Green IT:

Why Mid-size Companies Are Investing Now

Introduction

Environmental issues are receiving unprecedented attention from businesses and governments around the world.

In a special 2005 address to the World Economic Forum in Davos, then-Prime Minister of the United Kingdom, Tony Blair, argued that the weight of evidence is such that swift action must be taken to address global warming. This comment came alongside a marked shift in environmental dialogue across societies and in business leadership circles.

In January 2009, former US Vice President Al Gore urged Congress to take decisive action, "reverse years of inaction," and assume leadership in the preparations of a new, global climate treaty, which is critical for success at the Copenhagen UN climate summit in December 2009. At this summit, it is widely expected that industrialized nations will agree on a more comprehensive, actionable climate agreement to succeed the Kyoto Protocol.

As concern for climate change and sustainability continues to grow, and actions now ramp up, businesses are grappling with reducing carbon footprints while remaining profitable.

Feeling pressure from customers and other stakeholders, organizations have begun to make serious improvements in their environmental performance, recognizing that if they fail to deliver on this, it frequently translates into a negative impact on profit.

Many governments are introducing aggressive environmental policy, encompassing everything from greenhouse gas reduction and natural resource protection to clean power initiatives and incentives for energy efficiency.

Moreover, in 2009, businesses feel the negative impact of our economic climate. Senior leaders – in the corporate office and in IT – are surveying their businesses for readily achievable cost savings to make up for tightened budgets and profit margins. IT departments, having run lean in the past, are on the hunt for new initiatives that reduce costs without compromising business value.

Many businesses have discovered that Green IT initiatives offer costs savings benefits while reforming the organization, meeting stakeholder demands and complying with laws and regulations. In this study, IBM and Info-Tech Research Group find that businesses who complete Green IT initiatives realize significant cost savings alongside superior environmental performance.

This paper presents the results of a study conducted by Info-Tech Research Group and sponsored by IBM. More than 1,000 IT professionals in mid-size businesses, from 12 countries and eight industries, were consulted through surveys and interviews to understand why Green IT initiatives are undertaken, and how the results translate into cost savings, business value and environmental benefits.

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Executive Summary

Businesses around the world are realizing that addressing environmental concerns can also benefit the bottom line. They aren't jumping on the bandwagon in an effort to save the planet, though this sentiment is certainly expressed in many cases. Rather, businesses see an opportunity: By adopting initiatives that have a positive effect on the environment, they save money, and at the same time, use technology more efficiently. Great opportunities lie in the IT department, where reducing the environmental footprint of technology is now top of mind for many IT leaders.

This paper examines the impact and adoption rates of 11 Green IT initiatives in mid-size organizations around the world: server virtualization and consolidation, storage consolidation, desktop virtualization, existing server room upgrades, new server room builds, IT energy measurement, PC power management, printer consolidation, remote conferencing, telecommuting and IT equipment recycling. The most popular initiatives being adopted today are storage consolidation, remote conferencing and telecommuting projects, all of which yield immediate cost reduction benefits along with a reduced environmental footprint.

In the future, we see significant interest in initiatives such as server virtualization and storage consolidation. About 25% of mid-size businesses have already completed some form of virtualization or storage consolidation; another 50% are planning these for the next 12 months. This growth in adoption speaks to the benefits offered by server virtualization and storage consolidation: cost-efficiency, ease of management and reduction in energy use.

Controlling cost is the strongest factor driving all 11 initiatives. Under the cost-savings umbrella, four main benefits rise to the top: decreased electricity use, decreased consumables use, decreased future operational expenses or investments and realizing credits or rebates from local utilities and governments. Two additional benefits were also cited as key considerations by many businesses: the ability to better meet customers' demands and increased features and functionality for the business.

Companies thinking about implementing a Green IT project should consider that the majority of implementations are considered successful. In 65% of all Green IT projects, organizations' initial goals for these projects are met or exceeded. In other words, businesses typically accomplish what they set out to do, and realize additional benefits they weren't expecting.

This paper highlights the success businesses are experiencing in reducing costs and environmental impact through Green IT, and features profiles of leading-edge, mid-size organizations that are ahead of the curve.
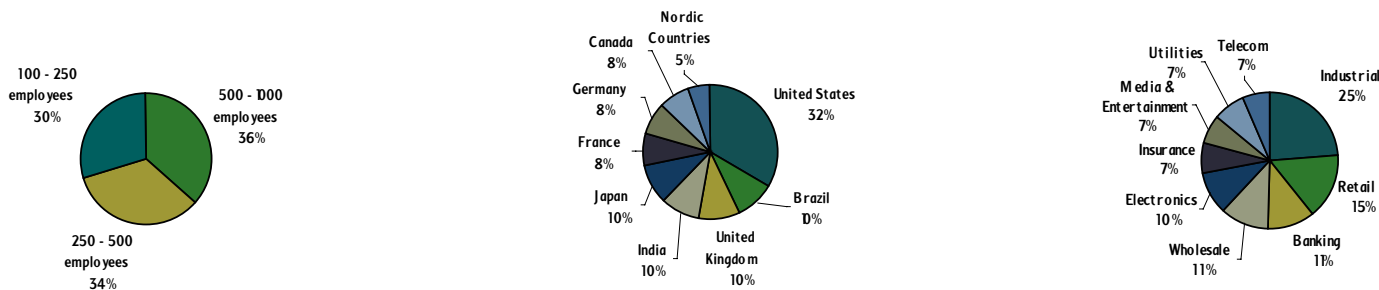
Green IT:
A Working Definition

Green IT is comprised of initiatives and strategies that reduce the environmental footprint of technology. This arises from reductions in energy use and consumables, including hardware, electricity, fuel and paper – among others. Because of these reductions, Green IT initiatives also produce cost savings in energy use, purchases, management and support, in addition to environmental benefits. Beyond cost savings and environmental benefits, some initiatives may address stakeholder and regulatory needs and demands.

For example, server virtualization allows businesses to reduce the capital cost of future server purchases, and the operational costs of energy, maintenance and management. Electricity footprints and the amount of equipment needing future recycling are simultaneously reduced, and often, the business realizes incentives or rebates for saving energy from local utilities or governments.

Study Methodology

This study was commissioned by IBM and conducted by Info-Tech Research Group. 1,047 IT and business professionals and decision-makers from companies with 100 to 1000 employees, representing 12 countries and eight industries, participated in an online survey between December 2008 and January 2009. In addition, a group of 20 respondents participated in 40-minute in-depth interviews. In both surveys and interviews, respondents were asked to describe their adoption state across 11 Green IT initiatives, as well as their organizations' outlook, attitudes, and reasons for adoption. They also answered questions about the state of environmental issues and action in their business and their region of the world. Please refer to the pie charts for a detailed breakdown of respondents.

Pie chart 1 (by employees): 100 - 250 employees 30%, 500 - 1000 employees 36%, 250 - 500 employees 34%.

Pie chart 2 (by country): Canada 8%, Nordic Countries 5%, Germany 8%, France 8%, Japan 10%, India 10%, United Kingdom 10%, Brazil 10%, United States 32%.

Pie chart 3 (by industry): Utilities 7%, Telecom 7%, Media & Entertainment 7%, Insurance 7%, Electronics 10%, Wholesale 11%, Banking 11%, Retail 15%, Industrial 25%.

