ICT Energy Saving and Industry Impact on Society

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Why Broadband? – The drivers

• Broadband evolution is being driven by the **digitalization of society** bringing radical improvements for Individuals, Enterprises, Governments both for Social, Economic and Environmental aspects

• Broadband, both fixed and mobile, is **growing rapidly**. By 2013 there will be nearly 3 billion subscriptions.

• The majority will be mobile broadband because the continual connection is in demand (50% percent want to take high speed connection wherever they go)

• Web 2.0 is turning broadband users into content producers, and they are demanding more bandwidth for the videos, images and music they create and share.

• Consumer demand for broadband at home is increasing thanks to the emergence of the digital home, including high-bandwidth services such as interactive and HDTV

• We are moving towards a **converged broadband** enabled world with connectivity embedded into all kinds of devices

• A converged broadband connection for **enterprises** means an average of 18% improved efficiency

Positive impacts on Economy and Environment

•The “Digital Britain” Report indicates that the UK digital economy is estimated to have generated around 125 B£ in gross added value in 2007, representing around 10% of UK GDP. Moreover, the digital economy employed over 2.1 million people, representing around 6% of total UK employment

• Broadband penetration is estimated to increase Irish GDP by 4 B€ by 2010

• A 4% broadband growth could give 1.8 million jobs and 132 B$ in payroll over 10 years in California; 1% increase in broadband penetration can increase employment by 0.2-0.3% per year

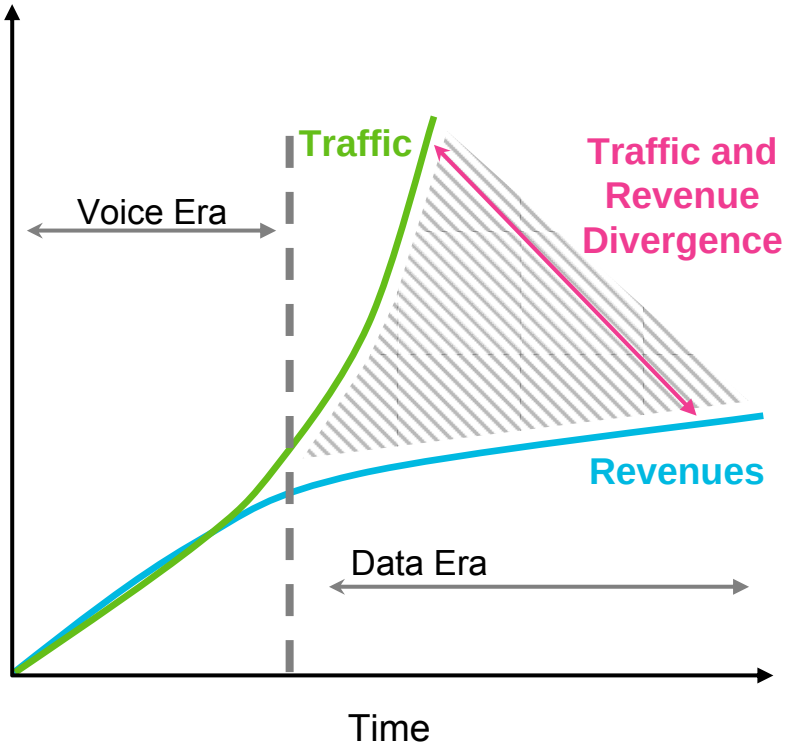
• The GSMA “2015 Mobile Manifesto” states that the mobile industry in Europe could generate approximately 60-120 B€ annually to 2015 – equivalent to 0.5% to 1.0% of EU GDP or 340-750B€ in aggregate between 2010 and 2015

• Broadband lead the global effort to avoid dangerous climate changes
  - Smart use of Broadband ICT can offset global CO2 emissions by 15% by 2020
  - 10% of British Telecom employees work from home or offices with remote access, which has reduced travel with ~69 million miles per year

The broadband dilemma

The predominance of data traffic over voice traffic is more and more a reality, when moving from the ***Voice Era*** to the ***Data Era*** the relationship between **Traffic** and **Revenues** is drastically changing:

- Bigger volume packages offered
- Traffic increase is significant for all operators
- Revenues per bit dropping off constantly
- Trend is even accelerated due to flat tariff schemes



… but there are also good news

- Prices/ bit will come down (flat architecture)
- Network utilization is up
- Well balanced network

… but there are also some risks

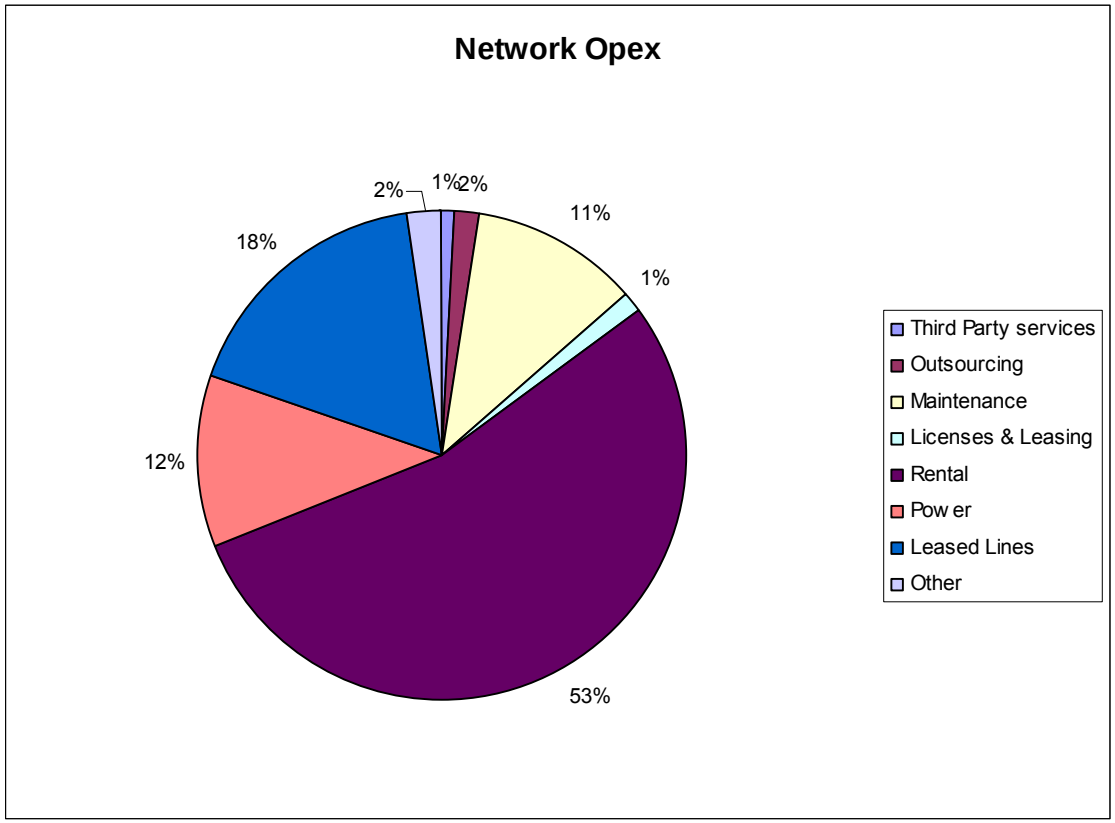
- Unlimited service offers
- Increasing P2P traffic (already around 40%)
- Physical limits in assigned spectrum capacity (new spectrum bids)

