

# **Roles of Stakeholders in Policy, Regulation & Strategy**

**ICT & Climate Change Training Program  
Session 3**

# Session Objectives

This module provides a comprehensive understanding of the policy and regulatory issues around climate change and the roles of different types of stakeholders including policy makers, regulators, telecommunications and IT service providers, community schemes and standardization bodies.



STUDENTS



# Session Topics

- International frameworks / initiatives (UNFCCC, WSIS, SSDM, EC DG ENERGY)
- Other relevant organisations including Environmental Protection Agencies (EPAs), GeSI and UNEP.
- Role of standards bodies and technical standards (e.g. ITU-T, ISO/IEC).
- Role of policy makers (e.g. Ministry of ICT, Ministry of Energy, Others)
- Role of regulators (e.g. FCC and FERC (US), Ofcom and Ofgem (UK)).
- Case study: How has regulatory environment in the EU led to lower GHG emissions?

# ICT and Environment



The ITU Global Portal on ICTs, the environment and climate change features ITU-T Green ICT Standards, and provides current external resources related to ICTs and climate change.

## ITU-T GREEN ICT STANDARDS



ITU develops Green ICT Standards to create, enable and ensure regulation for Green ICTs; continuing its aim on closing the standardization gap.

## CLIMATE CHANGE



Promoting the use of ICTs in both climate change adaptation and mitigation, for the prevention of environmental degradation and the reduction of GHG emissions.

## SMART WATER MANAGEMENT



Promoting ICT use towards a smarter more sustainable way to manage water resources.

## SMART SUSTAINABLE CITIES



Maximizing contributions of ICTs to smart grids and smart meters, smart buildings and urban planning as well as smart mobility and electric vehicles towards the development of smart sustainable cities.

## E-WASTE



Empowering institutional and governmental capabilities on the reduction of E-Waste and municipal waste.

## GREEN ICT PROCUREMENT



Strengthening capacities within institutions to procure the appropriate Smart Logistics and Green ICTs.

## CLOUD COMPUTING AND DATA CENTERS



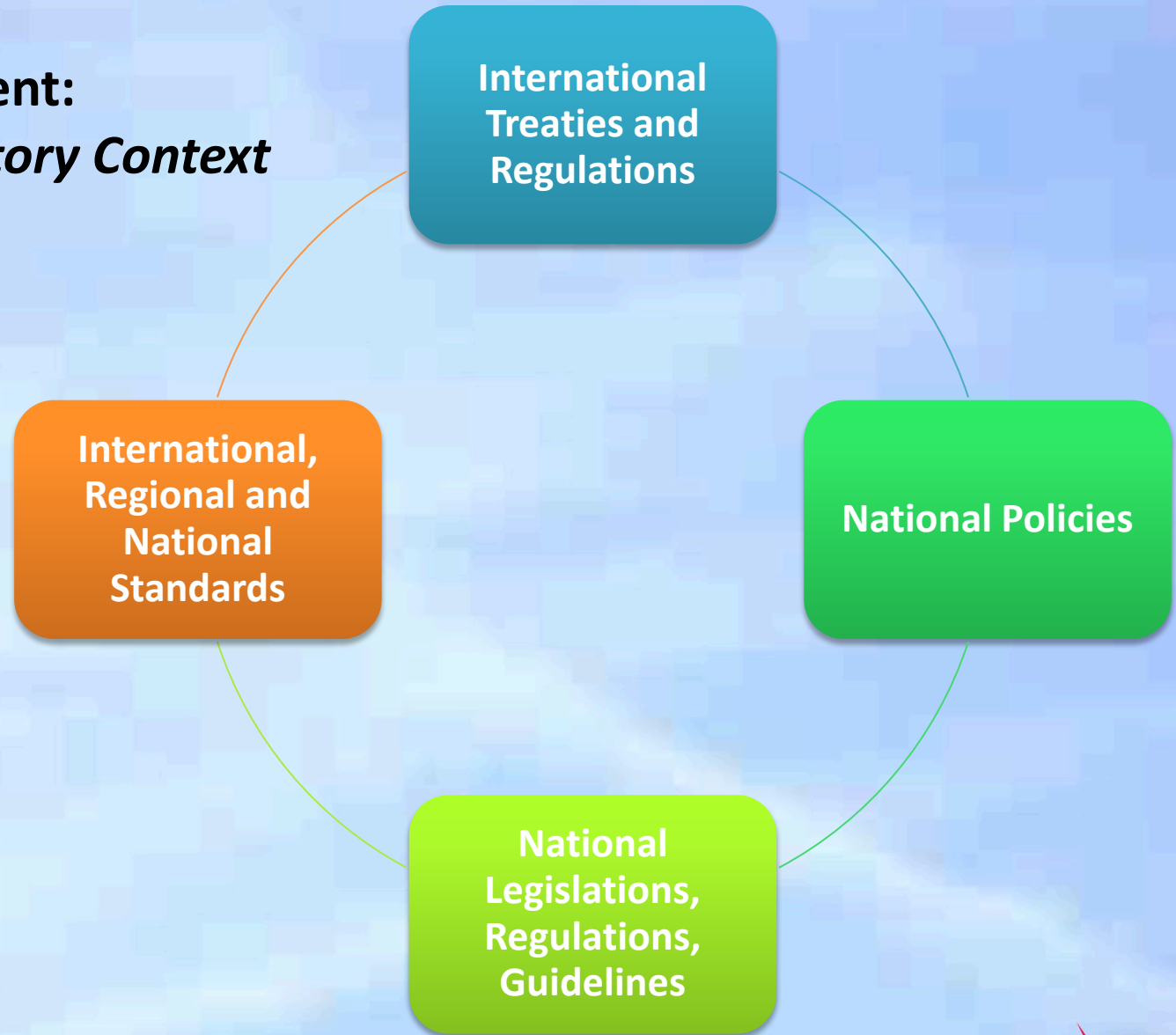
Realizing the potential of cloud computing and data centres on environmental sustainability and climate change mitigation and adaptation.

## GREENING ICT SUPPLY CHAINS



Advocating the Greening of ICT supply chains for sustainability as well as the use of ICT tools to help measure, certify and lower the impact of the supply chain of other products

## ICT and Environment: *Policy and Regulatory Context*



# International organisations – Green ICTs

- IPCC, UNFCCC and COP globally.
- UN World Summit on the Information Society (WSIS).
- International Telecommunication Union (ITU)
- UN Industrial Development Organization
- Regional organizations including DG ENERGY (EC)

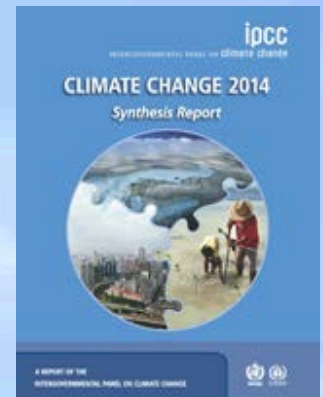


# The IPCC



Intergovernmental Panel on Climate Change (IPCC) is a scientific body tasked with evaluating risk of Climate Change caused by human activity:

- Established in 1988 by two UN organisations: World Meteorological Organization (WMO) and UN Environment Programme (UNEP).
- Shared 2007 Nobel Peace Prize with former US Vice President Al Gore.
- Does not carry out own research or monitor climate change - bases assessments on peer reviewed and published scientific literature.
- Main activity of IPCC is publishing special reports on topics relevant to UNFCCC.
- Provides summaries of reports for policy makers.



[www.ipcc.ch](http://www.ipcc.ch)

