8th World Telecommunication/ICT Indicators Meeting (WTIM-10)
Geneva, Switzerland, 24 - 26 November 2010

Contribution to WTIM-10 session 9

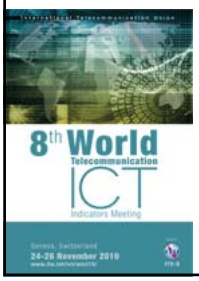
Document C/38-E
26 November 2010

English

SOURCE: Climate Associates Ltd

TITLE: Session 9: Measuring ICT and Climate Change - Quantifying the impact of ICTs on Climate Change

Session 9: Measuring ICT and Climate Change Quantifying the impact of ICTs on Climate Change



Dr K R Dickerson

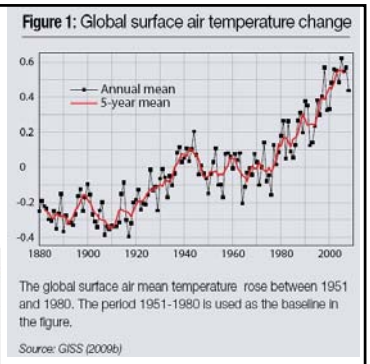
Chairman SG5 WP3
ICT & Climate Change

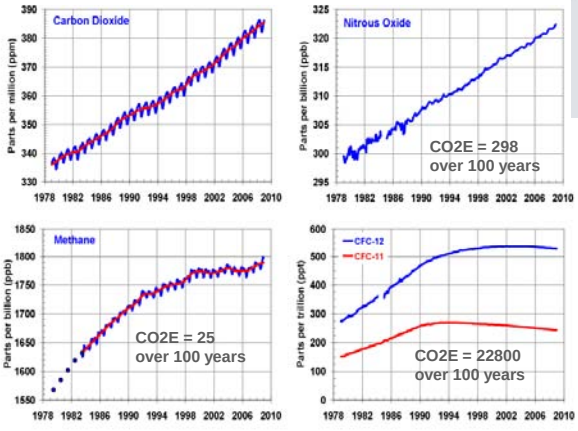
Overview

- The Problem
- What has ITU-T done so far?
- How are we measuring the impact of ICTs on Climate Change?
- What is ITU-T going to do next?
- Who are we working with?

