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Digitalization for energy efficiency

Luis Neves, CEO

10th Energy Efficiency Forum & Fair

Istanbul, 11-12 April 2019

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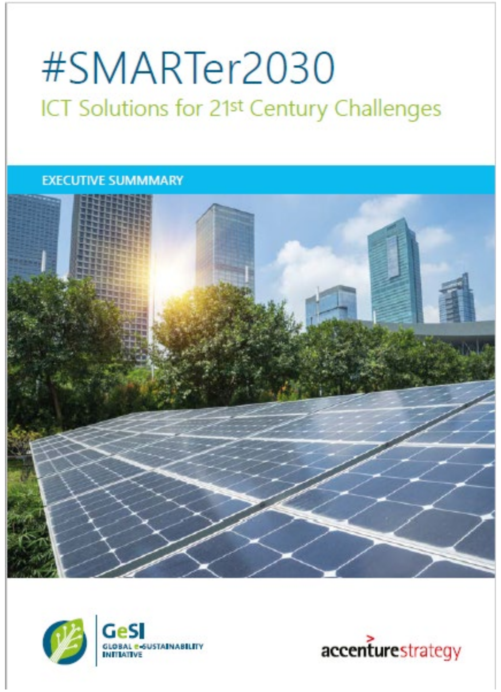
Raising awareness of the ICT enabling potential

SMART series →

- Quantifying the benefits of ICT-based solutions
- Three studies released so far:
  - SMART2020 (2008)
  - SMARTer2020 (2012)
  - SMARTer2030 (2015) →

- Extended analysis to social and economic benefits of ICT
- Extended time horizon considered to 2030
- Included recommendations to policymakers, consumers, and business to speed up adoption of ICT technologies



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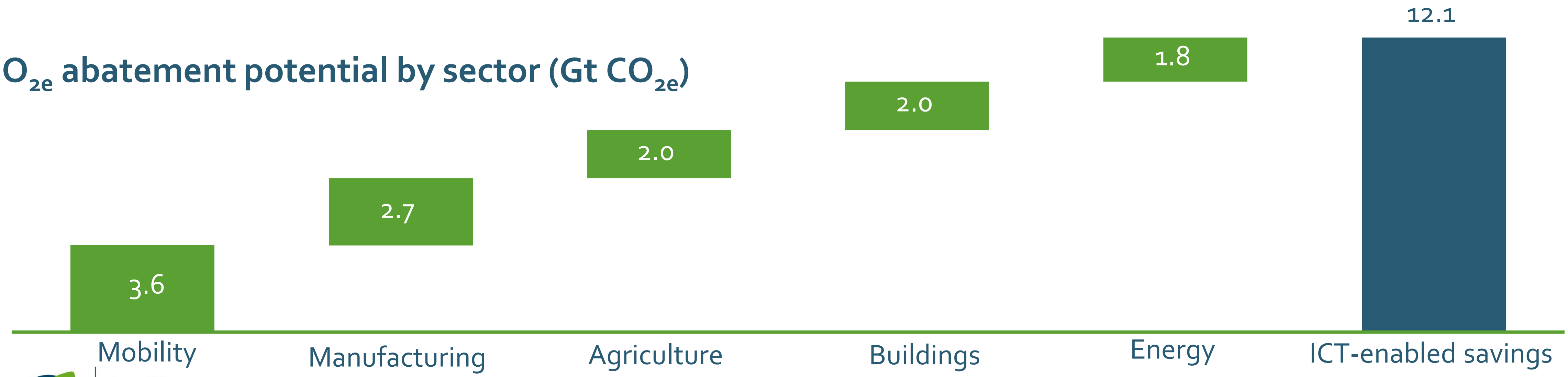
Increasing the efficiency of ICT…

