

THE NEXT WAVE OF GREEN IT

IT's role in the future of enterprise sustainability

A report prepared by CFO Research Services
in collaboration with Deloitte Touche Tohmatsu

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The Next Wave of Green IT is published by CFO Publishing Corp., 253 Summer Street, Boston, MA 02210. Please direct inquiries to Jane Coulter at 617-345-9700, ext. 211, or janecoulter@cfo.com.

CFO Research Services and representatives from Deloitte Touche Tohmatsu member firms developed the hypotheses for the research. Deloitte Touche Tohmatsu funded the research and publication of our findings.

At CFO Research Services, Sam Knox and Peter B. Lull directed the research and wrote the report.

CFO Research Services is the sponsored research group within CFO Publishing Corp., which produces *CFO* magazine in the United States, Europe, Asia, and China. CFO Publishing is part of The Economist Group.

January 2009

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Contents

About this report	2
Efficiency amid new risks and economic challenges	3
Immediate and obvious actions and benefits	5
The next wave of green IT: broader change in processes, behaviour, and company culture	12
New metrics, incentives, and influences	19
What lies ahead: risk management along with performance improvement	26
Sponsor's perspective	30

About this report

In 2008, CFO Research Services (a unit of CFO Publishing Corp.), in collaboration with representatives from Deloitte Touche Tohmatsu member firms, launched a research programme to explore senior finance and IT executives' views on how large companies around the world are changing their IT practices in an effort to save money, improve performance, and lessen their impact on the physical environment.

As part of this programme, CFO Research Services distributed a survey among senior finance and IT executives at companies in Europe, North America, and Asia (primarily China). More than 95% of the 353 responses we gathered were from companies with annual revenues of more than \$1 billion. We also conducted an in-depth interview programme with more than 23 senior finance and IT executives at the following companies, based in several regions around the world:

Europe

- Danske Bank
- John Lewis Partnership
- UK Department for Environment, Food, and Rural Affairs (DEFRA)
- Ipsos
- Lloyd's of London
- Volvo

North America

- AIG
- Cisco Systems
- IBM
- News Corp.
- Perrigo
- TransAlta
- Wells Fargo
- Caterpillar
- Dell
- Mayo Clinic
- Nortel
- TELUS
- WellPoint
- West Pharmaceutical

Asia and Australia

- EDS
- Intel
- HSBC

Several executives from other companies also participated in the programme, on the condition of anonymity.

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At CFO Research Services, Sam Knox and Peter B. Lull directed the research and wrote the report. CFO Research Services would like to thank all of the senior finance and IT executives who participated in this study.

Respondent demographics

CFO Research Services gathered 353 complete survey responses from senior finance and IT executives from around the world to prepare this report.

Respondents come from the following regions:

North America	56%
Europe	28%
Asia (primarily China)	16%

Respondents hold positions with the following titles:

IT director	21%
General manager of line of business	17%
Chief executive officer	7%
Chief information officer	6%
Chief financial officer	6%
Vice president of finance	6%
Vice president of information technology	6%
Director of finance	5%
Controller	5%
Government administrator (e.g., senior administrator for IT, finance and control, resource management)	5%
Other	16%

Respondents represent a broad cross-section of industries, including:

Banking and insurance	13%
High technology (hardware, software, and networking)	10%
Automotive and industrial manufacturing	10%
Wholesale and retail trade	7%
Energy and utilities	7%
Construction and real estate	6%
Professional and business services	6%
Government (federal, state, provincial agencies)	5%
Food, beverages, and other consumer packaged goods	5%
Health care and life sciences	5%
Transportation and warehousing	4%
Other	22%

Respondents' companies

represent a broad spectrum of revenues:

Less than \$1 billion	3%
\$1 billion–\$5 billion	28%
\$5 billion–\$10 billion	31%
More than \$10 billion	39%

Note: Percentages may not total 100%, due to rounding.

Efficiency amid new risks and economic challenges

Despite mankind's efforts to limit the effects of commercial and consumer activities, the earth is increasingly unable to bear mankind's collective footprint. At the global level, mankind's emissions of carbon dioxide into the atmosphere have contributed, say scientists, to a change in the earth's climate that will affect every person—as well as every firm and every market—within a few generations.

The earth is getting hotter, and economic activity is a major reason why. By using electricity generated from the combustion of hydrocarbons, these activities produce carbon dioxide. How much? In total, human activity produces about 27 gigatons of carbon dioxide annually, according to data from the US Department of Energy's Carbon Dioxide Information Analysis Centre. The United States produces 6 gigatons annually, followed by China and Taiwan, which combined produce 5 gigatons, and the member states of the European Union, which produce 4 gigatons as a group.

Modest, sustained changes in natural systems are likely to be felt in the years ahead throughout the environment and the broader financial, logistical, governmental, and social systems. Accordingly, stopping global warming has emerged as a high priority among world leaders. Global warming and commerce's impact on the environment are also on the minds of executives at large companies. They are evaluating their firms' contributions to environmental problems as never before, with a keen interest in limiting the negative impact of their activities, finding ways to improve business performance, and navigating amid new risks and regulatory scrutiny.

Progress in cutting pollution was real across the twentieth century, a period that evolved from the belching smokestacks and unaccountable pollution run-offs of the industrial era to today's reality of hybrid cars, recyclable materials, and efforts to save rain forests and polar ice caps. But nearly four decades after the first Earth Day and the famous "People Start Pollution, People Can Stop It" television commercials, environmental challenges loom much as they did fifty or one hundred years ago. The environmental progress of the last century now has to be accelerated or the downward environmental spiral is likely to be irreversible, causing widespread economic and social disruption.

Amid this acceleration of environmental progress, companies now have higher incentives to improve their

operating activities and environmental performance, and they are likely to face a new series of regulatory requirements and a new attitude from the public sector on environmental matters.

The new administration in the United States holds noticeably new assumptions about companies' environmental impact, and it will likely become a game of one-upmanship and "perception management" between companies and regulatory bodies as each imposes newer methods and higher expectations. The incoming US administration plans to endorse a "green energy economy" that it says will stimulate job creation in the near term and reduce greenhouse-gas emissions by 80% by 2050 (compared with 1990 levels) through a carbon-emissions cap-and-trade programme. Such a turnaround would align US policy much more closely with regulations in other parts of the world, especially the member countries of the European Union.

Companies now face this new regulatory environment amid a recession that may be deep, lengthy, and unpredictable. When economic times are grim, investment that is not explicitly linked to the core of the business is especially difficult to justify, as companies wrestle to control costs, increase efficiency, and preserve capital. However, in a survey CFO Research Services conducted in 2008, we asked senior finance executives around the world to reflect on the last economic downturn and to consider where their company should have invested more to position itself for long-term growth. Respondents highlighted the importance of driving efficiency, particularly in production processes (38%) and administrative processes (34%), as well as expanding market access (34%).* Now, during the current economic crisis, energy-saving green IT initiatives can deliver much of the efficiency improvement that senior executives say they wish they had implemented during the last downturn.

Through a survey and interview programme, this current green IT study reveals that environmental improvement and sustainability initiatives can be addressed and implemented through basic efforts such as the thoughtful use of technology, a combination of high-quality financial and operating information, useful metrics and well-considered business cases, and strong executive commitment. But there are no simple answers to building a sustainable enterprise.

This current research programme finds that companies have taken many early steps in the first wave of green IT to lessen their environmental impact. For example, they've retired out-of-date systems, consolidated data centres, and adopted substantially more efficient hard-

* For a complete discussion of this data, see *New Pressures, New Opportunities: Finance Executives on Managing Through Uncertain Times* (June 2008) at www.cfo-research.com.

ware and cooling systems. According to this research, these early efforts have been focused on cutting waste, decreasing energy usage, and optimising the efficiency of IT assets in data centres, on desktops, and throughout company operations. And executives say these early steps have yielded returns that are satisfactory or even better. In particular:

- **More than 9 out of 10 companies have made “incremental” or “aggressive” efforts to reduce their impact on the environment.**
- **Many companies have at least basic programmes in place for green IT and the funding to support them.** Nearly three in five respondents say their company has at least 5% of its IT budget set aside for such projects and more than one-third say their company has allocated 15% or more to green IT.
- **Two-thirds of respondents say their company has a formal programme in place for measuring, monitoring, and improving its environmental performance.** Three-quarters of respondents say a formal review of business impact on the environment has been conducted in the past two years.

Some companies have been particularly ambitious in leading environmental change, whether led by a desire to keep pace with competitors, to avoid penalties or bad publicity, or simply their own sense of right and wrong. But the new US administration is likely to push the environment to the top of its agenda and with it will come new regulations and expectations. Those who adopt a wait-and-see attitude may well be caught short, pulled under the next wave of green IT and forced to struggle to catch up or even survive. Those who are well prepared—especially those who learned the importance of strategic investments during the last economic downturn—may well be able to ride this wave successfully and even flourish as a result.

These companies will be able to build and understand the underpinnings of effective green technology deployment. They will be able to construct sound business cases to deploy IT to gather and manage information successfully, thus improving efficiency—and as a result performance—while also identifying and minimising areas of risk. This next wave of environmentally focused IT improvement will include a more structured approach to change in IT policies, practices, and investments. Survey respondents say to do that, they'll need to overcome barriers such as:

- A lack of information and trusted practices for improving IT's environmental performance (44% of respondents)

- The inability to build a sound business case for green IT investments (42% of respondents)
- A shortage of both capital and well-qualified, green IT talent (41% of respondents)

And while performance improvements such as greater efficiency and lower cost are surely objectives in this second wave of green IT, companies are also likely to focus on managing the risk of noncompliance amid a lack of standards, regulations, and clear best practices. A majority of survey respondents say that managing regulatory and operating risks are and will continue to be very important environmental objectives in the years ahead. In particular, executives express concern for these future risks:

- **Operating variability:** 56% of respondents say “decreasing the impact of energy market volatility on company operations and performance” is very important.
- **Regulatory risk and tort liability:** a majority of respondents say “reducing exposure to environmental liabilities” and “improving compliance with environmental regulations” are very important.
- **Public perception:** 59% of respondents identify “cultivating public perception of their company as ‘green’ and environmentally sound” as very important.

The IT and finance functions also play a critical role in broader environmental improvement, say sources interviewed for this study. Executives report a broad array of improvements, from IT-driven simulation in product design to better manufacturing methods, which illustrate how the IT and finance teams can serve as company-wide enablers of sustainability programmes. Thus, the next wave of green IT is likely to include broad alteration of business processes, new performance metrics, changes in company culture, and more circumspect investment decision making. And as the stewards of financial and operating information, the finance and IT functions will play an especially important role in green IT in the years ahead.

Some companies around the world are starting to lead the way in the next wave of green IT, and as we'll see in the pages ahead, they offer useful and sometimes surprising examples of how improving environmental performance leads to better business results and lower risk.

Immediate and obvious actions and benefits

Faced with growing concern for the health of the environment and that of their own performance, companies around the world have begun to take steps to lessen their impact on the natural world. In this survey of finance, IT, and line-of-business executives, more than 90% of respondents say their company has taken aggressive or moderate steps to improve its environmental performance. (See Figure 1.) But with a wide variety of regulations around the globe, differing levels of both environmental awareness and concern, and the complexity of tracking the direct impact of specific actions on nature, it is difficult to gauge how much actual progress companies have made.

There is little question that companies today are making a difference by taking some of the basic steps of green responsibility. And technology is increasingly a focus of corporate green initiatives, both as a target and an enabler of change. Properly deployed IT systems offer better tracking of supplies and costs, and improve processes and business-unit activities; as energy management and reporting applications gain more traction, companies will

be able to closely monitor and reduce power consumption. And IT itself can be changed positively as offerings continue to improve, through more energy-efficient hardware, shared software resources, virtualised server architecture, smaller data centre footprints, increased use of multifunction office machines, and streamlined system integrations. Some of the primary measures for being environmentally friendly have already been enacted: getting employees to turn off lights or other resources when not in use; improving data centre efficiencies by virtualising servers so that many more applications can run on them at once, thereby increasing utilisation rates; and consolidating certain functions, whether they be data centres or more sharing of office equipment such as printers and faxes.

While all of these efforts have a green aura to them—which is certainly positive—many of these improvements contribute directly to the bottom line, doubling their appeal.

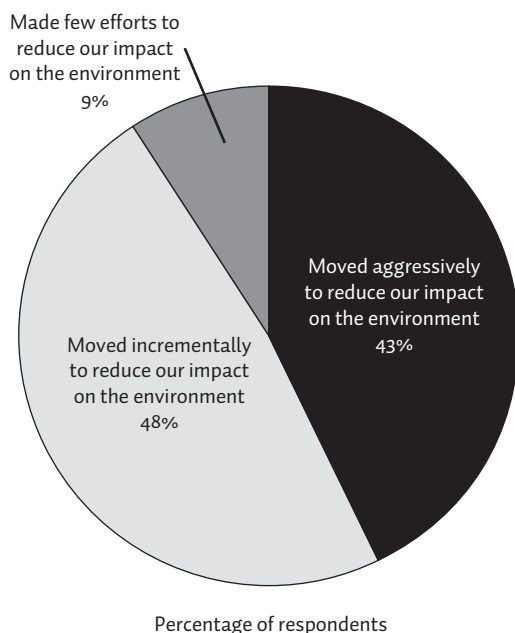
Intel took the heat its servers produced and redirected it to warm its cafeteria and restroom water supply, thus lowering the company's total carbon footprint, according to the semiconductor maker's IT controller in Asia.

Some specific examples of these common initiatives include:

- When improving data centre efficiency, Intel took the heat its servers produced and redirected it to warm the cafeteria and the restroom water supply, thus lowering the company's total carbon footprint (the amount of impact to the environment caused by human activity, measured in units of carbon dioxide), according to Trey Campbell, semiconductor maker Intel's IT controller in Asia.
- Approval forms to the Food and Drug Administration for new products—hundreds of pages of documentation—are now fast-tracked when submitted electronically; Thomas Farrington, senior vice president and chief information officer at Perrigo, a \$1.8 billion pharmaceutical manufacturer based in Allegan, Michigan, says that for business purposes the company pushed the initiative to save paper, ink, and its physical storage requirements, thus shrinking its footprint.

Figure 1. Most companies have made at least some effort to reduce their impact on the environment.

In the last year, how active has your company been in addressing the environmental effects of its business activities?



- Wells Fargo, a consumer and commercial bank based in San Francisco, California, with revenues of \$53 billion in 2007, controls processes at the microlevel, addressing the power management of the duty cycles of its servers, leading to significant cooling efficiency gains and improving the electrical distribution within the data centres to reduce power consumption. The efficiency of the facility's equipment itself—variable-speed drive motors, more efficient lighting, using recycled equipment, and using alternative energy and water (cooling) sources—has paid off well, according to the bank's senior vice president Bob Culver.

- Caterpillar, a Peoria, Illinois, manufacturer of earth-moving and construction equipment, has realised a "huge contribution" in its offerings to customers for sustainable development impact by applying IT knowledge to analyse productivity issues with its machines.

