ICT and Climate change: ICT's to the rescue?

http://www.gesi.org/

Luis Neves
GeSI Chairman
Luis.Neves@telekom.de

About GeSI

- **Founded in 2001**
  - **in response to the 2000 Millennium Development Goals**
- **Headquartered in Brussels, Belgium**
- **Global partnership of ICT companies to promote technologies for sustainable development**
- **Industry led**
  - **manufacturers, operators and regional associations**
- **Partners**
  - **UNEP, ITU, ETNO, US Telecom Association, Carbon Disclosure Project, WWF, GSMA and the EICC, WBCSD and WEF**
- **Address triple bottom line**

GeSI Membership

Alcatel·Lucent
Bell
BT
Cisco Systems
T
Ericsson
Fujitsu Computers Siemens
ftgroup
hp invent
intel
kpn
Microsoft
Nortel
Nokia Connecting People
Nokia Siemens Networks
Sun microsystems
Telecom Italia
Telefónica
O_2
verizon We never stop working for you.
vodafone
etno
Carbon Disclosure Project
USTelecom United States Telecom Association
WWF for a living planet

GeSI

GeSI Members

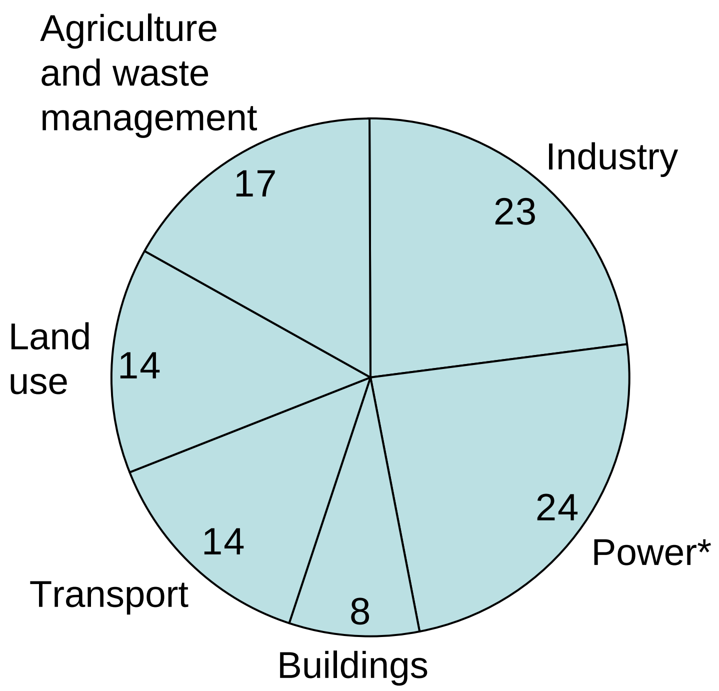
Expected to join soon:

- AT & T
- SKT (South Korea Telecom)
- TeliaSonera
- Huawei (China)
- HTC (Taiwan)
- Telstra (Australia)
- IBM

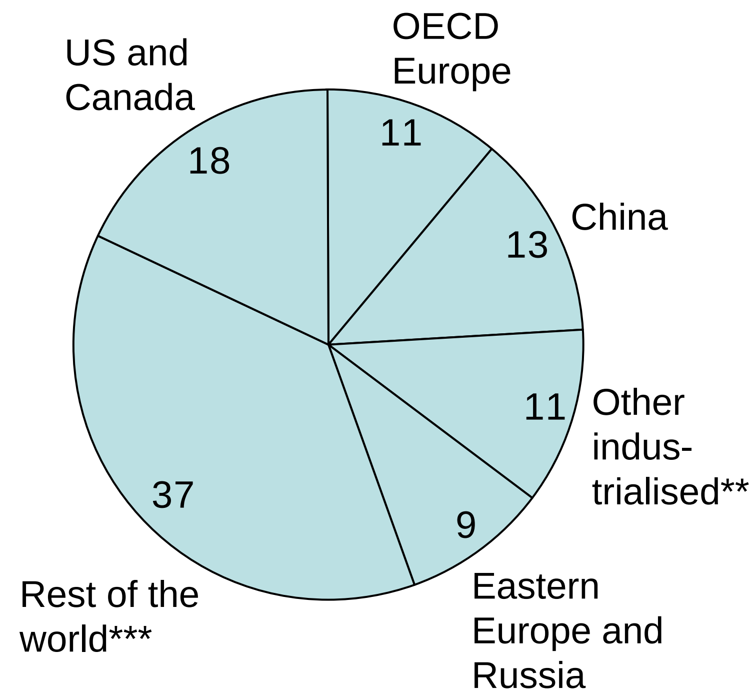
THE GLOBAL CLIMATE CONTEXT

GLOBAL CO2e EMISSIONS IN 2002 (Total: 40GtCO2e)

Direct emissions by sector
Percent



Direct emissions by region
Percent



* Power generation can be allocated to final demand from industry (45%) and buildings (55%)
** Australia, New Zealand, Japan, Singapore, South Korea, Taiwan, UAE, Saudi Arabia, Qatar, Oman, Kuwait, Israel, Bahrain, Mexico
*** Africa, South and Central America excl. Mexico, Asia excl. China and countries included in "Other industrialized" (see previous note)
Source:IEA World Energy Outlook 2004, team analysis

THE GLOBAL ICT STUDY

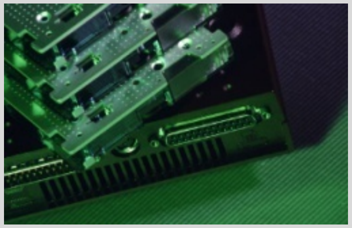
SMART 2020:
Enabling the low carbon economy in the information age

GeSI GLOBAL e-SUSTAINABILITY INITIATIVE

THE CLIMATE GROUP

GLOBAL ICT STUDY: WHAT WE DID

How can **ICTs reduce their own carbon footprint**?



