

Sustainable design

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The hundreds of millions of HP products in use worldwide collectively represent HP's largest impact on sustainability. We continually challenge ourselves to improve the environmental performance of our products throughout their **life cycle**, as well as design solutions that support digital transformation to a **low-carbon economy**. Our goal is improved environmental performance, enhanced productivity and entertainment, and lower total cost of ownership for customers. We also design our products and website with consideration of the varied physical capabilities of our customers. (See **accessibility**.)

Environmental issues have been integral to our **research and development** programs since the early 1990s, and we launched our Design for Environment (DfE) program in 1992. DfE is central to our design strategy and helps us meet **increasing customer demand** for improved environmental performance. More than 50 environmental product stewards globally work with design teams to decrease the impact of our products across their **life cycles**—including **materials** and **energy** used in **manufacture, packaging** and **distribution, energy** and resources (such as **paper**) consumed during use, and materials recovery at **end of life**.

Eco-labels

HP participates in a number of **eco-label** programs, including Electronic Product Environmental Assessment Tool (EPEAT®), ENERGY STAR®, China's Energy Conservation Project, Germany's Blue Angel, and Taiwan Green Mark. As of October 2010, HP is the only company with EPEAT Gold registered thin client computers, and we have the most U.S.-registered EPEAT desktop workstations in the industry (as of April 2011). We offer EPEAT registered **products** in 38 countries worldwide (as of November 2010).

Contributing to industry standards to enhance environmental performance

Highlights in 2010

BFR- AND PVC-FREE

At the end of 2010, 100% of all new HP notebook products are BFR- and PVC-free.¹ The HP ENVY¹⁰⁰ e-All-in-One is the planet's first PVC-free printer.²

1 BILLION

Number of HP ink cartridges containing post-consumer recycled plastic³ (800 million of which were manufactured with recycled plastic from the HP "closed loop" process, which uses plastic from returned cartridges and plastic bottles to make new cartridges).

320 TONNES

Weight of packaging material saved by using our award-winning ClearView packaging.

ENVIRONMENT

Sustainable design

- ▶ Research and development
- ▶ Life cycle assessment
- ▶ Materials
- ▶ Packaging
- ▶ Paper
- ▶ Goals
- ▶ Perspective: Randolph Kirchain, Ph.D., and Elsa Olivetti, Ph.D.
- ▶ Perspective: Richard Liroff, Ph.D.

RELATED LINKS

- HP Labs ▶
- The Green Screen Tool ▶



We regularly collaborate with other organizations to develop industry standards that encourage innovation, optimize environmental performance, and make it easier for customers to choose products that can help them reduce their impact on the environment. HP's participation in standards development in 2010 included:

- Contributing to development of the EPEAT standard for imaging products, launching in 2011. Previously, HP also helped develop the EPEAT standards for desktop computers, notebooks, and monitors.
- Working with the International Organization for Standardization (ISO) to develop a carbon footprint standard for print media.
- Contributing to the development of ISO/IEC 29142-3, an international standard to provide definitions and guidance for use in the development of print cartridge green procurement criteria, environmental standards, and environmental labels (expected to be published in 2012).
- Collaborating with the U.S. Green Building Council on the new Leadership in Energy and Environmental Design (LEED) Data Center standard.
- Participating in a U.S. government-led taskforce to develop recommendations for measuring data center efficiency.
- Assisting in the development of a new data center energy assessment certification program under the U.S. Department of Energy.
- Collaborating with the Green Grid in the development of new data center standards and protocols.
- Contributing to the development of the Greenhouse Gas Protocol Initiative's Product Life Cycle Accounting and Reporting Standard.
- Working with the International Electronics Manufacturing Initiative (iNEMI) Eco-Impact Evaluator Project for ICT Equipment to develop a simple way to determine the main life cycle environmental impacts and improvement opportunities for information and communications technology products. (See [Life cycle assessment](#) for more detail.)
- Collaborating with several universities, including Arizona State and MIT, as well as other organizations, in the Product Attribute to Impact Algorithm (PAIA) project, to identify and analyze the processes and components that contribute to the carbon footprint of a notebook PC. (See [Life cycle assessment](#) for more detail.)

Managing environmental performance

Our environmental product stewards engage design teams across the company to integrate environmental considerations and parameters into the product development process. Carefully designed metrics play an essential role in guiding design, enhancing the performance of HP products, measuring progress, setting appropriate goals, and communicating benefits to customers and other stakeholders. One example is our Product Environmental Metrics initiative for imaging and printing products. These cover life cycle energy consumption and carbon footprint, including materials processing, product manufacture and use, and ease of recovery or recycling. [Learn more](#)  .

