GREEN IT MADE REAL:

How Three Enterprises Took Action For A Greener IT Future

Prepared for Nortel by:

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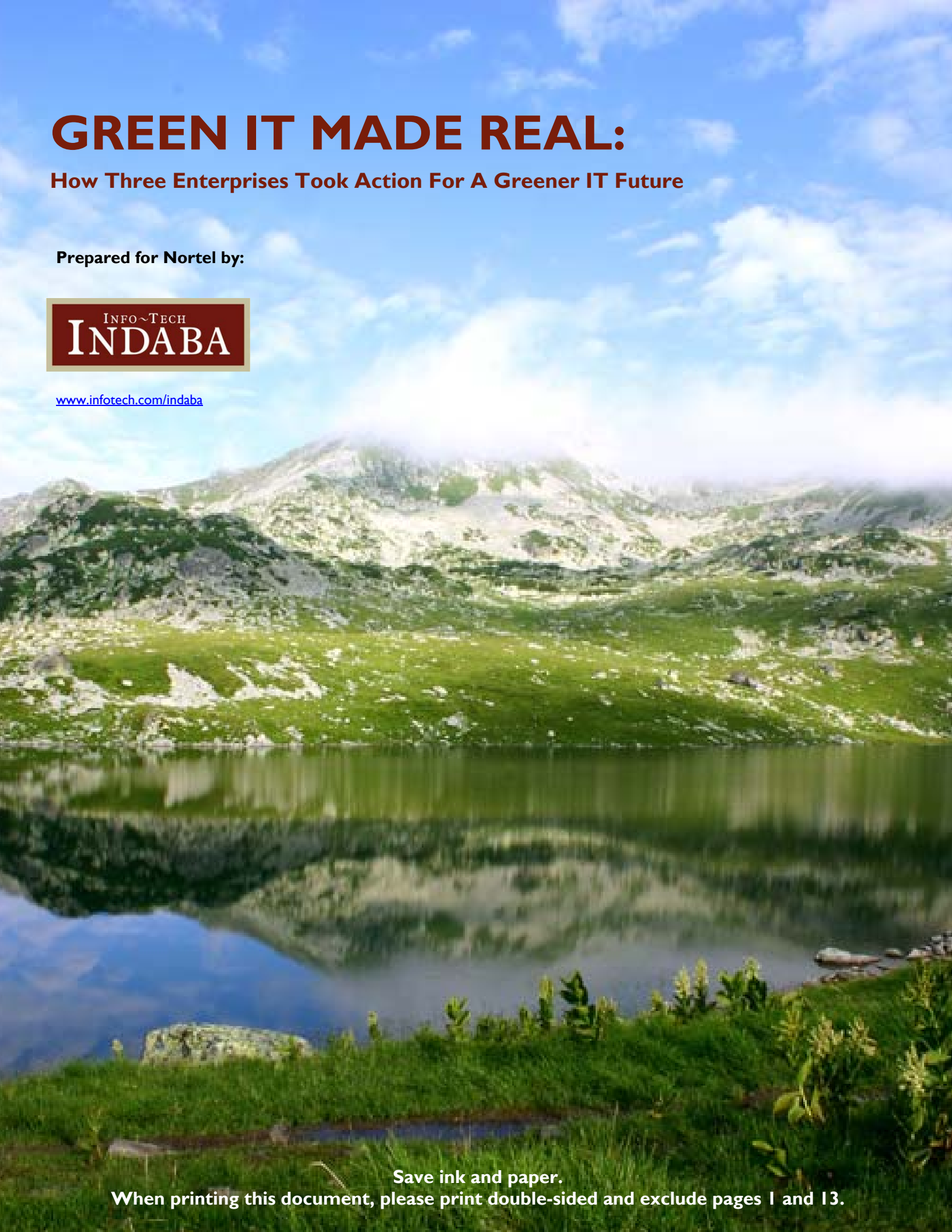

