

HP

LaserJet Enterprise M604dn

52 PPM Desktop Laser Printer



PERFORMANCE SUMMARY

The HP LaserJet Enterprise M604dn gave a competitive overall performance during BLI's environmental job stream test. Tested recovery times and noise emissions were also competitive for the group. Additional features include N-up printing, which lets users print up to 16 images onto a single sheet of paper to help reduce paper use. During the unit's recycled paper durability test, which included 26,250 impressions of paper made with various grades of recycled content, the unit gave a flawless performance. According to the company, spent toner cartridges and the waste toner container can be returned to the vendor for recycling. The unit also meets the requirements for US ENERGY STAR, EU RoHS, Canada EcoLogo, ECMA-370/The Eco Declaration, Germany Blue Angel, EPEAT Silver and China CECP.



- ★★★★☆ Energy Consumption and Cost
- ★★★★☆ Toner/Consumable Yields
- ★★★★★ Recovery Time
- ★★★★★ Runnability with 30% Recycled Paper
- ★★★★★ Runnability with 50% Recycled Paper
- ★★★★★ Runnability with 100% Recycled Paper
- ★★★★☆ Noise Emissions
- ★★★★☆ Environmentally Friendly Features

Strengths

- Faster than average recovery times from sleep mode
- Tested toner yields exceeded rated yields
- Proof mode helps to reduce paper and consumables waste
- Toner-save mode helps to reduce toner use

Weaknesses

- Below average tested toner yield
- Lack of job review mode may increase paper and consumables waste

TEST RESULTS AND OBSERVATIONS

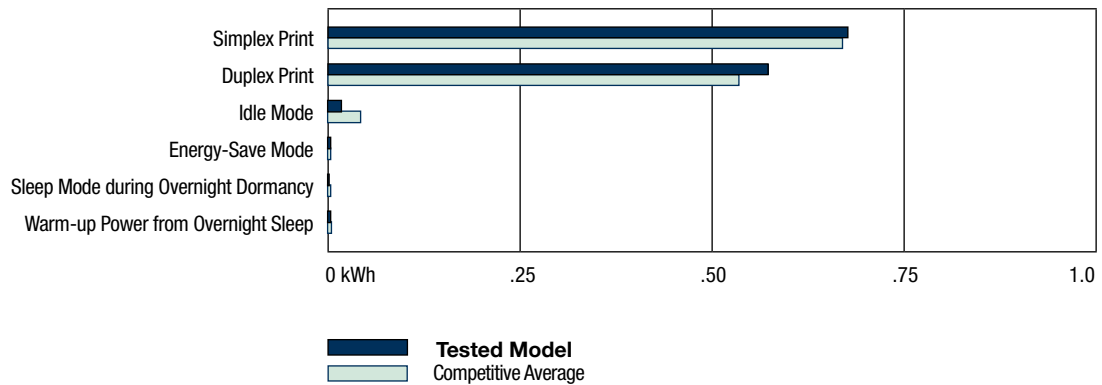
★★★★☆ ENERGY CONSUMPTION AND COSTS

Tested Energy Use and Costs by Mode / Competitive Averages

Data in the kWh column in the table below represent the energy consumed for each of the listed modes in one hour of use. A five-page ISO test suite was used to produce output in all copy and print modes (if applicable). For devices with more than one energy-save and/or sleep mode, the mode that uses the least energy was used. The energy costs are based on 2009 rates for the United States and Canada, and 2008 rates for the United Kingdom and Germany, as follow: USD: \$0.1061; GBP: £0.1033; German Euro: € 0.1410; CDN: \$0.1067. These values are multiplied by the kWh to arrive at a cost per kWh.

