GeSI
GLOBAL e-SUSTAINABILITY INITIATIVE

Dynamic Coalition on Internet and Climate Change

Internet Governance Forum 2008, Hyderabad, India

ICT as a Tool to combat Global Warming

http://www.gesi.org/

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What is GeSI?

- GeSI is a Global International Non for Profit Association to address sustainability (triple bottom line - social, environmental and economical)
- industry led and open to full ICT industry
- manufacturers, operators and regional industry associations
- partnered with 2 UN organisations: United Nations Environmental Programme (UNEP) and International Telecommunications Union (ITU) and with the World Business Council for Sustainable Development (WBCSD).
- Carbon Disclosure Project (Global Initiative of Institutional Investors representing more than 57 trillion USD of Asset under management) and WWF

GeSI Members

GeSI Members

Expected to join very soon:

- SKT (South Korea Telecom)
- TeliaSonera
- HTC (Taiwan)
- IBM
- Belgacom
- Telenor

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

OVERVIEW

SMART 2020: ENABLING THE LOW CARBON ECONOMY IN THE INFORMATION AGE

STUDY AIM:

What is the ICT sector's role in the transition to a low carbon economy, in terms of its own footprint and its ability to enable emissions reductions across the economy?

THREE KEY QUESTIONS:

1. What is the impact of the products and services of the ICT sector?

2. What is the potential impact if ICT were applied to reduce emissions in other sectors such as transport or power?

3. What are the market opportunities for the ICT industry and other high-tech sectors in enabling the low carbon economy?

OVERVIEW

ICT PLAYS A FUNDAMENTAL ROLE IN DRIVING GROWTH BY:

SMART 2020 PARTICIPANTS

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COMPANIES

Bell · BT · cisco · T · DELL · ERICSSON · ftgroup · hp · intel
LG · Microsoft · NOKIA Connecting People · Nokia Siemens Networks · Sun microsystems · telenor · Telefónica · vodafone · verizon

SMART 2020: KEY FINDINGS

> ICT is a high-impact sector in the global fight to tackle climate change

> The sector's current contribution of around 2% is set to more than double (0.5 Gt CO_2e to 1.4 Gt)

> ICT could reduce global emissions by a significant amount through enabling reductions in other sectors **(7.8 Gt out of 52 Gt business as usual in 2020, or 15% of total emissions)**

> ICT's pivotal role in monitoring, optimising and managing domestic and industrial energy usage could **save nearly €600 billion in 2020**

GHG EMISSIONS:THE GLOBAL CONTEXT

GLOBAL EMISSIONS:

> 2002: 40 billion tonnes (Gt) CO_2e

> 2020: Business as usual (BAU) projections – 51.9 Gt CO_2e

ICT SECTOR FOOTPRINT:

> 2002: 500 million tonnes (Mt) CO_2e

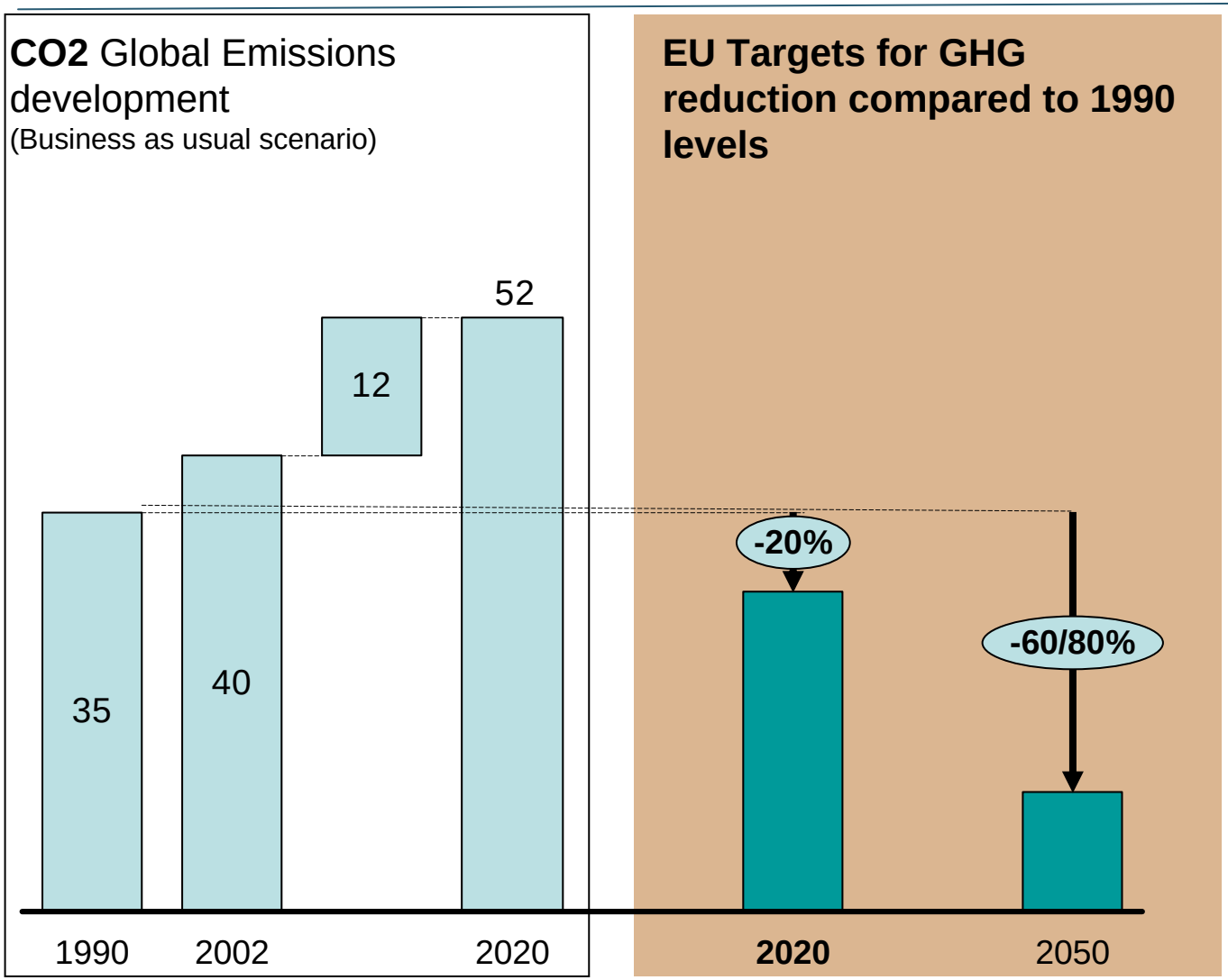
> 2020: BAU – 1.4 Gt CO_2e

REDUCTIONS NEEDED:

> 20 Gt CO_2e per year by 2050 - two tonnes per person

The Global Challenge

$GtCO_2e$, Greenhouse gases (GHG) anthropogenic emissions

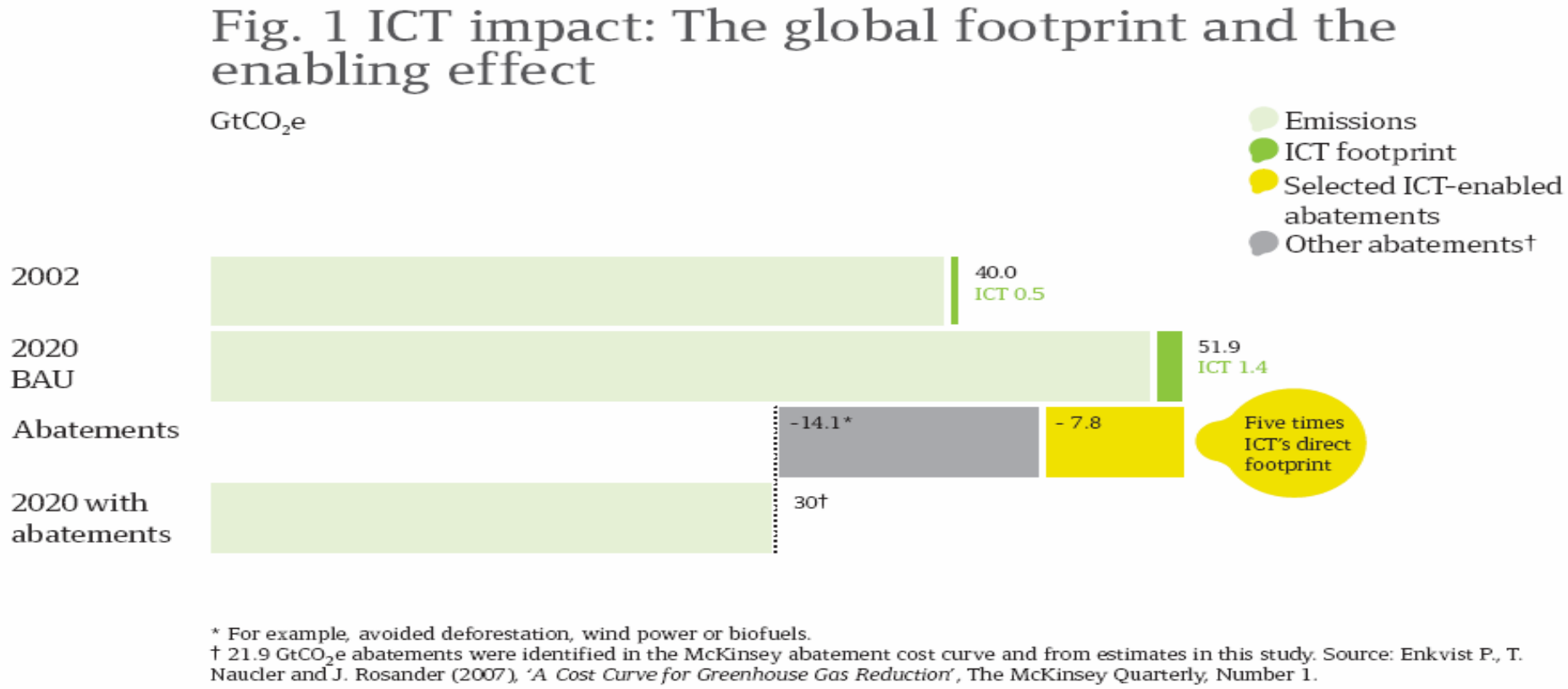


Key takeaways

- Under business as usual conditions, emissions will increase 1.5% per annum driven by global GDP and population growth
- The European Union has recently announced a 20% reduction target compared to 1990 levels for 2020
- A reduction of 60 to 80% compared to 1990 levels by 2050 “may be necessary to maintain the temperature increase under 2°C”

Source: Global abatement cost curve, IPCC, EU, team analysis

GLOBAL ICT STUDY:
WHAT WE FOUND



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

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The Business Opportunity

ICT can impact global emissions through dematerialization or by acting as a platform to increase energy efficiency and reduce carbon intensity of existing processes

How can ICT help reduce global emissions

	ICT role	Scope	Total abatement potential (Gt CO2e) identified by 2020
 **Dematerialization**	Substitute or virtualise physical processes through the application of ICT	• Processes that can be physically eliminated or for which value can be separated from physical medium • Dependent on behavioral change and demand for new ways of using products and services	0.5
 **Efficiency**	Act as a platform to **monitor** processes, **optimize** use of devices, and **manage** complex systems to reduce energy consumption and increase carbon efficiency	• All energy consuming processes, in particular those that rely on distributed use of energy and emissions • Dependent on financial impacts and return on investment	7.3

Source: Team analysis

Fig. 8 ICT: The enabling effect

$GtCO_2e$

7.8 $GtCO_2e$ of ICT-enabled abatements are possible out of the total BAU emissions in 2020 (51.9 $GtCO_2e$)

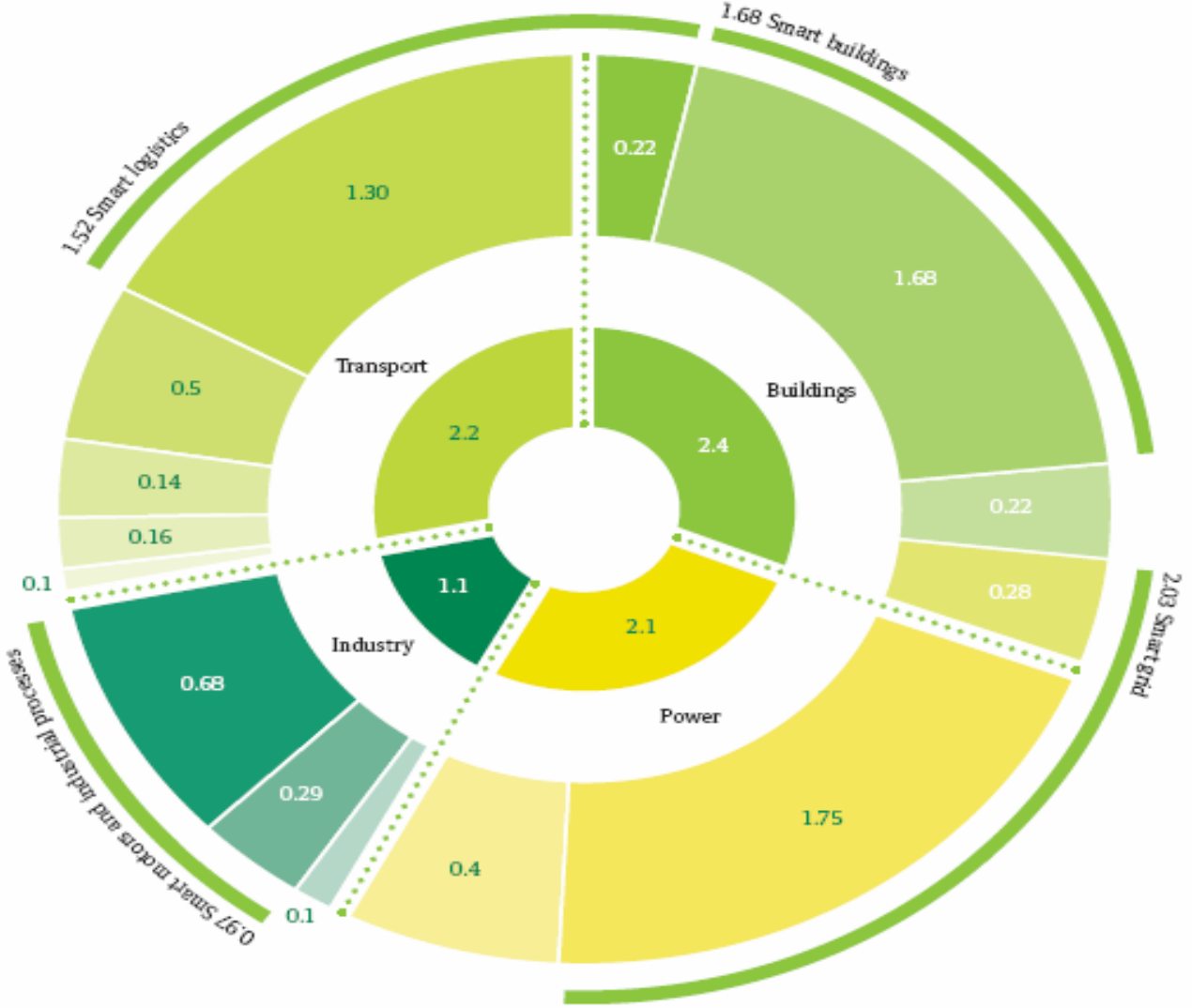
The SMART opportunities including dematerialisation were analysed in depth

Industry
- Smart motors
- Industrial process automation
- Dematerialisation* (reduce production of DVDs, paper)

Transport
- Smart logistics
- Private transport optimisation
- Dematerialisation (e-commerce, videoconferencing, teleworking)
- Efficient vehicles (plug-ins and smart cars)
- Traffic flow monitoring, planning and simulation

Buildings
- Smart logistics†
- Smart buildings
- Dematerialisation (teleworking)
- Smart grid‡

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



*Dematerialisation breaks down into all sectors except power. See detailed assumptions in Appendix 3.
†Reduces warehousing space needed through reduction in inventory. See Appendix 3.
‡Reduces energy used in the home through behaviour change. See Appendix 3.

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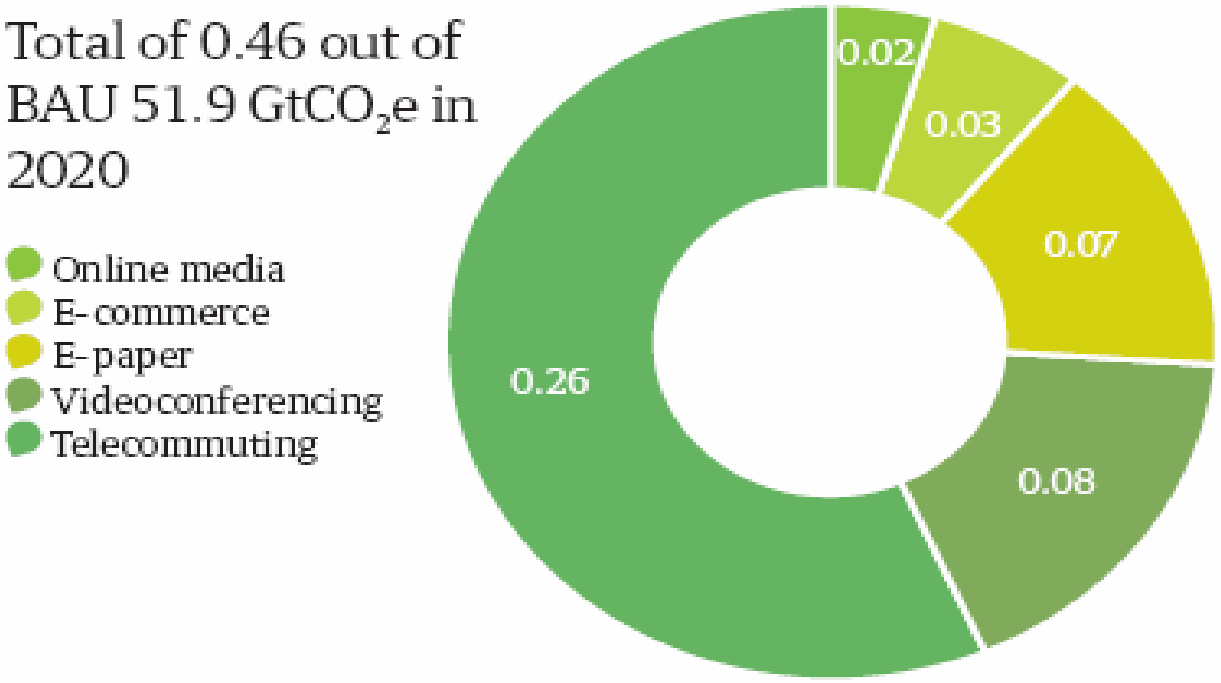
Fig 9. The impact of dematerialisation