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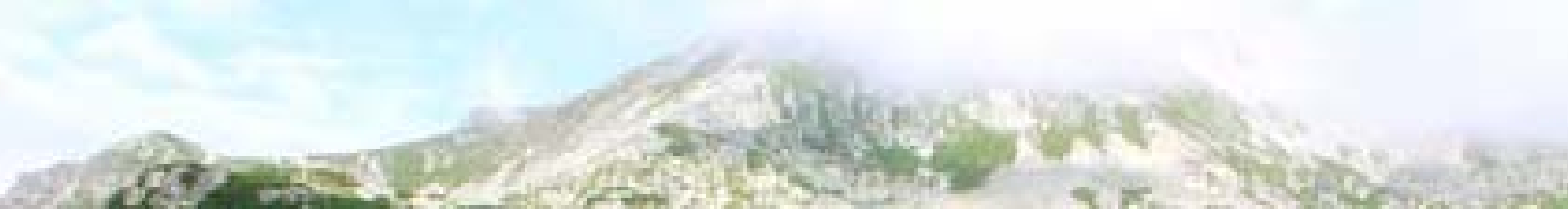

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INTRODUCTION

It's not unforeseeable that one day, your company's future will depend on its ability to adapt to a green economy.

Across the globe, financial markets are in turmoil. The daily news of downward-sliding stock indices and entire countries potentially on the verge of bankruptcy played an enormous role in both the Canadian and U.S. 2008 federal elections. Citizens expressed their fears at the ballot box, voting for candidates they felt could best resolve the current crisis.

Consumers have also started voting with their wallets, pressuring the companies they do business with to engage in environmentally sustainable business practices. Businesses, in turn, have begun to demand that their suppliers disclose the energy efficiency of their products.

For most organizations, a global trend in rising energy prices continues to exert pressure to cut energy costs wherever possible. Case in point: major European utility companies announced plans in January to raise prices by up to 27 per cent as a result of dramatically higher wholesale energy prices. As well, government regulation increasingly requires it. The United Kingdom, for example, has set targets to reduce greenhouse gases by 80 per cent from 1990 levels by 2050 – including aviation and shipping.

Finally, the IT industry is catching up, with products and solutions aimed at reducing the hardware, space, energy and manpower required to operate equipment; increasing processor utilization; maximizing the potential of intelligent networks; and enabling reuse of existing equipment.

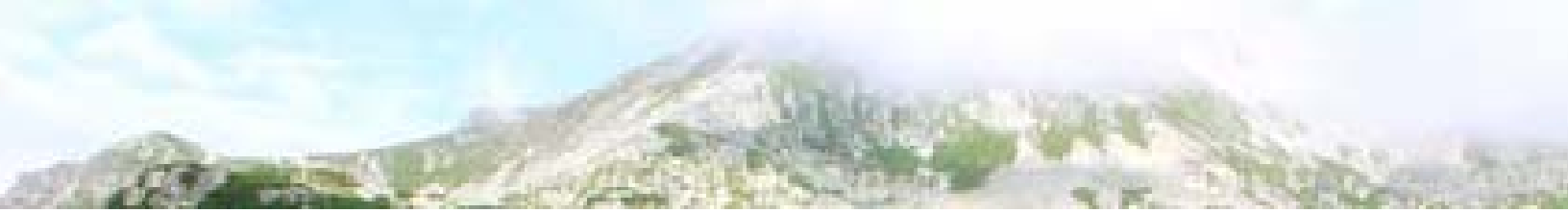
In this first installation of "Green IT Made Real," learn about how three unique organizations used green IT to deal with necessary cost reductions, rising energy prices, and environmental pressures and priorities.

Green IT: A Definition

Virtualization, along with server and storage consolidation has, over the last five years or so, contributed to a new paradigm: IT can maximize productivity and minimize resource use of every single asset it controls – not just servers. In most cases where resource use or productivity can be optimized, costs are also reduced. To some organizations, however, there's another benefit that is just as important as lower costs: a decrease in environmental impact.

Green IT consists of *initiatives that, through optimization of resource usage, minimize both costs and environmental impact.* Environmental impact is minimized because "consumables" are used in a more efficient fashion; as a result, cost is often decreased as well.

