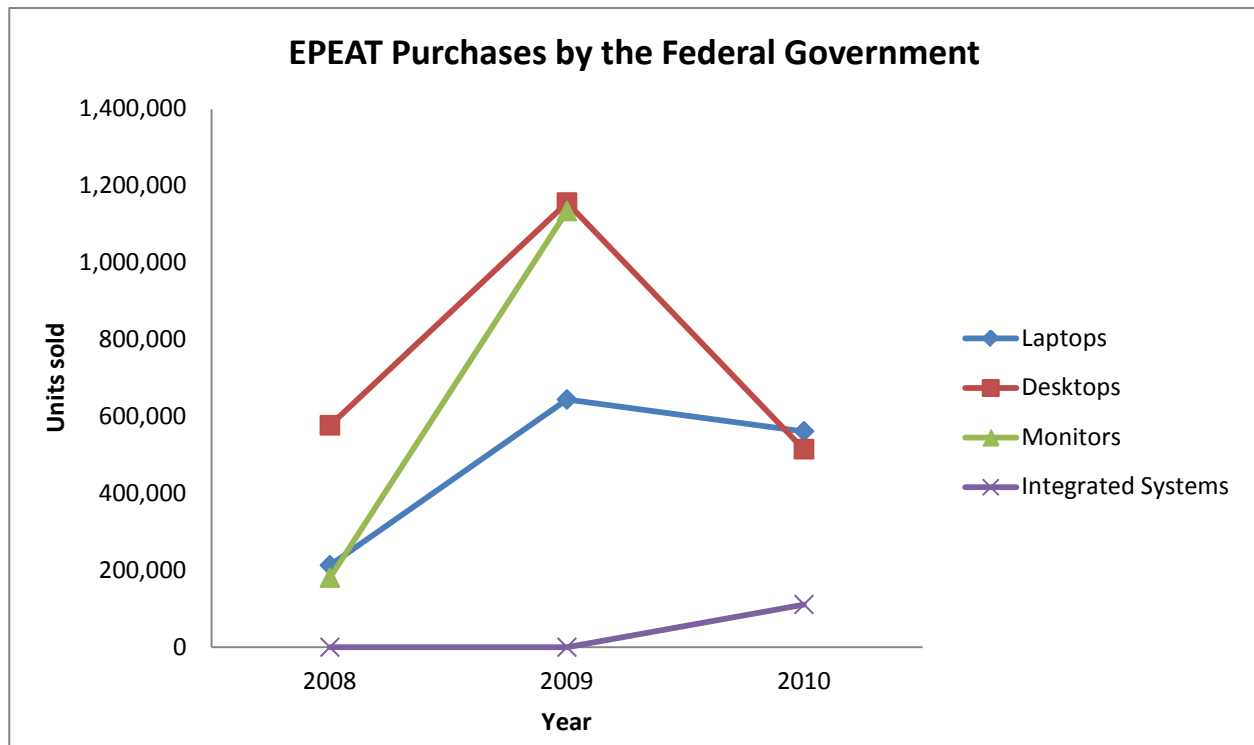
The EPEAT registry has been in existence since 2006; EPP played a key role in developing and launching the registry and the underlying IEEE standards. Since that time, EPEAT has figured prominently in the federal government’s sustainable procurement efforts. In January 2007, President Bush signed Executive Order 13423, which required federal agencies to purchase EPEAT products for 95% of their electronics in product categories with EPEAT standards. The 95% requirement was reaffirmed in President Obama’s Executive Order 13514, signed in October 2009. Due to the involvement of the EPP Program in developing EPEAT, and EPEAT’s centrality in government-wide environmentally preferable purchasing policy, EPEAT represents the logical focus for our analysis of the electronics sector.

The Green Electronics Council (GEC), which was established with start-up funding from EPP, currently manages implementation of the EPEAT program. GEC provided IEc with data on total sales of EPEAT electronics to the federal government (equivalent to total federal purchases of EPEAT electronics) for 2008 – 2010; this data is reproduced in Exhibit 3-11.

EXHIBIT 3-11. EPEAT PURCHASES BY THE FEDERAL GOVERNMENT¹

	2008	2009	2010
Desktops	577,260	1,156,682	515,184
Monitors	181,141	1,134,811	unknown ²
Laptops	213,275	644,564	561,852
Integrated Systems	0	4	111,187
Total	971,676	2,936,061	unknown

¹ Data reported is number of products purchased (not dollar amounts).
² Reported sales of EPEAT monitors in 2010 were 7,823,459; GEC staff consider this data point unreliable, but have been unable to obtain corrected data. (That level of purchases would amount to more than two monitors for every federal employee.) We therefore exclude this data point from our analysis.
 Source: data originally collected by the Information Technology Industry Council and reported to the Green Electronics Council. Provided to IEC through personal correspondence with Cate Berard, EPA, Dec. 14, 2011.



Total EPEAT purchases by the federal government increased from 2008 to 2010, but the pattern of growth was not steady over that period. Purchases tripled from 2008 to 2009, with laptops, desktops, and monitors all showing a substantial increase. Desktop purchases fell sharply in 2010, while the decline for laptops was more modest; notably, laptops accounted for a higher number of EPEAT purchases than desktops in 2010. This mirrors a more general market-wide shift away from desktops and toward laptops,

a point we will return to in other evaluation questions. Overall EPEAT purchases by the federal government decreased by about 36% from 2009 to 2010 (excluding monitors, for which data was not available in 2010). While we have not undertaken a comprehensive investigation of this issue, we speculate that the general pattern of fluctuating purchase levels may have been driven by broader trends in agency budgets (i.e., a sharp increase in purchasing due to the stimulus of the American Recovery and Reinvestment Act, followed by subsequent cutbacks).

Ideally, to evaluate federal purchases of green products, we would calculate the proportion of total computer and monitors purchases made up of EPEAT products over time, but reliable data on total (EPEAT and non-EPEAT) sales to the federal government are not available. In exploring this issue, IEC obtained data on government-wide electronics purchases from the Office of Management and Budget (OMB), which collects this data to report on federal agencies' progress toward meeting the sustainable purchasing goals laid out in Executive Order 13514. However, our review of the OMB data, particularly in comparison to data obtained from other sources, reveals several issues that lead us to question its accuracy.⁷² As a result, we are unable to report data on EPEAT's market share of government purchases.

Excluding monitors, total EPEAT purchases by the federal government were 50% higher in 2010 than in 2008. This compares to a 16% increase in EPEAT sales for the United States as a whole over this time period. In other words, the federal government increased its purchases of EPEAT electronics at a faster rate than the market as a whole; indeed, the federal government's rate of increase was greater than the United States as a whole in all four product categories. Because we have only three years of purchasing data, this preliminary trend does not support a definitive conclusion, but it nonetheless suggests that the

⁷² The issues with OMB's federal purchasing data become evident when these data are compared to other sources that we reviewed in the course of our analysis the Federal Electronics Challenge (FEC) program's effectiveness in encouraging EPEAT sales among its partner facilities (Evaluation Question 9). Specific points that cast doubt on the accuracy of OMB's federal purchasing data include the following:

- 1) FEC partners reported more purchases of non-EPEAT products in absolute numbers than are shown for the entire federal government in the OMB data. This is true in both 2009 and 2010 (there was no OMB data for 2008), in all product categories, with the exception of monitors in 2010 (where FEC's purchases supposedly accounted for 96% of all non-EPEAT purchases in the federal government). Unless FEC partners are over-reporting their non-EPEAT purchases for their reporting to FEC - but not to OMB - this can only mean that federal agencies are under-reporting their purchases of non-EPEAT products.
- 2) The federal government's proportion of EPEAT vs. non-EPEAT purchases is suspiciously high within the OMB data, particularly in comparison to the FEC. OMB's data purport to show that the federal government purchased at least 98% EPEAT products in all categories and in all years from FY 2009 through FY 2011, with the exception of monitors in FY 2010, when the proportion of EPEAT products was 95.8%. Note that this would imply full and immediate compliance with the 95% EPEAT purchase requirement of Executive Order 13514. In contrast, FEC partners purchased 96.4% EPEAT products in 2009 and 91.3% in 2010. Given the FEC program's particular emphasis on EPEAT purchases and voluntary reporting of data, we would expect that FEC partners are both more committed to EPEAT purchases, and more rigorous and accurate in their reporting, than non-FEC partners. This would strongly suggest that non-FEC facilities are reporting unrealistically high proportions of EPEAT purchases.
- 3) GEC reports total EPEAT sales to the federal government two to five times the numbers reported by OMB (varying by year and product category). Considered in light of the other evidence, we believe this is an indication of significant under-reporting of total purchases by federal agencies in the OMB data, rather than over-reporting of sales by manufacturers in the GEC data.
- 4) Related to this last point, the OMB data as reported suggest that in 2009, FEC facilities accounted for 78.5% of the federal government's total electronics purchases. (For 2010, the figure was 31.5%.) The FEC actually includes about 20% of all non-postal federal employees, and presumably a similar level of electronics purchases. This, too, suggests that the OMB data are under-counting total federal electronics purchases.

All in all, these points strongly suggest that OMB's data on EPEAT vs. non-EPEAT purchases by the federal government is significantly flawed. Given OMB's use of this data as a means to verify compliance with the requirements of Executive Order 13514, we recommend that OMB consider taking action to validate the information submitted by federal agencies to ensure its accuracy. As we understand, OMB does not currently provide any guidance or quality control to improve the accuracy of this data.

federal government has made significant strides to increase its purchases of environmentally preferable electronics. As additional data become available in future years, it should be easier to assess the purchasing behavior of the federal government compared to the market as a whole.

Building and Construction Products

The evaluation team was not able to identify a robust source of purchasing data for the building and construction product sector.⁷³ Given the lack of purchasing data maintained by the federal government, IEc contacted manufacturers that sell select environmentally preferable building and construction products to the federal government. Specifically, we were interested in products that are certified to environmentally preferable standards that EPP helped to develop. IEc cross-walked publicly available lists of manufacturers that sell certified building and construction products to the list of manufacturers on the GSA Multiple Award Schedules. We identified:

- 30 manufacturers that sell BIFMA e3/Level certified furniture through GSA Schedule 71;
- 11 manufacturers that sell NSF 140 certified carpet through GSA Schedule 72;
- 2 manufacturers that sell NSF 332 certified resilient flooring through GSA Schedule 72;
- 1 manufacturer that sells ULE 100 certified gypsum board through GSA Schedule 51V.

IEc sent initial screening emails to all of the above manufacturers to request publicly available sales data; the response was limited. We followed up via email and telephone with all of these companies to request their participation in our voluntary data request. Ultimately, we received sales data from one carpet manufacturer and four furniture manufacturers; we did not receive data from the resilient flooring companies or the gypsum board company.

The four participating furniture companies account for approximately 10% of GSA Schedule sales of all furniture manufacturers that sold BIFMA e3/Level certified products to the federal government in FFY11.⁷⁴ The participating carpet manufacturer accounts for approximately 15% of GSA Schedule sales of all manufacturers that sold NSF 140 certified carpet to the federal government in FFY11.⁷⁵ Given the relatively low number of respondents, and the relatively low market share for these respondents, we cannot extrapolate to the universe of manufacturers as a whole. Furthermore, the year in which respondents began selling certified product varies: of the four furniture respondents, one began selling BIFMA e3/Level certified furniture in 2010, two began in 2011, and one did not begin until 2012, which is outside our study period. Also, although we asked all respondents to provide data using a standardized data collection template, not all respondents provided data in a consistent way, limiting our ability to aggregate the sales numbers. Despite these caveats, the evaluation team believes that the analysis provides useful anecdotal information for the selected companies.

⁷³ GSA provided some data on sales of certified carpet through GSA schedules, which we present below in Exhibit 3-14; however, those data have important limitations. The evaluation team also tried to obtain building and construction product data directly from selected federal agencies, but could not obtain these data. Further details are provided in the methodology chapter.

⁷⁴ \$91 million out of \$875 million. The total is based on sales for 25 companies: Five furniture companies sell to the federal government through other contractors on Schedule 71.

⁷⁵ \$3.7 million out of \$24.2 million. The total is based on sales for nine companies: While two other companies that sell NSF 140 certified carpet were listed in the GSA Schedule database, sales data for these companies was not available for FFY 2011.

In addition to collecting sales data, IEC conducted telephone interviews with all but one participating manufacturer (one furniture manufacturer provided data, but declined to participate in an interview). The discussions covered their reasons for selling certified products to the federal government, other “green” product standards used, changes in their production process and/or marketing, and trends in demand among federal and non-federal purchasers. We present this qualitative information as well as the sales data in the following sections.

Furniture

The four furniture manufacturers report selling \$67.2 million of furniture (certified and uncertified) to the federal government in CY 2011.⁷⁶ Of these four companies, one began selling BIFMA e3/Level certified furniture in 2010, two began in 2011, and the fourth began in 2012. Exhibit 3-12 shows total federal sales, BIFMA e3/Level certified sales, and BIFMA e3/Level certified sales as a percent of the total for the four furniture companies. As shown in the exhibit, the portion of BIFMA e3/Level certified sales among these four manufacturers rose from zero in 2009 to more than a quarter (26%) in 2011.

EXHIBIT 3-12. BIFMA E3/LEVEL FEDERAL FURNITURE SALES FOR FOUR MANUFACTURERS

FURNITURE SALES (\$ VALUE)	CALENDAR YEAR (JANUARY 1 - DECEMBER 31)				
	2007	2008	2009	2010	2011
Federal Sales ¹	16,641,812	22,344,747	23,847,503	69,188,135	67,211,863
BIFMA e3/Level Certified ²	-	-	-	10,695,432	17,559,767
BIFMA e3/Level Certified % of Total	-	-	-	15%	26%
¹ 2007-2009 federal sales figures are based on data for three companies; 2010-2011 federal sales are based on four companies. The four companies account for approximately 10% of total sales of furniture manufacturers that sell BIFMA e3/Level certified products to the federal government. Therefore, the information in this table is anecdotal and may not be representative of all companies selling BIFMAe3/Level certified furniture to the federal government. ² Sales of BIFMA e3/Level certified products in 2010 are based on data for one company; sales for 2011 are based on three companies. The fourth company in our analysis achieved BIFMA e3/Level certification in 2012.					

Exhibit 3-13 provides information on other green federal sales for two of the four participating furniture manufacturers (the other two companies did not fill in the table). Other (non-BIFMA e3/Level) green certification, such as GreenGuard, accounted for 25% of sales, on average, between 2007 and 2011. Products that manufacturers considered green or low VOC, but without a green label, accounted for less than 1% of federal sales. With the introduction of BIFMA e3/Level sales in 2011 (5%), the portion of “other green certification” and green or low VOC (but not certified) both increased, while the percentage of sales with no green standard certification declined. This suggests that BIFMA e3/Level certification

⁷⁶ The GSA Sales Query (<https://ssq.gsa.gov/>) indicates that the four participating furniture manufacturers sold \$91 million of products through Schedule 71 in FFY 2011. Federal sales data that the companies provided directly to IEC shows total sales of \$67.2 million in CY 2011. The reason for the discrepancy is unclear: this may be partly due to the difference in timing (FFY vs. CY), and partly due to which sales manufacturers included when they provided data (for example, it is possible that manufacturers provided a subset of their total sales through GSA Schedule 71).

expanded the companies' green product offering, but did not displace existing green certifications or practices.

EXHIBIT 3-13. OTHER GREEN FEDERAL SALES FOR TWO MANUFACTURERS

FURNITURE SALES (\$ VALUE)	CALENDAR YEAR (JANUARY 1 - DECEMBER 31)				
	2007	2008	2009	2010	2011
Sales to Federal Government ¹	12,422,877	16,634,129	18,060,063	22,603,389	16,807,625
No Green Standard Certification	8,681,131	12,522,876	14,243,531	17,822,484	11,748,261
% Total	69.9%	75.3%	78.9%	78.8%	69.9%
BIFMA e3/Level Certified ²	-	-	-	-	848,418
% Total	-	-	-	-	5.0%
Other Green Certification, not BIFMA e3/Level	3,685,827	4,060,620	3,777,174	4,739,546	4,172,938
% Total	29.7%	24.4%	20.9%	21.0%	24.8%
Green or Low VOC, but not certified to any green third-party standard	55,919	50,631	39,358	32,359	38,008
% Total	0.5%	0.3%	0.2%	0.1%	0.2%
Discrepancy	-	2	-	9,000	-
¹ Based on data for two companies. A third company noted that 50% of its casegoods were Greenguard certified in 2006, and 100% of its seating was Greenguard certified in 2008; however, the company did not break out sales by product category. The fourth company provided BIFMA e3/Level and non-Level sales, but did not further break out non-Level sales. ² One company represented in this table achieved BIFMA e3/Level certification in 2011, the other in 2012.					

The sales data are consistent with qualitative information provided by the manufacturers. As noted above, IEC held telephone conversations with three of the four furniture companies about their reasons for selling certified products to the federal government, changes in their production process, changes in marketing practices, and demand for certified products. All three companies stated that BIFMA e3/Level was a credible standard that was necessary to help counter “green washing” in the furniture industry. All three companies offered other green certified furniture prior to BIFMA e3/Level, although one company had to change its manufacturing process to attain BIFMA e3/Level certification. All three companies interviewed mention BIFMA e3/Level in their marketing, although the standard does not appear to be a key element of their marketing strategy. The manufacturers anticipate growth in federal demand for the standard; they also noted the importance of federal leadership to stimulate demand among non-federal purchasers.

The furniture manufacturers offered the following observations:

- One furniture manufacturer who achieved BIFMA e3/Level certification in 2011 did so because it saw the need for a credible standard that would help eliminate “green washing” in the furniture industry. After just one year, BIFMA e3/Level certified products account for approximately 85% of this company’s total federal sales. Prior to BIFMA e3/Level, the company was selling GreenGuard

certified products (since 2006); currently most of their products are GreenGuard certified, and there is overlap between products certified to both BIFMA e3/Level and GreenGuard. However, attaining BIFMA e3/Level certification required additional changes to the company's manufacturing process. Specifically, the company changed its upholstery and finishing processes to reduce formaldehyde, VOC, and HAPS, and also changed its adhesive structures. In addition, the company created "work cell environments" to separate out recyclables for distribution to recycling centers. The company has not changed its marketing practices, other than stating that it offers BIFMA e3/Level certified furniture. The company reports that one in five federal clients requests various BIFMA/ANSI tests (e.g., furniture emissions testing), but clients have not requested information on what level the furniture is certified to at this time.

- Another furniture manufacturer echoed the sentiment that BIFMA e3/Level would help counter "green washing" in the furniture industry; this company participated in the process of creating the standard, and adopted BIFMA e3/Level for all of its furniture products in 2011. Prior to BIFMA e3/Level, 50% of the company's case goods were GreenGuard certified in 2006, and 100% of its seating was GreenGuard certified in 2008; in addition, the company has Forest Stewardship Council (FSC) Chain of Custody (CoC) certification. Achieving BIFMA e3/Level certification did not require changes to the company's manufacturing processes, but may require changes in the future as the company moves towards a higher level of certification. The company mentions its green certifications in its marketing materials, but BIFMA e3/Level certification has not changed how the company goes to market. The company reported increasing demand among federal customers, and expects this demand will "trickle down" to state, local and private customers, although this has not happened yet. The company noted that if BIFMA e3/Level certification is incorporated into LEED, this would be an important consideration for more customers.
- A third furniture company received BIFMA e3/Level certification in 2012; a "strong push" from the federal government was a major factor in the company's decision to obtain BIFMA e3/Level certification. While the federal government did not specify BIFMA e3/Level certification, there was a strong sense that the industry needed to enhance its sustainability credentials, and the company identified BIFMA e3/Level as the best standard on the market. The company attained certification in February 2012, and expects all of its sales for 2012 will be BIFMA e3/Level certified. Prior to BIFMA e3/Level, the company was one of the first to obtain FSC CoC certification, and has had GreenGuard certification, for more than five years. Achieving BIFMA e3/Level certification did not require changes in the company's manufacturing processes. However, the company updated its marketing materials to promote its use of the BIFMA e3/Level standard. The company reports that demand among federal customers is increasing very quickly, as the standard is becoming more of a widespread requirement. Some federal departments (including the Department of Homeland Security and the U.S. Navy) are already requiring the standard. State and local demand is not as strong, but the company expects it will follow federal demand; in particular, since many state contracts are predicated on GSA, if GSA integrates BIFMA e3/Level certification into purchasing schedules, states will follow. Similarly, there is growing demand from the private sector, but not as strong.

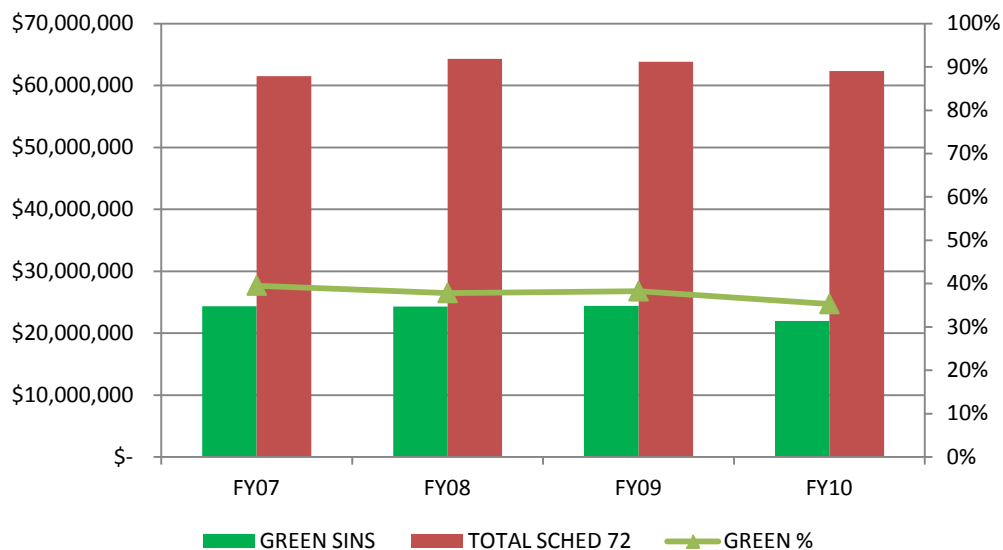
Carpet

We collected two sources of purchasing data for environmentally preferable carpet: federal sales data through GSA Schedule 72 and "mini-market" sales data from one carpet manufacturer.

- GSA Schedule Data.** GSA Multiple Award Schedules are long-term, government-wide contracts with commercial firms that provide access to a wide range of commercial products and services at volume discount prices. The contracts are managed by GSA. Four GSA Schedules offer the building and construction products covered by the evaluation: Schedule 71 (Furniture), 72 (Furnishings and Floor Coverings), 51V (Hardware SuperStore), and 56 (Buildings and Building Materials, Industrial Services and Supplies). GSA provided purchasing data for all of the requested schedules except Schedule 71 (Furniture). The Schedule data show annual federal purchases through each Schedule, broken out by Special Item Number (SIN). Specific SINs require contractors to provide environmentally preferable products.

Since January 2011, carpet sold through SINs 31-301 and 31-303 (Schedule 72) is required to be NSF 140 certified at the gold level.⁷⁷ Prior to January 2011, NSF 140 carpet was preferred but not required. GSA maintains data on sales that went through “green mandate” SINs (e.g., 31-301 and 31-303). Exhibit 3-14 shows total Schedule 72 spending, as well as the volume and percentage of spending that went through “green” SINs (i.e., 31-301 and 31-303) for FY07 through FY10. As shown in the exhibit, GSA recorded approximately \$23 million in annual sales through the “green” SINs, out of a total of approximately \$63 million in annual sales through Schedule 72. The percent of “green” sales (37%) remained roughly constant from FY07 through FY10.

EXHIBIT 3-14. GREEN SPEND THROUGH GSA SCHEDULE 72 - FURNISHINGS AND FLOOR COVERINGS



Although these data can provide some sense of the magnitude of environmentally preferable carpet sales to the government, the Schedule 72 data have a number of limitations. First, Schedule 72 sells products other than carpet; hence, the share of green *carpet* (as opposed to other furnishings and floor coverings) sold through Schedule 72 is likely to be much higher than the percentage shown in the exhibit. Second, federal agencies can still buy non-environmentally preferable carpet through

⁷⁷ We are using the data for carpet sales because we were able to interpret and validate the data by speaking directly with the GSA Schedule contact for carpet (Schedule 72). IEC was not able to arrange calls with the other GSA Schedule managers.

Schedule 72 if they buy from a small business SIN, or if they are buying specialty carpet (again through a separate SIN). Third, manufacturers on other (non-“green mandate”) SINs may opt to sell environmentally preferable products on a voluntary basis, but we do not know the relative mix of environmentally preferable versus non-environmentally preferable sales through those SINs. Finally, the GSA Schedules do not account for all sales to the federal government; federal agencies can purchase building and construction products outside of the GSA Schedules.

- Mini-market data.** We supplemented the GSA Schedule data with the mini-market analysis. As noted above, we received sales data from one carpet manufacturer out of 11 contacted; this manufacturer accounts for approximately 15% of total carpet sales of manufacturers that sell NSF 140 certified carpet products to the federal government, and may not be representative of the industry as a whole. However, this manufacturer has annual U.S. carpet sales of approximately \$350 million. As shown in Exhibit 3-15, since FY 2008 the company’s annual sales to the federal government have fluctuated between \$3.6 million and \$6.9 million. Since 2006, 100% of this company’s carpet sales to the federal government are certified to the Carpet and Rug Institute’s Green Label Plus. Since 2007, all federal sales are also NSF 140 certified at the platinum or gold level, depending on the backing used.

EXHIBIT 3-15. FEDERAL CARPET SALES FOR ONE CARPET MANUFACTURER

CARPET SALES (\$)	FEDERAL FISCAL YEAR (OCTOBER 1 - SEPTEMBER 30) ALL CARPET IS NSF 140 CERTIFIED AND GREENLABEL PLUS CERTIFIED			
	2008	2009	2010	2011
Sales to Federal Government	5,894,549	6,968,203	4,928,544	3,696,834

According to a company spokesperson, the company did not adopt any major changes to its production process to achieve NSF 140 certification. In general, the most challenging aspect of becoming NSF 140 compliant is the requirement for 10% post-consumer recycled content, which the company offers in its platinum certified product line. The spokesperson stated that many manufacturers had to create a special product offering to meet this requirement.

According to this manufacturer, marketing the standard has been challenging, and this responsibility has largely fallen to the manufacturers. Many buyers still are not aware of NSF 140. Of those who are aware, many buyers are seeking information on the specific credits that carpet manufacturers earned to get NSF 140 certification (manufacturers can obtain certification in different ways), and they are confused by the variety of standards and labels in the market. Nonetheless, this manufacturer supports the standard.

QUESTION 4: LEADING BY EXAMPLE

Introduction

As the organizational home of the EPP Program and the federal agency charged with environmental protection, EPA’s performance regarding environmentally preferable purchasing is of particular interest.

In several areas of environmental stewardship, EPA has strived to publicly demonstrate a good example for other federal agencies and non-federal institutions; for example, EPA has publicized efforts to green its own facilities and purchase electricity from renewable sources. With this context as a backdrop, Evaluation Question 4 asks, “Is EPA leading by example in terms of purchasing behavior for green products and services?”

To answer this question, ideally, IEC would compare quantitative purchasing data for EPA and the rest of the federal government, examining relative rates of environmentally preferable and conventional purchases. However, such data is not available, for either the federal government as a whole (excluding the EPEAT data discussed in Evaluation Question 3) or for EPA. In the absence of such purchasing data, we have gathered information on attitudes and behaviors regarding EPP purchasing from a variety of sources, including the survey of federal purchasers and interviews with EPA staff. We also examined data from the Federal Electronics Challenge (FEC), to compare EPA facilities to other facilities participating in the FEC program.

Key Findings

- EPA does not track its proportion of environmentally preferable versus conventional purchases. This seriously hinders the ability to evaluate EPA’s performance compared to other agencies. Reliable purchasing data is a critical need for any future efforts to evaluate EPA’s performance in this area.
- Survey data are somewhat mixed, but on the balance, indicate that EPA purchasers buy more environmentally preferable products and services than non-EPA purchasers. This appears to be due to a small group of EPA purchasers, rather than a widespread Agency-wide effect.
- While we have limited interview data, our interviews indicate that EPA has taken some steps to green its own purchasing, and is using purchasing tools to promote procurement of environmentally preferable electronics, building and construction products, and office supplies.
- Many EPP staff view leading by example as a secondary concern for the program compared to efforts to develop standards and other resources that could have a broader impact on the market.
- EPA offices participate in the FEC at rates well above the federal government as a whole. EPA FEC partners’ performance is also well above other FEC partners with respect to EPEAT purchases and enabling rates of Energy Star power management settings.

Survey Evidence of Leading By Example

In IEC’s survey of federal purchasers, we compared the responses of EPA and non-EPA purchasers on several key questions addressing environmentally preferable purchasing behavior. We also compared EPA purchasers to purchasers from a handful of other specific agencies on certain key questions.

81% of EPA purchasers indicated that their agency or department had an environmentally preferable purchasing policy, compared to 60% of all purchasers. Similar numbers indicated that their agency or department gave some kind of preference to environmentally preferable products (82% and 62%). Thus, in terms of agency policy, EPA appears to be promoting environmentally preferable products more than other agencies. Of course, this does not necessarily mean that EPA purchasers actually buy environmentally preferable products or services at higher rates. Thus, we compared EPA and non-EPA purchasers’ responses to survey questions on individual purchasing behavior. Two particularly important questions were:

- “In the past year, have you made at least one purchase where you considered environmental factors in your purchasing decision?”
- “In the past year, approximately what percentage (expenditures) of the products/services that you purchased was environmentally preferable?”

On the first question, we found no difference between EPA purchasers and non-EPA purchasers; 62.3% of EPA purchasers and 62.4% of non-EPA purchasers chose “yes” (Exhibit 3-16). EPA lagged well behind GSA on this question, and was somewhat behind USDA as well.

EXHIBIT 3-16. PURCHASERS CONSIDERING ENVIRONMENTAL FACTORS AT LEAST ONCE IN THE PAST YEAR

AGENCY	RESPONSES	% CONSIDERING ENVIRONMENTAL FACTORS
All	2539	62.4%
GSA	194	78.4%
USDA	413	68.3%
Department of Energy	25	64.0%
EPA	191	62.3%
Department of Homeland Security	317	54.3%

On the second question, EPA purchasers exhibited more environmentally preferable purchases than non-EPA purchasers to a statistically significant degree (Exhibit 3-17). We used a chi-square test for this analysis, which compares observed results to the results that would be expected if there was no difference between the two groups. This analysis provides perhaps the clearest evidence of EPA leading by example. However, the results appear to be driven by a relatively small group of purchasers. Specifically, if there was no difference between the groups, we would expect 14 EPA purchasers for whom 75% or more of their purchases were environmentally preferable. In fact, 23 EPA purchasers indicated this high rate of EPP purchases, a difference of just nine individuals. Thus, while the difference is statistically significant, only a small number of EPA purchasers exhibit any meaningful divergence in behavior from the rest of the federal procurement workforce. The results of the question discussed above, showing that an identical proportion of EPA and non-EPA purchasers considered environmental factors at least once in the past year, lends further support for this interpretation. Note, in addition, that GSA purchasers indicated higher rates of environmentally preferable purchasing activity than EPA purchasers on this question.

We also compared EPA and non-EPA purchasers’ responses to several other questions, in which we did not find any statistically significant differences. These include rates of environmentally preferable purchases for electronics and building and construction products specifically, and changes in environmentally preferable purchasing levels over the past three years. However, with respect to purchases in the individual product categories, the lack of a significant difference appears to be due to a low sample size – there were just 24 EPA electronics purchasers and 14 EPA building product purchasers – and a high number of EPA respondents choosing “don’t know.” Furthermore, the fact that EPA purchasers do not appear to be increasing their levels of EPP purchases over time more than non-EPA

purchasers could simply indicate that EPA purchasers were already buying EPP products at relatively high rates three years ago and have plateaued since that time, while other agencies are now catching up. For these reasons, we maintain that the most appropriate conclusion of the survey data is that EPA purchasers are buying environmentally preferable products at somewhat higher rates than non-EPA purchasers, due to the influence of a small number of highly committed purchasers.

EXHIBIT 3-17. ENVIRONMENTALLY PREFERABLE PURCHASING OF EPA VS. NON-EPA PURCHASERS: CHI-SQUARE TEST

PERCENTAGE OF ENVIRONMENTALLY PREFERABLE PURCHASED PRODUCTS/SERVICES	EPA PURCHASERS			NON-EPA PURCHASERS		
	OBSERVED	EXPECTED	% DIFFERENCE	OBSERVED	EXPECTED	% DIFFERENCE
Less than 25%	65	65	1%	739	739	0%
25-50%	36	33	11%	369	372	-1%
51-75%	15	19	-22%	224	220	2%
More than 75%	23	14	68%	147	156	-6%
Don't know	52	61	-15%	706	697	1%
Total	191			2,185		

Chi-square = 9.760; P value = 0.045

Interview Evidence of Leading By Example

We interviewed one staff person from the Office of Administration and Resources Management (OARM), the office with primary responsibility for EPA’s procurement activities, to discuss EPA’s efforts to purchase green products and services. We also interviewed five members of EPP Headquarters staff, plus three other EPA staff members in closely related positions, but these interviews were not focused on the issue of EPA leading by example. Thus, we have a limited basis for our interview-related findings on the leading by example question.

The OARM interviewee stated that they had seen a definite increase in environmentally preferable purchasing awareness and behavior in EPA in recent years. The interviewee credited this mainly to OARM’s behind-the-scenes efforts to facilitate purchasers choosing sustainable options; they viewed these activities as complementary to the EPP Program’s efforts to encourage green purchases. However, without quantitative purchasing data, we cannot confirm the interviewee’s assertion that EPA’s environmentally preferable purchasing has been increasing.

The interviewee reported that EPA makes use of several green purchasing tools, which could promote higher levels of environmentally preferable purchasing. One of these is a Blanket Purchase Agreement (BPA) for electronics, described as a “mandatory first option” for all electronics purchases; all of the computers and monitors included in this BPA are EPEAT certified. Thus, we would expect that a high percentage of EPA’s total electronics purchases are EPEAT certified, and indeed, FEC data on EPA’s EPEAT purchases, discussed below, support this contention.

Other important green purchasing tools that EPA uses include:

- The Federal Green Construction Guide for Specifiers, an important output of the EPP Program, which has been used to guide purchases of building and construction products for some EPA buildings;
- GSA’s Sustainable Facilities Tool (SFTool), which offers a wide variety of resources and guidance on building and construction products; and
- A BPA on office supplies, developed in 2003 with significant assistance from the EPP Program (see sidebar).

EPA’s use of these tools for its operations indicates that EPA is taking at least some steps to green its own procurement.

