



## Lab Testing Summary Report

July 2011

Report 110715

Product Category:

### Energy Efficient Switches

Vendor Tested:



Products Tested:

**E2620-24**

**E2620-48**

**E2620-24-PoE+**

**E2620-48-PoE+**

**E2620-24-PPoE+**



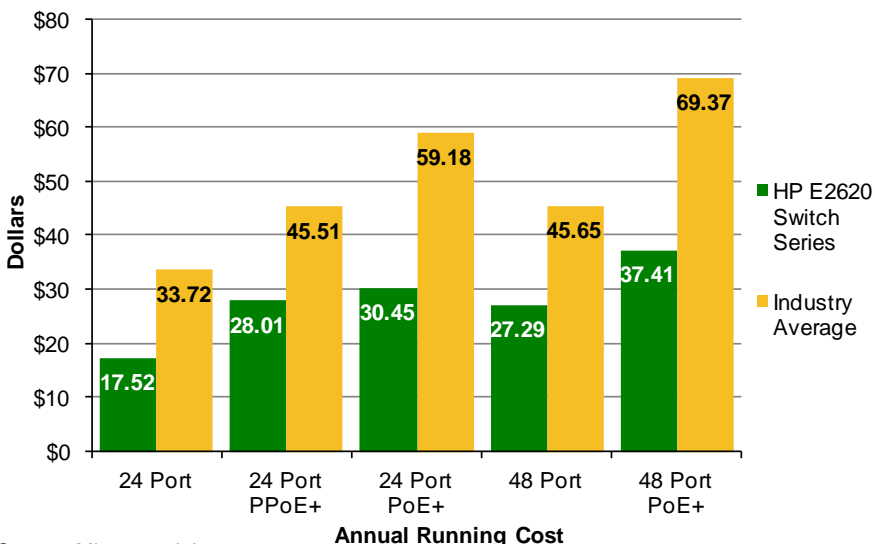
## Key findings and conclusions:

- HP E2620-24-PoE+ switch can save an average of \$28 annually when compared to the Industry Average
- In product performance, the E2620-48 uses energy 37% more efficiently than similar switches
- E2620 Switch Series has power supply options allowing daisy chaining from an E630 switch
- Multi-function front panel LED interface switch modes provide information without using a console cable
- Switches operate at 32-121° F, requiring less cooling; E2620-24 has no fan, while other models have variable speed fans

**H**ewlett-Packard E2620-24, -48; E2620-24-, -48-PoE+, and E2620-24-PPoE+ (Partial Power over Ethernet) switches were evaluated by Miercom under the Certified Green program for power consumption and energy efficiency. The E2620 switch product line is offered in 24- and 48-port configurations either with or without PoE. Each switch includes two auto-sensing 10/100/1000 Base-T ports and two mini-GBIC (SFP) slots. We analyzed the overall environmental impact and business-enabling green benefits that this HP E2620 series of switches offer.

In hands-on testing and data analysis, the HP switches proved to be energy efficient, environmentally friendly and easily manageable Layer 2 and Layer 3 switches. The HP switches are operational out-of-the-box, using default settings. Additional configuration is provided through Command Line Interface (CLI) and Web browser GUI.

**Figure 1: HP E2620 Switch Series Annual Running Cost**



Source: Miercom, July 2011

*Annual costs for the E2620 switches compared to the Industry Average. Cost is based on 12.9 cents per kWh. See Business Case on page 4 for more details.*

## Power Consumption

Power measurements were taken of the HP E2620-24, E2620-48, E2620-24-PoE+, E2620-48-PoE+, and E2620-24-PPoE+ switches using Layer 2 and 3 traffic with various frame sizes and loads. Power consumption of the products was measured while the switches were at idle and with 70% and 100% traffic load. Each switch has two GE SFP interfaces and two 10/100/1000 Base-T interfaces in addition to the 10/100 Base-T ports for Layer 2 and 3 switching. All of the ports are fully configurable to use as uplinks, devices, or standard switch communication on both Layer 2 and 3. Power consumption for this series of switches was recorded using 64-, 128-, 256-, 512-, 1024-, 1518- and 9216-byte frames in bursts with tests repeated to ensure accurate results. The switches were loaded at 70% and 100% to determine a typical operating power consumption and maximum power consumption. The HP E2620 series has been found to have such low power consumption that it varies little regardless of actual utilization factors. Configuration and power consumption are shown in a comparative chart in [Table 1](#) below and in [Figure 2](#) on page 3.

