Environmental sustainability

In 2011, the global population passed 7 billion on its way to a projected 9.3 billion by 2050—a rise that's creating many challenges.[1] None may be more critical than balancing the demands of economic growth with the need for long-term environmental sustainability. As more people strive for greater prosperity, we're facing increasing pressure to do more with finite resources.

As the world's largest provider of information technology (IT) infrastructure, software, services, and solutions, HP is in a unique position to respond to this challenge. We see unprecedented opportunities to transform the way the world lives and works—while advancing our business and helping our customers thrive.

Aiming for Positive Impact

Positive Impact is HP's drive to help conserve more than we as a company consume. We are applying our scale, portfolio, and partnerships both to reduce our own environmental impact and to help customers be more efficient and adopt more sustainable processes and behaviors.

We are taking a two-pronged approach toward Positive Impact. First, we're improving the efficiency of our portfolio, supply chain, and operations. Information and communications technology accounts for approximately 2% of the world's greenhouse gas (GHG) emissions, a share that's expected to climb with population growth and expanding use of technology.[2] By using less energy and other resources, HP and our industry can help keep these emissions in check, as well as save money, spark innovation, lower reputational risk, and open up new markets.

However, we see an even bigger opportunity in using technology to reduce the other 98% of GHG emissions. Developing HP solutions that improve or replace current energy- and resource-intensive processes and behaviors with more efficient alternatives is core to our aspiration for Positive Impact.

Highlights

20%

Reduction in GHG emissions from operations between 2005 and 2011, meeting our 2013 goal 2 years early.

50%

Reduction in energy consumption of our products by the end of 2011 compared with 2005 levels—exceeding our original goal of a 40% reduction.[*]

33%

The recycled plastic used in Original HP ink cartridges has up to a 33% smaller carbon footprint than the virgin plastic used in Original HP ink cartridges.[**]

[*] The average energy consumption of HP products is estimated using high-volume product lines representative of the overall shipped product volume. Energy consumption has been estimated in 2005 and annually since. The high-volume product lines include notebook and desktop computers, inkjet and LaserJet printers, and industry-standard servers.

[**] For cartridges produced in 2010 and beyond. Based on a 2010 life cycle assessment (LCA) performed by Four Elements Consulting and commissioned by HP. The study compared the environmental impact of using polyethylene terephthalate (PET) plastic with the environmental impact of using recycled PET to manufacture new Original HP ink cartridges. For details, see www.hp.com/go/RecycledPlasticsLCA.

[1] "Total Midyear Population for the World: 1950–2050," U.S. Census Bureau, International Data Base. Accessed February 4, 2011, www.census.gov/ipc/www/idb/worldpop.php.

[2] SMART 2020: Enabling the low carbon economy in the information age, page 17, 2008, www.smart2020.org/_assets/files/02_Smart2020Report.pdf.

Continuous innovation and collaboration with our customers and partners is central to how we develop and apply these solutions. It's also vital to how we advance responsible practices and standards across our global operations and supply chain as our business grows.

Helping customers do more while using less

We are pioneering solutions that either improve on existing technologies or replace them with more efficient alternatives, such as enterprise energy and resource management, sustainable data center projects, cloud infrastructure and services such as MagCloud, and other cloud computing solutions.

Used effectively, technology can ultimately contribute to a net positive impact in the consumption of resources and energy. A 2011 life cycle assessment (LCA) issued by HP on digital vs. offset book publishing offers a prime example. Compared with offset-only printing, digital print technology makes it easier to better align printing with demand and helps to reduce the book-return rate.[3] This could reduce the potential environmental impact of producing and selling paperback bestsellers by 17% in carbon dioxide equivalent (CO_2e). See the sidebar for more information about HP digital printing solutions.

Another example is HP Visual Collaboration—a high-definition, immersive, videoconferencing solution that was divested to Polycom, Inc. in 2011. As part of this agreement, the two companies are working together on solutions to provide customers with Polycom® RealPresence® video solutions and software infrastructure deployed on HP networking and systems.[4] Over the 3 years prior to divestiture, Visual Collaboration helped HP and its customers reduce about 175,000 tonnes in CO_2e emissions—comparable to eliminating more than 143,000 round-trip flights between New York and London.[5]

As we aim for Positive Impact, we are delivering solutions to address key areas such as energy consumption while investing in sustainable technology research and development that help customers improve their lives or businesses and reduce their environmental footprint.

