

HP workstations—environmental performance



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Introduction

The issues of the environment and conservation are being discussed with a new energy these days, and they are having more of a business impact than ever before. Aside from being the responsible thing to do, international agreements are beginning to mandate better environmental performance.

HP workstations are designed to meet (and typically exceed) these standards, but we also strive to improve our environmental performance in other areas, whether it is our environmental noise, our power consumption, or our packaging.

Materials—manufacturing, shipping, and end-of-life

Most people think of recycling when considering environmental issues and consumer goods, and with good reason. How things are made, what they are made from, and what happens to them when they reach the end of their life is at the heart of responsible manufacturing and consumption.

Frontrunners of RoHS

HP embraced compliancy with the Restriction of Hazardous Substances (RoHS) directive and we took pains to ensure that there was no disruption to our customers. RoHS restricts six toxic substances potentially found in electronic goods, including lead, mercury and cadmium. Ensuring that our workstation components are free of these elements and other toxic compounds while still maintaining our exacting performance and lifecycle standards is a challenge. So we:

- Continuously test to confirm materials are RoHS compliant
- Require our suppliers to implement proactive inspection plans
- Require our suppliers to certify RoHS-compliancy

As an HP workstation customer, you can be confident that your HP workstation is ROHS compliant and complies with EU environmental directives.

Other green initiatives

But that's not all—we have recently made the transition to water-based paints, which have a very low emission rate of polluting Volatile Organic Compounds, especially when compared to the lacquer-based paints widely used in the industry.

Our design and manufacturing supply chain has continuous cost reduction programs in place aimed at redesigning and improving the efficiency of manufacturing processes. Our investment of time and engineering brain-power results in fewer parts used in our designs and more efficient processes.

When we ship our workstations, we have taken steps to save on materials. We have reduced the quantity of printed materials that ship with our products and we have recently approved the use of bulk packaging for our configured systems to high volume customers, reducing our overall packaging materials.

What goes around, comes around: HP workstations and recycling

Addressing electronic waste is one of HP's global citizenship priorities, and we have tried to make it as easy as possible for our customers to recycle our systems, reducing the environmental impact of our IT products, minimizing landfill waste, and ensuring the convenient discarding of products in an environmentally sound fashion.

All HP workstations exceed the EU's Waste Electrical and Electronic Equipment (WEEE) directive. HP workstations are designed to be 90+% recyclable by weight.

All HP workstations qualify in the silver category of the Electronic Products Environment Assessment Tool (EPEAT). Discriminating customers can determine who their HP workstation compares to other computers through this online tool.

HP Planet Partners Hardware Return and Recycling Program is an initiative to provide HP corporate customers with an easy way to dispose of used computing equipment in a socially and environmentally responsible manner.

HP opened its first recycling facility in Roseville, Calif., in 1997, becoming the only major computer manufacturer to operate its own recycling facility. A second HP facility has since been opened in LaVergne, Tenn. Outside the United States, HP works with more than 10 recycling vendors across Europe, and regional and local recycling vendors throughout Asia Pacific. HP's recycling program operates globally in more than 36 countries, regions and territories.

Our state-of-the-art recycling facilities process each return in an environmentally responsible manner through a multi-phase recycling process. Products are sorted and shredded, then separated into plastics and metals. Materials are then processed into their raw forms so they can be used in automotive parts, microchip processing trays, spools, hangers, plastic toys, fence posts, serving trays and roof tiles.

We recycle our own electronic waste, we help you to recycle yours, and we take steps to ensure our vendors do the same. HP has implemented global recycling standards that ensure HP vendors manage product recycling responsibly and to set a high expectation regarding how vendors should manage their waste products. HP regularly monitors and reviews all of its recycling operations to ensure the highest standards of responsible recycling are maintained. Some information on our recycling programs:

- HP has implemented in-house recycling since 1987
- HP's recycled hardware and print cartridge amounts increased more than 16% in 2006 over 2005
 - We recycled more than 164 million pounds (74 million kilograms) of hardware - the equivalent weight of more than 600 jumbo jet airliners.
- HP collected more than 2.5 million units of hardware globally—weighing more than 50 million pounds (22.6 million kilograms)—to be refurbished for resale or, in the United States, donated.
- Our Planet Partners Hardware recycling program has been internet-based for over 5 years
- Member/Sponsor of EPA's "Plug-in to e-Cycling" Program

Power conservation performance

Intelligent management of workstation power consumption makes good environmental sense, but it also makes good business sense too. Our HP workstations are Energy Star 3.0 compliant, which according to the Environmental Protection Agency, means that they are 65% more energy efficient than conventional models¹. This can mean savings of \$30-40 dollars in energy costs over the lifetime of the workstation.

We use a variety of techniques to help manage our power consumption, including component placement, computer modeling, choices of materials and parts, cooling options and fan timings to mitigate power use without compromising component life span or noise output.

HP workstation power supply improvements

We have been working hard to greatly improve our power supply efficiency in our latest products. Power consumption has been reduced by changing termination resistors to improved values. Many of the onboard DC/DC regulators have increased efficiency with new technology introductions. We have also optimized fan speeds to reduce power dissipation due to heat and while also reducing noise pollution resulting from acoustical fan noise.

