



## eMobility stimulates “green research”

There is a huge demand for advanced telecommunication technologies in all parts of the globe. Wireless and wired communication technologies and Internet services are the motor of industrialised as well as developing countries. ICT is also a tool to manage globalisation. But unfortunately the role of ICT is twofold. Beside Europe, US and Japan, developing countries like Brazil, Russia, India, and China are heavily dependent on telecommunication technologies to organise today's life. Their growth rates in terms of adopting new technologies as well as energy consumption outperform the rest of the world.

The ICT industry in general is used to positive growth rates in various dimensions. Increasing numbers of (mobile) devices do have more memory and more storage capacity, more computing power, more and faster transmission technologies, and so on. Those positive trends lead to usage of more spectrum and consumption of more energy, which finally prevents sustainability. We cannot expect to have unlimited resources. Since, this is a global

problem we have to come up with global solutions. Next generation telecommunication systems can facilitate the usage of green technologies. Global adoption of green technologies is key.

eMobility strategic research agenda (SRA) contributed to this problem field already by identifying efficiency as one of the most important characteristics of future telecommunication systems. Intelligent communication technologies for mobile and fixed broadband networks can ensure a new level of energy saving. The research priorities as discussed among eMobility members range from 'new materials' up to 'energy efficient radio', and 'more flexible business models'. The key will be interdisciplinary research on a global level.

One central aspect ensuring sustainability on a long run will be the social component. People must understand the consequences of their doing. ICT can help to provide energy aware components as well as services and applications that educate people. Saving energy is the only solution to satisfy the ever growing demands. 8 billion people



are expected to live on earth by 2020. Today, we do not know the services and devices they will use. Certainly, they will have to use different energy sources to be available for everyone.

On October 16, the eMobility GA will come together to discuss how to continue international research in the area of mobile and wireless communications in the coming years. Along the work program of the 7th framework of European Commission academia and industry will team up to find solutions for the problems ahead. The ultimate goal will be to provide coming generations with the same potential for well being as most industrialised countries enjoy today.

eMobility invites all interested parties to participate interesting discussions to kick start “green research”.

Dr. Stefan Arbanowski  
Fraunhofer FOKUS

## Editorial

„During the summer months, eMobility members were very active and there are many activities and results to report to you. In this issue of the Newsletter, which was edited by eMobility Steering Board member, Dr. Stefan Arbanowski, you will hear about the exciting new field of sustainable communications. Stefan has solicited a range of articles providing good insight into the relationship between environmental issues and communications. At the General Assembly on October 16th in Stockholm, the content of the first edition of the strategic Applications Research Agenda will be presented as will the new and substantially revised Version 7 of the eMobility Strategic Research Agenda.

Our preparations for supporting networking between members who want to form or join consortia to make proposals for Calls 4 and 5 of the Framework Programme are progressing well. The results of our membership survey will be presented at the 16th October meeting. As a new initiative, we are organising a number of parallel sessions on the 16th October where members can introduce themselves and their proposal ideas to each other to help them find partners for proposals. In calls 1 and 2, our activities helped many SMEs in eMobility become partners in successful proposals. Currently, 13% of partners in running projects on mobile communications are SMEs. We anticipate that our activities will help many members to achieve success with their proposals in Calls 4 and 5 and we look forward to meeting you in Stockholm shortly!”

### Dr. Fiona Williams

Chairperson of the  
eMobility Steering Board  
Research Director, Ericsson  
Mobile: +49 172 2434 132  
E-mail: Fiona.Williams@ericsson.com



# ICT-Based Innovation for a Low-Carbon Economy: European Challenges and Policies

In 2008, the increases in energy, food and commodity prices in 2008 are a first sign that we cannot continue to use energy and materials in the next decades, as we have done in the past. The world has changed. Business as usual is not a credible scenario.

Disruption to energy-supply, and climate change, are real threats to economic, social and political stability. The levels of greenhouse gases in the atmosphere are already dangerously high; rising fast. We know that it would be foolish to allow them to continue to rise unchecked, and that we will need a huge, worldwide transformation to a much lower-carbon economy in the next decades. In addition, the fossil-fuel energy crisis is already with us. We are not exhausting fossil fuel reserves, but it will be difficult to expand production to match growing demand, and we are critically dependent on supplies from a few countries.

Greater energy efficiency is the key for the next decade: It makes good business and political sense – it saves money and generates new competitive advantage. It will be critical to the security and competitive position of businesses and countries. Large-scale substitution of fossil fuels by renewable sources

may be possible beyond 2020, but earlier and more cost-effective cuts in carbon emissions are more likely to come from energy efficiency gains. Energy efficiency is therefore emerging as the cornerstone of energy and climate policies.