Part I:
Progress in Green IT

Green IT Adoption Trends: An Overview

This report divides 11 Green IT initiatives into four major groups: Virtualization and Consolidation, Energy Efficiency, Travel Reduction and Asset Disposal.

Virtualization & Consolidation: Initiatives in this area include server virtualization and consolidation, storage consolidation and desktop virtualization. These projects typically improve cost and energy efficiency through optimized use of existing and new computing and storage capacity, electricity, cooling, ventilation and real estate.

Energy Efficiency: Initiatives in this area include server room upgrades and new builds, IT energy measurement, printer consolidation, and PC power management. These projects have energy efficiency or reduction as a major cost savings benefits.

Travel Reduction: Initiatives in this area include remote conferencing & collaboration and telecommuting. These projects are typically associated with reductions in travel, fuel and commuting costs.

Asset Disposal: IT equipment recycling is the lone initiative in this category.

Half the companies who participated in this study are either piloting or implementing at least one of the 11 Green IT initiatives. By and large, the most commonly adopted initiatives involve major cost savings up-front, with fewer major investments required. The most popular initiatives across the board include storage consolidation, remote conferencing and telecommuting, all of which yield immediate cost reduction benefits to the business if implemented correctly.

Initiatives allowing the business to realize long-term, operational cost savings garner less attention today, but organizations will be looking closely at these types of projects in the coming months. New server room builds, desktop virtualization and IT energy measurement all saw a lower rate of adoption, but businesses expressed significant interest in these for the coming year. In fact, around one-quarter of all IT departments plan to adopt one or more of these initiatives in the next 12 months. IT energy measurement is a particularly important initiative since its data quantifies the true cost of energy used by IT, and allows management to determine which parts of IT's infrastructure should be optimized next. One Danish IT manager, who recently adopted energy metering for the server room, explains, "We can install [meters] to track usage and make efficiency gains now and in the long run."

The benefits of some of the lesser-adopted initiatives are not well understood by respondents in this study. However, as organizations begin to understand the complete roster of cost-savings benefits associated with these initiatives, adoption will increase. New server room builds, telecommuting and IT energy measurement – are rated among the most successful initiatives overall. This again emphasizes that there are appreciable savings to be realized through Green IT initiatives.

Over 80% of companies have already adopted or are planning to adopt Green IT initiatives in the near future
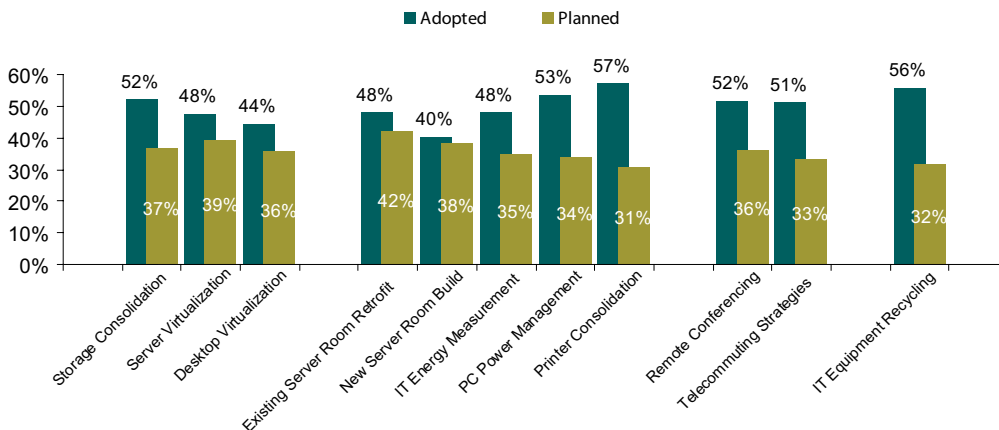
One mid-size British and North American retailer located its new server room in a sustainable, mixed-use building, and virtualized two full racks to a single, half-full blade rack, cutting their required space in half. The firm now heats living and office space using server room air.

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Businesses Look to Green IT for Business Benefits & Cost Reduction

Green IT initiatives present IT with opportunities to reduce carbon footprints and costs. However, there is a fine balance between adoption due to a genuine concern for the environment versus gaining business, cost and public relations benefits.

In this study, almost all initiatives were driven approximately 60% by business reasons and 40% by environmental reasons. This echoes the sentiments of one CTO at a Canadian electronics manufacturer: "Rising costs of fuel and electricity furthers the business case, so even if it wasn't a green initiative, the business case is there. So, it's not that we're tree huggers, but we're interested in saving money, as well as consumption and emissions."

"Cost cutting is important, but [our] philosophy is that we live in this world and we want to be good neighbors."

This 60/40 split plays out before and after implementation. However, as organizations learn, during implementation, about the positive environmental impact these initiatives have, the importance of environmental benefits increases somewhat. Indeed, initiatives not originally implemented for environmental benefits are now recognized as ones that have a positive effect on both the bottom line and carbon footprints. This is particularly true in travel reduction and virtualization & consolidation, where the environmental importance of implementation increased most significantly after implementation. As one VP of IT at an international investment firm expresses, "Cost cutting is important to every organization, let's be real, but [our] philosophy as an organization is that we live in this world and we want to be good neighbors. With our new investments, we are doing both."
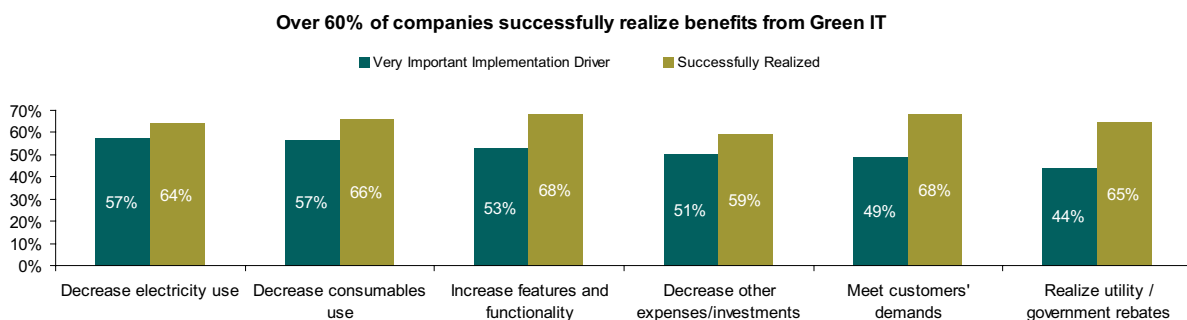
Most mid-size businesses require a positive return on investment to undertake Green IT initiatives. Only 20% of respondents, comprising Green Advocates, a group detailed in the Green IT Personalities section, place equal emphasis on business and environmental drivers.

Green IT may be an Urgent Priority if Budget Cuts or Compliance are Required

There are factors beyond the control of IT that create a sense of urgency in Green IT. In today's current economic climate, the primary driver for the majority of IT initiatives will be the ability to provide a solid return to the business. However, businesses should understand that "greening'"is possible while making a solid ROI. Although factors affecting the urgency to implement differ for each initiative, three additional drivers are seen in this study: reducing costs due to budget cuts, reducing consumption due to resource restrictions and complying with local laws.

