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?

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OVERVIEW

ICT PLAYS A FUNDAMENTAL ROLE IN DRIVING GROWTH BY:

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SMART 2020 PARTICIPANTS

SUPPORTING COMPANIES

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SMART 2020: KEY FINDINGS

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

> The sector's current contribution to GHG emissions of around 2% of the global total is set to double (0.83 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**

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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

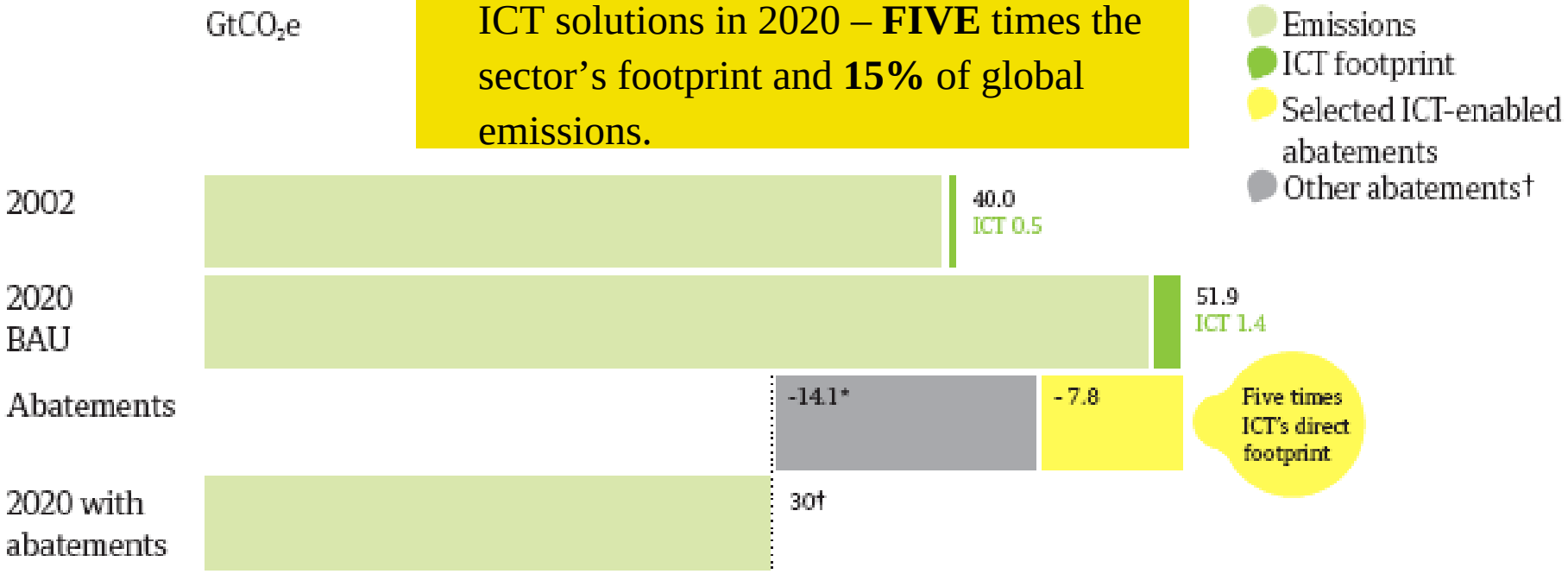
> 2020: BAU – 1.4 Gt CO_2e

REDUCTIONS NEEDED:

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

ICT IMPACT: THE GLOBAL FOOTPRINT AND THE ENABLING EFFECT

SMART 2020 identified savings of **7.8 Gt CO_2e** that could be delivered by ICT solutions in 2020 – **FIVE** times the sector's footprint and **15%** of global emissions.



* For example, avoided deforestation, wind power or biofuels.
† 21.9 $GtCO_2e$ abatements were identified in the McKinsey abatement cost curve and from estimates in this study. Source: Enkvist P., T. Naucler and J. Rosander (2007), *'A Cost Curve for Greenhouse Gas Reduction'*, The McKinsey Quarterly, Number 1.

