

## WHITE PAPER

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### Green IT Barometer

## European Organisations and the Business Imperatives of Deploying a Green and Sustainable IT Strategy

Sponsored by: Dell

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### IN THIS WHITE PAPER

Sustainability is an ever-increasing topic of discussion among corporations looking for ways to improve their ecological footprint while reducing operational costs. 52% of organisations operating a datacentre in Europe with at least 1,000 employees have clear strategies for environmental stewardship and efficient energy use. Those environmental strategies may include reducing overall power consumption, working to extend the useful life of their products and providing equipment recovery and recycling services.

- ☒ 35% of large European enterprises are already relying on IT to drive a green agenda deep into their organisation in response to macroeconomic changes, competitive pressures and existing inefficiencies in current IT infrastructure.
- ☒ Cost considerations, technology changes, upcoming legislation and the need to improve efficiency and TCO all combine to make dealing with "greenness" an imperative for CIOs.
- ☒ Green IT should not be approached as an isolated issue but should become part of the company's IT strategy, and should be embedded in other initiatives and projects such as consolidation and migration.
- ☒ The IT department's position and role is pivotal to the success of green and sustainability initiatives. Its mission to that end should be twofold — ensure that the technology being used is "green" and power efficient, and provide the IT tools and services needed to support a company's overall green investments.



## METHODOLOGY

This Dell sponsored IDC White Paper details the results of the first IDC-Dell Green IT Barometer. Addressing green and sustainability issues brings significant changes to the IT organisation and the infrastructure and applications that must support sustainable practices.

The objectives of this barometer is to assess the green and sustainability challenges European companies are facing today and in the future; to understand the implications on IT and its corporate mission; and to report on green IT best practices implemented by European IT organisations.

The research is based on the following field research:

- ☒ An extensive end-user survey of 459 European IT directors of organisations with more than 1,000 employees and operating at least one datacentre.

Respondents were split across France (100), the UK (74), Germany (80), Italy (52), Spain (51), the Netherlands (51) and the Nordics (51).

The sample included organisations in the services sector (149), the public sector (140), manufacturing, construction and utilities sectors (131) and in the retail and wholesale sector (39).

The distribution of the sample by company size was as follows: 1,000–4,999 employee organisations (369), 5,000–20,000 employee organisations (76) and 20,000 employees and more organisations (14).

- ☒ In-depth qualitative interviews with leading European organisations that have implemented green IT initiatives.

The European organisations surveyed have an average IT budget of €160 million for 2008, operate 3.7 datacentres each and support 4,195 desktop environments. 16.8% of respondents' installed servers are blades. Respondents reported owning on average 82.6% of their IT facility.

## **SUSTAINABILITY AND GREEN: A NEW BUSINESS IMPERATIVE**

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### **Green Agenda Firmly Entrenched in Development Plans**

Supporting long-term environmentally sound practices goes by many names — going green, corporate social responsibility (CSR), sustainability and many more. And guidelines are just as plentiful in the form of regulatory obligations and legislation, consumer demands and even pressure from environmental groups.

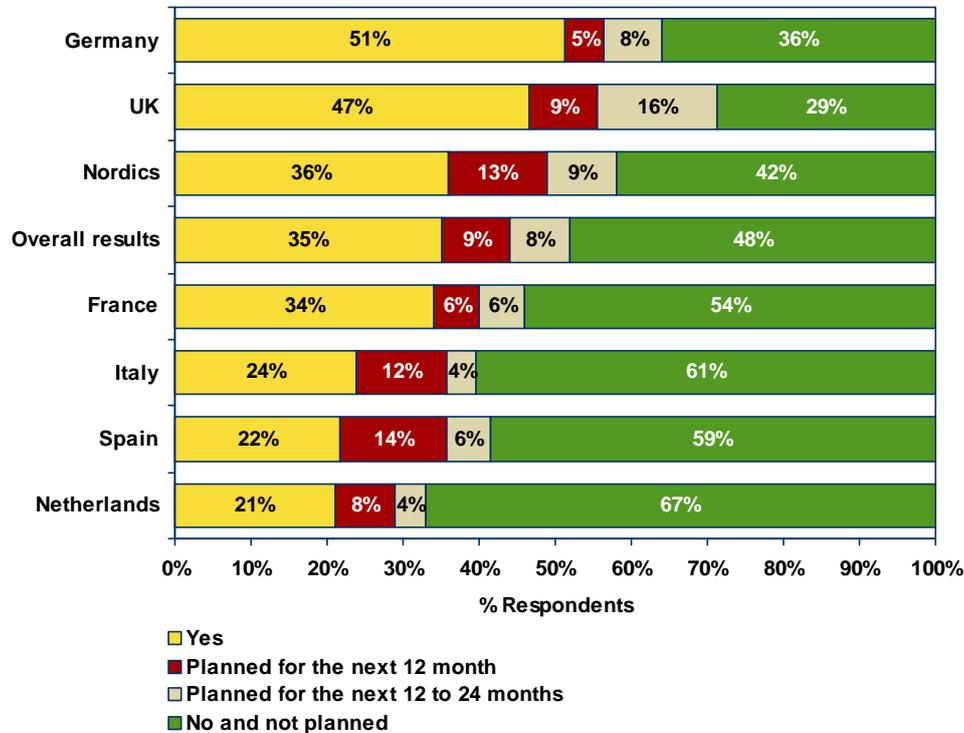
This profusion of terms is highly indicative of the emergence of sustainability as a topic of discussion for computing requirements, which has grown in importance over the past two years. In fact, sustainability has now become a well-defined part of a company's competitive dynamic, having outgrown its initial roots as a green marketing campaign. Organisations are incorporating sustainability into their operations, deploying internal recycling programmes, conducting energy audits in the workplace including the datacentre, encouraging remote working and teleconferencing as a travel replacement, and investing in technology such as server virtualisation to increase datacentre efficiency.

