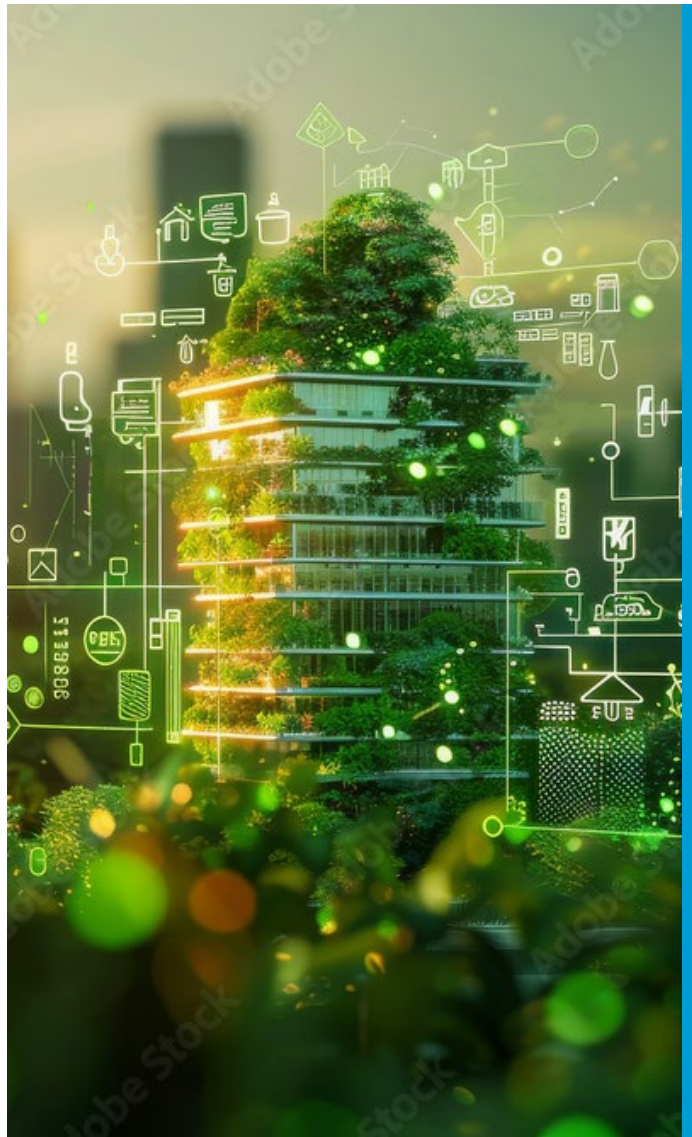
ITU-T Study Group 5

Environment, climate action, circular economy and electromagnetic fields

Introductory Presentation

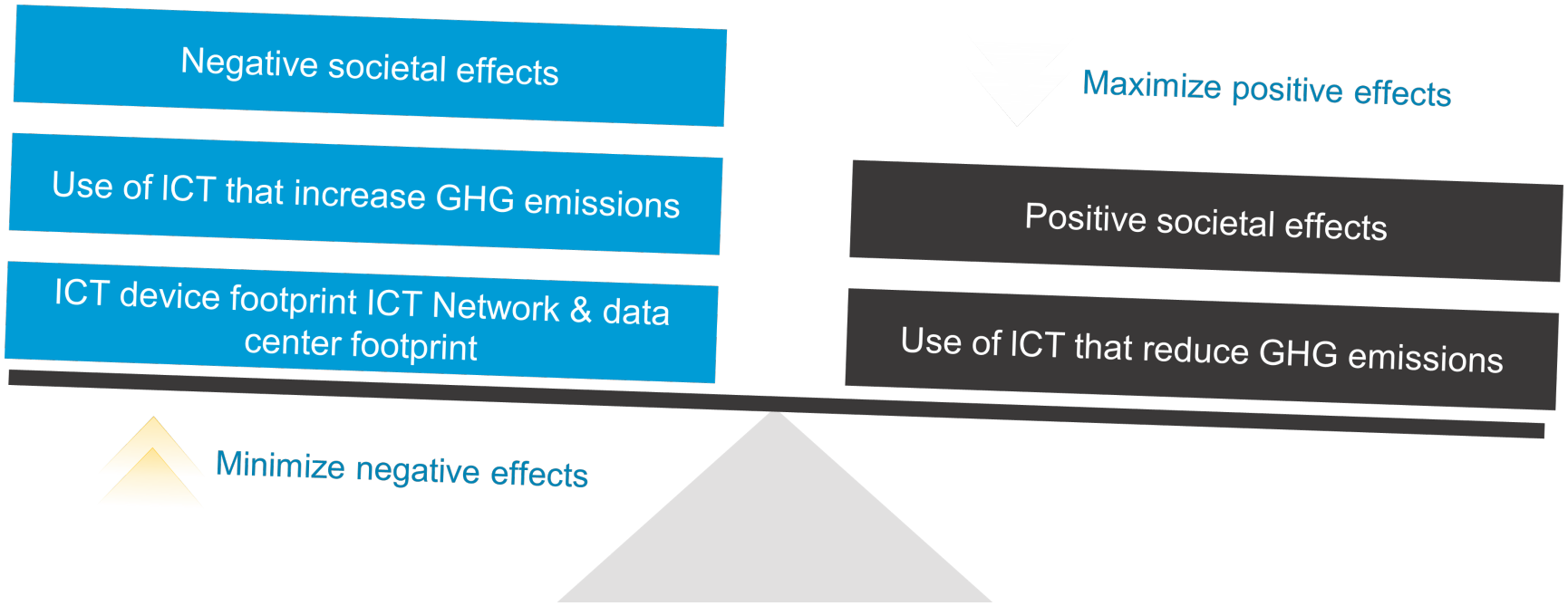
2025

The world is facing unprecedented climate threats



Digital transformation is a powerful force reshaping economies, societies, and the environment

The double-edged nature of ICTs