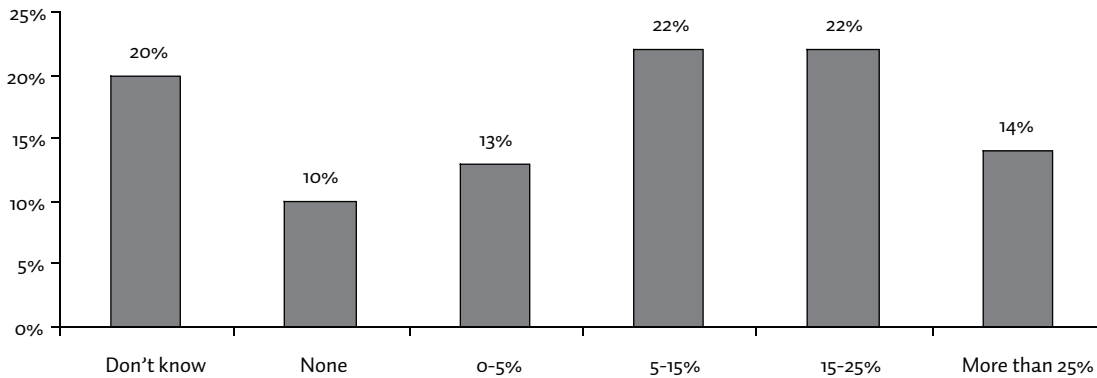
Implementing such measures offers management a better grasp of the operating efficiencies of its company's current systems and, more importantly, a plan for moving forward. According to Don Wharton, vice president of sustainable development at TransAlta, a \$2.8 billion independent power producer in Calgary, Canada, "We're in the process right now of implementing across the entire company an environmental monitoring and tracking programme that allows much better visibility of real-time or close to real-time performance in terms of things like emissions, by-product production, water utilisation, waste product streams, environmental incidents and

safety incidents, and our response to those. Visibility is really a critical issue in order to forward-manage issues so you're not always looking back; rather, you can look forward and do predictive monitoring." He continues, "Our first priority has been in our plant operations, so this is step one in probably a continuous series of steps, but definitely we have discussed how we could apply this to operations and energy utilisation within other things like our IT function."

"The subject of sustainability has become more and more important to all organisations. In the past, sustainability was confined to community investment, and also [to] corporate social responsibility. Now it actually goes much beyond that," says an executive at HSBC Holdings.

The easiest place for companies to start is with the obvious resource drains: "First, the low-hanging fruit—manufacturing facilities, factories, the things that impact the environment most heavily," advises Brad Fluegel, executive vice president and chief strategy and external affairs officer at WellPoint, an Indianapolis, Indiana-based health benefits provider with \$61.1 billion in 2007 revenues. "This is what companies need to prioritise." Teresa Au, head of corporate sustainability for the Asia-Pacific region of HSBC Holdings plc, says, "I think the

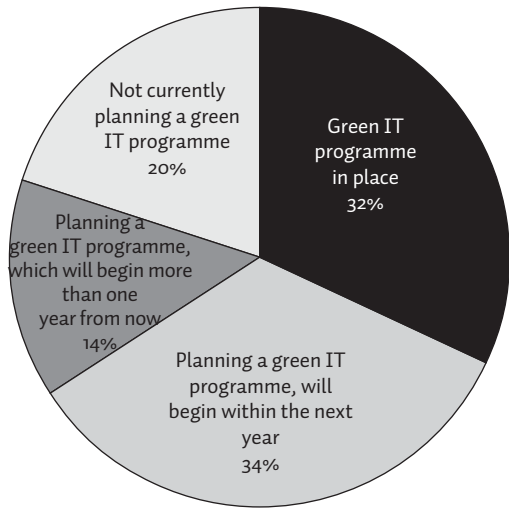
Figure 2. More than one-third of companies in the survey report spending 15% or more of their IT budget on green IT.
What percentage of your company's IT budget is allocated explicitly to green IT initiatives?



Note: Percentages may not total 100%, due to rounding.

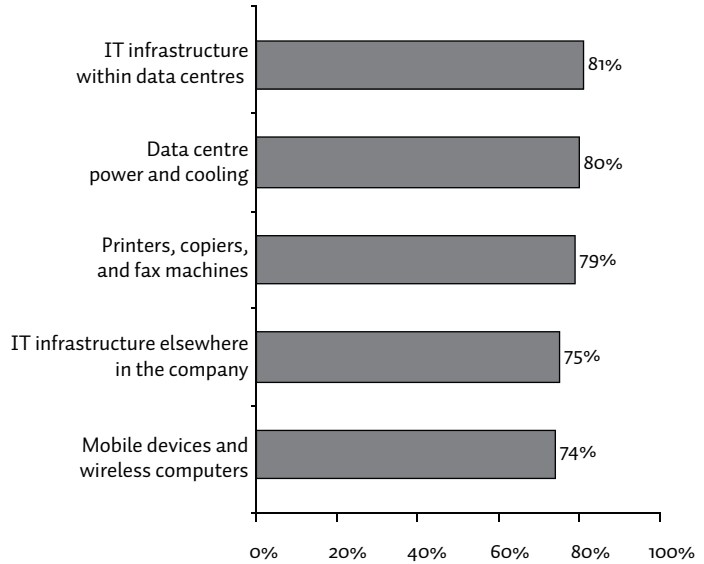
Figure 3. Data centres, office automation, and desktop PCs receive similar levels of scrutiny under green IT programmes, say respondents.

Which of the following best characterises the status of your company’s green IT initiatives?



Percentage of respondents

If you are planning or currently have a green IT programme under way, does it include changing the following elements of your IT infrastructure?



Percentage of respondents saying "yes"

whole subject of sustainability has become more and more important to all organisations. In the past, sustainability was confined to community investment, and also [to] corporate social responsibility. Now it actually goes much beyond that. With us, carbon footprint management is a very important part of our strategy, and the IT function is a contributor to the whole footprint management,” she says of the bank holding company based in London, England, with 2007 revenues of \$19.1 billion.

IT is a critical component to any green project in a company, but these efforts still have to have a sound business imperative behind them, as good environmental practices and sound business practices are becoming more and more intertwined. We asked the interviewees the following question: have you been informally moving towards more energy-efficient or conservation-minded practices for IT? When considering his company’s practices, Mr Farrington of Perrigo says, “I reflected on this question, and I actually came up with a plethora of projects that, while their intent wasn’t green, it was interesting to see that many of our projects actually have a significant impact on the whole green initiative.” While this firm found more projects with green implications than it expected, it is worth noting how easily companies can incorporate green outcomes through IT investments.

Perhaps the barriers to engagement are lower than many companies realise once they prioritise green IT projects. The majority of survey respondents say their company spends at least 5% of its IT budget explicitly on green IT initiatives. (See Figure 2.) More than one-third report their spending is at least 15% of the IT budget, while nearly one in seven (14%) indicates that at least a quarter of their IT budget is earmarked for these expenditures. While there are a number of companies plowing dollars into these initiatives, the survey reports that 23% of respondents’ companies are spending 5% or less on these efforts. In addition, one in five respondents doesn’t know how much of their company’s IT budget is spent on explicitly green programmes. As Ms Au explains, “I think the commitment has to come from the top, and a company needs to walk the talk. There must be strong buy-in from the CEO level that needs to permeate across all levels, and there needs to be a structure in place to enable things to happen. There must be committees set up to enable this to be debated and examined. Walk the talk. You have to not only say that you have done something, but you really have to invest in this so you can bring about the desired results.”

As part of the evolution of technology, systems improve in their efficiency with each new generation, so many

companies will reap the benefits of progress in an almost passive way—they don't need to seek out the improvements because they already come in the package. In the future, many companies will be looking to apply higher standards to their purchases and practices—specifically in IT—saving money and the environment concurrently. The use of IT will support these efforts. For some, benefits are already in place. “Anytime we can simulate something through a high-tech computer program, we're able to save on energy and environmental impact,” explains John Heller, CIO at Caterpillar. “For example, we can simulate how dirt is moved, how rocks are displaced, [and] create a finite element analysis where we don't have to build a prototype machine. The things we're able to simulate now, people would be amazed at—fluid-line routing, for example—simulations that enable us to cut less iron. Additionally, with electronics and IT on our machines, there is also a sustainable development impact in the customer space as operators are more productive.” Mr Heller's colleague Sharon Amdall, special projects manager for green IT initiatives at the \$45 billion firm, describes the process in the paint system at Caterpillar's large engine manufacturing facility. “IT worked with our engineers on a major rework of the paint booth system, which required computer software to make it run. This resulted in a large reduction in the amount of paint used.”

“We've looked into how many ways you can save, and most of the metrics boil down to three: space, power, and resources. From a green IT perspective, there's your big gain,” according to a bank senior vice president.

IT solutions can be both far-reaching and expensive. “I think as all companies' IT infrastructure started to hit their bottom line more, the weight of the massive cost of operating IT then put it into focus that efforts were needed, industrywide, probably about five years ago,” to find greater efficiencies, according to Bob Culver at Wells Fargo. “We've looked into how many ways you can save, and most of the metrics boil down to three: space, power, and resources. From a green IT perspective, there's your big gain.” And those elements will continue to benefit from process and production improvements in the critical areas of building materials, cooling capabilities, technology processing speed and power, and energy conservation techniques.

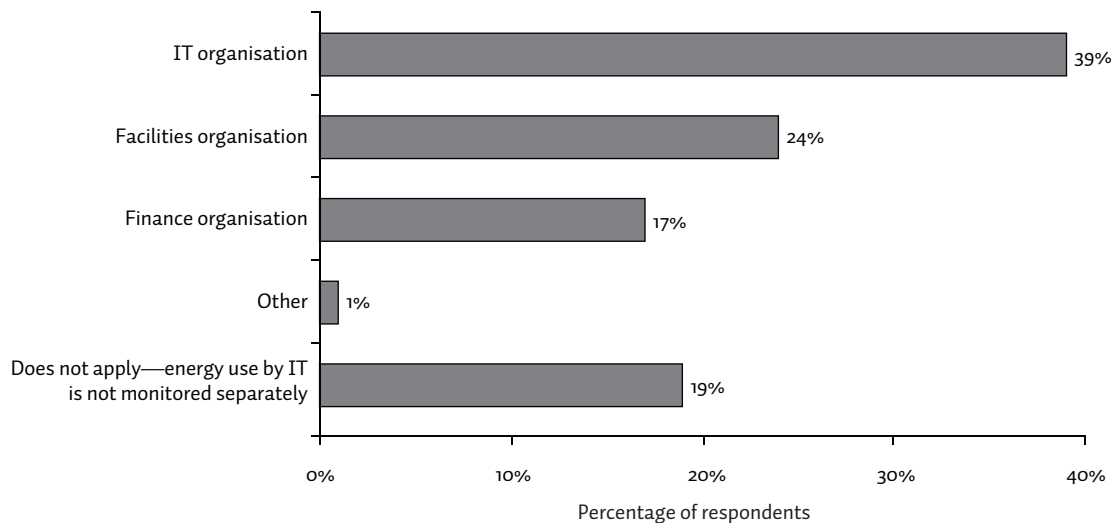
How widespread are green IT initiatives among large companies around the world? Two-thirds of survey respondents say they have some form of green IT programme in place at their company or anticipate having one within one year. (See Figure 3, page 7.) And executives who have a plan in place or will within one year say they are most likely to alter their data centres—their power conditioning and climate control systems as well as the IT infrastructure that these systems support. But end-user-focused technology and office automation equipment such as copiers, printers, and fax machines as well as desktop computers play an approximately equal role in respondents' green IT initiatives.

The first wave of green IT: virtualisation, data centre infrastructure, power management, and new technology on the desktop

This research programme indicates that the first iteration of green IT initiatives is focused on decreasing IT's data centre and desktop footprint, increasing the efficiency of IT infrastructure, and managing and reducing IT's consumption of electricity. By devoting time and resources to these dimensions of IT, companies save on hard costs—equipment, software licenses and maintenance, electricity, and rack space—and on the labor costs of IT management and technical support. These early efforts are primarily technical solutions that can be deployed through improvements in equipment or information. They include virtualisation of servers in data centres, adoption of basic energy management practices, use of IT gear that is more efficient than older equipment, and deployment of software as a tool to track the efficiency of operations.

An important evolution in IT management has been the practice of virtualisation, conceived to improve server efficiency. Sources say that the utilisation rates of servers can vary widely, and companies often have many servers that are dedicated solely to one software instance or application. By empowering servers to run multiple instances at once, companies can consolidate their many applications onto fewer physical servers, and as a result efficiency rises—especially for so-called commodity servers, which typically use Intel x86 processors (or those that are similar) and a version of the Windows operating system. According to Steven Sams, vice president, global site and facilities services for IBM, this practice is precisely the type of easy step that nearly every company can implement. If a company does not wring out more of the capacity available in its servers, it is paying a hefty price. “That means somebody's paid for 100% of a device, is paying for 100% of its energy, 100% of its maintenance, 100% of its operations support, but he's only actually us-

Figure 4. IT function monitors energy use at only two in five companies, according to survey respondents.
Who is responsible for monitoring the amount and cost of energy used by your company's IT systems?



ing 3% to 10% on average [for x86 servers] of its available capacity,” he explains. By compacting multiple processes and users through virtualisation, a company could realise considerable savings by swapping out 10 units at 3% efficiency for 1 unit at 30% efficiency. “By doing so, you save 90% of the energy bill. You also significantly reduce the complexity of the [computing] environment, and you reduce the operations cost and capital cost because you didn’t buy nine other servers,” says Mr Sams. “You don’t have staff to run nine other servers. You’re not paying for software on nine other servers. You’re not paying for the networking, storage connection, and everything else for nine other servers.”

While energy is the eye-catching line item from a cost standpoint, there are additional opportunities that virtualisation reveals, through savings and other benefits of the practice. Beverly Prohaska, vice president of information technology at West Pharmaceutical Services, a Lionville, Pennsylvania, medical supply and devices manufacturer with revenues of \$1 billion in 2007, says virtualisation allows her company’s IT group to respond quickly to business managers’ needs. Asked about the most successful aspect of her company’s green IT effort, she replies without hesitation, “No doubt the server virtualisation. It’s cut our costs in half. Also, it enables us to be very nimble and flexible in supporting any new requirements. We can have a new environment ready in no time at all. So server virtualisation is number one.” Gary Hird, IT strategy manager at John Lewis Partnership, a \$5.7 billion UK retailer based in London, England, notes

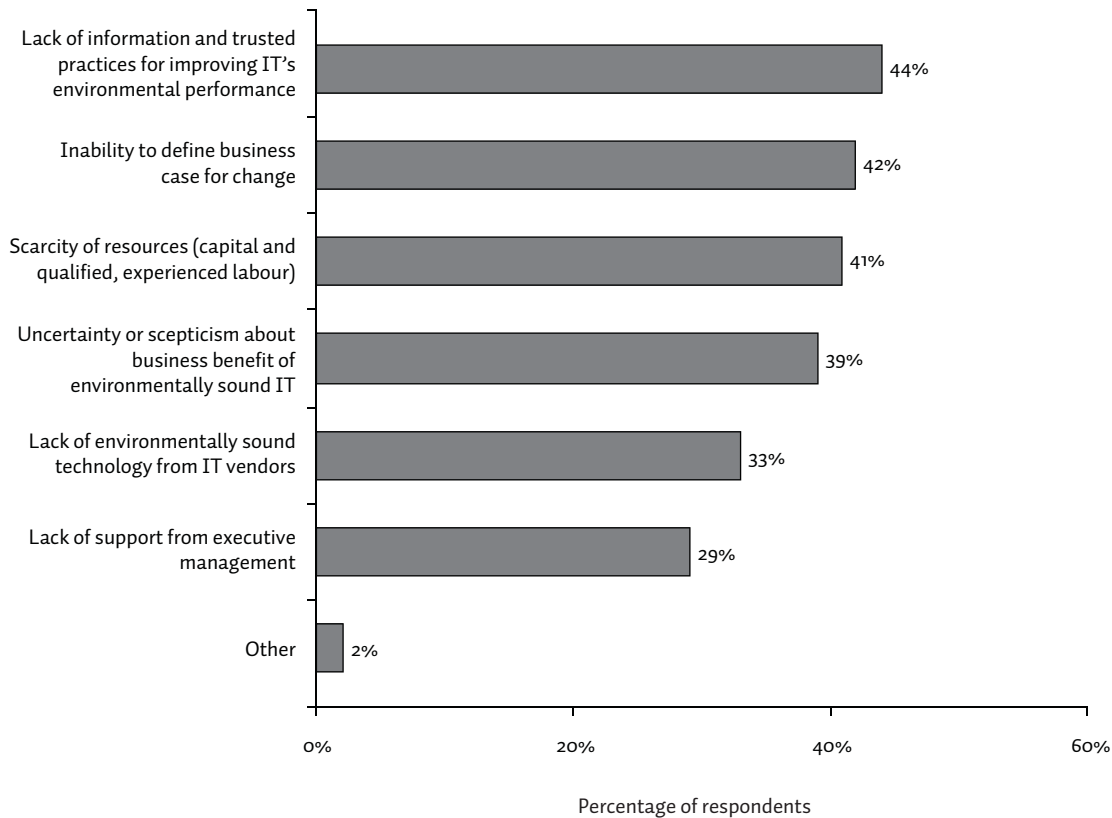
that virtualisation has been a great success beyond the power and space savings: “it’s also had spin-off benefits in that it enables us to provision new servers in a matter of minutes rather than wait a month or two to order a new server, receive it, build an install, and so on.”

