ERICSSON

GREENING ICT
TOWARDS ZERO-CARBON NETWORKING

Pierre Boucher
Montreal, May 30th 2012

Industry Canada Industrie Canada
Canada

ITU International Telecommunication Union

prompt

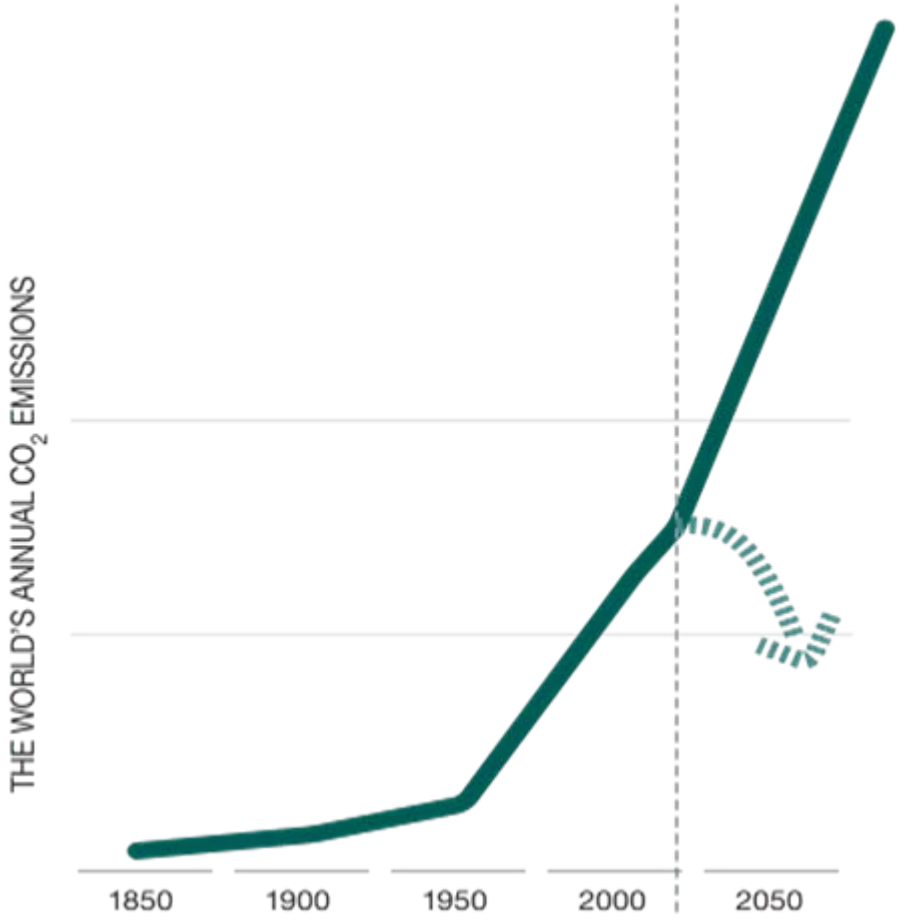
7th ITU symposium on ICTs, the environment and climate change