- The GeSI report SMART2020 (2008) estimated that the ICT sector's emissions would reach 1.43Gt CO2e by 2020, or 2.7% of global emissions;
- The SMARTer2020 report (2012) revised that forecast down to 1.27Gt, or 2.3% of global emissions;
- The SMARTer2030 released in 2015 predicts a **further decrease**, with **ICT's own footprint** expected to reach **1.25Gt CO2e in 2030**, or **1.97%** of global emissions
- The decrease in the ICT sector's footprint is due to a range of investments by companies in the sector to reduce their emissions, and to the expected improvements in the efficiency of ICT devices

…and through ICT

At the same time, the SMARTer2030 shows that the **12Gt CO2e avoided through the use of ICT** is nearly **10 times higher than ICT's expected footprint** in 2030

CO_{2e} abatement potential by sector (Gt CO_{2e})



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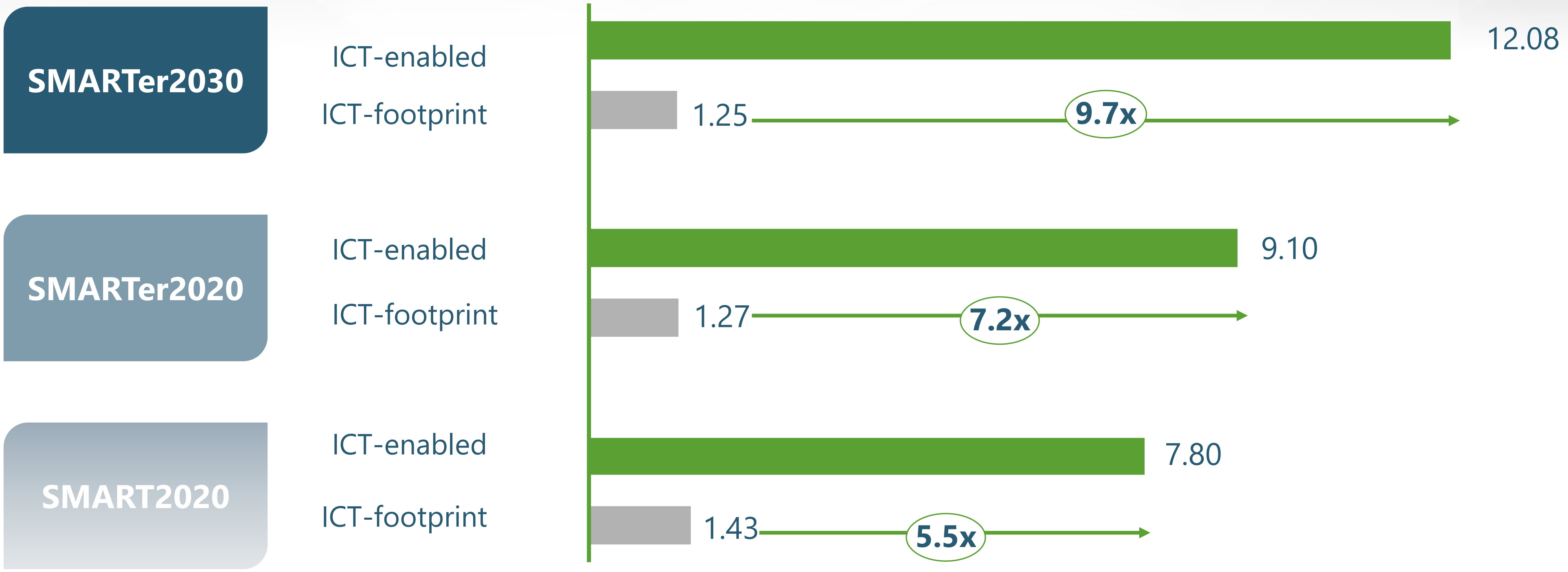
Source: WRI, IPCC, GeSI, SMARTer2020, Accenture analysis & CO2 models

ICT benefits factor trends (Gt CO_2e)



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Source: WRI, IPCC, GeSI, SMARTer2020, Accenture analysis & CO2 models

