

## **What Future Internet means for Smart Energy ?**

Convenor / Rapporteur : Pierre-Yves DANET France Telecom/Orange Labs

Support : Mikhail SIMONOV (ISMB)

### **Context :**

Scientists, economists and policy makers are calling for CO2 emissions targets of at least 20% below 1990 levels in 2020. CT could bring its contribution reducing the global carbon footprint on three main aspects :

- by reducing non-ICT carbon-footprint through smart use of ICT
- by enabling green energy, i.e. the generation and distribution of energy without CO2 emissions
- by reducing the carbon-footprint of ICT itself.

It has been estimated that ICT may help other sectors to reduce their CO2 emission by 15% in 2020 which is a significant step towards reaching the 20% objective.

ICT Energy efficiency should address two main topics :

- Network efficiency : How to reduce telecom infrastructure energy consumption ?
- Application efficiency : How to help people to reduce their energy consumption with innovative services ?

The Smart energy session has the objective to bring a wide vision of the situation today and to bring some ideas where savings could be done.

### **Objective :**

1. Get a common vision of where ICT and the Future Internet could help in energy savings (PPP, ETPs). 2 different areas :
  - How to reduce telecom infrastructure energy consumption : Network savings/scavenge (protocols, infrastructure, devices, ...)
  - How to help people to reduce their energy consumption with innovative services : Application savings (smart metering, home automation, eApplications, tele-transportation, ...)
2. Identify the research topics where ICT could bring features to decrease energy consumption
3. Identify those research topics which are already covered by existing research projects and see how they could contribute to the Future internet design.
4. Propose new projects ideas for the missing ones

### **FIA session agenda :**

11h30 – 11h45 : Session introduction : Pierre-Yves Danet (FT)

11h45 – 12h45: Smart energy panorama

- Energy Utility vision : Asier Moltó Llovet (REE)
- Smart grid vision : Duncan Botting (Smartgrids ETP)
- Open challenges enabled by Future Internet : Mikhail Simonov (ISMB)
- M2M standardisation activities : David Boswarthick (ETSI M2M)

12h45 – 13h00 : Socio economy analysis

- Gabriella Cattaneo (IDC)

13h00 -13h20 : Panel session Q&A with speakers

- Moderator Roger Torrenti (Sigma-Orionis)

13h20 – 13h00 : Conclusion and next steps : PY Danet

### **Session Introduction : PY DANET (France Telecom/Orange Labs)**

A short presentation of the context, the objective of the session and the session agenda (see previous points)

### **Energy utility vision : Asier MOLTO LLOVET (Red Electrica De Espana)**

European Energy Policy is driven by the 20/20/20 objectives, which consist of a 20% reduction of Greenhouse gas emissions, 20% of energy consumption from renewable origin and 20% reduction in energy consumption by 2020. National policies in Europe are therefore oriented to comply with these challenges.

During last decade, renewable production has exploded in European countries. For systems operators, this has constituted a big challenge, as data in control centres had multiplied and new tools for forecast and production management were to be developed. Today we can talk about this issue in terms of success, where ICT have been the enabling technologies.

Next decade challenges are about demand side management, where actions over millions of loads are required, in different consumption sectors. In this challenge ICT will play indubitably a significant role in enabling that consumers have access to information on their own energy consumption and production, hourly energy prices and best practices for sustainable energy consumption.

### **Smart grid vision : Duncan BOTTING (Smart Grid ETP vice chair – Scottish European Green Energy Center)**

An overview of the smart grid techniques as well as first solutions studied in the Smart Grid European Technology Platform.

The presentation outlined the importance of opportunities that exist between the Fast Internet world and that of SmartGrids but with a warning that ICT overlaid on power networks did not constitute a SmartGrid solution.

Many stakeholders exist in the current market supply chain and new ones are being added all the time; customers are now becoming suppliers, aggregators (virtual power plants) and demand side ancillary services are some of the possible new players that will emerge. Utilities are no longer the “command and control” entities they used to be. The customer is now becoming the dictator. It is not only consumer behaviour that will have to change, much of the market will need to change including legislators, regulators and other market based stakeholders.