Montreal, Canada, 29-31 May 2012

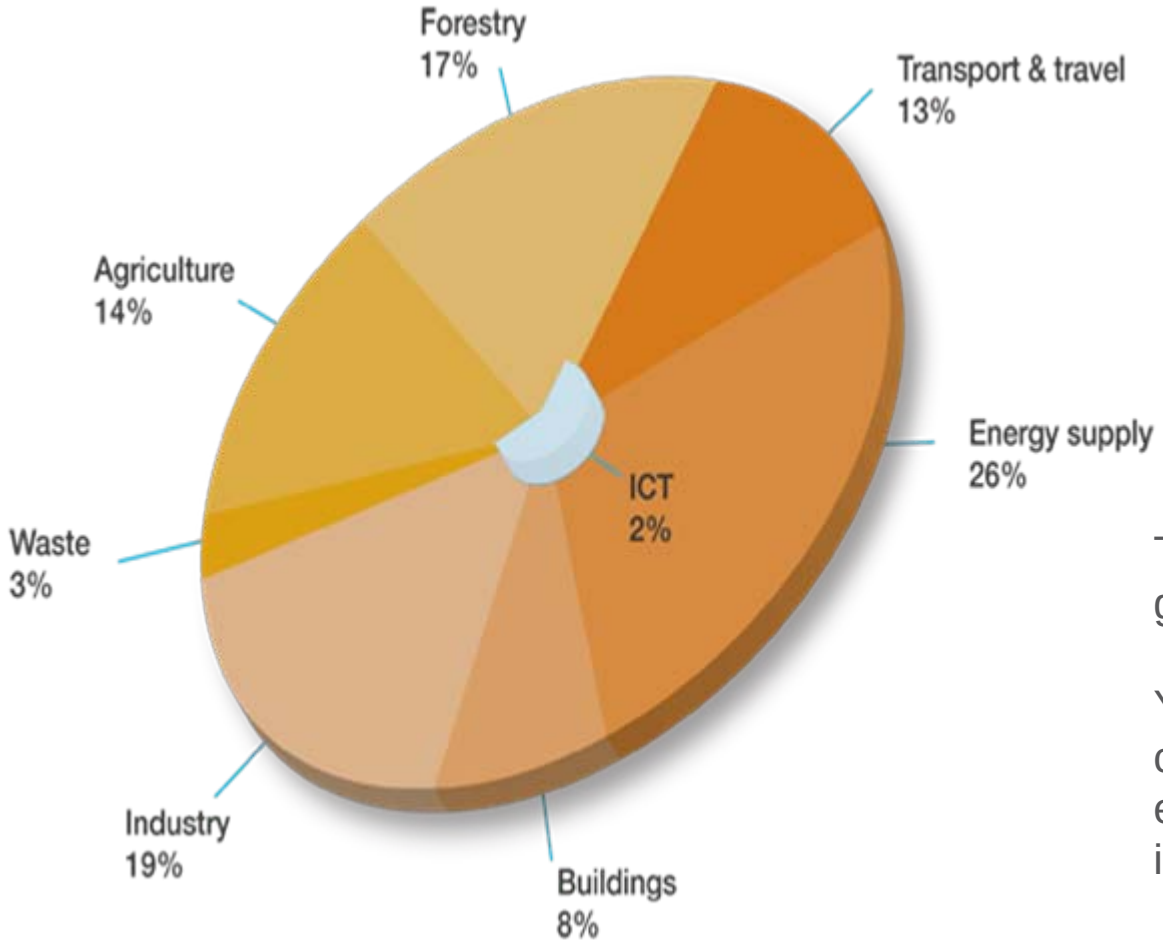
A GLOBAL CLIMATE CHALLENGE

Global CO2 emissions will need to be reduced 50-80% by 2050 (compared to 1990 levels). At the same time the world economy is expected to triple.

ICT based solutions, such as smart grids, remote working, and intelligent transport systems will enable significant energy efficiency gains.



ICT LEADING THE TRANSITION TO A LOW CARBON ECONOMY



The ICT sector = about 2% of global CO_2 emissions

Yet it can make significant contributions to reducing the 98% emissions that come from other industries

