2012 IBM and the Environment Report

Committed to environmental leadership across all of IBM's business activities

IBM

A Message from the Vice President, Corporate Environmental Affairs & Product Safety

Wayne S. Balta

IBM has had company-wide environmental programs for over 45 years and our commitment to environmental leadership was formalized in a corporate policy on environmental protection in 1971.

Along with IBM's business, our environmental programs and policy have evolved over the past four-plus decades. From their original focus on the environmental performance of our manufacturing operations, we expanded them significantly over the years to cover the diverse ways in which IBM intersects with environmental topics – from our research, product design and supply chain to the environmental benefits derived from our services and solutions.

This is our 23rd consecutive annual 'IBM and the Environment' Report and I am pleased to highlight that 2012 was another year of environmental accomplishment across our business. One example is the area of energy conservation and climate protection:

Second Generation Climate Goal:

We achieved and exceeded IBM's second generation climate goal. As of year-end 2012, IBM's energy conservation and procurement of renewable energy yielded a 15.7 percent reduction in our energy-related CO_2 emissions since 2005 – exceeding our Corporate goal of 12 percent. This success was on top of our having already reduced or avoided IBM's CO_2 emissions from 1990 to 2005 by an amount equal to 40 percent of our 1990 emissions.

Energy Conservation:

We also exceeded an additional energy conservation goal we set in 2009: to conserve 1,100,000 MWh of energy by year-end 2012 – a most substantial undertaking since this amount represented over 20 percent of the total electricity IBM consumed during 2008. The result: IBM experts around the world from our manufacturing, hardware, software,

services, and real estate units developed and deployed innovative energy conservation actions that avoided 1,246,000 million MWh of energy -- exceeding our target by 13.3 percent. This achievement was the result of more than 6,000 individual projects across more than 500 locations in 56 countries.

Data Centers:

Forty-three IBM data centers across 19 countries in the European Union (EU) were awarded "Participant" status in Data Center Energy Efficiency based on the EU Code of Conduct for Energy Efficient Data Centers. This honor represents the largest portfolio of data centers from a single company to receive this recognition to-date.

ISO 50001:

Within one year of its issuance in 2011, we successfully achieved registration of our global environmental management system and its integral energy management program to the ISO 50001 energy management systems standard. This follows upon IBM's earlier achievement as the first major company to earn a single global registration to the ISO 14001 standard for environmental management systems back in 1997.

The significant and wide-ranging environmental accomplishments you will read about in this report are the result of innovative and hard working IBMers around the world that are committed to environmental leadership. IBM is proud of what they have achieved and, on behalf of IBM, I thank them all.

Wayne S. Balta
Vice President, Corporate Environmental Affairs & Product Safety, IBM

3

IBM AND THE ENVIRONMENT

IBM has long maintained an unwavering commitment to environmental protection, which was formalized by a corporate environmental policy in 1971. The policy calls for IBM to be an environmental leader across all of our business activities, from our research, operations and products to the services and solutions we provide our clients to help them be more protective of the environment. This report is IBM's 23rd consecutive annual 'IBM and the Environment' report. Much of this content is also provided in IBM's Corporate Responsibility Report, which we have published annually since 2002, as well as in our annual Global Reporting Initiative Report. All of these reports may be found on IBM's Environment website at www.ibm.com/environment/annual.

TABLE OF CONTENTS:

A Commitment to Environmental Leadership

IBM's corporate environmental programs date back to the 1960s. In 1971, Thomas J. Watson, Jr., IBM's CEO at the time, formalized the company's commitment to environmental protection with our Corporate Policy on IBM's Environmental Responsibilities. Updated a number of times over the years, the policy and the environmental programs supporting it have defined and driven IBM's longstanding commitment to environmental leadership across all of our business activities.

IBM's operations can affect the environment in a number of ways. For example, the chemicals needed for research, development and manufacturing must be properly managed from selection and purchase through storage, use and disposal. Our data center operations are generally energy-intensive, and some of our manufacturing processes use a considerable amount of energy, water or both. We continually look for ways to reduce consumption of these and other resources.

Our product stewardship requirements include product energy efficiency, the use of environmentally preferable materials and designing for reuse, recycling and safe disposal at the end of the product's useful life. In addition, as we incorporate more purchased parts and components into our products, our requirements for the overall environmental responsibility of our suppliers and the environmental attributes of the goods they provide have become even more important.

We also apply our expertise, research and technology to develop solutions that can help our company, our clients and the world operate in a way that is more efficient and protective of the environment. We apply our research and innovation to help discover scientific solutions to some of the world's most challenging environmental problems.

Global Governance and Management System

IBM's Corporate Policy on Environmental Affairs calls for environmental leadership in all of the company's business activities.

_____

Global Environmental Management System

Our corporate environmental affairs policy objectives range from workplace safety, pollution prevention and energy conservation to product design for the environment and the application of IBM's expertise to help address some of the world's most pressing environmental problems.

The policy is supported by corporate directives that govern IBM's conduct and operations worldwide. These directives cover areas such as pollution prevention, chemical and waste management, energy management and climate protection, environmental evaluation of suppliers, product stewardship, and incident prevention and reporting.

IBM's commitment to environmental leadership is implemented through our Global Environmental Management System (EMS) which requires and confirms that we operate to the same high standards all across the world.

Employee and management responsibility
Every employee is expected to follow IBM's corporate environmental policy and report any environmental, health or safety concern to IBM management. Managers are expected to take prompt action when faced with a potential violation of the policy or its directives.

In addition, all of our employees are required by the company's Business Conduct Guidelines to comply with environmental laws and with IBM's own environmental requirements.

IBM executives are responsible for the environmental performance of their organizations or locations.

Our environmental programs and performance are reviewed annually by the Directors and Corporate Governance Committee of IBM's Board of Directors. Formed in 1993 the Charter for this committee established its responsibility for reviewing IBM's position and practices on significant issues of corporate public responsibility, including protection of the environment.

Environmental goals

Environmental goals are an important part of IBM's EMS. We maintain environmental goals covering the range of our environmental programs, including climate protection, energy and water conservation, pollution prevention, waste management and product stewardship. These goals and our performance against them are discussed in their respective sections of this report, and are provided in the listing of IBM's environmental Key Performance Indicators.

ISO 14001 Standard on Environmental Management Systems

In 1997, IBM became the first major company in the world to earn a single global registration to the ISO 14001 Environmental Management System Standard. We achieved this credential within just one year of the finalization of the standard.

The initial registration covered IBM's manufacturing, product design and hardware development operations across our business units worldwide. We have since expanded our global ISO 14001 registration to include our research locations that use chemicals, several country organizations with their non-manufacturing locations, our product development function, our Global Asset Recovery Services and our Integrated Supply Chain organization.

As our business model has evolved to include more services offerings, we have updated our EMS to appropriately address environmental opportunities and challenges in the services area.

ISO 50001 Standard on Energy Management Systems

IBM's energy management program dates back to 1974, when our CEO issued a formal corporate policy calling for the conservation of energy and materials in all of IBM's activities. Over the intervening years, we sustained our global energy management program and integrated it into the company's global EMS.

Upon the issuance of the ISO 50001 standard on energy management systems in June 2011, IBM set forth a strategy to achieve verification of conformity of our EMS against this newly published standard.

Within one year of the issuance of this standard, we achieved ISO 50001 registration of our energy management program at the corporate level and as an integral component of IBM's global EMS. Our approach recognizes and leverages the fact that IBM's existing EMS addresses both environmental and energy management.

Consistent with our global ISO certification strategy and following our successful ISO 50001 EMS registration at the corporate level, IBM's major energy-consuming locations are now receiving registration audits of their site-specific energy programs under IBM's single global ISO 50001 certification.

Three of our manufacturing locations, one in the United States, one in Mexico and one in Canada, have successfully concluded their registration audits thus far. Additional IBM locations are undergoing ISO 50001 registration audits during 2013 and 2014 as we continue the demonstration of conformity of our global EMS, inclusive of our energy program, against the requirements of the ISO 50001 standard.

Public disclosure

IBM's Corporate Policy on Environmental Affairs also calls for the company to publicly disclose information on our environmental programs and performance. This report marks IBM's twenty-third consecutive year of annual corporate environmental reporting.

In addition to providing information on our environmental programs and performance in this report, which we have been publishing annually since 2002, we provide a report based on the Global Reporting Initiative (GRI) and information through a number of other voluntary reporting programs and tools, such as the Carbon Disclosure Project and the OneReport® Sustainability Reporting Network. IBM's additional environmental reporting may be found at the following websites:

- Responsibility at IBM

- IBM and the Environment

Stakeholder Engagement

IBM has a variety of outreach programs through which we engage with various groups and individuals on the subject of the environment. Our community environmental outreach programs range from open houses and emergency preparedness drills with local organizations to the support of and participation in local environmental projects and environmental education efforts.

IBM has ongoing dialogues with many stakeholders, including socially responsible investors and other shareholders, environmental nongovernmental organizations (eNGOs), governments, employees and others on a range of environmental issues. We consider these relationships to be very valuable, as they allow us to share ideas and obtain various perspectives, input and feedback regarding our programs, activities and performance. They also inform our reporting, enabling us to better meet the information needs of a wide variety of interested people and entities.

In addition, IBM Stockholder Relations holds an annual Corporate Responsibility Financial Analysts Call and Webcast during which executives from various areas of corporate responsibility in IBM—including Corporate

Environmental Affairs, Global Supply Chain, Corporate Legal/Governance, Global Human Resources and Corporate Citizenship & Corporate Affairs—present a brief update on our programs and performance and invite questions from analysts on any of the areas of corporate responsibility in IBM.

The executives participating on this annual analyst call are on IBM's Corporate Responsibility Executive Steering Committee. Corporate responsibility is not a separate, standalone organization in IBM. Consistent with our century-long commitment to being a good corporate citizen, corporate responsibility is integrated throughout IBM. We coordinate across the company through our Corporate Responsibility Executive Steering Committee, which consists of executives responsible for the various relevant functions in IBM. The Committee is supported on a day-to-day basis by a Corporate Responsibility Working Group of representative experts from these various IBM functions.

Another example of engagement is collaborative innovation. We believe that integrating different expertise and different perspectives can accelerate new solutions to longstanding problems. You will find examples of IBM's collaborative innovation—in research and solutions, with business partners, clients, universities and other entities—throughout this report.

Voluntary Partnerships and Initiatives

IBM is strongly committed to participation in voluntary programs and we have founded or joined many voluntary initiatives and partnerships with governmental and nongovernmental organizations over the years.

Some current governmental examples include the United States Environmental Protection Agency's (EPA) ENERGY STAR®, SmartWay® and WasteWise programs and the European Union (EU) Code of Conduct for Energy Efficient Data Centers.

Examples of partnerships with eNGOs include our charter membership in the World Wildlife Fund's Climate Savers program and membership in the Center for Climate and Energy Solutions (the successor to the Pew Center on Global Climate Change). We also work with and support organizations such as The Conservation Fund, the Environmental Law Institute and the World Environment Center (WEC).

In addition, we partner with other companies and institutions to foster solutions for environmental sustainability. For example, IBM is a founding member of the GridWise® Alliance, an organization representing a broad range of the energy supply chain—from utilities and technology companies to academia and venture capitalists. Its mission is to transform the electric grid to achieve a sustainable energy future.

Two recent initiatives follow:

- In January 2013, IBM joined the Green Power Market Development Group (GPMDG) in Bangalore, India. Launched by the World Resources Institute (WRI) and the Confederation of Indian Industry, the objective of this initiative is to help improve the purchasing conditions for electricity generated from renewable sources and spur the growth of competitively priced renewable energy in this market. (IBM was a charter member of the WRI's Green Power Market Development Group in 2000.)

- In January 2012, IBM and the WEC formed the Innovations for Environmental Sustainability Council with the participation of major corporations. Its purpose is to explore how innovation in business process and technology can enable strategic solutions to major challenges such as those involving materials, energy, water, infrastructure and logistics. The Council recently published a report entitled "Meeting Next Generation Challenges through Innovations in Sustainability." (IBM has been a member of the WEC since its founding in 1977.)

A more complete listing of our voluntary partnerships and initiatives may be found on IBM's Voluntary environmental initiatives website at http://www.ibm.com/ibm/environment/initiatives.

We also encourage our employees to support environmental efforts. For example, through our Matching Grants program IBM matches contributions made by our US employees to a wide variety of environmental organizations including The Nature Conservancy and the World Wildlife Fund, as well as smaller groups dedicated to preserving lands and habitats in local communities.

In addition, our employees can support environmental organizations in their local communities through IBM's On Demand Community (ODC) program. ODC is a first-of-its-kind global initiative to encourage and sustain corporate philanthropy through volunteerism. It provides our employees and retirees with a rich set of IBM technology tools they can use to help schools and nonprofit organizations with which they volunteer, including environmental organizations. The program combines the expertise, interests and skills of our employees with the power of IBM's innovative technologies and solutions to help nonprofit organizations more effectively address community needs.

Environmental Investment and Return

Over the past five years, IBM has spent $89.4 million in capital and $498.5 million in operating expense to build, maintain and upgrade the infrastructure for environmental protection at our plants and labs, and to manage worldwide

environmental programs.

Environmental Capital and Expense Worldwide
($ in Millions)

	2008	**2009**	**2010**	**2011**	**2012**
Capital	$ 31.7	$ 14.3	$ 15.1 [1]	$ 18.4	$ 9.9
Expense	$ 111.3	$ 102.3	$ 90.6	$ 96.1 [2]	$ 98.2
Total	$ 143.0	$ 116.6	$ 105.7	$ 114.5	$ 108.1

[1] *IBM has restated its worldwide Environmental Capital Cost for 2010 due to discovery that some costs were previously omitted from the 2010 Environmental report.*
[2] *IBM modified its methodology for estimating operating expenses in 2011 to include information on expenses associated with compliance with worldwide environmental legal requirements for products, including costs associated with compliance with worldwide product takeback and recycling requirements.*

IBM has tracked environmental expenses related to our facilities, corporate operations and site remediation efforts for more than 25 years, and began publicly disclosing this information in our environmental report for 1992. In 2011, we expanded our tracking of environmental expenses to include expenses associated with compliance with environmental legal requirements related to products, including those costs incurred for compliance with product takeback and recycling requirements. In 2012, total environmental expenses associated with IBM's operations were $108.1 million.

IBM also estimates savings that resulted from our policy of environmental leadership. These include savings that come from energy, material and water conservation; recycling; packaging improvement initiatives; reductions in chemical use and waste, and process improvements from pollution prevention. Ongoing savings from the previous years' initiatives are not carried over in this comparison, resulting in very conservative estimates.

In addition, IBM realizes avoidance of costs that likely would occur in the absence of our environmental management system. These savings are not measurable in the same way that expenses are, but avoiding these environmental costs does result in savings for IBM, and a reasonable attempt has been made to estimate them. In 2012, IBM's estimated environmental savings and cost avoidance worldwide totaled $141 million.

IBM's experience has shown that annual savings from our focus on conservation, pollution prevention and design for the environment consistently exceed environmental expenses, thus demonstrating the value of proactive environmental programs and performance.

$141 million
estimated environmental savings and cost avoidance worldwide in 2012.

2012 Environmental Expenses Worldwide
($ in Millions)

Personnel	$39.1
Consultant and legal fees	3.6
Laboratory fees	2.1
Permit fees	0.7
Waste treatment and disposal	7.7
Surface water and wastewater management operations	8.3
Air emission control operations	0.4
Groundwater protection operations	1.3
Product takeback and recycling costs	0.9
Waste and materials recycling	2.2
Superfund and former IBM site remediation	22.7
Other environmental operations	9.2
Total	**$98.2**

2012 Estimated Environmental Savings and Cost Avoidance Worldwide
($ in Millions)

Location pollution prevention operations*	$34.6
Corporate operations*	5.6
Packaging improvements	17.3
Environmentally preferable materials usage	0.3
Energy conservation and cost avoidance	51.1
Superfund and site remediation efficiencies	1.7
Spill remediation cost avoidance**	4.9
Compliance cost efficiency***	19.6
Potential fines, penalty and litigation avoidance****	5.9
Total	**$141.0**

* Savings or costs avoided by having internal professional staff and tools versus using external consultants and tools.
** These savings are estimates based upon certain assumptions. The figure for spill remediation cost avoidance is estimated considering IBM's actual experience with remediation costs.
*** Compliance cost efficiency considers costs avoided through proactive efforts to stay ahead of environmental regulations and requirements.
**** The estimation for the avoidance of potential fines, penalties and litigation does not include cost avoidance of potential business interruption or fines related to noncompliance with product environmental laws and regulations (e.g., EU REACH or RoHS requirements).

Process Stewardship

Among its objectives, IBM's Corporate Policy on Environmental Affairs calls for our use of development and manufacturing processes that are protective of the environment.

_____

Environmentally Preferable Substances and Materials

As an integral part of the global EMS through which we support the objectives of our Corporate Policy on Environmental Affairs, we routinely and consistently monitor and manage the substances we use in our manufacturing and development processes and in our products.

