accenture strategy

#SMARTer2030 Business Case for KPN and the Netherlands

High performance. Delivered.

KPN has set sustainability targets for its own operations and its enabling impact and operates in a Dutch context with concrete climate targets

KPN's sustainability strategy and the Netherland's context

KPN's sustainability strategy

"We believe ICT is the key to unlocking a better future planet and its people."

kpn

KPN's sustainability agenda

- Environmental, climate neutral operations
- Economic, connected anytime anywhere
- Social, smarter living and working

Select sustainability targets

- Own operations: 25% absolute energy reduction in 2020 compared to 2010
- Enabling impact: In 2020 KPN services enable customers to save as much energy as consumed by KPN

The Netherland's sustainability context

The Netherland's climate targets

At the global Climate meeting in Paris in December 2015, the Netherlands have publicly committed to reduce Greenhouse Gas emissions:

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

- -40% by 2030 (compared to 1990)
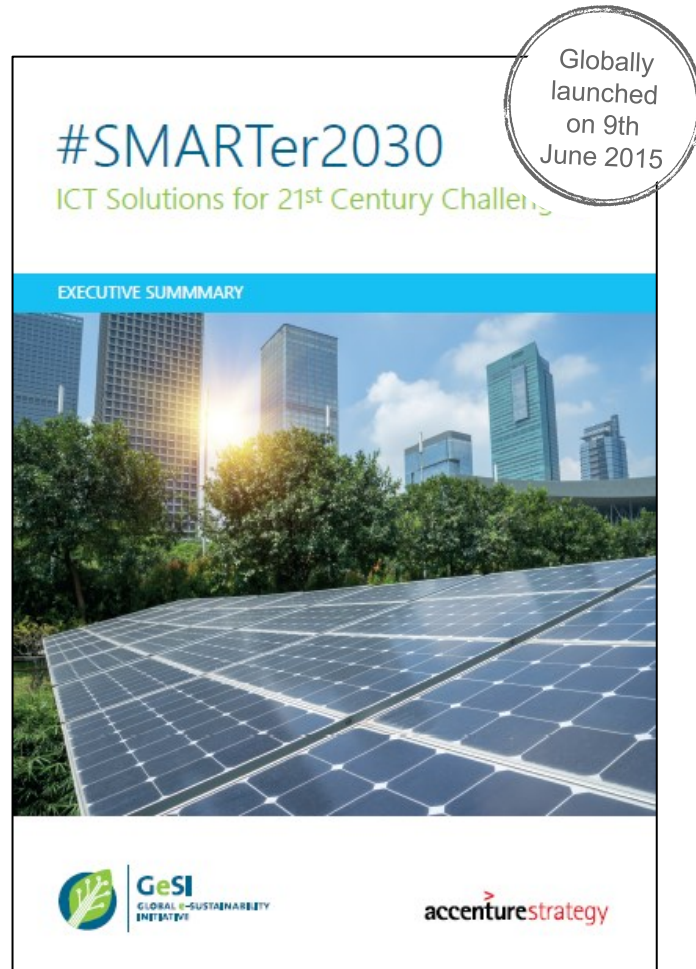- -80% to -95% by 2050 (compared to 1990)

Current emissions (2014) of the Netherlands amount up to ca. 187 Million tons of CO_2e.

Main sustainability issues in the Netherlands

- Climate change mitigation
- Sustainable mobility
- Renewable energy and energy conservation
- Agriculture productivity
- Energy performance of buildings

The global #SMARTer2030 study shows that ICT can decrease CO_2 emissions, stimulate the economy and deliver benefits to society

#SMARTer2030 main findings[1]

Globally launched on 9th June 2015

#SMARTer2030
ICT Solutions for 21st Century Challenges

EXECUTIVE SUMMMARY

GeSI
GLOBAL e-SUSTAINABILITY INITIATIVE

accenturestrategy

Environmental benefits

- ICT has the potential to maintain global CO_2e emissions at 2015 levels, with business as usual
- At the same time, ICT can reduce the consumption of scarce resources, e.g. -25 bn. barrels of oil

Economic benefits

ICT is good for growth and efficiency, enabling over US$ 11 trillion in business value from sustainability

- $6.5 trillion in new revenues in 2030 (of this, $2.0 trillion for the ICT sector)
- $4.9 trillion in cost savings

Social benefits

ICT could connect 2.5bn previously unconnected people to ICT services by 2030, enabling a total of

- 1.6 billion people connected to e-health
- 0.5 billion e-learning participants

[1] For additional information on global #SMARTer2030 results, pls refer to appendix 3
Source: GeSI / Accenture Strategy #SMARTer2030 study

#SMARTer2030 use cases demonstrate the positive role of ICT and create quantitative evidence for the company-specific analysis

Twelve #SMARTer2030 use cases

Twelve #SMARTer2030 ICT use cases

✓ **Quantified sustainability benefits**

🚗 Connected Private Transportation	👨‍🌾 Smart Agriculture
🏛 E-Banking	🏢 Smart Building
📱 E-Commerce	🗼 Smart Energy
🧑‍⚕️ E-Health	🚚 Smart Logistics
🖥 E-Learning	🔧 Smart Manufacturing
🧑‍💼 E-Work	🚦 Traffic Control & Optimization

ICT use case = innovative application of ICT that can deliver substantial sustainability benefit(s) compared to traditional approaches

Metrics for company-specific analysis

#SMARTer2030 use-case sustainability benefits demonstrate ICT's positive role and are provided with quantitative metrics.

The company-specific analysis includes:

🌐 Environmental benefits as Greenhouse Gas emissions savings, Fuel, Energy, Barrels of Oil and Water savings, Yield increases

📊 Economic benefits as ICT revenues, stakeholder revenues and cost savings

👪 Social benefits as the number of E-Health beneficiaries and E-Learning degrees

[1] Technologies are included in use cases definitions, e.g. Big Data Analytics, Cloud, M2M / Internet of Things, Smartphone-enabled Mobile Access, Social Media, pls refer to appendix 1 for use-case specific technologies and applications
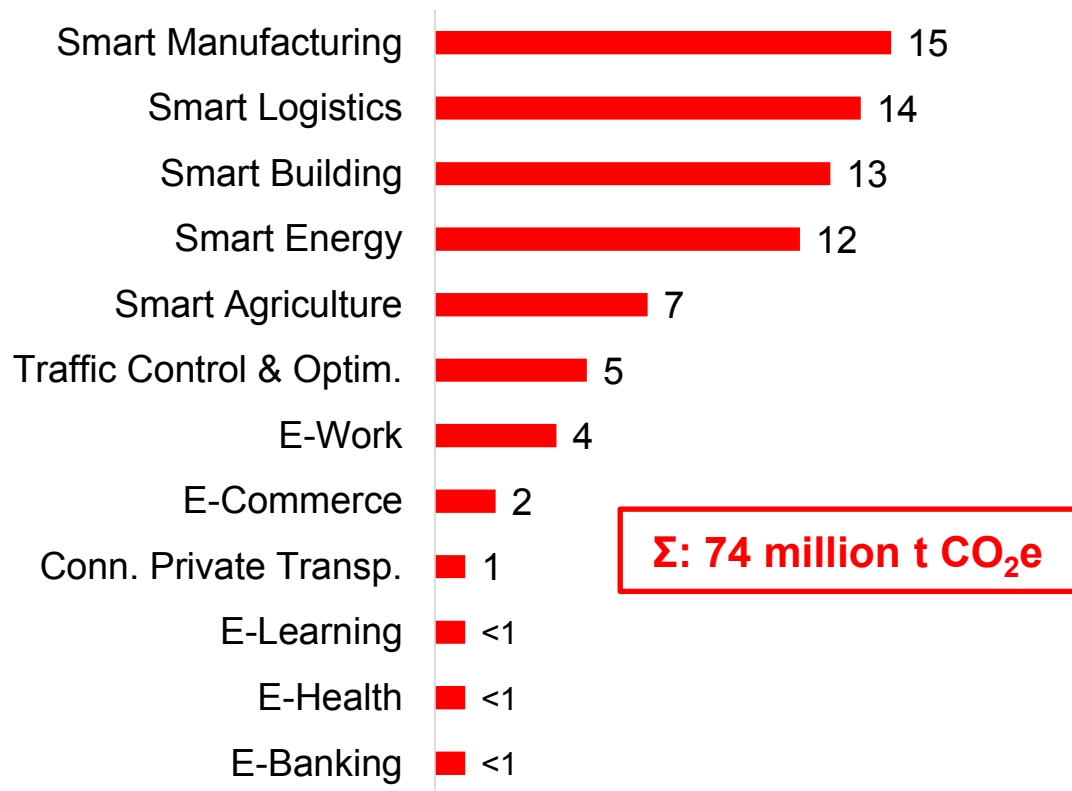Source: Accenture Strategy; GeSI

In the Netherlands, ICT can enable a reduction of Greenhouse Gas Emissions of ca. 74 million tons of CO_2e[1] in 2030

Greenhouse Gas emissions savings in the Netherlands in 2030

#SMARTer2030 use cases – GHG emissions savings in million t CO_2e in 2030

Use case	Savings
Smart Manufacturing	15
Smart Logistics	14
Smart Building	13
Smart Energy	12
Smart Agriculture	7
Traffic Control & Optim.	5
E-Work	4
E-Commerce	2
Conn. Private Transp.	1
E-Learning	<1
E-Health	<1
E-Banking	<1

Σ: 74 million t CO_2e

ICT solutions with sustainability benefits have a high potential to enable **Greenhouse Gas emissions reduction**, e.g. via the following **levers**:

- **Smart Manufacturing:** Processes automation and engine optimization

- **Smart Logistics**: Reduction in ground, air, maritime and air freight due to more efficient logistics management

- **Smart Building:** Reduction in the energy consumption of households and commercial buildings

- **Smart Energy:** Reduction in energy production due to improved demand management, improved renewable energy integration, more efficient distribution grids

1 CO2e = Carbon Dioxide Equivalents; combines all emitted greenhouse gas (GHG) emissions into one metric
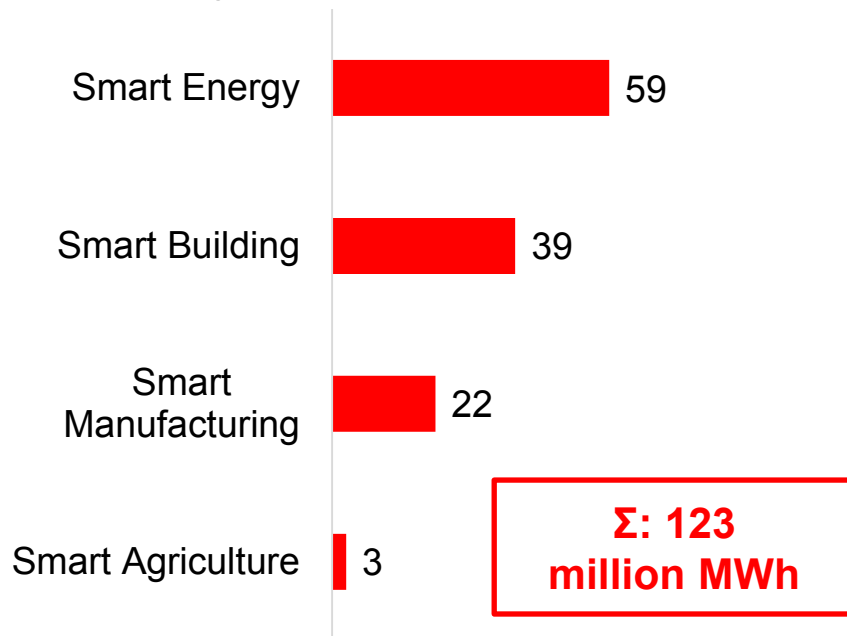Sources: GeSI SMARTer2030; Accenture Analysis