How can **ICTs reduce the footprint of other processes and sectors**

How can ICTs capture **new business opportunities** in the low carbon economy

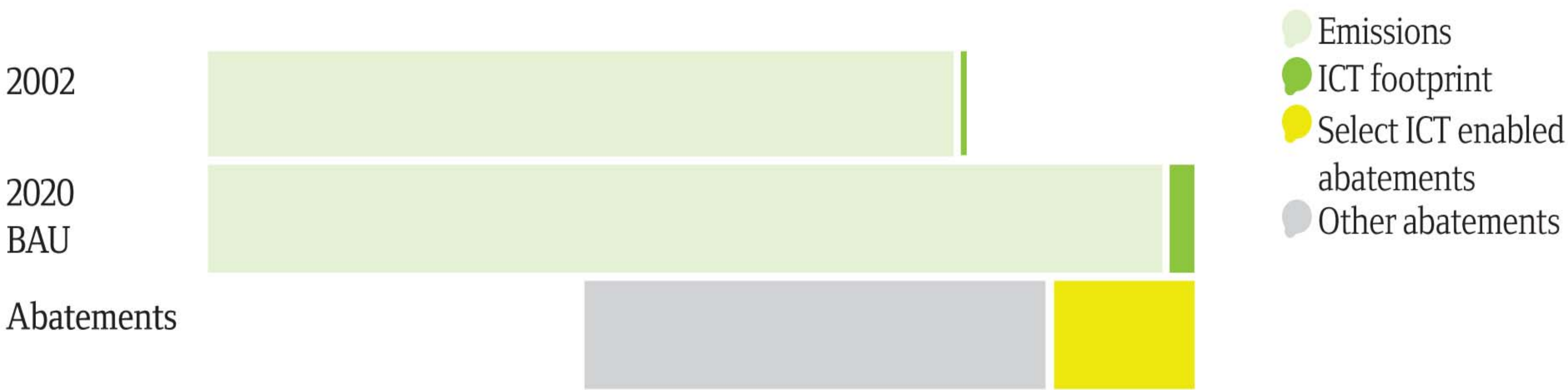
How can ICTs **enable new opportunities for other sectors**?

GLOBAL ICT STUDY:
WHAT WE FOUND

- ICT is a high-impact sector in the global fight to tackle climate change
- The sector's current contribution of around 2% is growing in spite of efficiency improvements that reduce the penetration of high-carbon products and power consumption of products and services
- ICT could reduce global emissions by a significant amount through enabling efficiency in other sectors
- ICT's pivotal role in monitoring, optimising and managing domestic and industrial energy usage could save over billions of EUR in 2020

ICT DIRECT IMPACT AND ENABLING ROLE

Numbers are calculated in Gt CO2e



How much abatement is necessary by 2020 is under debate, but emissions must certainly peak and begin falling globally before 2020

ICT Enabling role is greater than direct impact on emissions

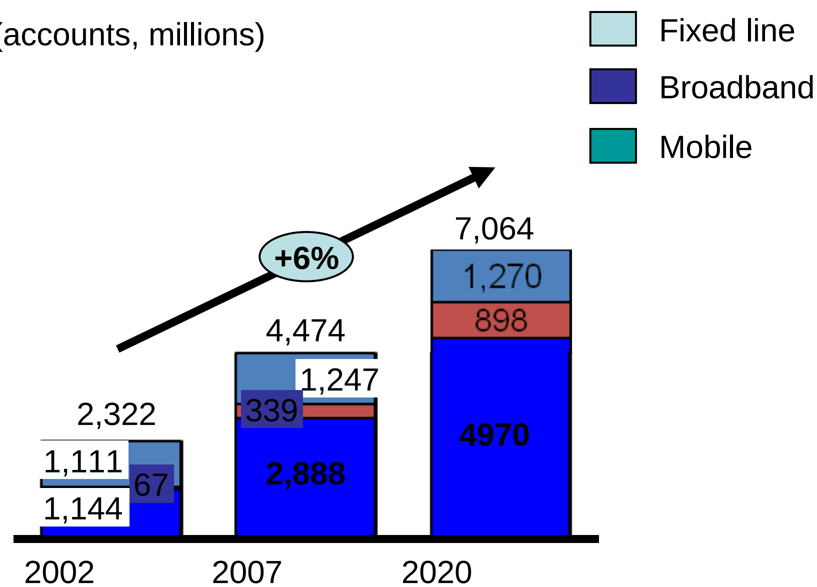
GeSI

TELECOMS DIRECT FOOTPRINT

TELECOMS CARBON FOOTPRINT

Growth in fixed and mobile accounts worldwide

(accounts, millions)

