Green ICT Standards

A path to environmental sustainability

ITU-T, Climate Change and Protection of the Environment

Information and Communication Technologies (ICTs), such as satellites, mobile phones or the Internet, are capable of playing a key role in addressing the global challenges of climate change and sustainable development.

By raising awareness of ICT's role in climate change mitigation and adaptation, ITU-T is promoting innovative ICT solutions to environmental questions, and is developing green ICT standards to support a sustainable future.

- More information on ITU-T's Climate Change activities can be found at: **www.itu.int/ITU-T/climatechange/**

ITU-T STUDY GROUP 5

ITU-T Study Group 5 is ITU's lead study group on ICTs, the environment and climate change.

- Climate Questions (work areas) under study:

  Q 17/5 – Energy efficiency for ICT equipment and climate change standards harmonization

  Q 18/5 – Methodology of environmental impact assessment of ICT

  Q 19/5 – Power feeding systems

  Q 21/5 – Environmental protection and recycling of ICT equipment/facilities

  Q 22/5 – Setting up a low cost sustainable telecommunication infrastructure for rural communications in developing countries

  Q 23/5 – Using ICTs to enable countries to adapt to climate change

  Pending the approval of the World Telecommunication Standardization Assembly (WTSA-12), ITU-T SG5 began work on a new Question "Leveraging and enhancing the ICT environmental sustainability".

- More information can be found at: **http://www.itu.int/ITU-T/studygroups/com05/index.asp**

Methodologies to Assess the Environmental Impact of ICTs

ITU-T is developing a set of standardized methodologies to assess the environmental impact of ICTs, both in terms of ICT greenhouse gas (GHG) emissions and the emissions-savings created through green ICT applications in other industry sectors. The methodologies are being developed in cooperation with over 60 organizations including major ICT private sector participants, the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Environmental Programme (UNEP).

Recommendation ITU-T L.1400 (Overview and general principles of methodologies for assessing the environmental impact of ICT) presents the general principles on how to assess the environmental impact of ICT, and outlines the different methodologies being developed to assess the environmental impact of:

(a) ICT goods, networks and services;

(b) ICT projects;

(c) ICT in organizations;

(d) ICT in cities*

(e) ICT in countries or groups of countries*.

**Under development at time of writing*

Recommendation ITU-T L.1410 (Methodology for environmental impacts of Information and Communication Technologies (ICT) goods, networks and services) provides a standardized way to assess the direct environmental impact of ICT goods, networks and services, as well as their indirect impact on the GHG emissions of non-ICT industry sectors. It is based on the Life Cycle Assessment (LCA) methodology standardized in ISO 14040 and ISO 14044.

Recommendation ITU-T L.1420 (Methodology for energy consumption and greenhouse gas emissions impact assessment of Information and Communication Technologies (ICT) in organizations) standardizes the requirements with which an organization should comply when assessing energy consumption and GHG emissions.

Using Submarine Communications Networks to Monitor the Climate and Provide Tsunami Warnings

The potential use of submarine telecommunications cables for climate monitoring and disaster warning was explored at a workshop entitled, "Submarine Cables for Ocean/Climate Monitoring and Disaster Warning: Science, Engineering, Business and Law," jointly organized by ITU, the Intergovernmental Oceanographic Commission of UNESCO (UNESCO/IOC) and the World Meteorological Organization (WMO).

Equipping repeaters – instruments amplifying optical signals, placed an average of 100 km apart on a submarine communication cable – with climate-monitoring sensors could make the telecommunications network part of a real-time global ocean-observation network.

The workshop encouraged the development of new technologies and standards needed to bring this network into existence, and explored business opportunities for telecommunication companies to become active players in monitoring climate change.

The workshop closed with the adoption of a written Call to Action inviting ITU, UNESCO-IOC and WMO to establish and coordinate a Joint Task Force composed of world-renowned experts in science, engineering, business and law to explore the issue further.

- **ITU-T Technology Watch Report: Using Submarine Communications Networks to Monitor the Climate**

An overview of how both retired and in-service submarine communication cables could be used for decades to come as a real-time global network to monitor climate change and provide tsunami warnings.