2

Climate Change is happening



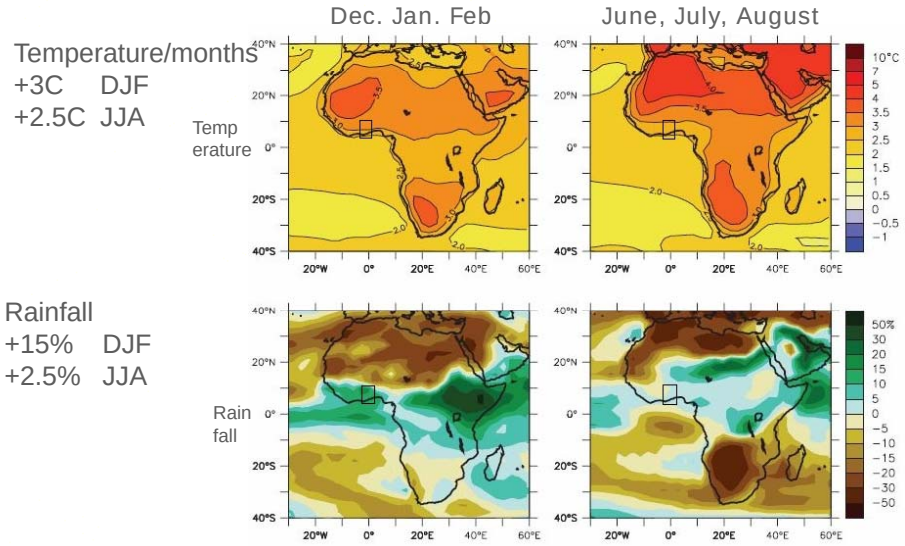


http://www.unep.org/yearbook/2010/PDF/year_book_2010.pdf

http://en.wikipedia.org/wiki/File:NOAA-greenhouse-gases.png

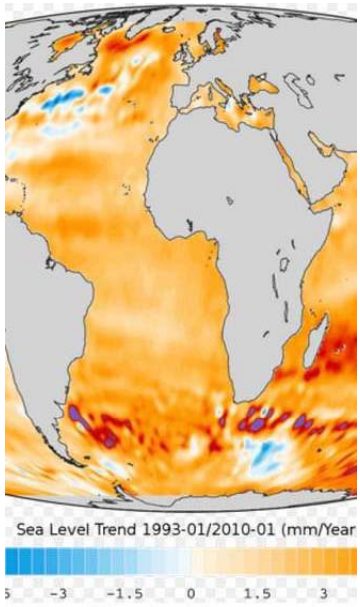
Climate change 100 years ahead

1980-1999 to 2080-2099 - These are averages. Daily & seasonal weather changes could be bigger



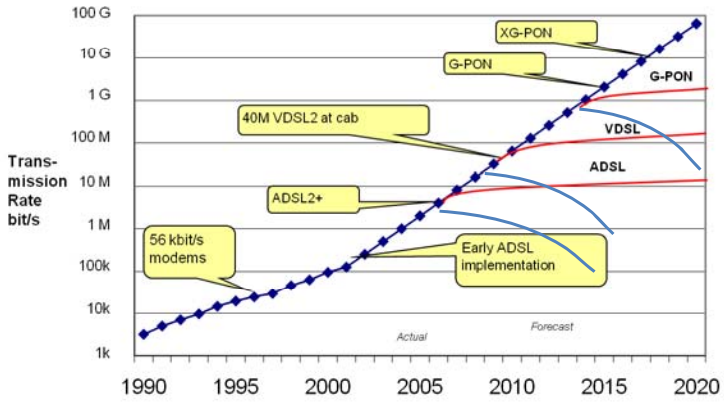
Sea Level Rise this Century

- IPCC 4th assessment report prediction [1] - 0.18-0.59m
- “Models of glacier mass balance (difference between melting and accumulation of snow and ice on a glacier) give maximum value for sea level rise in the current century of 2 metres (and a "more plausible" one of 0.8 metres), based on limitations on how quickly glaciers can melt [2,3].



[1] http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter6.pdf
[2] http://www.sciencemag.org/cgi/content/abstract/321/5894/1340
[3] http://en.wikipedia.org/wiki/Current_sea_level_rise
[4] http://en.wikipedia.org/wiki/File:NOAA_sea_level_trend_1993_2010.png

Broadband Modems
Bit-rate and power consumption versus time
Can we increase speed while saving power?



Trend line based upon “Next Generation Broadband in Europe: The Need for Speed”, Heavy Reading Report, Vol. 3, No. 5, March 2005.

ICTs (and ITU) can help with Climate Change:

- by cutting emissions in ICT sector through introduction of more efficient equipment and networks
- by reducing emissions and enabling energy efficiency in other sectors
- by helping countries adapt to the negative effects of climate change

7

ITU-T Timeline for ICTs and Climate Change

- Dec 2007: ITU Technology Watch report on ICTs & CC
- Jul 2008: TSAG sets up Focus Group on ICTs & CC
  - 4 deliverables including methodology
- Oct 2008: WTSA Resolution 73 on ICTs & CC
- Apr 2009: FG ICTs & CC report to TSAG
- May 2009: SG5 renamed "Environment & Climate Change" and sets up:
  - New WP3 on "ICT and Climate Change"
  - JCA on ICT & CC
- Mar 2010: Approval of L.1000 Universal Charger
- Oct 2010: Consent of L.1400 Methodology Umbrella

