ProCurve Networking by HP

Environmental Sustainability and Networking

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"Environmental responsibility is good business. We've reached the tipping point, where the price and performance of IT are no longer compromised by being green, but are now enhanced by it."
—HP CEO Mark Hurd

Introduction

Today, we are just beginning to realize the fragility of the planet on which we live. There is a growing awareness of our individual and collective responsibility for guarding our planet and preserving its resources, not only for future generations, but also for our own lives and in our own lifetimes.

The problems are as immediate and obvious as this morning's headlines. We are more conscious than ever of the rising cost of energy, mounting e-waste disposal problems, and hazardous materials and their effect on the environment. We read about global warming and the scarcity of natural resources. Water, oil, food, and electricity are all becoming flash points.

The good news is that companies are focusing more and more on the environment, and this is no less true in information technology than in other areas of business. In fact, environmental responsibility is already shaping policies and affecting IT decisions. And "Green IT" is at the top of Gartner's list of the top ten technologies and trends for 2008.[1]

So what can you do about the environment while still remaining competitive and accommodating the needs of your customers? Amid the assortment of conflicting claims, what information can you trust? How can you make sure that your networking technology is environmentally sound, and how can you take advantage of environmental business opportunities for networking?

This white paper discusses and explains green issues for networking, explains what to expect from standards development, and offers best practices suggestions for planning and implementing a network that will be aligned with environmental sustainability goals.

How HP is going green

As a company, HP is concerned about the environment. HP is committed to reducing its own environmental impact as well as that of its customers, partners, and suppliers. The company is working toward developing products and services that are environmentally sound by conducting operations in a responsible manner.

HP's environmental stewardship begins with its Design for the Environment Strategy, whose four pillars are:

- **Practical solutions** to reduce energy consumption, conserve materials and supplies, and more efficiently manage IT.
- **Convenience and simplicity** for customers to recycle their technologies and supplies.
- **Advanced technology** to deliver more performance for every watt of energy.
- **Collaboration, joint research, and participation** in industry consortiums to shape public policy for recycling, energy consumption, and climate change.

The company has also instituted a Green Business Technology initiative, and HP supports or has implemented many national and international standards aimed at improving the environment and reducing our impact upon it. While HP participates in or complies with dozens of environmental initiatives and standards worldwide, some of the major ones are shown in table 1.

[1] "Gartner Identifies the Top 10 Strategic Technologies for 2008," Gartner, 2007.

Table 1. Examples of HP participation in major Green initiatives and standards

eWaste and recycling programs	Make it convenient and simple for more customers to recycle their technology and supplies—from print cartridges to computer systems—and assist with product retirement and secure system re-use.
RoHS (EU)	Restricts hazardous substances in electrical and electronic equipment.
China RoHS	Officially known as Administrative Measure on the Control of Pollution Caused by Electronic Information Products, this is a Chinese government regulation to control certain materials, including lead, mercury, cadmium, hexavalent chromium, and others. ProCurve is in strict compliance with the China RoHS standard and requires that its material vendors also meet this standard.
ISO 14001 (US)	Certifies that work environments are healthy, safe, and environmentally sustainable for HP and our supply-chain partners.
WEEE (EU)	Waste from Electrical and Electronic Equipment. European Community (EC) directive that mandates the treatment, recovery, and recycling of electric and electronic equipment.

"Environmental sustainability is an essential element of global citizenship at ProCurve and is vital to our long-term business and your success."
—Mark Thompson, Director, Global Sales and Marketing, HP ProCurve

What HP ProCurve is doing

As is the case with products in other areas of HP, ProCurve solutions are engineered to save energy, reduce waste, and be environmentally friendly while still achieving a high return on investment. Besides adhering to the overall HP guidelines, ProCurve products offer a number of significant environmental advantages, beginning with the design philosophy and extending right down to the smallest of specific features.

Designing for the environment

Looking for an environmentally friendly IT network? Here's what you'll find in products from HP ProCurve:

- **Conservation of materials and supplies:** For reduced environmental impact and long-term economic advantages, ProCurve's chassis-based products offer module expansion or reconfiguration flexibility and reduced mass of components to ship, recycle, or repair.
- **Easy recycling:** ProCurve prevents industrial waste in landfills by making it easy to upgrade, trade in, or recycle equipment.
- **More efficient IT management:** ProCurve Manager allows easy long-distance management of even large, widely dispersed networks; this reduces administration hours and efforts, and cuts down on the number of trips by automobile, truck, and airplane.

Reducing energy consumption

ProCurve products are engineered to reduce power consumption, with features such as:

- **High port densities:** High port densities in ProCurve switches mean higher energy efficiency at the solution level. And ProCurve's chassis-based customer solutions offer strong economic and energy-efficiency advantages at the edge or core of a customer networking solution.