- **ITU/WMO/UNESCO-IOC Joint Task Force**

Under the secretariat support of ITU, the Joint Task Force will, inter alia, develop a strategy and roadmap able to lead to the availability of submarine repeaters equipped with scientific sensors for climate monitoring and disaster risk reduction (tsunami warnings). It will also analyze the potential renovation and relocation of retired out-of-service cables to be reinvented as climate-monitoring infrastructure.

The ICT Sector & Environmental Sustainability

ICTs have the potential to enable a low carbon economy, but are also responsible for roughly 2-3 per cent of global GHG emissions.

- **Environmental sustainability guidelines for the ICT sector**

ITU-T is coordinating a project to establish environmental sustainability guidelines for the ICT sector. Sustainability best practices will be determined in partnership with a number of ICT, environmental and research organizations, and the resultant sustainability guidelines will contribute to Study Group 5's goal of developing a global standard in this area. The guidelines will provide ICT organizations with a checklist of sustainability requirements; guiding them in efforts to improve their eco-efficiency, and ensuring fair and transparent sustainability reporting.

i. Areas of focus:

- Sustainable Buildings
- Sustainable ICT in Corporate Organizations
- Sustainable Products
- Sustainable Services
- End-of-Life Management
- General Specifications
- Assessment Framework for Environmental Impacts of the ICT Sector

ii. Partners listed in alphabetical order:

- Alcatel Lucent
- BBC
- BIO Intelligence Service
- BT
- CEDARE
- Climate Associates
- ClimateCHECK
- Datec Technology
- Dell
- Ernst & Young
- ETNO
- ETRI
- ETSI
- European Broadcasting Union
- France Telecom
- Fronesys
- GHG Management Institute (GHGMI)
- HP
- Huawei
- Imperial College
- Infosys
- International Telecommunication Union (ITU)
- Mandat International
- MicroPro Computers
- Microsoft
- MJRD Assessment Inc.
- National Inter-University Consortium for Telecommunications
- Nokia Siemens Networks
- PE International AG
- Research In Motion
- Scuola Superiore Sant'Anna of Pisa
- Step Initiative
- Telecom Italia
- Telefónica
- Thomson Reuters
- United Nations Environmental Programme Basel Convention
- United Nations University
- University of Genova
- University of Zagreb
- Verizon
- Vodafone Ghana
- 3p Institute for Sustainable Management

- **Green Data Centers**

Data Centers are among the fastest growing parts of the ICT industry, making it crucial to minimize their energy consumption and GHG emissions. ***Recommendation ITU-T 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.

L.1300 allows for considerable energy savings and applying its best practices on, for example, cooling procedures could reduce the energy consumption of a typical data center by over 50 per cent. The best practices include guidelines on management and planning of data centers; optimum design of data center buildings; cooling and power equipment; data center utilization and monitoring of data centers after construction.

Tackling E-waste

There have been alarming reports of e-waste mismanagement in many countries, particularly in less developed nations and countries with economies in transition. E-waste is a significant contributor to the ICT industry's impact on the environment, and urgent global action to address this issue is essential if the industry is to fulfill its commitment to a sustainable future.

- **ITU-T Universal Charger**

Recommendation ITU-T L.1000 (Universal power adapter and charger solution for mobile terminals and other hand-held ICT devices) details a universal charger compatible with a variety of consumer electronic devices, reducing waste and improving convenience to users. *L.1000* will eliminate an estimated 82,000 tonnes of redundant chargers and at least 13.6 million tonnes of CO2 emissions annually.

- **Global Survey on E-Waste**

The International Telecommunication Union (ITU), the United Nations Environmental Programme (UNEP)/ Secretariat of the Basel Convention, the United Nations University (UNU), Solving the E-waste Problem (StEP) Initiative and the Center for Environment and Development for the Arab Region and Europe (CEDARE) launched a joint survey on e-waste in November 2011. This survey aims to collect detailed data on e-waste management, policies and standards; constructing a comprehensive overview of the current e-waste landscape and identifying future challenges in this realm. This map of the e-waste issue will establish a base upon which the exchange of e-waste information and best practices can occur, and will form a valuable tool in promoting collaborative work in the future.