Our precautionary approach includes the careful scientific review and assessment of certain substances prior to their use in IBM processes and products. In specific instances, we have chosen to proactively prohibit, restrict or substitute substances used in our processes and products when the weight of scientific evidence determines a potential adverse effect upon human health or the environment, even when law permits the use of the substance.

We also conduct scientific assessments of existing approved substances when new processes or major modifications to existing processes are being developed. The objective of these scientific assessments is to identify potential substitutes that may be environmentally preferable. We believe that the same scientific rigor is required when investigating the human health and environmental effects of potential substitutes as was applied to the investigation of the substance in use.

IBM has a long history of continually taking proactive steps to evaluate the chemicals used in our processes and products; identifying potential substitutes that may have less impact on the environment, health and safety; and eliminating, restricting and/or prohibiting the use of substances for which a more preferable alternative is available that is capable of meeting quality and safety requirements of our processes and products.

The following provides a sampling of IBM's nearly 40 years of early leadership in prohibiting or restricting many substances of concern from our processes and products before regulatory requirements were imposed. A more complete listing may be found on our Materials use web page.

- **Polychlorinated biphenyls (PCBs)**
  IBM initiated a multi-year effort to eliminate PCBs from use in our

products in 1974 and achieved elimination in 1978.

- **Chlorofluorocarbons (CFCs)**
  In 1989, IBM became the first major information technology (IT) manufacturer to announce a phase-out of CFCs, a Class I ozone-depleting substance, from our products and manufacturing and development processes.

- **Class I and II ozone-depleting substances**
  IBM completed the phase-out of Class I ozone-depleting substances in 1993. Subsequently, IBM eliminated Class II ozone-depleting substances from our products and processes in 1995.

- **Trichloroethylene (TCE), ethylene-based glycol ethers and dichloromethane**
  Examples of other chemicals that IBM voluntarily prohibited from our manufacturing processes include TCE in the late 1980s, ethylene-based glycol ethers in the mid-1990s and dichloromethane in 2003.

- **Polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs)**
  IBM prohibited PBBs and PBDEs from its product designs in the early 1990s and then extended the prohibition to purchased commodities through our procurement specifications in 1993.

- **Cadmium**
  IBM prohibited the use of cadmium in inks, dyes, pigments and paints in 1993; in plastics and plating in 1994; and in CRT monitors along with nickel cadmium batteries in the mid-1990s.

- **Polyvinyl chloride (PVC) and tetrabromobisphenol A (TBBPA)**
  IBM ceased the specification of PVC in our IT system enclosures in 2000 and prohibited the use of TBBPA as an additive flame retardant in IT system enclosures for newly released products in 2007.

- **Specific perfluorinated compounds (perfluorooctane sulfonate [PFOS] and perfluorooctanoic acid [PFOA])**
  IBM prohibited the compounds' use in the development of new materials in 2005, in new manufacturing applications in 2007, and eliminated the use of PFOS and PFOA in manufacturing, development and research processes as of January 31, 2010.

The IBM restrictions on specific substances and other environmental requirements for our products are identified in our Engineering Specification: Baseline Environmental Requirements for Supplier Deliverables to IBM.

Nanotechnology

By definition, nanotechnology is the application of scientific and engineering principles to make and utilize very small things (dimensions of roughly 1 to 100 nanometers), creating materials with unique properties and enabling novel and useful applications. It involves an ever-advancing set of tools, techniques and unique applications involving the structure and composition of materials on a nanoscale.

Nanotechnology is already part of a wide variety of products—from cosmetics and sunscreens to paints, clothing and golf equipment. It can make products lighter, stronger, cleaner, less expensive and more precise, and has been critical to advancements in the IT industry.

IBM Research became involved in the world of nanoscience in 1981 when Gerd Binnig and Heinrich Rohrer invented the scanning tunneling microscope, revolutionizing our ability to manipulate solid surfaces the size of atoms. Since that time, IBM has achieved a number of developments in the field – from moving and controlling individual atoms for the first time and developing logic circuits using carbon nanotubes to incorporating sub-nanometer material layers into commercially mass-produced hard disk drive recording heads and magnetic disk coatings.

We were also one of the first companies to create safe work practices and health and safety training for our employees working with nanoparticles. IBM, along with the International SEMATECH Manufacturing Initiative (ISMI) and other semiconductor companies, is participating in a collaborative study with the National Institute for Occupational Safety and Health (NIOSH) and the College of Nanoscale Science and Engineering (CNSE) of the University at Albany-SUNY to monitor potential workplace exposure to nanoparticles during chemical mechanical planarization (CMP) operation and maintenance.

IBM's current nanotechnology research aims to devise new atom- and molecular-scale structures and methods for enhancing information technologies, as well as discovering and understanding their scientific foundations. We believe these technologies can bring with them significant social and environmental benefits.

The following are highlights of some of our latest nanotechnology research milestones:

- IBM announced a major advance in the ability to use light instead of electrical signals to transmit information for future computing. The breakthrough technology – called silicon nanophotonics – allows the integration of different optical components side-by-side with electrical circuits on a single silicon chip using, for the first time, sub-100 nanometer semiconductor technology. Silicon nanophotonics takes

15

advantage of pulses of light for communication and provides a superhighway for large volumes of data to move at rapid speeds between computer chips in servers, large data centers and supercomputers, thus alleviating the limitations of congested data traffic and high-cost traditional interconnects.

- Researchers from IBM and the Institute of Bioengineering and Nanotechnology announced their development of an antimicrobial hydrogel that can break through diseased biofilms and completely eradicate drug-resistant bacteria upon contact. The synthetic hydrogel, which forms spontaneously when heated to body temperature, is the first-ever to be biodegradable, biocompatible and non-toxic. Comprised of more than 90 percent water, if commercialized, it is ideal for applications like creams or injectable therapeutics for wound healing, implant and catheter coatings and skin infections and to help combat serious health hazards facing hospital workers, visitors and patients.

- IBM scientists demonstrated a new approach to carbon nanotechnology that opens up the path for commercial fabrication of dramatically smaller, faster and more powerful computer chips. For the first time, more than 10,000 working transistors made of nano-sized tubes of carbon have been precisely placed and tested in a single chip using standard semiconductor processes. These carbon devices are poised to replace and outperform silicon technology, allowing further miniaturization of computing components and leading the way for future microelectronics.

Pollution Prevention

Pollution prevention is a critical aspect of IBM's environmental efforts, and it includes, among other things, the management of hazardous waste, nonhazardous waste and chemical releases.

_____

Hazardous Waste

The best way to prevent pollution is to reduce the generation of hazardous waste at its source. This has been a basic philosophy behind IBM's pollution prevention program since 1971. Where possible, we redesign processes to eliminate or reduce chemical use and substitute more environmentally preferable chemicals. We maintain programs for proper management of the chemicals needed for research, development and manufacturing, from selection and purchase to storage, use and final disposal.

To more effectively track IBM's hazardous waste management performance, we developed a methodology to correlate the hazardous waste generated from our manufacturing operations relative to production in 1992 and expanded it to our manufacturing operations worldwide in 1993. We established a voluntary environmental goal based on this methodology in 1995 to drive continual reduction in the hazardous waste generated from these operations.

The goal is to achieve year-to-year reduction in hazardous waste generation from IBM's manufacturing processes indexed to output. The metric is measured at IBM's three microelectronics manufacturing locations that generate more than 90 percent (5,357 metric tons) of IBM's hazardous waste generation attributable to manufacturing processes (5,841 metric tons), although not all hazardous waste generated at these locations are indexed to production.

In 2012, IBM's hazardous waste generation indexed to output increased by 2.9 percent, or 68 metric tons, compared to 2011. There were two primary factors for this year-to-year increase: 1) an increased quantity of a hazardous waste solvent from a photolithography process, and 2) an increase in a hazardous waste stream from another wafer production line caused by a tool set problem that temporarily resulted in additional water entering the waste stream before the problem could be addressed.

Hazardous Waste Generation

2.9%

In 2012, IBM's hazardous waste generation indexed to output increased by 2.9% (68 metric tons) over 2011—despite ongoing, focused reduction efforts. There were two main factors for this year-to-year increase: 1) an increase in a waste solvent stream from a photolithography process, and 2) an increase in a waste stream from another wafer production line caused by a tool set problem that resulted in additional water entering the waste stream before the situation could be addressed.

Annual Change in Hazardous Waste Generation Indexed to Output
(metric tons & percent increase)

| Year	Value	Percent
2008	-330.0	-10.9%
2009	205.5	8.4%
2010	-714.0	-21.6%
2011	-88.0	-3.5%
2012	67.5	2.9%
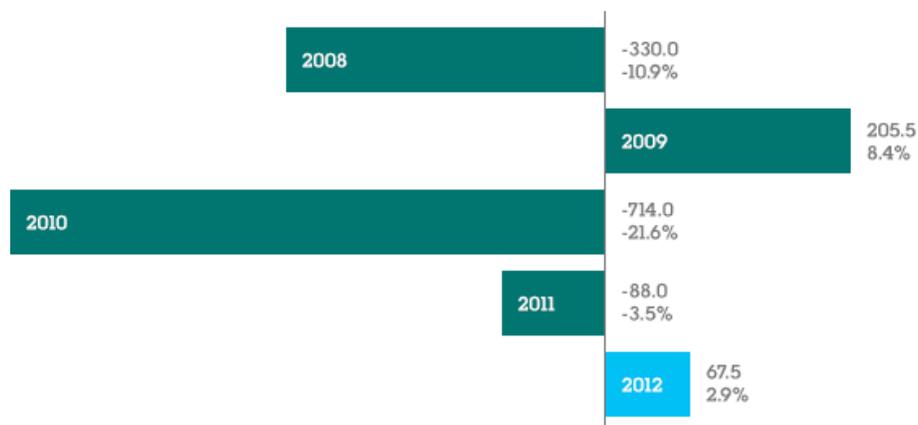
For the hazardous waste that is generated, we focus on preventing pollution through a comprehensive, proactive waste management program. For example, the waste solvents from photolithography are considered hazardous waste by regulatory definition and are therefore included in our hazardous waste metric. However, IBM has an active program for the off-site reclamation and beneficial use of the primary spent solvent in this waste. As is noted in the Awards and Recognition section of this report, our manufacturing location in East Fishkill, New York, received a Most Valuable Pollution Prevention Award from the US National Pollution Prevention Roundtable for its On-site and Off-site Waste Solvent Accomplishments Project in 2012.

Of the almost 7,400 metric tons of total hazardous waste IBM generated worldwide in 2012, 36 percent was recycled, 14 percent was sent off-site for treatment, 11 percent was sent for incineration, and the rest was sent to suitable regulated landfills worldwide. Of the total amount sent to landfills, approximately 90 percent were hazardous waste sludges generated from on-site industrial wastewater treatment processes. Government regulations required disposition of these hazardous waste sludges in secure landfills.

18

2012 Total Generated Hazardous Waste Worldwide by Treatment Method
(7,400 metric tons)

- 36% Recycled
- 39% Landfill
- 14% Treatment
- 11% Incineration
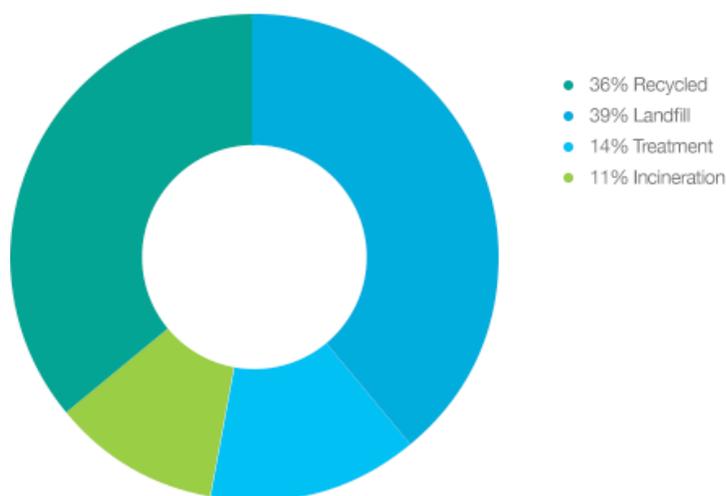
Nonhazardous Waste

IBM also has focused for decades on preventing the generation of nonhazardous waste, and where this is not practical, recovering and recycling the materials that are generated. Nonhazardous waste includes paper, wood, metals, glass, plastics and other nonhazardous chemical substances.

We established our first voluntary environmental goal to recycle nonhazardous waste streams in 1988. The goal has since evolved on two fronts. The first expanded on the traditional dry waste streams to include nonhazardous chemical waste and end-of-life IT equipment from our own operations as well as IBM-owned equipment that is returned by external customers at the end of a lease. The second expansion was made to include nonhazardous waste generated by IBM at leased locations, meeting designated criteria.

In 2012, IBM's worldwide operations generated approximately 68,900 metric tons of nonhazardous waste. This represents an absolute reduction of an estimated 1,200 metric tons, or 2 percent, when compared to 2011 quantities. The reduction was despite an annual increase in the generation of construction debris and an increase in end-of-life IT equipment and parts managed by IBM in 2012, when compared to 2011 quantities. Waste reduction and avoidance initiatives by IBM worldwide were estimated to have prevented the generation of 2,400 metric tons of nonhazardous waste, with estimated annual handling, treatment and disposal cost savings and revenue returns totaling $1.8 million. In addition, IBM worldwide product end-of-life management (PELM) operations reused 2,673 metric tons of end-of-life IT equipment and parts that were recovered during 2012.

Nonhazardous Waste Recycling

75%

Goal
Send an average of 75% of the nonhazardous waste generated at locations managed by IBM to be recycled.

87%

Result
In 2012, IBM sent 87% of its nonhazardous waste to be recycled.

Our voluntary environmental goal is to send an average of 75 percent of the nonhazardous waste generated at locations managed by IBM to be recycled. In 2012, we recovered and sent 87 percent of nonhazardous waste generated from designated IBM locations to be recycled.

The increase in our recycling rate for 2012 was partially attributable to the recategorization of some general office waste streams in Europe to indicate that they are being sent for energy recovery at controlled incineration facilities. IBM categorizes incineration with energy recovery as a method of recycling for the purposes of reporting against this goal. Ongoing reforms to waste management legislation in Europe are requiring that certain solid waste streams previously disposed of in landfills be diverted by waste management suppliers to beneficial reuse practices such as energy recovery.

Treatment methods that were credited towards the recycling target included: recycle, reuse, energy recovery, composting, reclamation, fuel blending and land farming. Treatment methods that result in a non-beneficial use that are not credited towards the recycling target include:

- Incineration

- Landfilling

- Treatment, such as aqueous treatment, biodegradation of organics, filtration, neutralization and stabilization.

Total Annual IBM-Generated Nonhazardous Waste Quantity and Recycling Performance
(Metric Tons x 1,000)

	2007	2008	2009	2010	2011	2012
Total sent for recycling	84	62	60	56	55	**60**
Total generated	107	82	79	71	70	**69**
Percentage recycled*	**78%**	**76%**	**76%**	**79%**	**78%**	**87%**

* Percent recycled versus the target of 75%

2012 Total Generated Nonhazardous Waste Worldwide by Treatment Method
(68,900 metric tons)

- 87.5% Recycled
- 11.2% Landfill & Incineration
- 1.3% Treatment
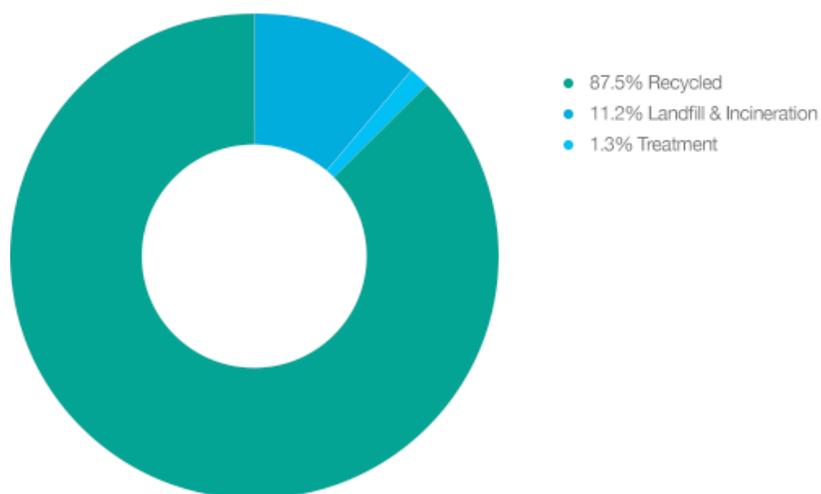
Management of Chemical Releases

Under Section 313 of the US Emergency Planning and Community Right to Know Act (EPCRA), companies are required to file an annual inventory of reportable quantities of more than 600 chemicals that were manufactured, processed or otherwise used in quantities exceeding the reporting threshold of 10,000 pounds (4.54 metric tons) for the preceding calendar year. These reportable quantities include:

- Routine releases of chemicals to the environment (e.g., permitted air emissions, water discharges, etc.)