Reducing the environmental impact of the IT supply chain

We embrace the challenge of improving environmental sustainability throughout our global supply chain. HP is an industry leader in helping our product manufacturing, transport, and recovery partners understand, improve, and report on their environmental performance. Through collaboration with our partners, as well as industry and environmental leaders, we can further reduce our extended environmental impact.

Improving data center energy efficiency

Many data centers are inefficient, estimated to use less than half of the overall energy they consume for computing. We're reimagining those models from the ground up. We're helping customers forgo brick-and-mortar data centers with the HP POD 240a modular data center, also known as the HP EcoPOD, which uses 95% less facilities energy. We're helping customers monitor and manage energy use in real time with the HP Data Center Smart Grid. Through HP Project Moonshot, we're designing next-generation, extreme-low-energy server technologies. And HP Labs' sustainable data center project is a large-scale rethinking of how data centers are designed, built, and operated. In pilot tests, HP Labs is using local micro-grids of renewable energy to reduce a data center's reliance on grid power. HP expects to reduce reliance on the grid by more than 75% while significantly lowering operational costs.

Embracing digital printing

Shifting to digital printing allows people and businesses to print only what they need, when they need it, helping to reduce unwanted prints and wasted paper. HP estimates that minimizing overruns of books, magazines, and newspapers through digital printing could reduce emissions by 114 to 251 million tonnes of CO_2e each year.[*] We're also developing printing technology innovations that consume fewer resources other than energy and paper. HP Photosmart Minilab printers eliminate up to 2,484 liters of wastewater per year, compared with silver halide photo systems tested.[**]

[*] Reducing the Greenhouse Gas Emissions of Commercial Print with Digital Technologies, 2009, page 2.

[**] Based on a 2010 LCA performed by Four Elements Consulting and commissioned by HP. The study compared the impact of using HP ML1000D, HP ML2000D, and HP Microlab pm2000e printers with the impact of using Fuji Frontier 350 and Noritsu QSS-3212 printers to produce 375,000 4 x 6-inch photos a year in Europe.

We continue to expand our reuse and recycling programs to improve availability, reduce waste resulting from the operations, and capture value from IT products at end of life. For example, we have used the plastic of more than 1.8 billion recycled plastic bottles and plastic from recycled HP ink cartridges to create over 1 billion new Original HP ink cartridges with our "closed loop" cartridge recycling process. By recycling these plastic bottles, we have diverted 24,000 tonnes of waste from landfills and reduced GHG emissions equivalent to 17,000 tonnes of carbon dioxide (CO_2).

Addressing our own environmental footprint

Responsibly managing our own operations is a cornerstone of our commitment to environmental sustainability. Across our global operations, we continually work to reduce energy consumption, GHG emissions, paper use, water consumption, and waste. In 2011,

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[3] When printing 500,000 copies of a 240-page mono color paperback book, duplexed with 5% coverage. First 450,000 copies printing using the Timson Offset Press, with supplemental short runs of 1,000 copies using the Digital T200 press. This assumes book return rate of 25% for offset printing, 5% for digital printing.

[4] Polycom is an exclusive partner for certain video collaboration solutions for HP's internal use and resale to its broad customer base, which is further helping to reduce travel and emissions.

[5] For air travel avoidance, an average of 1,609 miles each way per round-trip (average of short-, medium-, and long-haul flights at HP), and a weighted average CO_2 footprint per mile of 199g CO_2e is used. Car travel to/from airport on both ends is also considered. Of the 35% of meetings that avoid travel, only 1.4 persons are assumed to avoid travel in each meeting. Usage depends on a company's travel and meeting policies.

GHG emissions from our operations (not including travel) equaled a 20% reduction from our 2005 baseline, meeting our goal 2 years early (learn more in Energy and GHG emissions on page 30). Additionally, we completed energy-efficiency initiatives at our client-serving (or "trade") data centers that we project will save approximately 13 million kilowatt hours (kWh) and avoid an estimated 7,200 tonnes of CO_2e emissions on an annual basis. That's the equivalent of removing 1,758 passenger vehicles from the road for 1 year.[6]

In 2011, HP ranked in the top-scoring 10% of S&P 500 companies by the Carbon Disclosure Project and was listed on their Carbon Disclosure Leadership Index (CDLI). To learn more, read the CDLI report.

