Finances | Économie

Reducing GHGs with ICTs

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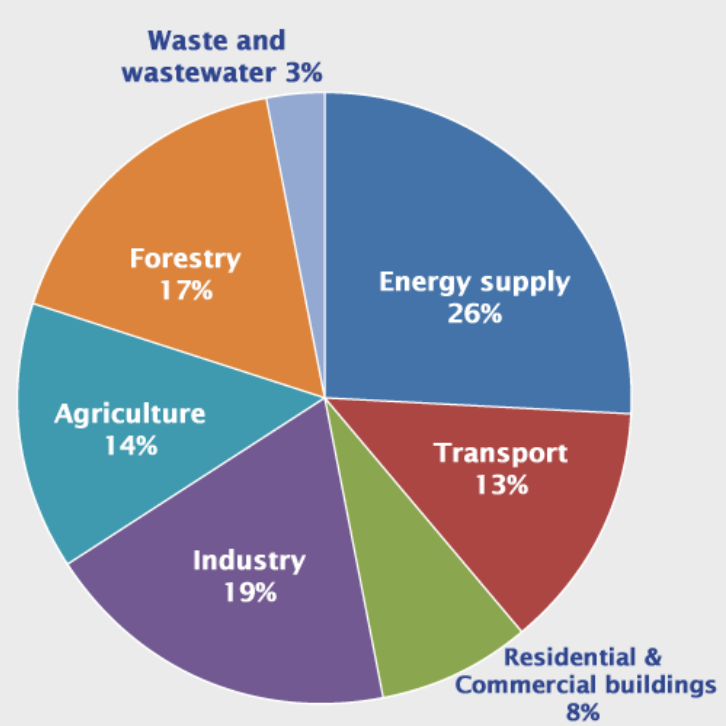
Québec

Outlook

- Green ICTs
  - ICT's carbon footprint and ways to reduce it (actions in Smart 2020 report and actions in Quebec)
- Greening with ITCs
  - It's role in GHGs reductions
  - Examples of ICTs uses in different sectors
- Quebec's climate change policies
- Conclusion

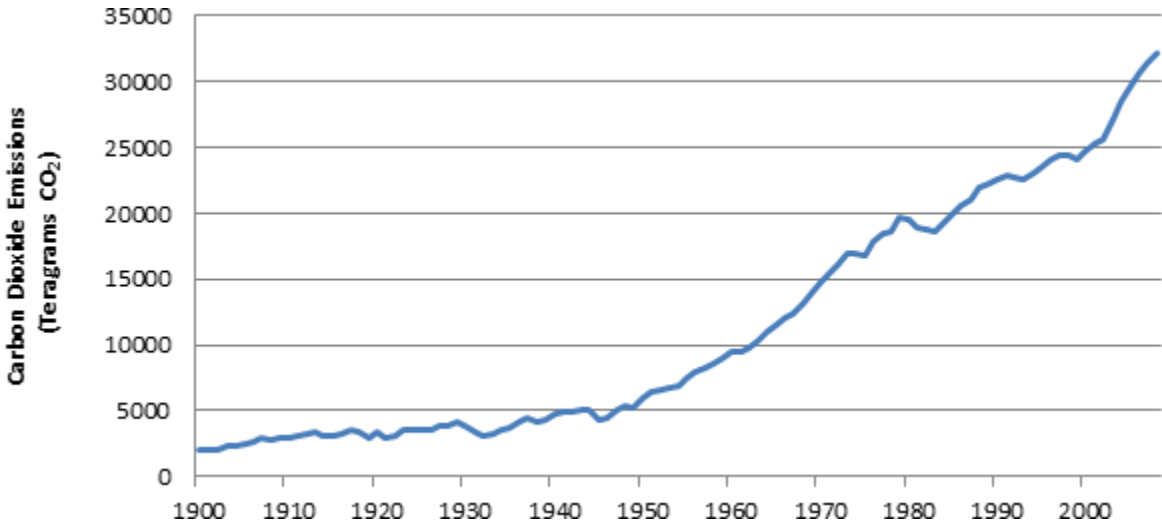
Green ICTs

Global GHG emissions



Source: IPCC 2007

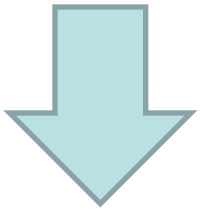
Fossil-Fuel emissions



Source: Boden, T.A., G. Marland, and R.J. Andres (2010). Global, Regional, and National Fossil-fuel CO2 emissions

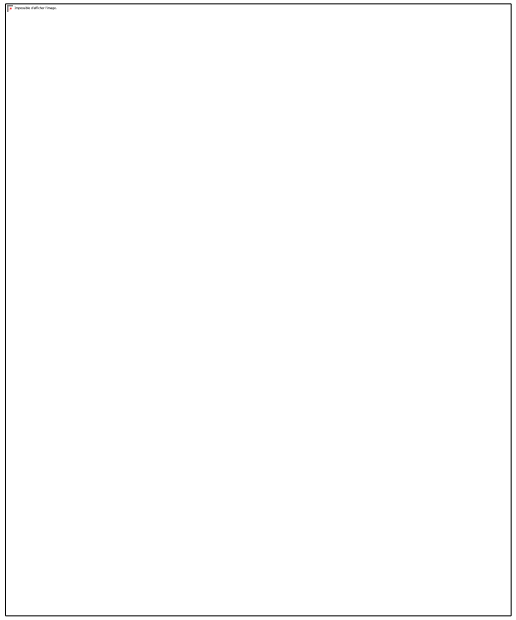
Trends in ICTs

- Increasing migration of social and economic activities on line: Facebook, E-Bay, etc.
- Strong decline in the cost of data collection, storage, transportation, and processing
- Increasing deployment of “smart” ICT applications such as smart grids and smart transportations based on machine-to-machine (M2M) communication
- Expansion of mobile communication