- Chemical quantities that are treated, recycled, or combusted for energy recovery on-site

- Chemical quantities that are sent off-site for recycling, combustion for energy recovery, treatment or disposal

Though EPCRA is a US reporting requirement, we have voluntarily extended this reporting metric to cover our worldwide operations since 1994. In 2012, IBM's worldwide reportable quantities of EPCRA-listed chemicals amounted to 2,797 metric tons, representing a reduction of 13.5 percent compared to 2011. More than 81 percent of this quantity was treated on-site or sent off-site for recycling or combustion for energy recovery.

2012 Worldwide Reportable Quantities of EPCRA-Listed Chemicals
(2,797 metric tons)

- 65.7% On-site Treatment
- 12.8% Off-site Recycling
- 17.6% Release to Water
- 2.9% Off-site Energy Recovery
- 0.6% Release to Air
- 0.3% Off-site Treatment
- 0.1% Off-site Disposal
- 0.0% On-site Recycling
- 0.0% Discharge to Public Treatment Works
- 0.0% Release to Land
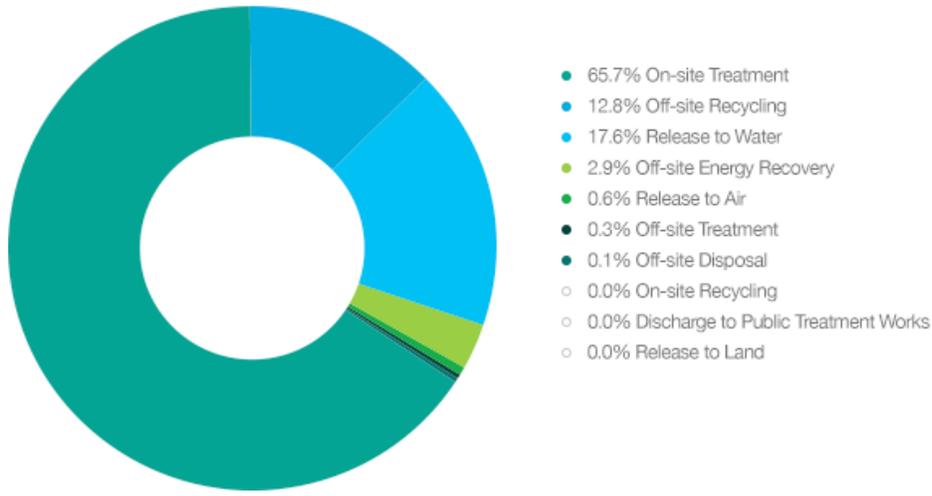
Worldwide Reportable Quantities of EPCRA-Listed Chemicals*
(2008–2012, metric tons x 1,000)

Year	Value
2008	3.6
2009	3.2
2010	3.6
2011	3.2
2012	2.8

*As defined under Section 313 of the US EPCRA.

22

2012 Worldwide Reportable Quantities of EPCRA-Listed Chemicals

Chemical	Metric Tons
Sulfuric acid (Aerosol only)	1,182
Nitrate compound	647
Xylene	214
Hydrogen fluoride	210
Nitric acid	156
n-methyl-2-pyrrolidone	152
Ethylbenzyne	46
Ozone	29
All others	161
Total	**2,797**

IBM's voluntary goal in this area is to achieve year-to-year reduction in routine releases of EPCRA reportable chemicals to the environment, indexed to output.

In 2012, IBM's routine releases of EPCRA reportable chemicals indexed to output increased by 3.8 percent from the prior year. The primary reasons for this year-over-year increase was an increase in nitrate releases indexed to output from two processes at one of our manufacturing sites. One increase was due to delayed connection of manufacturing equipment to a new chemical reuse system. The other was a reduction in wastewater treatment efficiency during the fourth quarter caused by new wastewater characteristics attributable to the installation of new manufacturing equipment.

Releases of nitrate compounds from this facility are not impacting the quality of the receiving water body in a material way and nitrate compound concentration is not a parameter that is regulated by our discharge permit at this facility. However, limiting discharges of nitrate compounds is an IBM corporate requirement that is set in our own environmental practices. Accordingly, and consistent with our environmental management system, we continue to invest in process upgrades and treatments aimed at reducing nitrate discharges in our effluents.
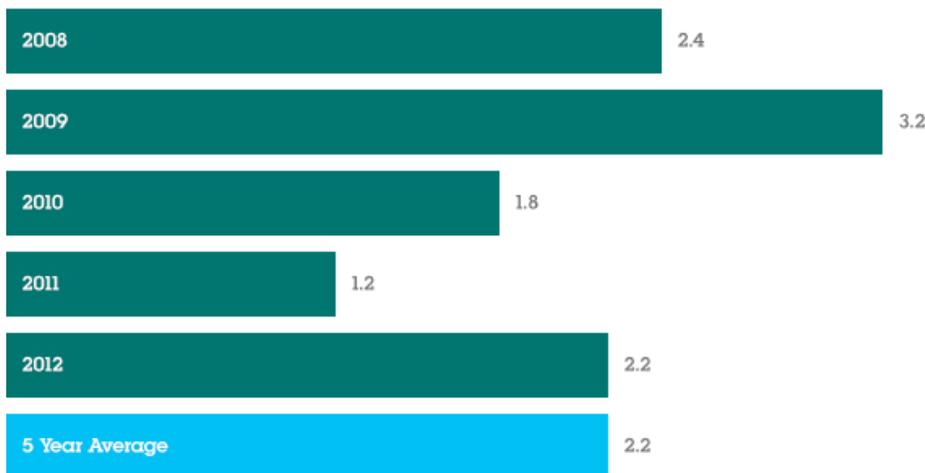
Water Conservation

The preservation of water resources and protection of watersheds are an internal focus for IBM.

_____

IBM's microelectronics manufacturing operations are our company's most water-intensive ones. In 2012, these operations represented 81 percent, or 9,300 TCMs (thousand cubic meters), of the 11,460 TCMs of water used at our manufacturing operations and laboratories worldwide.

Though our microelectronics operations are not located in areas of water scarcity, in 2000 we established a water conservation goal to achieve average annual water conservation savings equal to 2 percent of IBM's annual water use at microelectronics manufacturing operations, based on the water usage of the previous year and measured over a rolling five-year period. This voluntary environmental goal measures increases in annual water conservation resulting from new water reduction projects and improvements in water reuse and recycling at these locations.

In 2012, new water conservation initiatives in IBM's microelectronics manufacturing facilities achieved an annual 2.2 percent water conservation savings versus 2011 usage. Over the past five years, new water conservation initiatives at our microelectronics manufacturing facilities have achieved an average of 2.2 percent water conservation savings versus the 2 percent goal.

Water Conservation in Microelectronics Manufacturing Operations

2%

Goal
To achieve an annual average water savings equal to 2 percent of total annual water usage in our microelectronics manufacturing operations, based on the water usage of the previous year and measured as an average over a rolling five-year period.

2.2%

Result
As of year-end 2012, IBM's microelectronics manufacturing operations had achieved an average annual water savings of 2.2 percent over the past five years versus the 2 percent goal.

Annual Percentage Increases in Water Conservation Savings in Microelectronics Manufacturing Operations
(savings as percentage of previous year's total water use)

Year	Savings
2008	2.4
2009	3.2
2010	1.8
2011	1.2
2012	2.2
5 Year Average	2.2

The significant efforts undertaken by IBM's microelectronics operations in the early years of our water conservation goal were very effective in capturing opportunities for water conservation. Further improvements in water conservation are particularly challenging because, due to the low cost and high availability of water in the regions where we operate our microelectronics facilities, new water conservation projects at these locations are seldom financially compelling. That said, we continue to investigate options to further drive the efficient use of water at our manufacturing operations and laboratories worldwide.

In 2012, 569 TCMs of water were conserved in our microelectronics manufacturing operations through new and ongoing reduction, reuse and recycling activities. Of this total conservation, 425 TCMs of water withdrawals were avoided through on-site water reuse, and wastewater and groundwater recycling projects. New water use reduction projects contributed a further 144 TCMs in water savings. The total accumulated conservation efforts over the past five-year rolling period avoided the usage of 3,902 TCMs of water resource.

Smarter Water® solutions

Leveraging our experience and advanced analytics, information management, technology services and business consulting capabilities, IBM is providing strategic water management solutions that help governments, water utilities and companies monitor and manage water operations more effectively.

We are also applying our research to advancing water conservation and availability. One example: In May 2013, we opened an IBM Research Center in Nairobi, Kenya, our first research center in Africa. Research that will be conducted at the lab will include both applied and far-reaching exploratory research.

Water is one example of the applied research: Nairobi is currently home to more than three million inhabitants, and the population is expected to grow to over five million by 2020 as migration to urban areas continues. With this large population growth, it is necessary to better manage and reconcile the various systems within the city. IBM Research in Africa will initially focus on two of these systems—water and transportation. Using multiple data sources, analytics and models, IBM Research hopes to develop a complete understanding of Kenya's water system and optimize the use, storage, safety and distribution of the country's water supply.

Product Stewardship

IBM's Product Stewardship program was established in 1991 as a proactive and strategic approach to the environmental design and management of our products. The program's mission is to develop, manufacture and market products that are increasingly energy efficient; can be upgraded and reused to extend product life; incorporate recycled content and environmentally preferable materials and finishes; and can be recycled and disposed of safely.

Framework

IBM's product stewardship objectives and requirements are implemented through IBM's Global Environmental Management System (EMS), internal standards, product specifications and other requirements in IBM's Integrated Product Development process. Product environmental attributes such as energy efficiency, materials content, chemical emissions testing, design for recycling, end-of-life management plans and packaging data must be documented and reviewed in IBM's Product Environmental Profile (PEP) tool at various checkpoints during the development process.

Compliance management tools like the [Product Content Declaration for IBM Suppliers](#) support the assessments required for a complete PEP prior to product release. IBM's design and compliance controls, including a specification for [Baseline Environmental Requirements for Supplier Deliverables to IBM](#), Product Content Declarations and compliance assessment protocols are managed by an interdisciplinary team with representatives from all IBM organizations that design, manufacture, procure, deliver and service our product offerings. The team's activities are coordinated by IBM's Center of Excellence for Product Environmental Compliance.

Planning and Design

IBM's System z® development engineers are designing products that will be offered in 2016 and beyond. This requires anticipation of future environmental requirements and proactive partnerships with our suppliers to develop technology roadmaps with sound material selection strategies.

In advance of regulatory developments, IBM imposed prohibitions on benzyl butyl phthalate (BBP), dibutyl phthalate (DBP) and bis (2-ethylhexyl) phthalate (DEHP) above 0.1 percent in our suppliers' deliverables. These substances were identified by the European Union (EU)'s Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Directive as Substances of Very High Concern (SVHCs), and their continued use in cables and other IT components would require authorization under the directive. Rather than pursue continued authorization to use the substances, IBM's hardware organization modified the internal PEP tool to incorporate mandatory transition plans for products containing these compounds. All new requirements for development were reflected in updates of IBM's environmental product specifications for suppliers.

In product specifications related to the requirements of the EU's Restriction of Hazardous Substances (RoHS) Directive, IBM Engineering Specifications 53P6233 and 97P3864 were updated to reflect new provisions of the recast RoHS Directive (2011/65/EC) and to proactively prohibit several exemptions well ahead of their official expiration dates.

These exemptions include lead (Pb) in linear incandescent lamps with silicate coated tubes (expiring September 2013), cadmium in certain color-converting LEDs for display systems (expiring July 2014), and cadmium in photoresistors for analog optocouplers in professional audio equipment (expiring December 2013).

In addition, the specifications inform suppliers that IBM will eliminate lead (Pb) in solders that complete a viable electrical connection between the semiconductor die and carrier within integrated circuit flip chip packages by July 1, 2014, though this exemption currently has no expiration date in the law. These and other exemptions from the materials restrictions were officially included in the RoHS Directive because reliable alternatives were not available when the Directive was published. IBM and our suppliers continue to work to eliminate the exempted uses where practical, and ahead of official expiration dates.

In 2012, all of our product brands also successfully completed the phase-out of uses for lead (Pb) in compliant pin connector systems other than c-press connectors and lead (Pb) in dielectric ceramic for capacitors in more than 200 distinct product offerings. IBM's development organizations gained experience with a custom, smart data management interface called the Exemption Tracking Tool, designed by IBM to assess the need for any critical exemptions and drive conversions toward RoHS exemption-free parts in all of IBM's current and future product materials. The Exemption Tracking Tool consolidates documentation on the parts and suppliers affected by each expiring exemption of the RoHS Directive, along with documentation on the conversion plans for those parts and the qualification status of the corresponding exemption-free replacement parts.

Orchestration and Execution

The rapid pace of new requirements for electrical and electronic equipment in global markets is reflected by IBM's need to notify suppliers of 91 new or modified laws affecting our hardware and/or chemical product offerings in 2012. More than 6,000 individual communications to suppliers covered topics like the EU's REACH Directive, new requirements for implementing the recast RoHS Directive and the US Toxic Substances Control Act.

To address the increasing demands of due diligence, IBM's Integrated Supply Chain organization enhanced its Quality Management System to integrate product environmental compliance reviews into its supplier audit processes. The objective of these enhanced audits is to ensure that suppliers keep pace with the cadence of worldwide regulations and can provide all necessary technical documentation to substantiate conformance to environmental requirements.

2012 Product Stewardship Goals and Performance

Recycled Plastics | Recycled plastic used in IBM's products can range from 25 to 100 percent by weight of the commercial resin. In 2012, 25.5 percent of the total weight of plastic resins procured by IBM and its suppliers through IBM's corporate contracts for use in IBM's products were resins that contained between 25 and 100 percent recycled content. Comparing only the weight of the recycled fraction of these resins to the total weight of plastics (virgin and recycled) purchased, 12.6 percent of IBM's total weight of plastic purchases in 2012 was recycled plastic versus the corporate goal of 5 percent recyclate.

Use of Landfills | IBM's product end-of-life management operations worldwide processed 36,100 metric tons of end-of-life products and product waste, and sent only 0.3 percent of the total to landfills or to incineration facilities for treatment, versus IBM's corporate goal of minimizing its combined landfill and incineration rate to no more than 3 percent of the total amount processed.

Product Energy Efficiency*

Servers | IBM System p®: IBM released two models of Power Systems™ servers, the Power® 770 and 780, for which previous models or generations existed.

These new servers provide reductions of 10 to 58 percent in the typical power consumption per unit of relative performance compared to their previous generation system. In addition, the power supplies were upgraded from 80 PLUS® Gold to 80 PLUS Platinum certified power supplies.

IBM System x®: The 11 System x servers announced in 2012 for which comparison models existed provide reductions in watts/MTOPS** (the Japan Energy Saving Law metric) of 18 to 93 percent over the previous generation. All servers were announced with 80 PLUS Platinum certified power supplies. Five of the servers reduced power use by 50 percent or more when idle, and 10 servers by 32 percent or more.

IBM System z: IBM announced the new IBM zEnterprise® EC12 with a radiator-based air-cooled system and optional water cooling. The air-cooled system delivers a 48 percent improvement in capacity per watt and the water cooling option delivers a 57 percent improvement as compared to the previous generation z196. The system also offers a high-voltage DC power option which improves system efficiency by 3 percent through the elimination of two power conversions.

Storage Subsystems

IBM announced the new IBM System Storage® DS8870 in 2012 that reduces energy use by 20 percent over the previous generation DS8800 system and reduces the power use per gigabyte of capacity by 35.9 percent. The system also incorporates a power supply which would qualify for the 80 PLUS Gold level but does not qualify because it is a multi-volt power supply. IBM continues to improve storage performance through the use of mixed-drive systems with capacity and throughput improvements and optimization driven by software capabilities such as Easy Tier®, thin provisioning and storage virtualization.

* IBM's product energy goal is to continually improve the computing power delivered for each kilowatt-hour (kWh) of electricity used with each new generation or model of a product.

** MTOPS-million theoretical operations per second is a calculation of machine operations based on a specified formula.

Note: The above table no longer includes performance information for Point-of-Sale terminals as IBM sold its Retail Store Solutions division in 2012.

Product Energy Efficiency

Product energy efficiency has long been one of IBM's environmental and climate protection objectives. It was formalized as one of the company's corporate objectives when IBM's Product Stewardship program was established in 1991. We have initiated and invested in innovations and integrated solutions through collaboration between IBM Research and our product development teams. These teams have combined hardware and software innovations to improve the energy efficiency of IT equipment and data centers.

IBM also actively assists in the development of external product energy efficiency standards. As we did in 1992 when we helped to develop and were a charter member of the United States Environmental Protection Agency (US EPA) ENERGY STAR® Computer program, IBM is currently participating in the development of the ENERGY STAR specifications for server, storage and network devices, and providing technical assistance and equipment-operating data to assist in the development of criteria.

