Technical white paper

Conserve resources without sacrificing performance

HP PageWide business printers

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Make no compromise. HP PageWide series business printers and MFPs offer the features and reliability from HP you expect and help you dramatically lower energy consumption and waste. The HP Design for Environment (DfE) programme is an engineering perspective which strives to ensure products are energy efficient, and manufactured using recycled content and recyclable materials. Through this programme, we consider environmental impact in the design of every HP product and solution. You can save money, conserve resources and benefit from revolutionary best-in-class total cost of ownership and print speeds.[1,2]

While printing remains vital, environmental responsibility has come to the forefront of challenges faced by today's enterprises. By designing high-performance products that also conserve energy and reduce waste, HP strives to help our enterprise customers leave a smaller environmental footprint without trading quality or performance.

HP's ENERGY STAR® certified PageWide series business printers and MFPs continues HP's commitment to improving the sustainability of enterprise printing. These devices help conserve resources by using up to 95.25% less supplies and packaging by weight compared with lasers.[3] Smaller supplies and less packaging also mean you can reduce storage, shipping and transportation costs.

Automatic two-sided printing on every model creates an opportunity to reduce wasted paper. And HP PageWide Pro and Enterprise series devices meet some of the most rigorous eco-labelling requirements in the world. In addition, the HP PageWide Enterprise colour series offers additional improvements in speed and cost per page.

When you choose an HP PageWide MFP or printer, you're making the best choice to achieve your organisation's operational and environmental goals. It has never been more important to conserve resources, and HP technologies can help—without sacrificing performance.

Reduce energy use by up to 73.01%[3]

Because this MFP has no fuser, it consumes less energy than many colour lasers in its class. Keypoint Intelligence - Buyers Lab (BLI) performed independent tests comparing the HP PageWide Pro 452dw printers' energy consumption to leading competitive colour laser printers.[3] BLI used test methods consistent with ENERGY STAR Typical Electricity Consumption (TEC) methodology—an Environmental Protection Agency (EPA) designed methodology to measure the energy consumption of laser printers. The methodology tests devices in sleep, warm-up, and ready modes and while printing, based on product default settings, to reflect a typical week's electricity consumption.

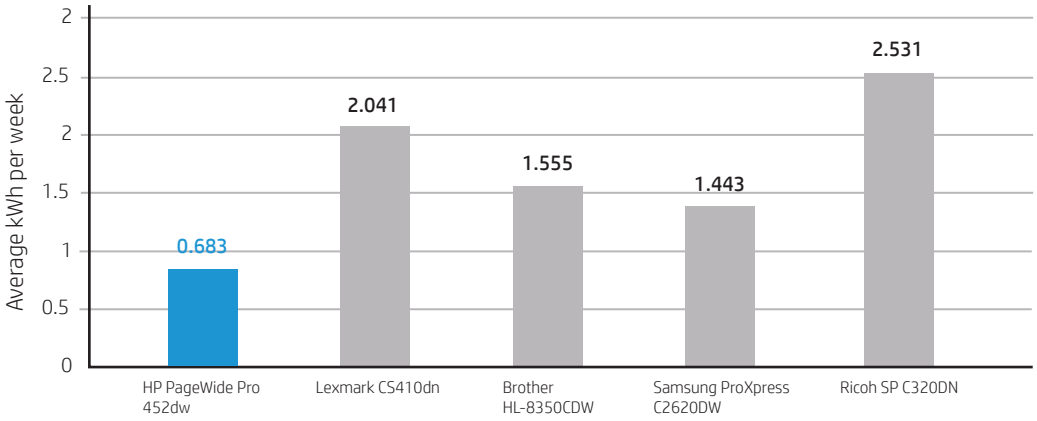
BLI found the HP PageWide Pro 452dw series to be among the most energy efficient among leading competitive colour laser printers. Test results showed that the Ricoh product consumed over 270% more energy than the HP PageWide Pro 452dw, while the Lexmark, Brother, and Samsung products consumed between 111% and 198% more electricity than HP.[3]