1. Utilities are not the custodian of the SmartGrid design, they are a component as much as the ICT is.
2. In order to deliver cost effective communications to millions of sensors that will enable the true SmartGrid system integration R&D will be required and innovative ICT solutions will be needed to provide affordable and reliable application solutions.
3. Providing data/information to end users (Smart Meters) is not a SmartGrid. If price signals are to be the only innovation then a SmartGrid will not develop. Fully automated demand side participation needs to be integrated into system level Grid operation in real-time (seconds not minutes)!
4. Generation is only any use if it is connected to end-users – often generation is considered as the only element to security of supply. Without a SmartGrid to deliver flexibility and options for future architectures, security of supply will be compromised.
5. SmartGrids rely on four important and parallel activities: Technology, Economics, Environmental and Cultural solutions. ICT will provide a substantial effect on each of these to enable the future SmartGrid.

### **Open Challenges enabled by the future internet : Mikhail SIMONOV (ISMB)**

The Future Internet brings concrete and significant impacts because of its enabling role. The main challenges are: Integration of grids in the system-of-system, making interoperable separate fieldbus; New dynamic nodes abstracting HEVs / HSVs; Possibility of the e-energy business e.g. online real time energy trading; the infrastructure for energy services with new control paradigms permitting to optimize both individual and collective interests; the anticipatory knowledge about events going to happen (proactiveness); multiplicity of services, working independently and together, to interact with.

A concrete presentation showing four main challenges where the future internet could help in the field of smart energy was given:

1. More renewable (beyond 10-15%). The anticipatory knowledge about the events to happen will permit to increase the percentage of PVs, keeping the power grid stable, because solving unpredictability;
2. Knowledgeable awareness instead of seamless consumption. Using new HMI complementing smart meters, it makes visible the seamless dynamics;
3. Proactive load management instead of the reactive one. Real time digitized energy anticipates significant energy consumption variations, enabling the proactive response;
4. Energy storage in grids. HEV/HSV integration brings new energy services and different way to balance the loads.

### **M2M Standardisation activities : David BOSWARTHICK (ETSI)**

Presents an overview of the eventual Smart Grid standardisation activities as seen from the perspective of ETSI TC M2M.

The presentation examines the various technical aspects of Smart Grids as seen from the perspective of the ICT industry.

ETSI being the European Standards Body responsible for ICT standards is highly active in domains such as Machine to Machine, Smart Meter, wireless, fixed and powerline transmissions, as well as many radio frequency technologies. Such areas are essential building blocks of the realisation of the Smart Grid and eventually, the Internet of Things.

The presentation provides an overview of the initial work already completed by ETSI TC M2M, and how it may potentially map onto the standardization needs of Smart Grid related technologies. It also examines the ongoing work for the EC Mandate on Smart Metering interworking (M441).e

### **Socio Economic analysis : Gabriella CATTANEO (IDC)**

This presentation looked at the socioeconomic scenario of the development of the Future Internet. The Future Internet promises to be a new wave of radical innovation, leading to new thresholds of pervasiveness of information infrastructures in the economy and the society, deeply transforming production, distribution and usage patterns of ICT, Technical innovation is an important driver of this transformation, but by no means the only one. The pace and nature of the development of the Future Internet in Europe will be influenced by general economic growth, the availability of investments for ICT innovation, the effectiveness of ICT investment and research policies by governments, the ability of businesses to exploit and embed ICT innovation in their business models, and the willingness by consumers to adopt new services. A new study about the socioeconomic impacts of the Future Internet promoted by the DG INFSO to prepare the ground for the Future Internet PPP will explore these main trends and assess these scenarios. Smart energy is certainly one of the most promising areas.

According to IDC research about the contribution of ICT to the Low Carbon economy, intensive use of ICT technology in the G20 countries can reduce emissions by over 25% annually by 2020 compared with 2006 levels; energy creation and distribution is the sector where the potential for emission savings is higher, particularly through integrating renewable energy into energy distribution using smart grids. There are already positive signs of dynamism in the use of ICT in the energy sector in Europe: according to IDC Energy Insights, spending in the intelligent energy grids in EMEA (Europe, Middle East and Africa) will reach \$8 billion in 2010.

### **Panel : Roger TORRENTI (Sigma Orionis)**

The presentations cover all the SE sector : Utility view, Smart grid, research use cases, standardisation, social economics

A short panel session where panellist have asked to propose their R&D priorities :

- Development of ICT skills to allow end users to improve their energy consumption behaviour
- Integration between power grid and ICT networks
- A need to insure interoperability through standardisation
- Management of large amount of data

- ICT network energy efficiency
- Deployment of sensors and communication in a cost-effective manner

### **Next Steps :**

- Collect the names of people interested (end of the week)
- Setup a mailing list with interested people (end April)
- Launch a survey in order to collect ideas from participants (end May)
- Analyse/classify ideas (end June) -> setup an editing group
- Identify which one are already covered by existing projects (end August)
- Come back to PPP and ETPs with the non covered topics (if any) in order to help new project proposals to rise. (end September)
- Publish a white paper collecting all these information (November in preparation to the next FIA) in order to :
  - Facilitate existing research projects to participate to the Future Internet design.
  - Provide recommendation to any ICT project to help them to take into account this cross issue.

