Economist Intelligence Unit

The Economist

IT and sustainability:
Bringing best practices to the business

A report from the Economist Intelligence Unit
Sponsored by Oracle

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Preface

IT and sustainability: bringing best practices to the business is an Economist Intelligence Unit briefing paper, sponsored by Oracle. The Economist Intelligence Unit bears sole responsibility for this report. The Economist Intelligence Unit's editorial team wrote the report, and the findings and views expressed do not necessarily reflect the views of the sponsor. Terril Jones was the author of the report and Debra D'Agostino was the editor.

January 2009

Executive summary

In recent years climate change has become an international concern, touching on politics, an uncertain economy, business and international security. At a time of soaring energy costs and fragile financial markets, executives are increasingly looking toward sustainability strategies to save money, cut emissions and, as many claim, simply to do the right thing.

Sustainability in an enterprise can mean small adjustments or a major reorientation. Information technology (IT) is not itself a big part of the problem, as it is estimated to contribute only a small percentage of global carbon emissions. But it can be a big part of the solution. In addition to data-centre optimisation and other operational issues such as teleworking, companies are now leveraging IT capabilities to facilitate sustainability initiatives across the enterprise in new areas, including fleet management, paperless billing, and construction and facility management, among others.

Challenges include initial costs, the sometimes lengthy periods before companies see a return on investment, and the need to keep up with fast-moving technology and to re-educate employees—whether these be the chief executive officer or rank-and-file workers—about the benefits of sustainability. Special attention must also be paid to ensuring transparency and good governance throughout all sustainability initiatives to make sure that policies are followed and goals are met.

If this is accomplished, the rewards of such efforts can be significant, measured in lower fuel and energy costs, a more productive workforce and, of course, a reduction in emissions of polluting and greenhouse gases—the so-called "triple bottom line" of profit, human capital and natural resources.

For sustainability initiatives to be successful, executives must lead by example while also welcoming bottom-up ideas and initiatives. Strategists should consider how all goals, from a reduction in electricity usage to carbon neutrality, can best be supported by IT systems, and how technology will play an integral part in the firm's long-term strategy to reduce its carbon footprint.

Introduction

In his most recent book, *Hot, Flat and Crowded*, Tom Friedman writes: "We can no longer expect to enjoy peace and security, economic growth and human rights if we continue to ignore the key problems of the Energy-Climate era. How we handle these…problems will determine whether we have peace and security, economic growth and human rights in the coming years."

In an age when climate change has become a major political and social issue, governments, non-profit organisations and certainly corporations are increasingly adopting "green" strategies—efforts to make their processes more environmentally friendly and reduce their carbon footprints. Such steps have been taken in response to new laws and industry guidelines on energy consumption and reduction of greenhouse gas emissions, and to increasingly vocal customers, who have demanded that the companies they patronise adopt more eco-friendly practices. But these measures are also driven by operational concerns about fast-rising fuel and energy costs and bottom-line profits.

"Sustainability is without doubt the most significant reorientation of global business strategy and operations since the high-tech and biotech booms of the 1990s," according to a report released in September 2008 by AMR Research, a US-based supply chain and IT consulting company. "It is inextricably linked to both the contemporary and future challenges of global climate change and the anticipated low-carbon economy."

IT contributes only 2% of global carbon emissions, compared with 20% from agriculture, according to The Climate Group, a UK-based non-profit organisation that promotes business and government leadership on climate change. And it offers a host of solutions to assist other parts of the business to become more environmentally sound. "The question is, how do we take [the capabilities of] the 2% associated with computing, and apply that to the other 98%?" says Lorie Wigle, director of the EcoTechnology office at US-based Intel, the world's largest manufacturer of computer microprocessors.

To be sure, IT has already helped companies take their first steps towards energy conservation. Simple measures, such as having lights or computers shut off automatically at set times, or setting room temperatures to an automated schedule, bring significant savings. More complex undertakings include the consolidation of data centres, upgrading to more energy-efficient hardware and supporting teleworking initiatives. For instance, US carmaker Ford Motor is reducing the number of its global data

centres from 20 to 6, to achieve savings running into millions of dollars. "IT has a huge opportunity in terms of reducing its consumption and complexity and utilising IT assets more effectively to drive down the carbon footprint," says Vijay Sankaran, Ford's director of infrastructure operations.