Easing demand on freshwater sources

Since 2007, HP's facilities in Singapore have been using "New Water" to reduce demand on freshwater. New Water is treated wastewater that is purified using microfiltration, reverse osmosis, and ultraviolet treatment, as well as conventional treatment processes. The water is potable but is mostly used by industries requiring high-purity water. New Water accounts for more than two-thirds of the facilities' annual water consumption and is 20% cheaper than standard potable water, helping us to save more than $3.5 million USD since 2007.

Eileen Claussen
President, Center for Climate and Energy Solutions (C2ES)

Eileen describes how technologies such as HP's Managed Print Services make business sense while also benefiting the planet. Visit our online gallery of external stakeholder perspectives to see Eileen's video.

Collaboration

Collaboration is essential to developing shared solutions for complex environmental challenges. HP works regularly with governments, nongovernmental organizations (NGOs), and other technology companies to understand the environmental issues involved, address the needs and concerns of stakeholders, search for effective solutions, and enact policies and practices that require a collective approach to work on a large scale. Through these efforts, we focus on such goals as improving resource efficiency, continually advancing standards for product development, and addressing the causes of climate change.

HP Executive Environmental Advisory Council

In 2010, we established the HP Executive Environmental Advisory Council (EEAC) to provide objective environmental counsel to HP leadership. The EEAC's insights help us better evaluate opportunities, set priorities, and assess progress in such areas as energy efficiency, product reuse and recycling, and supply chain responsibility.

The EEAC provides a forum to:

- Solicit expert feedback to inform HP's environmental strategies.
- Deepen HP's understanding of major environmental trends.
- Offer thought leaders a preview of HP's sustainability-focused research and innovation.
- Help HP to expand and evolve environmental programs.

In 2011, the EEAC recommended that HP more broadly integrate sustainability criteria into its procurement policies for nonproduction spend. One example of HP's commitment in this vein is our commitment to undertake more sustainable procurement in our U.S. auto fleet. Through the Clinton Global Initiative's Fleets for Change, we've agreed to reduce greenhouse gas (GHG) emissions from our U.S. fleet by 10% by 2015, compared with 2010 on a per unit basis. (Learn more about HP's involvement with Fleets for Change.) The council also recommended that HP share its environmental leadership more proactively. Our 2011 outreach included such communications programs as the HP Unlocking Your Energy tour.

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[6] U.S. EPA Greenhouse Gas Equivalencies Calculator. For details, see www.epa.gov/cleanenergy/energy-resources/calculator.html.

The council consists of 12 prominent business, academic, and NGO thought leaders. At the end of 2011, EEAC members included:

- Eric Brewer, Professor of Electrical Engineering and Computer Sciences, University of California, Berkeley, and Vice President of Engineering, Google
- Aron Cramer, President and CEO, BSR
- Amol Deshpande, Partner, Kleiner Perkins Caufield & Byers
- Ann Hand, CEO, Project Frog
- Steven Kline, Vice President, Corporate Environmental and Federal Affairs, and Chief Sustainability Officer, PG&E Corporation
- Peter Lehner, Executive Director, Natural Resources Defense Council
- Joel Makower, Chairman and Executive Editor, GreenBiz Group Inc.
- Dan Reicher, Executive Director, Steyer-Taylor Center for Energy Policy and Finance, Stanford University
- Steve Westly, Managing Partner, The Westly Group
- Scott Wicker, Chief Sustainability Officer, UPS
- Andrew Winston, Author and Founder, Winston Eco-Strategies
- David Yarnold, President and CEO, Audubon

Collaborating on low-carbon best practices and solutions

HP believes governments, businesses, and other organizations must meet the challenges of climate change with ingenuity. In 2011, HP signed the 2°C Challenge Communiqué, demonstrating our commitment to global action on climate change, sustainable development, forest conservation, and building a green economy. Signed by hundreds of corporate leaders worldwide, the communiqué calls for international government action to stabilize global average surface temperatures at a maximum 2°C above preindustrial levels.

Additional examples of our collaborations in 2011 include:

Center for Climate and Energy Solutions

HP provided funding to the Center for Climate and Energy Solutions (C2ES)—formerly the Pew Center on Global Climate Change—to launch *Business of Innovating: Bringing Low-Carbon Solutions to Market*. Released in October 2011, the study documents the challenges and best practices of companies dedicated to addressing climate change. HP was one of four multinational companies featured in detailed case studies. The report focused on two low-carbon HP innovations in particular: HP Visual Collaboration videoconferencing[1] and Managed Print Services (MPS). Read more about our energy and climate strategy.