The adoption of digital technologies poses significant impact on our environment

2%

of global GHG emissions annually are generated by the ICT industry

62 Billion

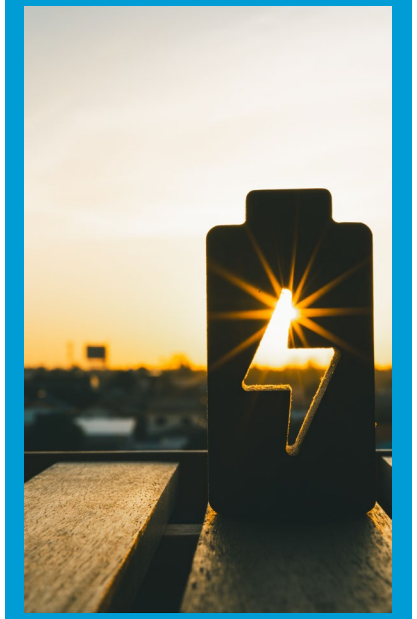
kilograms of e-waste was generated globally in 2022.

15%

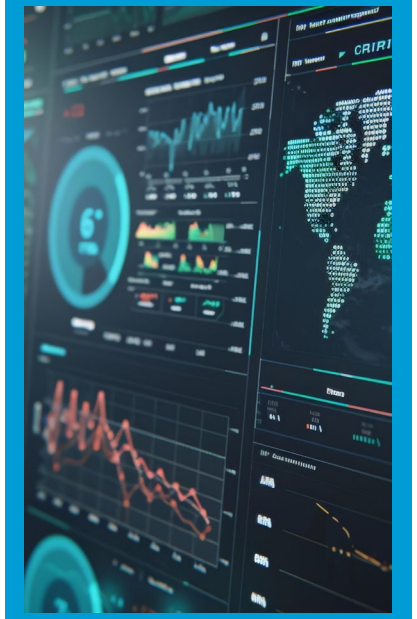
of global emissions by 2030 could be mitigated through the use of ICTs.

