



FUTURE  
INTERNET  
ASSEMBLY

10TH EDITION  
FUTURE  
INTERNET  
ASSEMBLY  
DUBLIN | 2013

8<sup>TH</sup>-10<sup>TH</sup> MAY 2013

[www.fi-dublin.eu](http://www.fi-dublin.eu)

**Session Title:** Green ICT: What would be the cost of doing nothing?

**Session organiser(s):**

Didier Bourse (Alcatel-Lucent, France) - [Didier.Arnaud.Bourse@alcatel-lucent.com](mailto:Didier.Arnaud.Bourse@alcatel-lucent.com)

Marco Ajmone Marsan (Politecnico di Torino, Italy) - [ajmone@polito.it](mailto:ajmone@polito.it)

**Purpose & Audience**

Sustainability and environmental challenges require innovation in the different regions of the world. ICT infrastructures have been identified as a key element in global strategies for sustainability across society. The ICT sector is estimated to account for around 2% of the global GHG footprint (equivalent level to the airline industry) but has the potential to reduce global GHG emissions by 16.5% by 2020, amounting to \$1.9 trillion in gross energy and fuel savings and a reduction of 9.1 GtCO<sub>2</sub>e of GHG. This is seven times the size of the ICT sector own GHG footprint by 2020. This benefit will happen by the further design and development of smart users technologies, smart grids, smart buildings, smart transportation... to monitor and control energy use and to globally contribute to smarter cities, communities and society.

The benefits of ICT networks depend on scalable and ubiquitous ICT network connectivity. Traffic will continue to dramatically grow, in particular mobile traffic, with a diversity of network services, applications and energy-hungry capabilities continuing to expand. Energy use of infrastructure elements (transmission, e.g. base stations, and storage, e.g. data centers) is becoming a significant fraction of the service and communications providers OPEX. Major new technological innovations are needed to keep pace with these changes, and continue network scaling into the future.

This session was building on recent sessions organized worldwide on sustainability and green ICT, taking here a different and disruptive approach "Green ICT: What would be the cost of doing nothing?".

The targeted audience was:

- 1) Researchers and developers from industry and academics engaged in research on Green ICT, energy efficiency, ICT infrastructures architectures, smart grids programmes and projects.
- 2) Innovation leaders and entrepreneurs interested to know more about the developments of Green ICT programmes and projects and participate to the discussion on the potential innovation and business opportunities ahead.

### Key message(s):

The major key messages addressed during the session were the following ones:

- ICT is a mandatory path for the development of low carbon economy.
- Energy Efficiency (EE) is a necessity and an opportunity for the ICT industry.
- The ambition of the GreenTouch initiative and consortium ([www.greentouch.org](http://www.greentouch.org)) is to “Deliver by 2015 architectures, specifications and roadmap and demonstrate key technologies to Increase network energy efficiency by a factor 1000 compared to 2010”.
- The ICT networks, PCs, and data centers have grown from representing 3.9% of the worldwide electricity consumption in 2007 to 4.6% in 2012. Periodic updates (e.g. every 5 years) of these estimations are useful to see where we are headed and evaluate if efforts to improve energy-efficiency are catching on.
- With the growth in customer number and greater demand for data services, it is important that the ICT sector plays its part in reducing energy emissions and its carbon footprint as far as it is able to. However, the ICT industry also has a huge role to play in helping its customers to reduce energy and fuel consumption and therefore their carbon footprint, through services such as smart grids, smart logistics, conferencing and cloud hosting facilities.

### Summary

The session gathered up to 35+ participants in the room, providing the opportunity of a well balanced mix of presentations, discussions and Q/As. The session contributed to develop detailed mutual understanding between the GreenTouch initiative participants, the GeSI participants, the EC projects (e.g. TREND) participants and the other participants in the audience, find out more about latest developments in energy efficiency in the ICT sector, and then identify potential synergies and convergence points. It has to be noted that both **Didier Bourse** and **Alice Valvodova** could not join the session due to personal issues.