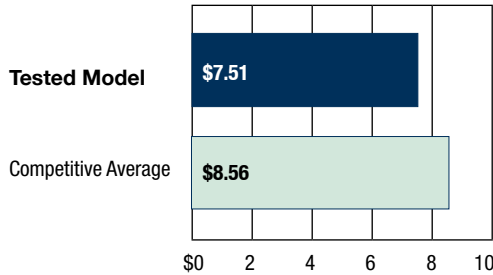
Tested Model / Competitive Average	kWh	US \$	UK £	Germany €	Canada \$
Simplex Print	0.678/0.671	0.072/0.071	0.070/0.069	0.096/0.095	0.072/0.072
Duplex Print	0.574/0.536	0.061/0.057	0.059/0.055	0.081/0.076	0.061/0.057
Idle Mode	0.018/0.043	0.002/0.005	0.002/0.004	0.003/0.006	0.002/0.005
Energy-Save Mode	0.004/0.004	0.000/0.000	0.000/0.000	0.001/0.001	0.000/0.000
Sleep Mode during Overnight Dormancy	0.002/0.004	0.000/0.000	0.000/0.000	0.000/0.001	0.000/0.000
Warm-up Power from Overnight Sleep	0.004/0.005	0.000/0.001	0.000/0.000	0.001/0.001	0.000/0.001

Tested Energy Use vs Competitive Averages

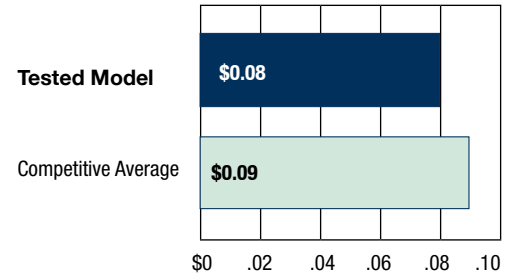


BLI's Job Stream Test Results

Projected Annual Energy Cost



Cost per 1,000 Pages



Job Stream—Projected Costs / Competitive Averages

The costs in the following table represent annual energy cost projections based on conducting BLI's Job Stream Matrix. Included in the projection is the cost of power for the device while in sleep mode and over the weekend. The energy costs are based on 2009 rates for the United States and Canada, and 2008 rates for the United Kingdom and Germany, as follow: USD: \$0.1061; GBP: £0.1033; German Euro: € 0.1410; CDN: \$0.1067. These values are multiplied by the kWh to arrive at a cost per kWh. Based on 91,872 impressions per year—actual usage may vary.

Tested Model / Competitive Average	US \$	UK £	Germany €	Canada \$
Projected Annual Energy Cost	7.51 / 8.56	7.31 / 8.33	9.98 / 11.38	7.55 / 8.61
Cost Per 1,000 Pages	0.08 / 0.09	0.08 / 0.09	0.11 / 0.12	0.08 / 0.09

Job Stream—Test Details

This table represents the kWh consumed when printing BLI's job stream test suite over a four-hour period, with the machine set to go into its energy-save and/or sleep modes at the shortest intervals possible. The table also details BLI's Job Stream Test schedule, including the start time, duration and energy consumption of each task. To calculate usage over an eight-hour workday, the total energy consumed after four hours of testing is multiplied by two. Total yearly energy consumption is calculated based on the total energy used during a typical workday, plus overnight and weekend sleep energy.

Time	Function	Elapsed Time	kWh Consumed
8:00:00 AM	Warm-up from Overnight Sleep	0:11	0.0021
8:00:11 AM	Print Simplex Black Job Stream	0:50	0.0096
8:01:01 AM	Idle Mode	1:00	
8:02:01 AM	Daytime Sleep	14:00	0.0012
8:16:01 AM	Print Duplex Black Job Stream	1:03	0.0120
8:17:04 AM	Idle Mode	1:00	
8:18:04 AM	Daytime Sleep	29:00	0.0022
8:47:04 AM	Print Simplex Black Job Stream	0:55	0.0103
8:47:59 AM	Idle Mode	1:00	
8:48:59 AM	Daytime Sleep	14:00	0.0012
9:02:59 AM	Print Duplex Black Job Stream	1:03	0.0116
9:04:02 AM	Idle Mode	1:00	
9:05:02 AM	Daytime Sleep	59:00	0.0041
10:04:02 AM	Print Simplex Black Job Stream	0:57	0.0106
10:04:59 AM	Idle Mode	1:00	
10:05:59 AM	Daytime Sleep	14:00	0.0012
10:19:59 AM	Print Duplex Black Job Stream	1:03	0.0119
10:21:02 AM	Idle Mode	1:00	
10:22:02 AM	Daytime Sleep	1:37:58	0.0066
TOTAL 4-HOUR ENERGY CONSUMPTION			0.0846 kWh