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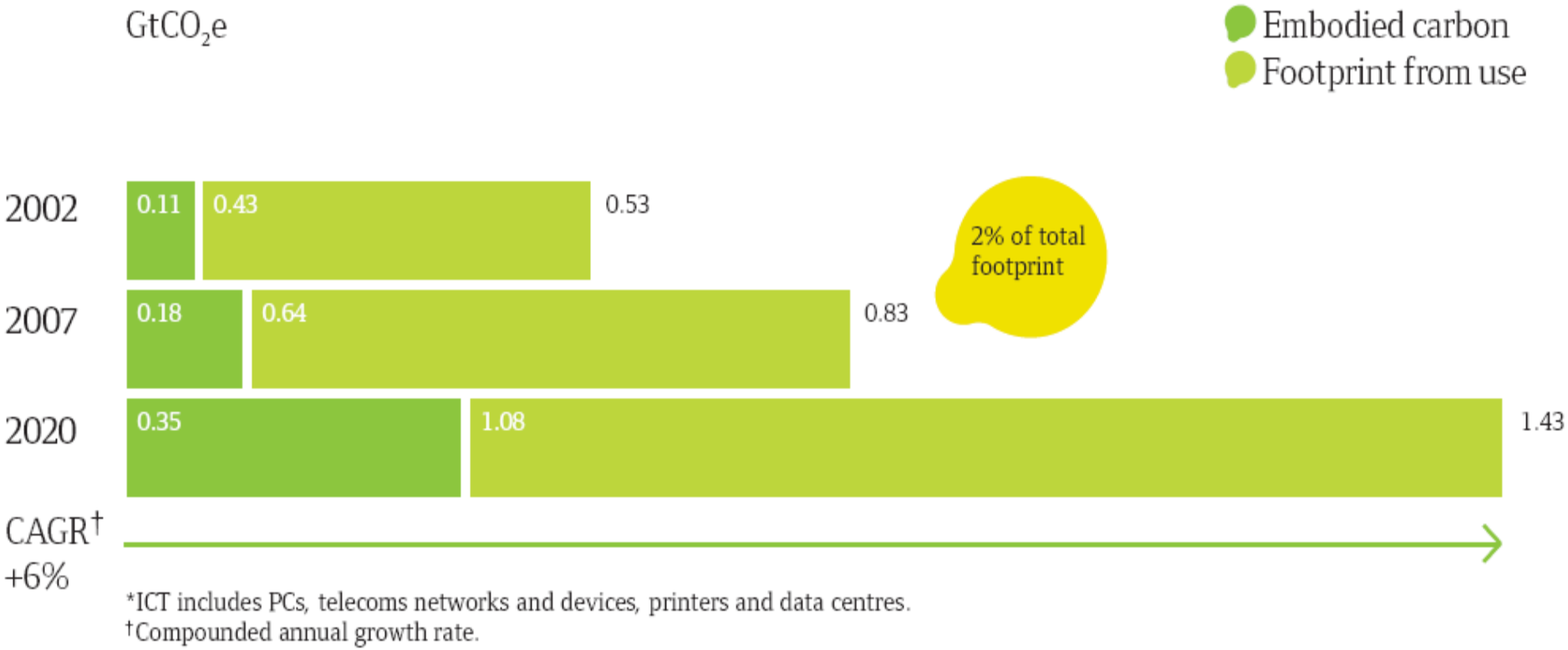
ICT's DIRECT FOOTPRINT



> 2% global emissions - 830 Mt $C0_2e$ (2007)