“Server virtualisation is number one. It’s cut our costs in half, [and] it enables us to be very nimble and flexible in supporting new requirements,” says the vice president of IT at a medical supply and devices manufacturer.

But the really big payoff for companies is the savings on power costs. The executives we interviewed for this study spoke with seemingly one voice of their desire to know, manage, and eventually curtail the expenditure on electricity used by their IT systems. By doing so, they have the opportunity to save substantially on their company’s external spending and to reduce its carbon footprint. But, say sources, saving money on electricity for IT requires that companies know first how their IT function uses energy, and second that the right authority and accountability are in place to ensure this cost is managed effectively. How well do companies understand the cost of electricity used by the IT function? According to survey data, the IT function, which sources say is best able to efficiently manage the cost of energy, is respon-

Figure 5. Information and expertise—not technology—are the most common barriers to green IT.

In your opinion, which of the following items are the most difficult barriers to implementing environmentally sound IT systems and processes at your company?



Note: Respondents were asked to select their top three answers.

sible for tracking electricity usage at less than 40% of companies. (See Figure 4, page 9.)

When tasked with finding improvements, the IT group is willing to take a hard look at its practices. Mr Culver at Wells Fargo notes the past thinking about data centres: "Historically, the IT mantra was, 'I don't care what it costs. I don't want my equipment to go down, so cool it as cool as you can, and make it a refrigerator'. Over the past few years, we've been questioning that; making the data centres more efficient while not losing sight of one of our main goals: to provide reliable, available data centres." Joe Pach, director of environment at TELUS, a \$9.5 billion telecommunications provider based in Vancouver, Canada, speaks of his company's efforts to whittle away at the problem: "The indirect emissions are the ones associated with our energy consumption in our networks in our buildings. The network piece is the largest part of our footprint. Now we look forward to making our networks as efficient as possible to try and shrink

that element of our footprint." Joe Fitter, finance director for Intel in China, speaks of the \$38.3 billion Santa Clara, California, semiconductor maker's effort to generate energy savings: "We've shifted away from the desktop computers to notebook computers. It's much more green IT from that standpoint" for the company. He adds, "They're portable; they're battery-operated with much lower power consumption."

And when the IT group is getting the bill, it can implement programmes to address the issue. "We have brought under the CIO the measurement and monitoring of electricity consumption in the data centre, as well as on the office side. Now the CIO is going to measure and monitor the electricity consumption because that is going to be the second-most-expensive line item" in the budget, according to Sundeep Khisty, green practice leader for Asia Pacific Japan for Electronic Data Systems (EDS), a Plano, Texas-based \$22.1 billion IT service firm recently purchased by Hewlett-Packard. "Previously, it

was all bundled up in the facility manager's account." Thomas Erhardt, EDS's CFO in the Asia Pacific region, says, "When you start to peel back the onion and you look at the evolution of this, you can say that historically things like cost of electricity for us in the data centre was such a small proportion of our cost of running a data centre that it was probably on the periphery of cost management initiatives. As the cost of energy escalates, it's actually working its way towards the centre and becoming more of the centre."

Mr Fluegel of WellPoint shares how the company's initiative started. "Our server farms around the country consume our greatest energy utilisation per square foot, and were therefore the area we thought best to focus on first." But focusing on a problem to solve doesn't automatically mean it will be addressed quickly. When asked in the survey what the most difficult barriers to implementing environmentally sound IT were, the leading responses were lack of information for improving IT's environmental performance (44% of respondents), inability to define the business case for change (42%), and scarcity of resources—both financial and technical labour (41%). (See Figure 5.) Far fewer said that getting environmentally sound technology was an issue.

There are plenty of technology solutions that IT would like to implement. Intel's Mr Fitter speaks of implementing greener practices by accelerating the replacement rate of the company's servers. "We looked at the ROI [return on investment] of shortening our refresh rate, taking advantage of the added performance and power efficiency of newer servers to offset the incremental cost of capital," he explains. "Rather than using servers for five to six years, we are aggressively refreshing everything over four years. This saves power, space, overall cost, and lowers the carbon footprint."

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Some even see bigger changes on the horizon. Brian MacIntosh, vice president of managed IT and collaboration solutions at TELUS, states, "I would say by the nature of how the technology solutions are evolving, it's moving away from hardware feature-driven solutions to application solutions. As such, there are not the same disposal issues." He continues: "You create an enabling platform. There's a significant movement to software as a service where the application resides in a centralised environment. Users are able to access it, very similar to Google. The device does not need to be technically refreshed as often—it just needs to access new versions of the application."

Some conceive of the problem as one that can be solved by equipment, relying on technology and technical expertise to resolve the issues of reducing power usage, carbon footprints, and the need to scrap old electronics. But is that how companies can become truly green, by taking a box off the shelf, opening it up, reading the manual, and plugging in better—new and improved!—equipment? Or is it much more complex?

Technology change is only one—albeit incredibly important—aspect of fully embracing the green movement. Technical solutions solve technical problems, but every company has the challenge of changing the human element as well. To tackle that issue, one must look at its processes, behaviour, and culture.

The next wave of green IT: broader change in processes, behaviour, and company culture

So how would the typical company make out if subjected to a “green” audit? Headlines make the worst eco-offenders infamous; PR spin makes the more environmentally active companies look nearly futuristic. In all, it would probably be fair to say that there is a pretty big middle area where most firms reside.

There are a host of challenges around investments, strategy, risk, and social commitments, as well as the efficiency and cost-savings topics already mentioned. The finance and IT departments are often at the nexus of these demands, balancing wants and needs against risks and budgets. Companies can often see what they have already accomplished, but taking the next step forward will require some help, not the least of which needs to come from the development of new technologies. Companies can take internal steps to improve processes and cut waste, but the giant leap forward will come from more environmentally sensitive solutions coming to market for them to employ. Such progress will allow companies to mitigate risk and strive to be a good corporate citizen, an employer for which people want to work, and a company that deserves customers’ business.

Sundeep Khisty explains that at EDS, green IT initiatives are at heart a business risk management strategy for a company in the technology outsourcing business. “The key motivator for us to start our go-for-green programme was to mitigate business risk,” he says. “We believe that it will add to the cost of a business if we don’t take proactive measures here.” But as well as the hard-side risk issue, there are those previously mentioned soft-side benefits to a company being seen as having a green tinge to its operations.

Scott Dillon, executive vice president and head of Wells Fargo’s Enterprise Hosting Services, realises that these concerns for business and the environment go hand in hand: “This starts at the top of Wells Fargo as a culture. We do care about social responsibility, and green IT is good business.” Wells Fargo relies on a vast IT infrastructure to service more than 7,000 bank branches and consumer finance offices in the United States. In an effort to control costs, boost efficiency, and lessen its environmental impact, the company has worked aggressively to “eliminate, consolidate, and virtualise” much

of its data centre infrastructure. Mr Dillon continues, “I would say we have a top-down commitment to social responsibility, but at the same time, we also have lots of commitments to efficiency and trying to drive down the cost of IT in general.... I don’t want to lose sight of how we look at this: we are seeing positive ROI benefits from these [IT investments], and they also happen to be green.”

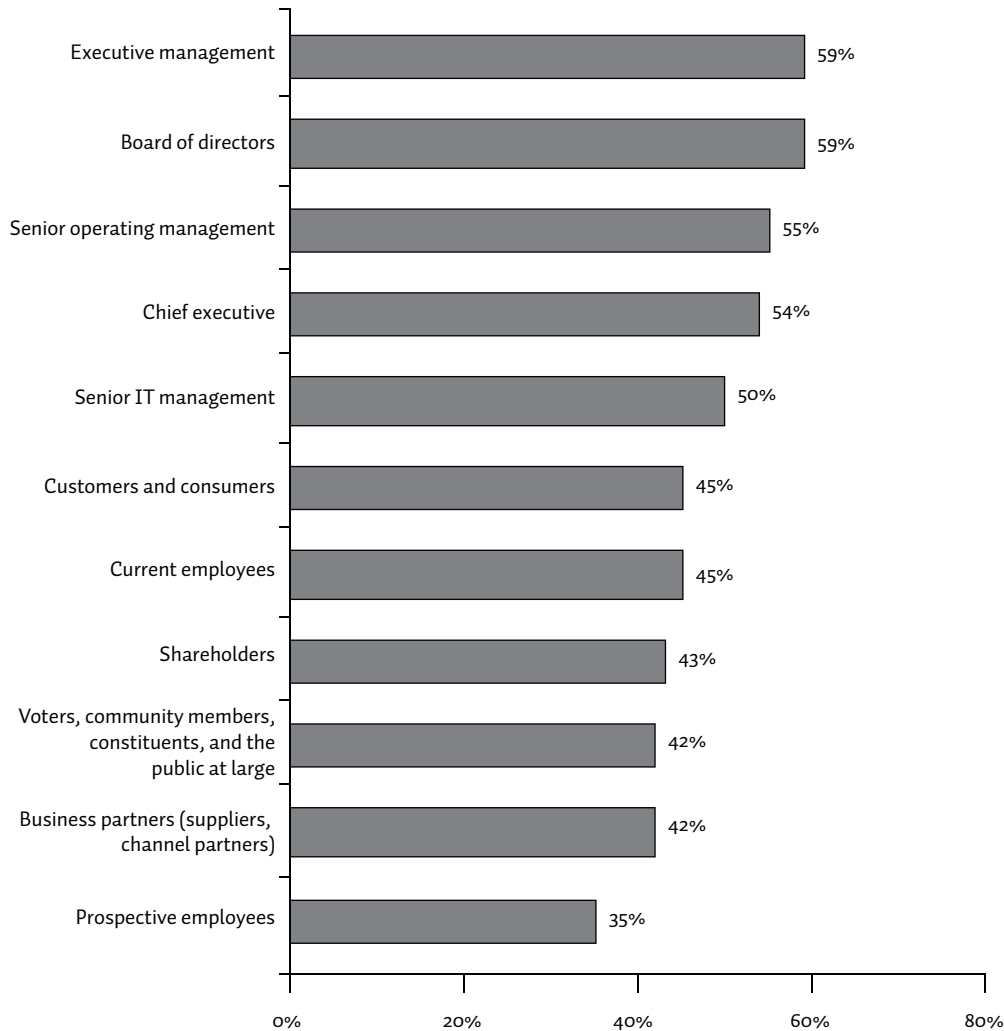
There is no question that businesses live and die by conventional measurements such as cost efficiencies and profits in their efforts to produce more and to earn more. But the seriousness with which company insiders view the issue of environmental sustainability is confirmed in a survey question in which we queried executives on who among company stakeholders is most concerned with environmental matters. Across all respondents in the study, a majority report that those closest to the core of the company—that is, the board of directors and various forms of executive and senior management—are very concerned with their enterprise’s environmental impact. (See Figure 6.) As stakeholders become more distant from a company, they are less likely to be very concerned with company environmental impacts. Accordingly, we infer that those who bear the most immediate and controllable risk of environmental impacts are seen by respondents as most concerned, while prospective employees and the public at large (who bear longer-term risk) are less likely to be greatly concerned.

“We have lots of commitments to efficiency and trying to drive down the cost of IT in general. I don’t want to lose sight of how we look at this: we are seeing positive ROI benefits from these [IT investments], and they also happen to be green,” says a bank executive vice president.

Finance, IT, and business unit executives have come to embrace environmentally sustainable business practices for various reasons: they seek greater operating efficiency and lower costs, they see using these practices as an excellent opportunity to rationalise their sprawling investments (especially in IT), and they see using them as an opportunity to lessen (if not neutralise) their impact on the natural environment. And while survey respondents see an information shortfall and lack of trusted business practices as formidable barriers to change (see Figure 5, page 10), we interviewed executives at several

Figure 6. Company leaders—who bear the most visible, controllable, and near-term risk of environmental impacts—are most concerned with companies’ environmental performance.

How concerned are the following stakeholders about the environmental impact of your company’s business activities?



Percentage of respondents choosing "very concerned"
 Note: Respondents were asked to select all that apply.

companies that have combined finance, IT, and line-of-business efforts in ways that, they say, have yielded great benefit. The management team at Caterpillar, for example, tells how business operations and IT work together to lessen the company’s environmental impact and improve its business performance. Mr Heller and Ms Amdall at Caterpillar explain that through server virtualisation, the company has saved substantially on hardware, data centre space, cooling, and energy costs. By tightly integrating green business principles into its operations, the IT function is able to support the busi-

ness more effectively. Ms Amdall cites environmentally motivated improvements in the engine facility’s paint booth system, in its fluid-line routing practices, and in tracking cores for its remanufacturing business—all of which she says were achieved through collaboration between business units and the IT function in an effort to limit waste and curtail emissions. “It’s all part of teaching our people to see through a sustainable development lens, where they previously could not see how their jobs in IT contributed to SD.” She concludes, “We try to educate them that green IT is an opportunity.”

The global view: Europe moved early; North America strides briskly towards greener IT

Survey results in this study indicate that executives in North America, the United Kingdom, Europe, and Asia hold diverse views on environmental improvement initiatives. And while cultural differences and small sample sizes may explain some of this variation, we find a theme throughout the data that suggests that European companies are somewhat further along in their efforts towards environmentally sound IT than are their peers in North America. But North American companies, spurred by greater concern among such stakeholders as investors, employees, and regulators, are moving briskly to catch up. In the US in particular there is a sense of a shift coming as the new administration comes online—revisiting the Kyoto Protocol and an increased focus on green economy solutions that are likely to spur changes in both regulations and corporate behaviour. And while European re-

sponses indicate that the region has adopted environmentally sustainable business practices, they are far more likely to say their companies haven't focused adequately on the benefits to the environment from such programmes.