Percent difference in weekly energy consumption compared to HP

	Typical Weekly Electricity Consumer (kWh)	Percent less energy consumed by HP PageWide Pro 452dw	Percent more energy consumed by laser models
HP PageWide Pro 452dw	0.683		
Lexmark CS410dn	2.041	66.54%	198.83%
Brother HL-8350CDW	1.555	56.08%	127.67%
Samsung ProXpress C2620DW	1.443	52.67%	111.27%
Ricoh SP C320DN	2.531	73.01%	270.57%

HP PageWide Technology uses significantly less power than laser printing technology because there is no fuser element to heat in order to print. Fewer moving parts also contribute to lower energy use. The stationary printhead, with more than 40,000 nozzles, spans the width of a page, simultaneously delivering four colours of Original HP pigment ink onto a moving sheet of paper.

Typical weekly electricity consumption (kWh)

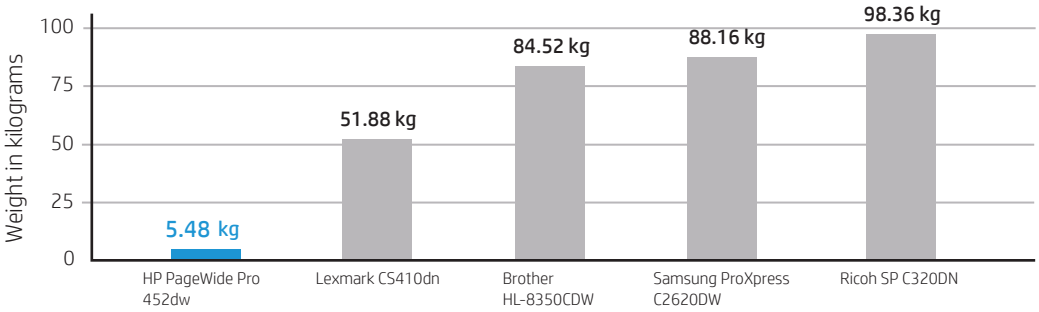


HP PageWide series printers also help you stay productive and conserve resources with HP Auto-On/Auto-Off technology, which turns your printer on when you need it and off when you don't.[4] You can even set custom times for your printer to turn on and off, so it's ready when you are. You can configure settings from the control panel, the HP Embedded Web Server, or HP Web Jetadmin.[5]

Use up to 95.25% less supplies and packaging[3]

BLI measured the supplies waste generated by HP PageWide Pro 452dw device compared to leading competitive colour laser printers.[3] HP produced the least amount of consumables and packaging waste by weight. The total weight of all cartridges and cartridge packaging required to print 150,000 impressions was just 5.48 kilograms (12.08 pounds) for the HP model. Total weights of all user replaceable consumable items used (toner, drums and waste containers) and associated packaging for the competitive devices ranged from 51.88 kilograms (114.38 pounds) for the Lexmark product to 98.36 kilograms (216.85 pounds) for the Ricoh product.[3]

Total supplies waste



Note: Weights above include all users' replaceable consumable items used (toner, drums, waste containers, etc.) and associated packaging.

Compare for yourself

Seeing is believing. HP PageWide Pro 452dw printer used up to 95.25% less supplies and packaging than lasers.[3] The images below show the amount of supplies and packaging required to print 150,000 pages.

The HP PageWide Pro 452dw generated 5.48 kilograms (12.08 pounds) of waste,[6] consisting of 75 cartridges, a waste tank and print bar, plus associated packaging.

The Brother HL-L8350CDW generated 84.52 kilograms (186.34 pounds) of waste,[6] consisting of 145 cartridges, 6 imaging unit kits and various maintenance items (fuser unit, laser unit, transfer, belt, etc.), plus associated packaging.

The Lexmark CS410dn generated 51.88 kilograms (114.38 pounds) of waste,[6] consisting of 164 toner cartridges, 2 drum unit kits and 7 waste containers, plus associated packaging.