> Set to grow 6% each year until 2020

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SCOPE

OUT OF SCOPE: GAMING, AUDIO, VIDEO, MEDICAL EQUIPMENT

WITHIN SCOPE: PATHWAYS TO 2020

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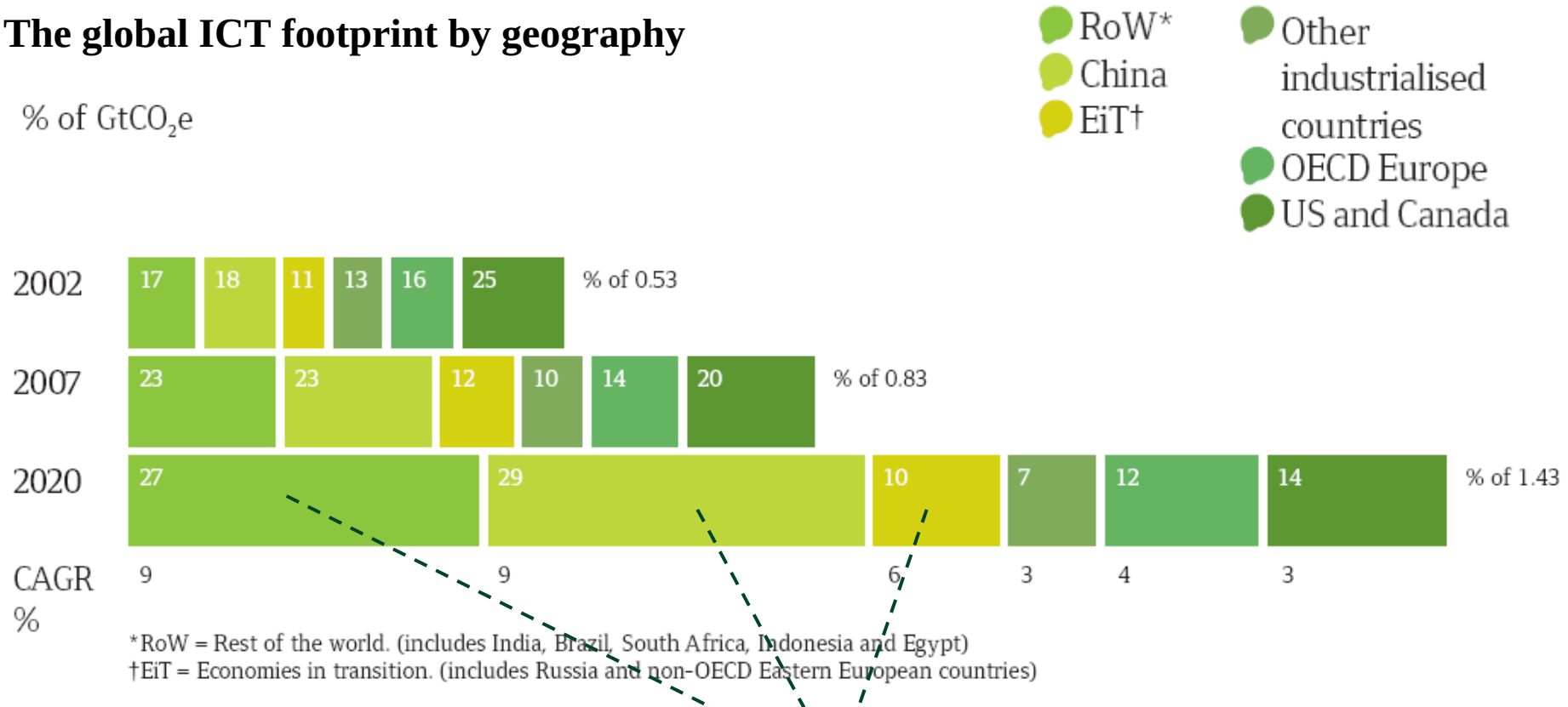
PROJECTIONS TO 2020