But as IT continues to evolve as a key strategic enabler across the enterprise, many companies are realising the need to think more holistically about how IT can support enterprise-wide corporate sustainability efforts. This paper aims to understand how those efforts are being applied in various business settings, and to identify best practices for other companies to follow.

Of course, no corporate initiative is easy. Sustainability is expensive, and requires collaboration between many different areas of the business. Tangible success does not happen overnight, and convincing employees to change old habits requires a commitment from the top tiers of the company to provide leadership, governance and transparency. "One of the things that kind of works against you is that most sustainability projects require money up front for [a] return that comes down the road, and in these days that can be a tough sell to a chief executive officer [CEO] or chief financial officer [CFO]," says Glenn Pohly, director of environmental compliance for Extreme Networks, a Santa Clara, California-based supplier of high-end communications equipment and access points.

However, executives who take the short-term view on technology investment to support environmental efficiency may cost their companies in the long run. "Procurement officials who fail to consider this are missing an opportunity from a sustainability and cost-effectiveness standpoint," says Andre de Fontaine, a researcher with the Pew Center on Global Climate Change in the US. "That's the major reason why communication between energy experts and procurement officials is key."

Success can reap big rewards. According to a recent report, *Smart 2020: Enabling the Low Carbon Economy in the Information Age*, co-authored by The Climate Group, a non-profit organisation, and the Global e-Sustainability Initiative, a consortium of technology firms, smarter use of enterprise technology could reduce global carbon emissions by 15% and save global industries US$720bn in annual energy costs by 2020.

Key points

- **It may not be apparent, but IT has a strategic role in sustainability.**
- **IT is crucial in sharing information and empowering executives.**
- **Integrating IT globally in sustainability plans is key.**

IT's green thumb

When it comes to corporate sustainability, the IT department is usually not the first place executives look for leadership. But many analysts and executives maintain that IT has a highly strategic role to play. "It's all about efficiency," says Stephen Stokes, AMR Research's vice-president of sustainability. "The very essence of IT is to drive down carbon footprints." In fact, the exclusion of the IT department from discussions about sustainability efforts could pose greater risks than executives realise. Without its input, companies' sustainability efforts may become fragmented and siloed, and results can be difficult to measure across the corporate landscape.

For instance, IT plays a key sustainability role in data management, in terms of the monitoring of greenhouse gas emissions, energy use and other environmental parameters. "IT will likely be most useful in making sure that information is available and presented in such a way that it empowers executives to make intelligent decisions on sustainability," says Mr de Fontaine.

Deere & Company, a US-based provider of products and services for agriculture, landscaping and irrigation, recognises the need to involve IT in sustainability governance. As part of its efforts to reduce its carbon footprint, the firm has designated "energy champions" at each of its 51 manufacturing facilities in more than a dozen countries. Each month the energy champions join Deere's manager of climate programmes, Joanne Howard, and other employees from various departments across the corporation, including IT, on an internal energy efficiency webcast. Each discussion focuses on a particular topic, such as lighting, compressor units, variable-frequency drives, or greenhouse gas education. IT's input is a key part of the discussion: although they do not serve as energy champions, IT staff are members of certain energy teams around the world, for example at the firm's headquarters, where the energy team works with several data-support facilities.

A separate group at Deere was charged last year with creating a "greener IT space" to test out new collaboration software and serve as a venue for newer employees to share sustainability ideas and practices. The collaboration software has now been launched across the company to go beyond IT-related green ideas to encompass other Deere sustainability activities.

Key points

- **Using IT in tracking and logistics can have big pay-offs.**
- **IT is integral to managing emissions from buildings, the biggest source of greenhouse gases.**
- **Going paperless eliminates waste and pollution on multiple levels.**

Industry-specific approaches

Clearly, there are many areas of the business that can be re-engineered for sustainability. Executives from various industries who agreed to be interviewed for this report identified several key areas where IT can play a significant role.