Our interviews revealed that EPP staff are divided on whether leading by example is an important part of the EPP Program’s mission. Most felt that it was not, stating that EPP had evolved away from earlier efforts where procurement leadership was more important; these staff felt that EPP’s resources were better spent working on developing voluntary consensus standards and other tools with the potential to influence the market more broadly. Several EPP staff also suggested that while leading by example is important, it is more appropriate to see this as a role for the entire federal government, setting a good example for other institutional buyers such as businesses and state governments. However, a minority of EPP staff indicated that they would like to see greater procurement leadership from EPA. They indicated that EPP needs to improve coordination with OARM to promote environmentally preferable purchasing within the Agency and verify that OARM’s green purchasing policies are actually being followed.

OFFICE SUPPLY BPA

This evaluation has not focused on the office supply product sector because it is not a current area of focus for the EPP Program. However, the EPP Program performed extensive work in this area in prior years. In 2003, EPA undertook a major effort to develop a Blanket Purchase Agreement (BPA) for office supplies. EPP and OARM were both involved in this endeavor.

The BPA changed EPA purchasers’ experience of purchasing office supplies. EPA awarded a single-source BPA, meaning they had only one supplier for all of their office supplies. EPA created incentives for the supplier to increase the number of environmentally preferable products offered, by offering an extension on the sole-source BPA in exchange for an increase in the number of environmentally preferable products. In response to the BPA, EPA’s supplier created a new special section of the office supply catalog exclusively featuring green products. The supplier also created a green icon to identify sustainable products when they were listed elsewhere in the catalog.

Other government stakeholders have recognized the BPA as a major success. GSA used similar criteria in its Federal Strategic Sourcing Initiative, and the White House recognized EPA with a prestigious ‘Closing the Circle’ award. Part of the reason the EPP Program is not currently focused on office supplies may be that its past success has reduced the need for further efforts.

EPA Participation in FEC

The Federal Electronics Challenge (FEC) is a voluntary partnership program for federal facilities and agencies that promotes sustainable electronics purchasing and use. Two evaluation questions (8 and 9) are devoted to analyzing the FEC program’s performance; we provide more detail on program structure and activities there. In this section, we focus on EPA’s participation in the FEC and how the Agency’s performance compares to other FEC partners. Our primary data source for this analysis is facility-specific performance information provided by FEC. We evaluate four metrics:

- Participation rate;
- Purchase rates of EPEAT vs. non-EPEAT electronics;
- Enabling of Energy Star power management features during equipment use; and
- Disposal of electronics products at end of life.

As of 2010, 16 EPA program offices and all 10 Regional offices were FEC partners, representing most if not all of the Agency. EPA offices accounted for 15% of all FEC partners from 2008 – 2010. According to the FEC program manager, FEC covers approximately 20% of all federal employees;⁷⁸ all else being equal, we would assume that the program would cover a similar proportion of federal facilities. This would imply that if FEC participation were distributed evenly among all federal agencies, about 20% of the facilities or program offices in any given agency would be FEC partners. Using this metric, EPA has a very high participation rate compared to the rest of the federal government.

EPA partners have also demonstrated leadership in several of the performance areas FEC tracks. Perhaps most important for our purposes is the proportion of EPEAT vs. non-EPEAT purchases. In every year from 2008 – 2010, EPA partners purchased EPEAT products for over 99% of their computers and monitors (Exhibit 3-18). While the FEC as a whole also had impressive levels of EPEAT purchases, their results were well below the EPA figures. The margin by which EPA partners out-performed the FEC as a whole ranged from 3% in 2009 to 12% in 2008.

FEC also promotes and tracks enabling of Energy Star power management features. Again, EPA partners' performance is strong compared to other FEC partners in this area (Exhibit 3-19). With the exception of monitors in 2008, EPA partners enabled Energy Star settings at higher rates than non-EPA partners in every year from 2008 – 2010 for both monitors and computers. While the differences were relatively modest for monitors, EPA partners had substantially higher enabling rates for computers; average enabling rates were 46.7% for all FEC partners compared to 93.3% for EPA partners. EPA partners reached 100% Energy Star enabling for both monitors and computers in 2010.

EPA partners' performance is less impressive in end-of-life disposal. Combining recycling and reuse for the sake of simplicity, we see that EPA partners chose these disposal options at slightly higher rates than other FEC partners in 2008, with a more pronounced difference in 2009 (Exhibit 3-20). EPA partners sent very few electronics products to landfills or incinerators in those years. However, results for 2010 are dramatically different. In that year, EPA partners disposed of roughly 20% of their electronics through landfill or incineration, compared to about 5% for the FEC as a whole. EPA partners' rate of reuse and recycling dropped correspondingly. It is important to note that all of the reported EPA landfill/incineration in 2010 came from one office, OARM; additional follow-up may be required to verify this data point given that it is an outlier.

⁷⁸ This metric excludes postal employees.

EXHIBIT 3-18. EPEAT AND NON-EPEAT PURCHASES, EPA VS. ALL FEC PARTNERS

	2008		2009		2010	
	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT
Desktops						
All FEC partners	90.0%	10.0%	97.0%	3.0%	92.4%	7.6%
EPA partners only	100.0%	0.0%	99.2%	0.8%	99.8%	0.2%
EPA margin	10%		2.2%		7.4%	
Laptops						
All FEC partners	79.5%	20.5%	97.3%	2.7%	97.6%	2.4%
EPA partners only	100.0%	0.0%	99.5%	0.5%	100.0%	0.0%
EPA margin	20.5%		2.2%		2.4%	
Monitors						
All FEC partners	89.7%	10.3%	95.5%	4.5%	85.2%	14.8%
EPA partners only	99.3%	0.7%	99.7%	0.3%	97.8%	2.2%
EPA margin	9.6%		4.2%		12.6%	
Total						
All FEC partners	88.2%	11.8%	96.4%	3.6%	91.3%	8.7%
EPA partners only	99.8%	0.2%	99.5%	0.5%	99.1%	0.9%
EPA margin	11.6%		3.1%		7.8%	

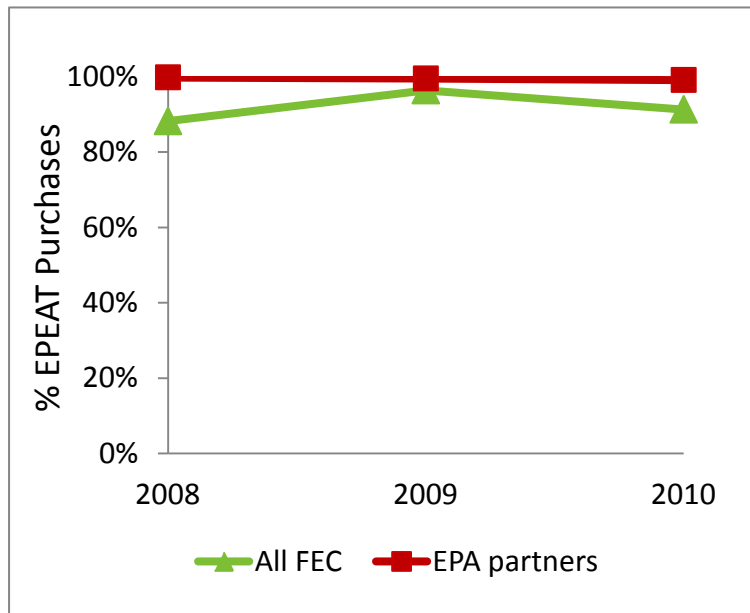


EXHIBIT 3-19. ENERGY STAR ENABLING, EPA VS. ALL FEC PARTNERS

	MONITORS			COMPUTERS		
	2008	2009	2010	2008	2009	2010
All FEC partners*	94.5%	95.7%	87.3%	36.4%	50.6%	53.1%
EPA partners only	92.0%	98.3%	100.0%	87.6%	92.2%	100.0%
EPA margin	-2.5%	2.6%	12.7%	51.2%	41.6%	46.9%

* Excluding anomalous data points.

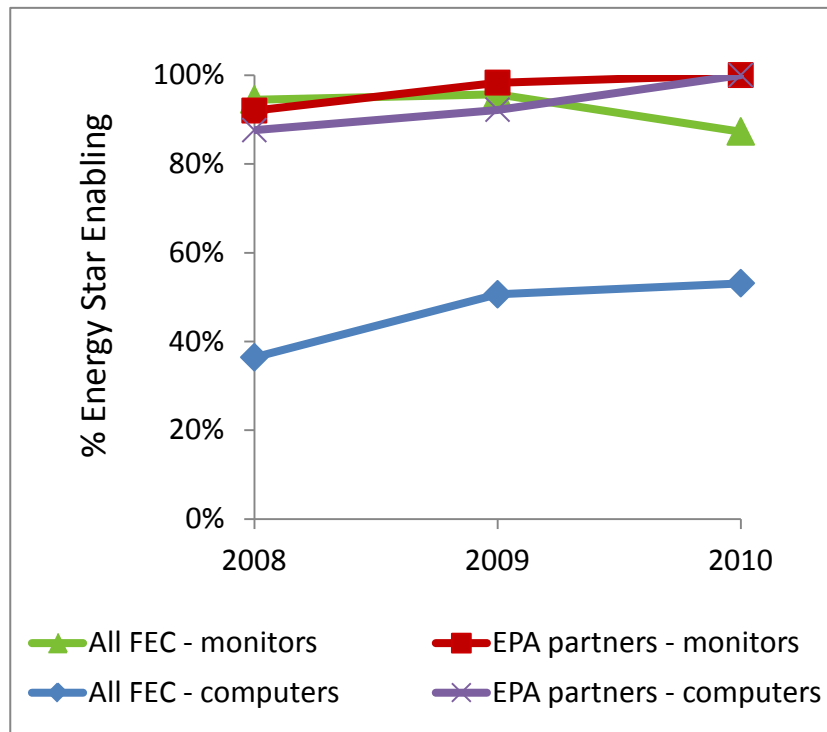
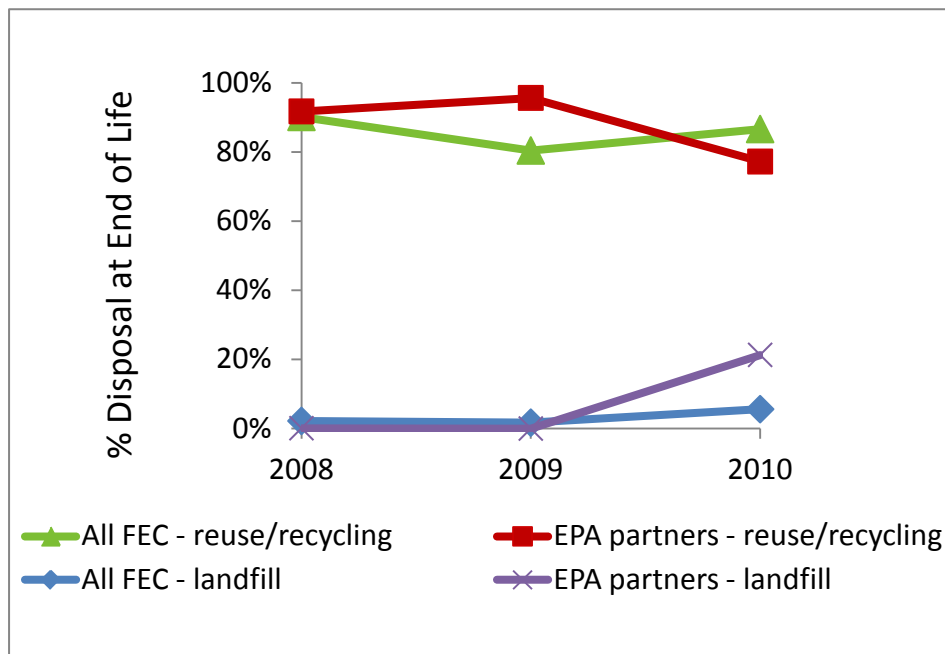


EXHIBIT 3-20. END-OF-LIFE DISPOSITION, EPA VS. ALL FEC PARTNERS

	MONITORS			COMPUTERS		
	2008	2009	2010	2008	2009	2010
% Reused						
All FEC partners	53.4%	37.7%	39.3%	48.3%	46.4%	42.3%
EPA partners only	43.7%	61.6%	63.8%	41.8%	61.6%	58.6%
EPA margin	-9.7%	23.9%	24.5%	-6.5%	15.2%	16.3%
% Recycled						
All FEC partners	36.7%	42.7%	47.3%	41.4%	37.0%	47.4%
EPA partners only	48.0%	34.0%	13.4%	44.1%	36.6%	18.8%
EPA margin	11.3%	-8.7%	-33.9%	2.7%	-0.4%	-28.6%
% Unknown Disposition/Sales						
All FEC partners	8.3%	21.9%	4.8%	9.2%	18.0%	4.0%
EPA partners only	8.2%	3.2%	1.1%	13.9%	1.3%	2.4%
EPA margin	-0.1%	-18.7%	-3.7%	4.7%	-16.7%	-1.6%
% Sent to Landfill/ Incinerator						
All FEC partners	2.2%	1.7%	5.6%	1.8%	1.3%	4.0%
EPA partners only	0.1%	0.0%	21.3%	0.1%	0.0%	19.1%
EPA margin	-2.1%	-1.7%	15.7%	-1.7%	-1.3%	15.1%

100% of EPA computers and monitors sent to landfill/incinerator in 2010 are from OARM.



QUESTION 5: ENVIRONMENTAL BENEFITS OF FEDERAL GREEN PURCHASES

Introduction

In this section, we explore the environmental impacts of federal green purchases. Specifically, Evaluation Question 5 asks, “What are the outcomes of federal green purchases in terms of reduced energy use and associated greenhouse gas emissions, reduced water use, and reduced use of hazardous materials?” As noted in our discussion of Evaluation Question 3, IEc was able to find comprehensive federal green purchasing data only for the electronics sector. The electronics sector was also the sector for which we identified a reliable means to translate green purchases into quantified environmental benefits. As a result, our analysis of environmental benefits focuses on the electronics sector exclusively, and specifically purchases of EPEAT certified computers and monitors.

Key Findings

- The environmental benefits of federal EPEAT purchases are substantial. In 2010, the benefits of federal EPEAT purchases were roughly equivalent to eliminating: the annual electricity consumption of 25,000 average U.S. homes; the greenhouse gas emissions of 40,000 U.S. cars for one year; and the solid waste generation of 252 U.S. households for one year.⁷⁹
- There is substantial year-to-year variability in the benefits of federal EPEAT purchases. These fluctuations are driven by the number of products purchased, the type of products purchased (especially laptops versus desktops), and assumptions on the per-unit environmental benefits of each product type.
- Because of the nature of the assumptions used to calculate environmental benefits, these estimates should be viewed as approximations rather than precise measurements.
- Due to a lack of purchasing data and tools to quantify benefits, estimates of the environmental benefits of federal purchases are not available for the building and construction products or travel and hospitality sectors.

Calculation of Environmental Benefits of Federal EPEAT Purchases

The Green Electronics Council (GEC), which manages the EPEAT program, produces publicly-available Environmental Benefits Reports on an annual basis. These reports summarize the market impact of the EPEAT program, describing the combined sales of all EPEAT products by all participating manufacturers in the U.S. and much of the rest of the world.

The Environmental Benefits Reports also detail the environmental benefits associated with EPEAT sales. GEC uses the Electronics Environmental Benefits Calculator, or EEBC, to estimate these environmental benefits, by comparing the energy, water, and other impacts of EPEAT certified electronics products to those of conventional units. The EEBC was initially developed by Abt Associates under EPA contract. The calculator was peer-reviewed when it was initially developed, and based on conversations with EPP staff and a limited review by IEc, it appears to be a reasonably robust method of estimating environmental

⁷⁹ As discussed below, environmental benefits were calculated based on data from GEC’s EPEAT Environmental Benefits Reports. Equivalencies are also adapted from these reports.

benefits. For that reason, IEC has opted to use GEC's reported benefits for the EPEAT program as a whole, which rely on the EEBC, as a basis for estimating the benefits stemming from federal government purchases of EPEAT electronics.⁸⁰ We report benefits only for 2008-2010, because we do not have EPEAT purchasing data beyond this timeframe.⁸¹

The EEBC is based on a series of assumptions characterizing both the average EPEAT product at each registry level (bronze, silver, and gold) and the average non-EPEAT product. It calculates benefits by comparing the estimated impacts of the purchased EPEAT product to the impacts of a default non-EPEAT product. While the EEBC's assumptions appear to be reasonable, other, equally plausible assumptions exist that would result in significantly different estimates of environmental benefits. We discuss this issue in greater detail below.

Data on federal purchases of EPEAT products is included in our analysis of Evaluation Question 3. Unfortunately, these data do not include detail on the number of products purchased at each level of EPEAT certification (bronze, silver, or gold). For that reason, it would not provide any methodological advantage to enter the total federal purchase numbers into the EEBC to calculate environmental benefits directly (since benefits vary with certification level). Instead, we simply multiply GEC's reported total environmental benefits from *worldwide* EPEAT sales in any given year (which does account for differences in EPEAT certification levels)⁸² by the federal government's share of worldwide EPEAT sales. We use worldwide rather than U.S. sales data because GEC reports benefits for each individual product category (laptops, desktops, monitors, and integrated systems) on a worldwide basis, but not for the U.S. alone.

Because we use the federal government's share of worldwide total sales as the basis for estimating its share of EPEAT's environmental benefits, our methodology implicitly assumes that the federal government's EPEAT purchases reflect the same proportional split between bronze, silver, and gold products as does the market as a whole. If the federal government actually purchases gold-level products in higher proportions than the market average, this approach would understate the government's environmental benefits slightly; conversely, if the government's purchases are more heavily weighted toward bronze products, we may overstate the government's benefits. Note, however, that any uncertainty in this regard would make an appreciable difference only with respect to energy and municipal solid waste-related benefits. For all other environmental impacts, there is less than a 10% difference in benefits between bronze and gold EPEAT certified products in the most recent version of the EEBC (and in most cases, the difference is less than 3%).

⁸⁰ In undertaking this analysis, IEC uncovered some evident errors in the benefits reported by GEC for specific product categories (though not, as far as we are aware, for total benefits across all product categories). These errors were evident because the reported total benefits for each category did not sum correctly to produce the reported totals across categories; inconsistencies in year-by-year trends and in equivalencies (e.g., translating kilowatt-hours of electricity saved into an equivalent number of U.S. homes' annual electricity demand) provided further evidence of the errors. IEC therefore corrected the apparent errors before calculating the federal government's share of EPEAT benefits. Specific errors corrected by IEC include the following: 1) 2009 electricity benefits from desktops were overstated by a factor of 10; 2) 2009 air emission benefits from desktops were overstated by a factor of 1,000; 3) toxic material benefits from desktops mistakenly repeated the same figure reported for laptops; and 4) 2010 electricity benefits from laptops were overstated by a factor of 10.

⁸¹ Data for 2011 was released after we had completed our analysis.

⁸² EPEAT calculated environmental benefits based on specific certification levels in 2009 and 2010, but not in 2008.

Exhibit 3-21 presents information on the federal government’s share of U.S. EPEAT purchases. The overall impacts of EPEAT, beyond the federal government, are discussed under findings for Evaluation Question 10.

EXHIBIT 3-21. FEDERAL GOVERNMENT SHARE OF WORLDWIDE EPEAT PURCHASES

PRODUCT TYPE	2008		2009 ¹		2010	
	FEDERAL GOVT. EPEAT PURCHASES	FEDERAL GOVT. SHARE OF WORLDWIDE PURCHASES	FEDERAL GOVT. EPEAT PURCHASES	FEDERAL GOVT. SHARE OF WORLDWIDE PURCHASES	FEDERAL GOVT. EPEAT PURCHASES	FEDERAL GOVT. SHARE OF WORLDWIDE PURCHASES
Desktops	577,260	2.96%	1,156,682	14.63%	515,184	6.42%
Monitors	181,141	0.47%	1,134,811	3.71%	N/A	N/A
Laptops	213,275	0.67%	644,564	1.60%	561,852	0.91%
Integrated Systems	0	0.0%	4	0.0%	111,187	3.15%
Total	971,676	1.07%	2,936,061	3.65%	N/A	N/A

¹ EPEAT implemented a country-specific registry protocol in 2009. One result of this change is that reported total sales for 2009 and 2010 exclude EPEAT sales in all countries other than the 40 represented in the registry; these other countries had previously been included in worldwide sales totals. This change is likely responsible for the reported decrease in EPEAT products from 2008 to 2009, and the concomitant increase in the U.S. federal government’s share of the worldwide market. Because reported worldwide environmental benefits dropped along with purchases, this change should not affect this portion of our analysis.

Environmental benefits associated with federal EPEAT purchases are shown in Exhibit 3-22. Although we calculate the federal government’s benefits for each product category separately,^{83,84} for ease of presentation we show only the aggregated figures across all product categories.

To put these in perspective, the federal government’s estimated environmental benefits in 2010 are roughly equivalent to the following:⁸⁵

- The annual electricity consumption of 25,000 average U.S. homes
- The greenhouse gas emissions of 40,000 U.S. cars for one year
- The solid waste generation of 252 U.S. households for one year

Across all categories, the federal government’s environmental benefits increased dramatically between 2008 and 2009 before dropping back in 2010. This is driven by the year-by-year trends in purchasing noted in our analysis of Evaluation Question 3; we believe (but cannot be sure) that the drop in EPEAT

⁸³ EPEAT reports benefits by product category for 2009 and 2010, but not for 2008. As a result, we use the federal government’s total market share of all products (1.07%) divided by worldwide benefits for all products in 2008.

⁸⁴ EPEAT counts integrated systems as laptops for purposes of calculating benefits. We account for this by using the weighted average of the federal government’s market share of laptops and integrated systems to determine its share of worldwide environmental benefits for those categories.

⁸⁵ Equivalencies are adapted from GEC’s 2009 and 2010 EPEAT Annual Benefits Reports.

purchasing mirrors a drop in overall governmental computer purchasing. We reiterate that, due to abnormalities in the underlying data, we do not include an estimate of federal monitor purchases in 2010; environmental benefits would be higher in that year if monitors were included.

EXHIBIT 3-22. ENVIRONMENTAL BENEFITS FROM FEDERAL GOVERNMENT EPEAT PURCHASES

BENEFIT CATEGORY	UNIT	YEAR		
		2008	2009	2010 ¹
Electricity	Megawatt-hours	203,175	885,263	293,234
Primary Materials	Metric tons	359,004	1,572,906	525,582
Air Emissions (including greenhouse gases)	Metric tons	829,300	3,565,784	1,212,922
Greenhouse Gas Emissions	Metric tons carbon equivalent	38,140	165,919	56,081
Water Emissions	Metric tons	1,737	7,556	2,548
Toxic Materials	Metric tons	24	91	31
Solid Waste	Metric tons	328	1,379	503
Hazardous Waste	Metric tons	987	3,439	1,308

¹ 2010 figures do not include any benefits from monitor purchases and thus understate actual benefits.

Impact of EEBC Assumptions on Total Environmental Benefits of EPEAT

Differences in environmental benefits between desktop and laptop computers play a large role in shaping the year-by-year trends in the federal government’s total environmental benefits. As treated by the EEBC, EPEAT laptops deliver only a small fraction of the benefits of EPEAT desktops. Thus, as the federal government shifts its purchasing away from desktops and toward laptops, the result will be a decrease in total environmental benefits from EPEAT. The magnitude of this effect is determined by 1) the rate at which purchases shift from desktops to laptops, and 2) the relative benefits accruing to each product type. While the first of these factors is easily measured via the sales data reported above, the second factor is more difficult to measure precisely.

Differences between desktops and laptops are present in all categories of environmental impacts, but they are especially pronounced in energy, primary materials, greenhouse gas emissions, and air and water emissions. This is as we would expect; by their nature, virtually all laptops use less energy and raw material than desktops, and consequently, the absolute difference between high-performing and conventional models should also be smaller for laptops.⁸⁶ However, the effect of these differential impacts is magnified by methodological choices built into the EEBC. To calculate environmental benefits, the EEBC compares the impacts of EPEAT products to the impacts of baseline (non-EPEAT)

⁸⁶ For example, under the EEBC version 2.0, a conventional desktop is estimated to use 507 kWh of electricity annually, while a conventional laptop is estimated to use 75 kWh, a difference of 432 kWh per year. Thus, even a hypothetical laptop that used zero energy would not produce as much incremental energy savings over a conventional laptop (75 kWh per year) as a conventional laptop saves in comparison to a desktop. The same phenomenon is true in other impact categories as well. This highlights the fact that laptop computers do not have as much variation in environmental performance (in absolute terms) as do desktops, and thus there will be less of a difference between high- and low-performing units.

products. In version 2 of the EEBC (released in March 2009), which is used to calculate EPEAT program benefits in 2008 – 2010, baseline products were assumed to meet the outdated Energy Star version 3.0 specifications, while EPEAT products were required to meet the criteria for the newer Energy Star version 4.0 or 4.1 specifications.⁸⁷ Thus, the benefits accruing to each product are equivalent to the performance improvement between the Energy Star specification versions 3.0 and 4.0 or 4.1 (for those benefit categories where EPEAT’s performance is based on Energy Star). IEC is not able to readily assess the foundation for this assumption, but it is beyond the scope of this evaluation to propose alternatives.

The change in performance requirements from Energy Star version 3.0 to 4.0/4.1 was more dramatic for desktop computers than for laptops, in both relative and absolute terms. Average annual energy consumption for Energy Star desktops dropped by 27.3%, from 507 to 369 kWh (a difference of 138 kWh). In contrast, energy consumption for Energy Star laptops only decreased by 1%, from 75 to 74 kWh. Thus, after accounting for all stages of the product lifecycle, as estimated by the EEBC version 2.0, EPEAT laptops delivered only about 1% of the benefits of EPEAT desktops for energy, primary materials, greenhouse gases, and air and water emissions. Benefits were more comparable in the other categories. EPEAT monitors generated between 34 and 60% of the benefits of desktops.⁸⁸ Per-unit benefits are shown in Exhibit 3-23.

As noted above, because the federal government (and the market as a whole) is shifting from desktops to laptops, total environmental benefits of EPEAT purchases are becoming considerably lower over time than they would be if the product mix held steady. Every laptop purchased instead of a desktop between 2008 and 2010 resulted in a 99% drop in potential energy, air, and water-related benefits (as measured by the EEBC). This is not to suggest that it would be environmentally preferable for a purchaser to choose an EPEAT desktop over an EPEAT laptop; it simply reflects the fact that the overall environmental impact of laptops, whether EPEAT or non-EPEAT, is significantly lower than the impact of desktops, and thus the benefits of a high-performing laptop versus a conventional one are less than the benefits of a high-performing desktop versus a conventional desktop.

In version 3.0 of the EEBC, released in April 2012, baseline products are assumed to match the profile of the now-obsolete Energy Star version 4.0 specifications, while EPEAT products must meet Energy Star version 5.0. However, changes between these Energy Star specifications did not proceed along the same track as they had between Energy Star versions 3.0 and 4.0. The latest changes produced a very different profile of environmental benefits than had been seen previously. In the newer EEBC, EPEAT laptops produce 5-6% of the energy and related benefits of desktops – still a small fraction, but far greater than the 1% benefits previously obtained. These per-unit benefits are shown on the right side of Exhibit 3-23.

⁸⁷ Because energy and related benefits (greenhouse gas emissions, air emissions) are due to the criterion that EPEAT electronics must meet Energy Star technical specifications, the EPEAT environmental benefits reported here may include some benefits that are attributed to the Energy Star program rather than EPEAT within EPA internal reporting (i.e., tracking the programs’ contributions towards EPA’s strategic goals). IEC could not determine how the Agency handles internal attribution. It should be noted several factors make it difficult to apportion credit to each program, including: the fact that EPEAT electronics must meet Energy Star technical specifications, but do not need to be Energy Star-certified; the question of to what extent obtaining Energy Star certification spurs manufacturers to also pursue EPEAT-certification, and vice versa; and the question of whether institutional purchasers or other buyers would have opted to buy either Energy Star- or EPEAT-certified products if the other program had not existed (i.e., determining the baseline to measure against in determining the programs’ impact).

⁸⁸ These figures compare EPEAT products certified at the silver level.

EXHIBIT 3-23. PER-UNIT ENVIRONMENTAL BENEFITS OF EPEAT PRODUCTS: EEBC VERSIONS 2.0 AND 3.0

BENEFIT CATEGORY	UNIT	EEBC VERSION 2.0 (MARCH 2009)			EEBC VERSION 3.0 (APRIL 2012)		
		DESKTOPS	LAPTOPS (% OF DESKTOPS)	MONITORS (% OF DESKTOPS)	DESKTOPS	LAPTOPS (% OF DESKTOPS)	MONITORS (% OF DESKTOPS)
Electricity	Kilowatt-hours	570.76	6.33 (1.1%)	197.99 (34.7%)	553.32	31.66 (5.7%)	65.53 (11.8%)
Primary Materials	Kilograms	1012.89	8.25 (0.8%)	350.83 (34.6%)	978.76	48.30 (4.9%)	110.55 (11.3%)
Air Emissions (including greenhouse gases)	Kilograms	2338.57	18.34 (0.8%)	809.86 (34.6%)	2258.99	109.70 (4.9%)	253.90 (11.2%)
Greenhouse Gas Emissions	Kilograms carbon equivalent	107.71	0.90 (0.8%)	37.31 (34.6%)	104.11	5.21 (5.0%)	11.81 (11.3%)
Water Emissions	Kilograms	4.90	0.04 (0.8%)	1.70 (34.6%)	4.73	0.23 (4.9%)	0.53 (11.3%)
Toxic Materials	Kilograms	0.05	0.01 (17.9%)	0.03 (53.0%)	0.05	0.01 (17.9%)	0.03 (53.0%)
Solid Waste	Kilograms	0.62	0.26 (41.2%)	0.26 (42.0%)	0.87	0.68 (77.8%)	0.54 (62.3%)
Hazardous Waste	Kilograms	1.64	0.69 (42.3%)	0.97 (59.5%)	1.64	0.69 (42.4%)	0.97 (59.5%)

The changes in impacts between different versions of the EEBC highlights a point raised earlier, namely, that obsolete Energy Star specifications may not be an ideal proxy for baseline electronics products. While the older Energy Star specifications may represent useful approximations of the ‘average’ product and be easier to document than other options, it is almost certainly not the case that the per-unit energy savings of EPEAT laptops grew fivefold over a three-year period (from 6.33 to 31.66 kwh), as would be implied by a literal interpretation of the results from the two versions of the EEBC.

Over the long run, it seems likely that changes in Energy Star requirements will track (and indeed, drive) changes in the environmental performance of the market as a whole. Nonetheless, we should view the EPEAT program’s environmental results in any given year with a critical eye. The reported year-by-year trends in EPEAT’s total environmental benefits (whether for the federal government, the market as a whole, or another unit of evaluation) should be seen as approximations, but not as perfect reflections of reality. The apparent downturn in total benefits from 2009 to 2010 should be viewed with this in mind.

QUESTION 6: USE AND INFLUENCE OF EPP PROGRAM OUTPUTS

Introduction

This question explores the use of EPP Program outputs. Evaluation Question 6 asks:

6. How have the EPP Program’s outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by federal agencies?

a. How have EPP activities contributed to purchasing changes at federal agencies?

The survey findings and interviews were our main data sources for this evaluation question.⁸⁹ We also analyzed FGCG web hit data.

Key Findings

- Direct use of EPP outputs such as model contract language and EPP policies by federal purchasers is limited. However, all EPP outputs tested in the survey were rated moderately helpful or very helpful by a majority of purchasers who have used them. Purchasers rely heavily on agency-specific purchasing policies and guidelines in their purchasing decisions. The EPP Program may have an indirect influence on purchasers through contract language and other EPP outputs adopted by agencies and incorporated in agency-specific purchasing policies. The survey was unable to explore indirect relationships.
- In general, higher exposure to EPP outputs is statistically associated with current greener purchasing behavior. There is a statistically significant relationship between the level of exposure to EPP outputs and the percent of purchases that are environmentally preferable. However, we found no relationship between exposure to EPP outputs and *changes* in purchasing behavior over the last 3 years.
- Federal buyer use of standards that EPP helped to develop has mixed findings from the survey. On one hand, a high percent of purchasers who regularly purchase building and construction products looks for the carpet, floor coverings, and gypsum board standards that EPP helped to develop. Also, respondents with higher exposure to EPP outputs were more likely to consider environmental factors in determining “best value” (59.6% versus 49.5%); this difference is statistically significant. On the other hand, only 33% of electronics purchasers report looking for EPEAT, and about half of purchasers cannot estimate the percent of their spending on products certified to EPEAT or to the building and construction standards. Importantly, purchasers who use EPP-developed standards are loyal users. In other words, once purchasers start using a “green” standard, they generally use it for the majority of relevant purchases.
- EPP made meaningful and significant contributions to the voluntary consensus standards featured in this evaluation – a key output of the EPP Program. EPP catalyzed the development of the standards and brought credibility and rigor to the process. EPP’s participation also resulted in more environmentally protective standards.

We discuss these findings in detail below.

Use and Helpfulness of EPP Program Outputs

Exhibit 3-24 summarizes the use of EPP outputs by survey respondents. As shown in the exhibit, the EPP website was the most frequently used resource (30%), followed by EPP guidance documents (25%), EPP’s model policy and contract language (20%), and EPP tools and environmental benefits calculators (16%). Fewer purchasers have used the other EPP outputs. However, the survey questions did not capture indirect relationships, for example, if a model policy was incorporated into an agency policy.

⁸⁹ The survey analysis includes both descriptive and inferential statistics, including analyses of the statistical association, if any, between higher exposure to EPP outputs and purchasing attitudes and behaviors. Chapter 2 describes the methodology for conducting the survey analyses.

All EPP outputs were rated moderately helpful or very helpful by a majority of purchasers who have used them, as shown in Exhibit 3-25. The highest-rated outputs (counting moderately or very helpful) included the EPP website (75%) and EPP guidance documents (71%). Outputs with the highest percentage of applicable respondents indicating that the resource was very helpful include: EPP presentations (35%); direct technical assistance (34%); and working groups with EPP staff (34%). Opinion was mixed on working groups, informal interactions, and direct technical assistance: 19% of applicable respondents rated each of these not at all helpful.