123 million MWh of energy and 5.6 billion liters of fuel can be saved in the Netherlands by 2030

Energy saved in the Netherlands by 2030

#SMARTer2030 use cases – energy savings in million MWh by 2030

Use case	million MWh
Smart Energy	59
Smart Building	39
Smart Manufacturing	22
Smart Agriculture	3

Σ: 123 million MWh

Most important lever for energy savings is reduced energy production, due to more efficient grids and a smarter energy supply/demand management

Fuel saved in the Netherlands by 2030

#SMARTer2030 use cases – fuel savings in billion liters by 2030

Use case	billion liters
Traffic Control & Optim.	1.6
E-Work	1.6
E-Commerce	1.1
Smart Logistics	0.7
Conn. Priv. Transp.	0.6
E-Learning	<0.1
E-Health	<0.1
E-Banking	<0.1
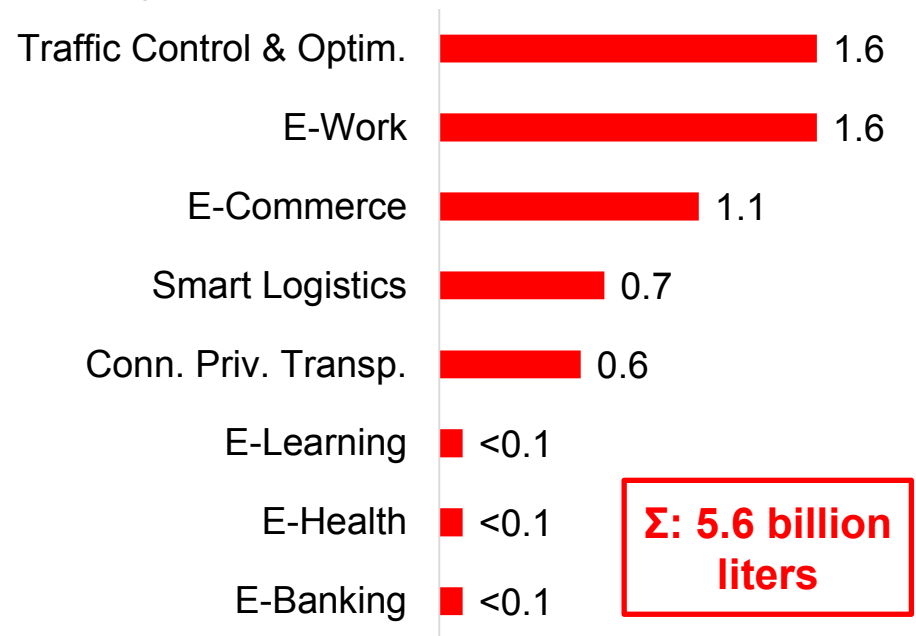
Σ: 5.6 billion liters

Most important levers for fuel saved are reduced private and business transportation, more efficient routes, more efficient vehicles

Sources: GeSI SMARTer2030; Accenture Analysis

Ca. 870 billion liters of water can be saved in 2030 and agricultural yield can increase by ca. 1 ton/hectare

Water savings in the Netherlands in 2030

SMARTer2030 use cases – water savings in billion liters in 2030

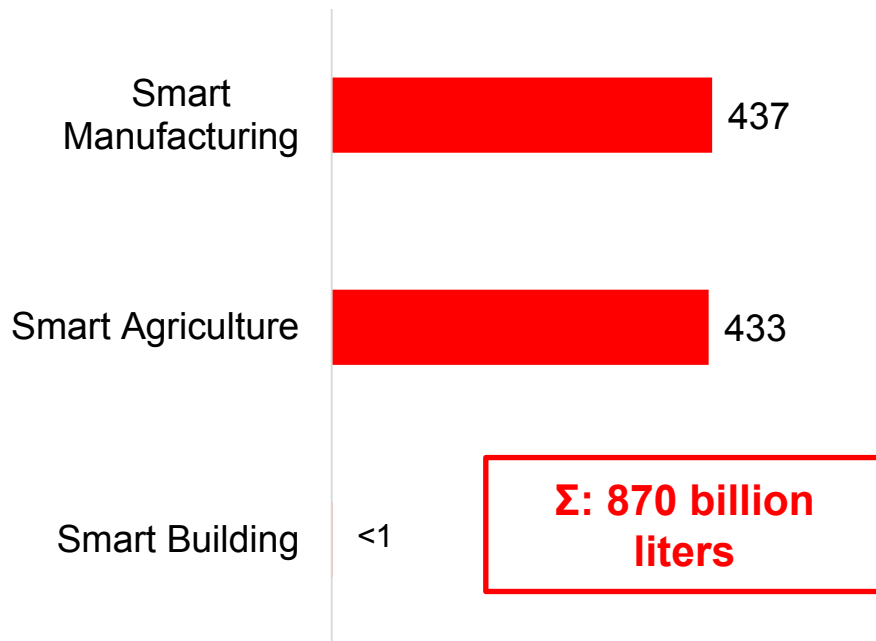|	
Smart Manufacturing	437
Smart Agriculture	433
Smart Building	<1

Σ: 870 billion liters

Yield increase in the Netherlands in 2030

Ca. 1 ton/hectare in additional agricultural yield via Smart Agriculture solutions in 2030, leading to, e.g.,

- Better management of soil conditions

- Improved knowledge of the requirements to help maximize production
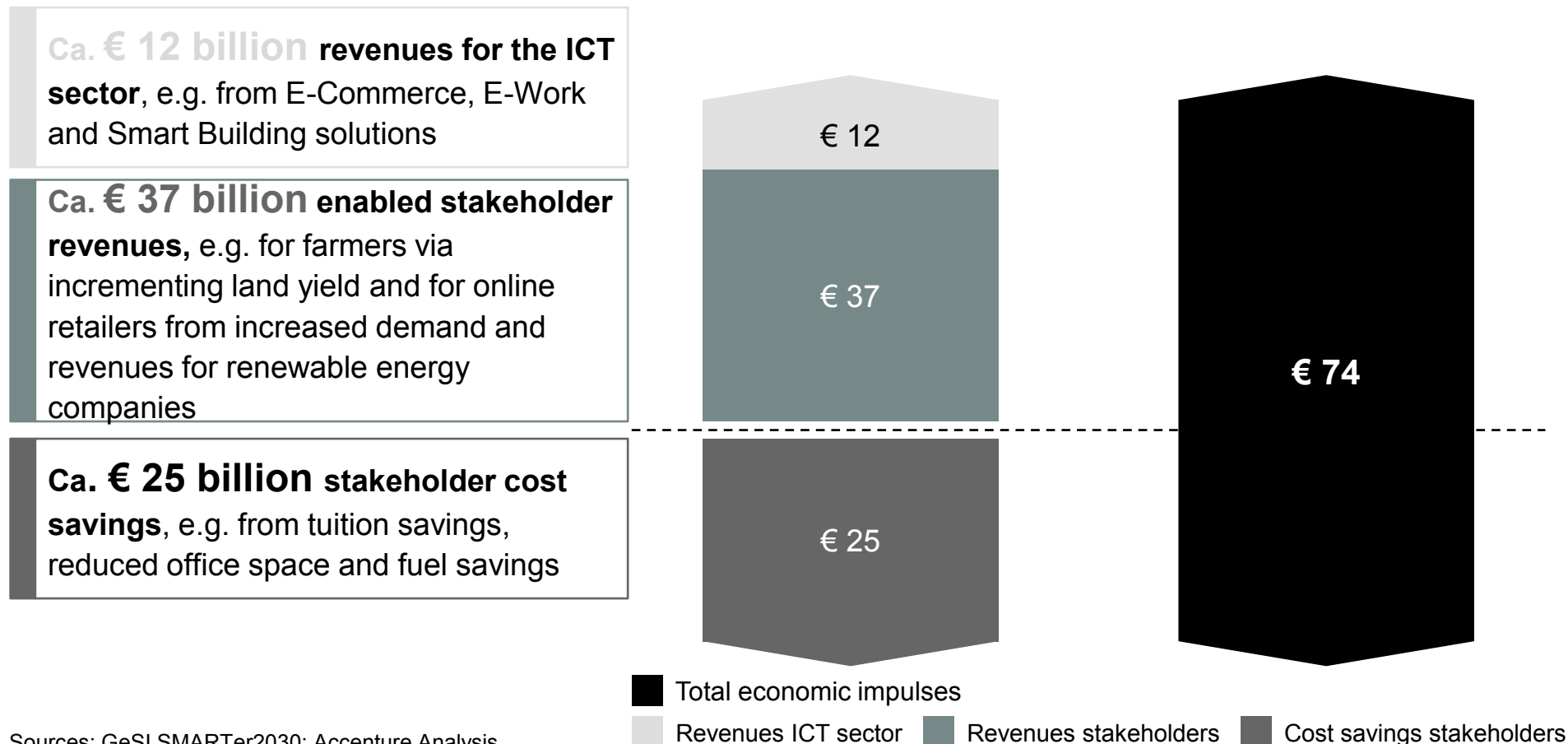
- Better control of pests and diseases

Water savings and yield increase are enabled by increased efficiencies as a result of the applied ICT solutions in 2030

Sources: GeSI SMARTer2030; Accenture Analysis

In the Netherlands, ICT solutions with sustainability benefits can deliver a total of € 74 billion of economic benefits in 2030

Overview economic benefits in the Netherlands in 2030

Economic benefits enabled by ICT solutions with sustainability benefits – in € billion, in 2030

Ca. € 12 billion **revenues for the ICT sector**, e.g. from E-Commerce, E-Work and Smart Building solutions

Ca. € 37 billion **enabled stakeholder revenues,** e.g. for farmers via incrementing land yield and for online retailers from increased demand and revenues for renewable energy companies

Ca. € 25 billion **stakeholder cost savings**, e.g. from tuition savings, reduced office space and fuel savings