8

ITU-T WP3/5
ICTs & Climate Change

Q17 Coordination and Planning of ICT&CC related standardization

Q18 Methodology of environmental impact assessment of ICT

Q19 Power feeding systems

Q20 Data Collection for Energy Efficiency for ICTs over the lifecycle

Q21 Environmental protection and recycling of ICT equipments/facilities

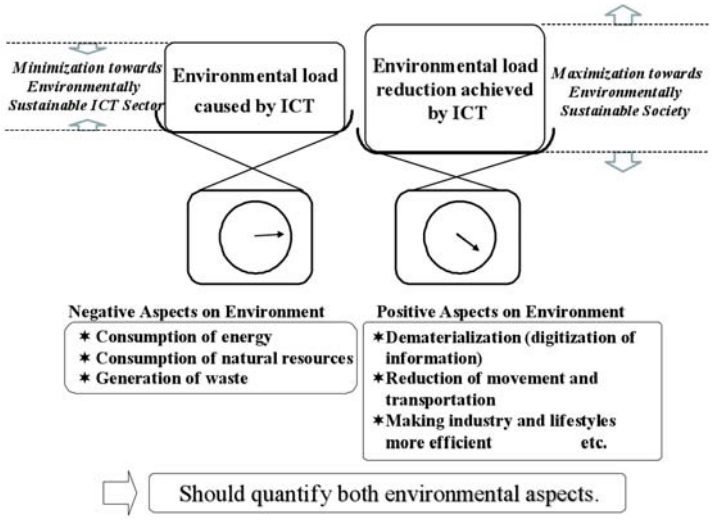
9

Methodology Recommendations under Preparation

- L.1400 General Umbrella, consented on 1 October 2010
  - Defines types of environmental impacts and general principles for evaluation of ICT environmental impacts
- Environmental impact of ICT goods, networks and services
  - Covers direct and indirect impacts of ICT
  - Expected mid-2011
- Environmental impact of ICT in organisations
  - Includes 3 scopes of ISO 14064-1
  - Expected mid-2011
- Environmental impact of ICT projects
- Environmental impact of ICT in cities
- Environmental impact of ICT in countries or group of countries

10

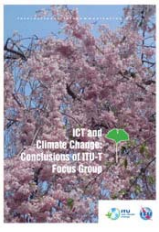
Environmental aspects of ICT



11

Impact of ICT goods, networks and services

- Will focus on energy and GHG emission impacts, over the entire life cycle
- Will provide guidance on how to evaluate direct and indirect impacts when using ICT products, networks and services, in comparison with baseline scenario without ICT
- Will establish recommendation in compliance with ISO 14040/44 principles
- Recommendation expected mid-2011

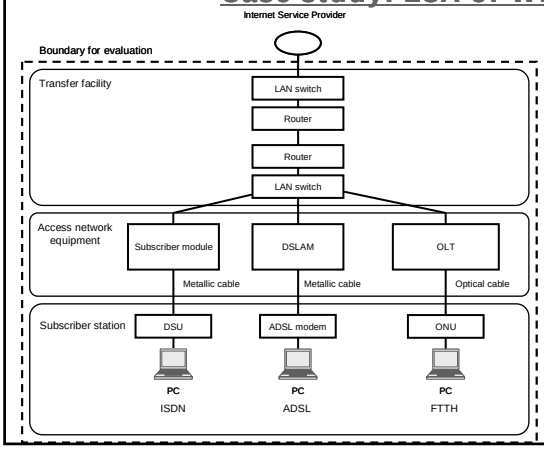


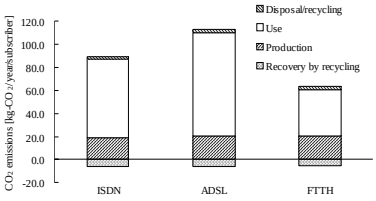
12

Impact of own GHG emissions

- LCA require to set
  - Functional Unit
  - System boundary
  - Allocation procedure