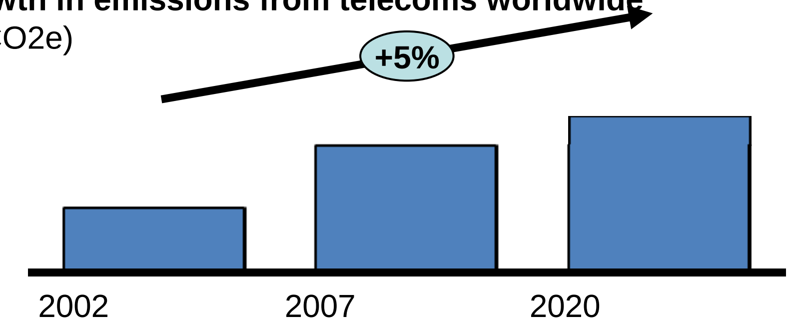


Assumptions for 2020

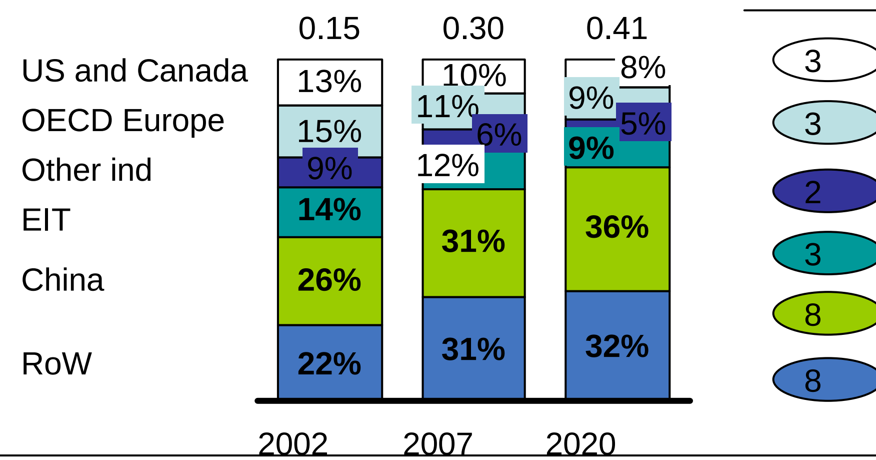
- Historic growth rate trends used to estimate future rates
- Calculated the footprint based on the energy used per account

Growth in carbon footprint of telecoms will vary by region

Growth in emissions from telecoms worldwide (GtCO2e)



Distribution of emissions by region, $GtCO_2e$



* Includes both telecom devices and infrastructure

CONFIDENTIAL

Source: Team analysis; "Energy usage of mobile telephone services in Germany", Schaefer, Weber & Voss (2001); Green Mobiles (http://www.greenmobiles.com.au/program-partners/index.php); "Mobile futures", Shields (Founder of Fonebak)

ICT ENABLING ROLE

5 CASE STUDIES

Industry
- Smart motors
- Industrial process automation

Transport
- Smart logistics
- Private transport optimisation
- Dematerialisation
- Efficient vehicles
- Traffic flow monitoring, planning simulation

Power
- Smart grid
- Efficient generation of power, combined heat and power (CHP)

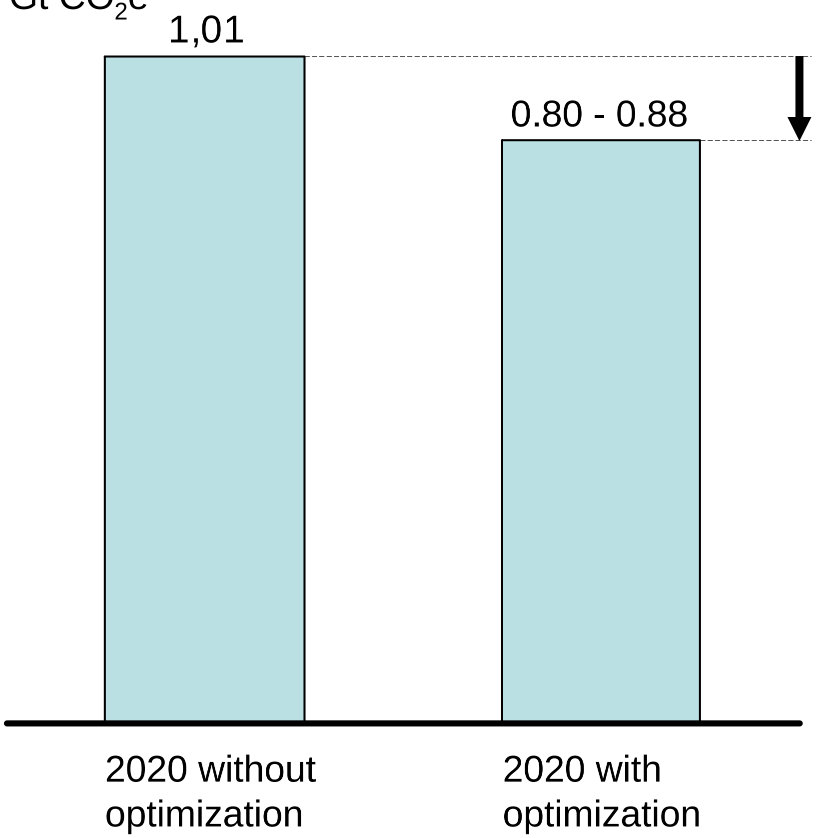
Buildings
- Smart buildings
- Dematerialisation