ICTs could help reduce global greenhouse gas emissions by up to 20% by 2030

Energy efficiency solutions



Climate data collection



Early warning systems

Equitable climate action

Source: GeSI

International Telecommunication Union (ITU)

The International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies (ICTs)

194 Member States

+700 Companies/ organizations

+160 Academia members

ITU Resolutions on Environment, EMF, Climate Change and Circular Economy

ITUPP BUCHAREST2022

ITU Resolution 182 – "Role of telecommunications/information and communication technologies in regard to climate change and the protection of the environment"

ITU Resolution 176 – "Measurement and assessment concerns related to human exposure to electromagnetic fields"

ITUWTSA NEW DELHI2024
15-24 October 2024
New Delhi, India

ITU-T Resolution 79 – "Role of telecommunications/information and communication technologies in handling and controlling e-waste from telecommunication and information technology equipment and methods of treating it"

ITU-T Resolution 72 – "Measurement and assessment concerns related to human exposure to electromagnetic fields"

ITU-T Resolution 73 – "Information and communication technologies, environment, climate change and circular economy"

The Power of Standards:
Driving a Sustainable Digital Future

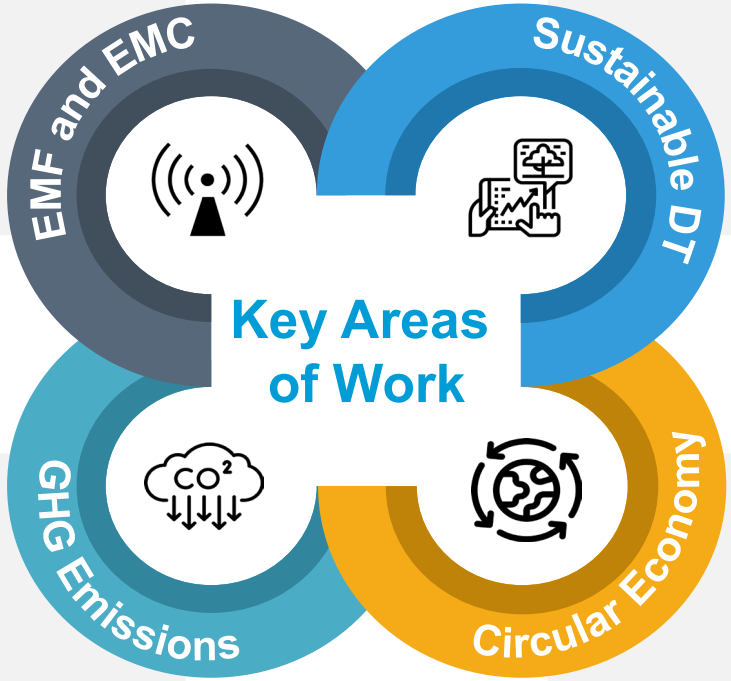
How ITU supports Environment, EMF and Circular Economy

ITU-T Study Group 5 lead roles: EMF, environment, climate action, sustainable digitalization and circular economy, develops standards on:

- Electromagnetic compatibility (EMC), resistibility and lightning protection
- Soft error caused by particle radiations
- Human exposure to electromagnetic fields (EMF)
- Circular economy and e-waste management
- ICTs related to the environment, energy efficiency, clean energy and sustainable digitalization for climate actions

ITU-T SG 5: Key Areas of Work

Continually addressing EMC, resistibility, and lightning protection. Furthered research on minimizing the potential health risks from EMF.



Development of standards that promote the integration of sustainable practices in the ICT sector, focusing on energy efficiency, resource management.

Development of standards and guidelines that help reduce the carbon footprint of ICT operations, contributing to global climate goals.

Support the transition to a circular economy within ICT, encouraging the strong e-waste management practices and the adoption of circular design principles.

ITU-T Study Group 5 Management Team

Chair

Mr Dominique WÜRGES
France

SG5 Secretariat

Ms Reyna UBEDA
Engineer to ITU-T SG5 / ITU

Mr Ahmad Alaa ALMIDANI
Administrative Assistant / ITU

Vice Chairs

Ms Shuguang QI
China

Ms Neha UPADHYAY
India

Mr Byung Chan KIM
Korea (Rep. of)

Mr Derick KHAMALI
Kenya

Mr William Daniel MNYIPPEMBE
Tanzania

Ms Helen NAKIGULI
Uganda

Mr Beniamino GORINI
Finland

Mr Daniel DIANAT
Sweden

Ms Rafia BARKAT
Algeria

Mr Khaled ALSALEEM
Kuwait

Ms Fatima ALOUANE
Morocco

Mr Saidiahrol SAYDIAKBAROV
Uzbekistan

ITU-T Study Group 5

SG5 Structure (Study Period 2025-2028)

