ITU-CITET Regional Training Workshop on ICT and Climate Change Mitigation and Adaptation in Arab Region

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Session 4: Role of Policy Makers and Regulators in ICT & Climate Change

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Objectives

To introduce the role of policy makers and regulators related to ICT and climate change and the key regulatory issues they are dealing with:

- The functions of regulators in the Telecommunications and Energy sectors.
- An overview of regulatory activities and trends in the ICT and Energy sectors.
- Emerging issues for regulators due to the role ICTs can play in tackling climate change.

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Session Topics

- 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)).
- Other relevant organisations including Environmental Protection Agencies (EPAs), GeSI and GSMA.
- Case study: How has regulatory environment in the EU led to lower GHG emissions?

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Remember: *In order to keep average global temperature rises to below 2°C*

- We have to limit GHGs in atmosphere to peak at ~450 ppm CO_2e.
- We have to reduce annual GHG emissions to levels of ~50 $GtCO_2e$
- We have to co… …ssions globally:
  - to 20…
- …ergy (green) technologies as soon as

What do the policy makers and regulators have to do with this?

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To start: The role of National policy makers

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.

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Policies and Legislation at National Level

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National Policy Domain: Ministries

Ministries are the highest level national authorities in this domain. They provide policy guidance and national directions, and are responsible for policy development and implementation at the national level. Examples of Ministries involved are:
1. Ministry of the Environment and Natural Resources (leads the climate change agenda at the national level)

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Danish Ministry of the Environment

Adapted from OSPINA & HEEKS, Making Policy on ICTs and Climate Change in Developing Countries, ***Centre for Development Informatics,*** *2012*

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National Policy Domain: Agencies

National-level Agencies are specialized agencies that are identified as lead bodies in all matters concerning the environment, including the implementation and monitoring of government policies, mainstreaming the environment into development processes and emergency response.
· Environmental Protection Agency
· National IT and Telecom Agency

Adapted from OSPINA & HEEKS, Making Policy on ICTs and Climate Change in Developing Countries, ***Centre for Development Informatics,*** *2012*

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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.

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Policy issues to consider (1)

- **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.

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Policy issues to consider (2)

- **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**

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Next:
The role of National regulators

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?

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National Policy Domain: Regulators

National-level Regulators are agencies which undertake functions aimed at promoting infrastructure investment, penetration and accessibility in their targeted sector/segment e.g. telecommunications, power,
· National Regulatory Agency for Telecommunications
· National Power/Electricity Regulators

Adapted from OSPINA & HEEKS, Making Policy on ICTs and Climate Change in Developing Countries, ***Centre for Development Informatics,*** *2012*

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Regulators in Energy and Telecommunications (examples)

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

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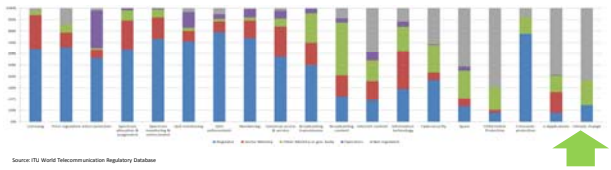
Duties of Regulators

Regulatory Mandate, 2013



Source: ITU World Telecommunication Regulatory Database

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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.

Ofcom
Independent regulator and competition authority for the UK communications industries.

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

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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, cost effective and transparent manner.

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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"

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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.

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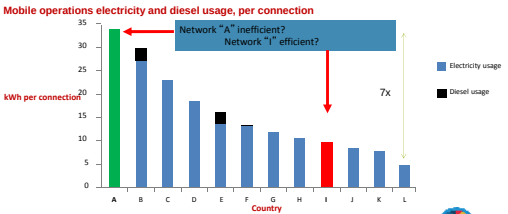
Internal benchmarking, before normalisation

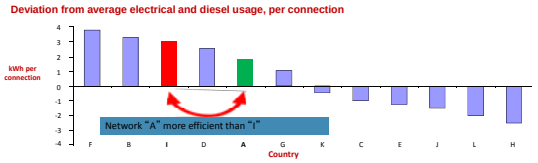
- Spread of energy per connection across countries can be high



www.gsma.com

Internal benchmarking, after normalisation

- Normalisation (against 4 variables) shows a truer picture



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)

www.gsma.com

What could Energy regulators do?

