Half the productivity, twice the carbon

EurekAlert

Unless the IT industry adopts new energy-efficient technologies in the coming decade, it runs a serious risk of being unable to contribute to growing the global economy if limits are placed on carbon emissions. The findings come from an 18-month investigation by scholars at the Institute for Sustainable and Applied Infodynamics (ISAID) in Singapore and Rice University's Baker Institute for Public Policy in Houston.

"In the face of growing global concerns over greenhouse carbon emission, the key for the industry is finding new technologies that deliver more performance for each kilogram of CO2 emitted," said Rice computer scientist Krishna Palem, who directs ISAID, a joint institute of Rice and Singapore's Nanyang Technological University (NTU). "Fortunately, there are viable technological options on the table and the information and communication industries have a strong track record of embracing new technologies."

The report found the information and communication technology (ICT) industry in the U.S. is on pace to grow its carbon emissions at twice the rate of its contributions to gross domestic product over the coming decade.

"In the U.S. in 2009, the economic output of the ICT industry per kilogram of CO2 emitted was about $2.83, and in a business-as-usual scenario, that output will fall to about $1.06 per kilogram of CO2 by 2020," said study co-author Chris Bronk, a fellow in technology, society and public policy at the Baker Institute and lecturer of computer science at Rice. "Based on those numbers, the industry is headed for a brick wall if limits are placed on CO2 emissions. In a carbon-constrained economy, green innovation will be absolutely essential for ICT profitability."

The report included a painstaking analysis of both the carbon emissions and the amount of gross domestic product (GDP) that are delivered each year by the information and communication technology (ICT) industry. The report also offers a new metric, the sustainability innovation quotient (SIQ), which expresses the number of dollars returned in GDP by the ICT industry for each kilogram of carbon dioxide it emits.

"Sustainability research and development is one of the key thrusts for NTU, and the latest research findings involving scholars from the joint NTU-Rice Institute for Sustainable and Applied Infodynamics, are a further affirmation of NTU's capabilities and commitment in promoting sustainability globally," said NTU Provost Bertil Andersson. "The Sustainability theme pervades the University, and it is through initiatives such as ISAID that NTU aims to promote and develop new energy-efficient technologies, playing its global role in achieving a sustainable Earth."

The report grew out of a graduate course on information technology sustainability

that Bronk and Palem, Rice's Ken and Audrey Kennedy Professor of Computing, co-taught at Rice in spring 2009. In preparing for the course, Palem and Bronk found a dearth of verifiable information about the ICT industry's carbon footprint, and Palem suggested the in-depth analysis after neither they nor their students found a reliable metric that related the ICT industry's contribution to gross domestic product relative to its carbon footprint.

Working with Bronk and Palem, graduate students Avinash Lingamneni and Kirthi Muntimadugu compiled numbers from government and industry sources. The team determined the number of various devices that are in use today, how much energy they consume and how that consumption is likely to be effected by expected growth in demand. Because IT devices don't emit CO2 themselves, but instead use electricity that is produced largely by burning coal and natural gas, the authors factored in the effect of cleaner, more efficient electric production technologies that will be rolled out in the coming decade.

In addition to information technology staples like PCs and laptops, the authors studied communications devices like smart phones, and they considered the impact of video game consoles -- one of the market's fastest growing product segments. Networking equipment for telecommunications and wireless providers was not included in the report, but data centers were, due largely to previous studies that had looked at their energy consumption in significant detail.

The authors calculated the global carbon emissions that will likely result if the ICT industry continues with business as usual. The calculations showed that global carbon emissions related to PCs and laptops, which accounted for 48.5 percent of all global ICT emissions in 2009, will nearly quadruple by 2020. Data center-related emissions will more than triple by 2020, and calculations showed that emissions related to both game consoles and mobile phones will more than triple by 2020. Mobile phones, which are constrained by battery life, and game consoles will together account for just 5.01 percent of total ICT emissions by 2020.

SOURCE [1]

Source URL (retrieved on *06/19/2013 - 9:36am*):
http://www.ecnmag.com/news/2010/10/half-productivity-twice-carbon

Links:
[1] http://www.eurekalert.org/pub_releases/2010-10/ru-htp100810.php