ENVIRONMENTAL BENEFITS OF 2011 EPEAT® PURCHASING

Continued Global Uptake and Positive Environmental Impact

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Executive Summary and Report documents are available at http://www.epeat.net/learn-more/environmental-benefits/

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EXECUTIVE SUMMARY

Over six years, the EPEAT green electronics rating system has become the definitive tool for purchasers seeking environmentally preferable electronics. EPEAT's breadth, depth and geographic reach have made it one of the most widely used and trusted systems worldwide for assessing product environmental performance in the IT sector. The roster of private and public purchasers around the world using EPEAT to "green" their IT purchases continues to grow, increasing interest among consumers has motivated EPEAT's gradual entry into the consumer market, and international demand continues to support the system's geographic reach.

Beginning in July 2006, the EPEAT program has evolved from three participating manufacturers—known in EPEAT as "Subscribers"—to 50, and from 60 registered products sold in the US to over 3000 unique products registered and sold in 41 countries worldwide.

The universe of EPEAT products is expanding, with new standards for imaging equipment and televisions completed in 2012 and opening for business in early 2013. Development of a new server standard and a revision of the existing PC/Display standard are both underway.

International usage has spread rapidly, with purchasers in Europe, Asia and Latin America increasingly using EPEAT to identify and specify green IT products. In 2011, United States' sales of EPEAT registered products accounted for only slightly over 50% of the total products on the registry - illustrating the trend.

This is the sixth annual report on the environmental benefits resulting from the purchase of electronic products registered and evaluated under the EPEAT program.

EPEAT Essentials

EPEAT is the definitive global rating system for greener electronics, covering the most products from the broadest range of manufacturers. Only EPEAT combines comprehensive criteria including, but not limited to, design, production, energy use, and recycling with ongoing independent verification of manufacturer claims.

Products are rated in EPEAT according to a combination of more than 50 required and optional lifecycle performance criteria. PC and display products qualify for Bronze rating by meeting 23 required criteria. To qualify for Silver and Gold rating, products must meet 50% and 75% respectively, of the optional criteria. The EPEAT Gold designation is the hallmark of the highest environmental performance, meeting an extensive set of criteria. EPEAT Silver and Bronze products meet a broad set of criteria, making them environmentally responsible purchasing options.

Products on the EPEAT registry are subject to unannounced audits at any time, and results are publicly reported—this ongoing verification system helps ensure environmental criteria are being met as declared. (See Appendix B for more on verification.)

Finally, by providing a central product registry, EPEAT enables purchasers to view and compare the specific environmental performance of registered products from all participating manufacturers—encouraging manufacturers to compete to meet higher numbers of criteria and qualify products at higher levels. This head to head comparison and competition pushes innovation and environmental excellence forward.

Manufacturers of all sizes participate in EPEAT—from Fortune 50 global leaders, including all 10 top global producers, to small regional companies. The system provides manufacturers with guidance for developing environmentally preferable products that will meet market demand.

EPEAT's environmental performance criteria, registration and verification processes, are embodied in the Institute of Electrical and Electronic Engineers (IEEE) 1680 and 1680.1 (PC/Display criteria) standards, supplemented now by IEEE 1680.2 (Imaging Equipment) and 1680.3 (Televisions). All EPEAT standards are developed in open, consensus-based, multi-stakeholder processes. The standards development processes have been, supported by the U.S. Environmental Protection Agency (US EPA). Those processes include participants from the public and private purchasing sectors, manufacturers, environmental advocates, recyclers, technology researchers and other interested parties. The deliberations for each product standard have lasted several years.

Bringing these varied constituencies' needs and perspectives to bear on standard development enables the resulting system not only to address significant environmental issues, but also to fit within the existing structures and practices of the marketplace—making it easy to use and thus widely adopted.

As a result, EPEAT has revolutionized the environmental playing field for the electronic product sector, with very broad participation by manufacturers and purchasers of all sizes and an extensive registry of products that meet the system's demanding criteria.

2011 EPEAT Registry Growth

2011 witnessed significant growth in EPEAT product registrations, with particularly rapid growth in Gold level registrations.

There are two ways to assess the EPEAT registry's growth—by unique product count and by registrations.

Unique product count reveals the number of individual products registered in the system, and offers a rough indicator of the volume of products on the market today that are able to meet EPEAT's stringent environmental performance requirements.

The number of unique products registered in EPEAT continued to grow in 2011.

- **On January 1 2011, 46 manufacturers had some 2830 unique products registered across the system's 41 covered countries.**
- **By June 1, 49 manufacturers had 3176 unique products registered.**
- **By December 1, 2011, 50 manufacturers were registering 3671 unique products in total.**

Volume of product registrations— i.e. instances of a given product being registered in any of the 41 covered countries - is the alternate way to assess EPEAT's scope. Registration numbers are a useful indicator of the overall volume of EPEAT registered products available to purchasers in different markets around the world.

In 2011, the number of country-specific registrations remained fairly steady, following rapid growth in 2009 after implementation of the country registration system (see Appendix E).

- **In January 2011, there were 2248 product registrations for the US and 18,662 outside the US - 20,910 registrations in total.**
- **By December 2011, there were 2833 US registrations and 18,196 product registrations across the 41 other covered countries. - 21,029 EPEAT product registrations in total.**

In total, 50 manufacturers participated in EPEAT during 2011.

2011 EPEAT Registered Product Sales

EPEAT's manufacturer Subscribers reported worldwide sales of 120,810,978 EPEAT registered products in 2011.

Because EPEAT only covers a portion of the world's countries (41 in 2011, 42 currently), we can only roughly compare unit sales of EPEAT registered product to total products sold worldwide. However the comparison gives a useful indication of the prevalence of EPEAT registered products in the global market.[1]

Sales of EPEAT registered products increased significantly worldwide – by nearly 30% over 2010 unit sales - to more than 120 million units.

Reviewing 2011 EPEAT registered product sales in comparison with previous years' data and with 2011 data on worldwide and regional unit sales[1] reveals that:

- **Sales of EPEAT registered products increased significantly worldwide – by nearly 30% over 2010 sales - to more than 120 million units.**
- **Sales of EPEAT registered PCs (all types) constituted over 25% of worldwide PC unit sales.**[1]
- **Worldwide, EPEAT registered Notebook sales increased modestly – by 7% - but at nearly 66 million units, constituted 32% of total world notebook sales.**[1]
- **Notebook sales increased by 21% in countries outside the US and Canada.**
- **Sales of EPEAT registered products in the US increased 23% over 2010, with sales exceeding 62 million products.**
- **The US share of total EPEAT registered product sales diminished to just over half of EPEAT's reported worldwide sales - reflecting rapid uptake outside the US market.**

1 Thanks to Gartner for worldwide unit sales data

2010 EPEAT Environmental Benefits

The lifecycle environmental benefits of the reported EPEAT registered product sales are calculated using the Electronics Environmental Benefits Calculator (EEBC). The EEBC was originally developed by the University of Tennessee Center for Clean Products under a grant from the US EPA, and revised several times under EPA contract. (See methodology section - Appendix A - for more detail.) This calculation reveals remarkable lifecycle environmental benefits linked to 2011 EPEAT purchasing.

120 million EPEAT registered products sold in 2011 will eliminate enough mercury to fill a million fever thermometers.

Over their lifetime, compared to products that do not meet EPEAT criteria, the 120 million EPEAT registered PCs and monitors purchased worldwide in 2011 will:

- **Reduce use of primary materials by 4.4 million metric tons, equivalent to the weight of 14 Empire State Buildings**
- **Reduce use of toxic materials, including mercury, by 1,381 metric tons, equivalent to the weight of 266 elephants**
- **Eliminate use of enough mercury to fill 1,007,761 household mercury fever thermometers**
- **Avoid the disposal of 74,082 metric tons of hazardous waste, equivalent to the weight of 7 Eiffel Towers**
- **Eliminate the equivalent of more than 76,262 US households' annual solid waste—50,976 metric tons**

In addition, due to EPEAT's requirement that registered products meet the latest ENERGY STAR efficiency specifications, these products will consume less energy throughout their useful life, resulting in:

- **Savings of over 12 billion kWh of electricity—enough to power 963,716 US homes for a year**
- **Avoidance of 9 million metric tons of air emissions (including greenhouse gas emissions) and over 16 thousand metric tons of water pollutant emissions**
- **Reduction of over 2.2 million metric tons of greenhouse gas emissions—equivalent to taking over 1.6 million average US passenger cars off the road for a year**

Conclusion

In its sixth year the EPEAT system continued to motivate, communicate and measure reduction of electronic products' environmental impact. The system's constructive role will increase in 2012–2013, as EPEAT expands to Imaging Equipment and Televisions, adds new geographies and as the existing PC/Display standard is updated to increase the breadth and challenge of its criteria.

For thousands of purchasers who use the system worldwide, EPEAT simply works - enabling them to easily and effectively select products that reduce their organizations' environmental impact. The fact that dozens of manufacturers of all sizes and multiple nationalities redesign products and services to satisfy EPEAT's demanding environmental performance criteria demonstrates that EPEAT is a hugely successful driver of change in the electronics sector. The benefits quantified in this report reflect the concrete outcome of that success.

For more information, visit www.epeat.net.

INTRODUCTION

Six years ago, the EPEAT green electronics rating system—51 environmental performance criteria for PC and Display products, a central registry where products meeting those criteria were listed, and a verification system for vetting product declarations—established a user-friendly scheme designed and guided by all stakeholders and accessible to purchasers and manufacturers of any size. Since then, EPEAT has revolutionized the environmental playing field for the electronics sector, with very broad manufacturer and purchaser participation and an extensive registry of products that meet the system's demanding criteria.