Factors Driving Implementation

Six key benefits come up when respondents explain why they adopt Green IT initiatives. In order of popularity, they are: decreased electricity use, decreased consumables use, increased features and functionality for the business (e.g. a key feature of virtualization is the ability to employ a single physical server in the provisioning of multiple, virtual servers), decreased expenses or investments, meeting customers' demands and realizing credits or rebates from local utilities or governments. Controlling costs is the most popular factor driving implementation across initiatives: the ability to decrease use of electricity and other consumables, both of which are chosen by more than half of respondents. Interestingly, initiatives with the widest adoption have decreasing electricity and consumables use as the most popular reason for implementation. This is not surprising, since reductions in electricity and consumables such as paper and fuel translate into immediate cost-savings.

Over 60% of companies successfully realize benefits from Green IT

■ Very Important Implementation Driver   ■ Successfully Realized

	Decrease electricity use	Decrease consumables use	Increase features and functionality	Decrease other expenses/investments	Meet customers' demands	Realize utility / government rebates
Very Important Implementation Driver	57%	57%	53%	51%	49%	44%
Successfully Realized	64%	66%	68%	59%	68%	65%

Green IT Outcomes

There is much to learn from organizations implementing Green IT initiatives. No single piece of information, however, is more compelling than the level of success organizations have seen. The benefit most commonly realized by 68% of companies was the ability to increase features and functionality. This includes enhancements in computing or storage capacity, and meeting employee demands for features or environmental action. Overall, 65% of companies successfully realized one of the major benefits of Green IT – a positive sign for companies considering these initiatives.

The chart below displays the main benefit realized by each initiative for the top four implementation drivers: decreasing energy costs, decreasing consumables used, increasing features and functionality, and decreasing other expenses or future investments. Storage Consolidation for example, had two main benefits: the enhancement of features and functionality due to the resulting increased computing capacity and reliability, and the reduction of future investments needed for storage hardware.

MAIN BENEFIT OF INITIATIVES		Decreased Energy	Decreased Consumables	Increased Features & Functionality	Decreased Other Expenses / Future Investments
VIRTUALIZATION & CONSOLIDATION	Storage Consolidation			●	●
	Server Virtualization & Consolidation			●	
	Desktop Virtualization & Thin Clients				●
ENERGY EFFICIENCY	Existing Server Room Upgrades			●	
	New Server Room Build				●
	IT Energy Measurement			●	
	PC Power Management	●			
	Printer Consolidation & Reduction	●			
TRAVEL REDUCTION	Remote Conferencing & Collaboration		●		
	Telecommute Strategies & Capabilities		●		
ASSET DISPOSAL	IT Equipment Recycling		●		

"It's not that we're tree huggers, but we're interested in saving money as well as consumption and emissions."

Regulations Around the World

Kyoto Protocol: Environmental treaty developed by the United Nations, and ratified by several countries (excluding the US who declined ratification). Sets targets for countries to reduce greenhouse gas emissions.

Waste Electrical and Electronic Equipment (WEEE) Directive introduced in 2002, and enforced in February 2003 for all EU member states. Restricts the use of hazardous material in electronics and promotes proper recycling.

Energy Conservation Act introduced in 2001: This was enacted by the Indian government to encourage energy efficiency. The Bureau of Energy Efficiency will enforce strict policies for energy consumption and supply.

National Greenhouse and Energy Reporting Act introduced in 2007, and enforced as of July 2008 in Australia. This law requires all corporations to produce reports on their greenhouse gas emissions, and energy production and consumption.

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Part II:
Consolidation & Virtualization

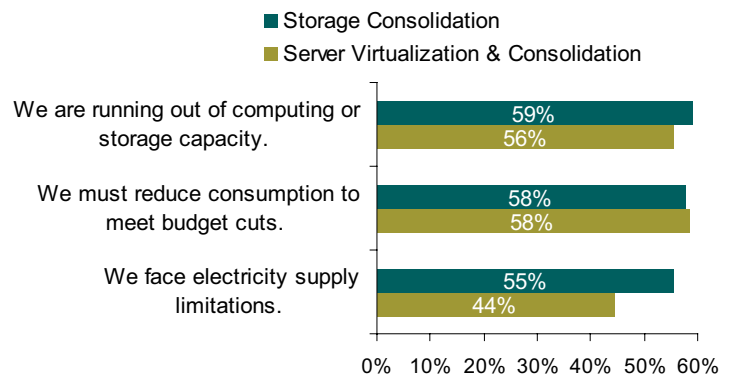## Storage Consolidation & Server Virtualization

Storage consolidation and server virtualization receive considerable attention as they offer a host of benefits in cost efficiency and ease of management – in addition to clear reductions in energy use. In our study, around 25% of mid-size businesses have already completed some form of storage consolidation or virtualization, and another 50% are planning for these initiatives within 12 months.

Businesses cite the following as most important when making consolidation and virtualization decisions:
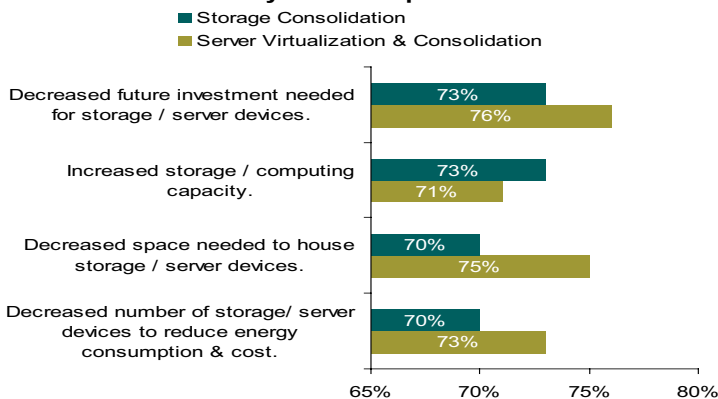- Decrease the overall number of devices running in the server room, along with the square footage needed to house these devices.
- Decrease the energy required to run servers and storage, along with the associated cost and greenhouse gas emissions.
- Decrease the cost of future investments in physical servers and storage devices. By operating server room assets at higher utilization rates, many IT shops will require fewer purchases during future refreshes.

Another serious consideration is reducing time needed for maintenance and management. Using server virtualization, IT departments can quickly change virtual server configurations, avoiding the time-consuming labor required by physical servers. Likewise, management of storage space is simplified when data is centralized on only a few systems.

Virtualization addresses urgent IT issues

- ■ Storage Consolidation
- ■ Server Virtualization & Consolidation

	Storage Consolidation	Server Virtualization & Consolidation
We are running out of computing or storage capacity.	59%	56%
We must reduce consumption to meet budget cuts.	58%	58%
We face electricity supply limitations.	55%	44%

(0% 10% 20% 30% 40% 50% 60%)

Over 70% of virtualization projects successfully realize important benefits

- ■ Storage Consolidation
- ■ Server Virtualization & Consolidation

	Storage Consolidation	Server Virtualization & Consolidation
Decreased future investment needed for storage / server devices.	73%	76%
Increased storage / computing capacity.	73%	71%
Decreased space needed to house storage / server devices.	70%	75%
Decreased number of storage/ server devices to reduce energy consumption & cost.	70%	73%

(65% 70% 75% 80%)

Running out of processing power

The case for consolidation and virtualization doesn't arise solely from a desire to reduce equipment counts, energy use and CO2 emissions. In fact, the need for these technologies is often the result of a classic IT problem: The crushing demand for computing and storage in modern, digitally driven businesses. Indeed, this is the most pressing issue spurring adoption. Up to 60% of businesses report they will run out of processing or storage capacity within the year.