Case study: LCA of Wired Network



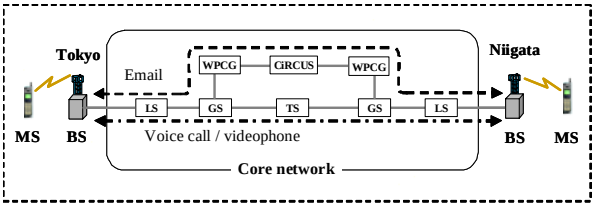


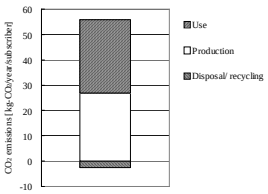
13

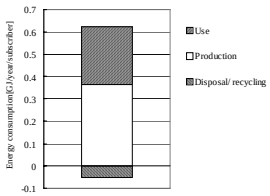
Impact of own GHG emissions

- LCA require to set
  - Functional Unit
  - System boundary
  - Allocation procedure

Case study: LCA of Wireless Network







14

Types of Indicators: Mobile Networks

Measure mobile network energy performance by country:

- Energy per mobile connection
- Energy per unit mobile traffic
- Energy per cell site
- Energy per unit mobile revenue

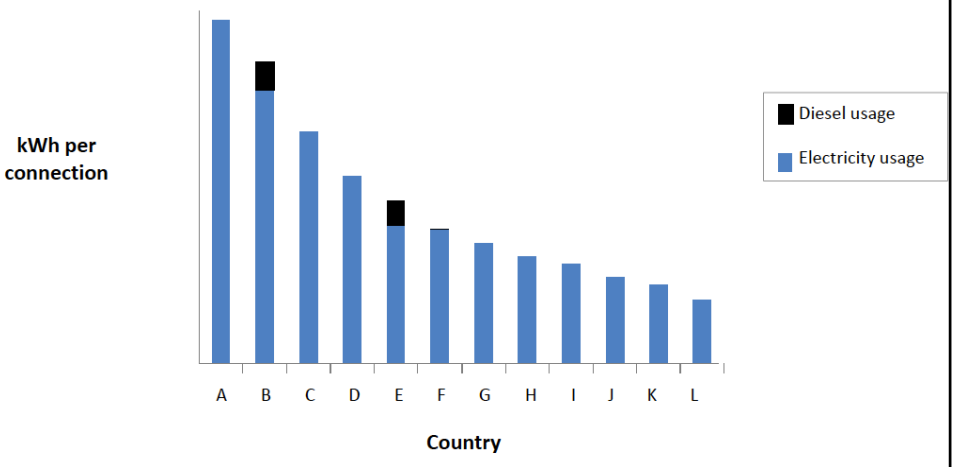
GSMA is collecting these

15

Benchmarking

Operator X

Mobile operations average electricity and diesel usage per connection, 2009



SG5 would like to collect data on:

- In-use energy consumption for each type of equipment
- Emissions during embodiment for each type of equipment and type of component
- Other environmental impacts for each type of equipment /component

17

Impact of ICT Projects

- Scope: agreement to initially evaluate only greenhouse gases involved in GHG emission reductions or GHG removal enhancements, over the entire life cycle
- Agreement to evaluate projects in the ICT sector and also projects using ICT to mitigate GHG emissions in other economic sectors
- Agreement to establish the recommendation in compliance with ISO 14064-2
- Draft recommendation in progress

18

Environmental Load Reductions possible using ICTs

CATEGORIES	EFFECTS
Consumption of materials	By reducing materials consumption (dematerialization), the environmental load related to goods production and disposal as well as waste generation can be reduced.
Power / energy consumption	By enhancing the efficiency of power and energy use to reduce consumption, the environmental load related to power generation, power transmission, etc. can be reduced.
Movement of people	By reducing the movement of people, the environmental load required for transportation can be reduced.
Movement of materials	By reducing the movement of materials, the environmental load required for transportation can be reduced.
Improved efficiency of office space	By using office space efficiently, power consumption for lighting, air conditioning, etc. can be reduced, thus reducing environmental load.
Storage of goods	By reducing storage space of goods, power consumption for lighting, air conditioning, etc. can be reduced, thus reducing environmental load.
Improved work efficiency	By enhancing work efficiency, the environmental load can be reduced.
Waste	By reducing waste emissions, the environmental load required for environmental preservation as well as for waste disposal can be reduced.