EPEAT has become the definitive global rating system for greener electronics, covering the most products from the broadest range of manufacturers across the most geographic regions. Only EPEAT combines comprehensive criteria for design, production, energy use and recycling with ongoing independent verification of manufacturer claims.

EPEAT's environmental performance criteria, registration and verification processes, embodied in the Institute of Electrical and Electronics Engineers 1680 family of standards for the Environmental Assessment of Personal Computer Products ("IEEE 1680"), were developed through an open, consensus-based process that included participants from the public and private purchasing sectors, manufacturers, environmental advocates, recyclers, technology researchers and other interested parties. Bringing these varied constituencies' needs and perspectives to bear on standard development enabled the resulting system not only to address significant environmental issues, but also to fit within the existing structures and practices of the marketplace—making it easy to use and thus widely adopted.

EPEAT provides manufacturers with guidance for development of environmentally preferable products that will meet market demand, while not restricting their strategic choices about how to design and develop products and services to meet EPEAT criteria and achieve specific ratings. Manufacturers of all sizes participate in EPEAT—from Fortune 50 global leaders, including all 10 top global producers, to small regional companies.

EPEAT's central product registry enables purchasers to view and compare the specific environmental performance of registered products from all participating manufacturers—encouraging manufacturers to compete to meet higher numbers of criteria and qualify products at higher levels, which pushes innovation and environmental excellence forward.

For the past six years, EPEAT has offered purchasers a method to assess the lifecycle environmental impacts of personal computer products—including desktops, laptops, integrated systems, workstations, and thin client devices—and displays. In 2012-2013 the EPEAT system will expand significantly; Imaging Equipment and Television standards developed through the Institute of Electrical and Electronics Engineers (IEEE) are now final and in the process of implementation in EPEAT. The Imaging Equipment registry is scheduled to open to the public in January 2013, and the Televisions registry is slated to open in March 2013. The product portfolio is expanding further through development of a standard for servers, currently underway. And the scheduled update of the PC and Display standard will 'move the goalposts' to encourage and reward innovation in sustainable product design and delivery.

Products on the EPEAT registry are subject to unannounced audits at any time, and results are publicly reported.

Products that meet EPEAT criteria reflect reduced environmental impact across the product life cycle— from fewer toxins in manufacturing to efficient operation and easier recycling. Products are rated Bronze, Silver or Gold in EPEAT according to a combination of required and optional criteria. PC and Display products must meet 23 required criteria to be registered with EPEAT, and qualify for higher ratings levels by meeting 28 optional criteria. This design ensures that to become registered, products must achieve significant environmental improvements over average products on the market, and then allows products that represent innovation and sector leadership to receive higher ratings by meeting more challenging environmental performance criteria. The EPEAT Gold rating is the hallmark of the highest environmental performance, designating products that meet an extensive set of criteria. EPEAT Silver and Bronze products meet a broad set of criteria, making them an environmentally responsible purchasing option.

Products on the EPEAT registry are subject to unannounced audits at any time, and issues are publicly reported—this ongoing verification system helps ensure environmental criteria are being met as declared. (See Appendix B for more detail on EPEAT system requirements and processes.)

Product registration in EPEAT is on a country by country basis, because the system contains service and support requirements which must be met on a local level.

All products on the EPEAT registry must meet the requirements of the IEEE 1680 standards, which remain the same globally, but manufacturers must support their product declarations locally to ensure conformity with the declared criteria. This country by country registration expansion was launched in 2009 with 40 covered countries— all EU and European Free Trade Area (EFTA) countries, China, Japan, Taiwan, Australia, New Zealand, Brazil and Mexico, in addition to the US and Canada. Singapore joined the system in 2010, through the Country Addition process, which is open to all countries that can demonstrate the capacity to support the system requirements. (During 2012, Costa Rica joined the system, to bring the number of covered countries to 42).

This country-specific application of system requirements enables EPEAT to avoid one of the significant pitfalls of global environmental certification systems. Ordinarily, the integration of stringent 'green' criteria into procurement may privilege large multinational suppliers in regions where local firms do not possess advanced skills in environmental product design and development. Since EPEAT requirements are applied and vetted on a local basis, and integrate service and support requirements, they can offer a way out of this conundrum by spurring growth of businesses that provide support functions as part of the global standard's local application. In this way, EPEAT can support environmental improvements to local and regional businesses, as well as to global organizations.

TABLE 1: EPEAT Covered Countries 2011

United States	Estonia	Lithuania	Singapore
Australia	France	Liechtenstein	Slovakia
Austria	Finland	Luxembourg	Slovenia
Belgium	Germany	Malta	Spain
Brazil	Greece	Mexico	Sweden
Bulgaria	Hungary	Netherlands	Switzerland
Canada	Iceland	New Zealand	Taiwan
China	Ireland	Norway	United Kingdom
Cypress	Italy	Poland	
Czech Republic	Japan	Portugal	
Denmark	Latvia	Romania	

EPEAT GROWTH

Since July 2006, the EPEAT program has evolved from three participating manufacturers—known in EPEAT as "Subscribers"—to 50, and from 60 registered products sold in the US to over 3000 unique products registered and sold in 42 countries worldwide in 2012. The roster of private and public purchasers around the world using EPEAT to green their IT purchases continues to grow, and EPEAT product registrations continued to grow In 2011 to meet this demand.

2011 Growth in EPEAT Registration and Participation

There are two ways to assess the EPEAT registry's growth—by unique product count and by registrations.

Unique Products The unique product count reveals the number of individual products registered in the EPEAT system, and offers a rough indicator of the volume of products on the market today that are able to meet EPEAT's stringent environmental performance requirements.

The number of unique products registered in EPEAT continued to grow in 2011.

- On January 1 2011, 46 manufacturers had some 2830 unique products registered across the system's 41 covered countries.
- By June 1, 49 manufacturers had 3176 unique products registered.
- By December 1, 2011, 50 manufacturers were registering 3671 unique products in total.

Product Registrations Each unique product could be registered in as many as 41 different countries in 2011. The number of such country-specific registrations is the alternate way to assess EPEAT's scope, and is a useful indicator of the overall volume of EPEAT registered products available to purchasers in different markets around the world.

Numbers of product registrations— i.e. each instance of a given product being registered in a specific country—remained steady overall in 2011 (see Appendix E). (A one time reduction in registration numbers occurred early in 2011 when a single large Subscriber archived multiple products that were registered globally. Archiving most often takes place when products are no longer sold by the Subscriber.)

- In January 2011, there were 2248 product registrations for the US and 18,662 outside the US - 20,910 registrations in total.
- By December 2011, there were 2833 US registrations and 18,196 product registrations across the 40 other countries covered by the system - 21,029 EPEAT product registrations in total.

50 manufacturers participated in EPEAT during 2011.

FIGURE 1: 2011 EPEAT Registry Growth - Unique Products and Registrations

Registration growth was most marked in the international (non-North American) markets—likely reflecting increasing use of EPEAT by national and state governments, and uptake by local municipal purchasers in countries like Australia, Brazil, China and France, and the resulting increase in awareness among the broader purchasing and supplier communities.

Growth Since Inception Growth in 2011 is consistent with the EPEAT registry's continual expansion since 2006—though it slowed somewhat in 2011 compared to 2010, which saw enormous uptake internationally with the new country-specific registration requirements. EPEAT's ongoing growth has persisted through updates of the EnergyStar specifications in 2007, 2009 and 2011—each of which saw multiple products removed from the registry because they did not meet the new ENERGY STAR specifications. Manufacturer growth slowed somewhat this year—but only because all major manufacturers in the PC/Display sector already participate. Smaller regional manufacturers continue to join EPEAT, as customers in their geographies require EPEAT registered products.

FIGURE 2: EPEAT Growth 2006-2011 – By Unique Products and Gold Products

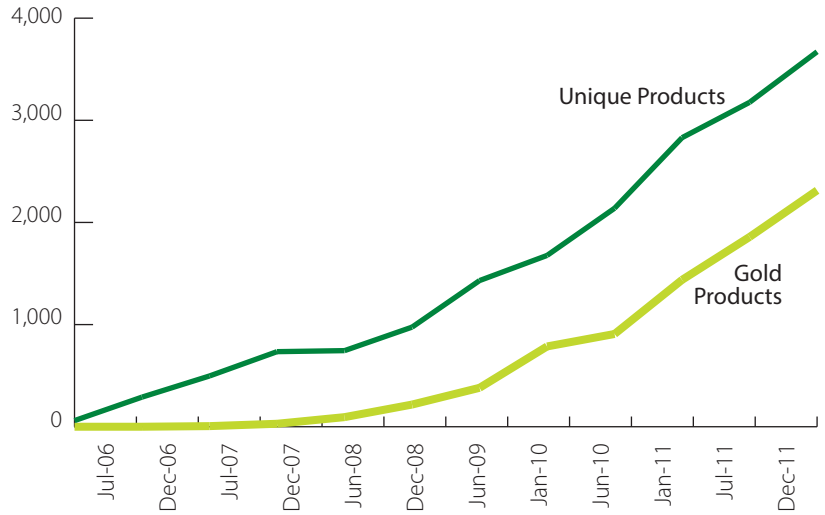
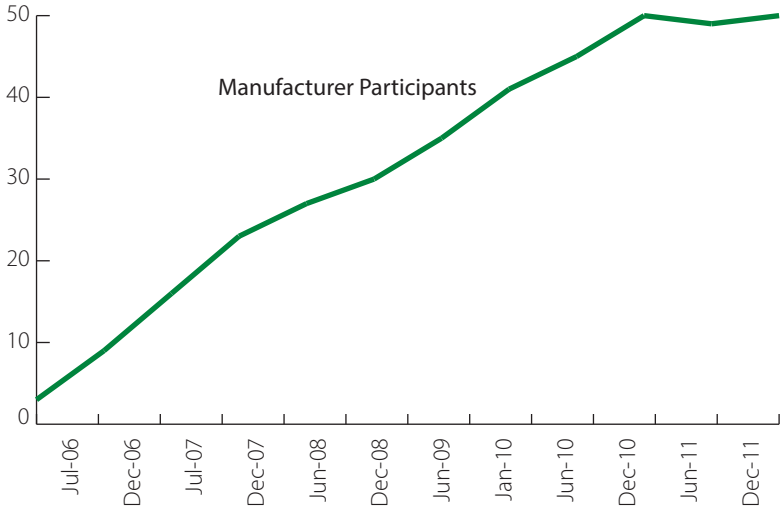


FIGURE 3: EPEAT Growth Since Inception – Manufacturer Participation



See Appendices F through G for detailed information on 2010 product registrations and manufacturer participation by country.