Higher Demand

Smart 2020 - methodology



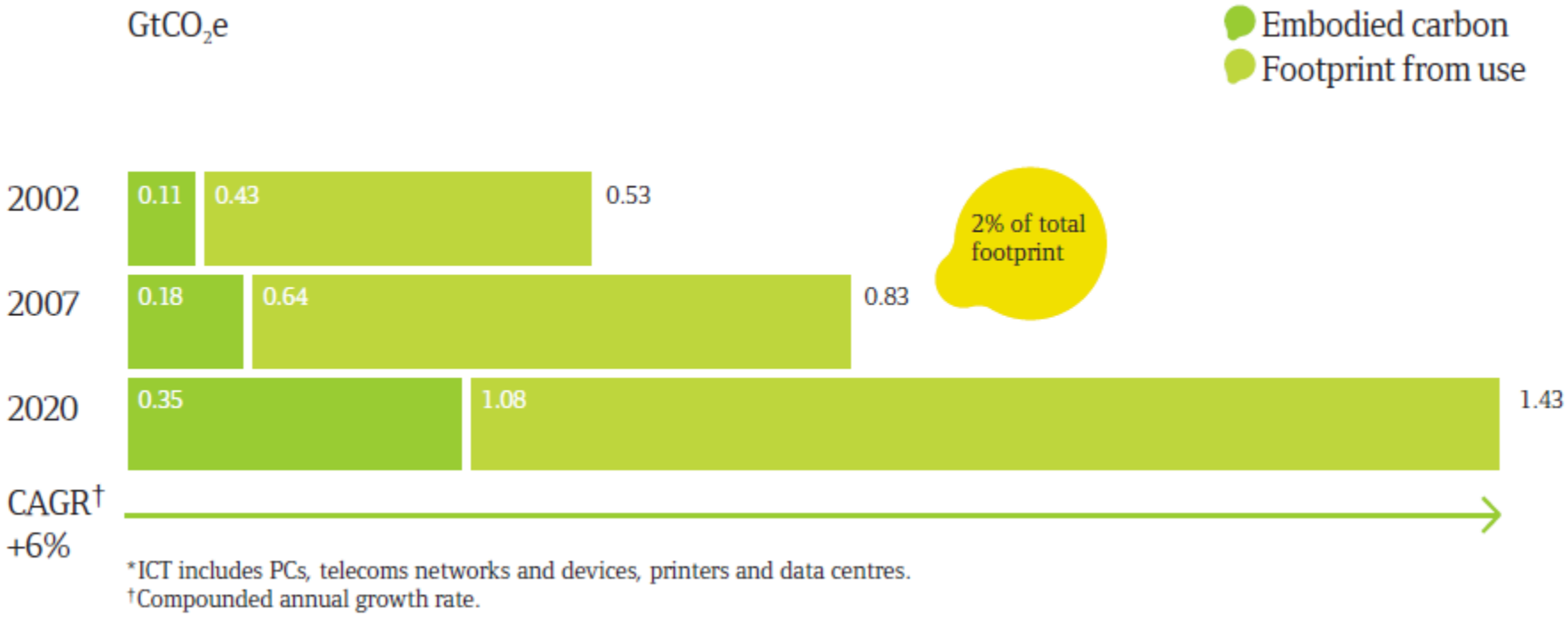
- The ICT sector covers:
  - PCs and peripherals
  - IT services
  - Telecom networks and devices
- Quantify the direct and indirect global impact of ICT on GHG emissions until 2020
  - Direct: Based on public and company based datas
  - Model used drew on McKinsey's previous work with Vattenfall on GHG reduction cost curve

Compared studies

Year	ICT emissions Mt		ICT share of overall emissions		Source
	CO2	CO2e	CO2	CO2e	
2002		530		1.1%	GeSI/The Climate Group 2008
2007	661		2.3%		Gartner 2007
2007		830		1.8%	GeSI/The Climate Group 2008
2007		1160		2.5%	Malmodin et al.