In March 2013, the US EPA finalized Version 2 ENERGY STAR program requirements for computer servers; the requirements for products covered by Version 1 will go into effect in December 2013. Version 2 also creates new product categories for blade servers and resilient servers, and eligible systems can be qualified upon the publication of the Version 2 requirements.

As of April 2013, IBM had 19 Version 1 qualified server systems available on the market—four System p and 15 System x enterprise server systems. These servers meet the US EPA's requirements for power supply efficiency, idle power limits or power management capability and data reporting. A list of IBM ENERGY STAR qualified servers may be found on the IBM and ENERGY STAR web page. IBM intends to qualify its System p and System x servers to the ENERGY STAR Version 2 requirements, including the addition of blade and resilient servers.

New advancements for increased product energy efficiency performance

The following are examples of new IBM technologies, software and solutions that have enabled the increased energy efficiency of IBM's servers and storage products:

IBM System x:

IBM announced new server solutions designed to expand cloud and analytics capabilities, helping to make Smarter Computing a reality for IBM System x x86 server clients. IBM's new portfolio of x86 computing solutions includes the following:

30

- The IBM BladeCenter® HS23 offers an integrated virtualization platform with built-in system management which ships preconfigured with servers, storage, and networking integrated into a BladeCenter chassis. BladeCenter Foundation for Cloud offers 62 percent more computer power and four times more memory compared to previous generation technologies enabling clients to run 20 percent more virtual machines, making more efficient use of the system hardware and reducing the energy needed to complete a given set of workloads.

- The IBM System x3550 M4 delivers four times more memory, 33 percent more storage capacity, 18 percent better performance/power capability (as measured by the Japan Energy Law metric), and more virtual machines. The server has an 80 PLUS Platinum certified power supply and reduces energy consumption by 50 percent when no workload is present.

The energy use reduction benefit of IBM System x products is exemplified by an IBM System x3650 M3 server installation at a large UK financial services firm. IBM migrated 84 percent of the existing physical environment to a new virtualized server and storage environment, upgrading to energy efficient IBM System x3650 M3 servers. As a result, 66 physical servers were consolidated to just six servers across two sites, plus an additional nine IBM hosts to provide the new virtual environment. In the four weeks following completion of the project in April 2012, overall power consumption had been reduced by 37 percent. This equates to a projected savings of approximately $46,000 per year and the avoidance of almost 13 metric tons of CO_2 emissions.

IBM PureSystems™:

A completely new product offering for 2012, PureSystems combine automated systems management expertise and pre-loaded/pre-tuned application software with open, scalable hardware systems that help maximize system utilization and reduce the total number of servers required in the data center. By eliminating lower utilization servers, PureSystems allows companies to consolidate their IT operations and enable continued application/user growth without significant hardware system additions. Increased utilization leads to a smaller real-estate requirement, lower energy costs and lower systems management costs.

The IBM PureFlex™ System, (part of the IBM PureSystems product family) combines computation, storage, networking, virtualization and management into a single infrastructure system. The table that follows illustrates the levels of facility space and energy use savings that can be achieved by consolidating older server/storage systems onto the integrated, virtualized PureFlex platform. The cost calculations are based on six user installations employing the full range of SAP applications. Results are based on a set of before and after calculations for each installation.

Examples of IBM PureFlex System Savings

Installation	Consolidation Type	PureFlex System % Less	
		Facilities	Energy
IT Services Company	Mixed Platforms	92%	87%
Manufacturing Company 1	Unix Servers	94%	94%
Distribution Company	Unix Servers	80%	78%
Retail Company	Mixed Platforms	66%	59%
Manufacturing Company 2	x86 Servers	80%	71%
Diversified Company	x86 Servers	65%	68%
Average for All Installations		**89%**	**85%**

IBM System z:

IBM announced the zEnterprise EC12, our next generation System z server, in August 2012. System z servers offer a host of capabilities that can drive energy efficiency in the data center: high levels of virtualization and utilization, static power savings mode for idle processors, a DC power option and optional water cooling.

The zEC12 can help provide better control of energy usage in the data center, offering a selection of energy efficient infrastructure options to complement the ability to run many workloads at high utilization. A static power savings mode allows for turning off processors that are not being used. The Unified Resource Manager monitors power use and provides trend reporting of energy efficiency for the entire system infrastructure. The zEC12 and zBX (zEnterprise BladeCenter Extension) includes a water-cooling option that offers energy savings without compromising performance. Two general examples of System z's energy efficiency benefits based on use of the previous generation systems are provided:

- A large insurance firm consolidated 3,000 distributed, largely underutilized servers onto Linux virtual servers running on IBM System z mainframes. By consolidating their distributed infrastructure to a private cloud supported on a handful of z196 and z10 servers, the client achieved an 80 percent reduction in power, cooling and floor space requirements—even as its application landscape has grown considerably. The company also expects to manage the majority of its 30 percent annual growth in computing requirements by provisioning new virtual servers on the existing System z cloud infrastructure.

- A major transportation operator wanted to upgrade its IT systems to meet the challenge of maintaining safe, secure and cost-effective air traffic control services in an increasingly busy airspace. To ensure 24/7 availability for these applications, the client migrated them to a private cloud environment hosted on an IBM zEnterprise 196 mainframe with the IBM zBX. The installation shrunk the data center footprint by 80 percent and reduced energy consumption by 58 percent.

Storage systems:

IBM continues to enhance our portfolio of storage systems, utilizing and improving various software-based data management capabilities such as Easy Tier, thin provisioning and storage virtualization which can reduce the storage hardware and energy footprint and the number of terabytes required to accomplish a given storage task. IBM also disclosed the DS8870 metric results for the Storage Networking Industry Association (SNIA) Emerald™ Power Efficiency Measurement Specification, the first disclosure for a storage system under that specification.

In 2012, IBM made a significant step to incorporating solid state disk (SSD) storage systems into our product lines with the acquisition of Texas Memory Systems (TMS). We plan to incorporate TMS products into our PureSystems prepackaged hardware systems, as well as into other storage, server and software product lines. SSDs offer performance and reliability advantages over traditional spinning disk based systems and have a significantly smaller power profile, making for more energy efficient systems.

High Performance Computers (HPC):

IBM offers a full range of purpose built and "off-the-shelf" technical computing (supercomputer) solutions. IBM's supercomputer solutions are prevalent on both the TOP500® and Green500™ supercomputer lists. As of November 2012, six of the top 10 and 21 of the top 25 most energy efficient supercomputers in the world are built on IBM high-performance computing technologies. IBM HPC systems also occupy six of the top 10 spots and 10 of the top 25 spots on the November 2012 TOP500 list of the world's top supercomputers. Technologies developed through IBM's HPC development efforts are leveraged across the entire IBM Systems and Technology Group product line to improve performance and energy efficiency.

The speed and expandability of IBM's HPC products have enabled business and the scientific community to address a wide range of complex problems and make more informed decisions in the life sciences, astronomy, climate, system simulations and modeling, and many other applications. The use of HPC systems also enable simulations of activities, such as crash testing, vehicle or airplane designs, and fuel burners, without the need to expend physical resources on prototypes or physical testing. IBM continues its leadership performance in a space-saving, power-efficient HPC package to address the most demanding performance applications. Two examples follow:

- One of the world's premier research universities implemented an IBM HPC solution to expand its computing capacity from 9 to 21.5 teraflops, increase the flexibility of the system to support and facilitate a more diverse range of research work beyond the previous, primary mission of climate research while also reducing power consumption and increasing efficiency. The upgraded system automatically powers on and off,

depending on need and usage, reducing the power use and the CO_2 emissions footprint of the system.

- A major supercomputing center in Germany built an HPC system incorporating IBM System x iDataPlex® Direct Water Cooled dx360 M4 servers with more than 150,000 cores to provide a peak performance of up to three petaflops. A revolutionary new form of hot-water cooling technology invented by IBM allows the system to be 10 times more compact, removes heat 4,000 times more efficiently than air, and substantially improves peak performance while consuming 40 percent less energy than a comparable air-cooled machine. The integration of hot-water cooling and IBM application-oriented, dynamic systems management software allows energy to be captured and reused to heat the buildings during the winter on the sprawling campus—and provides savings of $1.2 million per year.

Innovations in semiconductor manufacturing
IBM Research and IBM Systems & Technology Group continue to drive innovation in semiconductor technologies to increase computing and storage capacity while reducing the energy required for a given functionality. Two recent innovations:

- IBM Research has developed flexible, low-power circuitry that can be built on metal oxides, referred to as strongly correlated materials. These materials can be induced to change their ability to transmit electricity, establishing the state of a cell by switching the material state from a conductor to an insulator or vice versa. The approach promises to be more energy efficient than standard silicon transistors as the resulting strongly correlated material transistors would not need to have power constantly applied to maintain their state.

- IBM has developed a process to place more than 10,000 transistors made from carbon nanotubes (CNT) onto a single chip. While significantly below current silicon-based circuit densities of more than a billion circuits on a processor, the development is an important next step in commercializing CNT-based processor technologies. CNT circuits are smaller and can potentially carry higher current densities than silicon circuits and offer a potential replacement for silicon-based processors as silicon technologies reach their physical limits.

Product Recycling and Reuse

As part of our product end-of-life management (PELM) activities, IBM began offering product takeback programs in Europe in 1989, and has extended and enhanced them over the years. IBM's Global Asset Recovery Services organization offers Asset Recovery Solutions to commercial customers in countries where we do business. These solutions include:

- Management of data security and disk overwrite services

- Worldwide remarketing network for product resale

- State-of-the-art refurbishing and recycling capability for IT equipment

- Optional logistic services such as packing and transportation

In many countries and US states, we offer solutions to household consumers for the end-of-life management of computer equipment, either through voluntary IBM initiatives or programs in which we participate.

In 2012, IBM worldwide PELM operations processed 36,100 metric tons of end-of-life products for reuse or recycling. This represents 66 percent of the estimated 54,300 metric tons of new IBM IT equipment put on the market in 2012, up from 60 percent in 2011. The increase was primarily attributable to a reduction in the weight of equipment put on the market by IBM, due to the divestiture of our Retail Store Solutions business during 2012.

2012 Product End-of-Life Management Operations
Total processed: 36,100 metric tons
(percentage by weight)

- 53.1% Recycled
- 35.9% Resold for Reuse
- 8.2% Reused
- 2.5% Waste-to-Energy
- 0.3% Landfill & Incineration
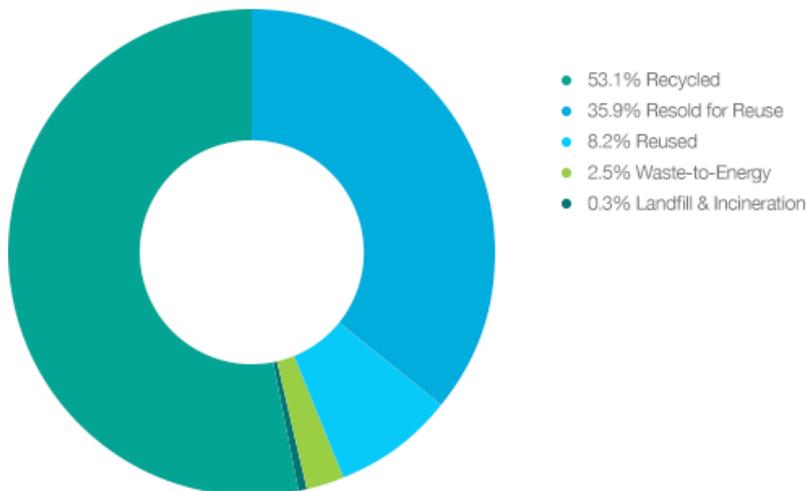
IBM's voluntary environmental goal is to reuse or recycle end-of-life products such that the amount of product waste sent by our PELM operations to landfills or to incineration facilities for treatment does not exceed a combined 3 percent of the total amount processed. In 2012, IBM worldwide PELM operations continued to send less than 1 percent (approximately 0.3 percent) to be landfilled or incinerated for treatment worldwide.

Of the total processed by IBM's worldwide PELM operations during this period, 53.1 percent was recycled as materials, 35.9 percent was resold as products, 8.2 percent was reused by IBM, 2.5 percent was incinerated for energy recovery, and 0.3 percent was sent to landfill or incinerated for final disposal.

Of the total 36,100 metric tons of product and product waste processed through IBM's worldwide PELM operations, approximately:

- 44 percent was processed in North America;

- 30 percent in Europe, the Middle East and Africa;

- 19 percent in Asia Pacific; and

- 7 percent in Latin America.

IBM's corporate-wide requirement for the environmental evaluations of the company's PELM suppliers was established in 1991, an expansion of our supplier environmental evaluation program introduced in 1972. We evaluate these suppliers prior to doing business with them and every three years thereafter. Our objective is to use only those suppliers that have a strong focus on environmental management, including complying with laws and regulations as well as sound management practices. More about IBM's requirements for our PELM suppliers may be found in the Environmental Requirements in the Supply Chain section of this report.

From 1995, when we first began including product recovery in our annual corporate environmental report, through the end of 2012, IBM has documented the collection and processing of approximately 880,000 metric tons (over 1.9 billion pounds) of product and product waste worldwide.

Product End-of-Life Management (PELM)

3%

Goal
Reuse or recycle end-of-life products such that the amount of product waste sent by IBM's PELM operations to landfills or to incineration for treatment does not exceed a combined 3 percent of the total amount processed.

0.3%

Result
In 2012, IBM's PELM operations sent only 0.3 percent to landfills or to incineration facilities for treatment.

IBM Worldwide PELM Operations:
Total Annual Quantity Processed
(Metric Tons)

Year	Total Processed
2008	42,600
2009	38,000
2010	36,700
2011	38,000
2012	36,100

Product Packaging

IBM has had a program focused on the environmental attributes of our product packaging since the late 1980s. Under the program, IBM packaging engineers design solutions that minimize toxic substances and packaging waste by specifying nontoxic materials and inks. We keep packaging to a minimum while continuing to provide protection to the product being shipped to clients, and collaborate with suppliers to use recycled and recyclable materials and promote reuse.

The design of rugged products and other optimization measures for the efficient use of product-protective packaging are addressed within IBM's Product Stewardship program and associated engineering specifications. Efficient use of product packaging and less tangible environmental benefits associated with improvements in transportation efficiency are tracked through this program.

IBM's environmental requirements for product packaging are included in our Environmental Packaging Guidelines, which were first published in 1990 and have been updated as needed over the years. Key elements of IBM's Packaging Guidelines have also been embedded in various engineering specifications and procurement documents, which extend their reach beyond IBM to include our supply chain and other business partners. The following supplier environmental packaging requirements are accessible from the Information for suppliers website:

- IBM Packaging requirements, 2006 as amended

- Engineering Specification(ES) 5897661: Recyclable packaging materials, selection and identification, 2012

- ES 5897660: Packaging materials, essential requirements, restricted heavy metals and other substances of very high concern, 2011

- ES 37L8024: Wooden packing, materials treatment and marking requirements, 2009

IBM's environmental packaging requirements incorporate a list of the most commonly used packaging materials. Each is evaluated on a variety of environmental criteria. Shippers are required to use materials that provide the best overall product protection and value, but when all else is equal they are required to choose the material that has the least possible adverse effect on the environment. The materials listed are based on practical and regulatory experience and customer feedback.

Other environmental areas addressed in the packaging requirements include:

- Ozone depleting substances;

- Restricted heavy metals and other materials of concern;

- Source reduction;

- Re-useable packaging systems;

- Recyclable packaging; and

- Conserving natural resources.

IBM's Recyclable Packaging Materials Selection and Identification specification

IBM's corporate Recyclable Packaging Materials Selection and Identification specification was updated in May 2012. The global specification applies to all primary, secondary and tertiary packaging for products, devices, parts, sub-assemblies, materials and supplies purchased by IBM for use in our manufacturing and distribution operations. It also applies to all packaging used in protecting, handling, or the marketing of IBM products, parts and supplies, including those manufactured by an original equipment manufacturer.

The objectives of the specification are:

- To establish parameters for the recycled content to be included in corrugated and plastic packaging

- To reduce or eliminate the use of non-recyclable materials or material compositions that prevent the recycling of IBM packaging after use

- To promote recycling by providing information (in the form of markings) that will increase the likelihood that our packaging materials will be recycled

The specification applies, but is not limited to, the following type of packaging materials and components:

- Molded and fabricated cushions (of any plastic resin)

- Corrugated fiberboard and paperboard

- Rigid and flexible plastics (bags and wraps)

- Wooden pallets, crates and skids

Protective product packaging

In 2012, our integrated worldwide packaging engineering team saved an estimated 1,400 metric tons of packaging materials through the implementation of 50 packaging redesign projects for parts and assemblies shipped from suppliers to manufacturing operations, and for packaged finished products supplied to clients worldwide. All environmental project data are submitted into the IBM Packaging Savings Database to track overall performance and details of ongoing annual costs and environmental savings delivered. The total annual materials and transport cost savings reported in 2012 was nearly $17.3 million. The following are highlights of a few of the projects implemented:

- The second-tier chassis supplier for IBM's Power Systems servers ships packaged parts to the first-tier fabrication supplier for additional manufacturing value-add. In these shipments, the packaging from the first shipment was discarded and new packaging was used to subsequently transport the finished goods from the first-tier fabrication supplier to IBM for final customer configuration.