EXHIBIT 3-24. USE OF EPP OUTPUTS

EPP RESOURCE	HAVE USED IN THE PAST YEAR %	HAVE <u>NOT</u> USED IN THE PAST YEAR %
EPP website	29.5%	70.5%
EPP guidance docs	25.7%	74.3%
EPP model policy, contract language, and/or specs	20.0%	80.0%
EPP tools/environmental benefits calculator	15.7%	84.3%
Attended seminar or conference where EPP staff presented	11.0%	89.0%
Attended training event offered by EPP staff	10.6%	89.4%
Engaged in regular (informal) interactions with EPP staff	7.9%	92.1%
Received direct technical assistance from EPP staff	7.7%	92.3%
Participated in working group with EPP staff	7.6%	92.4%
One or more of the above	35.9%	64.1%
Three or more of the above	20.7%	79.3%

EPEAT and Other Electronics

FAR 23.705 and Executive Order 13514 require federal agencies to meet at least 95% of their annual acquisition of eligible electronic products with EPEAT certified products.⁹⁰ All of the federal purchasing policy managers that IEC interviewed stated that their agencies (EPA, DOD, GSA, and DOE) use EPEAT; for instance, EPEAT has been incorporated in EPA’s blanket purchase agreement (BPA) for information technology. However, the survey found a difference between policy and practice: As shown in Exhibit 3-26, only 33% of electronics purchasers typically look for EPEAT; this is a higher percentage than look for FEMP (24%), but much lower than Energy Star (81%). The difference between the percent of purchasers that typically look for Energy Star and EPEAT could be a function of time and exposure: Energy Star started in 1992, and EPEAT started in 2006. In addition, even if federal purchasers do not typically look for EPEAT certified products, they may nonetheless be purchasing EPEAT products through their

⁹⁰ The FAR requires agencies to meet at least 95% of their annual acquisition requirement for electronic products categorized by EPEAT unless there is no EPEAT standard for such products. EO 13514 requires federal agencies to ensure that 95% of new contract actions are environmentally preferable (e.g., EPEAT registered), where such products and services meet agency performance requirements.

agency’s purchasing vehicles. For example, EPA’s BPA for IT is the “mandatory first option” for EPA purchasers; therefore, purchasers who use the BPA are likely purchasing EPEAT products even if they are not consciously looking for the EPEAT label. Our survey was not able to quantify this indirect effect.

EXHIBIT 3-25. HELPFULNESS OF EPP OUTPUTS

EPP RESOURCE	NOT AT ALL HELPFUL %	MARGINALLY HELPFUL %	MODERATELY HELPFUL %	VERY HELPFUL %
EPP website	4.7%	20.8%	43.5%	31.0%
EPP guidance docs	6.9%	22.2%	42.6%	28.3%
EPP model policy, contract language, and/or specs	8.9%	24.1%	40.8%	26.2%
EPP tools/environmental benefits calculator	12.0%	25.8%	37.6%	24.6%
Attended seminar/conference where EPP staff presented	13.3%	19.0%	32.6%	34.8%
Attended training event offered by EPP staff	12.6%	19.6%	34.1%	33.0%
Engaged in regular (informal) interactions with EPP staff	18.6%	20.6%	26.0%	32.8%
Received direct technical assistance from EPP staff	18.9%	16.9%	27.4%	34.3%
Participated in working group with EPP staff	18.9%	18.9%	27.0%	33.7%
Note: Excludes N/A; rounding				

EXHIBIT 3-26. ELECTRONICS STANDARDS THAT PURCHASERS TYPICALLY LOOK FOR

ENERGY STAR	FEMP	EPEAT (IEEE 1680)	NONE OF THE ABOVE	OTHER
81.3%	24.1%	32.6%	12.8%	5.6%

The survey also asked purchasers what percent of computers and monitors that they purchased in the past year was certified to various standards. As shown in Exhibit 3-27, 65% of respondents who purchased computers in the past year do not know the proportion of EPEAT certified computers they purchased. Of those who do know, the majority bought 75% or more EPEAT computers. Based on the figures for EPEAT and the other certifications, it appears that when computer purchasers use certifications, they purchase the majority of their computers to follow those certifications.

EXHIBIT 3-27. PERCENT OF PURCHASES CERTIFIED TO ELECTRONICS STANDARDS

In the past year, approximately what percent of computers and monitors that you purchased was...	LESS THAN 25%	25-50%	51%-75%	MORE THAN 75%	DON'T KNOW
Energy Star certified	4.9%	6.2%	7.6%	53.2%	28.1%
FEMP certified	4.0%	5.2%	3.5%	14.5%	72.8%
EPEAT (IEEE 1680) certified	3.8%	4.0%	5.6%	21.8%	64.8%

We also asked purchasers about the use of the EEBC. One federal purchasing policy manager that we spoke with (DOE) reported using the EEBC. The overwhelming majority (95%) of electronics purchasers who responded to the survey have not used the EEBC. This is not surprising, since the EEBC is more likely to be used by purchasing policy managers than by purchasing staff.

Building and Construction Products

Similar to the electronics standards, we explored the use of building and construction product standards and related outputs by federal agencies and purchasing staff. GSA requires NSF 140 certification for most carpet sold on the GSA Multiple Award Schedules (Schedule 72). DOE has incorporated NSF 140, NSF 332, and BIFMA e3 into its specifications and contract language. We did not interview any federal purchasing managers using the ULE 100 gypsum standard.

Exhibit 3-28 shows the percentage of survey respondents using each standard, for all building and construction purchasers and for purchasers of specific building and construction products. All of the building and construction standards and labels show at least modest use. Overall, the most commonly used labels are low VOC and BioPreferred, which are each used by more than one-third of building and construction product purchasers. It is not surprising that low VOC and BioPreferred are more commonly used, because these standards cover multiple product categories within the building and construction product sector. The floor covering, carpet, and gypsum board standards are used by a clear majority of purchasers of those products (80.1%, 72.4%, and 62.4%, respectively). The BIFMA e3 standard is not widely used by federal purchasers; only 11.6% of furniture purchasers used the standard.

For each building product category, nearly half of the respondents did not know the proportion of their purchases that met the standards; for furniture, 74% of purchasers could not estimate their proportion of green purchases. As shown in Exhibit 3-29, for purchasers who did know the proportions:

- For both NSF standards, the majority of purchasers purchased more than 50% certified product.
- Purchase rates for BIFMA certified furniture were low, with most purchasers that indicated a percentage buying less than 50% BIFMA e3 certified furniture.
- Gypsum board purchasers were split fairly evenly on their purchases of ULE certified products.

Again, similar to electronics purchasers, those who know their portion of green purchasing are generally buying green (except BIFMA e3).

EXHIBIT 3-28. BUILDING AND CONSTRUCTION PRODUCT STANDARDS THAT PURCHASERS TYPICALLY LOOK FOR

	PURCHASERS USING THE STANDARDS	
	ALL BUILDING AND CONSTRUCTION PRODUCT PURCHASERS	PURCHASERS OF SPECIFIC PRODUCTS
Low Volatile Organic Compounds (VOC)	38.4%	
BioPreferred	35.6%	
Green Seal	27.3%	
None of the above	26.0%	
NSF/ANSI Standard 332 (floor covering standard)	24.7%	80.1%
NSF/ANSI Standard 140 (carpet standard)	24.3%	72.4%
GreenGuard	19.1%	
Comprehensive Procurement Guidelines (CPG)	18.9%	
ULE ISR 100 (gypsum board/wallboard standard)	16.3%	62.4%
Forest Stewardship Council (FSC)	15.4%	
BIFMA e3 (furniture solutions)	11.7%	11.6%
Other* (respondents specified)	4.8%	

EXHIBIT 3-29. PERCENT OF PURCHASES CERTIFIED TO BUILDING AND CONSTRUCTION STANDARDS

Over the past year, approximately what percent of the [product] that you purchased was [x] certified?	LESS THAN 25%	25-50%	51-75%	MORE THAN 75%	DON'T KNOW
Carpet (NSF 140)	8.8%	7.2%	11.6%	27.6%	44.8%
Floor coverings (NSF 332)	9.0%	7.8%	15.1%	19.9%	48.2%
Furniture (BIFMA e3)	10.9%	5.5%	3.9%	5.7%	74.0%
Gypsum board (ULE 100)	14.2%	10.6%	12.1%	14.2%	48.9%

We also analyzed the use of the FGCG. Interviews with federal purchasing managers indicate that the Guide is used in some capacity by several agencies. EPA uses the Guide as a resource, and DOE indicated that its use is optional within the agency, but not given priority. GSA’s Public Buildings Service (PBS) and EPP staff had different perspectives on the use of the Guide by PBS: according to EPP staff, PBS adopted parts of the Guide into its Facilities Standards (P100), but our contact at PBS was not aware that they had used the Guide. This discrepancy points back to the potential indirect influence of the EPP Program, and the difficulty in tracking the use of EPP Program outputs. In this case, PBS may have incorporated language that was introduced in the FGCG, unbeknownst to the individual who we interviewed. EPP staff also reported that military agencies used the Guide to incorporate environmentally preferable principles into Unified Facilities Guide Specifications. IEc did not have an opportunity to corroborate this account with the users of the Specifications.

As shown in Exhibit 3-30, a low overall proportion of building and construction product purchasers in our survey have used the Guide (13%). However, 84% of purchasers who have used the Guide indicated that products meeting its criteria were given priority in their purchasing decisions, and about half (51%) indicated that products meeting the Guide’s criteria were required by their agency or department. Again, this survey result points to the finding of loyal use among those purchasers that use EPP outputs.

IEc also conducted an analysis of FGCG website data. Exhibit 3-31 summarizes the number of page views, unique page views, and average time spent on the page from 2010 – 2012. The exhibit shows there were more than 30,000 page views (more than 27,000 unique page views) in 2010 – 2012; the average time spent on the page averaged slightly less than two minutes. The number of page views has declined each year; page views in 2012 were less than half the level in 2010. According to the individual who provided the FGCG data to IEC, it is difficult to interpret the decline, but the decline is not due to changes in how EPA tracks web hit data. He noted there could be several reasons why FGCG pages are not being viewed as much as in earlier years, including the possibility that people have already downloaded the information and may not need to download it again.⁹¹

EXHIBIT 3-30. SURVEY RESULTS ON USE OF THE FGCG

		YES	NO	
Have you used the Federal Green Construction Guide for Specifiers?	All	4.3%	95.7%	
	Building products purchasers	12.8%	87.2%	
Are products that meet the criteria of the Federal Green Construction Guide for Specifiers given priority in your purchasing decisions?	FGCG users	YES	NO	
		83.5%	16.5%	
Are products that meet the criteria of the Federal Green Construction Guide for Specifiers optional or required by your agency/department?	FGCG users	OPTIONAL	REQUIRED	DON'T KNOW
		25.7%	50.5%	23.9%

⁹¹ Email from Director, Information Technology, National Institute of Building Sciences, to IEC, April 18, 2013.

EXHIBIT 3-31. FGCG WEBSITE ANALYTICS

	PAGE VIEWS	UNIQUE PAGE VIEWS	AVERAGE TIME SPENT ON PAGE (MINUTES:SECONDS)
2010	15,612	12,742	1:54
2011	11,301	9,111	1:37
2012	6,782	5,486	1:51
Total	33,695	27,339	
Note: 2009 data was tracked differently and is not comparable to subsequent years			

We also analyzed summary data for the top 3,000 documents downloaded from the Whole Building Design Guide in 2012 (<http://www.wbdg.org/>).⁹² The Whole Building Design Guide includes – but is not limited to – the FGCG specifications; therefore, the top 3,000 downloads include FGCG specifications and other information. The top three most downloaded FGCG specifications in 2012 were solar energy electrical power generation equipment (ranked 854 out of 3,000), commissioning (904 out of 3,000), and plumbing fixtures (1,098 out of 3,000). Exhibit 3-32 presents download data of the FGCG specifications for carpet, floor covering, furniture, and gypsum board. The specifications for resilient flooring and gypsum board were the most frequently downloaded, followed closely by carpeting. The specification for systems furniture was downloaded less frequently. This pattern echoes the survey findings on the use of EPP standards, which showed furniture lagging resilient flooring, gypsum board, and carpeting.

EXHIBIT 3-32. DOWNLOADS OF SELECTED GREEN SPECIFICATIONS

RANK	DOCUMENT	TOPIC	HITS	VISITS
1,935	/ccb/fedgreen/fgs_096500.pdf	Resilient Flooring	453	433
1,944	/ccb/fedgreen/fgs_092900.pdf	Gypsum Board	462	430
2,083	/ccb/fedgreen/fgs_096800.pdf	Carpeting	404	393
2,579	/ccb/fedgreen/fgs_125900.pdf	Systems Furniture	298	297

⁹² Data was not available for prior years.

Hospitality and Travel

Our information on the use of hospitality and travel outputs is limited. Nonetheless, we found some indications that purchasers are using EPP's hospitality and travel outputs. EPA Region 9 used the Convention Industry Council's (CIC) report as a resource to develop the Region's *Green Meetings and Conference Policy* (GMCP), and the Region uses the "14 questions" from the CIC report to book meeting venues. GSA is revising the Federal Travel Regulation based, in part, on the GMCP. Region 10 is also adapting the GMCP for its own use. Moreover, some facilities that participate in the Federal Green Challenge have used the GMCP as a resource to fulfill the program's requirements. (See the sidebar for more information about the Federal Green Challenge.) It is premature to see federal agencies using the ASTM Green Meetings and Events Standards, which were finalized within the past year. Moreover, it is unclear if EPA is going to use these standards.

Influence of EPP Outputs on Purchasing Attitudes and Behaviors

IEC used statistical analyses (chi-squared test) to examine the relationship (if any) between EPP outputs and purchaser attitudes and behaviors. We compared survey respondents with high exposure to EPP outputs to respondents with low exposure, and tested whether or not greater exposure to EPP outputs is statistically associated with greener purchasing attitudes and behaviors. (Chapter 2 describes our methodology for constructing the high exposure and low exposure groups and the statistical methods employed in our analysis.)

Exhibit 3-33 provides an overview of the results. As shown in the exhibit, we did not find any statistically significant relationship between the level of exposure to EPP outputs and purchasers' current views towards environmentally preferable purchasing. However, we did find a statistically significant relationship between level of exposure to EPP outputs and changes in attitudes over the past three years. The results for behavior are reversed: Exposure to EPP outputs is correlated with current purchasing behavior, but is not correlated with changes in purchasing behavior. These findings, while generally positive, are somewhat difficult to interpret. Based on our theory of the EPP Program, as reflected in the logic model in Chapter 1, we would expect changes in attitudes to precede changes in behavior. However, our analysis of the survey findings shows statistically significant results for changes in attitudes and current behavior (but not changes in behavior). This may reflect some channel of influence that is not

FEDERAL GREEN CHALLENGE

The Federal Green Challenge (FGC) is a national voluntary program that encourages federal agencies to reduce their environmental impact. Participants commit to an improvement of at least 5% in a minimum of two of the six target areas - waste, electronics, purchasing, energy, water, and transportation.

The FGC is modeled on the FEC and has adopted much of FEC's structure. When participants join FGC, they are required to provide baseline data and establish performance goals, and must follow up by providing performance data on an annual basis. However, FGC's focus is broader than FEC. FGC initially had four target areas: energy, transportation, waste, and water. In 2010 the program added purchasing and electronics. When electronics was added as a target area, FGC chose to use many of the same measures that FEC is tracking for purchasing and power.

FGC has monthly "web academies" as well as additional events on a regional level. These activities were also modeled after FEC, which has a similar educational component.

According to the co-creator of the FGC, the program was "inspired by FEC's success." In addition, the FGC has received technical assistance and resources from EPP Headquarters staff, focusing on the electronics area. According to the co-creator, the FEC has been very important to FGC's success.

captured in the logic model, or it may be a function of the survey. The available information does not allow us to offer a definitive explanation for the results in Exhibit 3-33.⁹³

EXHIBIT 3-33. CORRELATION BETWEEN EXPOSURE TO EPP OUTPUTS AND ATTITUDES/BEHAVIORS

		STATISTICALLY SIGNIFICANT?	
		YES	NO
Attitudes	Current		X
	Change over 3 Years	X	
Behaviors	Current	X	
	Change over 3 Years		X

We also looked for evidence of any differences in how high exposure and low exposure purchasers consider environmental factors in their purchasing decisions. As shown in Exhibit 3-34, respondents with higher exposure to EPP outputs were more likely to consider environmental factors in determining “best value” (59.6% versus 49.5%); this difference is statistically significant at the 5% confidence level. However, there was relatively little difference between high exposure and low exposure purchasers in how respondents evaluate cost (initial or lifecycle), as shown in Exhibit 3-35.

EXHIBIT 3-34. FACTORS THAT PURCHASERS CONSIDER IN DETERMINING “BEST VALUE”

FACTOR	EXPOSURE	%
Environmental considerations	Low	49.5%
	High	59.6%

EXHIBIT 3-35. FACTORS THAT PURCHASERS CONSIDER IN EVALUATING COST

FACTOR	EXPOSURE	%
Initial cost	Low	31.8%
	High	37.8%
Lifecycle cost	Low	64.6%
	High	58.2%
Don't know	Low	3.6%
	High	4.0%

⁹³ The chi-squared tests involve creating contingency tables to compare the actual and expected frequencies of events. See Chapter 2, Exhibit 2-5 for an example of a contingency table. For reasons of presentation and flow, we have not presented the contingency tables in this chapter.

Given the evaluation's heavy focus on EPP standards, we also looked at the relationship between being familiar with an EPP standard and the percent of products purchased with certification to that standard. We find a statistically significant relationship between looking for EPEAT and the percent of computers and monitors purchased with EPEAT certification.⁹⁴ Similarly, for the building and construction standards, there is a statistically significant relationship between being familiar with a particular EPP standard (NSF 140, NSF 332, BIFMA e3, ULE 100) and the percent of eligible products purchased with certification to that standard.⁹⁵

There is also a statistically significant relationship between familiarity with the EPP standards and the percent of purchases made in the past year that were environmentally preferable. Although all of these relationships are statistically significant, we used the Cramer's V to statistically rank the standards that are most strongly associated with environmentally preferable purchasing. The order (from strongest to weakest degree of association) follows:

- ULE 100 (gypsum board)
- NSF 140 (carpet)
- BIFMA e3 (furniture)
- NSF 332 (floor coverings)
- EPEAT (electronics)^{96,97}

The ULE 100 gypsum standard is both the most strongly correlated with green purchasing and arguably the least known; EPEAT has the weakest (but still statistically significant) correlation with green purchasing and is the most widely known of the standards. The findings suggest that the more widely known a standard is, the more likely a purchaser is to be familiar with it but not use it.

Standards Development

The voluntary standards for the product and service categories covered in this evaluation constitute key EPP Program outputs and are of significant interest to EPP Program managers. Therefore, in addition to examining the use of the EPP standards by federal purchasers (discussed above), the evaluation explored EPP's role in developing the standards and the environmental stringency of the standards. (The sidebar includes information on EPP's role in the cross-sector ASTM International Committee E60 on Sustainability.)

⁹⁴ The question asked: "Which of the following environmental standards/labels do you typically look for when purchasing computers and monitors?" The questions for building and construction standards asked: "How familiar are you with the [x] standard?"

⁹⁵ All results are significant at the 5% confidence level, except NSF 140, which is significant at the 10% confidence level.

⁹⁶ We also tested for the influence of Executive Order 13514, which specifically requires EPEAT. To do this, we compared purchasers who look for EPEAT and are familiar with the EO to those who look for EPEAT but are not familiar with the EO. There is no statistical difference between the proportions of purchasers in both categories who buy more than 50% environmentally preferable products/services.

⁹⁷ We also found a statistically significant relationship between using the EEBC and percent of environmentally preferable purchases.

Participants in the standards development process indicated that EPP played an important role in several standards by adding credibility and rigor to the process:

- EPEAT, the first of the voluntary standards to be adopted, grew out of an initiative launched in 2001 between EPA Regions 9 and 10, industry, and other stakeholders to develop a method for assessing the environmental attributes of electronic products. EPP Headquarters staff became involved in 2003, and steered the committee toward developing an ANSI-accredited standard. EPP staff also served on standards development workgroups and provided technical input. In addition, EPP provided seed funding for the Green Electronics Council, which administers and promotes EPEAT.
 - Within the building and construction sector, industry and other stakeholders recognized the need to address sustainability issues, but they were concerned that developing and certifying to product standards would be time-consuming and resource-intensive, and the standards might not gain acceptance in the market. Also, not all stakeholders agreed on the type of standards that should be developed – for example, single or multiple attributes – and which process was best – for example, whether standards should be developed by industry associations, by government, or through open committees. EPP staff steered industry toward a multi-attribute, multi-stakeholder process. In addition, EPP provided assurances that voluntary standards would have credibility with the government and in the broader market.
 - Several interviewees recalled a presentation by EPP staff at the Greenbuild Conference in Chicago as a turning point in their thinking about whether, and how, to develop standards. As one industry representative recalled, “Based on what I heard at the conference, I realized that EPA had interest in this, that EPP had legs and would be around for a while; it didn’t seem like a flash in the pan.” Similarly, a standards stakeholder from the furniture industry recalled a similar turning point during a meeting with EPP staff at EPA Headquarters in late 2005: “Based on EPA’s feedback at that meeting, we got the sense that an ANSI standard would be credible,” given that ANSI standards use an open and transparent process with multi-stakeholder involvement. In the case of gypsum board, UL Environment (ULE) had already developed an initial draft of the standard in house, prior to convening the standards committee – this is ULE’s standard operating procedure – but EPP staff provided input on the draft standard before it was released to the market for use by manufacturers.
- Importantly, EPP staff also served on the committees that developed the standards and provided technical input and coordination. EPP staff played a leadership role for NSF 140 and NSF 332, and a supporting role for BIFMA e3 and ULE 100.

ASTM INTERNATIONAL COMMITTEE E60 ON SUSTAINABILITY

In 2008, ASTM launched a cross-sector standards development committee - ASTM International Committee E60 on Sustainability. The committee has grown from 20-30 people initially to 800, due in part to EPP’s participation as well as broader market and cultural changes.

All ASTM sustainability standards are under the committee’s purview. The committee established a platform for green building standards covering a wide breadth of topics, and also works on hospitality standards. A case can be made that EPP played a role in catalyzing the development of all of the ASTM sustainability standards that have been developed since the committee was established. Relationships built with other stakeholders through the ASTM committee process have also been important in other standard development processes such as IgCC.

- In the hospitality and travel sector, EPP staff convened the Convention Industry Council’s Accepted Practices Exchange (CIC/APEX) and the Green Meetings Industry Council (GMIC) to develop ANSI-accredited standards through the ASTM process. It is unlikely that the stakeholders would have developed ANSI-accredited standards for green hospitality and travel without EPP’s involvement. EPP staff played a leadership role on the committees and provided technical input for the standards.

Across the board, EPP staff’s participation raised the profile of the standards, brought stakeholders to the table, and enhanced the credibility and rigor of the process. According to the individual who chaired three of the standards committees (NSF 140, NSF 332, and BIFMA e3): “There was a strong desire by industry to have EPA involved because the standard wouldn’t be seen as credible without EPA, and there were elements of the standard where EPA had technical expertise.” Similarly, the head of the ASTM Green Meetings and Events committee stated that EPP (and other EPA staff) provided substantive input on both the structure and contents of the standards. Likewise, gypsum board stakeholders reported that EPP brought scientific and technical rigor to the process. A number of stakeholders expressed a desire for EPP staff to be even more involved in developing the standards, and noted that EPP’s active and continuous engagement was important for the process to succeed. Some stakeholders noted the need for greater participation from other parts of EPA, especially in cases where the EPP staff lead may not have as much expertise in a particular subject area.

Standards stakeholders further noted that EPP staff increased the environmental protectiveness of the standards. For example:

- EPP staff insisted that Energy Star requirements were included in the IEEE 1680.2/EPEAT standards for computers and monitors. According to EPP staff, industry pushed back because manufacturers did not want the expense of becoming Energy Star qualified; the compromise was that IEEE products need to meet the technical specifications of Energy Star, but do not actually have to be Energy Star qualified.
- For the NSF 140 carpet standard, a participant noted that EPP staff “pushed industry beyond what they were comfortable doing otherwise” – for example, EPP ensured that NSF 140 included metrics for volatile organic compounds.
- Similarly, the Vice Chair of the NSF 332 committee stated that EPP staff “pushed the envelope and the committee” in making the standard more protective of the environment.
- Likewise, a furniture industry representative stated that EPP’s involvement pushed the BIFMA e3/Level standard to go beyond what industry was already doing with respect to chemicals of concern. In addition, the BIFMA e3 standard incorporated Energy Star in its scoring criteria.
- Gypsum board and green hospitality/travel stakeholders also reported these standards were more rigorous as a result of EPP’s involvement.

However, as discussed under the findings for Question 12, there is some disagreement as to whether the standards that EPP helped to develop are true “leadership” standards.

QUESTION 7: EPP PROGRAM COORDINATION WITH OTHER FEDERAL AGENCIES

Introduction

Evaluation Question 7 asks, “How effective is the EPP Program in coordinating with green purchasing programs at other federal agencies?” In this section, we present our findings on this evaluation question, drawn from 10 interviews with EPP staff and purchasing policy managers at several different federal agencies, including the Department of Energy (DOE), Department of Defense (DOD), the General Services Administration (GSA), and EPA’s Office of Acquisition Management (OAM).

A significant portion of EPP’s dealings with other federal agencies comes in the context of the standards development process; other interactions included ongoing interagency workgroups and workgroups assembled to address discrete tasks. Recognizing the diverse positions of the different players that influence purchasing activity in the federal government, we evaluated how EPP interacted with *any* relevant contacts at other federal agencies, without limiting our analysis only to contacts in formal green purchasing programs. We also consider EPP’s collaborations with other program offices within EPA.

Key Findings

- Interviewees indicate that EPP played a key role in moving the electronics, building products, and travel and hospitality sectors toward multi-stakeholder, multi-attribute standards. Interviewees also report that EPP’s involvement in standard development processes resulted in these standards being more protective of the environment.
- EPP worked effectively with other agencies to promote EPEAT through the Federal Electronics Stewardship Workgroup; green building products through the Federal Green Construction Guide; and green travel and hospitality through the Region 9 Green Meetings and Conference Policy (GCMP). Interviewees noted EPP’s strategic guidance and leadership in these initiatives.
- More collaboration with GSA is needed to incorporate travel standards that EPP supported into the Federal Travel Regulations.

Exhibit 3-36 summarizes the interactions between EPP and other federal agencies identified by IEc. While we do not discuss all of these efforts in detail, the exhibit provides context for our discussion of the key highlights from each sector. Because we conducted a relatively limited number of interviews that address this evaluation question, our conclusions are applicable only to a subset of the collaborative activities that EPP has undertaken with other agencies; we do not reach any global conclusions regarding the entirety of EPP’s collaborative activity. Even so, we believe our conclusions are useful in highlighting some specific successes, and shortcomings, of the EPP Program.

Electronics

EPP appears to have had substantial impact on electronics purchasing across the federal government. Interviewees remarked that EPP has met ‘real success’ in electronics, and have favorably noted collaborative relationships developed with EPP staff. On the whole, EPP has been effective in its collaborations with other agencies in this sector.

EXHIBIT 3-36. KEY EPP INTERACTIONS WITH OTHER FEDERAL AGENCIES

SECTOR	INTERACTION	OTHER PARTIES INVOLVED	YEAR STARTED	GOALS	OUTCOMES	NOTES
Electronics, Building Products, and Travel & Hospitality	Coordination on standards development process	Other EPA program and Regional offices; DOE, GSA, and other federal agencies		Coordinate between experts in different agencies and offices to develop coherent government positions on standards development issues	Unclear	Parties involved vary from standard to standard.
Electronics	Federal Electronics Stewardship Workgroup (FESWG)	Numerous federal agencies, institutional consumers, state and local governments, and industry representatives. Chaired by the Office of the Federal Environmental Executive (OFEE)	2004	Information exchange Coordinate interagency efforts on stewardship Help develop policies, guidance, reporting metrics, etc. for EO 13514 Acts as advisory board for FEC	Development and promotion of EPEAT	
Building products	Green Building Workgroup	Over 100 individuals across EPA program offices Formerly co-chaired by EPP, now chaired by Office of Sustainable Communities	2003	Clarify definition of Green Buildings Influence standards such as USGBC LEED, ASHRAE 189, IgCC Better reflect lifecycle and systems thinking, and all costs of green building	Draft EPA Recommended Green Building Principles, Goals and Practices EPA comments on numerous draft green building standards	
Building products	Federal Green Construction Guide Workgroup	EPA, OFEE, Whole Building Design Guide (WBDG)	Formed in 2000; released FGCGS in 2006		Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings Federal Green Construction Guide for Specifiers	
Travel & hospitality	EPA Region 9 Green Meetings and Conference Policy workgroup	Region 9, other EPA regions, GSA, DOD	2009		GSA adapting GCMP into Federal Travel Regulations (FTR). EPP provided draft amendments to the	Interviewees report that GSA's adoption of the GCMP into the FTR/FAR has the

SECTOR	INTERACTION	OTHER PARTIES INVOLVED	YEAR STARTED	GOALS	OUTCOMES	NOTES
					rule which GSA is expected to use (at least in part).	potential to influence the entire federal government.
Travel & hospitality	City Pairs Program	GSA, EPA Region 10, DOD, DOT	Collaboration began in 2009	Integrate consideration of GHGs emissions into evaluation of which airlines receive contracts for federal travel in existing GSA program.	Unclear	Collaboration is currently stalled, due to miscommunication of different goals for the program, and difficulty of identifying acceptable metrics.
Travel & Hospitality	EPA Acquisition Regulations (EPAAR) Procurement Language	EPA OAM	2007	Revise EPAAR to include more specific guidance on procurement for meetings and travel.	The "14 Questions," intended to guide travel-related procurement decisions.	EPP noted that the 14 questions are designed to raise awareness, but are not enforceable and are not intended to be a permanent solution.
Travel & Hospitality	OCFO workgroup on travel-related GHGs	EPA OCFO, other EPA offices, GSA, DOD, DOT	2009	Working groups include: 1. Amending the Federal Travel Regulations (FTR) 2. Amending the Federal Acquisition Regulations (FAR) 3. Encouraging hybrid vehicles 4. City Pairs (see above) 5. Encouraging teleconferencing	Recommendation lists.	OCFO played facilitating role. EPP played a central role in all subgroups and producing the resulting recommendations.
Cross-sector	Federal Green Challenge	First created by EPA Regions 9 and 10; currently managed by EPA ORCR	2008	Encourage green actions in six areas waste, electronics, purchasing, energy, water and transportation		Inspired by FEC and uses similar voluntary reporting framework. EPP

SECTOR	INTERACTION	OTHER PARTIES INVOLVED	YEAR STARTED	GOALS	OUTCOMES	NOTES
						collaboration is through providing technical assistance on electronics issues. Generally well-regarded, but sustainable acquisition area is viewed as weak.
Cross-sector	Green Products Roundtable	35 members, including GSA, DOE, EPA, NIST, and several industry and non-profit representatives	2009	Increasing green purchasing among institutional buyers by providing guidance to improve decision-making capabilities.	Glossary; framework for differentiating green products; green marketing pledge; and set of preferred practices.	
Cross-sector	Interagency Section 13 Product Standards & Ecolabels Subgroup	Led by GSA and EPA, with representatives from several other agencies	2010	Support the product environmental-related procurement goals of EO 13514 Provide a clear rationale to evaluate product environmental standards Simplify sustainable acquisition for the federal workforce	Draft Guidelines for Evaluating Standards and Ecolabels	Work is still in process.
Other	Sustainable Acquisition and Materials Management Practices Workgroup (SAMM)	Convened by OFEE; 40 active members from various agencies, including DOD and GSA		Develop green purchasing and recycling policy implementation guidance recommendations.	Unclear	Extent of EPP participation is unclear. Formerly known as EO 13101 Interagency Advisory Group.

Standards Development

EPP was influential in the development of the IEEE (EPEAT) electronics standards, and a major part of EPP's work in this area was coordinating with experts at EPA and other federal agencies to develop coherent government positions. Our interviews indicate that EPP was very successful in this area. One interviewee who participated in the standard development process noted that EPP's hard work and expert facilitation was a key element of the standard's success.

Other Electronics Efforts

Outside of the standards development process, EPP's major ongoing collaborative effort in the electronics sector is the Federal Electronics Stewardship Workgroup (FESWG). Created in 2004, the FESWG acts as an interagency forum for coordinating, developing and promoting federal electronics policies and activities. Interviewees from other agencies involved in the workgroup had high praise for EPP staff and stated that they have been effective in using the forum to promote purchases of EPEAT products.

Another important interaction concerns the Federal Acquisition Regulations (FAR). When the EPEAT program was first developed, EPP staff worked with GSA to develop language incorporating purchase requirements for EPEAT computers and monitors into the FAR. They have recently done similar work in advance of the new EPEAT standards on televisions and imaging equipment. Interviewees noted that having this language in the FAR has been an important means of increasing purchases of EPEAT products.

Finally, the Federal Electronics Challenge (FEC) provides multiple avenues for collaboration with other government programs. Most directly, it recruits purchasers from a wide array of federal agencies for direct participation in the program, which encourages EPEAT purchases, energy conservation practices, and product recycling or reuse at end of life. We discuss FEC's effectiveness in these areas in more detail under Evaluation Questions 8 and 9. FEC also provides trainings and technical assistance to other agencies directly (e.g., DOD, DOE) and through the Federal Green Challenge (FGC), a voluntary cross-agency program modeled in large part on the FEC. An interviewee from DOE praised the FEC coordinator's assistance in facilitating DOE's participation in the program, mentioning her well-deserved awards from EPA. Consequently, DOE built off of the FEC model for their own program. An interviewee involved in the FGC noted that FEC staff have been very important to FGC's ongoing success.

Building Products

Standards Development

Interviewees indicated that through its involvement in the NSF/ANSI carpeting and floor covering standards and the BIFMA furniture standard, EPP drove the industries toward the use of multi-attribute, multi-stakeholder standards, and made the standards more environmentally protective. Stakeholders for both the carpet and floor covering standards remarked that the EPP staff pushed the industry representatives on the committee to a higher level of environmental stewardship than they otherwise would have been comfortable with. For example, EPP's efforts resulted in the inclusion of criteria addressing volatile organic compounds in the carpet standard. Interviewees also noted that while EPP staff effectively steered the standards toward greater environmental protectiveness, they did not do so in an overbearing way.

Other Building Product Efforts

Aside from standards development, EPP's primary collaboration in the building products sector was on the development and distribution of the Federal Green Construction Guide for Specifiers (FGCGS), the first guide of its kind. The aim of the FGCGS is to "address the need for a comprehensive guide for procuring green building products and construction/renovation services within the federal government."⁹⁸ Because we did not interview any non-EPP staff involved in developing the FGCGS, we cannot assess the collaborative *process* that took place.

Travel and Hospitality

Standards Development

EPP Headquarters staff pulled in several subject matter experts from EPA Regional offices to participate in the development of the APEX/ASTM Green Meetings and Events standards. By all accounts, this collaboration was a challenging one. The main difficulty stems from the fact that the Headquarters and Regional EPA staff had different goals for the standards. While EPA Headquarters staff envisioned the standards as a potential tool for guiding sustainable procurement that focused on measurable performance targets (e.g., energy and water use), Regional staff viewed them more as a means to engage with industry practitioners to develop environmental management practices (e.g., policies and procedures). This philosophical difference also emerged between some of the other, non-EPA participants. However, the issue was not discussed explicitly at the beginning of the collaborative process and did not become clear until later on. The results were a somewhat challenging (though still functional) process, and a set of standards viewed as potentially useful but not fully satisfactory to all participants. An upfront dialog on the objectives of the standards could have lessened some of these difficulties.

According to one interviewee, the collaboration was also hindered by the fact that not all of the EPA staff involved had prior experience developing voluntary consensus standards. EPA's standards executive has worked with the National Institute of Standards and Technology (NIST) to develop a training course on standards and the standards development process; she recommended that EPA staff new to the standards development process take the course.