Job Stream—Test Output

Pages Printed	174 total—6 jobs of 29 pages each
Test Documents Used	DOC, XLS, PPT, HTML, PDF, Outlook email messages
Output Modes	50% simplex, 50% duplex

Total number of pages run is based on a BLI survey of average monthly volumes by speed range.

Job Stream—Projected Annual Energy Consumption in kWh

WEEKDAY CONSUMPTION	
Eight Hours Operation (4-hour matrix x 2)	0.1692
16 Hours Overnight Sleep	0.0621
24-Hour Weekday Energy Consumed	0.2313
Total Annual Weekday Energy Consumed (weekday energy x 22 days in a month x 12 months in a year)	61.0632
WEEKEND CONSUMPTION	
48-Hour Weekend Energy Consumed	0.1864
Total Annual Weekend Energy Consumed (weekend energy x 52 weekends in a year)	9.6928
Total Annual Energy Consumed	70.7560
Competitive Average	80.6820
Associated CO ₂ Emissions (lbs)*	112.1
Competitive Average (lbs)	127.8

* CO₂ emissions are based on the US Environmental Protection Agency's Climate Change Action Plan emission factor for 2009.

★★★★☆ **TONER/CONSUMABLES YIELDS**

Tested Model / Competitive Average	Black
Tested Toner Yield	12,880 / 23,479
Rated Toner Yield	10,500 / 23,479
Rated Drum Yield	10,500 / 38,938

The rating for consumable yields is based on the tested toner yield of the product as determined in BLI's full lab test. Tested toner yield is based on an average of two cartridges using the ISO 19752 toner yield test original. Some devices in the competitive group employ a cartridge that includes the toner and drum in a single component; in those cases, rated toner yield is used as the rated drum yield in calculating the average.

★★★★★ **RECOVERY TIME**

Recovery time for idle, energy-save (if applicable) and daytime sleep measures the time required for the device to come out of each mode and print one page. The page is sent after the device has been in idle mode for 30 seconds, energy-save mode for five minutes and sleep mode for 15 minutes. Recovery time for sleep mode after overnight dormancy is taken from the start of BLI's job stream test. The device is set to enter energy-save mode and sleep mode after the shortest intervals of time possible.

Tested Model / Competitive Average	Idle	Sleep (During Daily Use)	Sleep (After Sitting Dormant Overnight)
Seconds	6.0 / 7.0	9.0 / 17.0	11.0 / 21.0

RUNNABILITY PERFORMANCE WITH RECYCLED PAPER

- ★★★★★ 30%
- ★★★★★ 50%
- ★★★★★ 100%

This test is conducted to evaluate a device's runnability performance when using recycled paper that consists of 30%, 50% and 100% post-consumer waste.