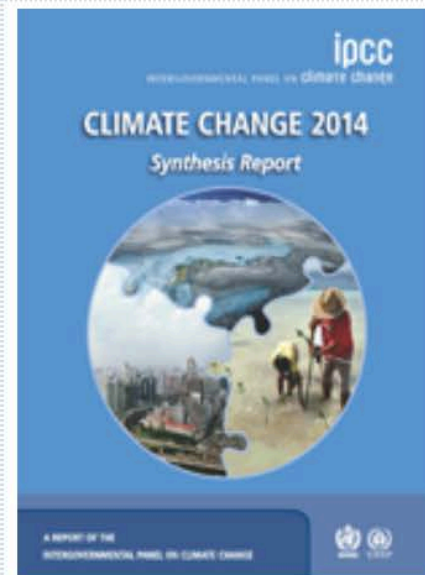
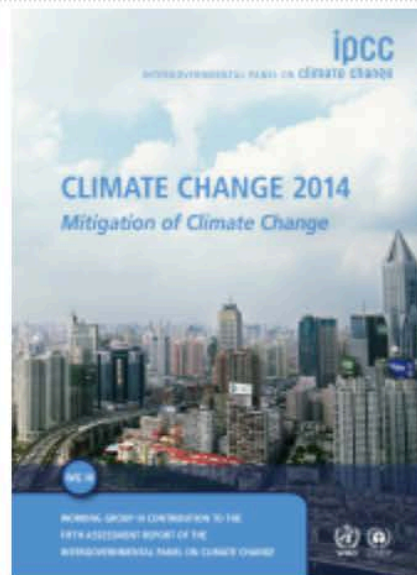
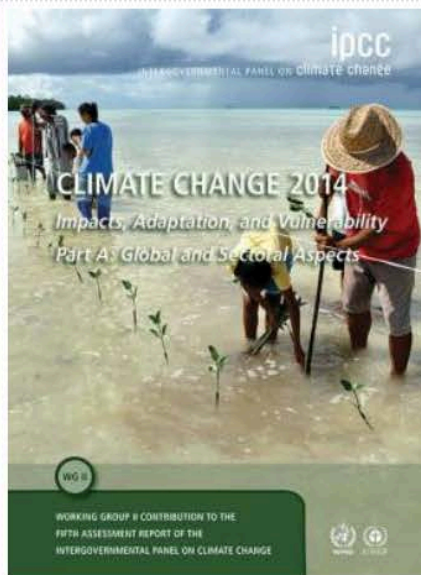
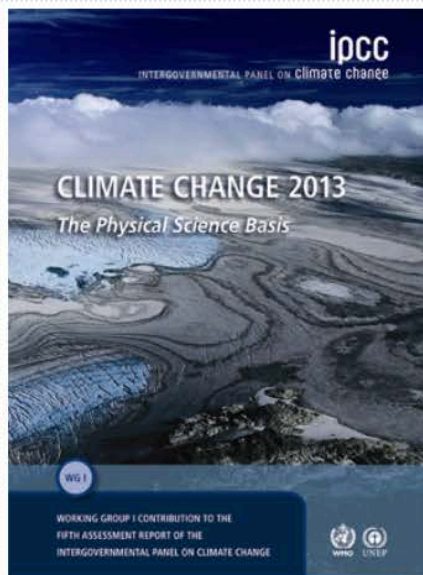
# IPCC 5<sup>th</sup> Assessment Reports

## Fifth Assessment Report (AR5)

EN | [FR](#) | [Sp](#) (beta)

[Search AR5 Reports](#)

The decision to prepare a Fifth Assessment Report (AR5) was taken by the members of the IPCC at its 28th Session (09-10 April 2008, Budapest, Hungary). Following the election of the new IPCC Bureau at the 29th Session of the IPCC (31 August - 04 September 2008, Geneva, Switzerland) and discussions about future IPCC activities at the 30th Session of the IPCC (21-23 April 2009, Antalya, Turkey), a Scoping Meeting was held (13-17 July 2009, Venice, Italy) to develop the scope and outline of the AR5. The resulting outlines for the three Working Group contributions to the AR5 were approved by the 31st Session of the IPCC in Bali (26-29 October 2009).





# The UNFCCC



- UN Framework Convention on Climate Change (UNFCCC) is an international treaty that acknowledges the possibility of harmful climate change:
  - Created at UN Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992.
  - Implementation of UNFCCC led eventually to the Kyoto Protocol (1997).
  - One of first tasks was to establish national inventories of GHG emissions and removals, used to create 1990 benchmark levels for Annex I countries and for their commitment to GHG reductions.
  - UNFCCC is also name of UN Secretariat in Bonn charged with supporting operation of the Convention.

[www.unfccc.int](http://www.unfccc.int)

# WSIS

- UN General Assembly Resolution 56/183 endorsed holding of World Summit on the Information Society.
- **Geneva Phase: 10-12 December 2003**
- Objective to develop and foster clear statement of political will and take concrete steps to establish the foundations for an Information Society for all, reflecting all the different interests at stake.
- Geneva Declaration of Principles and Action Plan adopted in December 2003.
- **Tunis Phase: 16-18 November 2005**
- Objective to implement Geneva's Plan of Action and find solutions and reach agreements in on Internet governance and financing mechanisms.
- Tunis Commitment and Agenda adopted on 18 November 2005.

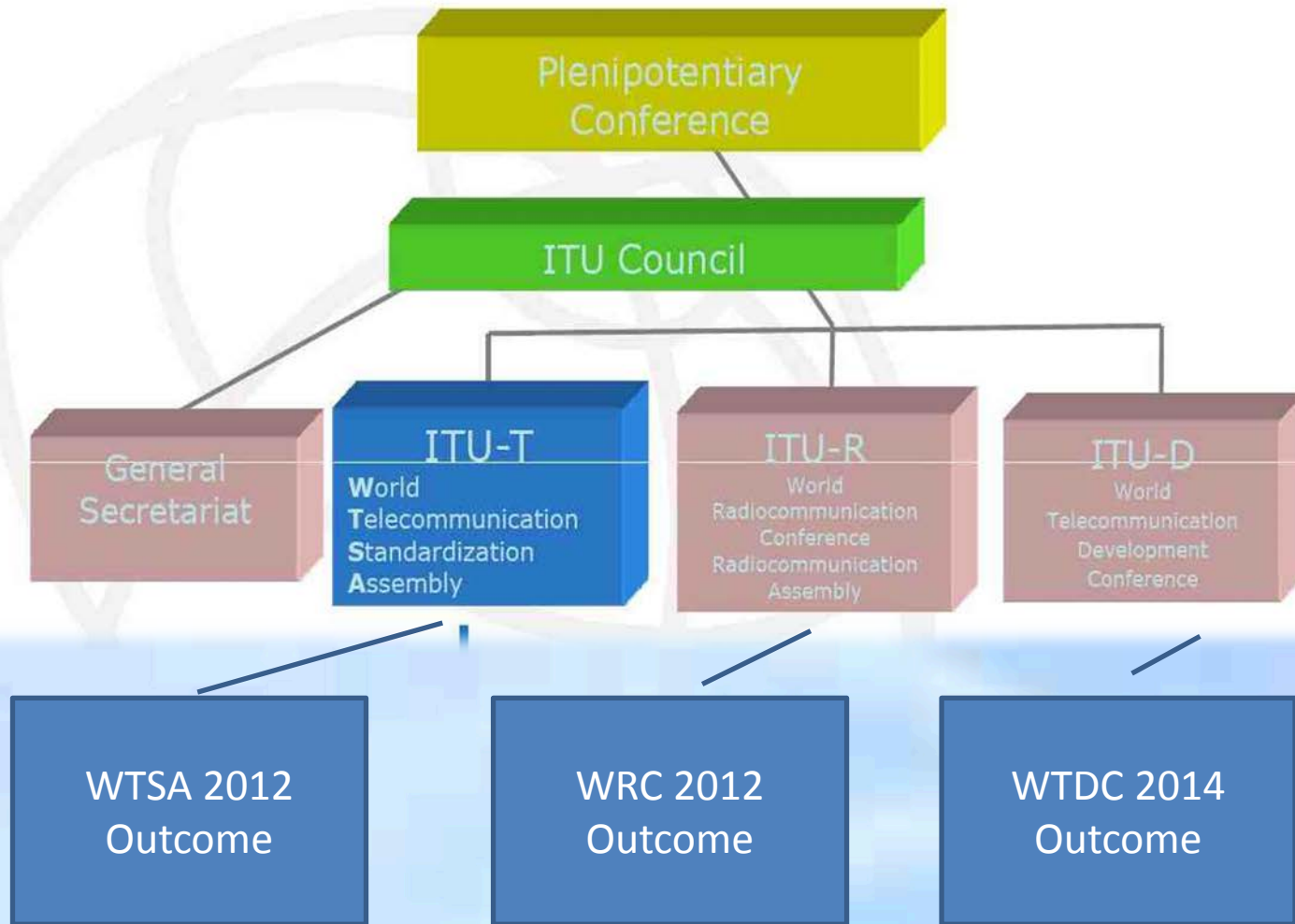
[www.itu.int/wsis/](http://www.itu.int/wsis/)

# The International Telecommunication Union (ITU)

- Founded in Paris in 1865 as the International Telegraph Union.
- Took present name in 1932, became a specialized agency of the United Nations in 1947.
- First area of expertise was the telegraph, work of ITU now covers whole ICT sector, from digital broadcasting to the Internet, and from mobile technologies to 3D TV.
- Organization of public-private partnership since its inception, ITU currently has a membership of 193 countries and some 700 private-sector entities.
- Headquartered in Geneva, Switzerland, has twelve regional and area offices around the world.

[www.itu.int](http://www.itu.int)

# ITU Structure



[www.itu.int](http://www.itu.int)





## Identifying standards and policy needs: ITU-T Climate Change Reports

[www.itu.int/en/ITU-T/climatechange/Pages/publications.aspx](http://www.itu.int/en/ITU-T/climatechange/Pages/publications.aspx)

# International Organization for Standardization (ISO)



International  
Organization for  
Standardization

- Began in 1926 as International Federation of National Standardizing Associations (ISA).
- ISO set up in 1947 by UN Standards Coordinating Committee (UNSCC) as an International standard-setting body headquartered in Geneva, Switzerland.
- Has representatives from the national standards organizations of 164 countries.
- Scope includes all subjects not covered by IEC (electrotechnologies) and ITU (telecommunications).
- Overlaps with ITU and IEC in ICT area and has 2 joint committees with IEC.