Other Travel and Hospitality Efforts

EPP played a key facilitating role in several other initiatives concerning green travel and hospitality, with the clearest success relating to Region 9's Green Meetings and Conference Policy (GMCP).

- To at least some extent, EPP has been successful in promoting the GMCP, and is working to expand its impact across the federal government. EPP convened a workgroup to adapt the GMCP developed by EPA Region 9 in 2009 into GSA's Federal Travel Regulations (FTR). A GSA participant in the workgroup noted that EPP was actively engaged, drafting numerous documents and seeking to make the guidance more protective of the environment. This was sometimes perceived as overbearing by GSA participants. While the GMCP has not yet been adopted into the FTR, if and when this occurs, it will have strong potential for use across the federal government.

⁹⁸ Whole Building Design Guide. "Federal Green Construction Guide for Specifiers." Updated July 8, 2011. <http://www.wbdg.org/design/greenspec.php>

- Similar to the GMCP effort, EPP led a workgroup with several agencies set up by EPA’s Office of the Chief Financial Officer (OCFO) focusing on developing recommendations for reducing the cost and greenhouse gas impact associated with federal travel. EPP coordinated the process, and the EPP staff person involved was regarded by interviewees as an expert leader. However, it is unclear how OCFO has used or plans to use the workgroup’s recommendations.
- One outgrowth from the EPA OCFO workgroup was an initiative on the City Pairs program. City Pairs is a GSA program that awards contracts to airlines for federal employees’ travel on a route-by-route basis. Starting in 2009, EPP collaborators sought to integrate prior work by EPA Region 10 on calculating travel-related GHG emissions into the GSA decision-making process, by adding emissions as an evaluation factor. Unlike some of the other collaborative efforts noted above, this one has not been successful. The City Pair program has been hindered by challenges in determining how to weigh GHG emissions versus cost, and on how to measure emissions, but it appears that the effort has also been plagued by miscommunication. Specifically, in our interviews, EPP staff (including both Headquarters and Regional staff) described relatively modest goals for the initiative of setting up information systems to inform sustainable travel choices, whereas the GSA staff person interpreted EPP’s aims as being more ambitious, seeking immediate emissions reductions by airlines. This disconnect has led to a perceived lack of goal alignment between EPP and GSA that, among other factors, has hindered progress in the collaboration.

Other Collaborative Efforts

Beyond the sector-specific endeavors described above, EPP staff have also engaged in several broader initiatives, including the Green Products Roundtable, the Sustainable Acquisition and Materials Management Practices Workgroup (SAMM), and the Section 13 Interagency Product Standards and Ecolabels Sub-working Group. Our interviews did not address the Green Products Roundtable or the SAMM. The Section 13 workgroup is engaged in ongoing work to facilitate the use of product sustainability standards by federal purchasers, by developing guidelines for purchasers to use in assessing standards. Participants in this workgroup considered the EPP staff person involved “extremely knowledgeable and effective” and gave them high accolades. It is unclear what the outcome of the collaboration will be, as its work is still underway.

Although it is outside of the three product sectors being addressed in this program evaluation, one other effort worth brief mention is a 2003 collaboration between EPP and EPA OAM to develop a blanket purchase agreement (BPA) for office supplies. An OAM staff person involved in this effort saw the collaboration as a major success that changed the concept of how EPA purchasers bought their goods. The BPA was awarded to a sole supplier and created incentives to increase the number of environmentally preferable products offered. In response, the supplier created a new section of its product catalog and a new green icon to designate environmentally preferable product. EPA was recognized with a “Closing the Circle” Award from the White House for the BPA, and GSA is now using similar criteria in its Federal Strategic Sourcing Initiative.

Interview Suggestions for Improving Future Collaborations

Overall, our interviews indicate that where EPP has engaged with other federal agencies, the EPP staff members’ efforts have generally been well-received, with positive assessments from other stakeholders. This has been true both for coordination on standards development and for other interactions, such as

interagency workgroups. However, the interviews do provide some suggestions for improving future collaborations:

- EPP’s experience in the travel and hospitality sector highlights the importance of having goal alignment and clear communication between stakeholders from the beginning of the effort. A relatively small upfront investment of time may have prevented difficulties later on in the process.
- Interviewees suggested that certain aspects of EPA’s culture may be hindering effective collaboration. One interviewee mentioned “micro-managing” by EPA management as an obstacle; another interviewee felt that valuable EPP staff members were underappreciated by EPA management. We do not have enough information to evaluate the validity of these comments, but we flag them here for EPA’s consideration.
- Several interviewees felt that EPP needed to focus on changing behavior, rather than tracking compliance. Suggestions included building on the FEC model to further incentivize green purchasing in a broader sense (i.e., beyond electronics); the Federal Green Challenge may address this comment. Suggestions also include advocating for more federal purchases of green products beyond those included in current federal regulations, which the Section 13 workgroup process is designed to facilitate.
- The scope of our interviews generally did not allow us to identify missed opportunities where EPP could have pursued a coordinated effort with another agency but did not do so, and our analysis is limited in that respect. However, there is one exception. An overarching finding from our evaluation of the EPP Program is that a lack of data tracking currently hinders green purchasing efforts throughout the federal government, which is discussed in several other areas in this report. However, DOE used its own Pollution Prevention Tracking and Reporting System for 14 years to track green product purchases, and reportedly offered the data to both EPA and GSA, who declined it. As a result, DOE stopped collecting these data in 2011. Note that the DOE staff person spoke to EPA staff that were outside of EPP, and did not contact the EPP Program directly. Nonetheless, this represents a missed opportunity that could have been avoided through stronger collaborations between EPP and DOE and/or between EPP and other EPA offices.

QUESTION 8: FEDERAL ELECTRONICS CHALLENGE

Introduction

The Federal Electronics Challenge (FEC) is a voluntary partnership program for government agencies and individual facilities. Its aims are to encourage its participating partners to purchase environmentally preferable electronics; reduce the environmental impacts of electronics while in use; and manage the disposal of electronics safely at the end of their useful life. FEC focuses on a defined group of widely-used electronics products, including desktop and laptop computers, monitors, and printers.⁹⁹ Other electronic products, such as televisions and mobile devices, may be added to the program in the future.

In 2010, the program results that FEC submitted to the Pollution Prevention Division (PPD) showed a substantial downturn in energy savings and greenhouse gas emissions reductions between 2009 and 2010.

⁹⁹ See <http://www.federalelectronicschallenge.net/>

FEC had reported energy savings of approximately 1,684 billion BTUs in 2009; in 2010, it reported approximately 1,087 billion BTUs in energy savings – a 35% decrease. The downturn came from a 32% decrease in energy savings from power management activities and a 37% decrease in energy savings from end-of-life management.

IEC's analysis of the FEC, motivated by this circumstance, is designed to answer the following evaluation question:

8. The Federal Electronics Challenge, a key EPP priority area, has reported an apparent decline in energy savings from 2009 to 2010. Is this decline in reported energy savings indicative of backsliding on energy savings behavior reported to FEC?
 - a. If yes, why has backsliding occurred?
 - b. If yes, what changes are needed within FEC to address backsliding?

Key Findings

Our analysis focused on the downturn in energy savings we would have seen from 2009 to 2010, if we measured *only* the changes in the specific behaviors that FEC is trying to promote: proportional rates of Energy Star-enabling during use, and reuse at end of life. Combining the results of the power management and end-of-life analyses, we find that rather than the 35% decrease reported, this alternative means of evaluating the data would show a drop in energy savings of about **6.1%**. This 6.1% downturn was driven almost entirely by a decline in FEC partners' rate of reuse of computers (but not monitors) at end of life.

The much larger decline in FEC's results as reported to PPD is due to a number of factors:

- Anomalous data points, likely caused by human error in the reporting process, were responsible for a modest proportion of the decline in the power management area.
- Fluctuations in which specific partners submitted data to FEC accounted for a large majority of the downturn in the power management area. These fluctuations also contributed nearly half of the decline in the end-of-life area.
- Variations in the overall number of electronics products in the system – regardless of what environmental steps were being taken – were responsible for a sizable portion of the apparent decrease.
- Actual backsliding, i.e., less environmentally preferable behavior, was a negligible factor in power management. Backsliding was more evident in end-of-life, but this must be tempered by the fact that lower rates of equipment reuse were partially balanced by higher rates of equipment recycling, the benefits of which are awarded to ORCR, not FEC.

Due to the assumptions and uncertainties inherent in our analysis, which are discussed below in this section, the quantified environmental benefits discussed in this analysis should be understood to be approximations and not precise figures. Different assumptions would yield different results. See the textbox at the end of this evaluation question for further details on calculations.

Notes on this Analysis

This analysis is narrowly focused. It is not concerned with longer-term trends, e.g., in FEC's program growth or reporting rates since its inception. The analysis is focused only on the benefits associated with FEC's internal reporting: Energy Star-enabling of computer equipment (power management) and equipment reuse at end-of-life.¹⁰⁰ Moreover, the analysis also does not examine non-energy related environmental benefits.

IEC obtained and reviewed FEC's database aggregating the information submitted by individual partners, to investigate several factors that may have contributed to the apparent decrease in energy savings. Potential contributing factors include backsliding (i.e., FEC partners engaging in less environmentally-friendly activity); reduced use of electronics equipment in 2010 compared to 2009 (simply using fewer pieces of equipment); fluctuations in which specific facilities reported results; and human error in reporting or tabulating results. Our results, detailed below, indicate that each of these factors impacted FEC's bottom-line results. However, our key finding is that the vast majority of the apparent decline was due to 1) reduced use of electronics equipment, and 2) fluctuations in which facilities reported results in each year. Only a small portion of the decline in energy savings behavior reported by FEC from 2009 to 2010 was actually due to backsliding by FEC partners. The magnitude of the decline due to backsliding is sufficiently small that no major changes to the FEC program are warranted. Different measures of the available data yields very different results, and strongly indicate that FEC's actual performance was not as poor in 2010 as the reported results would suggest.

Overview of FEC Activities

FEC engages in a variety of activities to achieve its goals. It provides technical assistance to assist its partners in reducing electronics-related environmental impacts. It also serves as a forum to exchange information and resources (for both partners and non-partners). In addition, FEC partners can apply for awards, which give their efforts greater visibility and provide an incentive to undertake more aggressive efforts. The award application includes a menu of optional activities for the applicant to choose from, promoting environmental stewardship beyond the basic activities expected of every FEC partner. For FY2010, FEC recognized seven platinum-level award winners, four gold-level winners, 12 silver-level winners, and 16 bronze-level winners.

FEC partners are, by and large, individual facilities, but two federal agencies (the Departments of Education and Transportation) with centralized procurement and IT management functions are FEC agency partners and report aggregate data covering all of their facilities.¹⁰¹ FEC partners are strongly encouraged to submit information tracking their performance on an annual basis, using a standardized reporting form. FEC program staff review this data, consult with partners to address suspicious data points, aggregate data across all partners reporting in that year, and use the Electronics Environmental

¹⁰⁰ FEC now also includes results for life extension, i.e., using products for a longer time before disposing of them. However, this activity was not included in FEC's reported 2009 or 2010 results. For that reason, we do not consider it in our analysis.

¹⁰¹ IEC considered the potential issue of agency partners having internally inconsistent data that would skew FEC's results. If these agencies would have to gather data from each of their individual facilities but report only aggregate data to FEC, then FEC would have no readily available means to determine whether the partners had any nonresponsive facilities in any given year. Thus, FEC would have no way of knowing whether any year-to-year fluctuations in results for these partners were driven by actual changes in behavior or simply by inconsistent reporting. However, because the relevant functions at FEC's two agency partners are performed in a centralized manner, the necessary data is held at the agency level and does not need to be collected from individual facilities. Thus, the two agency partners present no added difficulties for FEC to validate data.


Benefits Calculator (EEBC) to translate the data reported by FEC partners into estimated environmental benefits for the year.

Historically, reporting has been voluntary, meaning that membership in the FEC has not been contingent on consistent reporting.

However, as of 2012, partners must submit their results or face expulsion from the program.

There are several activities that FEC partners report on, including:

- Use of an Environmental Management System (EMS)
- Purchase of EPEAT electronics
- Use of Energy Star power management features on computers and monitors
- Lifespan of desktop computers
- Default use of double-sided printing
- End-of-life management, including reuse, recycling, landfill/incineration, and unknown disposition/sales



Federal Electronics Challenge
Baseline Survey and
Annual Reporting Form

Updated: 8/9/2011

SECTION 2: ACQUISITION & PROCUREMENT

1. How many electronic products purchased, leased, and/or provided under seat management were, or were not, EPEAT registered?

	Number of EPEAT registered units (Bronze)	Number of EPEAT registered units (Silver)	Number of EPEAT registered units (Gold)	Number of units not EPEAT registered
Desktop computers				
Cathode ray tube (CRT) monitors				
Liquid crystal display (LCD) monitors				
Laptop/notebook computers				
Printers*				
Multifunction devices (MFDs)*				
Televisions*				
Servers*				
Cellular/mobile telephones*				
Personal digital assistants (PDAs)*				

*Reporting acquisition information for these products is optional for partners completing this form for annual reporting.

SECTION 3: OPERATION & MAINTENANCE

1. How many computers and monitors are in use at your organization?

_____ Desktop computers

_____ CRT Monitors

_____ LCD Monitors

_____ Laptop/notebook computers

2. Are ENERGY STAR® power management features enabled on non-exempt computers (desktops and laptops/notebooks) and/or monitors at your organization?

Yes

Estimated percentage of enabled non-exempt monitors: _____ %

Estimated percentage of enabled non-exempt computers: _____ %

No

Don't Know

A page from FEC's Annual Reporting Form

While FEC reports the environmental benefits generated by all of these activities (to the extent possible) in its publicly-available annual accomplishments summaries, only a subset of the benefits are attributed to FEC when the program internally reports its contributions toward EPA's Strategic Goals. For example, EPEAT sales are attributed to the EPEAT program, and recycling at end of life is attributed to ORCR; benefits from these activities are excluded from FEC's results. Exhibit 3-37 summarizes FEC's handling of the various categories of environmental benefits relating to its program activities. As shown in the table, FEC gets internal credit only for Energy Star-enabling of computer equipment (power management) and equipment reuse at end-of-life.

Power Management

Energy savings from power management are calculated in a three-step process. First, FEC partners report on the total number of desktop computers, laptops, and CRT and LCD monitors in use at their organization. They then estimate the percentage of monitors and computers for which Energy Star power management features are enabled. Finally, FEC program staff multiplies the number of products in use by the proportion that is Energy Star-enabled, and uses the EEBC to translate those figures into environmental benefits.

EXHIBIT 3-37. TREATMENT OF ENVIRONMENTAL BENEFITS FROM ACTIVITIES TRACKED BY FEC

ACTIVITY TRACKED BY FEC	TREATMENT OF ENVIRONMENTAL BENEFITS			NOTES
	ATTRIBUTED TO FEC	ATTRIBUTED ELSEWHERE	NOT CALCULATED	
Environmental Management System (EMS)			X	Not included in EEBC.
EPEAT purchases		X		Attributed to EPEAT; benefits remain within EPP.
Energy Star-enabling (power management)	X	X		FEC claims benefits of Energy Star-enabling above assumed default enabling rate; benefits of default level of Energy Star-enabling accrue to Energy Star.
Lifespan extension			X	FEC started measuring benefits of lifespan extension starting in 2011. Thus, these benefits are excluded from IEC's analysis.
2-sided printing			X	Not included in EEBC.
Equipment reuse at end of life	X			
Equipment recycling at end of life		X		Attributed to ORCR; benefits do not remain within EPP.
Unknown disposition, sales, landfill, or incineration of equipment at end of life			X	No benefits assumed in EEBC.

The first step in the analysis was to search for anomalous data points. IEC identified eight facilities with abnormal results, relating to dramatic changes in the proportion of Energy Star-enabled equipment.¹⁰² Working with the FEC coordinator, IEC contacted the partners involved to request confirmation or correction of the anomalous data points. In three cases, partners responded with corrected information, which we used in our analysis. One partner confirmed that the suspicious data point was, in fact, correct. The remaining four did not respond to our request for information. We removed the data from these four facilities from our analysis.¹⁰³

¹⁰² In addition to the eight facilities noted here, results for the Department of Energy headquarters also appeared anomalous on initial review. DOE showed a huge increase in the number of electronics units in use from 2008 to 2009, with a return to prior levels in 2010. For example, PCs in use jumped from 5,700 in 2008 to 126,977 in 2009 before dropping back to 5,700 in 2010. However, the FEC coordinator had already investigated and validated these figures when they were provided in 2009. In that year, DOE had aggregated results for several (though not all) of its FEC partner facilities, and reported all of these as belonging to the Headquarters facility. Thus, while the facility-level results for DOE Headquarters (as well as the other DOE facilities involved) were incorrect for 2009, the overall results across all DOE facilities were accurate. We have therefore retained all of these facilities in our reported results.

¹⁰³ These four facilities accounted for 3.8% of Energy Star-enabled monitors in 2009 and 1.1% in 2010, and 7.7% of Energy Star-enabled computers in 2009 and 3% in 2010.

Exhibit 3-38 shows the total number of pieces of electronics equipment in use among reporting FEC partners in 2009 and 2010, as originally reported and then excluding the questionable data points just noted. These figures reveal an obvious pattern: total electronics equipment use among all reporting partners dropped substantially from 2009 to 2010. The number of PCs in use dropped by more than 20%, while the decline in monitor use was even steeper.

EXHIBIT 3-38. ELECTRONICS IN USE AND ENERGY STAR ENABLING AMONG FEC PARTNERS

	MONITORS			COMPUTERS			TOTAL		
	2009	2010	% CHANGE	2009	2010	% CHANGE	2009	2010	% CHANGE
As reported									
Partners reporting	130	109	-16.2%	117	102	-12.8%			
Total units in use	977,199	659,672	-32.5%	929,953	734,208	-21.0%	1,907,152	1,393,880	-26.9%
Energy Star-enabled units in use	932,727	542,974	-41.8%	484,201	358,904	-25.9%	1,416,928	901,878	-36.3%
Excluding anomalous data points									
Partners reporting	127	106	-16.5%	113	98	-13.3%			
Total units in use	937,642	614,951	-34.4%	883,407	673,584	-23.8%	1,821,049	1,288,535	-29.2%
Energy Star-enabled units in use	897,040	536,932	-40.1%	446,721	357,983	-19.9%	1,343,761	894,915	-33.4%

It is important to consider the implications of these data. If FEC partners had continued to enable Energy Star settings at the same rate in 2010 as in 2009, FEC's results would still reflect this as a decrease in energy savings behavior, corresponding exactly to the drop in total equipment use. Yet this would not actually reveal anything about the FEC program's effectiveness in reducing the environmental impact of its partners, because a facility's decisions about how many computers and monitors to use is unrelated to FEC's aims. Thus, a tension exists between the way in which FEC reports its results and the actual environmental benefits it is seeking. For this reason, **a more meaningful metric for FEC's success is the proportion of all computers and monitors at FEC partner facilities that are Energy Star-enabled.** We have included this measure in Exhibit 3-39.

Excluding the anomalous data points noted above, while Energy Star-enabling of monitors dropped somewhat from 2009 to 2010, the enabling rate for computers increased. Because we are dealing with proportions and not absolute numbers for the reasons just articulated, we cannot translate this precisely into environmental benefits. However, as an approximation, we can estimate the environmental benefits that would result from these changes in enabling rates, *if* the total number of products in use remained constant at 2009 levels. Using the EEBC, we find that these enabling rates would have resulted in a 1.5%

increase in environmental benefits from 2009 to 2010.¹⁰⁴ That is to say, **the environmental gain from improved Energy Star enabling in computers in 2010 more than offset the lower rate of Energy Star enabling in monitors.**

EXHIBIT 3-39. PERCENTAGE RATES OF ENERGY STAR ENABLING AMONG FEC PARTNERS

	MONITORS			COMPUTERS			TOTAL		
	2009	2010	% CHANGE	2009	2010	% CHANGE	2009	2010	% CHANGE
As reported	95.4%	82.3%	-13.1%	52.1%	48.9%	-3.2%	74.3%	64.7%	-9.6%
Excluding anomalous data points	95.7%	87.3%	-8.4%	50.6%	53.1%	2.5%	73.8%	69.5%	-4.3%

Much of the decrease in the number of products in use is driven by differences in which FEC partners reported in which specific years. Reporting rates dropped between 2009 and 2010. In 2009, 130 FEC partners reported results for Energy Star-enabling of monitors, while 117 reported on Energy Star-enabling of computers. In 2010, 109 and 102 partners reported results on monitors and computers, respectively. Further complicating matters, only 96 and 85 partners reported results consistently in both years for monitors and computers, respectively (Exhibit 3-40); several partners reported only in one year or the other.

To explore the magnitude of the effect of these reporting differences on FEC's bottom-line results, we examined trends among those facilities that reported in both years, i.e., excluding facilities that reported only once in 2009 – 2010 (see Exhibit 3-40).¹⁰⁵ Key results from those facilities are as follows:

- The number of products in use dropped substantially from 2009 to 2010. This indicates that a substantial portion of the apparent downturn in energy savings is likely due to individual facilities using fewer pieces of electronics equipment.
- 85.6% of all monitors in use were Energy Star-enabled in 2009. An essentially equivalent 85.4% were Energy Star-enabled in 2010.
- In both 2009 and 2010, 53.1% of all computers in use were Energy Star-enabled.
- Again, we cannot translate this precisely into environmental impacts. However, if we hold the total number of products in use constant at 2009 levels, **the slight decline in Energy Star enabling would have resulted in a decrease in energy savings of only 0.1%.**

Comparing these results to those of all FEC partners, it becomes clear that the population of FEC partners reporting only in 2009 does *not* match closely with the population as a whole, in ways that heavily influenced the program's overall results. Partners that reported only in 2009 had higher rates of Energy

¹⁰⁴ This process is described in more detail later in this analysis.

¹⁰⁵ Because the evaluation question being addressed concerns only 2009 and 2010, facilities that did not report in either year have no impact on our analysis.

Star enabling for monitors (though somewhat lower enabling rates for computers), and, more importantly, more electronics units in use per facility. Partners reporting only in 2010 were more characteristic of the population as a whole. This means that the failure of many partners that reported in 2009 to report again in 2010 accounts for a substantial part of the drop-off in observed energy savings.

EXHIBIT 3-40. ELECTRONICS IN USE AND ENERGY STAR ENABLING AMONG FEC PARTNERS REPORTING IN BOTH YEARS

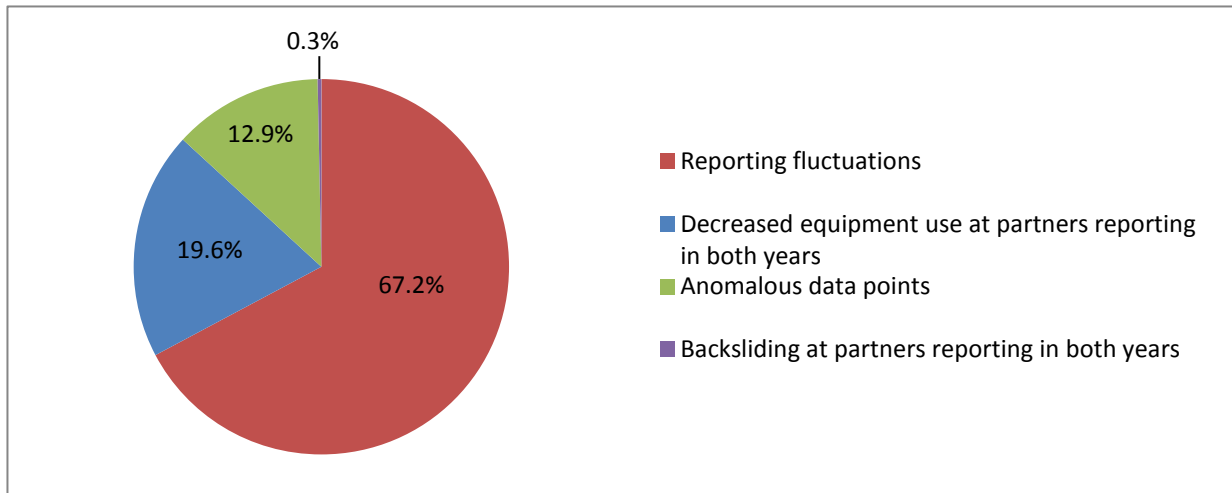
	MONITORS			COMPUTERS			TOTAL		
	2009	2010	% CHANGE	2009	2010	% CHANGE	2009	2010	% CHANGE
Partners reporting	96	96	N/A	85	85	N/A			
Total units in use	555,705	507,896	-8.6%	672,015	558,964	-16.8%	1,227,720	1,066,860	-13.1%
% Energy Star-enabled	85.6%	85.4%	-0.2%	53.1%	53.1%	0.0%	67.9%	68.5%	0.6%
Energy Star-enabled units in use	475,877	433,516	-8.9%	357,175	296,876	-16.9%	833,052	730,392	-12.3%

Exhibit 3-41 shows how each of the factors discussed above – anomalous data points, reporting fluctuations, decreased equipment use, and backsliding – contributed to the decrease in the number of Energy Star-enabled products at reporting FEC facilities. The same basic pattern would hold true for the downturn in reported energy savings, although there may be some minor differences in the exact numbers.¹⁰⁶ Only a minuscule portion of the observed decline was due to backsliding. The remainder was caused by other factors.

We cannot definitively state that the patterns noted above for facilities reporting in both years (i.e., minimal change in rates of Energy Star-enabling, coupled with a modest decrease in the total number of units in use) would also hold true for the entire universe of FEC partners, for the simple reason that there are many FEC partners whose actual results we cannot observe for 2010 (since they did not report any results). 96 partners reported results for monitors in both years; this represents 76% of all facilities reporting in 2009, and 91% of facilities reporting in 2010. Similarly, 85 partners reported results for computers in both years, accounting for 75% of all facilities reporting in 2009 and 87% of facilities reporting in 2010. If the facilities excluded from this calculation had different characteristics from the ones that were included, then our estimated results may be inaccurate. However, the relatively high proportion of facilities reporting in both years suggests that the overall pattern would not change too drastically if we had data for these other facilities that we could include in our analysis.

¹⁰⁶ Because per-unit environmental benefits vary by equipment type (CRT monitors, LCD monitors, desktop computers, and laptops), the overall change in environmental benefits across all equipment types would be slightly different from the change in the numbers of Energy Star-enabled units across all equipment types.

EXHIBIT 3-41. FACTORS CONTRIBUTING TO THE DECREASE IN ENERGY STAR-ENABLING OF ELECTRONICS PRODUCTS AMONG FEC PARTNERS FROM 2009-2010



We also cannot conclusively state that the ‘actual’ backslide in energy performance among the entire universe of FEC partners was only 0.1%. Nonetheless, *if* the same trends held true for non-reporting facilities as for reporting facilities, the observed downturn in energy savings from power management activities would disappear almost entirely. As noted above, a relatively high proportion of FEC partners reported in both years, giving us confidence that the overall result for all FEC partners would likely not be dramatically different. While the precise result (which is unknowable) may be slightly different, this analysis clearly indicates that FEC’s performance in the area of power management was not nearly as poor as the numbers reported to PPD suggest.

End of Life

The second area in which FEC reported results in 2009 and 2010 was end of life. The process for calculating benefits from end of life is similar to power management. FEC partners report on the total number of desktop computers, laptops, and CRT and LCD monitors in their facilities that reached the end of their life in the past year. They then estimate the percentages that were disposed of through reuse, recycling, landfill and incineration, and unknown disposal. FEC program staff multiplies the number of items being disposed of by these proportions, and uses the EEBC to calculate environmental benefits.

FEC claims environmental benefits only for products that are reused. The benefits of recycled electronics are attributed to ORCR. Electronics that are sent to landfill or that have unknown disposal are considered not to generate any environmental benefits. FEC began tracking end-of-life treatment for printers in 2010, but because there is no comparable data for 2009, we exclude printers from our analysis and evaluate only monitors and computers.

There are three factors that contributed to the downturn in reported energy savings from 2009 to 2010:

- Differences in which specific facilities reported results;
- A lower number of electronics products reaching their end of life; and

- A lower proportion of electronics being reused at end of life.¹⁰⁷

In addition, the fact that recycling benefits are attributed to ORCR further complicates matters, in that gains in one environmentally preferable means of disposal may come at the expense of another.

As with the power management area, there is a disconnect between what FEC reports and what constitutes an actual environmental good in end-of-life disposal, which distorts measures of the program's effectiveness. The number of products reaching the end of their useful lives does not tell us anything about FEC's effectiveness in encouraging partners to reuse or recycle electronics rather than disposing of them in a landfill.¹⁰⁸ However, the number of products reaching end of life directly affects how FEC calculates its results. The proportion of end-of-life electronics being reused is a better metric of FEC's effectiveness than the absolute number of electronics being reused, since it would better illustrate how FEC partners are changing their behavior.

Exhibits 3-42 and 3-43 characterize end-of-life treatment for all reporting FEC partners in 2009 and 2010. Note that there was a 26% decrease in the total number of electronics products reaching their end-of-life in 2010. The proportion of products being reused dropped slightly, from 43.5% to 41.5% (Exhibit 3-43). Recycling increased from 38.9% to 47.4%, but as noted above, EPA attributes this to ORCR, not EPP.

EXHIBIT 3-42. ELECTRONICS REACHING END OF LIFE AMONG FEC PARTNERS

	MONITORS			COMPUTERS			TOTAL		
	2009	2010	% CHANGE	2009	2010	% CHANGE	2009	2010	% CHANGE
Partners reporting	100	92	-8.0%	109	97	-11.0%			
Units reaching end of life	93,906	52,927	-43.6%	189,535	146,611	-22.6%	283,441	199,538	-29.6%
Reused units	35,394	20,826	-41.2%	87,941	62,057	-29.4%	123,335	82,883	-32.8%
Recycled units	40,078	25,034	-37.5%	70,205	69,452	-1.1%	110,283	94,486	-14.3%

Again, we examined data for the subset of facilities that reported results in both years, to explore the impact of year-to-year differences in reporting activity (Exhibit 3-44). Results for these facilities were as follows:

- The total number of units reaching end-of-life dropped by 18.8%. This indicates that a substantial portion of the apparent downturn in energy savings is likely due to facilities extending the lifespan of their electronics equipment, and/or normal fluctuations in cycles of electronics procurement and disposal.

¹⁰⁷ IEC did not find any anomalous data points among the individual FEC partners reporting results in the end-of-life area.

¹⁰⁸ However, the number of products reaching end of life may indirectly point to an environmental benefit from FEC partners deferring the disposal (and presumably, the replacement) of electronics by keeping them in use for a longer period of time. Starting in 2011, FEC has tracked these benefits through another metric, namely, the average lifespan of computers in use at partner facilities.

EXHIBIT 3-43. PERCENTAGE RATES OF REUSE AND RECYCLING AT END OF LIFE AMONG FEC PARTNERS

	MONITORS			COMPUTERS			TOTAL		
	2009	2010	% CHANGE	2009	2010	% CHANGE	2009	2010	% CHANGE
% Reused	37.7%	39.3%	4.4%	46.4%	42.3%	-8.8%	43.5%	41.5%	-4.5%
% Recycled	42.7%	47.3%	10.8%	37.0%	47.4%	27.9%	38.9%	47.4%	21.7%

- Reuse of monitors increased from 2009 to 2010, but this was more than offset by a decline in reuse of computers. Combined, the rate of reuse dropped from 43.5% to 38.5%, but recycling increased dramatically, from 37% to 51% (Exhibit 3-44).
- As before, we cannot translate these numbers precisely into environmental benefits without adopting some additional assumptions. Nonetheless, *if* we hold the overall number of products reaching end-of-life constant at 2009 levels, a drop from 43.5% to 38.5% reuse would result in a **10% decrease in energy savings from reuse from 2009 to 2010**, rather than the 37% decrease reported by FEC.¹⁰⁹

EXHIBIT 3-44. ELECTRONICS REACHING END OF LIFE AMONG FEC PARTNERS REPORTING IN BOTH YEARS

	MONITORS			COMPUTERS			TOTAL		
	2009	2010	% CHANGE	2009	2010	% CHANGE	2009	2010	% CHANGE
Partners reporting ¹	73	73	N/A	61	61	N/A			
Units reaching end of life	45,867	29,716	-35.2%	123,269	107,578	-12.7%	169,136	137,294	-18.8%
% Reused	23.1%	31.1%	34.2%	51.1%	40.6%	-20.6%	43.5%	38.5%	-11.5%
% Recycled	42.8%	53.8%	25.6%	34.8%	50.2%	44.3%	37.0%	51.0%	37.9%
Reused units	10,609	9,227	-13.0%	62,944	43,642	-30.7%	73,553	52,869	-28.1%
Recycled units	19,647	15,990	-18.6%	42,869	53,999	26.0%	62,516	69,989	12.0%

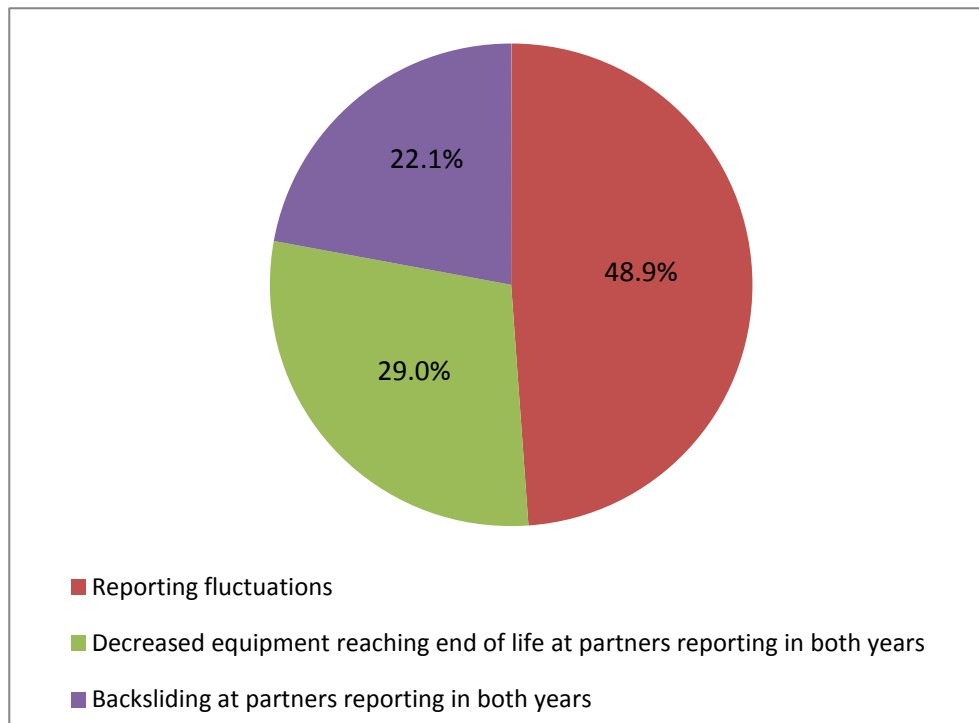
The main difference between facilities reporting in both years and those reporting only in 2009 were that the consistent reporters had much lower monitor reuse rates. This contributed to the observed downturn in energy saving behavior from 2009 to 2010. Other differences between the two groups were less dramatic.

