Developing Green ICT policies for climate change mitigation- Indian perspective

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Climate change at a glance

Global Warming

- The 2011–2020 decade warmed to an average **1.09 °C** compared to the pre-industrial baseline
- Burning fossil fuels is attributed as primary human activity contributing to global warming, resulting in higher emission of Green House Gases. It has impact in terms of:
  - more frequent extreme weather events such as heat waves, flooding,
  - melting of permafrost and glaciers causing sea level rise
  - crop failures causing scarcity of food and loss of livelihood

International Efforts

- **Paris Agreement** (2015) aims to keep global warming well below 2.0 °C and contains an aspirational goal of keeping warming under 1.5 °C
- Key takeaways of **COP27** held in November' 2022 at Egypt
  - Countries reaffirmed their commitment to limit global temperature rise to 1.5°C
  - Accountability of commitments made by sectors, businesses and institutions

Key elements of climate action

- Earth's temperature to be kept at 1.5°C above pre-industrial levels.
- Reducing global greenhouse gas emissions to **half by 2030** and reach **net zero before 2050**.
- Reducing emissions requires generating electricity from low-carbon sources for emission reduction
- Enabling technologies to reduce **global energy consumption**, **effects of CO2 pollution**, and **inefficient use of resources**

Pillars

Mitigation	Adaptation	Resilience
• efforts to reduce or prevent emission of greenhouse gases. This is basically a focus on slowing the rate of global warming	• humans adapting to life in a changing climate and adjusting to the actual or expected future climate	• a measure of an area's ability to deal with the effects of climate change and 'bounce back' or recover

ITU Climate Action Areas

Digital technologies for **mitigation and adaption**	• Helping use **digital technologies** for monitoring, **mitigating and adapting to climate change**
e-Waste	• Protecting human health and the environment from **e-waste**
digital solutions for **energy efficiency**	• Facilitating digital solutions for **energy efficiency** by driving down emissions and reducing carbon footprint
greening ITU	• Growing its effort to **greening ITU**

India and Climate Action

- India aims to reach **net zero by 2070**, covering all key sectors
- India has been **ranked amongst top 5 countries in the world**, and the best among the G20 countries as per Climate Change Performance Index (CCPI, 2023) published by New Climate Institute and Climate Action Network International based in Germany.
- India earned a high rating in the GHG Emissions and Energy Use categories, while a medium for Climate Policy and Renewable Energy.
- The **aggressive policies of India** towards rapid deployment of renewables and robust framework for energy efficiency programs have shown considerable impact.
- As per the CCPI report, **India is on track to meet its 2030 emissions targets** (compatible with a well-below -2°C scenario).

What constitute ICT Sector

User Devices	• Fixed and mobile phones, tablets, routers, modems, CPE, Desktop and laptop PCs, Public displays, Connected devices (IoT)
Access Networks	• Fixed telephone networks, mobile networks, Fixed broadband networks
Data centres	• **Data centres** and **enterprise networks** (including ICT service providers)
Operator Activities	• offices, stores, travel and vehicles, control and core nodes

Climate Impact of ICT Sector

- The ICT sector's carbon footprint in 2015 was **about ~1.4%** of the global carbon footprint.
- Around **half of ICT carbon footprint is contributed alone by user devices**
- Further, for user devices, about half of the emissions are related to usage and the other half to the rest of the life cycle
- In future, ICT footprint is expected to grow with linear pace, **however IoT will grow exponentially**

Policy dimensions

- **Green ICT**
  - It is about mitigating the impact of ICT on the environment by reducing the energy use of computers, servers and data centres.
  - The whole life cycle of ICT equipment right from the manufacturing, usage and disposal (i.e. e-waste and recycling)

- **ICT solutions for climate action**
  - ICT is not only part of the problem of our environmental impact, but it is also part of the solution.

