#SMARTer2030

ICT Solutions for 21st Century Challenges

GeSI
GLOBAL e-SUSTAINABILITY INITIATIVE

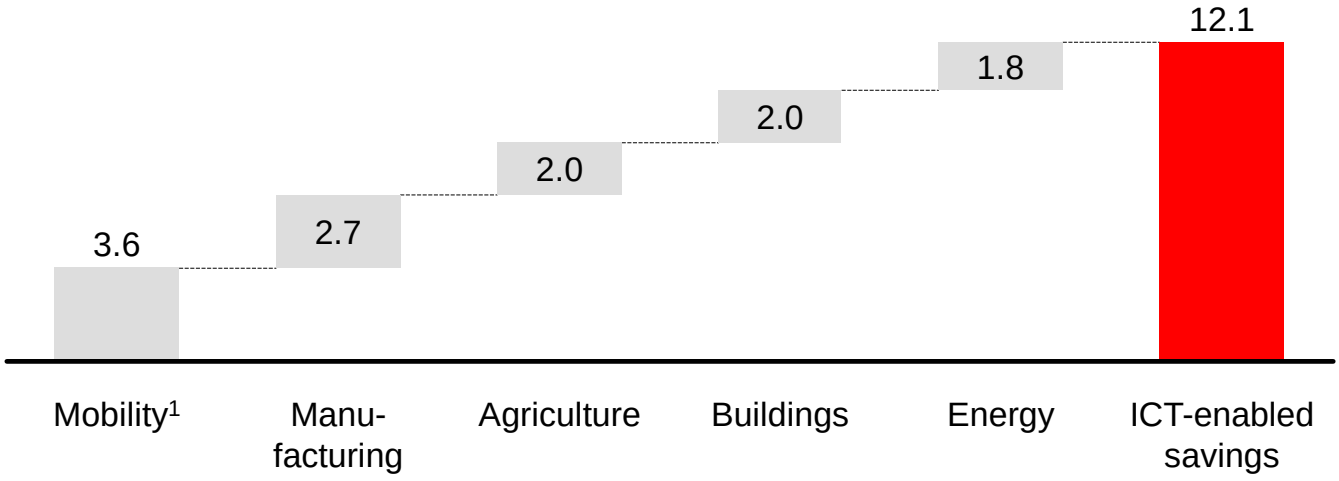
accenturestrategy

2.2 Environment – Decreasing emissions and resource consumption whilst allowing for growth

Global abatement potential

We have found that by rolling out identified ICT solutions across the global economy, the world could cut its global emissions by 12Gt CO_{2e} by 2030 and promote sustainable economic growth. Figure 5 illustrates the contribution to global emissions mitigation of the main sectors we have examined.

Figure 1: Environment - CO_{2e} abatement potential by sector (2030)



1 Mobility solutions consider ICT-enabled improvements to private and commercial mobility and additionally consider the reduced need to travel from various sectors, including health, learning, commerce, etc.