# Some relevant ISO Technical Committees

TC172 Optics and Photonics

TC180 Solar Energy

TC184 Industrial Automation Systems and Integration

TC197 Hydrogen Technologies

TC203 Technical Energy Systems

TC204 Intelligent Transport Systems

TC205 Building Environment Design

TC207 Environmental Management

TC211 Geographic Information Systems

TC215 Health Informatics

TC242 Energy Management

TC265 Carbon Capture and Storage (CCS)

TC274 Light and Lighting

# International Electrotechnical Commission (IEC)



- Set up in 1906 as an International standard-setting body, now headquartered in Geneva, Switzerland.
- 82 countries are members, with another 82 participating in Affiliate Country Programme.
- Charter embraces all electrotechnologies including energy production and distribution, electronics, magnetics and electromagnetics, electroacoustics, multimedia, telecommunication and medical technology.
- Has 2 joint committees with ISO.



# ISO/IEC JTC1 Information Technology

- Set up in 1987 to develop IT standards for business and consumer applications where worldwide remits of ISO and IEC overlap.
- Avoids duplicative or possibly incompatible standards between ISO and IEC.
- Provides a standards approval (PAS) process for ICT specifications from fora and consortia such as OASIS, OGC, OMG and W3C.
- Responsible for many critical ICT components such as JPEG and MPEG codec standards.

# ISO/IEC JTC2 Energy efficiency and renewable energy sources

- Set up in 2009 to develop common terminology in the fields of energy efficiency and renewable energy sources.
- 2 work items (published):
  - Common international terminology for Energy efficiency
  - Common international terminology for Renewable energy sources
- No further standards under development.

# United Nations Environment Programme (UNEP)



- UN agency that assists developing countries to implement environmentally sound policies and practice.
- Set up in June 1972, headquartered in Nairobi, Kenya.
- Covers a wide range of issues regarding the atmosphere, marine and terrestrial ecosystems, environmental governance and green economy.
- Played a significant role in developing international environmental conventions, promoting environmental science and information and illustrating the way those can be implemented in conjunction with policy.
- WMO and UNEP established the Intergovernmental Panel on Climate Change (IPCC) in 1988.



# Role of Environmental Protection Agencies (EPAs)

- National agencies created to protect human health and the environment by drafting and enforcing regulations based on laws passed by Governments.
- US EPA is most prominent with over 15,000 full-time employees.





# **Roles of Telecommunication/ICT Policy Makers and Regulators**

# ITU Plenipotentiary Conference (PP 2014) agreed on Global Telecommunication/ICT Targets by 2020.....



## Goal 1 Growth : Enable and foster access to and increased use of telecommunications/ICTs

**55%**

of households should have access to the Internet

**60%**

of individuals should be using the Internet

**40%**

Telecommunications/ICTs should be **40%** more affordable



GROWTH

## Goal 2 Inclusiveness – Bridge the digital divide and provide broadband for all

**50%**

of households should have access to the Internet in the developing world; **15%** in the least developed countries

**50%**

of individuals should be using the Internet in the developing world; **20%** in the least developed countries

**40%**

affordability gap between developed and developing countries should be reduced by **40%**

**5%**

Broadband services should cost no more than **5%** of average monthly income in the developing countries



INCLUSION

**90%**

of the rural population should be covered by broadband services



Gender equality among Internet users should be reached



Enabling environments ensuring accessible ICTs for persons with disabilities should be established in all countries

## Goal 3 Sustainability – Manage challenges resulting from the telecommunication/ICT development

**40%**

improvement in cybersecurity readiness

**50%**

reduction in volume of redundant e-waste

**30%**

decrease in Green House Gas emissions per device generated by the telecommunication/ICT sector



SUSTAINABILITY

## Goal 4 Innovation and partnership – Lead, improve and adapt to the changing telecommunication/ICT environment



Telecommunication/ICT environment conducive to innovation

Effective partnerships of stakeholders in telecommunication/ICT environment



INNOVATION

# PP-2014 – Resolution 182

## The role of telecommunications/information and communication technologies in regard to climate change and the protection of the environment

....."resolves

that ITU, within its mandate and in collaboration with other organizations, address the causes and effects of climate change through the following:

1. to **continue and further develop ITU activities on telecommunications/ICTs and climate change, and disaster management planning**, in order to contribute to the wider global efforts being made by Member States and the United Nations to contribute to further preventing and combating the effects of climate change;
2. to **encourage improvement of the energy efficiency of telecommunications/ICTs** in order to reduce the GHG emissions produced by the telecommunication/ICT sector;
3. to encourage the **telecommunication/ICT sector to contribute, through its own improvement of energy efficiency and in the use of ICTs in other parts of the economy**, to an annual reduction in GHG emissions;
4. to **promote awareness of the environmental issues** associated with telecommunication/ICT equipment design and **encourage energy efficiency** and the use of materials in the design and fabrication of telecommunication/ICT equipment that contributes to a **clean and safe environment throughout its lifecycle**;
5. to include, as a priority, assistance to developing countries so as to **strengthen their human and institutional capacity** in promoting the use of telecommunications/ICTs to tackle climate change, as well as in areas such as the need for communities to adapt to climate change, as a key element of disaster-management planning;
6. to **promote the benefits that accrue to the environment and society from the use of sustainable telecommunication/ICT equipment and services in bridging the standardization gap**;
7. to encourage reduction of GHG emissions through the **adoption of green energy sources in the telecommunication/ICT sector**;
8. to support the use of **telecommunications/ICTs in implementing smart grid**, which helps reduce the waste of energy in transmission and distribution and regulate peak energy demand from consumers,

# PP-2014 – Resolution 182

## The role of telecommunications/information and communication technologies in regard to climate change and the protection of the environment

### *invites Member States, Sector Members and Associates*

1. to continue to contribute actively to work within ITU's sphere of activities, together with other bodies, and in all international, regional and national platforms on the topic of telecommunications/ICTs and climate change, and **to exchange best practices with regard to law and regulation in the area of environmental protection and management of natural resources**;
2. to continue or initiate public and private programmes that include telecommunications/ICTs and climate change, giving due consideration to relevant ITU initiatives;
3. to take **necessary measures to reduce the effects of climate change by developing and using more energy-efficient ICT devices, applications and networks, as well as green energy sources, and through the application of telecommunications/ICTs in other fields**;
4. to promote **recycling, reuse of telecommunication/ICT equipment and efficient disposal of e-waste** from telecommunications/ICTs;



# PP-2014 – Resolution 182 (continued)

## *The role of telecommunications/information and communication technologies in regard to climate change and the protection of the environment*

5. to continue to support the work of ITU-R in **remote sensing (active and passive) for environmental observation** and other radiocommunication systems that can be used to **support climate and water resource monitoring, disaster prediction, alerting and response** in accordance with relevant resolutions adopted by radiocommunication assemblies and world radiocommunication conferences;
6. to **integrate the use of telecommunications/ICTs as an enabling tool in combating the effects of climate change into national adaptation and mitigation plans**;
7. to **incorporate the environmental indicators, conditions and standards into their national telecommunications/ICT plans**;
8. to conduct work in their countries on improving access to and **expanding the use of alternative energy sources** in the telecommunication/ICT sector;
9. to promote **the introduction of ecological innovations in the telecommunication/ICT sector**;
10. to **adopt and implement ITU recommendations** to tackle environmental challenges such as climate-change adaptation and mitigation, as well as e-waste, and to promote smart sustainable cities.

# Policy making at National level

- Parliaments, Presidential Orders, Ministries, Cabinet Decisions provide broad policy guidelines on the vision and strategic direction keeping in view the national priorities and international obligations.
- These policy objectives are implemented through legislations, regulations, agreements, cross-sector committees, guidelines etc.
- An example is the UK Climate Change Act 2008.

# Policy issues to consider

- **Nationwide affordable high speed broadband:** Accelerate the roll-out of ubiquitous high speed broadband so that e-services can be rolled out effectively,
- **Promote and adopt energy efficient practices** (e.g. infrastructure sharing, government adoption, smart buildings, transport, procurement),
- **Create enabling environment** to promote research and energy efficient ICT innovations
- **Energy efficient devices and energy sources:** Developing and using more energy-efficient ICT devices, applications and networks, as well as green energy sources,
- **Integrate in other national plans and cross-sector collaboration:** Integrate the use of telecommunications/ICTs as an enabling tool in national adaptation and mitigation plan,
- **Recycling and E-Waste:** recycling, reuse of telecommunication/ICT equipment and efficient disposal of e-waste,
- **Sensing and monitoring:** Remote sensing (active and passive) for environmental observation support climate and water resource monitoring, disaster prediction, alerting and response ,
- **Measurement and KPIs:** incorporate the environmental indicators, conditions and standards into their national telecommunications/ICT plans,
- **Green ICT Standards:** Adopt and encourage Green ICT standards to tackle environmental challenges such as climate-change adaptation and mitigation, as well as e-waste, and to promote smart sustainable cities,
- **Awareness and Capacity building**

# The role of regulators

- National telecoms regulatory authorities, e.g. IDA (Singapore), NBTC (Thailand), FCC (US), Ofcom (UK).
- National power regulatory authorities, e.g. EGAT (Thailand), Ofgem (UK), FERC (US).
- Impact of regulatory obligations, targets and KPIs
  - How should regulators use KPIs and targets effectively?