$GtCO_2e$

Total of 0.46 out of BAU 51.9 $GtCO_2e$ in 2020



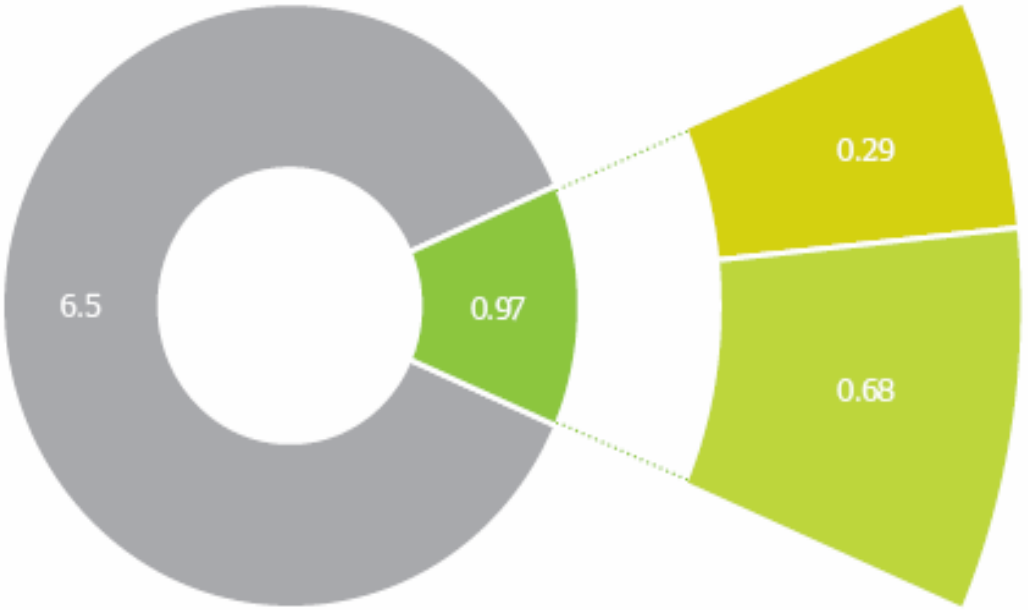
Source: Expert interviews, Jan – March 2008

Fig 10.1 SMART motor systems: The global impact in 2020

$GtCO_2e$

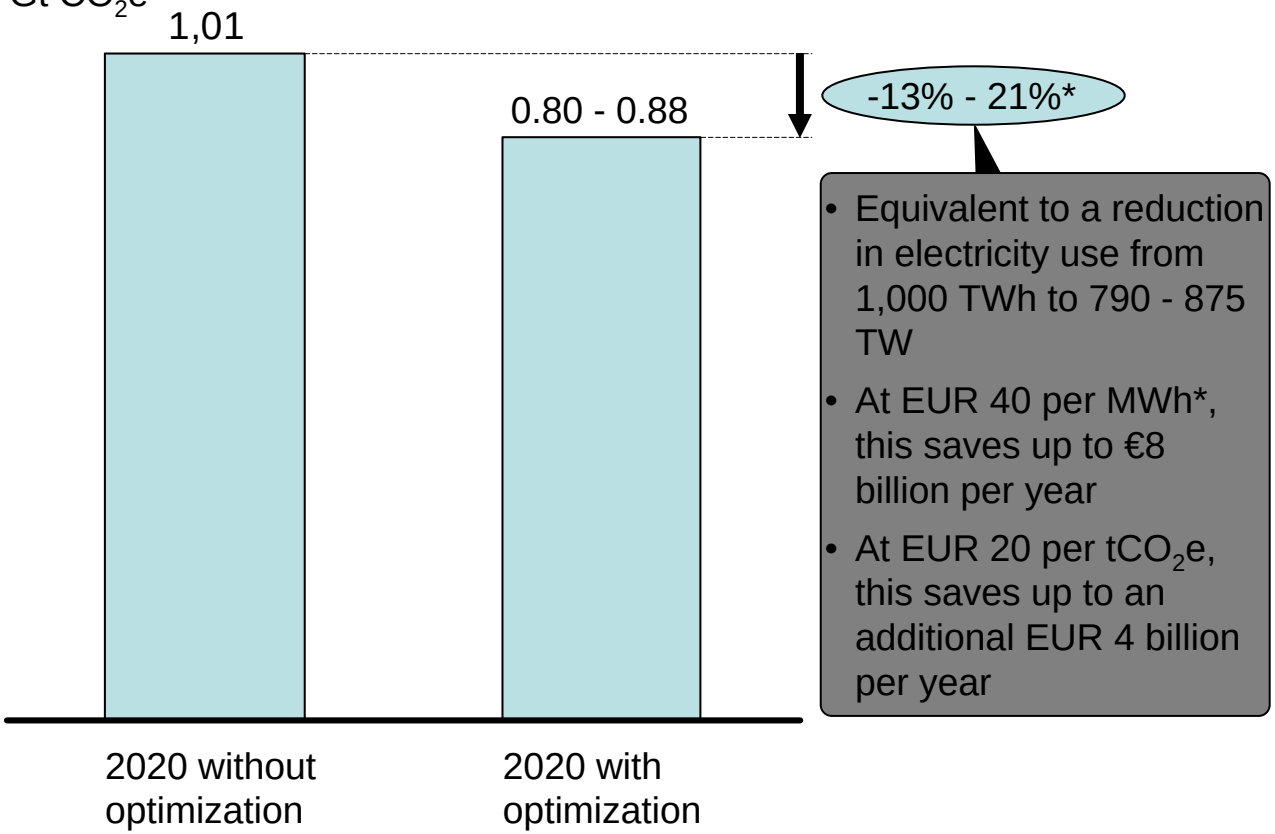
Total emissions BAU
in 2020 = 51.9 $GtCO_2e$

- Total emissions from power used by industrial systems
- Total ICT smart motor system abatements
- ICT-driven automation in key industrial processes
- Optimisation of variable speed motor systems



SMART MOTORS IN CHINA

GHG emissions from motor systems in China, 2020
Gt CO_2e



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

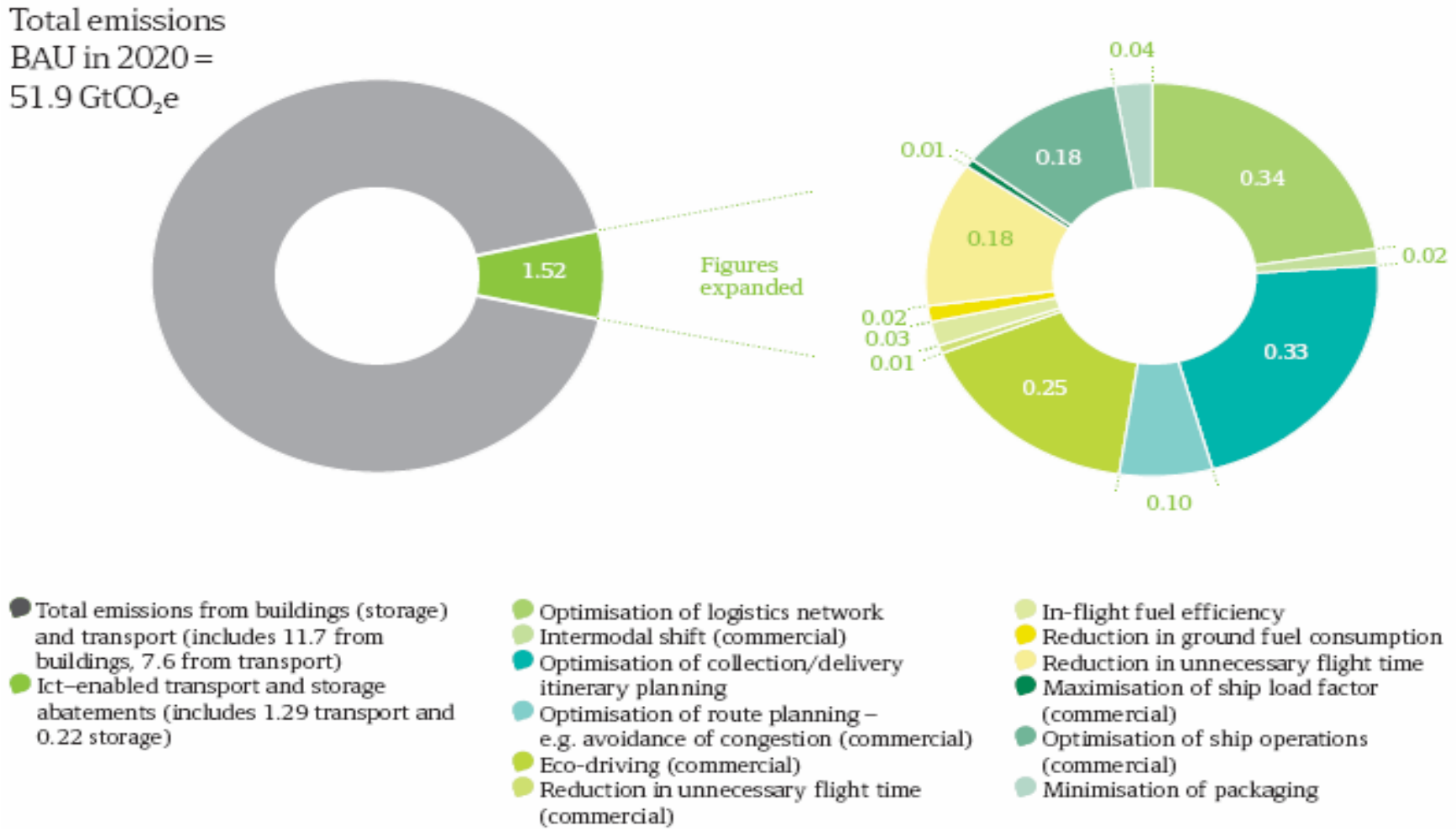
* Based on current average retail price of RMB 381.4 per MWh in Guangdong province