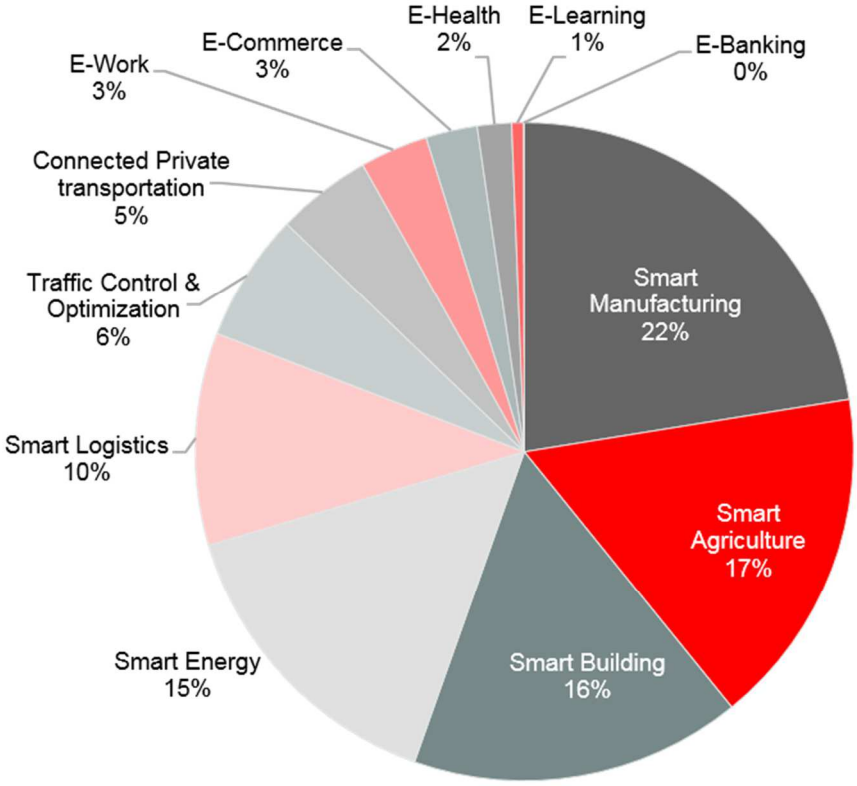
Source: WRI, IPCC, World Bank, GeSI, Accenture analysis & CO2 models

In the IPCC's projected 'business as usual' scenario, global emissions are set to grow by 11.1Gt CO_{2e} between now and 2030 (from 52.4Gt CO_{2e} in 2015 to 63.5Gt CO_{2e} in 2030). We wanted to *inject* ICT solutions into this scenario to find out what ICT-enabled savings *alone* could contribute to *total* emissions savings before adding the potential savings the IPCC had included in its scenario. We find that the ICT-enabled emissions reductions we have identified in this report are mostly not considered in the business as usual scenario. Only 1.8Gt CO_{2e} from integrating renewables into the grid are already considered in the IPCC's business as usual forecast for 2030. After removing 1.8Gt CO_{2e} we find that ICT-enabled emissions savings could reduce the IPCC's business as usual forecast by 10.3Gt CO_{2e}. *ICT-enabled solutions are therefore able to hold global emissions at 2015 levels.*

Abatement potential per use case and sector

This report has analyzed the overall abatement potential of ICT by examining its impact across twelve ICT *use cases* which can be summarized into eight sectors. Figure 6 shows the abatement potential for each of these twelve use cases.

Figure 2: Environment - CO_{2e} abatement potential by use case (2030)



As shown, our analysis finds that ICT is likely to have the biggest impact through Smart Manufacturing, Smart Agriculture, Smart Buildings and Smart Energy technology. By combining Smart Logistics, *traffic control & optimization* and connected private transportation, mobility becomes the largest area of potential impact. As the major impact from e-services is also mobility-related we have added this to mobility as well. The sector by sector chapters later in this report provide further details.

ICT solutions can help cut 9.7 times more CO_{2e} than they emit

Our analysis shows that ICT realizes a benefit 9.7 times higher than its own CO_{2e} emissions and decreases its own footprint over time to 1.97% by 2030 compared to 2.3% of global emissions expected in our last report for 2020.