TECHNOLOGICAL REVOLUTIONS FOLLOW A SIMILAR PATTERN

1971-
IT & telecommunication

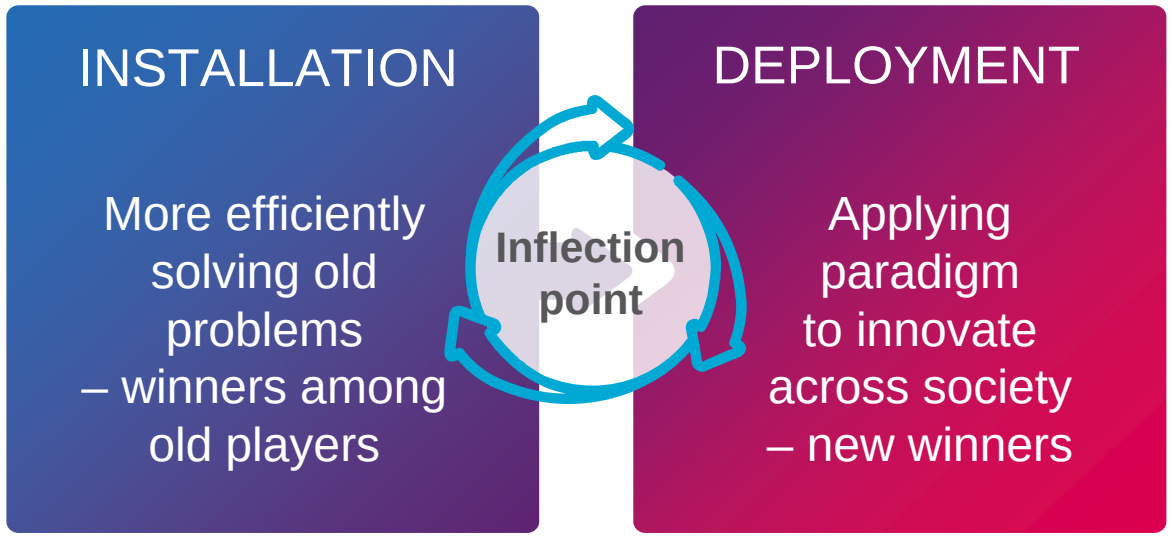
1908-
Automobile, oil, mass production

1875-
Steel & heavy engineering

1829-
Steam, coal, iron & railways

1771-
The industrial revolution

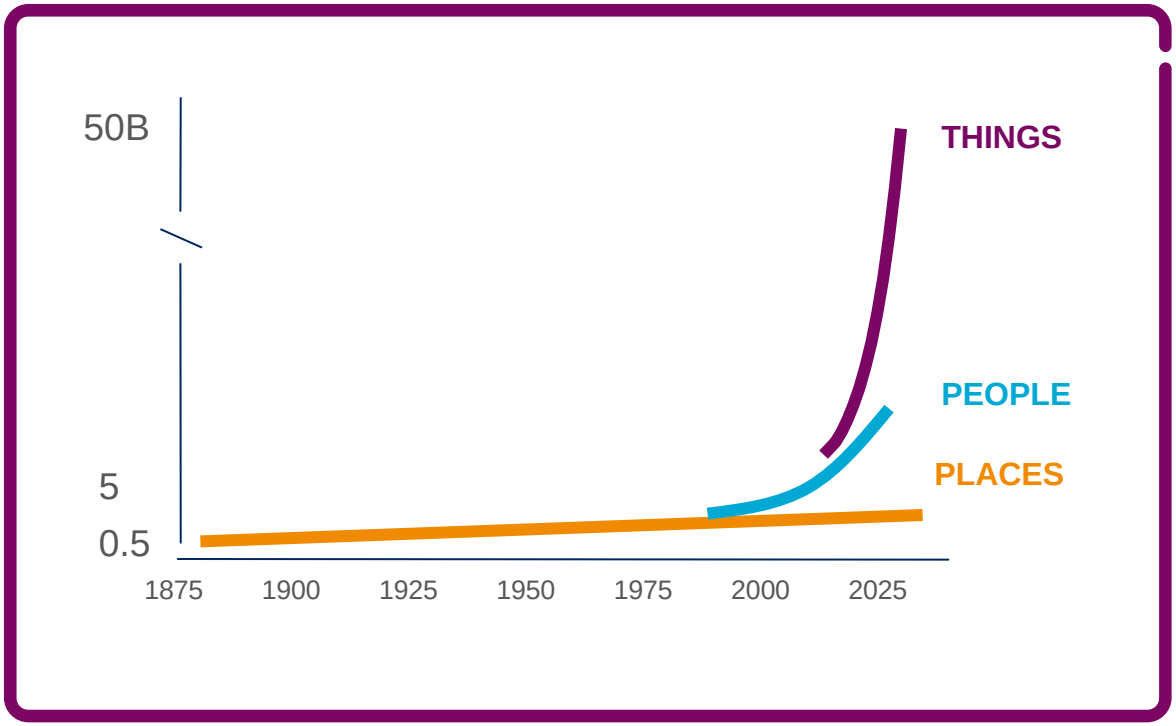
Two different periods of each technological revolution