World Wildlife Fund (WWF)

In 2011, HP Canada expanded its collaboration with WWF Canada by providing financial, technical, and consulting expertise for WWF's Living Planet @ Work. Launched in late October, the program provides free resources to businesses to help engage employees in "green" initiatives. The program included close to 100 business members by the end of 2011. Learn more about the relationship between HP Canada and WWF Canada.

HP is also a member of WWF's Global Forest and Trade Network (GFTN), which aims to expand the market for environmentally responsible forest products. HP signed the GFTN's Corporate Tiger Declaration in early 2011. Corporate signatories agree to reduce their impact on global tiger habitats through the responsible procurement of wood and paper.

Forest Stewardship Council

In 2011, HP became an official member of the Forest Stewardship Council (FSC®), an independent NGO and certifying body that promotes responsible management of the world's forests. In 2009, we set a goal that 40% or more of HP-branded paper sold would be FSC certified or have more than 30% postconsumer waste content by the end of 2011. We met our goal this year, and established a new goal for 2015. Read more about our paper policy and practices.

Other collaborative efforts

To advance environmental sustainability, HP engaged in several other collaborative relationships in 2011, including the following:

- Participating in The Sustainability Consortium (TSC) to develop a consistent, transparent methodology for sharing information on the sustainability of notebooks, desktops, monitors, and televisions based on a life cycle approach. HP is also working with the TSC Paper Working Group to develop environmental assessment tools for paper.
- Developing a transparent, objective product carbon footprint (PCF) methodology for notebooks, desktops, and monitors in collaboration with the Massachusetts Institute of Technology (MIT), NGOs, and other original equipment manufacturers (OEMs). See Life cycle assessment on page 31 for more information on our PCF research.
- Contributing to the development of the EPEAT® standard for imaging and printing products in collaboration with other technology stakeholders and the Green Electronics Council.
- Working with other stakeholders, the U.S. Environmental Protection Agency, and the U.S. Department of Energy to revise the ENERGY STAR® standard for both printers and computer servers, and to develop a new ENERGY STAR standard for data center storage.
- Working with the U.S. Green Building Council on new LEED® standards for data centers and with the Green Grid Association (as a board member) on new data center protocols.

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[1] HP divested its HP Visual Collaboration business to Polycom, Inc., in July 2011.

• Contributing to the development of the Greenhouse Gas Protocol Product Life Cycle Accounting and Reporting Standard.

• Collaborating with the NGO Camara to support the East African Computer Recycling (EACR) facility in Mombasa, Kenya, which processes end-of-life electronics equipment while creating employment in disadvantaged communities.

• Partnering with the Canada-based Lavergne Group to support a new HP plastic treatment facility in Vietnam, expanding the "closed loop" HP ink cartridge recycling program. Read more about our work with recycling vendors in developing countries.

Learn more about how HP's approach to stakeholder engagement helps us address a broad range of environmental and social challenges.

Employee engagement

Around the world, HP creates opportunities for employees to learn about, demonstrate, and share environmental practices that benefit their professional and personal lives. The HP Sustainability Network is the centerpiece of our approach and, with thousands of members, is among the largest employee network groups at HP. The network expanded from 29 chapters in 2010 to 36 in 2011.

Located in 13 countries, the chapters coordinate a wide range of efforts including several alternative commute programs, local volunteering efforts, on-site composting, educational workshops, and local site events for World Environment Day and Earth Day. During 2011, 17 sites around the world ran World Environment Day or Earth Day events that were attended by thousands of employees.

In 2011, the network set up a global steering committee to improve effectiveness and manage growth, increase stakeholder support and communications, and offer activities to more individuals in more countries. The committee coordinates with HP's Sustainability and Social Innovation team to ensure alignment.

During the year, the network encouraged the growth of employee-led horticultural users groups (HUGs) worldwide. HUGs foster activities such as seed exchanges, tree planting in local communities, classes on how to eat locally, and lessons on how to work with local farmers' markets. Six sites—in Australia, Canada, the United Kingdom, and the United States—have employee vegetable gardens.