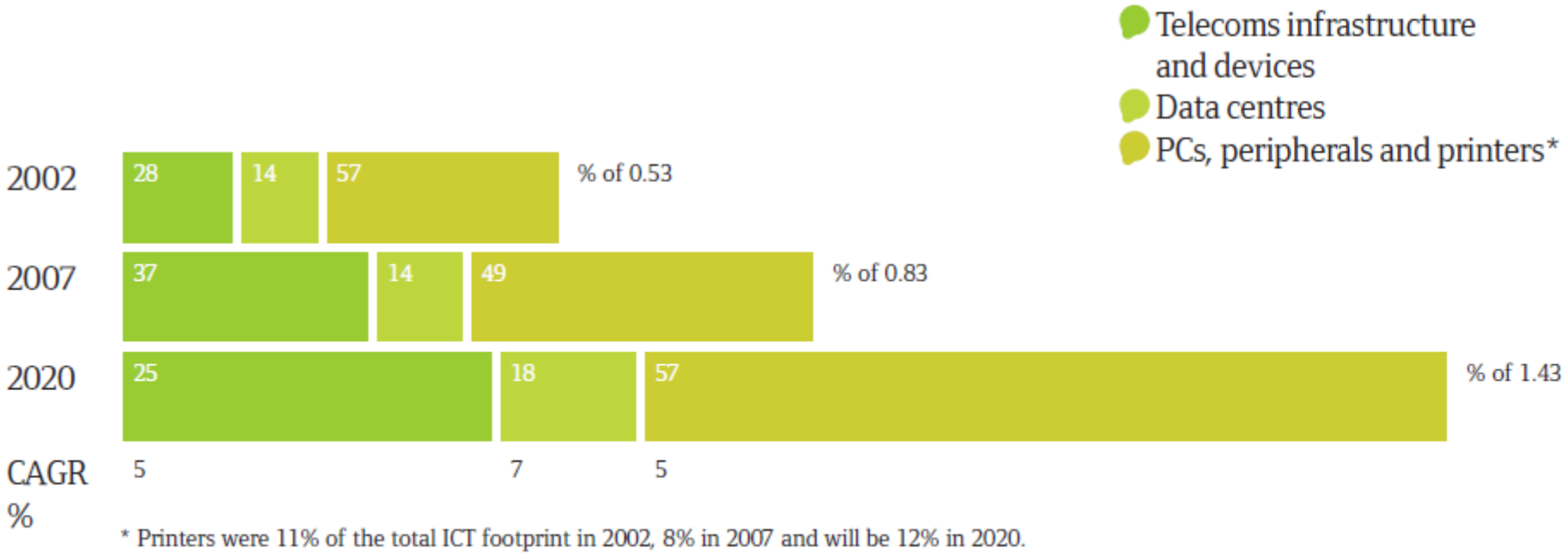
Source: Compiled by OECD

ICTs carbon footprint



Source: Smart 2020 report

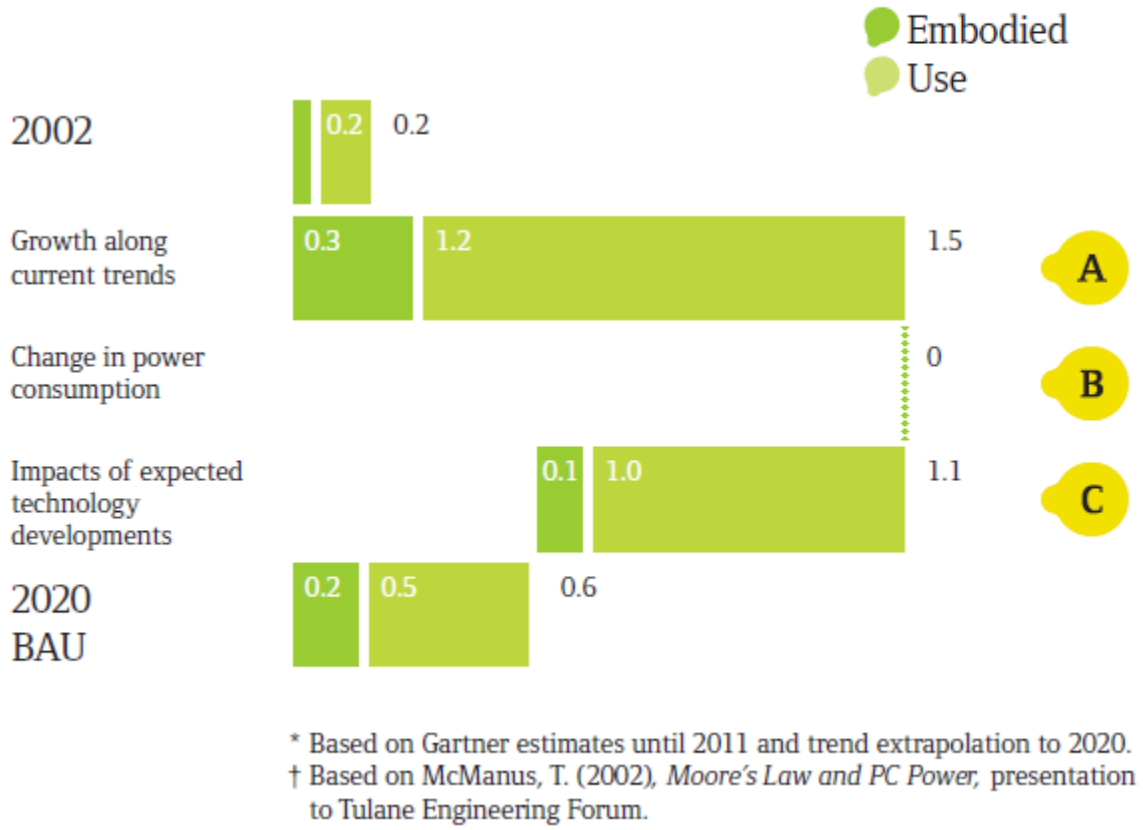
Footprint by subsector



Source: Smart 2020 report

PCs and peripherals

Gt CO2e



A: Today's technology

B: Better Efficiency

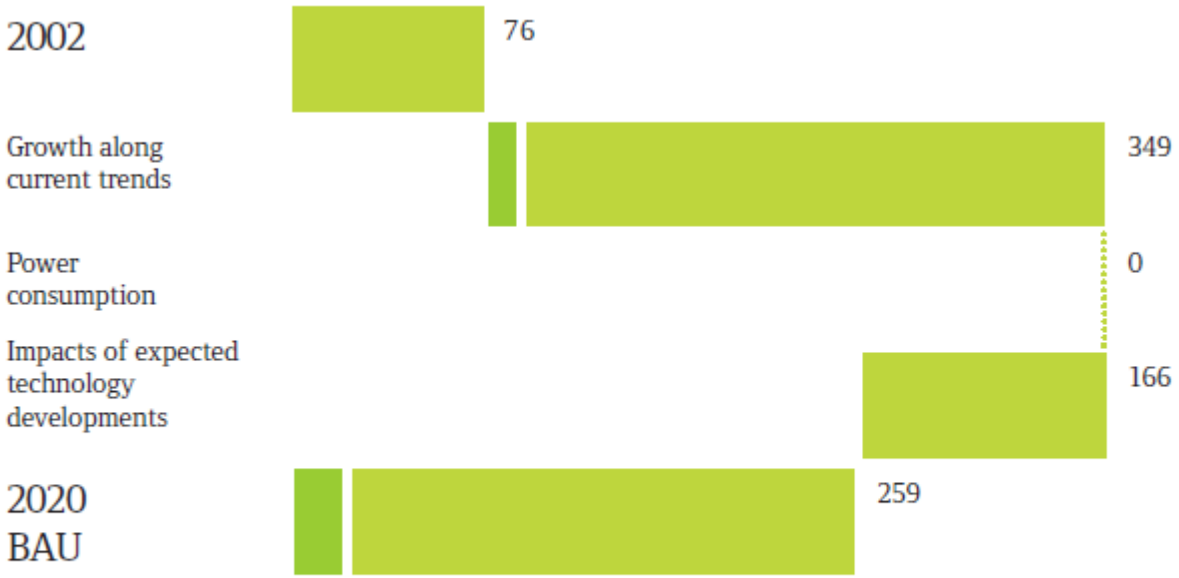
C: Laptops, low energy screens

* Based on Gartner estimates until 2011 and trend extrapolation to 2020.
† Based on McManus, T. (2002), *Moore's Law and PC Power,* presentation to Tulane Engineering Forum.