Network Cost Control

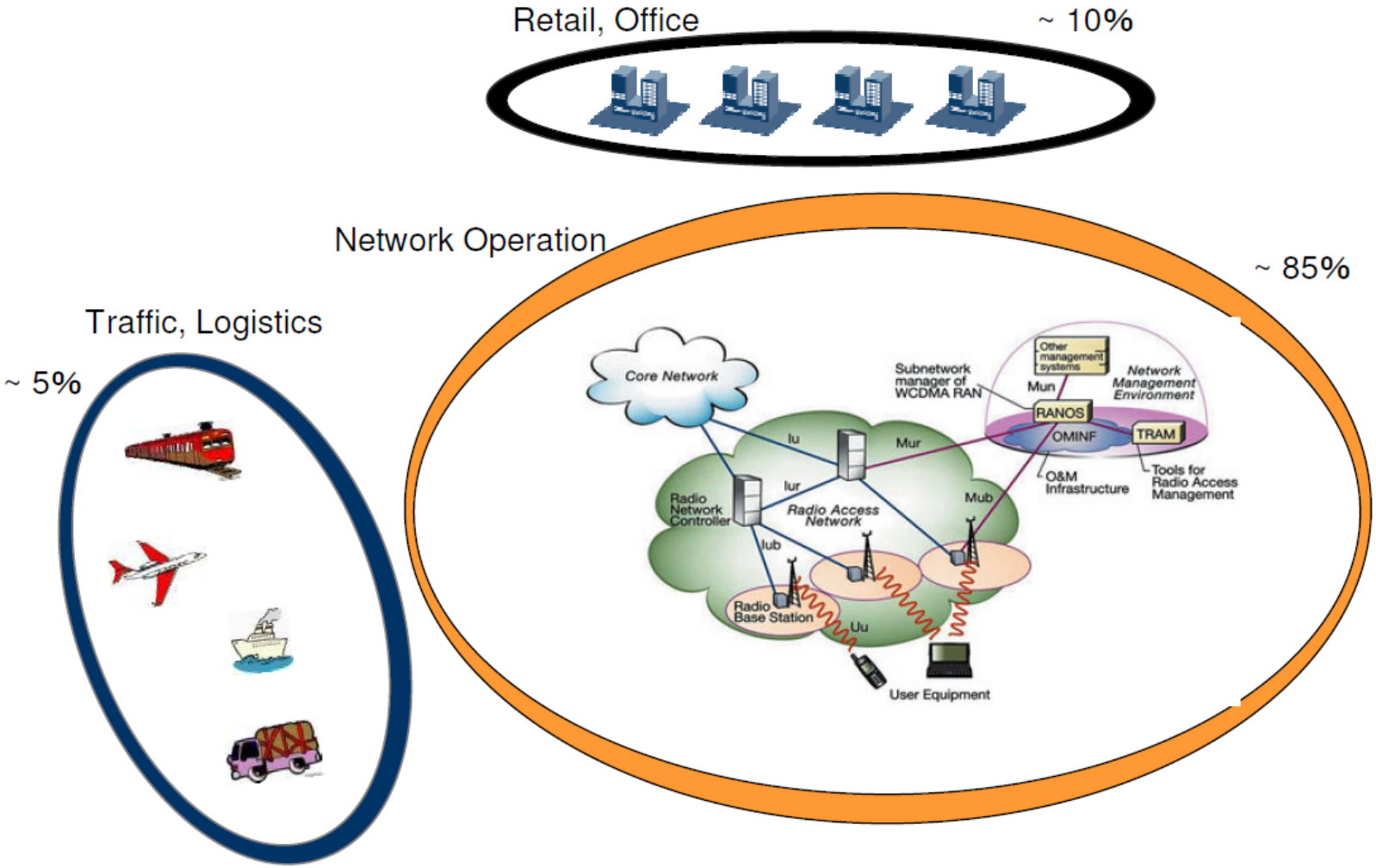
We are deeply **studying** the broadband dilemma both from a strategic point of view and from an operative one. The related business model is not stable and the international experience doesn't indicate a unique and successful case

In addition to the Technology innovation, ensuring that the Network incremental Cost trend per data traffic unit follows a decreasing path, special attention must be anyway surely devoted to **Opex reduction**

Besides the usual controls on Rental and Lease, the most interesting component is the Power:
the TLC industry has rapidly become the highest electricity consumer