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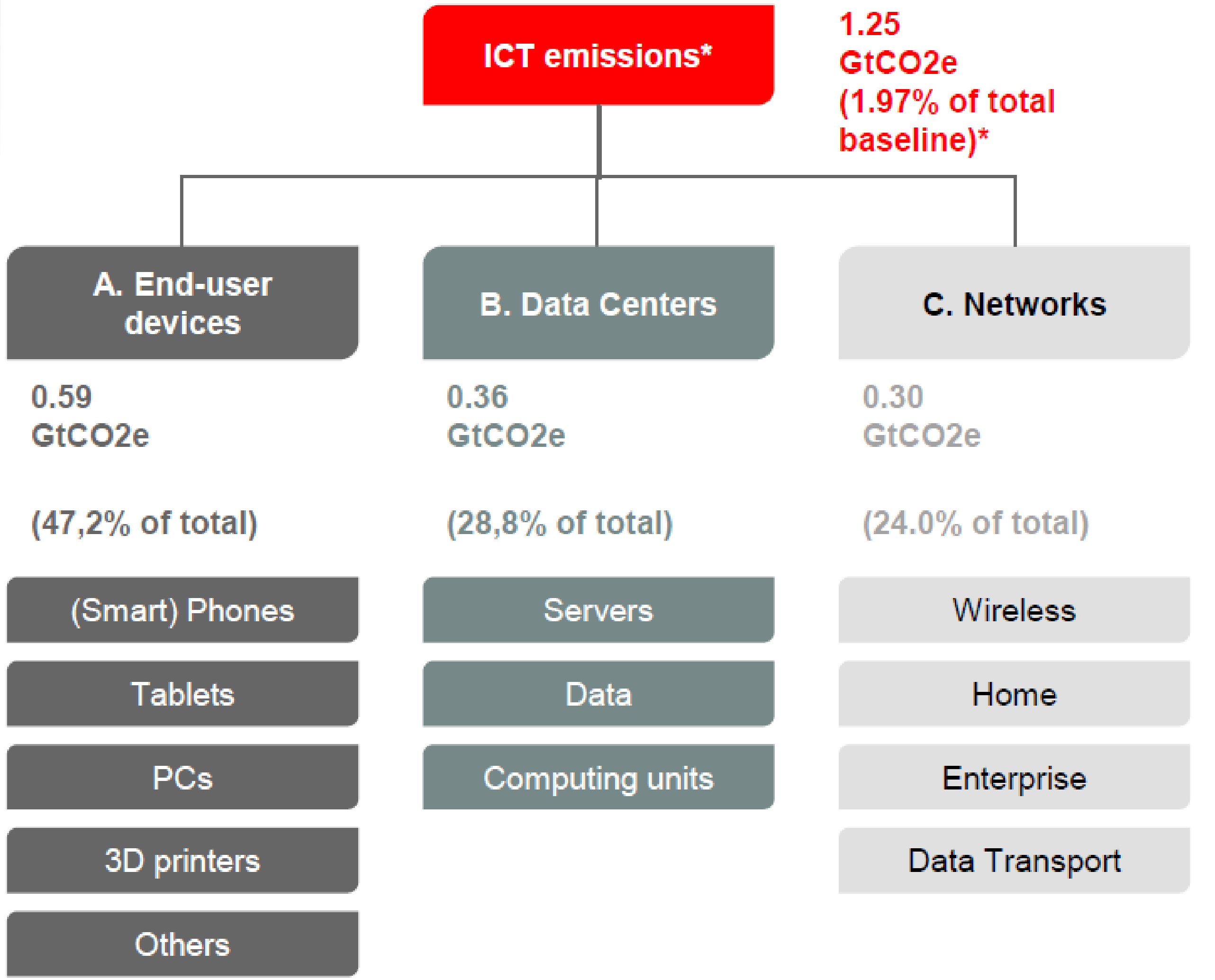
ICT emissions – State of play



*SMARTer2030 analysis includes, where feasible, Scope 1 (direct), Scope 2 (indirect from energy consumption), and Scope 3 (all others related) emissions. The baseline was fixed at 63.5 GtCO2e)