The opportunities where ICT could play a driving role include:

- Smart grid
- Smart buildings
- Smart logistics
- Smart motor systems
- Dematerialisation

SMART MOTORS IN CHINA

GHG emissions from motor systems in China, 2020
Gt CO_2e



-13% - 21%*

- Equivalent to a reduction in electricity use from 1,000 TWh to 790 - 875 TW
- At EUR 40 per MWh*, this saves up to €8 billion per year
- At EUR 20 per tCO_2e, this saves up to an additional EUR 4 billion per year

Key takeaways

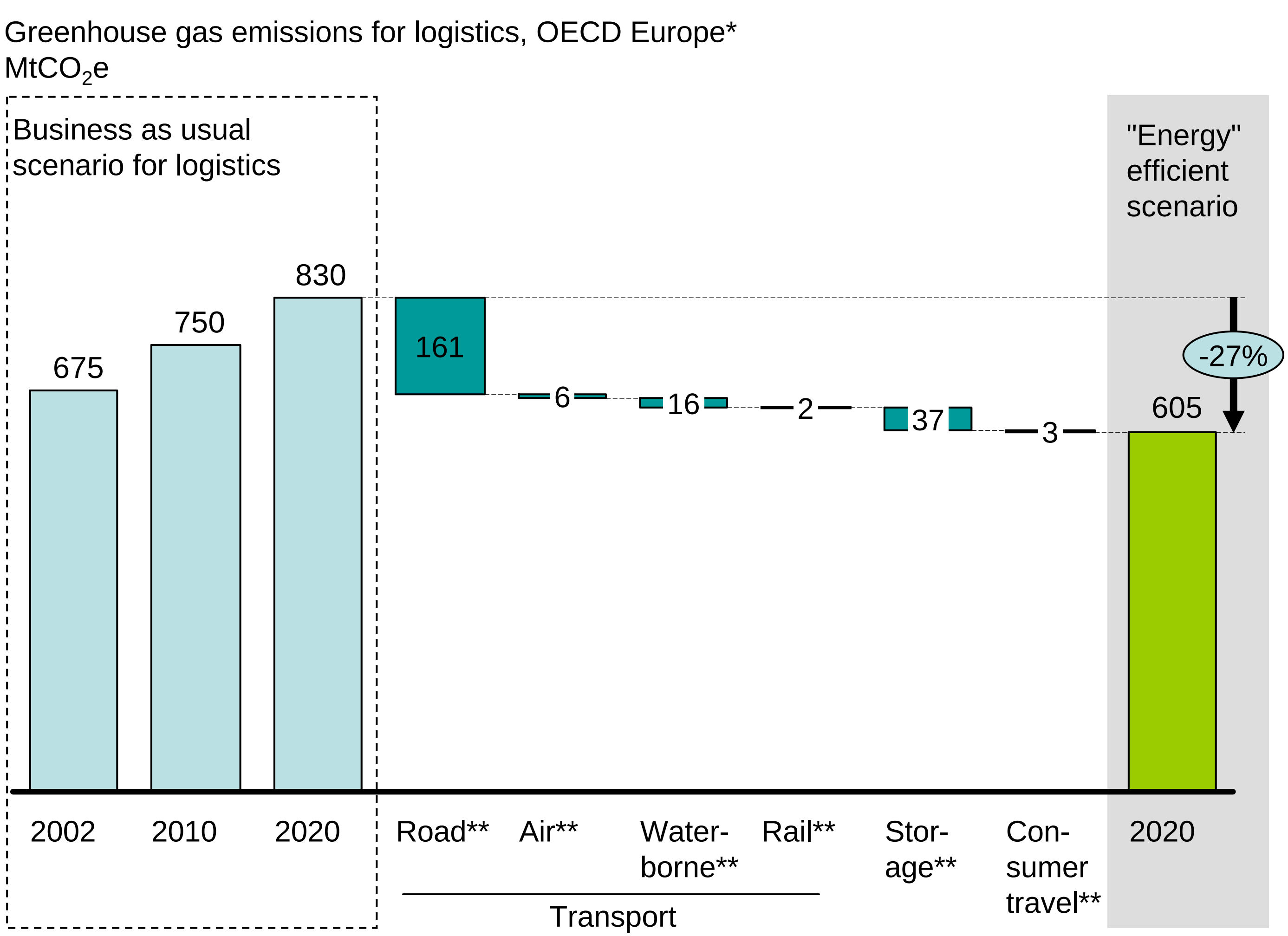
- Optimizing motor systems in China could reduce carbon emissions by between 0.1 and 0.2 Gt CO_2e **
- Savings from motor systems are comparable to the total emissions of a country the size of the Netherlands
- A cost of carbon of EUR 20 / tCO2e would imply a value at stake of up to EUR 12 billion per year

* Based on current average retail price of RMB 381.4 per MWh in Guangdong province

** Assumes a replacement rate of 10% per year (as currently observed in China): Conservative scenario assumes that 50% of motor application can incur a 25% energy saving; Aggressive scenario assumes a replacement rate of 10% per year (as currently observed in China) and that 70% of motor application can incur a 30% energy reduction; carbon intensity of end user electricity of 1.01 tCO2/MWh