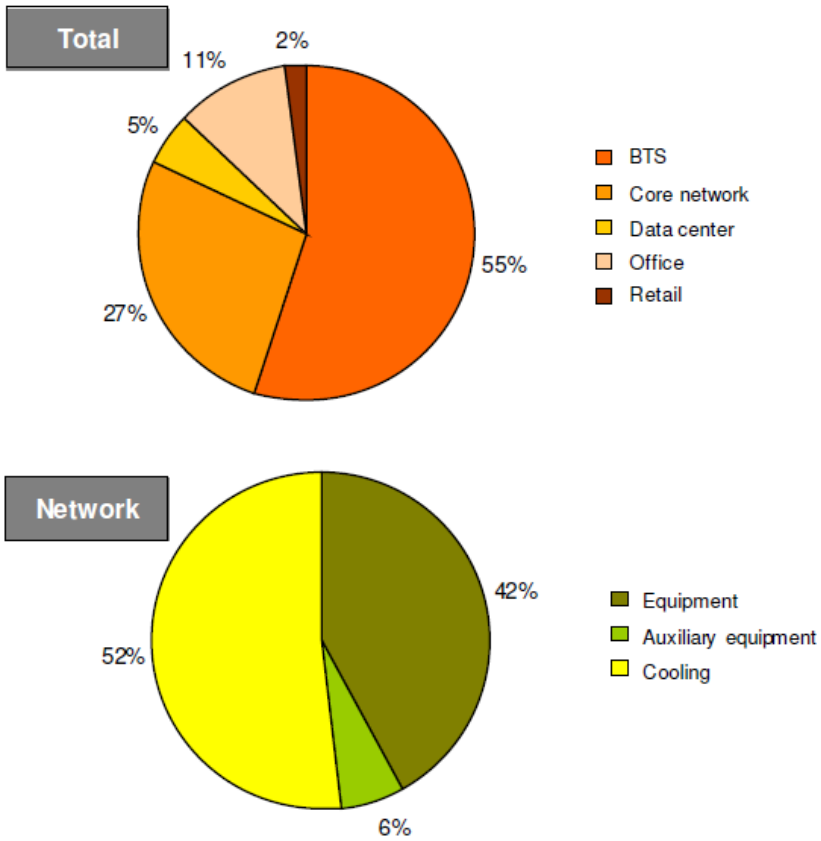


Energy Consumption of Telecom Operators

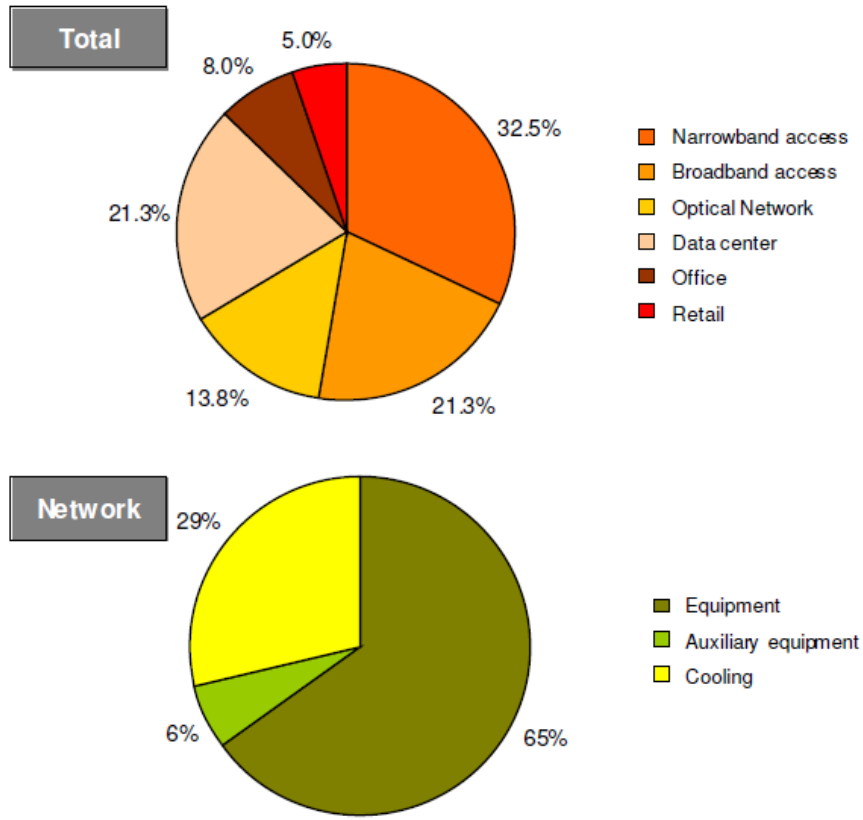


Network Operation Energy Consumption

Typical mobile operator energy consumption

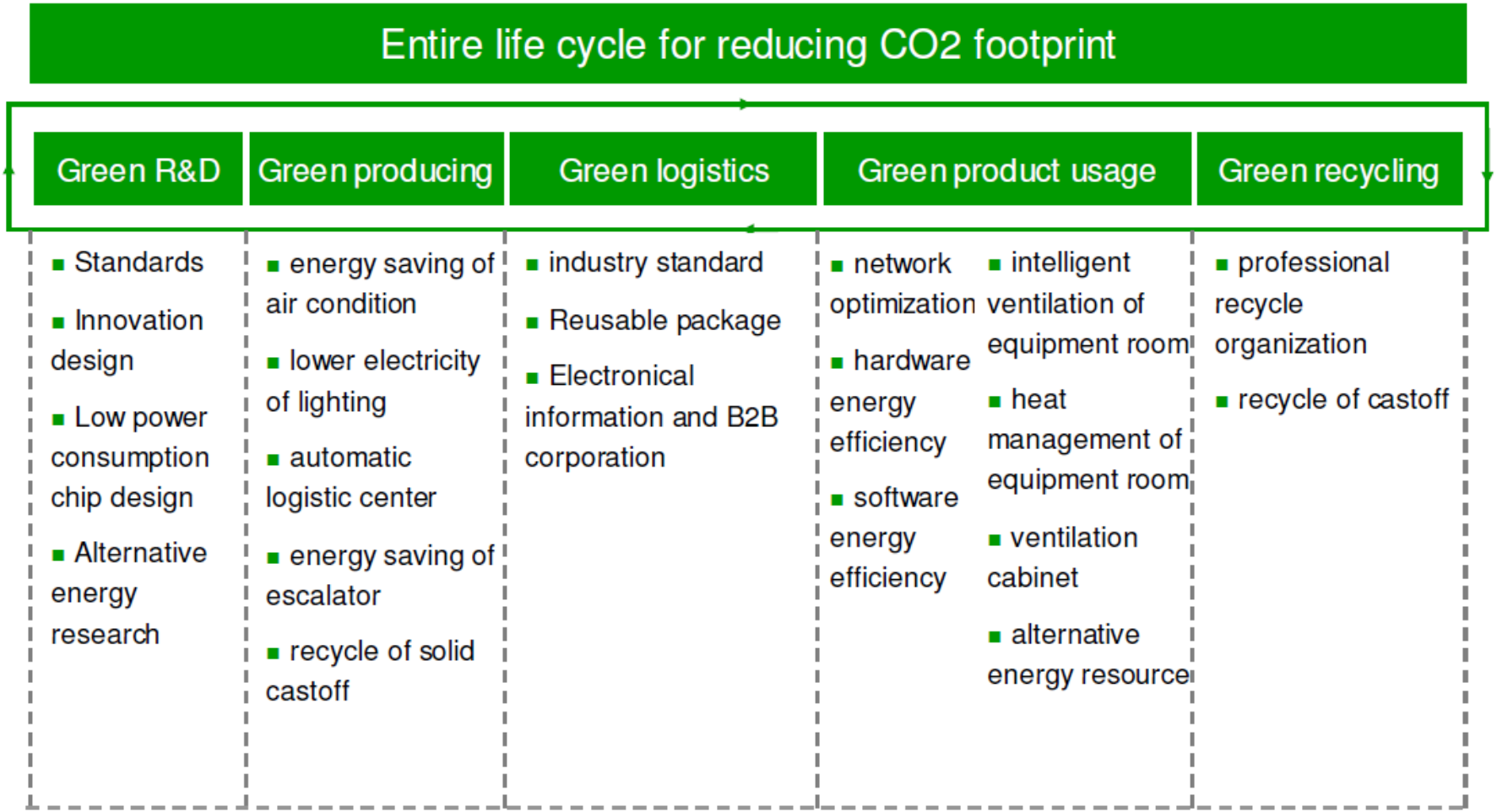


Typical fixed operator energy consumption



Source: Huawei analysis based on data of PLC

Industry End-to-End Green Strategy

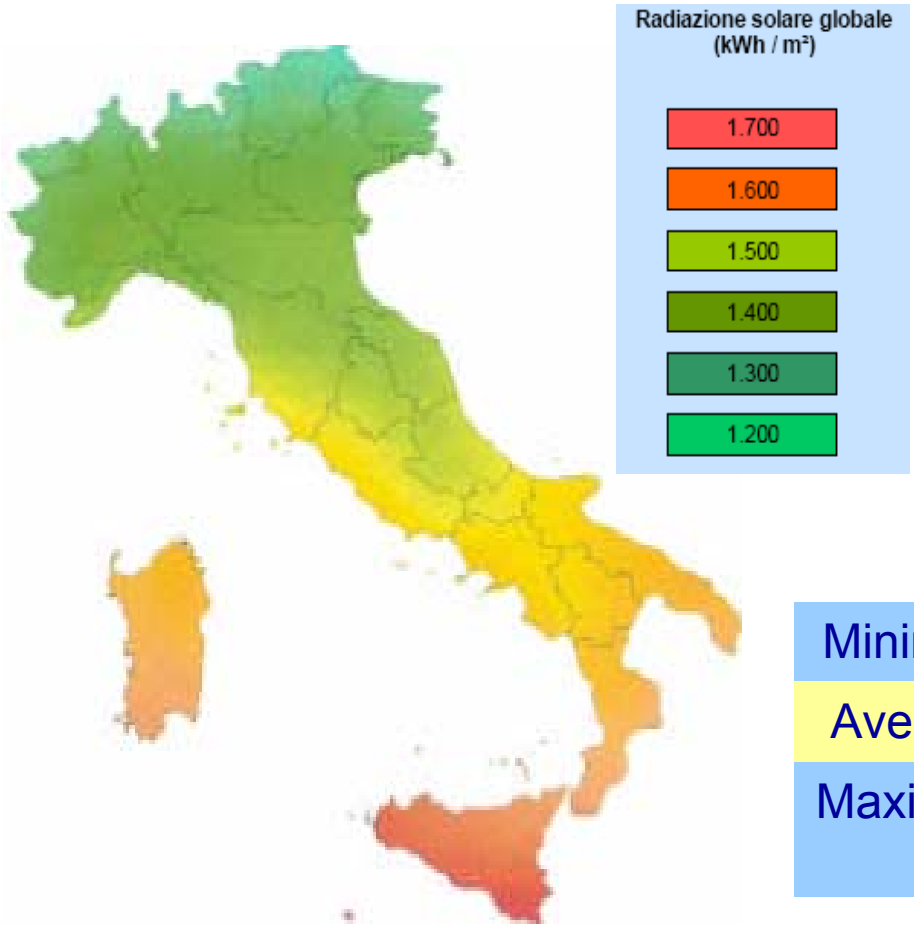


Wind Energy Saving Plan

- The Green characteristics of equipments are considered in the tendering process
- Green Access Network:
  - Optimize number of sites
  - Improve site/node efficiency
  - High efficiency power amplifiers
  - Intelligent power shutdown
  - Reduce Fixed Broadband access power consumption
  - Alternative Energy (Solar, Wind, Fuel Cell)
- Green Transmission:
  - Automatically Switched Optical Network (ASON)
  - Back-to-back clustering routers
  - Highly integrated Optical Transport Network
- Green Central Office:
  - Next Generation Networking (NGN)
  - All IP
  - MSC/SGSN Pool
  - Advanced Telecommunications Computing Architecture (ATCA) platforms
  - Heating Management

Solar Resource

Italy is one of the **“attractive - for - solar - business”** European countries



Yearly global irradiation (kWh/m^2) in Italy

	Horizontal surface	Vertical surface	Optimal surface
Minimum	951	647	1111
Average	1409	1062	1611
Maximum	1809	1293	2048

Wind in the Sun

• The installations of PhotoVoltaic plants will be realized on WIND main sites present on the Italian territory.