The IDC-Dell Green IT Barometer indicates that almost half of European enterprises are addressing the green and sustainable challenges facing them, with 35% of the respondents reporting that they have a green IT strategy in place, while a further 16% plan to implement a green IT strategy within the next 24 months.

**FIGURE 1**

Large European Organisations and Green IT Implementations

*Do you have a green IT strategy in place for your IT infrastructure?*



n = 459

Source: IDC-Dell Green IT Barometer, July 2008

The rise of green IT on European organisations' agendas has its roots in a number of trends affecting global economies:

- ☒ **The cost of energy continues to increase**, and while short-term fluctuations in energy costs mask a trend, it is clear that most countries will continue to derive their electricity from sources that are increasingly scarce and expensive.
- ☒ **There is mounting evidence of increased carbon emissions and concentrations.** There are measures in place to control carbon emissions and encourage recycling, particularly in countries and regions where this is recognised as being a serious long-term threat. These early efforts have focused on major polluters such as steel manufacturers and power stations, but there are moves to extend similar measures to other industries and to consumers.
- ☒ **Many European and US organisations are faced with price pressure** from lower-cost countries and are looking to differentiate their offerings to their customers based on their business being environmentally responsible. It is perfectly possible for organisations to be established on environmentally sustainable principles and to enjoy higher margins than their competitors due to this strategy.

- ☒ Lastly, it is clear that datacentre equipment will be subject to regulation of its power efficiency. Currently, EU regulations are focused on products that cause more pollution or higher volume products. However, it is highly likely that regulations will be extended to datacentre equipment in the next five years.

In addition, IDC has observed other requirements relating to the datacentre that have emerged over the year and that are now becoming critical. These include:

- ☒ **The age of a datacentre's building facilities and equipment** has prevented customers from making the datacentre as responsive to business needs as is needed. This has resulted in being unable to launch new applications, take advantage of volumes of data, and/or meet regulatory and reporting requirements. Datacentre power infrastructure has not been adapted to the rise of higher-density equipment: blade servers demand an enormous amount of energy and most European datacentres do not have the appropriate power or cooling capacity to accommodate this infrastructure. Power and cooling capabilities are often maxed out, making power provisioning one of the biggest challenges for today's datacentre managers. In addition, most of the equipment currently installed in datacentres is not RoHS compliant, which negatively impacts the green audit of an organisation.
- ☒ **A need to better manage technologies in the datacentre**, partly to make systems more available, partly to reduce the cost of management and increasingly to lower power consumption. IT managers are indeed grappling with operational issues such as "hot spots" while trying to meet the needs of an increasing server population.
- ☒ **A massive growth in the volumes of computing equipment** and growth in associated equipment such as cooling equipment. Air conditioners, power converters and transmission use almost half of the electricity in the datacenter, and IDC estimates that datacentre energy cost will be higher than equipment costs by 2015.

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## **Cost Pressures and Regulatory Compliances Driving Green IT Agenda**

The growth in modular systems, particularly in x86-based systems, has caused the installed base of servers to grow significantly in recent years. The traditional scale-out architecture that has been adopted to date, whereby one server per application is the norm, has resulted in a highly complex and siloed IT environment.

Of course high complexity translates into high cost of management. IDC estimates that for every euro invested in server hardware, seven euros are required to manage that investment through its life cycle. Dynamic IT architectures and modular solutions are certainly a good way to resolve many of the management and complexity issues IT departments face today. However, they fail to address how the power requirement of these systems needs to be managed. This is where green IT investments can play a major role and lead the way to a new level of efficiency for IT organisations.

The IDC-Dell Green Barometer identified two main drivers, external and internal, for organisations' green-motivated IT investments.