## Product Performance

Product performance of the E2620 switches was compared to the Industry Average using Watts/Gbps at 100% load using a Layer 2 1518-byte frame size. The E2620 Switch Series consumes between 3.38 and 5.08 Watts/Gbps, depending on the model. [Figure 4](#) on page 4 shows a comparison of power efficiency between the HP switches and the Industry Average.

The HP E2620 Series, when compared to the Industry Average, shows a 34% to 45%

improvement in power efficiency. The HP switches use less power to maintain throughput when in use. The following chart shows the efficiency advantage of the E2620 switches.

Switch Model	Efficiency Improvement
E2620-24	34%
E2620-24-PPoE+	36%
E2620-24-PoE+	44%
E2620-48	37%
E2620-48-PoE+	45%

*Using 1518-byte frames with 100% Layer 2 load, the HP switches are from 34 to 45% more efficient in Watts/Gbps comparison to the Industry Average.*

## Product Efficiency

During testing we measured the efficiency of each switch during boot, idle, with 70% load and 100% load. Testing the switches at various loads provides the data needed to calculate the annual running cost. See the Business Case on page 4 for additional annual cost breakdown. There is a repeatable pattern in all five switches during the four different power readings. The initial boot uses more power than idle since the boot process consists of a Power-On Self-Test (POST), causing each port to be checked when powered on. Note that the initial boot power reading is to learn how many watts are used during the boot process and is not used to calculate annual cost.

When comparing 70% to 100% load, there was little or no increase in wattage used. The E2620 Switch Series is operates as efficiently at 70% or 100% loads.

Being able to operate between 32° and 131° F allows the switches to run with little or no fan

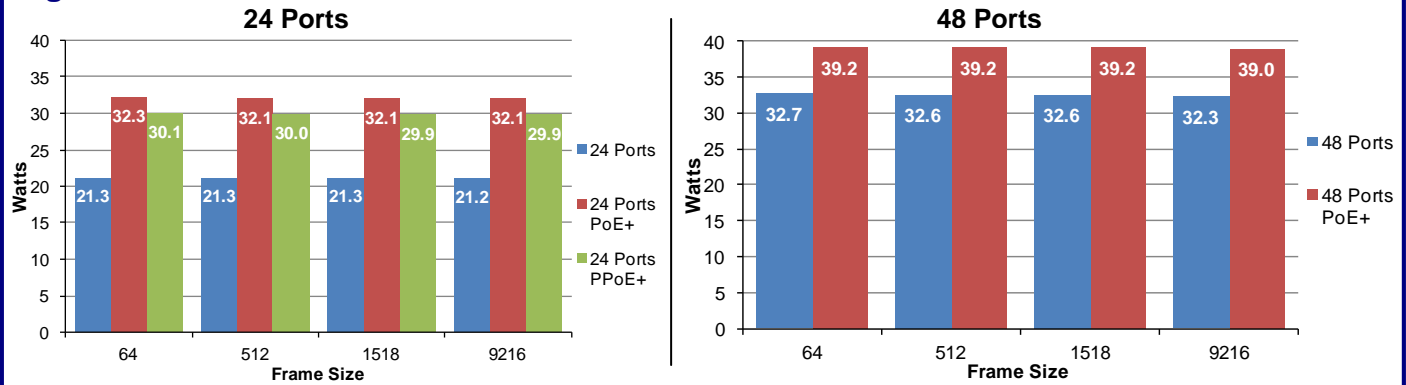
Table 1: Physical Configuration and Power Consumption of the HP E2620 Switch Series

Model	E2620-24	E2620-24-PPoE+	E2620-24-PoE+	E2620-48	E2620-48-PoE+
PoE	X	✓(PPoE)	✓	X	✓
10/100 Base-T Ports	24	24	24	48	48
10/100/1000 Base-T Ports	2	2	2	2	2
1GB SFP Ports	2	2	2	2	2
Power Consumption at					
Idle (No Link)	12.5	22.0	24.2	19.7	30.0
70% load	21.3	29.9	32.1	32.6	38.9
100% load	21.3	29.9	32.1	32.6	39.2

*Physical configuration features and power consumption with Layer 2 traffic using a 1518-byte frame size.*

Source: Miercom, July 2011

**Figure 2: HP E2620 Switch Series Power Profiles**



Source: Miercom, July 2011

*Energy used by the HP E2620 Switch Series with different frame sizes.*

usage. Only E2620-24 does not have a fan, while all other models have fans with two variable speeds. These fans are useful when the switches are idle or not operating at full load, allowing them to scale down fan operation while reducing noise.