WP1/5

1/5
Electrical protection, reliability, safety, and security of telecommunication/ ICT systems

2/5
Equipment specification and component/device for protection against lightning and other phenomena

3/5
Assessment of human exposure to electromagnetic fields (EMFs)

4/5
Electromagnetic compatibility (EMC) aspects in telecommunications /ICTs

WP2/5

6/5
Environmental efficiency of telecommunications/ICTs

7/5
E-waste, circular economy, and sustainable supply chain management

PLEN

8/5
Guidance and terminology on environment

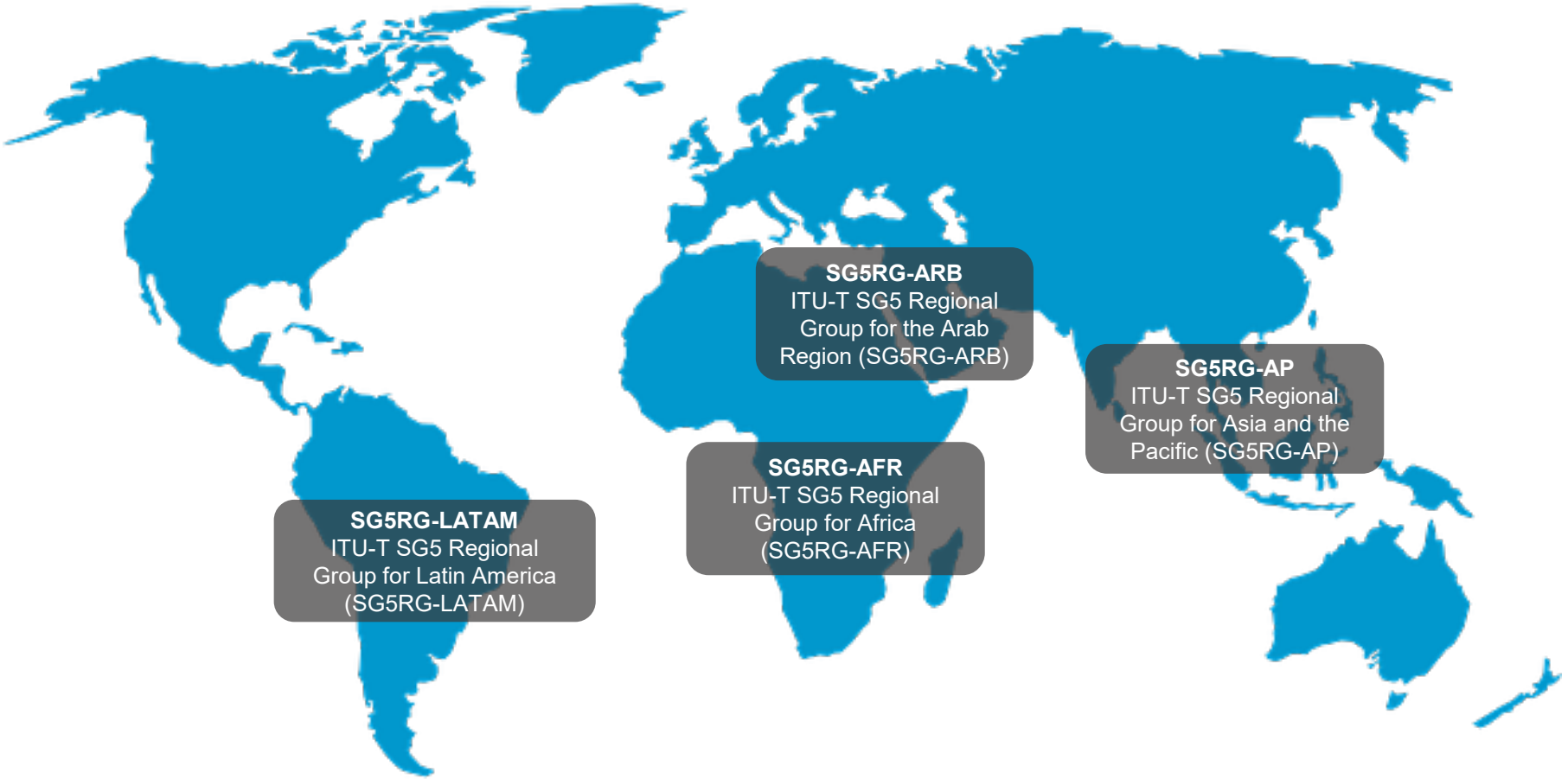
WP3/5

9/5
Assessing the impact of telecommunications /ICTs on climate change, biodiversity and the environment - including the influence on other sectors