We have other initiatives as well to encourage employees to engage on environmental issues. In 2011, we combined HP Canada's Green Advocates program with the Eco Solutions Advocate program in the United States. This created the HP Eco Advocate program, which helps employees communicate the company's environmental initiatives to customers and the community. Through the initiative, we trained more than 1,300 HP employees on environmental topics. In 2012, we plan to expand the Eco Advocate program into other regions and are incorporating elements into our sales training.

"The Eco Advocate program has enabled me to channel my passion for all things green into creating a business advantage for HP. I know my customers look to me for expertise in this area, and the program helps me to provide that knowledge."
—Hilde Allman, Technology and Business Process Consultant, Printing and Personal Systems, HP Canada

"The knowledge and confidence the Eco Advocate program fosters is awesome. It has allowed me to educate my customer base—and has helped our procurement and IT staff to win deals."
—Adam Hughes, Commercial Account Manager, Printing and Personal Systems, HP Canada

HP employees making an impact: Frances Edmonds

Frances Edmonds, director of environmental programs for HP Canada, supports World Wildlife Fund (WWF) in helping other businesses become more sustainable. Learn more about Frances Edmonds on page 137.

Phillip Kong

Phillip Kong brings his passion for environmental sustainability to both his job as a Green Practice Consulting Manager for HP Enterprise Services, and as the global lead for the HP Sustainability Network. Learn more about Phillip Kong on page 141.

Energy and climate

The opportunity

Energy drives the global economy and nearly every aspect of modern life. With consumption forecast to rise nearly 50% by 2035,[1] the world needs solutions that improve efficiency to keep pace with demand—as well as reduce emissions that fuel climate change.

Investing in energy efficiency is sound business strategy as well. According to McKinsey & Co., the average internal rate of return on energy efficiency projects is 17%, which could yield energy savings up to $900 billion USD annually by 2020 in the United States alone.[2]

At HP, we believe this represents an enormous opportunity to deliver energy-efficient information technology (IT) infrastructure, and to innovate IT solutions that provide people and businesses with better insight into and control over their energy use.

Energy efficiency also helps mitigate climate change. According to The Climate Group, information and communications technologies (ICT) could save 7.8 billion tonnes of carbon dioxide equivalent (CO_2e) in 2020, representing 15% of global emissions. We believe enabling customers to better understand and improve their energy use can reduce costs, but also help them make better choices. Thanks to smart meters, energy management systems, and other emerging technologies, the data to guide those decisions is increasingly available.

Using IT to improve energy-efficiency

At the same time, the rapidly growing volume of energy consumption data is challenging to manage and use. As the world's largest provider of IT infrastructure, software, services, and solutions to individuals and organizations of all sizes, HP is in a unique position to help customers turn energy-consumption data into usable information, enabling them to develop more efficient and productive operations that use less energy and reduce associated greenhouse gas (GHG) emissions.

For example, HP Energy and Sustainability Management (ESM) is designed to help enterprise customers measure and manage energy use and other resources across their facilities, IT, supply chain, and workforce. And for individual users, HP Power Assistant makes it easy to monitor and reduce PC energy consumption, operating costs, and CO_2e impact, without affecting productivity.

We also focus on the supply side of the equation. Utilities are challenged to manage and make sense of the vast amount of the data generated by a proliferation of smart meters, which gather and communicate data on energy use in virtually real time. Improving their operations and better serving customers hinges on effectively capturing, storing, analyzing, and acting on that data.

HP Smart Grid Solutions enable utilities and other partners to design and deploy dynamic pricing programs and energy-efficiency, conservation, and demand-response programs. With operational improvements, utilities can limit outages and develop business plans that can defer the build out of new generation and transmission infrastructure.

Energy-efficient IT

In addition to developing solutions that better measure and manage energy use, HP is committed to improving energy efficiency across our portfolio of products, from desktop PCs and printers to data centers. In fact, HP's product portfolio is on average 50% more energy efficient today than it was in 2005.

We're also delivering solutions that replace inefficient technologies with more productive and sustainable alternatives. For example, HP thin clients enable computing on a "virtual desktop" residing on a central server. Users access the virtual environment through a simple and efficient desktop device that contains no hard drives or other moving parts, relying on the server for all computing resources. Replacing 2,000 desktop PCs and monitors made in 2005 with the same number of HP thin client solutions—including the required servers—would cut energy consumption by 74% and save an estimated 795,000 kilowatt hours (kWh) per year.[3]

Mark Kenber
CEO, The Climate Group

Mark thinks advances in information and communications technology led by companies such as HP can transform how we live and do business. Visit our online gallery of external stakeholder perspectives to see Mark's video.