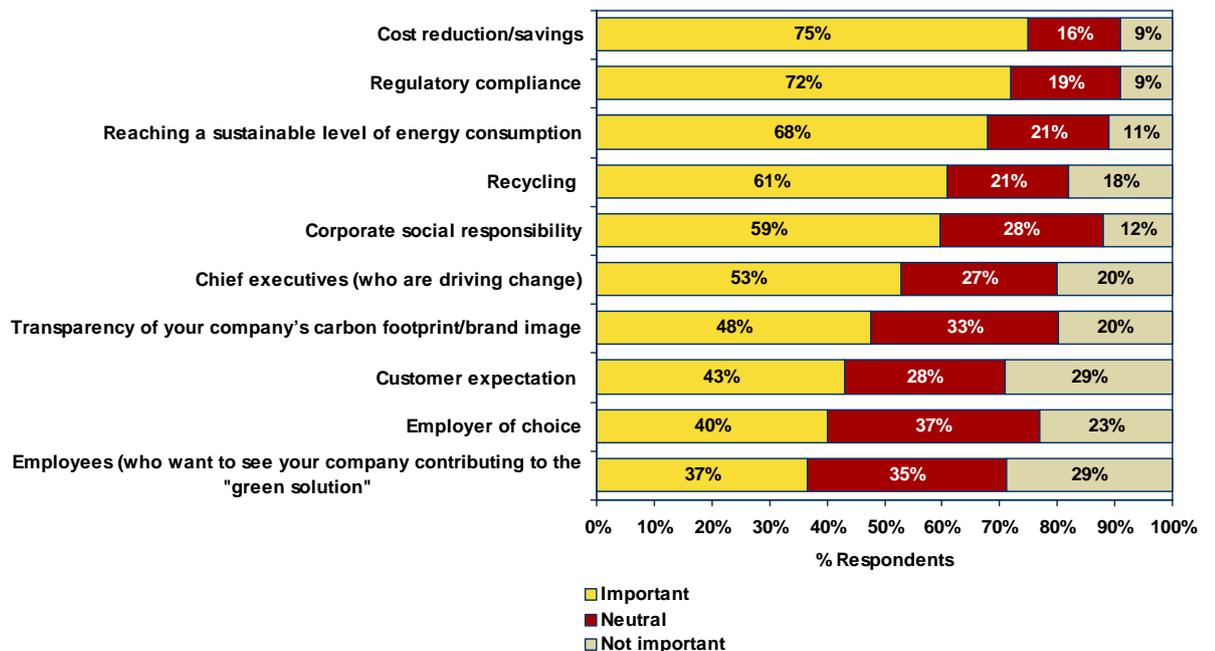
- ☒ Requirements to comply with government regulations (72% of organisations)
- ☒ Pressure to reduce cost (75%) through the deployment of energy-efficient, recyclable and sustainable IT infrastructures (68%)

Paradoxically, only two-thirds (65%) of those organisations anticipated IT cost savings in the next 12 months. This highlights the challenge the IT organisation faces in how to effectively measure the energy efficiency gains resulting from green IT initiatives.

**FIGURE 2**

**Green IT Initiative Driving Forces**

*Which of the following drivers behind investment in "green IT" are, or would be, most important to your organisation?*



n = 444

Source: IDC-Dell Green IT Barometer, July 2008

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## European Organisations Embedding Green IT Initiatives in Corporate Strategy

Green and sustainability concerns are by no means specific to the IT department. In fact, green issues are fragmented and embedded in many areas of a company's ecosystem from its supply chain to production and the charter of CSR.

Most organisations favour a companywide strategy over a piecemeal approach to comprehensively address sustainability and environment concerns. 61% of respondents said their green IT initiatives were part of a wider CSR project. The IDC-Dell barometer also indicates that in 53% of the cases chief executives including heads of IT tend to be the driving force behind green IT initiatives.

CSR strategies are becoming more important in Europe, especially as businesses are less easy to differentiate in terms of revenue growth and profit margin calculations. Although a company can significantly improve its operations through mergers and acquisitions, in many industry sectors companies are playing "follow the leader" in terms of how to organise business processes and handle their supply chains. At the same time governments in EMEA are proving to be more concerned with social and ecological issues than the federal government in the US. In particular the variety of cultures in the EMEA region makes it essential to think about how to address stakeholders from a strategic angle.

The IDC-Dell Green Barometer results suggest that IT departments have a leading role to play in the successful implementation of CSR strategies. 55% of European organisations surveyed already have a CSR strategy in place or are planning to implement one in the next 24 months. 44% of those organisations also indicated that IT will either play an extremely important role or an important role in supporting their organisation's effort to reduce its environmental impact and in supporting CSR objectives in the next three years.

When asked to compare green IT implementations with other CSR initiatives, 13% of respondents said their green IT implementations were far more advanced in comparison to the other CSR initiatives. Overall, in 43% of cases, green IT initiatives are on the same level of implementation and maturity as other CSR initiatives.

IDC defines corporate and social responsibility (CSR) as the strategy an organisation or business implements in order to behave ethically and contribute to economic and ecological development.

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## Addressing Organisational and Process Challenges to Meet Green IT Requirements

The European Union encourages businesses from all sectors within its member states to operate their IT departments as efficiently as possible. However, it is up to the discretion of each organisation as to how or if this is implemented, and currently no measurements or quotas have been set by the EU. For those companies that have chosen to adopt their own green agenda, the challenge for heads of IT is twofold:

- How do I upgrade my existing IT infrastructure to create greater green credentials and a new level of energy efficiency?
- How do I carry out these changes in a way that is both compatible with my existing infrastructure and sustainable in the long run?

The barometer results highlight some of the main constraints organisations face when going green, which can be summarised as follows:

- ☒ **Alignment constraints:** Green IT strategies are not necessarily paramount to organisations and can sometimes be incompatible with their corporate mission. While improving the bottom line through cost reduction and efficiency gains are often the main objective for IT departments, most businesses balance this out with other objectives. 41% of the European organisations surveyed stressed their green IT objectives were overshadowed by higher imperatives for the business. In addition, 19% reported perceiving green IT as risky to the organisation.
- ☒ **Resource constraints:** Shortage of skills and expertise (41% of the European organisations surveyed), lack of time (30%) and the absence of clear management responsibility for green IT internally (24%) impede the deployment of green IT initiatives. The barometer results, however, indicate a shift as organisations are now starting to structure their approach to green by appointing an executive whose sole corporate mission is to implement a green IT strategy. 20% of those organisations surveyed with a green IT strategy said they have already adopted such an initiative, with a further 9% declaring they would do so in the coming months.
- ☒ **Lack of visibility:** As the saying goes, organisations "can't improve what they don't measure", and the results from IDC-Dell Green Barometer certainly suggest that a large number of European IT departments are in no position to improve power consumption generated by their IT infrastructure: 31% of the organisations surveyed said they didn't know what the electricity consumed from their datacentre amounted to and 89% said they were unaware of the power consumption of distributed computing environments. Discussions with end users have also pointed out that in most instances where electricity consumption is actually measured, data was available only at a datacentre level, with very little insight on the consumption generated by the different devices or racks.
- ☒ **Lack of incentives:** IT departments have little incentive to reduce power consumption. 70% of the organisations surveyed didn't have any incentives in place to reduce power consumption. This is largely due to the organisational structure of most enterprises, which have the facility department (48% of respondents) or finance (25%) responsible for footing the company electricity bill. 17% of the organisations surveyed effectively mandated their IT department to pay for the energy its IT infrastructure consumed. As a result, only 7% of the respondents surveyed reported having a calculated objective of reducing the energy and carbon footprint of the IT department by yearend.

Despite these organisational constraints and hurdles, IT is a key component of a company's CSR strategy. For 10% of the European organisations surveyed, IT plays an extremely important role and for 33% IT plays an important role in reducing the organisation's energy and carbon footprint and in supporting the organisation's CSR objectives in the next three years.

This is something that is also apparent in an IT department's budget and development plans. Respondents who have a green IT strategy for IT infrastructure or client devices reported that green initiatives represent on average 7.6% of the current IT budget and there are expectations for this number to grow to 9.0% of the IT budget in the next two years.

Green initiatives represent on average 7.6% of current IT budgets; this is expected to grow to 9.0% of IT budgets in two years from now.

## SOLUTIONS FOR SUSTAINABLE COMPUTING

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### **Towards a Sustainable Datacentre Infrastructure**

Since each IT infrastructure has different constraints, which vary from industry, it is difficult to determine a standard roadmap towards a green IT infrastructure. The majority of CIOs are working within the confines of an existing datacentre and looking to extend the life cycle of a facility that has been impacted by technology advancements such as server blades. This represents a complicated juggling act, balancing the cost of maintaining current operations and investing in new infrastructure. The journey towards a dynamic infrastructure is long and complicated, and with each organisation comes a different starting point and end game.

The IDC-Dell Green IT Barometer identified three areas of investments, which are critical to building efficiency in the IT infrastructure. These areas are:

- ☒ Virtualisation and server consolidation
- ☒ Changing user behaviour and Improving system management
- ☒ Datacentre efficiency tools

#### ***Virtualisation and Server Consolidation***

Most organisations have gone through server consolidation activity, typically to consolidate workloads such as file/print. However, server volumes continue to grow and so has the power consumption.

There is an alternative to growing the number of servers and growing the cost of power and cooling. Several trends point to increased opportunities for restricting server growth and encouraging consolidation.

- ☒ Firstly, the increased capacity of new systems, now designed to be at higher power efficiency, suggests that more applications can be consolidated onto fewer boxes at lower power consumption.
- ☒ Secondly, improved management technologies and isolation of operating system and applications on the same box help ensure that such consolidation can be done with less risk than has been the case previously.
- ☒ Thirdly, a greater willingness and need to consolidate core systems (as opposed to systems such as file/print where application availability guarantees have not been the same as for core business systems) is evident across different businesses.

Given that the "greenest" possible IT resource is a resource that is not physically there — a virtual IT resource — virtualisation should be one of the key constituents of a green IT strategy. Virtualisation can potentially lead to leaner datacentre operations, where physical IT resources including power consumption are optimised to match required business needs at any time. Virtualisation also reduces the footprint of physical assets in the datacentre, therefore reducing the carbon footprint that would have been generated by those replaced physical assets throughout their entire life cycle.

Both virtualisation and blades are adopted mainly with the same goal of making the hardware installed base as compact and efficient as possible. Yet consolidation is not the only common trait between virtualisation and blades. Due to their scalable and uniform build, blade servers are naturally able to host wide virtualisation environments. A blade stack can be easily adapted to act as a single consistent "resource pool" on which it is possible to manage and move all the deployed virtual machines much more easily than in heterogeneous infrastructures. Management tools produced by hardware and virtualisation vendors seem to increasingly converge in this direction. Blade servers can also be highly beneficial when the need arises to expand the "resource pool", which can be done by simply adding one or more new blades into the enclosure.