North American companies are investing more aggressively in green IT than are companies in Europe, according to survey data. More than 40% of North American companies anticipate allocating 15% or more of their IT budget to green initiatives, while less than one-quarter of respondents from Europe (23%) anticipate doing so. (See related data in Figure 2, page 6.) And the extent to which companies will make dramatic changes in the next two years is much higher for North American respondents than for all European respondents in several important categories. When asked about dramatic changes in information technology, nearly one-third of the North American respondents (31%) choose this option, compared with fewer than one in five European

Figure 7. Stakeholder concerns about companies' environmental impact run higher in North America than in Europe.
How concerned are the following stakeholders about the environmental impact of your company's business activities?

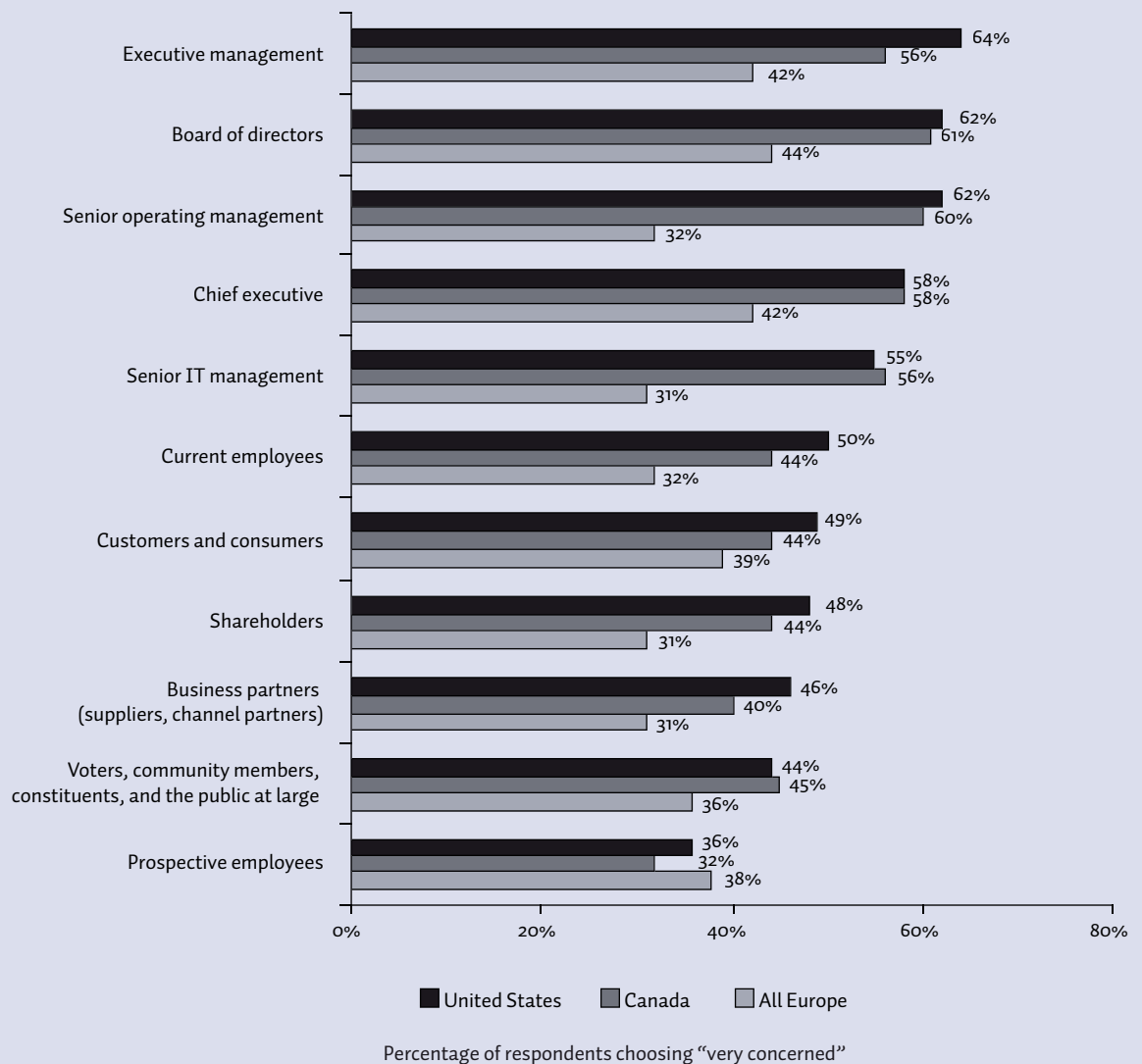
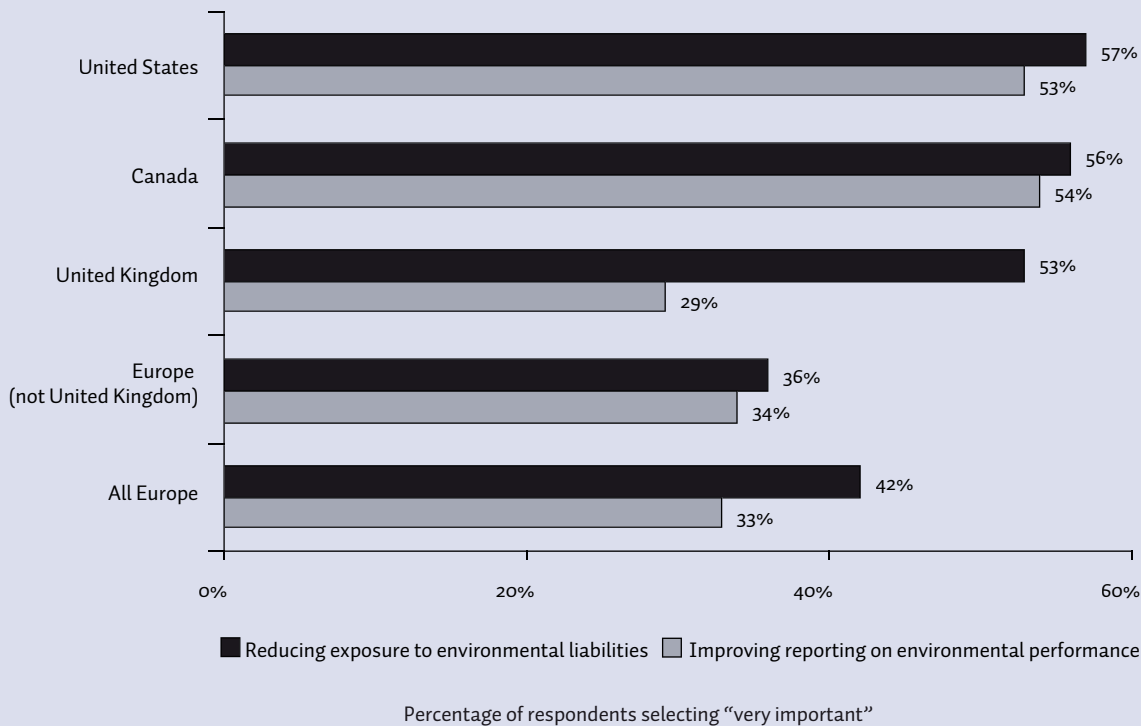


Figure 8. North American finance executives indicate a higher concern for reporting on environmental performance and reducing exposure to environmental liabilities than do European executives.

In your opinion, which of the following environmental objectives are most important to your company's senior management team?



respondents (18%). Production processes and product design yield similar proportions, with North American respondents selecting dramatic changes more often than Europeans.

Investment priorities in North America may well be a reaction to stakeholders' concerns about the environmental impact of company business activities. For each item tested—except prospective employees—respondents from the United States and Canada had higher response rates in the "very concerned" category than the European respondents. More than three out of five US respondents say three stakeholder groups in particular—executive management, the board of directors, and senior operating management—are very concerned about the impact (64%, 62%, and 62%, respectively), compared with all European respondents who selected very concerned (42%, 44%, and 32%, respectively) for these same options. (See Figure 7.) Compared with all the rest of Europe, the UK respondents were even less likely to select very concerned in each category, save two: customers and consumers; and voters, community members, constituents, and the public at large. These higher priorities among North American firms reveal why green IT and business process investments are so aggressive in North America.

Despite their early moves to adopt green business practices, European respondents say their companies haven't given enough attention to the benefit to the environment that should emerge from those practices. All European respondents were more likely to say their companies paid "not enough attention" to environmentally sound business

practices compared with the US respondents for the operating benefits (27% versus 21%) and the environmental benefits (40% versus 22%). However, while the Europeans see room to focus more attention in those areas, the US respondents did select at a slightly higher rate (23%) that not enough attention is given to the promotional benefits of environmentally sound business practices compared with all European respondents (21%).

European respondents are less concerned with exposure to environmental liabilities—perhaps due in part to Europe's more advanced regulations, as well as to differences in litigation and legal recourse between the two regions. Asked for their opinion of environmental objectives that are most important to the senior management team, reducing exposure to environmental liabilities was very important to nearly three in five (57%) of US respondents—and a like number of Canadian respondents (56%)—but only 42% of all Europeans selected the same level of importance. A further split occurred within the European group, with UK participants choosing reducing liability as being very important more often (53%) than the rest of the European group (36%). A similar divide arose in another question about senior management's objectives for improving reporting on environmental performance: 53% of US and 54% of Canadian respondents note that it is very important, an indication that improvement is needed (since the question focused on management objectives), while only 33% of all European respondents had a similar concern. (See Figure 8.)

Culture change and owning results

This perception of environmental responsibility as opportunity, which sources say can offer a competitive edge, needs to grow from within a company and become a part of its essence. Throughout this study, nearly half of the executives we interviewed say improving environmental performance is “part of our DNA”. The challenge for many organisations, however, is how to move from simply awareness, a few memos, and a sincere environmental commitment to embedding this aspiration into every employee and into every business decision. In short, how does an idea morph into a mantra and become the culture of the company? It is a matter of thinking in new ways and implementing new business rules and models.

Turning simple conservation practices into common habits can have a surprisingly significant impact, says Mr Farrington at Perrigo. “You’ve probably been a victim of somebody in your company who unwittingly sends you an e-mail with a large file attachment that has pictures in it. They very graciously share that same e-mail with dozens of others in the organisation,” he explains. By contrast, he notes, you can store it once and reference the link, removing the need for all those attachments to be stored multiple times. “You’re sending links to documents, which then allow you better control and you don’t have to worry about revisions because you have one source document,” says Mr Farrington. “Aside from document control, there are good business reasons for doing this: I don’t have to have as much storage to store duplicative information, which means that I don’t have disposal of that equipment at the end of its life, and I’ve avoided the purchase and manufacture of equipment, which has additional environmental impact. These small shifts in work patterns across large groups of people create a big impact, taking little effort. Again, it’s not one of those things that’s a project, but more of a culture change.”

Sources throughout the interview programme cite cultural change in a broad array of forms that often grew from empowerment of the employees. “We created local green teams at each of our major sites whose central purpose is to drive the reduction of our carbon footprint by reducing energy consumption, reducing our waste that goes to landfills, and increasing our recyclables,” says Mr Fluegel at WellPoint. Mr Farrington cites a similar employee-driven approach at Perrigo: “I’m going to open up our project economic model and now include documentation of what impact we’re seeing there in terms of green savings. I think it starts with awareness. Then as we start looking at some of the natural things that we do related to good business practices as a result of our business model, and looking at our impact, it just opens

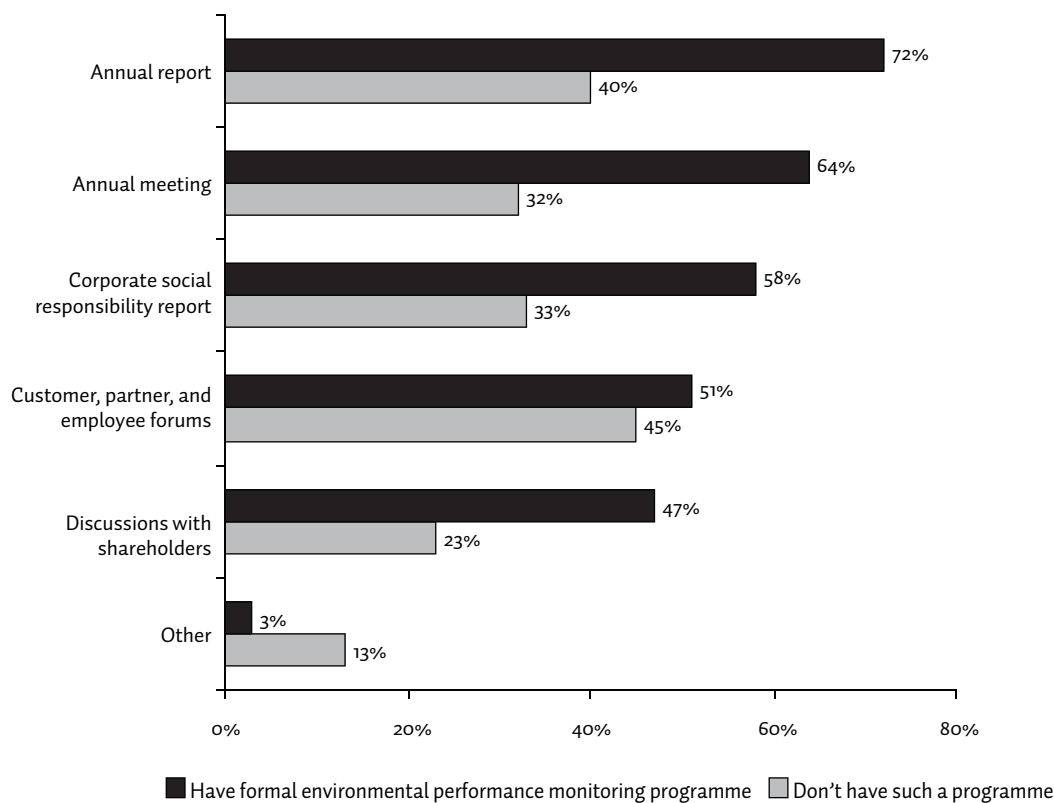
up your lens to, ‘How can I be even more efficient?’ From that bottom-up approach...it starts creating a different culture over time.” Says Sean Worthington, vice president of information technology at Cisco Systems, a San Jose, California-based \$34.9 billion network equipment manufacturer, “We want it to be a way of life, not someone else’s job. We all partly own the results.”

“Small shifts in work patterns across large groups of people create a big impact, taking little effort. It’s not...a project, but more of a culture change,” says the senior vice president and chief information officer at a pharmaceutical manufacturer.

A commitment to green IT is hardly sufficient to achieve a measurable result. Sources report that the common difficulties of managing change at a large global company can be even more formidable for environmental improvement efforts. As Hugh Strange, director, energy initiatives, for News Corp., a \$33 billion media conglomerate based in New York, says, “I think another challenge for us is continuing to keep all of this tied together because there are so many different businesses doing so many different things. Having people feel like it’s part of this big global initiative is not an easy task; and from a communications standpoint, it’s a challenge that our team is always dealing with.”

Environmental performance reporting is both an internal and an external matter and is especially difficult in its early stages, as companies wrestle with a shortage of well-established practices for what information to disclose to whom under what terms. To get a sense of how companies portray their environmental impact—that is, how they tell their environmental improvement story—we asked where companies discuss their environmental performance with the outside world. Across the total survey sample, 62% of respondents say they discuss environmental matters in their annual report, 54% do so at their annual meeting, and 50% do so in some form of corporate social responsibility report. In an effort to confirm the utility of a formal programme for measuring environmental performance, we segregated respondents into two segments—the 67% whose company does have such a programme, and the 33% whose company does not. Companies that have a formal programme for environmental performance monitoring are far more likely to discuss such information in the annual report and at their annual meeting. (See Figure 9.)