The traditional method of adding capacity – installing physical servers and hard disks – is hindered not only by sheer inefficiency, but by budget constraints and "grid issues". The conventional model of adding hardware doesn't scale well for cost savings – and almost 60% of organizations cited budget issues as a major factor for optimizing the cost of processing data through virtualization and consolidation. The final factor driving organizations to virtualize and consolidate is electricity capacity. Many server rooms simply can't handle the additional load of new physical equipment.

Success in storage and server virtualization projects

Companies that have adopted storage consolidation and server virtualization achieved overwhelming success. Three-quarters of organizations achieved their No. 1 objective: to decrease the number of devices running in the server room. One Danish business services IT manager explains that, "In our own shop, we were at a high of about 110 devices, and through virtualization we have that down to 58. " The spinoff effects of this accomplishment – decreased space requirements, energy consumption and management and maintenance time – are often realized as well. And, in more than 7 of 10 cases, IT successfully addresses critical computing and storage capacity issues.

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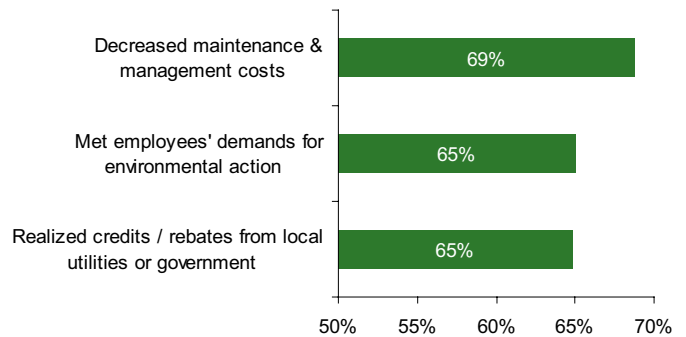
Desktop Virtualization & Thin Clients

Moving desktops to a virtual environment and employing thin-client machines reduces energy consumption and environmental impact of user infrastructure. As one senior partner at a 100-employee services firm reports, "[Thin clients have] no CPU, no RAM, no moving parts, and connect to the virtual desktop environment. Our typical computer used up to a 250-watt power supply; our thin client uses a 4.8-watt power supply, so the reduction in electricity usage is 97, 98 percent, with all the functionality. " Energy savings result, as does cost avoidance, thanks to extended refresh cycles provided by thin client equipment.

Realizing the Benefits

Decreasing costs of maintenance and management is cited as the most important factor driving implementation, realized by 69% of companies. As one IT Manager of a 350-employee company in the Netherlands says, "We tried to reduce IT [employee] headcount ...and by putting in thin clients, we could justify reducing service-desk staff."

Over 65% of Desktop Virtualization projects successfully realize important benefits

Benefit	Percentage
Decreased maintenance & management costs	69%
Met employees' demands for environmental action	65%
Realized credits / rebates from local utilities or government	65%

Additionally, up to 65% of companies satisfy employee demands for environmental action, and earn credits and rebates from local utilities and governments. The latter is not surprising due to the recent surge of financial incentives being offered by utility companies, such as Pacific Gas and Electric, as an incentive for various virtualization initiatives.

CASE STUDY

US wholesaler saves $40K in energy

Organization: Mid-size American wholesaling and retailing organization, specializing in the construction industry.

Situation: This firm is interested in saving energy, dollars – and in the process, the environment. The IT Director explained, "We're interested in initiatives that are going to save money, energy and then the environment. Anything along these lines will get investigated, and probably adopted."

Approach: Realizing they had many servers running single applications, with a boatload of maintenance costs, the firm felt they could greatly reduce operational and energy costs by upgrading to new server boxes running many applications at once. The organization virtualized 37 servers running 40 applications onto a rack of eight blade servers. The business later installed specific energy sub-meters in the server room to baseline specific equipment energy draw. "We admit that it would have been nice to do this with virtualization a year ago, so we can better identify future optimizations," said the IT Director.

Result: $40,000 in energy savings per year; reduced maintenance time for server room staff; increased flexibility to test and run new applications on the go.
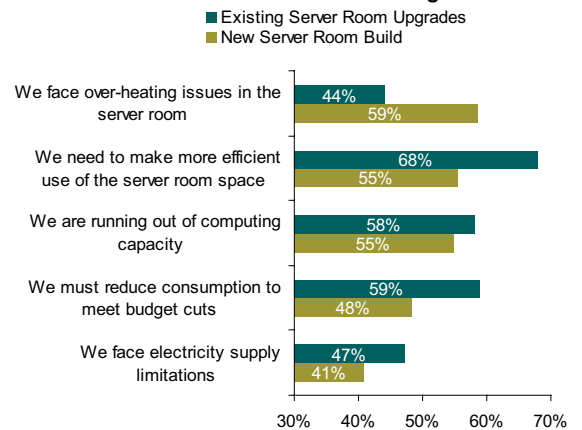
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Part III:
Energy Efficiency

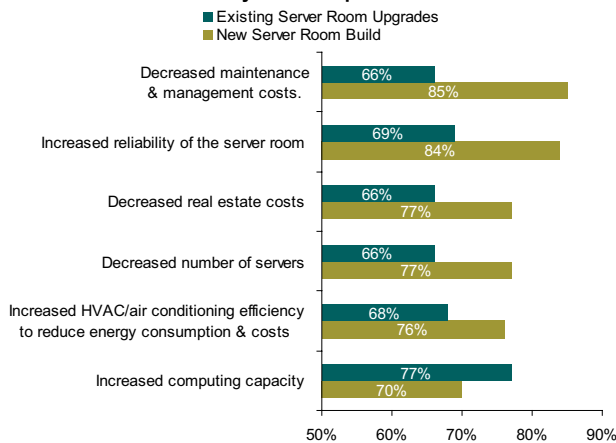# Server Room Upgrades & New Server Room Builds

Mid-size businesses face a preponderance of issues when it comes to the server room. In this study, businesses cite the following reasons for undertaking server room upgrades and the construction of new server rooms:

- Decrease cost and increase effectiveness of cooling and ventilation systems. Many existing HVAC systems cannot keep up with smaller, more powerful servers that throw off more heat than older, low-density equipment. Most server rooms were not designed to keep pace with the modern complement of fully virtualized servers and consolidated storage.
- Increase server and computing capacity. Server room spaces are simply maxed out; they are either too small to house needed servers, or inadequately equipped to deal with a high rate of virtualization on fewer devices that run hotter.
- Questionable reliability of aging server room infrastructure; the server room design of yesterday no longer supports business needs of today, in terms of up-time and availability.
- Mounting maintenance and management costs for older facilities, which may not affordably handle growth of computing and storage.
- The need to decrease real estate costs, through server room infrastructure that supports denser, smaller footprints of new servers and storage.

Server Room initiatives address urgent IT issues
- Existing Server Room Upgrades
- New Server Room Build

We face over-heating issues in the server room	44% / 59%
We need to make more efficient use of the server room space	68% / 55%
We are running out of computing capacity	58% / 55%
We must reduce consumption to meet budget cuts	59% / 48%
We face electricity supply limitations	47% / 41%

Over two-thirds of server room projects successfully realize important benefits
- Existing Server Room Upgrades
- New Server Room Build

Decreased maintenance & management costs.	66% / 85%
Increased reliability of the server room	69% / 84%
Decreased real estate costs	66% / 77%
Decreased number of servers	66% / 77%
Increased HVAC/air conditioning efficiency to reduce energy consumption & costs	68% / 76%
Increased computing capacity	77% / 70%

What pressing issues do server room projects address?