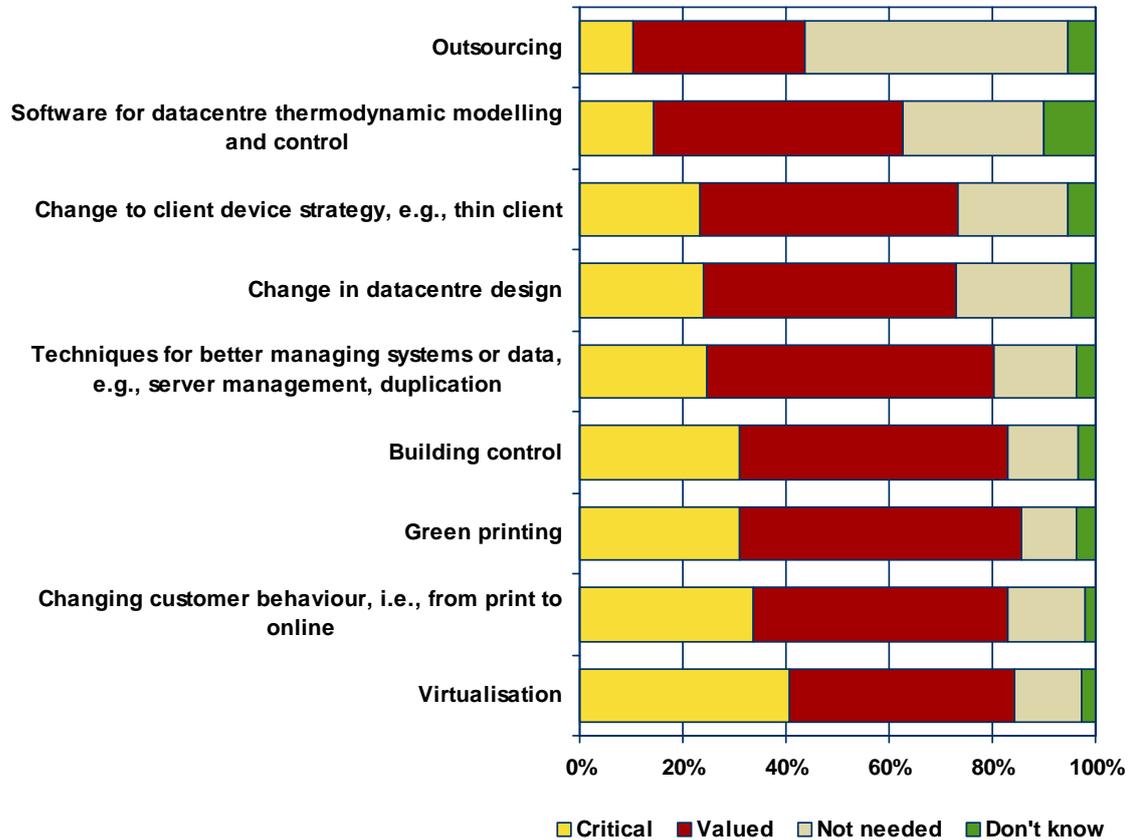
Virtualisation typically allows organisations to consolidate anywhere from two to 20 virtual systems onto a single physical platform. Results vary greatly based on the particular applications, user demand and configuration of both the old and new servers. However, the 2008 IDC European survey of server virtualisation adoption suggests that virtualised servers support on average 5.5 partitions per server.

These benefits led 41% of the European IT departments surveyed to rate virtualisation as the most critical technology to achieve an organisation's green IT goals. In fact, 48% of those respondents that either have a green IT strategy or are currently developing one for the coming months have already deployed server virtualisation in order to support their green IT initiative.

**FIGURE 3**

**Sustainable IT Technologies**

*Which of the following technologies are, or would be, critical, valued or not needed to achieve your green IT goal (reduce its environmental impact)?*



n = 444

Source: IDC-Dell Green IT Barometer, July 2008

***Changing User Behaviour and Improving System Management***

IT infrastructure alone is not responsible for the carbon footprint and power inefficiencies of an organisation. IT administrators and end-user behaviour are also part of the equation.

A number of factors contribute to rising energy costs — inefficient use and poor maintenance of computing resources, printing of documents that could be read online and always-on computers. The challenge for organisations pursuing a green agenda is as much behavioural as managerial. 34% of the European IT organisations surveyed said behavioural modification programmes for end users were critical to realise their green IT objectives. 42% of organisations with a green IT strategy either in place or in planning have already reported that they have deployed such programmes.



### Datacentre Efficiency Tools

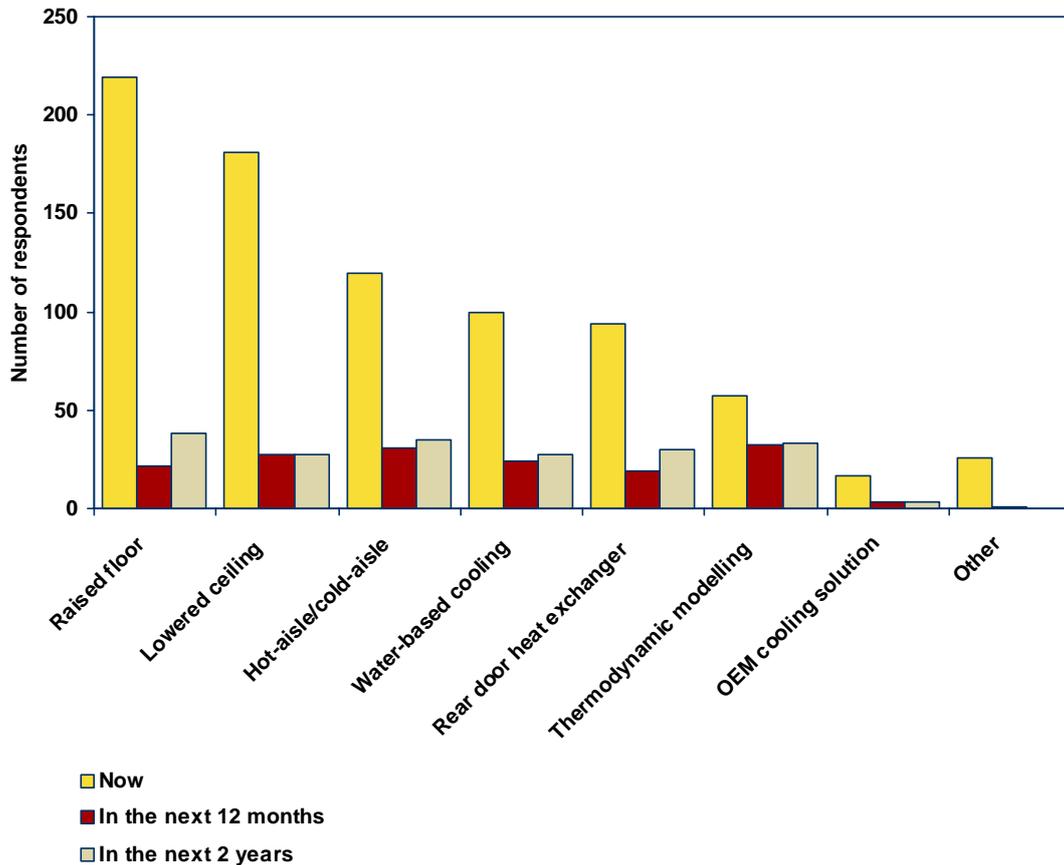
The third area for improvement in efficiency, particularly in datacentre power consumption and floor space, is in using tools to improve environmental efficiency in the datacentre.