	30%	50%	100%
Total Test Pages	8,750	8,750	8,750
Simplex Misfeeds	0	0	0
Simplex Misfeed Rate	Not applicable	Not applicable	Not applicable
Duplex Misfeeds	0	0	0
Duplex Misfeed Rate	Not applicable	Not applicable	Not applicable
Multi-Sheet Feeding	None	None	None
Curl	No problems encountered	No problems encountered	No problems encountered
Dusting	No problems encountered	No problems encountered	No problems encountered
Downtime Due to Paper	None	None	None

Total number of pages tested is equal to 5% of the manufacturer's monthly duty cycle. Testing was conducted with Georgia-Pacific 30% Spectrum Recycled Paper and Boise ASPEN 30, ASPEN 50 and ASPEN 100, each of which are quality-grade recycled multipurpose papers. It should be noted that due to the increased paper dust that may occur with recycled papers (which will vary by brand), more frequent machine maintenance may be required to ensure that dust build-up over time does not negatively affect an imaging device's performance.

★★★★☆ **NOISE EMISSIONS** in decibels

Multiple noise emission readings were captured one meter from the panel at two points, with the device in two operating modes.

	Mode	Range	Tested Average	Competitive Average
Tested at Front	Simplex, Inner Tray	61-62	61.5	61.3
	Duplex, Inner Tray	58-63	60.5	60.5
Tested at 30° Angle	Simplex, Inner Tray	60-61	60.5	60.3
	Duplex, Inner Tray	59-62	60.5	60.1

★★★★☆ **ENVIRONMENTALLY FRIENDLY FEATURES**

The HP LaserJet Enterprise M604dn's user programmable sleep mode can be set from one to 120 minutes in one minute increments. By default the device enters sleep mode immediately after a print job.

	Print
Automatic Duplexing	Yes
Intelligent/Smart Duplex	Yes
Toner-Save Mode	Yes
Recycled Paper Mode	Yes
Job Review	No
Blank-Page Removal	No
Proof Mode	Yes
N-up Mode	Up to 16

Intelligent/Smart Duplex: single-page originals and the last page of odd-numbered originals are not duplexed. N-up Mode: prints multiple originals on one or both sides of the paper.

Factory defaulted to duplex mode?	No
Electronic product documentation instead of hard copy?	Yes
While in sleep mode, does the display remain off when a print job is sent to the device?	No
Does the device fall into sleep mode at its set time after an error occurs?	No
Does the device automatically resume outputting after paper is added to the paper tray for an unfinished job?	Yes
Can the product be upgraded to extend life?	Yes

Environmental Features — % Drop in Duplex Speed vs Simplex Speed

Tested Model / Competitive Average		Black
Print 1:2	Tested Speed in PPM	30.5 / 28.4
	% Drop	32.52 / 35.45

The % drop in duplex speed is calculated by comparing the average tested speed when conducting BLI's full lab test.

Environmental Features—Sleep Mode Functionality

Device Performance Emerging from Sleep Mode

Seconds it takes for Copy menu to appear after coming out of sleep mode?	Not applicable
Does the machine start scanning immediately after coming out of sleep mode?	Not applicable
Scan/copy job into memory/network?	Not applicable
Fax/scan without full machine warm-up	Not applicable
Release private/stored jobs?	No
Does the operator have full access to the control panel?	Yes

VENDOR SURVEY RESULTS—Product Information

This information consists of environmental certifications, recyclability of the device and its components, chemical use and emissions, as well as the manufacturer's corporate social responsibility policies. The information contained in this section has been either provided by the manufacturer or taken from its sustainability report and is not based on BLI's lab tests. While all product-specific questions are based on the US model of this device, manufacturer-specific information includes company-wide data. For more information on the categories in this section, including a glossary of terms and additional details, please go to <http://www.buyerslab.com/green/glossary.pdf>. Additional corporate/product information can be found on the company's website.