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[1] www.eia.doe.gov/oiaf/ieo/index.html.

[2] www.mckinsey.com/Insights/MGI/Research/Natural_Resources/The_case_for_investing_in_energy_productivity.

[3] The technology refresh takes 2005 desktops and monitors in an enterprise setting and replaces them 1:1 with HP t5570 Thin Clients and new HP Compaq LE19 WLED monitors. In the background, a set of HP DL460cG7 blade servers and a rack of storage disks support the new thin clients (about 70 thin clients to one blade server).

Energy and the data center

As demand for computing resources increases, companies are relying more heavily on data centers, increasing energy use. According to the 2011 Data Center Industry Census, the world's data centers will consume 19% more energy in 2012 than in 2011. Total power use will reach about 31 gigawatts, equivalent to the energy used by all the residential households in France, Italy, or the United Kingdom.[4]

To help slow this trend, HP is helping customers rethink the data center from design through operational management. HP Critical Facilities Services (CFS) provides consulting, design, and engineering services for new or retrofitted data centers. Our approach helps align IT, facilities, and operations with data-center capacity and flexibility to meet business needs and manage environmental impact.

One challenge is that traditional data centers can be over provisioned and under used, resulting in wasted energy and money. Virtualization offers one solution. By consolidating many servers into a single machine, virtualization can dramatically reduce the energy demands of a data center while increasing its capacity and performance. Another solution is modular design, which helps enterprises rapidly and efficiently expand data-center capacity. One example is the HP POD 240a, also referred to as the HP EcoPOD— a compact, self-contained, modular, ultraefficient data center.

The availability of usable performance data is also key to saving energy. The HP Data Center Smart Grid creates an intelligent, energy-aware data center using interconnected sensors that detect when power is being wasted, allowing IT managers to make adjustments in real time. This powerful management tool can reduce a facility's power and cooling costs by up to 30%.

HP is also developing data centers based on a more efficient cloud-based infrastructure. This enables servers to use and share resources more efficiently, getting more work out of each kWh used.

Looking to the future, the sustainable data center project is a large-scale rethinking of how data centers are designed, built, and operated. Managed by HP Labs, the company's central research arm, the aim is to develop a facility that consumes net-zero energy from nonrenewable sources over its entire life cycle—from resource extraction and manufacturing to operation and end of life. This means moving away from sources like the public power grid and relying on local microgrids of renewable energy to offset all or most of a data center's energy needs. HP Labs has also created an IT infrastructure that dynamically allocates resources to shape demand, so the data center receives the resources it needs when it

needs them—and no more. In pilot tests, HP Labs is using local microgrids of renewable energy to reduce a data center's reliance on grid power. HP expects to reduce reliance on the grid by more than 75% while significantly lowering operational costs—contrary to the view that sustainability requires companies to "pay more to be green." This shift to renewable energy microgrids can reduce a data center's carbon footprint by an equivalent 75%.

HP technology, services, and solutions can help transform how the world lives and works. We make it possible for customers to grow responsibly and to be more productive while being conscious of the environment and efficient with resources. For HP, this alignment of business and environmental benefits is core to creating a Positive Impact, HP's drive to help conserve more than we as a company consume.

HP employees making an impact: Sundeep Khisty

As the lead for HP Carbon Emissions Management Service, Sundeep Khisty shows enterprise clients how to measure and reduce their carbon footprints. Learn more about Sundeep Khisty on page 140.

Energy and GHG emissions across HP's business

We're committed to making our global operations more energy efficient, seeking low-carbon energy sources where possible. In 2011, we implemented a software platform from Hara, a provider of energy and sustainability management software, to automate energy and sustainability data collection across 770 HP sites worldwide. Learn more in Energy efficiency on page 35.

HP ESM group is also involved in this global implementation. The ESM group will apply the insights and best practices they gain to benefit other customers undertaking similar deployments.

HP works to manage and decrease energy use and GHG emissions throughout our business (see table below). From manufacturing and operations to product transport, use, and recycling, HP recognizes the importance of environmental sustainability in our products, services, and practices.

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[4] 2011 Data Center Industry Census, DataCenterDynamics.