- Encourage a reduction in overall energy consumption.
- Encourage a switch away from fossil fuels.
- Encourage introduction of carbon-free sources of power generation:
  - Nuclear
  - Renewables
- Enable other sectors (e.g. Transport) to reduce their GHG emissions.

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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

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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

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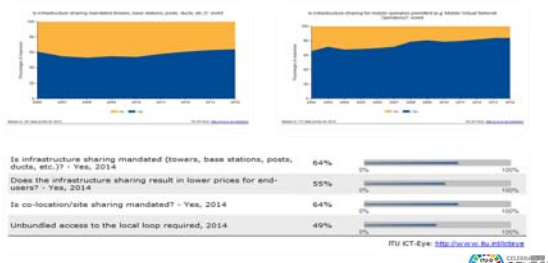
Infrastructure sharing regulation: trends and practices



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What could Telecoms/ICT regulators do?

- Encourage a reduction in overall energy consumption.
- Encourage introduction of renewables to power ICT equipment.
- Enable other sectors to reduce their GHG emissions:
  - Roll out a high speed broadband infrastructure to enable growth in e-services.

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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.

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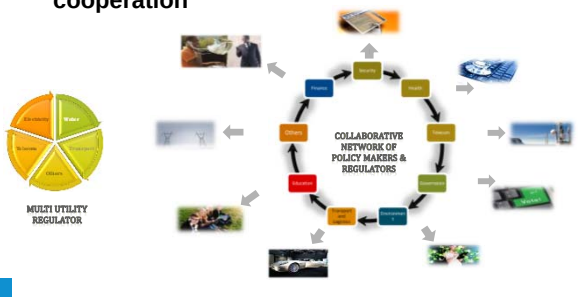
Next:
The benefits of cooperation between policy makers and regulators

Policy Maker and Regulator cooperation



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Energy Efficient Singapore : Collaboration amongst multiple agencies

Source: http://www.e2singapore.gov.sg/Default.aspx

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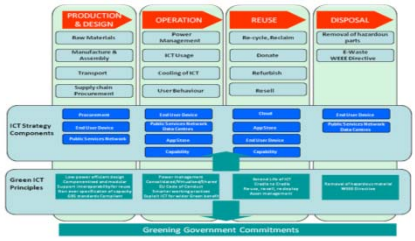
Greening Government: ICT Strategy (UK)



UNCLASSIFIED

Source: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/155098/greening-government-ict-strategy.pdf

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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 ahcieve 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.

Source: http://www.trai.gov.in/WriteReadData/Direction/Document/Green%20Directions%20For%20Access%20SPs0001.pdf

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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 reduce energy consumption / GHG emissions
  - Measurements and monitoring

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Next: National Policy Leadership Case Study

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National Policy Leadership: Australia

"One of our National Digital Economy Strategy goals is to better manage the energy use of our infrastructure and environment. High-speed broadband can help to improve Australia's environmental sustainability by supporting smart technology applications that encourage more efficient use and demand management of water, energy, transport and infrastructure.

The Australian government has taken a lead in integrating climate change and ICT policies by implementing an ICT sustainability plan to assist in lowering its carbon footprint. *Government ICT operations are estimated to be able to improve its energy management up to 20 per cent on current consumption levels by mid-2015. This equates around 325,000 tons of carbon emissions mitigated over the five year plan."*

Stephen Conroy, Former Minister for Broadband, Communications and the Digital Economy and Minister Assisting the Prime Minister on Digital Productivity

Source: Australian Government ICT Sustainability Plan, Department of the Environment, Water, Heritage and the Arts, 2010, ISBN: 978-1-921733-15-4, http://www.environment.gov.au/sustainability/government/ictplan/publications/plan/pubs/ict-plan.pdf

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National Policy Leadership: Australia

A hallmark of the Australian approach has been trans-sector cooperation, to extend the benefits of broadband (for which Australia is one of the top 10 economies in the world) to other sectors of the economy, such as environmental protection. In the words of Stephen Conroy, Minister for Broadband, Communications and the Digital Economy and Minister Assisting the Prime Minister on Digital Productivity:

"Across all levels of government, collaboration is necessary to tackle climate change. The Government is committed to ensuring that all stakeholders are aware of initiatives that are underway and of their value. It has adopted a whole-of-government strategy to address climate change via the ICT Sustainability Plan and its environmental goal within the National Digital Economy Strategy."