Recycling

How much of the product is made from recycled materials/parts?	<0.1%
List the recycled materials/parts used in the product.	Metal, plastic materials
Is this product designed for recycling?	Yes
List product components that can be recycled.	Glass, metal (chassis), plastic (housing, internal)
Does the device have a toner recycling system?	No
Can the toner bottles/ink cartridges be recycled through the manufacturer?	Yes
Can the waste toner container be recycled?	Yes
Are prepaid labels for returning empty consumables provided with the product?	Yes

Packaging

Is this product shipped using environmentally friendly packaging?	Yes
Does the packaging contain PVC?	Yes
Does packaging contain any heavy metals?	No
List the packaging used.	Corrugated paper, EPS, LDPE bag, wood
Is packaging compostable?	No
Is packaging separable?	Yes
Is it chlorine and/or bleach free?	Yes
Can the packaging be returned to the manufacturer for reuse?	No

Eco Product Labels

ENERGY STAR	Yes
Other	Canada EcoLogo, ECMA-370/The Eco Declaration, Germany Blue Angel, EPEAT Silver, China CECP

It's common for similar products to be sold in other countries and carry different eco labels. Eco labels listed in the "Other" category may only be available on the product within the country or region of origin.

Chemical Emissions

Ozone	<1.5
Styrene	<1
Benzene	<0.5
TVOC	<10
Dust	<4
Other	Not applicable

Average emissions output of this device is represented in milligrams per hour.

Use of Hazardous Materials

Benzene	0
Beryllium	<0.1%
Brominated Flame Retardants	Yes, amount unknown; some internal parts
Brominated Polystyrene	0
Cadmium	<0.1%, except for exempted applications
Chlorofluorocarbons	0
Chlorine (used for bleaching packaging or user manuals/materials)	0
Halogenated Organic Compounds	Yes, amount unknown
Hexavalent Chromium	<0.1%, except for exempted applications
Lead	<0.1%, except for exempted applications
Mercury	0
Nickel	0
Polybrominated Biphenyls	<0.1%, except for exempted applications
Polyvinyl Chloride	Yes, amount unknown
Polybrominated Diphenylethers	<0.1%, except for exempted applications
Selenium	0

Hazardous substances used in this product, including packaging, parts cleaning and user manual binding.

International Directive Compliance

EU Restriction of Hazardous Substances (RoHS)	Yes
Montreal Protocol	Yes

Though not mandated under US laws, this product may comply with international directives.

VENDOR SURVEY RESULTS—Global Corporate Information

Company-Wide Emissions/Waste/Resource Consumption for Fiscal Year 2014

HP plans to reduce the greenhouse gas emissions from HP-owned and HP-leased facilities by 20% relative to 2010 levels by 2020 on an absolute basis.

		Reduction Target Progress (%)
Carbon and/or Greenhouse Gas Emissions (tons)	1,667,700	Reduced by about 6% from previous year
Recycled Waste (tons)	55,600	Information not available
Non-Recycled Waste (tons)	14,100	Information not available
Water Consumption (tons)	363,848,105	Reduced by about 10% from previous year
Energy Use (MWh)	3,852,000	Reduced by about 4% from previous year

Alternative Energy Sources Used

Solar Energy	Yes, amount unavailable
Wind	Not applicable
Hydroelectric	Not applicable
Other	Not applicable

Programs Hosted by Corporate Offices

		Participating Offices/Regions
Carpooling	Yes	Company-wide
Internal Recycling	Yes	Company-wide
Telecommuting	Yes	Company-wide
Environmentally Friendly Shipping (e.g., EPA Smartway program)	Yes	Company-wide
LEED-certified Buildings	Yes	Nine HP facilities across the world
Use of Recycled Office Supplies	Yes	Company-wide
Energy-Efficient Servers	Yes	Company-wide

Number of ISO-Certified Operation Sites

	Total Number	Certification Rate
ISO-14001	19	Information not available
ISO-50001	Information not available	Information not available

“Green” Procurement Policy

HP complies with the Electronic Industry Code of Conduct (EICC), which covers environmental permits and reporting, pollution prevention and resource reduction, the use of hazardous substances, waste water and solid waste, air emissions and product content restrictions. HP also audits third-party vendors through a program that breaks the suppliers down into three tiers. First-tier suppliers are those that HP deals with directly and, as a result, aren't audited. Second-tier suppliers are suppliers for the first tier, while third-tier suppliers work for the second-tier suppliers. While the first-tier suppliers are considered low risk because HP has chosen these companies based on the EICC, second- and third-tier suppliers are considered “high-risk.” Therefore, first-tier suppliers audit the second-tier suppliers, who in turn audit the third-tier suppliers. Whether an audit should be performed is further determined by location, manufacturing process, existing contractual relationships and basic company information such as previous audit results, accident reports and press releases.