The above list is not just a roster of benefits for mere consideration. In fact, a number of issues cause serious performance and reliability problems for organizations. For example, almost half of businesses face immediate overheating issues, while 68% said that making more efficient use of server room space is paramount. Almost 60% said they had to reduce server room operational costs – through efficiency upgrades – to meet budget constraints. "We would have run out of power long ago if we hadn't virtualized almost all of our servers already," said one IT Director in the a global food wholesaling firm. "We had a pent-up demand for major changes to the server room . . . to avoid equipment failures, and to have enough power to run things going forward." The need for new server rooms is also underscored by pressing reliability, energy efficiency and capacity concerns. The majority of businesses completing a new server room report major overheating issues in the existing facility as their most pressing issue. In half of all cases, organizations also seek to increase energy efficiency per square foot of space and create additional computing capacity.

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Server room projects achieve great success?

Three-quarters of organizations that have upgraded their server rooms, or built new ones, report successful outcomes. In most cases, the projects meet or exceed top goals identified at the outset: decreased maintenance, increased reliability of the server room and increased efficiency and cost effectiveness of air conditioning and ventilation systems. One CTO of a mid-size US financial services firm reports he is "extremely pleased" with the results of his server room upgrade: the organization consolidated 250 aging servers into a new, more efficient server room, equipped to house 10 new mainframes servers.

Existing server room upgrades represent a lower capital expense than breaking ground on a new facility. However, the trade-off for benefits does not appear to be punitive: At least two-thirds of organizations upgrading the existing server room facility are happy with the results. Of particular importance is the success in increasing computing capacity, with 7 in 10 businesses able to realize this. At the end of the day, many mid-size firms may well be able to continue to operate with the existing facility, provided they choose appropriate upgrades.

From an environmental standpoint, the single biggest benefit comes from more efficient use of each watt that enters the server room. IT can hold total energy costs steady, along with the associated environmental footprint, while computing capacity grows, through modern practices supported by a new facility.

"We had a pent-up demand for major changes to the server room . . . to avoid equipment failures and to have enough power to run things going forward."

CASE STUDY

Server room upgrades save a Danish Manufacturer 80% in energy costs

An 800-employee Danish manufacturer upgraded its cooling technology in the server room by installing equipment that employs cold, outside air to reduce the need for air conditioning, thereby reducing energy costs. The IT specialist says that by adopting "free cooling," the firm's air conditioner – a traditional tool in cooling its 270 square-foot server room – is only used about 25% of the time. Additionally, an investment in blade servers and virtualization allowed the company to expand processing capacity without adding physical space.

Expanding the facility to accommodate new servers would have been a costly endeavor, so the company opted to invest in blade technology instead. This combination of cooling upgrades and server modifications – once fully implemented – should save the firm 65-80% in energy costs over current consumption. "We only have so much power going into the server room. Server needs are bigger, and each year we increase our storage by 100 percent. So, that's the motivation [for the upgrades]."
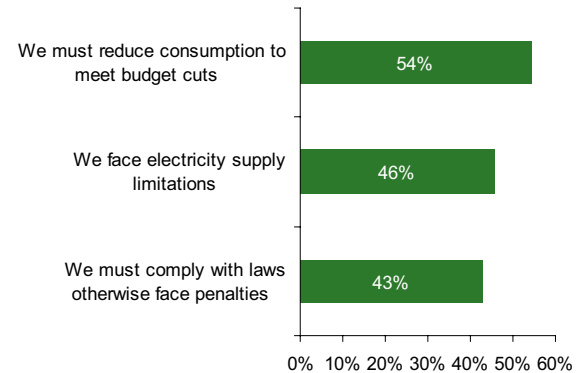
IT Energy Measurement

You can't manage what you can't measure: This is a common refrain in leading-edge organizations where IT is increasingly under pressure to manage energy costs. Our mid-size respondents are taking note: Almost one-quarter have already finished some form of energy measurement project, and up to half plan to do so in the coming year. Initiatives in this group include sub-metering for the server room, PC energy measurement and assessment of total IT energy use. Businesses consider energy measurement most useful for the following:

- Provide evidence for increasing efficiency in existing and future IT practices. Many organizations seek to understand, roughly, the level of energy efficiency at which they currently operate and how they can begin to improve.

- Measure server room consumption. Many CIOs want to decrease the power consumed by servers and the server room.

- Surprisingly, many IT organizations report their energy initiatives are in response to customers' demands for action. As major customers question their supplier's environmental performance, firms find it necessary to have quantifiable results as part of their answer. For IT, energy consumption data is most important in understanding environmental performance.
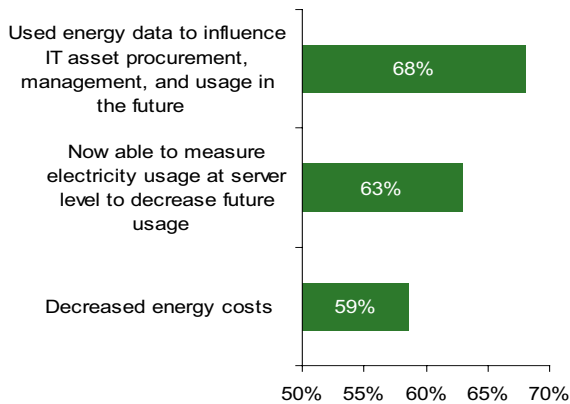
A number of other issues influence the decision to measure energy. Budgetary constraints are an issue in more than half of IT departments, where the pressure to reduce consumption is great. One CIO explains that, "We installed power meters to get a granular view of where our power consumption occurs. We charge internal customers for the electrical consumption of their servers within the server room. It forces [departments] to think economically about consumption and what they're doing with the budget."

IT Energy Measurement addresses urgent IT issues

We must reduce consumption to meet budget cuts	54%
We face electricity supply limitations	46%
We must comply with laws otherwise face penalties	43%

0% 10% 20% 30% 40% 50% 60%

Electricity supply limitations – often within the server room – force IT to "create" energy capacity through more efficient use of energy. Finally, 43% of businesses expect to feel regulatory pressure, relating to energy efficiency, within a year.

IT Energy Measurement projects realize important beneifts

Used energy data to influence IT asset procurement, management, and usage in the future	68%
Now able to measure electricity usage at server level to decrease future usage	63%
Decreased energy costs	59%

50% 55% 60% 65% 70%

Energy Measurement used as a Strategic Tool

Armed with the knowledge of energy conditions, most businesses agree they can make improvements. For businesses already engaged in energy measurement, almost 70% use the data to improve IT operations, and almost two-thirds report a better sense of how much energy is consumed by servers. Almost 60% of businesses are happy with the decreased energy use that results from energy-related projects.

CASE STUDY

Energy measurement helps apparel manufacturer make the grade

This 400-employee sports apparel manufacturer's journey began with the CEO. He committed to moving the organization's environmental practices to a leadership position – with a goal of carbon neutrality by 2020. The VP of IT explains, "This commitment ramped up in 2006, with the hiring of an environmental affairs officer," who performed a full eco-audit, and now monitors all consumption, sets targets for each facility, and identifies large impact reduction opportunities. Having pitched in three years ago, IT measured the server room energy footprint. A local utility then provided credits when the organization reduced energy use through server consolidation, resulting in thousands in refunds on the utility bill.