NEW OPPORTUNITIES IN THE NETWORKED SOCIETY

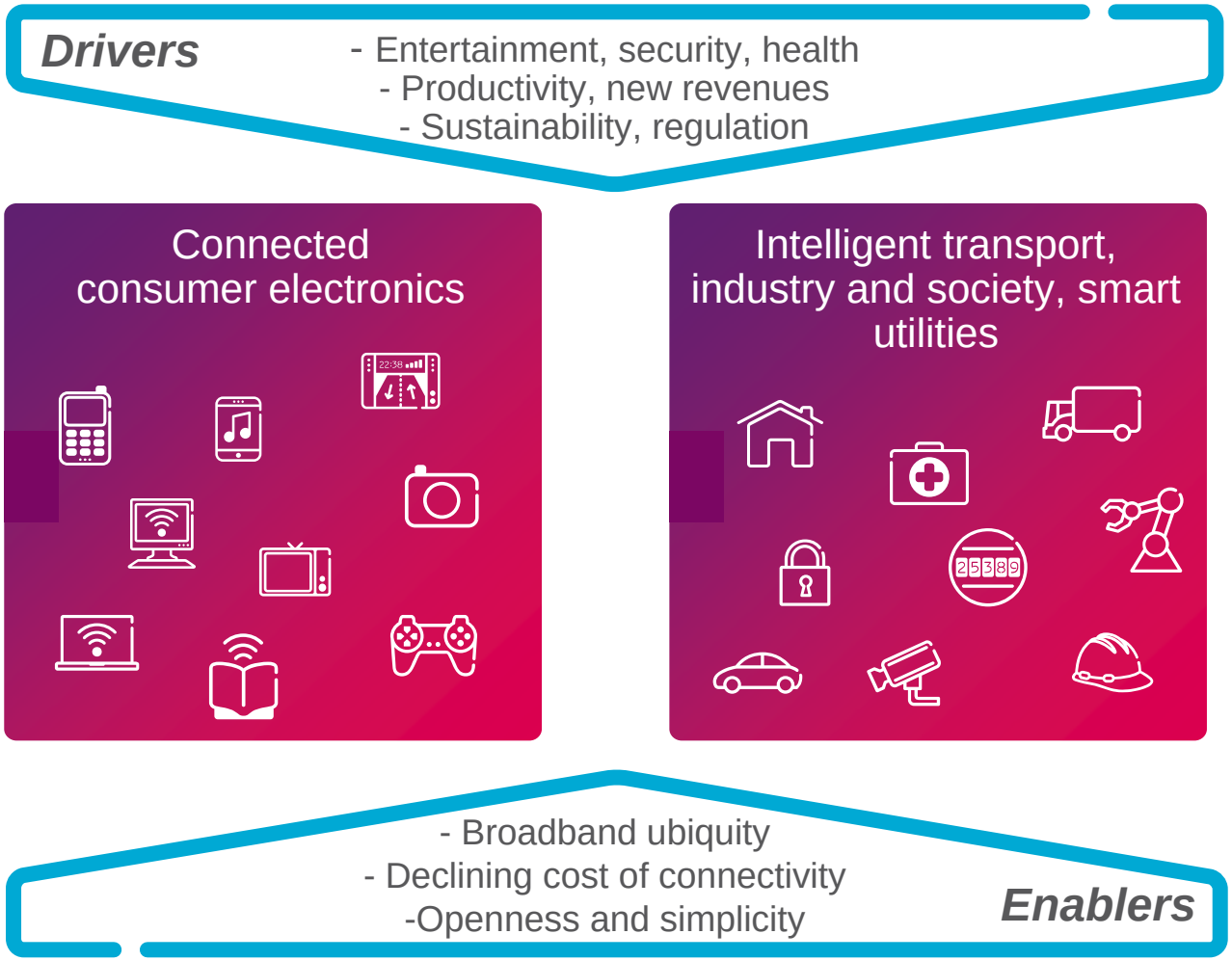
Source: Professor Carlota Perez Universities of Cambridge, Tallinn and Sussex