As the following case studies demonstrate, green IT does not mean building data centers with sod and IT-issued hemp-wear. Instead, green IT, for almost every IT department, means incremental but progressive reduction in costs and environmental impact.



WHERE TO START

As our case studies demonstrate, there are many paths to green IT. All have considerable impacts on reducing the organization's environmental footprint – and cutting costs in virtually every area of IT operations over the long term.

Although each organization may have taken a unique approach to its green IT strategy, these cases share one thing in common: they require vendors and suppliers to provide solutions that reduce energy costs and environmental impacts – and to prove there's more than marketing behind their claims.

- *A **Multinational Service Firm*** is implementing videoconferencing at its North American and international member firms. One videoconference saved an estimated $66,000 on travel costs, significant wear and tear on consultants, and considerable carbon emissions.

- ***The Missouri Department of Conservation (MDC)*** implemented voice over IP to enable teleworking and videoconferencing, attract and retain IT talent, and reduce department and employee fuel costs. By offering the option to work from home and reducing the amount of business travel, MDC casts a wider net when recruiting and offers a perk that's still unique.

- ***Nortel*** embarked on a server virtualization project in 2000 that cut its raised floor space by more than half, saving an estimated 15 ***million*** kWh of energy per year, valued at approximately $530,000.

In this first installation of "Green IT Made Real," learn about these three unique, but successful and practical, approaches to cost and environmental impact reduction in IT.

Green IT Technologies in This Issue

End-user device optimization: Enforced ENERGY STAR settings and organization-wide device energy management minimize the time end user devices spend active, and reduce the energy footprint of desktops, notebooks, and thin clients.

Telecommuting: Remote networking technologies, such as VPN, enable workers to telecommute, saving on real estate and energy costs while reducing fuel consumption, traffic congestion and carbon emissions.

Teleconferencing: The newest generation of teleconferencing provides full-featured audio, video and presentation tools, and life-like, high-definition "presence."

Voice over IP: Converging voice and data on one network offers reduced operating costs, vastly improved communications options (including easily provisioned remote and "work from home" lines), and increased productivity.

Server virtualization: By moving many physical servers onto only a few physical machines through virtualization, IT saves on energy, real estate, staffing, maintenance, and data center management workload.

CASE STUDY: MULTINATIONAL SERVICE FIRM

The days of non-essential business travel are over – or at least, coming to an end.

According to a recent Association of Corporate Travel Executives survey, two-thirds of executives surveyed said they planned to spend the same or less on business travel in 2009. The bottom line: as travel costs escalate and the economy struggles, businesses can't afford the expense. And neither can the planet. The David Suzuki Foundation states that air travel contributes up to nine per cent of today's climate change related to human activity. Since 1990, CO2 emissions from international aviation have increased 83 per cent.

The solution, however, isn't for businesses to stop meeting with clients and colleagues in other cities; it's to use technology to minimize how often employees hop on a plane. That's why a global consultancy with a North American headquarters recently made videoconferencing a key part of a green IT strategy that also includes reducing the number of servers it uses and building green requirements into RFPs.

The Challenges

As with any new technology, organizations that are implementing videoconferencing are still working out best practices and applying lessons learned.

This company, for example, is still overcoming connectivity and security issues related to connecting fully secured, firewalled networks.

As well, the company has no control over its customers' sites, so when the company calls a customer site for a videoconference or to perform a test, the customer-site equipment might not always be on, for various reasons.

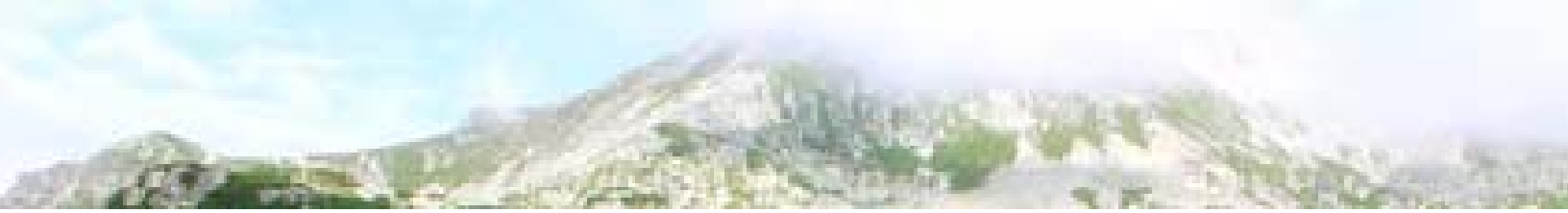
To reduce the amount of uncertainty, the company has embarked on a plan to certify public and customer sites. Long-term client sites are included in the reservation system and are pre-tested twice in advance of booked videoconferences; once at 24 hours and again at 30 minutes.