Source: Smart 2020 report

Data centers

MtCO2e



*Based on IDC estimates until 2011 and trend extrapolation to 2020, excluding virtualisation.
†Power consumption per server kept constant over time.

A: Increased number of servers from 18 M to 122 M

B: Better efficiency

C: virtualisation (27% efficiency) and smart cooling (18%)

Ex.: Readily available cloud-based email, customer relationship management and groupware applications offer a carbon abatement potential within China of 1.9 Mt CO2e annually

Source: *The enabling technologies of a low carbon economy, a focus on cloud computing, GeSI*

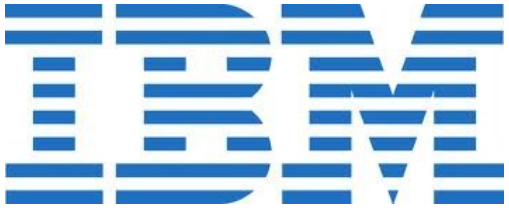
Quebec's project on Green ICT – Equation (Prompt)

- Part of an Innovation Strategy (Stratégie québécoise sur la recherche et l'innovation)
- Objective of the partnership: develop and demonstrate new technolgies (ICT) that help reduce GHGs
- 70 M $: 30 M$ from the governement and 40 M$ from industry
  - Where 5% must go to Research centers and 5% to SMEs
- Six companies:
  - CGI, Ericsson, Fujitsu, IBM, Miranda, Teledyne Dalsa
- Key areas:
  - Cloud computing
  - Smart grid

http://equationict.com/

ERICSSON

- Project:
  - Develop cloud network infrastructure node prototypes that will handle increased traffic and addresses without significantly increasing energy usage
  - Develop software cloud network management tool prototypes that will enable the measurement of energy usage by slices and virtualized portions of the network
- Next phase:
  - Green Star Network

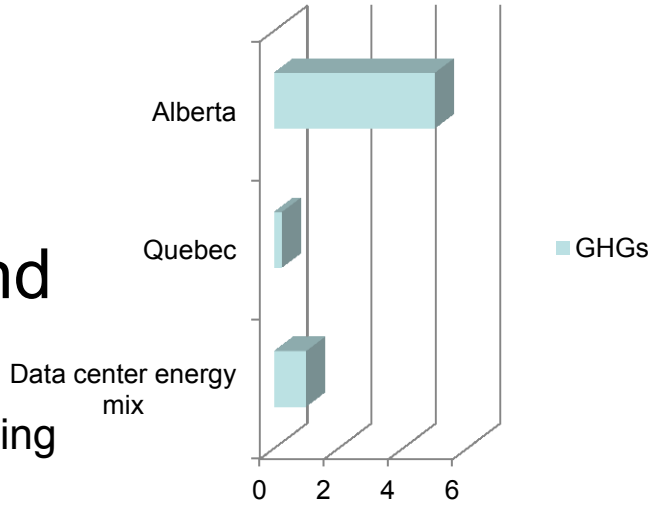


- IBM Bromont, specialized in advanced flip chip assembly
- Design and development of forward looking manufacturing process allowing for significant reduction in power and water consumption

TELEDYNE DALSA
Everywhereyoulook™

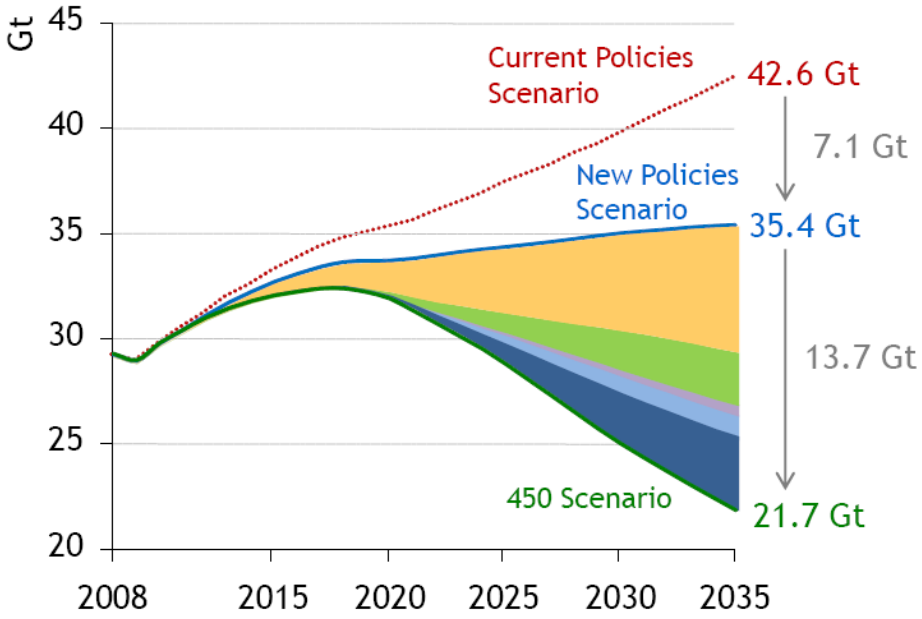
- Company specialized in MOEMS (Micro-Opto-Electro-Mechanical Systems), miniaturized mechanical and electro-mechanical elements that are made using the techniques of microfabrication
- Project: Develop a customized integrated optoelectronic switch, with low power consumption, for digital optical-fiber communication networks

- Quebec's Carbon Footprint program - Pilot project with 12 companies
- Cloud computing service where 16 000 active mail boxes will be offered in a virtual environment
- LCA: Material acquisition & manufacturing, Operation and use, end of life
  - GHG Protocol Product Life Cycle Accounting and Reporting Standard ICT Sector Guidance



Greening with ICTs

Energy Efficiency for a low C future (IEA)



Share of cumulative abatement between 2010-2035	
Efficiency	50%
Renewables	18%
Biofuels	4%
Nuclear	9%
CCS	20%

In moving from the New Policies Scenario to the 450 Scenario, more expensive abatement options such as CCS play a growing role