The HP switches are fully manageable either through a secure Web browser interface, the CLI via serial console, Telnet or SSH, or any network management solution. HP E-PCM Plus Network Management Software Series is a Windows-based HP network management solution that can be used to map, configure, and monitor these switches. One of the features of HP E-PCM Plus is to display exactly what is connected to each port of the switch, whether it is a computer, telephone, camera or authenticated users. HP E-PCM Plus saves power on the switches by shutting down unused ports. PoE can also be

turned on or off via a policy within the HP E-PCM Plus software, enabled only when PoE devices are connected.

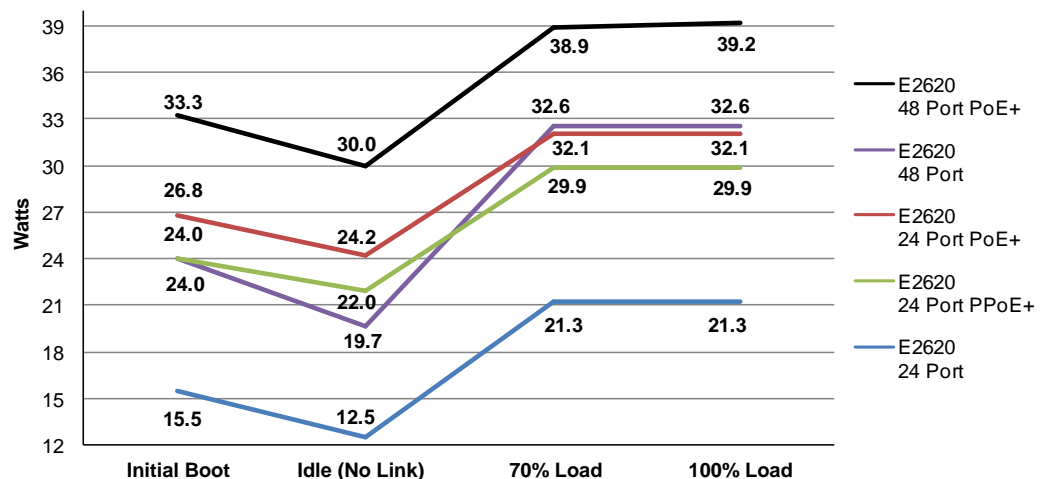
### Business Processes

HP networking products are shipped using processes that utilize recyclable packaging materials, as well as the reduction of documentation shipped with the switch. All HP networking products are in compliance with Restriction of Hazardous Substances (RoHS) directives which restrict the use of certain hazardous substances in electrical and electronic equipment.

HP networking products have factory trade programs for compliance with Hewlett-Packard Supply Chain Social and Environmental Responsibility Policy. Along with offering trades, HP

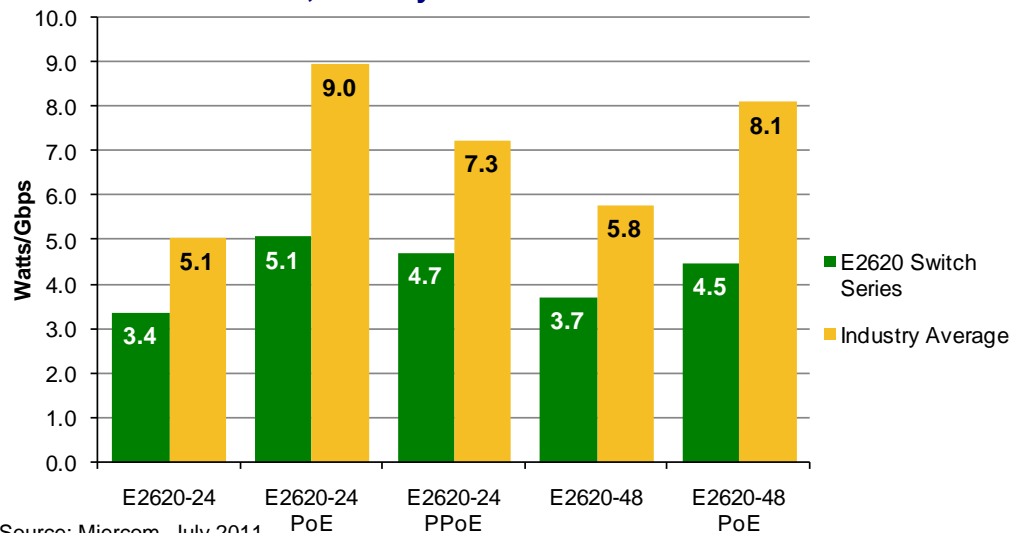
*Watts used by each of the HP E2620 Series Switches under different loads utilizing Layer 2 traffic.*