The decision to implement the Nortel-managed videoconferencing system came in 2006, after the top executives from each of the country divisions held a one-day meeting in Europe. After reviewing the costs and time associated with the event, the company's executives decided it was time to look for an alternative to so much travel, says the company's operations director for Canada. The better way, the company decided, was a full-presence videoconferencing system.

So far, the system, which uses a combination of Polycom technology and a Nortel network backbone, has been rolled out at 40 of the company's offices.

At print time, other divisions of the company in major countries across the globe were in the process of signing agreements with Nortel, providing the company's Canadian arm with videoconferencing access to 12 other global sites. Eight other divisions across several continents are also considering the technology.

Videoconferencing saved the company an estimated $66,000 in avoided travel expenses in one meeting alone.



But cost savings aren't the only benefit. In fact, the operations director pitched the technology to company executives based on the time savings and reduction in wear and tear on employees. "We're in the people business," he points out. "We sell our people's time and knowledge to our clients, and the better we can treat those people, the more effective they're going to be and the longer we're going to retain the talent we need to serve our clients."

It helps that the system was championed by the CEO and his executive team. Without that, he adds, it would have been more difficult to get the project funded.

CASE STUDY: MISSOURI DEPARTMENT OF CONSERVATION

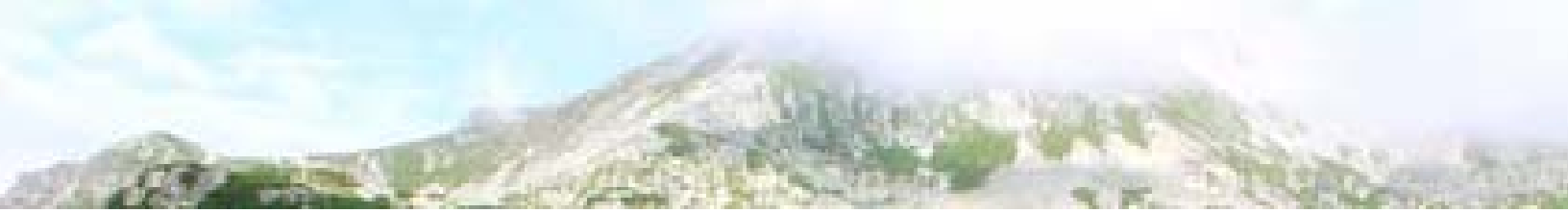
Over the past 100 years, hunting and wildlife habitat destruction have nearly decimated a number of species in the U.S. Fortunately, as numerous examples have shown, all it takes is the political will to act before it's too late. Take Missouri for example. Abundant in pre-settlement times, but by 1925 there were merely 400 deer in the entire state, according to the state's Conservation Commission. By 1944, as the result of conservation efforts, the number soared to an estimated 15,000.

Today, the Missouri Department of Conservation (MDC) is applying that same approach to its own operations – acting now to reduce impact on the planet before it is too late. The MDC adopted a green strategy partly because rapidly escalating costs and stagnating public revenues forced the organization to find more efficient ways to operate. But the voting public also pressured the organization to go green.

"We really started thinking about green IT when the rest of the world did," says Doug Young, CIO of the MDC. "We were doing some things because they made sense for us, but we probably didn't really focus on green IT as much as we should. Now, the public wants to know a lot more about what we are doing to conserve energy."