2011 SALES OF EPEAT REGISTERED PRODUCTS

Unit sales of EPEAT registered products in 2011 were very strong—increasing by nearly 30% over 2010 sales, to reach a total of 120,810,978 products purchased In 41 countries. These figures come from EPEAT's manufacturer Subscribers, who must report annually on their sales of all EPEAT registered products sold in covered countries where they actively register products, by ratings tier (Bronze/Silver/Gold). Table 3 below shows total unit sales worldwide for 2011.

TABLE 2: 2011 Worldwide Unit Sales of EPEAT Registered Products

Region	Desktops	Notebooks	Displays	Integrated Systems	Total
USA	5,444,736	31,319,287	17,048,046	8,733,543	62,545,611
Canada	531,823	2,613,031	1,610,848	575,418	5,331,119
ROW*	7,234,713	32,045,072	12,204,996	1,449,466	52,934,247
Eastern Europe	214,528	1,123,464	899,641	11,519	2,249,151
Western Europe	3,894,228	10,930,804	6,402,875	1,028,642	22,256,549
Total	**13,211,272**	**65,977,390**	**30,863,890**	**10,758,426**	**120,810,978**

Key findings on 2011 EPEAT Unit Sales :

- Combined 2011 purchases of all types of EPEAT registered PCs constituted over 30% of worldwide PC shipments in 2011, as reported by Gartner (120,801,978 of 352,499,530).[1]
- Sales of all EPEAT product types grew by 23% in the US, to over 62 million products. In Canada sales increased by 27%, to over 5.3 million EPEAT registered units.
- EPEAT registered products unit sales grew by over 60% In Eastern Europe in 2011, while Western Europe saw more modest 14% growth over 2010 sales figures.
- Overall, global sales outside the US and Canada increased by 40%.
- EPEAT continues to play a significant role in the notebook market. Reported EPEAT notebook sales increased by 21% in countries outside the US and Canada, with EPEAT registered products constituting over 30% of notebook sales worldwide.[1]
- Worldwide sales of EPEAT registered displays increased by more than 50% over 2010 sales.
- The US share of total EPEAT registered product sales diminished to just over half of EPEAT's reported worldwide sales - reflecting rapid uptake outside the US market.

The Rest Of World ("ROW") totals include the European sales numbers as well as sales numbers from covered countries In the Asia/Pacific region and Latin America.

(Appendix E contains specific 2011 purchase volumes for each product category by country.)

1 Thanks to Gartner for sharing worldwide PC unit sales data

EPEAT 2011 ENVIRONMENTAL BENEFITS

Using the Electronics Environmental Benefits Calculator (EEBC), developed as a means to assess the benefits of purchasing EPEAT registered products, we can estimate the total reductions in environmental impact connected to the lifetime use of the EPEAT registered products purchased in 2011, compared to products that do not meet the EPEAT criteria. Full methodology for both collection of sales data and calculation of the benefits results is detailed in Appendix A.

The tables on the following pages illustrate the environmental benefits of EPEAT purchasing by geography. The results reported in Table 4: Estimated Environmental Benefits of 2011 Worldwide EPEAT Purchasing, are based on evaluation of the environmental impacts resulting from total unit sales of more than 120 million EPEAT-registered products worldwide in 2011. (See Table 3 above for specific unit sales figures in each product category.)

Tables 5 and 6 show the benefits specific to the US and to the broad category "Rest of World"—which in EPEAT 2011 terms means Canada, all EU and EFTA countries, Japan, China, Singapore, Taiwan, Australia, New Zealand, Brazil and Mexico. Regional benefits calculations have been pulled out of the aggregated "Rest of World" to begin to better track benefits across regions with greater and lesser uptake of EPEAT purchasing.

It is important to note that the benefits enumerated in these tables accrue over the full product lifecycle. When purchasers specify and buy EPEAT registered notebooks, desktops, and monitors rather than "conventional products" that do not meet EPEAT criteria, environmental benefits are realized over the lifetime of those products and at a variety of endpoints.

For instance, when a purchaser selects a computer containing less toxic materials, fewer toxic substances extracted through mining are used, fewer will be employed in manufacturing (where they could result in worker exposure to health hazards), and fewer will be released into the environment at the end of the product's life to impact wildlife or human health, or to pollute natural resources.

Similarly, when a consumer buys a computer that (like all EPEAT registered products) meets ENERGY STAR energy efficiency specifications, the user benefits from reduced power consumption and reduced energy costs over the life of the product, but that reduced energy consumption also contributes to lowering the upstream material inputs and emissions associated with power generation.

Because EPEAT's underlying PC/Display standard (IEEE 1680.1) was designed to reduce duplicative effort and streamline environmental reporting, a number of EPEAT's environmental criteria align with the requirements of other programs or regulatory schemes, such as ENERGY STAR® and the EU's WEEE regulations. Therefore not every change in product design and delivery that enables EPEAT registration results from EPEAT alone. However, every EPEAT registered product purchase results in environmental benefits specific to that purchase. This report measures those benefits.

ESTIMATED EPEAT ENVIRONMENTAL BENEFITS BY REGION, 2011

Notes on benefits calculations adjustments for 2011: First, to eliminate any double counting of benefit, we have removed all toxics and hazardous waste reduction benefits from the European and Chinese calculations because products sold in the EU must meet RoHS and those sold in China are required to meet China RoHS. Second, because cost savings calculations in the current version of the EEBC are based on US factors, in the interest of accuracy we have only included cost benefits for the US sales. Similar cost benefits undoubtedly accrue to the rest of the countries covered by EPEAT, and we expect to eventually regionalize the calculator to be able to better account for cost saving on a country-specific basis.

TABLE 3: Estimated Environmental Benefits from 2011 Worldwide EPEAT Purchasing

Metric	Reductions	Equivalents
Electricity	12 million megawatt hours	The annual electricity consumption of 963,716 average us households
Primary Materials	4.4 million metric tons	The weight of 14 empire state buildings
Air Emissions (including greenhouse gases)	8.9 billion kg	8,919,250 metric tons
Greenhouse Gas Emissions	2.2 million MTCE	Removing 1,631,274 average us passenger cars from the road for a year
Water Emissions	16 million kg	16,052 metric tons
Toxic Materials (incl Hg)	1,381 metric tons	The weight of 266 elephants, including enough hg to fill 1,007,761 household fever thermometers
Solid Waste	50,976 metric tons	Annual solid waste generation of 27,262 us households
Hazardous Waste	74,082 metric tons	The weight of 7 eiffel towers

*METRIC TONS CARBON EQUIVALENT

TABLE 4: Estimated Environmental Benefits from 2011 United States EPEAT Purchasing

Metric	Reductions	Equivalents
Electricity	5.65 million megawatt hours	The annual electricity consumption of 442,861 average US households
Primary Materials	2.1 million metric tons	The weight of 6 Empire State Buildings
Air Emissions (including greenhouse gases)	4.1 million kg	4,085,676 metric tons
Greenhouse Gas Emissions	1,038 million MTCE	Removing 746,764 average US passenger cars from the road for a year
Water Emissions	7 million kg	7,460 metric tons
Toxic Materials (incl Hg)	1053 metric tons	The weight of 203 elephants, including enough Hg to fill 533,700 household mercury thermometers
Solid Waste	26,275 metric tons	Annual solid waste generation of 14,051 US households
Hazardous Waste	37,068 metric tons	The weight of 4 Eiffel Towers

*METRIC TONS CARBON EQUIVALENT

TABLE 5: Estimated Environmental Benefits from 2011 Rest of World EPEAT Purchasing

Metric	Reductions	Equivalents		
Electricity	6.1 million megawatt hours	The annual electricity consumption of	479,820	average US households
Canada	524 thousand megawatt hours		41,035	
Europe	3,303,000 million megawatt hours		258,676	
Latin America	965 thousand megawatt hours		75,652	
Asia/PAC	1.8 million megawatt hours		145,492	
Primary Materials	2.2 million metric tons	The weight of	7	Empire State Buildings
Canada	190 thousand metric tons		1	
Europe	1.2 million metric tons		4	
Latin America	352 thousand metric tons		1	
Asia/PAC	673 thousand metric tons		2	
Air Emissions (including greenhouse gases)	4.4 billion kg		4,454,254	metric tons
Canada	379 million kg		379,320	
Europe	2.4 billion kg		2,407,581	

Notes on EPEAT Regional Coverage:

Europe includes all EU and EFTA Countries

Asia/PAC includes China, Japan, Singapore, Taiwan, Australia and New Zealand

Latin America includes Brazil and Mexico

Metric	Reductions	Equivalents		
Air Emissions (including greenhouse gases) *continued*				
Latin America	708 million kg		709,076	
Asia/PAC	1.3 billion kg		1,337,597	
Greenhouse Gas Emissions	6.12 million MTCE	Removing	815,152	average US passenger cars from the road for a year
Canada	96 thousand MTCE		69,358	
Europe	613 thousand MTCE		440,825	
Latin America	180 thousand MTCE		130,014	
Asia/PAC	339 thousand MTCE		244,314	
Water Emissions	7.9 million kg		7,905	metric tons
Canada	686 thousand kg		687	
Europe	4.2 million kg		4,222	
Latin America	1.20 million kg		1,203	
Asia/PAC	2.4 million kg		2,480	

Notes on EPEAT Regional Coverage:

Europe includes all EU and EFTA Countries

Asia/PAC includes China, Japan, Singapore, Taiwan, Australia and New Zealand

Latin America includes Brazil and Mexico

Metric	Reductions	Equivalents					
Toxic Materials (incl Hg)	232 metric tons	The weight of	45	elephants,	Including enough mercury to fill	429,496	household mercury thermometers
Canada	95		18			44,565	
Europe	0.1					188,654	
Latin America	106		21			30,713	
Asia/PAC	125		24			210,128	

Notes on EPEAT Regional Coverage:

Europe includes all EU and EFTA Countries

Asia/PAC includes China, Japan, Singapore, Taiwan, Australia and New Zealand

Latin America includes Brazil and Mexico

ESTIMATED EPEAT ENVIRONMENTAL BENEFITS BY PRODUCT CATEGORY, 2011

EPEAT environmental benefits estimation in the EEBC is calculated by product type, based on the specific characteristics of desktops, notebooks and displays. The following tables illustrate the worldwide benefits for each product type sold in 2011, as another way of measuring EPEAT's positive environmental impact.

TABLE 6: Estimated Environmental Benefits from 2011 Worldwide EPEAT Desktop Purchasing

Metric	Reductions	Equivalents
Electricity	8.6 million megawatt hours	The annual electricity consumption of 677,106 average US households
Primary Materials	3.02 million metric tons	The weight of 9 Empire State Buildings
Air Emissions (including greenhouse gases)	5.8 billion kg	5,823,123 metric tons
Greenhouse Gas Emissions	1,458 million MTCE	Removing 1,048,946 average US passenger cars from the road for a year
Water Emissions	13 million kg	13,428 metric tons
Toxic Materials (incl Hg)	415 metric tons	The weight of 80 elephants (No significant Hg contained in Desktops)
Solid Waste	111,995 metric tons	Annual solid waste generation of 59,891 US households
Row	60,480	32,343
Canada	5,232	2,798
Europe	35,705	19,629
Latin America	7,711	4,124
Asia/PAC	16,062	8,590
Hazardous Waste	18,396 metric tons	The weight of 2 Eiffel Towers
Row	10,043	1
Canada	743	<1
Europe	5,673	<1
Latin America	2,046	<1
Asia/PAC	2,321	<1

TABLE 7: Estimated Environmental Benefits from 2011 Worldwide EPEAT Notebook Purchasing

Metric	Reductions	Equivalents
Electricity	2.6 million megawatt hours	The annual electricity consumption of 205,981 average US households
Primary Materials	933 thousand metric tons	The weight of 3 Empire State Buildings
Air Emissions (including greenhouse gases)	1.8 billion kg	1.8 million metric tons
Greenhouse Gas Emissions	456,773 million MTCE	Removing 328,398 average US passenger cars from the road for a year
Water Emissions	3.95 million kg	3,957 metric tons
Toxic Materials (incl Hg)	432 metric tons	The weight of 83 elephants, including enough mercury to fill 736245 household mercury thermometers
Solid Waste	29,535 metric tons	Annual solid waste generation of 15,794 US households
Hazardous Waste	41,373 metric tons	The weight of 4 Eiffel Towers

TABLE 8: Estimated Environmental Benefits from 2011 Worldwide EPEAT Display Purchasing

Metric	Reductions	Equivalents
Electricity	2.2 million megawatt hours	The annual electricity consumption of 172,938 average US households
Primary Materials	774,023 thousand metric tons	The weight of 2 Empire State Buildings
Air Emissions (including greenhouse gases)	1.52 billion kg	1.52 million metric tons
Greenhouse Gas Emissions	384,920 million MTCE	Removing 276,740 average US passenger cars from the road for a year
Water Emissions	4.1 million kg	4,132 metric tons
Toxic Materials (incl Hg)	532 metric tons	The weight of 102 elephants, including enough mercury to fill 523,172 household mercury thermometers
Solid Waste	20,196 metric tons	Annual solid waste generation of 10,799 US households
Hazardous Waste	14,213 metric tons	The weight of 1 Eiffel Tower

EPEAT CUMULATIVE SALES AND BENEFITS – 2006-2011

Since July 2006, nearly 532 million EPEAT registered products have been sold worldwide. Table 10 below shows the year-to-year and cumulative total reported sales of EPEAT registered products since the system's inception.

The environmental benefits of EPEAT purchasing have also burgeoned over time—and will continue to be realized throughout the life of all products sold since 2006. Table 11 shows the cumulative benefits of all reported EPEAT sales.

TABLE 9: Year-to-Year and Cumulative EPEAT Unit Sales Worldwide 2006–2011

Year	Desktops	Notebooks	Displays	Integrated Systems	Total
2006	12,100,081	8,858,208	15,602,431	Recorded w/Desktops	36,560,720
2007	35,865,425	24,156,128	48,709,354	1,196,680	109,927,587
2008	19,512,831	31,671,055	38,612,720	1,146,067	90,942,673
2009*	7,904,561	40,298,554	30,617,703	1,629,802	80,450,620
2010*	8,021,529	61,694,686	20,115,100	3,532,100	93,363,415
2011	13,211,275	65,997,390	30,863,890	10,758,426	120,810,978
Cumulative Total	**96,615,702**	**232,676,021**	**184,521,198**	**18,263,075**	**532,055,993**

*Changes in reporting took place in 2009; sales reporting were restricted to only those products sold in covered countries (from 200+ countries reporting prior to 2009 to 40 reporting in 2009 and 41 in 2010 and 2011.

TABLE 10: Total Estimated Benefits from Reported EPEAT Purchases 2006–2011

Metric	Reductions	Equivalents
Electricity	90.6 million megawatt hours	The annual electricity consumption of 6,570,250 average US households
Primary Materials	143 million metric tons	The weight of 421 Empire State Buildings
Air Emissions (including greenhouse gases)	9.2 billion kg	329,885,555 million metric tons
Greenhouse Gas Emissions	17 million MTCE	Removing 11,565,801 average US passenger cars from the road for a year
Water Emissions	689 million kg	689,195 metric tons
Toxic Materials (incl Hg)	9,738 metric tons	The weight of 1,704 elephants, including enough mercury to fill 2,338,881 household mercury thermometers
Solid Waste	166,976 metric tons	Annual solid waste generation of 85,793 US households
Hazardous Waste	394,082 metric tons	The weight of 43 Eiffel Towers

*2009 and 2010 benefits were calculated using ratings tier - improving accuracy of benefits estimates. The 2010 toxicity and hazardous waste calculations and benefits were adjusted to remove European toxicity benefits associated with RoHS.

NOTE ON EEBC BENEFITS ESTIMATES

The EEBC is an excellent tool and has been carefully reviewed by the US EPA and other independent analysts. However, like any lifecycle impact calculator, the EEBC tool employs methodological and data assumptions that are open to argument and improvement. In addition, data culled from the EEBC can be interpreted in a wide variety of ways. We encourage readers to carefully review the methodology described In Appendix A and in the EEBC itself in order to correctly interpret the results.

In addition, the EEBC only addresses a portion of the benefits that result from EPEAT purchasing. Some of the significant environmental benefits resulting from individual EPEAT criteria (such as ease of product disassembly, corporate performance requirements, or the required product takeback option) are not easily quantified and therefore are simply not addressed. Given these omissions, the real environmental benefits of the EPEAT system may actually be greater than those reflected in our calculations.

Please note that the EEBC was substantially revised In 2012 through a process managed by US EPA., and we have used that version - 3.1 - for this report's calculations. The process updated data sources, brought the ENERGY STAR assumptions up to date, and otherwise corrected, modernized and improved the calculator. The revisions affect the benefits linked to individual product types and EPEAT ratings tiers; however these changes are not uniform - some increase the estimated benefits and others decrease them. The bottom line - it's Important to be cautious about direct comparison from previous years to this one - as some changes in benefits may simply reflect changes to the tool.

Finally, several points provide general context for the environmental benefits reported here:

1) As noted earlier, manufacturers report their total sales of EPEAT-registered products—not only the sales to purchasers that required EPEAT.
2) Because EPEAT's underlying standard was designed to reduce duplicative effort and streamline environmental reporting, certain of EPEAT's environmental criteria are also requirements of other programs or regulatory schemes, including ENERGY STAR and the EU's RoHS and WEEE regulations. Therefore not all the environmental benefits reported here can be characterized as resulting solely from EPEAT.
3) We continue to refine the precision of our calculations. With the adjustment this year of the environmental benefits attributed to products sold in Europe and China, we have increased the accuracy of the benefits estimate; in future years we expect to continue such refinement with increasingly precise attribution of benefit.
4) EPEAT's role is to serve as a channel to aggregate purchaser demand for environmentally preferable products, not as a creator of those products in itself. Credit for the development of products that meet EPEAT's environmental performance criteria lies with researchers who have developed enabling technologies, environmental advocates and purchasers who have demanded more environmentally responsible products, and manufacturers who have designed and manufactured greener products.

Reported environmental benefits are the result of an informed purchase decision, yet may be realized over time and in multiple places.