Source: The Broadband Bridge: Linking ICT with Climate Action for a Low-Carbon Economy, a report by the Broadband Commission

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National Policy Leadership: Australia

- In 2009 the government announced a Mandatory Renewable Energy Target of 45,000 MW (20% of its electricity supply) to come from renewable energy sources by 2020. The Clean Energy Future legislation committed to cutting GHG emissions by at least 5% compared with 2000 levels by 2020, and 80% below 2000 levels by 2050.
- Smart grid policy was deemed integral to this energy strategy. The National Framework for Energy Efficiency included developing standards, and tackling regulatory hurdles that impede adoption of smart grid technologies.

- With broad, multi-stakeholder consultation, the government kick-started an AUD$100 million (USD 100 million) **Smart Grid, Smart City** program as part of its National Energy Efficiency Initiative.

Source: The Broadband Bridge: Linking ICT with Climate Action for a Low-Carbon Economy, a report by the Broadband Commission; Securing a clean energy future: The Australian Government's Climate Change Plan, ISBN 978-0-642-74723-5, 2011, Australian Government, http://www.cleanenergyfuture.gov.au/wp-content/uploads/2011/07/Consolidated-Final.pdf; Clean Energy Australia: Investing in the Clean Energy Sources of the Future, ISBN 978-0-642-74721-1, 201, Australian Government, http://www.cleanenergyfuture.gov.au/wp-content/uploads/2011/07/clean-energy-australia.pdf

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National Policy Leadership: Australia

- The National Broadband Network (NBN) was identified as a significant potential platform for future smart grid implementation in Australia.

- The Australian Government invested AUD27.5 billion (USD27.5 billion) in a high-speed, wholesale-only, open-access network to reach 93% of Australian premises by 2021 with fibre to the premises technology, with the remaining 7% to be connected with next generation fixed wireless and satellite technologies.

Source: The Broadband Bridge: Linking ICT with Climate Action for a Low-Carbon Economy, a report by the Broadband Commission, 71 National Broadband Network: Progress Update, 2010- 13537# 02 NBNI, Australian Government, Aug 2011, http://www.nbn.gov.au/wp-content/uploads/2011/05/august-update.pdf

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National Policy Leadership: Australia

The NBN underpins the **National Digital Economy Strategy**, which sets eight Digital Economy Goals, two of which target climate change:

1) to extend national access to smart technology by 2020 to better manage energy use; and
2) double the level of teleworking to at least 12 percent of Australian employees. The NBN can enable more Australians to telework more easily.

Access Economics has estimated that if 10% of Australian employees were to telework 50% of the time, total annual gains of AUD1.4-1.9 billion (USD 1.4-1.9 billion) could be delivered, including savings of 120 million litres of fuel.

Source: The Broadband Bridge: Linking ICT with Climate Action for a Low-Carbon Economy, a report by the Broadband Commission, 71 National Broadband Network: Progress Update, 2010- 13537# 02 NBNI, Australian Government, Aug 2011, http://www.nbn.gov.au/wp-content/uploads/2011/05/august-update.pdf and Impacts of teleworking under the NBN, Report by Access Economics Pty Limited for the Department of Broadband, Communications and the Digital Economy', http://www.dbcde.gov.au/__data/assets/pdf_file/0018/130158/ImpactsofteleworkingundertheNBN.pdf

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Next:
Case study on EU DG Energy

ENERGY 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.

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How has the 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 DG Energy achieving this?

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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, 4th 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: www.managenergy.net/resources/881#.VfCkjun87A0

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Summary

- A wide range of policy makers and regulators exist with different roles.
- There are a range of policy issues related to ICT & CC that should 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.
- Regulators should cooperate to achieve goals.

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References for further reading:

Reference documents from ITU:

- ITU Global Symposia for Regulators: 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 sources:

- (EU) Energy for a Changing World: www.managenergy.net/resources/881#.VfCkjun87A0
- Energy Efficient Singapore: www.e2singapore.gov.sg/Default.aspx
- (UK) Greening Government: www.gov.uk/government/uploads/system/uploads/attachment_data/file/155098/greening-government-ict-strategy.pdf

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