€ 12

€ 37

€ 25

€ 74

■ Total economic impulses
■ Revenues ICT sector   ■ Revenues stakeholders   ■ Cost savings stakeholders
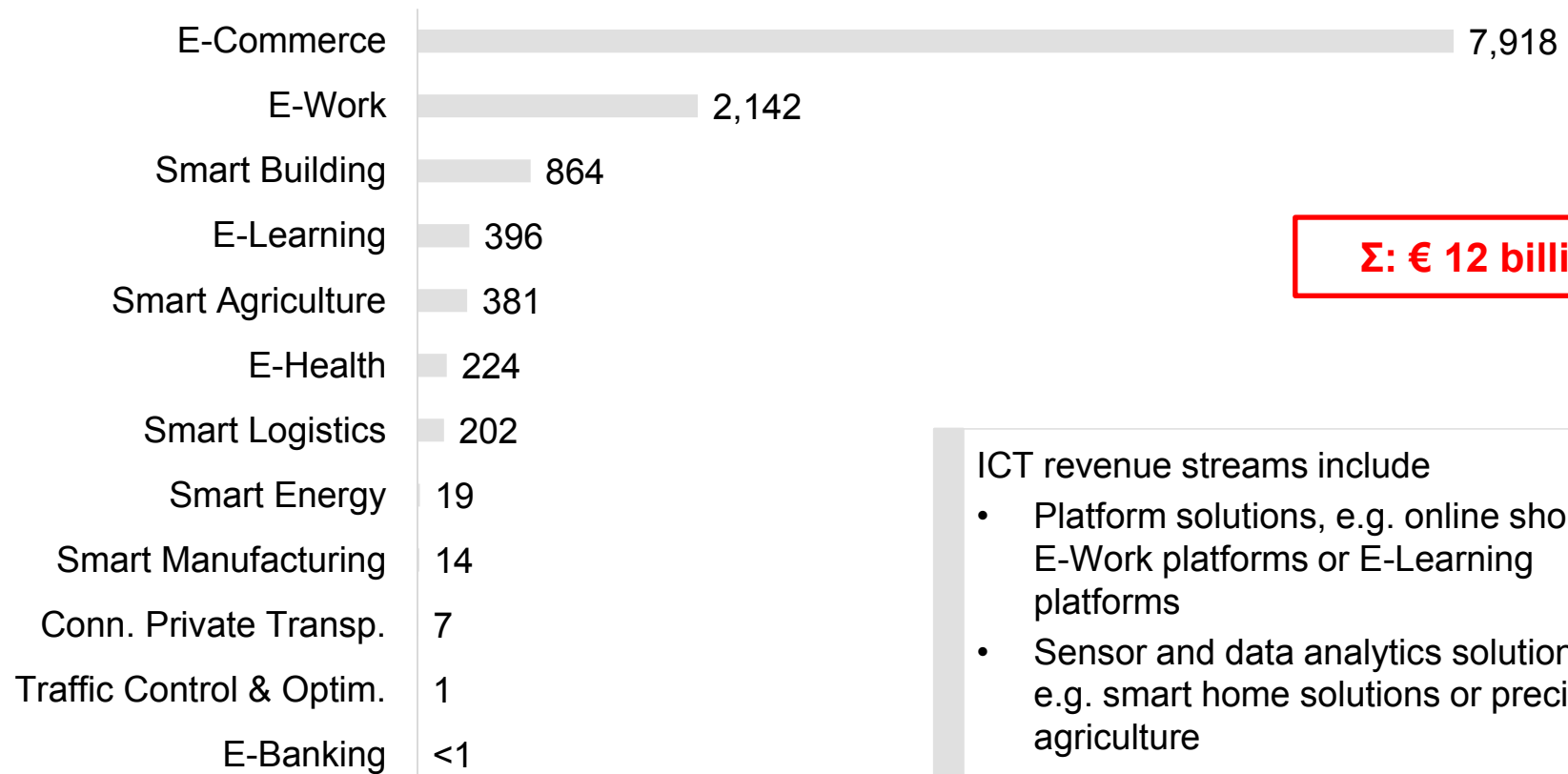
The ICT sector could generate € 12 billion in revenues providing services that deliver sustainability benefits

ICT revenue potential in the Netherlands in 2030

#SMARTer2030 use cases – ICT revenues in € million in 2030

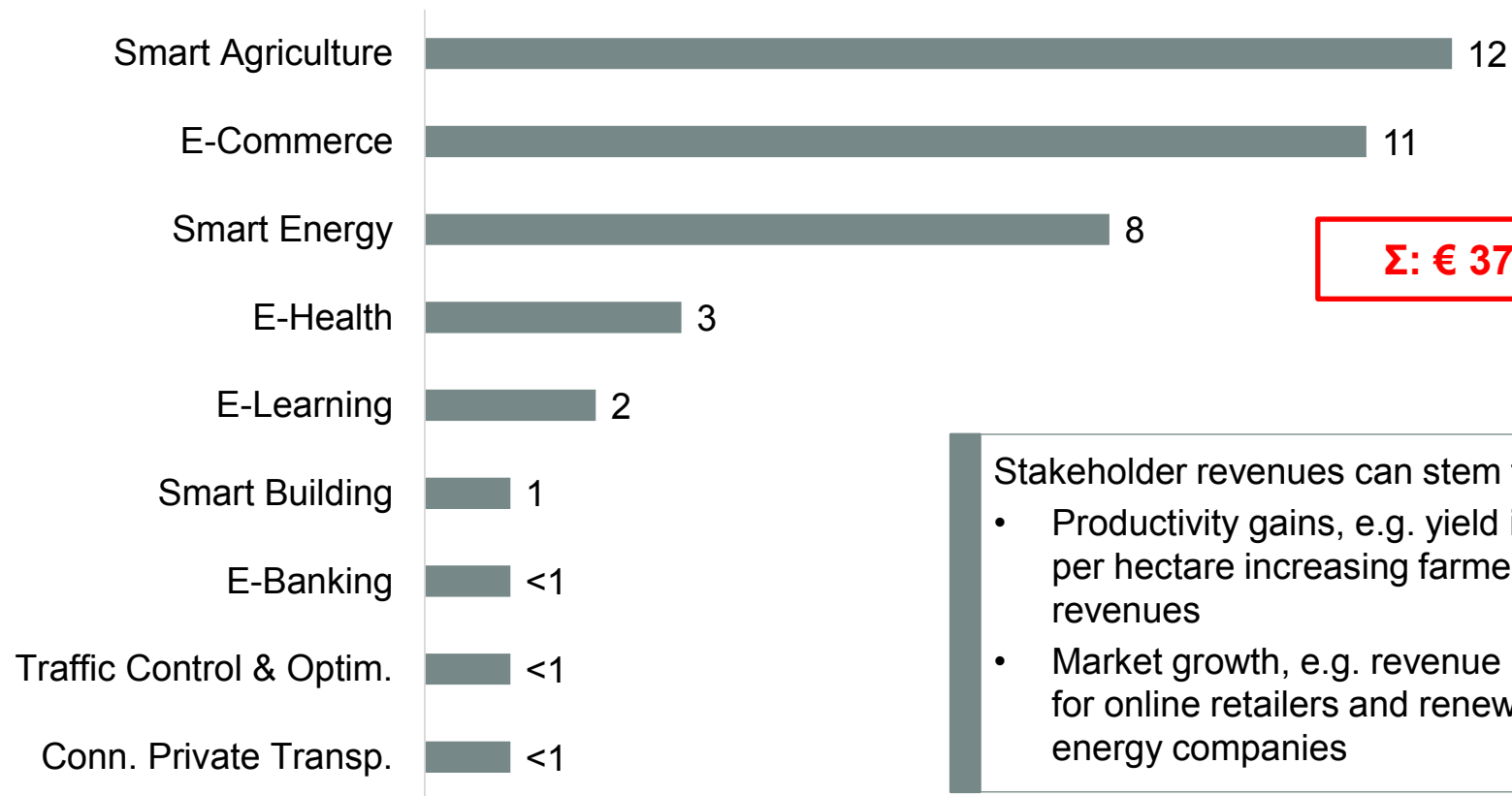| Use case	Revenue
E-Commerce	7,918
E-Work	2,142
Smart Building	864
E-Learning	396
Smart Agriculture	381
E-Health	224
Smart Logistics	202
Smart Energy	19
Smart Manufacturing	14
Conn. Private Transp.	7
Traffic Control & Optim.	1
E-Banking	<1

Σ: € 12 billion

ICT revenue streams include
- Platform solutions, e.g. online shopping, E-Work platforms or E-Learning platforms
- Sensor and data analytics solutions, e.g. smart home solutions or precision agriculture

Sources: GeSI SMARTer2030; Accenture Analysis

Stakeholder revenues enabled by the application of ICT solutions with sustainability benefits can amount up to € 37 billion

Stakeholder revenue potential in the Netherlands in 2030

#SMARTer2030 use cases – stakeholder revenues in € billion in 2030

Use case	Revenue (€ billion)
Smart Agriculture	12
E-Commerce	11
Smart Energy	8
E-Health	3
E-Learning	2
Smart Building	1
E-Banking	<1
Traffic Control & Optim.	<1
Conn. Private Transp.	<1

Σ: € 37 billion

Stakeholder revenues can stem from
- Productivity gains, e.g. yield increase per hectare increasing farmers' revenues
- Market growth, e.g. revenue increases for online retailers and renewable energy companies
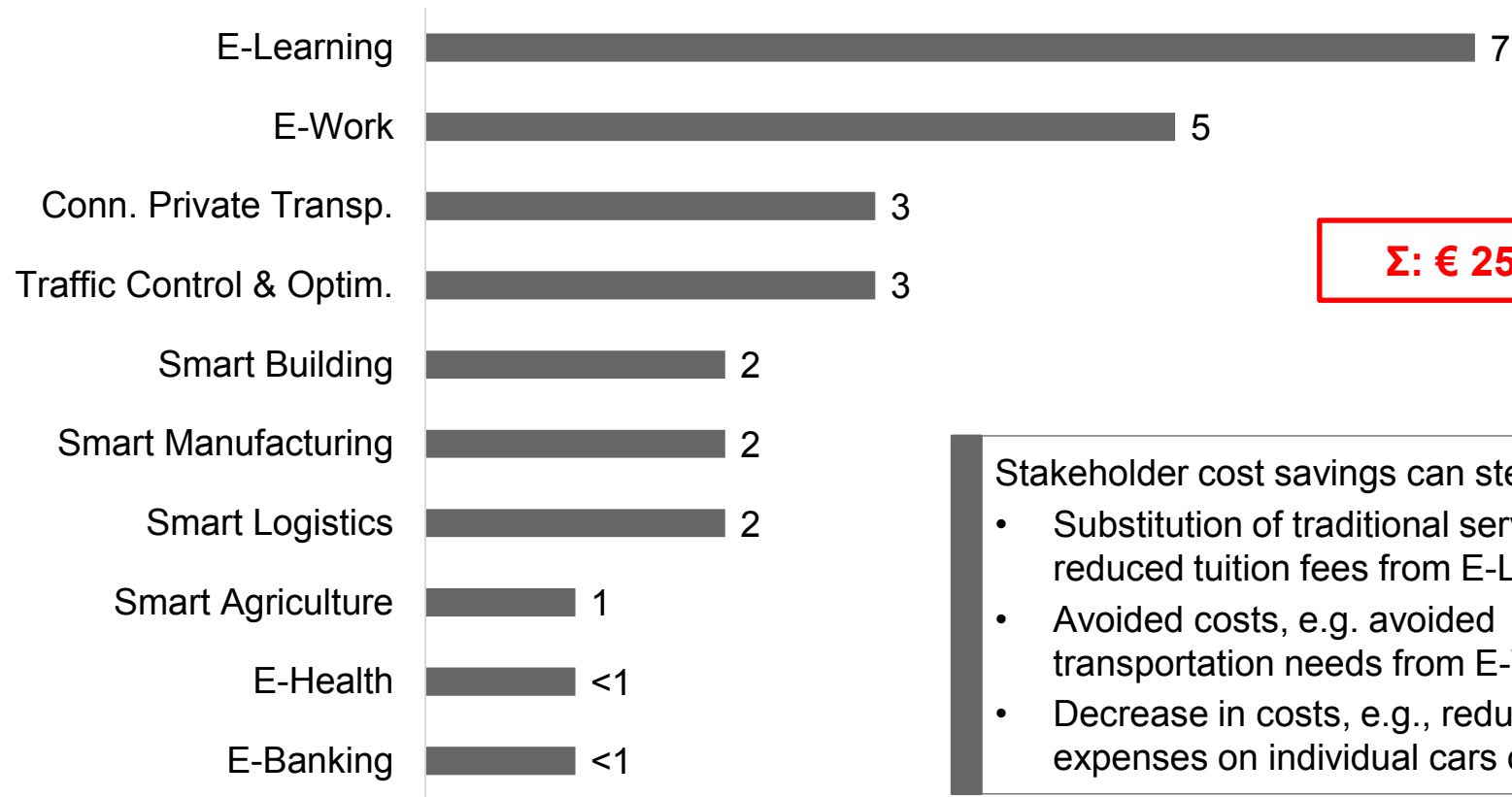
Sources: GeSI SMARTer2030; Accenture Analysis