Figure 9. Companies with environmental performance monitoring programmes are especially likely to use them in public venues.
Does your company discuss its environmental impact and performance in the following venues?



Percentage of respondents in each segment
Note: Respondents were asked to select all that apply.

“Happy to do the right thing”

Once companies develop a better understanding of their environmental impact and demonstrate their commitment to lessening this impact, employees are often willing to adopt a new and greener mind-set. “The last 18 months here have been characterised by a tremendous sense of people from various teams making an effort to go above and beyond what they’re being measured on,” says Mr Hird at John Lewis Partnership. “We haven’t formally made this part of how we are assessing an individual’s performance, and yet they’re very happy to do the right green thing.” According to Mr Wharton of TransAlta, enthusiasm for improvement is high. “It’s more looking for the opportunity for employees to really engage in what we think is pent-up energy around contributing to our environmental performance,” he says of the staff at the power producer. “We actually have quite a positive view of where our employees are. It’s not so much trying to change people who don’t care into those who do, but rather finding a constructive avenue for them to actually do what we think they already want to do.”

Executives say, however, that one of the biggest difficulties when undertaking broad environmental improvement campaigns is gaining sufficient momentum. But once new processes and procedures are in place, they say, people will accept that there are at least sacrifices, if not outright changes, that have to be made. IT is an obvious place to alter current unsustainable patterns. Chris Chant, CIO at the Department for Environment, Food, and Rural Affairs (DEFRA), a UK government department, relates, “I think what surprised me is the willingness of people to accept [green IT] as a solution. This is not a difficult business change selling point, you know? When we say to people, ‘Only one device per user, because of the green situation’, they get it, and they want to help with that. I’ve been delighted with that.”

Some changes are more profound than simply putting limits on electronic devices. Some green IT initiatives include new work-from-home policies, which can have meaningful business results as a by-product. As Mr MacIntosh at TELUS explains about offering a telecommuting work option, "Initially, people were talking about environmentally friendly reasons to do it. When you actually look at the numbers, financially it's incredibly attractive to promote a teleworks programme, just from the real estate savings alone. Then you layer on top of that the fact that you can reduce your attrition rate tremendously because people are more satisfied when they can have a flexible two days in the office and three days at home or vice versa. On top of that, you're catching the environmental benefits, so it really is a triple play on that particular solution."

The benefits of responsible environmental projects can flow two ways—not only does the company reap business efficiency and risk reduction rewards, but it can make the firm attractive to potential employees. As Mr Khisty of EDS notes, this management strategy extends to human capital as well, as the company seeks to attract and retain young employees who in 40 years may well live in a very different world. "The most important thing I would say is that to retain employees and to attract new employees, the 'Generation Y' people are looking for a company which is more progressive and much more in tune with climate and environment," he says. "They understand [that] the company has seriously taken on environmental policy and procedures in their day-to-day business, and they want to work for the company."

From cultural change to new ways of working
"Awareness", "willingness to do the right thing", and "owning results" are each admirable traits, to be sure. But, say executives interviewed for this study, companies must build the managerial structures to measure and encourage environmentally sound changes in their business activities. By doing so, they will be able to realise and sustain the full operating and environmental benefits of green IT.

Measurement and accountability are part of a broader, coordinated approach to green IT and better environmental performance, say sources. "We've had some people until fairly recently plowing their own furrows" in an effort to improve environmental performance, says Mr Chant of DEFRA. "We're bringing consistency now in line with the UK government strategy on greening IT and that will bring a more coordinated approach to it. But we do have a central IT department for DEFRA so in terms of IT, there is a consistent approach throughout the department."

Once management at News Corp. identified some best practices in the green IT initiatives among their lines of business, they asked, "What did this company do? How did they do it? How did they make not just the technical change, but also the cultural change that needed to be associated to some of these steps?"

As Mike Trkay, executive director of technology at News Corp., explains, "We went out and we looked at each of the operating companies. What were these companies working on? What were they able to track?" Once management identified some best practices in its green IT initiatives, it would ask, "What did this company do? How did they do it? How did they make not just the technical change, but also the cultural change that needed to be associated to some of these steps?" By packaging the information and sharing what its sister companies were doing, News Corp. was able to quickly realise the benefits of more environmentally sound IT practices and policies. "As we started doing that, one thing became very clear and apparent," says Mr Trkay. "That was that we needed a common vocabulary." Embedding this vocabulary allows News Corp. to share good practices and metrics for measuring and reporting as a set of individual companies across the entire enterprise.

Taking on the big-picture perspective and firm direction in these issues is critical. "We're a big company with 42,000 employees, scattered around the country. So coordinating between departments [can be difficult]," notes Mr Fluegel of WellPoint. "Real estate, IT, and our business units are all involved in designing a new site, so we must make sure they're all engaged if we want to achieve buy-in for our environmental and energy goals with each new site." Later in our conversation, Mr Fluegel states, "The most important factors are executive leadership, socialisation, and communication. You have to convince your employees and managers that being green promotes better business outcomes: [in] cost performance, reputation, engagement of your associates, and design of products and services."

New metrics, incentives, and influences

Measuring performance: “Accepting progress over perfection”

As companies seek to change their business practices to lessen their environmental impact and improve their business performance, their ability to make comparisons against external standards and peers as well as mark internal accomplishments becomes more important. And while survey respondents say programmes to measure environmental impact are commonplace, the actual results from these programmes often fall short of what managers need to make good decisions.

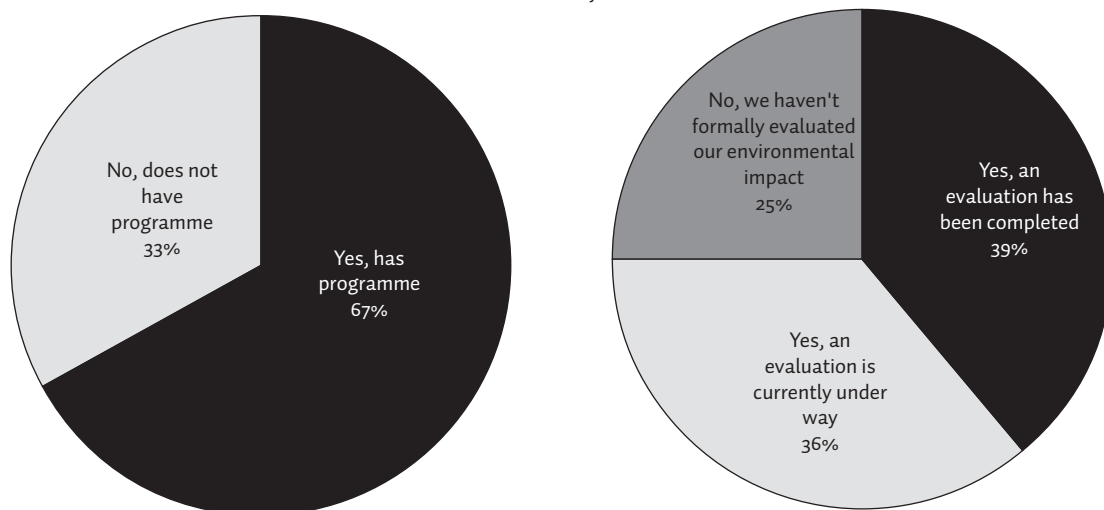
Mr Erhardt at EDS argues that as companies come to understand how IT has become such a great part of their businesses, their managers will develop a more sophisticated set of metrics with which to gauge their progress and performance. “For me”, says Mr Erhardt, “the biggest thing is how eye-opening it is. It’s something that’s been there forever, but until you actually start to isolate it out and focus on it, you don’t understand how far-reaching it is to every dimension of everything you do every day. When you start to then understand that,

“Until you actually start to isolate it out and focus on it, you don’t understand how far-reaching [information technology] is to every dimension of everything you do every day,” says the CFO of an IT services firm.

it starts to hit you about the magnitude of the effect of focusing on it as a management mechanism.” As a key to business management and risk assessment, it seems clear that just such a sound understanding of a company’s environmental performance is essential. We asked executives whether their company had a formal programme in place for measuring, monitoring, and improving its environmental performance, and by a two-to-one margin, respondents say yes. (See Figure 10.) And three out of four respondents say their company either has conducted a formal evaluation of its environmental impact in the past two years or has one under way.

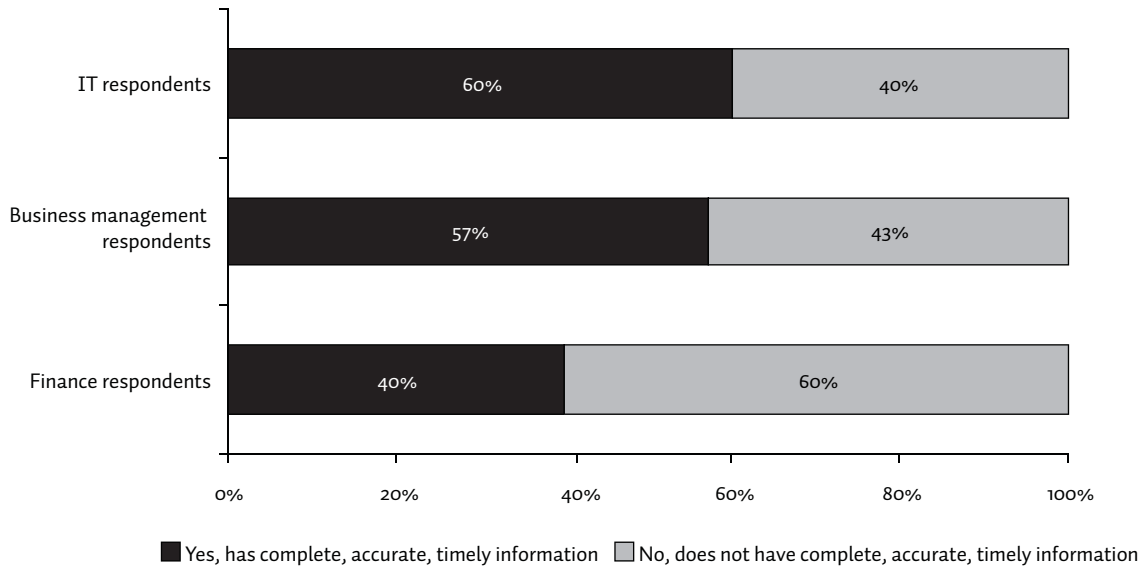
To focus in on and make sound decisions about IT resources—whether and how to invest in them, how to govern and maintain them, and so on—managers need more specific, high-quality information on the IT function’s environmental impact. Such information, say

Figure 10. Finance, IT, and operating executives say they are well on their way to understanding their firm’s environmental impact. Does your company have a formal programme for measuring, monitoring, and improving its environmental performance? Has your company conducted a formal evaluation of the environmental impact of its business activities in the last two years?



Percentage of respondents

Figure 11. Finance respondents are most likely to see room for improvement in information about IT's environmental impact.
In your opinion, does your company have complete, accurate, timely information on IT's impact on the environment?



Percentage of respondents in each functional segment

sources, is very broad and varies widely from firm to firm. Nearly all executives we spoke to for this study say they seek to measure their use of electricity—both its cost and the actual volume of kilowatts—and to use the data to gauge efficiency improvements and as a proxy for IT's carbon footprint. Other measures cited frequently in both the interviews and free-text responses to the survey include hardware recycling, disposal, and decommissioning costs.

"Everything from the actual cost of electricity that's used within a factory or a data centre to items that involve wastewater treatment, reduction of hazardous chemicals, and materials in the environment: all of those can potentially create financial exposures," according to Mr Fitter at Intel. "So to the extent that a company can be green, they can mitigate not only their day-to-day operating costs but also liabilities and other types of exposures in the future." Controlling costs and increasing efficiency are critical to any enterprise, whether it is making a modest or aggressive effort. Plans need to be risk-sensitive as well, as environmental issues can raise vulnerabilities in many places.

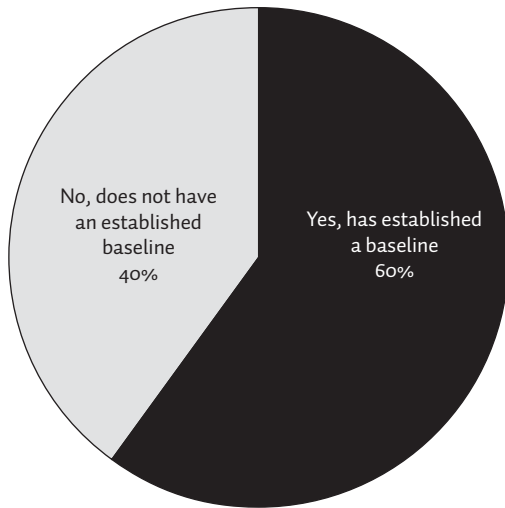
Queried on whether their company has high-quality information on IT's environmental impact, a slim majority (52%) say they have "complete, accurate, timely

information". Respondents from the IT function—chief information officers, directors, and vice presidents of IT—are more likely than their peers in the finance function to endorse their environmental information on IT, but even so, fully 40% of IT respondents say they don't have high-quality environmental information. (See Figure 11.) In comparison, three in five finance respondents believe they do not have complete and accurate information. It is interesting to note that to a larger degree, finance respondents believe the current reporting is not sufficient compared with their IT colleagues, which may be a sign of their heightened risk sensitivity or perhaps their sense of lost opportunity. "Measurement is also key around education. It creates a lot of opportunities in the company to optimise environments, since the calculations highlight that there is money to be saved," states Rick Dipper, leader, corporate responsibility, for Nortel, a global telecommunications equipment maker headquartered in Toronto, Canada, with \$10.9 billion in 2007 revenues.

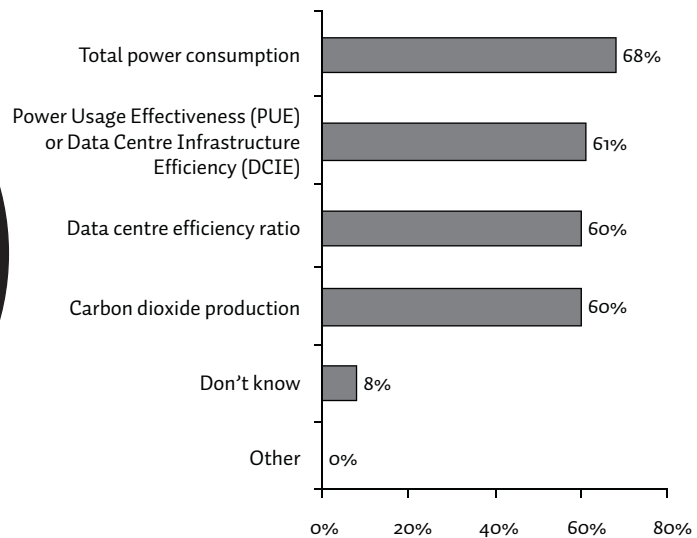
A company's overall environmental impact and IT's role in improving it are critical measurements to capture. By integrating IT solutions more completely into everyday business practices, positive results emerge quickly. Ms Amdall of Caterpillar offers this example: "Our software

Figure 12. Total power consumption is the most popular baseline assessment, edging out carbon dioxide production.

