NGNs and Energy Efficiency

Workshop on Internet and Climate
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Agenda

- What are NGNs?
- How NGNs contribute to reducing power consumption
- NGN applications and climate change
- ITU-T standardization work and challenges ahead
What are NGNs?

- Packet-based networks, which provide telecommunication services to users, able to make use of multiple broadband technologies, with independence of service-related functions from transport technologies.
- Some see them as unification of today’s fixed, mobile and broadcast networks.
- Expected to achieve greater energy efficiency than existing networks.

Significant contribution against global warming.
Traditional Networks vs NGN

**Traditional Networks**
- Dedicated network
- Different signalling system
- Multiple Circuit-switched and packet switched platforms
- Separated services and transmission
- Classical switches
- Separate platforms for connection oriented and connectionless

**NGN**
- Sharing same network
- All IP
- Converged packet-switched network
- Converged fixed/mobile services
- Quality of Service enabled
- Generalized mobility
- Single Softswitch platform for connection-oriented or connectionless communications
- *Improved energy efficiency*
How NGNs contribute to energy efficiency (1)

- Internet Protocol Systems
  - Core network: improved efficiency
  - Transmission capacity requirements: digital compression techniques → 60–70% reduction already achieved

Migration to NGNs is expected to reduce 30-40% of power consumption compared with PSTN

Sources: “Sustainable energy use in mobile communications” White Paper, August 2007 Ericsson, BT, Dittberner Associates International
How NGNs contribute to energy efficiency (2)

- Multiple Power Modes
  - Full Power Mode
  - Low Power Mode
  - Standby
  - Hibernation

European Commission Code of Conduct on Energy Consumption of Broadband Equipment
How NGNs contribute to energy efficiency (3)

- Reduction in number of switching centres
  - Higher capacity routers and higher speed transmission
  - Example: BT 21CN project reduction from 3000 to 120

- More tolerant climatic range specification:
  Before → 35°C (between 5 and 40°C)
  NGN equipment → 50°C (between -5 and 45°C)

- But, it will also require an increase of number of Data Centres, action needed
  - Example: “Five Ways to Reduce Data Centre Server Power Consumption”, The Green Grid

Sources: BT, ITU
Potential climate impact of NGN applications

- 460 Mt of CO2e emissions could be saved by 2020 by making use of networks applications such as:
  - Teleconferencing
  - Teleworking
  - e-shopping
  - e-learning
  - Other virtual worlds

Indirect effects

Sources: GeSI report, Telefonica I+D; images from Cisco, AMCERT Ltd and ITU-D.
When?

- **Migration to NGNs:**
  - Fixed networks is expected to be fully deployed by 2012 in developed countries; mobile networks by 2020

- **Impact on energy requirements:**
  - Immediate
  - Power consumption monitoring is needed

- **Impact on climate change:**
  - Delayed effects
  - Difficult to determine, depending on the use of ICTs by users

Sources: "Trends in Telecommunication Reform: the Road to NGN", ITU
ITU-T Standardization Work

- NGNs: Next-Generation Networks Global Standards Initiative (NGN-GSI), created in 2006
  - Standards and recommendations, Y Series.
  - SG 13: focuses in NGNs technologies, Ethernet and MPLS
  - SG 16: multimedia terminals, systems and applications (essential for remote collaboration)
- ITU-T Study Groups working on energy savings:
  - SG 15: DSL, optical access and backbone technologies
    - Energy-saving checklist for standardization activities, Feb 2008
- ITU-T Study Groups working on other climate related issues
  - SG 6: environmental and safety procedures, recycling copper and optical cables materials
  - SG 2: emergency situations, climate disasters
  - SG 17: new recommendation X.1303, jointly with OASIS, common alerting protocol
Summing up

- Migration to NGN ➔ Energy savings in ICTs
- Reduced GHG emissions: ICTs and other sectors
- ITU working on Standards and Recommendations related to NGN technology and to reduce GHG emissions from the ICT sector

ITU-T Focus Group on ICTs and Climate Change (June 2008-April 2009)
Background material


- ITU Climate Change site [www.itu.int/climate](http://www.itu.int/climate)
  - Climate Change symposia website [www.itu.int/ITU-T/climatechange](http://www.itu.int/ITU-T/climatechange)


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