The global ICT footprint by geography



Responsible for largest footprint share in 2020

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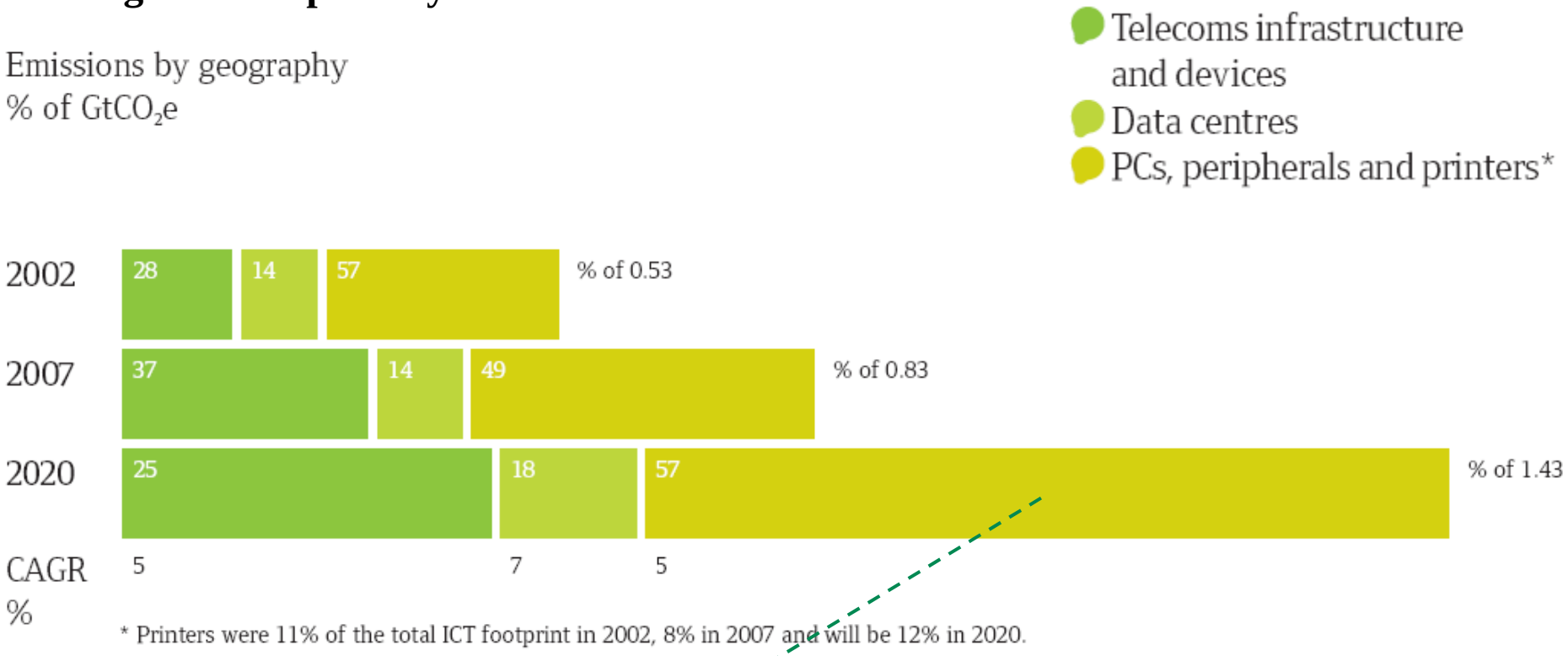
PROJECTIONS TO 2020