¹⁰⁹ This was calculated via a similar process to that noted above for power management.

Exhibit 3-45 shows how reporting fluctuations, fewer products reaching end of life, and lower rates of reuse (i.e., backsliding) each contributed to the decrease in the overall number of products being reused. Again, the same basic pattern would hold true for the decrease in reported energy savings, but the exact numbers would be slightly different due to the differing environmental characteristics of the various product groups.

Backsliding, as opposed to other factors, is a more significant contributor to the observed decline in end of life than was the case for power management activities. Even so, only about 22% of the decline was due to backsliding. It is also important to emphasize that ‘backsliding,’ in this context, does not account for the substantial increase in electronics recycling, the benefits of which accrue to ORCR instead of FEC. The estimated 10% decrease in environmental benefits noted above (i.e., the decrease due to backsliding among partners reporting in both years) would only be a 7.5% decrease if benefits from recycling were included in FEC’s results.

EXHIBIT 3-45. FACTORS CONTRIBUTING TO DECREASE IN REUSE OF ELECTRONICS PRODUCTS AT END OF LIFE AMONG FEC PARTNERS



Details On Calculations Used In This Analysis

The hypothetical energy savings downturn of 6.1% was estimated in the following manner:

- First, we used the Electronics Environmental Benefits Calculator to estimate the marginal energy savings associated with a single piece of equipment of each type going through each of the treatments tracked by FEC. For instance, we evaluated the benefits of a single Energy Star-enabled desktop computer, a single LCD monitor being reused at end of life, etc. In estimating per-unit benefits, we assumed that all EPEAT electronics were certified at the silver level, which is the default used in the EEBC.
- We then multiplied the per-unit benefits in each category by the total number of products in that category in 2009 among those facilities reporting in both years. This gives us an estimate of the total energy benefits accruing to the consistently reporting FEC partners in 2009.
- For each category, we multiplied the estimated total benefits in 2009 by the relevant proportional measures for 2010 and 2009 described above in the main body of the report. For example, for reuse of monitors, we multiplied 2009 results by $31.1\% \div 23.1\% = 1.346$. The interpretation of this step is that among consistently reporting FEC partners, in 2010, there was a 34.6% increase in the proportion of monitors being reused. Note that in this step, we used aggregated (weighted) proportions combining both desktop and laptop computers, and both CRT and LCD monitors.
- Finally, we summed benefits across all categories to arrive at a total for 2010, and compared this to the estimate for 2009 to determine the extent of the 2009-2010 downturn.

Several factors introduce uncertainty and imprecision into this analysis, including the use of EPEAT silver as a default, rather than analyzing all EPEAT levels individually; the aggregation of desktop and laptop computers, and CRT and LCD monitors; and the assumption that non-consistently reporting partners follow the same patterns as consistently reporting partners. Thus, **our numerical result should be considered approximate**, not definitive. Even so, the evidence is clear enough to support the findings.

QUESTION 9: FEDERAL ELECTRONICS CHALLENGE AND EPEAT PURCHASES

Introduction and Key Findings

As discussed above, the Federal Electronics Challenge (FEC), a voluntary partnership program for federal facilities and agencies, promotes a variety of environmentally-motivated activities among its members, and tracks data on those partners' performance. While FEC does not receive credit for all of these activities when reporting program results to PPD, the program may nonetheless be an important means of driving more environmentally-conscious behavior even in areas for which it does not officially receive credit.

One area that FEC addresses, but for which the program does not receive credit, is encouraging the purchase of EPEAT-registered electronics by federal agencies. Because this is an important aspect of FEC's efforts, Evaluation Question 9 asks, "How effective is the FEC's voluntary approach in promoting purchases of EPEAT-labeled electronics among federal agencies?"¹¹⁰

¹¹⁰ In our methodology report, this evaluation question was worded to explore the FEC's "voluntary reporting approach." We have dropped the word "reporting" from the question to emphasize that we are examining the overall effectiveness of the FEC program, rather than its reporting aspect in particular. As noted in our analysis of Evaluation Question 8, FEC engages in a variety of activities, including technical assistance, information exchange, and awards in addition to progress reporting.

Overall, we found strong, albeit indirect, evidence that FEC partners did purchase EPEAT electronics at higher rates than the rest of the federal government: Our main findings for this evaluation question are as follows:

- FEC partners had relatively high rates of EPEAT purchases in all years, from a low of 80.9% in 2007 to a high of 96.4% in 2009.
- FEC's proportion of total federal EPEAT purchases is shrinking over time, implying that the rest of the federal government is catching up to the high bar set by FEC early on.
- FEC partners accounted for more purchases of EPEAT monitors in 2008 than the entire rest of the federal government.
- Most importantly, if we make two key assumptions – that FEC is doing no worse than the rest of the federal government at purchasing EPEAT electronics, and that FEC provides a reasonable proxy for the whole federal government with respect to total (EPEAT and non-EPEAT) electronics – the data indicate that FEC purchased EPEAT products at higher rates than the rest of the federal government in the early years of the program. This suggests that FEC partners were early adopters of EPEAT. However, the disparity between the FEC and the rest of the federal government has lessened over time. We cannot evaluate whether FEC is still purchasing proportionally more EPEAT products than the rest of the government.
- A relatively high number of federal facilities participate in the FEC program compared to other voluntary environmental programs. FEC partners also account for a significant fraction of all federal EPEAT purchases. Thus, FEC has also been successful in terms of its overall reach.
- Finally, although not directly related to this evaluation question, we note that FEC partners have shifted decisively from predominantly silver to gold certified EPEAT products, which are more protective of the environment.

The data available and methods used in this analysis do not allow us to establish causation, so we cannot state with complete certainty that the FEC program was effective in promoting purchases of EPEAT products. Nonetheless, the results are consistent with the presence of an “FEC effect,” and provide strong evidence that membership in the FEC is correlated with more EPEAT purchases. At least a portion of this effect is likely a product of selection bias, wherein federal facilities that were more predisposed to purchase EPEAT products opted in to the FEC. However, given the fact that promoting EPEAT purchases is one of FEC's core goals, it seems likely that at least some of the observed difference between FEC partners and other federal facilities is attributable to the influence of the FEC program. We therefore conclude that the FEC's voluntary approach has likely been effective in promoting EPEAT purchases among federal agencies.

Electronics Purchase Data

To answer this question, IEC compared EPEAT purchase data for FEC partners to data for the entire federal government. The FEC data was compiled from data provided to FEC by its individual partners, as discussed in our analysis of Evaluation Question 8 above. We obtained government-wide purchasing data from the Green Electronics Council (GEC), the organization which manages the EPEAT program; GEC, in turn, collected this data through the Information Technology Industry Council (ITI). Because the

government-wide data covers only the years 2008-2010, our analysis focuses predominantly on those years.

IEC also obtained data on government-wide electronics purchases from the Office of Management and Budget (OMB), which collects this data to report on federal agencies' progress toward meeting the sustainable purchasing goals laid out in Executive Order 13514. However, as noted in our discussion of Evaluation Question 3, our review of the OMB data revealed several issues that led us to question its accuracy.¹¹¹ Thus, we have chosen to use GEC's data for this analysis, notwithstanding several methodological challenges that we face in relying on that data (discussed below).

The clearest way to measure the FEC's effectiveness in promoting EPEAT purchases would be to compare FEC partners' share of electronics purchases that are EPEAT-registered to the proportion for the federal government as a whole (excluding FEC partners). However, with the exception of the questionable OMB data, we were unable to find information on the total number of computers and monitors purchased by the federal government in any given year, and as a result, we cannot determine how the federal government's EPEAT purchases may compare to total electronics purchases. Thus, we can only provide indirect evidence of the FEC's effectiveness.

To provide greater consistency from year to year, in this analysis we exclude data from FEC partners that reported data in only one year from 2008 – 2010, and instead use data from FEC partners that reported in at least two of these three years. All reported FEC data reported in this section reflects this convention unless otherwise noted. This has only a relatively small effect on our overall numbers; excluded facilities accounted for just 0.9% of all FEC electronics purchases in 2008, 5.5% in 2009, and 18.2% in 2010. In addition, unless otherwise noted, we also exclude all FEC purchases when reporting data for the federal government, so that our comparison is between FEC partners and all other federal facilities.

The starting point for this analysis is data on total (EPEAT and non-EPEAT) electronics purchases by FEC partners and EPEAT purchases for the rest of the federal government. Exhibit 3-46 provides this data for the FEC, excluding those facilities that reported data in only one year. Data for the federal government is shown in Exhibit 3-47.

Note that FEC partners' purchases of EPEAT monitors in 2008 were greater than the purchases made by the rest of the federal government (Exhibit 3-48). We will return to this point later.

¹¹¹ To briefly recap the issues raised on this subject in our analysis of Evaluation Question 3, the specific points that cast doubt on the accuracy of OMB's federal purchasing data include the following:

- 1) FEC partners reported more purchases of non-EPEAT products in absolute numbers than are shown for the entire federal government in the OMB data.
- 2) The federal government's proportion of EPEAT vs. non-EPEAT purchases is suspiciously high, particularly in comparison to the FEC reporting.
- 3) GEC reports total EPEAT sales to the federal government two to five times the numbers reported by OMB (varying by year and product category).
- 4) As reported, the OMB data suggest that in 2009, FEC facilities accounted for 78.5% of the federal government's total electronics purchases. (For 2010, the figure was 31.5%.)

All in all, these points strongly suggest that OMB's data on EPEAT vs. non-EPEAT purchases by the federal government is significantly flawed.

EXHIBIT 3-46. ELECTRONICS PURCHASES AMONG FEC PARTNERS

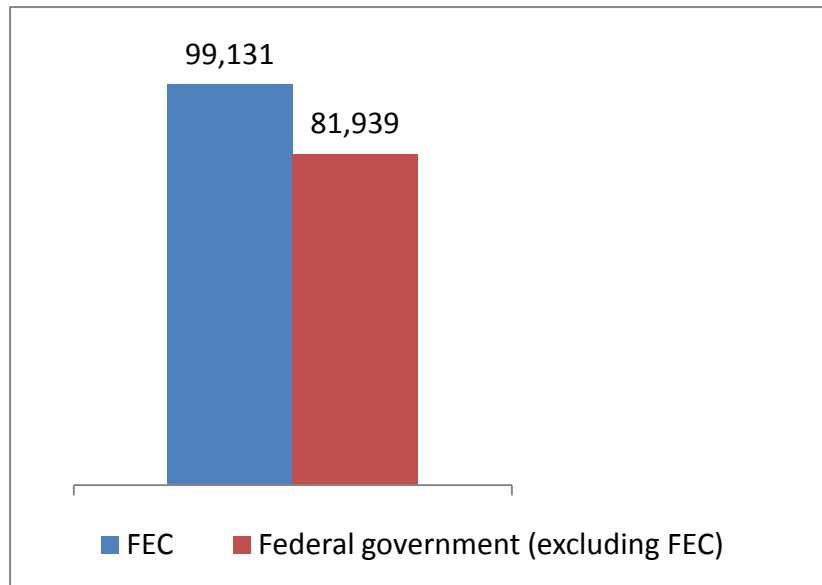
	2007		2008		2009		2010	
	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT
Desktops	71,329	12,438	88,851	9,851	197,566	6,085	73,612	6,025
Monitors	64,416	11,334	99,131	11,367	228,273	10,737	66,506	11,540
Laptops	2,921	0	30,886	7,940	91,030	2,554	60,997	1,503
Total	138,666	23,772	218,868	29,158	516,869	19,376	201,115	19,068

EXHIBIT 3-47. EPEAT PURCHASES FOR THE FEDERAL GOVERNMENT

	2008 EPEAT	2009 EPEAT	2010 EPEAT
Desktops	488,197	948,542	428,002
Monitors	81,939	893,104	N/A ¹
Laptops	181,013	547,795	487,662
Total	751,149	2,389,441	915,664

¹ Reported sales of EPEAT monitors in 2010 were 7,823,459; GEC staff consider this data point unreliable, but have been unable to obtain corrected data. (That level of purchases would provide more than two monitors for every federal employee.) We therefore exclude this data point from our analysis.

EXHIBIT 3-48. EPEAT MONITOR PURCHASES, 2008



An obvious question is how FEC's growth rates in EPEAT purchases compares to the federal government's. To illustrate these growth rates, we set EPEAT purchase levels in 2008 (the first year for which we have complete data) equal to 1.0, and then show how purchase levels in subsequent years compare to that baseline. The results are shown in Exhibits 3-49 and 3-50.

Broadly speaking, the data for both FEC and the federal government indicate sharp increases in EPEAT purchases in 2009, followed by declines in 2010. However, as shown in Exhibits 3-49 and 3-50, the federal government ended at a higher point relative to the 2008 baseline than did FEC in the two categories for which we have data (desktops and laptops). Furthermore, the sharp increase in EPEAT monitor purchases for the federal government in 2009 – more than ten times the level from the year before – suggests that the 2010 level for that product category was likely also higher for the federal government than for FEC.

In short, the federal government's rate of increase in EPEAT purchases outstripped FEC's. This metric therefore does not indicate that the FEC had a positive effect in promoting EPEAT sales. Yet as discussed below, an alternative interpretation of this data, in conjunction with other figures, suggests otherwise.

EXHIBIT 3-49. EPEAT PURCHASES AMONG FEC PARTNERS (NORMALIZED TO 2008)

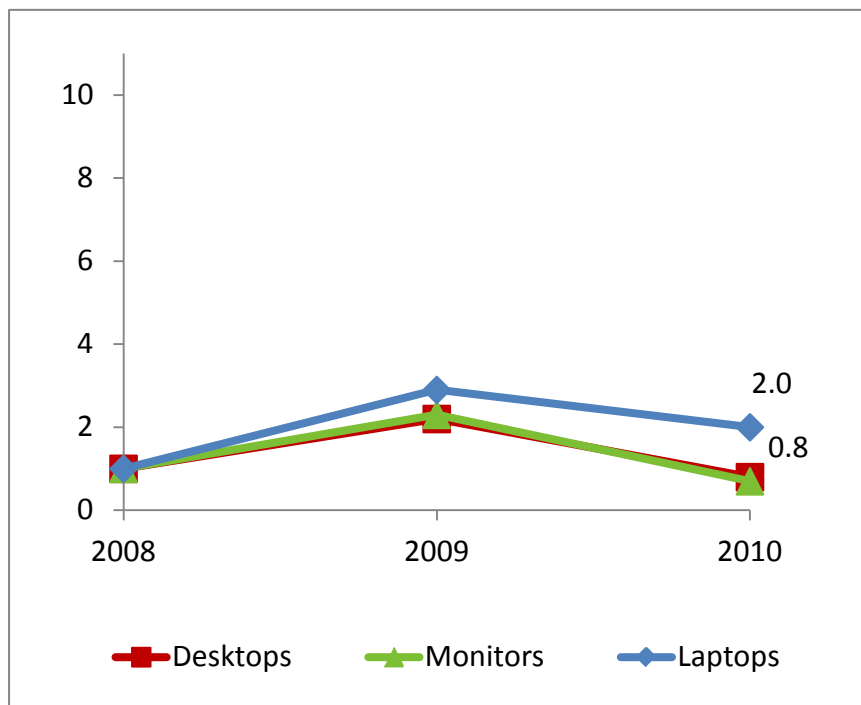
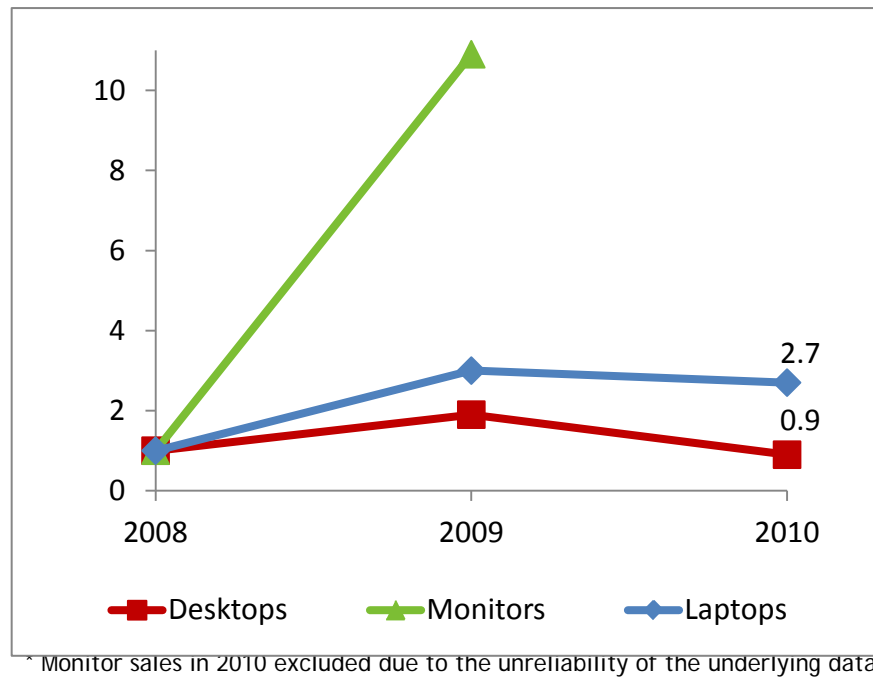


EXHIBIT 3-50. EPEAT PURCHASES FOR THE FEDERAL GOVERNMENT (NORMALIZED TO 2008)



Proportional Levels of EPEAT Purchases and the ‘Early Adopter’ Hypothesis

The relative rates of increase in EPEAT purchases imply that the federal government as a whole is making greater strides in this area than the FEC. But this fact on its own is not necessarily inconsistent with the FEC demonstrating leadership in this area. FEC partner facilities were already relying heavily on EPEAT electronics by 2008; it is possible that the rest of the federal government lagged the FEC as of 2008, and faster growth since then simply reflects them making up some of this lost ground. If that premise is correct, the trends described above would indicate that the federal government is beginning to catch up to the FEC, but not necessarily outperforming them in terms of the actual rates of purchases of EPEAT vs. non-EPEAT electronics. Exhibit 3-51 translates the data from Exhibit 3-46 into proportions of EPEAT and non-EPEAT purchases among FEC partners.

EXHIBIT 3-51. PROPORTIONS OF EPEAT AND NON-EPEAT PURCHASES AMONG FEC PARTNERS

	2007		2008		2009		2010	
	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT	EPEAT	NOT EPEAT
Desktops	85.2%	14.8%	90.0%	10.0%	97.0%	3.0%	92.4%	7.6%
Monitors	85.0%	15.0%	89.7%	10.3%	95.5%	4.5%	85.2%	14.8%
Laptops	55.8%	44.2%	79.5%	20.5%	97.3%	2.7%	97.6%	2.4%
Total	80.9%	19.1%	88.2%	11.8%	96.4%	3.6%	91.3%	8.7%

As noted previously, we do not have similar, reliable data for the federal government as a whole, making an “apples-to-apples” comparison impossible. But certain other data strongly suggests that FEC facilities likely purchased EPEAT electronics at higher rates in the earlier years than did the federal government. For instance, FEC’s share of the entire federal government’s EPEAT purchases shrunk in every year from 2008 – 2010 (Exhibit 3-52).¹¹²

EXHIBIT 3-52. FEC SHARE OF TOTAL FEDERAL EPEAT PURCHASES

	2008	2009	2010
Desktops	15.4%	17.1%	14.3%
Monitors	54.7%	20.1%	
Laptops	14.5%	14.1%	11.8%
Total	22.5%	17.6%	

FEC partners were purchasing EPEAT electronics in relatively high proportions in each of these three years (80% or greater), yet their share of total federal government EPEAT purchases shrank. This implies that the federal government as a whole began this period with more room for improvement. That is to say, the federal government was likely starting from a lower base of proportional EPEAT purchases in 2008 than was the FEC, meaning that FEC partners were earlier adopters of EPEAT. If true, this would indicate that the FEC program did have a positive impact in promoting EPEAT sales, but that the effect has weakened over time. Such a phenomenon would not be surprising, since EPEAT electronics have gained market share generally over this timeframe, and federal agencies have taken stronger steps to respond to the EPEAT purchasing requirements of Executive Orders 13423 and 13514.

We can explore this hypothesis in greater detail by making two hypothetical assumptions:

1. FEC facilities are no *worse* than the rest of the federal government with respect to the proportion of their electronics purchases that are EPEAT-registered. Put more concretely, this would mean that the federal government’s *maximum* proportions of EPEAT purchases in 2010 (the last year for which we have data) would be equal to FEC’s observed proportions. Given the FEC program’s emphasis on EPEAT purchases, this appears to be a sound proposition.
2. The universe of FEC facilities constitutes a reasonable proxy for the federal government as a whole with respect to year-by-year *trends in total electronics purchases* (counting both EPEAT and non-EPEAT products). FEC partners include hundreds of facilities across a broad swath of federal agencies and departments, purchasing hundreds of thousands of electronics products each year and representing a significant fraction of the entire federal government. Thus, this assumption also appears to be reasonable as well, at least as an approximation.

¹¹² Because this point considers FEC’s contribution to total federal purchases, the data for the federal government used for these calculations does not exclude FEC purchases, as is the case elsewhere in this analysis.

If we accept those two assumptions, we can use 1) the government’s actual EPEAT purchases in 2010;¹¹³ 2) the presumed ‘maximum’ proportion of government EPEAT purchases in that year (based on the proportion seen in the FEC data); and 3) the assumed trend in overall electronics purchases, to calculate the highest possible proportion of EPEAT purchases the government could have achieved in 2008 and 2009 (again based on FEC data). The calculation steps required are somewhat complicated, so we describe them in detail below.

- First, we apply FEC’s proportions of EPEAT and non-EPEAT purchases in 2010 to the data on federal government purchases, representing the *best-case scenario* for federal EPEAT purchases (per assumption #1). This allows us to estimate federal purchases of non-EPEAT electronics in that year. See Exhibit 3-53.

EXHIBIT 3-53. CALCULATION OF 2010 TOTAL PURCHASES

	2010 EPEAT PURCHASES (OBSERVED)	2010 EPEAT PROPORTION OF TOTAL (BASED ON FEC)	2010 NON-EPEAT PURCHASES (CALCULATED)	2010 TOTAL PURCHASES (CALCULATED)
Desktops	428,002	92.4%	35,031	463,033
Monitors	N/A			
Laptops	487,662	97.6%	12,016	499,678
Total				

- We then multiply the calculated 2010 total government purchases by the ratio of FEC’s 2009 total purchases to its 2010 total purchases, as illustrated in Exhibit 3-54. This gives us estimated total government purchases for 2009. Comparing these totals to the observed government EPEAT purchases for that year, we can calculate the proportions of EPEAT versus non-EPEAT purchases for the government in that year.
- Because the data point for 2010 federal monitor purchases was unreliable, we perform the same calculation described above for computers in 2010 to estimate federal monitor purchases in 2009.

EXHIBIT 3-54. CALCULATION OF 2009 EPEAT PROPORTION OF PURCHASES

	2010 TOTAL PURCHASES (CALCULATED)	2009 TOTAL SALES ÷ 2010 TOTAL SALES (BASED ON FEC)	2009 TOTAL PURCHASES (CALCULATED)	2009 EPEAT PURCHASES (OBSERVED)	2009 EPEAT PROPORTION OF TOTAL (CALCULATED)
Desktops	463,033	2.6	1,184,087	948,542	80.1%
Monitors		N/A	935,112	893,104	95.5%
Laptops	499,678	1.5	748,190	547,795	73.2%
Total		N/A	2,867,389	2,389,441	83.3%

¹¹³ Because the data point for EPEAT monitor purchases in 2010 is unreliable, we perform this analysis using the 2009 data point in that product category.

- We repeat this calculation to find the corresponding figures for 2008 (Exhibit 3-55).

EXHIBIT 3-55. CALCULATIONS OF 2008 EPEAT PROPORTION OF PURCHASES

	2009 TOTAL PURCHASES (CALCULATED)	2008 TOTAL SALES ÷ 2009 TOTAL SALES (BASED ON FEC)	2008 TOTAL PURCHASES (CALCULATED)	2008 EPEAT PURCHASES (OBSERVED)	2008 EPEAT PROPORTION OF TOTAL (CALCULATED)
Desktops	1,184,087	0.4	516,606	488,197	94.5%
Monitors	935,112	0.4	387,844	81,939	21.1%
Laptops	748,190	0.3	246,929	181,013	73.3%
Total	2,867,389	0.4	1,151,379	751,149	65.2%

- Finally, we compare the calculated EPEAT proportions of government purchases in each year to the FEC proportions to determine the extent to which FEC over-performed (or under-performed) relative to the rest of the government. See Exhibit 3-56.

EXHIBIT 3-56. FEC VS. FEDERAL GOVERNMENT EPEAT PURCHASES

	EPEAT PROPORTION OF TOTAL PURCHASES		
	2008	2009	2010
FEC (reported)			
Desktops	90.0%	97.0%	92.4%
Monitors	89.7%	95.5%	85.2%
Laptops	79.5%	97.3%	97.6%
Total	88.2%	96.4%	91.3%
Federal government (maximum; calculated)			
Desktops	94.5%	80.1%	92.4%
Monitors	21.1%	95.5%	
Laptops	73.3%	73.2%	97.6%
Total	65.2%	83.3%	
FEC margin above federal government (minimum; calculated)			
Desktops	-4.5%	16.9%	0.0%
Monitors	68.6%	0.0%	
Laptops	6.2%	24.1%	0.0%
Total	23.0%	13.1%	

If the starting assumptions for this calculation hold true, then the federal government had a *maximum* proportion of EPEAT purchases of 65.2% in 2008 and 83.3% in 2009. These figures are well below the FEC's observed rates of 88.2% and 96.4%, respectively. As we would expect, the margin between FEC and the rest of the government shrank over time.

It is important to reiterate that this calculation rests on the two critical assumptions noted above that, while plausible, cannot be verified with the data on hand. As such, the numerical results should not be interpreted literally. Nonetheless, they provide support for the contention that FEC facilities likely purchased EPEAT electronics at proportionally higher rates than did other federal agencies in 2009 and earlier. These data are exactly what we would see if FEC facilities were, in fact, early adopters of EPEAT relative to the rest of the federal government. For that reason, **this analysis strongly suggests that membership in the FEC was correlated with an increased likelihood of purchasing EPEAT rather than non-EPEAT electronics in the early years of the registry. However, the effect has lessened over time.** Note that while we have assumed for this analysis that the FEC is performing at least as well as the rest of the federal government, we do not have sufficient data to determine whether FEC is continuing to outperform the rest of the federal government.

As one other point of support for the early adopter argument, recall that FEC partners purchased more EPEAT monitors in 2008 than did the rest of the federal government (99,131 versus 81,939). This is reflected in the massive, 68.6% margin between the FEC's and the federal government's estimated rates of EPEAT purchases shown in Exhibit 3-57. While we do not know the exact proportion of the federal government that participated in the FEC in that year, it is certainly not a majority. At a minimum, then, it seems safe to conclude that FEC facilities purchased EPEAT monitors at higher levels than other federal facilities, even if the evidence for other EPEAT products is less direct.

FEC Program Participation

Determining how individual FEC program participants compare to non-participants with respect to EPEAT purchases is a critical part of addressing this evaluation question. But to evaluate the FEC's effectiveness in promoting EPEAT purchases among federal agencies, it is also important to consider the overall reach of the FEC program, to determine whether it has been successful in enrolling a large number of partners that constitute a significant portion of the total federal government.

Based on our review of FEC program data, there were a total of 120 partners that participated in the FEC and reported data in 2008 (the first year for which we reviewed data), 136 partners in 2009, and 124 partners in 2010. As we have already mentioned, not all partners reported data in all years; 161 total partners reported data in at least one year from 2008 – 2010. There were 30 new partners reporting data in 2009 and eight in 2010. However, some of these partners may have reported data in 2007 or earlier, so we cannot state for certain that they were new to the FEC program without reviewing earlier records.

To put this in context, there are approximately 40 federal facilities in the Energy Star for Buildings program, or about one-third the number of facilities actively participating in FEC (i.e., reporting data) in any given year.¹¹⁴ Another voluntary government program, WasteWise (which focuses on waste reduction

¹¹⁴ On the Energy Star website, searching for federal government Energy Star partners yields a list of 44 facilities; see http://www.energystar.gov/index.cfm?fuseaction=estar_partner_list.showImproversSearch&s_code=ALL&partner_type_id=ESB&cntry_code=ALL&award_search=N. An alternative search of Energy Star labeled buildings by facility owner produces a list of 38 facilities owned by various federal agencies; see http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.showMoreOptions&SEARCH_OWNER_ID=1&S_CODE=ALL&PROFILES=&YEAR=&BUILDING_TYPE_ID=ALL%20Buildings&SEARCH_SPP_ID=&CITY=&NEWQUERY=true&ZIP=&SEARCH_PROP_MANAGER_ID=&FILTER_B_ID=&optionType=owner_id. Note that there are considerably more Energy Star buildings outside of the federal sector; the program boasts just over 20,000 total certified buildings and plants. See http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.locator

and recycling), lists 25 federal partners.¹¹⁵ However, it should be noted that because many of the WasteWise partners are agencies rather than facilities, there may be considerably more individual facilities participating in that program (GSA, for example, is listed as a single partner). Nonetheless, viewed in comparison to these other voluntary programs, FEC's participation rate appears quite high.

Beyond the number of participating facilities, we can also examine purchasing data. Exhibit 3-56 showed FEC's share of total federal EPEAT purchases, including just those FEC partners reporting in two or more years from 2008 - 2010. Exhibit 3-57 reproduces that data, adding in data for all FEC partners.

EXHIBIT 3-57. FEC SHARE OF TOTAL FEDERAL EPEAT PURCHASES

	2008	2009	2010
FEC partners reporting in two or more years:			
Desktops	15.4%	17.1%	14.3%
Monitors	54.7%	20.1%	
Laptops	14.5%	14.1%	11.8%
Total	22.5%	17.6%	
All FEC partners:			
Desktops	15.4%	18.0%	16.9%
Monitors	54.8%	21.3%	
Laptops	15.1%	15.0%	13.2%
Total	22.7%	18.6%	

FEC partners accounted for 22.7% of all federal EPEAT purchases in 2008 and 18.6% in 2009; based on the category-by-category trends for desktops and laptops, the proportion likely fell further in 2010. As discussed above, the downward trend over time is likely driven more by the rest of the government increasing its EPEAT purchases than by any significant downturn on the FEC's part. What is important for this part of the analysis is that FEC covered about one-fifth of all federal electronics purchases. We consider this to be a high participation rate.

Trends in EPEAT Certification Levels Among FEC Partners

While Evaluation Question 9 asks about overall levels of EPEAT purchases, FEC's purchasing data reveals an additional, related trend worth discussing. Specifically, FEC partners have shifted from purchasing mainly silver-level EPEAT products to mostly gold-level products, which must meet stricter requirements and are therefore more protective of the environment. Exhibit 3-58 shows purchasing data broken out by certification level.

¹¹⁵ See <http://www.epa.gov/epawaste/consERVE/smm/wastewise/about.htm>

EXHIBIT 3-58. PROPORTIONS OF EPEAT PURCHASES AMONG FEC PARTNERS, BY CERTIFICATION LEVEL

	2007				2008				2009				2010			
	BRONZE	SILVER	GOLD	NOT EPEAT	BRONZE	SILVER	GOLD	NOT EPEAT	BRONZE	SILVER	GOLD	NOT EPEAT	BRONZE	SILVER	GOLD	NOT EPEAT
Desktops	0.5%	72.4%	12.3%	14.8%	1.6%	14.3%	74.2%	10.0%	0.7%	10.3%	86.0%	3.0%	2.1%	2.1%	88.3%	7.6%
Monitors	0.3%	74.8%	9.9%	15.0%	1.2%	71.7%	16.9%	10.3%	0.1%	33.8%	61.6%	4.5%	3.5%	26.0%	55.7%	14.8%
Laptops	10.9%	35.7%	9.2%	44.2%	4.1%	58.4%	17.1%	20.5%	1.1%	23.8%	72.3%	2.7%	2.7%	24.7%	70.2%	2.4%
Total	1.9%	68.2%	10.9%	19.1%	1.8%	46.8%	39.7%	11.8%	0.5%	23.2%	72.7%	3.6%	2.8%	17.0%	71.6%	8.7%

In 2007, more than two-thirds of FEC partners' electronics purchases were EPEAT Silver, the middle certification level, while just 10.9% of electronics products were EPEAT Gold. There was a dramatic change over the next two years. In 2008, the share of silver certified products dropped by 20 percentage points, while gold products increased by nearly 30 points. By 2009, silver products were a distinct minority, at 23.2% of purchases, while gold, with 72.7%, had come to dominate FEC partners' purchasing. Bronze-level products contributed a trivial portion to FEC purchases in all years.

We do not have tier-specific information on EPEAT purchases by the federal government or the United States as a whole, so we do not have a baseline to measure FEC's performance against in this area. Nonetheless, FEC's shift from silver to gold products was dramatic, and we suspect that this likely represents a move toward greater environmental protection by FEC partners that was not wholly matched by other purchasers.

QUESTION 10: USE OF EPP OUTPUTS OUTSIDE OF THE FEDERAL GOVERNMENT

Introduction

While the evaluation of the EPP Program focuses primarily on outcomes in the federal government realm, it also addresses the broader influence of the EPP Program in the non-federal sector. Specifically, Evaluation Question 10 asks: "How have the EPP Program's outputs, such as technical assistance, information dissemination, decision tools, standards, and policy and contract language, been utilized by purchasers outside of the federal government, including state and institutional purchasers?"

This section presents our findings for Evaluation Question 10. Overall impacts of EPEAT sales outside of the federal sector are discussed first. We then present findings specific to states, universities, and other non-federal institutional purchasers. Within each section, we briefly summarize general trends in environmentally preferable purchasing based on third-party survey results and other secondary research; then, we present results for our three specific categories (electronics, building and construction products, and hospitality and travel) based on primary research conducted for this evaluation.

Key Findings

- Looking across all purchasers, **EPEAT's reach has grown markedly** since the program's inception. EPEAT's total sales and market share of laptop computers, in particular, have grown dramatically. Although EPEAT's total sales (and market share) of desktop computers and monitors have fallen, this is reflective of the broad market shift away from desktops and toward laptops; the total sales of EPEAT products has continued to increase. More than 50 million EPEAT certified products were purchased in the U.S. in 2010, and nearly 100 million worldwide.
- **The environmental benefits of EPEAT purchases are substantial.** As an example, worldwide EPEAT purchases in 2010 produced greenhouse gas reductions equivalent to eliminating the annual emissions from over 1 million cars in the U.S. However, due to the market-wide move from desktops to laptops, total estimated environmental benefits of EPEAT have fallen fairly consistently from 2007 through 2010. IEC's assessment is that the EEBC's methodology potentially exacerbates the magnitude of the reduction of EPEAT benefits that result from shifting from desktops to laptops.
- **EPEAT has achieved significant success among state purchasers.** At least 11 states have adopted EPEAT as a purchasing criterion for computers and monitors. Further, the State Electronics Challenge – which was modeled after the Federal Electronics Challenge, and draws heavily on tools

developed by EPP – has expanded from the northeastern U.S. to the entire country. Third-party surveys of state procurement officials confirm the widespread adoption of EPEAT.

