

# Hardware Manufacturers Find Green in “Going Green”

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U.S. hardware manufacturers have taken significant steps to improve their environmental standing. Those steps are not only playing well with consumers, but also are providing moneymaking opportunities for the vendors through cost reduction and new revenue streams. Much of the focus is on the energy consumption of data centers, because energy consumption for them is almost doubling every five years. Also, they use 1 percent to 2 percent of the total power consumption in the United States, according to multiple studies. So large computer manufacturers are focusing their initial internal efforts on data centers, while also striving to improve the eco-friendliness of their product offerings.

### **Apple**

The [Apple](#) iPhone 3G Environmental Status Report states that the new mobile device is designed with the following features to reduce environmental impact:

- mercury-free LCD display;
- PVC-free handset, headphones and USB cable;
- bromine-free printed circuit boards;
- most packaging made from post-consumer recycled fiberboard and bio-based materials; and
- power adapter that outperforms strictest global energy efficiency standards.

Since 2001, Apple's standalone displays have consisted only of material-efficient LCDs. The company has continued to make ecological product and packaging efforts. According to the Apple Web site, the third-generation iPod nano packaging is 35 percent lighter and uses 54 percent less volume than the first-generation iPod nano did. MacBook Air consumes the least amount of power of any Mac, and its retail box, made primarily from 100 percent post-consumer recycled material, is 56 percent smaller by volume than previous MacBook packaging.

Apple takes a number of specific measures to reduce environmental impact over a product's life cycle in product design, manufacturing, energy efficiency and recycling. In design, power management features have enabled, in some cases, a dramatic reduction in power consumption from one generation of product to another. Between the first-generation and current-generation iMac, sleep-mode energy usage has decreased 92 percent due to improvements in CPU power management and increased hardware efficiency.

Apple aims to design its products to facilitate expandability and recycling, and they ban many environmentally harmful substances. Many popular features (such as AirPort and Bluetooth) are built into the main logic board, thereby eliminating the need to design and manufacture additional hardware, which in turn saves on energy usage and the production and recycling of product packaging.

In manufacturing, Apple first achieved ISO 14001 certification for a manufacturing site in 1996. ISO 14001 is a voluntary international standard that establishes the requirements for an organization's environmental management system (EMS). No ozone-depleting chemicals are used in any processes to manufacture components, materials or product packaging materials used by Apple (as stipulated by the Montreal Protocol on Substances That Deplete the Ozone Layer).

Many Apple products are designed to facilitate the disassembly of parts and materials for recycling, and Apple attempts to select materials to optimize recycling. For instance, the aluminum used in the Power Mac G5 and MacBook Pro enclosures is highly recyclable, as is the polycarbonate used for the iMac and other systems. And Apple participates in recycling programs worldwide (locations are available on its Web site), often achieving as high as a 90 percent recovery rate by weight of the original product.

## **Dell**

According to the company's Web site, [Dell](#) Chairman and CEO Michael Dell has stated that green information technology can be one of the world's strongest assets in achieving and sustaining a prosperous, low-carbon economy.

In IDC's report, *2008 Assessment of U.S. IT Asset Disposal Service Providers*, Dell's Asset Recovery Services, a recycling arm for large customers, was given the Green Recycling and Asset Disposal for the Enterprise (G.R.A.D.E.) certification. [Hewlett-Packard](#) (HP), [IBM](#) and two smaller firms were also recognized. Dell will soon release its greenest desktop PC ever: more than three-quarters smaller in size and operating on up to 70 percent less energy. Attention has even been given to packaging, which is made up of recycled material that can again be recycled.

Dell is now powering its entire 2.1-million-square-foot global headquarters' campus with 100 percent sustainable, green power, according to a Dell press release. It is using all of the power generated from [Waste Management's](#) Austin, Texas, Community Landfill gas-to-energy plant, to meet 40 percent of Dell headquarters' power needs. The remaining 60 percent comes from existing wind farms and is provided by [TXU Energy](#). (But bear in mind that Dell doesn't do manufacturing itself, so most of the power use caused by Dell is in decidedly "un-green" Chinese OEM factories.)

The company says it's using green technology to drive operating expense down. Dell is currently powering its Twin Falls, Idaho, facility with 100 percent green power, 97 percent of which is wind power and three percent solar, according to a recent press release. Last fall, Dell press relations announced it would make company-owned and leased facilities "carbon neutral" in 2008 through a strategy of improving energy efficiency in its operations and maximizing the purchase of renewable power. That commitment is part of the company's climate strategy, which also seeks to minimize carbon impact of supplier operations and customer product use.

There is more than just customer goodwill at stake. Almost \$2 million has been saved through Dell's efforts to reduce power consumption at its central Texas campuses, and the improved efficiencies are expected to cut carbon dioxide-equivalent emissions by almost 12,000 tons per year. Dell gains price certainty on its operational costs by purchasing green power, and future cost savings and possible tax benefits are expected.

Dell offers consumers no-charge recycling of any brand of used computer or printer with the purchase of a new [Dell computer](#) or printer. According to a recently announced policy, Dell will provide consumers with no charge recycling of any Dell-branded product, regardless of whether a replacement product is purchased.

