ICT and Climate Change

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Introduction

Pros and Cons of ICTs

- The rapid growth of ICTs bring many benefits
  - Efficiency
  - New economic sector
  - Innovation

- In addition, ICTs can cause difficult problems
  - energy requirements
  - e-waste

Introduction

- ICT positively contributes to Climate Change
  - Making business more efficient and less polluting
  - Reducing energy required for productivity in various areas
  - Facilitating monitoring and modeling of climate change
  - Promoting awareness, education, knowledge sharing on climate change

Introduction

- ICT negatively contributes to Climate Change
  - Releasing of greenhouse gases (GHG)
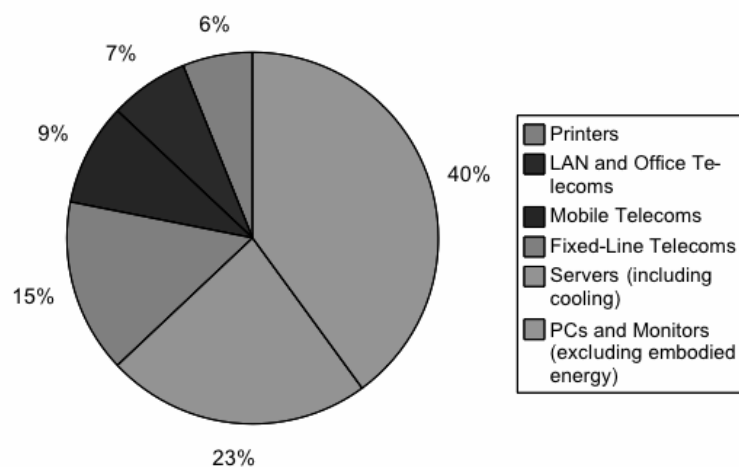 - Producing e-waste

GHG Emission

- The ICT sector (excluding the radio-communication sector) contributes between 2% -2.5% of GHG

- Main sources:
  - Increase of user devices, all of which need power and radiate heat
  - ICT devices acquire more processing power, their requirement for power and for cooling rise

- ICT is growing faster than the rest of the economy, then this share might increase

Source: ITU report ICTs and Climate Change, 2009

Estimated distribution of global CO2 emission from ICT

Legend:
- Printers
- LAN and Office Telecoms
- Mobile Telecoms
- Fixed-Line Telecoms
- Servers (including cooling)
- PCs and Monitors (excluding embodied energy)

Pie chart values: 6%, 7%, 9%, 15%, 23%, 40%

Mitigating the Impact of ICT on Climate Change

The sector faces the challenges to limit and reduce its carbon emission

- Directly: by reducing the ICT sector's own energy requirement
  - Ex: Next Generation network reduce the energy consumption by 40% compared to PSTN.

- Indirectly: by limiting and reducing GHG emission in other sectors
  - Ex: promoting video conference instead of travelling

Mitigating the Impact of ICT on Climate Change

- BT in UK reduced its carbon footprint by 58% since 1996
- Vodafone group announced that it will reduce its CO_2 emission by 50% in 2020:
  - Improvement in energy efficiency
  - Increase use of renewable energy
  - Develop products and services that help its customer to reduce their own emission.
- Cisco Systems, NTT have similar approaches

ICT to reduce GHG in other sectors

- Reducing travel requirements for people and goods especially business travel
  - Email, phone calls, video conference, supply chain production, collaboration tools

Telecommuting and e-work

- ICTs allow unprecedented capability to improve business efficiency
  - Reduced travel costs for
  - Smaller commercial real estate
  - Reduced utilities costs for commercial real estate

- While not all business are good candidates for telework, available opportunities are impressive.

Telecommuting and e-work

- Telecommuting requires an evolution of business practices. Some things can go wrong…
  - Communication costs are higher
  - Levels of trust are lower among team members
  - Decision making can take longer
  - The infrastructure must be reliable

ICT to reduce GHG emission

- Reducing CO2 emission caused by transport

- Transport accounts for 14% of total GHG emissions

- Intelligent Transport System: ICT can be used
  - parking guidance systems,
  - GPS use for navigation,
 - management of congestion

ICT and Business Efficiency

ICT to reduce GHG emission

- By making business more efficient, ICTs reduce the amount of energy and resources necessary in manufacturing, services and so forth.