**Figure 3: HP E2620 Switch Series Power Consumption Layer 2 Traffic with 1518-byte Frame Size, Specified Load**



Source: Miercom, July 2011

**Figure 4: HP E2620 Series Switches Power Efficiency  
100% Load, 1518-byte Frame Size**



*Power consumption of the HP E-Series switches utilizing Layer 2 traffic using 1518-byte frame size at maximum load as a function of throughput compared to the Industry Average (IA). Lower values indicate higher power efficiency.*

has programs to allow for switch returns for cash, as well as recycle or donate options for disposing of old equipment, while minimizing impact on the environment.

## Green Innovation

HP is focused on Holistic innovation around energy savings that includes products, solutions and services. Specifically for the HP E2620 Switch Family, the switches are able to run at higher temperature values, and variable speed fans provide power efficient cooling with minimal noise. In addition, the platform is designed with minimal components and the PoE+ switches have dynamic power negotiation that ensures optimal power usage.

The HP E2620 Switch Series are capable of operating at higher temperatures, allowing fans to run at slower speeds, reducing the overall energy consumption of the switch. The E2620-24 does not require a fan. Both the E2620-24-PoE+ and E2620-48-PoE+ utilize 80 Plus Silver Efficiency power supplies, certified to operate 80% more efficiently at 20, 50 and 100% of rated load.

## Business Case

The annual running cost is calculated based on the projected use of the switch in a business environment. The assumption is the switch will be in operation 12 hours daily during the week. Of those 60 hours, 10 hours or 2 hours daily will be operating at 100% and the remaining 50 hours will be at 70%. For the other 108 hours, (48 hours

weekend and 12 hours weekday) the switch will be considered idle. We are using a rate of 12.9 cents per kWh, currently considered as a national average. Your calculation may vary depending upon the rate in your area.

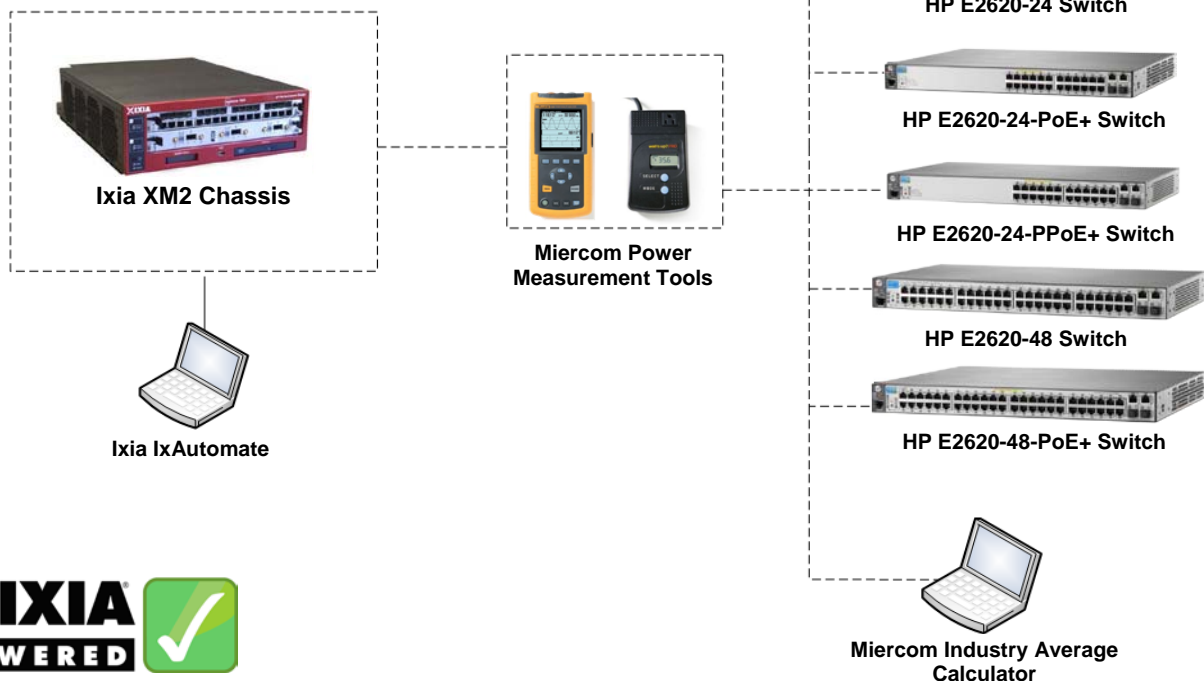
As shown in [Figure 1](#) on the first page, all HP E2620 switches present lower running costs. The dollar amount savings per unit ranges from \$15 to \$32 yearly. On average the HP switches can save 48% for the 24-port model. This savings is seen across the board on all models of these switches, including the 48-port PoE switch with a 46% reduction in cost.