# Regulators in Energy and Telecom (example)

## Energy

- CERC (India)
- ERC (Thailand)
- FERC (US)
- NEPRA (Pakistan)
- Ofgem (UK)
- SERC (China)
- DG Energy (EU)

## Telecommunications

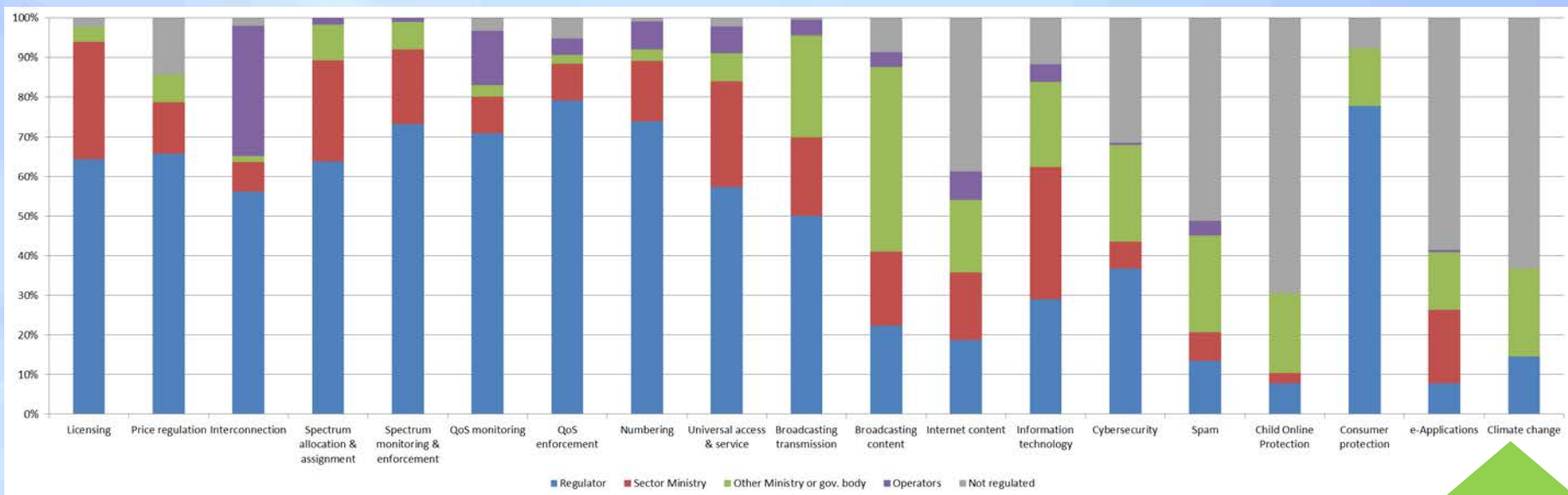
- ACMA (Australia)
- ANATEL (Brazil)
- ARCEP (France)
- BNA (Germany)
- CONATEL (Ecuador)
- FCC (US)
- NBTC (Thailand)
- NTA (Nepal)
- NICTA (PNG)
- Ofcom (UK)
- PTA (Pakistan)
- TRAI (India)

Need for cross-sector collaboration



# Duties of regulators

## Regulatory Mandate, 2013



Source: ITU World Telecommunication Regulatory Database

# Example: Ofcom

- Responsible for regulation of:
  - TV and radio sectors,
  - fixed line telecoms,
  - mobiles,
  - airwaves over which wireless devices operate.
- Ensures that:
  - customers get the best from their communications services,
  - are protected from scams and sharp practices,
  - while ensuring that competition can thrive.
- Encourages mobile network operators to share masts and/or sites where possible (without setting targets).
- Promotes spectrum sharing and technology neutrality.
- Ensures equivalence of access to OLOs through splitting of Openreach from rest of BT.

<http://licensing.ofcom.org.uk/radiocommunication-licences/mobile-wireless-broadband/cellular-wireless-broadband/policy-and-background/site-sharing/>

# Example: PTA (Pakistan)



- Responsible for:
  - establishment, operation and maintenance of telecommunications,
  - applications for use of radio-frequency spectrum,
  - protecting interests of users of telecommunication services,
  - promoting availability of wide range of high quality, efficient, cost effective and competitive telecommunication services throughout Pakistan,
  - promoting rapid modernization of telecommunication systems and telecommunication services,
  - investigating and adjudicating on complaints against licensees arising out of alleged contraventions of provisions of Telecoms Act,
  - making recommendations to Federal Government on policies with respect to international telecommunications,
  - provision of support for participation in international meetings and agreements to be executed in relation to the routing of international traffic and accounting settlements.
- Ensures:
  - rights of licensees are duly protected,
  - decisions and determinations are made promptly, in an open equitable, non discriminatory, consistent and transparent manner.

# Types of Indicators: Mobile Networks

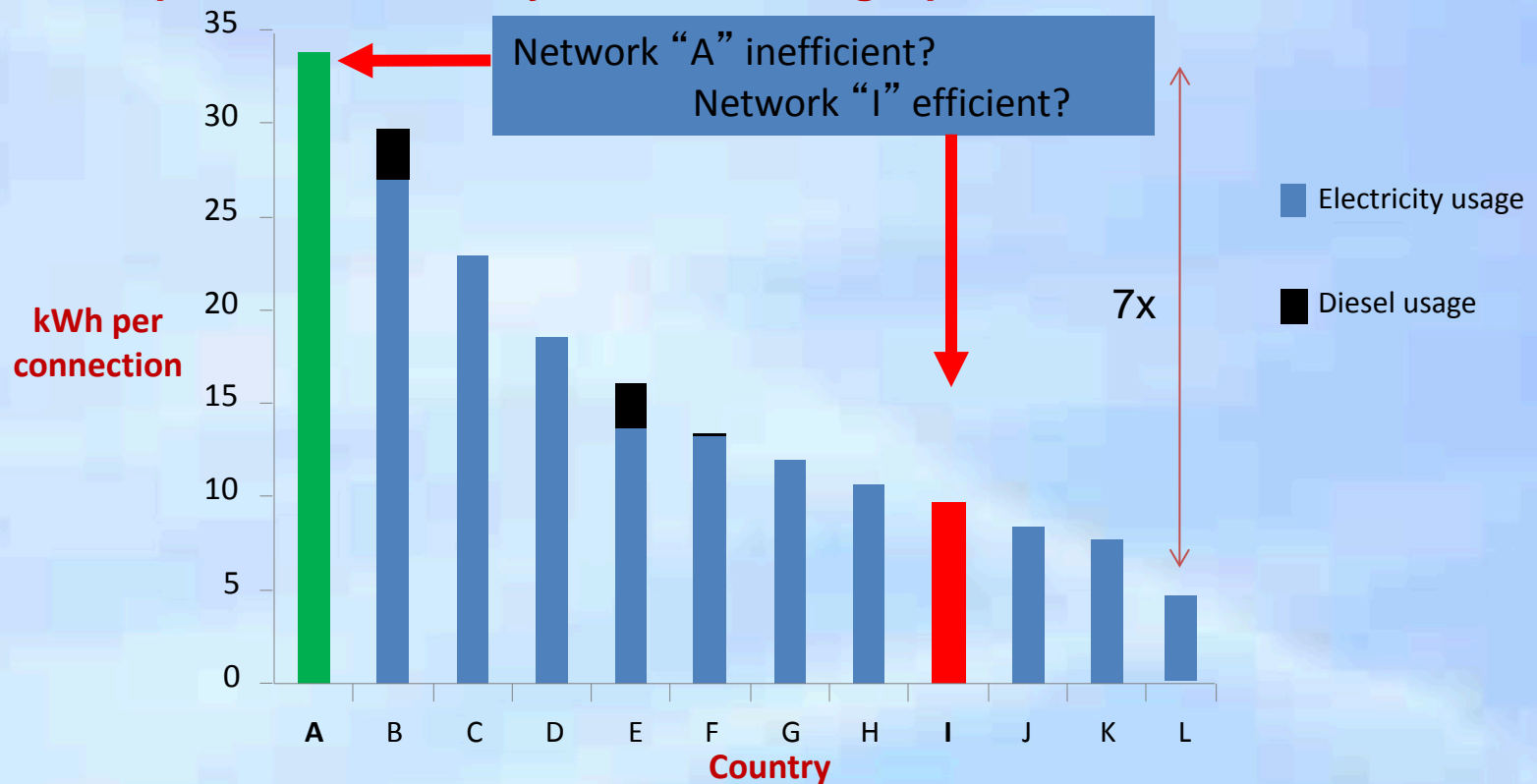
Measure mobile network energy performance by country and by network:

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

# Internal benchmarking, before normalisation

- Spread of energy per connection across countries can be high

Mobile operations electricity and diesel usage, per connection

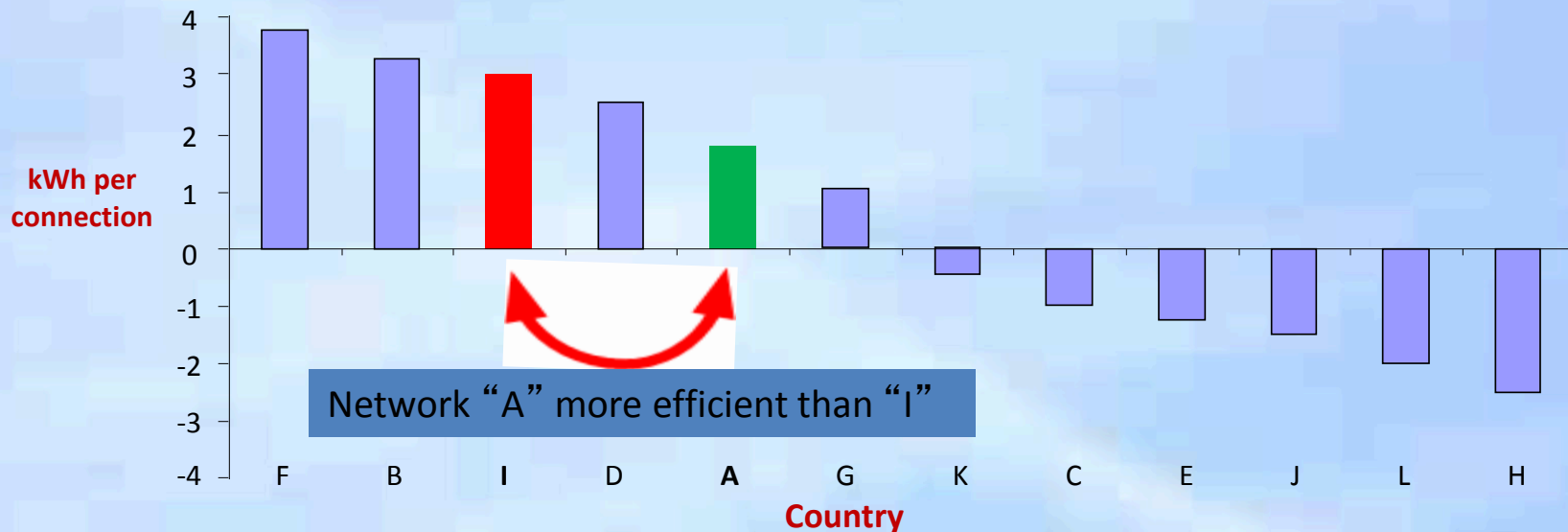




# Internal benchmarking, after normalisation

- Normalisation (against 4 variables) shows a truer picture

## Deviation from average electrical and diesel usage, per connection



### Regression variables

Mobile operations diesel & electricity usage per connection regressed against:

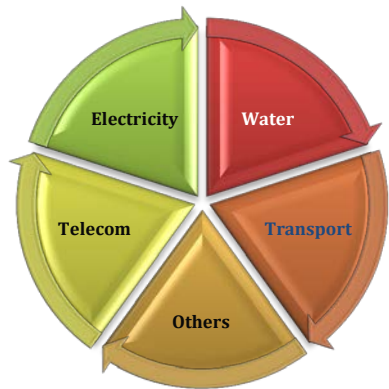
- % 2G connections of all mobile connections
- Geographical area covered by MNO per connection
- % urban population / % population covered by MNO
- Number of cooling degree days (population weighted)

# Example: DG Energy (EU)

- Responsible for:
  - creating a competitive internal energy market to lower prices,
  - developing renewable energy sources,
  - reducing energy dependence,
  - reducing energy consumption.
- Sets targets for:
  - reduction in energy consumption (from 1990 baseline),
  - % of renewable energy that must be introduced.



# POLICY MAKERS & REGULATORY COLLABORATION



**MULTI UTILITY  
REGULATOR**





Emergency



Education



Health



Electricity



Governance



Transport, Trade, Logistics



Water



Teleworking



Infrastructure Security



Integrated Policy

Legislation

Co-Regulation

Standardization (International / National)

MoU or Cooperation Agreement

Coordination Committee

Projects, Coordination on Case to Case basis



## COLLABORATION EXAMPLES



Electricity

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Thailand      MoU between National Broadcasting and Telecommunications Commission (NBTC) and the Electricity Generating Authority of Thailand (EGAT)

UAE      [Environment Agency - Abu Dhabi \(EAD\)](#) and the **Telecommunications Regulatory Authority (TRA)** have signed a Memorandum of Understanding (**MoU**) to promote cooperation and partnership in the field of technology and information security,



Green ICT & E-Waste

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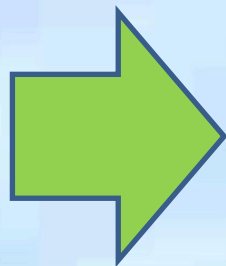
Egypt      Green ICT Strategy implemented through a **MoU** between **Ministry of Communications & IT (MCIT)** and Ministry of Environmental Affairs (MEA)

Singapore      E2PO is a **multi-agency committee** led by the National Environment Agency (NEA) and the Energy Market Authority (EMA) and comprises the Economic Development Board (EDB), Land Transport Authority (LTA), Building and Construction Authority (BCA), Housing and Development Board (HDB), **Infocomm Authority of Singapore (IDA)**, Agency for Science, technology and Research (A\*STAR), Urban Redevelopment Authority (URA), Jurong Town Corporation (JTC) and National Research Foundation (NRF). The Ministry of the Environment and Water Resources (MEWR) and Ministry of Trade and Industry (MTI) are also represented in the committee.

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# Energy Efficient Singapore : Collaboration amongst multiple agencies



Energy Efficient Singapore  
An E2PO Initiative

Singapore Government  
Integrity • Service • Excellence

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- JTC
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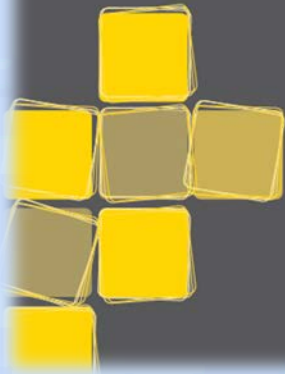
Source: <http://www.e2singapore.gov.sg/Default.aspx>

# Policy, Plan and Strategy Examples (ICT)



Arab Republic of Egypt  
Ministry of Communications  
and Information Technology  
www.mcit.gov.eg

## Policies of the Communications and Information Technology Sector 2012-2017



### 1. Green ICT

Green ICTs have become a principal need in the current age, in view of the deteriorating environmental conditions and climate change impact and the potential inherent in ICTs in mitigating the effects of climate change. The state is expected to mitigate the effects of climate change through the adoption of national policies that correspond to the global trends, while taking into consideration national needs and priorities. ICT tools can play a significant role in mitigating and adapting the effects of climate change. They contribute in offering solutions for reducing the greenhouse gas emissions caused by other sectors. Therefore, a group of policies should be adopted in this regard. They are as follows:

- Linking ICTs, the environment and energy policies to improve environmental performance
  - Linking and coordinating ICT, environment and energy policies
  - Promoting energy efficiency and sustainable management of resources through the use of ICTs
  - Integrating ICT policies in the national adaptation plans with the aim of reducing emissions and facilitating climate change adaptation
  - Developing and adopting methodologies to measure and mitigate the impact of ICTs on the environment
  - Development of indicators to assess the potential of green and smart ICTs in reducing the negative impact of other sectors on the environment.
- a-Developing policies for the sustainable management of ICT equipment
- Sustainable management of ICT devices from cradle-to-grave including; manufacturing, importation, distribution, use, reuse, recycling and disposal
  - Adopting e-waste management policies and developing an integrated legislative framework in this regard
  - Capacity building and training of local professionals in Green ICTs

b-Promoting private sector's investments in green ICT  
Promoting investments in green ICTs

- Compiling and distributing of information related to best practices in green ICT
- Preparing feasibility studies, guidelines and studies to support investment in green ICT
- Developing legislation to regulate and support investments in green ICT

c-Strengthening national, regional and international cooperation in the field of sustainable development

- Taking part in international decision-making forums concerned with defining and supporting sustainable development goals (SDGs)
- Promoting the culture of clean technologies on the national level through the exchange of experiences and knowledge transfer
- Creating partnerships between developing and developed countries to address global environmental challenges
- Tapping into global and bilateral funds to enhance policies targeting sustainable development and encouraging the creation of funding mechanisms on the international level
- Integrate ICTs as a facilitator into the international dialogue on climate change in the framework of the international organizations in charge
- Participating in international efforts to formulate green technology standards and disseminating on the local level