IEA. 2010. *World Energy Outlook 2010*. N. Tanaka, Executive Director, IEA, Beijing, 17 Nov. 2010. PowerPoint presentation. 35 slides. http://www.energy.eu/publications/weo_2010-China.pdf

ICTs enhance efficiency & facilitate conservation

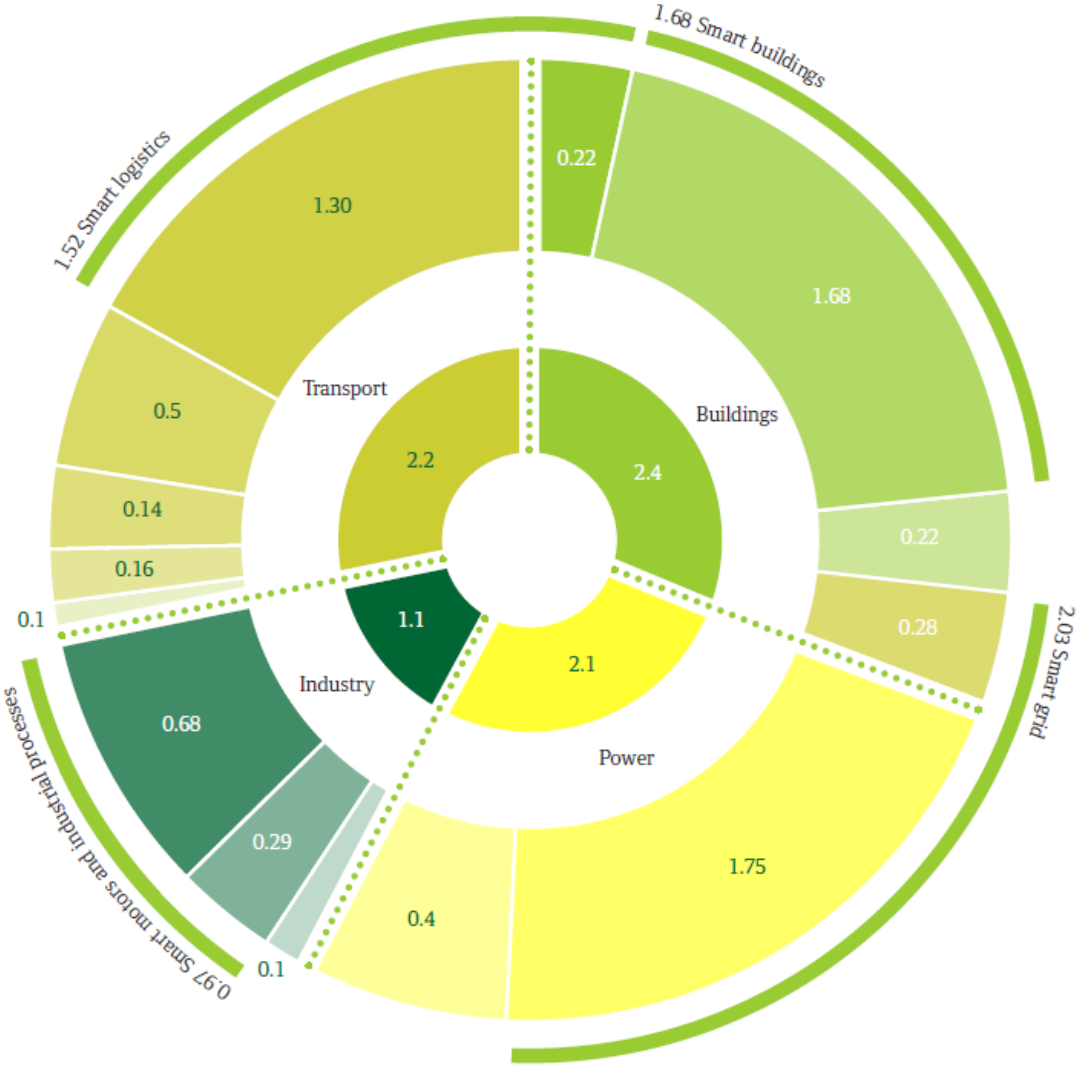
- Process efficiency
  - Doing things fast
  - Use less energy → emit less Carbon
- Controlling everything
  - Smart controls
  - Connect & control all motors & energy consumption

12% energy efficiency gain by letting consumers send in their utility meter readings by SMS / Smart Phone

Listening to music today consumes half the CO2 to play that a decade a go using CDs (Stanford University)

Accenture Study: Cloud solutions can reduce energy use and carbon emissions by +30% Vs. on-premise.