The Ricoh SP C320DN generated 98.36 kilograms (216.85 pounds) of waste,[6] consisting of 90 toner cartridges, one waste container, one maintenance kit and one image transfer kit, plus associated packaging.

The Samsung ProXpress C2620DW generated 88.16 kilograms (194.36 pounds) of waste,[6] consisting of 118 cartridges, 8 waste tanks and various maintenance items (fuser, transfer belt and rollers, etc.), plus associated packaging.

The HP PageWide series printers and MFPs offer high-capacity supplies—up to 10,000 black pages per cartridge and up to 7,000 colour pages per cartridge.[7] This means there are fewer spent cartridges to be disposed of over the life of the printer. In addition, HP PageWide Technology requires a lower volume of ink to print a page compared to the volume of toner required to print a page with laser technology. The result is that ink cartridges are smaller and require less packaging, per page printed, than supplies for laser devices.

Many laser devices have consumables like drums and fusers that can add to the waste stream over the life of the printer. By contrast, the HP PageWide series is built for longevity, through and through—the device's PageWide printhead is designed to last the lifetime of the device. Recommended monthly page volumes are as high as 4,500 pages per month and monthly duty cycles are up to 50,000 pages.

In fact, in BLI tests, HP's device had the fewest issues among tested competitors to produce 150,000 pages.[3] Besides avoiding wasted output and expended power, the HP device helps keep your office productive. It just works!

In addition to waste generated, consider the added environmental and financial costs of producing, shipping, and storing the competitive lasers' supplies—which are larger, have more packaging, and may require more frequent replacement.

Life Cycle Assessment

Background

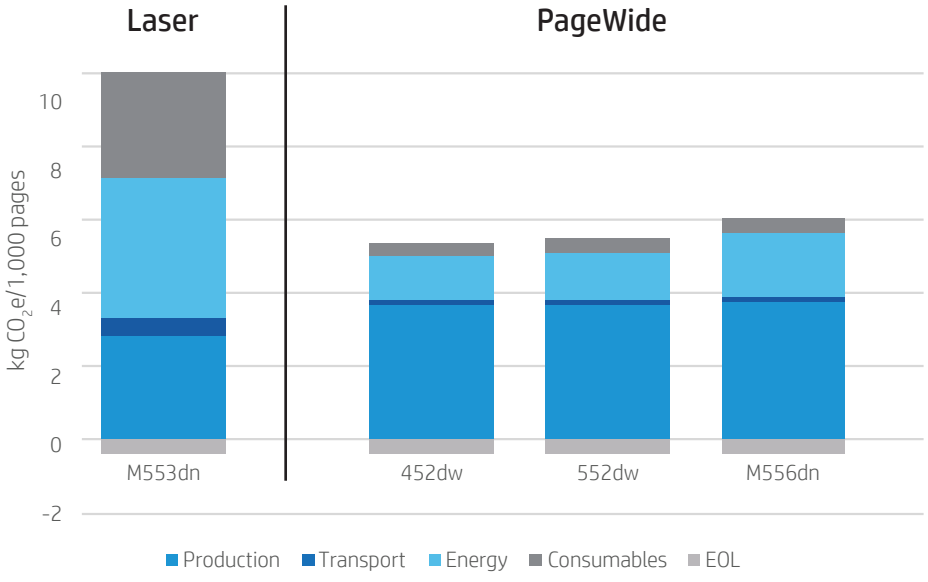
Life-cycle assessment (LCA) is a technique that evaluates the total environmental impact of a product life including raw material extraction, processing, manufacture, distribution, use, repair and maintenance, disposal and recycling. The objective of LCA is to avoid a narrow environmental outlook by assessing relevant energy and materials inputs and environmental releases, evaluating impacts of inputs and releases, and interpreting results to better manage environmental impact and decision-making. Procedures for life-cycle assessment are part of the ISO 14000 environment management standards.

