

## Energy limitations in data transmission and switching

Rod Tucker, University of Melbourne

Abstract: The expanding volume of data on the global Internet is causing continuous growth in energy consumption of the network. In response to rising electrical power bills, network operators are now thinking seriously about how they can improve the energy efficiency of their networks. Fortunately, there have been continuous improvements in the energy efficiency of commercial communications and switching equipment. But there is no end in sight to the growth of the so-called data tsunami, and improvements in equipment energy efficiency are barely keeping up with what is needed to constrain growth of the total energy consumption of the global network. Where is this leading us? And what are the future prospects for continued improvements in energy efficiency? In this talk, I will explore some of the technological and fundamental limitations on the lower bound of energy consumption in transmission and switching, both in optical and electronic devices. I will compare energy consumption of state-of-the-art commercial devices and systems with the lower-bound limitations and contemplate what measures can be employed to close the gap between practical devices and these limitations.

Rod Tucker is an Emeritus Professor at the University of Melbourne. He is a Fellow of the IEEE, the Optical Society of America, the Australian Academy of Science, and the Australian Academy of Technological Sciences and Engineering. He has previously held positions at the Plessey Company, AT&T Bell Laboratories, Hewlett Packard Laboratories, and Agilent Technologies. Rod was Founding Director of the University of Melbourne's Centre for Ultra-Broadband Information Networks (CUBIN) and Centre for Energy-Efficient Telecommunications (CEET).