- Adding ICTs to the electrical grid allows more efficient utilities.
  - This market is expected to grown from $69.3 Billion in 2009 to $171.4 Billion in 2014.

ICT and Business Efficiency

GDP vs. Energy Efficiency
(Top 40 Economies by GDP)
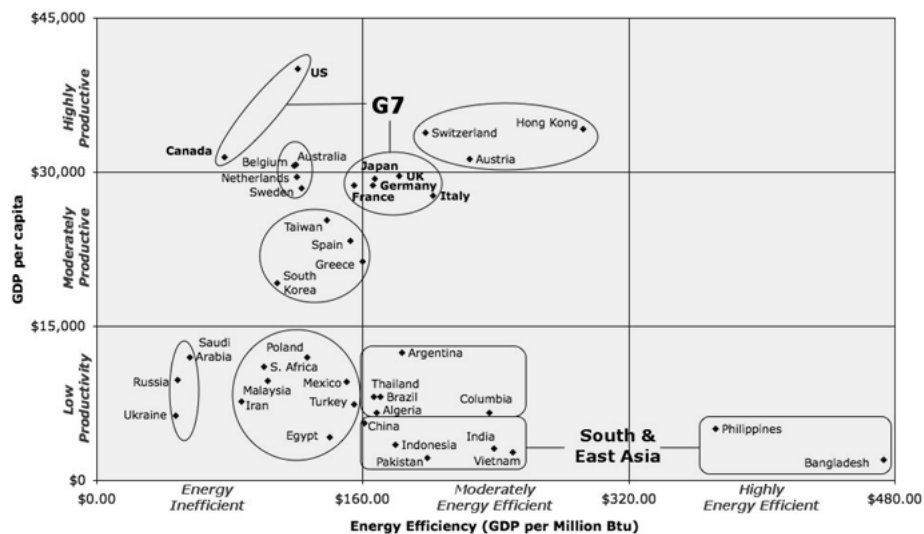
ICT and Business Efficiency

- Together with other factors, ICT use has enabled businesses to significantly reduce their resource requirements and pollution outputs.

- Estimates in the US market have shown that up to $2.8 billion per year in energy costs could be saved by turning computers off at night.

- Using more efficient data centers (using virtualization) has allowed companies to save 8.4 Billion kilowatt hours of electricity per year.

ICT for Monitoring Climate Change

- ICTs are widely used to measure climate change
  - Distributed data collection (thermometers, etc.)
  - Data observation through satellites
  - Analyzing forensic records of past climate activity
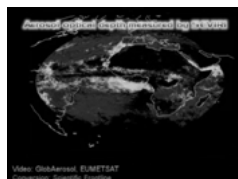
ICTs for Modeling Climate Change

- The global climate is very complex. ICTs help us create models to understand this system.

Reducing Direct Pollution from ICTs

- e-Waste is very dangerous for the environment.
- Desktop PCs contain harmful chemicals such as:
  - Lead,
  - Mercury
  - Cadmium,
  - Arsenic

- A computer monitor may contain more than 6% lead by weight!

Reducing Direct Pollution from ICTs

- Increasing the useful life of ICTs makes them more efficient (PC have an average life cycle of 3.4 years)