** 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

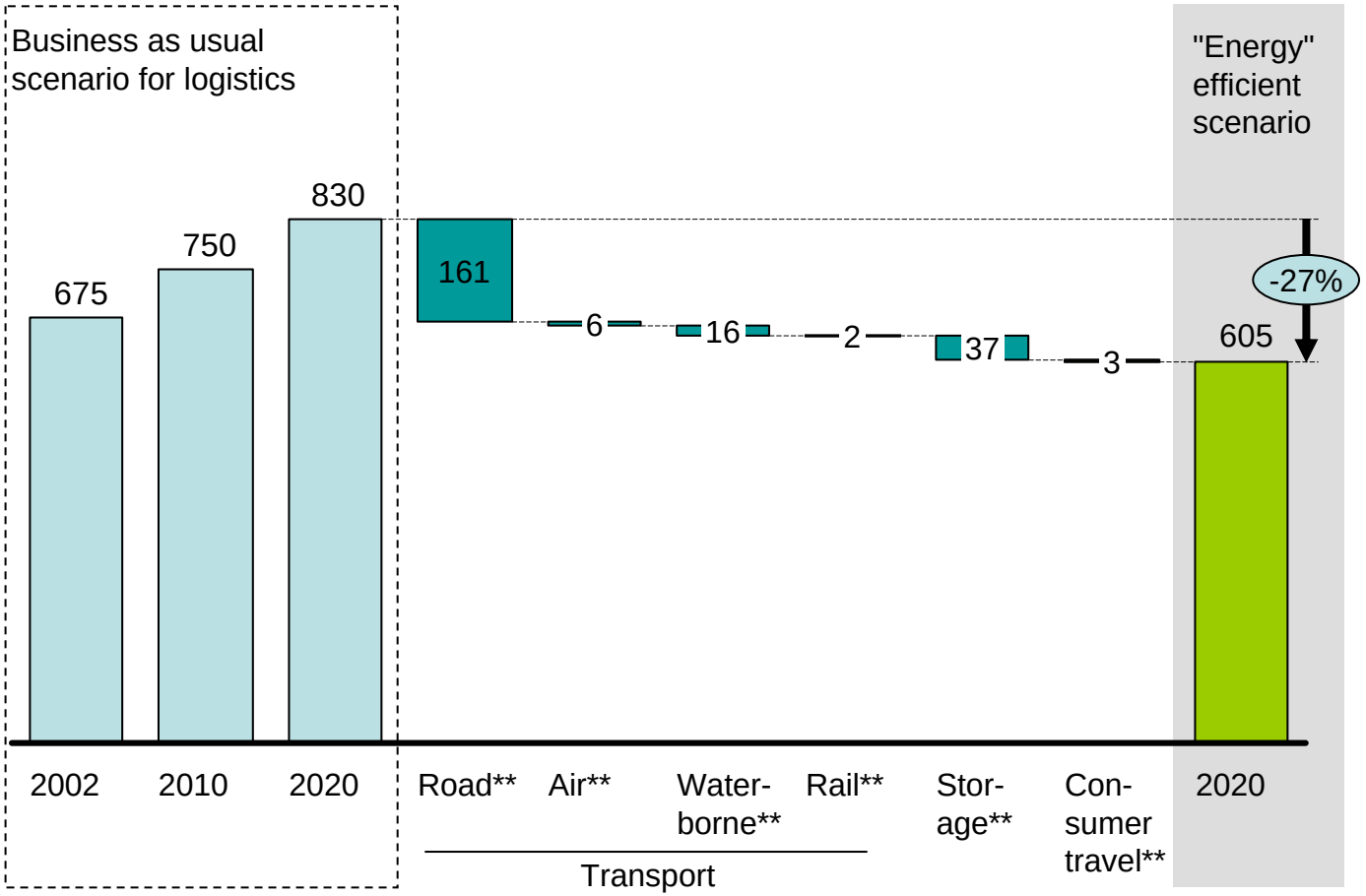
Fig. 11.1 SMART logistics: The global impact in 2020

$GtCO_2e$



SMART LOGISTICS IN EUROPE

Greenhouse gas emissions for logistics, OECD Europe*
$MtCO_2e$



Impact of ICT enabled abatements

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

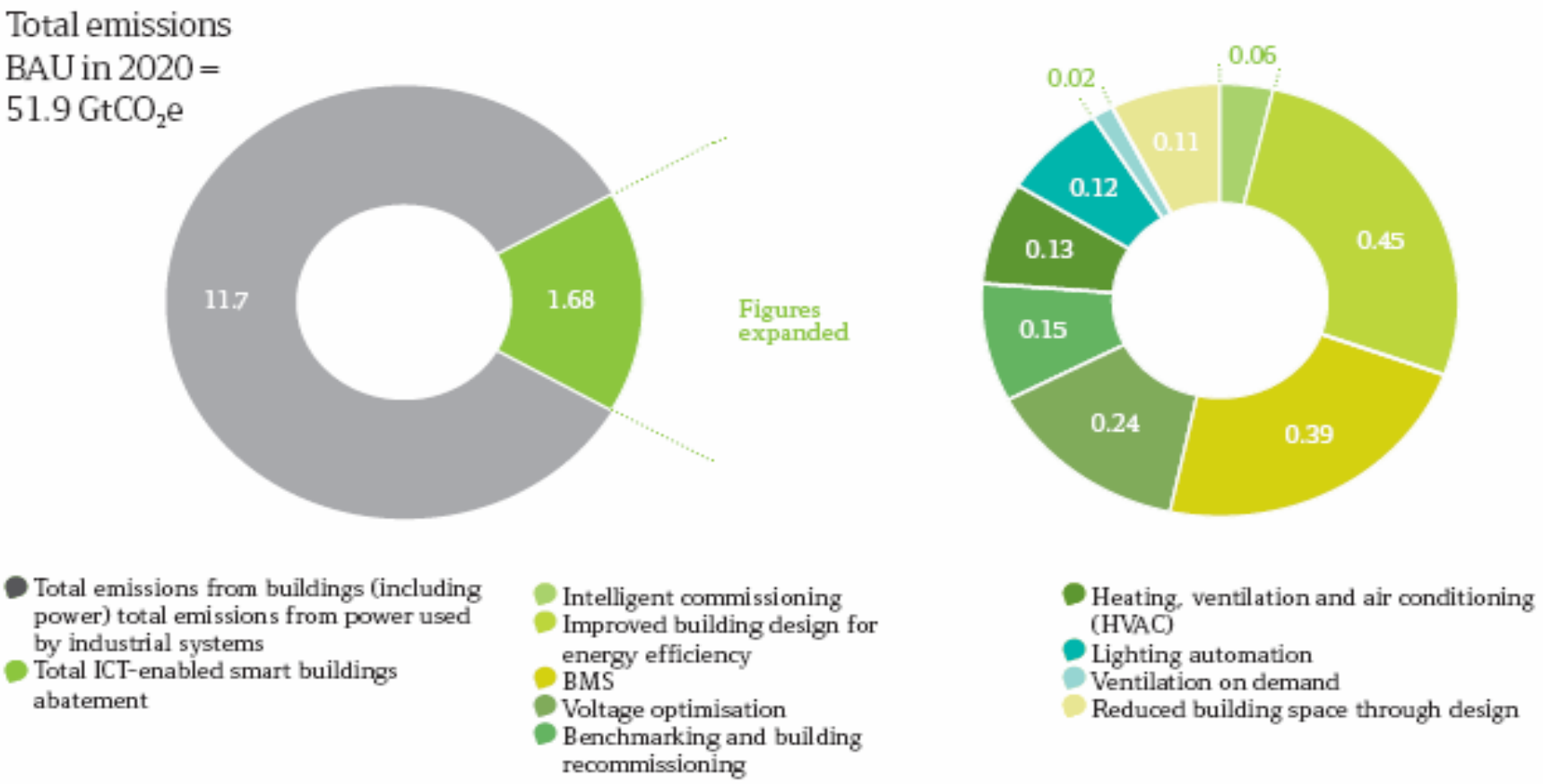
** Impact of each lever based on case studies: 10% of initiatives assumed to result in highest possible abatement, 50% of initiatives assumed to result in lowest possible abatement, and 40% assumed to result in average of both