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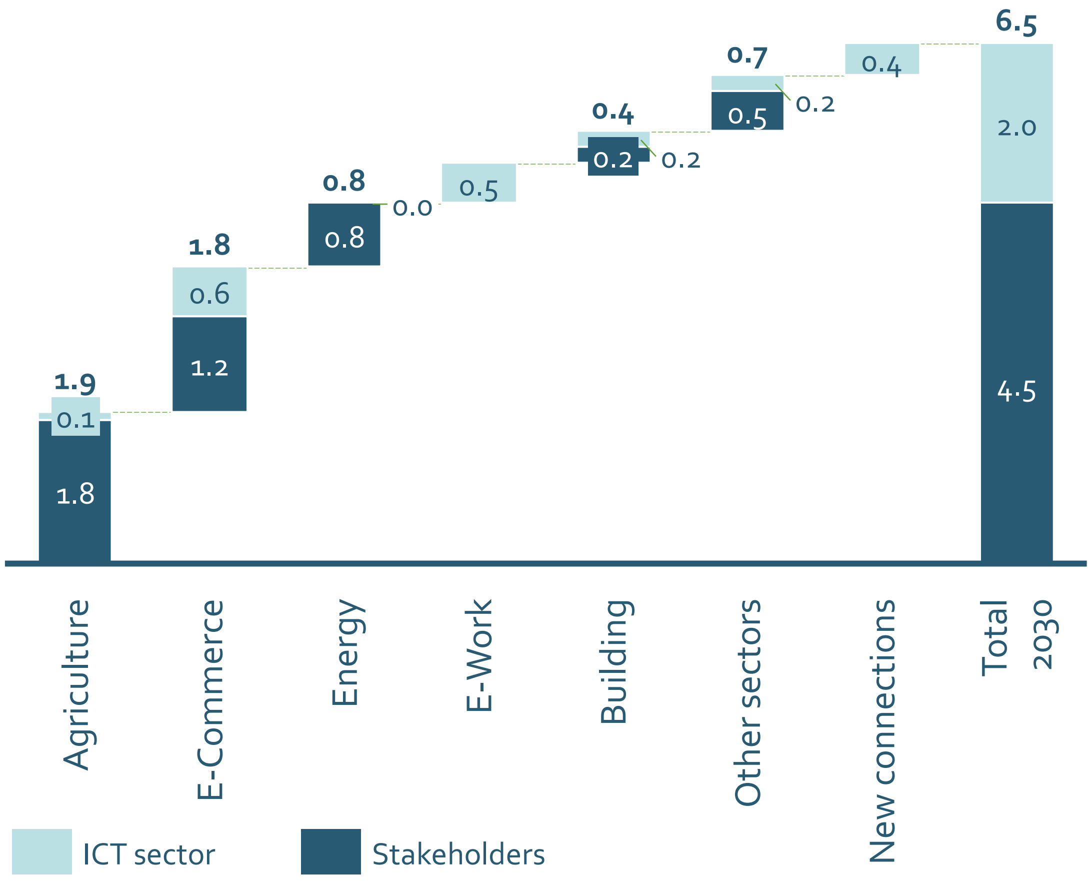
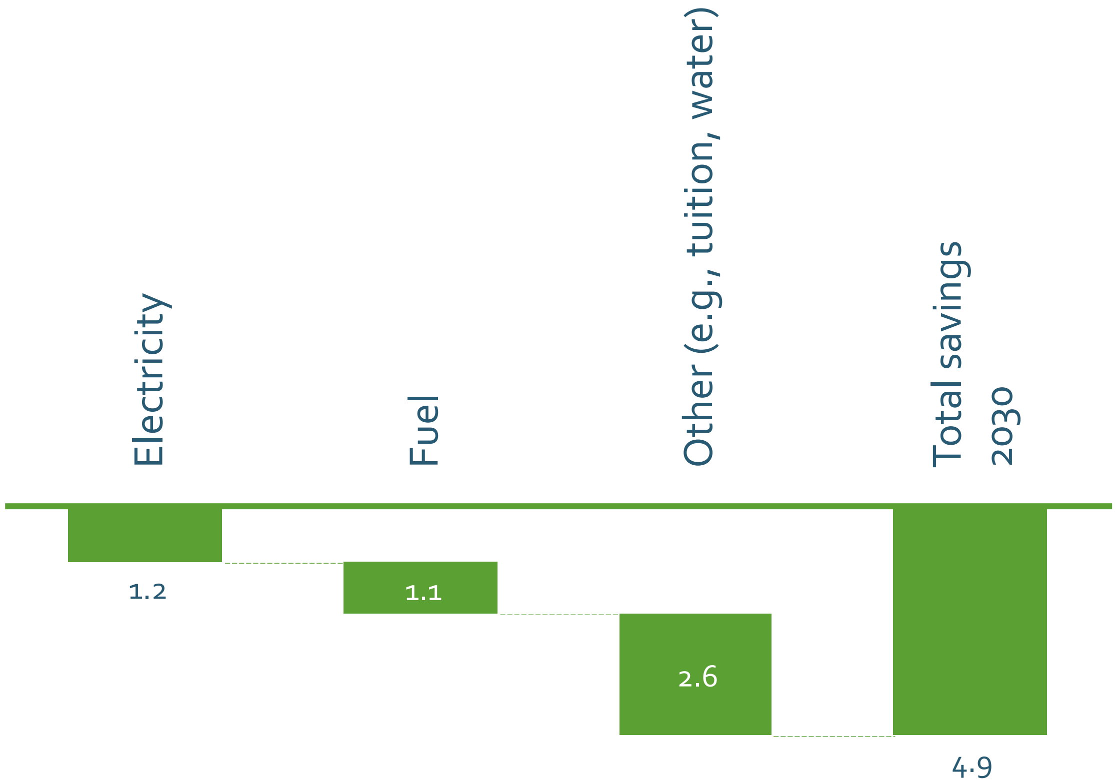
ICT-enabled revenues and cost savings (USD trillion)