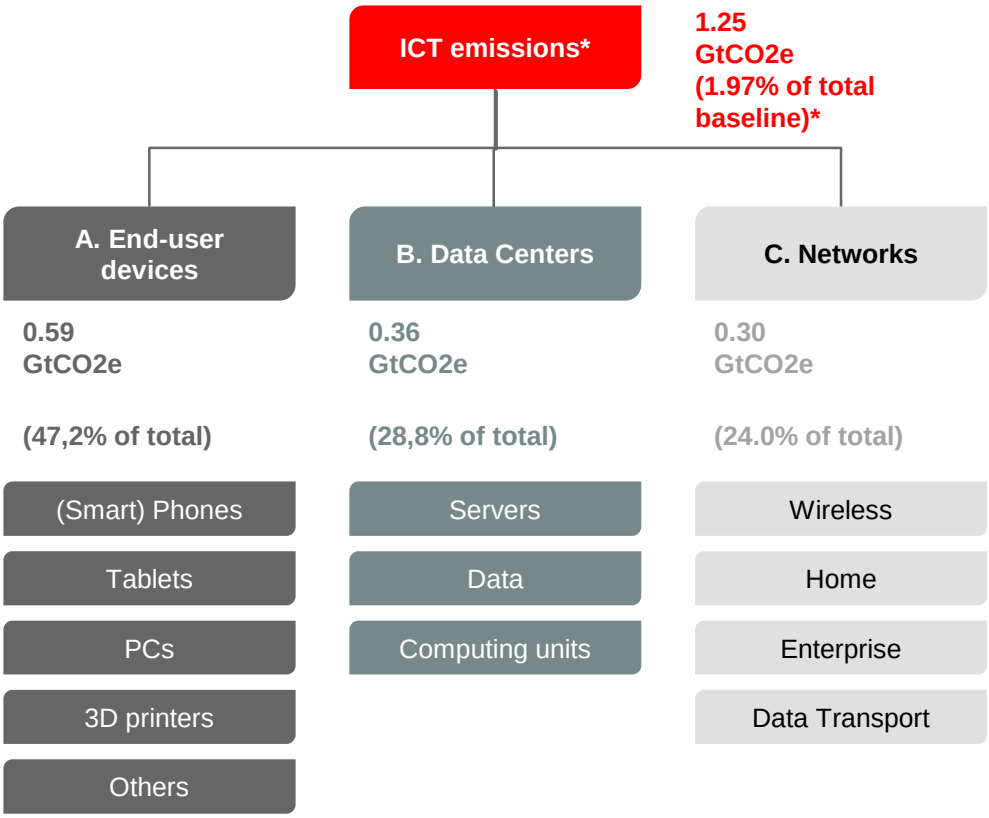
SMART2020, published in 2008, estimated the ICT sector footprint to reach 1.43Gt CO_{2e} by 2020, equal to 2.7% of expected global emissions. Only five years later, SMARTer2020, revisited this estimate and decreased the forecast to 1.27Gt CO_{2e} by 2020, equal to 2.3% of global emissions. These revised estimates were based on actual energy efficiencies realized between 2008 and 2012 and based on updated data for 2020. In our latest report, SMARTer2030, we estimate that the sectors' emissions could be even lower, reaching 1.25Gt CO_{2e} in 2030 or 1.97% of global emissions. Our estimate considers actual trends towards greater energy efficiency but also the existing commitments of leading operators to increase energy efficiency. Other studies consider various scenarios, including scenarios with significantly higher energy demand from ICT[1].

A rapid increase in the adoption of devices like tablets and smartphones, as well as services like cloud computing, broadband networks and data centers, will result in additional emissions from ICT. Holding down the ICT-sector's *own* emissions as the number of devices increases is important and can be helped by, for example, switching from large hardware like PCs and printers to smaller and more efficient devices like tablets and smartphones and by bearing down on emissions from data centers. The switch to smaller

[1]Andrae ASG, Edler T. On Global Electricity Usage of Communication Technology: Trends to 2030. Challenges. 2015; 6(1):117-157. URL: http://www.mdpi.com/2078-1547/6/1/117

and more energy efficient end-user devices is particularly important, as nearly half the sector's emissions, in the scope of this analysis, comes from "end-user-devices", rather than from networks or data centers (see figure below).

Figure 3: Environment - ICT emissions footprint (2030)

