

## NEWS

## New Green Touch Telecom Consortium Reveals Energy-Saving Plan

A new consortium has unveiled a master plan for reducing the energy consumption of telecom networks

BY ALEXANDER HELLEMANS // APRIL 2010

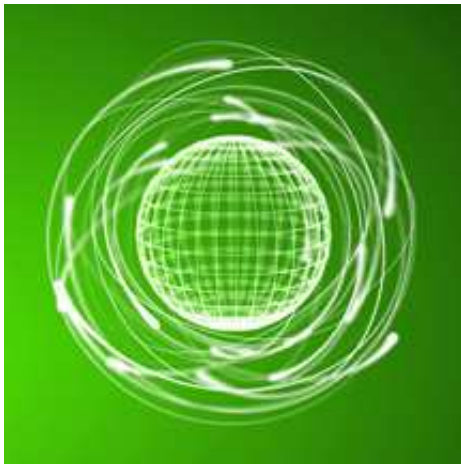


Image: Chad Baker/Getty Images

6 April 2010—Telecommunications networks suck up 2 percent of the world's energy production—equivalent to the energy produced by 50 million cars—but technologies now in the works could cut that consumption by 99.9 percent. That's the goal put forward by Green Touch, a new consortium of companies and research laboratories, at a meeting in Paris in mid-March.

The consortium's prime mover, Bell Labs, the research division of Alcatel-Lucent, began by examining ongoing research in its own divisions and in other companies' research outfits. "We are all working on programs to improve the efficiency by a factor of two, or three, or five," says Gee Rittenhouse, head of research at Bell Labs. "What was lacking was the idea of how far we can go. When we did the calculations, we found that the energy efficiency of a network could be improved by a factor of 10 000 or higher."

That sort of legerdemain would require superadvanced technologies, such as those that transmit information as the spin of the electrons rather than the electrons themselves. For practical reasons, Rittenhouse added, the consortium will begin by shooting to merely improve efficiency by a factor of 1000.

The 16-member consortium began with 15 founders, including service providers such as AT&T, research organizations such as Imec of Belgium and the National Institute for Research in Computer and Control Sciences of France, and such manufacturers as Samsung and Freescale Semiconductor. The workers sketched out a picture of the energy consumption in a complete communications network, giving special attention to wireless transmission. "All the energy you radiate across the cell is in a sense wasted," says Rittenhouse. By aggressively reducing the cell size combined with improved node electronics and the introduction of "sleep modes," in which cells get switched off when not in use, you can cut energy consumption to 1/1000 of today's levels, he explains.

Other technical approaches should also save energy. One idea is simply to operate under lower voltage. Another is to switch circuits at such low power that the likelihood of errors rises substantially—and then to correct those errors with built-in mechanisms. Then there is the possibility of designing adiabatic circuits, which save energy by switching more slowly, much as an elevator does when it moves slowly rather than first accelerating and then decelerating. Huge savings are also in the offing in smart systems.

Jo De Boeck, the CEO of Imec Netherlands, an independent research center in microelectronics, says the key to energy conservation lies in integrating everything, from transistors to final applications. "In fact, we already couple internally the technical progress on the IC level with the intelligent aspects of performance-to-consumption levels," he adds.

Detailed research programs will come at a later stage, following consultations among the existing members and new members. It's still early, yet already the founders have welcomed two new organizations, France Telecom and Huawei, of China.

Expect the plans that finally emerge to be radical. According to Andrea Goldsmith, an expert in wireless systems at Stanford's department of electrical engineering, big energy savings won't come out of a series of baby steps involving bits and pieces of the system. "To get three orders of magnitude reduction in energy consumption, you have

to go beyond the incremental approaches," she says. "You really need a new approach, such as the rethinking of the architecture of the system, taking into account all the advances in technology. The sum of these technologies gives us more than the individual parts."

**About the Author**

Alexander Hellemans is a science writer based in London. In the October 2005 issue of *IEEE Spectrum* he covered accusations that the Vatican's radio transmitters were causing cancer.