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# ***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

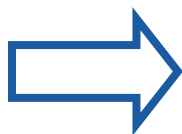
Migration to NGNs is expected to reduce 30-40% of power consumption compared with PSTN

## How NGNs contribute to energy efficiency (2)

### ■ Multiple Power Modes

➤ Full Power

➤ Off



➤ Full Power Mode

➤ Low Power Mode

➤ Standby

➤ Hibernation

European Commission Code of Conduct on  
Energy Consumption of Broadband Equipment

([http://re.jrc.ec.europa.eu/energyefficiency/html/standby\\_initiative.htm](http://re.jrc.ec.europa.eu/energyefficiency/html/standby_initiative.htm))

## 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

# Potential climate impact of NGN applications

- 460 Mt of CO<sub>2</sub>e 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



Big impact



# When?

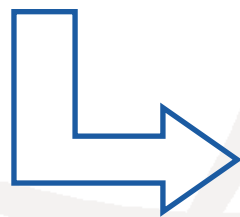
- Migration to NGNs:
  - Fixed networks is expected to be fully deployed by 2012 in developed countries; mobile networks by 2020
- Impact on energy requirements:
  - Immediate
  - Power consumption monitoring is needed
- Impact on climate change:
  - Delayed effects
  - Difficult to determine, depending on the use of ICTs by users

# 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

- Next Generation Networks Global Standards Initiative site <http://www.itu.int/ITU-T/ngn/>
- ITU Climate Change site [www.itu.int/climate](http://www.itu.int/climate)
  - FG on ICTs and Climate Change website <http://www.itu.int/ITU-T/focusgroups/climate/>
  - Climate Change symposia website [www.itu.int/ITU-T/climatechange](http://www.itu.int/ITU-T/climatechange)
- “Next Generation Networks and Energy Efficiency”, Technology Watch Briefing Reports [www.itu.int/ITU-T/techwatch/reports.html](http://www.itu.int/ITU-T/techwatch/reports.html)
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