5) The environmental benefits reported here come from the purchase of EPEAT-registered products but accrue from all phases of the life of the products themselves. So, the reported benefits are the result of an informed purchase decision, yet may be realized over time and in multiple places. Many other benefits not assessed in this report may result when purchasers take advantage of management options such as power management software, virtualization, refurbishment and resale or donation programs, and responsible recycling.

EPEAT brings many strands of innovation and environmental improvement together into a single tool that is easily used and that clearly lays out an overall scheme for product and service design—that is the system's value in the marketplace and its role in motivating the environmental benefits enumerated in this report.

STRENGTHS OF THE EPEAT MODEL

Why has the EPEAT scheme, among the many certifications in the electronics space, so outperformed the field? Judging by observation and purchaser and manufacturer feedback, the success of the EPEAT system and its rapid worldwide uptake appear to arise from six fundamental attributes of the system.

Stakeholder Participation: The standards underlying EPEAT's ratings are developed via an ANSI accredited, open, consensus-based process with extensive participation from an increasingly global group of stakeholders based on wide-ranging stakeholder knowledge, consensus and global best practice, and subject to continual updates. Though such a process can be arduous, its successful outcome, is informed by multiple perspectives and embraced by many different interest groups.

Manufacturer Participation: 50 manufacturers of all sizes currently register products in EPEAT. The system's annual fee model (as opposed to per-product charges) encourages manufacturers to register multiple products in their line while the accessibility of the registration system and sliding scale fee assessment reduces barriers to participation. This ensures an adequate supply of registered products to meet end users' needs, and easy access through a central registry enables all interested parties in a purchasing transaction to vet the available options.

Geographic Scope: EPEAT's combination of geographic reach and country-specific declaration offers electronics purchasers the opportunity to use a single standard worldwide and the assurance that product claims will be verified locally. This makes it an ideal system for use by global enterprise.

Centralized Product Data: EPEAT's central registry, and the accessibility of registry data through detailed searches (on optional attributes met, countries and dates of registration, ratings tiers and more) offers purchasers the ability to find the products they need across companies and countries. It also enables manufacturers to compete head to head on environmental grounds with their peers.

Ongoing Verification: Continual policing of claims across the system and transparent public reporting of any failures to conform to the criteria claimed enable purchasers to be confident about the accuracy of product declarations. (See Appendix B for a discussion of EPEAT's unique method of third party verification and its particular relevance to the electronics sector.)

Transparency: As noted above, the working group processes which develop the underlying standards for EPEAT product assessment are open to all interested parties(see above). But beyond that openness, EPEAT's operating procedures, verification processes, criteria and conformance requirements, stakeholder participation processes and Advisory Council meetings and deliberations are all public and accessible. The organization's efforts are all intended to be open to comment, critique and improvement by knowledgeable observers and participants in the electronics marketplace.

Because EPEAT was developed by and is managed in consultation with stakeholders, it simply works well for them. Purchasers find it a simple and accessible system that they can use to adjust existing contracts or develop new ones. Manufacturers are able to register conforming products with no delay in time to market, and to know that the system will provide access to significant sales opportunities to reward their environmental efforts. Resellers and retailers are able to access the product registry data to identify EPEAT registered products by tier on their web portals and other materials—making it easy for customers to access the information at point of purchase.

But more than any of these specific attributes, it increasingly appears that one of the transformational characteristics of EPEAT is that it is a web-based tool that offers open access to the information it contains by anyone anywhere for any purpose. Because of this web-based openness the EPEAT system provides more than a traditional eco-label's top down "seal of approval".

In a sense, EPEAT's key function has been to provide a direct interface between those seeking environmental benefit and those creating it. This direct access enables purchasers to easily find and use EPEAT, and to reward those products that meet their specific environmental priorities, be they toxics reduction or recycled content. It also has the potential to foster competition among manufacturers as they observe each other's success in meeting new criteria and know that customers are seeing it. And it has led to international growth with almost no marketing intervention by EPEAT supporting staff, particularly after the country-specific registrations offered purchasers clear access to products available locally. Six years into the system, the core strength that the central, web-based registry provides is more and more evident, and testifies to the genius of successful stakeholder consensus.

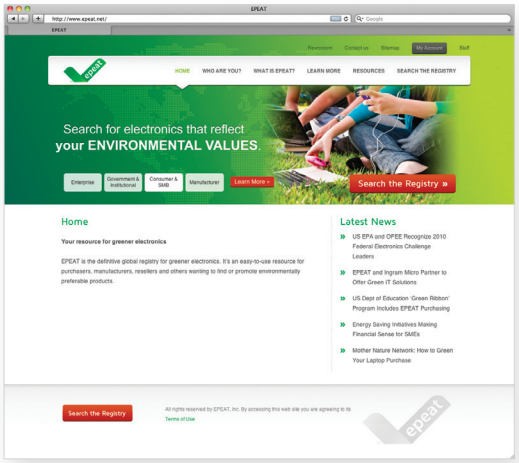
LOOKING FORWARD

New Graphic Identity

In 2011 EPEAT launched a new graphic identity and website to bring the program into a more consumer-friendly posture and enable Channel Partners to better communicate the value of EPEAT to their enterprise and SME customers. Over 2012 we have continued to upgrade the brand identity, and to deploy it in additional settings, with increasing focus on using EPEAT ratings to help consumers choose more environmentally responsible products. Recent test deployment in an Office Depot store, and usability surveys undertaken with Staples are helping EPEAT hone store-level presentation that combines specific, credible claims with easy, positive consumer messaging.

Before

After



Opening of New Product Registries

The Imaging Equipment (1680.2) and Television (1680.3) standards that form the basis for EPEAT's next registry expansion were voted on positively by the general IEEE Standards Association membership and by the SA Standards Board, and published in October 2012. The EPEAT Imaging Equipment registry will open to public view in January 2013, with the Television registry opening in early March. During Fall 2012 EPEAT is moving rapidly to implement the standards, building registry software, providing training to Subscribers and potential Subscribers, and reaching out to purchasers and retailers. Our registration network partners in their turn are preparing their Internal staffing and processes to support Subscribers as they declare products in the system,

More than 300 stakeholders from all interest groups participated in the IEEE 1680 Work Group processes that developed these standards- manufacturers, environmental NGOs, recyclers, private and public purchasers, researchers, government representatives, suppliers and others. Participation was international, with stakeholders from the UK, China, Taiwan, Canada and the United States involved.

Update of 1680.1 Standard

A study group process to address update of the existing PC and Display standard began in late 2011. The new criteria developed in this process will raise the bar for EPEAT inclusion, and support leadership and accomplishment in environmental performance improvements.

Geographic Expansion

Demand for EPEAT registered products continues to grow around the globe—with contract specifications and requests for information regularly reaching EPEAT from all corners of the globe. In 2012, Costa Rica joined the system, following interest by government purchasers in using EPEAT in procurement. The Advisory Council and staff moved forward on a streamlined country addition process to ensure that those purchasers who want to use EPEAT can do so within the established country-coverage framework. We anticipate this will continue to create additional county coverage to complement the increase in covered product categories.

CONCLUSION

Over six years now, EPEAT has demonstrated the value of a convenient, credible, centralized tool for measuring products' environmental performance. A tool like EPEAT enables purchasers to confidently select products for superior environmental performance, without having to master all the complexities of the environmental impact of the electronics supply chain, or to simply take suppliers' word for their products' preferability. Every year since 2006 has seen increasing market share of EPEAT rated products purchased and increasing environmental benefit resulting.

Because electronics are manufactured, used and disposed globally, purchasing choices have an enormous impact around the world. Choices made regarding product design and engineering impact the entire supply chain, including extraction, processing, and transportation of materials, components and finished products. In addition, design affects energy consumption during use, and the efficiency and efficacy of end-of-life recovery.

Manufacturers respond to purchaser demand. When purchasers use a centralized tool like EPEAT in lieu of individualized specifications, aggregated demand for a specific set of environmentally preferable attributes can set a clear direction and drive change more effectively. When that tool, like EPEAT, is available to purchasers across regions and market segments, but also grounded in local compliance and support, the impact is even stronger.

By confirming that purchasers (whether institutional buyers or individual consumers) care about electronic products' environmental attributes, use of EPEAT to select products supports manufacturers' commitment to and expansion of environmental design and innovation efforts. The level of purchasing commitment to EPEAT registered products in 2011 indicates a clear and continuing trend in favor of responsibly designed and managed electronics.

The EPEAT system encourages manufacturers to design their products to last longer, contain less hazardous material, to be more energy efficient and to be easier to upgrade and recycle. In this, it resembles numerous other ecolabels that address electronic products. But EPEAT's unique characteristics—comprehensive criteria, international coverage, level of manufacturer participation, country-specific detail, breadth of participation and central web-based product registry—together with its ongoing and transparent policing of manufacturer declarations mean that using the EPEAT system drives those changes more effectively through a broader segment of the IT market than using any other system.

APPENDIX A: METHODOLOGY AND ASSUMPTIONS

How EPEAT Sales Data is Gathered and Reported

As part of their annual agreement with EPEAT, manufacturers who register products in the system—known as EPEAT Subscribers—are required to report unit sales of their EPEAT registered products (notebook computers, desktop computers, integrated desktop systems, and computer displays) to EPEAT. To preserve confidentiality around specific companies' sales and market share data, the Information Technology Industry Council (ITI), an industry trade association, acts as a data consolidator for this process. ITI preserves the confidentiality of each manufacturer's individual data, and forwards the aggregated sales data to the Green Electronics Council, which manages the EPEAT system.

Manufacturers report total sales of their EPEAT registered products—not only the sales to purchasers that required EPEAT, or the sales directly attributable to EPEAT. Though contract specifications and policies requiring EPEAT are now very widespread, and interested consumers have begun to use EPEAT registration as a criterion in their purchasing, many sales still occur without such intentional selection of EPEAT registered products. However the environmentally preferable design of EPEAT registered products and related services have environmental benefits, whether or not purchasers intentionally selected them.