The global footprint by sub-sector



PCs remain largest contributor to emissions

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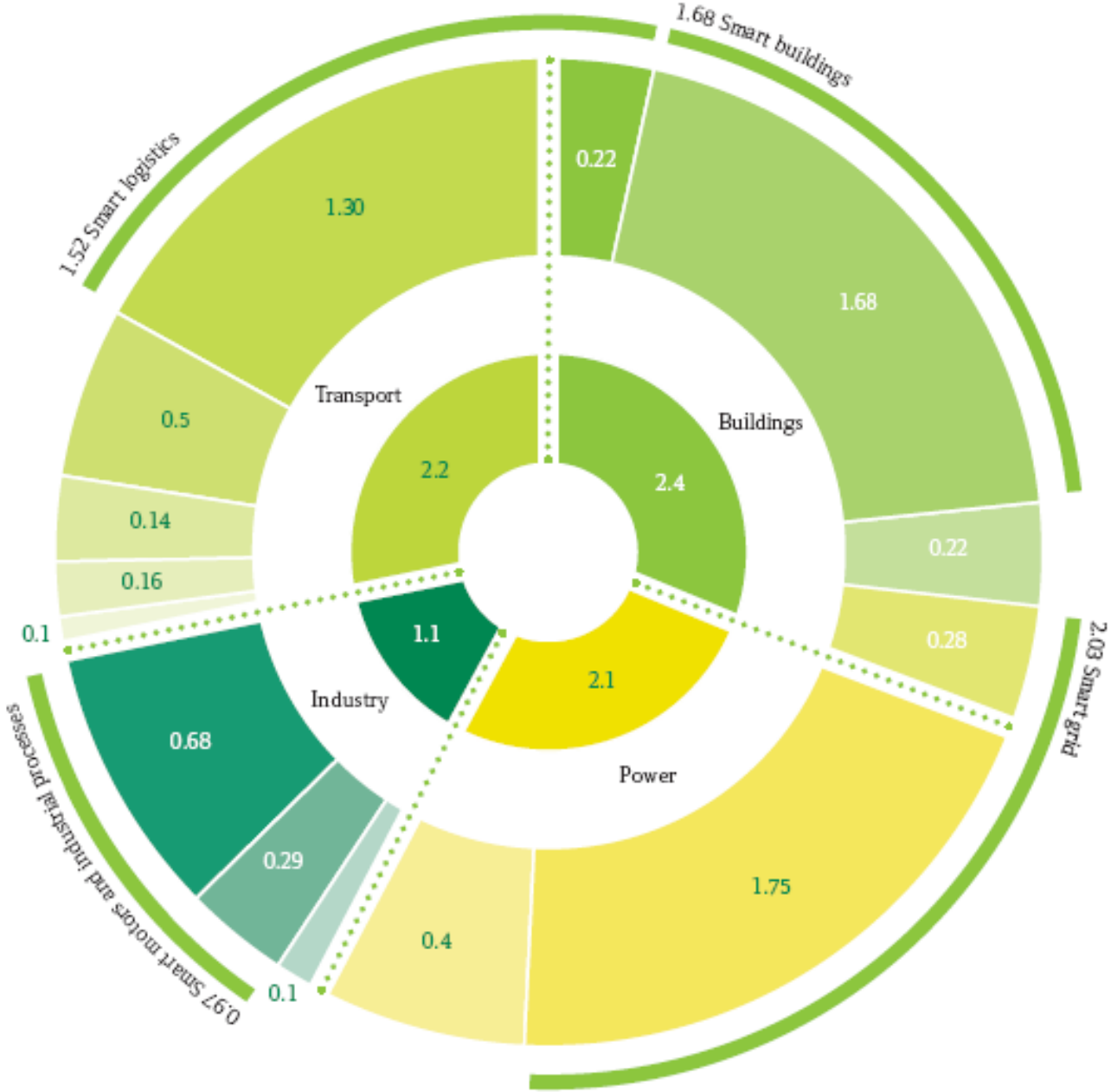
THE ENABLING EFFECT

IN 2020, ICT could enable reductions of 7.8 Gt CO_2e



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

The substitution of high carbon products and activities with low carbon alternatives:

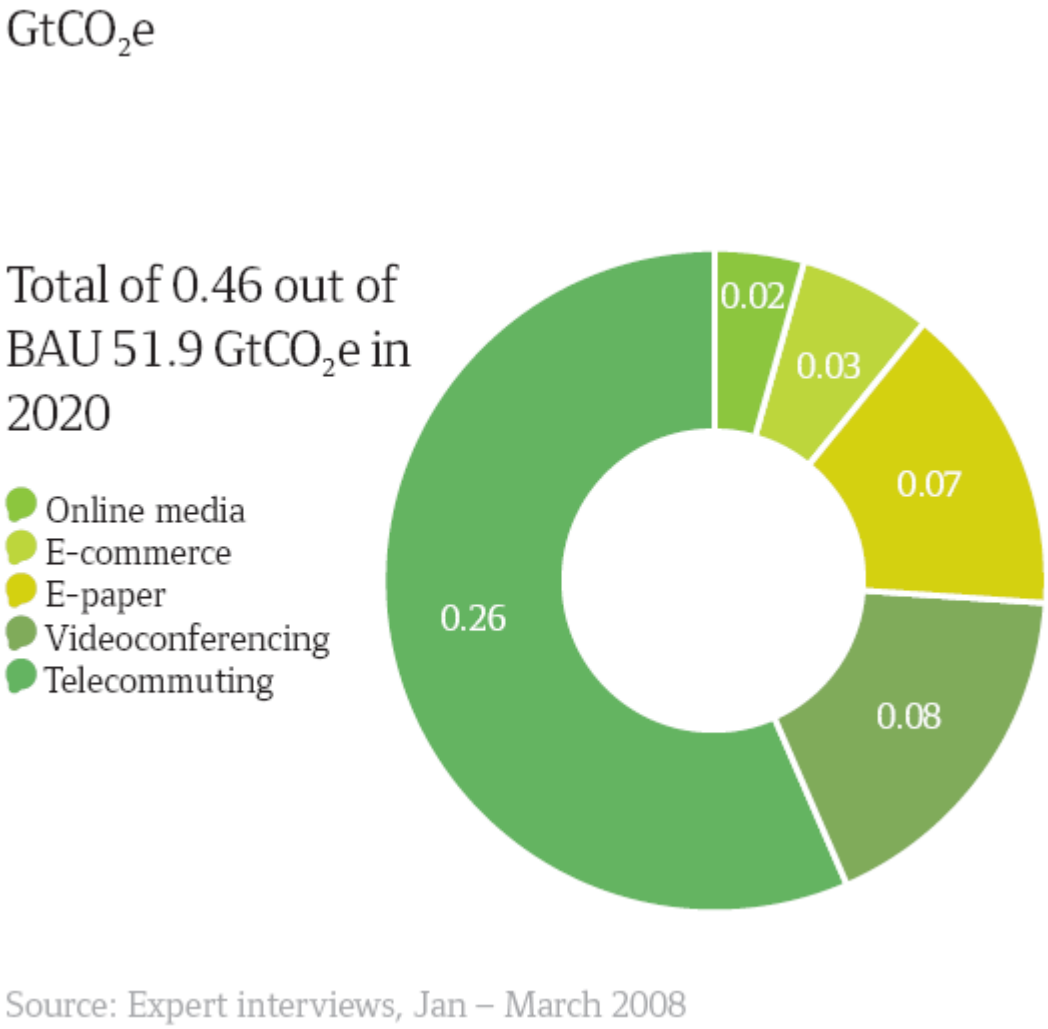
> Replacing face-to-face meetings with tele- and videoconferencing