- **Recycling Rare Metals in ICT Products**

Rare metals are essential to the high-end functionality of ICT products, and the ICT industry has reached a point where it is impossible to omit these metals from product design. A mobile phone contains no less than 20 rare metals, and the need to recycle these metals is clear - a tonne of gold ore yields just 5 grammes of gold, whereas a tonne of used mobile phones yields a staggering 400 grammes.

Recommendation ITU-T L.1100 (A method to provide recycling information of rare metals in ICT products) details the necessity of rare-metal recycling and the procedures to be employed when recycling these metals. The recommendation outlines key considerations in all phases of the recycling process, and provides guidelines as to how organizations may fairly and transparently report on rare-metal recycling.

Smart Solutions

- **Smart Grid**

Electricity grids must be modernized to reflect the energy demands of the 21st century. A Smart Grid adds communications and thus monitoring, analysis and control capabilities to the electricity grid; increasing its efficiency and reliability, reducing its energy consumption and minimizing its GHG emissions

Recommendations ITU-T G.9955 (Narrow-band OFDM power line communication transceivers – Physical layer specification) and ***G.9956 (Narrow-band OFDM power line communication transceivers – Data link layer specification)*** define three next-generation narrowband power line communications (NB-PLC) standards. The standardized next-generation NB-PLC transceivers will provide a 'smart' link between electricity and communications networks through their support of the use of power lines as a communications medium. PLC exploits electricity networks' existing wired infrastructure, greatly reducing the cost of deploying a dedicated communications channel.

The family of standards will enable cost-effective smart grid applications such as distribution automation, diagnostic and fault location, smart metering, demand response, energy management, smart appliances, grid-to-home communications and advanced recharging systems for electric vehicles.

- **Intelligent Transport Systems (ITS)**

Transportation accounts for a large proportion of global GHG emissions and ICT is to play a central role in improving the industry's energy-efficiency. Today's communications capabilities give vehicles the potential to navigate the quickest route to

their destination, make use of up-to-the-minute traffic reports, identify the nearest available parking slot and consequently minimize their carbon emissions.

Considerable resources have been invested in R&D, but the lack of global standards is widely regarded as a major impediment to large-scale deployment of ITS services and applications. To progress standardization work in ITS, an ITU Focus Group on Car Communications (FG CarCom) has been established and Study Group 16 (Multimedia coding, systems and applications) has an ITS question under study: Q27/16, "Vehicle gateway platform for telecommunication/ITS services/ applications."

An ITU, ISO partnership has created a Joint Task Force for ITS Communications, which invites national and regional standards bodies to pool their resources, link their existing work and collaboratively create the standards needed for ITS to become a definitive feature of the modern automotive industry.

In addition, the IEC/ISO/ITU Fully Networked Car event at the Geneva International Motor Show gathers experts from the ICT and automobile industries, forming new collaborative relationships and uncovering industry insight into the future of ITS.

Future Networks

Environmental awareness is one of the fundamental objectives of Future Networks (FNs) and energy-saving methodologies are therefore key ingredients to their design.

Recommendation ITU-T Y.3021 (Framework of energy saving for future networks)

Through their creation of network architectures for smart energy grids and ubiquitous sensor networks, FNs will do much to improve the energy efficiency of other, non-ICT industry sectors. Their proliferation will however also increase the volume of energy demanded by FNs themselves. *Y.3021* thus provides a framework to minimize the energy consumption of network facilities such as routers, switches and servers, as well as a method to manage the total energy consumption of FNs at all stages of their lifecycle.

Green ICT Application Challenges - Share your ideas with us!

ITU and Telefónica co-host the ***ITU Green ICT Application Challenge*** and the ***Green ICT Hackathon.***

The *ITU Green ICT Application Challenge* is an initiative to attract innovative Concept Papers for climate-related ICT applications. The Concept Papers received yield novel solutions to environmental challenges and cover such topics as climate change monitoring, GHG emissions measurement and community engagement with mitigation and adaptation to climate change.