## Certified Green

Miercom conducts environmental analysis on products using a holistic view, considering power efficiency, manufacturing, and other factors which are part of the product and its lifecycle. Power consumption and power efficiency are important metrics when comparing products. Typically, other reports only address these metrics in their documents. Miercom, however, believes in a more comprehensive approach, which reveals the true business case savings including discussion of other environmental benefits that the product may afford.

Competitive indexing with industry average is achieved by comparing measured results from products in a similar class. This comparison allows a single view of the annual cost for power consumption of a product, and comparison information that will help the user understand if the evaluated product affords an overall advantage for power efficiency.

## Test Bed Diagram



## How We Did It

HP E2620-24, E2620-48, E2620-24-PoE+, E2620-48-PoE+, and E2620-24-PPoE+ switches were evaluated for total environmental impact by testing at the individual components, as well as looking at and evaluating the other features and capabilities. Testing was performed at Miercom lab and focused on power consumption and efficiency of the product. A full audit was additionally conducted to analyze the overall product-specific environmental impact.

Lab testing was conducted for power consumption under load. Measurements and audit results were verified with site survey assessments. HP E2620 series and E2620-24-PPoE+ switches were configured and tested using the respective number of ports on the switch. HP E2620-24, E2620-24-PoE+, and E2620-24-PPoE+ were all tested using 24 10/100 Base-T ports + 4 10/100/1000 Base-T SFP ports. HP E2620-48 and E2620-48-PoE+ switches were tested by utilizing all ports on the Ixia XM2 Chassis. We measured power consumption changes by scheduling the independent ports for power down and configuring them for rate changes via CLI and GUI. In addition, we measured the power consumption at idle with no traffic, no links, partial load and full load under all standard frame sizes between 64- to 9,216-bytes. Power consumption of the HP switches was measured with varying network and link loads that a switch would typically experience in a real-world deployment. The SUT was loaded with traffic at various rates and packet sizes in accordance with RFC 2544 Benchmarking Methodology for Network Interconnect Development.

Power consumption was measured while running Layer 2 traffic from the XM2 traffic generator from Ixia ([www.ixia.com](http://www.ixia.com)). Miercom recognizes Ixia as an industry leader in energy efficiency testing of networking equipment. Ixia's unique approach utilizes coordination of energy measurements with network traffic load – allowing energy consumption to be graphed against network traffic volume. Real-world traffic is generated by Ixia's test platform and test applications, principally IxAutomate for Layer 2 and 3 switching and routing traffic.

The tests in this report are intended to be reproducible for customers who wish to recreate them with the appropriate test and measurement equipment. Current or prospective customers interested in repeating these results may contact [reviews@miercom.com](mailto:reviews@miercom.com) for details on the configurations applied to the Device Under Test and test tools used in this evaluation. Miercom recommends customers conduct their own needs analysis study and test specifically for the expected environment for product deployment before making a product selection.



## Miercom Certified Green

The HP E2620 Switch Series was evaluated by Miercom according to the Certified Green Program. Based on the observations and audit analysis, these switches have been proven to be energy efficient and are environmentally sound network products.

The E Switch Series provide operations at higher temperatures, auto shutdown of unused ports, PoE switching and variable fan speeds.



**HP E2620 Switch Series**



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## About Miercom's Product Testing Services

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