

This insightful guide to Green IT best practices starts with a hard-eyed analysis of the environmental impact of IT equipment (positive and negative). Then, it dives into a step-by-step recommendation for best practices that include understanding behavior, policy creation, savings simulation, and long-range planning.

Executive Summary

The term Green IT is becoming a part of the vernacular for CIO's and Directors of IT in corporate America. While the strategies and tactics to reduce the environmental impact of IT are being defined, it is essential for those involved in the process be able to speak directly to the issues at hand. This white paper is designed to provide an understanding of these issues including:

- ▶ Analyze the environmental impact of IT at each stage of the product lifecycle, including:
 - Production/Acquisition
 - Operation
 - End of Life Disposal
- ▶ Isolate the decisions/changes that are within the control of an IT organization to reduce their overall environmental footprint.

After reading this whitepaper, you should be able to frame a discussion around creating a Green IT strategy and identify the most environmentally friendly practices at each stage of the IT lifecycle.

Overview

Saving the planet is a societal obsession poised to impact your IT department in a significant way within the next 12 months, if it hasn't already. If your team hasn't been hit with a collective demand for reducing your company's ecological footprint, a social responsibility initiative straight from the boardroom, or a regulatory directive designed to change behavior, you soon will be. But although demand is increasing, the right solutions aren't always apparent. A quote from the famous, ahead of his time, frog Kermit, reminds us that whether in color or behavior, "It's not easy being green."

Gartner Group, one of the leading IT analyst firms for Fortune 1000 companies, identified Green IT as the number one "Strategic Technology" for 2008.¹ Technologies are given this honor for their potential to have a significant impact on the enterprise over the next three years combined with a need for major

dollar investment, and the risk of being late to adopt. Included in their rationale for giving Green IT this distinction was the potential for outside regulations to require IT to minimize its impact on the power grid, reduce carbon emissions and other environmental/resource reductions.

While it can be hard to think about adding another initiative to your already full daily agenda, Green IT has a significant upside. Green initiatives present significant opportunity for cost savings. In addition, these initiatives offer significant opportunity to communicate goodwill to customers and the public. A commitment to the environment is an intangible asset that many consumers are embracing today. The best part, though, is that many recent studies show the easy-to-do green projects significantly contribute to the bottom line, directly saving significant money on energy expenses.

So, while going green may not be the journey you planned on taking this year, in all likelihood, it will be a part of your IT organization. This white paper is designed to give you the information necessary to take the first step towards Green IT in your organization.

Impact of IT on the environment

Google the term Green IT and you will find almost 100 million results, many of which are recent IT industry articles that will make it sound as if IT is single-handedly melting the icebergs and depleting the ozone layer one server at a time. A recent Gartner press release states that the global carbon dioxide (CO₂) emission footprint from IT and communications technologies is now 2 percent of global CO₂ emissions, placing it on par with the aviation industry.² A recent *ComputerWeekly* article cites a 2004 UN University report that shows a PC requires 10 times its weight in raw materials at the manufacturing stage.³ This article also points out the end of life environmental impact of PC. The computing industry is built on a model of Moore's Law, which states the transistor density on chips increases exponentially approximately every

two years, significantly increasing processing power. The net result of this is almost a billion computers that have been built, with the sole intention of eventually decommissioning them⁴ – usually in a few years when cheaper, faster, better machines are available to replace them. The Silicon Valley Toxics coalition estimates that there are 500 million obsolete computers in the United States alone, not to mention the 130 million cell phones thrown out every year.⁵ So what exactly is the environmental impact of IT? And more importantly, how does an organization go about identifying their role in minimizing this impact?