Basic assumptions

HP used 100,000 pages over the life of the printer as the basis for the comparative analysis, with a 2-sided print rate of 20%, or 20,000 pages. Since these printers are office printers, a 100% recycling of the printer was assumed. Analysis was based on US power and cartridge ratios.

Results

HP PageWide series printers and MFPs carbon footprint (CF) is less than half that of comparable laser printers, the result of PageWide's lower energy and consumables usage. Specifically, HP PageWide delivered CF up to 52% lower, energy usage up to 71% lower, and consumables up to 88% lower than comparable lasers.



Eco-labels

All HP PageWide models are ENERGY STAR certified devices.[8] ENERGY STAR is a voluntary eco-label managed by the US Environmental Protection Agency (EPA) and is recognised worldwide.

These devices are also Blue Angel-compliant. Blue Angel is a German eco-label based on criteria in product design, energy consumption, chemical emissions, noise, recyclable design, and take-back programmes.

Approved for cleanroom use

You can feel at ease placing the HP PageWide series right next to your desk. HP's device has been tested by UL and shown to be consistent with use in an ISO specification class 5 cleanroom—making it perfect for your work area or other sensitive places such as production environments where airborne particulates need to be minimised.[9]

Recycling through HP Planet Partners[10]

HP helps you recycle your Original HP cartridges—it's easy at no additional cost with the HP Planet Partners programme, available in more than 60 countries and territories around the world.[10] HP offers postage-paid recycling boxes or shipping labels for most Original HP cartridges. Since 1991, customers have returned 682 million cartridges to HP Planet Partners for recycling. For more than 25 years, we've been making a difference, together.[11]

HP recycles its cartridges using a process where recycled plastics from HP Planet Partners are used as raw material in new HP cartridges or other products. No Original HP cartridges returned through HP Planet Partners are ever sent to a landfill.

For more information, visit hp.com/recycle.

Paper use

Reduce paper use by up to 50% by printing two pages on a single sheet, using automatic two-sided printing. In managed print environments, HP Web Jetadmin[5] can help cut the cost of paper consumption by setting automatic two-sided printing as the default for individual devices or entire fleets (for two-sided printing capable devices).

The HP series provides automatic nozzle health sensing, active and passive nozzle substitution, and automatic printhead servicing for dependable print quality and fewer reprints. And the paper transport offered with HP series printers effectively stabilises the sheet through the paper path for low jam rates.

Sustainability at HP

Sustainability is a powerful force for innovation at HP. We believe that technology should make life better for everyone, everywhere—and in doing so, make a better world.

Our approach covers the broad range of sustainability factors across three categories:

- **Environment**: HP is reinventing how products are designed, manufactured, used, and recovered as we shift our business model and operations toward a material- and energy-efficient circular economy. With increased functionality and performance, your HP products do more, require less energy and resources to manufacture and use, and are easily reused and recycled. We have set a goal to reduce the greenhouse gas emissions intensity of HP's overall product portfolio by 25% by 2020, compared to 2010.[12]
- **Society**: Throughout our supply chain, we empower workers and ensure protections for the people who make the HP products you rely on. We demonstrate a deep commitment to our employees and we work with business and non-profit partners to use our technology, capital, and resources to help develop strong, resilient communities.
- **Integrity**: HP is committed to always acting with integrity, fairness, and accountability, which are fundamental to an inclusive society and thriving business. We are uncompromising in our expectations of ethical behaviour by our employees, partners, and suppliers.

Partner with one of the world's most sustainable companies, as recognised by:

- Gartner Supply Chain Top 25 for 2016—HP earned a perfect 10 out of 10 score for corporate social responsibility
- CDP A List—HP Development Company received a 100/A for the second consecutive year, the highest possible CDP climate disclosure and performance scores
- Dow Jones Sustainability Index—For four years in a row, HP Development Company has been named to the DJSI World Index and North American Index

HP is dedicated to further developing printing technologies and services that deliver high-performance and productivity, as well as decrease energy use and waste. HP is a leader in delivering ENERGY STAR certified and EPEAT® registered products,[13] as well as paper products with recycled content and fibre sourced from responsibly managed forests. And HP Planet Partners makes recycling any brand of hardware and HP supplies easy for everyone.