- **Fine-grained Power over Ethernet (PoE) power allocation:** ProCurve switches support ANSI/TIA-1057, the Link Layer Discovery Protocol for Media Endpoint Devices (LLDP-MED), enabling fine-grained Power over Ethernet allocation and management. This standards-based feature set lets you understand and better manage the power budget for each device on a port. Armed with the detailed knowledge provided by this standard, you can make informed decisions to select the most efficient power supplies and correctly size UPS requirements to capitalize on power efficiency gains in the data center or the wiring closet.
- **Policy control of PoE:** Scripting features of ProCurve Manager Plus let you control the PoE circuitry to shut off devices and save electricity and reduce environmental impact when equipment isn't being used—on a weekend, for example.

Building adaptable, "future-proofed" equipment

The tendency in technological circles to "rip and replace" does not help the environment. ProCurve combats this tendency with:

- **Chassis-based design:** Upgrades or reconfigurations are easy, with minimal or no waste.
- **Lifetime warranty:** Nearly all ProCurve products include a lifetime warranty, which offers customers the opportunity to extend the usable product life for chassis and stackable products, thereby reducing e-waste. And the higher quality necessitated by this warranty also means fewer shipments of replacement parts and fewer repair calls, which, in turn, lessens consumption of fossil fuels and other resources.[2]
- **Product lifecycle design:** ProCurve takes responsibility for the full product life cycle, all the way through end of life (EOL), including disposal.
- **Open standards based:** By helping to create, advocate for, and deliver networking technology and products based on open standards, ProCurve helps customers to maintain their flexibility with respect to vendors, applications, and the future needs of their business. Avoiding single vendor lock-in is a key strategy for customers to maintain future flexibility and choice.

Following a standards-based approach

In most technical fields, and especially in computer networking, adopting standards is better for the customer, the industry, and the planet. Standards are usually developed via a participatory or community-oriented process that incorporates an outstanding solution while avoiding ineffective or inefficient ones. Adopting standards aids interoperability, which means customers can create systems using the best, most efficient components without being forced to rely on a single vendor's proprietary equipment.

HP ProCurve is working to foster a standards-based approach to energy efficiency and improved environmental sustainability for networking equipment. And ProCurve has joined forces with other industry and research leaders in consortiums to shape public policy, including innovation, participation, and compliance. Some examples of ProCurve's standards-based approach include:

- **History of standards:** ProCurve has a history of standards development support and advocacy. The popular IEEE 802.1X, PoE, LLDP-MED, and many other industry standards are good examples of standards that ProCurve has helped to make a reality for the benefit of customers, the industry, and the environment.
- **IEEE P802.3az participation:** HP ProCurve is playing a significant role in the IEEE committee for establishing P802.3az, the Energy Efficient Ethernet, and is a member of the task force that is drafting this standard, which is aimed at facilitating lower power consumption during periods of little or no Ethernet network utilization.

[2] Lifetime warranty is for as long as you own the product, with next-business-day advance replacement (available in most countries). The following hardware products and their related family modules have a one-year warranty with extensions available: The ProCurve Routing Switch 9300m Series, ProCurve Switch 8100fl Series, ProCurve Access Control Server 745wl, and the ProCurve Network Access Controller 800. Standalone software may have a different warranty duration. For details, refer to the ProCurve Software License, Warranty, and Support booklet at: **www.hp.com/rnd/support/warranty/index.htm**

- **The Green Grid:** HP is a founding sponsor and board member of The Green Grid, a global consortium dedicated to developing and promoting energy efficiency for data centers and information service delivery by defining meaningful, user-centric models and metrics; developing standards, measurement methods, processes, and new technologies to improve performance against those metrics; and promoting the adoption of energy-efficient standards, processes, measurements, and technologies.
- **Network of choice:** ProCurve products meet the requirements of national and international standards, allowing customers to choose the most environmentally friendly network solutions and combine them. Compliance to standards is a major reason ProCurve is known as the Network of Choice.

What you can do

What can you do to help ensure that your networking solution supports the environment? Here are some tips and best practices from HP ProCurve. As you read them, notice that the best solution may not be the most obvious one.