Printer Consolidation

For more than 65% of companies, decreasing consumables such as paper, toner, ink and energy are driving forces behind printer consolidation and reduction. As one manager of a 1000-employee insurance firm said, "We eliminated 300,000 pages of output a year by moving to print-on-demand . . . with [savings of] six to nine cents per page". The firm realized operational savings of nearly $30,000 year-over-year.

Additionally, many businesses wish to reduce maintenance and management costs associated with scattered printer fleets composed of different makes, models and hardware requirements.

The majority of businesses are happy with the decreases they see in paper, toner and ink consumption. More than two-thirds report that projects meet or exceed energy consumption goals. This is not surprising, since typical mid-size companies have the potential to reduce fleet size by two-thirds, as one 350-employee international services firm did.

"We eliminated 300,000 pages of output a year by moving to print-on-demand . . . with savings of six to nine cents per page."

PC Power Management

Many look to managing end-user device power consumption as an easy, effective way to reduce energy costs. These power management initiatives include the following:

- Using software that centrally manages energy settings of PCs and monitors.
- Enforcing standardized power settings on all PCs before distributing to end users.
- Procuring energy-efficient equipment, such as Energy Star certified devices.

Every kilowatt counts

Older computers can use up to 300 watts during peak load, but less than eight watts during sleep modes. By maximizing the number of PCs and monitors controlled for hibernate, sleep or shut-down times, companies reduce the amount of energy consumed during lengthy idle times, particularly overnight. Procuring Energy Star-compliant devices or more energy-efficient equipment can also reduce power consumption during equipment use. This includes replacing old desktops with laptops, or refreshing CRT monitors with LCD flat-screens. Altogether, these power management strategies result in significant energy and maintenance cost savings; such benefits are realized by 65% of companies that complete such initiatives.

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Part IV:
Travel Reduction

Remote Conferencing & Telecommuting Strategies

Given recent jumps in fuel costs and greater awareness of harm caused by greenhouse gas emissions, many companies wish to reduce travel to cut costs and decrease negative impact on the environment. The initiatives in this study consist of the following:
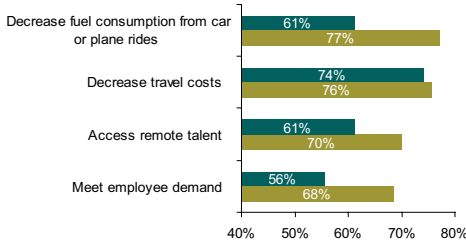
Remote Conferencing & Collaboration

- Video-conferencing and teleconferencing implementations between facilities or between office and client sites.
- Online collaboration environments.

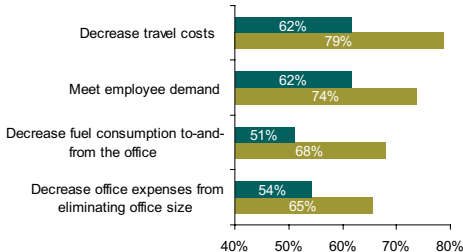**Telecommuting Strategy & Capabilities**

- Virtual Private Network (VPN), remote access, and unified or voice communications capabilities to enable access from home and other remote locations.
- Policies and strategies allowing or encouraging employees to work from home.
- Policies allowing or enforcing employees to work "Four-Tens" (4 days a week, 10 hours a day).

Travel reduction initiatives reduces costs and keeps employees satisfied

■ Very Important Implementation Driver
■ Successfully Realized Benefit

Remote Conferencing & Collaboration

Driver	Very Important Implementation Driver	Successfully Realized Benefit
Decrease fuel consumption from car or plane rides	61%	77%
Decrease travel costs	74%	76%
Access remote talent	61%	70%
Meet employee demand	56%	68%

Telecommuting Strategies & Capabilities

Driver	Very Important Implementation Driver	Successfully Realized Benefit
Decrease travel costs	62%	79%
Meet employee demand	62%	74%
Decrease fuel consumption to-and-from the office	51%	68%
Decrease office expenses from eliminating office size	54%	65%

Cutting travel costs where it counts

Not surprisingly, businesses adopting travel reduction initiatives seek to decrease the travel and fuel consumption costs associated with driving or flying between office locations and to client sites. These initiatives not only reduce costs of fuel, flights, hotels and related expenses, but also result in higher employee satisfaction. After implementation, more than three-quarters of organizations report their expectations regarding travel cost savings are either met or exceeded. As one CTO of a 115-employee financial services firm expresses, "The first time we ever had a board meeting where we decided not to send West coast folks to the East... we bought a $17,000 system, but it paid for itself in having everybody on a video-conference for just that session."

Keeping your people happy

Another major factor pushing companies to implement these initiatives, particularly telecommuting strategies, is to satisfy employees. This rang true for one CIO of a North American public company who notes that, "Our employees, faced with high gas prices, are coming back to us and saying, 'I really like working here but I'm driving 30 miles one way, I may have to look at something else. People don't want to move, especially for the salaries that we can pay. Telework is going to open up some avenues for us to get employees that are, frankly, out of our reach right now."

Organizations are also gaining access to remote talent that they otherwise would not be able to tap. In two-thirds of all travel reduction projects, organizations report their employees are very satisfied with the increased flexibility they are now offered.

CASE STUDY

German financial services firm cuts environmental footprint of travel

A 100-employee German financial services firm proves that even businesses with a small environmental footprint can save money by going green. According to its IT Director, "We've been given full support for two things: go green and cut costs." Indeed, from a management perspective, the firm's decisions are driven by cost savings. However, the CFO pays particular attention to decisions involving energy and consumables, since major cost savings and environmental benefits usually both result. It comes as no surprise, then, that the CFO was the first person to push a comprehensive telecommunications strategy to reduce travel pollution and expenses and excessive voice communications costs (a typical issue in German businesses). IT implemented a strategy which included a new VoIP backbone, a custom instant messenger, and wikis. Moreover, customer and internal communications were moved, successfully, to web conferencing for meetings whenever possible. Reductions in travel and telecom costs resulted.

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Part V:
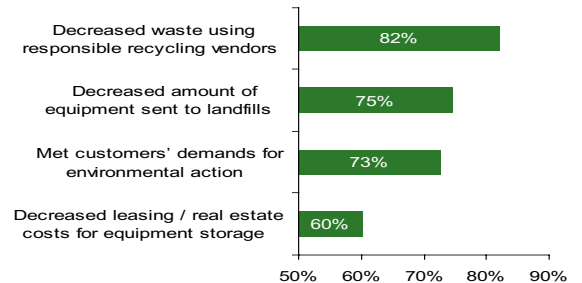## Asset Disposal

IT Equipment Recycling

Out of all initiatives in this study, the success of IT equipment recycling relies not on a business case with cost savings, but on a combination of environmental responsibility and regulatory pressures.

The single most important factor in adopting recycling initiatives is to decrease waste sent to landfills. A close secondary consideration is ensuring equipment is responsibly discarded at end of life. Additionally, there appears to be greatly increased customer demand for responsible recycling practices. Space, too, plays an issue: Many IT departments are simply running out of closets and crannies to store old equipment.