- **At least 13 states have adopted the NSF 140 carpet standard**, and at least two states are specifying to the BIFMA e3/Level furniture standard. Starting in January 2010, NSF 140 Platinum superseded California Gold as the required standard for all State of California government agency carpet purchases. As of January 2012, GSA specifies the NSF 140 standard (minimum of gold level) for carpet; this means that five states also specify the standard by default, as these states mirror the GSA schedule: Florida, Louisiana, Ohio, New Mexico, and Texas.
- **Two states report using hospitality and travel tools developed by EPP.** One state reports using the ASTM Green Meetings and Events standards, and two states report using the Convention Industry Council's (CIC) *Green Meetings Report*, which was developed by EPP. Several stakeholders who participated in developing the ASTM Green Meetings and Events standards predict the standards will achieve greater adoption over time. At least one large supplier of hospitality services is already incorporating the standards in their training and operations.
- **A number of universities have adopted EPEAT as a purchasing criterion, and at least two universities are specifying the NSF 140 carpet standard.** IEc did not identify any universities that are using other building and construction product standards and tools, or travel and hospitality standards and tools, developed by EPP. However, we did not conduct a comprehensive review of purchasing specifications.
- **Many cities, businesses, and other non-federal purchasers have adopted EPEAT.** Use of other EPP tools by non-federal purchasers, outside of states and universities, has been limited. However, the current draft of the 2012 Edition of the *ICC 700 National Green Building Standard* – a consensus-based standard that received ANSI approval – includes references to NSF 140 carpet, NSF 332 resilient flooring, and ULE 100 gypsum board.
- **IEc did not identify any states that are specifying to the NSF 332 resilient flooring standard or the ULE 100 gypsum board standard.** However, we did not conduct a comprehensive review of all state purchasing specifications.

Overall EPEAT Impacts: Non-Federal Buyers

Sales and Associated Environmental Benefits of EPEAT Electronics

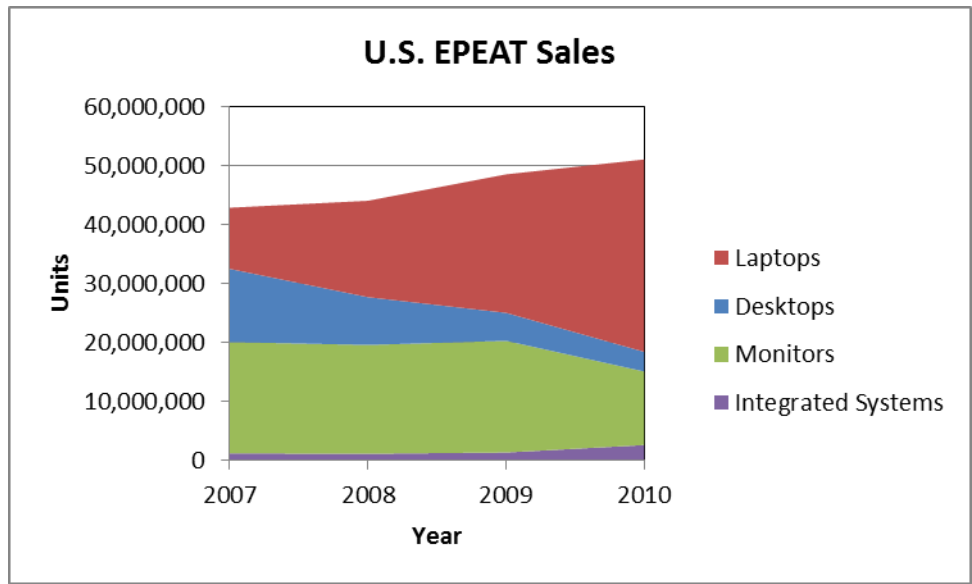
The EPP Program's most prominent output in the electronics sector is the EPEAT registry for environmentally preferable computers and laptops, along with the closely-related IEEE 1680 standards that underlie the registry.¹¹⁶ IEc reviewed annual sales data of EPEAT products, as reported by the Green Electronics Council (GEC), as a primary means of assessing EPP's impact in the electronics sector. This evaluation has already reported data on sales of EPEAT electronics to the federal government, and to FEC program participants; in this section, we provide figures on total EPEAT sales in the U.S. and worldwide.

¹¹⁶ To be included in the EPEAT registry, products must meet the specifications of the relevant IEEE product standard. It appears that all products certified to the IEEE standards are included in the EPEAT registry.

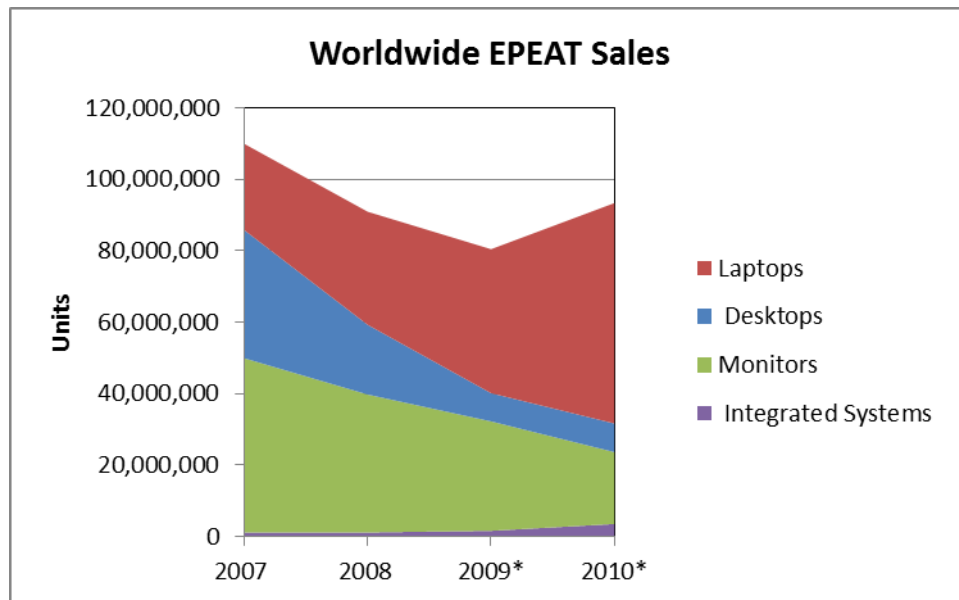
Key data on total EPEAT sales for 2007 – 2010 are shown in Exhibit 3-59.¹¹⁷ Two important caveats are necessary for interpreting this data.

EXHIBIT 3-59. U.S. AND WORLDWIDE EPEAT SALES

	YEAR			
	2007	2008	2009	2010
U.S. EPEAT Purchases				
Desktops	12,403,405	8,106,204	4,735,905	3,340,172
Monitors	18,883,816	18,455,653	18,938,387	12,474,055
Laptops	10,375,874	16,351,938	23,499,428	32,628,963
Integrated Systems	1,196,621	1,133,557	1,358,947	2,612,388
Total	42,859,716	44,047,352	48,532,667	51,055,578
Worldwide EPEAT Sales (including U.S.)				
Desktops	35,865,425	19,512,831	7,904,561	8,021,529
Monitors	48,709,354	38,612,720	30,617,703	20,115,100
Laptops	24,156,128	31,671,055	40,298,554	61,694,686
Integrated Systems	1,196,680	1,146,067	1,629,802	3,532,100
Total	109,927,587	90,942,673	80,450,620	93,363,415



¹¹⁷ At the time this analysis was conducted, the most recent available information was through 2010. GEC released its 2011 EPEAT Annual Benefits Report in November 2012, after we had concluded our analysis. In broad terms, the 2011 report shows increases in sales and in most categories of environmental benefits over 2010.



*Due to a change in reporting conventions, 2009-2010 data are not comparable to 2007-2008.

- First, GEC’s 2008 EPEAT benefits report notes that only 20 – 30% of EPEAT manufacturers reported on non-U.S. sales in that year, and as a result GEC included only U.S. sales data in its report for that year. The worldwide 2008 data reported here is included in subsequent reports, but it is not clear whether this reflects only the 20-30% of manufacturers noted in the 2008 report, or if the data is more comprehensive. If the former is true, then non-U.S. sales for 2008 may be substantially underestimated.
- Second, GEC changed its reporting procedure and implemented a country-specific registry protocol in 2009. As a result, the reported total sales for 2009 and 2010 exclude EPEAT sales in all countries other than the 40 represented in the registry; these other countries were included in worldwide sales totals for 2007 and 2008. This change is likely responsible for the reported decrease in worldwide EPEAT sales from 2008 to 2009.
- Due to these two factors, 2009 and 2010 are the only two years for which the worldwide data are truly comparable. Neither of these issues impacts the U.S. sales figures.

In the U.S., there has been steady growth in EPEAT sales, from about 43 million total units in 2007 to 51 million in 2010, an increase of 19% (Exhibit 3-59). Yet the overall trend masks distinct differences between product categories. Most notably, sales of desktop computers have fallen by nearly three-fourths, while laptop sales have tripled. Thus, the overall mix of EPEAT products being sold in the U.S. has changed dramatically since the registry was first developed.

It is less easy to interpret the worldwide sales data, due to the factors noted above. Nonetheless, as reported, worldwide sales appear to follow a fairly similar pattern, i.e., a three-fourths decline in desktop sales offset by a substantial (over 250%) increase in laptop sales (Exhibit 3-59). The decrease in monitors is more pronounced worldwide (a nearly 60% drop) than in the U.S. (34%). Total sales across all product categories fell by 15% from 2007 to 2010, but in the only two years with truly comparable data, there was a 16% increase in total sales from 2009 to 2010.

To highlight the extent to which the EPEAT program is affecting the market as a whole, we present data on the market share of EPEAT products in Exhibit 3-60 below. GEC reports this data only for desktop and laptop computers,¹¹⁸ and so we must follow the same convention here.

EXHIBIT 3-60. MARKET SHARE OF EPEAT PRODUCTS

	YEAR			
	2007	2008	2009	2010
U.S. EPEAT Market Share				
Desktops ¹	40%	NR	20%	16%
Laptops	35%	NR	50%	72%
Combined	37%	NR	42%	58%
Worldwide EPEAT Market Share (including U.S.)				
Desktops ¹	24%	NR	7%	6%
Laptops	19%	NR	23%	30%
Combined	22%	NR	17%	22%
NR = Not reported				
The GEC report includes the following disclaimer: This percentage does not accurately reflect EPEAT's presence in the system's covered countries. Because EPEAT reporting excludes many countries where sales are reported by Gartner, the Gartner worldwide unit sales denominator is out of scale with EPEAT's 41-country reporting territory.				
¹ Includes integrated systems.				

EPEAT has come to dominate the U.S. market for laptop computers, with a 72% market share in 2010. In contrast, the registry's share of desktop computers has shrunk from 40% in 2007 to 16% in 2010; this trend is likely influenced by the overall decline in desktop computer use. For these two product categories combined, EPEAT's U.S. market share has risen dramatically, from 37% in 2007 to 58% in 2010, helped in part by a widespread market transition from desktops to laptops. Clearly, the registry has been extremely successful in terms of market adoption – so much so, in fact, that one interviewee expressed the opinion that if EPEAT is to continue to push the industry toward greater sustainability by promoting exceptional products, the program will need to adopt stricter standards and accept a lower market share in the future.

Worldwide, EPEAT's market share is respectable, but does not approach its dominance in the U.S. EPEAT had 30% of the global market for laptops in 2010, up from 19% in 2007. In desktop computers, worldwide market share fell to just 6% in 2010.

IEc did not investigate why EPEAT's market share has risen over the last few years for laptops while falling for desktop computers; there are several factors that could explain this dynamic:

¹¹⁸ GEC reports EPEAT market share data for laptops and desktops combined, and for laptops alone. We have used this data to interpolate market share for desktops alone.

- One possibility is that because laptop computers as a group are much less energy- and material-intensive than desktop computers and monitors, sustainability-minded consumers may have shifted toward greater reliance on laptops. If true, this would mean that consumers who continue to use desktop computers are less environmentally concerned, leading EPEAT to gain market share for laptops while losing ground in desktops.
- A related possibility is that institutional buyers may be shifting from desktops to laptops. We do not have precise data, but our impression is that institutional buyers account for a significant portion of EPEAT purchases. If this core group is changing its purchasing behavior, it could explain the trends in both EPEAT purchases and market share.
- Finally, we note that there are substantially more EPEAT certified laptop models available than EPEAT certified desktop models – 9,762 vs. 2,549 in 2010.¹¹⁹ We do not have data to determine the proportion of computer *models* (rather than units sold) that are EPEAT certified vs. non-certified. We also cannot determine whether the disparity in the number of EPEAT certified models is a cause or consequence of the difference in EPEAT’s market share. Nonetheless, it is possible that supply, rather than demand, is creating the observed pattern.

Regardless of the cause, assuming consumers continue to move toward laptops, EPEAT’s relative lack of uptake in the desktop computer market will prove to be less important than its marked success with laptops.

Exhibit 3-61 shows environmental benefits from EPEAT purchases, as reported by GEC.¹²⁰ Benefits have fallen in most categories and in most years from 2007 – 2010, leading to a broad decrease in benefits over time. For example, in the U.S., electricity and primary materials benefits were 70% lower in 2010 than in 2007. However, the annual benefits of the EPEAT program are still quite significant. To put the impacts in perspective, estimated environmental benefits of the EPEAT program in 2010 are roughly equivalent to avoiding the following impacts:¹²¹

- The annual electricity consumption of 390,000 average U.S. homes (for U.S. sales) or 760,000 U.S. homes (for worldwide sales)

¹¹⁹ GEC reports this data for each country individually. Thus, a single model of computer that is EPEAT-registered in 10 different countries would be counted as 10 different models in this data, significantly inflating the totals. For context, EPEAT had 2,830 unique product registrations in 2010 (i.e., excluding duplicates across different countries). This issue notwithstanding, this data illustrates the different availability of models of EPEAT laptops vs. desktops within different countries, and suggests that consumers within a given country likely have far more choices of EPEAT laptops than EPEAT desktops.

¹²⁰ As noted in our analysis of Evaluation Question 5, because energy and related benefits (greenhouse gas emissions, air emissions) are due to the criterion that EPEAT electronics must meet Energy Star technical specifications, the EPEAT environmental benefits reported here may include some benefits that are attributed to the Energy Star program rather than EPEAT for purposes of internal reporting (i.e., tracking the programs’ contributions towards EPA’s strategic goals). We could not determine how any such internal attribution occurs. However, there are several factors that complicate proportioning benefits to each program, including: the fact that EPEAT electronics must meet Energy Star technical specifications, but do not need to be Energy Star-certified; the question of to what extent obtaining Energy Star certification spurs manufacturers to also pursue EPEAT-certification, and vice versa; and the question of whether institutional purchasers or other buyers would have opted to buy either Energy Star- or EPEAT-certified products if the other program had not existed (i.e., determining the baseline to measure against in determining the programs’ impact).

¹²¹ Equivalencies are adapted from GEC’s 2009 and 2010 EPEAT Annual Benefits Reports.

- The annual greenhouse gas emissions of 578,000 U.S. cars (for U.S. sales) or 1,127,000 U.S. cars (for worldwide sales)
- The annual solid waste generation of 8,800 U.S. households (for U.S. sales) or 16,100 U.S. households (for worldwide sales)
- Hazardous waste with the weight of 21,000,000 bricks (for U.S. sales) or 29,763,000 bricks (for worldwide sales)

EXHIBIT 3-61. ENVIRONMENTAL BENEFITS FROM U.S. AND WORLDWIDE EPEAT PURCHASES

BENEFIT CATEGORY	UNIT	YEAR			
		2007	2008	2009	2010
U.S. Benefits					
Electricity	Megawatt-hours	16,500,000	8,400,000	6,700,000	4,700,000
Primary Materials	Metric tons	29,400,000	14,800,000	11,700,000	8,100,000
Air Emissions (including greenhouse gases)	Metric tons	68,000,000	34,200,000	27,000,000	18,600,000
Greenhouse Gas Emissions ¹	Metric tons carbon equivalent	1,290,000	1,570,000	1,240,000	860,000
Water Emissions	Metric tons	142,319	71,683	57,000	40,000
Toxic Materials	Metric tons	1,190	1,021	935	791
Solid Waste	Metric tons	N/A	14,353	18,174	17,571
Hazardous Waste	Metric tons	46,700	43,337	43,395	42,001
Worldwide Benefits					
Electricity	Megawatt-hours	42,200,000	19,000,000	10,900,000	9,000,000
Primary Materials	Metric tons	75,500,000	33,600,000	19,000,000	16,000,000
Air Emissions (including greenhouse gases)	Metric tons	174,400,000	77,500,000	44,000,000	36,300,000
Greenhouse Gas Emissions ¹	Metric tons carbon equivalent	3,310,000	3,560,000	2,000,000	1,600,000
Water Emissions	Metric tons	364,789	162,322	93,482	77,054
Toxic Materials	Metric tons	3,220	2,227	1,537	1,156
Solid Waste	Metric tons	N/A	30,649	29,127	31,992
Hazardous Waste	Metric tons	124,000	92,231	71,724	59,525
¹ The EEBC changed its conversion factor from electricity to GHGs in 2008, reflecting a change in the underlying EPA data source. This explains why electricity benefits fell by approximately 50% from 2007 to 2008 while GHG benefits remained at about the same level.					

As we discussed in detail in our analysis of Evaluation Question 5, GEC uses the Electronics Environmental Benefits Calculator (EEBC) to estimate the environmental benefits associated with EPEAT purchases. Because the EEBC attributes much smaller environmental benefits to laptops than to desktops, estimated total annual environmental benefits have fallen markedly since the program was created, both in the U.S. and worldwide, due largely to the widespread market shift from desktops to laptops. This decline in benefits is evident in spite of the fact that reported annual sales have grown in the U.S., and fallen only modestly worldwide. In addition, the reporting procedure change noted above led to a substantial reduction in reported worldwide EPEAT sales in 2009 compared to 2008; this change carries through to the estimates of worldwide environmental benefits as well. Thus, the benefits figures reported above should be viewed with a critical eye and an understanding of the underlying assumptions. The success of the EPEAT program should be judged by figures for both EPEAT sales and resulting environmental benefits, rather than examining one set of numbers in isolation from the other.

State Trends

General Trends

The National Association of State Procurement Officials (NASPO) and the Responsible Purchasing Network (RPN) surveyed NASPO-RPN members from the 50 states and the District of Columbia (DC). NASPO is comprised of the directors of the central purchasing offices in each of the 50 states, the District of Columbia, and the territories of the United States. RPN is a network of government agencies (federal, state, and local), colleges and universities, non-profit organizations, and private businesses dedicated to socially responsible and environmentally sustainable purchasing.¹²² Because RPN members are committed to sustainable procurement, the survey results are not likely representative of mainstream procurement practices. Nonetheless, the results provide useful information about trends in state purchasing, and the use of voluntary consensus standards developed by EPP.¹²³ The survey was administered in 2009 and 2010; we focus on the results from 2010.

The survey has several encouraging findings. Two out of three respondents (67%) had a formal (54%) or informal (13%) “green” purchasing policy. While nearly all respondents rated product performance, purchase price, availability, and durability as “important” or “very important” factors in their purchasing decisions, a solid 68% rated environmental considerations as “important” or “very important,” and 60% rated social impact considerations in this manner. The majority of respondents (58%) reported they “usually” or “always” consider environmental and social criteria in their purchasing decisions. Recycled content (88%), energy conservation (79%), human health (79%), and recyclability (79%) topped the list of environmental and social impact considerations.

The survey also probed the recognition and use of ecolabels and standards. As shown in Exhibit 3-62, one-third of respondents *recognized* at least 18 labels/standards in the survey; however, only nine of these labels/standards were *used* by at least one-third of purchasers. With respect to standards that EPP contributed to the development of, EPEAT enjoyed a high level of recognition and use (95% recognition/77% use). Recognition of EPEAT rose by seven percentage points between 2009 and 2010, while the use of EPEAT increased by 13 percentage points. Just under one-third of respondents (32%)

¹²² <http://www.responsiblepurchasing.org/>

¹²³ Respondents to the 2009 survey represented 46 states plus DC; respondents to the 2010 survey represented 25 states plus DC.

recognized Level/BIFMA e3, and only 9% of respondents reported using this standard. Level/BIFMA e3 was relatively new when the survey was administered in 2010; recognition and use of this standard may have increased in the time since the survey was conducted.

The survey also examined challenges to environmentally and socially preferable purchasing. A solid majority of respondents (78%) identified cost as the single most important hurdle to sustainable purchasing. Other significant barriers to sustainable purchasing included: lack of experience on how to specify responsible products (65%) and unclear or conflicting information about ecolabels/standards (61%).

EXHIBIT 3-62. RECOGNITION AND USE OF STANDARDS AND CERTIFICATIONS

Standard/Certification	Recognized / Used
ENERGY STAR	100% / 100%
LEED	95% / 78%
EPEAT	95% / 77%
Green Seal	91% / 65%
EcoLogo (Environmental Choice)	87% / 55%
EnergyGuide	82% / 46%
CRI Green Label	78% / 48%
USDA Organic	73% / 50%
CFPA (Chlorine-Free Products Association)	66% / 22%
Fair Trade Certified	64% / 18%
FSC (Forest Stewardship Council)	63% / 36%
GreenGuard	47% / 30%
Green-e	46% / 5%
DfE (Design for Environment)	45% / 18%
C2C (Cradle-to-cradle)	45% / 9%
WaterSense	41% / 4%
SCS (Scientific Certification Systems)	39% / 10%
SFI (Sustainable Forest Institute)	38% / 14%
Level (from BIFMA, Business and Institutional Furniture Manufacturer's Association)*	32% / 9%
Rainforest Alliance Certification*	29% / 5%
MSC (Marine Stewardship Council)*	14% / 0%

Notes: *New labels that were added to the report in 2010
 Source: Responsible Purchasing Network and National Association of State Procurement Officials, *Responsible Purchasing Trends 2010: The 'State' of Sustainable Procurement*

Trends in Northeastern States

While the NASPO-RPN survey in the previous section considered all 50 states (plus DC), the Northeast Recycling Council (NERC) conducted a survey focused on ten northeastern states (April 2009). Of the 10 states included in the survey, five had formal EPP programs: Connecticut, Maine, Massachusetts, New York, and Pennsylvania.

The ten northeastern states purchase a variety of environmentally preferable products. Eight procure environmentally preferable electronics. Of particular note for this evaluation, six states purchase environmentally preferable computers; six purchase environmentally preferable carpet; four purchase environmentally preferable flooring; and four purchase environmentally preferable furniture.

The states use a variety of EPP criteria to inform their purchasing decisions, such as green standards and eco-labels, federal legislation, and state laws and executive orders. As shown in Exhibit 3-63, five states use EPEAT as a criterion.

EXHIBIT 3-63. EPP CRITERIA USED

	CT	DE	ME	MA	NH	NJ	NY	PA	RI	VT
EcoLogo	X		X	X		X			X	
Energy Star	X	X	X	X	X		X	X		X
EPA's Comprehensive Procurement Guidelines (CPGs)		X		X				X		
EPA's Design for the Environment						X				
EPEAT			X	X		X	X	X		
European Union									X	
Federal Legislation	X									
Forest Stewardship Council (FSC)		X	X				X	X		
Green Seal	X		X	X	X	X	X	X	X	
LEED			X	X				X	X	
State Executive Orders	X		X	X			X	X		
State Law	X				X			X		

Source: Environmentally Preferable Purchasing by Northeast States: Compilation of Survey Responses from Northeast States Research Conducted by Northeast Recycling Council, Inc. for Rhode Island Resource Recovery Corporation, April 14, 2009.

The ten northeastern states also vary in terms of their cost allowance for environmentally preferable products and services. Four states – Connecticut, Delaware, New York, and Vermont – allow price premiums up to 10% or more for certain types of environmentally preferable products. On the other hand, three states – New Hampshire, New Jersey, and Rhode Island – have no cost allowance for environmentally preferable purchases.

Electronics

EPEAT has enjoyed significant recognition and use in the non-federal realm. As noted above, in the RPN-NASPO survey conducted in 2010, 95% of state purchasing officials reported that they recognized EPEAT, and 77% reported using EPEAT in their purchasing decisions.¹²⁴ While this may represent a high estimate (RPN members likely have a more favorable view of environmentally preferable purchasing than non-RPN members), it is broadly indicative of the widespread recognition and use that EPEAT has

¹²⁴ Responsible Purchasing Network and National Association of State Procurement Officials, Responsible Purchasing Trends 2010: The 'State' of Sustainable Procurement.

achieved. The NERC survey of northeastern states indicated that five out of ten states had adopted EPEAT as of April 2009.

In addition, the Green Electronics Council reports that the Western States Contracting Alliance (WSCA) – an alliance of 15 western states for cooperative multi-state contracting – is also using EPEAT. WSCA uses a “lead state” model where one WSCA state leads the procurement and manages the contract based on that state’s statutory requirements and processes; all other governmental entities within WSCA states are eligible to use WSCA contracts.¹²⁵ The WSCA website indicates that Minnesota is currently the “lead state” for computer equipment; according to the Green Electronics Council, Minnesota has adopted EPEAT. Overall, the Green Electronics Council reports that at least 11 states are using EPEAT as of January 2012, including: California, Maine, Massachusetts, Michigan, Minnesota, New York, Ohio, Oregon, Pennsylvania, Washington, and Wisconsin.¹²⁶ Interviewees from the States of California and Washington also reported that they use the EEBC. In addition, the State of Washington (Department of Ecology) received support from the EPP Program’s EPEAT coordinator; an interviewee from the Department stated that EPP’s staff’s contributions were timely and effective. This same interviewee noted that the Department is purchasing EPEAT computers (silver and gold), and has increased the timeframe for computer turnover to five years.

In addition, EPEAT and EEBC play a key role in the State Electronics Challenge (SEC), which includes participants from states across the country.

State Electronics Challenge

The Northeast Recycling Council (NERC) launched the State Electronics Challenge (SEC) in 2008 with financial support from a federal Resource Conservation Challenge Grant. The SEC was initially piloted within the 10 northeastern states that comprise NERC; the program went national in 2011. State agencies, counties, towns, tribal units, public schools and universities, and other public-sector entities can become SEC partners. As of February 2013, the SEC had 105 partners in 36 states.

The SEC was heavily influenced by the Federal Electronics Challenge. According to the SEC’s program manager, NERC borrowed as much as possible from the Federal Electronics Challenge model. The EPP Program’s FEC coordinator served on the advisory committee that set up the SEC. In addition, one of NERC’s staff members had served as a consultant to the Federal Electronics Challenge and helped develop the original version of the EEBC. As with the Federal Electronics Challenge, EPEAT and the EEBC play a central role in the SEC. The Federal Electronics Challenge continues to influence the SEC; for example, the SEC regularly borrows webinars, interactive maps, and other tools from the Federal Electronics Challenge website. In addition, the SEC provides partners with annual sustainability reports, recognizes well-performing partners, and offers free technical support to partners.

¹²⁵ http://www.aboutwsca.org/content.cfm/id/WSCA_FAQs

¹²⁶ Green Electronics Council, *EPEAT Purchasers, Representative Sample - as of January 2012*. In addition, the results of the NERC survey suggest that New Jersey is also using EPEAT.

Exhibit 3-64 presents the SEC’s environmental results for 2008-2011.^{127,128} From its inception through 2011, SEC partners reduced their energy use by at least 188 million kWh – equivalent to the amount of electricity needed to power 15,770 U.S. households for one year – and reduced greenhouse gas emissions by more than 25,000 metric tons of carbon equivalents – which is equivalent to removing 16,889 cars from the road for one year. In addition, SEC partners reduced municipal solid waste by 1,785 tons, which is equivalent to the waste generated by 809 U.S. households in a year.

EXHIBIT 3-64. SEC RESULTS - ENVIRONMENTAL BENEFITS

REDUCTION IN	HOW MUCH?
Energy use	188 million kWh
Greenhouse gas emissions	25,148 metric tons of carbon equivalents
Toxic materials, including lead and mercury	7,490 pounds
Municipal solid waste	1,785 tons
Hazardous waste	520 tons
Source: SEC, http://www.stateelectronicschallenge.net/total_results.html Notes: Calculations made by SEC using Version 2.0 of the Electronics Environmental Benefits Calculator, dated 3-2-09, available at http://isse.utk.edu/ccp/projects/benefitscalculator/elecbenefcalc.html . Calculations for paper reduction made using the WARM model conversion factors, http://www.epa.gov/climatechange/wycd/waste/downloads/Paper%20Products.pdf , February 2012.	

Exhibits 3-65 and 3-66 present data on computer and monitor purchases, reuse, and recycling, and data reported by partners for computers in service. SEC partners reported purchasing nearly 16,000 EPEAT-registered desktop computers, more than 14,000 EPEAT-registered LCD monitors, and more than 10,000 EPEAT-registered notebook computers from 2008-2011. A significant percentage of reporting partners enabled power management features on their computers. It is important to note that the EPEAT figures shown below are included in total EPEAT purchases presented earlier – i.e., the figures presented in the table below are a *subset* of EPEAT purchases presented earlier in the report (they are *not* additive). As shown in Exhibit 3-66, since 2011, SEC is also tracking reductions in paper use. Starting in 2012, SEC requires double-sided printing features to be enabled on 75% of printers and copiers. SEC uses EPA’s Waste Reduction Model (WARM) to calculate the benefits of avoided paper savings, and uses EEBC to calculate other environmental benefits.

¹²⁷ This information is publicly available on the SEC website, http://www.stateelectronicschallenge.net/total_results.html. IEC has not independently verified the data.

¹²⁸ The cumulative 2008-2011 results include: 13 Partners reporting in 2008; 12 Partners reporting in 2009, 26 Partners reporting in 2010, and 39 Partners reporting in 2011. 2012 environmental results had not been posted to the SEC website as of March 2013.

EXHIBIT 3-65. AGGREGATED DATA REPORTED BY PARTNERS COMPUTER & MONITOR PURCHASES, REUSE, AND RECYCLING

	DESKTOP COMPUTERS	LCD MONITORS	NOTEBOOK COMPUTERS	CRT MONITORS
Products Purchased				
EPEAT Bronze	0	29	40	N/A
EPEAT Silver	1,661	2,909	4,287	N/A
EPEAT Gold	14,261	11,600	6,149	N/A
Total Purchased	15,922	14,538	10,476	N/A
Reused (units)	8,167	1,653	17,089	1,382
Recycled (units) + 671,361 lbs. of mixed office equipment + 703 cell phones	12,638	2,808	2,989	10,340
Source: SEC, http://www.stateelectronicschallenge.net/total_results.html				

EXHIBIT 3-66. DATA REPORTED BY PARTNERS FOR COMPUTERS IN SERVICE, 2008-2011 (AVERAGES)

		2008	2009	2010	2011
Power management enabled	Computers	59%	51%	73%	81%
	Monitors	68%	86%	95%	86%
Average equipment lifespan (months)		62	61	63	58
Paper reduction (reams of paper)		N/A	N/A	N/A	10,779
Source: SEC, http://www.stateelectronicschallenge.net/total_results.html					
Notes: The data in this table should not be considered to reflect trends. Rather, it reflects the practices of the Partners that reported in that calendar year. Reporting on paper reductions began in 2010.					

It is beyond the scope of this evaluation to attempt to quantify the portion of the above benefits that can be attributed to SEC, much less the EPP Program. However, it seems reasonable to conclude that the EPP Program inspired the creation, and influenced the design of, the SEC, through the successful Federal Electronics Challenge. As the SEC program manager stated, “The Federal Electronics Challenge is a fabulous program, and I’m thrilled to have been able to steal it.”

Building and Construction Products

We reviewed data from a number of sources to identify states making use of the building and construction product standards that EPP helped to develop, including a variety of formal reports and personal communications with representatives from standards development organizations and other stakeholders. However, there is no comprehensive list of states (or other purchasers) using these standards; as a result, the information we report here provides an incomplete listing.

Among the building and construction product standards, the NSF 140 carpet standard has had the greatest uptake by state purchasers, and has been adopted by at least 13 states. Starting in January 2010, NSF 140 Platinum superseded California Gold as the required standard for all State of California government agency carpet purchases.¹²⁹ As of January 2012, the U.S. General Services Administration (GSA) specifies the NSF 140 standard (minimum of gold level) for carpet; this means that five states also specify the standard by default, as these states mirror the GSA schedule: Florida, Louisiana, Ohio, New Mexico, and Texas.¹³⁰ A further seven states have also adopted the standard in their specifications: Delaware, Maine, Minnesota, New York, Pennsylvania, Virginia, and Washington.¹³¹ In addition, interviewees from Washington's Department of Ecology and California's Department of General Services (DGS) reported that their states have used the EPP Program's procurement guidance for carpet.

The BIFMA e3/Level furniture standard has also achieved some recognition and adoption among state purchasers. As noted above, 32% of respondents to the 2010 NASPO-RPN survey recognized BIFMA e3/Level, and 9% of respondents reported using the standard. These percentages may have increased since the survey was conducted. The States of California and Washington are including BIFMA e3 in their specifications. California's DGS requires BIFMA for state purchases, which is significant given the state's substantial buying power. Interviewees from California DGS further noted that EPP Program resources have been helpful for specifying sustainable furniture.

California has also made use of EPP's *Federal Green Construction Guide for Specifiers*. In general, DGS has found EPP Program resources to be helpful for understanding what other purchasers are requiring of manufacturers, and to inform the development of their own specifications.

We found less evidence that states have adopted NSF 332 (resilient flooring) and ULE 100 (gypsum board). While individual state purchasers or departments may be specifying these standards, we did not receive any reports the states are requiring these standards. However, NSF 332 and ULE 100 are relatively new; recognition and use may increase over time.

Hospitality and Travel

Activities in the hospitality and travel sector are generally less mature than in other sectors, and the full impact of these activities has not yet been felt at the federal or state level. However, at least two states are already using outputs developed by EPP Program staff. Notably, the State of Washington reports using the ASTM Green Meetings and Events standards; in addition, the State uses the Convention Industry Council's (CIC) *Green Meetings Report*, which was developed by EPP. The State of California also uses the *Green Meetings Report*. As with building and construction products, we did not find a comprehensive list of states (or other purchasers) using the ASTM standards or other EPP resources, and thus, they may be used more widely than we have reported here.

¹²⁹ Revised Department of General Services Management Memo 10-01, *Carpet Purchases to Meet Environmentally Preferable Criteria*, 31 December 2009: "Effective immediately, all carpet purchased by State agencies shall be certified to meet the NSF/ANSI 140-2007 Standard at its Platinum level."

¹³⁰ Written communication from Dave Kitts, VP-Environment, Mannington to his sales group, quoted in email from Dave Kitts to Daniel Kaufman, IEC, 6 June 2012.

¹³¹ Email from Dennis Gillan, NSF, to Dan Leistra-Jones, IEC, re: "FW: City/Country NSF 140 Purchasing," December 21, 2011. Note: According to an interviewee from the Washington Department of Ecology, NSF 140 is "not required, but prioritized."