IT plays a central role in reaching the organization's green goals, which include reducing travel, energy consumption, and a reduction in fuel expenses by 5 per cent per year. The department, with 97 offices across Missouri, leveraged a long-standing relationship with Nortel to help meet those goals. Currently, it is in the midst of implementing Nortel Communication Server 1000, a server-based IP phone system distributed over LAN and WAN infrastructures. CS 1000 supports unified messaging, customer contact centers, wireless voice over IP and IP phones, and it requires less energy to operate than other compatible systems.

"Typically, we replaced telephone systems on a 10-year life cycle," says Young. "We got into VoIP about two years ago. We did not want to be constrained by putting in any more plain old telephone systems. We see where the world is going, and we see a lot of benefits in VoIP, so even though we were not taking advantage of all the capabilities of VoIP immediately, we wanted to put in systems that would allow us those capabilities as we grew our installed base."



Young cites the example of their company directory, which he no longer prints two to three times a year at $400 a pop, as one benefit. "Those are little cost savings but that's the kind of thing that this technology gets us. It gets us out of relying on paper," he says.

As well, the system enables the organization to implement videoconferencing, which is helping to meet the MDC director's mandate to reduce gasoline consumption this year by five per cent. That's on top of last year's reduction of nine per cent. Based on a videoconferencing pilot project in one division of the MDC last year, Young says, it was clear that "this (videoconferencing) makes too much sense. We *have* to do this where it's appropriate."

MDC employees also see the benefits of videoconferencing: one employee who used to drive three hours each way to work on a federal grant project saved six hours of driving – along with the fuel burned, and resulting carbon emissions – by videoconferencing. "He was just ecstatic about that and really started singing its praises in that office," says Young. "That office then became one of the early adopters of teleconferencing and Web conferencing."

Calculate Your Network Costs

Nortel has developed an online tool, called the Nortel Energy Efficiency Calculator, which IT professionals (or anyone who registers) can use to find out how much energy their network uses. The tool can be customized according to country, network type, number of employees, and other factors. Once the data is entered, the tool calculates the amount of energy consumed and the CO2 emissions generated.

While most of the organization's green IT efforts focus on end users, MDC has also adopted virtualization as part of its new disaster recovery plan, and cut by almost half (from 110 to 58) the number of devices in its data center.

Another strategy MDC will continue to push is enabling more employees to telecommute. As Missouri citizens embrace e-government, maintaining physical office space becomes less critical for service delivery, explains Young. At the same time, employees are unhappy that it's costing them more money to get to work. "Our employees, faced with high gas prices, are saying, 'Man, there's no raise this year and health insurance has gone up. I really like working here but I'm driving 30 miles one way, so I may have to look at something else.'"

By removing the geographical limitations of an office, the organization now casts a wider net in its recruitment efforts. "And quite frankly, for a lot of staff, I don't need to see them very often," says Young. "We're hoping that telework is going to open up avenues for us to attract employees that are out of our reach right now."

CASE STUDY: NORTEL

Today, everyone talks about "green IT" as if it were an entirely new way of operating. And for most, it is. But for some companies, such as the global networking equipment firm Nortel, it has been the *only* way of operating for most of this decade. Now that the rest of the world is catching up, the 33,000-employee organization can rightfully claim green IT credentials for practices that have helped it – and its customers – cut costs, improve operational efficiency, and save the environment.

Tony Leger, the leader within the office of the CIO responsible for Nortel's green IT efforts, says the firm was looking for ways to optimize IT efficiency prior to the year 2000, and had moved towards a centralized model of IT. Then the industry crashed in 2001, and reducing operational costs became an even greater priority. "We had a tremendous amount of cost in the company related to building and IT environments," says Leger. "But first we had to figure out where those costs were."

At the time, global warming wasn't the "burning" issue it is today, although cooling and electricity have always been considerations for telecom environments. "In those days, the main time you thought about energy was when you were putting a new box in the data room," says Leger. "The biggest concern was whether or not the circuit it attached to would have enough headspace to be able to carry the load."