Source: IEA industrial motor systems efficiency workshop, May 2006; The China Motor Systems Energy Conservation Program: A Major National Initiative to Reduce Motor System Energy Use in China, S. Nadel, W. Wanxing, P. Liu, A. McKane

SMART LOGISTICS IN EUROPE



Key takeaways

- The implementation of efficient logistics levers enabled by ICT could result in an emissions reduction of approximately 27%
- Road transport abatement opportunities represent 70% of the total abatement potential from energy efficiency measures

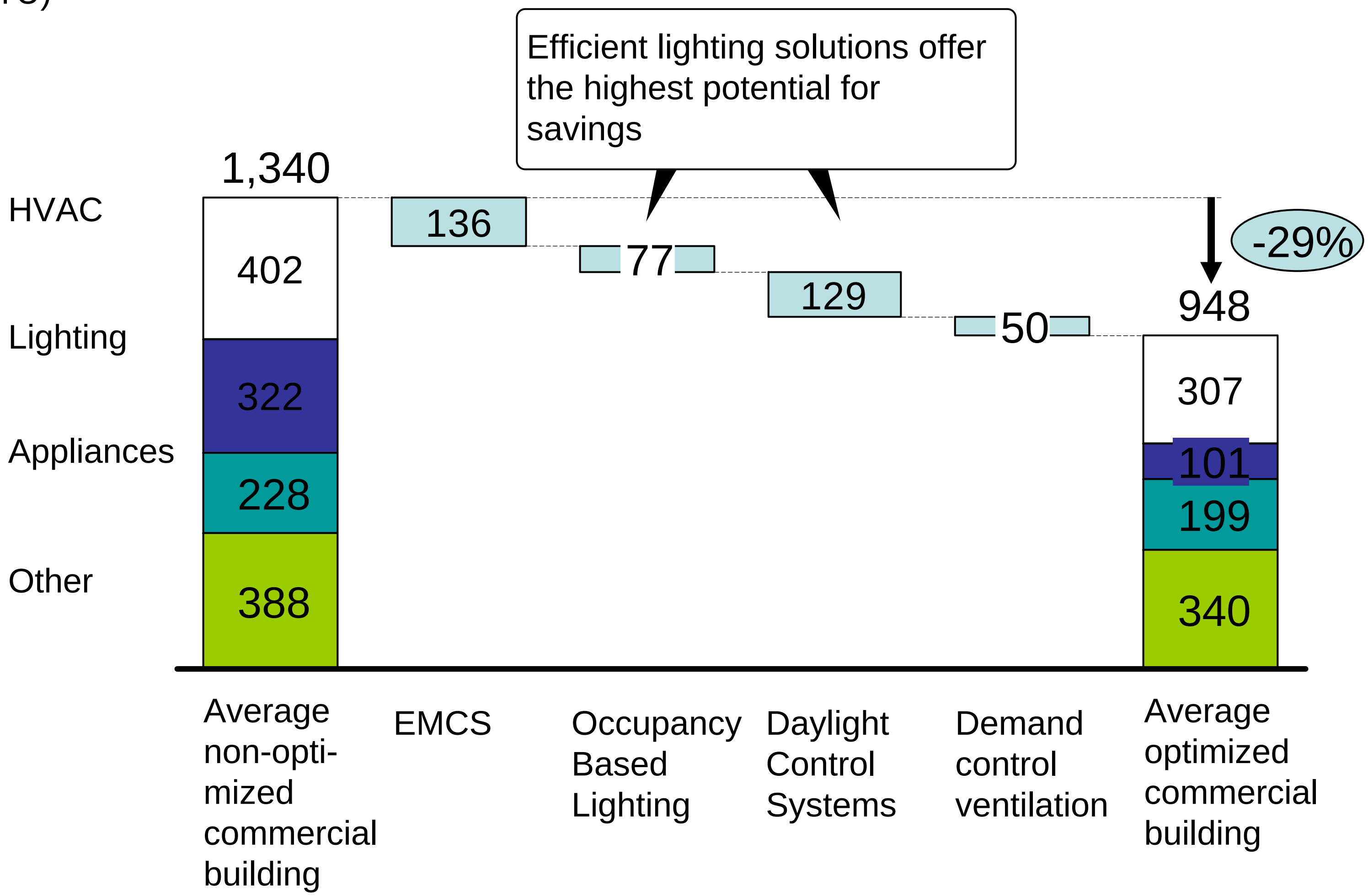
* Includes transport, storage, and consumer emissions only; excludes emissions from production of goods and packaging and from waste processing

** Impact of each lever based on case studies: 10% of initiatives assumed to result in highest possible abatement, 50% of initiatives assumed to result in lowest possible abatement, and 40% assumed to result in average of both