> Remote working

> Paper with email/online billing

> CDs with online music

Total abatement potential of dematerialisation in 2020: 460 Mt CO_2e



Source: Expert interviews, Jan – March 2008

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SMART MOTORS

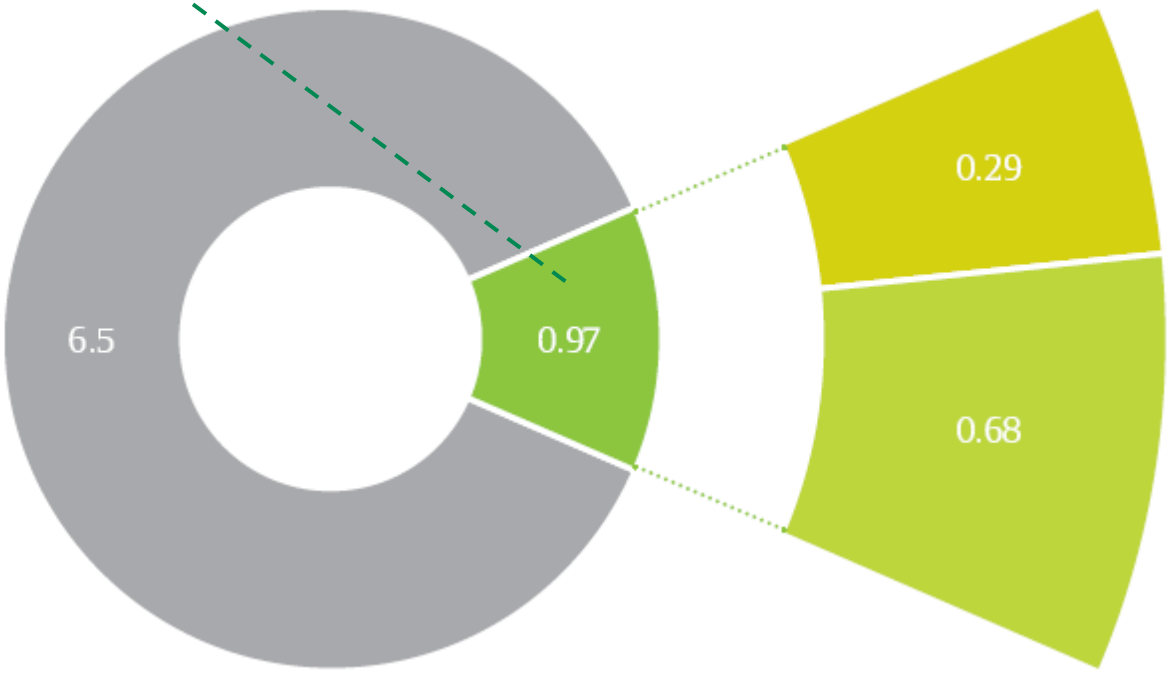
Total abatement potential of SMART motors in 2020: 970 Mt CO_2e