  Working with both suppliers, IBM arranged for the packaging from the second-tier chassis supplier to be reused by the first-tier supplier to transport the completed assembly to IBM, thereby eliminating one set of packaging. In addition, the thickness of the polyethylene bag used to protect the equipment from moisture and scratching during shipment was reduced, while still retaining the protective quality. Total savings of 117 metric tons of packaging materials were delivered annually, with total materials and transport costs savings of $288,000 per year.

- In collaboration with a supplier of planar sub-assemblies for IBM Power Systems, we determined that the corrugated fiberboard cushioning being used could be eliminated because the polyethylene foam was sufficient for cushioning the product. As a result, additional parts are now packed into the original corrugated fiberboard carton. The enhanced design saved nearly 19 metric tons per year in packaging materials, with a combined materials and transport cost savings of $246,000 per year.

1,400 metric tons

2012 savings in packaging materials through new or redesigned packaging solutions

$17.3 million

Associated savings in transport costs.

- The IBM System Storage DS2000 and DS3000 series models originally had been packed separately from the accessories on a pallet. After packaging design enhancements, the accessories were able to be combined into a single, smaller corrugated fiberboard carton for shipment to clients. This redesign saved 9.5 metric tons per year of packaging materials and provided a total materials and transport cost savings of $82,000 per year.

- All IBM System x server switch assemblies were shipped from IBM's manufacturing sites to customers in a corrugated fiberboard carton incorporating polyethylene (PE) cushioning. Our packaging design engineers were able to reduce the overall dimensions of the carton and replace the PE cushion with a lighter, but stronger, thermoformed PE cushion, made from 100 percent post-consumer recycled polyethylene. These design initiatives saved 3.4 metric tons per year of corrugated fiberboard and plastic packaging materials, with an annual combined materials and transport cost savings of $274,000. Similar projects were implemented globally across different products during the year.

Suppliers are also applying these types of new design specifications for IBM and with other customers to deliver tangible benefits across the integrated supply chain.

Over the last five years, IBM has reported combined environmental savings of over 6,200 metric tons of product packaging materials from redesign projects implemented by the engineering packaging team worldwide. The total materials and transportation cost savings was approximately $60.4 million over the same period, benefiting IBM, parts suppliers and clients globally.

IBM's requirement for sourcing packaging materials
We established IBM's voluntary environmental requirement for the responsible sourcing of paper and paper/wood-based packaging in 2002. It required that the paper- and wood-based packaging directly acquired by IBM be procured from suppliers that source from sustainably managed forests, where such sources exist.

When this goal was first established, sufficient quantities of sustainably sourced paper and packaging materials were not yet available for much of the company's needs. With a continued focus on this objective by IBM and our suppliers over the years, since 2010, 99 percent of the paper/wood-based packaging IBM procured worldwide has come from suppliers that contractually warranted that the source was derived from forests managed in an ecologically sound and sustainable manner. This requirement is now incorporated into our standard supplier specification for paper/wood-based packaging.

Product Safety and Hardware Compliance

IBM's product safety and hardware compliance requirements are integrated within various steps of the product development, test, manufacturing and delivery processes. Each product completes the required product safety, electromagnetic compatibility, telecom and wireless regulatory compliance reviews as part of IBM's Product Safety Review Board process, ensuring newly announced or modified products comply with applicable hardware compliance standards. The review board process also ensures that products comply with applicable national regulations, and that IBM obtains any third-party or national certifications required by law. Our Integrated Supply Chain organization helps us ensure that our suppliers provide hardware that is compliant with current international and national requirements.

Programs for continual improvement include both internal and third-party assessment of IBM's product safety and hardware compliance design, development and product controls implementation. These assessment results are fed back into the development and conformity assessment process for future products. In addition, product safety and regulatory compliance incident review programs provide effective capture, investigation and remediation of product safety-related incidents.

IBM plays a leading role in the development of national, regional and international product safety, electromagnetic compatibility and conformity assessment standards for IT products.

Energy and Climate Programs

IBM recognizes climate change as a serious concern that warrants meaningful action on a global basis to stabilize the atmospheric concentration of greenhouse gases (GHGs). We believe all sectors of society, the economy and governments worldwide must participate in solutions to climate change.

_____

Climate Change

IBM has been a leader in addressing climate change through our energy conservation and climate protection programs for decades. IBM's leadership is defined by our:

- Longstanding global commitment

- Comprehensive and multifaceted programs covering the company's operations, products and services

- Leading-edge innovations and client solutions

- Significant results, both early and ongoing, benefiting IBM, our clients and the world

A Six-Part Strategy

We have a six-part strategy to reduce the GHG emissions related to our operations:

1. Designing, building, updating and operating facilities, including data centers and manufacturing operations, that optimize their use of energy and materials and minimize GHG emissions

2. Purchasing electricity generated from low CO_2-emitting and renewable energy-generating sources where it makes business and environmental sense

3. Minimizing the use and emissions of perfluorocompounds (PFCs—a family of GHGs) in semiconductor manufacturing

4. Requiring our suppliers to maintain an Environmental Management System which includes energy use and GHG emissions inventory and

reduction plans

5. Reducing employee commuting and business travel

6. Increasing the efficiency of IBM's logistics operations

In addition, in the area of our hardware and software products and services, IBM's strategy includes designing energy efficient products and providing clients with energy efficient solutions that also help protect the climate.

IBM considers energy and material conservation to be the cornerstone of our climate protection efforts. IBM does not have plans to use emissions offsets to become "carbon neutral" for all or part of our operations. Our efforts to reduce IBM's GHG emissions are focused on delivering results in the areas where the company can make the greatest positive impact on climate protection—by devoting available resources to actions, products and solutions that actually increase energy efficiency and reduce GHG emissions for both IBM and our clients, rather than offsetting them.

Conserving Energy

IBM's commitment to energy conservation dates back to 1974 and has continued unabated ever since. Energy conservation is a major component of our comprehensive, multifaceted climate protection program because the release of CO_2 by utility companies powering our facilities, or from the use of fuel for heating or cooling, represents the greatest potential climate impact associated with our operations.

In 2012, IBM's energy conservation projects across the company delivered savings equal to 6.5 percent of our total energy use versus the corporate goal of 3.5 percent. These projects avoided the consumption of 336,000 megawatt-hours (MWh) of electricity and 215,000 million British thermal units (Btu) of fuel oil and natural gas, representing the avoidance of 155,000 metric tons of CO_2 emissions. The conservation projects also saved $35 million in energy expense. While the quantity of energy avoided through conservation projects is slightly (0.9 percent) lower than in 2011, the 6.5 percent avoidance is consistent with the 2008-2012 average of 6.4 percent per year. These strong results are due to our continued, across-the-board focus on energy demand reduction, efficiency and the implementation of standard, global energy conservation strategies for facility operating systems.

IBM's energy conservation goal recognizes only completed projects that actually reduce or avoid the consumption of energy in our operations. Reductions in energy consumption from downsizings, the sale of operations and cost avoidance actions, such as fuel switching and off-peak load shifting, are not included in the results for measuring performance against achieving this goal. Moreover, the conservation results discussed above are

Energy Conservation

3.5%

Goal
Achieve annual energy conservation savings equal to 3.5 percent of IBM's total energy use.

6.5%

Result
In 2012, IBM's energy conservation projects across the company delivered savings equal to 6.5 percent of its total energy use.

—————————

155,000 metric tons

of CO_2 emissions avoided through IBM's energy conservation projects in 2012

conservative in that they include only the first year's savings from the conservation projects. Ongoing conservation savings beyond the first year are not included in the tally. Accordingly, the total energy savings and CO_2 emissions avoidance from these conservation actions is actually greater than this simple summation of the annual results.

Electricity and Fuel Use and Related CO_2 Emissions
Scope 1 and Scope 2 CO_2 Emissions

Year	Electricity and Fuel Use (thousand MMBtu)	CO_2 (estimated) (metric tons x 1,000)
2008	22,443	2,502
2009	21,507	2,436
2010	21,622	2,156
2011	21,758	2,182
2012	21,613	2,195

IBM uses the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard developed by the World Resources Institute and the World Business Council for Sustainable Development for estimating and reporting its CO_2 emissions.

CO_2 emissions data includes the CO_2 avoidance associated with IBM's purchases of renewable energy.

Between 1990 and 2012, IBM saved 6.1 billion kWh of electricity consumption, avoided 3.9 million metric tons of CO_2 emissions (equal to 57 percent of the company's 1990 global CO_2 emissions) and saved $477 million through its annual energy conservation actions.

Managing IBM's energy program
Our global energy management program leverages the expertise of more than 40 IBM energy management professionals deployed around the world. The team has created best-practices checklists that set minimum expectations for building systems and operations, including controls and equipment for lighting, HVAC (heating, ventilating and air conditioning), central utility plants (CUPs), compressed air, data center and IT systems, cafeterias and office systems.

All IBM sites using 2,000 MWh/year or more of energy must complete the checklists, perform a gap analysis and develop an energy conservation implementation plan a minimum of every four years. The program is buttressed by several enterprise-level databases that collect, store and analyze energy-use data, conservation project results, completed checklists, and relevant key performance indicators. These analyses enable monthly metrics reporting to the management team and the identification of opportunities for improvement. The continuous review of energy use and conservation performance has driven the strong results noted above.

1990-2012
6.1 billion kWh
of electricity conserved,

3.9 million metric tons
of CO_2 emissions avoided and

$477 million
saved between 1990 to 2012 through IBM's annual energy conservation actions

More than 2,670 energy conservation projects involving a full range of energy efficiency initiatives delivered savings at over 400 IBM locations globally in 2012. Examples include:

- Projects to match building lighting and occupancy schedules or install more efficient lighting systems were implemented at 208 locations, reducing electricity use by 12,700 MWh while saving $1.7 million.

- HVAC systems or operating schedules were modified at over 150 locations reducing 48,500 MWh of electricity use and 99,000 MMBtu of fuel use, saving $5.3 million.

- Central utility plant projects were implemented at 92 locations:

  - Boiler and chiller operation optimization helped reduce 19,300 MWh of electricity and 21,000 MMBtu of natural gas consumption at a savings of $1.4 million.

  - Free cooling reduced 8,200 MWh of electricity consumption saving $0.8 million.

  - Equipment upgrades and maintenance improvements reduced 17,200 MWh of electricity and 25,000 MMBtu of natural gas consumption while saving $0.9 million.

- Manufacturing energy efficiency projects:

  - IBM's microelectronics locations derived energy savings from nearly 220 efficiency improvement projects in their manufacturing and test areas. These projects saved 33,800 MWh of electricity, 69,000 MMBtu of fuel and $2.9 million.

The projects focused on increasing the capacity and throughput of manufacturing equipment through process optimization, improved HVAC management and relaxed space temperature and humidity specifications where appropriate, as well as upgrades to more efficient equipment such as variable-speed vacuum pumps on semiconductor manufacturing tools.

Leveraging analytics for further efficiencies
As opportunities for incremental savings from typical energy conservation projects diminish due to IBM's decades-long focus on energy efficiency, we are increasingly leveraging analytics to uncover less obvious, embedded opportunities to achieve continual improvement in operational energy efficiency.

- Smarter Buildings technologies such as IBM TRIRIGA® Energy Optimization (ITEO) are being deployed in IBM facilities to increase

energy efficiency. IBM locations are updating and connecting existing sensor networks to analytics-based control systems to collect data and analyze individual events and system trends. This information is then used to optimize building energy consumption. Through March 2013, IBM deployed ITEO at 23 of our highest energy consuming sites, with deployment underway at eight more locations in 2013. Twelve sites reported reductions of 8,400 MWh of electricity and 29,000 MMBtu of fuel use, with a net savings of $500,000 in 2012.

- Chilled water optimization software and supporting sensor systems are being installed at IBM locations with large chiller plants. Three sites recorded 13,500 MWh and $980,000 of savings in 2012. Four other locations installed the system in 2012; savings from those sites will be reported in 2013. Six additional US locations plan to install the software and supporting sensor systems in 2013.

Data centers

IBM manages a diverse portfolio of data centers, consisting of both IBM and IBM-managed customer facilities all over the world. IBM operates additional raised-floor space to support internal operations, as well as design and test centers for our Systems and Technology Group and Software Group.

We take a holistic approach to managing our data center portfolio, building new, high-efficiency data center space where we need to expand our raised-floor space to meet the needs of existing and new customers, and retrofitting and improving existing data center space to increase utilization and derive more workload per area, equipment and energy resources. These efforts are accomplished through initiatives that include the following:

1. Building new high-efficiency data center space. IBM's most recent data center expansions in the United States have achieved LEED® certification and use state-of-the-art design and system techniques to enable PUE (Power Usage Effectiveness) measurements of 1.4 to 1.6 when the data center is fully populated. PUE is the ratio of the total power required at the data center divided by the power required to operate the IT equipment.

2. Implementing best practices and thermal monitoring programs at our data centers to optimize cooling delivery and minimize energy use and cost.

3. Consolidating and virtualizing workloads for our internal operations and our customers' operations, and utilizing cloud computing.

New data center construction

IBM's most recent data center expansion, constructed in 2012 in Canada, uses state-of-the-art design and system techniques to enable PUE measurements of

less than 1.4 when the data center is fully populated. The data center is designed to operate at 60 percent less energy than existing data centers through the inclusion of several leadership characteristics:

- **Smarter data center management:** Intelligent building systems connect IT equipment with the centralized energy consumption analysis system, constantly measuring power, water and fuel use in real-time to identify opportunities to conserve energy commensurate with demand.

- **Free-flow cooling:** Energy consumption is reduced by taking advantage of free cooling—using the outside air to cool the data center. The data center is located in a favorable climate zone; we will gain an estimated 200 days of full "free" cooling annually, and 120 days of partial free cooling.

- **Variable speed fans and chiller systems:** The data center cooling system uses energy efficient mechanical equipment, including motors, variable frequency pumps and chillers that will deliver a return on investment in three years or less.

- **Higher chilled water operating temperatures:** The cooling water delivered from the chillers to the raised-floor has been increased from 48 degrees in a data center built just four years ago to 55 degrees at this site.

- **Modular data center design:** Our new leadership data center in Canada uses the same innovative modular design as IBM's leadership data center in Raleigh, NC. It was built in smaller increments—or modules—allowing it to respond to business growth while adapting to IT changes in a way that permits upgrades without disrupting operations.

Existing data centers

In 2012, we completed nearly 400 projects at over 120 existing data center locations that reduced energy use by over 49,700 MWh, and saved more than $5.5 million. Total savings from these projects are equivalent to the energy use of a 4,000 to 6,000 square meter IBM strategic data center.

The IBM Measurement and Management Technology (MMT) thermal management system has been installed at IBM's major data centers representing more than 60 percent of the global raised-floor energy consumption for IBM's internal and client IT operations. This innovative technology from IBM Research produces a real-time, three-dimensional thermal map of the detailed heat sources and sinks within a data center. Using the information provided by MMT, IBM has been able to take the following actions over the past three years:

$5.5 million

saved by nearly 400 energy conservation projects at more than 120 existing data center locations that reduced energy use by a total of over 49,700 MWh

- Install thousands of blanking panels and cable cutout plugs, reducing the short circuiting of cooling air in the data center

- Shut down more than 20 percent of the total installed CRAC units and improve average CRAC utilization to greater than 60 percent

- Increase the average raised-floor temperature by 1.6ºC, with work continuing to further raise temperatures toward an average of 24ºC

MMT offers the additional benefit of rebalancing a data center's thermal profile as equipment is removed and installed, enabling the early identification of developing problems to proactively mitigate their impacts.

System virtualization and cloud computing

Virtualizing workloads allows a single system to support multiple applications or images, making greater use of the full capabilities of the IT equipment and executing more workloads in less space with less energy.

IBM is utilizing virtualization to consolidate multiple workloads from servers and storage systems with low utilization onto single systems, reducing energy use and cost by more than 104,300 MWh and $10 million in 2012. IBM virtualized more than 22,000 applications in our owned/leased data centers in 2012 and plans to continue these projects in 2013 and beyond to continually improve utilization of IBM and client hardware assets and reduce data center operation energy use and space requirements.

We continued to expand IBM's cloud computing programs through 2012, offering cloud services from seven IBM data centers around the globe. Cloud computing is an efficient model for providing IT services that optimize the use of virtualization technologies. It allows us to further improve utilization of IT equipment assets, better balance workloads, adjust power consumption and virtualize infrastructure in data centers to align processing and storage needs with power consumption.

Data center power usage performance

IBM measures, calculates or uses estimating protocols to determine the PUE of the data centers we manage. These data centers include recently constructed Leadership Data Centers as well as large legacy data centers. The average PUE for this raised-floor space is 1.73.