The grand total of stakeholder cost savings can be € 25 billion in 2030

Stakeholder cost savings potential in the Netherlands in 2030

#SMARTer2030 use cases – stakeholder cost savings in € billion in 2030

Use case	Savings (€ billion)
E-Learning	7
E-Work	5
Conn. Private Transp.	3
Traffic Control & Optim.	3
Smart Building	2
Smart Manufacturing	2
Smart Logistics	2
Smart Agriculture	1
E-Health	<1
E-Banking	<1

Σ: € 25 billion

Stakeholder cost savings can stem from
- Substitution of traditional services, e.g. reduced tuition fees from E-Learning
- Avoided costs, e.g. avoided transportation needs from E-Work
- Decrease in costs, e.g., reduce the expenses on individual cars owned

Over 3.8 million people could benefit from E-Health and over 1.6 million additional E-Learning degrees could be enabled in the Netherlands

Social benefits of ICT in 2030 in the Netherlands: E-Health and E-Learning

Improved access to more affordable healthcare:

>3.8 million E-Health beneficiaries in the Netherlands in 2030

Enabled by "The doctor in your pocket", comprising:

- Remote access from any connected smart device
- More affordable healthcare services
- More effective treatment through personalized medicine
- Empowered and informed decision-making

Improved access to and more affordable Learning opportunities:

>1.6 million E-Learning degrees in the Netherlands in 2030

Enabled by the transition of knowledge delivery from "static classroom" to "anytime anywhere", comprising:
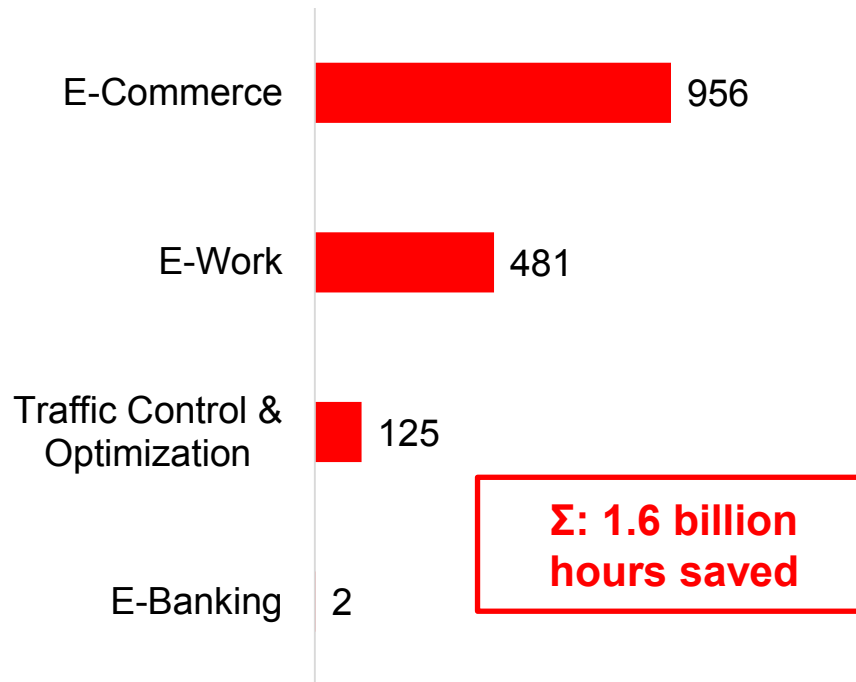
- Remote access from any connected smart device
- More affordable tuition fees
- More available learning offers
- Lifelong learning process controlled from your smart device

Sources: GeSI SMARTer2030; Accenture Analysis

In the Netherlands, ICT could enable time savings of ca. 1.6 billion hours in 2030

Time savings in the Netherlands in 2030

#SMARTer2030 use cases – time savings in million hours in 2030

Use case	Million hours
E-Commerce	956
E-Work	481
Traffic Control & Optimization	125
E-Banking	2

Σ: 1.6 billion hours saved

ICT solutions with sustainability benefits have a high potential to enable **time savings**, e.g. via the following **levers**:

- **E-Commerce:** People will be able to buy online, avoiding the trip to the store and saving time on the road
- **E-Work:** People will be able to work wherever they are, avoiding the trip to the office and saving time
- **Traffic Control & Optimization:** Efficiency in transport will reduce traffic jams, reducing the time spent on the road
- **E-Banking:** People will be able to be attended to wherever they are, whatever they need, avoiding the trip to the bank and saving time

Sources: GeSI SMARTer2030; Accenture Analysis

Smart Manufacturing technologies in 2030 can enable various quantifiable economic and environmental benefits in the NED

Deep-dive on Smart Manufacturing use case

Technology vision 2030

- Augmented reality devices
- Cyber-physical systems (CPS)
- Data analytics & cloud computing
- Drones & Robotics
- Embedded system production technology
- Global network
- Industrial Internet of Things (IoT) and Machine-to-Machine (M2M)
- 3-D printing

Enabled benefits (qualitative)

Virtual Manufacturing	Customer Centric Production
Circular Supply Chain	Smart Services

#SMARTer2030 quantitative evidence for benefits

Category	Metric	In NED in 2030
Economic	ICT revenues	€ 14 million
	Stakeholder cost savings	€ 2 billion
Environ-mental	GHG saved	15 million t of CO_2e
	Barrels of oil saved	14 million barrels
	Energy saved	22 million MWh
	Water saved	437 billion liters

Sources: GeSI SMARTer2030; Accenture Analysis

Smart Logistics technologies in 2030 can enable various quanti-fiable economic and environmental benefits in the Netherlands

Deep-dive on Smart Logistics use case

Technology vision 2030

- Augmented reality and wearable technologies
- Commercial Unmanned Aerial Vehicles (UAV)
- Connected commercial vehicles, load units, products and machines
- Digital warehouses
- Fleet management and optimized routes
- Operational agility systems

Enabled benefits (qualitative)

Fall in transport as a result of a reduction in road freight due to route optimization, maximization of vehicle capacity, logistic sharing and eco drive

Fall in transport as a result of a reduction of air, maritime and train freight due to maximization of vehicle capacity and logistic sharing

#SMARTer2030 quantitative evidence for benefits

Category	Metric	In NED in 2030
Economic	ICT revenues	€ 202 million
	Stakeholder cost savings	€ 1.8 billion
Environ-mental	GHG saved	14 million t of CO_2e
	Barrels of oil saved	6 million barrels
	Fuel saved	712 million liters

Smart Building technologies in 2030 can enable various quanti-fiable economic and environmental benefits in the Netherlands

Deep-dive on Smart Building use case

Technology vision 2030

- Monitoring, detection and diagnosis technologies, e.g.
  - Data analytics and cloud computing
  - Internet of Things
- Alarm management and automation
- Energy management technologies, e.g. smart metering and steering apps
- Information and communication platforms

Enabled benefits (qualitative)

Energy & resource efficiency	Improved process efficiency
Reduction in energy consumption	Enhanced living & working

#SMARTer2030 quantitative evidence for benefits

Category	Metric	In NED in 2030
Economic	ICT revenues	€ 960 million
	Stakeholder cost savings	€ 2.8 billion
	Stakeholder revenues	€ 965 million
Environ-mental	GHG saved	13 million t of CO_2e
	Barrels of oil saved	24 million barrels
	Energy saved	39 million MWh
	Water saved	542 million liters

Smart Energy technologies in 2030 can enable various quanti-fiable economic and environmental benefits in the Netherlands

Deep-dive on Smart Energy use case

Technology vision 2030

- Advanced analytics
- Convergence of Information Technology and of Operations Technology
- Demand response technologies (B2B, B2C)
- Distribution management system
- Energy storage technology
- Internet of Things (IoT) and Machine-to-Machine (M2M) technology
- Sensor technologies

Enabled benefits (qualitative)

Improved load management + enablement of renewables

Grid efficiency

Resilient energy infrastructure

#SMARTer2030 quantitative evidence for benefits

Category	Metric	In NED in 2030
Economic	ICT revenues	€ 19 million
	Stakeholder revenues	€ 7.9 billion
Environ-mental	GHG saved	12 million t of CO_2e
	Barrels of oil saved	36 million barrels
	Energy saved	59 million MWh

Appendix 1: Explanation of #SMARTer2030 use cases

Overview #SMARTer2030 use cases (1/6)

Use case definition

Overview of #SMARTer2030 results for use case

#SMARTer2030 use case	Main technologies and applications considered in 2030 vision of use case	Expected use case benefits (qualitative, ordered per estimated relevance)	Main #SMARTer 2030 calculated benefits metrics and results
Connected Private Transport	• Board computer system • Car/route sharing • Connected private and public vehicles • GPS/GEO location based services • Intermodal transport • Remote diagnosis for maintenance • RFID (radio frequency identification)/NFC (near-field communication) technologies • Smartphone enabled car-sharing or car-pool platforms • Social Media technology & apps	• Reduced emissions, pollution, noise, resource consumption, traffic jams, accidents • Reduced car ownership, transportation and infrastructure costs • Freed up space in cities • Increased mobility regardless of age, mental or physical capabilities	• ICT revenues ($): 2 bn • Stakeholder revenues ($): 550 m • Stakeholder cost savings ($): 610 bn • Carbon emissions saved (GtCO2 eq) globally: 0.766 • Fuel saved (L) globally: 220 bn • Time saved (h): 42.3 bn
E-Banking	• Digital assistants/consults • Digital currencies (e.g. BITCoin) • Faster and 24/7 access • Financial market insight and investment platforms • Online banking apps • Videoconferencing	• Reduced use of resources (wood, water, energy) • Reduced infrastructure needs (branch offices) • Reduced amount of coin production and cash transports • Immediate access to banking services regardless of location	• ICT revenues ($): 77 m • Stakeholder revenues ($): 15.3 bn • Stakeholder cost savings ($): 2 bn • Carbon emissions saved (GtCO2 eq) globally: 0.003 • Fuel saved (L) globally: 1.3 bn • Time saved (h): 915 m