Source: Team analysis

19

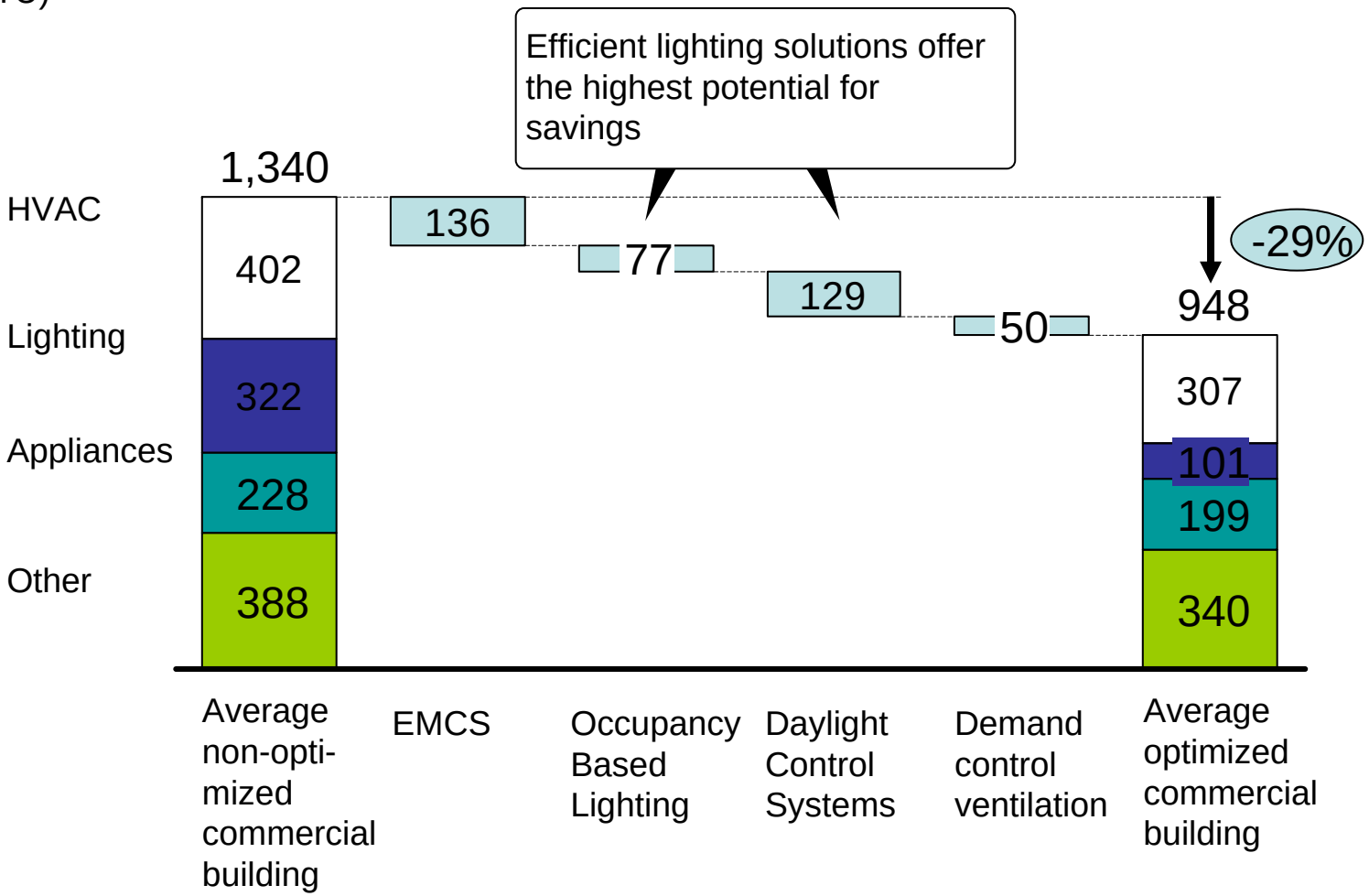
Fig. 12.1 SMART buildings: The global impact 2020

$GtCO_2e$



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)

21

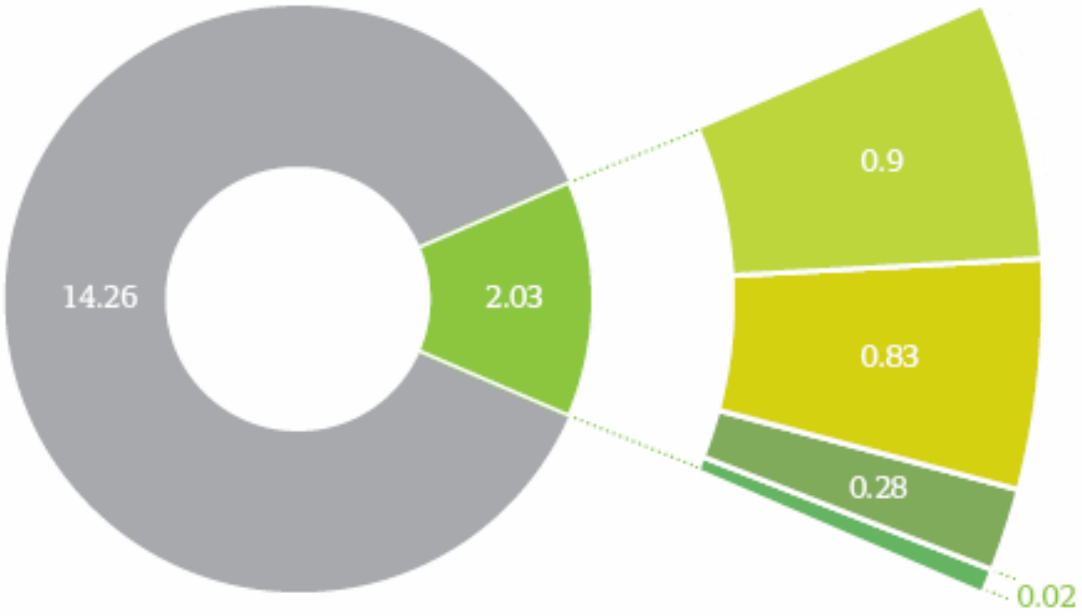
Fig. 13.1 SMART grids: The global impact in 2020

$GtCO_2e$

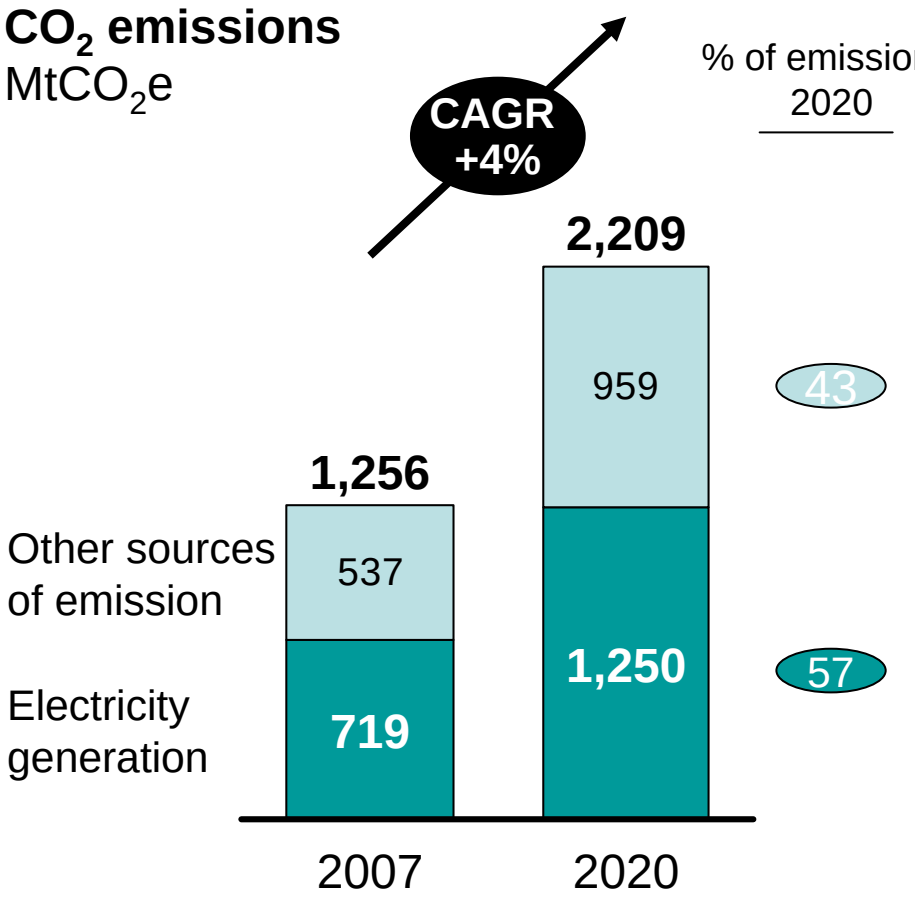
Total emissions BAU
in 2020 = 51.9 $GtCO_2e$