Has your company established a baseline for IT's environmental performance against which improvements can be evaluated?



If so, does your company's baseline assessment include the following metrics?



Percentage of respondents

Note: Respondents were asked to select all that apply.

people developed software that enabled our engineers to route fluid lines on our tractors to reduce leaks. They assembled a program that enabled the engineers to gather facts and data that proved that if you use this approach, leaks are greatly reduced.” This type of modelling finds efficiencies without wasting materials. “Another [example] is with our engines, when they are assembled and tested. Our software people devised software that enabled a reduction in hot testing time—that means less diesel fuel consumed,” she continues. “And we do a lot of these tests!”

Harnessing and implementing the potential that exists within each company is not a simple matter of a directive from corporate headquarters. “My learning so far with green is that there is all this enthusiasm and there is a lot of information out there floating in the world, but what it hasn't crystallised into is exactly what efforts have certain effects within the world,” notes Mr Worthington of Cisco. Cutting travel and turning off computers are easy and obviously good for both the company and the environment, he says. “But I think solving the sustainability issue is going to be a lot of smaller things versus one or two big things. In order to do that, we need the ability to capture the net impact of our changes.” He would like “some sort of data collection mechanism or reporting mechanism to tell us that our efforts are really having the desired effect.” Ben Booth,

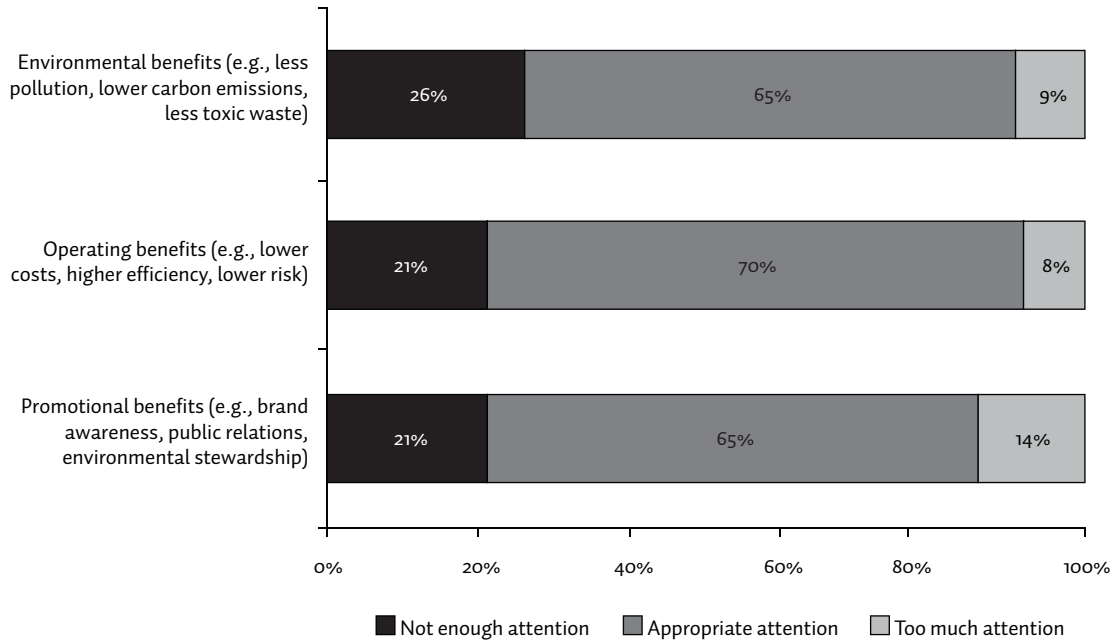
global chief technology officer at Ipsos SA, a Paris, France-based market research firm with revenues of \$1.3 billion in 2007, echoes this view, noting there is “lots of ‘me too’ to green IT” and it is challenging to determine how to separate out what is really important. “There is a lot of noise there, and I also sense that people are keen to jump on the bandwagon.... Everyone wants to be doing it, and there's a proliferation of conferences, and things going on,” says Mr Booth. “I'm a little bit sceptical. That's not to say I think it's not a good idea; I think it's terribly important. But I think there is a lot of noise.”

We asked if companies had set up baseline measurements to assess environmental performance improvements, and three in five respondents indicate that their firm has established some initial standard—a soft baseline from which to measure performance improvement. When asked about the inclusion of specific metrics, the most common measurement was for total power consumption (68%). The next three responses—power usage effectiveness/data centre infrastructure efficiency, data centre efficiency ratio, carbon dioxide production—were each selected by three in five respondents. (See Figure 12.)

Some firms may want to put off establishing a baseline because they may believe that they aren't ready yet or the

Figure 13. Companies are focused on the right benefits, says a solid majority of survey respondents.

In your opinion, do you think your company spends too much, the right amount, or not enough attention on these benefits of environmentally sound business practices?



Percentage of respondents
 Note: Percentages may not total 100%, due to rounding.

system for doing so is rudimentary. But Mr Chant at DEFRA encourages making an effort to gauge carbon output even if the metrics aren't finely calibrated. "Let's get on and do the stuff we know is right; let's not spend our time right now waiting to debate the rights or wrongs of measurement or the rights or wrongs of particular solutions," he says. In the case of DEFRA, "We're working on all those things. We've done some measurement ourselves of our carbon footprint from an IT perspective, but is that much better than 60% accurate? Probably not. Does it need to be? Definitely not," he admits. "We know there are lots of things we can do and we should get on and do them. I think I've got enough information for what we're doing now, but we're refining that. And if you look at this in a few years' time, with much more refined data, the choices will start to become a lot more complicated, because there will be a much finer degree of benefit to be gained from different activities, once we've moved on a bit." He continues, "Right now we don't need that level of fine measurement; we need to get on with what we've got to do, and do that as soon as possible."

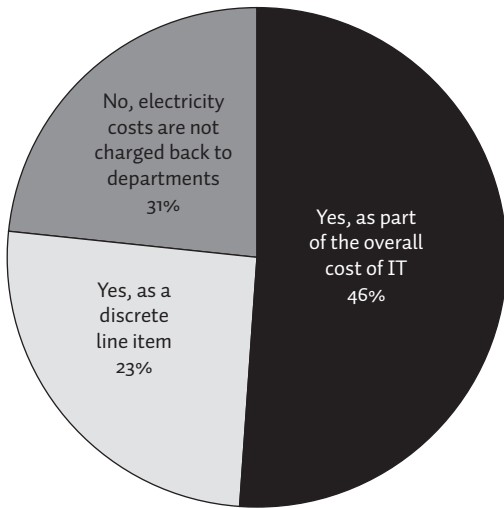
As Mr Chant says, companies may well need to get started with their measurement efforts sooner rather than later. As companies work to improve their environmental perfor-

mance and their understanding of it, a solid majority of executives in this study say their company is devoting the right amount of attention to the environmental, operating, and promotional benefits that flow from their environmental improvement programmes. (See Figure 13.) It's true that executives are consistently more likely to say their company should devote more attention, not less, to these three classes of benefits. But nearly two out of three respondents say their company is focused appropriately.

Once financial and operating metrics are in place, companies will be able to invoke incentives and accountability for departments that deliver an economically efficient outcome. By assigning accountability and measuring it carefully, say sources, groups will operate more efficiently and in more environmentally responsible ways. Mr Farrington of Perrigo offers a glimpse of what comes along with such improvements. "On our factory floor, it's a very intense environment. We focus on quality first and foremost and the real-time communication of information," he says of the company's pharmaceutical manufacturing plant. "In the past, we used to draw things on paper, and pass information through the operations from line to line. We are now putting this information on visual screens. We

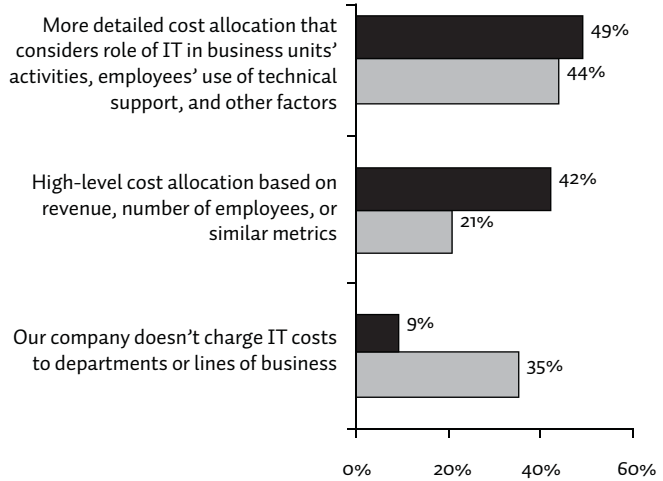
Figure 14. Electricity costs are charged back to the business at a majority of companies.

Is the cost of electricity for IT charged back to departments based on their usage as part of an overall framework or as a discrete line item?



Percentage of respondents

Which of the following methods does your company use to charge IT costs back to departments and business units?



■ Have information on IT's environmental impact - Yes
 □ Have information on IT's environmental impact - No

Percentage of respondents in each segment

actually have metrics that are being produced to a plasma screen that tell operators how they're doing, and it helps them manage quality [and] avoid rework, which can add to waste in operations."

Performance metrics and their sufficiency are also a topic of concern at Caterpillar. Mr Heller, the company's CIO, reports that measuring the benefits of environmental improvement of IT can be a daunting task at times. Caterpillar's server virtualisation efforts have paid off handsomely, says the CIO, and the company has "an entire scorecard measuring current emission of greenhouse gases and recycling. I've challenged each of my directors to have sustainable development goals. But we try not to get overly focused on measurement numbers. We want principles to be [managers'] guide. Our consensus now is that if we help folks to understand how they can contribute as IT professionals, the results will show up." He adds that he and his team sought to balance developing the ideal environmental performance metric with a need to make demonstrable progress. "We don't want them to stop what they're doing in the sustainable development efforts, so we measure what we can measure and accept progress over perfection."

Getting departments to own responsibility for tracking

and outcomes can influence behaviours, reinforcing a culture of efficiency. If the managers are on the hook more often for the results, the inefficiencies get squeezed out more quickly. "What we're finding is that, again as a by-product of just the way we're making decisions and framing our strategy", says Mr Farrington, "people are getting very smart about taking that unneeded mass out of the organisation that just adds weight and burden."

Realigning budgets and accountability

Mr Sams at IBM relates how changes in energy prices and in the use of electricity by IT organisations caused a shift in how IBM Corp. came to rethink its measurement and accountability for electricity usage throughout the entire company. "We started really paying attention to energy use four or five years ago," he says. "What it caused us to do was to start focusing on who the actual users were. We saw these huge energy bills that were increasing very dramatically, and our CFO basically asked, 'Who are the major users of this energy?'"

There were four major areas, one of which was IT for running data centres. "We learned that data centres are only 6% of our total space but were 30% of the energy costs. That bill we gave to our CIO and asked him to start optimising the energy efficiency of our IT operations around the

world. So, we've had that IT focus from an IT use-of-electricity perspective for the last four to five years," explains Mr Sams. Since close to 80% of CIOs don't see the energy bill, by linking responsibility and accountability for energy spending, Mr Sams says the economic incentives will be in place to ensure that CIOs make IT investment and operating decisions that are truly efficient.

In our survey, we asked whether the cost of electricity was charged back to specific departments as a line item. According to two out of three respondents, the current practice is to break it out; for 46% in this group it is part of the overall cost of IT, while 23% indicate it is a discrete line item. (See Figure 14, page 23.)

Moving the cost accountability and other environmentally friendly responsibilities closer to the front line managers helps to break down barriers and foster not only discussions but also critical business analysis of both internal processes and external relationships, particularly with suppliers. The IT function, say sources, is a great tool for facilitating communication as well as for capturing the measurement piece of the puzzle. "I think IT is a phenomenal area for us because not only is it one of a handful of areas that we can actually really track our progress on these issues, but it's also one of the ones that can really go across the various silos of the News Corp. family," says Mr Strange. "So, on an issue like climate change, where we really have an opportunity to be working across all of our various businesses that normally might not talk to each other that much, IT is a great avenue for that."

And it is not just the internal partners that can be influenced—many of the interview participants speak of green IT initiatives as a means to get higher performance out of their partners, both up and down the supply chain. Ms Au of HSBC says, "We look at all this from the whole supply chain, from procurement to the final disposal: how we're going to deploy the equipment, and at the same time, how we dispose of the equipment." She notes that on the "supplier side, we look at how we can actually incorporate environmental elements into our procurement criteria, so we look at energy-efficient equipment which conforms with what we call the electronic product environment assessment to ensure that the equipment that we purchase is actually energy saving". According to Ms Au, HSBC is also concerned with packaging, recycling, and waste disposal: "As we dispose of some of our used equipment, we try to look at ways to donate to disadvantaged people and how we can contribute to the community in a diversified manner."

Mr Wharton from TransAlta explains the company's IT purchasing considerations in both directions. "We're looking at the potential for recycling both computer and

other hardware devices, but also in terms of the front-end purchase and selection," he says. "We will be looking both to find vendors that have more environmentally sustainable offerings and also to use whatever purchasing clout we have to try to influence backwards on the supply chain that we have expectations of more environmentally sustainable products than we currently see on the market."

Mr Wharton continues, "I guess in the grand scheme of things we're not an enormous retail purchaser, but we do have a view that we need to exercise some supply-chain influence on this particular issue." And there are efficiencies to be found—sometimes in places one wouldn't expect. Mr Chant of DEFRA notes his organisation's concern not only that "the products are transported in environmentally friendly packaging, but also shipped fully assembled. One of the things that was of interest to us was that we could just get a fully assembled device—often the things are made in, are sourced in, the Far East and the transportation impact of getting a fully assembled device from the Far East rather than one that's sent over in parts and assembled in the European Union was significant. So that was important to us."

"We're learning that the carbon footprint of making [energy-efficient equipment] is actually the lion's share of that machine's [overall] carbon footprint. What I'd like to have is... the real sweet spot where you should be replacing technology and where you shouldn't," says the IT strategy manager at a major UK retailer.

Another consideration is how quickly to scrap old IT equipment and bring in the latest model. Sources report a persistent struggle in decision making among buying new features and efficiencies, maximising use of a current asset, and not choking landfills with electronics that still have a useful life. "We like to sweat our assets anyway here. But there are competing tensions. There's a tension that says energy efficiency is greater in the newer models, so go out and buy a new model now, and in that way you're going to reduce your energy. And that's very seductive," says Mr Hird at Britain's John Lewis Partnership. "But the thing is, we're now learning that the carbon footprint of making the new model is actually the lion's share of that machine's [overall] carbon footprint. So in green terms, it's not necessarily right to be doing that. What I'd like to have is a really good picture... the real sweet spot where you should be replacing technology and where you shouldn't." Mr Hird likens such decision mak-

ing to consumer purchases, saying, "It's almost like a sell-by date: when I buy a laptop for the company, what I want to know is, from a green point of view, what's the optimum time to keep that machine. I think the refinement of the models we have on that needs to be much better."

But one stumbling block Mr Hird notes is that not all applications are set up to scale easily. "We want to virtualise unless there's a very good reason not to. So unless we are jeopardising the stability, performance, or security of our systems by doing it, we want to have all our applications running on a virtualised environment," he says. "But some of those applications aren't certified by the supplier to run in that environment; some of them would incur rather punitive licensing costs if we were to put them on a bigger machine with more processes." In this situation, the partnership uses its leverage to make demands up the supply chain. "What we do in that situation is we challenge the supplier" to provide a solution that will fit in with the company's virtualisation strategy.