Source: Accenture Strategy; #SMARTer2030

Overview #SMARTer2030 use cases (2/6)

Use case definition

Overview of #SMARTer2030 results for use case

#SMARTer2030 use case	Main technologies and applications considered in 2030 vision of use case	Expected use case benefits (qualitative, ordered per estimated relevance)	Main #SMARTer 2030 calculated benefits metrics and results
E-Commerce	• Advanced data analytics • Apps for retail mobile shopping • Delivery on demand • Integrated multichannel infrastructures/mobile shopping • Location based services • Retail 3D printing • Videoconferencing/augmented reality	• Reduced private transportation • Reduced transportation of goods to stores, but more to homes • Reduced infrastructure needs (stores) • Customer-centricity • Product & service comparison • Immediate access to goods regardless of location	• ICT revenues ($): 580 bn • Stakeholder revenues ($): 1,144.7 bn • Carbon emissions saved (GtCO2 eq) globally: 0.3 • Fuel saved (L) globally: 165.5 bn • Time saved (h): 105 bn
E-Health	• Augmented reality (e.g. medical training) • Data generation and big data analytics • Data storage in electronic form • DNA sequencing • Remote access • Remote diagnostics (capture and communicate health data) • Videoconferencing (between service seekers and providers) • Wearable health-monitoring watches or mobile phones	• Improved access to and quality of public health services • Informed and empowered patients • Efficient monitoring and distribution of information • Personalized medicine • Value-based reimbursement, e.g. incentives for preventative behavior	• ICT revenues ($): 63 bn • Stakeholder revenues ($): 208.8 bn • Stakeholder cost savings ($): 63 bn • Carbon emissions saved (GtCO2 eq) globally: 0.2 • Fuel saved (L) globally: 1.7 bn • E-Health beneficiaries (#): 1.6 bn

Source: Accenture Strategy; #SMARTer2030

Overview #SMARTer2030 use cases (3/6)

Use case definition

Overview of #SMARTer2030 results for use case

#SMARTer2030 use case	Main technologies and applications considered in 2030 vision of use case	Expected use case benefits (qualitative, ordered per estimated relevance)	Main #SMARTer 2030 calculated benefits metrics and results
E-Learning	• Advanced data analytics • E-Learning apps • Gamification, virtualization, access to computing • Massive Open Online Courses (MOOC) • Online community platforms • Smart systems portfolio (Personalized and competency-based platforms that track what, how, and when you learn) • Videoconferencing	• Improved access and quality will raise earning potential and quality of life • Lifelong, personalized, affordable, engaging learning • Self-directed learning anytime, anywhere	• ICT revenues ($): 75 bn • Stakeholder revenues ($): 412.9 bn • Stakeholder cost savings ($): 1,211 bn • Carbon emissions saved (GtCO2 eq) globally: 0.07 • Fuel saved (L) globally: 5.0 bn • E-learning degrees (#): 450 m
E-Work	• Augmented reality • Cloud-based platforms (e.g. "platform as a service") • Connections and smart devices • Telecommuting/collaboration tools • Telework ("mobile workspace") • Videoconferencing • Virtual business meetings • Voice over IP	• Reduced emissions, pollution, noise, resource consumption, traffic jams, and accidents through virtual commuting • Better work-life balance • Reduced amount of work-related accidents, stress-related diseases	• ICT revenues ($): 536 bn • Stakeholder cost savings ($): 680 bn • Carbon emissions saved (GtCO2 eq) globally: 0.4 • Fuel saved (L) globally: 165 bn • Time saved (h): 105.0 bn

Source: Accenture Strategy; #SMARTer2030

Overview #SMARTer2030 use cases (4/6)

Use case definition

Overview of #SMARTer2030 results for use case

#SMARTer2030 use case	Main technologies and applications considered in 2030 vision of use case	Expected use case benefits (qualitative, ordered per estimated relevance)	Main #SMARTer 2030 calculated benefits metrics and results

Smart Agriculture	• Automation and optimization of farm management technologies
	• Online platforms and apps
	• Precision agriculture, comprising e.g.
	  - M2M / IoT, sensors and satellites
	  - Advanced data analytics
	  - Processing of genomic sequencing of livestock, seeds and plants
	• Traceability and tracking systems, incl. Smart logistics (RFID1, GPS)
		• Reduced hunger & famine
		• Improved food distribution, productivity
		• Resilience towards climate change, pests
		• Reduced emissions, pollution, land degradation, water consumption
		• Increased biodiversity
			• ICT revenues ($): 53 bn
			• Stakeholder revenues ($): 1,762 bn
			• Stakeholder cost savings ($): 404 bn
			• Carbon emissions saved (GtCO2 eq) globally: 2,018
			• Energy saved (MWh): 1 bn
			• Water saved (L) globally: 251 tr
			• Yield increase (kg/ha growth) globally: 897

Smart Building	• Alarm management & automation
	  - Data analytics tolls
	• Energy management technologies
	  - Smart metering & sensors
	• Information & communication platforms
	• Monitoring, detection and diagnosis technologies
	  - Data analytics & cloud computing
	  - Sensor technologies
		• Large gains in energy & resource efficiency
		• Enhanced living & working
		• Proactive fire, gas, structural failure detection increases safety
		• Higher real estate valuation
		• Lower maintenance, operational costs
			• ICT revenues ($): 200 bn
			• Stakeholder revenues ($): 184.9 bn
			• Stakeholder cost savings ($): 361 bn
			• Carbon emissions saved (GtCO2 eq) globally: 0.79
			• Energy saved (MWh): 5 bn
			• Water saved (L) globally: 261 bn

Source: Accenture Strategy; #SMARTer2030

Overview #SMARTer2030 use cases (5/6)

Use case definition

Overview of #SMARTer2030 results for use case

#SMARTer2030 use case	Main technologies and applications considered in 2030 vision of use case	Expected use case benefits (qualitative, ordered per estimated relevance)	Main #SMARTer 2030 calculated benefits metrics and results
Smart Energy	• Advanced analytics • Convergence of Information Technology and of Operations Technology • Demand response technologies (B2B, B2C) • Distribution management system • Energy storage technology • Internet of Things (IoT) and Machine-to-Machine (M2M) technology • Sensor technologies	• Decarbonization through broad deployment of renewables • Energy and cost savings • Energy security • Energy independence • Diversification to reduce risk of system failure (blackout) • Universal access to energy • Social cohesion through shared energy systems • Consumers become producers	• ICT revenues ($): 2 bn • Stakeholder revenues ($): 811.3 bn • Carbon emissions saved (GtCO$_2$eq) globally: 3.4 • Energy saved (MWh): 6.3 bn
Smart Logistics	• Augmented reality and wearable technologies • Commercial Unmanned Aerial Vehicles (UAV) • Connected commercial vehicles, load units, products and machines • Digital warehouses • Fleet management and optimized routes • Operational agility systems	• Reduced emissions, pollution, noise, resource consumption, traffic jams, accidents • New revenue streams for logistics providers • Operational efficiency gains (distance driven, capacity utilization, reduced risks)	• ICT revenues ($): 60 bn • Stakeholder cost savings ($): 462 bn • Carbon emissions saved (GtCO2 eq) globally: 1.3 bn • Energy saved (MWh): 1.1bn • Fuel saved (L) globally: 266.7 bn

Source: Accenture Strategy; #SMARTer2030

Overview #SMARTer2030 use cases (6/6)

Use case definition

Overview of #SMARTer2030 results for use case

| #SMARTer2030 use case	Main technologies and applications considered in 2030 vision of use case	Expected use case benefits (qualitative, ordered per estimated relevance)	Main #SMARTer 2030 calculated benefits metrics and results
Smart Manufacturing	• Augmented reality devices • Cyber-physical systems (CPS) • Data analytics & cloud computing • Drones & Robotics • Embedded system production technology • Global network • Industrial Internet of Things (IoT) and Machine-to-Machine (M2M) • 3-D printing	• Rapid manufacturing of new products • Remote monitoring, early issue identification • Higher productivity, quality, flexibility, resource efficiency • Worker safety • Mass customization	• ICT revenues ($): 3 bn • Stakeholder cost savings ($): 420 bn • Carbon emissions saved (GtCO2 eq) globally: 2.7 bn • Energy saved (MWh): 4.2 bn • Water saved (L): 81.2 tr
Traffic Control & Optimization (TCO)	• Automated driving • Autonomous vehicles • "Car to x communication" • Connected smart sensors • Driverless cars • Driving support technologies • GPS/GEO location-based applications • Information Technologies • Intelligent infrastructure • Real-time information gathering and data analytics • Traffic management platform	• Reduced emissions, costs, pollution, noise, resource consumption, traffic jams, accidents • Higher productivity, efficiency • Improved health & safety, mobility	• ICT revenues ($): 95 m • Stakeholder revenues ($): 0.7 bn • Stakeholder cost savings ($): 377.7 bn • Carbon emissions saved (GtCO2 eq) globally: 0.8 bn • Fuel saved (L): 236.1 bn

Source: Accenture Strategy; #SMARTer2030

Appendix 2: Additional information on global #SMARTer2030 results

The world is not on track: Under business as usual CO_{2e} emissions will continue to grow
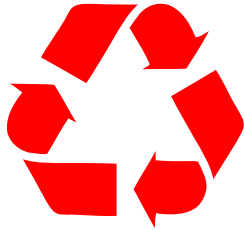
CO_{2e} emissions forecast (Gt CO_{2e})