Environmental Recognitions Received

In 2014, HP earned a Green Supply Chain award from Supply Chain Asia for its supply chain environmental program. In that same year, HP earned two transportation related environmental awards: a “first leaf” by Green Freight Asia and Green Freight Europe, and the SmartWay Excellence Award by the US EPA

Standards Used in the Design of Environmentally Friendly Products

According to the company, HP believes that, along with customers and power utilities, it shares responsibility for the energy used by its products. The company says it works to reduce the amount of materials used in both its products and packaging and is saving tons of paper annually through an internal printing-efficiency program. HP offers more than a thousand printing and imaging products that meet key eco-label programs. These include ENERGY STAR, Canada Environmental Choice, Germany Blue Angel, TCO (Sweden), China Energy Conservation Program, Japan Green Mark and Korea Eco Label. Many HP office product models are ENERGY STAR-qualified.

The Company’s Sustainability Strategy

HP believes sustainability leadership starts with setting a good example. As such, the company leverages its IT solutions to reduce the carbon footprint of its own company and additionally influence industry action by setting stringent environmental expectations for its suppliers and partners. According to the company, HP works to reduce the carbon footprint of the company (Our House), provide practical solutions to make it easy for the customer to go green (Your House), and conducts high-impact research on sustainability solutions to help the earth in the future (Our World).

ENVIRONMENTAL TEST PROCEDURES

Test Configuration

HP LaserJet Enterprise M604dn base model (US).

Test Material and Conditions

The device to be tested, lab test equipment and paper are tested with daily conditions maintained between 20° and 26° C (68° to 78° F) and 35% to 65% RH. All products lab tested by BLI are powered by dedicated circuits that are protected by ESP (Electronic Systems Protection, Inc.) surge protectors to prevent transient power and communications disturbances from affecting equipment under test. Letter-size 20-lb. bond paper is used for all testing. Electricity is automatically regulated to <1% variation at 115 VAC using a Powerstat voltage regulator. Energy measurements are recorded using a Yokogawa WT210 digital power meter. Devices with multiple energy level settings are set to use the lowest amount of energy for energy-save mode and/or sleep mode and to go into each mode at the shortest interval possible. The Job Stream Test is started from sleep mode after overnight dormancy and the running mode tests are started from idle mode. Energy used for all tests is reported in kWh.

Cost Analysis

All projected costs in this report are based on kWh rates and foreign exchange rates collected by BLI and are intended for comparative purposes only; they aren't intended to represent the actual costs that will be paid by a consumer. US and Canada rates were collected in 2009 and UK and Germany rates were collected in 2008. All test data herein is based on BLI's testing of the US version of the device in its US laboratory.

About Buyers Laboratory LLC

Buyers Laboratory LLC (BLI) is the world's leading independent provider of analytical information and testing services to the document management industry. For over 50 years, buyers have relied on BLI to help them differentiate products' strengths and weaknesses and make the best purchasing decisions, while industry sales, marketing and product professionals have turned to BLI for insightful competitive intelligence and valued guidance on product development, competitive positioning and sales channel and marketing support. BLI also offers private, for-hire testing services that help manufacturers develop and market better products and consumables.

Note: This report is based on BLI testing one representative test sample at a specific point in time. BLI is not responsible for differences in performance that may be the result of lot-to-lot variation, changes in production and machine modifications implemented by the manufacturer, service issues or any other reason beyond BLI's control. Test unit serial #: CN3CH1D0YN.