The EPEAT sales data collected through manufacturer reporting is entered into the Electronics Environmental Benefits Calculator (EEBC – see more below)—a tool to assess the comparative environmental impact of products qualifying for EPEAT registration against products that do not meet the EPEAT criteria.

Recent Improvements

Since 2009, all Subscribers have been required to report their worldwide sales of EPEAT registered products by country and tier for each country in which they have actively registered products (as opposed to reporting sales from the entire world, as was the practice prior to 2009).

This change significantly reduced the territory for which manufacturers report sales, making comparison of data prior pre- and post- 2009 challenging. However the current system provides more accurate assessment of the real world impacts of EPEAT than in previous years, because reporting is only completed for those territories where Subscribers are actively declaring and supporting products as EPEAT registered.

Since the EEBC calculations used to estimate the environmental impact of EPEAT sales are based on tier-specific attributes, the tier-specific reporting in effect since 2009 also increases the accuracy of benefits calculations. (Before 2009 sales reporting did not include tiers, so EPEAT environmental benefits were calculated based on an assumed Silver status for all products.)

Finally, reporting by country allows for adjustment of environmental benefits calculations to accommodate different conditions by geography. For example, as noted elsewhere, we have subtracted all toxics reduction benefits related to the Regulation of Hazardous Substances (RoHS) and China RoHS Directive from the EU and China country benefits, since products sold in the EU and China would already have to meet these regulations.

Electronics Environmental Benefits Calculator

The Electronics Environmental Benefits Calculator (EEBC) is a tool developed to support and evaluate purchases of EPEAT and other environmentally preferable electronics, and to provide information on the benefits of different practices in the use and end-of-life phases of electronics products' lifecycle.

The tool was originally developed by the University of Tennessee Center for Clean Products with funding from the US EPA, and was revised significantly under EPA supervision in 2008-2009, and again in 2011-2012.[1] The EEBC measures quantifiable benefits (such as greenhouse gas reductions, waste avoided, pounds of mercury eliminated) of specific EPEAT (and other electronics) purchases over the purchase of comparable conventional products that do not meet EPEAT's criteria.

The EEBC tool estimates environmental benefits for eight metrics:

- Energy savings
- Greenhouse gas reduction
- Solid waste reduction
- Primary material savings
- Hazardous waste reduction
- Toxic material reduction
- Air emissions
- Water emissions

The EEBC can be viewed and downloaded at http://www.epa.gov/fec/publications.html#calculator. The tool contains a detailed discussion of how each benefit type is calculated, the underlying assumptions for each product tier and for "conventional products" and much more.

The EEBC's primary data input is the number, type and tier of EPEAT registered products. The tool calculates the environmental benefits resulting from the purchase of a specific number of EPEAT registered products at a specific tier, based on a comparison of EPEAT product attributes, such as material composition and energy consumption, to the average attributes of a composite conventional product that does not meet EPEAT requirements.[2]

The calculations include impacts from raw material extraction and processing, product manufacture, and product use and disposition, depending on the specific metric involved.[3] Data for greenhouse gas reduction, primary material savings, and air and water emissions may be proportionally greater than other metrics because they include inputs and outputs from all phases of product life, including those from upstream processes.

The EEBC explicitly outlines all the assumptions for EPEAT and "conventional" products so that users can review all data inputs. (See the EEBC itself—Sheets 5b and 8 a-f—for a detailed explanation of the benefits calculations and their linkage to specific criteria.)

Assumptions and Procedures

The 2011 environmental benefits detailed in this report were obtained by entering the total number of EPEAT registered products sold in 41 covered countries, as reported by subscribing manufacturers, into the EEBC.

- Products were reported and entered by tier. (As noted above, this allows more precise calculation than the previous Silver assumption.)
- We used the generic assumptions for each EPEAT product tier,[4] because the breadth and variety of products reported prevents accurate apportionment of individual attributes.
- For the purposes of calculation, each Integrated System (e.g. a product where the CPU and monitor are part of a single unit) was counted as one notebook. (For the purposes of market share analysis they are counted as desktops.)
- To obtain overall benefits within countries, the benefits results from all product categories/tiers were summed at the country level.
- To obtain regional and global environmental benefits figures, the country benefits totals were summed across countries.
- We have subtracted from the EU and China country benefits all toxics reduction and hazardous waste benefits related to the Regulation of Hazardous Substances (RoHS) Directive (see Note below) and the China RoHS regulations.
- Although EPEAT includes a mandatory requirement for manufacturers to provide end-of-life takeback and responsible recycling of all registered products, we do not have sufficiently specific data on end of life disposition of EPEAT registered products to assess recycling motivated by EPEAT. Therefore we do not calculate any environmental benefits related to end of life management—despite the likelihood that many EPEAT purchasers take advantage of the end of life services required by EPEAT.
- Because the cost savings benefits calculations are based on US cost factors, we have not reported them as part of the worldwide or non-US benefits estimates. No doubt there are cost savings at a similar scale, and as part of our efforts to continually improve reporting and analysis, we anticipate having regionalized cost calculations for the 2012 benefits report.

1 See http://www.epa.gov/fec/resources/faq_eebc.pdf detail on the revisions and impact.

2 For an explanation of how the "conventional product" model was developed, see the Calculator itself at http://www.epa.gov/fec/publications.html#calculator. Sheet #8a Assumptions—Baseline.

3 The use of lifecycle data in benefits calculations varies depending on the metric and EPEAT criterion. For a complete summary of benefits calculations, see the EEBC tool itself at http://www.epa.gov/fec/publications.html#calculator - Sheet 5a Explanations of Savings Calculations.

4 For the specific criteria assumptions for each EPEAT tier, see the EEBC tool itself at http://www.epa.gov/fec/publications.html#calculator - Sheets 8b1, b2 and c.

Specific Calculations

- **Worldwide Benefits** were calculated by summing all countries' reported sales by product category and tier (e.g. Gold notebooks, Silver desktops), then entering those sums into the EEBC. Benefits results were calculated by product category, using specific tier information (e.g. all Gold notebooks, all Silver notebooks, all Bronze notebooks). Results of these product category calculations were then summed to obtain overall results.
- **US Benefits** were calculated by product category, using specific tier information (e.g. Gold notebooks, Silver notebooks, Bronze notebooks). Results of these product category calculations were then summed to obtain overall results.
- **Rest of World Benefits** were calculated by summing the 40 non-US countries' reported sales by product category and tier (e.g. Gold notebooks, Silver desktops), then entering those sums into the EEBC. Benefits results were calculated by product category, using specific tier information (e.g. all Gold notebooks, all Silver notebooks, all Bronze notebooks). Results of these product category calculations were then summed to obtain overall results.

RoHS Adjusment Note:

One of EPEAT's required criteria for all registered products is compliance with the final requirements of the EU's Reduction of Hazardous Substances (RoHS) Directive, which restricts the use of certain hazardous substances in electronic equipment including cadmium, mercury, lead, hexavalent chromium and certain brominated flame retardants.

Because computers and displays sold in Europe and China (where a regulation known as "China RoHS" imposes the same substance restrictions as EU RoHS) would already have to meet these criteria to be eligible for sale, we subtracted from our benefits totals all RoHS-/China RpHS-related toxics reduction and hazardous waste benefits from the sale of computers and displays in Europe.

This more precise calculation is a refinement in the methodology that more accurately represents the environmental benefits that are directly attributable to EPEAT

ENERGY STAR Conformity and Calculation

The EEBC tool currently measures the benefits of the EPEAT ENERGY STAR requirement as a comparison between Energy Star specification Version 5.2 for computers and Version 5.1 for displays. The comparison is to what Energy Star defines as a conventional non-qualified product for those two specs based on market analysis.

All products registered in EPEAT at any time during 2011 were required to meet ENERGY STAR 5.1 (Displays) or 5.2 (Computers) specifications.

APPENDIX B: EPEAT SYSTEM DETAILS

Development

EPEAT was developed over three years by a large group of stakeholders including environmental advocacy organizations, institutional purchasers, electronics manufacturers, the US EPA and other government officials, electronics recyclers, researchers, and others, in a process facilitated by an independent nonprofit organization, the Zero Waste Alliance, under an EPA grant. The draft EPEAT criteria and system developed by this working group were balloted, revised and accepted by the Institute of Electrical and Electronic Engineers (IEEE) through an American National Standards Institute (ANSI) accredited process, becoming IEEE Standard 1680 for the Environmental Assessment of Personal Computer Products.

In 2009, that original standard was split into two parts—IEEE 1680, which governs the operation of the registry, declarations of conformance to the standard and product verification, and IEEE 1680.1, which contains the environmental performance criteria for computer products. New standards, such as the recently published IEEE 1680.2 Imaging Equipment and IEEE 1680.3 Televisions standards, contain product-specific criteria, and are numbered consecutively. Application of individual product standards is governed by the 1680 "umbrella" standard.

Registered Products

EPEAT registered products are high-performance business-class computers that cost no more on the whole than comparable products that do not meet EPEAT's criteria. Compared to traditional computer equipment, however, all EPEAT registered computers have reduced levels of cadmium, lead, mercury and problematic flame retardants, to better protect human health and the environment. They are more energy efficient (meeting ENERGY STAR specifications), which reduces power consumption and related emissions of greenhouse gases, and they are also easier to upgrade and recycle.

Environmental Criteria

The EPEAT program currently rates computer desktops, notebooks, and monitors based on their conformance with 51 environmental criteria across eight performance categories:

- Reduction/elimination of environmentally sensitive materials;
- Materials selection;
- Design for end of life;
- Product longevity/lifecycle extension;
- Energy conservation;
- End of life management;
- Corporate performance; and
- Packaging.