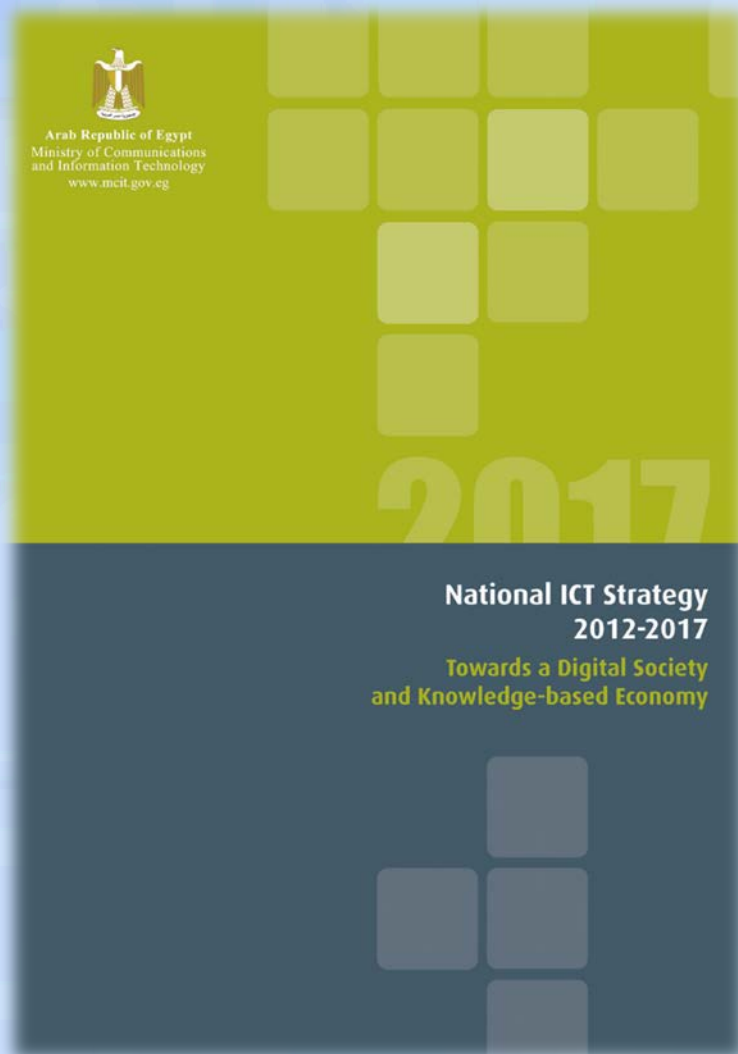
d-Reducing the negative environmental impact of the government sector through the use of green ICT

- Observing environmental standards in the public procurement of ICT equipment
- Using smart ICTs to increase the environmental efficiency of public utilities
- Fostering an environment friendly business cycle through the use of smart applications, such as teleconferencing and video conferencing

e-Raising public awareness about the sustainable and rational use of ICTs

f -Supporting research and development

# Policy, Plan and Strategy Examples (ICT)



## 7.6 Green ICT Initiative

In line with Egypt's aim to reduce greenhouse gas emissions and play an active role in international efforts to promote sustainable development both locally and internationally, programs have been adopted in a number of sectors to reduce emissions and protect the environment.

In this context, the ICT sector has a special role to play in reducing emissions and limiting the environmental impact not only of its own activities but across all sectors, thereby supporting sustainable economic and social development. On a global level, the sector has the potential to significantly reduce emissions in other sectors for only a low increase in its own emissions.

MCIT's efforts in the field of green ICT – in cooperation with governmental and non-governmental organizations, international organizations and the private sector – include programs in the following areas of focus:

**Sustainable management and development of the ICT sector:**

- Establishing a framework for the Green ICT Strategy for 2012-2015
- Coordinating green ICT at the national level
- Sustainable management of e-waste
- Recycling of e-waste
- Policies and legislation
- Exchange of experience and knowledge
- Research
- Raising community awareness

ICT sector support of environment-friendly sustainable development in other sectors

The primary objectives of this initiative are:

- Supporting sustainable development on the national level
- Accelerating economic growth by encouraging investment in green ICT
- Setting national policies for green ICT
- Raising public awareness of ICTs and their relation to the environment
- Building human capacity in green ICT
- Promoting the adoption of smart and energy-saving ICT solutions
- Promoting research in the field of green ICT
- Promoting use of green ICTs in all sectors
- Promoting sustainable management of ICT equipment from procurement to recycling
- Formulating policies that promote reuse and recycling of ICT equipment



# Policy, Plan and Strategy Examples (ICT)

## Republic of Korea (I)

The Korean government established the 2nd Five- Year Plan for **Green Growth** to be implemented during **2014-2018** in June 2014.

**3** policy objectives:  
 establishing a low-carbon socioeconomic system,  
 achieving a creative economy through the convergence of green technology and information and communications technology (ICT), and settling a living environment safe from the harmful effects of climate change



### Comparison of the 1<sup>st</sup> and 2<sup>nd</sup> Plans for Green Growth



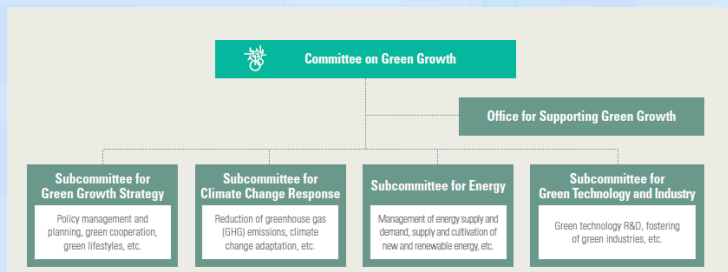
### Basic Structure of the 2<sup>nd</sup> Plan

Vision : Realization of People's Happiness through the Harmonious Development between Economy and Environment					
3 Strategies	Establishing a Low-carbon Socioeconomic Infrastructure		Achieving a Creative Economy through the Convergence of Green Technology and ICT		Building a Pleasant Living Environment Safe from the Harms of Climate Change
5 Directions	Effective GHG Reduction	Establishing a Sustainable Energy System	Forming an Ecosystem for Green, Creative Industries	Realizing a Sustainable Green Society	Strengthening Global Green Cooperation
20 Core Tasks	Systematic implementation of GHG reduction roadmap	Reinforcing energy demand management	Developing cutting-edge green technology	Strengthening the capacity for climate change adaptation	Effectively responding to climate talks
	Establishing the ETS and vitalizing the carbon market	Increasing the supply of new and renewable energy	Fostering green, creative industries	Enlarging the basis for eco-friendly living environment	Extending regional cooperation in green growth and its global spread
	Setting a long-term national reduction target	Building a dispersion type generation system	Setting an economic structure for resource circulation	Forming green space in the national territory	Enhancing cooperation with developing countries and internal stability
	Expanding carbon sinks	Securing the safety of energy facilities	Rationalizing regulation and cultivating green talent	Expanding the bases for green welfare and governance	Reinforcing cooperation with and support of GGGI and GCF

# Policy, Plan and Strategy Examples (ICT)

## Republic of Korea (II)

The Committee on Green Growth is responsible for evaluating and mediating the Korean government's green growth policies as well as collecting and discussing various relevant opinions from all corners of society. Currently, the Committee consists of 38 persons, including the Korean Prime Minister and one private expert as Co-chairs, 17 committee members (ministers), and 21 private experts who are representative leaders of the economic and social sectors.



## Achieving the People's Happiness through the Harmonious Development between the Economy and the Environment





# Policy, Plan and Strategy Examples (ICT)

Thailand

## **ICT Policy Framework 2020**

### **Strategy 7. ICT and Environment: the Green ICT**

Promote the use of ICT in energy saving and environmental protection measures.

This is to reduce the level of energy consumption and promote sustainable development by promoting research and development so as to increase innovation in the form of devices, equipment or ICT systems leading to lower energy consumption and environmental protection in the longer term, both at the local and national levels.

Stipulate requirements to change the behavior of people in order to reduce energy consumption, such as the reduction of paper use in government agencies, increase in teleconferences and working from home by using ICT. Also, support investment in the smart grid in order to promote renewable energy in a concrete manner. In addition, promote the development of “green cities”.

Promote environmental awareness at every step of ICT product life cycle by issuing design regulations for eco-design. Develop ICT products that have greater production potential, reduce costs and lower natural resource use at every step of the manufacturing process. Develop eco-label for ICT products manufactured in the country. Undertake public relations and build up awareness of the people about ecolabels before purchasing ICT products. At the same time, promote knowledge, understanding and awareness of ICT impacts on the environment. Set conditions for purchasing ICT goods and services by the public sector with due consideration to environmental sustainability.