University Trends

General Trends

The National Association of Educational Procurement (NAEP) conducted a survey in 2009 and 2010 to collect information on environmentally preferable procurement trends in higher education. The survey was distributed to 1,246 NAEP member institutions in February 2009 and February 2010; 101 institutions (8%) responded in 2009, compared to 230 institutions (19%) in 2010. Almost one-third of respondents (32%) had a formal green procurement policy in 2010, up from 24% in 2009. Sixty-five percent (65%) of respondents had a campus sustainability plan, and 33% had a climate action plan. The main drivers of sustainability among respondents included “do the right thing” (81%), reduce carbon (73%), improve image (73%), reduce consumption (72%), and reduce costs (65%).

The survey also asked respondents: “What green product certifications are in your procurement system?” The percentage of respondents that recognize green labels increased from 2009 to 2010, although Energy Star was the only green label recognized by more than 50% of respondents (57%). Other recognized labels included “recycled” (40%), Green Seal (32%), and Green Guard (20%). Respondents also mentioned EPEAT, LEED, FSC, EcoLogo, and SCS; however, percentages were not provided). More than one-third of respondents (38%) “don’t use any” green products or labels.

Respondents identified the following factors as the most challenging barriers to green procurement: measuring progress with green procurement (43%), changing user behavior to focus on sustainability (42%), justifying cost for green purchasing (42%), and validating suppliers’ “green” claims (38%). Other challenges included: securing executive support for green programs (15%), getting suppliers to provide accurate and updated product information (23%), and effectively promoting certified products and suppliers to end users (32%). Notably, several of these challenges echo concerns raised in the federal purchasing survey and NASPO-RPN state purchaser survey, including: justifications for higher upfront costs, difficulty verifying green marketing claims, and quantifying/tracking the volume of green purchases.¹³² Respondents to the NAEP survey also expressed concerns about the training (or lack thereof) they had received in green purchasing: One-third of respondents indicated they have not received any “green” procurement training at their institution, and an additional one-third indicated they received training that was “fair” or “poor.” The lack of training and the absence of systems may pose a significant barrier to green purchasing, even for procurement officials who are receptive to the idea of buying green.

Electronics

EPEAT has achieved considerable success in the university sector, with numerous colleges and universities including EPEAT in their procurement specifications, including: University of California system (10 campuses), Arizona State University, Central Michigan University, Cornell University, Harvard, Michigan State, Penn State, University of Pittsburgh, University of Utah, and Yale. EPEAT was also featured in the *College Sustainability Scorecard 2010*. Out of the approximately 300 colleges and universities surveyed, 190 (more than 60%) used EPEAT as a criterion in their electronics purchasing decisions; of these, 70 schools (more than one in five) purchased *exclusively* EPEAT-registered

¹³² Although we draw a high-level qualitative comparison across the results of the federal, state, and university purchaser surveys, we cannot compare the results in quantitative terms because of the different methodologies used for each survey. Each survey phrased its questions differently and used different screening criteria to select survey respondents; for example, the federal purchaser survey was limited to purchasing staff, whereas the other surveys included purchasing policy managers.

electronics products.¹³³ EPEAT is also recognized in the AASHE STARS certificate system for higher education, and is also a criterion for the Consortium on School Network (K-12 association) Green IT certificate.

Though not the focus of this evaluation, it is worth noting that universities *outside* the U.S. are also specifying EPEAT, including: Universite Laval (Canada), Centre Nationale des Recherches Scientifiques (France), Linkoping University (Sweden), and Warsaw University of Technology (Poland).

Building and Construction Products

At least two universities are specifying NSF 140: Penn State (requires NSF 140 Platinum) and Rutgers. The evaluation team was not able to locate information on other universities that are specifying NSF 140 or the other voluntary standards for building and construction products. However, given that we do not have complete information for all of the thousands of colleges and universities across the U.S., these findings should be interpreted as inconclusive, as other colleges and universities may be specifying one or more of these standards without our knowledge.

Hospitality and Travel

We did not find evidence that universities are using EPP Program standards, guidance, or tools related to green hospitality and travel. As noted above for building and construction products, these findings should be seen as inconclusive. Furthermore, colleges and universities may use EPP hospitality and travel outputs to a greater extent as these outputs reach maturity and are more widely disseminated.

Trends Among Other Non-Federal Institutional Purchasers

General Trends

In addition to the joint RPN-NASPO survey of state purchasing officials discussed above, RPN surveyed its broader membership in 2007 – 2010, including state purchasers plus other non-federal and federal buyers. Unfortunately, the RPN report does not separate state purchasers from other institutional purchasers. Further, respondents include federal agencies and non-federal purchasers (e.g., state agencies, municipal agencies, educational institutions, non-profit organizations, religious congregations, business membership organizations, and corporations); however, the RPN report does not disaggregate responses for federal purchasers versus non-federal purchasers. Finally, RPN respondents are not likely representative of mainstream procurement trends, since RPN is committed to sustainable procurement. Given these limitations, we were not able to use the survey results to characterize general trends for non-federal institutional purchasers, outside of states and universities.

However, we found another data source that gives some indication of the use of EPP building and construction standards by other non-federal institutional purchasers. Specifically, the Criteria for High Performance Schools (CHPS) incorporates two of the building and construction product standards that we evaluated: NSF 140 and NSF 332. CHPS started in 1999 as a multi-stakeholder collaborative to improve the quality of schools in California; it is now used throughout the country. CHPS is a flexible rating system that defines the characteristics of a high performance school building. School districts are encouraged – and, in some states, required – to apply the criteria for new school buildings. The criteria

¹³³ Green Electronics Council, *EPEAT Purchasers, Representative Sample - as of January 2012*.

can also be used for major renovations. Our research found that four states incorporate the EPP standards in their CHPS criteria: California, Washington, Colorado, and Texas.

Electronics

Consistent with state and university purchasers, EPEAT has achieved significant recognition and use among other non-federal institutional purchasers. The Green Electronics Council has identified a number of cities and private enterprises that were specifying EPEAT as of January 2012. Cities that are specifying EPEAT include: San Francisco, Phoenix, San Jose, Seattle, Portland, LA County, Culver City (CA), and Keene (NH). Private enterprises specifying EPEAT include: Broadlane, Catholic Healthcare West, Charles Schwab, Deutsche Bank, Fairmount Hotels, HDR, HSBC, Kaiser Permanente, KPMG (U.S.), Marriott International, McKesson, Microsoft, NBC-Universal, Nike, Premier Inc., and Tesco.¹³⁴ Moreover, a number of sustainability systems recognize EPEAT, including: LEED, Green Guide for Health Care, and Practice Greenhealth Awards.¹³⁵ Finally, the RPN itself features EPP tools on its website, including the EEBC.¹³⁶

Though not the focus of this evaluation, it is worth noting that a number of other non-federal purchasers *outside* the United States are also using EPEAT. National government agencies/ministries in the following countries are specifying EPEAT: Canada, Australia, New Zealand, France (multiple ministries), Scotland, UK Environment Agency, Mexico, Poland, and Singapore; and Thailand, Ecuador, Costa Rica, and Colombia. Cities outside of the U.S. that are using EPEAT include Vancouver and Leeds (U.K.). Other buyers specifying EPEAT include the Provinces of British Columbia, Nova Scotia, Ontario, Quebec; Warwickshire County (UK), and Minas Gerais State (Brazil).¹³⁷

Building and Construction Products

Interviews with industry association representatives, manufacturers, and standards stakeholders suggest that the uptake of building and construction product standards by purchasers outside the federal realm has so far been modest. A possible exception may be the NSF 140 carpet standard; according to the chair of the standard committee, there have been reports that some architectural specifiers are calling for NSF 140. However, IEc was not able to obtain quantitative information on the number of specifiers requiring the various building and construction product standards or the number of times the standards were included in specifications.¹³⁸

The number of copies of the standards sold may serve as a rough proxy for adoption of the standards. NSF reported selling 90 copies of the NSF 140 carpet standard and 23 copies of the NSF 332 flooring standard through 2011. However, NSF notes that they give away several copies of the standards each year, and some associations they work with do the same.¹³⁹ This suggests that the actual number of

¹³⁴ Green Electronics Council, *EPEAT Purchasers, Representative Sample - as of January 2012*.

¹³⁵ *Ibid.*

¹³⁶ http://www.responsiblepurchasing.org/purchasing_guides/computers/calculator

¹³⁷ Green Electronics Council, *EPEAT Purchasers, Representative Sample - as of January 2012*.

¹³⁸ The evaluation team decided not to subscribe to the McGraw-Hill Construction Guide, which may have provided limited data on this topic. See the methodology chapter.

¹³⁹ Email communication from Dennis Gillan, NSF, to Dan Leistra-Jones, IEc, 9 January 2012.

organizations using the standards may be significantly greater than the figures suggest. On the other hand, the figures do not indicate which types of organizations purchased the standards. IEC was not able to obtain the number of copies sold of the BIFMA e3/Level standard.

Several standards stakeholders interviewed believe that adoption of building and construction standards that EPP supported will increase over time. Notably, one indication that the standards may be gaining a foothold in the marketplace is that the current draft of the 2012 Edition of the *ICC 700 National Green Building Standard* references NSF 140, NSF 332, and ULE ISR 100.¹⁴⁰ The *ICC 700 National Green Building Standard* was established in 2007 by the National Association of Home Builders (NAHB) and the International Code Council (ICC); it is consensus-based and received ANSI approval. The Standard defines green building for single-family homes, multi-family buildings, residential remodeling projects, and site development projects; certification to the standard is provided by the NAHB Research Center.¹⁴¹ While it is too soon to tell if NSF 140, NSF 332, and ULE ISR 100 will remain in the final version of the 2012 Edition, their inclusion in the draft 2012 Edition of ICC700 is a positive sign that the standards may be gaining traction.

Though not the focus of this evaluation, it is worth considering if and how the building and construction product standards could be marketed internationally, as has EPEAT. IEC did not focus specifically on the adoption of voluntary consensus standards outside the United States, but our discussions with EPP staff suggest that the building and construction standards are not enjoying international success comparable to EPEAT. However, in an encouraging development, it appears that the Government of Canada has adopted certain criteria from the BIFMA e3 standard as part of a set of environmental specifications for government-wide National Master Standing Offers for office furniture. According to information on the Canadian government's website: "In preparation for the eventual introduction of third party registration to the BIFMA Sustainability standard (BIFMA E3-2008), the GoC (Government of Canada) has adopted certain criteria from the Sustainability standard at this time. As soon as there is a registration program in place, the GoC will be considering the silver level as the minimum standard for all office furniture NMSO programs."¹⁴² An interviewee from BIFMA indicated that as of June 2012, the Canadian government was considering e3 Standard credits for "potential" use in the Canadian procurement process. IEC is not aware of countries outside the U.S. that are considering or actually using the other building and construction standards (NSF 140, NSF 332, and ULE 100), although as noted above, this was not the focus of our study. More research would be needed to understand if/how the building and construction standards could be marketed internationally.

Hospitality and Travel

Although the ASTM Green Meetings and Events standards were recently published, there are already positive indications that the standards will impact hospitality and travel booking behavior in the general marketplace (outside of the federal government). Several stakeholders who participated in the development of the standards, including EPA Regional staff and non-government stakeholders, stated that

¹⁴⁰ NAHB Research Center, Public Comments Report on the Development of the 2012 Edition of the ICC 700 National Green Building Standard, October 15, 2012.

¹⁴¹ <http://www.nahbgreen.org/ngbs/default.aspx>

¹⁴² Public Works and Government Services Canada, "Minimum Sustainability Requirements for Federal Government Office Furniture." <http://www.tpsgc-pwgsc.gc.ca/app-acq/rccgmb-gofacm/mobilierexigences-furniturerequirements-eng.html>. Date Modified: 2011-12-09.

the standards are a useful resource for meeting planners and a helpful guide to show suppliers what they must do to win business. The head of the ASTM Committee was cautiously optimistic that the standards will be incorporated into the specifications (Requests for Proposal) that meeting planners issue to hotels, convention centers, and other suppliers and vendors. She noted that Hyatt, Marriott, and Wyndham, among others, are already showing interest, and indicated that the draft standards are already being used.

Aramark – a leading provider of food services, facilities management, and related services – reports they have already started incorporating the standards in their training and operations. According to an interviewee in Aramark’s sports and entertainment group, Aramark is working to build capacity by bringing the standards into trainings for their own sales staff and adopting some aspects of the standards into their own practices. In addition, Aramark is promoting the standards and working to build awareness of the standards with their clients at convention centers, and to a lesser extent, at sports facilities. They are also starting to pay more attention to sustainability metrics, because some clients are starting to request data on the impact of their events. While they are not yet aware of meeting planners specifying the standards (because the standards are still new), Aramark anticipates that planners will demand the standards going forward.

QUESTION 11: USE OF VOLUNTARY CONSENSUS STANDARDS BY MANUFACTURERS

Introduction

While Evaluation Question 10 addressed the use of EPP Program outputs by non-federal purchasers, Evaluation Question 11 addresses the program’s influence on manufacturers. Specifically, it asks, “To what extent are manufacturers using the voluntary consensus standards that EPA has helped develop?”¹⁴³ This section presents our findings on this evaluation question. We obtained what we believe to be comprehensive data on manufacturers’ use of the standards EPP helped develop in the electronics and building products sectors. We have only limited anecdotal information on the travel and hospitality sector, gleaned from interviews with industry participants.

Key Findings

- The Institute of Electrical and Electronics Engineers (IEEE) 1680.1 (EPEAT) standard is widely used. As of December 2010, 54 manufacturers, including all of the largest producers of personal computers, had products certified under the standard. There were a total of 2,830 unique EPEAT-registered products at that time. In another sign of the importance of the EPEAT program, when Apple briefly withdrew from EPEAT in mid-2012, it faced a strong backlash from its customers and immediately re-joined.
- In the building products sector, two sustainability standards in particular have enjoyed widespread adoption by manufacturers, the NSF 140 carpet standard and BIFMA-e3 furniture standard. While only two manufacturers are using the ULE 100 gypsum board standard, they represent the two largest players in the industry, with 50% market share in the U.S.; thus, the gypsum board standard has also

¹⁴³ The original wording of the question, as laid out in our methodology document, asked about standards use by both manufacturers and purchasers. We have addressed purchasers’ use of standards in our analysis of Evaluation Questions 10 and 12; thus, to avoid redundancy, we restrict our analysis of Evaluation Question 11 to manufacturers.

seen success with respect to uptake by manufacturers. In contrast, the NSF 332 floor covering standard that EPP helped to develop has had limited uptake.

- There is not sufficient information available to determine the extent to which industry participants are using the ASTM Green Meetings and Events standards. We found some anecdotal evidence of meetings planners utilizing the standards, but they mostly seem to be using them as a menu of environmentally preferable actions, rather than a firm set of criteria leading toward certification.

Use of the IEEE 1680 (EPEAT) Standards by Electronics Manufacturers

The IEEE 1680.1 standard sets the requirements for computers, monitors, and integrated systems to be included in the EPEAT electronics registry. The IEEE standard was first released in 2006 and was updated in 2009; as of November 2012, a second round of revisions was underway. All electronics certified to meet the IEEE 1680.1 standard are included in the EPEAT registry, and thus membership in the registry and use of the standard can be considered interchangeable.

The Green Electronics Council (GEC), which manages the EPEAT program, tracks both the number of manufacturers participating in EPEAT and the number of products in the registry, and reports these figures in its Annual Benefits Reports. Exhibit 3-67 summarizes this data.

EXHIBIT 3-67. MANUFACTURER PARTICIPATION AND PRODUCT REGISTRATION IN EPEAT

	2007	2008	2009	2010
Manufacturers producing EPEAT products	23	30	37	54
Products in EPEAT registry:				
Unique product registrations	735	975	1408 (US), 277 (ROW)	2219 (US), 611 (ROW)
Total country registrations			1408 (US), 8376 (ROW)	2219 (US), 15857 (ROW)
ROW = Rest of world				

It appears that most if not all major computer manufacturers have EPEAT-registered products. Participating manufacturers in 2010 included (among others) Hewlett-Packard, Acer, Dell, Lenovo, Toshiba, and Apple, which at the time represented the five largest manufacturers of personal computers worldwide (excluding Apple) and in the U.S. (excluding Lenovo).¹⁴⁴ The breadth of the EPEAT program’s reach makes it clear that it is a major force in the marketplace, and one that manufacturers feel they must address. Nowhere is this illustrated more clearly than in Apple’s recent decision to leave the EPEAT program, only to backtrack under pressure and re-join just a few days later (see text box on next page).

¹⁴⁴ “Gartner Says Worldwide PC Shipments in Fourth Quarter of 2010 Grew 3.1%; Year-End Shipments Increased 13.8%.” Gartner, January 12, 2011. <http://www.gartner.com/it/page.jsp?id=1519417>

We do not have information on the total number of different computer and monitor models (including both EPEAT and non-EPEAT) available in the marketplace, so we cannot determine what proportion of all product models are EPEAT-registered. However, as noted in our analysis of Evaluation Question 10, EPEAT enjoys a 22% worldwide market share for computer purchases. This would imply that a significant portion of all models of computers (and presumably, monitors as well) are EPEAT-registered.

In summary, it is clear that manufacturer participation, as well as overall market share and use by major purchasers, indicates that the IEEE 1680.1/EPEAT standard for computers and monitors has been widely adopted. It stands as a clear success of the EPP Program.

Market Power of EPEAT: Apple Example

In July 2012, Apple abruptly withdrew all of its 39 EPEAT-registered products from participation in the EPEAT registry. Critics speculated that the decision was tied to the design of the new MacBook Pro, which have batteries glued into the case and cannot be disassembled for recycling, as required by the IEEE standard. Many observers were surprised by the withdrawal, as Apple had been actively involved in creating the standard. Environmental and technology reporters were quick to pick up the story. Public upset ensued; several organizations started petitions; and most prominently, the City of San Francisco decided not to buy any new Apple products.

The City of San Francisco's Department of Environment is a strong supporter of third-party ecolabels as easy-to-use procurement tools for identifying environmentally preferable products. In 2008, the City adopted a policy requiring that any City electronics purchases be EPEAT silver certified; in 2009, they updated the requirement to EPEAT Gold. When the City heard about Apple's withdrawal from EPEAT, they decided to cease purchasing Apple computers. The City did not publicly decry Apple or declare a boycott; they simply stated that they could not continue to buy Apple products since they had an EPEAT Gold requirement that Apple would no longer satisfy. Observers expected other institutional purchasers to follow suit.

A week after the withdrawal, Apple's Senior Vice President of Hardware Engineering announced in an open letter that Apple placed all of its products back on the EPEAT registry. Mansfield acknowledged receiving complaints from many Apple customers and called the decision to leave EPEAT a "mistake." He affirmed Apple's continued commitment to the environment, and remarked that Apple's relationship with EPEAT "has become stronger as a result of this experience, and we look forward to working with EPEAT as their rating system and the underlying IEEE 1680.1 standard evolve."

Sources:

Hull, D. and Boudreau, J. Apple's withdrawal from 'green' certification program surprises purchasers. July 10, 2012. http://www.mercurynews.com/business/ci_21038486/apple-withdrawal-epeat-green-certification-p

Mansfield, B. A letter from Bob Mansfield. July 13, 2012. <http://www.apple.com/environment/letter-to-customers/>

Geiger, Chris, City of San Francisco Department of the Environment. Personal communication. September 6, 2012.

In mid-2012, IEEE finalized standards 1680.2 and 1680.3, which set environmental criteria for imaging equipment (i.e., printers) and televisions, respectively, to be admitted to the EPEAT registry. As of May 2013, the EPEAT registry included 411 products certified under the imaging equipment standard, including 173 silver and 15 gold-rated products. Participating manufacturers included Canon, Dell, Epson, Hewlett-Packard, Konica Minolta, Lexmark, Ricoh, Samsung, and Xerox. For the TV standard, two manufacturers (LG and Samsung) had 123 certified products, including 84 silver and 39 gold (there are no bronze-level televisions registered as of yet). The high number of products certified so quickly

after the standards were finalized, particularly at the higher rating levels, has led some observers to conclude that industry participants unduly influenced the standard development process, which is discussed in evaluation question 12.

Use of Voluntary Consensus Standards by Building Product Manufacturers

BIFMA, NSF, and ULE provide information on their websites regarding products certified under their standards, and the manufacturers of these products. We also gathered information on the number of manufacturers with certified products through interviews with industry representatives and GSA schedule managers, and through internet searches. Based on this research, it is clear that none of these information sources provide a comprehensive list of all manufacturers producing certified products (with the possible exception of BIFMA, which appears to have a complete list of furniture companies with products certified to the BIFMA-e3 sustainability standard). Exhibits 3-68 and 3-69 summarize the available information on manufacturers and products associated with each of the building product sustainability standards being evaluated.

EXHIBIT 3-68. MANUFACTURER PARTICIPATION AND PRODUCT CERTIFICATION IN THE BUILDING PRODUCT SECTOR

PRODUCT CATEGORY	STANDARD	PARTICIPATING MANUFACTURERS	CERTIFIED PRODUCTS
Carpet	NSF 140	13	> 305
Resilient Floor Coverings	NSF 332	5	> 74
Furniture	BIFMA e3	48	2685
Gypsum Board	ULE ISR 100	2	2

The NSF 140 carpet standard has enjoyed the most success in terms of overall market share. All four of the world’s largest carpet companies (Shaw, Mohawk, Beaulieu, and Interface) have products certified under NSF 140; these companies alone have more than 50% of the global market share in the industry. Thus, the 13 certified manufacturers represent most of the global market. Overall, more than 300 products are certified to meet the NSF 140 standard.¹⁴⁵ The carpet industry is widely considered a leader in sustainability issues, and has been involved in sustainable standard development since the 1990s. The Carpet and Rug Institute (CRI), a major industry association, is very active in promoting the standard. As discussed in our analysis of Evaluation Questions 10 and 12, demand for NSF 140 certified carpet is also driven by extensive requirements from GSA, states, universities, and other private sector customers.

The NSF 332 resilient floor covering standard has had somewhat lower adoption from manufacturers, attributed by interviewees in part to a shorter history in the industry of addressing sustainability, lack of

¹⁴⁵ The NSF website identifies nine companies selling NSF 140 certified carpet, with 305 certified products between them. It appears that these nine companies represent those whose products were certified by NSF (as opposed to another certification group, which can also certify compliance with NSF standards). Products that were certified to the NSF 140 standard by other certifying bodies are not included; thus, there are more total NSF 140 certified products than the 305 reported. The same is true for NSF 332 certified floor coverings.

leadership in the sector, and ultimately a lack of external demand drivers. However, the five participating manufacturers have more than 74 NSF 332 certified products between them.¹⁴⁶

EXHIBIT 3-69. MANUFACTURER PARTICIPATION BY PRODUCT CATEGORY

CARPET (NSF 140)	RESILIENT FLOOR COVERINGS (NSF 332)	FURNITURE (BIFMA E3)	FURNITURE (BIFMA E3) CONT.	FURNITURE (BIFMA E3) CONT.	GYPSUM BOARD (ULE ISR 100)
Atlas Carpet Mills	Armstrong	Affordable Interior Systems (AIS)	Allseating	Allsteel	National Gypsum
Beaulieu Group	Congoleum	Baker Manufacturing	Bernhardt Design	Bush Industries	United States Gypsum Co.
Bentley Prince Street	Flexco	Carolina	DARRAN Furniture	Dauphin	
Blueridge Commercial Carpet	Johnsonite (Tarkett; Azrock)	Davies Office Refurbishing	Descor Industries	First Office	
Dixie Group (Masland Contract; Whitespace)	Mannington Mills	Global Contract (Global Total Office)	Godrej & Boyce	Haworth	
InterfaceFLOR		HBF	Herman Miller	High Point Furniture	
J+J / Invision		Humanscale	Indiana Furniture	Inscape	
Mannington Mills		Interstuhl Buromobel	Izzy+	Jasper Desk Company	
Milliken & Company		Jofco	Keilhauer	KI	
Mohawk Group		Kimball Office	Knoll	Krug	
Shaw		Lamex	Loewenstein	Maxon Furniture	
Tai Ping Carpets International		MooreCo	National Office Furniture	Nightingale	
Tandus Flooring		Nucraft	OFS	Paoli	
		Spec Furniture	Steelcase	Teknion	
		The Gunlocke Company	The HON Company	Trendway	
		Trinity Furniture	Versteel	Via Seating	

The BIFMA-e3 furniture standard, approved in 2008, has also enjoyed a fair amount of success in terms of its adoption by manufacturers. The 48 companies with products certified under BIFMA-e3 account for about 45% of the furniture association’s members. The 110 BIFMA members (including those without e3 certified carpet) produce an estimated 80% of the office furniture sold in North America.

¹⁴⁶ See footnote 3.

Finally, the ULE ISR 100 gypsum board standard, approved in 2010, has only two manufacturers producing certified products. However, these two manufacturers are responsible for a majority of the gypsum board sold in the U.S., making them the largest players in the industry. Both of these manufacturers use the standard as a marketing tool. Stakeholders interviewed suggested that the limited adoption of the standard is due to the lack of demand drivers, such as codes specifying use of the standard, and purchasing requirements.

For each of the building product standards being considered, we discuss the main factors driving their success (or lack thereof) in greater detail in Evaluation Question 12. In addition, in the course of our research we obtained limited information on the extent to which manufacturers needed to make changes to their production processes in order to achieve certification to the various standards; that information is presented in Evaluation Question 3.

Use of the ASTM Green Meetings and Events Standards by Industry Participants

There are nine standards in the suite of ASTM Green Meetings and Events Standards. Eight of the nine were finalized in early 2012; the last standard, on accommodations, was completed in early 2013. These standards cover:

- Destinations;
- Exhibits;
- Transportation;
- Audio visual (AV) and production;
- Communication and marketing materials;
- Onsite offices;
- Food and beverage;
- Venues; and
- Accommodations.

We were not able to obtain data comparable to the information presented above on the number of industry participants using these standards, for several reasons:

- ASTM does not appear to track the use of its standards in the same way as the building product standards organizations, meaning there is no centralized data source on standards uptake.
- The Green Meetings and Events Standards are relatively new, and have not had sufficient time to gain significant traction in the market.
- The ASTM standards address services and materials for one-time occurrences (i.e., meetings and events), rather than mass-produced physical products; this makes it difficult to classify a given manufacturer or service provider as using the ASTM standards on an ongoing basis.
- Finally, the nine standards cover very different aspects of meetings and events, so an event planned to meet one standard may not necessarily meet the others. Thus, a count of meetings and events certified to one or more of the ASTM standards (if one were available) would provide an incomplete picture at best.

In light of the above limitations, we can provide only limited anecdotal information on the use of the ASTM Green Meetings and Events Standards, gathered through interviews with industry participants. One interviewee stated that their company was training its employees on the standards, and starting to work with clients and business partners to build awareness. The company's aim is to position itself to be able to meet demand for ASTM-compliant meetings and events, if it materializes. The interviewee stated that at present, event planners in their company were using some elements of the ASTM standards, but were not yet designing whole events that would satisfy all of the standards' requirements.

Another interviewee said that while it is too soon to see any major impacts, they expect that in time the meetings and events standards will change behavior and promote more sustainable events. Meeting planners' typical approach is to issue RFPs to hotels, convention centers, and other stakeholders for specific events; the interviewee stated that they expect planners to start incorporating elements of the ASTM standards into these RFPs. The collaborative nature of event planning also suggests that knowledge of and experience with the ASTM standards could spread through the industry quickly. The same interviewee noted that major hotel chains such as Hyatt, Marriott, and Wyndham have already shown interest in the Green Meetings and Events standards, and used draft versions for some events.

While these are encouraging signs, it appears that the standards will be of limited use to the federal government. We discuss the reasons for this under Evaluation Question 12. For now, we simply note that if the federal government (and potentially, other major purchasers as well) does not see the ASTM standards as a useful procurement tool, it could reduce the number of meeting planners and other industry participants that choose to use the standards.

QUESTION 12: SUCCESS FACTORS FOR VOLUNTARY CONSENSUS STANDARDS

Introduction

Evaluation Question 12 asks, "What factors influence the extent to which the voluntary consensus standard approach is successful in designating and promoting green products and services?" IEC's findings for Evaluation Question 12 are summarized below. We base our findings on our assessment of six groups of standards that EPP staff contributed to developing:

- IEEE/EPEAT standards for desktop computers, laptops, and monitors;
- NSF 140 carpet standard;
- NSF 332 resilient flooring standard;
- BIFMA e3/Level standard for office furniture;
- ULE 100 standard for gypsum board; and
- APEX/ASTM green meetings and events standards.

Our assessment draws on several data sources: interviews with EPP staff, non-federal purchasing policy managers, standards stakeholders, and EPA and GSA hospitality and travel contacts; publicly available NSF 140 and BIFMA e3 certification data; and data provided by standards development organizations.

Key Findings

- Market demand drivers play an important role in motivating industry to embrace voluntary standards.
- The history and dynamics within specific sectors also influence the adoption of voluntary standards.
- Market confusion and lack of awareness hinder recognition and use.
- Executive Orders and Federal Acquisition Regulation can push federal buyers to specify purchases meeting specific standards.
- Promoting voluntary standards is important for raising awareness and increasing adoption; however, EPP lacks the authority to promote the standards that it helps to develop.
- Cost may not be as much of a barrier as is widely perceived.
- The nature of voluntary consensus standards means that EPP does not control the process. This, in turn, often requires compromise on substance.
- Developing standards requires effective coordination across multiple parties with competing interests and perspectives.
- Stakeholders agree that the standards are more environmentally protective with EPP's involvement, but some question whether they are environmental "leadership" standards.
- Seemingly minor procedural details can influence the substance and content of the standards. For example, standard development organizations' rules on membership or voting help determine the relative influence given to different stakeholders. This in turn may affect the provisions that can be included in a draft standard and garner sufficient support to ultimately be approved.
- EPP needs to remain continuously engaged to ensure ongoing standards improvement.

We group these key findings in two categories: market success factors and other success factors. The following two sections describe the key findings for each category.

Market Success Factors

IEc identified five market factors that mediate the influence and use of voluntary consensus standards. The heat map in Exhibit 3-70 arrays these market success factors against six groups of voluntary standards that EPP staff contributed to developing. Green indicates strong factor presence, yellow indicates weak factor presence, and red indicates the factor is not present; gray indicates insufficient information/too early to judge. Each factor is discussed in detail below.

Market demand drivers play an important role in motivating industry to embrace voluntary standards. Market drivers are required to motivate companies to incur the effort and expense of certifying to voluntary standards. Large institutional buyers, in particular, can play a significant role in developing the market for voluntary standards. For example, according to EPP staff and other stakeholders that participated in developing the EPEAT standards for computers and monitors, the success of these standards is due, in part, to the strong demand for these products by institutional purchasers within and outside the federal sector. Federal, state, and local governments, universities, and corporations purchase large quantities of computers and monitors, and as discussed in the findings for Question 10, many have adopted EPEAT as a green purchasing criterion. Some EPEAT stakeholders

expressed uncertainty about whether the EPEAT standard for televisions, which are not as integral to the operations of many institutional buyers, will achieve a similarly high level of market penetration.

EXHIBIT 3-70. STANDARDS AND MARKET SUCCESS FACTORS

Success Factors	IEEE/EPEAT Computers and Monitors	NSF 140 Carpet	NSF 332 Resilient Flooring	BIFMA e3/Level Office Furniture	ULE 100 Gypsum Board	APEX/ASTM Meetings and Events
Market demand drivers	Green	Green	Red	Yellow	Red	Grey
History and dynamics within sectors	Green	Green	Yellow	Yellow	Red	Yellow
Market clarity and awareness	Green	Yellow	Red	Red	Red	Grey
Executive Orders and Federal Acquisition Regulation	Green	Red	Red	Red	Red	Red
Promotion by EPP	Green	Red	Red	Red	Red	Red

Strong factor presence
 Weak factor presence
 Factor not present
 Insufficient data/too early to judge

In the building and construction product sector, a number of standards stakeholders noted the absence of two potentially powerful market demand drivers: GSA Schedules and LEED. With the notable exception of NSF 140, which GSA requires for most types of carpet, and which received a provisional LEED credit, voluntary building and construction product standards have not been incorporated into GSA Schedule requirements or LEED standards. Several interviewees indicated that including other building and construction product standards in the GSA Schedules and LEED would provide an important incentive for manufacturers to “green” their products and become certified, particularly because states, local governments, and many institutional buyers tend to follow the federal government’s lead. This is particularly important for industries that do not have a history of competing on sustainability issues. For example, flooring and gypsum board stakeholders stated that the standards would gain limited traction in the market unless they are included in procurement specifications, contract language, and federal codes. As one gypsum stakeholder put it, “We don’t think it’s a bad standard, but it’s the sort of thing that needs to be driven by customers. Usually, it would be driven by code standards and programs calling for these types of certifications, but right now the standard is not written into any code or language, so there are no demand drivers.” Similarly, an NSF 332 representative commented, “Sometimes when these standards are put in place, businesses have anxiety about whether things will pan out. Some companies want assurances that this will last before they spend the time and money to get their products certified.”

BIFMA may be an exception to this general trend. As discussed in the findings for Question 10, at least two states – California and Washington – specify BIFMA e3/Level even though this standard is not included in GSA Advantage or LEED. Also, as noted in the findings for Question 11, a number of

furniture manufacturers have adopted the standard. However, the survey results indicate that purchaser use of the BIFMA e3/Level standard is low.

Interviewees in the hospitality and travel sector identified “green” meetings and events as a growth area for this sector, as reflected in the large and growing level of corporate resources committed to “green” initiatives and marketing – e.g., sustainable lodging and food. EPA interviewees in regions 9 and 10 also reported high demand on the west coast for “green” meetings and events. In general, hospitality and travel stakeholders stated that they expect hotels, convention centers, and other providers of hospitality and travel services will use the APEX/ASTM Green Meetings and Events standards if meeting planners specify the standards in their requests for proposal.

The history and dynamics within specific sectors influence the adoption of voluntary standards.

Electronics (computers and monitors) manufacturers were accustomed to competing on sustainability issues prior to EPEAT, primarily due to Energy Star as well as efforts to reduce waste and recycling of electronics.

Within the building and construction product category, the success of the NSF 140 carpet standard reflects, in part, the history and dynamics of the carpet industry. Specifically, Ray Anderson, the founder of Interface Flooring, served on President Bill Clinton’s Council on Sustainability and was an early adopter of sustainable business practices. With Interface leading on sustainability issues, sustainability became a competitive issue for the carpet industry from as early as the 1990s. Several other standards that address carpet were developed prior to NSF 140, including GreenGuard, Green Label, Cradle to Cradle, and the Scientific Certification Systems (SCS) carpet standard. California adopted the SCS standard, but subsequently developed its own California Gold Sustainable Carpet Standard. Interviewees who participated in the NSF 140 standard committee stated that California’s actions put pressure on the carpet industry to develop one unified standard that would be accepted nationwide. (The State of California subsequently replaced California Gold with NSF 140 Platinum.) Similarly, carpet manufacturers had a strong incentive to embrace the final version of the standard, owing to the industry’s history of competing on sustainability issues and the fact that purchasers were requiring environmentally preferable carpet.