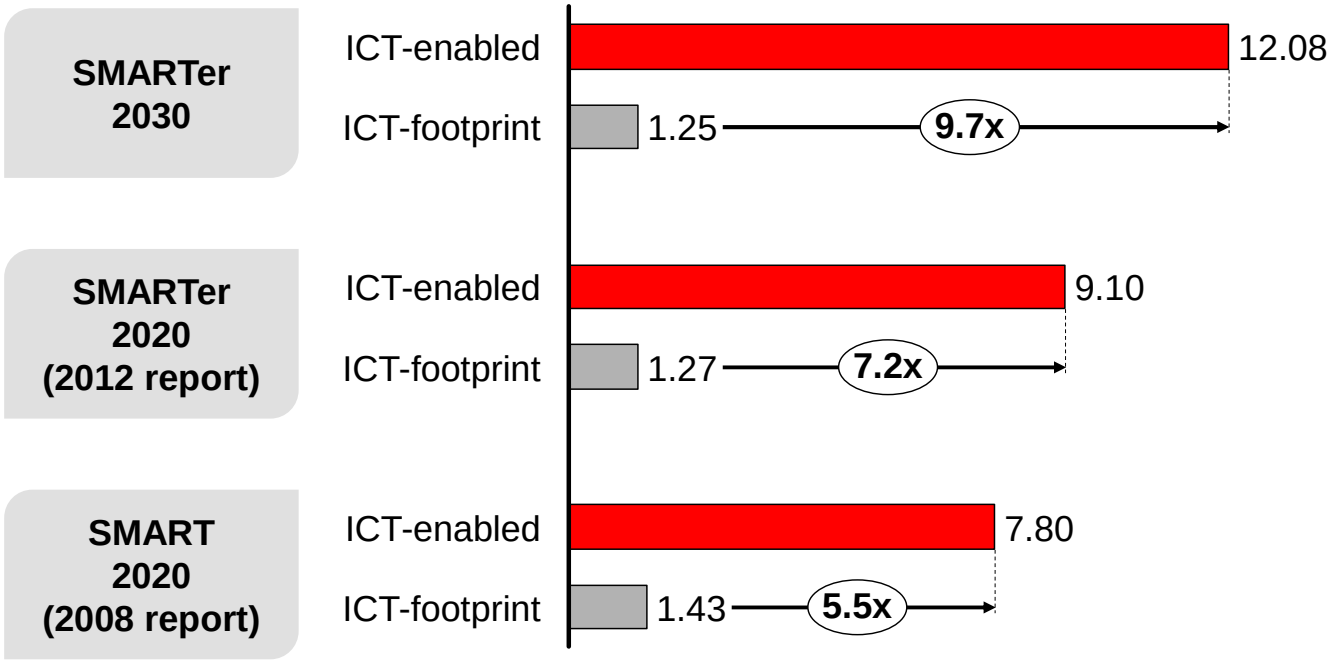


*Accenture has included, where feasible, scope 1 (direct), scope 2 (indirect from consumption of energy), and scope 3 emissions (all others related). Baseline fixed at 63.5 GtCO2eq

Comparing ICT's own footprint of 1.25Gt CO_{2e} in 2030 with the 12Gt CO_{2e} of emissions *avoided* through the use of ICT solutions demonstrates that ICT delivers a benefit 9.7 times *higher.* In other words, for each ton of CO_{2e} used to power ICT, users can on average realize almost 10 tons of CO_{2e} savings in 2030. In our previous report, SMARTer2020, we found that ICT could cut CO_{2e} by 9.1Gt in 2020 and create an enablement factor of 7.2. Our first report, SMART2020, published in 2008, had estimated the enablement factor of ICT at 5.5 times ICT's own footprint (see Figure 8).

Our preliminary analysis of ICT's *enablement factor* in 2015 leads us to conclude that the ICT sector currently abates roughly 1.5 times that of its own emissions.

Figure 4: Environment - ICT enablement factor (2030)