52.4	11.1	63.5
2015	**Business as usual (BAU) increase**	**2030 BAU**
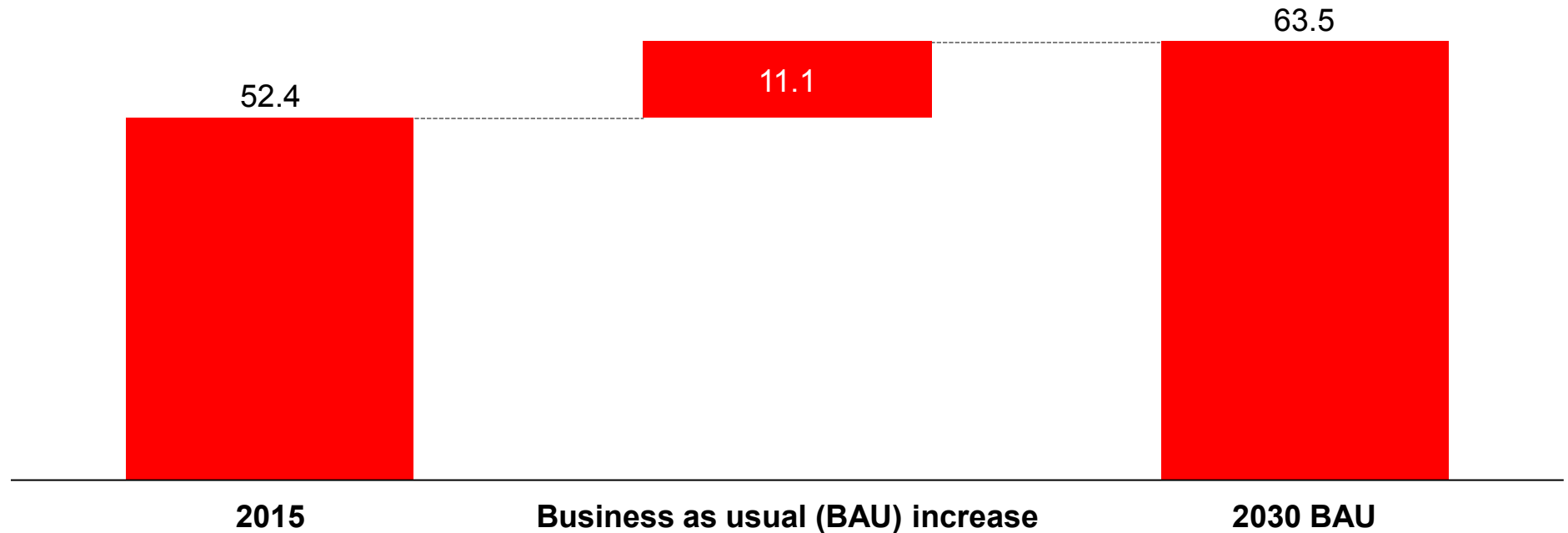
Historically each 1% of growth in GDP equated to a 0.5% increase in CO_{2e} emissions

#SMARTer2030

ICT can decrease global carbon emissions, stimulate economic growth and deliver benefits to society

SMARTer2030 main findings

- ICT has the potential to maintain global CO_{2e} emissions at 2015 levels
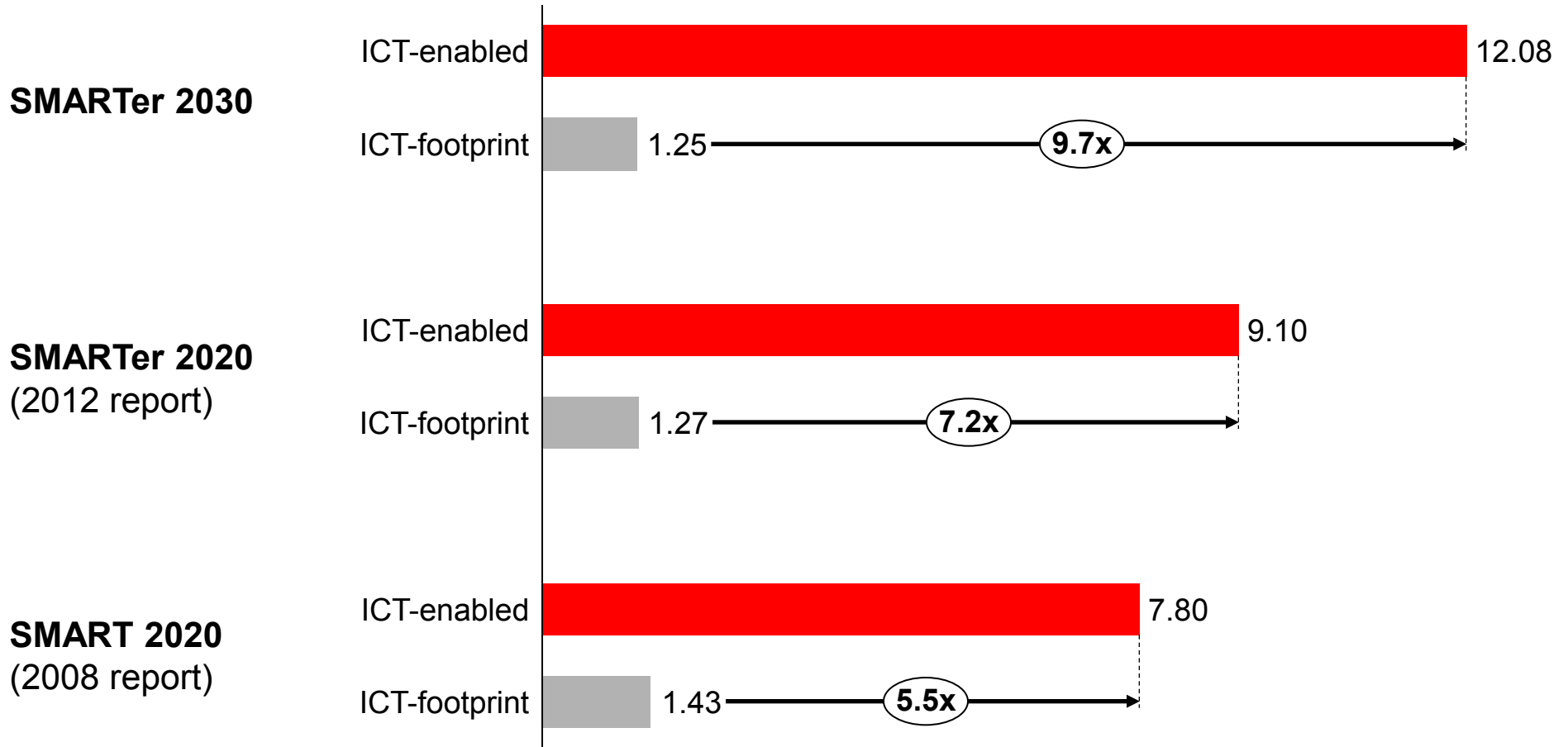- At the same time, ICT can reduce the consumption of scarce resources
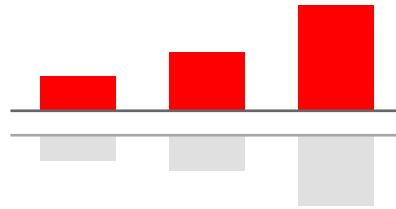
- ICT is good for growth
  - Over 6 trillion USD in new revenues in 2030
  - Close to 5 trillion USD in cost savings in 2030, including 2.3 trillion USD from energy efficiency
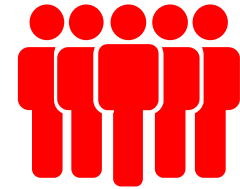
- ICT could connect 2.5 billion previously unconnected people to ICT services by 2030, enabling a total of
  - 1.6 billion people connected to e-health
  - 0.5 billion e-learning participants

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ICT could realize a benefit 9.7 times higher than its own emissions in 2030, while its footprint is expected to fall

ICT benefits factor in 2020 and 2030 (Gt CO_{2e})

SMARTer 2030
- ICT-enabled: 12.08
- ICT-footprint: 1.25 — **9.7x**

SMARTer 2020
(2012 report)
- ICT-enabled: 9.10
- ICT-footprint: 1.27 — **7.2x**

SMART 2020
(2008 report)
- ICT-enabled: 7.80
- ICT-footprint: 1.43 — **5.5x**

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ICT enables improved customer centricity and new business models building on increased digital density

Improved user centricity

ICT is now genuinely putting people at the center, allowing for more compelling service offerings that "deliver it all": better experience, reduced cost, improved sustainability

New business models

The business case for ICT-enabled business is now stronger than ever. Digital disruptors have grown into multibillion dollar businesses, far beyond what seemed possible 2012
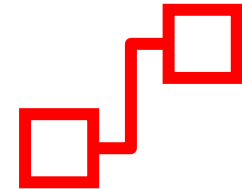
Increased digital density

Internet access and smartphone ownership are at much higher levels and the number of connected devices is expected to grow to 100 billion by 2030

Source: International Energy Agency, More Data Less Energy, 2014

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Smart solutions to mobility, manufacturing, agriculture, building and energy deliver ICT's potential of 12Gt CO_{2e}

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

Mobility[1]: 3.6 — Manu-facturing: 2.7 — Agriculture: 2.0 — Building: 2.0 — Energy: 1.8 — ICT-enabled savings[2]: 12.1
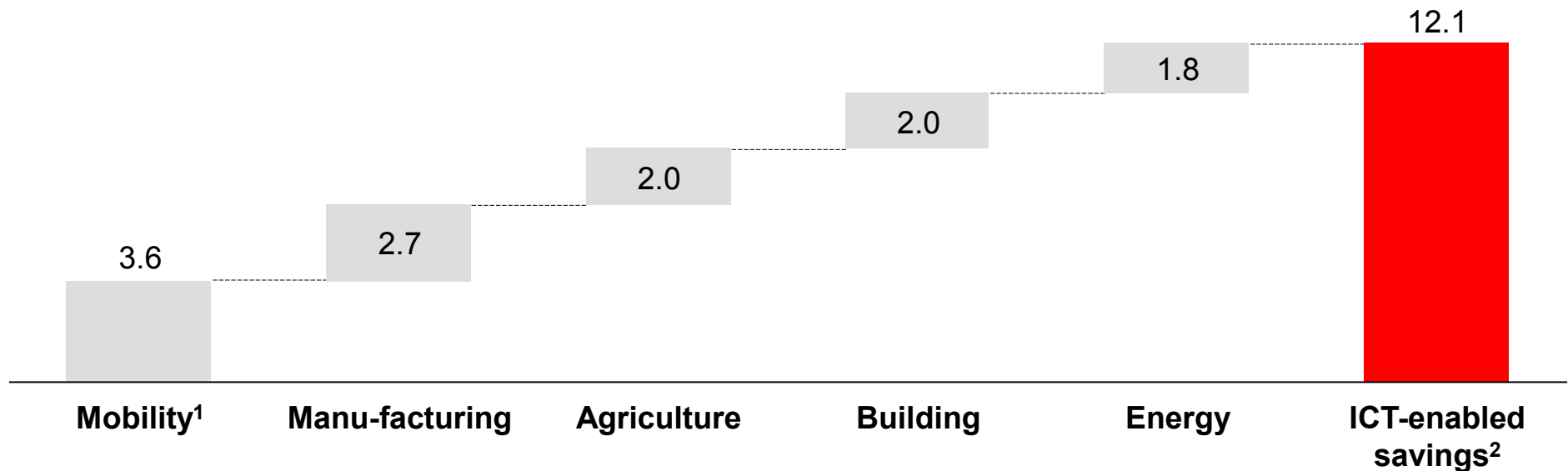
ICT has the potential to maintain global CO_{2e} emissions at 2015 levels, decoupling economic growth from emissions growth

[1] Smart mobility solutions consider improved driving efficiency but also the reduced need to travel from various sectors, including health, learning, commerce, etc.