IT Equipment Recycling is successful in reducing environmental waste

Decreased waste using responsible recycling vendors	82%
Decreased amount of equipment sent to landfills	75%
Met customers' demands for environmental action	73%
Decreased leasing / real estate costs for equipment storage	60%

50% 60% 70% 80% 90%

A Picture of Success, For Those Who Recycle

More than 80% of organizations that got into the habit of equipment recycling are happy with their performance in responsible disposal, having dramatically reduced the amount of equipment they send to the dump. Moreover, these organizations get a big nod from customers for developing a recycling mandate. After facing some hard questions from his customers, one IT director of a corporate services firm said, "We get to go back to show our clients that these things aren't ending up in landfills – we're either reusing the equipment when we can, otherwise it's being recycled – and it's the responsible thing to do."
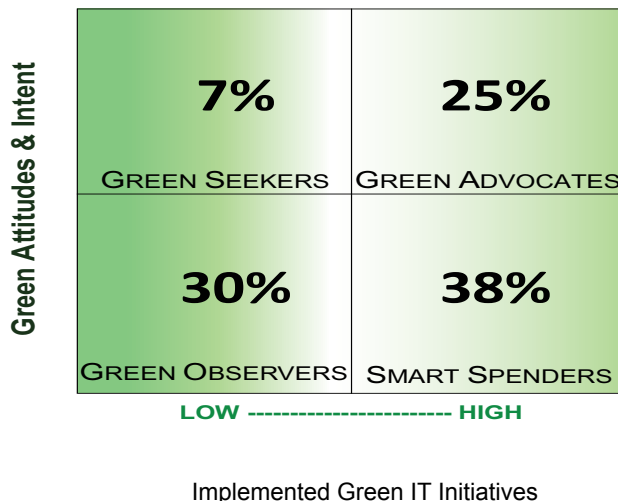
Part VI:
Green IT Personalities

IT has Four Distinct 'Green' Personalities

Through conversations with IT and business decision-makers, and in survey results, four predominant Green IT Personalities emerge. These Personalities are built from two areas. The first area concerns Green IT attitudes and intention, or the range of approaches businesses and IT take toward environmental issues. The second area examines implemented Green IT initiatives – which ones businesses have adopted, and the rationale for adoption.

The Green IT Personality Matrix plots Green Attitudes & Action on the vertical axis, and Implemented Green IT Initiatives on the horizontal. The four Personalities are Green Advocates, Smart Spenders, Green Seekers and Green Observers. Read on to understand each personality, and where your IT department fits. Then, understand the steps required to move forward with Green IT in your organization.

Which personality are you?

- Does your business have aggressive environmental policies and goals?
- Are environmental realities built into the way your firm does business?
- Do you have several IT initiatives already underway or complete, along with green procurement and recycling policies?
  If yes, your business is likely a GREEN ADVOCATE.

- Is senior management at your firm sharply focused on cost control?
- Has IT has taken advantage of Green IT initiatives that decrease IT's operational costs and lessen investments in your infrastructure?
- Is the environment typically a secondary consideration?
  If yes, your business is likely a SMART SPENDER.

- Have you been tasked to investigate ways to improve the organization's environmental standing while keeping costs in mind?
- Has senior management team recently established green goals?
- Have you undertaken some Green IT initiatives, but you aren't sure what the next best step for IT is?
  If yes, your business is likely a GREEN SEEKER.

- Your management team hasn't made an environmental mandate a priority? IT is most interested in realizing ongoing cost savings, without much thought regarding energy use?
- You don't have formalized recycling policies?
  If yes, your business is likely a GREEN OBSERVER.

Green Attitudes & Intent

7% GREEN SEEKERS	**25%** GREEN ADVOCATES
30% GREEN OBSERVERS	**38%** SMART SPENDERS

LOW ----------------------- HIGH

Implemented Green IT Initiatives

CASE STUDY — Green Advocate

This 60-store British and North American retailer was founded by a conservationist with a passion for sustainable business. Beyond hoping to make every employee an activist, he requires IT to pursue energy-efficiency. IT first automated low-power modes for stores outside operating hours. Next, IT located a new server room in a mixed-use building, virtualized two full racks to a single, half-full blade rack and cut required space by half. Now, they also heat living and office space using server room air. Beyond energy savings, the IT Director explains, "When we buy one server for $10,000 versus 7 servers at $3,000, there's huge ROI." Additionally, all equipment is now recycled by a vendor with responsible recycling accreditation. A new print-optimization program for 75 printers will minimize toner and paper use and cost-per-page. The response from end users? "Across the board, our users are tuned into being green. And they would all be more than happy to shut their machines down before they walk out the door."

Green Seekers

Green Seekers make up 7% of organizations in this study.

Attitudes & Intents:
- Having implemented basic measures, such as paper recycling and CFC bulb replacements, Green Seekers aren't sure where to go next. They wish to reduce environmental impact, but are unsure of how to start and what works for their infrastructure. Competing ideas burden managers trying to get their bearings.
- Some Green Seekers face regulations – such as equipment recycling rules – and must comply.
- A Green Seeker's competitors may be adopting green practices – and the business is wondering how to catch up.

Action in IT:
- Have typically completed initiatives with business benefits that also pick the "low-hanging fruit" on the green tree. For example, the firm's employees have benefited from the flexibility of telecommuting, but IT isn't sure how to quantify CO2 emissions reductions from this.
- IT is unable to discern which projects offer both environmental benefits and cost savings.

Policies in IT:
- IT does not have a green procurement policy or energy measurement efforts, and isn't sure where to start.
- However, IT may have unofficial support for telecommuters or an informal recycling initiative for common equipment.

Next Steps: To understand which initiatives offer cost savings and environmental impact reduction, Green Seekers must determine IT's sweet spot. For example, with 1,000 workstations and five servers, user infrastructure is a better place to baseline energy and plan appropriate initiatives. Initiatives must be accompanied by standard processes (for example, in equipment procurement and recycling), measurement tools (for understanding energy costs), and management that encourages IT and facilities to optimize energy use together.

Green Observers

Green Observers make up 30% of organizations in this study.

Attitudes & Intents:
- Green Observers are unlikely to have an environmental policy; beyond minor grassroots efforts, such as paper recycling, not many initiatives are underway.
- However, this is not necessarily due to skepticism or outright opposition. In most cases, Green Observers are unaware of the relative ease of select initiatives, or they don't recognize potential energy and cost savings available through some projects.

Action in IT:
- Common initiatives include server virtualization, printer consolidation and remote conferencing. However, IT chooses these for specific business reasons, such as avoiding a new server purchase, reducing operational costs or decreasing company travel.
- IT has less knowledge of how these initiatives decrease the company's environmental footprint, and considers them for business reasons other than energy efficiency.

Policies in IT:
- IT does not have a green procurement policy, energy measurement efforts, official travel reduction or telecommuting mandates, or a full equipment recycling initiative yet.

Next Steps: Education is the first step. Making the links between energy efficiency, cost savings and the environment is necessary for understanding Green IT initiatives. Beyond education, it is imperative that an Observer organization get senior management support – perhaps by emphasizing the cost savings benefits – for all initiatives.

Green Advocates

Green Advocates make up 25% of organizations in this study.

Attitudes & Intents:
- Environmental considerations are integrated into all business operations; this is driven by multiple stakeholders, and usually has management sponsorship.
- Employees tend to be educated on environmental issues, and state that minimizing environmental impact while doing business is a major goal.
- Cost savings through energy and consumables reduction are important, but not the only reason for a green initiative gets approval.