Design for recyclability

Our objective is to design HP products to be increasingly easier to recycle, using common fasteners and snap-in features and avoiding the use of glues, adhesives, and welds where feasible. This makes it easier to dismantle products and to separate and identify different plastics. For example, new HP notebooks are more than 90% recyclable by weight on average,⁴ and HP workstations and DC series desktop products have a tool-less chassis for easy upgrade and recycling at end of life.

Materials selection can further enhance recyclability. For example, in 2010 we launched several products free of brominated flame retardants (BFRs) and polyvinyl chloride (PVC),¹ and our entire notebook line is now mercury-free.

Recycling terms

Recycling Products are diverted from the waste stream via available processes and programs, and are collected, processed, and returned to use in the form of raw materials or products.

Recycled content Proportion of recycled material in a product or package.

Recycled material Material that has been reprocessed from recovered (or reclaimed) material by means of a manufacturing process and made into a final product or into a component for incorporation into a product.



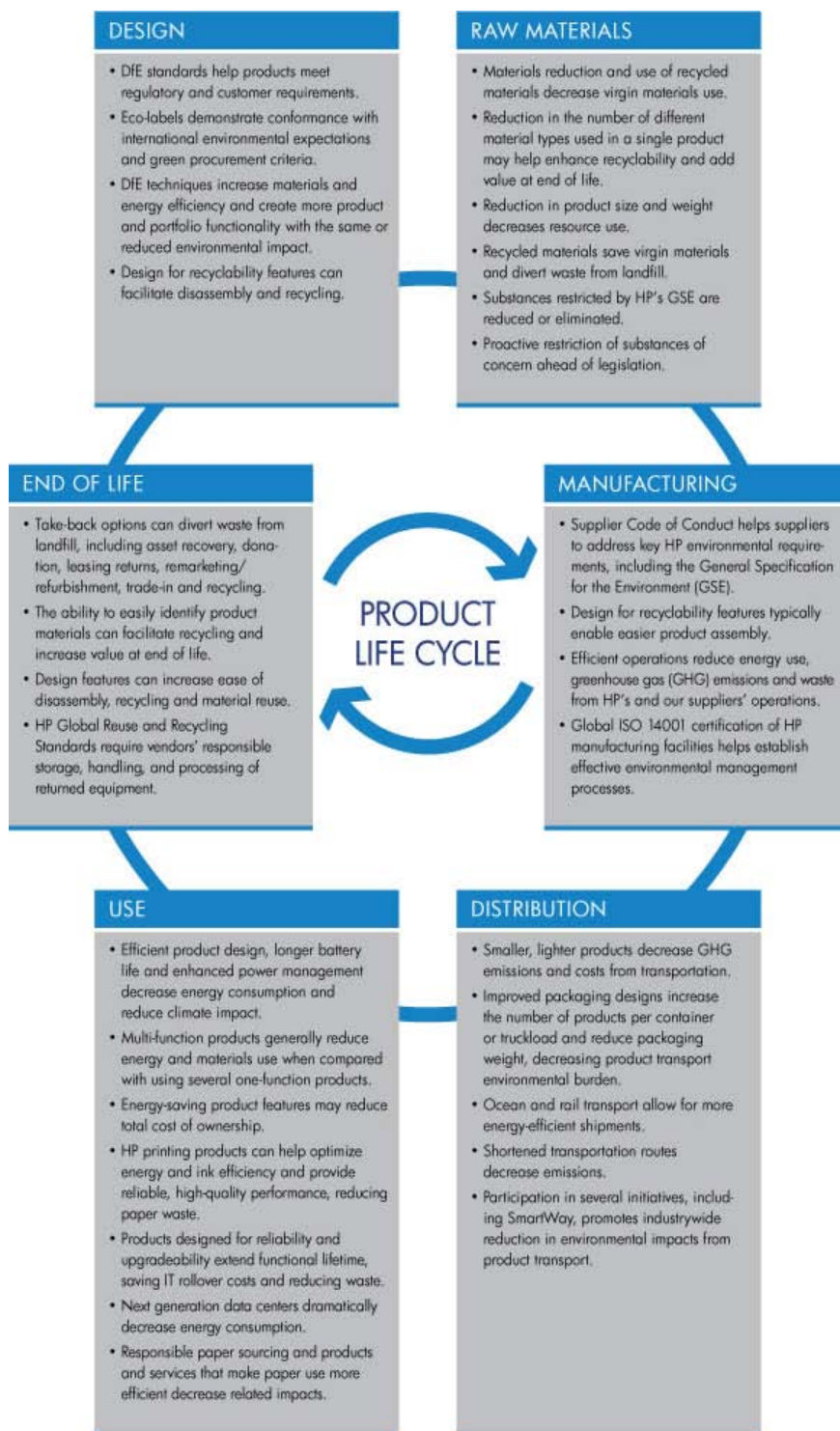
Paper use represents a significant environmental impact of printing, and recycling paper can save energy as well as the pulp required for making virgin material. Recyclers need to be able to remove ink on used paper to produce high-grade recycled pulp. We have a comprehensive "de-inking" research and development program to ensure that the growing volumes of paper printed digitally can continue to be a valuable part of the waste stream for recyclers. We have developed new and improved inks, demonstrated the enhanced deinkability of HP ColorLok® paper, and continued collaborating with major paper recyclers on de-inking research.