Transportation and logistics

Applying improved monitoring and control of corporate fleets can lead to significant reductions in carbon emissions. Real-time tracking of delivery routes using global positioning systems (GPS) helps fleets of trucks to operate more efficiently, by monitoring traffic and suggesting alternative routes to keep deliveries on schedule and avoid unnecessary use of fuel. Such tracking systems can also monitor drivers' speeds: companies can save as much as 15% in fuel expenses by limiting the speed of their trucks to 62 mph, and drivers who exceed that limit may hear about it from their supervisors, says Dr Stokes of AMR.

At United Parcel Service (UPS), the global shipping and deliveries firm, technology is critical to operational efficiency and profitability. "UPS used to be a trucking company with technology," says Donna Barrett, a public relations manager with the firm. "Now we're a technology company that has trucks." The company has a well-established Information and Technology Strategy Committee, a cross-functional group of about 15 senior executives including the IT division, to chart the firm's course in implementing new technology projects. These are typically large-scale, multi-year projects whose merits are decided on both a business and an IT basis.

Roughly three years ago UPS developed a sophisticated tracking system that it calls Package Flow technology, which not only labels incoming parcels in the order in which they are to be loaded on to delivery trucks, but also plans their routes to avoid heavy traffic. The original goal of the programme was to expedite deliveries, but the company quickly realised that the initiative had significant potential environmental benefits as well. For example, by adjusting the routes taken by UPS trucks, the company minimised the number of left turns that drivers had to make, greatly reducing carbon dioxide (CO_2) emissions from engines idling while vehicles waited to turn. In 2008 UPS reduced delivery routes by 30m miles, equivalent to a saving of 3m gallons of fuel—and 32,000 tons of CO_2 emissions.

UPS has also been test-piloting the use of telematics—wireless communications providing information

about the functioning of its vehicles—in 334 of its trucks. Based on data collected roughly every 24 minutes from sensors located around the delivery vehicles, UPS constructs a detailed profile of each truck, recording when it accelerates and brakes, its maintenance needs and other factors. The goal is to provide feedback that can help drivers to be more efficient and reduce fuel consumption. UPS estimates the value of the initiative at US$188 per driver each year; if rolled out to the entire fleet, this would translate into annual savings of more than US$17m. Furthermore, the firm estimates that it will have reduced its CO_2 emissions by 1.52bn tons overall by 2020.

UPS's technology has been able to help other companies to reduce their carbon footprints by optimising fleet operations, through the repackaging of elements of Package Flow into a product called RoadNet, which UPS markets through a subsidiary. Anheuser-Busch, a US-based brewer, has used RoadNet to slash 645m miles off its delivery routes, eliminating about 700,000 tons of CO_2 a year.

Building construction and maintenance

One clear area where IT can help companies to become more energy-efficient is in the design, construction and ongoing maintenance of office buildings. "The common assumption is that most greenhouse gases come from transport, but in fact it's only 25-27%," says Steven Moore, a professor at the University of Texas and founder of the university's Center for Sustainable Development (CSD). The largest contributing activity—at 47% of total emissions, he says—is the construction, operation and decommissioning of buildings. "Architecture is quickly becoming the biggest threat to public health, safety and welfare via global warming," says Professor Moore, who heads the longest-running sustainability-focused academic programme in the US. "Clearly the area where IT can make the most significant contribution is in energy management," he says.

For example, Yahoo!, an Internet company, uses an online system to track energy consumption building by building on its California campus, and translates that into kilowatt-hours used and dollars spent. Wal-Mart, a US retail giant, monitors and controls in real time the lighting, heating, air conditioning and refrigeration in all 4,200 of its Wal-Mart and Sam's Club stores in the US from its headquarters in Bentonville, Arkansas. This allows the company to analyse its energy use and performance and to adjust specific levels at any time.