¹ EPA press release – 10/23/2006:

<http://yosemite.epa.gov/opa/admpress.nsf/a8f952395381d3968525701c005e65b5/113b0c0647fee41585257210006474f1!OpenDocument>

	Continuous power supply rating in watts	Percent reduction from previous generation	Reduction in watts
HP xw4400	460	3%	~15
HP xw6400	575	3%	~20
HP xw8400/9400	800	3%	~25

Power and performance

HP workstations are designed as systems for the power-user, so compromising performance for power-efficiency isn't an option. This design ethos is well-demonstrated when we released the HP xw6400 Workstation to replace our HP xw6200, which saves money on power costs and produced less excess heat and noise. The HP xw6400 combined energy saving, high performance dual core technology from Intel with improved fan and heatsink technology:

- A compute-intensive Monte Carlo simulation similar to those used by our financial customers led to an improvement of 3X in performance while typical power usage decreased by 30% in active mode. The system power in idle mode reduced 25% from 200W to 150W.
- In another financial customer benchmark, power/performance increased from 23 tasks per hour/kw with the HP xw6200 to 118 tasks per hour/kw with the HP xw6400. This is a 522% increase in useful work performed for the same amount of power consumed.

Linux power management, AMD PowerNow, and S3 sleep

We enabled power management in our Linux Workstations in 2006, allowing Workstation Linux customers to use power saving sleep states. Currently an energy conscious Linux workstation customer can take advantage of the following savings by allowing their computer to power down non-critical components and sleep instead of running idle 24 hours per day. This can make the difference of about 1800 kWh per year—about enough to light a normal home for a year².

The table below illustrates the difference in power consumption between Sleep and Idle states.

	Sleep watts	Idle watts
HP xw4400	3.3	127
HP xw6400	4.3	180
HP xw8400/9400	4.1/6.3	293/226

The HP xw9400 Workstation hardware and BIOS supports AMD PowerNow. This feature results in significant idle power savings with only a small performance impact. In January 2007 we included this driver as part of our default Windows image.

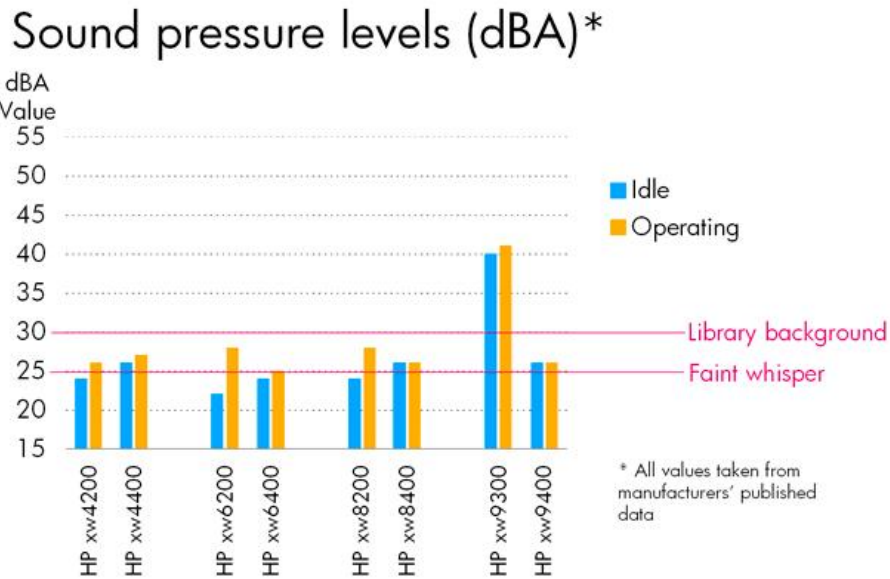
Office ambience—control of noise levels means low or no noise pollution

Acoustic emissions reduction has long been a design goal for HP workstation engineers who strive to achieve ever-lower acoustic emissions. Techniques such as optimized component layout, large pulsed width modulation fans and hard drive rail grommets to reduce rotational and acoustic vibrations all help control the overall noise levels.

Changes between the last generation of HP workstations and this one could reasonably have led to higher noise levels. These include the switch to dual-core processors, the change to FB-DIMMs that produce more heat than standard SDRAMs, and a move to larger capacity power supplies. The current HP xw6400 and HP xw8400 workstations noise levels were measured using two dual-core processors, providing a total of 4 processing cores compared to just two cores in their dual processing forebears, the HP xw6200 and HP xw8200. You might reasonably conclude that there

² <http://pmdb.cadmusdev.com/powermanagement/quickCalc.html#calculatorTop>

would be an increased noise output to keep them effectively cool. This has not turned out to be the case.



As you can see, there have been little changes between the generations in acoustic output, except a mild improvement in operating level noise compared to the HP xw6200 and HP xw8200. A redesign between the HP xw9300 and the HP xw9400 led to significantly improved noise levels. Our latest workstations run scarcely louder than a faint whisper, even when running moderate loads.

For more information

HP workstations
www.hp.com/go/workstations

HP product recycling
www.hp.com/hpinfo/globalcitizenship/environment/recycle/index.html

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