

# How IT can help save the planet

**The growing cloud of environmental damage caused by internet use and technology like laptops and smartphones could have a green lining.**

**By Chris Gibbons.**

It's hard now to imagine a world without the Internet and laptops, netbooks, Blackberrys and iPhones. Technology and the ability to connect globally from almost anywhere, anytime via wireless networks is now so embedded into our daily lives, it has transformed the way we interact with each other, the way we shop, access public services and run our businesses.

But that power and convenience comes at a cost. The vast majority of these devices and services use electricity - lots of it - and as they become more pervasive, energy demand and continues to climb alarmingly.

The United Nations estimates that information and communications technologies (ICT) are responsible for around two per cent of the world's total emissions of greenhouse gases – that's about as much as the airline industry. The UN estimates the Internet itself consumes up to one trillion kilowatt hours of electricity every year - about five per cent of the world's total electricity consumption. More than half of this figure comes from PCs, gaming consoles, laptops and screens, and other consumer electronic devices, with business data centres are also a major contributor.

Those figures will increase as ICTs and the reach and use of the Internet increases. Broadband deployment and the increasingly intense use of the Internet will contribute to the rise in greenhouse gas emissions, especially as Internet and cell phone use expands in the developing world.

In addition, the falling cost of electronic devices and aggressive marketing means they are becoming more disposable. We throw away more computers, phones and TVs than ever as they become cheaper to replace than repair and in the process we are creating an ecological nightmare as hundreds of thousands of tons of often lethal e-waste annually end up in landfills or are dumped on Third World countries.

The ICT sector readily acknowledges that it contributes to global warming and other environmental issues but believes it can be part of the solution rather than the problem.

It says it is not only taking steps to clean up its own industry by developing longer-lasting batteries, more energy-efficient computers and processors and using less harmful metals and minerals in its devices, for example, but claims it can actually help cut emissions in other industries too.

At the recent Global Public Policy Summit (GPPS) of the World Information Technology and Services Alliance (WITSA) held in Bermuda in November, part of a nine-point post-summit declaration by the influential consortium of more than 72 global industry associations read:

“The ICT industry has a central role to play in reducing harmful emissions across all industry sectors. While the ICT sector has worked hard to reduce its own environmental impact (as illustrated by dramatic falls in processor power use and in

standby power consumption) it can aid the efficiency of sectors such as transport, utilities and buildings. It also has the ability to create positive change in other sectors through transforming processes and altering behaviour. ICT is one of the few tools available that can produce dramatic changes without negative effects on prosperity or individual lifestyles.”

For example, by enabling more people to work remotely or from home, ICT can reduce the need for travel and reduce the carbon footprint of individuals and companies. Software like GoToMeeting and Skype, which enable users to videoconference and share files and applications inexpensively in real time over a broadband connection, is becoming increasingly popular as companies cut travel budgets and become more environmentally aware.

Indeed, a 2005 report “Avoiding Dangerous Climate Change” compiled by leading international scientists concluded: “In the long run, technology needs to be the central element of response strategies to climate change”

John Higgins, Director General of Intellect UK, a British-based tech industry group that has carried out extensive studies of how technology can be part of the solution to climate change, told GPPS delegates that technologies like broadband can change business models and behaviour and help other sectors work more efficiently and reduce their emissions.

A recent IntellectUK report, High Tech: Low Carbon, noted: “Incremental improvements in energy efficiency can achieve great advances. However, we believe that we must do more than this if we are to have any chance of avoiding harmful climate change ... As well as doing the same things more efficiently, we need to change what we do. Technology is a primary enabler of behavioural change, and as such can play a pivotal role in helping make the low carbon economy a reality.”

“The European Commission recently estimated that ICT-enabled improvements in other sectors could save 15% of carbon emissions by 2020,” Higgins told the Bermuda Summit. “The EC estimated such savings could be achieved in the short term in three areas – building and construction, transport and logistics, and energy production and distribution.”

Intelligent transport systems – from sat navs to complex monitoring of air traffic and shipping - can cut fuel and emissions dramatically. In the UK, transport accounts for 25% of total UK CO<sub>2</sub> emissions. The EC estimates, for example, that 50% of fuel consumption is caused by traffic congestion and “non-optimal driving behaviour” – such as finding the right direction. UK supermarket giant Tesco estimated that by using telematics, which monitor how vehicles are being driven, and GPS tracking, it was able to make an additional 50,00 deliveries a week without increasing the size of its fleet of trucks - and cut its fuel costs in the process.

In construction, smart building technologies like energy management systems, light sensors and smart metering systems can drastically cut down energy waste and cost by eliminating unnecessary use and utilising more energy-efficient options such as LED lighting. The UK government estimates energy to light, heat and run buildings account for a third of the country’s CO<sub>2</sub> emissions. The government has issued a directive requiring all public buildings to display their energy usage and all new homes to comply with low and zero carbon standards.

Google has recently introduced PowerMeter, a free software tool that provides consumers with information on how much energy their home uses. The software receives information from utility smart meters and in-home energy management devices and displays the information on a personalised web page. The tool is currently available in the UK, Germany, India, parts of the US and Canada.