Until recently, there was very little use of tools outside of a standard raised floor design. As power and floor space constraints increased, a wide range of techniques appeared on the market and advanced tools and techniques such as thermodynamic modelling have become a major component in improving efficiencies when running a datacentre.

**FIGURE 5**

#### Best Practices for Thermal dissipation

*Within your datacentre, what best practices or tools do you use to minimise the impact of thermal dissipation?*



n = 459

Source: IDC-Dell Green IT Barometer, July 2008

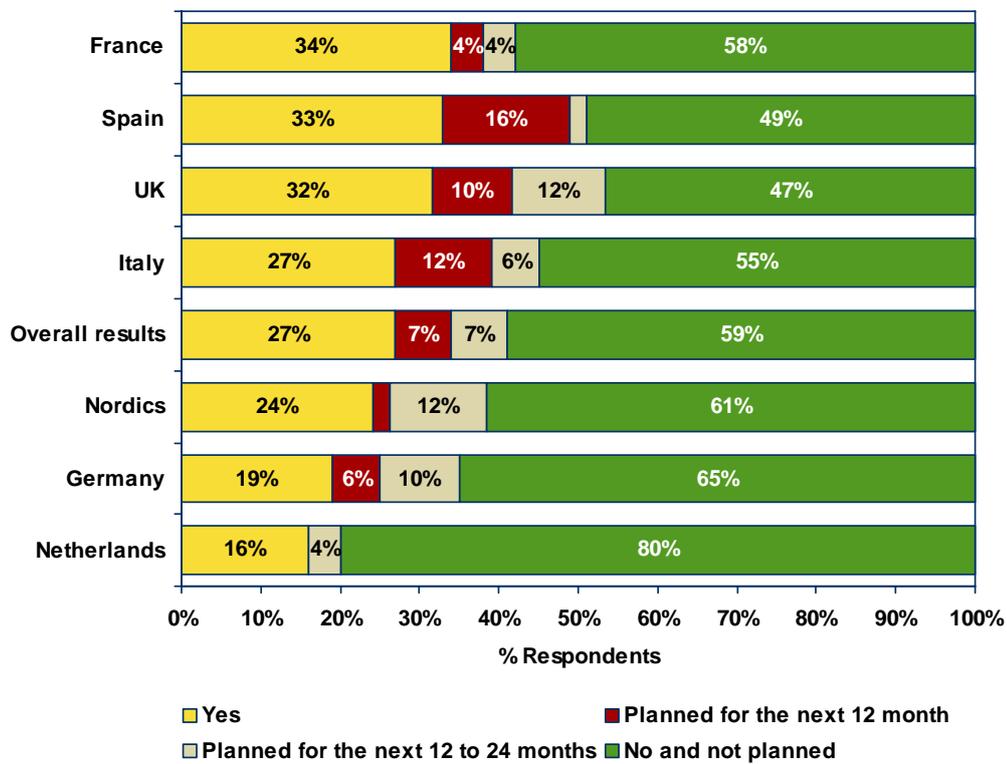
### Towards Sustainable Distributed Computing Environment

Building a sustainable datacentre environment only represents one axis of the development of a green IT strategy. 27% of the European IT organisations surveyed also extend their green IT strategy to their distributed computing environment and 14% of them will do so in the coming 24 months.