"Recycling, reducing greenhouse gases, reducing the carbon footprint—anything that forces us to look at overall waste is something we have to consider here at Caterpillar," concurs CIO Mr Heller. This drive for efficiency at Caterpillar includes exerting its purchasing power in IT. Mr Heller says the company focuses on "getting proper engineering and alignment with our partners and the supply chain. Anywhere we have to buy materials or supplies either directly or indirectly, if we have suppliers who ship things in foam or computer hardware without energy-efficient design, it's a problem." He continues, "We have to get them to understand that we're willing to make buying decisions based on these considerations. We're pulling on them to get their operations up to our expectations."

While such clout with suppliers may be more available to a \$45 billion industrial giant than to smaller firms, this research programme suggests that many companies aspire to get similar cooperation from their suppliers in their green business initiatives. As for motivating employees, EDS's Mr Khisty tells of one effort the company is using. "What we propose in our policy is that employees can offset their personal carbon emissions at home, and the company will match dollar for dollar up to \$300. So again, a signal has gone to the employees that this is not about cost cutting," he explains. "It is about getting engaged in this climate change and to fight it together, change the behaviour, switch off when it is not required, because that is a waste, and that is cost to the company, cost to the environment, and all in all, we believe we have started... the green journey by influencing the behaviour and the practices."

Mr Fluegel at WellPoint also mentions employee engagement and incentives in his company's efforts. "We have initiatives

to increase the use of videoconferencing: it's easier on the individuals, and reduces greenhouse gases and travel-related expenses," he says. "It's also incredibly important to our associates, for engagement with our employees who want to work for a good company that does good things. Sometimes they're ahead of leadership on this; very engaged in it." WellPoint has experienced a 20% annual growth in videoconferencing hours since 2005.

TELUS also uncovered an incentive for employees that it hadn't anticipated when the company began offering a telecommuting option in 2006. The company began a pilot programme to track and report emissions avoided by commuting, and had 178 team members voluntarily sign up. Ten months of tracking these employees revealed "compelling numbers", according to Mr Pach. "The environmental benefits were there, but far beyond that, over those 10 months, 178 employees saved some 13,000 to 14,000 hours of commuting, time that you'd spend with your family or in balancing your life. We didn't expect that. Nobody thought that," he recalls. "Then we started adding this all up, and we could see that sure, the environmental benefits are there, but really the economic benefits from reduced fuel cost [and] vehicle maintenance, and also the externality of impact on municipal infrastructure, clogging of traffic, and wear and tear were reduced. Then on top of that, people are balancing their lives by taking that hour out of the car and giving it to their family." Today TELUS reports that more than 18,000 workers are enabled to work remotely. "On any given day, we're seeing about 6,500 of those folks signing in," says Brian MacIntosh, vice president of managed IT and collaboration solutions, reinforcing the notion that there can be a win-win-win of company benefit, environmental impact, and employee incentives through green initiatives.

"We have to get [suppliers] to understand that we're willing to make buying decisions based on these considerations. We're pulling on them to get their operations up to our expectations," says the chief information officer at a construction-equipment manufacturer.

At John Lewis Partnership, the employee incentive is much more direct. "There's a very healthy element of self-interest," says Mr Hird. "We're all partners; we all share directly in the profits of the business. So we've arguably got more of an interest as employees in practices that effectively reduce the power we are using."

What lies ahead: risk management along with performance improvement

In the long run, companies will need to prove their environmental credentials on their own, not through meeting other companies' requirements as they emerge. Indeed, it is likely better to change environmental practices on one's own terms rather than as part of an effort to get or keep an important account. However, building a programme that integrates sound green practices with good business decisions and gains acceptance across each business unit and function is a tall order. Mix in the unknown of how quickly regulations could tighten and the uncertain gyrations

of economic activity, and it all adds up to a new class of risk on senior management's crowded agenda. So where should management focus its attention? We queried executives in IT, finance, and lines of business about the objectives they sought most eagerly from environmental improvement efforts. Confirming the responses elsewhere in the study, two-thirds of executives report seeking higher energy efficiency and lower energy costs, and a majority cite reducing the impact of energy market volatility on business operations. (See Figure 15.) In recent months, the volatility of energy prices has made this risk readily apparent. After climbing to record high prices in midsummer, in early December a 19% drop in crude oil represented the biggest weekly decline in five years. Indeed, the price of oil has fallen by more than 50% in the past several months.

Figure 15. Risk and energy—its cost, efficiency, and variability—are among the most important rationales for green business efforts. In your opinion, which of the following environmental objectives are most important to your company's senior management team?

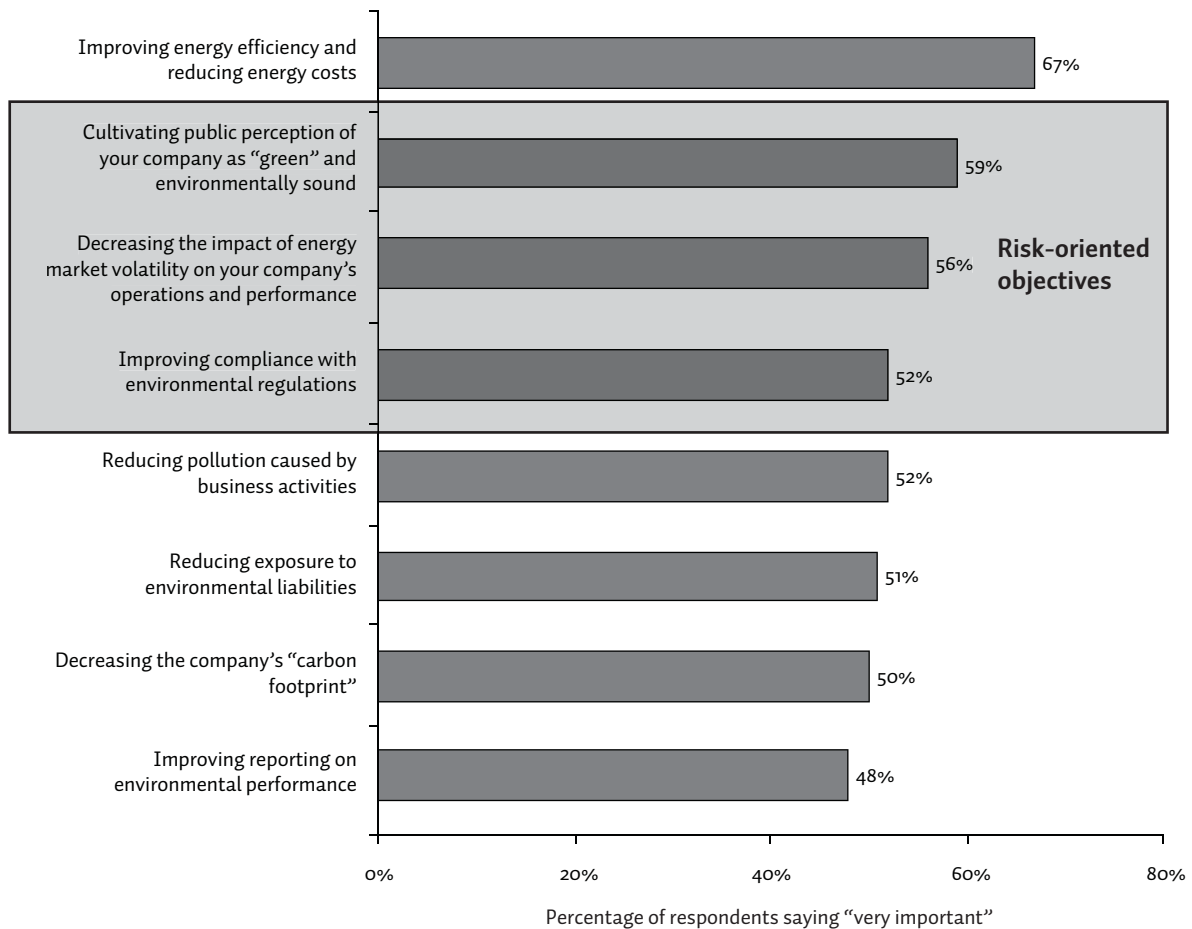
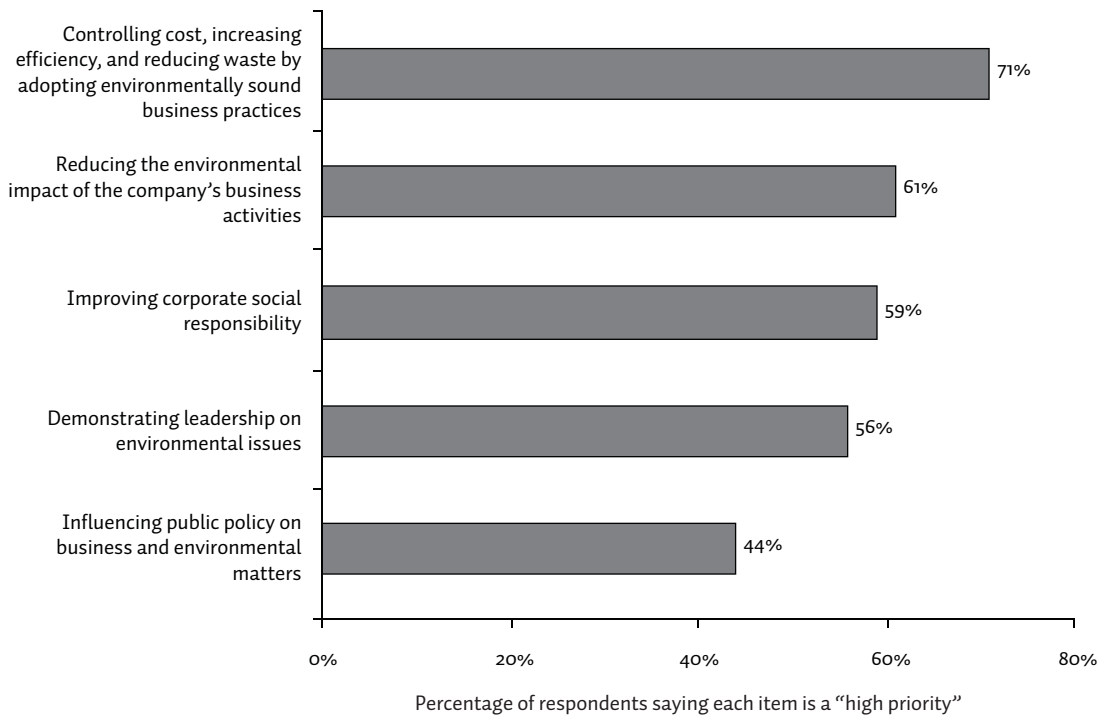


Figure 16. Measurable, firm-specific issues matter the most to senior management and corporate boards, say senior executives.
How high of a priority are the following issues among your board of directors and senior executive team?



Little will change if senior management itself does not throw its full weight behind green initiatives. Once it has its priority list, it must work to convert these ideas into actions and integrate sustainability with business objectives. Senior executives who responded to the survey strongly endorse business policies and practices that minimise their firms' impact on the natural environment, and this comes as little surprise. But when queried on their priorities from a list of sustainability issues, from firm-specific matters such as cost control and increasing efficiency to influencing public policy, survey respondents rate measurable operating benefits more highly than influencing environmental policy. (See Figure 16.) In interviews with senior finance, IT, and operating executives around the world, we found a similarly strong commitment to improving environmental performance, but the rationale for making change and measuring results is often tied to creating those operating efficiencies.

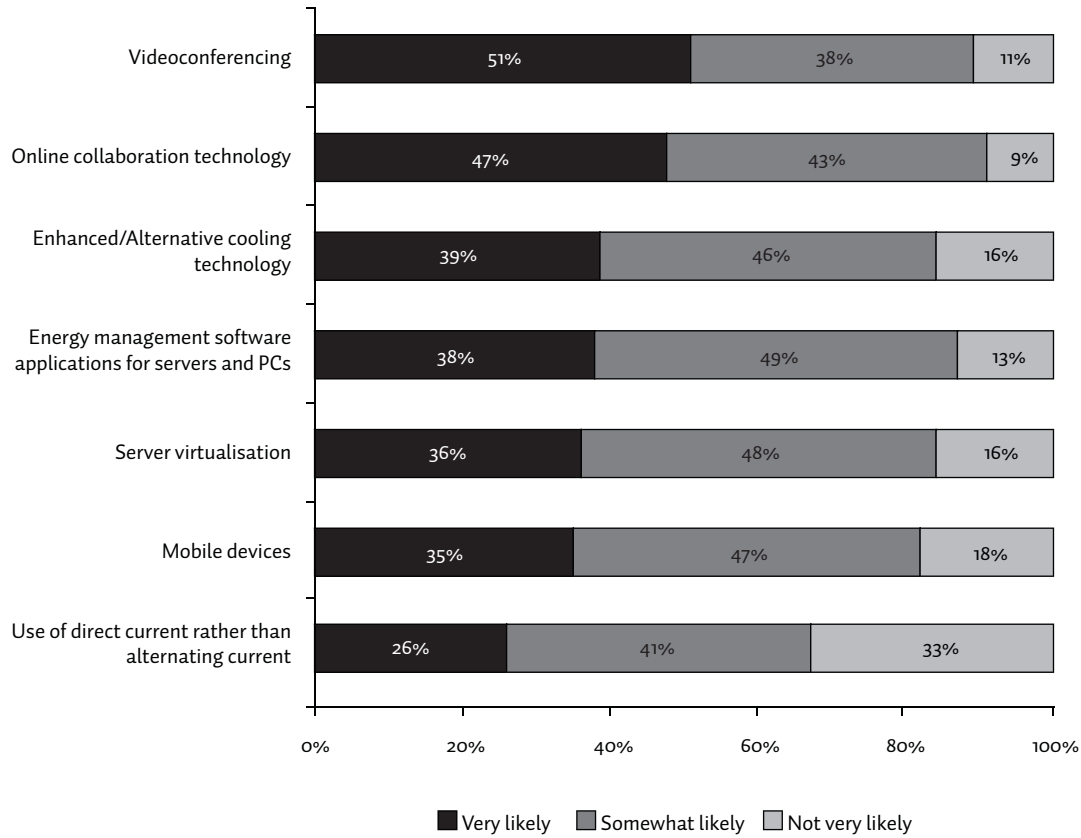
In their hurry to make these improvements, companies cannot lose sight of their ultimate priority: the customer. "Some of the initiatives may achieve great power-save results, but they may risk the availability of our enterprise," says Mr Culver of Wells Fargo. "That's an evaluation we have to make as to whether we're going

to get some power-consumption save, and possibly risk the availability to our customers. The number-one reason we're in business is to serve our customers, so we don't want to jeopardise that if it's a case of saving some money or power consumption."

"The number-one reason we're in business is to serve our customers, so we don't want to jeopardise that if it's a case of saving some money or power consumption," according to the senior vice president at a major bank.

Some products have more immediate appeal than others for companies looking to use technology to solve their environmental problems, and will no doubt curry more favour with senior management for getting the ball rolling. Technology applications such as videoconferencing and online collaboration technology, which focus directly on serving end users, are most likely to attract investment dollars in the years ahead, according to

Figure 17. End-user applications focused on productivity improvement are most likely green IT investment candidates, say executives.
 In your opinion, how likely is your company to adopt the following types of technology in an effort to reduce its impact on the environment?