The *Green ICT Hackathon* is an application-development marathon where developers compete to create climate-related ICT apps within a defined timeframe. ITU and Telefónica have teamed up to host a series of these events, harnessing the energy of young innovators and encouraging them to extend ICT's connection with environmental protection.


search:
DEADLINE!
BLOG

Raising Awareness on ICTs, the Environment and Climate Change

- ***ITU Symposia on ICTs, the Environment and Climate Change***

ITU Symposia bring together key specialists in the ICT and environmental-protection fields; from top decision-makers to engineers, designers, planners, government officials, regulators and standards experts. Topics presented and discussed include climate change mitigation and adaptation methods in the ICT and other industry sectors, green ICT policy frameworks, green ICT standards, green ICT applications and the use of ICTs in climate change science and emergency situations.

- ***ITU Green Standards Week***

ITU Green Standards Week hosts a cluster of workshops focused on raising awareness of the importance of ICT standards in building green economies and combating climate change. Government, industry and academic participants, from both the ICT and environmental-protection communities, discuss means to extend the use of green ICT standards and highlight areas able to benefit from future standardization.

- **Remote participation in ITU events**

ITU offers interactive remote participation in its major symposia, seminars and workshops. Remote participation is an accurate simulation of on-site participation, and ITU encourages meeting participants to make use of this valuable service. It is an opportunity to enlarge the audience of an event, hosting participants from all corners of the globe, without enlarging the event's carbon footprint.

- ***Joint Coordination Activity on ICTs & Climate Change (JCA-ICT&CC)***

The purpose of the JCA-ICT&CC is to provide a visible contact point for ICT and Climate Change activities in ITU-T, to seek co-operation from external bodies working in the field of ICT & CC and enable effective two-way communication with these bodies. External bodies include representatives from relevant SDOs such as IEC, ISO or relevant academia, consortia or fora.

- ***Global Coalition on ICTs and Climate Change***

ITU and the Global e-Sustainability Initiative (GeSI) have launched a *Global Coalition on ICTs and Climate Change.* Participants in the coalition are ITU, GeSI, Ghana's Ministry of Communications and Ministry of Environment, South Africa's Ministry of Communications, Egypt's Ministry of Communications, TechAmerica, the United Nations Global Compact and the United Nations Framework Convention on Climate Change (UNFCCC) secretariat.

The coalition will unite the voices of organizations working in the field of ICT&CC, and four major objectives will guide the coalition's members in their efforts to produce a more robust ICT industry stance on climate change.

The four major objectives:

(1) Raise awareness of the role ICT and related technologies in addressing the causes and effects of climate change.

(2) Showcase innovative initiatives being undertaken by the ICT sector in the interests of environmental sustainability, and promote the exchange of best practices between the public and private sectors.

(3) Mobilize political will to better reflect the role of ICT in the outcomes produced by major conferences on climate change and sustainable development.

(4) Encourage governments to include ICT and related technologies as key elements of their national climate change policies, across all industry sectors.

- ***Global Repository on ICTs, Environment and Climate Change***

ITU-T website provides references to external resources: background papers, in-depth reports, case studies and statistics on ICTs and the environment. Topics covered include climate change, conflict minerals, e-waste and other sustainability issues.

- Methodologies of Environmental Impact Assessment of the ICT Sector
- ICTs for Monitoring Climate Change
- ICTs for Adapting to the Effects of Climate Change and Environmental Degradation
- ICTs for Mitigating the Effects of Climate Change
- Energy Efficiency and Low Carbon Economy
- Smart Grids and Smart Meters
- Data Centers
- Cloud Computing
- Smart Cities and Smart Buildings
- Smart Logistics and E-Procurement
- Electric Vehicles and Mobility
- E-Waste
- Enhancing Sustainability in Conflict Minerals Supply Chains
- International Organizations involved in ICTs and Environment
- Case Studies

Related website addresses

Homepage: **itu.int/ITU-T/**

About ITU-T and CC: **itu.int/ITU-T/climatechange/**

Video: **bit.ly/cm1d37**

Membership: **itu.int/ITU-T/membership/**

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