Because the majority of the data centers in IBM's facility portfolio consist of spaces that are 10 to 30 years old and contain IT equipment varying in age from new to 10 years, improving the energy efficiency of these data centers requires thoughtful planning and execution to ensure that we meet both our operational objectives and our commitments to our customers.

The overall performance of these IBM data centers compares favorably with the average PUE of 1.8 to 1.89 as reported in the Uptime Institute 2012 Data Center Industry Survey of 1,100 data center users and with an average PUE of 2.9 as reported by a Digital Realty Trust 2012 survey of 300 IT decision makers. The results from both surveys were reported in an April 15, 2013, Techworld article. IBM has made – and will continue to make – significant investments and improvements to reduce energy demand and improve energy efficiency in our data centers. Our results speak to the success of our efforts.

Voluntary data center energy efficiency initiatives

In January 2012, the European Commission (EC), the executive body of the European Union (EU), awarded 27 IBM data centers in 15 EU countries with "Participant" status in Data Center Energy Efficiency, based on the EU Code of Conduct (CoC) for Energy Efficient Data Centers.

An additional 16 IBM data centers were awarded "Participant" status later in 2012 under the EU CoC. The registered data centers represent more than 70 percent of IBM's IT delivery and business recovery data center space in the EU. This honor represents the largest portfolio of data centers from a single company to receive the recognition to date. The EU CoC for Energy Efficient Data Centers is a voluntary initiative that aims to promote energy efficiency performance standards for data centers.

IBM maintains energy efficiency leadership in data centers by deploying uniform practices across our global data center portfolio. In addition, IBM applies innovative solutions such as Measurement & Management Technologies (MMT) thermal monitoring and control system, virtualization technologies, dynamically managed air conditioning control systems and development of alternate power systems such as the direct current solar system at IBM's software lab in India.

IBM data center and IT system professionals continue to be involved in governmental and professional data center energy efficiency initiatives, including the EU CoC for Energy Efficient Data Centers program, ENERGY STAR® and The Green Grid® initiatives. These programs set operating criteria or metrics that inform and encourage data center operators and owners to reduce energy consumption in a cost-effective manner while enabling operators to maintain the mission-critical functions of their data centers.

An additional significant energy conservation goal

In 2009, amid business growth and continued increases in global energy prices, IBM set an additional goal to conserve 1,100,000 MWh of energy by year-end 2012. This was a substantial undertaking—1,100,000 MWh represents more than 20 percent of the total electricity IBM consumed in 2008.

43
IBM data centers across
19
countries were awarded "Participant" status in Data Center Energy Efficiency, based on the EU Code of Conduct for Energy Efficient Data Centers.

Over the last four years, an integrated team from IBM's environmental and finance staffs, real estate organization and business units saved 1,246,000 MWh of energy through conservation and efficiency, exceeding our target by 13.3 percent. Over 6,000 individual projects were completed across more than 500 facilities in 56 countries. The projects involved the deployment of unique IBM technologies and know-how, as well as a strong management system supported by senior executives.

The following provides a summary of the accomplishments achieved over the period of this initiative:

- Server and storage virtualization and consolidation projects reduced or avoided 375,000 MWh/year of energy use and enabled the closure and consolidation of 20 data center spaces into larger, more efficient data center space. Over 100,000 images were consolidated onto multi-image servers across IBM's data center and lab operations.

- Data center best practices were implemented across our data center portfolio and MMT was implemented at 47 data centers, reducing or avoiding 92,300 MWh/year of electricity use and $8.9 million per year.

- Forty-two locations in the United States, Canada and Europe implemented or improved free cooling systems, reducing energy use by over 34,000 MWh/year.

- Building systems operations were improved through the use of chiller plant and building analytics and continuous commissioning projects, conserving 88,000 MWh of electricity and 305,000 MMBtu of fuel and purchased commodity consumption.

- At IBM's semiconductor manufacturing locations, conservation projects involving equipment and process optimization, optimizing clean room temperature and humidity specifications and the installation of higher efficiency equipment saved 110,000 MWh in energy use.

This additional goal augmented IBM's already strong company-wide energy conservation focus and enabled us to increase our average annual energy conservation savings rate as a percentage of our annual energy consumption from the 5 percent we achieved between 2005 to 2008 to 6.3 percent from 2009 to 2012.

Executing this additional goal also revealed several keys to achieving continual improvement in energy conservation and efficiency, including:

- Integration of diverse skills, knowledge of interrelated activities and collaboration across business units are essential to capture the full

1.246 million MWh

of energy avoided through conservation and efficiency actions 2008-2012

13.3%

Percentage by which we exceeded our target

energy conservation opportunity in integrated systems like data centers and manufacturing facilities.

- Use of IT-based monitoring, measurement and control technologies and analytics provide powerful insights into system performance and identify significant efficiency improvement opportunities, even in previously optimized systems.

Renewable Energy

In 2012, IBM contracted with its utility suppliers to purchase 499 million kWh of renewable energy over and above the quantity of renewable energy provided as part of the mix of electricity that we purchased from the grid. The 499 million kWh represented 9.8 percent of our global electricity usage and resulted in the avoidance of 212,000 metric tons of CO_2 emissions. In addition, more than 5 percent of IBM's electricity purchases from the grid were electricity generated from renewable sources – bringing our total renewable energy purchases to approximately 15 percent of our consumption in 2012.

IBM continued to contract for defined renewable energy purchases in Australia, Austria, Belgium, Denmark, Finland, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, the United Kingdom and the United States in 2012. We have at least two data center facilities located in each of these countries and these data centers receive some or all of their electricity from renewable energy purchases.

Our procurement of renewable energy must meet our business needs. Not only should the cost be competitive with market prices over time, but the energy must also be consistently reliable to ensure uninterrupted power for our critical operations. IBM's strategy of contracting for defined renewable energy has been successful in Europe and we continue to request the inclusion of electricity generated from renewable sources as an option in our contracts in all geographies.

Currently, due to limitations in the market regulatory and procurement structures and in the distribution infrastructure, there is limited renewable energy available through the grid in most areas of the world. These restrictions limit the total quantity of renewable energy available for purchase directly from the grid for consumption at a facility. Continued advances are needed in renewable electricity generation, distribution and storage technologies to increase the availability of economically viable renewable electricity in the marketplace to supply electricity directly to consuming locations. IBM is working with industry peers, utilities, NGOs and other renewable energy industry participants to identify, develop and capture opportunities to procure electricity generated from renewable sources where it makes business sense.

499 million kWh
of renewable energy purchased by IBM from its utility suppliers

9.8%
The amount of IBM's global electricity usage represented by purchased renewable energy

51

IBM also endeavors to incorporate on-site solar energy, co-generation or tri-generation systems or geothermal systems on an individual location basis. Some recent examples:

- In 2012, we contracted with the landlord of a leased location in Massachusetts to purchase electricity from a 780-kilowatt rooftop solar panel array at this location. The system supplies electricity directly to the facility and is estimated to deliver 5 to 10 percent of the location's annual electricity use. The system became fully operational in April 2013.

- Three IBM facilities in Europe have co-generation/tri-generation systems which provide 10 to 20 percent of our electricity use at these facilities, as well as heating and cooling to support building operations.

- IBM's Zurich Research Center has a geothermal heating system.

We are continuing to pursue additional opportunities to install on-site electricity generation systems at our facilities. These systems offer a means to diversify our electricity supply and increase our purchases of renewable energy, though they typically only generate 10 to 20 percent of our site energy demand because the majority of the energy consumed by IBM occurs at locations with energy-dense activities, such as data centers and semiconductor manufacturing sites.

Research to advance renewable energy

In addition to procuring renewable energy for our own use, IBM is working to further the availability and affordability associated with various forms of renewable energy by investing in IT-related research and development. Three recent examples:

- IBM scientists have developed a method of dramatically improving the overall efficiency of concentrated solar power systems up to 80 percent. The prototype High Concentration Photovoltaic Thermal system uses a large parabolic dish, made from a multitude of mirror facets, which are attached to a sun tracking system that positions the dish at the best angle to concentrate the sunlight onto several microchannel-liquid cooled receivers with specialty photovoltaic chips. Hundreds of the photovoltaic chips are mounted on micro-structured layers that pipe liquid coolants within a few tenths of a micrometer off the surface of the chip to absorb the heat and draw it away 10 times more effectively than can be achieved with passive air cooling. The entire receiver combines hundreds of chips and provides 25 kilowatts of electrical power.

- IBM has demonstrated a light-weight, ultra-high-density lithium-air battery with the maximum energy density theorized to be 15 times

greater than lithium-ion batteries. Most importantly, continued advancement of the technology may achieve energy density comparable to that of gasoline, which would markedly improve the economics of electric vehicles.

- IBM is working with a range of partners to deliver smart grid capability to improve the integration of distributed generating assets—including wind and solar electricity generation systems and systems with energy storage capacity, such as electric cars and large refrigeration systems—into grid dispatching and planning processes. These projects are critical to enabling the smooth integration of renewable energy generation resources into the grid system.

CO_2 Emissions Reduction

IBM met its second-generation climate protection goal in 2012, reducing our operational CO_2 emissions by 15.7 percent against the 2005 baseline and exceeding our commitment to achieve a 12 percent reduction over the period. Operational CO_2 emissions increased slightly from 2011 to 2012 primarily due to an increase in the average CO_2 factor of IBM's purchased electricity.

IBM's CO_2 emissions reductions have been achieved through:

- IBM's energy conservation efforts that have reduced or avoided a total of 1.83 million MWh of electricity and 2.9 million MMBtu of fuel use (based on one-year savings associated with conservation projects) from 2006 to 2012, which resulted in a reduction in IBM's electricity and fuel use by 2.3 percent and 25.9 percent, respectively, against the 2005 baseline use adjusted for acquisitions and divestitures.

- IBM's direct purchases of electricity generated from renewable sources, i.e., beyond that supplied through grid-purchased electricity, and the associated CO_2 avoidance, increased by a factor of 3.8 from 2005 to 2012.

- An increase in the amount of renewable energy IBM procured as part of the grid-supplied electricity between 2005 and 2012. This is evident as the average grid emissions factor for IBM electricity purchases reduced from 0.45 metric tons CO_2/MWh in 2005 to 0.43 metric tons CO_2/MWh in 2012, as reported by the International Energy Administration and the US EPA. This increase is the result of higher percentages of wind, solar and natural gas generation and lower levels of coal (in some jurisdictions) in the mix of grid generation.

CO_2 Emissions Reduction

12%

Goal
Between 1990 and 2005, IBM's energy conservation actions reduced or avoided CO_2 emissions by an amount equal to 40 percent of its 1990 emissions. To further extend this achievement, IBM set an aggressive "2nd generation" goal: to reduce the CO_2 emissions associated with IBM's energy use 12 percent between 2005 and 2012 through energy conservation and the procurement of renewable energy.

15.7%

Result
As of year-end 2012, IBM's energy conservation results and procurement of renewable energy resulted in a 15.7 percent reduction in IBM's energy-related CO_2 emissions from 2005.

CO$_2$ Emissions Reduction
(metric tons x 1,000)

Second Generation Reduction Goal by 2012
12%

| 2005 | 2,604* |
| 2012 | 2,195 |

Decrease from 2005 Base Year
15.7%

*2005 emissions baseline adjusted for acquisitions and divestitures of operations

PFC Emissions Reduction

IBM releases some perfluorocompounds (PFCs) from our semiconductor manufacturing operations, with PFC emissions representing approximately 10 percent of IBM's Scope 1 and 2 emissions. IBM was the first semiconductor manufacturer to set a numeric reduction target for PFCs in 1998. We subsequently set a second-generation goal to achieve an absolute reduction in PFC emissions from semiconductor manufacturing of 25 percent by 2010 against a base year of 1995. We exceeded this goal by reducing IBM's PFC emissions by 36.5 percent at the end of 2010.

The Semiconductor Industry Association, of which IBM is a member, is currently working with the EPA to update various parameters (e.g., process emissions factors, emissions abatement system destruction efficiencies) and methodologies for estimating PFC emissions from semiconductor operations. IBM plans to incorporate, as appropriate, the updated factors and methodologies at the conclusion of this industry and EPA effort.

In the meantime, we continue to take actions to reduce our PFC emissions and monitor performance. Between 2010 and 2012, we reduced our PFC emissions by 2.9 percent. Two replacement projects at IBM's semiconductor manufacturing plant in Vermont primarily drove these reductions:

- Chamber cleans, which remove deposited material from manufacturing equipment parts, were originally performed using C_2F_6, a gas with low process utilization (20 to 40 percent). IBM is implementing replacement processes using NF_3, which has a very high utilization rate (95 to 99 percent), significantly reducing the GHG emissions from the process.

- In some other chamber clean processes where the NF_3 substitution does not work, C_2F_6 was replaced with C_4F_8, a gas with a much higher

54

utilization rate and much lower global warming potential, significantly reducing the GHG emissions from the process.

IBM also monitors two other materials with global warming potentials that are used in connection with manufacturing and lab operations: 1) nitrous oxide (N_2O), which is used in manufacturing semiconductors but has a lower global warming potential than PFC gases; and 2) heat transfer fluids (HTFs) that are primarily used in tool-specific chiller units associated with manufacturing and lab processes.

IBM continues to evaluate replacements for the HTFs that have lower volatility and global warming potential. IBM has achieved reductions in these emissions through the use of lower GHG emitting materials in some test operations and through the installation of solid state chillers on some semiconductor equipment.

Voluntary Climate Partnerships

IBM continued participation in the World Wildlife Fund's Climate Savers program in 2012. We achieved our committed goal to reduce CO_2 emissions associated with our operational energy (electricity and fuel) use by 12 percent between 2005 and 2012 through energy conservation and the purchase of renewable energy. This goal was over and above the 40 percent reduction and avoidance of CO_2 emissions IBM had already achieved between 1990 and 2005. By the end of 2012, IBM had exceeded its Climate Savers commitment, achieving a 15.7 percent reduction in operational CO_2 emissions against the 2005 baseline.

Under Climate Savers, IBM has also committed to improving the energy efficiency and energy utilization of our own and our clients' data centers through activities and offerings for data center best practices, measurement and monitoring programs, and virtualization and consolidation programs. Activities in support of this commitment are detailed in the Data Centers section of this report.

Transportation and Logistics Initiatives

Employee commuting and leased/rental vehicles
IBM has been active in promoting programs that reduce employee work commutes for decades. Key contributors to this effort are IBM's two flexible work programs:

- Work-at-home: Enables many employees to work from a home office

- Mobile employees: Enables many other employees to work from home for a designated number of days each week

In 2012, 103,000 of our 430,000 global employees participated in one of these two programs, which not only helps employees balance their work and personal responsibilities, but also benefits the environment. In the United States alone, IBM's work-at-home program conserved approximately 5.8 million gallons of fuel and avoided more than 45,000 metric tons of CO_2 emissions in 2012.

IBM joined the reconstituted United States Best Workplaces for Commuters[SM] (BWC) program in 2009. Currently, 22 IBM locations are registered as BWC sites, which represent approximately 60 percent of the company's US employees. Many locations actively work with their local or regional transit commissions to integrate IBM's programs with regional programs to increase commuting options for the company's employees. Globally, many of our locations provide support for the use of public transit systems, including shuttles from locations to mass transit stations and alternate transportation or "loaner" cars for business trips during the workday.

In some countries, IBM provides leased vehicles for employees that they may use for both business and personal purposes. For these vehicles, we continue our effort to move to more fuel-efficient models by setting standard guidelines for smaller engine sizes with lower emissions profiles. These guidelines enable reductions in average car emission levels as their car fleets are renewed. For the cars our employees rent while travelling for business, we have worked with rental car companies to require and/or offer more fuel-efficient vehicles for employee rentals.

Reducing business travel

In 2012, IBM further expanded the use of collaboration tools, both internally and externally, which provide business efficiency and boost productivity by connecting our global workforce while reducing travel-related resource consumption and emissions.

We conducted more than 2.5 million minutes of online meetings and exchanged more than 50 million instant messages daily. We also have increased our use of video conferencing to help reduce travel and improve team interactions. In addition to video-equipped conference rooms around the globe, we completed work on an initial IBM Sametime® desktop video pilot to extend video capability to 6,000 employees' desktops. Because of its success, we plan to continue growing this capability in 2013.

Another area of IBM's focus on collaboration has been the use of social business technologies. The rapid adoption of the IBM Connections social business application has enabled approximately 60 percent of employees to further share plans, ideas and documents collaboratively. These knowledge-sharing capabilities bring employees together without travel through conversations on social networks regarding topics of business interest.

Efficiency of logistics

IBM is reducing the CO_2 emissions associated with transporting our products through the efficient design of our packaging, working with suppliers on their packaging designs and optimizing logistics. IBM has been an active participant of the US EPA's SmartWay® Transport Partnership since 2006. SmartWay is a voluntary initiative to improve fuel efficiency and reduce GHG emissions associated with logistics operations.