Percentage of respondents
 Note: Percentages may not total 100%, due to rounding.

survey respondents. (See Figure 17.) Videoconferencing holds particular appeal for some sources interviewed for this study. Using an early version of a high-definition videoconferencing product, Cisco has been able to cut its business travel costs by 20%, according to Mr Worthington, the vice president of information technology. However, virtualisation does not rise to the very top among the responses to this particular question, perhaps because many who can may have already implemented such technology.

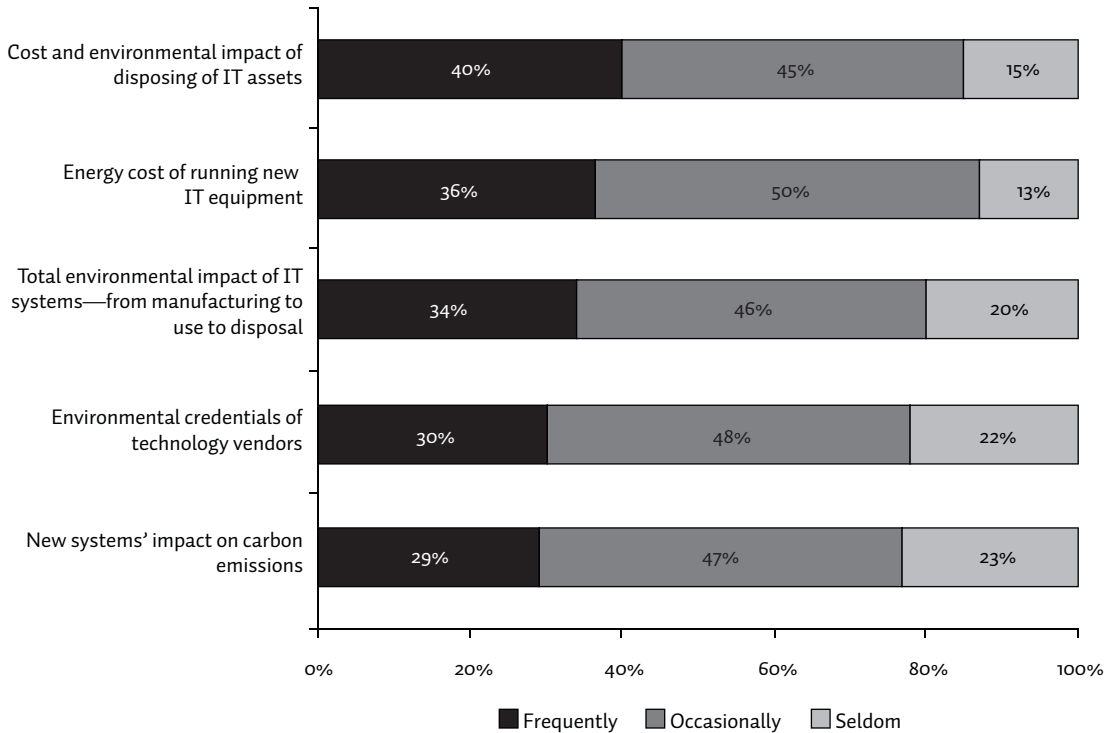
We also asked respondents how much consideration their company will give to selected factors for IT investments in the next several years. Of those responding in the “frequently” or “occasionally” categories, the cost and environmental impact of disposing of IT assets and the energy cost of running new IT equipment were the factors predicted to be most often given consideration in evaluating investments. (See Figure 18.)

The disposal issue could be an enormous one for many companies and is a risk they already own even if it does not appear on any financial statement. Many large companies already have tens of thousands of pieces of electronic equipment that are installed and in use—and perhaps thousands more that are sitting idle—that will eventually need to be disposed of. Each of these pieces has a limited life span, dictated by either performance or obsolescence. As regulations evolve about such equipment’s afterlife, companies need to have a plan to move these assets from risk exposure to complete disposal.

The risks we’ve identified here—those tied to regulation, energy markets, product and production liability, and operating performance—appear to be top of mind among executives in finance, IT, and lines of business. And as green IT and environmentally sustainable business practices progress through their second wave, new risks and opportunities will emerge. Companies that have taken

Figure 18. Companies are most likely to make green IT investments based on operating benefits.

In your opinion, how frequently will your company explicitly consider the following factors when evaluating investments in information technology over the next several years?



Percentage of respondents
 Note: Percentages may not total 100%, due to rounding.

early steps to understand their own businesses from an environmental point of view will be well positioned to navigate these new risks successfully. To prepare to do so, companies should look to their peers that have moved early on environmental matters and consider how they themselves can gather the information, measure the environmental impact of their business activities, and cultivate decision making that serves their companies, their stakeholders, and the environment at large.

Companies that have taken early steps to understand their own businesses from an environmental point of view will be well positioned to navigate these new risks successfully.

The Next Wave of Green IT

A company's IT organisation is no stranger to scrutiny when it comes to corporate responsibility and sustainability. As a major consumer of electricity in many organisations and a significant producer of waste electronics, IT has been among the first to come under pressure to better manage energy consumption and to "reduce, reuse, and recycle" in order to improve efficiency and lessen environmental impact. Fortunately, in improving its sustainability performance, IT has had a lot of low-hanging fruit to choose from, including server consolidation, application rationalisation, procurement of energy-efficient hardware, better printing policies, and even simple behavioural changes such as having people turn off the lights and shut down their desktop computers at night. But the question arises, What happens when the supply of this low-hanging fruit has been exhausted?

Many CIOs are discovering that the answer to this question lies in the C-suite. An evolution in green IT is under way as the topic rounds the bend from a siloed cost-reduction play to an enabler of corporate responsibility and sustainability. This research programme suggests that much work still needs to be done within IT itself, but smart companies are moving forward and elevating green IT to the enterprise level in parallel with improving efficiency and reducing waste within their IT departments. Examples abound: companies such as Caterpillar are using high-tech computer modelling to improve the efficiency—and thus reduce the carbon output—of their supply chain and manufacturing processes, including distribution and transportation management, and several well-known companies are implementing energy-management software to facilitate better monitoring and control of their energy usage. Why the push in this direction? The writing is on the wall. Pending regulations and new views on accountability are making environmental and social performance integral with economic and financial performance as major imperatives for global business.

Many leading companies realise it is important to begin to establish and execute a number of sustainability strategies in order to support their long-term viability. These strategies involve calculating the cost of carbon in the forthcoming carbon economy; facilitating compliance with existing and pending regulations; managing risk by reporting accurately on sustainability initiatives and thus avoiding penalties and financial misstatements; making the company more attractive as a place of employment for environmentally sensitive employees and recruits; improving supply chain performance by reducing material

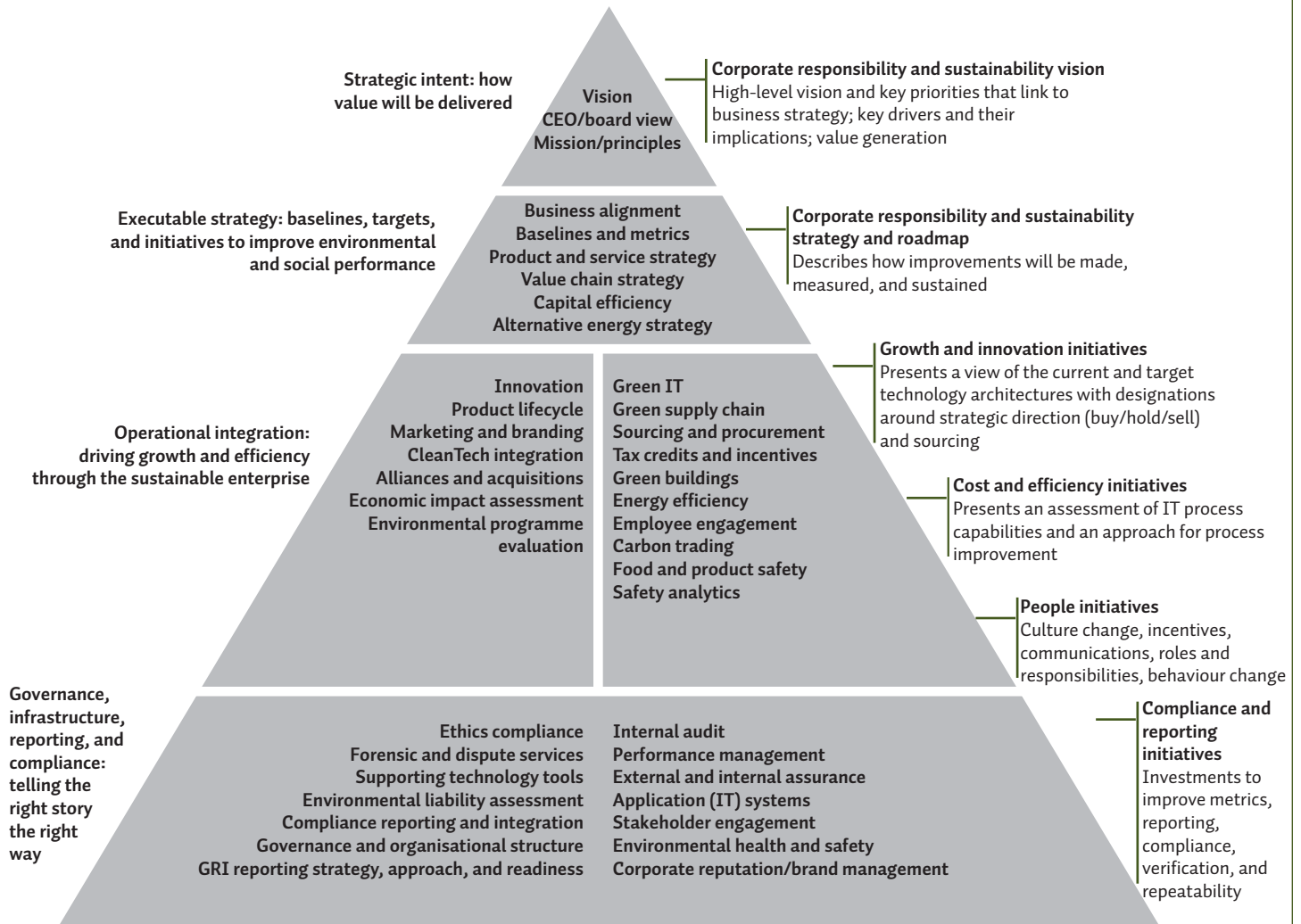
usage and improving efficiency; and controlling costs by better managing energy consumption. While broad-ranging, these strategies all share a common denominator: they are powered by information—the "I" in green IT.

As the importance of information grows, IT is being thrust to the fore as an enabler for corporate sustainability, particularly in the areas of measuring, monitoring, and reporting on sustainability performance and compliance. This is especially true in locations where carbon-accounting regulations or cap and trade schemes are pending or already in place. For instance, companies in the UK must soon comply with the Carbon Reduction Commitment legislation, due to go into effect in 2010. This programme overlays the European Union Emissions Trading Scheme, establishing more onerous cap levels and affecting a much broader segment of business and public sector institutions—even schools are included. Organisations should now determine not only what type of sustainability information they need, but also where it should come from, how it should be organised, and how to report it expeditiously. Clearly, IT should be a huge component of these efforts or else the cost of compliance, and the risks incurred from doing it poorly, may severely damage business performance.

Customers and other external stakeholders are also adding fuel to this burning platform. Market leaders (e.g., Wal-mart and Tesco) are increasingly requiring vendors to meet sustainability reporting criteria, and consumers and non-governmental organisations (NGOs) are demanding transparency into areas ranging from waste production to consumption of renewable energy. These developments inspire us to ask this question: if necessary, could your company produce information on energy consumption, carbon/greenhouse gas emissions, water usage, percentage of waste recycled, and the effects of working conditions on employee health and morale? Few can, especially in the United States.

Through formal announcements and prominent choices for energy leadership, the Obama administration has signaled its focus on using sustainability—and regulations surrounding it—both to address climate change and to create jobs. This now appears to be more in line with European governmental strategies. Climate change and its economic impact are likely to be high priorities among governments and companies from around the world as they convene in Copenhagen for the annual UN Climate Change Conference. Yet many companies are still taking a wait-and-see attitude. Based on our previous experiences of regulatory-driven change, this may be disadvantageous and a costly stance to take. Bringing together the regulatory, financial, risk-management, and

Deloitte's Multidisciplinary Sustainability Framework



strategic tax components of sustainability should demand a coordinated, enterprise-wide effort and a strong data governance and management framework. Breaking down silos and effecting company-wide cultural change will take time. If companies don't start this journey now, they may run the risk of incurring financial penalties as well as exorbitant costs associated with resource shortages once stringent carbon audits become a reality and the stampede to comply begins. They may also risk missing out on the many new business opportunities that are likely to accompany a sustainability-driven market rebound. And there is even one more reason to act quickly: many local tax credits and incentives are likely to disappear once more stringent regulations are put into place. These incentives make up an attractive line in the business case, and companies should take advantage of them now, before it's too late.

So what are the next steps for companies that wish to capitalise on—rather than catch up with—the evolution of green IT? To begin, IT should work to get control of the carbon it is producing, if it hasn't done so already. The next step is to think about ways that IT can help the business understand its sustainability performance and how to improve it. This is done through:

- Establishing a baseline measurement of current sustainability performance that is satisfactory for both IT and finance.
- Calculating the cost of carbon and what is at stake from the perspectives of finance, operations, and risk-management.
- Aligning the enterprise's tax strategy with its sustainability strategy and green investments.
- Determining what type of sustainability information is likely to be needed to measure progress at both the

macro and business-unit levels.

- Assessing whether or not that information currently exists: if so, how can it be accessed and organised? If not, what types of frameworks are needed in order to collect it?
- Evaluating the capabilities of current IT systems to measure, monitor, and report on sustainability criteria.

It may be difficult to think about a long-term sustainability strategy amid a worldwide economic downturn that is forcing a relentless focus on cost, but leading companies understand that there is no turning back. They also understand that improving enterprise sustainability, while simultaneously improving the bottom line, requires multidisciplinary capabilities across strategy and operations, risk management, tax, accounting, and IT strategy and implementation.

Indeed, the ability to break down silos and to analyse sustainability information from different business areas may be prerequisites for developing an appropriate enterprise sustainability strategy and a roadmap for executing it across the company's entire base of activity. The recent trends of broad C-suite sponsorship of green IT and sustainability initiatives are encouraging signs that the silos of authority are falling and companies are increasingly able to develop sustainability strategies.

To be effective, the strategy and roadmap should be designed to articulate a high-level vision and key sustainability priorities that link back to business strategy as well as outline how improvements can be made, measured, and sustained. The diagram on page 31 illustrates how Deloitte's sustainability framework links business strategy to execution, operations, and governance and compliance activities. The name of the game moving ahead is about using the information in green IT to help make strategic decisions and to deliver value by driving growth and efficiency through the sustainable enterprise.

Despite the current economic challenges, the good news is that many companies have found that their early sustainability efforts, particularly those involving green IT, have yielded returns that are satisfactory or even better. Considering this fact and the urgency building within the regulatory environment, those who act now to align their IT assets in support of monitoring, measuring, and enhancing sustainability performance may have the opportunity to improve the bottom line and widen the lead on the competition. Laggards are likely to find this gap becoming larger and more costly to close with each passing day as the advent of the carbon economy draws nearer.

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