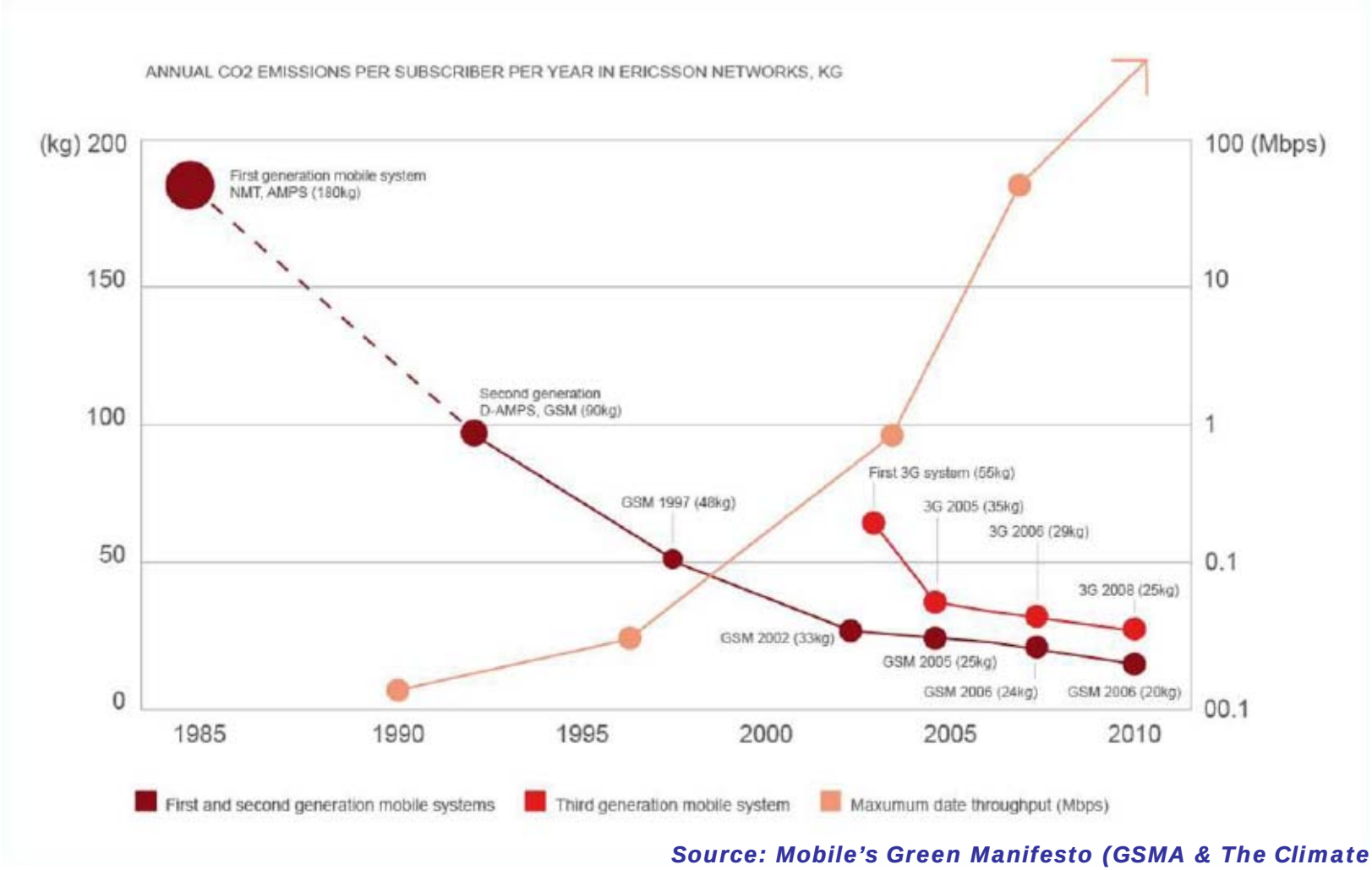
• The PV plants are connected to the local utility – GRID CONNECTED (ENEL, ACEA, AEM, etc.), that receives the energy produced by the PV plant and transfers the energy to the network through NET METERING (SCAMBIO SUL POSTO).

• The first experimental plant was completed in December 2008 in the new main site of Rome – Tor Cervara with an installation of 60 kWp.

• New plants are under realization for around 200 kWp involving some main sites in Center and South Italy (Catania, Palermo and Bari)