In the IEEE 1680.1 Standard, all EPEAT-registered products must meet a minimum of 23 environmental performance criteria to qualify at the "Bronze" level. Required criteria include compliance with the current applicable ENERGY STAR standard, compliance with the EU's RoHS Directive (which requires reduction or elimination of four toxic heavy metals and two classes of brominated flame retardants) and provision of a takeback and recycling program for the product by the manufacturer.

For a more detailed discussion of the IEEE 1680.1 criteria, see www.epeat.net/learn-more/criteria-discussion/.

Ratings Tiers - PCs and Displays

An additional 28 optional criteria across the environmental performance categories are used to determine whether products earn higher level EPEAT Silver or Gold recognition. Manufacturers select among the optional criteria to achieve higher EPEAT ratings, as follows:

- **Bronze** – product meets all 23 required criteria.
- **Silver** – product meets all required criteria plus at least 50% of the optional criteria.
- **Gold** – product meets all required criteria plus at least 75% of the optional criteria.

Standard Additions and Revisions

New Imaging Equipment and Televisions standards follow the PC-Display required and optonal criteria model but with dfferent numbers of crteria in each category. The Imaging equipment criteria encompass 33 required and 26 optonsal critera, while the Televisions standard has 24 required and 29 optional criteria in all.

The PC and Display standard is undergoing a revision process during 2012 - 2013 and may add and drop criteria as it moves forward, likely retaining the general outlines of about halfand half required and optional criteria.

The basis for ratings tiers will remain the same.

Verification

EPEAT is based on self-declaration by manufacturers that their products meet the criteria of the IEEE 1680/1680.1 Standard, but this declaration is supplemented by rigorous, ongoing audits of the registry to assure the accuracy of declarations. The EPEAT approach requires active and tough auditing of the registered product set both on a random and on a "for cause" basis, with public disclosure of the verification results, to assure that the Registry is accurate.

Product declarations are not pre-certified; however manufacturers must be able upon request at any time following product registration to produce the required supporting evidence spelled out in the IEEE standard. In order to maintain the credibility of the system, EPEAT regularly selects a batch of products and criteria from the registry and verifies that they meet the criteria as declared. All criteria declared by all products on the registry are subject to verification at any time; specific products to be investigated are selected at random unless there is reason to believe a specific manufacturer or criterion is not in conformance.

EPEAT Verification is conducted by expert independent contractors and reviewed by an expert panel—the Product Verification Committee (PVC)—also composed of independent contractors, who are blind to the identity of the products and Subscribers involved. There is no advance warning of verification, since manufacturers must be able to provide verification information at any time upon request.

Criteria are selected for investigation by the PVC based on the expectation that a criterion may be challenging to meet or highly significant in terms of environmental impact. EPEAT's verification system is designed to include multiple levels of scrutiny of manufacturer declarations, including strategic investigation of especially difficult-to-meet criteria across the entire registered product set, individual verification of criteria declarations that appear questionable, and regular rounds of verification addressing selected subsets of the criteria.

There are two types of verification—those based on evidence provided by the manufacturer and/or their suppliers, and those based on examination of an independently purchased product, which may include detailed laboratory analysis or destructive disassembly. While EPEAT will work with manufacturers to correct or clarify a nonconforming declaration, if a manufacturer is found over time to be an untrustworthy user, they may be barred from using the EPEAT system.

Why Not Precertify?

EPEAT's unconventional approach—product declaration by the manufacturer, followed by registry surveillance and ongoing verification investigation—was decided upon by the stakeholders during development of the original IEEE 1680 standard.

The group very carefully considered the most effective way to maintain the credibility of the Registry based on the unique characteristics of these high-tech products:

- Very rapid technology development,
- Very short time to market,
- Very complex and continually morphing global supply chains, and
- Very high variability in the configurations of individual products (components from totally different suppliers in different locations, with different processes, may be found inside of the "same product" over time).

Electronic and computer products experience continual changes in sourcing of components and materials, suppliers, and other elements, from the original product launch through the commercial life of a given model. Given this rate of change, a precertification based on a one-time investigation before a product is on the market is fundamentally inadequate to assess IT equipment as it will be delivered to the purchaser. Stakeholders recognized that ongoing and randomly timed surveillance is the best way to identify potential problems.

Therefore, in accordance with to the IEEE 1680 standard, EPEAT has developed rigorous and transparent post-declaration verification procedures based on unannounced and very in-depth investigations, and on public exposure in case of non-conformances. The system is designed to make nonconformance publicly embarrassing, and to maintain the constant likelihood of investigation at any time.

To review all EPEAT Verification investigations, including the plans, findings and corrective actions, as well as the contractors who perform various investigative functions, visit www.epeat.net/learn-more/verification/.

International Application Details

Since inception, EPEAT has been used by purchasers worldwide who find its credibility, transparency and rigor, ease of use, central product registry, and ongoing verification optimal for their needs. However, a single global registry could not differentiate where products were available, or enable accurate verification of specific claims country by country. To achieve these goals and more, EPEAT's stakeholder Advisory Council authorized the establishment of a country-specific international registry system in 2009.

The country-specific registry implemented in 2009:

- Avoids the assumption that a complex standard declaration will necessarily be met equally in all geographies, without ongoing surveillance of conformity in different geographies.
- Enables purchasers to compare and contrast products available in their country with registrations that accurately reflect country-specific names, configurations and environmental attributes.
- Allows manufacturers to accurately communicate, and gain recognition for, the environmental attributes of their products as they are implemented in recognized countries.
- Enables EPEAT to accurately target verification investigations to specific claims made in particular geographies.
- Allows the EPEAT registry to be an accurate and complete resource for stakeholders globally to research the status of manufacturers' environmental programs and product offerings in different countries.

The system requires conformity with the vast majority of criteria (more than 40) everywhere a registered product is sold (including outside EPEAT covered countries). It then allows a few criteria to be met flexibly in different geographies—for example a battery takeback program that is accomplished through retail drop-off in one geography may be provided by a mail-in service in another, and this difference noted in the registry.

Finally a very small number of optional criteria may be met in one geography before they are met in others—for example, a manufacturer might establish a packaging takeback and recycling program in one area that it is not prepared to roll out in every country until demand and capacity grow. (This variable declaration can also eliminate program duplication where it might be environmentally unsound—for example establishing packaging recycling where the material would have to be shipped to a remote location for processing—consuming energy and producing carbon emissions in the process.)

For a succinct overview of EPEAT's international application, see the short presentation available on http://www.epeat.net/learn-more/country-specific-registration/.

Financial Support

EPEAT management activities include maintenance of the website and registry, EPEAT promotion through direct assistance to purchasers both in person and through media outreach, verification program management, support of EPEAT's Advisory Council (a stakeholder group that guides the system's operations and development), and responding to all inquiries by purchasers, manufacturers, government agencies and other interested parties.

EPEAT received start-up funding from the US EPA to establish the systems and tools needed to begin to sign on OEM Subscribers, but since 2007 has been supported entirely by annual fees paid by participating manufacturers to register their qualified products in the EPEAT system, supplemented by a small amount of private foundation funding and membership fees from Channel Partners who use EPEAT to support their customers green IT initiatives.

EPEAT Subscriber fees are annual payments, rather than per-product registration fees. The Subscriber fee is independent of the number of products registered for two reasons: 1) to eliminate direct linkage between numbers of products registered and

system income, avoiding the potential conflict of interest where program income depends on maintaining and increasing numbers of registered products; and 2) to promote the registration of as many conforming products as possible, since the direct cost per product to manufacturers is reduced with every additional registration.

The current manufacturer fee schedule may be reviewed at www.epeat.net/documents/subscriber-resources/epeat-sub-fee-sched.11-0127.pdf.

EPEAT Boards

EPEAT is substantially guided by the EPEAT Advisory Council, a volunteer advisory board whose membership is a balanced representation of the stakeholders who developed EPEAT: environmental advocates, institutional purchasers, manufacturers, government policy professionals, researchers and electronics recyclers. EPEAT staff manages day-to-day operations of the system but all significant decisions about system operation and expansion are taken in consultation with representatives of all affected constituencies.

The current members of the EPEAT Advisory Council may be viewed at http://www.epeat.net/who-is-epeat/directors-advisors/.

The EPEAT Board of Directors, an independent fiduciary board, represents the general public and ensures proper legal and financial management of EPEAT. Members may be viewed at http://www.epeat.net/who-is-epeat/directors-advisors/.

For much more detail on EPEAT including sample contract language, media coverage, manufacturer and purchaser lists, detailed criteria and more, visit www.epeat.net.

Product Registration Entities (PREs)

The IEEE standard laid out two primary roles in the EPEAT system – Market Surveillance Entity – responsible for maintaining the registry and overall quality assurance – and Product Registration Entity – responsible for assisting manufacturers to register products and verifying those registrations.

In May 2012 a pilot group of certification bodies began functioning as EPEAT Product Registration Entities (PREs), following the model laid out in the IEEE 1680 standard. CESI, DEKRA, Intertek, VDE and UL Environment – highly experienced certification and testing organizations with global reputations for technical excellence—are participating as the first PREs in the EPEAT system. For more on the EPEAT PRE network members, see http://www.epeat.net/pre-network/.

Following training and organizational on-boarding, these trusted providers will work directly with manufacturer Subscribers to register products in the EPEAT system and to verify their environmental attributes. On completion of this pilot phase EPEAT will accept applications from other qualified organizations to become PREs.