GHG emissions across HP's business, 2011[*]

Category	2011 emissions [tonnes CO$_2$e]	Level of influence[**]	Our actions
Product manufacturing	4,800,000[***]	Medium	We work with our direct suppliers to report and reduce their energy use.
HP operations	1,856,400	High	In managing our facilities and data centers, we strive to reduce energy consumption and purchase energy from renewable sources.
HP employee business travel	461,600	High	Our travel policies and use of online virtual meetings and videoconferencing decrease business travel.
Product transport	1,900,000	Medium	We enhance distribution networks and convert to lower-energy transport modes where appropriate. Improved packaging reduces waste and weight, saving shipping fuel and cutting GHG emissions.
Product use	Based on customer energy use of sold products, approximately an order of magnitude more than emissions from HP operations	Medium	We design products, software, and services that help customers use less energy.
Product recycling (CO$_2$e avoided)	250,000[****]	Medium	We offer customers a range of reuse and recycling services, resulting in reduced GHG emissions.

[*] Includes direct measurements as well as estimates.

[**] Refers to the level of influence HP has on this category of emissions.

[***] 2010 is the most recent year for which this data is available.

[****] According to the U.S. Environmental Protection Agency's Waste Reduction Model (WARM) Tool, CO$_2$e reductions from recycling are calculated per the following formula: 1.858 kg CO$_2$e/kg recovered electronic waste.

Working with others

We collaborate with government agencies, nongovernmental organizations (NGOs), universities, and peer technology companies to improve our own performance, develop standards to advance the industry, and contribute to advanced research in energy and sustainability.

HP supports international action to address climate change and minimize the risks of serious environmental, economic, and social impact. Because we believe that energy-efficient HP technology can be a catalyst in meeting the challenge of climate change, we again participated in the United Nations Climate Change Conference (COP 17). For the second consecutive year, HP was selected as the primary provider of low-carbon IT solutions for the conference.

HP is an official signatory of The 2°C Challenge Communiqué, a statement from more than 400 international businesses that calls on governments to take action at a national level to ensure a successful transition to green growth and a climate-resilient economy.

HP Unlocking Your Energy

In 2011 we hosted a series of HP Unlocking Your Energy events to showcase innovative HP products, services, and solutions that help consumers, enterprises, and entire industries reduce their energy consumption, cut carbon emissions, save money, and boost productivity.

Academics, NGO leaders, industry analysts, journalists, and sustainability experts attended the events, providing a forum for new thinking and dialogue on the opportunities for IT to reduce energy use and advance sustainability.

Learn more about the HP Unlocking Your Energy event in London.

Paper

As the world's largest information technology (IT) company, with one of the industry's most extensive supply chains, HP is committed to the responsible sourcing and use of paper products throughout our operations and to reducing the environmental impact associated with producing the paper that we sell. We work with leading environmental organizations to promote responsible forestry practices, increase the use of sustainably sourced paper, and encourage broader recycling. And as a leading supplier of imaging and printing equipment, we deliver product innovations that make it easy for our customers to reduce paper waste.

Our Environmentally Preferable Paper Policy details HP's principles for buying, selling, and using paper and paper-based packaging. We seek to source paper from suppliers who demonstrate responsible forestry and manufacturing practices. Our environmental strategy for packaging prioritizes renewable, recycled, and recyclable materials. Consequently, we have shifted many products to paper and molded-pulp packaging that is made from responsibly sourced fiber.

Responsible paper sourcing and sales

HP sells approximately 260,000 tonnes of HP-branded printer and copier papers annually. We require suppliers to verify the source of pulp used in HP-branded papers so we can be confident that it is legally and responsibly sourced. We are working to increase both the percentage of postconsumer recycled fiber in HP-branded papers and our use of pulp that is certified as sustainable by the Forest Stewardship Council (FSC®)—widely regarded as the leading independent standards organization for responsible forestry.

HP became an FSC member in 2011, helping to shape the council's policies and criteria, and we strongly encourage our paper suppliers to pursue FSC certification. We also achieved our goal of having at least 40% of HP-branded paper be FSC-certified[1] and/or contain at least 30% postconsumer waste (PCW) content by the end of 2011. HP's new goal is that 50% or more of its branded papers will meet one or both of these criteria by the end of 2015. The majority of our photo papers and specialty papers have achieved FSC "chain of custody" (CoC) certification (SCS-COC-002255), demonstrating that the paper's fiber originates from a forest that is responsibly managed in accordance with FSC principles and criteria.