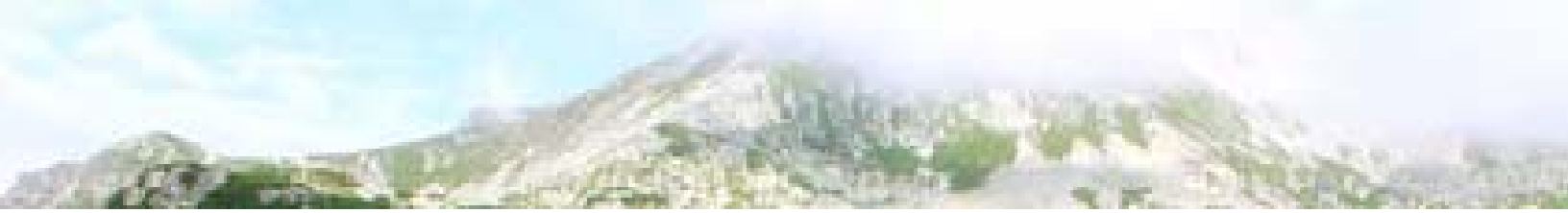
To analyze the costs, Nortel worked to inventory its IT footprint and devise new processes and approaches to streamline and standardize the IT environment. IT looked at the number of data centers it had, the equipment in those centers, who was using the equipment, and how. The results were staggering. "In 2000-2001, we had more than 12,000 servers," says Leger. "We just couldn't afford to maintain them all.

Overcoming the Obstacles

Implementing green IT, while clearly beneficial to Nortel and the environment, is not without its challenges.

Virtualization, for example, sounds great in theory, and Nortel's experience indicates it's effective in practice. But that doesn't mean you should plan to move your entire environment to a virtualized space tomorrow and expect to just reap the rewards, advises Leger. Moving environments to virtualized platforms can be tricky, especially since not all legacy software vendors support their applications in a virtual environment. "In some cases, such as with many of the Unix-based offerings, the functionality of the virtualized space just isn't mature enough yet to move this stuff over, so you've got a lag between when some of this stuff hits the street to when you can honestly get good traction with it," he says.

Then there's the great divide between IT and facilities or real estate groups in most organizations. Each unit tends to focus on its own budget and not worry about costs it's not responsible for, so IT typically doesn't lose too much sleep over the utility bill. To maximize IT's contribution to a company's green strategy, though, that separation of responsibilities – and incentives – needs to disappear. When IT sees how taking steps as simple as enforcing ENERGY STAR desktop settings can benefit both the environment and the bottom line, half the battle will be won.



Our storage needs were growing by leaps and bounds too." Nortel then looked at ways to eliminate unneeded capacity and consolidate workloads to save money on maintenance and licensing. It also looked for ways to reduce the number of staff required to operate the servers and the footprint of the data server rooms the equipment was in. By employing virtualization, it saved $107,000 a year on energy costs and $750,000 in capital avoidance.

Paul Greenley, global data center manager for Nortel, says the company had more than 150,000 square feet of raised floor space in 2003. By the end of 2009, even with high growth in computing demand, it will have less than half that: 60,000 square feet, spread out over a global data center in Raleigh, N.C., a backup data center in Ottawa, and seven design centers, resulting in savings of millions of dollars in real estate, air-conditioning, and UPS infrastructure costs.

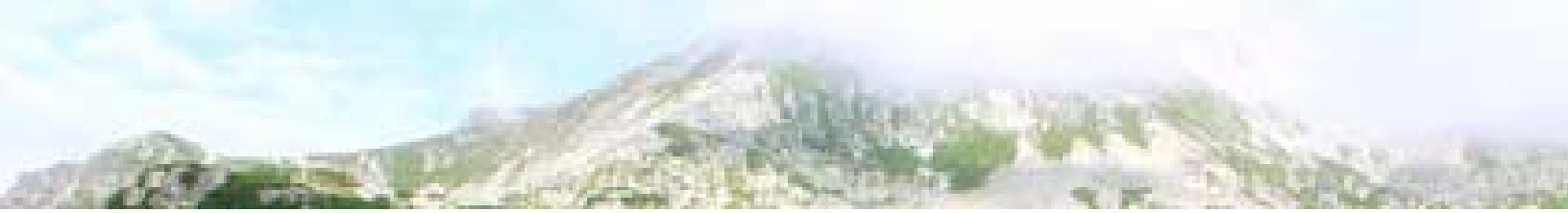
Through this reduction of servers alone, Nortel has avoided 15 *million* kWh of energy valued at approximately $530,000 a year, or the equivalent of operating nearly 465,000 fluorescent bulbs four hours a day for a year, Leger says. It has also increased storage utilization to 73 per cent – up 12 per cent – and reduced energy cost per terabyte by 50 per cent.