ICT could deliver over $6 trillion in revenues…



…and close to $5 trillion in savings



Source: WRI, IPCC, Gartner, FAO, GeSI, Accenture analysis & CO2 models

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The enabling potential of ICT for the energy sector

- ICT is a crucial component in the energy sector's transition from a production-centric to a service-oriented approach, and in the development and roll-out of smart grids
- A comprehensive smart grid roll-out could deliver:
  - 6.3 billion MWh of energy savings, i.e. a 20% reduction, as a result of better demand management and integration of renewables
  - A 5% reduction of energy losses
  - 700,000 km worth of saved grid
  - $810 billion of additional revenues for renewable energy companies
  - Universal access to energy

ICT Tools

Convergence of IT/OT
Integration of Operations Technology (OT) – enterprise technology used to monitor and control physical devices, assets and processes – and Information Technology (IT)

Distribution management system
Two-way flow of information, component management and sensor technologies

Demand response technologies (B2B, B2C)
Technologies using real-time information to better match supply and demand (load management); incentives to shift demand

Advanced analytics
Modelling support, real-time system analytics, forecasting, predicting and contingency analysis

Energy storage technology
Help to manage power supply

Impacts

Improved load management
Real-time demand response technologies flattens out demand curve, decreases system load by better supply & demand matching

Enablement of renewables
Improved load management allows better integration of variable and distributed energy (e.g. in microgrids).

Grid efficiency
Improved load management and remote optimization of assets/ operations through grid monitoring result in **lower efficiency losses** during transmission, storage and/or distribution.

Resilient energy infrastructure
Improved management of power supply and peak loads through energy storage creates a more resilient grid.