In 2010, we:

- Announced technical collaborations with AbitibiBowater, Stora Enso, and UPM, expanding on our existing partnership with NewPage Corporation. These companies are the largest de-inkers in Europe and North America and we are working together to examine aspects of ink, paper, and the deinking process to improve deinkability.
- Launched a new and improved HP Color Inkjet Web Press ink with enhanced de-inking characteristics.
- Identified aspects of paper design and pulp grades that improve deinkability in office and commercial printing.
- Published and presented data on improved deinkability of prototype inks for the HP inkjet web press at the Technical Association of the Pulp and Paper Industry (TAPPI) PEERS conference.
- Published data showing enhancement in deinkability due to use of HP ColorLok office papers.
- Conducted a large-scale pilot to test more responsible use of chemicals during the de-inking process itself, and published the results for the benefit of the paper industry.

See www.hp.com/go/deinking for more information.

Reducing environmental impacts across the product life cycle



Accessibility and aging

HP strives to create products, services, and information that are accessible to everyone, including people with disabilities or seniors with age-related limitations. HP's commitment is reflected in our:

- Product and website design process
- Partnerships with assistive technology vendors
- Education of employees about accessibility regulations and best practices
- Participation in efforts to update accessibility standards around the world, such as the refresh of U.S. Section 508.

Our product design teams explore ways to enhance accessibility, productivity, and user comfort. Accessibility features on HP products may include buttons identifiable by touch, ports and

switches positioned within easy reach, and large adjustable displays. Product examples include dual-hinge widescreen monitors that can be lowered closer to the desk surface for bi-focal, tri-focal, or progressive lens wearers, and the Senior PC, which is configured to provide seniors easy access to e-mail and the Internet.

During 2010, we migrated our customer support from Teletype (TTY) to Telecommunications Relay Service (TRS), Video Relay Service (VRS), and Web Captioned Telephone. These new technologies provide enhanced support to customers who are deaf or hard of hearing.

See our HP [Accessibility website](#) for extensive additional information.

¹ Meeting the evolving definition of BFR/PVC-free as set forth in the "iNEMI Position Statement on the Definition of Low-Halogen Electronics (BFR/CFR/PVC-Free)." Plastic parts contain < 1000 ppm (0.1%) of bromine [if the Br source is from BFRs] and < 1000 ppm (0.1%) of chlorine [if the Cl source is from CFRs or PVC or PVC copolymers]. All printed circuit board (PCB) and substrate laminates contain bromine/chlorine total < 1500 ppm (.15%) with a maximum chlorine of 900 ppm (.09%) and maximum bromine being 900 ppm (.09%). Power supply and power cords are not BFR/PVC-free. Service parts after purchase may not be BFR/PVC-free. WWAN is not BFR/PVC-free.

² HP ENVY¹⁰⁰ e-All-in-One is polyvinyl chloride-free (PVC-free); meeting the evolving definition of PVC-free as set forth in the "iNEMI Position Statement on the Definition of Low-Halogen Electronics (BFR/CFR/PVC-free)." Plastic parts contain <1000 ppm (0.1%) of chlorine [if the Cl source is from CFRs or PVC or PVC copolymers]. Printers sold in Korea are not PVC-free. USB cable, required in limited geographic areas, is not PVC-free.

³ As of September 2010. Many Original HP ink cartridges with recycled content include at least 50% recycled plastic by weight. Exact percentage of recycled plastic varies by model over time, based on the availability of the material.

⁴ Calculated using HP's Recyclability Assessment Tool.