Value: €68b

$GtCO_2e$

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



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SMART LOGISTICS

$GtCO_2e$

Total abatement potential of SMART logistics in 2020: 1.52 Gt CO_2e

Value: €280b

Total emissions BAU in 2020 = 51.9 $GtCO_2e$

- Total emissions from buildings (storage) and transport (includes 11.7 from buildings, 7.6 from transport)
- Ict–enabled transport and storage abatements (includes 1.29 transport and 0.22 storage)
- Optimisation of logistics network
- Intermodal shift (commercial)
- Optimisation of collection/delivery itinerary planning
- Optimisation of route planning – e.g. avoidance of congestion (commercial)
- Eco-driving (commercial)
- Reduction in unnecessary flight time (commercial)
- In-flight fuel efficiency
- Reduction in ground fuel consumption
- Reduction in unnecessary flight time
- Maximisation of ship load factor (commercial)
- Optimisation of ship operations (commercial)
- Minimisation of packaging

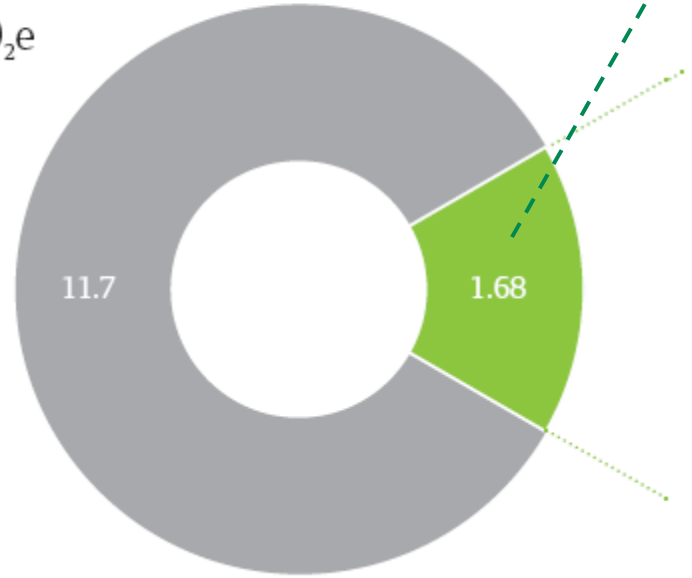
SMART BUILDINGS

$GtCO_2e$

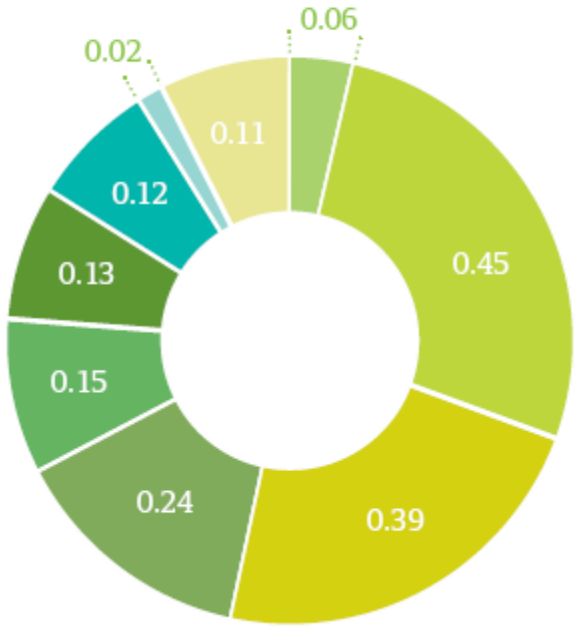
Total abatement potential of SMART buildings in 2020: 1.68 Gt CO_2e

Value: €216b

Total emissions BAU in 2020 = 51.9 $GtCO_2e$



Figures expanded



- Total emissions from buildings (including power) total emissions from power used by industrial systems
- Total ICT-enabled smart buildings abatement