The session addressed the following questions:

- 1) What are the energy consumption and related costs of ICT infrastructures?
- 2) What are the risks of the “doing nothing” approach and what would be the ending point in 2020 and 2030 for a business as usual situation?
- 3) What are the top energy efficiency challenges for ICT infrastructures today and tomorrow?
- 4) What is the scale of effort and related costs to enhance ICT infrastructures energy efficiency?
- 5) What could be the potential infrastructure migration path from now to 2020-2030?

The session was kicked-off by **Marco Ajmone Marsan** who explained the context and ambitions of this session and introduced the speakers and panellists.

**Philippe Richard** then addressed the Alcatel-Lucent and GeSI perspectives on ICT and energy efficiency. He stressed the data explosion and the fact that “doing nothing is not an option”. He also detailed the ICT “Leverage Effect” analysed by GeSI in their Smarter2020 report. He then introduced the GreenTouch initiatives and ambitions.

**Marco Ajmone Marsan** then opened the panel discussion by asking panelists to give short presentations to illustrate their points of view.

**Piet Demeester** addressed the issue of ICT growth rate vs electricity production. He explained that the annual growth in electricity consumption of ICT networks, PCs, and data centers has been slower

than forecasted. This can partly be attributed to a shift to more efficient technologies (e.g. desktops to laptops, virtualization in data centers...) and the global financial crisis of 2008. However, the electricity use of ICT is still growing at a higher pace than the annual growth of the worldwide electricity consumption. Therefore the ICT networks, PCs, and data centers have grown from representing 3.9% of the worldwide electricity consumption in 2007 to 4.6% in 2012. The networking components exhibit the fastest growth, in excess of 10%. Periodic updates (e.g. every 5 years) of these estimations are useful to see where we are headed and evaluate if efforts to improve energy-efficiency are catching on.

**Nicola Woodhead** then introduced the Vodafone perspectives on Energy Efficiency, as the best way to fight ecological degradation and cut costs. She explained the important role of mobile technologies in the current societal / technological evolution. She illustrated three concrete examples of (1) ASB introducing data management solutions to reduce energy consumption using Vodafone M2M capability, (2) the city of Groningen, where Vodafone M2M connectivity helps the municipal authority route its trucks according to where they are actually needed, saving time and money, and increasing carbon efficiency and (3) a fleet management solution where Vodafone provides M2M connectivity between TomTom GPRS-enabled devices and a central platform that automatically collects and conveys real-time data on location, traffic, driving styles, engine performance, fuel consumption and carbon emissions.

Then **Jaafar Elmirghani** presented in details the GreenTouch initiative and introduced the related challenges, opportunities and activities. He stressed with quantified figures that Green makes economic sense. He then introduced several GreenTouch projects “Beyond Cellular Green Generation” (BCG), BiPON (Bit Interleaving PON), Silicon Photonic Interconnects and Single-Chip Linecard, Optimal End to end Resource Allocation (OPERA), Switching and transmission (STAR), Router Power Measurements (REPTILE) and Time for a Greener Internet (TIGER).

Finally **Klaus Wuenstel** presented the GreenTouch Wireless Box, the GreenTouch methodology to compute the energy consumption for nation wide mobile networks. As a black box, its main functionality is taking in traffic demand and providing measureable performance to satisfy the requirement, meanwhile, generating corresponding operating cost such as energy consumption. The overall system is comprising different types of area Dense urban, Urban, Suburban, Rural and Scarcely populated areas.

The panel addressed the possibilities for rapid adoption of Green approaches in ICT networks and the actions on-going and forecasted by the different stakeholders, e.g. networks operators, manufacturers... There were discussions about parameters and forecasts (e.g. Shannon, Moore and Koomey laws, parameters for the GreenTouch Wireless box modelling...) as well as performance metrics for energy efficiency. The specific technologies that could support the enhancement of Energy Efficiency were also questioned, e.g. virtualization, SDN... Finally the panel also addressed the geographical areas best suited for the initial penetration of Green networks and what could be the role of renewable energies, with respect to different regions of the world.

Want to know more about this session, read <http://www.fi-dublin.eu/green-ict/>

**Recommendations**

ICT Energy Efficiency is clearly one of the grand challenges for the decade and requires a significant effort in the different regions worldwide, and thus deserves quite a prominent position in the context of the forthcoming EC H2020 programme and projects.