- Total emissions from the power sector
- Total ICT smart grids abatement potential

- Reduce T&D losses
- Integration of renewables
- Reduce consumption through user information
- DSM



SMAR GRID IN INDIA: THE GROWTH IN GENERATION



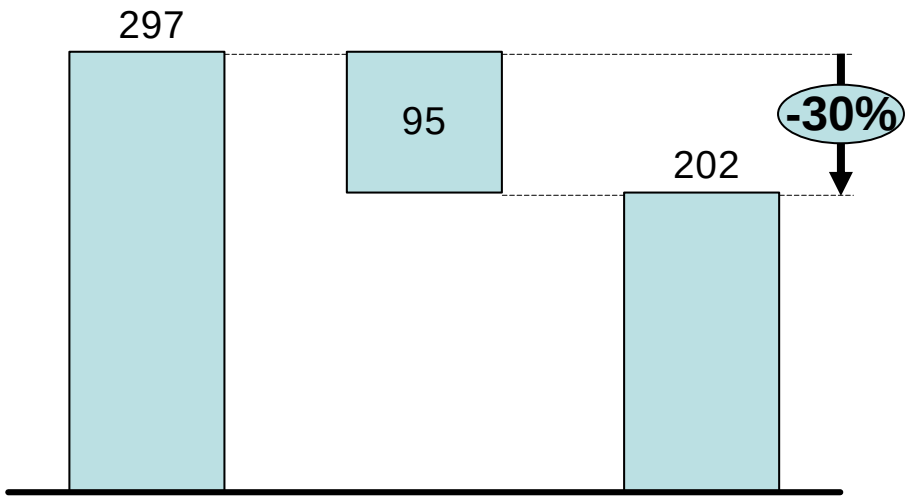
Key messages

- 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

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**

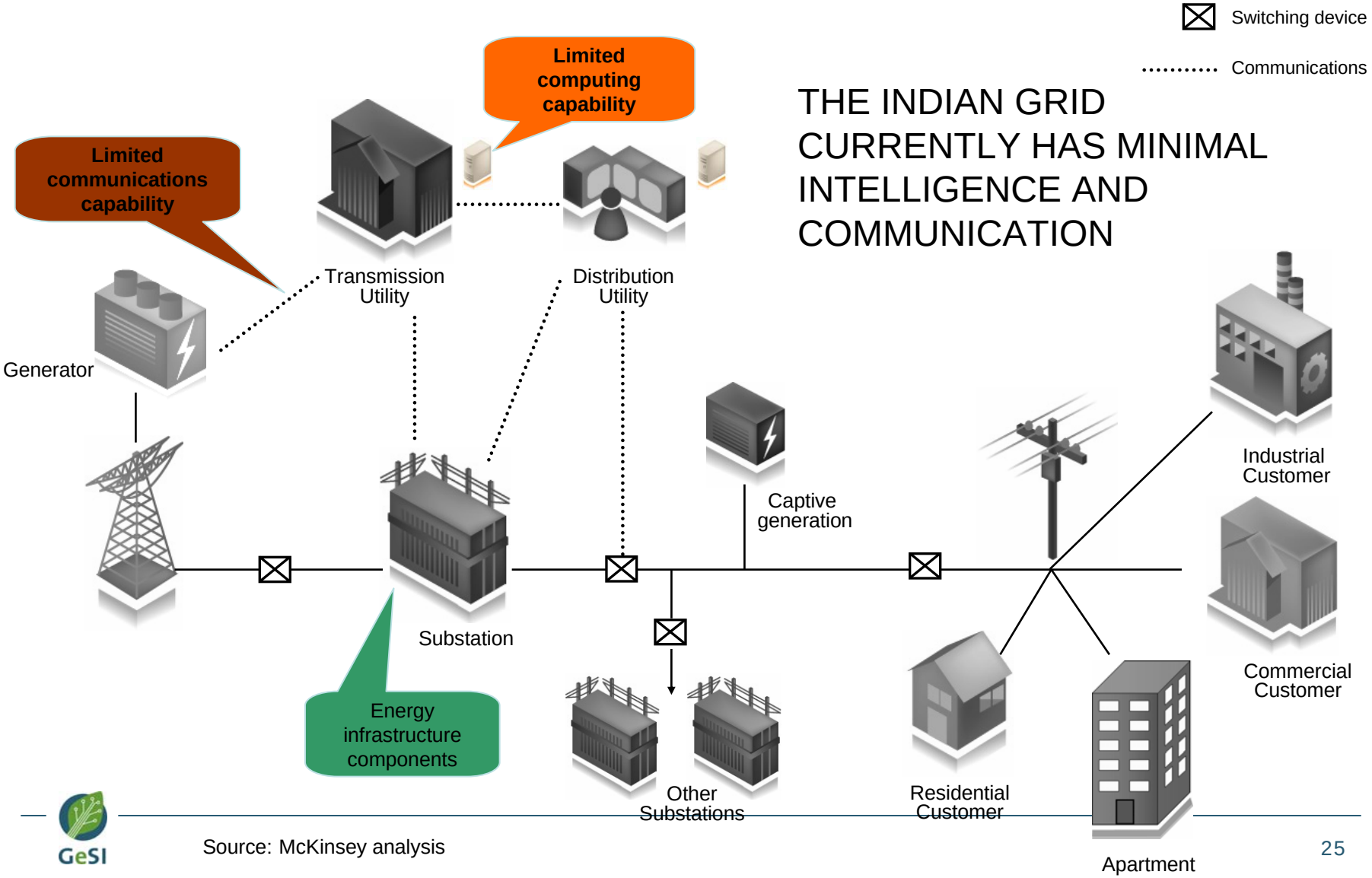
Key takeaways

- 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

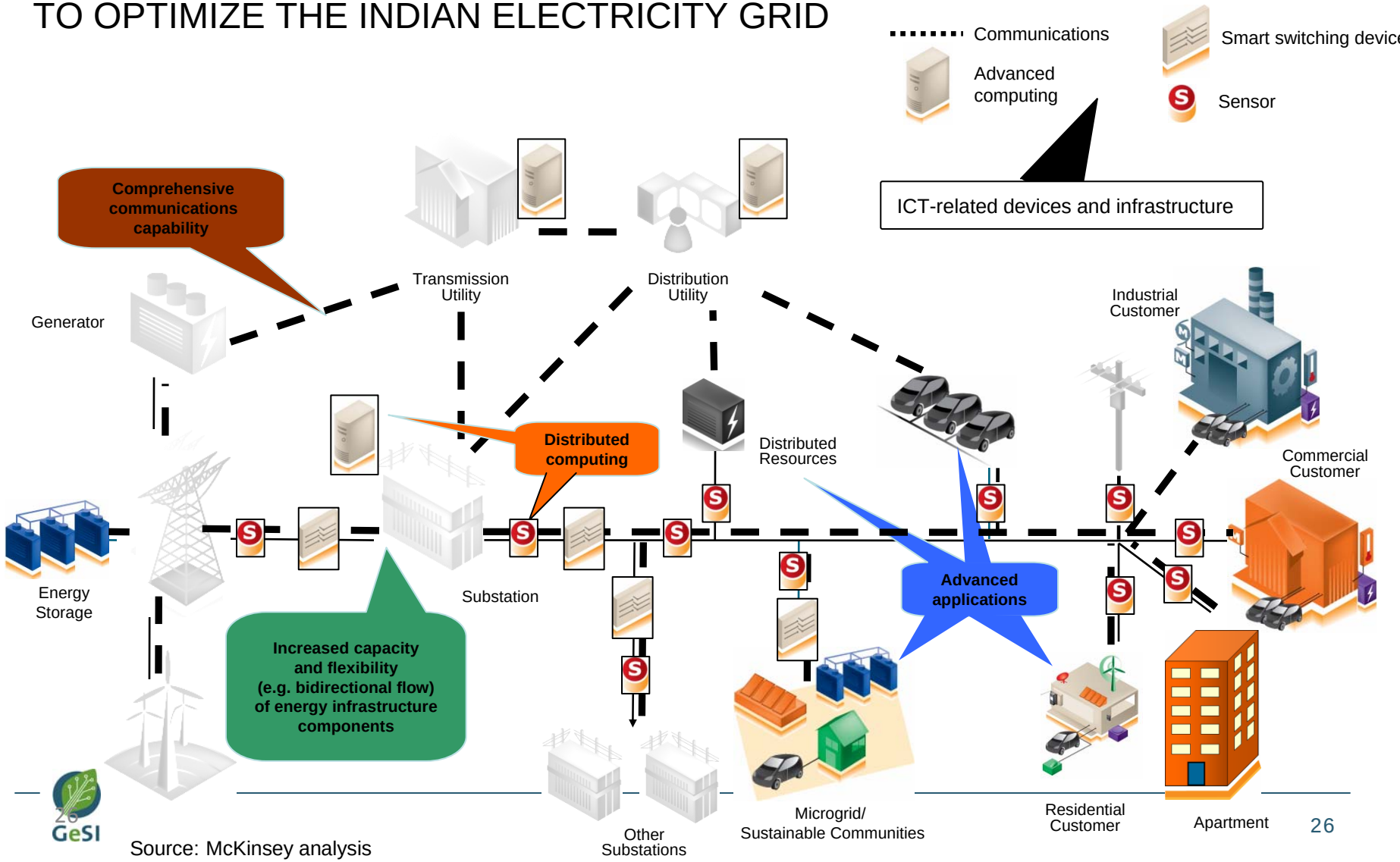
THE INDIAN GRID



Source: McKinsey analysis