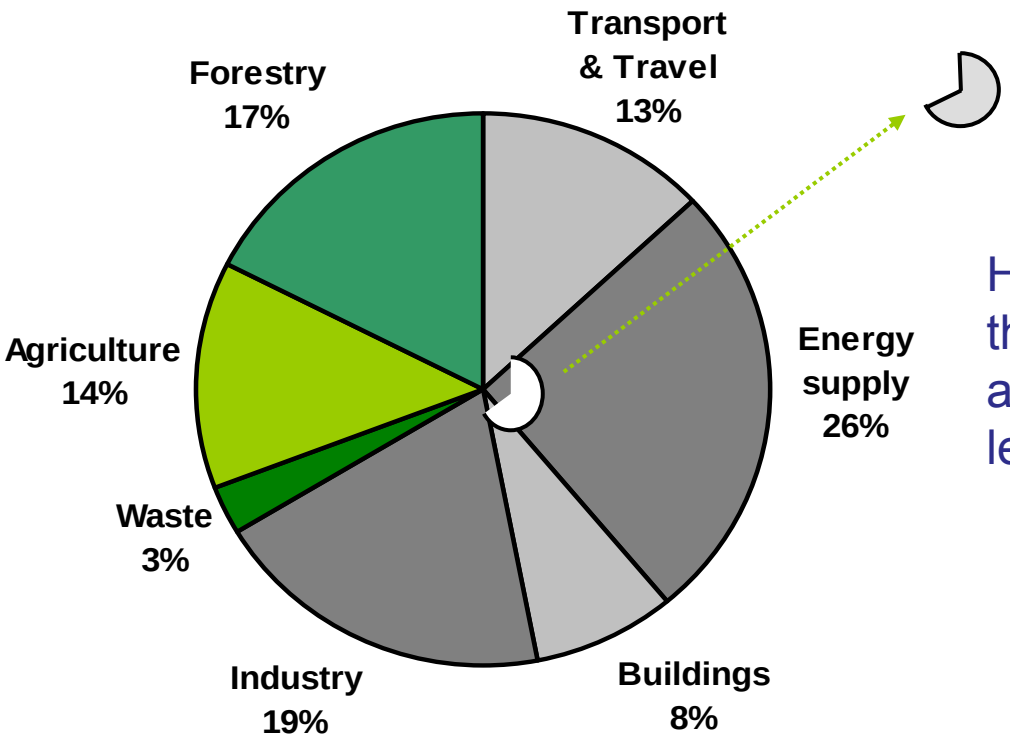
• The development of the above plants will allow the production of **296 GWh per year** and a reduction in CO2 emission of **around 270 tons per year.**

Annual CO2e Emissions per Mobile Subscriber



Source: Mobile's Green Manifesto (GSMA & The Climate Group)

The carbon footprint by sector*



ICT: 2% of direct CO_2 or 1.5% of total CO_2e

How can ICT help to reduce the other 98% and shape a more carbon-lean economy?

Source: Eurocities 2009 (Ericsson)

*CO2-equivalents (CO2e) reported by IPCC in their latest report (no.4)

Wind Energy Platform

- **Misurare in tempo reale** :
  - ✓ I consumi di tutta l'impiantistica tecnica di uffici ,Data Center, ambienti industriali,ecc.;
  - ✓ I dati di conforto della temperature, del tasso di umidità nell'aria e di CO_2.
- **Elaborare i dati raccolti per :**
  - ✓ Monitorare in modo continuativo le performance degli apparati collegati (elettrici, contatori gas, acqua , impianti industriali);
  - ✓ Rendere disponibili le informazioni rilevate direttamente sul desktop in forma di grafico animato;
  - ✓ Consentire di stabilire e correlare gli allarmi;
  - ✓ Avviare analisi comparative nel tempo con la granularità desiderata (edificio, piano, stanza, apparato);
  - ✓ Prevedere i consumi e il calcolo delle emissioni CO_2 .

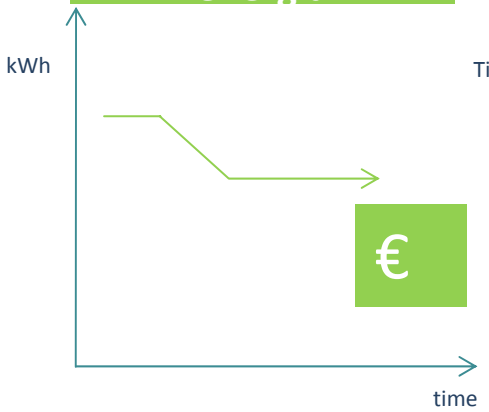
10-30% energy savings

UN UNICO OBIETTIVO

Identificare le opportunità di risparmio energetico a supporto e controllo di una strategia di efficienza energetica aziendale.

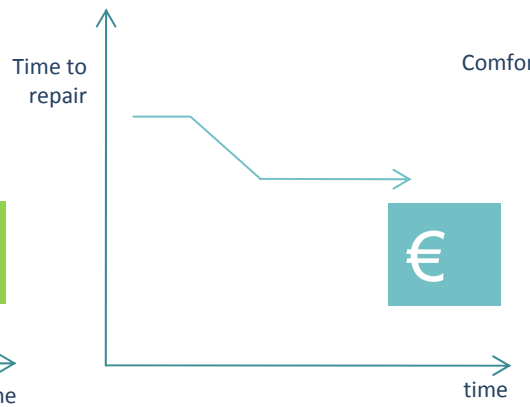
Obiettivi della piattaforma di integrazione

Ottimizzazione uso energia



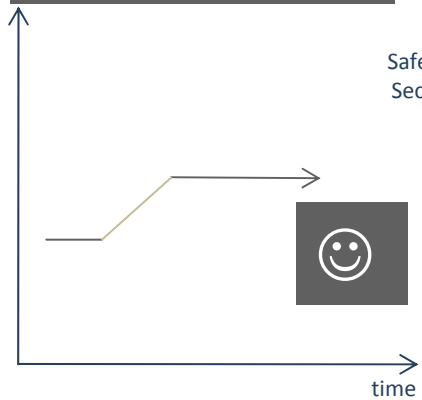
Ottenere un risparmio senza impatto sull'infrastruttura esistente

Efficienza



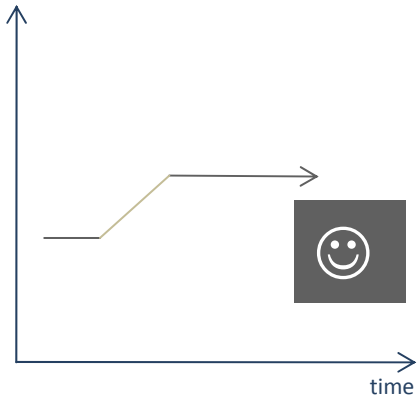
Ottenere un risparmio sulla spesa di gestione e manutenzione degli impianti

Confort Lavorativo



Ottenere un elevato grado di confort dell'ambiente lavorativo

Sicurezza



Ottenere un elevato grado di sicurezza per gli utenti degli edifici

Senza alcuna modifica alle infrastrutture esistenti

Il mercato italiano in prospettiva

Scenario delle riduzioni di emissioni al 2020

- ✓23% da F.E.R.
- ✓11% da uso razionale
- ✓8,6% da tecnologie lowcarbon
- ✓10,2% da miglioramento nella generazione elettrica
- ✓**46% da efficientamento**

Obiettivo atteso: riduzione complessiva di 80-100Mt di CO_2.