Action in IT:
- IT goals for minimizing consumption; to meet this goal, a variety of initiatives have been customized to the firm's infrastructure and adopted.
- Metrics, in terms of kilowatt-hours or at least energy costs, which are tracked to baseline and improve performance.

Policies in IT:
- Environmentally preferable procurement and responsible recycling policies.
- Policy of energy and consumables tracking and reporting to senior management, who expect continuous improvements in environmental performance.
- Full telecommuting and travel avoidance policies and strategies.

Next Steps: Green Advocate organizations should focus on continuous improvement when approaching major infrastructure refreshes. For example, a desktop refresh may be an opportunity to deploy virtualized desktops on thin clients, which consume less energy Such opportunities should be explored on an ongoing basis. Moreover, publicity on environmental leadership is a given for any Green Advocate firm able to quantify results.

Smart Spenders

Smart Spenders make up 38% of organizations in this study.

Attitudes & Intents:
- Costs are carefully controlled – and, often unknowingly, so is environmental impact. While costs are well accounted for, IT and the business doesn't always realize that smart spending can reduce environmental impact.
- Environmental mandates may not exist, and if they do, senior leaders may not translate reduced consumption into an environmental benefit.

Action in IT:
- Minimize paper use, reduce company travel, optimize server energy use, and actively manage PC power settings. The greenness of these initiatives is tangible – but plays second fiddle to the main driver of cost effectiveness.
- Use energy and consumables effectively, and target major pieces of infrastructure with suboptimal expenses. Spend money up-front if long-term cost reduction, as demonstrated in a business case, is achievable.

Policies in IT:
- Mandates to purchase energy-saving equipment and shun travel whenever possible are common. However, these policies do not have a green underpinning.
- IT may not have formal energy measurement in place, and therefore has only a rudimentary idea of what energy savings are achieved; however, establishing further measurement could identify new cost savings opportunities.

Next Steps: Recognizing existing initiatives as green is a start. Moving forward, these firms should understand future cost-optimization projects allow decreased consumption and reduce environmental footprint. If management develops a green mandate, the return-on-investment bar may sometimes need to be decreased to approve Green IT projects offering smaller, but still positive returns.

CASE STUDY Smart Spender

A mid-size American financial services firm aimed to get server and travel costs as low as possible – and realized a reduction in its environmental footprint, too. The CTO explains that, "I try to incorporate some green into our practices. Ultimately, it needs a strong financial incentive, but I find that the initiatives usually do." In 2005, IT virtualized 30 servers onto six machines, with 5 kWh savings, hourly (about $4,000 yearly – and 24 fewer servers to replace). It also liberated one full-time employee to work on other tasks. With two offices on opposite coasts, travel reduction made sense; the US$17,000 cost of a video-conferencing setup was covered by savings from a two-day meeting with eight employees who would've otherwise travelled. Besides a philosophy of aggressive cost control, the CTO mused that something intangible is happening: "The Coke can, the newspaper no longer goes in the garbage. Some have developed habits at home and those people are bringing them here. I don't see it as a business thing. It's broader. It's more of a social or community thing."

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Part VII:
Succeeding with Green IT

Key Success Factors for Green IT Projects

The likelihood that companies will successfully implement Green IT initiatives depends on three factors:

1. **Stakeholder Support.** Having the support of key stakeholders is critical to the success of any project but, particularly for Green IT initiatives as they require education and a shift in attitude. Major stakeholders include C-level executives, IT directors, IT staff, employees, and in some cases, property or facilities management. Although gaining buy-in from all levels is important, the likelihood of success is higher when implementations have support of C-level executives – specifically, the CEO. The most successful projects are strongly supported by the CEO in more than three-quarters of implementations. As an IT manager at a finance company said, "One of the reasons we've been able to move forward with this is because of sponsorship and support from the CEO and his executive team. Without that, we wouldn't have the funding to do it. It wouldn't be pushed." Note that all 11 Green IT initiatives had more than 60% of all stakeholders' support – which contributes substantially to the successes demonstrated in this paper.

Less than 20% of Companies Face Extreme Implementation Barriers

2. **Lack of Implementation Barriers.** Companies adopting Green IT initiatives may face barriers that inhibit the successful approval and implementation of these projects. A lack of choice due to missed refresh cycles, inadequate funding, misalignment with physical facilities, and a lack of resources, such as IT staff, can all be barriers. However, we found that less than one-third of respondents cite these as major barriers to implementation; only 7% say they face extreme barriers. The most common barrier for this latter group is a lack of flexibility due to missed refresh cycles.

3. **Economic Tradeoffs.** In light of the current economic situation, respondents were asked to anticipate the impact of the downturn on their revenues, IT budget, prioritization of projects, and funding for Green IT projects for the next 12 months. On average, 61% of respondents do not believe they will be negatively affected in the above-mentioned areas. Included in this figure are over 50% of respondents who do not think funding for Green IT projects will drastically decrease. This paints an optimistic picture for Green IT, especially if presented for cost-cutting benefits, since 38% of companies strongly felt that initiatives of a cost-savings nature would be prioritized going forward.
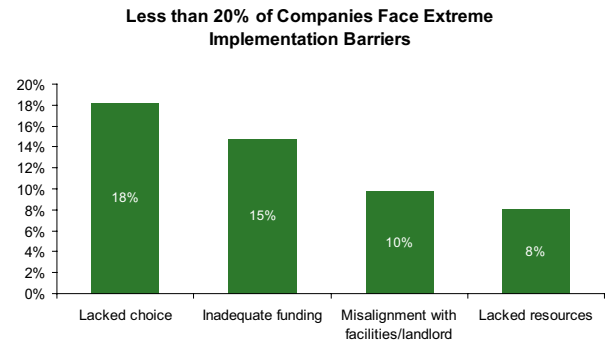
Conclusion

Businesses around the world have discovered that going green isn't just good for the planet; it's good for their bottom lines. The findings in this report highlight how mid-size companies are realizing significant cost savings when they adopt Green IT initiatives.

Many governments are pressing business for action on the environment, through both regulatory regimes and international treaties, and this trend will surely continue. Customers and partners will demand even greater environmental accountability. Employees, too, will start to ask for measures that reduce environmental impact, whether it is the ability to telecommute or to implement a recycling program in the office.

This report demonstrates that IT departments across the globe are committed to minimizing their environmental footprint, despite the challenges presented by the current economic climate. IT decision-makers show significant interest in adopting the 11 initiatives studied in this report. The initiatives' cost reduction benefits, coupled with business intentions in the next year, both signal that greening will continue through 2009 and beyond. Leading IT departments have embraced the cost savings opportunities inherent to increased energy efficiency and reduced consumption, and many others have now recognized these same benefits.

Several issues are acting as catalysts for the adoption of Green IT initiatives. In the server room, for example, almost six in 10 businesses will run out of computing or storage capacity within 12 months. In these cases, improving the server room to accommodate the infrastructure needs of modern virtualization and consolidation techniques will address pressing business needs – as well as provide energy-saving opportunities.

Many of the initiatives studied in this report allow businesses to save energy, money and, in many cases, realize new business capabilities. Telecommuting, for example, can offer businesses the advantage of reducing their office space while providing employees with a more flexible working environment.

In the future, corporate environmental responsibility will become the norm rather than the exception as pressure from stakeholders and governments continues. CEOs will be calling on IT departments to do their part in reducing the organization's overall footprint.

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