ICT equipment and services can certainly be more energy efficient. ICT energy-use must be cut, and ICTs must become a key enabler of more efficient energy-use across society. Worldwide, the ICT sector has the most powerful civil research and innovation capacity in the world today. Recent analyses indicate that ICT-enabled improvements in energy efficiency can reduce carbon emissions by five-times as much as the ICT footprint itself. In the European Commission, we have identified these as one of the potentially most cost-effective ways in which Member States can meet their 2020 targets. We launched a wide consultation in May 2008 to identify policy measures that could best help realise the potential. From it, we can clearly see that the trend to greater functionality in personal, mobile equipment, with highly efficient battery power can cut the footprint of ICT equipment itself. In addition, wireless networking of large numbers of

embedded energy-use sensors in household appliances, machine tools and other equipment will make a major contribution to greater energy-efficiency in heating and lighting buildings; in intelligent transport logistics; in automation and control in manufacturing, and in management of smart electrical power grids.

Realisation of these gains will depend on wide availability and take-up of low-cost sensors and embedded, networked processors. The ICT sector has developed tools for business management – supply chain, enterprise, logistics and customer relations management. The same is now needed for 360° energy-use and carbon accounting – for consistent and validated reporting by companies and labelling for customers.

To conclude: We face enormous challenges. We must get on track to a high-tech, low-carbon economy. You are all part of the solution. You work in a sector with enormous innovation capacity, but new ideas and partnerships are needed to cut the sector's own footprints and increase its contribution to energy-efficiency across the economy.

*Peter Johnston, European Commission*

## Towards a Greener Future

4WARD addresses the Future Internet – also for a greener way of communication too.

The ICT sector is contributing around 2% to the global warming as the often cited Gartner es-

timate claims. While the Internet is certainly growing further the WWF has recently identified how consequent usage of ICT could easily result in a 3% reduction of the overall emissions. There is all

reason to expand the applications running over communication networks and to “de-materialise” information sharing and travel. But can we also work on the ICT itself, making this grow-

ing sector contribute less to the carbon dioxide footprint? In the 4WARD project we are working on a radical long-term approach to create the Internet of the future, not only to support new types of applications but also to make the network itself a lot more efficient. A few examples of the approaches taken and how they contribute to a greener future are:

- Network virtualisation will lead to more dynamic network structures where resources are being shared. As such power consumption for the network itself will follow the usage pattern and will not stay at the peak.

- Self-management of more autonomous parts of the total network will enable optimisation of power and resource consumption.
- New transport technologies (generic paths) will reduce the power needs especially of the mobile network access.
- A network of information is maybe the biggest single saving approach as it avoids unnecessary transport and processing of information not wanted or needed at the receiving side. Users get only what they want, when they want it and how they want it.

A consequent development of these techniques and its compilation into one overall architecture will enable a greener Network of the Future.

*Dr. Norbert Niebert, 4WARD  
Technical Manager, Ericsson*



## Sustainability in the ICT sector

Information and communications technology (ICT) systems are the core of today's knowledge based society. Innovations in this area are adapted at tremendous speed and have been responsible for a quarter of GDP growth in Europe in recent years. To enable this growth, the worldwide use of ICT has soared in the past two decades. Both the number of installed internet servers and the number of mobile network subscribers have grown by more than a factor of 1'000 from 1995 to 2008. Over the same time span, the processing power, storage capacity and data transfer speeds of ICT systems increased by a similar factor. However, this unprecedented growth comes at a price: ICT systems are meanwhile responsible for 2% of global CO2 emissions and 10% of electrical energy consumption in industrial nations. In the past, the power consumption of the ICT infrastructure (server farms and

telecommunications networks) has doubled every 4-5 years. If this growth continues at its present pace, it will endanger ambitious plans to reduce CO2 emissions and tackle climate change. Increasing the energy efficiency of ICT systems is thus clearly the major R&D challenge in the decades to come. To cite Viviane Reding: „To meet Europe's energy efficiency goals by 2020, we need a high growth, low carbon economy. Research and rapid take-up of innovative energy efficient ICT solutions will be crucial“.

Two key drivers behind the rapid growth in the ICT sector are the Internet and personal mobile communications. In both areas, the increasing energy consumption has become not only an ecological but also an economical challenge, as the total energy cost spent over a system's lifetime surpasses the investment cost. Not surprisingly, "Green IT" and

"Green Communications" have become two new megatrends in the past two years. This is exemplified by the selection of "Green IT" as the theme of this year's CeBit and by the growing number of workshops on Green Communications, e.g. the W-Green workshop at this year's WPMC. The R&D community is also rising to the challenge, for example with the initiative for a new eMobility White Paper on "Green Wireless Communications" and the "Cool Silicon Spitzencluster" funded by German BMBF, in which over 50 partners will develop concepts for energy efficient computing, mobile communications, and sensor networks. With an abundance of open questions in this area, tackling the energy efficiency challenge provides fertile ground for a lot of new and exciting research.