The focus on sustainability among carpet manufacturers put competitive pressure on the resilient flooring industry to develop its own standard, so as not to appear “behind the curve” on sustainability issues. However, manufacturers have been slower to certify to NSF 332 than NSF 140; according to interviewees who participated in the development of both standards, this may be due, in part, to the resilient flooring industry’s shorter history of competing on sustainability issues, and the absence of a clear sustainability “leader” in the resilient flooring sector.

In the furniture sector, the proliferation of ecolabels and standards in other sectors was one impetus behind the development and subsequent adoption of the BIFMA e3 standard by manufacturers; moreover, some furniture manufacturers have a history of using sustainable wood. Gypsum board does not have a history of competing on sustainability issues, although two large gypsum board manufacturers are currently marketing their ULE 100 certification.

The travel and hospitality sector has a history of competing on sustainability issues. For example, even before the publication of the APEX/ASTM Green Meetings and Events standards, the Convention Industry Council (CIC)’s Accepted Practices Exchange (APEX) was providing information on best practices for green meetings and events. Similarly, a leading meetings and events service provider

reported that their company has been working on environmental issues for the past six to eight years, which suggests the company views sustainability as a competitive issue.

Greater market clarity and awareness raise the likelihood that manufacturers and purchasers will recognize and use a standard. Manufacturers and purchasers need to be aware that standards exist before they will certify to or require the standards. Moreover, standards need to pass muster with the federal government, which requires that the standards have (or are perceived to have) a sufficiently high degree of environmental protectiveness.

It takes time for any new standards to gain recognition, but it is particularly challenging when the EPP Program and the rest of the government is hindered in its ability to actively promote the standards (see discussion below). In addition, companies and buyers need clarity about which standards will be required and which should be adopted; this becomes much more difficult when there are competing standards for the same product or service category. For example, EPP Program staff attributed some measure of EPEAT's success to the fact that no other comprehensive standards existed for computers prior to EPEAT. Similarly, although NSF 140 is not the only carpet standard, it has enjoyed a fair amount of recognition and broad acceptance; for example, the State of California adopted NSF 140 Platinum to replace California Gold.

On the other hand, there has been a significant amount of debate within the furniture industry between the Forestry Stewardship Council and the Sustainable Forestry Initiative about what constitutes sustainable wood. The BIFMA e3/Level standard was delayed for more than a year because of this debate, and this is also a major cause of delay in releasing the latest version of LEED. This situation has created uncertainty in the market which, according to some stakeholders, has made it more difficult for the government to specify the BIFMA e3 standard. It is possible that other competing furniture standards, such as Cradle to Grave, are also contributing to uncertainty in the market.

On a related note, two stakeholders questioned whether the market is moving away from voluntary consensus standards in favor of environmental product declarations (EPDs). One of these stakeholders observed that the voluntary standards are not only competing with other standards, but with EPDs and other sustainability initiatives. Lack of market clarity hinders buyers' ability to specify the standards, and reduces manufacturers' incentives to certify to these standards.

As discussed in the findings for Questions 6 and 11, EPP staff indicated that the federal government does not view the APEX/ASTM meetings and events standards as being sufficiently protective of the environment, and does not plan to adopt these standards in federal procurement requirements. While it is too early to judge the market uptake of these standards, experience in other sectors suggests that the federal government's decision not to specify the APEX/ASTM meetings and events standards may put a damper on their adoption in the market.

Executive Orders and Federal Acquisition Regulation can push federal buyers to specify standards. EPEAT is the only voluntary consensus standard among those that EPP helped to develop that was explicitly referenced in Executive Order (EO) 13514 and the Federal Acquisition Regulation (FAR).¹⁴⁷ According to EPP staff, manufacturers, and other standards stakeholders in the electronics sector and the

¹⁴⁷ EPP staff filed the proposal to include EPEAT in the FAR. However, EPA has been told that specifying additional individual environmentally preferable standards in the FAR will not be allowed due to concerns expressed by the United States Trade Representative (USTR).

building and construction products sector, the inclusion of EPEAT in EO 13514 and the FAR partly explains EPEAT's significant success. The inclusion of EPEAT in the EO and the FAR raised the standard's profile, and motivates federal buyers to specify purchases meeting the standard. It may also explain why more state purchasers adopted EPEAT compared to the other standards that EPP helped to develop, as many state purchasers follow official federal signals regarding green purchasing preferences.

Given the vast market power of the federal government, it is possible that federal purchases of EPEAT products, and subsequent EPEAT purchases at the state level, helped to galvanize the market for EPEAT products, and build institutional and even consumer awareness for the label. With high federal and state demand for EPEAT products, manufacturers were incentivized to offer more models that were certified to the label. It is also likely that changes to production or sourcing required to manufacture EPEAT products became more affordable for manufacturers, and more engrained, as the volume of EPEAT product sales increased. In terms of awareness, the visual ubiquity of the EPEAT label at federal and state offices likely raises awareness of EPEAT; for example, if a consumer visits a state or federal office and sees EPEAT computers, he or she may become aware of the label. Or if that individual uses an EPEAT computer at work, he or she is likely aware of the label, and may be more likely to consider purchasing an EPEAT computer for home use.

Finally, inclusion in the EOs and in the FAR has given EPP and the federal government greater flexibility to promote the standard, including the development of the FEC program (see below).

Promoting voluntary standards is important for raising awareness and increasing adoption; however, EPP lacks the authority to promote the standards that it helps to develop. Among the standards considered in this evaluation, EPEAT is the only standard that EPA has actively promoted. The Federal Electronics Challenge (FEC) and the Federal Electronics Stewardship Workgroup have promoted EPEAT to federal buyers, as has EPP staff through conferences, workshops, and awards. The active promotion of EPEAT is one factor in the widespread adoption of the standard for computers and monitors. However, one EPP staff member reported that within the past year, there has been less support within EPA for efforts to promote EPEAT.

With the exception of EPEAT, EPP has not actively promoted the voluntary standards that it helped to develop. This reflects, in part, an ongoing discussion across EPA, GSA, other federal agencies, and industry about the criteria that the government should use when evaluating and specifying standards. It also reflects the federal government's inability to "endorse" private standards, products, and services. As such, EPP is largely dependent on manufacturers to educate their customers and promote the standards. Some manufacturers have promoted, and continue to promote, voluntary standards that they certify to, but they are looking to EPP to assume a more active role in promotional activities. A few industry stakeholders expressed concerns that if GSA and other agencies only promote and specify standards developed by the government, such as Energy Star and WaterSense, it will put voluntary consensus standards at a disadvantage. Although this is a policy issue that is mostly beyond EPP's control, it affects market recognition and adoption of the standards.

The federal government recognizes this challenge and is taking steps to address it. Specifically, EPA, in consultation with GSA and other agencies, has developed draft Guidelines to evaluate environmental performance standards, including but not limited to the standards that EPP helped to develop (see sidebar). Once implemented, the Guidelines could provide a means for the federal government to recognize voluntary consensus standards, subject to the provisions in the NTTAA and OMB Circular A-119 (see below).

Other Success Factors

The evaluators examined a number of other success factors, including the following:

Cost may not be as much of a barrier as is widely perceived. Some interviewees reiterated the widely held view that cost is a barrier to certification, especially for small businesses. However, data provided to EPA's Office of Policy by 10 standards development organizations, which manage more than 200 standards, suggest that more than 40% of businesses qualifying for the leading North American, non-federal product environmental standards are small businesses, defined for this sector as having annual revenues under \$25 million and/or fewer than 500 employees.¹⁴⁸ Available data indicate that over half of firms with products qualifying for BIFMA e3/Level certification have fewer than 500 employees. More than half of the companies with products qualifying for the leading environmental standards of ULE, EcoLogo, and GreenGuard have annual revenues under \$25 million; only about 9% of companies qualifying for these standards would qualify as Fortune 500 firms based on their revenues. It appears that a similar

DRAFT EPA GUIDELINES FOR EVALUATING STANDARDS AND ECOLABELS

Federal agencies face a number of requirements on sustainable procurement. Most notably, EO 13514 requires 95% of the government's purchases to be sustainable. In addition, the NTTAA directs agencies to "use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities," except when "inconsistent with applicable law or otherwise impractical."

However, as discussed in this report, federal purchasers have indicated uncertainty regarding which product sustainability standards are appropriate for use in purchasing. For example, as discussed in Evaluation Question 6, only a minority of purchasers made regular use of the standards addressed in this evaluation. Informational barriers have led to an inconsistent approach to using standards and ecolabels in federal procurement.

To address these issues, EPA, in collaboration with other agencies, has developed a set of draft Guidelines to evaluate non-governmental environmental standards and ecolabels for use in federal procurement. These Guidelines provide a means to evaluate the robustness of product sustainability standards alongside federal requirements and mission needs. The Guidelines are organized into four categories, including standard setting process, standard substance, conformity assessment, and ecolabel program management. The primary outcome of this evaluation will be a list of conforming sustainability standards and ecolabels.

If widely adopted for use by federal agencies, the Guidelines could have numerous benefits with respect to promoting environmentally preferable purchasing. Most directly, the Guidelines are intended to provide clarity as to the standards and ecolabels, and therefore products, that EPA considers "environmentally preferable." The Guidelines could also be used to make sustainable purchasing choices the default, by adding approved standards as "default selections" in acquisition planning systems to contract terms. Furthermore, consistent use of a list of recognized products could be used to facilitate better tracking of "green spend." For example, the federal Procurement Data System Next Generation (FPDS-NG) could be aligned with the Guidelines.

¹⁴⁸ Personal communication between individual standards development organizations and Stephan Sylvan, EPA's Office of Policy.

share of small businesses qualify for GreenSeal standards. Thus, while the cost of green product certification may be an important consideration for some firms, available data suggest that cost is not a prohibitive barrier for many smaller firms.

The voluntary consensus standards process requires EPP to relinquish control of the process and to compromise on substance. EPP's efforts to develop voluntary, consensus-based standards are guided by the National Technology Transfer and Advancement Act or NTTAA (Public Law 104-113), which directs federal agencies and departments to "use technical standards that are developed or adopted by voluntary consensus standards bodies," with limited exceptions, and provides that the government "shall, when such participation is in the public interest and is compatible with agency and departmental missions, authorities, priorities, and budget resources, participate with such [voluntary, private sector, consensus standards] bodies in the development of technical standards." OMB Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities," establishes policies on federal use and development of voluntary consensus standards.

The nature of the voluntary consensus standard process requires compromise. According to EPA's Standards Executive, "No one should go into these standard development processes and demand and expect to get everything. These processes require compromise while working together with industry." The requirement to go through the voluntary consensus standard process, and the compromise that the process requires, have implications for the substance of the standards that EPP helps to develop. Put simply, standards developed through a voluntary consensus process, which includes negotiations with industry representatives, may not be as environmentally protective as standards that the government develops on its own.

The process also has implications for assessing EPP's contribution to the development of standards – i.e., the fact that a standard may not incorporate all of EPP's recommendations reflects the framework in which EPP is required to operate; it does not reflect a failure on the part of EPP staff. A better measure of success is the extent to which standards are more protective of the environment than they would have been without EPP's involvement. By this measure, EPP has performed well; as discussed in the findings for Question 6, all of the standards that we assessed are more protective of the environment than they would have been without EPP's input.

Developing standards requires effective coordination across multiple parties with competing interests and perspectives. This finding is borne out from EPP's experience coordinating with various stakeholders in developing the standards covered by this evaluation. A number of interviewees noted that coordination *within* EPA (for example, between EPA Headquarters and the regions) can be as challenging as fostering coordination between EPA and industry. For example, EPA Headquarters and the regions had different visions for the Green Meetings and Events standards: EPA Headquarters was focused on quantifiable environmental outcomes, whereas the regions were more focused on management practices. Despite the different visions of what the standards should be, this issue was not addressed explicitly until the process was well underway. In retrospect, an *upfront* discussion and resolution about the purpose and objectives of the standards would have been helpful.

Other standard stakeholders observed that the attitude and temperament of EPP staff can also enhance or diminish their effectiveness. Industry representatives, in particular, appreciated EPP's willingness to work with industry and other stakeholders rather than dictate the terms of the standard. For example,

stakeholders described the EPP representative on the NSF 140 committee as “fair and reasonable.” Although industry was aware that the standards would ultimately need to pass muster with EPA, EPP staff was careful not to “overplay their hand,” as one stakeholder put it. Stakeholders also appreciated EPP’s ability to marshal scientific evidence to inform the debate. Similarly, EPP staff noted that a key part of their role in the standard development process is coordinating with subject matter experts from across EPA to provide input on the standards. In the case of EPEAT, some industry stakeholders expressed concerns that EPP staff was too insistent that certain environmental provisions be included in the computer standard. While this may be true from industry’s perspective, EPP’s firmness on these issues resulted in a more environmentally robust standard.

Stakeholders agree that the standards are more environmentally protective with EPP’s involvement, but some question whether they are environmental “leadership” standards. In particular, some EPP staff and standards stakeholders expressed concerns about EPEAT and NSF 140, noting the high adoption rate of both standards in their respective industries. One interviewee whose company sells certified carpet products cited an article in *Environmental Building News* that compared NSF 140 and BIFMA e3/Level (among other standards); the article noted that while a majority of NSF 140 certified products are certified to platinum – the highest level – and some to gold, only 20% of BIFMA e3/Level certified products have achieved gold, and less than 1% have achieved platinum.¹⁴⁹ One interpretation is that NSF 140 is less rigorous than BIFMA e3/Level, is easier to certify to, and is therefore not a true leadership standard. However, other observers note that the carpet industry got a “head start” on sustainability issues and may be farther along the path to sustainability (see below); further, the State of California and other large buyers demand NSF 140 Platinum, making it less worthwhile for manufacturers to certify to the other levels of the standard.¹⁵⁰ Regardless, critics contend that if the majority of products are certified to the highest level, buyers cannot differentiate across products.

A similar critique has been made for EPEAT: Given the very high level of adoption of the IEEE 1680.2 standard for computers and monitors, it has become difficult to differentiate across products that are certified to the standard. Moreover, as EPEAT gains market share and expands into new product categories, some manufacturers are pushing back on certain environmental criteria (e.g., Energy Star specifications). Industry players have become far more active in IEEE since the development of the EPEAT computer standards in 2006. In fact, there are indications that large industry players may have largely “captured” the IEEE standard development process for EPEAT televisions and imaging equipment.¹⁵¹ In December 2012, in response to industry pressure, IEEE dissolved the consensus-based taskforce that develops the policies and procedures that govern the standard development process.¹⁵² EPA is under pressure from environmental groups to abandon IEEE in favor of another standards organization for future EPEAT standards.¹⁵³

¹⁴⁹ Atlee, Jennifer, “What’s New in Multi-Attribute Environmental Certifications.” *Environmental Building News*, Vol. 19, No. 12, December 2010.

¹⁵⁰ Ibid.

¹⁵¹ Kyle, Barbara, “Big Electronics: Bully of the eco-label playground.” *Electronics TakeBack Coalition*, January 29, 2013. <http://www.electronicstakeback.com/2013/01/29/big-electronics-bully-of-the-eco-label-playground/>.

¹⁵² Ibid.

¹⁵³ Ibid.

The new EPEAT television and imaging equipment standards are not as stringent as the computer standard was when it came out in 2006. In 2006, no model qualified for gold for at least six months, and most models only qualified at bronze for years. Gold was a “reach” for most manufacturers for a time, as the Green Electronics Council noted in 2008.^{154,155} In contrast, at the end of February 2008, the registry for imaging equipment had been open for two months and already had 28 gold products, 70 silver products, and 86 bronze products. Put differently, 15% of total registered imaging equipment was gold certified and more than half (53%) was gold or silver certified within two months of the registry’s opening. The data corroborates concerns that the EPEAT standard for TVs and imaging equipment is not a leadership standard.

Seemingly minor procedural details can influence the substance and content of the standards.

Different standard development organizations (SDOs) have different procedures, and seemingly minor procedural issues can influence the outcome. EPP staff noted the importance of understanding differences across SDOs and choosing the best SDO for the task at hand. Further, regardless of the SDO selected for a particular standard, EPP needs to understand the rules before engaging; this is a key lesson learned based on EPP’s experience to date. For example, EPP staff acknowledged that IEEE’s rules presented challenges that EPP did not fully understand when they selected IEEE to develop EPEAT. IEEE’s rules require a three-fourths majority of all voting members to pass anything, which can make it difficult to get things done. IEEE has two membership categories – individuals and organizations – and the committee chose individual membership because it costs less, and would give everyone an opportunity to participate regardless of finances. However, because every individual gets one vote, larger organizations with more members have greater influence. New members can join at any time: one manufacturer joined six months into the process and wanted to revisit major decisions that the group had already made; another manufacturer reportedly sent staff to the committee “for the express purpose of opposing certain criteria” in the standard.

In a similar vein, a stakeholder on the ASTM Green Meeting and Events committee noted that EPA Headquarters staff and event planners were not familiar with the ASTM process; as a result, “there were a number of false starts, where the group put a huge amount of effort into things that went nowhere.” At the same time, it should be acknowledged that the voluntary standard process was new for many of the participants involved, and EPP staff has learned from experience. For example, a standards stakeholder who participated in developing NSF 140 and NSF 332 stated that their experience with carpet informed the committee’s approach to flooring.

Standard development is an ongoing process, subject to advances as well as setbacks; EPP needs to remain continuously engaged to ensure ongoing environmental improvement. In some sense, voluntary consensus standards are never really “final”; rather, they continue to go through new iterations and revisions. As one industry stakeholder noted, “There’s an expectation that standards will keep getting better and better, but that’s not necessarily so.”

¹⁵⁴ Green Electronics Council. “Environmental Benefits of 2007 EPEAT Purchasing.” May 2008. P. 9.

¹⁵⁵ Omelchuck, Jeff and Wayne Rifer (Green Electronics Council), “Product Stewardship in the Real World: Why the new EPEAT standard for electronics has been so successful.” ISSP Insight, October 2008. <http://www.sustainabilityprofessionals.org/files/ProductStewardshipInsight.pdf>.

EPP's ongoing involvement may be needed to ensure that successful standards remain leadership standards. As the same industry stakeholder noted, "Carrying the burden is onerous; it gets harder and harder as time goes on, because companies tend to do the easier things first." For example, now that a majority of NSF 140 certified carpet meets the highest level (platinum), it may be time to revisit the criteria for platinum certification to ensure that NSF 140 remains a leadership standard.

Ongoing involvement by EPP staff may also be needed to prevent backsliding. As noted above, since the initial version of IEEE 1680.2 was published, some industry stakeholders have sought to remove the requirement for products to meet Energy Star specifications. EPA has held firm on this issue and has so far managed to prevent this change from occurring. However, this example illustrates the importance of EPP continuing to be involved in standards committees even after the initial version becomes "final." Similarly, one of the APEX/ASTM Green Meetings and Events standards stakeholders stated that the current version of the standards is "too rigorous," but went on to state, "This is just the first cut, so we can revisit it later."

QUESTION 13: EPP EFFECTS ON THE MARKETPLACE

Question 13 asks, "How has EPP affected the availability of environmentally preferable goods and services in the marketplace?" The answer to this question is influenced by all of the factors covered in Evaluation Questions 10-12. Thus, this section briefly summarizes relevant key findings for the previous evaluation questions, organized by EPP product/service category:

- **Electronics:** EPEAT is a major force in the electronics sector. A number of cities, states, universities, businesses, and other non-federal purchasers inside and outside of the U.S. have adopted EPEAT, and most if not all major manufacturers participate in EPEAT, including the top five computer companies worldwide and in the U.S. (as of 2010). EPEAT's market presence has grown markedly since the program's inception. More than 50 million EPEAT certified products were purchased in the U.S. in 2010, and nearly 100 million worldwide. EPEAT's total sales and market share of laptop computers, in particular, have grown dramatically. U.S. purchases of EPEAT certified laptops tripled from 10 million units in 2007 to 32 million units in 2010; U.S. market share increased from 35% to 72% over the same time period. EPEAT's total sales and market share of desktop computers and monitors have fallen, but this reflects the broad market shift away from desktops and towards laptops; total sales across all EPEAT products have continued to increase. As calculated by the EEBC and reported in EPEAT's annual benefits reports, the environmental benefits of EPEAT purchases are substantial.
- **Building and construction products:** The NSF 140 carpet standard and BIFMA e3/Level furniture standard have gained traction with non-federal purchasers and have enjoyed widespread adoption by manufacturers. At least 13 states and two universities have adopted NSF 140, and at least two states are specifying to BIFMA e3/Level. The 13 manufacturers of NSF 140 certified carpet account for a clear majority of the global carpet market. The 48 companies with products certified under BIFMA e3/Level account for about 45% of BIFMA members, and these 110 BIFMA members produce an estimated 80% of office furniture sold in North America. However, the survey results indicate more limited use of the BIFMA e3/Level standard by federal purchasers. NSF 332 (resilient flooring) and ULE ISR 100 (gypsum board) have been less successful in gaining adoption by manufacturers, although the two largest U.S. gypsum board companies, which are responsible for a majority of the

market, certify to ULE ISR 100. Quantitative data are not available on total sales or market share of environmentally preferable building and construction products.

- **Hospitality and travel services:** Quantitative data are not available on the use of the ASTM Green Meetings and Events standards, which were only approved in 2012. However, at least two states are already using hospitality and travel tools developed by EPP. Interviews provided some anecdotal evidence that event planners are beginning to use the ASTM standards, and expect more uptake in the future. However, if the federal government does not use the standards, it may limit their use by event planners and other industry participants.

The evaluation identified several factors contributing to the market success of voluntary standards, including: market demand drivers (e.g., including certified products in GSA Schedules); history and dynamics within specific sectors; market awareness and clarity around standards and ecolabels; and inclusion in Executive Orders and the Federal Acquisition Regulation.

CHAPTER 4 | RECOMMENDATIONS

Based on the findings of the evaluation, IEC presents recommendations below. For recommendation areas where EPP has a large degree of control over outcomes, we frame recommendations as EPP “should” undertake activities that the evaluation findings suggest are critical; we say that EPP “should consider” undertaking activities that are not critical. However, several of the recommendations below address challenges that the EPP Program has limited control over, including 1) advancing the implementation and use of EPA’s forthcoming guidelines for evaluating environmental standards and ecolabels, which will result in a list of select voluntary consensus standards recommended for use in federal procurement, and 2) updating procurement systems used by other federal agencies to track green purchasing. We make recommendations in these two areas because they are very important to fulfilling EPP’s mission and demonstrating the program’s impact. Although EPP has limited control over outcomes in these two areas, we think that limited, if any, progress will be made in these areas without EPP’s involvement. In these two areas, we often frame recommendations as EPP working with other agencies, playing a leadership role, and advocating for change. This work can entail different activities depending on the context, but in general we are referring to EPP leading the coordination of interagency work on these issues, and EPP regularly communicating about the importance of these issues with decision-makers within EPA and outside of the Agency. EPP is already demonstrating this type of leadership in advancing the guidelines for evaluating standards and ecolabels; we suggest that EPP engage in similar work to overcome procurement data challenges.

EPP STANDARDS DEVELOPMENT AND PROMOTION

- The federal government should develop a list of recommended environmental standards and ecolabels for use in federal procurement to: overcome informational barriers to green purchasing among federal buyers by identifying recognized standards and certified products on federal procurement sites; clarify the landscape of standards for non-federal buyers and subsequently reduce greenwashing; and to allow EPP to promote the voluntary consensus standards that it helps to develop. As such, **EPP should continue its leadership role in discussions of formal guidelines for evaluating environmental standards and ecolabels** that can lead to the development of the above list.
- **If the guidelines process moves ahead in 2013,¹⁵⁶ and leads to the development of a widely utilized and referenced list of environmental standards and ecolabels, then EPP should continue to participate in the development of new voluntary consensus standards on the same scale as in recent years, resources permitting.** Given the lessons learned from the evaluation regarding successful standards, we recommend that EPP apply the following factors when selecting future product categories and standards development processes to engage in:

¹⁵⁶ EPA published draft guidelines for public comment (<http://www.epa.gov/epp/draftGuidelines/>) on November 20, 2013, as this report was being finalized.

- Positive market success factors identified in this evaluation;
- Potentially high environmental benefit relative to other product categories; and
- Availability of a standards development organization appropriate for the particular standard being considered (in terms of relevance, policies and procedures, etc.).
- **If the guidelines process is not finalized in 2014, or results in a list that is not widely used or referenced outside of EPA, then EPP should narrow its participation in new voluntary consensus standards development moving forward.** Specifically, EPP should focus on product categories that have positive market success factors and have a consumer audience. These product categories are most likely to have green standards succeed, in terms of market penetration, without federal recognition and promotion. EPP may want to consider developing federal standards (i.e., such as Energy Star and WaterSense) for product categories that do not meet these criteria.
- **If the guidelines are finalized, EPP should develop and execute a promotion campaign for federally recognized standards that emerge from the process and that EPP supports,** perhaps in collaboration with GSA and other federal partners. Survey results from this evaluation indicate that EPEAT registered products and building and construction standards are utilized by less than one-third of federal purchasers that report buying relevant products. We would expect that more purchasers would procure more certified products once they are clearly identified in federal procurement systems, but promotion may also be necessary to make substantial progress toward the 95% green procurement requirement.
- **EPP should continue to remain engaged with standards that it has worked on to date, to ensure that environmental considerations are appropriately addressed as standards are revised.** Stakeholders have raised concerns about the potential for standards to be weakened over time with respect to environmental protectiveness if EPP does not stay involved.
- **Given that inclusion in the EO 13514 and FAR were key to EPEAT's success, EPP should work with GSA, CEQ, OFEE, and other relevant agencies to advocate for including federally recognized standards in the FAR.**
- In future standards development processes, **EPP should ensure that all EPA staff involved in developing the standard, and ideally all federal staff, engage in an upfront dialog to ensure a shared understanding of how the process will work and the federal goals for the standard.** Lack of upfront agreement hindered travel and hospitality standards processes in particular.
- **EPP should continue to work to include building and construction standards in GSA Schedules and in the USGBC LEED family of standards, which are key market drivers for this product category.** Currently, only the NSF 140 carpet standard is included in a GSA Schedule, and LEED has not incorporated any of the building and construction standards that EPP has worked on in a meaningful way.

OTHER EPP RESOURCES FOR PURCHASERS

- Given that purchasers rely more on resources developed by their own agencies than on EPP resources, **EPP should consider reviewing other agencies' purchasing policies and procedures to see if they generally comport with EPP's model policies, contract language, and specifications.**

If not, EPP should reach out to agencies to inform them about EPP tools and how they may be beneficial in helping agencies reach the 95% green procurement requirement contained in EO 13514. If EPP undertakes this review, it should prioritize agencies according to their level of purchasing (i.e., focus on the largest purchasers) and extent of purchasing in sectors for which EPP has developed standards, tools, and resources.

- **EPP should update its website to ensure that content is current, and to provide information on federally recognized standards that it has helped to develop.** The survey found that EPP’s website is the EPP resource that federal purchasers report using the most.

ADDITIONAL RESEARCH

- Currently, no existing methodology or calculator exists to quantify the environmental benefits of purchasing greener building and construction products, which limits EPP’s understanding of its impact in this area. Thus, we recommend that **EPP should develop environmental benefits calculators for building and construction products that the program works on.**
- Similarly, no existing methodology or calculator existing to quantify the environmental benefits of purchasing greener travel and hospitality services, which will limit EPP’s understanding of its impact in this area in the future. Thus, we recommend that **EPP should work to develop a methodology or calculator for travel and hospitality, in particular for capturing the energy savings and GHG emission reductions associated with greener air travel (or avoided air travel).** The work already developed by EPP under the City Pairs program may provide a foundation for developing a methodology or calculator.
- Federal purchasers are generally instructed to purchase goods and services that provide the “best value” to the government. Factors included in making a best value determination can include initial price and several other factors including past performance, product lifespan, product warranties, and environmental and energy efficiency considerations.¹⁵⁷ To analyze price and energy efficiency together, the purchaser would need to know the lifecycle cost of the product, factoring in energy use. Most simply, a lifecycle cost analysis would entail adding the initial price of the product to the projected cost of energy use of the product over the product’s lifespan. The survey results for this evaluation found that approximately one-third of purchasers emphasize first costs over lifecycle costs in purchasing decisions. It can be difficult and time-consuming for purchasers to estimate lifecycle costs; purchases may need to research product energy use and lifespans, and perform some mathematical calculations. Thus, **to address the issue of lifecycle costs and simplify the process for purchasers, EPP should consider supporting analyses designed to develop a recommended price premium allowance for first costs, for product categories such as electronics where significant energy use occurs during the use of the product.** Ultimately, these allowances could be programmed into procurement systems so they are clearly visible to purchasers.
- **EPP should consider supporting additional research to better understand the market penetration of EPP standards in the domestic private sector.** Existing data and literature provide good insights only for market penetration among states and institutions of higher learning (with the exception of EPEAT).

¹⁵⁷ Federal Acquisition Regulation, Section 8.405-1, available at: <http://www.acquisition.gov/far/current/pdf/FAR.pdf>

- **EPP should consider supporting additional research to understand if and/or how the building and construction standards that it helped to develop could be marketed internationally** (researching international markets was out of the scope of this evaluation).
- **EPP should consider conducting limited additional research to understand the limited use of the BIFMA standard among federal purchasers, despite generally positive market factors, and to investigate whether BIFMA uptake is higher in the private sector.** We hypothesize that BIFMA may have higher uptake in the private sector because furniture is the least commoditized of all products included in this evaluation, and BIFMA may be more popular among higher-end commercial buyers and consumers.
- **EPP should consider conducting additional research to understand the program’s indirect influence and spillover effects.** This evaluation was not able to probe the indirect or spillover effects of EPP’s activities, although we have indications that these effects may be substantial. EPP’s diverse audiences – including federal agencies, purchasing managers, procurement staff, state and institutional buyers, manufacturers, suppliers, vendors, and the public – constitute a “network” through which EPP disseminates information and tools beyond the confines of the program. Innovative evaluation techniques, such as Social Network Analysis (SNA), may help EPP understand how information flows from the program to its intended audiences.¹⁵⁸
- The Federal Acquisition Institute (FAI), which administered the federal purchaser survey used for this evaluation, provides training for federal procurement staff that covers incorporating green criteria into purchasing. **EPP should work with FAI to ensure that FAI’s training reflects the barriers identified in the federal purchaser survey.**

PROCUREMENT DATA RECOMMENDATIONS

- **EPP should work with OARM and other federal agencies to facilitate tracking of green product and service sales to the federal government via comprehensive systems updating. Barring this change, the federal government will not be able to fully assess its performance against the 95% green procurement requirement included in EO 13514, and EPP will not be able to assess its own impact in a comprehensive manner, outside of EPEAT.**
 - EPP should work with OARM to update EPA’s EAS procurement system, and any other relevant procurement systems, to facilitate tracking of green product sales to the Agency.
 - EPP should advocate for updating federal procurement systems to facilitate tracking of green product sales, and specifically tracking of all green standards and ecolabels recognized by the

¹⁵⁸ SNA maps relationships and flows of information and knowledge between people, groups, or organizations. (Presentation by Chris Ellis, National Oceanic and Atmospheric Administration (NOAA), “Social Network Analysis and Evaluation,” 2010 Environmental Networking Evaluators Forum, Washington D.C.) SNA typically relies on surveys of individuals within a network to understand with whom they are collaborating, on whom they rely for information, and what types of information they have gathered. The information gathered through the surveys is then mapped to show the pattern and strength of information flows through a network. This analysis can then be repeated after a period of time to assess how information flows have changed. Applying SNA over time allows a series of “snapshots” of network structure, which could logically be related to immediate program outcomes and be correlated with program activities and outputs. (However SNA does not prove that changes in network structure are the result of program impacts.)

federal government.¹⁵⁹ Although all procurement systems should be updated, EPP should prioritize working with agencies with high levels of purchasing: GSA Advantage!; DOD EMALL; and internal procurement systems within DHS, HHS, DOE, and other agencies with relatively high levels of purchasing.

- EPP should work with GSA to update the Federal Procurement Data System (FPDS-NG), which stores all federal procurements over \$3000, to store green attributes associated with purchasing data (i.e., the environmental standard or ecolabel that purchased products or services are certified to). Updating FPDS will enable the federal government to manage green purchasing data from all of the government’s procurement systems in one central database, facilitating analysis of green purchasing data moving forward.
- EPP should inform OMB about problems encountered with their data on government EPEAT and non-EPEAT purchases, which are used for official reporting purposes. IEC does not have enough information about OMB’s data collection and QA/QC process to diagnose the root cause of the problems, but our review of the OMB data in conjunction with manufacturer-supplied sources of EPEAT data indicates that several of OMB’s data points do not accurately reflect actual government purchases. If the above procurement data recommendations are implemented, OMB will have access to comprehensive federal purchasing data on EPEAT and non-EPEAT products, directly from federal procurement systems, and will no longer need to ask agencies to self-report EPEAT and non-EPEAT purchases. As an interim measure, OMB and EPP could consider asking the Green Electronics Council (GEC) to gather data on sales of non-EPEAT purchases to the federal government, along with the EPEAT sales data that GEC already collects in collaboration with the Information Technology Industry Council (ITI). However, a potential barrier to this approach may be GEC/ITI’s ability to gather data that is not covered by manufacturers’ agreements with EPEAT.

MEASUREMENT RECOMMENDATION

- Evaluation Question 8 asked about the cause of apparent “backsliding” by FEC partners. IEC’s analysis showed that actual backsliding was minimal, and the apparent backsliding was actually due to reporting fluctuations and changes in the number of monitors in use. Using proportions as part of FEC metrics would prevent this false appearance of backsliding. Thus, FEC should track and report proportion-based annual metrics to PPD, in addition to the estimated energy savings it has been reporting:
 - The percentage of computers and monitors, across all FEC partner facilities, that is Energy Star-enabled.
 - The percentage of computers, monitors, and printers, across all FEC partner facilities, that is disposed of through reuse, recycling, landfilling, and unknown disposition.
 - For the new life extension area, the average lifespan of computers, monitors, and printers across all FEC partner facilities.

¹⁵⁹ See recommendation on Section 13 for discussion on the need to expand standards and ecolabels recognized by the federal government to include third-party standards and ecolabels.

We recommend that PPD use only proportion-based measures to assess FEC’s performance because absolute energy savings are driven by several factors in addition to performance of FEC facilities, including the number of FEC reporters in a given year and annual fluctuations in equipment use. However, we understand that FEC and PPD must continue to report FEC data on existing measures because FEC data are aggregated with data from other programs to assess progress on specific measures included in EPA’s Strategic Plan.¹⁶⁰

¹⁶⁰ As noted previously, after IEC completed this evaluation, EPA decided to undertake substantial changes to the FEC program model. As a result, some of the recommendations regarding the FEC appearing in this report may no longer be applicable to the program in its current form. Nonetheless, we have left the recommendations in our report unchanged in order to more accurately document our evaluation of the FEC as it existed at the time of our analysis.