Source: Team analysis

SMART BUILDINGS IN NORTH AMERICAN

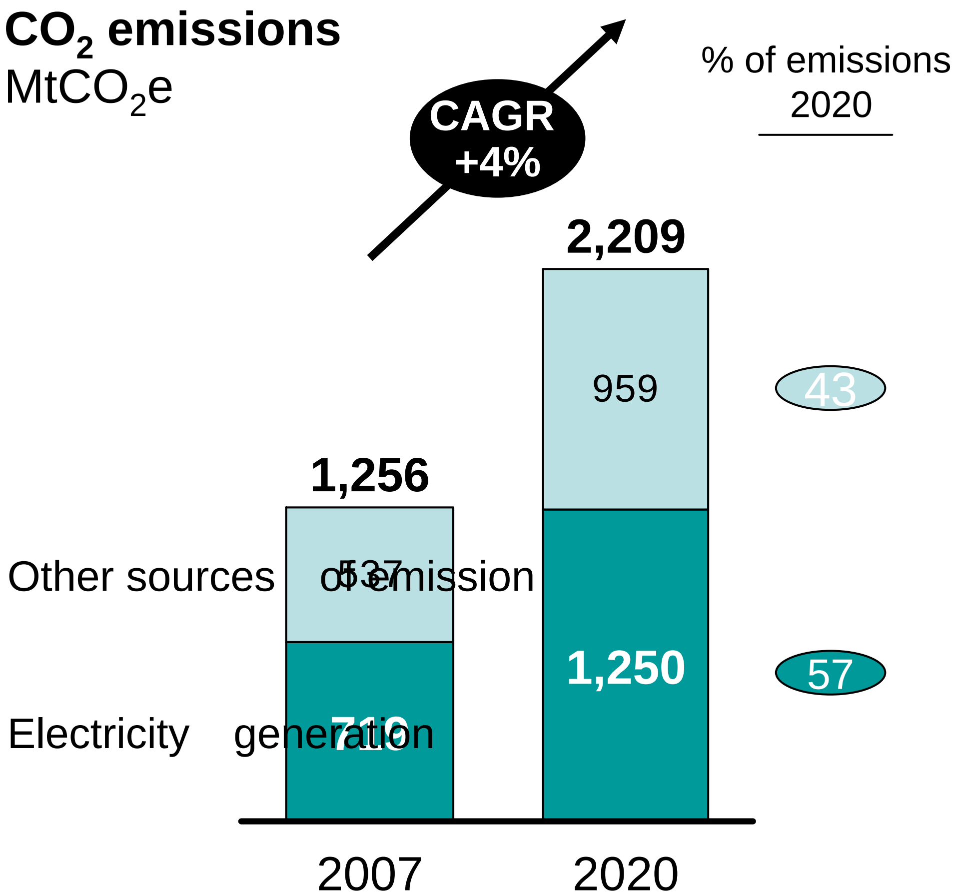
Annual energy consumption of an average commercial building in the US*
(MBTU)



*Estimate of savings based on midpoint of percentage range of projected savings

Source: M.R.Brambley, Advanced Sensors and Controls for building applications and Potential R&D pathways, US DOE (2005), EIA Commercial Buildings Survey (2003), University of Michigan Commercial Building Facts (2002)

SMAR GRID IN INDIA: THE GROWTH IN GENERATION



Key messages

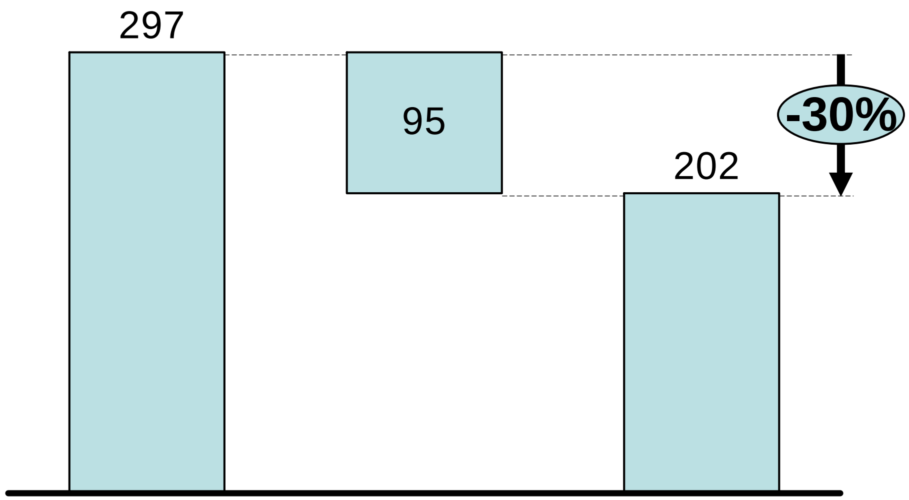
- The electricity sector is responsible for most of the footprint by 2020
- India's carbon footprint from electricity generation will grow to 1250 $MtCO_2$ at a CAGR of 4%, double the global average CAGR of 2% from 2010 to 2020

Source: "India's Energy Prospects – Reference scenario", IEA Outlook (2007); Team analysis

CONFIDENTIAL

SMART GRID IN INDIA

Emissions associated with T&D losses[1] $MtCO_2e$



	2020 Baseline[2]	Impact of smart grids[3]	2020 efficient
Equivalent electricity (TWh)	371	118	253
Share of generation (%)	22	7	15