### **Speakers bio**

#### **Mikhail Dr. SIMONOV (ISMB)**

Mikhail Simonov is graduated in 1987 from the Moscow State University. Specialized on Computer Science. Ph. D. research at Energy Dept. of Polytechnic University of Milan (on Near-Energy Ubiquitous Services: digital energy, cyber security, load management and forecast, and softcomputing). He attended a stage in management consultancy at Bain in Italy, worked in an Insurance company and Software House.

Project leader and manager for more than 15 years. After a long experience in application projects and executive tasks, he performs EU R&D activities since 1999, some chairing and participation in Advisory Boards, several publications. Main areas of competence and experience include ICT, Knowledge and Internet Of Things technologies and their applications.

#### **Asier MOLTO, (Red Eletrica de Espana)**

Asier Moltó is Industrial Engineer from the Universidad Politécnica de Madrid. He has completed his formation in the École Nationale des Ponts et Chaussées in Paris and started his professional career in France as strategy consultant in the European energy markets.

He joins the Demand Side Management Department within Red Eléctrica de España in 2008, where he works in the development of strategies to drive demand side management into the operation of the electrical system

#### **Duncan BOTTING (Scottish European Green Energy centre)**

Duncan currently holds the posts of Executive Chairman and Interim CEO of the Scottish European Green Energy Centre and Managing Director Global Smart Transformation Limited, based in Scotland. In these roles he works closely with customers, academia, industry, government and regulators to deliver innovative technical solutions to market challenges. His previous roles included Managing Director, ITI Energy (a research institute) and with ABB as Head of Technology & Business Development. He has over 30 years experience covering the complete spectrum of technical and commercial roles from apprentice to boardroom. He is a visiting professor at Imperial College London and the University of Strathclyde, Glasgow.

He is an active member of the Institution of Engineering and Technology (IET, formerly the IEE) and is involved in many influential panels, advisory boards and committees both at a National and European level. As an active member of the IET Energy Sector Panel and as Vice-Chair of the European Technology Platform for "SmartGrids" he is helping to shape future thinking in the energy sector. He is also a founding member and shadow board member of the National Skills Academy for Power.

#### **Gabriella CATTANEO (IDC)**

Gabriella Cattaneo is the director of the Expertise Centre on Competitiveness and Innovation of Government Insights, business unit of IDC EMEA, the global ICT market research and consulting

company. She has 20 years experience in socioeconomic research on the development of the information society, ICT markets qualitative-quantitative analysis, monitoring and benchmarking of ICT services. She is currently involved in studies for the EC on the Future Internet socioeconomic impacts, the Enterprise 2.0, and Benchmarking indicators of e-government. She is a graduate in Political Sciences Magna cum Laude from Milan State University with a prize-winner research Thesis and has worked ten years as a business journalist.

**David BOSWARTHICK, Technical Officer, ETSI**

David has been extensively involved for over 10 years in the standardization activities of mobile, fixed and convergent networks in both the European Telecommunications Standards Institute (ETSI) and the 3rd Generation Partnership Project (3GPP). He is currently involved in the M2M standards group which is defining an end to end architecture and requirements for multiple M2M applications including Smart Metering, Smart Grid healthcare and enhanced home living. David holds a Bachelor's Honours Degree in Telecommunications from the University of Plymouth, and a Master's Degree in Networks and Distributed systems from the University of Nice and Sophia Antipolis, France.

**Roger TORRENTI, Sigma Orionis**

Roger founded Sigma Orionis, a market and research company specialising in ICT, after having managed a research center on energy systems and renewable energies. Sigma Orionis is involved today in several ETPs and particularly in NEM and is a partner of the BeyWatch project coordinated by Telefonica which recently received from the European Commission the award of the best ICT for energy efficiency project. Sigma Orionis is also the coordinator of the PARADISO2 FP7 project launched on April 1, exploring the societal aspects of the Future Internet and the organizer of the annual ICT for sustainable homes cooperation forum.