**FIGURE 6**

#### Distributed Green IT Implementations Within Large European Organisations

*Do you have a green IT strategy in place for your distributed computing environment including PCs, printers and peripherals?*



n = 459

Source: IDC-Dell Green IT Barometer, July 2008

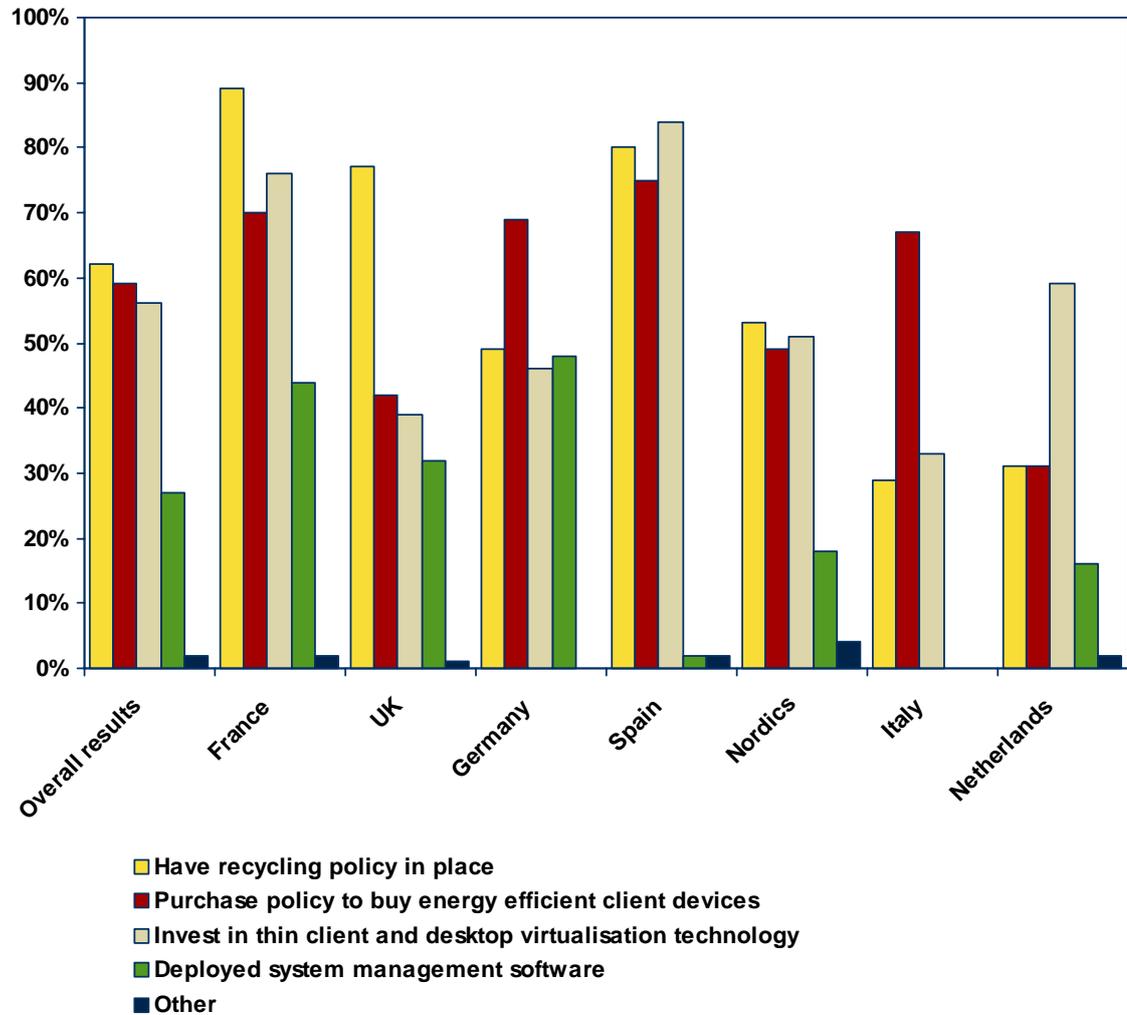
European IT organisations are becoming increasingly aware of the costs associated with powering their client IT assets, particularly when utilisation rates of those devices are similarly compared.

The extremely low power draw of most thin clients gives the technology a strong appeal to European IT managers on a quest for green IT. Similarly, management tools for configuring and maintaining power settings for clients' systems and peripheral devices are a critical part of enterprise efforts to manage client device energy consumption.

**FIGURE 7**

**Green Distributed Computing Strategies**

*Please specify which green IT strategy is applicable (or would be applicable) to your distributed computing environment including PCs, printers, remote servers and peripherals.*



n = 459

Source: IDC-Dell Green IT Barometer, July 2008

**CONCLUSION**

While IT organisations have been focused on ensuring that the technology being used is "green", they have been far less involved in providing the IT tools and services needed to support a company's overall green initiative.