Key takeaways

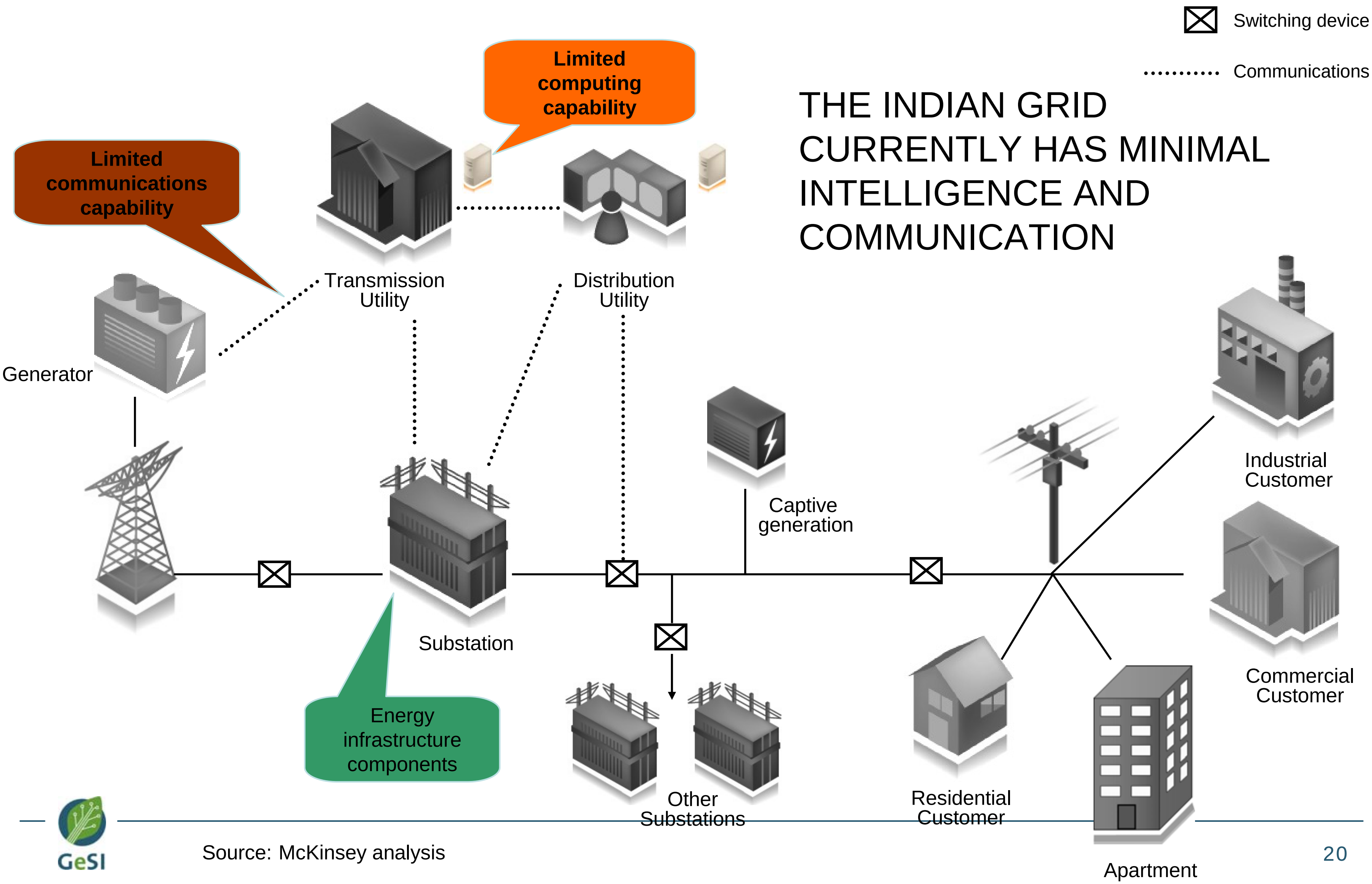
- Smart grids enable better monitoring of electricity flows across the grid and improved preventive maintenance
- Reduction in T&D losses by 30% are the most direct benefit of smart grids
- Potential savings of 30% T&D losses i.e. 118 TWh/ 95 MtCO2e with EUR 6.7 bn[4] in energy savings and EUR 1.9 bn[5] in cost of carbon

1 Based on an assumed energy intensity of generation of 0.8 tCO2e/MWh in 2020
2 Based on 2020 generation projection of 2020 TWh and projected 2020 T&D losses of 22%
3 Based on T&D loss reduction to 15% from the implementation of smart grids
4 Based on a cost of electricity generation of EUR 0.06/ kWh
5 Based on a cost of carbon of EUR 20/ tCO2e

Source: "India's Energy Prospects – Reference scenario", IEA Outlook (2007); Team analysis