Since 2009, 100 percent of IBM's spend for shipping goods within the United States and from the United States to Canada and Mexico went through a SmartWay logistics provider. IBM also voluntarily applies specific SmartWay requirements to our distribution operations globally.

IBM's packaging programs also help reduce transport-associated CO_2 emissions by reducing the volume and weight of the company's product shipments through innovative packaging design. Accomplishments in this area are discussed in the Product Stewardship section of this report.

Energy and Climate Protection in the Supply Chain

As noted elsewhere in this report, IBM is committed to doing business with environmentally responsible suppliers. One of the supply chain areas on which we focus is our suppliers' energy efficiency and climate protection programs.

We require that all of our "first-tier" suppliers—those firms with which we hold a direct commercial relationship—establish and sustain a management system to address their corporate and environmental responsibilities—including their use of energy and Scope 1 and Scope 2 GHG emissions. Our suppliers are also required to measure their performance, establish voluntary goals in these areas and publicly disclose their performance against those goals. We manage this requirement through two processes: our membership in the Electronic Industry Citizenship Coalition (EICC) and IBM's own supplier environmental management system requirements.

IBM has been an active participant in the EICC Carbon Reporting System, which has completed its third year of operation. The EICC reporting process requests that selected suppliers providing components or products to EICC members disclose their operational energy and water use and GHG emissions through the EICC reporting tool.

We believe, as do the other EICC members, that as companies gain an understanding of their energy use and GHG emissions, they are more likely to take actions to improve their performance. EICC and its member companies have developed education modules to assist suppliers in developing their energy use and GHG emissions inventories. Companies in the electronics

industry share many suppliers, and the EICC GHG emissions disclosure process provides efficiency associated with information disclosure.

Through the EICC's Carbon Reporting System, IBM and other participating companies gain insight on how suppliers are addressing climate change and working to reduce GHG emissions. As a participant in the program, IBM invited 107 of our suppliers to respond to the EICC reporting form in 2012 (reporting 2011 data). These 107 companies represent a cross-section of IBM's procurement spend. They included services, general and production-related spend (including logistics), third-party-operated data centers and rental cars.

Of the 107 IBM suppliers that received questionnaires, 89 responded. This 83 percent response rate is above the typical response averages for the EICC survey. The majority of the responding suppliers report their Scope 1 and Scope 2 emissions, have a GHG emissions reduction target in place and are taking actions to achieve their targets.

In addition to EICC supplier reporting, IBM has continued to work with Tier 1 suppliers to further our company's requirement that all IBM suppliers have an environmental and social management system in place and disclose on goals and performance. More information on this supplier program may be found in the Environmental Requirements in the Supply Chain section.

IBM's requirements for our suppliers rest on the foundational belief that real results in GHG emissions reduction are made possible by actionable information about a company's energy use and GHG emissions, and that each company is best positioned to assess and implement actions to address its own emissions in a way that is meaningful and sustainable. In short, each enterprise must take responsibility to reduce its own energy use and GHG emissions.

IBM's position on the determination of Scope 3 GHG emissions

Gross approximations of Scope 3 GHG emissions can help entities recognize where the greatest amounts of GHGs may occur during the lifecycle of a typical process or general product or service on a macro level. This can be helpful when assessing, for example, what phases of a general product's design, production, use and disposal are ripe for improved energy efficiency and innovation. However, IBM does not assert on a micro level what the Scope 3 GHG emissions are from the operations of our suppliers and external distribution partners in their work that is specific to IBM, or associated with the use of our products and services. The necessary estimating assumptions and corresponding variability simply do not allow for adequate credibility, let alone calculations that could be perceived as deterministic.

Like many manufacturers, IBM has thousands of suppliers around the world. They are in all types of businesses and very few, if any, work solely for IBM.

does not believe we could determine a credible estimate or apportionment of the energy used by these suppliers that would be associated with the products or services provided to IBM, versus that associated with products or services provided to other companies and customers. In addition, IBM's specific scope of business with any given supplier remains dynamic, as it is driven by business need.

Moreover, one company's asserted Scope 3 emissions are another company's Scope 1 and Scope 2 emissions. Since the ultimate goal for climate protection is for global societies to achieve demonstrable reductions in actual GHG emissions, IBM believes real results in GHG emissions reduction are directly achieved when each enterprise takes responsibility to address its own emissions and improve its energy efficiency. This is reinforced by IBM's announcement in 2010 that all of our first-tier suppliers will be expected to develop a management system, inventory their key environmental impacts—including GHG emissions—and develop reduction plans for those key impacts.

Our Smarter Planet® Solutions

IBM offers a variety of products, services and solutions that enable companies, governments and other entities to improve the efficiency of their operations and systems. Many of these Smarter Planet solutions also bring about environmental benefits or directly focus on managing environmental issues, ranging from operational energy management strategies and GHG inventory processes to solutions for optimizing the efficiencies of corporate business processes, logistics and transportation, water management and other operations. A sampling of the solutions related to climate and energy is provided below.

Smarter Building solutions

IBM TRIRIGA® Energy Optimization (ITEO) software is an advanced solution that optimizes the energy and environmental performance of buildings. It monitors energy-consuming equipment, manages maintenance activities and reports performance. The solution applies analytic rules to heating, cooling, lighting and power systems that identify sub-optimal conditions. It also identifies savings, takes immediate action to optimize performance and provides a performance dashboard.

Employing a smarter buildings strategy can help organizations reduce energy use by up to 40 percent, and sometimes more, and increase facility utilization by up to 85 percent.

Smart Grid solutions

IBM continues to develop its portfolio of Smart Grid solutions. These solutions can integrate inventory, data collection, analytics and system management functionality into a holistic package that enables the monitoring

and management of energy distribution grids and generation facilities. The objective is to improve system efficiency and reliability, reduce generating capacity requirements and integrate intermittent, distributed generation systems such as those involving wind and solar generated power.

Many of today's distribution systems have little or no intelligence to balance loads or monitor energy flows, resulting in losses equivalent to the annual electricity use of India, Germany and Canada combined. Making the US grid alone five percent more efficient would be roughly equivalent to permanently eliminating the annual fuel use and greenhouse gas emissions associated with 53 million cars.

In addition to IBM's focus on the distribution grids and generation facilities however, we also focus on other energy-related Smarter Solutions. A few examples follow.

Electrical Vehicle Solutions:

IBM is teaming with an electric vehicle (EV) charging network provider to implement a fully integrated EV charging IT system across Ireland to help manage approximately 1,000 public electric vehicle charging points. The companies will add a layer of intelligence and convenience to the charging process, allowing electric vehicle drivers to connect, charge and pay using an identification card. Additionally, this project will provide utilities with access to energy usage data that can help improve grid operations, reduce power strain during peak charging times and ensure reliable energy distribution to customers.

Smart Grid pilot based on renewable energy:

IBM formed a consortium with several Swiss energy and retail companies to undertake a unique project called FlexLast that will use refrigerated warehouses as a buffer to help balance fluctuations driven by the availability of sun and wind energy on the energy grid.

Using software and algorithms developed by IBM scientists, the FlexLast pilot will integrate intermittent wind and solar generation with refrigerated warehouse energy consumption, maximizing air conditioning with high solar and wind production and initiating a lower refrigeration level or complete shut down when intermittent electricity production is minimal, in order to improve grid stability and increase the percentage of renewable energy sources that can be efficiently supported on the grid. IBM scientists have also successfully applied the same concept in Denmark for electric vehicles and appliances in the EDISON and EcoGrid EU projects.

Smarter Energy® research:

IBM is a member of the Smarter Energy Research Institute, a new collaboration between IBM Research and the energy and utilities industry practice. The goal of this collaborative work is to transform the operations of leading energy companies through the use of predictive analytics, system optimization and advanced computation to deliver better services to their customers. The Institute has identified five core innovation tracks to pursue joint research: outage planning optimization, asset management optimization, integration of renewable and distributed energy resources, wide-area situational awareness, and the participatory network.

Smarter computing/data center solutions

IBM offers a range of data center energy efficiency solutions including planning, design and construction services for new, energy efficient facilities; measurement, management and assessment technologies to continually improve the efficiency of both existing and new facilities; and virtualization services to increase server and storage system utilization and the workload delivered per each unit of energy consumed. For example:

IBM worked with a major telecom and data services provider to design and build the largest data center facility in India to deliver new cloud and networking services. Covering more than 900,000 square feet with 20 enterprise modular data centers in a four-tower building, the new, highly efficient data center is designed to international "green" building standards and will easily scale to customers' growing infrastructure needs while optimizing the energy use of current operations.

IBM also designed and built a 1,100-square-foot data center for a furniture retailer. The new data center, which has a modular design and uses 100 percent free cooling, reduces energy costs and use by 40 percent and supports the furniture company's brand strategy and commitment to being an environmentally responsible company.

Smarter transportation and logistics solutions

IBM solutions for Supply Chain and Traffic Management enable companies and governments to anticipate, control and react to demand and supply volatility within the distribution or transportation network and track and manage fuel use within their fleets. With the IBM Supply Chain Management for Logistics solutions, firms can now solve complex planning, scheduling and logistics management problems while tying these operations to corporate objectives to reduce costs, improve operational efficiency and enhance the customer experience.

IBM worked with an international airline to develop a system to accurately calculate, track and report fuel use and aircraft emissions. The system uses advanced analytics to map the carrier's carbon emissions and optimize its fuel usage through a detailed analysis of each flight. The system will enable the airline to reduce its overall fuel usage and its emissions profile.

Environmental Requirements in the Supply Chain

As part of our longstanding corporate commitment to environmental leadership across all of our business activities, IBM is committed to working with environmentally and socially responsible suppliers. The objectives of our requirements for suppliers and our supplier evaluation programs include:

– Preventing the transfer of responsibility for environmentally sensitive operations to any company lacking the commitment or capability to management them properly

– Reducing environmental and workplace health and safety risks

While examples of this commitment have been highlighted in other relevant sections of this report, the following table provides key milestones of this leadership over the past four decades.

Environmental Evaluations of Suppliers

- **1972**
  Established a corporate directive requiring the environmental evaluation of suppliers of hazardous waste services

- **1980**
  Expanded our environmental evaluations of suppliers by establishing a second corporate directive to require the environmental evaluation of certain production-related suppliers

- **1991**
  Further expanded our environmental evaluations of suppliers, adding a requirement that product recycling and product disposal suppliers be evaluated

- **2002**
  Nongovernmental organizations raised a concern about electronic waste being exported to some non-OECD countries. Though we confirmed that IBM was not shipping hazardous electronic waste products to non-OECD countries, we added a requirement to assess our suppliers and certain subcontractors they may use to handle recycling and/or disposal operations in non-OECD countries

---

- **2010**
  Established a requirement that all of IBM's first-tier suppliers establish a management system to address their social and environmental responsibilities—and that they cascade this requirement to their suppliers

IBM's environmental evaluations of suppliers

IBM's environmental requirements for its suppliers are set forth in a corporate directive that governs the contracts by which we:

- Specify and/or furnish chemicals, process equipment or contaminated equipment involved in production

- Procure materials, parts and products for use in hardware applications

- Procure hazardous waste treatment and/or disposal services

- Procure product end-of life management services

Specific environmental requirements are documented in our contracts with suppliers conducting these types of activities. These may include requirements related to chemical content, chemical management, waste management, spill prevention, health and safety and reporting, to mention some of the most relevant ones.

For hazardous waste and product end-of-life management suppliers, IBM conducts an on-site review of the supplier facility's environmental, health, safety and industrial hygiene management program; its medical screening and monitoring programs; and a review of its environmental, health and safety audits for the previous three years. We evaluate these suppliers prior to entering into a contract with them and then again every three years thereafter to ensure their operations and commitment to workplace safety and sound environmental practices continues to meet our requirements. The audits are conducted by IBM's Corporate Environmental staff or by environmental professionals under the direction of this staff.

IBM's hazardous waste and product end-of-life management supplier audits are comprehensive in the scope of the environmental aspects covered. The following provides a summary of the scope of the environmental aspects of the audits:

- Facility operational activities, capabilities, capacities and services

  o Waste management services, treatment, recycling or final disposal methods, processing capacity and facility construction design (floors, docks, secondary containment)

- o Treatment and recycling methods for the hazardous and nonhazardous special wastes generated by supplier's operations

- o Environmental, health and industrial safety and hygiene management plan, training, fire and safety equipment, emergency response plan, personal protective equipment, chemicals used and safety data sheets, evacuation plans, first aid, medical screening and monitoring programs, etc.

- Environmental and corporate responsibility

    - o Social and environmental management system

- Applicable legal requirements and compliance

    - o Permits, licenses and other applicable regulatory requirements, regulatory agencies and contacts

    - o Compliance history (notices of violation, government citations, public complaints and summary of inspections and findings)

- Environmental programs including:

    - o Air emissions, water discharges and water consumption

    - o Underground storage tanks and piping systems

    - o Spill prevention, containment and response

    - o Environmental liabilities and insurance coverage

IBM also requires its hazardous waste and product end-of-life management suppliers to track the shipment and processing of any hazardous materials they handle for IBM and report that information to us.

Global requirements for waste processing (treatment, recycling or disposal) and product end-of-life management (PELM)

As we do with all of our environmental programs, IBM manages its hazardous waste and product end-of-life management programs to the same high standards no matter where in the world we are operating. Doing so can be particularly challenging in some countries when processing infrastructure (treatment, recycling and/or disposal) that meets IBM's requirements is lacking.

If there are no suppliers in a country that meet IBM's environmental and safety requirements for hazardous waste or product processing, the waste

generated by IBM's operations is shipped to facilities in other countries where those requirements can be met. This shipping is done in compliance with country laws and regulations and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

Though rare, there are sometimes situations in which local processing of waste is not possible and shipping to IBM-approved suppliers in other countries is not allowed due to legal requirements. In these situations, IBM will store wastes and product end-of-life materials in properly contained and managed storage facilities until suitable processing facilities are available.

The processing and recycling of lead acid batteries is a concern some interest groups recently brought to our attention. It had been reported in various media that some companies have been exporting lead acid batteries from the U.S. to Mexico or other countries where the batteries may be recycled in operations that are not properly protective of the workers or the environment. The uninterruptible power units for our data centers contain lead acid batteries - but all lead acid batteries disposed of by IBM are covered under IBM's hazardous waste management program and are recycled at IBM approved facilities within the country where they are generated, whenever possible. IBM does not export used lead acid batteries from the U.S. or any other country where suitable recycling facilities are available within the country.

IBM's Social and Environmental Management System (S&EMS) requirement for all its suppliers

In 2010, IBM established a requirement that all first-tier suppliers establish a management system to address their social and environmental responsibilities. Our objective in establishing this requirement was to help our suppliers build their own capability to succeed in this area.

These suppliers are required to:

- Define, deploy and sustain a management system that addresses their intersections with their employees, society and the environment

- Measure performance and establish voluntary, quantifiable environmental goals

- Publicly disclose results associated with these voluntary environmental goals and other environmental aspects of their management systems

- Cascade these requirements to their suppliers who perform work that is material to the products, parts and/or services supplied to IBM

More information on these new supplier requirements may be found on IBM's Supply Chain Environmental Responsibility website.

Remediation

When groundwater contamination was first discovered at one of IBM's sites in 1977, the company initiated groundwater monitoring at all of its manufacturing and development locations worldwide. Today, IBM has 2,624 monitoring wells and 109 extraction wells.

_____

In 2012, approximately 16,400 pounds of solvents from past contamination were extracted while remediating, controlling and containing groundwater at six currently operating sites and 11 former sites in three countries. At four of these sites, an additional 2,700 pounds of solvents were removed by soil vapor extraction or other methods. IBM also has financial responsibility for remediation at two additional former sites.

As a result of the US Superfund law, IBM is involved in cleanup operations at some non-IBM sites in the United States. The Superfund law creates retroactive responsibility for certain past actions, even though those actions may have been technically and legally acceptable at the time. As of year-end 2012, IBM had received notification (through federal, state or private party) of its potential liability at 112 sites, since the beginning of the Superfund program in 1980. Of these, 61 are on the US National Priority List. At the majority of the 112 sites, it has been determined that IBM either never had liability or has resolved its potential liability. As of now, IBM believes it may have potential liability at only 17 sites noticed through 2012.

When investigation and/or remediation at an IBM location or an off-site facility is probable, and its costs can be reasonably estimated, IBM establishes accruals for loss contingency. Estimated costs connected with closure activities (such as removing and restoring chemical storage facilities) are accrued when the decision to close a facility is made. As of December 31, 2012, the total accrual amount was $229 million.

Audits and Compliance

IBM measures our environmental performance against both external and internal requirements.
_____

Every year, and more frequently for some, IBM's manufacturing, hardware development and research sites and organizations— such as Product Development, Global Real Estate Operations, Global Asset Recovery Services, Global Logistics, Global Services Environmental Compliance and Integrated Supply Chain—complete a comprehensive self assessment. In addition, IBM's Corporate Internal Audit staff may conduct environmental, health and safety compliance audits. Audit results are communicated to top management. Follow-up, accountability and actions are clearly delineated.