Green ICT – India Perspective

- The Indian Telecom Industry accounts for around 1% of the country's total carbon emission as against global average of 0.7%.
- Slightly higher emissions are primarily attributed to:
  - Telecom operators needs to maintain a network availability higher than 99.5 %.
  - Assured power 24x7 is, therefore, a pre-requisite for any telecom tower site.
  - Electricity situation is still erratic in several pockets of the country, which leads to use of Diesel along with battery backup to generate backup power
  - Use of Diesel adds to the carbon emissions by the sector.

Green ICT – India Perspective

- The move towards 5G also is expected to increase the total network energy consumption by 150-170% by 2026 globally, mainly due to large number of small cells and use of massive MIMO technology.

- As such, there is a need to use Renewable Energy Technology (RET) for carbon emission reduction and sharing of towers for reduction in energy intensity/requirement.

- National Digital Communications Policy (NDCP) 2018 released by DoT also focuses on promoting the use of alternate energy solutions for the telecom sector.

Current Status of Use of Green Energy in Telecom

- Currently more than 7 lac Mobile Towers, housing more than 23 lac BTSs Pan-India.
- Industry adopted concept of 'Sharing' of mobile towers – optimum utilization of resources.
- Close to 40% of sites are diesel free (=< 1 liter diesel usage per day).
- Less than 5% of total towers use Renewal Power Source for Energy
- Major Renewal Power Source for the Telecom Infrastructure Providers – Solar.

DoT Green Energy Regulations

- In March 2013, DoT constituted Renewable Energy Technology (RET) Committee to develop the roadmap, comprehensive program and viability gap funding for mobilizing the renewable energy technology deployment in the telecom sector.
- After industry representation and intent to adopt voluntary measures, the sustainable telecommunications norms were revised in June 2019 by the Government.
- Comparison is as given below:

DoT's guidelines for RET adoption (2012)	Revised Guidelines (2019)	Remarks
- 50% of rural towers, 20% of urban towers on RET by 2015 - 75% of rural towers, 33% of urban towers on RET by 2020	RET targets have been made voluntary	Due to non- techno commercial feasibility
Carbon emission reduction targets - 5% by 2012-13 to 17% by 2018-19	Average Carbon reduction of 30% by 2020 & 40% by 2022-23	Base year 2011-12, reduction targets increased.
Reporting on Carbon footprint on per subscriber basis	Reporting made on per data consumed basis	

Renewable Energy Technology (RET) options

Solar Energy	• very low environmental impact and low-maintenance • Around 33,000 out of total 730,000 sites on solar power
Wind Energy	• Deployment in telecom towers still in nascent stage • Structural stability of the tower needs to be ensured.
Fuel Cells	• Not deployed for telecom towers at present
PNG	• Not deployed for telecom towers at present
Ethanol blended diesel	• Its use in existing DG sets is still under R&D

Measures adopted by Indian telecom Industry till now

- Sharing of towers, reduction in energy intensity/ requirement.
- Conversion of Indoor sites to Outdoor sites, needing less energy.
- Usage of high-end VLRA batteries and Li-Ion batteries.
- Use of cooling free units instead of ACs has led to reduction in energy demand.
- Installed latest products such as high efficiency products.
- Use of Natural Gas and CNG/PNG – only on pilot basis, many challenges to adopt on workable scale.

Indian Telcos towards net-zero emissions

Reliance Jio Infocomm Ltd.

- To become Net Carbon Zero by 2035
- Embracing new technologies to minimize CO2 emissions
- Planning to develop next generation carbon capture utilization and storage technologies
- Pilot projects to use of low emission Lithium-Ion batteries, HVAC, fuel cell, solar energy, building fabric
- Plans for wheeling of power from third party RE sources for large facilities

Bharati Airtel Ltd.

- Aim to install hybrid solar at 70,000+ locations with a total capacity of 400 MWp
- It will result in a 25% coverage of solar hybrid solutions and de-carbonization of 30% of the installed sites' existing emissions
- Initiatives to identify, analyse technical and economic efficiency and scalability of few additional green technologies such as gas generators, hydrogen and methanol-based fuel cells, wind-solar hybrids

Sustainable manufacturing

- Green passport lab
  - Green Passport Lab for Standardization of Test Procedure and Certification of Telecom Equipment for Green Passport (GP) has been setup by DoT.
  - This Lab is conceptualized as a test bed created for testing of telecom devices for Energy Efficiency Testing of IP Routers, Edge Routers, GPON, GEPON.