Selling Green IT to Employees

Any IT organization that has undertaken green initiatives will tell you that real estate and server reductions are the first step in a long journey. Ultimately, you have to transform the mindset of an entire organization. The CEO can set the direction for an organization to reduce its environmental impact, and IT can create the conditions to make it happen, but it is employee buy-in that determines its success or failure.

Leger advises organizations to explain green IT initiatives to users in terms that make sense to them. Telling them you can save 15 million kilowatt hours might not mean much to the average employee, but if you explain that it's the equivalent to 450,000 compact fluorescent light bulbs running for four hours a day for a year, they get it. The same light will go on, so to speak, when they have a power meter connected to their computer that shows the energy footprint of a workstation in full use and on standby mode.

"That's a very powerful statement to them to not leave their monitor or computer on and not muck with the settings because it makes a big difference," Leger says. "It's like having a 100-watt light bulb on around you all the time. They know that generates heat, and they know it generates cost. And we've got lots of employees, so it adds up fast."



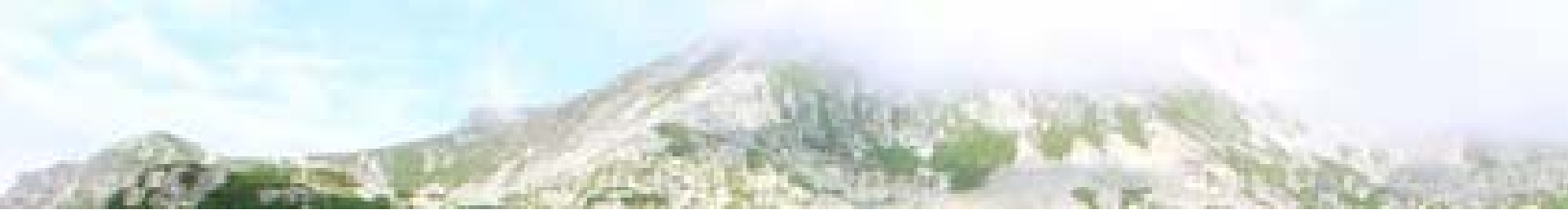
Drilling Down

Those are impressive numbers. But Nortel didn't just pull them out of the air. It had to profile its asset base and it used industry approaches to calculate a conservative-numbers view. "As part of driving improvement in our understanding of the Raleigh global data center, we measure energy consumption to complement our calculated view," says Leger. A Web tool, provided by the local utility company, connects to the facility's sub-meters. The Web tool enables Nortel to contrast its energy consumption with its server usage data, so it can identify and target energy-saving opportunities.

"If you don't graph the data centers and you don't look at sub-metering, you'll never see green IT in action in data centers," Leger says. "You've got to be able to measure it." And once you can put a price tag on energy consumption in IT, upper management typically starts paying a lot of attention to the issue, he says. In Nortel's case, he says, "All of a sudden the IT and real estate executives looked at it and said, 'Wow. This is something I shouldn't ignore.'"

Additional Green Initiatives at Nortel

- Several travel and commuting reduction initiatives, including:
  - A Transportation Demand Management program, GreenCommute, which provides information, resources and support to encourage the use of alternatives to single-occupancy vehicles.
  - A telework strategy, enabling employees to work from anywhere. As of December 2006, 10 per cent of Nortel employees were full-time teleworkers and more than 85 per cent were mobility-enabled.
  - Offices selected based on proximity to transit, airports, and the environmental footprint associated with employee commuting.
- Recovering, re-using and recycling electronic waste. Nortel's investment Recovery Centers have operated in the U.S. since 1987 and in Europe since 1994. The centers re-use, re-sell or recycle 96.5 per cent of the products they collect, well above the European Union's standard of 75 per cent for e-waste recycling.
- A lighting standardization program at its Richardson, Texas location, which resulted in savings of nearly 2.4 million kWh (the equivalent of an entire year's electricity use of 135 homes) and almost $300,000 a year.
- A supplier code of conduct to ensure that Nortel's suppliers adopt and adhere to specified green policies and procedures, develop environmentally friendly solutions, and take responsibility for environmental impacts of their products, as well as a program to work with suppliers to minimize the use of hazardous chemicals.