11/5
Climate change mitigation and smart energy solutions

12/5
Climate actions and adaptation to climate change through sustainable and resilient telecommunications/ICTs (including new and emerging)

ITU-T Study Group 5 Regional Groups



ITU-T Study Group 5 Regional Groups

Why are regional groups important?

- Strengthen the participation of experts from the region in the work of ITU-T SG5
- Discussion of the priority of the region
- Preparation of joint contributions to advance the standardization work
- Share knowledge and best practices among countries of their region

ITU-T regional groups play a crucial role in promoting inclusivity, collaboration, and regional cooperation in the development of international ICT standards.

Resolution 54 - (Rev. New Delhi, 2024) - Regional groups of study groups of the ITU Telecommunication Standardization Sector

ITU-T SG5 Regional Group for Africa (ITU-T SG5RG-AFR)

Management Team

Chair

Helen Nakiguli Sekasala
Uganda

Vice Chairs

Jean BaptisteYetondji Houeyetongnon
Benin

William Mnyippembe
Tanzania

Nevine Tewfik
Egypt

Key priorities identified:

- Human Exposure to Electromagnetic Fields
- E-waste management to achieve a Circular Economy
- Smart Energy
- Sustainable Digital Transformation

Last meeting:

7-9 May 2024

Ouagadougou, Burkina Faso

ITU-T SG5 Regional Group for Asia and the Pacific (SG5RG-AP)

Management Team

Chair

Shuguang Qi
China

Vice Chairs

Byung Chan Kim
Korea (Rep. of)

Kazuhiro Takaya
Japan

Key priorities identified:

- Smart Green Energy management and energy transition & Energy efficiency
- Cloud and Edge data centre
- EMF & EMC & Overvoltages, Overcurrents and lightning protection
- Net Zero/ Carbon Neutrality
- E-waste

Last meeting:

11-12 September 2023

Bangkok, Thailand

ITU-T SG5 Regional Group for the Arab Region (SG5RG-ARB)

Management Team

Chair

Eiman Farouk Mahmoud Osman
Sudan

Vice Chairs

Salma Al Sulaiti
Qatar

Khaled Alsaleem
Kuwait

Ahmed Rguigue
Mauritania

Nevine Tewfik
Egypt

Key priorities identified:

- Human Exposure to Electromagnetic Fields
- E-waste management to achieve a Circular Economy
- Sustainable Digital Transformation

Last meeting:

13-16 May 2024

Muscat, Oman

ITU-T SG5 Regional Group for Latin America (SG5RG-LATAM)

Management Team

Chair

Lina Zuluaga
Colombia

Vice Chairs

Viviana AMBROSI
Argentina

Christian Victoria
Dominican Rep.

Key priorities identified:

- Human Exposure to Electromagnetic Fields
- E-waste management to achieve a Circular Economy

Last meeting:

5 September 2024

Lima, Peru

ITU-T documents

Formal meeting documents (SG5 home page)

Collective letters – meeting announcements

Circulars – other info to all membership (e.g. on events)

Resolutions (revised every 4 years in WTSA)

Contributions – written proposals submitted by members (sequential numbering inside a study period) – submit Contributions at least 12 calendar days before the meeting in question if no translation required.

ITU-T is a contribution-driven (and consensus-based) organization

ITU-T documents cont.