E-Waste Policy Framework in India (1/2)

- Only 22.7% of the e-waste out of the total 10, 14,961.21 tones generated in 2019-20 in India was collected, dismantled, and recycled or disposed off.

- India is the world's 3rd largest generator of e-waste after China and the US, according to the UN Global E-Waste Monitor Report.

- Salient features of e-waste (management) rules 2022, notified by Ministry of Environment, Forest and Climate Change
  - Applicable to every manufacturer, producer refurbisher, dismantler and recycler of e-waste which came into force from 1st April 2023

  - Manufacturers shall use the technology or methods so as to make the end product recyclable and shall ensure that components or parts made by different manufacturers are compatible with each other so as to reduce the quantity of e-waste

E-Waste Policy Framework in India (2/2)

- It requires producers to set up e-waste exchange facilities to facilitate collection and recycling, and assign specific responsibility to bulk consumers of electronic products for safe disposal.
- Imports or placement in the market for new electrical and electronic equipment shall be permitted only for those which are compliant with provisions laid down by the government.
- It is the responsibility of the manufacturer to collect e-waste generated during manufacture and to ensure its recycling or disposal.
- Targets: At least 60% of electronic waste is collected and recycled by 2023 with targets to increase them to 70% and 80% in 2024 and 2025, respectively

ICT as climate action tool

Monitoring

- Monitoring of greenhouse gases
- Pollution detection, measurement & monitoring
- GIS & earth observation
- Early warning systems

Resource Management

- Energy management
- Waste management
- Precision farming
- Urban planning and management
- Water reserves assessment, monitoring, & control
- Transport Solutions

Challenges

- High CAPEX & OPEX: Lithium ion batteries, solar panel, energy efficient equipment's, additional area required for installation of solar panel equipment's, high production cost of green energy etc.

- Space Limitations
  - Unavailability of space near telecom tower for installation of green energy equipment's (solar panels etc.)
  - For roof-top sites huge challenges in getting feasibility of space, owner's consent, building strength, clear south facing area etc

- Geographical challenges such as terrain, climatic conditions, feasibility, local approvals etc.

- Low domestic production lithium ion batteries, energy efficient equipment's etc.

- Cost of operation & maintenance of green energy is very high, yet no fiscal incentives for using green energy equipment's in telecom sector.

Way Forward

- Support R&D work in field of Green Energy
- Incentivize procurement of green energy equipment
- Embracing new technologies to minimize CO2 emissions and developing next generation carbon capture utilization and storage technologies to convert CO2 into useful products.
- Deploying conservational energy sources such as use of low emission Lithium Ion batteries, HVAC, fuel cell, solar energy, building fabric etc., in order to reduce the carbon emission.
- Exploring hydrogen based fuel cell, small scale solar wind hybrid, cylinder based natural gas generator, Bio-diesel based generator, aluminum based fuel generator for reducing or eliminating diesel consumption
- Enhancing availability of power at telecom sites and reducing subsidy on diesel can reduce diesel consumption and promote use of alternate energy sources.

Thank you

Comparison – Renewable Energy Targets

Country	Current Share %	Target	Target Year
India	21.4%	40%	2030
USA	23.0%	100%	2035
UK	40.0%	100%	2050
China	12.0%	35%	2030
New Zealand	80.0%	100%	2035
Thailand	7.0%	20%	2022
Mexico	26.0%	50%	2050
UAE		50%	2050
Brazil	50.0%		
Russia		2.4%	2024

Comparison – Carbon Neutrality Targets

Country	Year	Status
India	2070	Pledge
USA	2050	Statement of intent
UK	2050	Law
China	2060	Policy Position
New Zealand	2050	Law
Thailand	2050	
Mexico		
UAE	2050	Statement of intent
Brazil	2060	Submission to UNFCCC
Russia	2050	Pledge