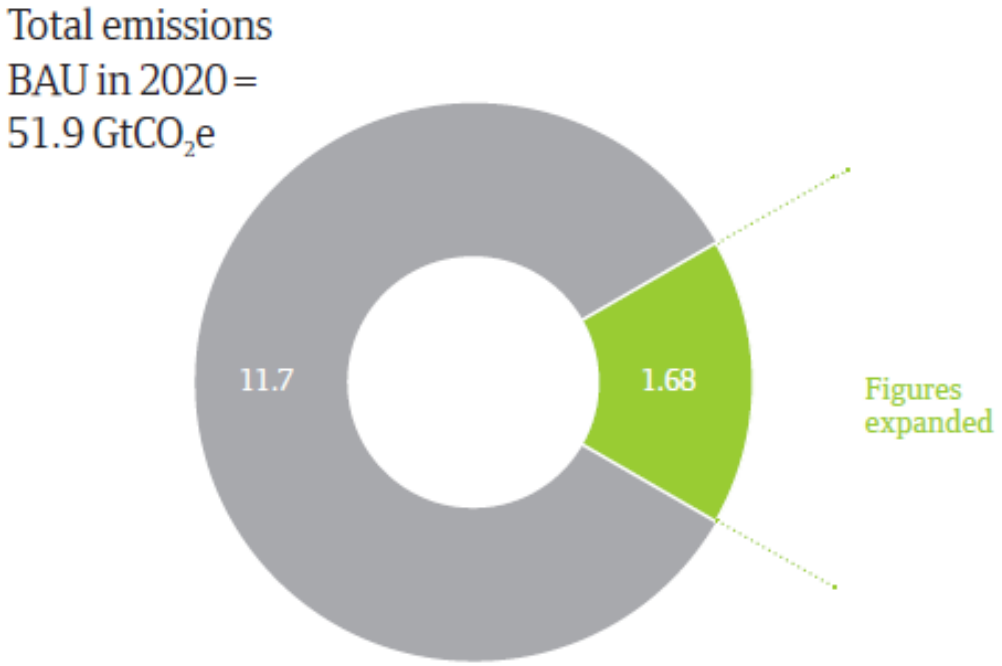
GHGs reductions – greening with ICTs



7.8 Gt CO2e ICT-enabled abatements

Source: Smart 2020 report

Smart buildings



Scope of energy efficiency: examples

Technical Measures

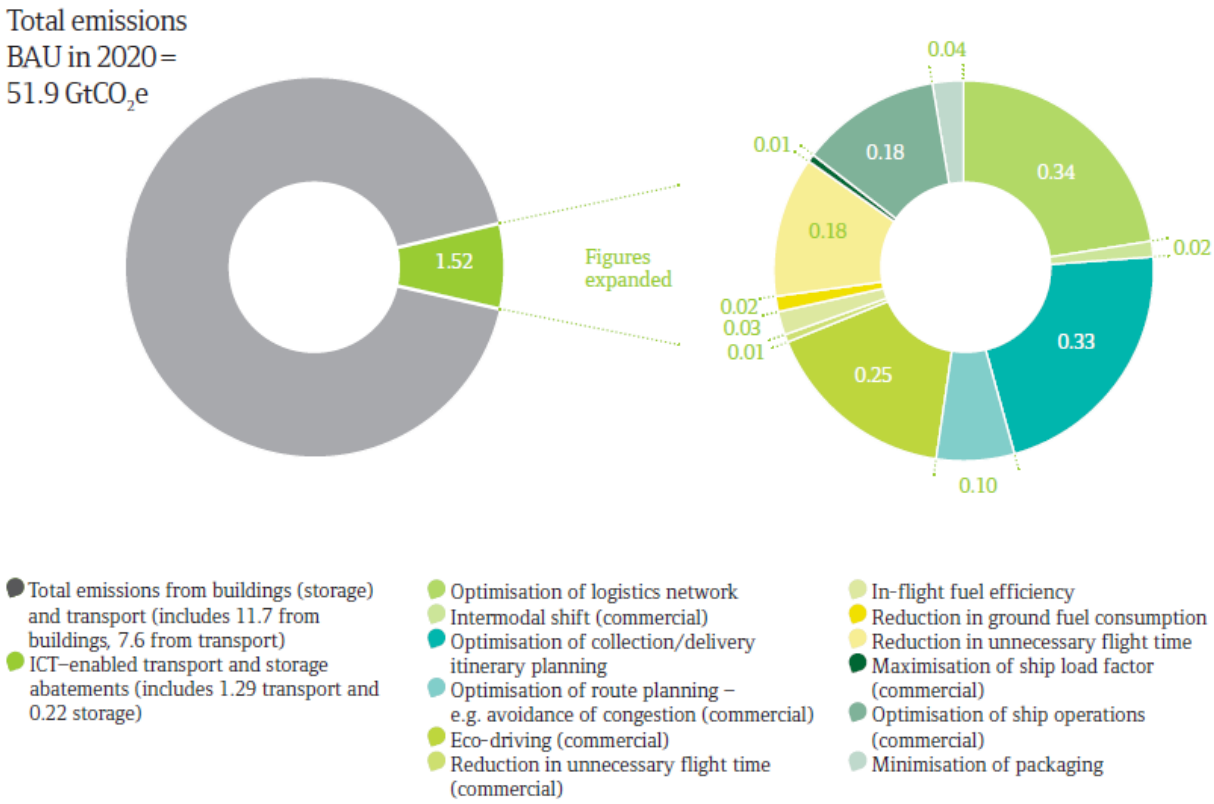
- Lighting retrofit – T8, T5, Electronic Ballasts, LED technology
- Lighting Controls – Timers and occupancy controls
- Day Lighting
- Lighting Reconfiguration

- Reduce Run Time of Major HVAC equipment
- Demand Controlled Ventilation
- Enthalpy Economizer
- Chilled / Condenser Water Reset

- Convert CAV Air Handling System to VAV
- Occupancy Sensor Control of HVAC
- Replacement with High Efficiency Units
- Variable Flow Pumping

- Energy-Efficient Motors
- Motor Variable Speed Drives
- Equipment Sequencing
- Proper sizing
- Cogeneration

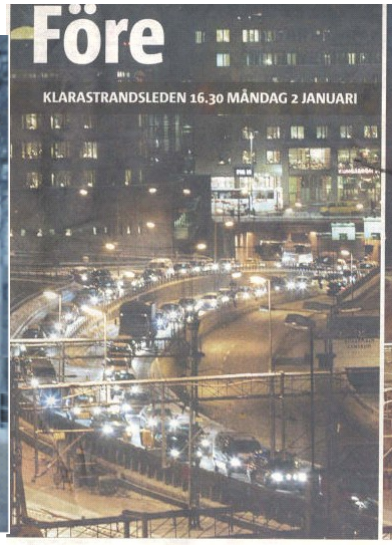
Smart logistic

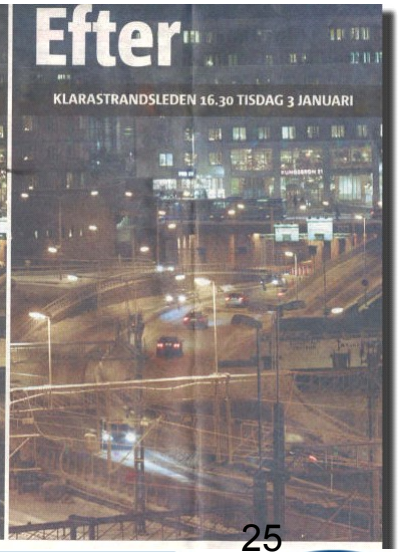


- Onboard driver information and data logging
- Real time fleet tracking
- Global Positioning Systems (GPS)Telematics
- Supply chain design and modelling software
- Real time route optimisation (RTRO) software
- Electronic freight exchanges (EFX) to allow for the “auction” of spare space on vehicles