[2] 12 Gt CO2e reduction in 2030 enabled by ICT include 2 Gt CO2e abatement from integration of renewable energy production into the grid. In its business as usual emissions forecast for 2030 the Intergovernmental Panel on Climate Change (IPCC) already considers the CO2e abatement potential from renewable energy. Therefore, the additional ICT-enabled CO2e reduction against the IPCC emissions forecast for 2030 is 10 Gt CO2e

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

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ICT offers further environmental benefits, from better yields to reduced consumption of scarce resources

ICT-enabled environmental benefits across sectors beyond CO_{2e}

+900 kg crop yield increase per hectare from Smart Agriculture

-25 billion oil barrels saved across all sectors analyzed

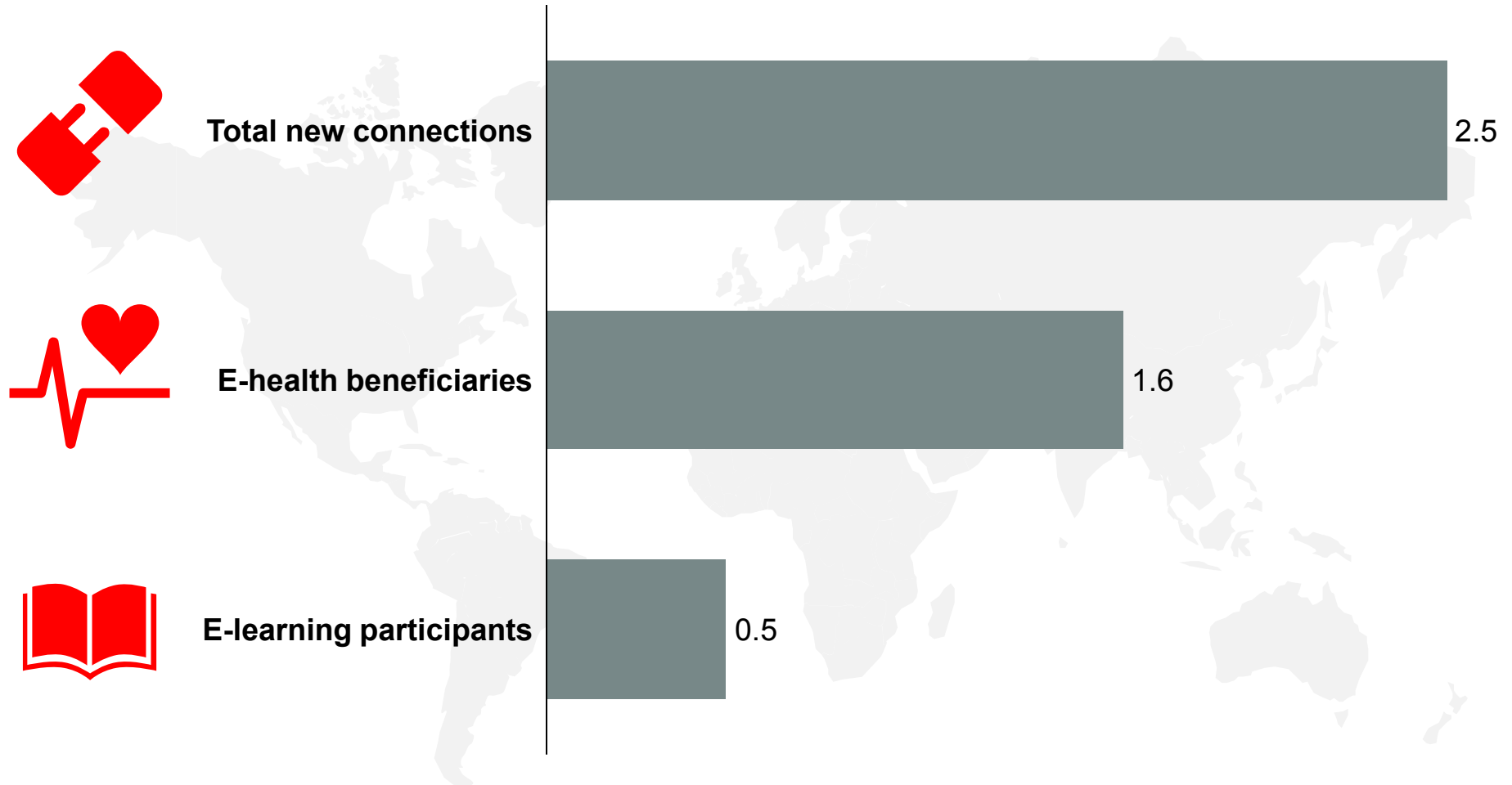**-135 million cars** reduced from total installed base

-300 trillion liters of water saved across all sectors analyzed
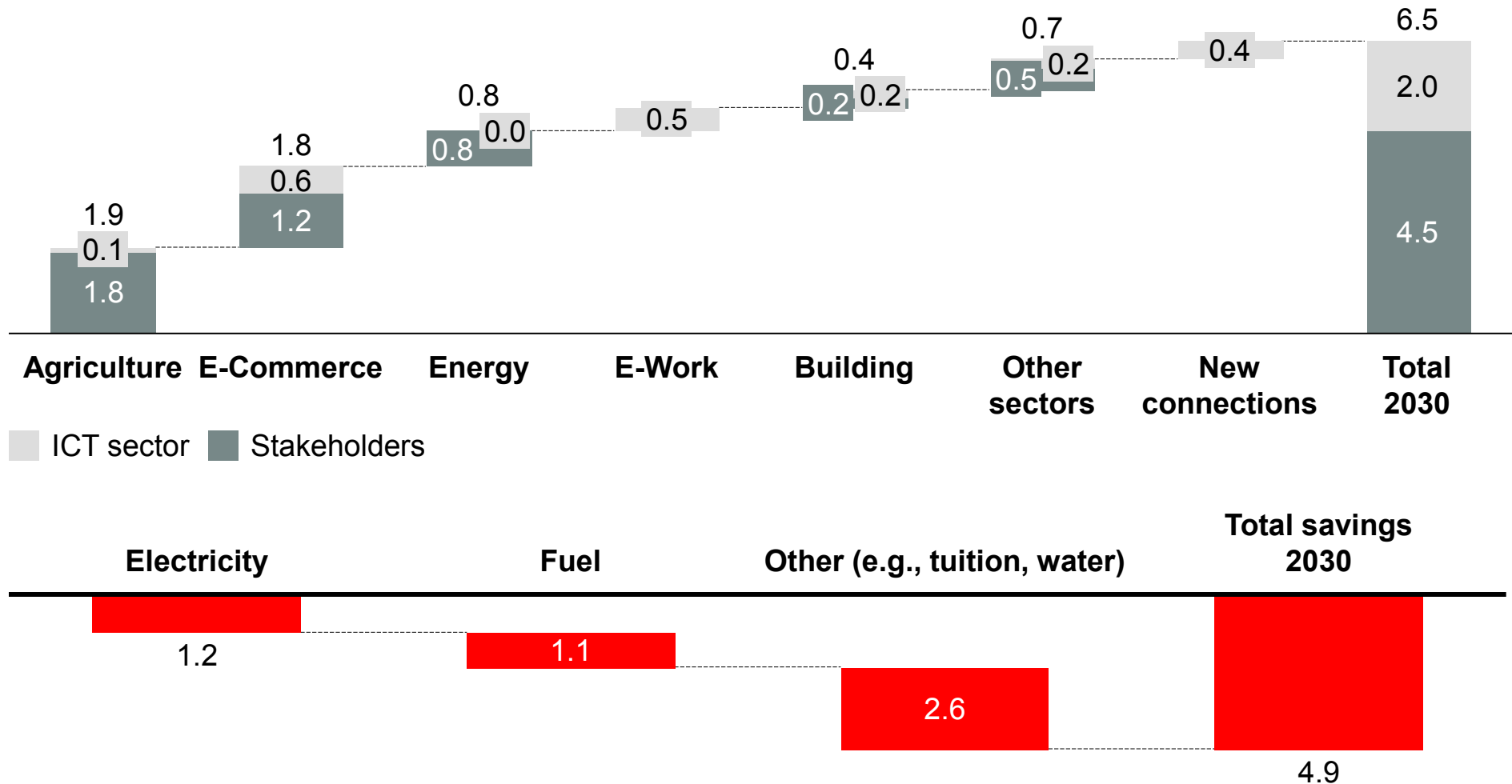
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ICT will connect 2.5 billion more people to ICT thereby making a broad range of benefits available

New ICT connections 2015-2030 (billion connections)

Category	Value
Total new connections	2.5
E-health beneficiaries	1.6
E-learning participants	0.5

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ICT is good for growth and could deliver over $6 trillion in revenues and close to $5 trillion USD in cost savings

## ICT-enabled revenues and cost savings p.a. (2030, USD trillion)

Legend: ICT sector | Stakeholders

	Agriculture	E-Commerce	Energy	E-Work	Building	Other sectors	New connections	Total 2030
Total	1.9	1.8	0.8	0.5	0.4	0.7	0.4	6.5
ICT sector	0.1	0.6	0.0	0.5	0.2	0.2	0.4	2.0
Stakeholders	1.8	1.2	0.8		0.2	0.5		4.5

Electricity	Fuel	Other (e.g., tuition, water)	Total savings 2030
1.2	1.1	2.6	4.9

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To fully realize ICT's potential stakeholder action is required with policy action as a key priority

Prioritized policy action areas

National CO2 targets

Set national CO2 targets and recognize ICT solutions as an effective and necessary tool to decrease carbon emissions while enabling continued economic growth and sustainable living
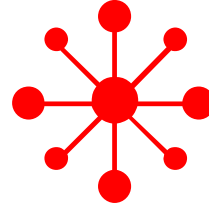
Investment incentives in infrastructure deployment

Create investment incentives in infrastructure deployment to connect the unconnected and enable broad segments of the population access to ICT solutions

Fair, balanced & consistent regulatory approach

Establish a fair, balanced and consistent regulatory approach to ICT solutions that promotes innovation and investment, protects intellectual property rights and ensures consumer privacy and security

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Infographics provide illustrative evidence of the #SMARTer2030 results, e.g. on CO_2 emissions savings