ICT has the potential to transform energy supply by replacing at least part of our fossil-burning power generation with renewable sources such as wind, wave and solar power. Specifically, it can help the distribution of energy through computer systems that can integrate different and often widespread sources of energy into a country's major grid or the development of photovoltaics, the silicon solar cells that convert light to energy.

In addition there are a whole range of "virtualisation" technologies that by their very nature reduce demand on natural resources as well as saving time, energy and effort, such as internet banking, e-commerce, e-books, downloadable music and movies, videoconferencing and computer aided design. All of these technologies continue to evolve and as they become more widely used, their value and impact increases.

Higgins points out that long before global warming was – pardon the pun, a hot issue – the tech industry was already working on improving energy efficiencies, especially in consumer devices.

Computer processor chips, for example, use a staggering one million times less energy than they did 30 years ago. The power consumption of a TV in standby mode used to be horrendous – about 6 watts. Now the average is 2.6W (top models are 0.3W) and, says Higgins, "means that a TV on standby for one hour uses less electricity than a 100W lightbulb does in two minutes".

IntellectUK says the current UK terrestrial TV broadcast system consumes "more than 50MW and releases at least a quarter of a million tons of CO<sub>2</sub> per annum". A single sun-powered satellite can provide all the UK's TV in HD format and release zero CO<sub>2</sub> into the atmosphere. As satellite power and antenna size increase, future satellite systems will also be able to provide cheaper broadband and mobile phone access and a greener ICT network alternative for a wide range of service providers.

Phone companies have dramatically cut the amount of energy used by mobile phones and power-hungry base stations and chargers. Just 10 years ago, a mobile phone call used tens of watts of power – now it uses about one. Virtually all computers today have a "sleep" or "hibernate" mode that uses very little power when the machine is not in use.

All these incremental measures might not seem very much but multiplied across millions of users, the savings are enormous, although skeptics say much of the savings are lost because we are using more appliances and devices than ever.

A bigger issue is the huge corporate data centres that house the computing and communications equipment used by businesses to manage and store their corporate data. A large corporate data centre can cover the same area as several football fields and contain thousands of servers and in the UK alone, they account for up to 3.3% of the UK's total electricity. But about half that power is used for air conditioning and the energy used for core functions like data processing is often not used efficiently because machines are frequently run at low load, when they are least efficient. A lot of power is wasted because firms often install more hardware than they need to cope with possible spikes in demand, regulations, and storing historical and often obsolete data. Although

only about 5% of data is generally “mission critical”, business tends to treat all data as equal.

Solutions include better data centre design, improved facility management systems, virtualisation and new hardware, such as multi-core processors, offers greater capacity with reduced energy consumption and heat generation. According to IntellectUK, in one year server hardware had become around three times more powerful whilst reducing energy consumption by about 40%.

While all these green IT measures sound appealing, putting them into practice is another matter. Higgins admits that the ICT industry still has much work to do to educate and change business and consumer habits while at the same time persuading governments to adopt policies and incentives that encourage and reward more energy efficient practices and hardware development.

For example, those responsible for facilities management at a company are often not involved in purchasing ICT and so energy efficiency is not a factor in purchasing decisions, which means there is little incentive do suppliers to offer energy efficient solutions.

The simple task of turning off company desktop PCs at night – or at least putting them in sleep mode – could lead to significant reductions in CO<sub>2</sub> emissions. A study by the UK National Energy Foundation (NEF) found that more than 87% of employees had never been asked to shut down their PC at night by their employers and that at least 1.7 million PCs were habitually left on overnight and at the weekends, wasting 1.5 billion KWh of electricity per year - 700,000 tonnes of CO<sub>2</sub>. NEF estimated that shutting down the government’s estimated two million PCs alone would save around 140,000 tonnes of CO<sub>2</sub> annually.

Convincing consumers may be even harder. A recent report in the US by Forrester Research found that only 12% of adults would pay more for environmentally friendly consumer electronics products, 41% were concerned about the environment but did not believe they should pay more for green products, and 47% did not have concerns about the environment or global warming in particular.

Bodies like WITSA, the Internet Governance Forum and others are working to raise awareness and influence government policies. The International Telecommunication Union (ITU) launched the Dynamic Coalition on Internet and Climate Change (DCICC) in 2007 as “an open body committed to moderating the environmental impact of the Internet, to seeking new ways to embrace the power of the Internet for reducing greenhouse gas emissions worldwide, and to enabling transformation in line with the objectives set and to be set under the United Nations Framework Convention on Climate Change (UNFCCC)”.

Concludes John Higgins: “Through our trade organisations like WITSA, we need to do more so that countries see ICT not as part of the 2% problem but part of the 98% opportunity.”

*Further reading:*

SMART 2020 – Enabling the low carbon economy in the information age  
([www.theclimategroup.org](http://www.theclimategroup.org))

High Tech: Low Carbon ([www.intellectuk.org/hightechlowcarbon](http://www.intellectuk.org/hightechlowcarbon))

ITU and Climate Change ([www.itu.int/themes/climate/index.html](http://www.itu.int/themes/climate/index.html))