50 BILLION CONNECTED DEVICES

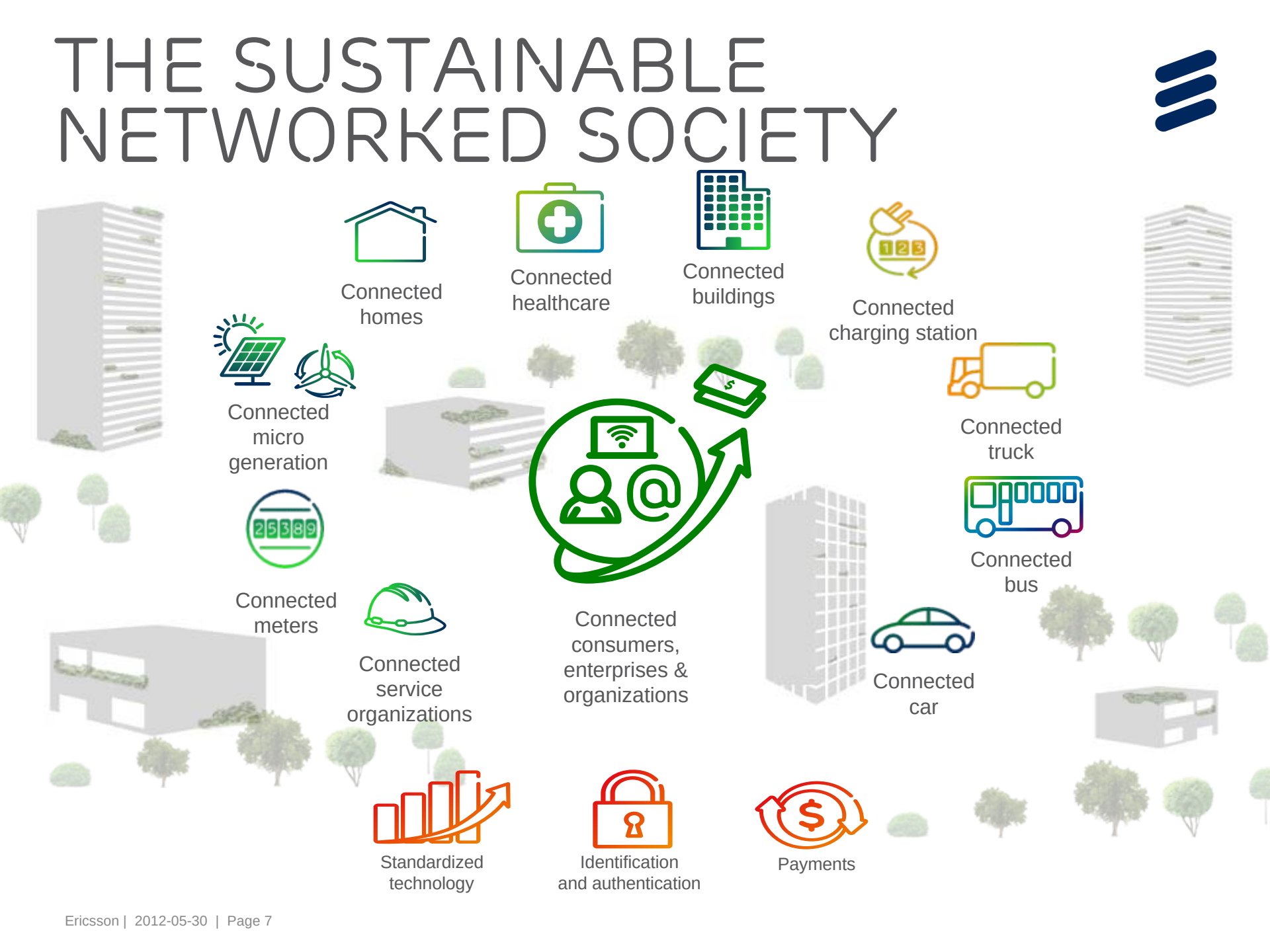


Everything that benefits from being connected will be connected

EVERYTHING CONNECTED



THE SUSTAINABLE NETWORKED SOCIETY



LCA FOR ICT SERVICES

LCA of ICT services requires LCA of ICT goods and networks

ERICSSON CO_2 REDUCTION CASE STUDIES

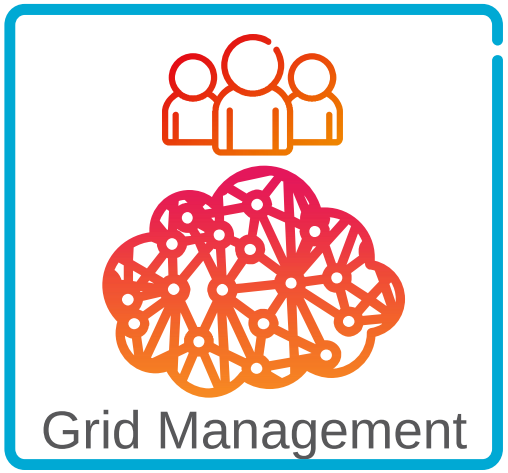
ICT service:	CO_2 Reduction ratio:	Country:
m-Health	> 20	Sweden
e-Health	> 45	Croatia
Digital delivery	Up to 200, -90%	Spain
Smart work	- 40%	Sweden
Virtual presence	Up to 200	Sweden, Global
m-Money	> 65	Kenya
Field Force Mgmt	Up to 100	Turkey