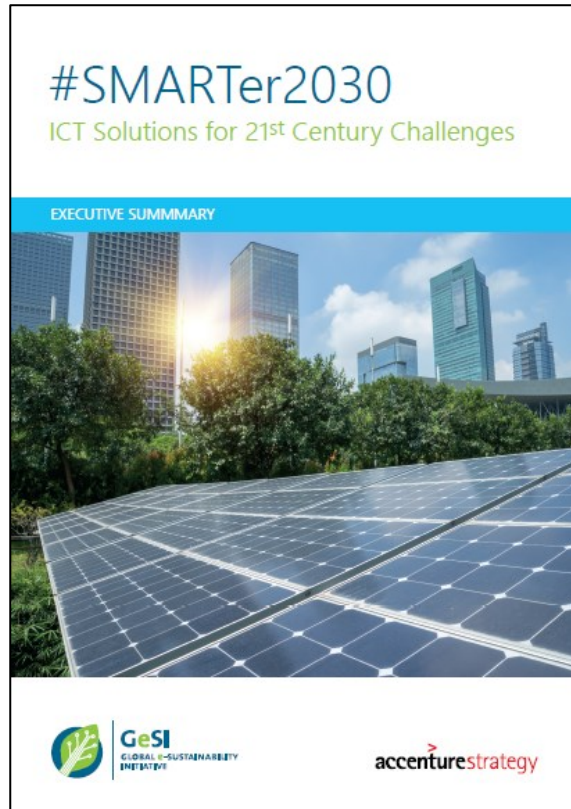## Overview results CO_2e savings from ICT solutions with sustainability benefits
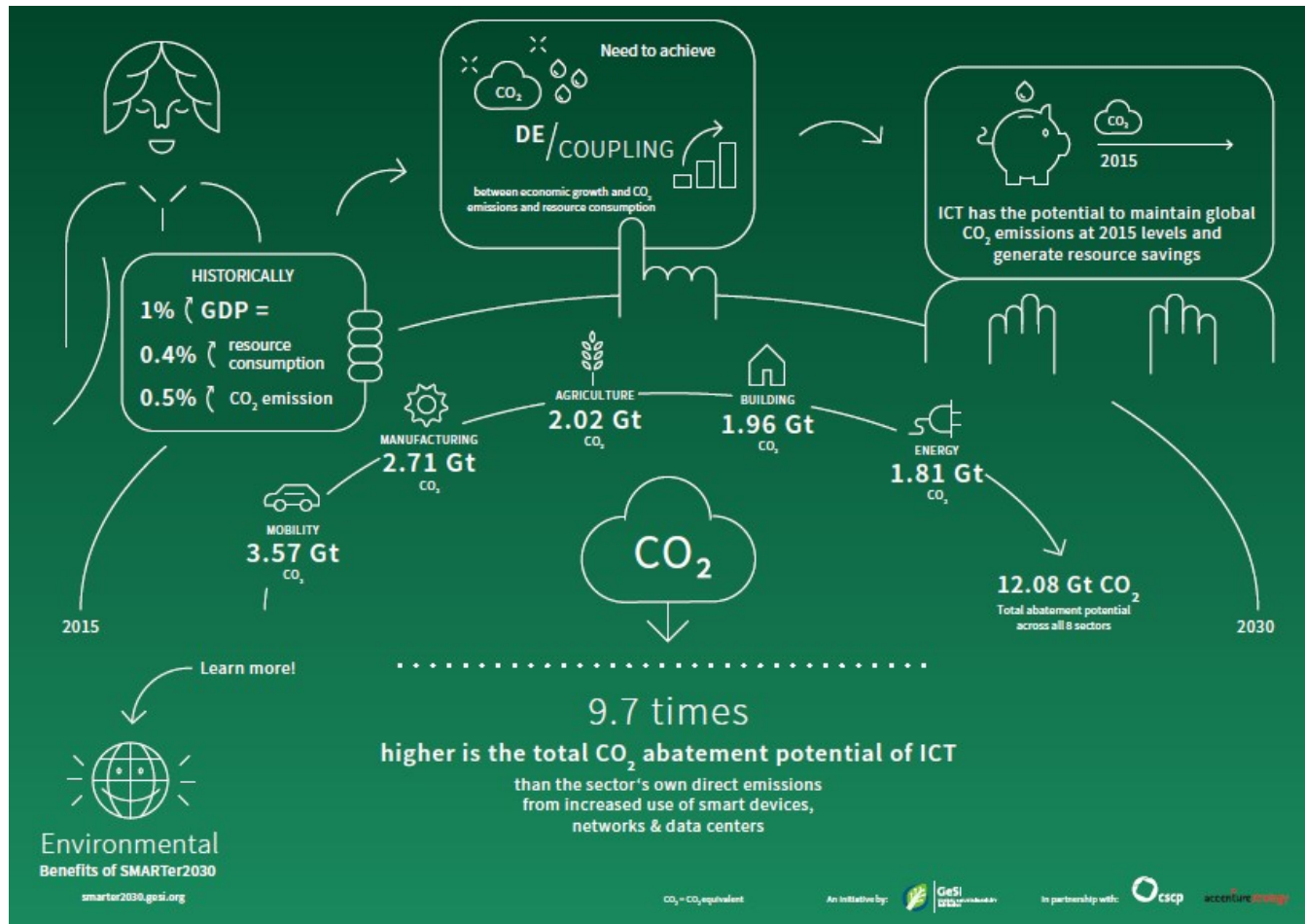
More information on #SMARTer2030 results can be found in different formats

Links to more information on #SMARTer2030

#SMARTer2030
ICT Solutions for 21st Century Challenges

EXECUTIVE SUMMMARY

GeSI
GLOBAL e-SUSTAINABILITY INITIATIVE

accenturestrategy

Link to #SMARTer2030 full report:

GeSI # SMARTer2030 full report

Link to #SMARTer2030 executive summary:

GeSI #SMARTer2030 executive summary

Link to #SMARTer2030 business playbook (10 pages results with key messages to business leaders):

GeSI #SMARTer2030 business playbook

Link to #SMARTer2030 video:

SMARTer2030: Creating a More Sustainable Future with ICT Solutions

Source: GeSI / Accenture Strategy #SMARTer2030

Appendix 3: Extrapolation metrics to calculate use case benefits for other than the nine SMARTer2030 focus countries

High-level overview of how the results for The Netherlands are obtained from the results calculated for the nine focus countries
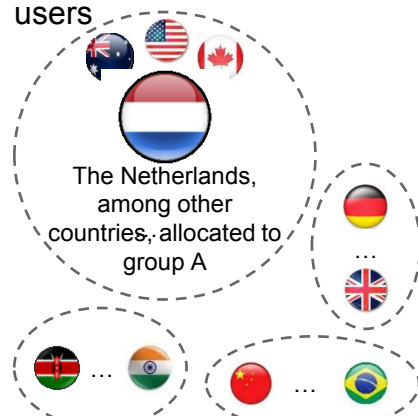
STEP 1

Calculated results for all **use cases** for **nine focus countries**:

- USA
- Canada
- Australia
- UK
- Germany
- China
- Brazil
- India
- Kenya

STEP 2

Grouping of worldwide countries with the ones assessed, according to macroeconomic similarities, e.g. GDP/capita and internet users

The Netherlands, among other countries, allocated to group A

...
...
...
...

STEP 3

Selection of use case specific extrapolation metrics from World Data Bank[1]

a) Two or more metrics[1] are selected for each use case to enhance extrapolation accuracy (results not depending on a single extrapolation)

b) Assessment of share of the nine countries per metric and all other countries according to each select metric (per group)
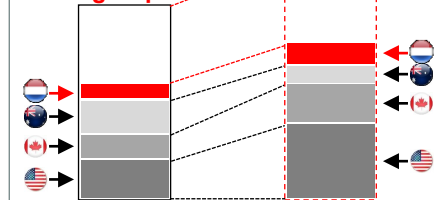
STEP 4

Extrapolation calculation based on the weight of the country with the other countries in the group

Illustrative

STEP 4a)
Extrapolation result per metric per group

STEP 4b)
Result of all metrics combined per use case[1]

Illustrative example for one World Bank Data metric: GHG emissions for Smart Energy with "Energy Use" metric

STEP 1 & 2   Illustrative

Use case results for nine focus countries (CO_2)

USA: 0,5 Gt CO2
Canada: 0,25 Gt CO2
Australia: 0,2 Gt CO2
The Netherlands grouped to these three countries (Group A)

STEP 3a)   Illustrative

Country result in the World Data Bank Metric for Energy Use (in kt of oil equivalent)

Group A: 100 kt
USA: 30 kt
Canada: 12 kt
Australia: 10 kt
The Netherlands: 7 kt

STEP 3b)   Illustrative

Country weight over the World Data Bank Metric (%)

Group A: 100%
USA: 30%
Canada: 12%
Australia: 10%
The Netherlands: 7%

STEP 4a)   Illustrative

Group A total result and The Netherlands result for the Use Case Metric

USA + CAN + AUS = 0,95 Gt CO2 → 52% of group A
Group A = 0,95 / 52% = 1,83 Gt CO2
The Netherlands = 7% x 1,83 = 0,13 Gt CO2

STEP 4b)

Combines results of all metrics per use case and country

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[1] Pls refer to following slide for list of used World Bank Data Bank extrapolation metrics per use case
Source: GeSI; Accenture Strategy

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Extrapolation metrics to calculate use case benefits for other than the nine SMARTer2030 focus countries

Specific extrapolation metrics per use case

Extrapolation of the results of each use case, calculated for nine focus countries, are made using tailor-made metrics from World Development Indicators Database:

Connected Private Transportation
- CO_2 intensity
- GDP
- Road sector gasoline and diesel consumption

Smart Agriculture
- Arable Land
- Cereal Yield
- CO_2 intensity
- Fertilizer consumption
- GDP from agriculture

E-Banking
- CO_2 intensity
- Stocks traded
- Credit provided by FS
- GDP
- Gross capital formation

Smart Building
- CO_2 intensity
- Urban population

E-Commerce
- CO_2 intensity
- Exports from GDP
- Imports from GDP
- Population

Smart Energy
- CO_2 intensity
- Energy Production
- Energy Use
- GDP

E-Health
- CO_2 intensity
- Healthcare expenditure
- Improved sanitation facilities

Smart Logistics
- CO_2 intensity
- Exports from GDP
- Imports from GDP
- Merchandise trade

E-Learning
- CO_2 intensity
- Expenditure on education
- Primary education pupils

Smart Manufacturing
- CO_2 intensity
- Industry Value Added from GDP

E-Work
- CO_2 intensity
- Employment to population/Labor force

Traffic Control & Optimization
- CO_2 intensity
- GDP
- Urban population

Source: Accenture Strategy models for GeSI SMARTer2030

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Each sector impact is based on a bottom-up analysis of the main drivers per sector for nine focus countries

CO2e emissions abatement potential per sector – Agriculture (Gt CO_2e)

Extrapolation to rest of world

Other countries including Canada, Australia

United States

SMART AGRICULTURE Abatement potential

0.15 GtCO2eq

1 Emission abatement not related to energy use — 0.09 GtCO2eq

a Emissions from enteric fermentation
⌐ Reduction from Smart Agriculture

b Emissions from fertilizers used
⌐ Reduction from Smart Agriculture

c Emissions from manure unmanaged
⌐ Reduction from Smart Agriculture

2 Emissions related to energy use — 0.02 GtCO2eq

d Emissions from rice cultivation
⌐ Reduction from Smart Agriculture

e Emissions from agriculture energy
⌐ Reduction from Smart Agriculture

3 Emissions related to food waste — 0.04 GtCO2eq

f Emissions from pre-consumption food waste
⌐ Reduction from Smart Agriculture

g Emissions from post-consumption food waste
⌐ Reduction from Smart Agriculture

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