But to be truly eco-friendly, environmental issues must be taken into consideration at the earliest planning stages of a new office complex. That has been the case with the Shanghai Tower, which, it is claimed, will be the most sustainable skyscraper in the world when it is completed in 2014. At 128 floors, the building will have two "skins", with an airy inner atrium surrounding the core structure. "We're designing it like a Thermos bottle that's close to 2,100 feet tall," says Marshall Strabala, director of design for Gensler, the global architecture firm responsible for the skyscraper's design and sustainability strategy.

The top of the office building will have a wind farm of 54 vertical-axis wind turbines generating 540,000 kwh of electricity per year—enough to power up to 400 homes. There will also be systems to collect rainwater and condensation. These and other sustainability elements will be computer-controlled and linked through a variety of enterprise and application software that will be controlled by the building's owner, Shanghai Tower & Construction. "We couldn't do what we do today without IT," Mr Strabala says.

Online commerce and paperless billing

Eliminating paper bills is an obvious way to cut costs and ease the strain on the environment. The financial, telecommunications, public utility, insurance, healthcare and retail industries have led this trend, which reduces logging, paper processing, and the fuel consumption associated with transporting bills and payments. Every year in the US alone, paper cheques account for an estimated 674m gallons of fuel and add 3.63m tons of CO_2 into the atmosphere, according to Boston-based Dove Consulting Group.

But creating paperless systems is not easy. There are various approaches to establishing paperless account management, and decisions about online strategies depend on a number of factors. Chief among them are whether to pay outright for software, servers and staff, or to outsource these services to an online bill-paying service. Large companies that can afford the capital expense and have the necessary IT staff tend to choose the former option, because it allows greater control over the customer experience. Smaller companies often go with the hosted option, as this allows them to focus on their core business.

Educating all employees about the benefits of paperless billing, regardless of the business unit that they work in, is also beneficial. Con Edison, an electric utility serving the city of New York, began a campaign in 2007 to migrate customers to paperless billing. Instead of confining the plan to the IT and billing departments, it waged an aggressive green campaign both inside and outside the company to promote e-billing, which involved the marketing, billing, finance, website, public affairs and advertising departments. To reach customers, Con Edison produced radio and subway advertisements and direct mailings (which may run counter to the paperless spirit, but "you have to reach out initially," says George Roach, the customer operations systems specialist who runs the programme). When customers phoned for service and were placed on hold, the company reminded them about the benefits of e-billing. Corporate communications was also very involved, educating Con Edison employees about the cost and

CASE STUDY How Nokia cultivates green employees

One of the world's leading mobile-phone manufacturers, Nokia of Finland buys environmentally friendly components, uses recyclable materials and purchases 25% of its global energy needs from green sources, aiming to increase this to 50% by 2010. But it is also trying to instill in its employees a corporate philosophy steeped in the ideas of sustainable resources and the minimisation of carbon emissions. "The way we look at it, our sustainability agenda is based on the principle that it has to be part of everything we do, and fully integrated into our business activities," says Kirsi Sormunen, the company's vice-president of environmental affairs.

Workers at Nokia's offices in New York, the UK and China are encouraged to use "mobile offices"—desks and meeting rooms where IT supplies wireless access and to which employees can relocate for an hour, a day or more. This system has so far reduced office space needs by roughly 30%, Ms Sormunen says, leading to lower energy and building-maintenance costs. Top management is leading the way by being the first to use the mobile office concept.

Employee travel is discouraged when teleconferencing will suffice. But for those who do travel and book their passage on the company's intranet, there is an option to purchase, at company expense, carbon offsets equivalent to the appropriate carbon credit for that distance.

Nokia is taking sustainability initiatives to its customers as well. Some of its phones come with applications such as city maps to encourage walking, directions to phone-recycling centres and information on ways to purchase carbon offsets. Nokia has formed partnerships with European Internet services to educate consumers about the environment, link them to a conservation bulletin board or offer a daily sustainability tip. To conserve energy further, the company has developed software to make battery chargers beep when phones are fully charged, so that users will unplug them and avoid drawing unnecessary power from outlets. Nokia calculates that if its 1bn phone users followed this practice they would conserve enough electricity to power 100,000 homes.

environmental impact of paper billing. In the first year of the programme requests from Con Edison's customers to go paperless leapt by 65%.