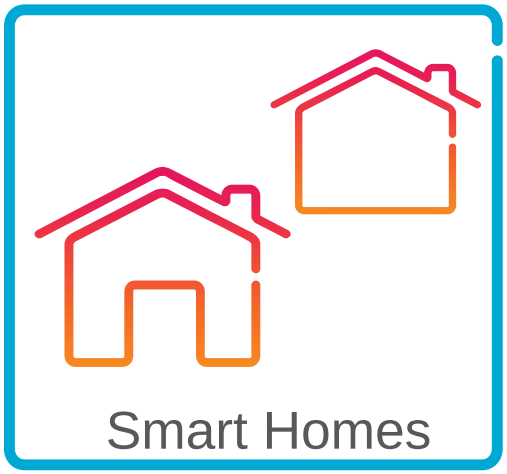




Case studies available on
http://www.ericsson.com/thecompany/sustainability_corporateresponsibility/enabling_a_low-carbon_economy/incremental_change

INTELLIGENT UTILITIES SYSTEMS





› Multiservice Comms Networks

IBERDROLA · COPEL · Énergie NB Power · endesa · Hydro Québec · vector

› Fibre to the Home

UNION FENOSA · Falu Energi & Vatten · Dalton · DONG energy · Radius

› Field Force Automation

energex · Giahsa

› Power Cables & Micro Grids

Fortum · VATTENFALL

› SCADA, Smart Metering & MDMS

VENCorp · City West Water · Yarra Valley Water | a fresh approach · acea · ASM Terni S.p.A. · Ausgrid

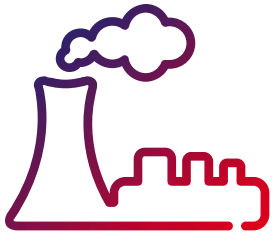
› Operational & Technical Consulting

ENECO energie · ESB · Origin energy

FROM "GREEN" TO "SMART"

› Green and Intelligent technologies will converge

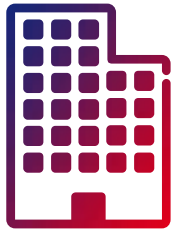
Smart is not only about adding technology, but about utilizing technology to achieve a sustainable future



› Smart Energy

Renewable energy (wind, solar, etc)

Smart grid infrastructure (real-time monitoring of power flow, energy surplus provision)



› Smart Buildings

Green and Intelligent with BIPV (Building Integrated Photovoltaics)

› Smart Mobility

Bus Rapid Transit

Electric vehicles and extensively deployed fast-charging stations

Source: Frost & Sullivan (October 2010), Ericsson

DATA CENTER GROWTH

"Data Centers are one of the fastest growing parts of the ICT industry and it is essential to reduce energy consumption and GHG emissions from these. ITU-T Recommendation L.1300 "Best Practices for Green Data Centers" states that reducing energy consumption and GHG emissions should be considered at the design and construction stages, and that constant monitoring will be required to consistently manage and improve energy consumption while the data center is in operation."

› The BroadBand Bridge, ITU Broadband Commission, p. 10, April 2012.

INNOVATION TO "ZERO"

› Emerging technologies will innovate to achieve Zero accidents, Zero breaches of security, Zero fatalities, Zero defects and Zero emissions.

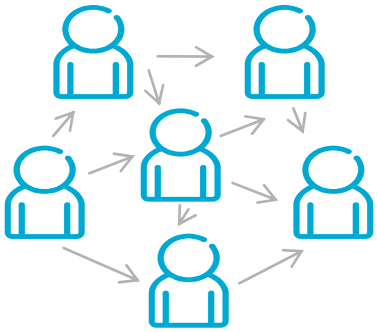
Source: Frost & Sullivan (October 2010)

INFRASTRUCTURE CHALLENGES

- Infrastructure services are common on most cities
- But different challenges arise based on the city's economical development

"DEVELOPING" CITIES CHALLENGES	INFRASTRUCTURE SERVICES	"DEVELOPED" CITIES CHALLENGES
Providing uninterrupted, affordable, quality services	Water	Modernizing, enhancing and/or expanding existing infrastructure
	Energy	
	Air	
	Waste	
	Housing	
	Transportation	
	ICT	
	Green areas	

