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Broadband's Hand in Cleaner, Greener Earth

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Broadband has a big role in enabling technology solutions that are having a positive impact on Mother Earth, from federal auctions to downloading albums.

If the recently concluded, highly successful $41.3B auction for advance wireless service is any indication, the FCC's plan to free up wireless spectrum in the U.S. not only will provide more opportunity to meet skyrocketing demand for mobile broadband, but also will contribute to a cleaner environment.

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So how does that work?

Well it's in how people use broadband and the reductions in global emissions, estimated as much as 15% less by 2020, coupled with energy-efficiency savings to businesses around the work of more than $800B annually. This according to a **2008 report** from The Climate Group and McKinsey & Co. titled "Smart 2020: Enabling the Low Carbon Economy in the Information Age."

Tele-working, videoconferencing, e-paper and e-commerce are increasingly commonplace today. But the report notes that replacing physical products and services with their virtual equivalents is only one part — 6% — of the estimated low-carbon benefits that digital and information technology applications can promote. Far more emissions-saving opportunities exist globally in, among other applications, smart building design and use, smart logistics, smart electricity grids, and smart industrial motor systems that rely on broadband, among other technologies.

One eye-popping McKinsey estimate: A smart U.S. electricity grid could unlock more than $130 billion in annual savings through functions such as peak-demand reduction and energy conservation.

Among other broadband-based carbon-savings initiatives that The Climate Group's report and others note: dramatic falloffs in air pollution and hazardous waste levels tied to e-commerce; greenhouse gas emission reductions linked to telecommuting and smart traffic management; and more-efficient, energy-saving practices stemming from smarter supply-chain management and inventory practices.

Connected Cow and Cloud-Based Carbon Reduction

And it's not just for office workers, but for agriculture and digital music downloads.

Down on the farm, broadband is enabling a new generation of tech-savvy farmers to develop applications that will radically transform the agriculture industry in the next decade, according to some extensive reporting **here**. Big Data and technology are being customized to enable the Internet of Things to play a larger role in how consumers' food is produced worldwide.

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Some examples:

- So-called "connected cows" are cogs in sophisticated milking operations governed by WiFi-powered sensors and algorithms that determine, among other things, how long to milk an animal.

- Several connected vineyards in Spain's Rias Baixas region have reported a 20% reduction in fertilizer and fungicide usage, as well as a 15% improvement in growing productivity thanks to the use of broadband-connected sensors that monitor ground conditions, according to Libelium, a company that manufactures sensors. (Here's a **case study** with details from Libelium.)

As for downloading an album to save a tree, Apple Inc.'s 2001 introduction of iTunes touched off a transformation of the music industry that continues to reverberate beyond the digital arena.

In servicing more than 160 million iTunes accounts and 12 billion song downloads, Apple has not only stamped itself as the digital music market's leader, but as a friendly environmental force, as well. Same goes for cloud-based competitors like Amazon, Pandora, MOG, Spotify, Rdio, Grooveshark, among others.

According to a Microsoft/Intel-funded **study** written by academics at Carnegie Mellon University and Stanford, buying an album digitally reduces carbon dioxide emissions by as much as 80% compared to a best-case scenario for purchasing a CD in person or having it delivered by such carbon-intensive methods as air express and truck.

The study states that even when a music lover downloads tunes and burns them to a CD and puts the disc in a case, the carbon differential is 40% in favor of the download. If the downloaded music isn't burned to a CD, the differential rises to 80%.

One caveat from the study: Large file transfer sizes can reduce downloads' carbon advantage, due to the "increased Internet energy use for downloading."

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