Promote highly energy-efficient use of ICT. Due importance is given to higher energy efficiency of the ICT system and devices. Create suitable incentives under the “Green Data Center” to induce development, efficiency and reduce energy use within data centers. Link up all data centers. Set minimum standards for efficient energy usage and environmental-friendliness of ICT devices, in order to serve as the standard for inspecting ICT products available in the market in an equitable and fair manner.

Create an information system about energy, environment and natural resources that can demonstrate the overall condition of ecosystems around Thailand on a real-time basis, which will link up with geographic information systems. In addition, create a way to present information to the public in various formats so that the people and all business sectors can access and apply the knowledge widely. Build up information and communication system for public administration and promote creating social networks to promote participation and create awareness about conserving energy, environment and natural resources.

# Policy, Plans and Strategy Examples (ICT)

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## India

### National Telecom Policy 2012

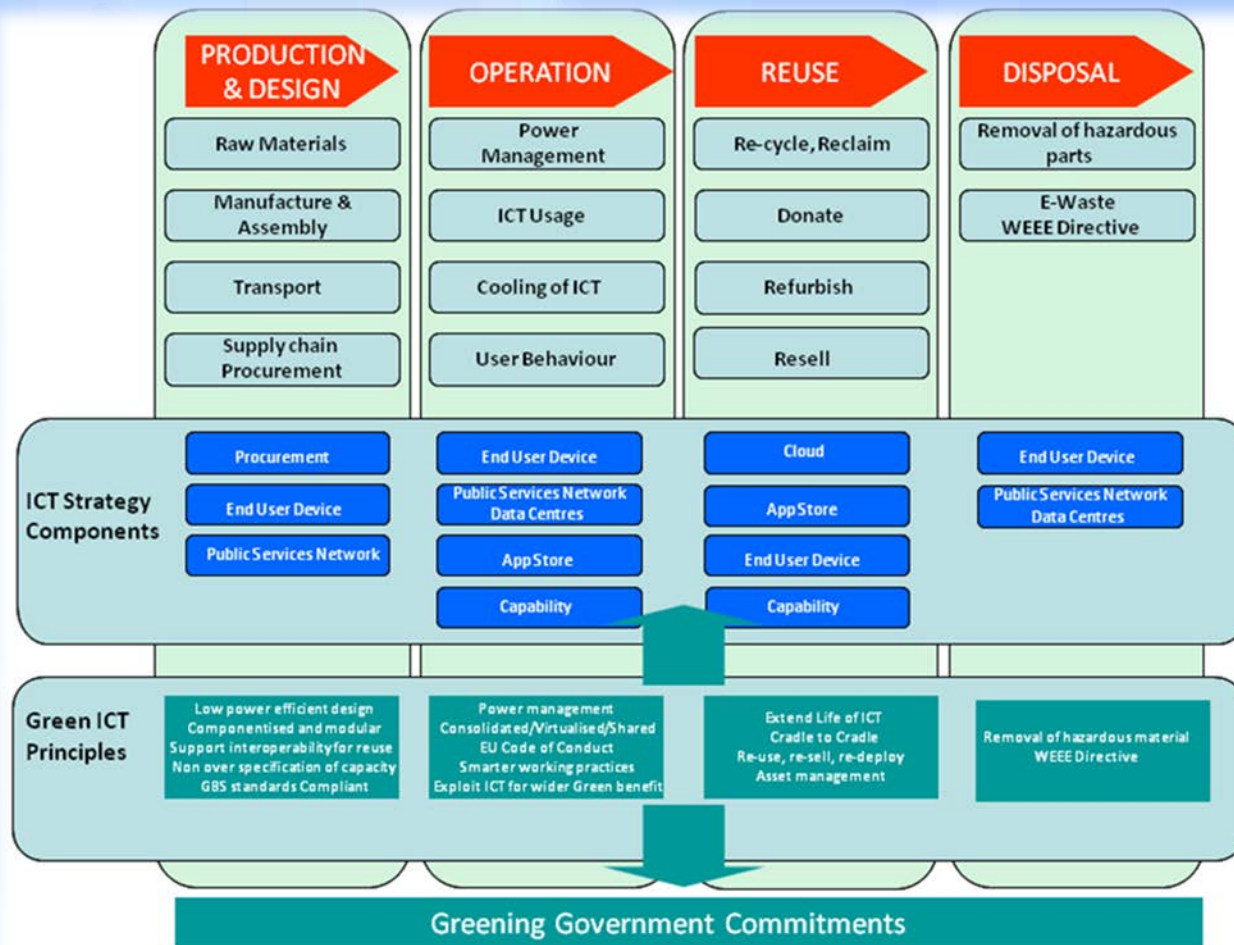
- Enhanced and continued ***adoption of green policy in telecom*** and incentivise use of renewable energy sources for sustainability.
- To promote the use of ***energy efficient equipment and renewable energy technologies*** to achieve long term sustainability
- To facilitate increased use of alternative sources (Renewable Energy Technologies) of energy for powering telecom networks through active participation of all the stakeholders – the government, the telecom industry and the consumer for green telecommunications. Sector specific schemes and targets for promotion of green technologies will be finalized in consultation with Ministry of New and Renewable Energy (MNRE) and other stakeholders.
- To ***promote the use of energy efficient equipment*** including low power wireless devices in telecom networks and adopt measures for the reduction of carbon footprint in the telecom sector.

## USA

### Connecting America: The National Broadband Plan (Chapter 12: Energy and Environment)

- How broadband and advanced communications can make the greatest impact on energy and the environment: as the foundation of a smarter electric grid and as a platform for innovation in smart homes and buildings, especially if utilities unlock energy data?
  - How industry and the federal government can improve the energy efficiency and environmental impact of ICT usage?
  - How broadband and advanced communications can make transportation safer, cleaner and more efficient?
-

# Greening Government: ICT Strategy (United Kingdom)



UNCLASSIFIED

Source: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/155098/greening-government-ict-strategy.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/155098/greening-government-ict-strategy.pdf)

# A multi-tier SSC ICT architecture from communication view (physical perspective)

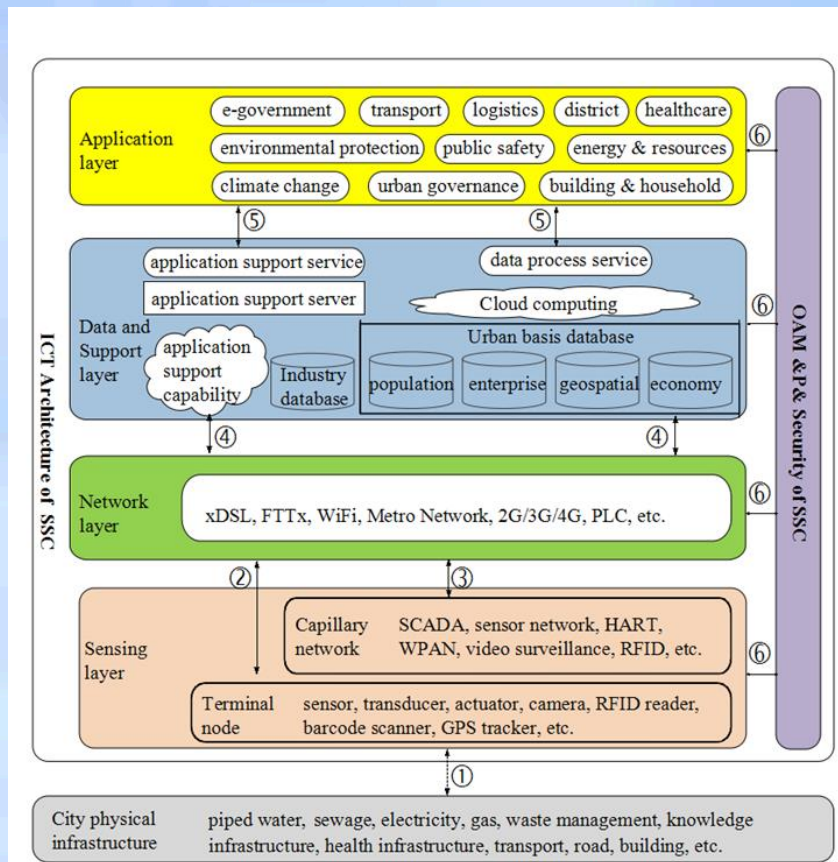


Figure source: ITU-T Focus Group on Smart Sustainable Cities: *Overview of smart sustainable cities infrastructure*

As telecommunication/ICTs networks grow to support multiple networks and applications, a number of issues (short list) arise



Cross-Sector Collaboration	
Competition	Investment
Licensing	Spectrum
HetNets	Broadband
Cloud	IoT / M2M
Interoperability	QoS/QoE
Numbering & Addressing	
Big Data & Open Data	
Security	Privacy
Right of Way	Infrastructure Sharing
Green ICTs	e-Waste
Data Centres	
Emergency Telecommunications	