Source: WRI, IPCC, GeSI, SMARTer2020, Accenture analysis & CO2 models

The future outlook

- The roll-out of 5G is expected to increase energy demand from the digital sector, party based on historical assumptions that energy consumption increases directly with the increase in data traffic
- However, research carried out in 2016 (data points 2010 to 2015) shows that, in Europe, **data traffic growth is becoming decoupled from energy consumption**
  - In the timeframe considered, the electricity consumption of the ICT networks grew by 31%, from a level of 185 TWh or 0.97% of the total electricity grid supply. During the same period, the operational carbon emissions grew by 17%
  - The number of fixed and mobile subscriptions rose from 6.7 bn to 9.0 bn during the same period
  - The average annual operational electricity consumption has slightly decreased from 27.6 kWh to 27 kWh per subscription
  - Operational carbon emissions per user have decreased from 21,5 kg CO_2e to 19 kg CO_2e per year (this corresponds to driving about 100 km on the highway, including fuel supply chain emissions)
- Seen in the light of earlier estimates this study shows a result which is **24% lower** than the operational carbon emissions per user in 2020, as estimated by the SMARTer2020 report

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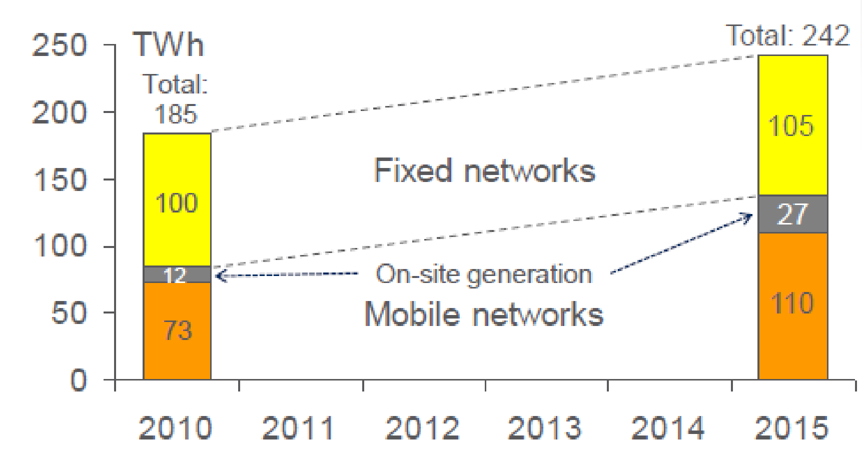
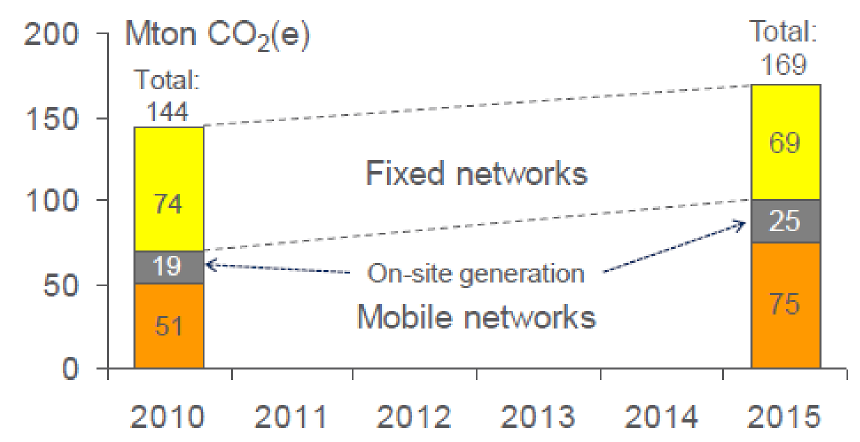
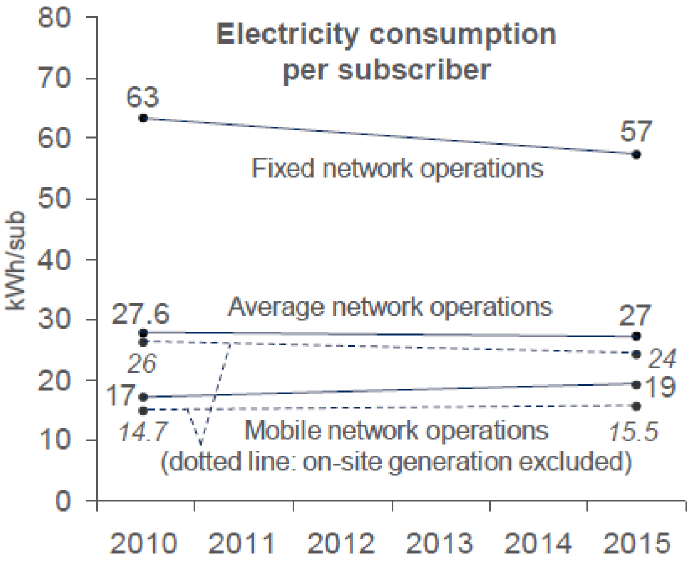
The decoupling of data traffic from consumption and emissions at a glance (1/2)