–I settori industria e terziario sono responsabili del 77% dei consumi elettrici annuali e sono quindi i settori con maggiore possibilità di efficientamento.

–Circa 20.000 aziende in Italia hanno una bolletta energetica superiore ai 500.000 euro all'anno

La necessità di un elevato investimento iniziale frena le imprese ad adottare tecnologie orientate al risparmio energetico.
Wind Energy Platform lavora su l'efficientamento dell'esistente

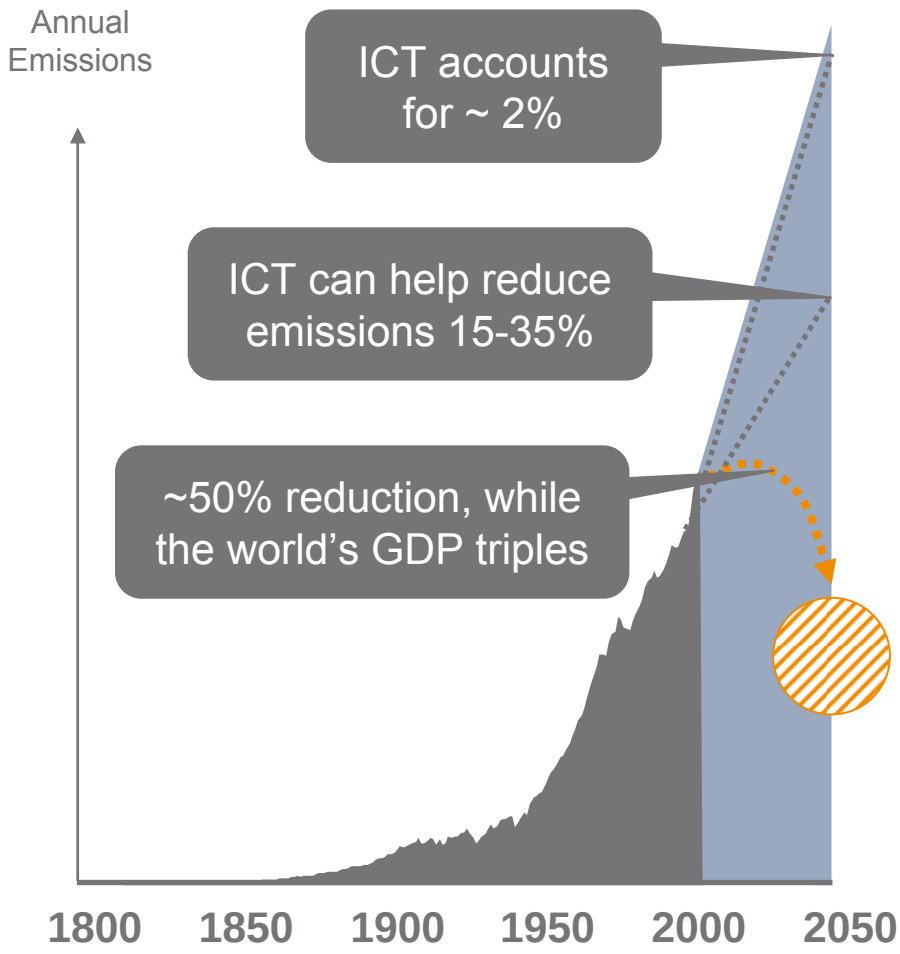
ICT ed energia: il ruolo delle TLC

- Le reti di TLC collegano tutti i dispositivi presenti in azienda …
  - ✓Computer, stampanti, memorie di massa, firewall
  - ✓Access point per reti wi-fi
  - ✓Centralini e telefoni (fissi e mobili)
  - ✓*Telecamere di sorveglianza e TVs*

  .. diventando un importante strumento di raccolta di informazioni, controllo e ottimizzazione del consumo energetico dei dispositivi connessi.

- Le TLC favoriscono l'introduzione di nuove modalità di lavoro
  - ✓Uso di apparati di videoconferenza (risparmio circa 30% delle spese di viaggio)
  - ✓Telelavoro
  - ✓Soluzioni di Unified Communication (rapporto della SIS Int. Research stima in 4000€/anno il costo a dipendente per gli effetti di comunicazione "caotica").

Sustainability potential of ICT



From incremental to transformative changes in Smart opportunities and Dematerialization

- Smart grids
- Connected home

- Digital society
- Smart work

- Facility mgmt
- Monitor & control

- Virtual presence
- Smart transport

Thank You!

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 $GtCO_2e$)