The environmental impact of IT can be broken out into three categories:

1. The impact of building and acquiring technologies
2. The impact of operating those technologies in your enterprise
3. The impact of disposing of these technologies after they have served their useful life in your organization

Building and acquiring technologies

Building technology hardware for power and performance has long been the industry standard. With every release and passing year, consumers find smaller, faster, cheaper and better electronics than previous versions. This relentless pursuit of improvement has not been friendly to the environment. Truth be told, the “vast majority of environmental cost occurs even before you even switch on the PC – it is the complete opposite of a fridge or washing machine.” says Tony Roberts, managing director of charity Computer Aid in a recent *ComputerWeekly* article.⁶ Demand has driven design, and it is only recently that the collective consumer conscience has started examining the environmental impact of technology hardware manufacturing. The result is a growing trend towards eco-friendly product design and manufacturing. Because of this trend, it is very likely that 10 years from now most technology hardware will be built with the environment in mind. The cold hard fact is, however, that the IT hardware in most organizations today is environmentally unfriendly.

Operating technologies

Operating technology requires energy to power, heat, ventilate and cool the equipment. The energy consumed affects the environment in the form of CO₂ emissions, or greenhouse gasses, required to create that power in the first place. The impact of these emissions is significant. In fact, Gartner estimates that the CO₂ emissions from operating IT equipment is on par with the emissions from the entire aviation industry, accounting for almost two percent of the global greenhouse gasses.⁷ It is easy to see how this is such a significant number, when you consider

that the average PC and its monitor consume 600 kWh annually, which results in 710 to 1330 lbs of CO₂ being sent into the atmosphere.⁸ The CO₂ emission from just 10 computers are equivalent to the emissions of an average car in the US.⁹ Advanced computing capabilities have resulted in increased energy consumption as well. While the desktop itself may operate more efficiently, the actual wattage consumption may be greater – for example, a Dell Optiplex 745 consumes 79 Watts, vs. a Dell 620 that consumes only 70 Watts.¹⁰

Add to this consumption the fact that a significant amount of this energy consumption is wasted on PCs fully-powered when not in use. The outdated, but unfortunately still standard industry practice of keeping desktops on 24-7 for security and maintenance reasons means most companies are unnecessarily adding to the operating impact of their IT hardware. Companies that implement network-level PC power management solutions reduce their PC energy consumption by almost a third annually – this means that a small to medium sized company with 5,000 computers can reduce their carbon emissions by almost 1.7 million pounds.

Disposing of technologies

Creating the fastest, most reliable and powerful IT hardware often means using environmentally unfriendly resources such as barium, beryllium, phosphorous and lead. These hazardous wastes inside your PC and monitors represent a public health threat if not disposed of properly. In fact, according to a recent eWeek article on Green IT, more than 1,000 chemicals used during electronics production such as lead, mercury, and cadmium have been linked to cancer, reproductive problems and other illnesses.¹¹ According to Silicon Valley Toxics Coalition, this so called e-waste is the fastest growing part of the waste stream, accounting for 2 percent of the municipal solid waste in the US.

The EPA and some state environmental agencies mandate the proper disposal of obsolete IT equipment. California’s Department of Toxic Substances Control requires companies to manage the disposal of their computer monitors as they would with hazardous waste.¹² Legislation introduced in the US House of Representatives, HR 233, known as the National Computer Recycling Act attempts to address this issue as well, by establishing a fee on IT equipment to be put towards recycling efforts. And to this end, many IT departments already allocate budget towards their recycling and disposal of equipment at the end of its useful life.

Unfortunately, participating in the manufacturer’s recycling program isn’t as green as it may sound. Oftentimes manufacturers recycle parts from perfectly usable Pentium 4 computers that have thousands of

user hours of life left in them. Considering a recent UN University study shows that it takes almost 1.8 tons of raw materials to produce the average computer,¹³ it's easy to understand the importance of extending the useful life of your desktops.

IT Organization's impact

With facts in hand, it is easy to feel overwhelmed with the notion of "Green IT." After all, can one organization's IT department really save the world from its pending doom? More realistically, how much of this can an IT department really control? When it comes to making environmentally friendly decisions about your home, do you go big and tear down your existing structure to be replaced with an eco-friendly one? No, you make lots of little decisions like sorting your recyclables out of the trash, reusing paper bags at the store, installing compact fluorescent light bulbs, and when the washer dies, replacing it with one that is energy efficient. Consider approaching your Green IT strategy in the same manner. Small actions, within your control, that in the end, add up to a big impact.