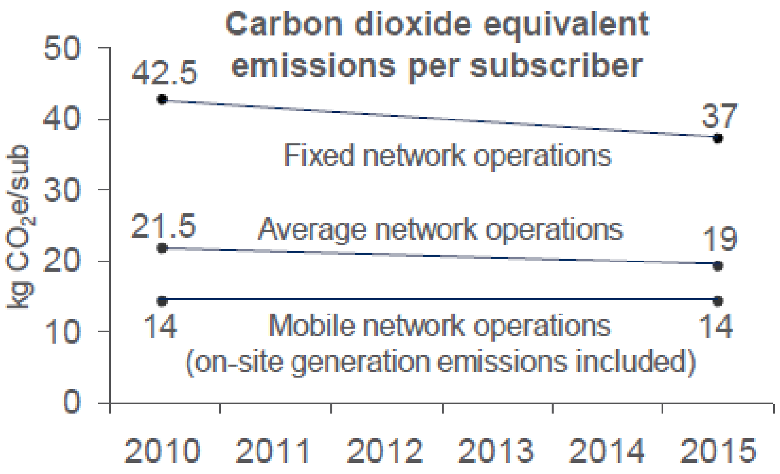




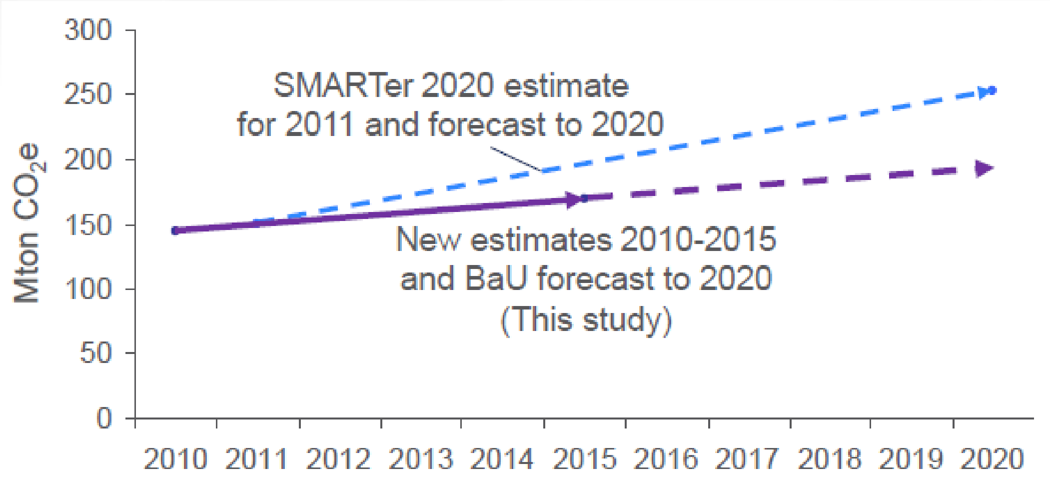
Absolute electricity consumption (above) and per subscriber (below)

Absolute carbon emissions (above) and per subscriber (below)





The decoupling of data traffic from consumption and emissions at a glance (2/2)



Seen in the light of earlier estimates, the expected emissions increase is **24% lower** than the operational carbon emissions per user in 2020, as estimated by the SMARTer2020 report

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