# Infrastructure sharing to be energy efficient

- **Passive component sharing (examples)**
  - Sharing ducts, towers and associated infrastructure;
  - Third party providers;
  - Renewable resources;
- **Active component sharing (examples)**
  - Mobile equipment
  - Data Centres
  - Sensor networks / IoTs
- **MVNO**
- **Roaming (examples)**
  - Intra cell and inter cell



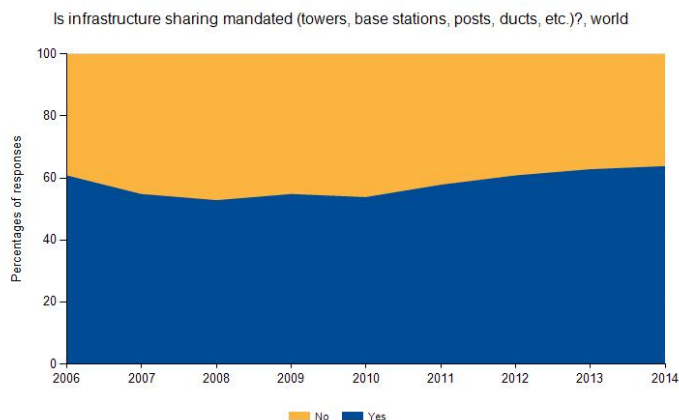
# Infrastructure sharing: International practices

**Case study (Indonesia):** In Indonesia, the regulator, Kominfo, has restricted the construction of new towers in the vicinity of an existing tower in order to persuade operators to undertake infrastructure sharing. Under the terms of the regulation, a new tower can only be constructed if for some reason the existing tower cannot be shared. The regulation provides a guideline for the construction and development of joint mobile towers. Under the regulation, the owner of a mobile tower is required to give non-discriminatory access to other telecommunications operators. The tower owners are also required to give information in terms of the tower capacity to potential access-seekers in a transparent manner.

**Case study (France):** In France, the regulator has mandated network sharing in respect of in-building wiring. This has resulted in operators that install in-building wiring to grant a passive access to other operators at the concentration point. Under the French IRU model, one operator signs a contract with the co-owners of a building and becomes the operator of the building. This operator is in charge of the construction and the maintenance of the network within the building, and offers passive access, either through a dedicated fibre line or through a shared fibre line, to other members of the co-investment agreement. Access is granted through long-term 30-year (or 24-year) cooperation agreements (granting of the IRU).

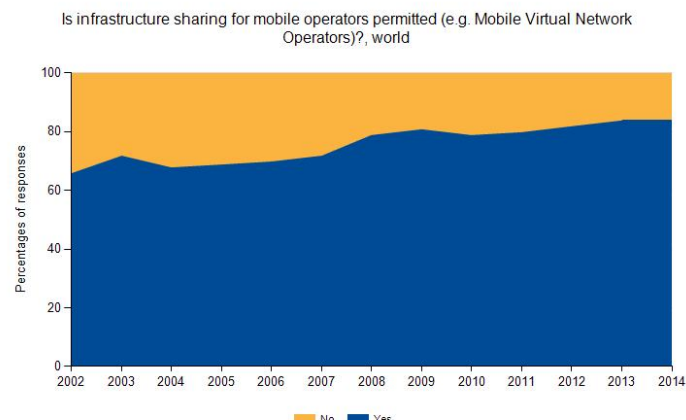
Source, ITU GSR discussion paper, Accelerating Broadband Deployment through Network Sharing and Coinvestment, Malcolm Webb

# Infrastructure sharing regulation: trends and practices



Based on 167 data points for 2014

ITU ICT-Eye: <http://www.itu.int/icteye>



Based on 177 data points for 2014

ITU ICT-Eye: <http://www.itu.int/icteye>

Is infrastructure sharing mandated (towers, base stations, posts, ducts, etc.)? - Yes, 2014

64%



Does the infrastructure sharing result in lower prices for end-users? - Yes, 2014

55%



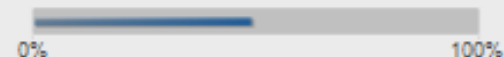
Is co-location/site sharing mandated? - Yes, 2014

64%



Unbundled access to the local loop required, 2014

49%



ITU ICT-Eye: <http://www.itu.int/icteye>

# Regulatory Approaches to RET

- Set a target for the % of BTS using renewable energy by 2020.
- Request figures from mobile TSPs providing “*average power originating from fossil fuels per customer connected*” to assess and compare progress on energy efficiency:
  - would encourage use of renewable energy sources,
  - would need to estimate % of fossil fuels in grid-supplied electricity if BTS takes power from grid for part of day,
  - would need to apportion power used by TSPs at shared sites.
- Permit different BTS site sharing tariffs to be levied when renewable or battery power is provided.

# Example: India - Approach to green telecommunications

- At least 50% of rural towers and 20% of urban towers are to be powered by hybrid power (RET + Grid Power) by 2015
- At least 75% of rural towers and 33% of urban towers are to be powered by hybrid power (RET + Grid Power) by 2020
- The TSPs should aim at GHG reduction targets for the mobile networks of:
  - 8% by the year 2014-2015
  - 12% by the year 2016-2017
  - 17% by the year 2018-2019
- All telecom products, equipment and service .....”Green Passport”
- Declaration of carbon footprint by service providers
- Service provider should evolve carbon credit policy
- Voluntary code of practice
  - E.g. induct energy efficient radio networks, endeavour to achieve that Total power consumption of each BTS should not exceed 500W by 2020, phased program to have cell sites, esp in rural areas, through hybrid renewable sources.

# Regulatory issues

- Incorporate energy efficiency as a regulatory strategy.
- Consider regulatory areas (sample)
  - Licensing framework to facilitate innovation and energy efficient networks and services
  - Competition: Balance between competition and consolidation
  - Quality of Service
  - Spectrum availability to support energy efficiency
  - Type approvals and adoption of green standards
  - Guidelines (e.g. Green data center)
  - Coordinate with other sector regulators
  - Interoperability to improve economies of scale
  - Infrastructure sharing to
  - Measurements and monitoring



# Case study: How has regulatory environment in the EU led to lower GHG emissions?

- DG Energy has clear mandate (based on Lisbon Treaty) to create a fully integrated competitive European energy market.
- In January 2014, EU agreed:
  - a 40% emissions reduction target by 2030 compared to 1990 levels,
  - a 27% renewable energy target,
  - most ambitious of any region in the world,expected to create 70,000 full-time jobs and cut €33bn in fossil fuel imports.
- How is it realising this?

# EU principles of a low carbon economy

- Cut of at least 20% in emissions from all primary energy sources by 2020, while pushing for international agreement aimed at achieving 30% cut by all developed nations by 2020.
- Cut of up to 95% in carbon emissions from primary energy sources by 2050.
- Minimum target of 10% for use of biofuels by 2020.
- Minimum 10% electricity interconnection target for all member states by 2020.
- Energy supply and generation activities of energy companies to be 'unbundled' from their distribution networks.
- Improve energy relations with EU's neighbours, including Russia.
- Development of European Strategic Energy Technology Plan:
  - to develop renewable energy, energy conservation, low-energy buildings, 4<sup>th</sup> generation nuclear reactor, clean coal and carbon capture.
- Develop an Africa-Europe Energy partnership:
  - to help Africa 'leap-frog' to low-carbon technologies and to help develop the continent as a sustainable energy supplier.

Energy for a Changing World: <http://www.managenergy.net/resources/881#.VfCkjun87A0>

# Encouraging Community Energy Projects

- Community Energy projects are funded partly or wholly by the local community. Benefits flow to local community.
- In (e.g.) Pakistan there are many examples of communities wanting to generate their own power using solar PV, which is leading to the setting up of many small scale enterprises.
- Given sufficient encouragement and funding these could provide at least 10% of Pakistan's electricity in the future.
- Also, electricity so generated is mostly used by the community where it is generated – avoids construction of new high voltage transmission lines to transport electricity between towns and villages.
- Community energy schemes could provide a large proportion of the power needed to fill the energy gap.
- Policy makers and regulators in the energy sector should encourage creation of community organizations to grow proportion of renewable energy and reduce overall GHG emissions.

Source: ITU Report: “Enabling Energy Efficiency through ICTs: The case of Pakistan”

# Summary

- A wide range of policy makers and regulators exist with different roles.
- The ITU (as well as ISO/IEC) publish many green standards which show how to reduce energy consumption in networks.
- There are a range of policy issues that must be considered at National and regional level.
- Regulators should use more instruments and take a more active role in reducing energy consumption in telecoms networks.

# References for further reading:

Reference documents from ITU and ITU-T reports and handbooks:

- ITU Global Symposia for Regulators: [www.itu.int/ITU-D/treg/Events/Seminars/GSR/](http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/)
- ITU World Telecommunication/ICT Indicators database
- ITU Symposia on ICT and Climate Change 2007 – 2014

Other references:

- BT Group plc. “Better Future Report”, London, UK.
- Verizon Sustainability Policy - [www.verizon.com/about/responsibility/sustainability](http://www.verizon.com/about/responsibility/sustainability)