Environmentally friendly acquisition

Well-meaning IT articles that suggest replacing existing hardware with more efficient or higher capacity equipment have not thought their recommendations through completely. This notion of replacing existing equipment is akin to throwing the baby out with the bathwater. As stated earlier, the majority of the impact to the environment has already happened – it happened during manufacturing. The raw materials required are roughly equivalent to the amount of materials used to manufacture a mid-sized car,¹⁴ but the lifespan of these two products is radically different – a car is approximately 10 years, while a PC is about three. Instead of retiring machines after an average of two or three years, the environmentally responsible choice is to extend the useful life of your current hardware as much as possible. For some organization this will mean finding ways to make the existing hardware they own more efficient. For others it will mean participating in recycling programs that ensure PCs are relocated to schools or third world countries and used for additional years, as opposed to disposing of the hazardous waste and sending the rest of the parts to a landfill.

Another step that organizations can take today is to begin collecting data on the environmental impact of the new equipment they acquire. Adding standard language to RFPs that ask questions of manufacturers about their product design and its impact on the environment, as well as the expected footprint to operate the equipment. While it may not be a deciding factor in the ultimate product purchase, asking the question of your suppliers helps reinforce the concern to both your organization and to the manufacturer,

in the hopes that it will influence your decision in the future.

Controlling the operating impact

Reducing the electricity consumed to power, cool, and ventilate equipment is completely within the control of your organization and the single simplest step you can take towards Green IT efforts. While no one argues that turning lights off when no one is present is environmentally sound, many IT departments wrongly believe they have no option but to keep PCs at full power at all times, even though they are not in use. Whether the concern is users disabling power-settings in the operating system, or ensuring PC availability for critical security updates, network-level power management software is available and provides a set-it-and-forget-it approach to reducing the amount of power consumed by PCs in an organization. Desktop operating systems and accompanying software applications have incorporated power management settings into their code such that reliability of immediate waking from states such as hibernate or sleep ensures workers immediate access to their desktop. The day of either-or PC power management is no longer, and organizations are missing the bus by ignoring this simple action item that will make a significant reduction in the power consumption of PCs.

US Department of Energy studies estimate that a third of the energy used to operate a PC can be saved with network-level power management software. This equates to savings of approximately \$20 to \$60 per PC, and reduction of 200 kWh annually per PC. This change requires no additional staff, or change to operating hours, and adds a boost to a company's bottom line. So in addition to being a green action, turning PCs off when not in use is a significant cost-savings strategy.

Consider the following organization as a case in point. The Lake Washington School District, 5th largest district in Washington State with over 23,500 students in 48 schools and over 11,000 PCs district wide, implemented Verdiem's network-level PC power management system, SURVEYOR to turn PCs off when not in use. The results are astonishing:

Reduced consumption by 221 kWh saving \$18.08 per PC.

1,580 metric tons of CO₂ gas not emitted, equating to:

342 cars not driven for one year

179,954 gallons of gasoline saved

3,674 barrels of oil not used

\$808,000 savings in lower energy bills over 4 years¹⁵

Strategies like the one used by the Lake Washington School District represent the significant upside of Green IT. Also known as low hanging fruit, this type of green measure is relatively easy to implement, without requiring significant man-hours or capital. The result is a significant and measurable hard cost savings that contribute directly to an organization's bottom line.

Responsible Recycling

As mentioned previously taking a decommissioned piece of IT hardware to the dumpster and wishing it well as it goes to the local landfill is no longer an acceptable disposal method. But, being green also means more than just participating in the manufacturer's recycling program. Look for disposal programs that will take outdated equipment and resell or donate whenever feasible. Some PC recyclers will put together an employee buy-back program, offering your still useful desktops and laptops to employees for home use. While this approach can mean more effort on your part, it also provides environmental benefits. Charities that specialize in taking corporate IT hardware to third world countries estimate that donated equipment sees an additional 6,000 user hours when sent overseas.¹⁶ This means the environmental impact of the equipment manufacturing is spread across a longer-life span, thus reducing its overall impact. In addition, turning your obsolete equipment into refurbished machines for resale helps reduce the number of new machines introduced into circulation. Both green benefits.