Example IBM – Stockholm Congestion Charging System

- The congestion charge is a national tax levied on most vehicles entering and exiting central Stockholm ($84 million)
- Amount of tax payable depends on what time of the day
- Technologies: automatic plate recognition with cameras, laser detectors, antennas
- Effects: reduced traffic by 20%, GHGs by 12%





Greener Aircraft

- Name of the project: **SA²GE (Smart Affordable Green Efficient)**
- Name of the organization: **Coalition for Greener Aircraft**
- Term: **4-years**
- Budget: **$150 millions** ($70 millions comes from the provincial government and $80 millions from the industry)

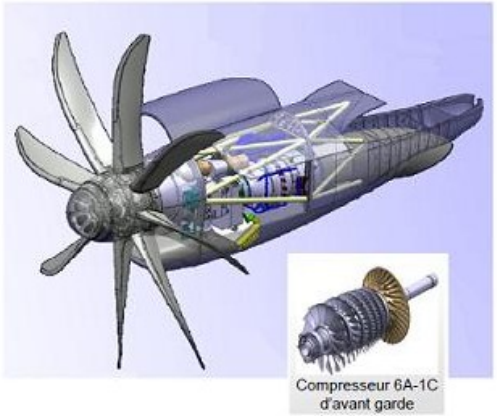
www.sa2ge.com

Greener Aircraft

New technologies on 5 critical components

- Composites fuselage
  - **Bombardier inc.**
  - **Bell Helicopter Textron Canada Ltée**
- Green compressor
  - **Pratt & Whitney Canada Corp.**
- Cockpit applications
  - **CMC Électronique (filiale Esterline Corp.)**
- Integrated modulor avionics for critical systems
  - **Thales Canada inc.**
- Landing gear of the future
  - **Héroux Devtek inc.**

BOMBARDIER



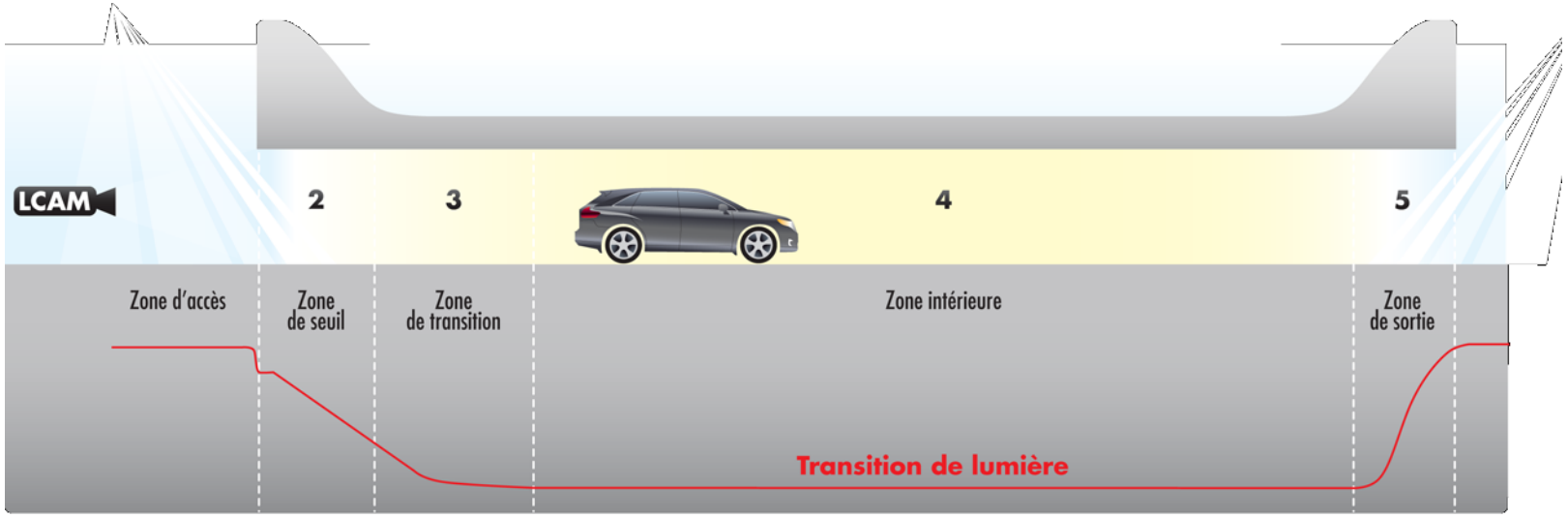
Données exclusives à P&WC

Propriété d'Esterline CMC Électronique

Lufa Farms

- Hydroponic greenhouse rooftop farm
- Food box to a subscriber base of about 1,000 people
- Has recently secured $4 million in equity investments led by a venture capital fund
- Energy optimization: rideaux thermiques, climatisation avoided for the building under the greenhouse
- Less Water: rain utilization, water recirculation