In addition, as part of IBM's single, global registration to ISO 14001, approximately 25 sites or registered entities are audited annually by an independent ISO 14001 registrar. The company's manufacturing, hardware development and chemical-using research sites are audited by either the Corporate Internal Audit team or the external ISO 14001 registrar every 18 to 30 months.

Accidental Releases

IBM sites around the world report environmental incidents and accidental releases to IBM management through the company's Environmental Incident Reporting System (EIRS). IBM's environmental incident reporting criteria are equal to or exceed legal reporting requirements and every event meeting IBM's reporting criteria must be reported through EIRS. Each IBM location must have a documented incident prevention program (including provisions for preventing environmental incidents or their recurrence) and reporting procedure.

In 2012, a total of 26 accidental releases of substances to the environment related to IBM operations were reported through EIRS. Of these, 12 were to air, seven to land, five to water, and two to both land and water.

Emissions to the air included ten releases of refrigerants. One emission was smoke resulting from a chemical reaction that took place during cleaning activities (mixing of epoxy resin and hardener) and there was one release of particulate matter.

Releases to land included one each of reclaimed water, fuel oil, cooling tower water, hydraulic fluid, sanitary wastewater, potable water and chilled water.

Releases to water included one each of cooling tower water, chilled water, hot

water, water containing a cleaning agent and one lubricant oil.

Releases to both land and water include two releases from treated groundwater.

The root cause was investigated for all releases and corrective actions were taken as appropriate. None of the releases were of a duration or concentration to cause long-term environmental impact.

Fines and Penalties

One significant measure of a company's environmental performance is its record of fines and penalties.

IBM was the subject of 89 successful environmental regulatory agency inspections and visits worldwide in 2012 with no fines or enforcement measures being assessed associated with those inspections.

IBM did receive three fines, however, related to inspections in previous years. Relating to a 2009 Notice of Violation issued by the Connecticut Department of Environment and Energy Protection, IBM received two fines in 2012 totaling $36,814. The citations were for exceeding the permitted time limit for operating an emergency power generator at a data center and for failure to timely complete the scheduled emissions testing on the emergency generators. The emissions testing was completed after the notification in 2009 and we have since updated our processes to prevent recurrence.

In addition, a fine of $38,000 was paid to the Environment Authority of Portugal related to a 2010 shipment of used electronic products from Portugal to IBM's product reutilization facility in France. Shipments of used electronic products for recycling within the European Union require permits from both the shipping and receiving countries. In this particular case, the permit for the shipping country (Portugal) had expired the month prior to the shipment and had not yet been renewed. IBM has addressed the issue with its contracted logistics supplier to ensure that proper permits are in place in both shipping and receiving countries prior to any future shipments.

Over the past five years, IBM has paid five fines for a total amount of $104,814.

Fines and Penalties Worldwide
($ in thousands)

	2008	2009	2010	2011	2012
Number	0	2	0	0	3
Fines	$0.0	$30.0	$0.0	$0.0	$74.8

Awards and Recognition

_____

Internal Recognition

Chairman's Environmental Award Program

IBM established the Chairman's Environmental Award Program in 1991 to encourage leadership and recognize achievement and progress in environmental affairs on the part of IBM's organizations.

Over these past 21 years, the Chairman's Environmental Award has promoted the contributions of IBM's business units toward the objectives of IBM's Corporate Policy on Environmental Affairs. IBM's organizations are required to address their accomplishments over the past three years in all eleven elements of the Corporate Policy, to the extent that each policy element is applicable for their global operations.

Recipients of the Chairman's Environmental Award are selected based on their degree of leadership, initiative and results in contributing to IBM's environmental policy objectives. Performance against these criteria is evaluated against each nominee's opportunity to contribute given its mission and operations.

In 2012, we modified the schedule of this annual award program. The recipient of the next Chairman's Environmental Award will not be announced until July 2013. IBM's Global Real Estate Operations received the most recent IBM Chairman's Environmental Award.

(Left to right) IBM Chairman Sam Palmisano presents the 2011 IBM Chairman's Environmental Award trophy to Mark Loughridge, Senior Vice President and Chief Financial Officer, Finance and Enterprise Transformation and James Kavanaugh, Vice President and Controller. (April 26, 2012)

Global Real Estate Operations (RESO) has global management responsibility for the IBM real estate portfolio of more than 1,600 locations in 97 countries, overseeing all facilities operations, engineering, workplace design and construction. RESO plays a vital role in implementing IBM's environmental and energy programs, and the development and implementation of IBM's Smarter Building Solutions at the company's high energy usage sites worldwide.

The IBM Chairman's Environmental Award recognized RESO's outstanding leadership and execution of globally integrated business processes. Its achievements ranged from its outstanding energy conservation program and results, procurement of renewable energy and implementation of highly effective alternative commuting programs to its expansion of IBM's Environmental Management System to include landlord-managed leased locations, its sustainable building design and operation which resulted in twelve IBM buildings certified to the Leadership in Energy and Environmental Design^{TM} (LEED) and other environmental performance standards and its internal deployment of IBM Smarter Building Solutions while demonstrating capabilities of the solutions.

External Recognition

2012 Gold Medal, World Environment Center

IBM received the World Environment Center's (WEC) 28th Annual Gold Medal for International Corporate Achievement in Sustainable Development, becoming the first and only company to earn the award twice. We were recognized with our first WEC Gold Medal in 1990.

EU Data Center CoC 2012 Corporate Level Participant of the Year

IBM received recognition as the EU Data Center Code of Conduct (CoC) 2012 Corporate Level Participant of the Year. The award recognizes IBM's achievement in registering 27 data centers to the CoC and its work to improve the efficiency of the cooling operations at the registered data centers.

Canada

IBM Canada's Bromont site received an Industrial Energy Technology Conference (IETC) Energy Award for its ongoing energy conservation initiatives. From 2008 to 2012, the site completed more than 145 energy conservation projects reducing or avoiding annualized energy use of 76,000 MWh/year and saving $3.1 million.

China

IBM received the International Institute for Advanced Purchasing & Supply (IIAPS) Sustainable Supply Chain Award at the IIAPS Asian Supply Chain Excellence Forum in Shanghai, China, for its Supply Chain Social and Environmental Management System.

India

IBM India received the 2012 Golden Peacock Environment Management Award. The Award is designed to promote best strategy and management of environmental issues by organizations.

Ireland

IBM was recognized in The Chambers Ireland President's Awards for Corporate Social Responsibility for Excellence in Marketplace for its Integrated Supply Chain Social and Environmental Management System.

Netherlands

IBM Netherlands was awarded the International Union for Conservation of Nature prize for sustainability.

Singapore

IBM Singapore Limited received the Singapore Environmental Achievement Award (Services) from the Singapore Environment Council for its outreach to the community on environmental issues, meeting its own environmental goals and data center energy efficiency.

United States

2013 (and 2012) Climate Leadership Award

IBM received a 2013 Climate Leadership Award from the US EPA, the Association of Climate Change Officers, the Center for Climate and Energy Solutions, and The Climate Registry. The award recognized IBM for its ambitious greenhouse gas emissions reduction goals and for being at the leading edge of setting requirements for suppliers to measure, disclose and reduce their emissions. This is the second Climate Leadership Award for IBM, having received one in 2012, the first year the awards were given.

#1 Ranking of World's Greenest Companies, Newsweek

IBM was the #1 company in Newsweek's 2012 Green Rankings. This is the second year in a row that IBM was recognized as top-rated in this annual listing. The methodology behind this annual ranking assesses the environmental performance, management (policies, initiatives, controversies) and transparency of the 500 largest public companies in America.

White House Champion of Change Award for Leadership in Corporate Sustainability

IBM received a White House Champion of Change award for leadership in corporate sustainability in recognition of IBM's environmental leadership. Only eight awards were given, and IBM was the only company to receive one.

Most Valuable Pollution Prevention Award

IBM East Fishkill, New York, won a Most Valuable Pollution Prevention Award (MVP2) from the National Pollution Prevention Roundtable for its On-site & Off-site Waste Solvent Accomplishments Project. The project eliminated 200 tons per year of n-methyl-2-pyrrolidone and photo resist stripper chemical use and 300 tons per year of hazardous waste solvent and enabled the beneficial reclamation of 500 tons per year of waste solvent. This was the third consecutive MVP2 Award for East Fishkill.

2012 Environmental Excellence Award

IBM East Fishkill also received a 2012 Environmental Excellence Award from the New York State Department of Environmental Conservation. The site was recognized for its catalytic hydrogen peroxide treatment system that demonstrates the environmental, economic and health and safety benefits that can be achieved as a result of pollution prevention and green chemistry technologies.

Vermont Governor's Award

IBM Burlington, Vermont, received a 2013 Vermont Governor's Award for Environmental Excellence for its energy outreach efforts with two non-profit organizations (Howard Center and Vermont Technical College) and multiple Vermont-based companies. IBM shared its innovations in energy management to help them achieve energy, associated CO_2 emissions and operational cost reductions. This marks 20 consecutive years that IBM has been recognized with at least one of these awards— which is every year the competition has been held.

Most Valuable Pollution Prevention Award

IBM's facilities in Burlington, Vermont received a 2012 Most Valuable Pollution Prevention (MVP2) Award from the National Pollution Prevention Roundtable. IBM Burlington was recognized for its community outreach program. Outreach efforts included education, community volunteer hours, sharing best practices in energy and water management and financial support to local non-profits with IBM funded grants. This award marked the fourth time in five years the IBM Burlington site has received an MVP2 Award.

Earth Charter Sustainable Business Award

Earth Charter US (ECUS) Sustainable Business Coalition, in partnership with the University of Tampa's Center for Ethics, recognized IBM Tampa Bay, Florida, with its Sustainable Business Award, large business category. IBM was recognized for its Smart Building Technology as well as the company's annual corporate responsibility report.

Summary of IBM's Environmental Performance

IBM maintains goals covering the range of its environmental programs, including climate protection, energy and water conservation, pollution prevention, waste management and product stewardship. These goals and our performance against them are discussed in this report. The goals identified here as KPIs are based on stakeholder interest and materiality. IBM considers all of its goals to be important metrics of the company's performance against its commitment to environmental protection.

Energy Conservation:

IBM's goal is to achieve annual energy conservation savings equal to 3.5 percent of IBM's total energy use. In 2012, IBM again achieved this goal, attaining a 6.5 percent savings from its energy conservation projects.

Energy Conservation (KPI)	2008	2009	2010	2011	2012
As % of total electricity use	6.1	5.4	5.7	7.4	6.5

CO$_2$ Emissions Reduction:

Between 1990 and 2005, IBM's energy conservation actions reduced or avoided CO$_2$ emissions by an amount equal to 40 percent of its 1990 emissions. To further extend this achievement, IBM set an aggressive "2nd generation" goal: to reduce the CO$_2$ emissions associated with IBM's energy use by 12 percent between 2005 and 2012 through energy conservation and the procurement of renewable energy.

As of year-end 2012, IBM's energy conservation results and procurement of renewable energy yielded a 15.7 percent reduction in its energy-related CO$_2$ emissions since 2005 – achieving and exceeding our 12 percent reduction goal.

CO$_2$ Emissions Reduction (KPI)	2008	2009	2010	2011	2012
% reduction against the 2005 base year	-1.6	-5.7	-16.7	-16.0	-15.7

Product Energy Efficiency:

IBM's product energy goal is to continually improve the computing power delivered for each kilowatt-hour of electricity used with each new generation or model of a product. Performance is tracked by product line: Servers and Storage Systems.

Product Energy Efficiency (KPI)	Please see the Product Energy Efficiency table.

Recycled Plastics:

In 2012, 25.5 percent of the total weight of plastic resins procured by IBM and its suppliers through IBM's corporate contracts for use in IBM's products were resins that contained between 25 and 100 percent recycled content. Comparing only the weight of the recycled fraction of these resins to the total weight of plastics (virgin and recycled) purchased, 12.6 percent of IBM's total weight of plastic purchases in 2012 was recycled plastic versus the corporate goal of 5 percent recyclate.

Recycled Plastics	2008	2009	2010	2011	2012
% of total plastics procured through IBM contracts for use in its products that is recyclate	10.3	13.2	11.5	12.4	12.6

Product End-of-Life Management:

IBM's goal is to reuse or recycle end-of-life IT products such that the amount of product waste sent by IBM's Product End-of-Life Management (PELM) operations to landfills or incineration for treatment does not exceed a combined 3 percent of the total amount processed.

In 2012, IBM's PELM operations sent only 0.3 percent of the total processed to landfill or incineration facilities for treatment.

Product End-of-Life Management (KPI)	2008	2009	2010	2011	2012
% of total processed sent by these operations to landfill or incineration for treatment	0.6	0.5	0.6	0.4	0.3

Hazardous Waste Management:

IBM's goal is to achieve year-to-year reduction in hazardous waste generated from IBM's manufacturing processes indexed to output. IBM's hazardous waste generation indexed to output increased 2.9 percent in 2012.

There were two primary factors for this year-to-year increase: 1) an increased use of a solvent in a photolithography process, and 2) a mechanical problem that resulted in additional water entering a hazardous waste stream before the situation could be addressed.

Hazardous Waste Reduction	2008	2009	2010	2011	2012
% reduction in hazardous waste generated from manufacturing operations indexed to output	-10.9	+8.4	-21.6	-3.5	+2.9

Nonhazardous Waste Recycling:

Our voluntary environmental goal is to send an average of 75 percent of the nonhazardous waste generated at locations managed by IBM to be recycled. In 2012, we recovered and recycled 87 percent of our nonhazardous waste.

Nonhazardous Waste Recycling	2008	2009	2010	2011	2012
% recycled of total generated	76	76	79	78	87

Water Conservation:

IBM's goal is to achieve annual water savings equal to 2 percent of total annual water usage in microelectronics manufacturing operations, based on the water usage of the previous year and measured as an average over a rolling five-year period. In 2012, new water conservation and ongoing reuse and recycling initiatives in IBM's microelectronics operations achieved an annual 2.2 percent savings in water use, resulting in a rolling five-year average of a 2.2 percent savings versus the 2 percent goal.

Water Conservation	2008	2009	2010	2011	2012
% annual water savings in microelectronics manufacturing based on 2011 usage, measured as an average over a rolling five-year period	4.6	3.1	2.8	2.6	2.2

IBM ENVIRONMENTAL AFFAIRS POLICY

IBM is committed to environmental affairs leadership in all of its business activities. IBM has had long-standing corporate policies of providing a safe and healthful workplace, protecting the environment, and conserving energy and natural resources, which were formalized in 1967, 1971 and 1974, respectively. They have served the environment and our business well over the years and provide the foundation for the following corporate policy objectives:

- Provide a safe and healthful workplace and ensure that personnel are properly trained and have appropriate safety and emergency equipment.

- Be an environmentally responsible neighbor in the communities where we operate, and act promptly and responsibly to correct incidents or conditions that endanger health, safety or the environment. Report them to authorities promptly and inform affected parties as appropriate.

- Conserve natural resources by reusing and recycling materials, purchasing recycled materials, and using recyclable packaging and other materials.

- Develop, manufacture and market products that are safe for their intended use, efficient in their use of energy, protective of the environment, and that can be reused, recycled or disposed of safely.

- Use development and manufacturing processes that do not adversely affect the environment, including developing and improving operations and technologies to minimize waste; prevent air, water, and other pollution; minimize health and safety risks; and dispose of waste safely and responsibly.

- Ensure the responsible use of energy throughout our business, including conserving energy, improving energy efficiency, and giving preference to renewable over nonrenewable energy sources when feasible.

- Participate in efforts to improve environmental protection and understanding around the world and share appropriate pollution prevention technology, knowledge and methods.

- Utilize IBM products, services and expertise around the world to assist in the development of solutions to environmental problems.

- Meet or exceed all applicable government requirements and voluntary requirements to which IBM subscribes. Set and adhere to stringent requirements of our own no matter where in the world the company does business.

- Strive to continually improve IBM's environmental management system and performance, and periodically issue progress reports to the general public.

- Conduct rigorous audits and self-assessments of IBM's compliance with this policy, measure progress of IBM's environmental affairs performance, and report periodically to the Board of Directors.

Every employee and every contractor on IBM premises is expected to follow this policy and to report any environmental, health or safety concern to IBM management. Managers are expected to take prompt action.

IBM Corporate Environmental Affairs
294 Route 100
Somers, New York 10589

For more information about
IBM's environmental initiatives,
please visit our website:
www.ibm.com/environment

BladeCenter, Easy Tier, iDataPlex, Power, Power
Systems, PureFlex, PureSystems, Sametime,
Smarter Energy, Smarter Planet, Smarter Water,
System p, System Storage, System x, System z,
TRIRIGA and zEnterprise are registered trademarks
or trademarks of International Business Machines
Corporation or its wholly owned subsidiaries. Other
company, product and service names may be
trademarks or service marks of others.