*Dr. Ernesto Zimmermann,  
Technical University of Dresden*

## Meetings

### October

16 October 2008  
eMobility General Assembly  
Stockholm, Sweden

15 + 17 October 2008  
eMobility Meeting and Workshop  
of Working Group Leading Edge  
Applications  
Stockholm, Sweden

22-24 October 2008  
e-Challenges  
e-2008 Conference  
Stockholm, Sweden

### November

25-27 November 2008  
ICT event 2008 „I's to the future  
invention - innovation - impact  
Lyon, France

30-4 November/December 2008  
IEEE Globecom 2008  
New Orleans, USA

### December

9-10 December 2008  
Future Internet Assembly meeting  
Madrid, Spain

11-12 December 2008  
2nd Future Internet Assembly Event  
Madrid, Spain

10-13 December 2008  
Service Wave  
Madrid, Spain

### In 2009

22-23 January 2008  
Paradiso Open International  
Conference  
Brussels, Belgium

26-29 April 2008  
69th IEEE Vehicular Technology Con-  
ference Spring 2009

10-12 June 2009  
ICT Mobile Summit 2009  
Santander, Spain

## A new Working Group on "Green Wireless Communications"

Recently, in the communication "Addressing the challenge of energy efficiency through Information and Communication Technologies", the European Commission acknowledges on the one hand the opportunities that ICTs have to offer to reduce the energy consumption of the economy, and on the other hand that ICT needs to lead by example in increasing its energy efficiency. The data volume carried by networks increases approximately by a factor of 10 every 5 years, which corresponds to an increase of the associated energy consumption by approximately

16 – 20 % per year. A significant part of these data is transmitted through wireless links, thus we need to pay more attention to the energy efficiency of existing and future wireless radio systems.

To identify and analyse the related research challenges, a Working Group entitled "Green wireless communications" has been created in the eMobility European technological platform. It addresses the inter-disciplinary research challenges associated with the design, implementation, and application of future wireless technologies aiming at

environmental friendly technology deployment.

Topics discussed in the working group include:

- Holistic view of energy consumption in wireless communications
- Architectures and design of low power equipments (sensors, terminals, network infrastructure)
- Energy efficient wireless networks, through e.g. efficient combinations of different networks, inter/intra-system optimisation, optimised deployment and operation

- Exploration of "Green" services, such as those to make our environment "greener"

To share the views of important stakeholders, the first International Workshop on Green Wireless (W-GREEN'08, Lapland, 8 Sept. 2008) has been organised by the Working Group.

In October 2008, some research priorities on these topics will be highlighted in a white paper in preparation.

*Dr. Laurent Hérault, CEA-LETI*

## Broadband for Europe using Structural Funds

This working group is currently preparing a "Report on current usage of public funds (e.g. Structural Funds) to promote innovation and early take-up of R&D results". This report is addressing the instrument of Structural Funds, the Structural Fund budget per Member State during the financial period 2007 – 2013 and the distribution of this budget per Member State to different

economic areas. The document is complemented by statistics and examples for broadband in Europe and examples of projects for deployment of broadband technology by using Structural Funds. In order to get a better overview on successful projects in Europe a questionnaire is under preparation, which is investigating relevant conditions in respective communities and regions in order to identify success factors. The results of this questionnaire will be discussed with experts for different technology options (such as optical commu-

nications, mobile communications, broadband wireless access and satellite technology) to develop generic recommendations for regions and communities with similar conditions.

*Dr. Werner Mohr,  
Nokia Siemens Networks*

## Working group on applications

The WG on applications will be having its 3rd Workshop on Oct. 15 (the day previous to the General Assembly), and its 3rd Meeting on Oct. 17th (the day

next to the General Assembly), both co-located with the General Assembly in Stockholm, Sweden (but hosted by Ericsson, in Kista, outside the city centre). The workshop will have speakers addressing the focus areas (Health and Inclusion, Transport, Environment, and Future Internet), while the meeting will be dealing essentially with the SAA. Information on both events is available at eMobility's website.

*Prof. Luis M. Correia,  
Technical University of Lisbon*

## Public Research Program Advisory Committee

eMobility is investigating to facilitate a set of cooperating project proposals for the forthcoming FP7 Calls 4 and 5. This approach will also be discussed with other European Technology Platforms in the ICT domain. As starting point for this process a meeting was

organised on June 24, 2008 with the objectives to discuss FP7 Calls 4 and Call 5 and potential areas for collaborative coordinated project proposals. Based on a generic vision for future systems in the context of „Future Internet“ these areas will be identified, where

collaboration makes sense. This will result in a generic reference model for the identification of potential interfaces between collaborating projects. Complementary cooperating projects will enable the possibility to research bigger issues with significant impact.

Based on the overall technical preparatory work the initiative will be structured in a promising set of collaborative projects.

*Dr. Werner Mohr,  
Nokia Siemens Network*