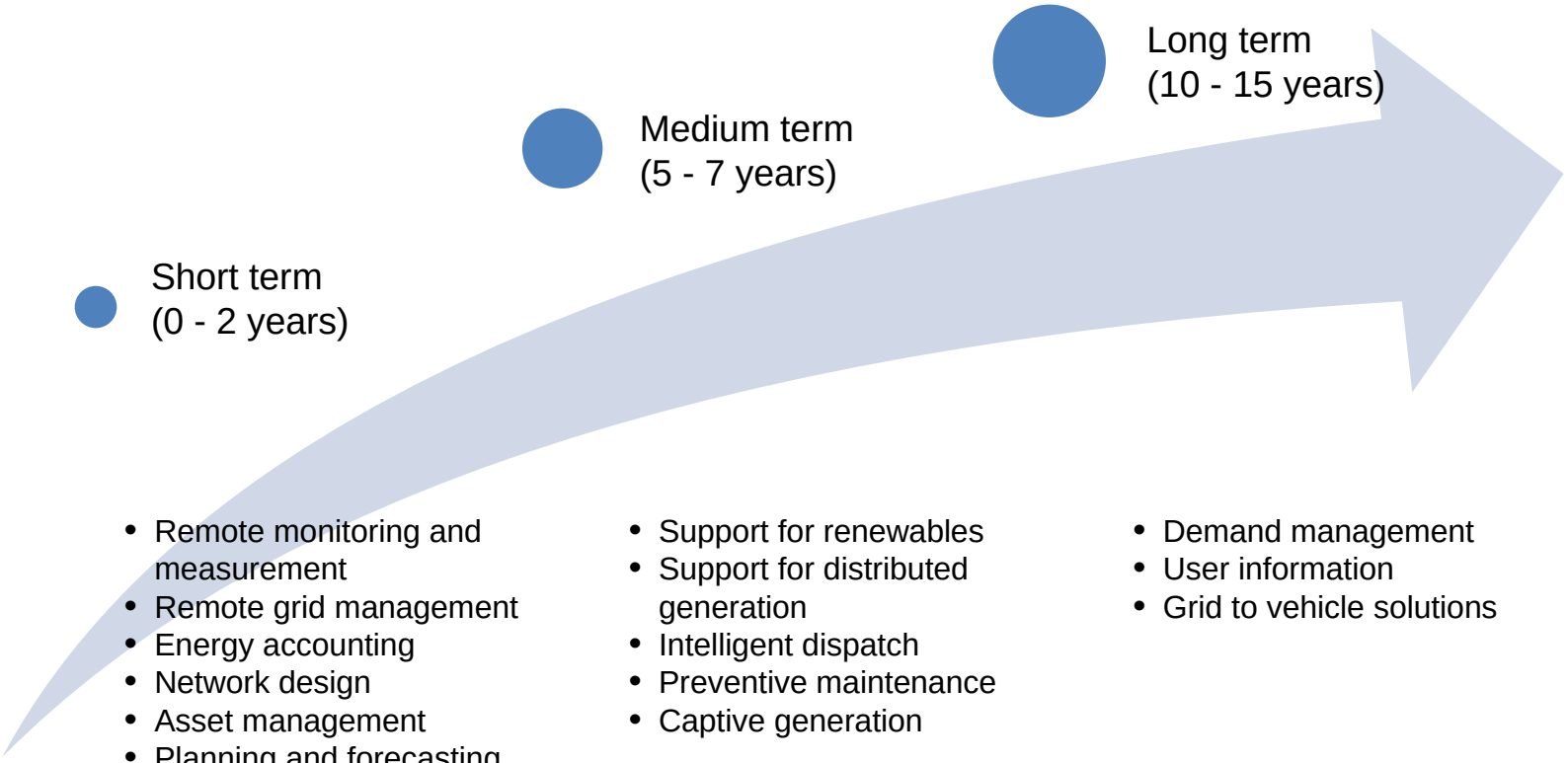
THE SMART GRID

USE OF COMMUNICATION AND INTELLIGENCE TO OPTIMIZE THE INDIAN ELECTRICITY GRID



Source: McKinsey analysis

SMART GRID: TECHNOLOGIES



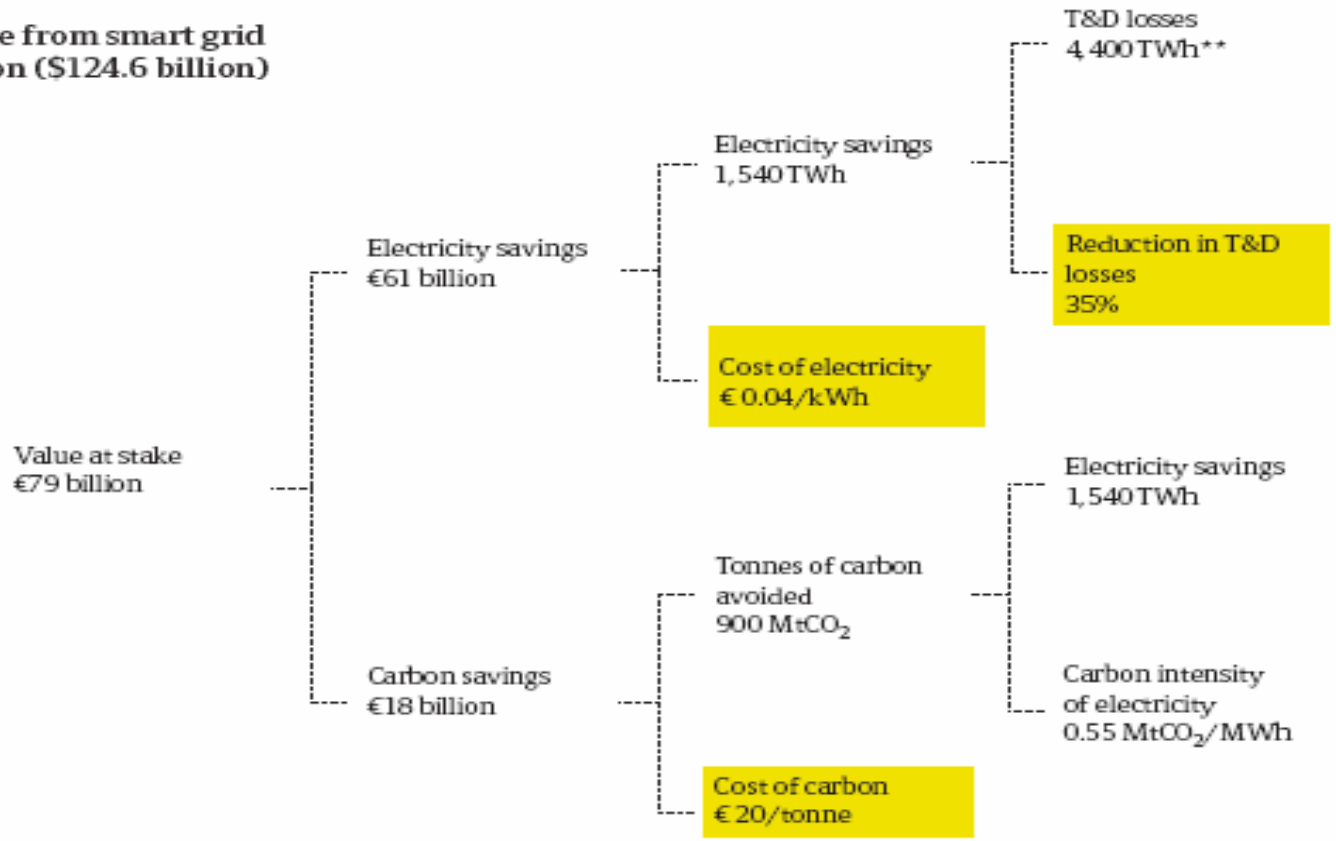
	Short term (0 - 2 years)	Medium term (5 - 7 years)	Long term (10 - 15 years)
Levers	• Remote monitoring and measurement • Remote grid management • Energy accounting • Network design • Asset management • Planning and forecasting • Smart billing	• Support for renewables • Support for distributed generation • 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

