



Climate Change : Climate Solutions

Green IT: Taking Bytes Out of Carbon Emissions

Modern communication technology reduces the need to travel, but it produces as much CO2 as aviation. Struggling to live up to its "clean" image, the IT industry explores new ways to go green.



Edward J. Markey, Chairman of the US Congress' Energy Independence and Global Warming Committee, holds a speech at the UN climate summit in Bali using virtual reality community called Second Life (Image: Select Committee on Energy Independence and Global Warming)

Despite the scorching heat in Bali, U.S. Representative Edward J. Markey still looks immaculate in his dark blue suit, white shirt, and green tie, as he speaks to delegates during the UN Bali climate summit. While keeping his cool in Bali, Markey is also joining in heated debate or Capitol Hill, supporting a critical energy bill.

How did the Massachusetts Democrat manage to be in two places at once? By sending his virtual self to the tropical paradise via the website Second Life, while his real self stayed in wintry Washington. Choosing the Internet over a plane saved him an estimated 5.36 tons of CO2 emissions.

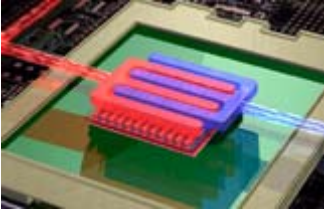
Such online events, videoconferences, and even the old telephone call could significantly reduce the carbon footprint of businessmen, politicians and other frequent flyers. The Worldwide Fund for Nature (WWF) says that if all European companies replaced 20 percent of business flights with videoconferencing, it would save 22 million tons of CO2 each year.

Information and communication technologies (ICT) seem like ideal tools for a more sustainable future. But what about ICT's own carbon footprint? With more and more data being transferred via the Internet, the footprint of the world's networks is getting heavier. Research firm Gartner estimates that the global ICT industry is responsible for two percent of global CO2 emissions, about the same as aviation.

"Increasing financial, environmental, legislative and risk-related pressures will force IT organizations to get 'greener'," suggests Simon Mingay, research vice president at Gartner.

Save on servers

The best place to start is data centers – warehouses packed with humming servers that process and store digital information. These “server parks” produce 23 percent of ICT emissions, using power to both run the servers and to cool the machinery. Data centers worldwide produce more CO₂ in a year (170 tons) than either Argentina or the Netherlands. And these emissions will quadruple by 2020, says the management consultancy, McKinsey.



IBM is using using water-chilled copper plates rather than air conditioning to cool microprocessors, reducing energy consumption for cooling by 40 percent (Photo: IBM).

Even worse, data centers are astonishingly energy-inefficient. McKinsey found that almost a third of servers are doing almost nothing except consuming energy. Turning these “dead” servers off, or powering them down, is critical. Some server manufacturers have begun including power management features like those in desktop and laptop computers, resulting in power savings of up to 20 percent.

More savings can be made by bundling servers together. IBM has replaced 3,900 old servers with only 33 new servers, potentially saving enough electricity annually to power about 9,000 U.S. homes. Hewlett-Packard is replacing its 85 data centers across the world with just six in the United States.

One way to do this is by replacing traditional servers with “virtual” servers within the larger data network. Virtual hear means that underutilized assets such as computing and data storage are not limited to any specific site, but can be used across the entire enterprise and beyond. This technology could reduce IT emissions by 27 percent, says the Climate Group – equivalent to 111 million tons of CO₂ per year. If “virtualized” servers were to be moved close to renewable energy sources or sites where natural cooling is possible, through fresh air or cold water, efficiency gains could even be higher.

IBM is also tackling the cooling problem at the microprocessor level, using water-chilled copper plates to remove heat from the chips. This can reduce the number of air conditioning units in a data center by 80 percent, and energy consumption for cooling by 40 percent, says the company.

Smarter by design

These advances notwithstanding, green data center design is in its infancy. And the energy consumption of microprocessors will rise for years to come. Because of the insatiable demand for greater processing power and speed, companies are wedded to the “upgrade or die” business model. With short life cycles of computer hardware, the design manufacture and distribution of computers and monitors now accounts

for forty percent of ICT emissions.

According to the European Commission, fast processing units requiring more energy could be replaced by several "slow" processing units in parallel in a single computing chip. This could, says the Commission, "decouple performance from energy consumption."

Smarter design and recycled materials could improve ICT's environmental track record even more. Most computers, for example, convert AC power from the wall into DC, losing a lot of energy in the process. For about 20 dollars, manufacturers can add a power converter that improves efficiency from 65 to 80 percent.

Perhaps the most visible efforts to go green by ICT companies are in the rapidly-growing mobile phone sector, where innovations include solar chargers and handsets made from recycled materials.

Ericsson and Motorola have experimented with biofuel, wind, and solar power to run mobile network infrastructure in remote, off-grid areas in India, parts of Africa, and Indonesia. These solutions replace diesel generators with renewable energy sources.

Motorola recently completed a trial using a solar and wind power system in Namibia with local mobile phone company MTC Namibia. The solar array and wind turbine jointly generate enough power to drive a mid-sized cell site that can provide mobile phone services to a village community. Excess power could be used for phone recharging or other battery charging.

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Whether these trials will turn into more substantial deployments remains to be seen. With rising energy prices, mobile network operators, data center managers, and computer chip manufacturers have no option but to be more energy-efficient. The weightless economy needs to lighten its surprisingly heavy carbon footprint to really become an alternative to stressful and inefficient business travel.

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