- Facilitates Social Capital development by teaching useful job skills

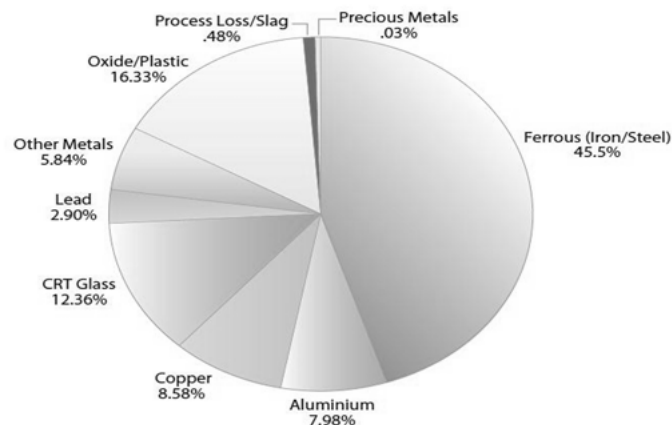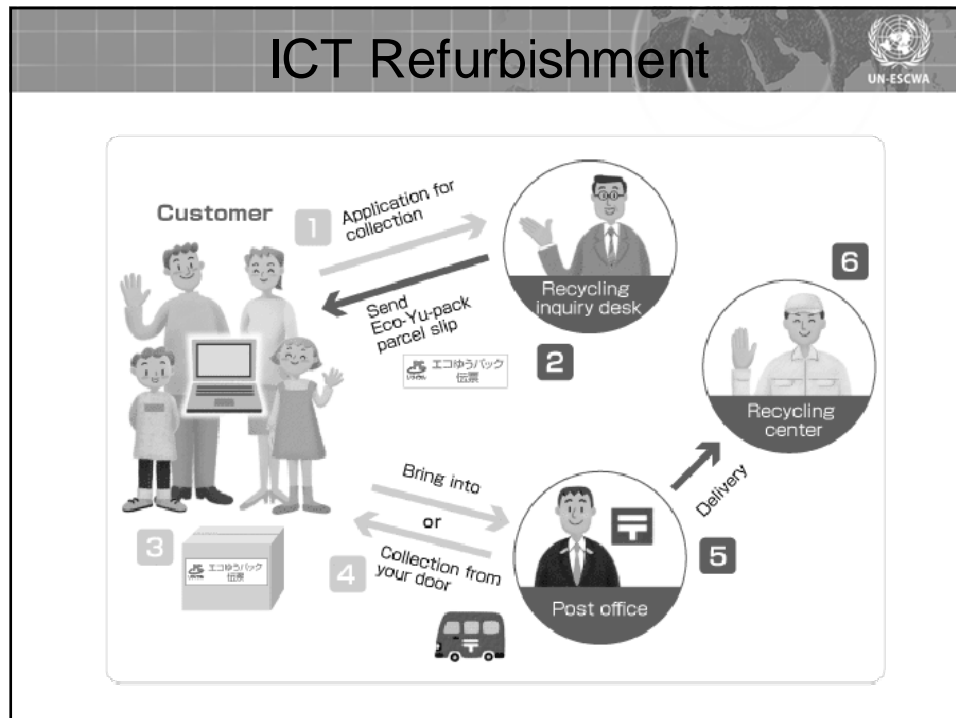- Recycling and refurbishment are used to accomplish these goals

ICT Recycling

Recycling E-Waste Recovers Significant Resources

RDC provides each customer with a breakdown of the resources recovered from its discarded IT equipment. This chart shows the materials recovered, as a percentage of the total weight, from a typical customer with a collection of PCs, monitors and printers that have been disassembled and recycled.

Process Loss/Slag .48%
Precious Metals .03%
Oxide/Plastic 16.33%
Other Metals 5.84%
Lead 2.90%
CRT Glass 12.36%
Copper 8.58%
Aluminium 7.98%
Ferrous (Iron/Steel) 45.5%

ICT Refurbishment

Industrial Opportunity

- 40 million tons of electronic items are generated as e-waste worldwide annually;

- Only 20% is recycled and disposed of in a proper manner;

- Turnover exceeded $1 billion in 2007 in Europe;

Source: Jan Krikke. Recycling e-Waste: The Sky is the Limit. IEEE Computer Society. January/February 2008

Conclusion

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- When used properly, ICTs make a major difference in understanding and acting on climate change.
  - Reducing pollution (directly and indirectly)
  - Monitoring the climate
  - Modeling changes

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Thank you