## **Hewlett-Packard**

HP says it is committed to developing products and services that provide its customers with the opportunity for smarter growth. Its goal is to reduce the absolute energy consumption of its own facilities to 16 percent below 2005 levels by 2010.

According to the company Web site, HP and [Xtreme Energetics](#) (XE), a solar energy system developer based in Livermore, Calif., announced they have entered into an agreement for the development of a solar energy system designed to generate electricity at twice the efficiency and half the cost of traditional solar panels. Under the technology collaboration and licensing agreement, HP will license its transparent transistor technology to XE in return for royalty payments.

The transparent transistor technology that will be used in XE's solar energy device was co-developed by HP and [Oregon State University](#). The technology includes thin film transparent transistors, which are made from low-cost, readily available materials such as zinc and tin. The materials are said to raise no environmental concerns, and to provide higher mobility, better chemical stability and easier manufacture.

The flat design of XE's system eliminates the need for mechanical tracking of the sun as it traverses the sky. Also, with HP's transparent electronics technology, the system can be artistically patterned to mimic the appearance of any building material or terrain for aesthetic appeal. That low-profile design also overcomes the persistent dilemma of mechanical solar trackers, which cast shadows onto themselves, require large maintenance costs and are vulnerable to high winds, making rooftop installations especially difficult.

HP has implemented a number of steps to reduce the environmental impact of its products used by customers and within the company itself. HP LaserJet printers and new Inkjet printers automatically reduce power consumption after a set period of inactivity. With HP Web Jetadmin, a user can remotely schedule sleep/wake-up modes or automatically turn off devices on nights and weekends. Internally, HP sets the print default for printers, MFPs and copier devices to duplexing. As a result, duplexing increased from 13 percent to more than 60 percent, and paper consumption was reduced by 25 percent.

HP Power Manager is now available as a free option on certain HP desktop PCs. With it, users can customize their PC power settings and actually view the estimated savings as compared to familiar daily uses, like a comparison with carbon dioxide emissions of a typical car.

## **IBM**

Last year, IBM announced "Project Big Green," a \$1 billion annual program of green initiatives to deliver technologies that will help customers reduce energy costs. IBM has engaged with more than 2,000 customers in Project Big Green. It found that customers' energy consumption at data centers has been almost doubling every five years. Through IBM green initiatives, the company maintains, it can cut energy consumption at data centers by 40 percent to 50 percent.

IBM now offers the "IT Carbon Strategy Study" as part of Project Big Green. The study is a three- to four-week assessment that makes specific recommendations for actions IBM customers can take to become more eco-friendly. The study covers not only the data center, but also all IT operations.

"Significant reduction in carbon footprint can be achieved in often overlooked areas such as desktop systems, networking components, server rooms and printers that can contribute more than 50 percent of the total energy consumption for IT," said Jeanine Cotter, VP for IBM's IT strategy and architecture services.

Through the U.S. [Environmental Protection Agency's](#) (EPA) Leaders program, IBM has committed to cut its total global greenhouse gas (GHG) emissions by 7 percent from 2005 to 2012. Underscoring that commitment, IBM officially opened what it calls its "greenest data center in North America" in Boulder, Colo., several months ago. The 115,000-square-foot, energy-efficient facility features a combination of leading-edge technologies, including energy-efficient power and cooling technologies and high-density computing systems using virtualization technology.

With roughly 60 percent of the capital costs and 50 percent of the operational costs of running a data center being energy-related, the ability to design, construct and activate a highly energy-efficient data center has become a business imperative, IBM has said.

In building the new data center, IBM retrofitted an existing office building on the Boulder campus. It recycled 65 percent of the materials from the original building, and one-quarter of construction materials came from recycled products.

More than 1 million kilowatt-hours per year of wind-powered electricity are being purchased by IBM, which would make Texas oilman T. Boone Pickens proud. (Pickens has invested heavily in wind- and solar-powered energy

creation, and recently unveiled a massive, nationwide plan to use wind to supplant other fuel sources used for power plants.)

In using alternative power, IBM's approach will result in cutting approximately 2 million pounds of carbon dioxide produced per year. When outside conditions allow, the new data center's technology switches to free-cooling mode, using a water economizer to significantly reduce energy consumption. Backup generators at the center even are using low-sulfur fuels to reduce emissions.

## **Sun**

[Sun](#) is firm in its commitment to a one-fifth reduction of its U.S. greenhouse gas emissions over 2002 levels by 2012, according to a press release, which was made as part of the EPA's Climate Leaders program.

Sun is coordinating an overall green strategy that includes:

- fine-tuning Sun's 2002 baseline GHG emissions data on which its 20 percent reduction goal is based;
- implementing tracking systems to capture and measure GHG emissions, and reporting findings publicly;
- determining a global baseline and setting reduction targets for all worldwide operations;
- continuing to reduce power consumption at Sun's own internal data centers; and
- developing an alternative energy strategy.

Like IBM, Sun also offers green IT consulting services. The Sun Eco Assessment Service provides an energy optimization plan, but also includes the study of cooling, general environmental conditions and space utilization. The goal is to cut operating costs while optimizing data center infrastructure. There are basic and advanced options for the Eco Assessment.

Leading hardware providers are pushing internally to become more green and offering more eco-friendly solutions for their customers. There still are great advances to be made vs. the status quo, but both vendors and their customers are finding that there is green (money) in "going green."