Increase ROI while aiding the environment

The path to environmental sustainability is the right path, for a host of reasons. Besides the obvious goal of reducing your network's impact on the environment, going green can—and should—be accompanied by a similarly healthy improvement in the return on your company's IT investment. Reducing resource consumption, improving efficiency, and wringing the most utility out of every watt of power are good for the earth and good for your business. Here are some recommendations:

- **Avoid quick fixes and proprietary paths:** Reducing your environmental impact should be another of your long-term business goals. A short-term proprietary solution may seem "greener" at first, but not at the expense of lack of sustainability, new or difficult-to-management requirements, being locked into an inflexible single-vendor path, or unique or unforeseeable maintenance requirements. These can all be significant obstacles to meeting environmental goals. Even worse, they can cause escalating costs and missed business objectives. And they can completely undermine environmental goals altogether.
- **See the entire environmental picture:** Take a close look at all aspects of your business needs and environmental objectives. Your choice should be dictated not by any single feature—power consumption, say, or chassis size—but rather by a comprehensive analysis of all relevant factors. Remember, information technology offers a number of opportunities for energy efficiency, including servers, end nodes, and cooling. Your network infrastructure is just one aspect. Sizing up your business needs and your environmental goals, and then comparing those needs and goals across the current state of your IT infrastructure, is a good starting point. Be aware of where the sustainability opportunities and the highest ROI opportunities might exist.
- **Go for the least disruption:** Converting to a sustainable network shouldn't mean a wholesale upgrade of everything. Think about the overall effect of your changes. Focus on areas where achieving the result or attaining the goal will have the largest long-term impact, and proceed accordingly. An Adaptive Network solution should be your goal. It must be adaptive to users, adaptive to applications, and adaptive to your organization's needs. To take one example of adaptation, your network should make it easy to evolve and conform to power-efficiency standards and technology improvements as they occur.
- **Take the long view:** Choose standards-based, evolutionary solutions and maintain a consistent, long-term environmental and energy-efficiency strategy. One of the best things you can do is to work closely over the long term with your networking vendor, leveraging the vendor's scale and technological expertise. Long-term environmental sustainability requires a long-term perspective and a sensible strategy—not one based on a periodic "rip-and-replace" approach.

Ask your vendor the hard questions

Q. What are you doing to help ensure that energy-efficiency features will have interoperability and compatibility in the market?

The right answer: Your vendor should be adhering to international standards and must be capable of fully supporting a diverse multivendor networking infrastructure.

Q. How are you protecting current customer investments with respect to new energy-saving or environmentally friendly features?

The right answer: Your vendor should be able to supply an evolutionary, not revolutionary, solution. And the solution should be based on standards and leverage the vendor's scale and expertise.

Q. Are there hidden costs of pursuing environmental sustainability improvements for the network? What are they?

The right answer: Blindly concentrating on environmentally focused improvements while overlooking business objectives and failing to do sufficient assessment and planning can cause substantial cost increases and unnecessary disruption when addressing environmental issues. Your vendors should all have a clear understanding of your needs and objectives, and employ a consistent set of commonly used metrics.

Q. When should customers expect to refresh equipment to achieve environmental objectives?

The right answer: Planning and priorities will determine when to refresh. Your vendor should realize that solutions for achieving environmental objectives must be prioritized and integrated within a refresh cycle driven by business, user, customer, and TCO/ROI objectives.

Q. What evidence do you have to prove you are investing for the environment?

The right answer: Your vendor should be able to show adherence to the RoHS and WEEE environmental standards, show compliance with ISO 14001 (internally and externally), and should demonstrate further participation in environmental standards bodies and creation. Your vendor should also have in place mature, effective recycling programs for equipment and parts, and should demonstrate a commitment to helping customers achieve environmental sustainability goals.

Practical tips for building a more resource-efficient network with ProCurve

Let's look at some of the ways in which implementing an environmentally friendly strategy in your network can produce a better bottom line for your business. Consider these practical examples of best practices.

Deploy a chassis-based networking infrastructure when appropriate

For many networking deployments, some of the most impressive environmental savings can come from using a chassis-based networking infrastructure with a higher port density for a given rack space. The higher per-power-supply and per-fan density of the chassis increases the overall system efficiency as well. Using a chassis-based infrastructure can also reduce the overall floor space and associated cooling costs that can occur when customers build out larger networks using stackable switches with lower port densities.

Assess your current network. If your data center is packed with "pizza boxes" or stackable components, remember those components require more power supplies and occupy more rack space than a comparable chassis-based solution. Not only does a chassis-based infrastructure save space and power, but it also gives you more deployment flexibility. You can easily add or upgrade modules, such as those with wireless or security capabilities, without having to install or replace a separate appliance.

ProCurve offers several types of chassis-based switches, multifunction blades with high port densities that mean fewer appliances in the wiring closet or data center, further reducing the number and size of power supplies and fans. What's more, chassis-based configurations are easier and more cost-effective to upgrade or deploy.