Although Con Edison's IT department works with a third-party vendor to handle such requests, the move to paperless billing has not been pain-free. The biggest hurdle was convincing the firm's various business units to buy into the system. "You need interdepartmental co-operation, whether developing something for the website, or IT working to ensure files are transferred as quickly as possible," Mr Roach says. But when corporate executives clearly expressed their support for the IT division's efforts, other departments quickly followed. IT is now a member of the company's sustainability governance team. "You can't do this in a vacuum," says Mr Roach.

The benefits of moving to paperless billing have been significant. By eliminating three paper bills per month, consumers can each save 3.6 lbs of paper and 35 gallons of wastewater annually, prevent the discharge of 122 lbs of greenhouse gases and eliminate 122 vehicle miles. Con Edison provides a conservation calculator on its website to help customers to understand the benefits.

Key points

- **Companies will increasingly name executives with sustainability portfolios.**
- **Corporate green initiatives will continue to accelerate.**
- **Triple bottom line reporting will gain prominence.**

The future of corporate sustainability

Over the next few years, executives expect companies to maintain their focus on sustainability, deploying more IT resources and establishing positions of accountability within their organisations to ensure that they reach important milestones.

US companies such as Dow Chemical, a Michigan-based products and services provider, DuPont, a Delaware-based maker of paints, plastics and other industrial substances, and Owens-Corning, a building materials producer based in Ohio, are among those that have created a new role of C-level executive: a chief sustainability officer, who works with IT as well as business units to create enterprise-wide strategies for enhancing environmental performance. Japan's largest trading company, Mitsubishi, in 2008 designated its North American CEO to serve also as its chief sustainability officer in the region, in order to integrate sustainability into the company's business plans more effectively. Meanwhile, many companies are adding sustainability duties to the functions of their CIO or are creating the position of vice-president of environmental affairs.

The growth in the number of such types of positions is leading to an increase in the number of calls from headhunters seeking to recruit executives to these roles, says Professor Moore of the University of Texas. And graduate students are more frequently coming to the university's CSD with the goal of attaining such a position.

Meanwhile, green initiatives continue to gather pace. Ford Motor, for example, has deployed a centralised energy metering and monitoring system that collects electricity and natural-gas consumption data in near-real time from all its North American manufacturing facilities. These data are used to identify how energy efficiency can be improved across all the company's facilities, how performance can be quantified and how Ford can purchase fuel more effectively. A second system, specific to centralised plant air compressors, monitors a network of sensors that track energy consumption as well as temperature, heat, oil pressure and other parameters, in order to keep tabs on efficiency in every plant on the continent. "It may take six weeks for me to get an energy bill, but I get this information in 15-minute intervals," says Bill Allemon, manager of energy efficiency with Ford Land, a property development and maintenance subsidiary of Ford Motor. Mr Allemon's team draws up weekly power-usage charts that are sent to all the firm's North American factories.

In reducing their carbon footprints, corporations will continue to offset as much of their CO_2 emissions as possible. Dell, a US computer maker, announced last year that it had reached carbon neutrality ahead of schedule as part of its stated plan to become the "greenest IT firm on the planet". Dell achieved that aim partly by vastly improving the power management of its computers. Dell's blade servers, for instance, now achieve 400% more performance per watt than a few years ago, notes Dane Parker, the company's head of global environmental health and safety. Building and computer centre energy management also plays a role: Dell receives electricity consumption reports from its various plants and office locations weekly, which helps executives to shift energy resources as needed. Furthermore, the firm now powers roughly 20% of its operations through renewable energy sources (a figure that continues to grow, Mr Parker says), and purchases carbon offset credits for the rest.

More employers are offering flexible time schedules for their workers for a variety of reasons, but among them environmental concerns rank high. At Extreme Networks "we encourage work-at-home days, and it's the IT infrastructure that allows conference calling and videoconferencing," says Mr Pohly, the company's director of environmental compliance.