For more information, visit hp.com/sustainability

[1] Comparison based on manufacturers' published specifications of fastest-available colour mode (as of November 2015) and includes colour laser MFPs ≤€3,000 Euros and colour laser printers ≤€1,200 Euros, based on market share as reported by IDC as of Q3 2015, excluding other HP PageWide products, and products with 1% or lower market share using market share. Learn more information, see hp.com/go/printerspeeds.

[2] For PageWide Pro: Total cost of ownership comparison based on 90,000 pages, manufacturers' published specifications for page yields and energy use, manufacturers' suggested retail price for HP hardware and supplies, average street prices for competitive devices, cost per page based on ISO yield with continuous printing in default mode with highest-available-capacity cartridges, long-life consumables of all colour business printers €300–€800 Euros and MFPs €400–€1,000 Euros as of November 2015, excluding products with 1% or lower market share using market share as reported by IDC as of Q3 2015. Learn more at hp.com/go/pagewideclaims and hp.com/go/learnaboutsupplies. For PageWide Enterprise: Total cost of ownership Enterprise comparison based on 150,000 pages, manufacturers' published specifications for page yields and energy use, manufacturers' suggested retail prices for hardware and supplies, cost per page based on ISO yield with continuous printing in default mode with highest-available-capacity cartridges, and long-life consumables of all colour business A4 MFPs €1,000–€3,000 Euros as of November 2015, excluding products with 1% or lower market share using market share as reported by IDC as of Q3 2015. Learn more at hp.com/go/pagewideclaims and hp.com/go/learnaboutsupplies.

[3] BLI Custom Test Report, Comparative Reliability, Energy Consumption, Image Quality and Waste Evaluation, HP PageWide Pro 452dw vs. Competitive Laser Models, June 2017, http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA7-0526ENW.

[4] HP Auto-On/Auto-Off Technology capabilities subject to printer and settings; may require a firmware upgrade.

[5] HP Web Jetadmin is available for download at no additional cost at hp.com/go/webjetadmin. Universal device plug-in is offered with HP Web Jetadmin 10.3 SR4 and higher.

[6] Weights include all user-replaceable consumable items used (toner, drums, waste container, etc.) and associated packaging.

[7] Yield based on ISO 24711 cartridge yields for HP 973X High Yield Original PageWide Cartridges, which are not included in printer purchase; purchase separately. Comparison based on ISO 24711 cartridge yields for HP 973 series High Yield Original PageWide Cartridges compared with HP 913 series Original PageWide Cartridges. High-yield cartridges are compatible only with HP PageWide Pro 400 and 500 series MFPs and printers. Learn more at hp.com/go/learnaboutsupplies.

[8] For more information, visit energystar.gov.

[9] Based on HP internal testing using ISO 14644-1:1999, Cleanrooms and associated controlled environments – Part 1: Classification or air cleanliness, International Organisation for Standardisation (ISO), 1999. (3) CLEAN ROOM EVALUATION for HP, HP PageWide Pro 477dw MFP.

[10] Programme availability varies. For more information, visit hp.com/recycle.

[11] As of 2016. Based on a nominal payload of 18,000 kilograms (40,000 pounds).

[12] Emissions intensity of HP's product portfolio refers to tonnes CO2e/net revenue arising from use of more than 95% of HP product units shipped each year, including notebooks, tablets, desktops, mobile computing devices, and workstations; and HP inkjet, HP LaserJet, and DesignJet printers, and scanners. Expressed as emissions generated per unit of output, based on anticipated usage. For personal systems products, this reflects energy consumed by each product unit during customer use. For printing products, this reflects energy and paper consumed to print each page. Through 2015, progress against this goal equalled a 17% reduction.

[13] EPEAT® registered models of this product are available where HP registers imaging and equipment products (Australia only).

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