THE INDIAN GRID

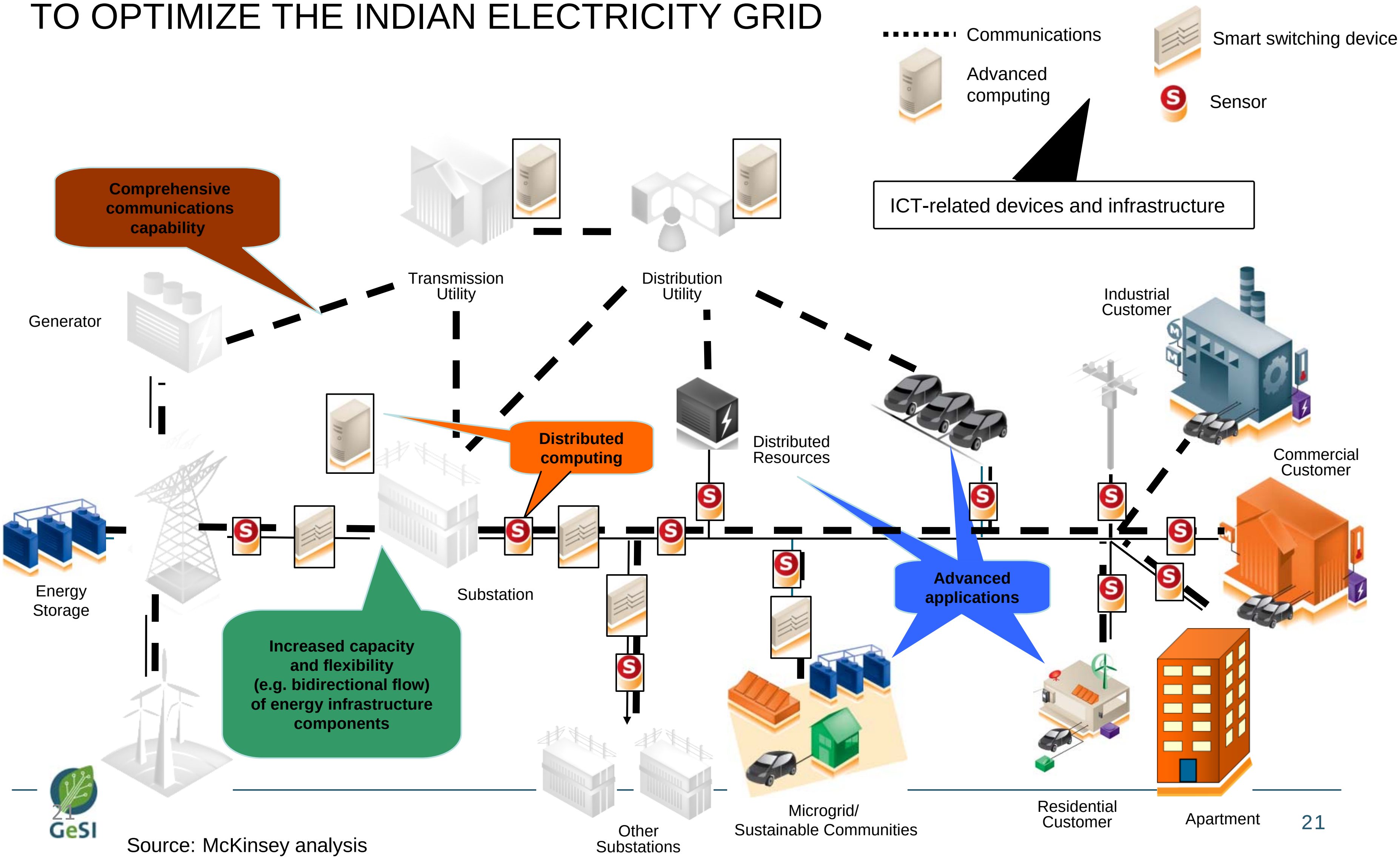
THE INDIAN GRID CURRENTLY HAS MINIMAL INTELLIGENCE AND COMMUNICATION



Source: McKinsey analysis

THE SMART GRID

USE OF COMMUNICATION AND INTELLIGENCE TO OPTIMIZE THE INDIAN ELECTRICITY GRID



Source: McKinsey analysis

SMART GRID: TECHNOLOGIES

	Short term (0 - 2 years)	Medium term (5 - 7 years)	Long term (10 - 15 years)
Levers	• Remote monitoring and measurement • Remote grid management • Energy accounting • Network design • Asset management • Planning and forecasting • Smart billing	• Support for renewables • Support for distributed generation • Intelligent dispatch • Preventive maintenance • Captive generation	• Demand management • User information • Grid to vehicle solutions
Rationale for prioritisation	• High T&D losses provide easy gains • Ease of implementation • Business case established • Controlled by utilities	• Renewables currently a nascent area • Require monitoring and data in place • Less control by utilities	• Require substantial infrastructure in place and extended to users • Benefits case not yet clear • Require a complex and stable grid in place

Source: Interviews, Team analysis

THE SMART OPPORTUNITY

SMART 2020: next steps

Standardise: Develop protocols to enable smart systems to interact
Direct action: Ensure energy standards are included in technological standards development
Enabling action: Like TCP/IP enables machine messaging, develop ways for devices outside the sector to message about energy consumption

Monitor: Make energy and carbon emissions visible
Direct action: Monitor energy consumption of ICT products and networks
Enabling action: ICT can incorporate monitoring information into the design and control of energy use

Account: Link monitoring to accountability
Direct action: Make energy use transparent throughout the supply chain by reporting and labelling
Enabling action: ICT can provide the software tools and platforms to improve accountability of energy and carbon throughout service and product life cycles

Rethink: Optimise for energy efficiency, and find alternatives to high-carbon development
Direct action: Optimise its own products and services and continue to deliver radical product innovation
Enabling action: ICT can offer new innovations that, if considered during the design phase of buildings, roads and other infrastructure can change our current ways of living

Transform: Implement smart low carbon infrastructure at scale
Direct action: Make the ICT sector an exemplar of low carbon technologies
Enabling action: ICT can apply smart and integrated approaches to energy management of systems and processes, incorporating system-wide benefits from both automation and behaviour change

Contact GeSI

GeSI Secretariat

Scotland Europa,
Scotland House
Rond Point Schuman, 6
B-1040 Brussels
Belgium

phone: +32 2 2828316
fax: +32 2 2828319
e-mail: info@gesi.org
press: press@gesi.org
US office: +1 650-948-2544