Another way in which companies are commiting themselves to, and monitoring, their sustainability is through "triple bottom line" reporting, whereby enterprises record not only their financial gains or losses but also their social and environmental performance. "It really focuses the mind on your performance in all these areas," says Dunstan Hope, director of the information and communications technology practice at Business for Social Responsibility, a consultancy headquartered in the US.

CASE STUDY Intel's energy-efficient strategy

For decades Intel, a US-based manufacturer of computer microprocessors, has been trying to improve the power-management design of its computer processors. In 2007 Intel created a new internal team called the EcoTechnology group that, according to its general manager, Lorie Wigle, "focuses on the sustainable manufacturing and use of our products". Ms Wigle works with Intel's recently formed IT Sustainability office to find ways to leverage IT to improve Intel's environmental footprint and pass on green savings to customers.

One early initiative is the consolidation of Intel's data-centre network. The company operates 117 power-hungry data centres worldwide. Intel is reorganising the network into eight global hubs and significantly fewer data centres, eliminating 18 of them in 2008. Ms Wigle also turned to the Green Grid, a consortium that seeks to improve energy efficiency in data centres. Rating Intel's data centres according to the Green Grid's "power usage effectiveness" index, she found that some of them scored 2 or higher—meaning that twice as much power was going into the data centres as was being used there. Ms Wigle and her team were able to bring the scores down to around 1.3 in some facilities by bringing in outside air to cool the computers or separating out the hot air being expelled.

Ms Wigle is also president of the Climate Savers Computer Initiative, a group launched by Intel and Google last year to promote environmentally friendly manufacturing and personal computer (PC) use. Climate Savers now has 350 members, including firms in industries ranging from high-technology to retail and confectionery. "The premise of Climate Savers Computing is to get companies like Starbucks and Hershey to join," Ms Wigle says. Member companies commit themselves to purchasing efficient computers and deploying power management. Based on such pledges, Climate Savers urges PC makers to manufacture more energy-efficient hardware.

Intel hopes that by 2010 participating companies will cut computers' power consumption in half and will reduce CO_2 emissions from computers by 54m tons per year, or the amount that would be produced by 11m cars. Participating companies' pooled energy savings could be worth US$5.5bn per year.

Conclusion

Of course, technology alone cannot make companies more eco-friendly. But IT is one important element of a broader strategy that includes solid leadership and constant communication of corporate goals. "True value and tangible benefits will be achieved only when sustainability is embedded as a core element of company culture and strategy, with systemic links to innovation and creativity," Dr Stokes of AMR says in his recent report. "Moving sustainability from the peripheral position of corporate social responsibility reporting and societal sustainability to a more strategy-centric, organisation-wide position allows a company to…ensure appropriate future-proofing and engagement with the vast potential that the emergent low-carbon economy offers." The following are some points to keep in mind for executives looking to take advantage of IT to further their sustainability efforts:

- Involve IT early on in discussions about sustainability initiatives. Leaving IT out of the discussion limits the collection, analysis and sharing of data and best practices, and promotes the further fragmentation of sustainability efforts.

- Create an enterprise-wide governance strategy that includes IT and all key areas of the business. Cross-functionality leads to cross-fertilisation, so ideas will flourish, but a strong central strategy will ensure that business units will work together and will not draw up separate, competing initiatives.

- Measure and publicise success to constituents within the company and to consumers and the public on the outside, including touch-points that IT can provide (such as Internet, wireless access and messaging). This involves asking IT to create transparent systems and reporting tools to help executives track progress.

- Lead from the top. When the rank-and-file workers see corporate executives take a clear stance on corporate sustainability through formal governance and strategic use of IT resources, corporate culture will follow suit.

As Mr Friedman notes in his book, the end goal of corporate sustainability is to reach a point when the term "green" disappears entirely. "There will be no such thing as a green building, a green car, a green home, a green appliance, a green window or even green energy," he writes. "All of those things will simply be the norm, because the ecosystem of prices, regulations and performance standards will demand it." At that point, "you'll know that we're having a green revolution, and not just a green party."

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