Conclusion

Leading an IT organization into the green requires information and education on the issues surrounding the environmental impact of IT. In many cases, the choice is between one environmental impact and another. Understanding the issues surrounding Green IT, and asking questions now can help your organization stay informed. Competing priorities will always affect decision making, but with the right information, your organization will be able to decide which trade offs they are willing to make to go green. Some are easier than others, and those with clear benefits should be implemented today. Building a Green IT strategy will be a lot like building a green strategy for your home. Start with the little stuff, since it can make a big difference, and stay informed. When it comes time to look at the bigger stuff, you'll have the information you need to make the right decision.

About Verdiem

Long before being green was politically correct, Verdiem began developing SURVEYOR to provide measurable and verifiable energy cost savings. Nearly 500,000 users worldwide have installed SURVEYOR to lower their PC energy consumption. To date our customers have saved over \$27 million dollars and 275 million kWh. This savings has prevented over 232,000 tons of CO₂ from being released into the environment – that's the equivalent of taking 29,000 cars off the road.

About SURVEYOR

SURVEYOR provides organizations a simple and effective network-level control of PC power management settings. With SURVEYOR your organization can decrease energy costs while protecting user productivity and increasing maintenance success rates from one central location. SURVEYOR provides:

- › **Network-level control of PC energy policies** – implement power setting policies and track energy consumption from a central location.
- › **Flexible and dynamic policy implementation** – easily configure policies to match user needs and activity, or account for periods where energy costs increase due to high regional demand.

- › **Improved maintenance and upgrade success rates** – bring PCs to full power for scheduled maintenance windows and software upgrades.
- › **Wake or shut down PCs on-demand** – access the power status of your entire network and power-down to mitigate a threat or power-up to accept an urgent upgrade via Wake-on-WAN/ Wake-on-LAN functionality.
- › **Comprehensive reporting** – detailed and verifiable reports on energy consumption, CO₂ emissions and costs savings achieved with SURVEYOR.

The development of SURVEYOR began in 2001, and was funded in part by the Northwest Energy Efficiency Alliance. SURVEYOR uses internationally recognized standards for measuring energy consumption, so after rigorous third party testing, SURVEYOR has been approved as a conservation measure by utilities throughout North America, and is a recognized partner in the EPA's Energy Star program.

To learn more about saving energy costs and cutting carbon emissions in your organization, please visit www.verdiem.com or call 1-866-VERDIEM today.

¹ Gartner Identifies the Top 10 Strategic Technologies for 2008, press release, October 9, 2007

² Gartner Says Data Centres Account for 23 Per Cent of Global ITC CO₂ Emissions, press release, October 11, 2007

³ "Is green IT an illusion?" Mick James, ComputerWeekly.com, September 12, 2007

⁴ "Is green IT an illusion?" Mick James, ComputerWeekly.com, September 12, 2007

⁵ "5 steps to green IT", Tiffany Maleshefski, eWeek.com, October 12, 2007

⁶ "Is green IT an illusion?" Mick James, ComputerWeekly.com, September 12, 2007

⁷ Gartner Says Data Centres Account for 23 Per Cent of Global ITC CO₂ Emissions, press release, October 11, 2007

⁸ International Emissions Trading Association

⁹ Department of Energy

¹⁰ Dell.com

¹¹ "5 steps to green IT", Tiffany Maleshefski, eWeek.com, October 12, 2007

¹² "5 steps to green IT", Tiffany Maleshefski, eWeek.com, October 12, 2007

¹³ "UN Study: Think upgrade before buying a new PC", Martyn Williams, IDG Newservice, InfoWorld, March 7, 2004

¹⁴ "UN Study: Think upgrade before buying a new PC", Martyn Williams, IDG Newservice, InfoWorld, March 7, 2004

¹⁵ "Lake Washington School District Case Study", Verdiem Corporation, August, 2006

¹⁶ "Is green IT an illusion?" Mick James, ComputerWeekly.com, September 12, 2007