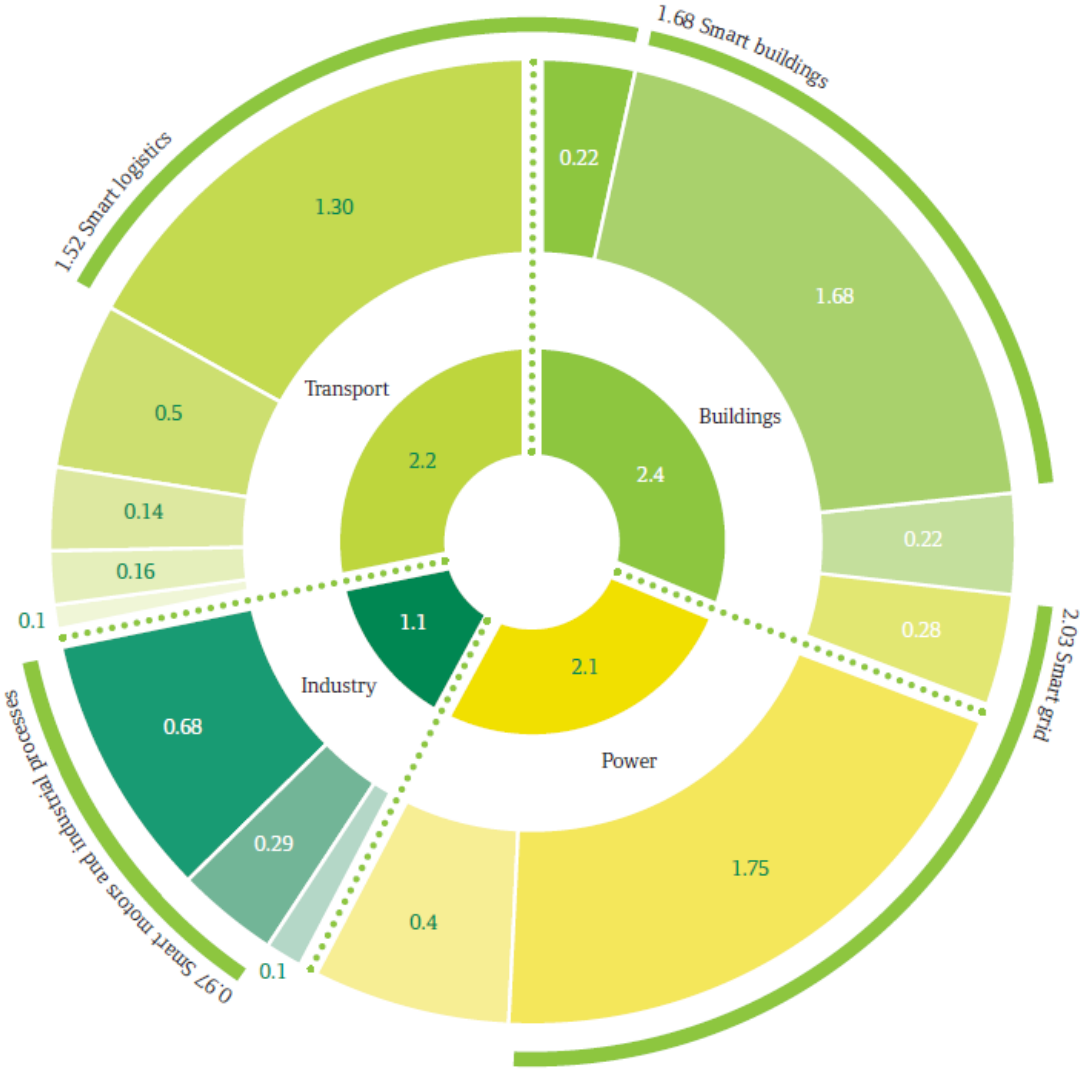
The SMART opportunities including dematerialisation were analysed in depth

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.

Source: SMART 2020 Report (The Climate Group)

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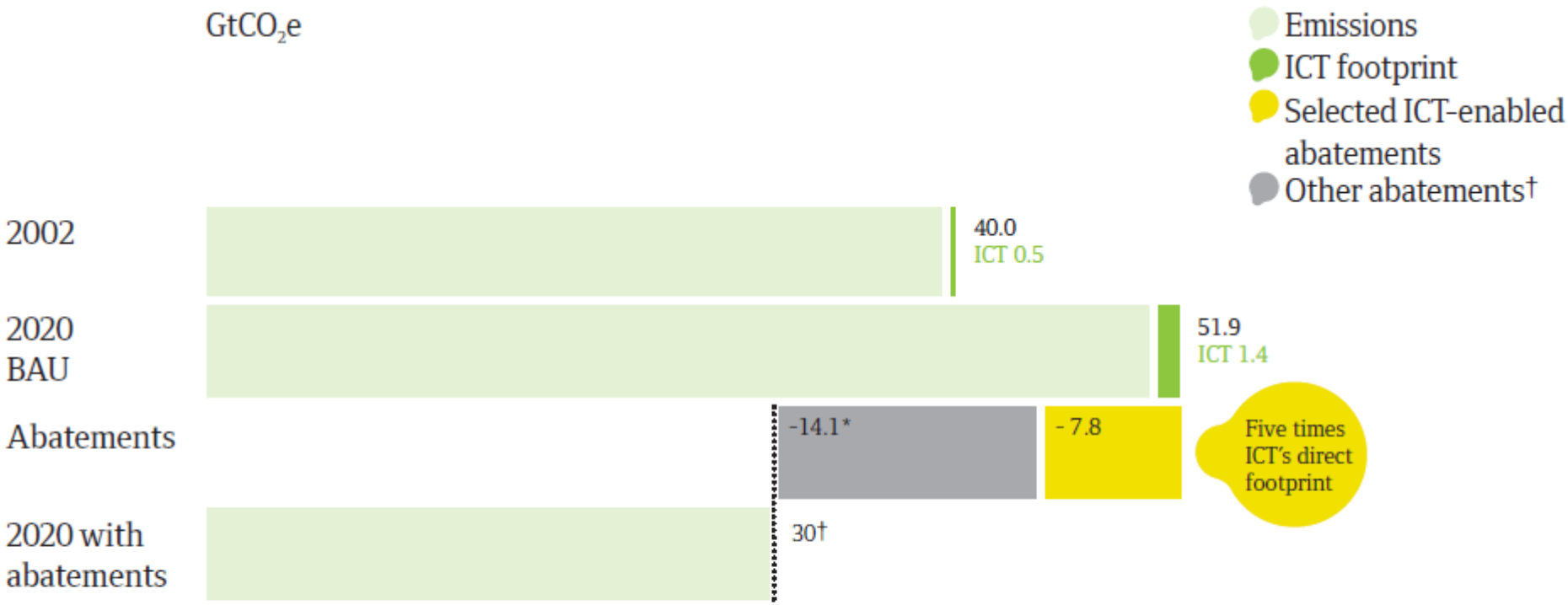
ICT: Global Footprint and Enabling Effect



* 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.

Source: SMART 2020 Report (The Climate Group)

From incremental to transformative change