HP has a preference for offering FSC-certified papers. Where FSC-certified pulp is not currently available, HP offers papers certified by the Programme for the Endorsement of Forest Certification or the Sustainable Forestry Initiative.

To learn more about certifications for specific HP-branded paper products, as well as the percentage of recycled content in our papers, see the "Media Supplies" section of HP Eco Highlights Products.

HP is also a member of the World Wildlife Fund's Global Forest and Trade Network, through which we gain valuable expertise to help us achieve our responsible paper-sourcing goals. (Read more about collaboration on environmental issues between HP and its stakeholders.)

We have implemented HP's Environmentally Preferable Paper Policy with our suppliers of HP-branded papers, and we encourage paper manufacturers to implement environmental management systems such as ISO 14001. Our efforts include working with major paper suppliers to better understand their energy and water use and their greenhouse gas (GHG) emissions so we can help these suppliers assess the potential for improvements.

For more information, see our customer brochure, HP Home and Office Papers—Designed with the Environment in Mind.

Helping customers conserve resources

HP provides technology and services to help make customers' printing and paper use more effective. We are also working to advance the analog-to-digital transformation of the printing and publishing industry, as well as in other commercial and industrial sectors that produce materials such as marketing collateral, labels, and signage. HP Digital Publishing, for example, helps publishing industry customers convert from offset book printing to digital on-demand printing. This enables book publishers to print only the volume of books required to meet demand—helping to reduce energy and resource use and avoid excess waste. (Read more in Environmental sustainability on page 19.)

We also help customers to:

- Assess, understand, and reduce unnecessary paper use through the HP EcoSMART Console and EcoSMART Fleet—online tools that provide centralized access to usage data along with customizable options for saving energy and paper, and reducing carbon footprint.

- Ensure optimum paper use by taking advantage of automatic two-sided printing, and by setting two-sided printing as the default across entire print fleets through tools such as HP Universal Print Driver and HP Web Jetadmin.

- Reduce paper waste by up to 55% with HP Smart Print, a free online tool that helps users select and print only the webpage content they need.[2]

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[1] FSC (license code FSC-C017543).

[2] Supports Microsoft® Internet Explorer® 7.0, 8.0, 9.0 as well as Mozilla® Firefox® version 3.5 through 5.01. An independent study commissioned by HP compared paper consumption using HP Smart Print with a web browser's print command. Microsoft Internet Explorer users can save up to 55% and Mozilla Firefox users (tested on v3.6.19) can save up to 15% on paper usage.

Conserving paper across HP

We are working to lead the shift to more environmentally sustainable printing and paper use across HP. Focus areas include:

- **Paper used in our offices** We use HP Everyday Papers, which are made from pulp produced through responsible forestry practices, for internal office printing. Two-sided printing is the default for our office printers.
- **Paper shipped "in the box"** This includes manuals, guides, and warranties. We are changing specifications (for example, using smaller fonts and thinner paper), reducing document length, and switching to electronic delivery (where legally permissible). As a result, HP shipped 14,200 fewer tonnes of paper documents in 2011 compared with 2008. Learn more about our efforts to reduce packaging.
- **Paper used for commercial and promotional purposes** We strongly encourage our commercial print vendors to print all HP sales and marketing materials on paper that is certified (preferably by FSC) and/or contains postconsumer recycled content. Over the past 4 years, we have switched to Print on Demand for most of our sales and marketing materials, reducing storage requirements and paper waste associated with discarding obsolete documents.

Deinking research aids paper recycling

HP is working to improve the ability to remove inks from printed paper for enhanced recycling through research and development in innovative inks, additives, paper design, and deinking processes. For instance, the paper design and additives typically used in HP ColorLok® and HP ColorPRO papers greatly enhance inkjet deinkability. Our innovations in deinking help recycling mills transform ink-covered paper into clean, high-quality pulp for producing white recycled paper. (See how this process works.)

During 2011 testing of HP Color Inkjet Web Press prints, more than 15 papers were rated as having "Good Deinkability," based on the European Recovered Paper Council scorecard using INGEDE Method 11. We also partnered with Arjowiggins Graphic on a 2011 recycling mill trial in which we successfully deinked more than 9 tonnes of paper printed with HP Indigo inks, using the standard process of the Arjowiggins Graphic Greenfield mill. Learn more.