A Framework for Modelling ICT and Environmental Challenges Using Future Scenarios

Don MacLean
Associate, International Institute for Sustainable Development

OECD Workshop on ICTs and Environmental Challenges
Copenhagen, 22-23 May 2008
Purpose

• To present a framework being developed by IISD in conjunction with Industry Canada and other partners
  – for modelling the relationship between ICT and environmental challenges
  – in the context of sustainable development goals and objectives
  – by using scenario-building and future forecasting techniques
Background

• IISD founded in 1990 in response to the Brundtland Commission report “Our Common Future”

• Work on SD includes
  – climate change, energy, resources
  – economics, trade, investment
  – market sustainability, security
  – measurement and assessment
  – leadership, networks, partnerships, governance
Background

• IISD founded in 1990 in response to the Brundtland Commission report “Our Common Future”

• Work on SD includes
  – climate change, energy, resources
  – economics, trade, investment
  – market sustainability, security
  – measurement and assessment
  – leadership, networks, partnerships, governance

• IISD has worked on relationship between ICTs and sustainable development since 2003
  – WSIS-1 and -2
  – Internet Governance Forum
  – WSIS Action Lines

• Believes SD and ICT policy-makers have underestimated
  – potential impact of ICTs on SD
  – potential impact of SD on ICTs
Framework Building Blocks

- **Goal**: Concept of Sustainable Development
- **Context**: Concept of Information Economy and Society
- **Challenges**: Research on ICTs and Environment
- **Issues**: OECD and WSIS Policy Agendas
- **Options**: Future Forecasting Scenarios

Presentation version - 19 May 08
Concept of Sustainable Development

- UN Summit on Environment and Development (Rio, 1992)
  - Agenda 21
- Millennium Summit (New York, 2000)
  - Millennium Development Goals
- World Summit on Sustainable Development (Johannesburg, 2002)
- International Conference on Financing for Development (Monterrey, 2002)
Concept of Sustainable Development

- UN Summit on Environment and Development (Rio, 1992)
  - Agenda 21
- Millennium Summit (New York, 2000)
  - Millennium Development Goals
- World Summit on Sustainable Development (Johannesburg, 2002)
- International Conference on Financing for Development (Monterrey, 2002)

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of needs, in particular the essential needs of the world’s poor, to which overriding priority should be given: and
- the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs”
Sustainable Development

- Economic Pillar
- Environmental Pillar
- Social Pillar
Where are we today?

- Current governance arrangements have not achieved balance between
  - economic growth
  - social development
  - environmental sustainability

Source: Global Footprint Network
Where are we today?

- Current governance arrangements have not achieved balance between
  - economic growth
  - social development
  - environmental sustainability

- Climate change has emerged as
  - a key cross-cutting environmental issue
  - a driver of economic and social change
Sustainable Development

Economic Pillar  Environmental Pillar  Social Pillar

Global Governance
Building Block 2

- Concept of sustainable development

- Concept of the information economy and society
  - OECD Ministerial Conference on the Future of the Internet Economy (Seoul, 2008)

“The Internet is increasingly critical to our economies and societies with implications across all policy domains. Only now is there broad appreciation for the Internet’s potential as a powerful driver of innovation, sustainable economic growth, and social well-being”
Key Research Questions

• What changes to current economic and social structures and behaviours are needed to achieve long-term environmental sustainability?

• How can ICTs help enable these changes through innovations in networking technologies, products, services, applications, and use?

• What governance reforms and policy options are most likely to maximize the long-term benefits of networking ICTs and minimize harm?
Building Block 3

- Concept of sustainable development
- Concept of the information economy and society

- Research on ICTs and the environment
  - Impact of the ICT producing Sector
  - Impact of the application and use of ICTs
  - ICT-enabled changes in consumer behaviour, economic, social and governance structures
Different kinds of effects

- **Direct effects**: small, easy to measure
- **Indirect effects**: significant, hard to measure
- **Systemic effects**: very big, mainly theories

Source: ETNO & WWF, 2007, “Saving the Climate @ the Speed of Light”