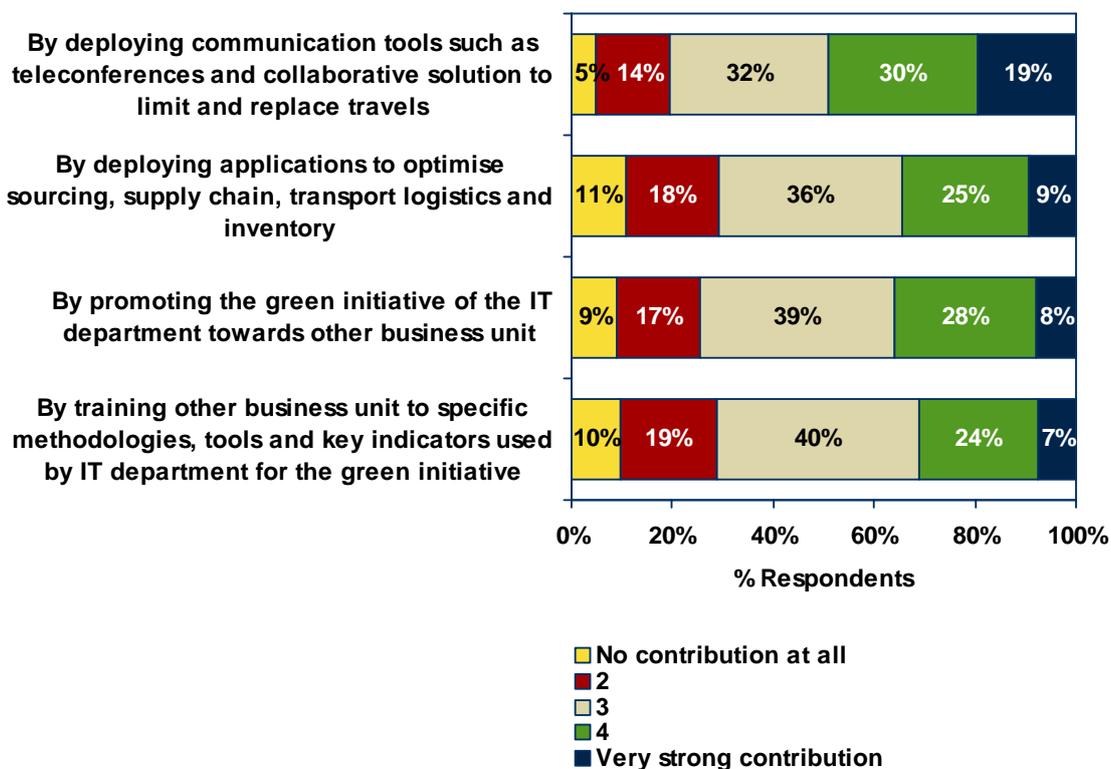
If leveraged appropriately, IT can be pivotal to the success of the organisation's sustainability and green efforts. Communication tools such as teleconferencing and collaborative solutions can limit or even remove the need to travel Databases

obviously provide the basis to collect data on an organisation's energy consumption and carbon emissions, providing a starting point to make improvements. Supply chain management systems can include decision support for profitable proximity, where profit includes a green aspect. Analytics analyse exposure related to asset portfolio or service fleet optimisation. Procurement and supplier relationship management applications can help evaluate criteria related to recycling-friendly materials, processes or packaging.

**FIGURE 8**

**IT in Support of Green**

*What is the level of contribution of the following solutions which could help IT reduce the environmental impact of your company?*



n = 459

Source: IDC-Dell Green IT Barometer, July 2008

The Dell-IDC Green Barometer results suggest that European CIOs have a unique opportunity to lead the way with "IT in support of green". To that end, CIOs should take note of the following:

- ☒ **If you can't measure it, you can't manage it:** Much of the progress towards greener organisations is naturally being driven by reducing cost associated with raw materials, energy, distribution, etc. But at some point, the more difficult challenge will be incorporating environmental measurements such as greenhouse gas emissions and redefining "cost", especially as carbon emissions come at a cost.

- ☒ **Information is essential to understanding what needs to change:** Going green also requires knowing what needs to be changed in the business process. Information technology serves up the information for shaping a green strategy. For example, when factoring the carbon footprint into cost equations, it may become more economical to choose a supplier with close proximity, even if the product it supplies is more expensive. That may mean changing the approach to a manufacturer's supply chain. Applying an optimisation routine to internal and external data helps a company decide on the best approach.
  
- ☒ **True TCO:** Increasing visibility on the electricity consumption of different devices is crucial to draw presales estimates of the TCO due to the different technology options for their entire projected life cycle. The CIO should promote within the IT planning team the concept that hardware cost alone is an insufficient parameter for choosing one technology over another.
  
- ☒ **Sustainability requires a cross-company perspective:** Many CIOs are in a unique position to support the company's corporate citizenship and sustainability programmes. As a cross-functional role, a well-respected CIO understands all aspects of the business whereas individual business units may have siloed perspectives.
  
- ☒ **Sustainability requires a value chain perspective:** The CIO is already engaged in collaborative initiatives with trading partners in his or her value chain. CIOs actively engaged in collaborative planning, forecasting and replenishment (CPFR), global data synchronisation (GDS), vendor managed inventory (VMI) and other business initiatives underpinned heavily by information technology have already established relationships with their counterparts to pave the way for engaging across the broader supply chain.
  
- ☒ **Supporting sustainability will require IT:** Information technology will be a part of many sustainability initiatives, essentially because of the ubiquity of technology in the business and its ability to reach into every aspect of a business. For example, an industrial-gas manufacturer is using advanced analytics to improve the aerodynamic performance of compressors and a manufacturer of turbine engines is using high-performance computing to design a more fuel-efficient, lower-emissions airplane engine. Not only able to improve on product design, IT offers new ways to communicate and collaborate with coworkers, customers and business partners. Telecommuting has been around for a while, cutting down on the time, fuel and money spent on travelling in order to get to the office, and telepresence, which is just taking off, will serve to limit air travel without removing "face time".

IT in support of green should not be a siloed initiative. Collaboration is required across functional towers within organisations, across trading partner networks and across industry verticals. Technology needs to provide the tools to manage and measure IT's green impact as well as the innovations to reduce companies' environmental footprint as we make a shift from talk and qualitative information to action, supported by quantitative analysis.

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