AN ACTION PLAN FOR GREEN IT TODAY

This paper has set out strategies that organizations can effectively employ in green IT to generate resource savings and increase efficiency. We leave you with an action plan for bringing these practices into your organization.

1. **Draft a practical plan that will work for the realities of your organization.** Not all green IT initiatives require multi-year plans and big budgets. Take simple steps – using desktop computers' energy-saving settings and EPEAT standards in green RFPs, and engaging hardware recycling partners – that lay the foundation for future, ambitious green undertakings. Pilot-project successes can lead to support for more ambitious undertakings requiring executive sponsorship, initial funding, and interdepartmental collaboration.

2. **Understand the profile of your IT assets, and where the most impact is possible.** Before you can assess where to make energy and environmental footprint reductions, you need to know what is possible, based on the assets you own. The first step is an asset inventory. If your organization has 1,500 desktops, but only 10 servers, opportunities for improvement are greatest at the end-user level.

3. **Quantify and baseline.** Measuring energy and other consumables use is absolutely critical. How much do you use of what? Even if you can only estimate server and end-user device energy usage through a simple plug-in wattage meter and an Excel spreadsheet, along with local energy rate and emission information, this is better than nothing. It starts to quantify the true operating and environmental costs of IT.

4. **Make energy efficiency a key criterion in RFIs and RFPs.** By buying only from vendors whose products meet your energy efficiency standards, you are one step closer to being able to quantify your energy costs – and to taking steps to reduce them. Moreover, you force vendors to carefully consider environmental decisions in future product design and production.

5. **Involve and educate employees.** If you want employees to buy into your green IT strategy, explain savings and environmental benefits in a way they can relate to, such as the cost in gas, number of car trips, or carbon emissions avoided. Ask employees how *they* think you can reduce your environmental footprint – the grassroots support and resulting suggestions are often surprising to many IT leaders.

6. **Don't expect the entire organization to hop on board.** Introduce new technologies in tandem with an education strategy that ensures staff knows how – and why – to use the technology. Once pilot projects are understood as successful, IT can draft a more aggressive plan that requires cross-enterprise support and, potentially, up-front investments.

7. **Align the facilities, real estate and IT units in an organization.** For a mature green IT strategy to succeed, alignment (and mutual rewards) between IT, facilities and senior management is critical. Organization-wide cost and environmental impact reductions frequently require close collaboration between IT and real estate. Meeting the facilities director and sitting down for a few conversations, in many cases, is the first simple step to take.

BOTTOM LINE

Many organizations still see going green as optional. In fact, according to Info-Tech Research Group, more than 50 per cent of IT departments say they are strongly concerned about climate change, but far fewer act on those concerns. Those days may be coming to an end, though: the rising cost of energy is likely to drive IT departments of all sizes to find ways to reduce costs and increase efficiency. Info-Tech found that U.S. commercial electricity prices increased 20 per cent during the past five years. This continues unabated; in fact, a July 2008 CIBC World Markets report found that electricity prices will increase by an additional 20 per cent over the next three years.

Act now to meet the financial and environmental challenges of burgeoning energy costs by kick-starting a green IT strategy. Follow the lead that these successful case studies have set, and use the seven-step plan outlined here. Prepare for future business and environmental realities, by getting started on practical improvements – today.

Watch for "Green IT Made Real Part II" to learn about another successful case of environmental impact reduction, through the construction of a unique, sustainable, LEED-certified workspace, renewable energy choices, and a backbone of network-driven facility power management.

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