

The growth of 'green IT'

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Bill Tomlinson, associate professor of informatics, says we need “to become aware of our computational footprint, which is an increasingly important part of our overall carbon footprint.” Photo: Daniel A. Anderson

(PhysOrg.com) -- Emerging field helps create a more sustainable future, though information technology itself is part of the problem.

Southern California Edison is in the process of installing 5 million “smart” electricity meters in homes and small businesses throughout its 50,000-square-mile territory. The devices, which provide hourly data and can be accessed wirelessly, will enable consumers to optimize their [energy usage](#) - saving them money and conserving resources.

This is just one example of a field called “green IT” that, according to Bill Tomlinson of UC Irvine, is emerging at the intersection of two trends: concern about the global ecosystem and the use of digital tools and techniques for manipulating information.

Tomlinson, associate professor of [informatics](#) at the Donald Bren School of Information & Computer Sciences, has published a new book, *Greening Through IT: [Information Technology](#) for Environmental Sustainability*, that explores how IT can help address the environmental issues currently facing the Earth.

Q. What are some common misconceptions people have about IT and sustainability?

A. They often don't realize how intertwined IT systems and environmental issues are. This works two ways: First, there are the environmental ramifications of the IT systems people use every day. From the valuable black mineral coltan in mobile phones (the mining of which is implicated in profound humanitarian and ecological concerns in the Congo) to the CO₂ produced by data centers (which run search engines, e-mail servers and many other data services around the world) to the vast amount of e-waste that results from the rapid obsolescence of technology (much of which is exported to Asia and Africa, where it's processed in unsafe ways), there are some pretty dramatic problems that arise from existing IT systems.

For example, a lot of people include "Please consider the environment before printing this message" at the bottom of every e-mail they send. But given what it takes to send and store that e-mail - the hardware required, the power consumed and the CO₂ emitted - it's worth considering the impact of electronic communication as well. To quote one of my grad students, "Please consider the environment before hitting 'Reply All.'"

Second, though, there's remarkable potential for current and future IT systems to help address environmental concerns throughout society. From tools for personal change - like those letting field biologists collect data more efficiently - to systems supporting large-scale group action -

such as “smart” power grids - IT is likely to play a critical role in helping us fix some of the problems our species has created and move toward a more sustainable future. This is the primary focus of the book.

Q. Are there environmental effects associated with virtual technologies?

A. Definitely, though they’re largely hidden. There have been a couple significant debates about this topic over the past few years. One was about the energy consumption of a Google search. A British reporter proposed that it was half that of boiling a pot of tea. In a rebuttal, Google claimed it was far less - only 1/70 the amount needed to boil a pot of tea. What’s interesting about this debate isn’t the exact figure; it’s the fact that most people haven’t considered that Googling has any environmental impact at all!

And there was an interesting article on the carbon footprint of an avatar in the virtual world Second Life, estimated by the author to be about equal to that of a typical human citizen of Brazil. I asked the chief technology officer at Linden Lab - the maker of Second Life - about this, and he questioned various figures the author had used. But again, what surprised me most was that an avatar’s carbon footprint is even in the same ballpark as that of many people.

Q. How can people be more green when purchasing their next computer or gadget?

A. Often the best thing consumers can do is just wait a while. The average American gets a new mobile phone every 17 or 18 months; it’s this kind of rapid turnover that leads to the e-waste problem. If you need a justification to procrastinate in getting the “next big thing,” here it is. And if you do buy a new device, make sure the old one is either reused by someone or recycled properly.

Q. What challenges and opportunities do you foresee as technology advances?

A. Right now, the IT sector produces 2 percent to 2.5 percent of global CO₂ emissions. That's on par with the entire airline industry. As largely invisible data systems spread throughout the infrastructure that supports our everyday behavior, this percentage is likely to grow. Therefore, a challenge for people, corporations, universities, governments and all sorts of other institutions is to become aware of our computational footprint, which is an increasingly important part of our overall carbon footprint.

However, much of this computing mitigates activities that are even more environmentally problematic. Teleconferencing may reduce air travel; GPS devices help people plan outings more effectively. (The shipping company UPS apparently significantly reduced its fleet's fuel consumption by using route-planning algorithms to optimize pickups and deliveries. A central strategy: eliminating left-hand turns, which waste gas as trucks wait for a break in oncoming traffic.) In such cases, computational benefits can far outweigh costs. There will be opportunities in many sectors of society to improve people's lives while reducing their environmental impact. IT systems can ensure we make the most of these chances.

Provided by UC Irvine

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