The pilot PRE group worked with EPEAT to flesh out the unique certification model laid out in IEEE 1680, which enables products to be registered against environmental performance criteria and strictly monitored after registration. Expanding oversight capacity as the system grows, maintaining stringent verification, and providing cost effective solutions are all keys to this next step toward global capability.

The expanded EPEAT system will provide increased options for support services – including multiple languages, regional presences and technical capacities – within the strict bounds of EPEAT quality assurance requirements. By expanding manufacturer support and enabling more product verifications, the addition of PREs to the EPEAT system supports the ongoing improvement in the environmental performance of electronic products. For more on the PREs role and responsibilities see http://www.epeat.net/pres.

APPENDIX C: 2011 EPEAT SUBSCRIBERS

EPEAT PARTICIPATING MANUFACTURERS WORLDWIDE – 2011

ASUSTeK Computer Inc.	Gammatech Computer Corporation	On Line Datensysteme Gmbh
Ace Computers	General Dynamics Itronix	Oracle America Inc.
Acer Inc.	Grace Global, Inc.	Panasonic
Action S.A.	Hewlett-Packard	Planar Systems, Inc.
Apple Inc.	Howard Technology Solutions, A Division of Howard	Positivo Informática S.A.
Arquimedes Automacao e Informatica Ltda	Hyundai IT America Corp.	Procomp
BenQ	Ilhaservice Servicos de Informatica Ltda.	Samsung Electronics
CIARA-TECH	Itautec S.A. - Grupo Itautec	SEMP Toshiba Informatica Ltda.
CTL Corporation	Komparsa UAB	Sony Electronics Inc.
Corporativo Lanix, S.A. de C.V	LG Electronics USA, Inc.	TH ALPLAST
Cybernet Manufacturing, Inc.	Lenovo	TPV Technology Limited
Daten Tecnologia Ltda	Login Informatica	Tangent Computer, Inc.
Dell, Inc.	MMD Taiwan Ltd.	Toshiba
EIZO NANAO Corporation	Manage Your IT Ltd.	Transource
Ecomnets, Inc.	NCS Technologies, Inc.	ViewSonic Corporation
Fujitsu Limited	NEC Display Solutions, Inc.	Wyse Technology, Inc.
GETAC	Northern Micro Inc.	

APPENDIX D: EPEAT PRODUCT REGISTRATIONS BY PRODUCT TYPE AND TIER - 2011

EPEAT TOTAL REGISTRATIONS BY TIER AS OF JANUARY 1, 2011 – WORLDWIDE

Product Type	Bronze	Silver	Gold	Totals
Desktops	12	1,038	1,515	**2,565**
Displays	0	2,798	1,541	**4,339**
Notebooks	87	6,449	3,249	**9,785**
Integrated Desktop Computers	1	541	112	**654**
Workstation Desktops	0	288	331	**619**
Thin Clients	0	548	114	**662**
Workstation Notebooks	0	45	22	**67**
Totals	**100**	**11,707**	**6,884**	**18,662**

EPEAT TOTAL REGISTRATIONS BY TIER AS OF JUNE 1, 2011 – WORLDWIDE

Product Type	Bronze	Silver	Gold	Totals
Desktops	8	466	1,933	2,407
Displays	0	2,834	2,053	4,887
Notebooks	94	3,977	3,484	7,555
Integrated Desktop Computers	0	533	169	702
Workstation Desktops	0	46	396	442
Thin Clients	0	456	114	570
Workstation Notebooks	0	11	18	29
Tablets	0	0	0	0
Totals	**102**	**8,323**	**8,167**	**16,565**

EPEAT TOTAL REGISTRATIONS BY TIER AS OF DECEMBER 1, 2011 – WORLDWIDE

Product Type	Bronze	Silver	Gold	Totals
Desktops	2	675	2,113	2,790
Displays	0	3,746	2,878	6,624
Notebooks	62	3,133	3,727	6,922
Integrated Desktop Computers	1	687	254	942
Workstation Desktops	0	74	334	408
Thin Clients	0	315	194	509
Workstation Notebooks	0	10	14	24
Tablets	0	0	0	0
Totals	**65**	**8,640**	**9,514**	**18,196**

APPENDIX E: 2011 EPEAT REGISTERED PRODUCT SALES BY COUNTRY AND PRODUCT TYPE

Country	Notebooks	Desktops	Displays	Integrated Systems	Totals
Australia	1,407,989	352,337	423,176	44,374	2,227,877
Austria	300,915	131,621	131,113	986	564,635
Belgium	404,557	119,506	188,537	5,616	718,215
Brazil	2,275,799	1,281,651	345,346	107,791	4,010,587
Bulgaria	36,079	10,589	16,366	13	63,047
Canada	2,613,031	531,823	1,610,848	575,418	5,331,119
China	13,900,174	544,161	2,893,332	140,236	17,477,903
Cypress	137,099	17,855	6,709	0	161,663
Czech Republic	264,481	50,110	484,317	4,604	803,511
Denmark	301,730	88,271	150,473	3,265	543,739
Estonia	1,878	1,439	5,912	0	9,229
Finland	1,850,681	871,610	1,034,402	79,699	3,836,391
France	582,508	66,932	126,001	338,589	1,114,030
Germany	1,674,934	881,667	1,486,234	345,081	4,387,916
Greece	115,877	12,436	14,390	1,873	144,576
Hungary	45,625	16,341	49,464	45	111,475
Iceland	0	0	64	0	64
Ireland	65,522	49,111	16,923	43	131,599
Italy	802,528	223,639	226,236	9,512	1,261,915
Japan	1,347,172	484,435	433,207	78,305	2,343,119
Latvia	3,374	1,304	2,539	0	7,217

Country	Notebooks	Desktops	Displays	Integrated Systems	Totals
Liechtenstein	42,754	9,518	17,104	257	69,632
Lithuania	0	2,019	0	0	2,019
Luxembourg	7,060	2,926	7,347	0	17,333
Malta	1,202	264	1,287	0	2,753
Mexico	322,168	183,001	138,788	13,311	657,268
Netherlands	375,128	181,135	1,215,505	4,028	1,775,796
New Zealand	294,109	65,908	106,719	19,135	485,871
Norway	319,327	52,303	94,163	385	466,178
Poland	343,472	78,125	268,906	4,187	694,690
Portugal	72,297	15,733	42,438	775	131,243
Romania	124,991	14,060	26,771	1	165,823
Singapore	270,130	67,135	422,619	3,901	763,785
Slovakia	58,868	15,503	30,424	2,592	107,387
Slovenia	107,597	7,183	8,233	78	123,092
Spain	790,667	194,563	280,692	16,825	1,282,748
Sweden	639,633	230,607	360,137	111,910	1,342,288
Switzerland	320,500	183,318	244,347	4,835	753,001
Taiwan	173,263	147,330	139,293	2,251	462,137
United Kingdom	2,262,985	579,068	765,482	104,962	3,712,497
United States	31,319,287	5,444,736	17,048,046	8,733,543	62,545,611
TOTAL	**65,977,390**	**13,211,272**	**30,863,890**	**10,758,426**	**120,810,978**

APPENDIX F: 2009-2011 GROWTH IN REGISTRATIONS BY COUNTRY

EPEAT PRODUCT REGISTRATIONS

Country	As of January 1, 2011	As of June 1, 2011	As of December 1, 2011
Australia	370	327	363
Austria	481	492	488
Belgium	487	370	490
Brazil	459	412	420
Bulgaria	289	254	269
Canada	1,135	1,288	1,312
China	443	417	409
Cyprus	380	220	200
Czech Republic	487	498	494
Denmark	481	367	389
Estonia	376	246	251
France	611	527	594
Finland	487	370	402
Germany	606	634	686
Greece	317	267	335
Hungary	487	463	504
Iceland	21	10	10
Ireland	487	369	388
Italy	548	433	489
Japan	380	352	340
Latvia	376	246	269
Lithuania	257	211	253
Liechtenstein	21	21	21
Luxembourg	372	362	383
Malta	145	178	189
Mexico	90	75	78
Netherlands	526	409	441
New Zealand	367	337	396
Norway	317	267	334
Poland	440	317	451
Portugal	487	370	402
Romania	390	254	269
Singapore	89	123	172
Slovakia	389	381	360
Slovenia	376	246	250
Spain	542	440	516
Sweden	487	370	529
Switzerland	487	370	389
Taiwan	406	369	395
United Kingdom	518	412	433
United States	2,248	2,491	2,833
Total	**18,662**	**16,565**	**18,196**

APPENDIX G: 2011 MANUFACTURER PARTICIPATION BY COUNTRY

EPEAT MANUFACTURER PARTICIPANTS

Country	January 2011	July 2011	December 2011
Australia	7	7	7
Austria	6	6	7
Belgium	6	5	7
Brazil	12	13	13
Bulgaria	4	4	5
Canada	19	20	20
China	6	5	5
Cyprus	5	3	4
Czech Republic	6	6	7
Denmark	6	5	5
Estonia	5	4	5
Finland	6	5	6
France	9	9	11
Germany	11	12	13
Greece	6	5	6
Hungary	6	6	7
Iceland	3	2	2
Ireland	6	5	5
Italy	6	5	7
Japan	4	4	4
Latvia	5	4	6

Country	January 2011	July 2011	December 2011
Liechtenstein	3	3	3
Lithuania	5	4	6
Luxembourg	5	5	5
Malta	4	3	3
Mexico	4	3	3
Netherlands	7	6	7
New Zealand	5	5	6
Norway	6	5	6
Poland	9	8	12
Portugal	6	5	6
Romania	5	4	5
Singapore	3	3	3
Slovakia	5	5	6
Slovenia	5	4	4
Spain	7	7	9
Sweden	6	5	8
Switzerland	6	5	5
Taiwan	6	5	6
United Kingdom	7	7	8
United States	33	34	35