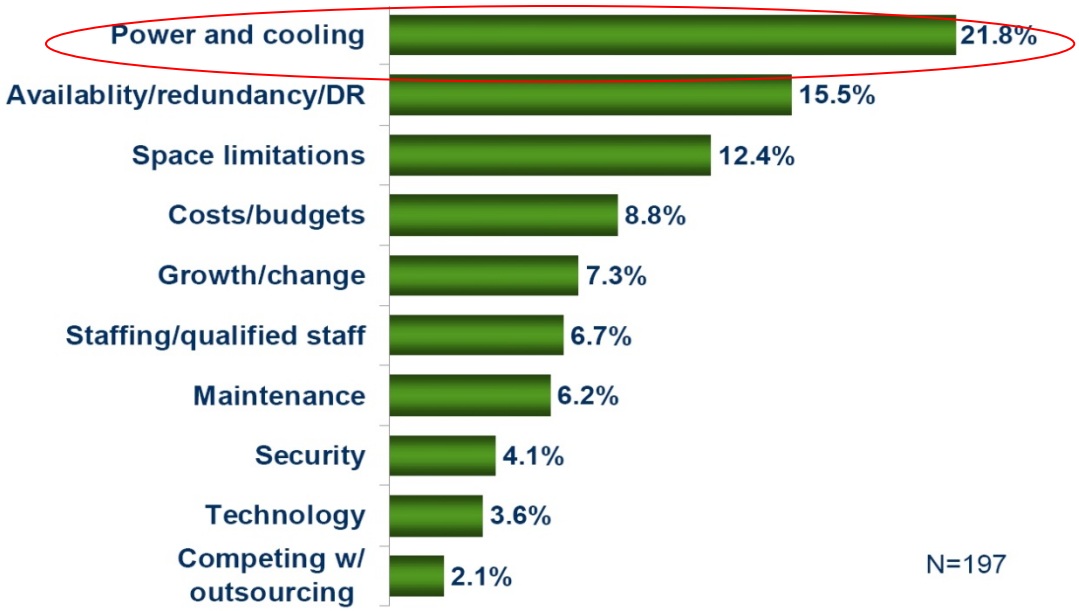
NETWORK CHALLENGES



New demands
on networks
mobility, broadband & cloud

ICT ENERGY & ENVIRONMENT CHALLENGES - SOLUTIONS

What is the number one challenge your data center faces today? *



*Source: IDC Inc.

THE GREENSTAR NETWORK SOLUTION

- Energy efficiency techniques
- Data centers powered by renewable energy sources (e.g. hydroelectricity, solar, wind)
- Separate infrastructure ownership and maintenance from usage
- All-optical Core network
- IT service is migrated around nodes when power dwindles
- Virtualization and Cloud Computing must be implemented
- Scalable & Flexible management for intermittent energy sources

How to keep IT service green?

THE GREENSTAR NETWORK SOLUTION

World's First Zero Carbon Internet & Cloud

(i)Distributed Cloud Software

(ii)Follow the Sun/Wind Energy

(iii)Carbon protocol, GeoChronos relocation

Infrastructure Resources

Compute Resource	M	Network Resource	M
Compute Resource	M	Sensor Resource 1	M
Network Resource	M	Sensor Resource n	M

Infrastructure Metrics Aggregation

Decision Engine

GHG Measurement Engine (ISO 14064)

Compute Cluster

Network Equipment

Instruments, Sensors

Metrics (M)

Data Centre n

GreenStar Network

Central Hub

Hydro-powered node

Spokes

Sun or Win powered nodes

THE GREENSTAR NETWORK MAP

Website: http://www.greenstarnetwork.com

Open-source: https://github.com/synchromedia/OpenGSN

GREENSTAR

How Real Reductions will be Achieved

GHG Emission reductions =

- Green Powering application
  - Cook/Diesel electrical plant
  - carbon-intensive energy sources
  - Data centre
  - +
  - Hydroelectric Dum
  - Wind turbine
  - Solar panel
  - zero or low carbon energy sources
- Compute efficiency
  - increase energy efficiency per unit of computing services delivered.
  - +
  - CLOUD COMPUTING
  - Server Consolidation, Infrastructure Virtualization and Cloud Computing
- Technological or process improvements that increase end-use efficiency
  - direct cooling
  - ...
  - ENERGY STAR
  - ...
  - higher efficiency servers
  - Data centre

CONCLUSION

- Virtualizing ICT infrastructure:
  - Green benefit: energy efficiency and GHG emission reductions.
  - Digital benefit: economic incentive for broadband network deployments.
  - Productivity benefit: economic incentive for investment in ICT products
- Green ICT must be a key element of both a digital economy strategy and an action plan to combat climate change.

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