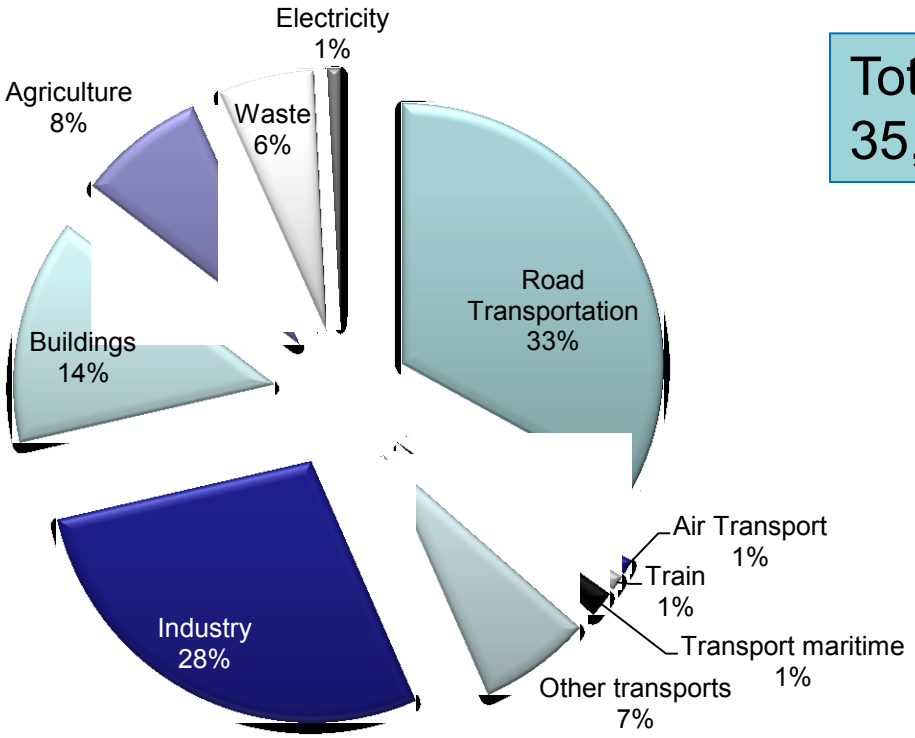
NYX Hemera Technologies



- Control system for tunnel lights
- Automatically adapts the brightness at a tunnel's entrance, according exterior luminance
- Monitors lights use-life
- Control of each light individually
- Leads to efficiency gains

Quebec's climate change policies

Quebec's 2009 GHGs

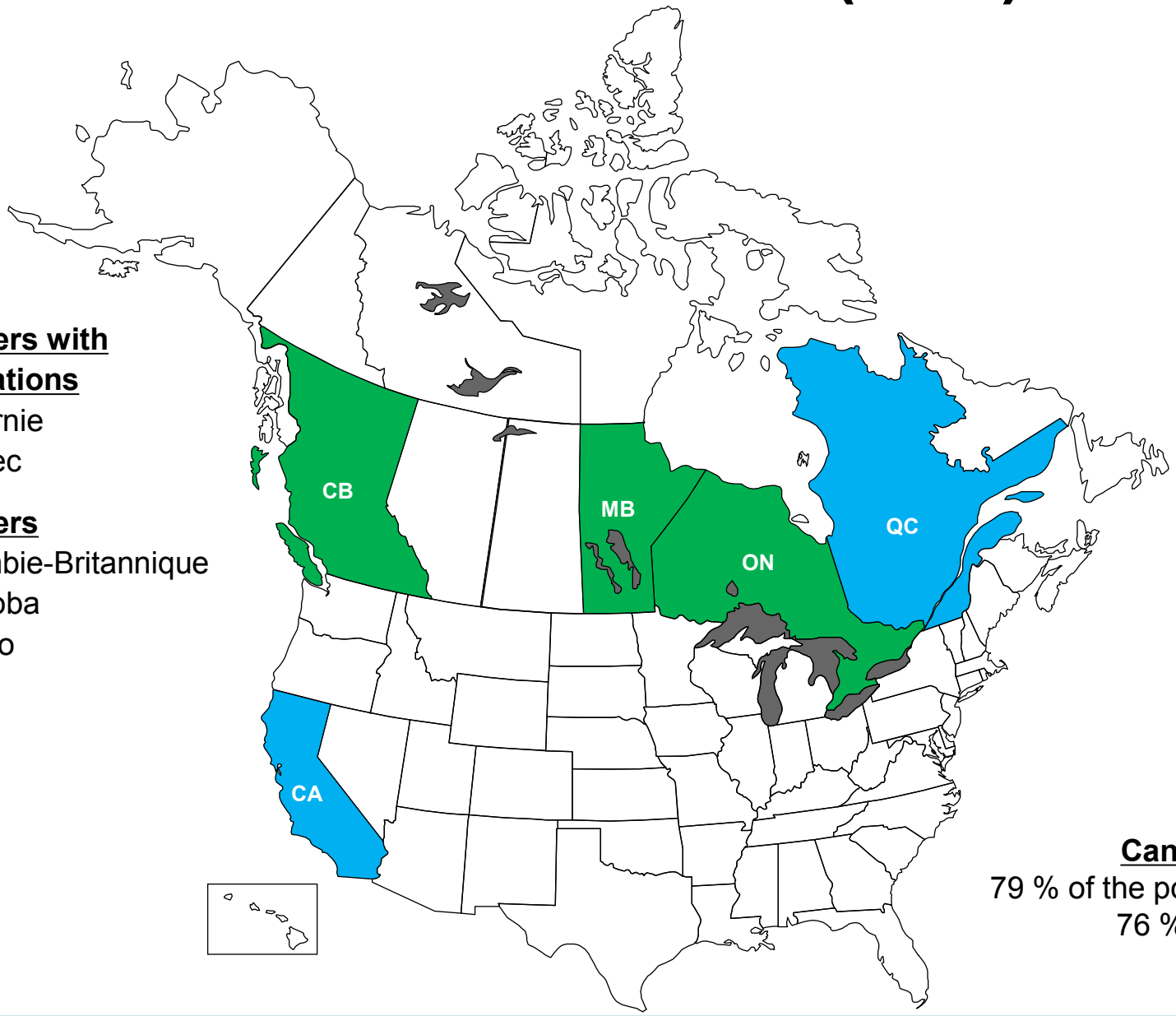


Total transportation:
35,6 Mt, 43,5 %

Total: 81,79 Mt CO2e

Source: GHG inventory 2011, MDDEP

Western Climate Initiative (WCI)



Partners with regulations
Californie
Québec

Partners
Colombie-Britannique
Manitoba
Ontario

Canadian partners
79 % of the population (2011)
76 % of GDP (2011)

ICT's role

- Cap & Trade
  - Companies directly regulated and all fuel consumers will need new ways of reducing their energy consumption and CO2 emissions
  - The rate of return on investment will change with the carbon cost
- Climate Change Action Plan
  - Use of best practices in logistics for less energy-consuming transportation

Conclusion

Conclusion

- ICTs are responsible for about 2% of GHGs they can help reduce them by 15%
- Greening the ICT but also integrating ICTs in transport, industry, energy sectors where major efficiency gain

Merci!

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