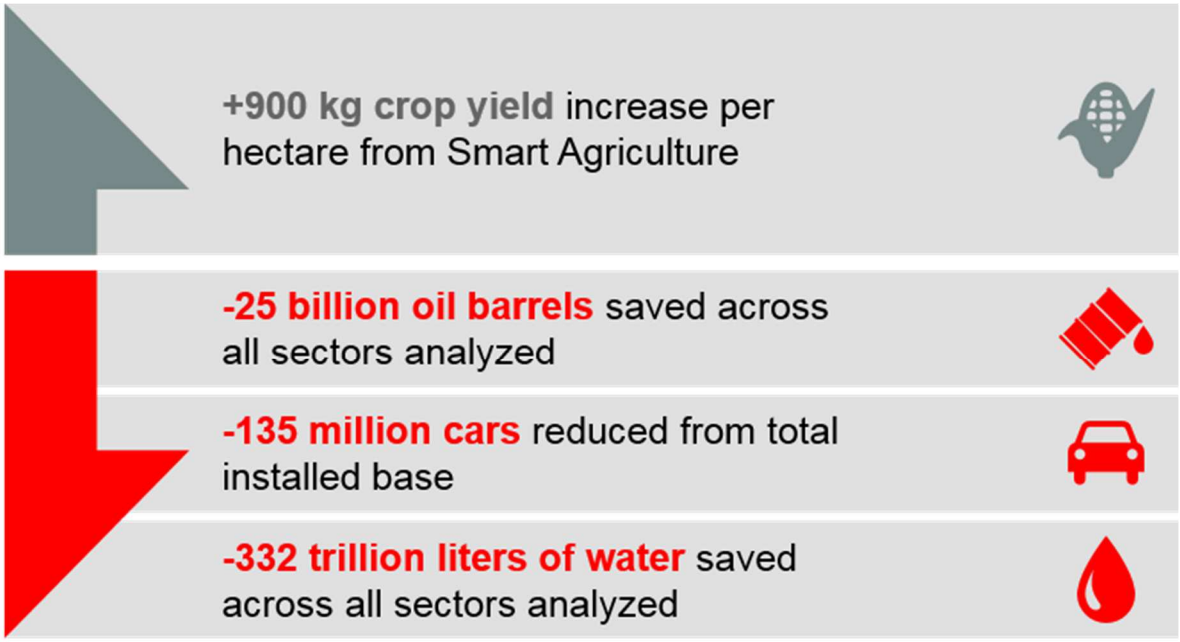


Source: Source: WRI, IPCC, GeSI, SMARTer2020, Accenture analysis & CO2 models

ICT enables increased resource efficiency

ICT also offers environmental benefits beyond carbon mitigation, helping to reduce the consumption of scarce resources and increasing resource efficiency. We find the most substantial additional environmental benefits could come from agriculture, where crop yields could increase by 900kg per hectare; in energy, where 25 billion barrels of oil could be saved across all the sectors we analyze; and in transport, where 135 million cars could be taken off roads. We also find that ICT could save over 300 trillion liters of water, across the eight sectors as a whole.

Figure 5: Environment - Environmental benefits of ICT beyond CO_{2e} (2030)



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

Solutions to electronic waste

One of the by-products of increased ICT adoption, of course, is electronic waste, so the industry, along with municipal and national governments, needs to develop solutions to encourage the reuse, resale, salvage, recycling or, at the very least, safe disposal of used electronics. In developing countries especially, the illegal processing of e-waste can cause serious health and environmental problems. But in developed countries too, it can present significant risks to workers and communities. Great care must be taken to avoid unsafe exposure in recycling operations and the leaking of materials such as heavy metals from landfills.

Not only does e-waste form a health risk to people and the environment, it is also a significant waste of increasingly valuable resources. Finding more "circular solutions" like reusing, refurbishing, or recycling e-waste is critical to ensuring the reliable and affordable sourcing of materials and to reducing supply chain volatility. Encouragingly, what some call *circular business models* are flourishing, enabled in many cases by ICT. We profile some of these below.

Case examples of ICT solutions with environmental benefits

Connected Car – Solutions for Sustainability

Improving the efficiency of traffic, mobility and private transportation is one of the main ways in which major issues such as CO_2 emissions and air pollution can be reduced. Deutsche Telekom developed a Connected Car Solutions Suite for Original Equipment Manufacturers (OEMs) that can enable people to drive their cars more efficiently and sustainably. Your 'Connected Car' can combine a range of smart driving solutions including: Eco-drive, a coaching system for optimizing driver behavior; Car2x, a real-time guiding system to anticipate the traffic environment; E-Call, an automatic emergency contact system; and Live Traffic, a real-time information system on traffic jams and alternative routes.