- Intelligent commissioning
- Improved building design for energy efficiency
- BMS
- Voltage optimisation
- Benchmarking and building recommissioning

- Heating, ventilation and air conditioning (HVAC)
- Lighting automation
- Ventilation on demand
- Reduced building space through design

SMART GRIDS

Total abatement potential of SMART grids in 2020: 2.03 Gt CO_2e

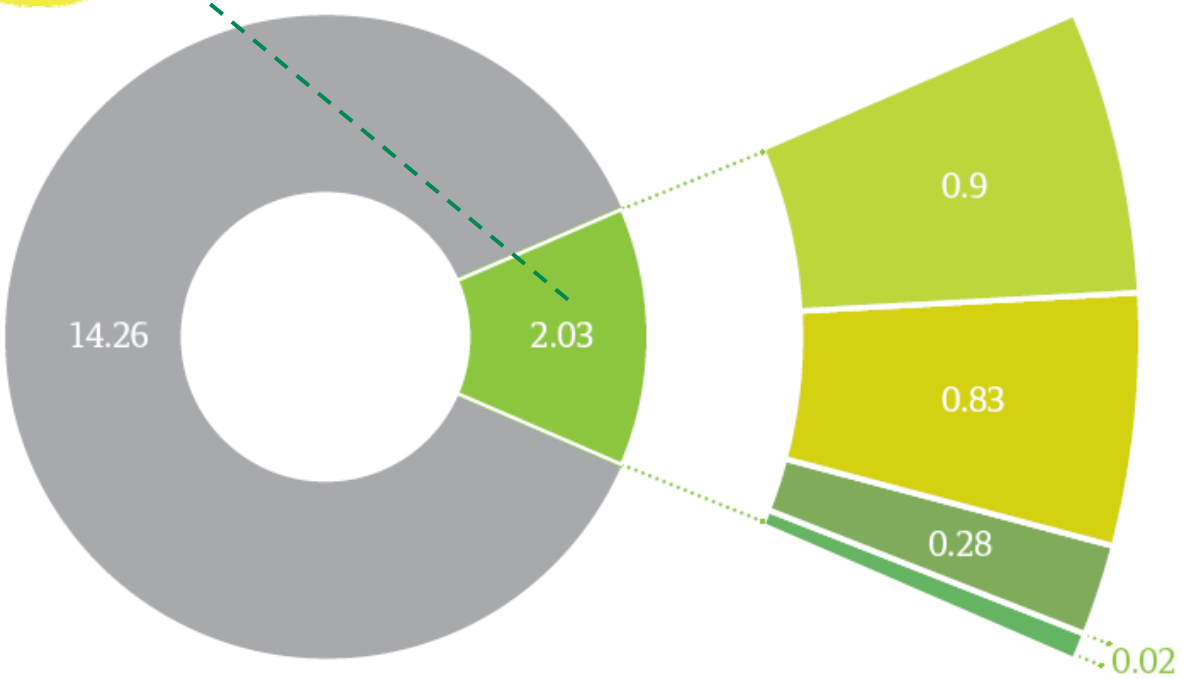
Value: €79b

$GtCO_2e$

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



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SMART 2020 TRANSFORMATION

Standardise: Develop protocols to enable smart systems to interact

Opportunity: ICT can provide information in standard forms on energy consumption and emissions, across sectors, and allow messaging between devices

Monitor: Make energy and carbon emissions visible

Opportunity: ICT can incorporate monitoring information into the design and control of energy use

Account: Link monitoring to accountability

Opportunity: ICT can provide the software tools and platforms to improve accountability of energy and carbon throughout service and product life cycles, linking to business decision making

Rethink: Optimise for low-carbon, and find alternatives to high-carbon growth

Opportunity: 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

Opportunity: ICT can apply smart and integrated approaches to energy management of systems and processes, including benefits from both automation and behaviour change

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STANDARDS ARE IMPORTANT

Direct Footprint

- Build energy reduction into all future ITU standards
- Build energy monitoring into all new equipment specifications

Indirect Footprint

- Extend energy monitoring standards into other electrical equipment
- Other protocols for SMART technology communication

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