SMART grids:

The global value at stake from smart grid is estimated at €79 billion ($124.6 billion)

Global Impact, 2020



Key drivers of business model

Estimate does not include benefits of smart grids beyond reduction of T&D losses such as:

- DSM
- Integration of renewables
- Improved asset management

THE SMART OPPORTUNITY

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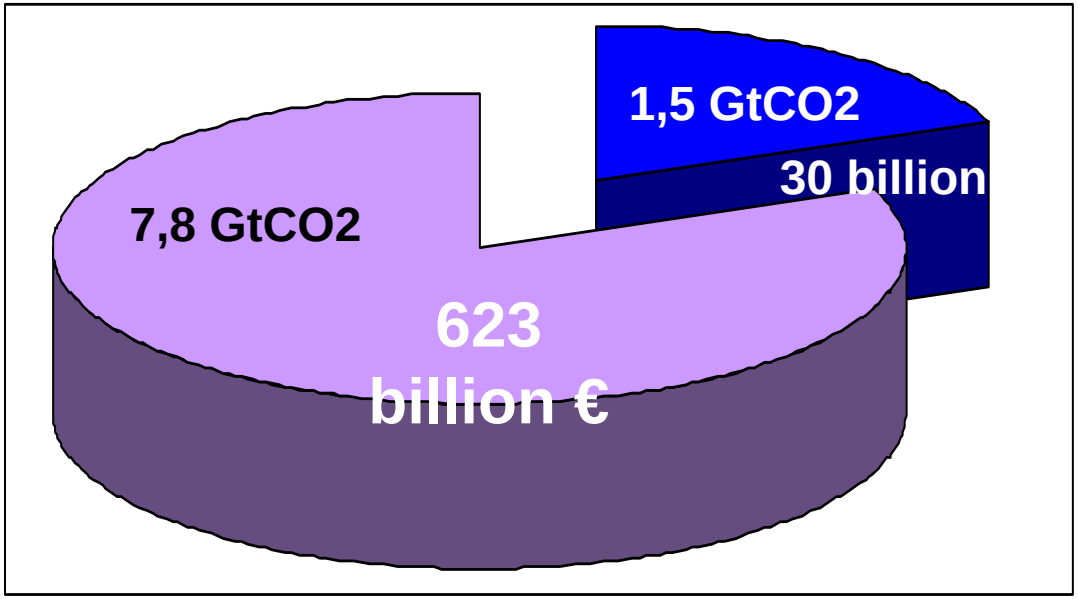
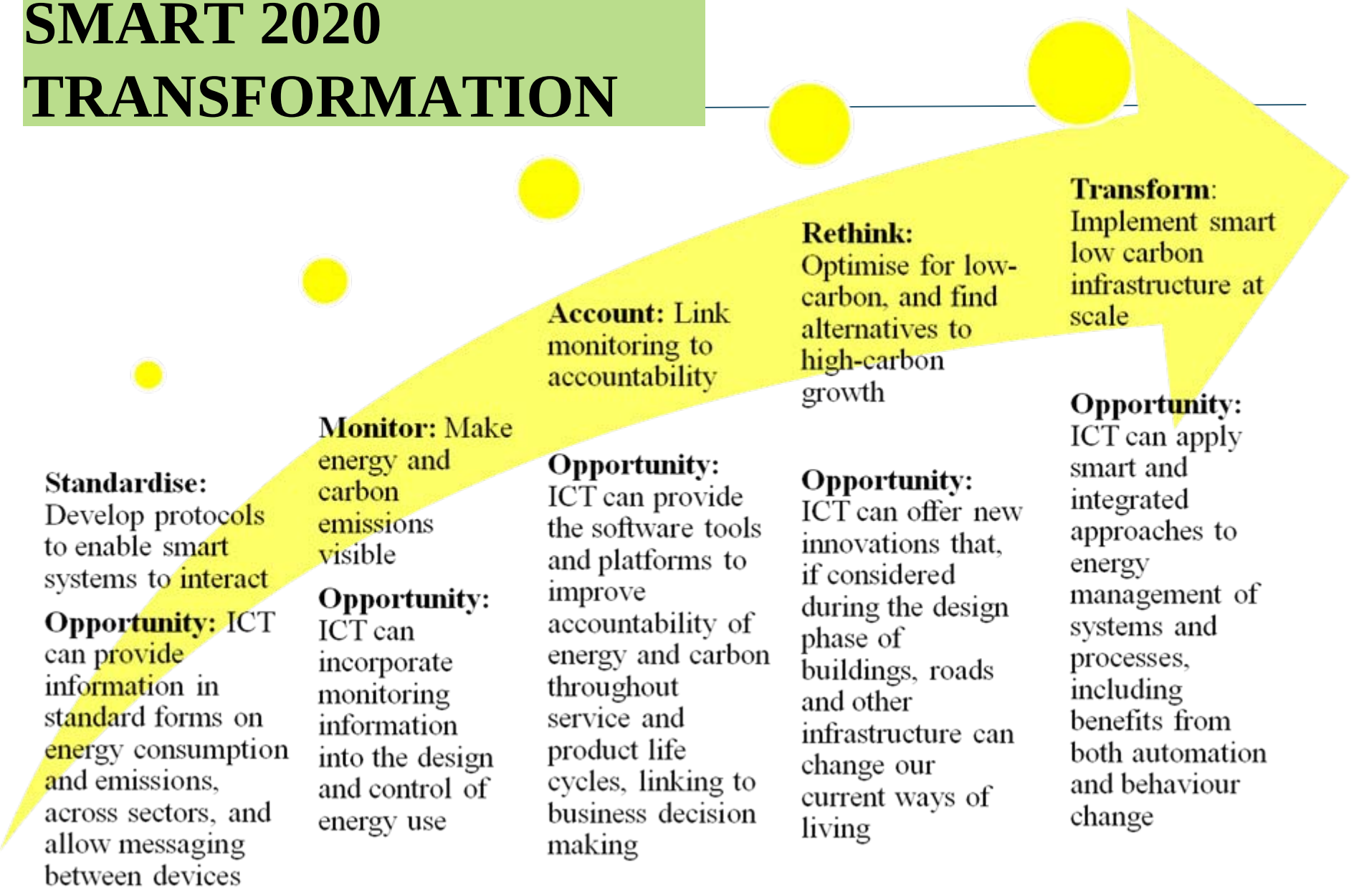
The size of the “opportunity”

ENABLING OPPORTUNITY:
The ICT can facilitate carbon reductions across sectors world-wide up to the order of **15% of total emissions by 2020**, or 7.8GtCO2 emissions through the development and deployment of products and services. **This is an opportunity 5x bigger than the size of the sector’s footprint of its own products and services, including manufacturing, use and end of life impacts**



SMART 2020 TRANSFORMATION



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COMPANY COMMITMENTS

A complete list of company commitments is in the appendix of the report. They address their own operations and products, green power procurement, and the enabling role of ICT

BT -- Reduce the worldwide CO_2 emissions per unit of BT's contribution to GDP by 80% from 1996 levels, by 2020

CISCO -- As part of CGI commitment, invest $15 million in the Connected Urban Development initiative to create replicable templates for sustainable urban infrastructure development considering urban planning, built environment, transport and energy solutions to reduce carbon emissions from cities

Dell -- Starting with FY08, achieve net carbon neutrality for all Dell–owned and –leased manufacturing and facilities operations worldwide, including business air travel. Double our average facilities LEED score by 2012

Deutsche Telekom AG -- 100% of German electricity demand obtained from renewable sources (water/wind/biomass) as of 2008

Intel -- Reduce IT-related CO_2 emissions by 50% by 2010 by ensuring commitments to produce, sell, buy and use the most energy efficient IT equipment, via the Climate Savers Computing Initiative

HP -- Quadruple the number of high-end video conferencing units at company sites worldwide by 2009, resulting in an expected reduction of more than 20,000 trips

GeSI COMMITMENTS

1. Develop an agreed ICT industry-wide methodology for the carbon footprinting of ICT products and services

2. Put more emphasis on climate change issues in our supply chain work so we influence the end-to-end manufacturing process for electronic equipment

3. Ensure that energy and climate change matters are fully considered by the organisations that set the technical standards for our industry

4. Work with organisations in the key opportunity areas – travel/transport, buildings, grids and industry systems – to help turn potential CO_2 reductions into reality. This will include a strong emphasis on the significant opportunities offered by dematerialisation

5. Work with public policy makers to ensure that the right regulatory and fiscal frameworks are in place to move us all in the right direction.

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