These Connected Car solutions provide significant sustainability benefits, not only environmental, but also social and economic. For drivers it can reduce annual CO_2 emissions by 15.9% per car, save €237 per year from reduced fuel consumption and 23 hours per year through reduced time in traffic. For the automotive industry, Connected Car solutions helps OEMs contribute to CO2 emissions reduction targets and helps improve reputation as well as market position and sales. In terms of societal benefits, 16% of all domestic traffic-related CO_2 emissions could be avoided, equal to 2% of all domestic CO_2 emissions. Furthermore, reduced congestion and traffic jams through ICT-enabled safer and smarter driving would reduce asthma-related sickness days and as well as road accidents.

HydroPoint – Shutting down water waste through the Internet of Things

HydroPoint is a leading 360° smart water management solution targeting the area of greatest waste in urban water use: landscape irrigation. Garden or landscape irrigation in homes and commercial buildings is most often still irrigated manually or by controlled timers, without much regard for how much water is actually needed at that point in time. HydroPoint developed WeatherTRAK, a system that uses a machine-to-machine solution connecting the irrigation controller and sensors to a cloud-based platform for analyzing climate and determining water needs. Each site is individually monitored and controlled to determine the exact amount of water needed at that patch of the garden or landscape at that point in time.

By providing the wireless network, customized network access and a self-service management platform, AT&T supported HydroPoint in reducing water waste and saving money for all HydroPoint subscribers. As a result of using this ICT-enabled water management solution HydroPoint customers were able to save more than 15 billion gallons of water, hundreds of thousands of man hours, 62 million kWh of energy and achieve $137 million in cost savings in 2014 alone.





Gold Sponsors

- BT
- Deutsche Telekom
- Fujitsu
- Microsoft
- Verizon


Silver Sponsors

- AT&T
- Samsung


Bronze Sponsors

- Swisscom
- Telenor

Major conclusions independently reviewed by

- John A. “Skip” Laitner, Economic and Human Dimensions Research Associates, and President, the Association for Environmental Studies and Sciences
- Mike Berners-Lee, Director, Small World Consulting

Acknowledgements: The Global e-Sustainability Initiative and Accenture Strategy thank the many experts engaged throughout the duration of this effort for generously providing their time, insights, and feedback to strengthen the quality of this report. A full list of SMARTer2030 team members is listed in the appendix.

Contact information
Global e-Sustainability Initiative (GeSI)
c/o Scotland House
Rond Point Schuman 6
B-1040 Brussels
Belgium

Tel: +32 2 282 84 42
Fax: +32 2 282 84 14

General enquiries: info@gesi.org
Press enquiries: press@gesi.org

About GeSI

The Global e-Sustainability Initiative (GeSI) is a strategic partnership of Information and Communication Technology (ICT) companies and organizations committed to creating and promoting technologies and practices to foster economic, environmental and social sustainability. Formed in 2001, GeSI's vision is a sustainable world through responsible, ICT-enabled transformation. GeSI fosters global and open cooperation, informs the public of its members' activities to improve their sustainability performance, and promotes innovative technologies for sustainable development. GeSI's membership includes over 30 of the world's leading ICT companies; the organization also collaborates with a range of international stakeholders committed to ICT sustainability objectives. These partnerships include the United Nations Environment Program (UNEP), the United Nations Framework Convention on Climate Change (UNFCCC), the International Telecommunications Union (ITU), and the World Business Council for Sustainable Development (WBCSD). Such collaborations help shape GeSI's global vision on evolution of the ICT sector, and how it can best meet the challenges of sustainable development. For more information, see www.gesi.org.

About Accenture

Accenture plc. (,,Accenture'') is a global management consulting, technology services and outsourcing company, with more than 323,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US$30.0 billion for the fiscal year ended August 31, 2014. Its home page is www.accenture.com.

About Accenture Strategy

Accenture Strategy operates at the intersection of business and technology. We bring together our capabilities in business, technology, operations and functional strategy to help our clients envision and execute industry-specific strategies that support enterprise wide transformation. Our focus on issues related to digital disruption, competitiveness, global operating models, talent and leadership help drive both efficiencies and growth. For more information, follow @AccentureStrat or visit www.accenture.com/strategy