Presentation version - 19 May 08
Sustainable Development

- Economic Pillar
- Environmental Pillar
- Social Pillar

Efficiency

ICT-Enabled Networks
- GHG Emissions
- E-Waste

Global Governance

Presentation version - 19 May 08
Sustainable Development

- Economic Pillar
- Environmental Pillar
- Social Pillar

Efficiency
De-materialization

ICT-Enabled Networks

GHG Emissions
E-Waste

Global Governance

Presentation version - 19 May 08
Sustainable Development

- Economic Pillar
- Environmental Pillar
- Social Pillar

Efficiency - De-materialization

ICT-Enabled Networks

GHG Emissions - E-Waste

ICT Sector

Global Governance

Presentation version - 19 May 08
Sustainable Development

Economic Pillar • Rebound effects • Unintended consequences

Environmental Pillar

Social Pillar • Trade-offs • Re-materialization

Efficiency • Unintended consequences • De-materialization

ICT-Enabled Networks

GHG Emissions

ICT Sector

E-Waste

Global Governance

Presentation version - 19 May 08
ICTs and Environmental Challenges: Two Kinds of Uncertainties

• Research on ICTs and the environment has tended to treat the impact of ICTs as a dependent variable, largely predictable in terms of factors such as
  – Supply (Moore’s Law + imagination)
  – Demand (demographics + per capita GDP)
  – Governance (“Washington consensus”)
ICTs and Environmental Challenges: Two Kinds of Uncertainties

• Research on ICTs and the environment has tended to treat the impact of ICTs as a ‘dependent variable’ largely predictable in terms of factors such as
  – Supply (Moore’s Law + imagination)
  – Demand (demographics + per capita GDP)
  – Governance (“Washington consensus”)

• IISD believes this work has not taken sufficient account of
  – The complexity of issues currently facing ICT policy-makers
  – The potential long-term positive and negative impacts on sustainability of different ICT policy choices
  – ICT’s function as an independent or intermediate variable in the sustainable development equation
Building Block 4

- Concept of sustainable development
- Concept of the information economy and society
- Research on ICTs and the environment
- International work on ICT policy and governance issues
  - OECD
  - WSIS follow-up
Sustainable Development

Economic Pillar

Environmental Pillar

Social Pillar

ICT-Enabled Networks

Convergence

Creativity

ICT Sector

Global Governance
Sustainable Development

- Economic Pillar
- Environmental Pillar
- Social Pillar

ICT-Enabled Networks

- Convergence
- Creativity

ICT Sector

Confidence

Global Governance
Sustainable Development

- Economic Pillar
- Environmental Pillar
- Social Pillar

ICT-Enabled Networks

- Convergence
- Creativity

ICT Sector

Confidence

Global Governance

- Standards
- Resources
- Interconnection
- Access

Presentation version - 19 May 08
Sustainable Development

Economic Pillar
- Standards
- Resources
- Interconnection
- Access

Environmental Pillar
- Openness
- Diversity
- Neutrality
- IPR/CC

Social Pillar
- Security
- Stability
- Scalability
- Universality

ICT-Enabled Networks
- Convergence
- Creativity

ICT Sector
- Confidence

Global Governance
Building Block 5

• Concept of sustainable development
• Concept of the information economy and society
• Research on ICTs and the environment
• OECD work on the Internet economy

• Scenario-building methodologies
  – Shell
  – Great Transitions Initiative, UNEP
  – EC Joint Research Centre
Shell Global Scenarios to 2025

a legalistic, “prove it to me” world

a pragmatic, “know me” world

a dogmatic, “follow me” world

Presentation version - 19 May 08
Sustainable Development

Economic Pillar

Environmental Pillar

Social Pillar

ICT-Enabled Networks

Efficiency

De-materialization

GHG Emissions

Convergence

Creativity

E-Waste

ICT Sector

Confidence

Governance Scenario A

Governance Scenario B

Governance Scenario C

Presentation version - 19 May 08
For Further Information

• Project Contacts
  – Heather Creech
    IISD Director
    Knowledge Communications
    hcreech@iisd.org
  – Tony Vetter
    IISD Project Manager
    tvetter@iisd.org

• Reading
  – Don MacLean and Bill St. Arnaud, “ICTs, Innovation and the Challenge of Climate Change”, IISD, forthcoming at http://www.iisd.org/info_soc
  – Bill’s blog http://green-broadband.blogspot.com