19

Transport: Travel Avoidance using ICT

- Tele-working
  - Up to 260 MtCO2e savings each year. For example, in the US, if up to 30 million people could work from home, emissions could be reduced 75-100 MtCO2e in 2030, comparable to likely reductions from other measures such as fuel efficient vehicles
  - Delivers less benefit if your home's heating and cooling is less efficient than at a central office
- Tele- and videoconferencing
  - Conducting meetings online or on the phone instead of face-to-face – could also reduce emissions
  - Previous conservative estimates have suggested that tele- and videoconferencing could replace between 5 and 20% of global business travel
  - Advanced videoconferencing applications in the early stage of adoption could have a very significant impact in transport sector reduction

Impact on other sectors - Teleworking

Typical CO_2 emissions per unit area of office space

Japan

1. CO_2 emissions per unit area of office space

	Energy Consumption [Mcal/m²/year] A	Basic Unit of CO_2 Emissions [kg-CO_2/Mcal] B	CO_2 Emissions [kg-CO_2/m²/year] A x B
Electricity	135	0.441	59.9
Urban gas	44	0.237	10.4
Heavy oil A	9	0.309	2.8
Kerosene	2	0.299	0.6
District heat and cooling	17	0.324	5.5
Total	208		79.2(2)

2. Space occupied by an office worker for clerical work: 13.6 m²/person(3)

3. Basic unit of office space

(1) x (2) = 1,078 kg-CO_2/person/year

* If the annual working hours are 2040 hours (170 h x 12 mth),

CO_2 emissions are estimated to be 0.528 kg-CO_2/person/hour when an office worker works for one hour in Japan.

USA

1. CO_2 emissions per unit area of office space

	Energy Consumption [Mcal/m²/year] A	Basic Unit of CO_2 Emissions [kg-CO_2 / Mcal] B	CO_2 Emissions [kg-CO_2/m²/year] A x B
Electricity	134	0.66	88.8
Natural Gas	79	0.21	16.6
Fuel oil	9	0.29	2.5
District heat	24	0.31	7.5
Total	246		115.4(1)

2. Space occupied by an office worker for clerical work: 21.4 m²/person (2)

3. Basic unit of office space

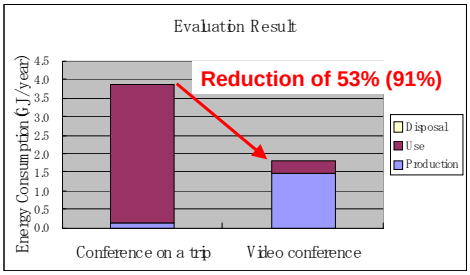
(1) x (2) = 2,470 kg-CO_2/person/year

* If the annual working hours are 2040 hours (170 h x 12 mth,

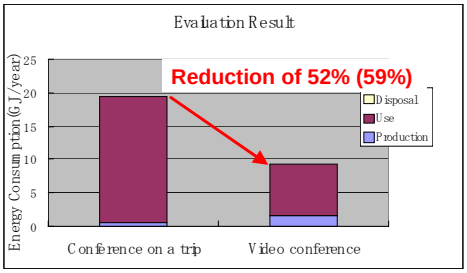
CO_2 emissions are estimated to be 1.21 kg-CO_2/person/hour when an office worker works for one hour in USA.

Impact on other sectors - Videoconferencing

Video conference held between Tokyo and Yokohama, once a week (48 times / year), one hour each time, participated in by two people from each office



Video conference held between Tokyo and Yokohama, every working day (240 times / year), eight hours each time, participated in by two people from each office



Cooperations include:

Digital Europe

23

Recommendations

- We must measure the energy consumption of network equipment and set benchmarks and targets for reductions.
- We must promote more energy efficient ICT products and services.
- We must ensure ICTs play a key role as an enabling technology to reduce GHG emissions in other sectors.
- We must develop global standards including methodologies to measure the impact of ICTs on climate change.

24