For smaller deployments, where port densities tend to be lower, as is commonly the case with small businesses, stackable switch products may be the best choice. Stackable switches can provide you with a variety of other energy-efficiency advantages—for instance, fanless configurations and so-called "pool-of-power" PoE switches. (Pool-of-power PoE switches can be configured to offer a subset, or limited number, of their total ports to include PoE power.) These products provide excellent options to efficiently, quietly, and appropriately provision smaller networks where a chassis solution would be excessive. ProCurve has historically provided an excellent line of fanless and pool-of-power POE stackable switches.

Make use of network management tools

Administrator time is no less a resource than power or floor space. And network management tools such as ProCurve Manager can reduce the number of administrator hours needed for network management. The secure, advanced network management platform of ProCurve Manager allows administrators to configure, update, monitor, and troubleshoot widely dispersed ProCurve devices—all from a single central location.

ProCurve Manager allows policy-based management that will take automated actions in response to network events triggered by a variety of sources. Integration with HP OpenView Network Node Manager integration allows you to monitor multivendor networks while leveraging ProCurve-specific Adaptive EDGE management functions. Such sophisticated management reduces administration time and cuts travel expenditures, further increasing your organization's energy savings and cost reductions.

Take advantage of Power over Ethernet capabilities

With its capability for control by ProCurve Manager Plus (PCM+), PoE technology has the potential to deliver significant energy savings by shutting off idle PoE devices when they are not in use. For instance, a business with many devices that are used only on weekdays—such as Voice over Internet Protocol (VoIP) phones—can use a PCM+ script to shut down unused devices after working hours and on weekends, for significant energy and cost savings.

Table 2 illustrates an example of energy usage with and without PCM+ PoE scripting. Assume a business has 1,000 IP phones, each drawing 5 watts when idle. If these phones are left on all of the time, 168 hours per week, even at idle they will consume 43,680 kilowatt hours per year).[3]

But if you use PCM+ to disable PoE power to those phones after working hours and on weekends, they draw power for only 9 hours a day, for a total of 45 hours per week. Their annual power consumption is reduced to 11,700 kilowatt hours. Disabling PoE power to the phones in this example saves some 31,980 kilowatt hours of electricity, reduces the carbon footprint of the business, and provides significant cost reductions.

Table 2. Energy usage for VoIP phones with and without PoE after-hours shutdown

	No. of IP phones	Watts/phone at idle	Hours/week	Energy consumed/year	Energy cost/year (@ US$0.11/kW)
PoE off time	1,000	5	168	43,680 kW	$4,804
PoE on time	1,000	5	45	11,700 kW	$1,287
Total saved by PoE after-hours shutdown				**31,980 kW**	**$3,517**

Select the power supplies and UPS based on actual power requirements

With modular power supplies, it's tempting to over-engineer the network, choosing power circuitry that is much too large, with the mistaken belief that nothing will be lost if it's not used. Power supplies are most efficient when operated toward the higher end of their maximum output. A UPS and power supply that are too large for the application may be running at only 20 percent of their capability, and this renders both extremely inefficient.

HP ProCurve networking products allow accurate measurement of PoE power requirements with fine-grained granularity. Such accurate measurement can eliminate wasteful "power overkill" and can lead to resource savings in two ways:

- Choosing the appropriate power supply and UPS combination for a particular installation
- Monitoring and controlling that power circuitry for better efficiency

HP ProCurve's standards-based implementation of precise fine-grained allocation, based on ANSI/TIA-1057 (LLDP-MED), is supported on all ProCurve PoE-capable switches. With this technology, it's easier to assess and design for actual power requirements. Accurate power allocation allows users to determine and control PoE power throughout the network, make informed power supply and UPS sizing decisions for better efficiency, and capitalize on power efficiency gains in the wiring closet. Choosing an appropriately sized UPS with the goal of electrical efficiency can also reduce costs that might be incurred when purchasing an expensive, overlarge UPS solution.

[3] Caution: Many PoE devices are VoIP phones. Turning off phones, or any PoE device, should be considered carefully from both a health and safety perspective (a 911 emergency call, for example), as well as from the user experience perspective. Dial tone and phone function are normally taken for granted as "always on," so make sure VoIP phones are indeed unused during the period they are shut off.

Summing up

HP ProCurve is making it easier to achieve your company's environmental objectives, thanks to a large variety of products and solutions designed to add greater efficiency and savings to existing infrastructure and data center facilities. ProCurve is working to develop solutions, products, and services that:

- Help ensure partner and supplier compliance
- Are consciously designed to reduce environmental impact
- Incorporate materials and components that lower environmental impact during use
- Comply with key worldwide environmental directives and programs

Now you have a choice for the future, from ProCurve, the Network of Choice.

For more information

For more information about HP ProCurve and how you can produce a resource-efficient networking environment, contact your ProCurve reseller, or visit us at:

www.procurve.com

For more information

To learn more about ProCurve Networking, please visit
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