Formal meeting documents (SG5 home page)

TDs – produced by SG leadership team and TSB (sequential in a study period, multiple TD series possible)

Liaison statements – communications with liaison partners

Reports – reports created at meetings, draft texts

Working documents (informal FTP area, collaboration site)

Rapporteur group meetings documents - some docs have no life outside the meeting (e.g. drafting docs), others are submitted as TD to next SG/WP meeting

Mailing lists

General distribution list for SG5

t22sg5all@lists.itu.int

Q1/5: *Electrical protection, reliability, safety, and security of telecommunication/ICT systems*

t22sg5q1@lists.itu.int

Q2/5: *Equipment specification and component/device for protection against lightning and other phenomena*

t22sg5q2@lists.itu.int

Q3/5: *Assessment of human exposure to electromagnetic fields (EMFs)*

t22sg5q3@lists.itu.int

Q4/5: *Electromagnetic compatibility (EMC) aspects in telecommunications/ICTs*

t22sg5q4@lists.itu.int

Q6/5: *Environmental efficiency of telecommunications/ICTs*

t22sg5q6@lists.itu.int

Q7/5: *E-waste, circular economy, and sustainable supply chain management*

t22sg5q7@lists.itu.int

Q8/5: *Guidance and terminology on environment*

t22sg5q8@lists.itu.int

Q9/5: *Assessing the impact of telecommunications/ICTs on climate change, biodiversity and the environment - including the influence on other sectors*

t22sg5q9@lists.itu.int

Q11/5: *Climate change mitigation and smart energy solutions*

t22sg5q11@lists.itu.int

Q12/5: *Climate actions and adaptation to climate change through sustainable and resilient telecommunications/ICTs (including new and emerging)*

t22sg5q1@lists.itu.int

ITU-T SG5 Regional Group for Africa (ITU-T SG5RG-AFR)

tsg5rgafr@lists.itu.int

ITU-T SG5 Regional Group for Asia and the Pacific (SG5RG-AP)

tsg5rgap@lists.itu.int

ITU-T SG5 Regional Group for the Arab Region (SG5RG-ARB)

tsg5rgarb@lists.itu.int

ITU-T SG5 Regional Group for Latin America (SG5RG-LATAM)

tsg5rglatam@lists.itu.int

Electromagnetic Compatibility

ITU-T K.136 “Electromagnetic compatibility requirements for radio telecommunication equipment”

ITU-T K.137 “Electromagnetic compatibility requirements and measurement methods for wireline telecommunication network equipment”

EMF

ITU-T K.91, “Guidance for assessment, evaluation and monitoring of human exposure to radio frequency electromagnetic fields”

ITU-T K.Suppl.1 to K.91, “Guide on electromagnetic fields and health

Updates on the EMF Guide and mobile app to include 5G references and updates on WHO and other guidelines.

Resistibility

ITU-T K.44 “Resistibility tests for telecommunication equipment exposed
to overvoltages and overcurrents – Basic Recommendaiton”

Protection, Reliability, Safety and Security

ITU-T K.120 “Lightning protection and earthing of a miniature base station”

ITU-T K.134 “Protection of small-size telecommunication installations with poor earthing conditions”

ITU-T K.151 “Electrical safety and lightning protection of medium voltage input and up to ±400 VDC output power system in ICT data centres and telecommunication centres”

Study Group 5 Key Topics

EMC, lightning protection, EMF

Classification of the K.series Recommendation

Recommendations Under Study

K.5G-Lightning:

Practical guide for lightning protection, earthing and bonding, and safety consideration of 5G radio base station

K.isolators:

Integrated circuit isolators for telecommunications use

K.devices:

RF-EMF exposure assessment of wireless communication devices operating close to the human body

Power feeding and energy storage

ITU-T L.1210 “Sustainable power-feeding solutions for 5G networks”

ITU-T L.1221 “Innovative energy storage technology for stationary use - Part 2: Battery”

Environmental efficiency of digital technologies

ITU-T L.1317 “Guidelines on energy efficient blockchain systems”

ITU-T L.1331 “Assessment of mobile network energy efficiency”

ITU-T L.1333 “Carbon data intensity for network energy performance monitoring**”**

ITU-T L.1050 “Methodology to identify the key equipment in order to assess the environmental impact and e-waste generation of different network architectures”

Smart Energy Solutions

ITU-T L.1380: Telecom Sites

ITU-T L.1381: Data Centre

ITU-T L.1382: Telecommunication Room

ITU-T L.1383: City and home applications

Sustainable Data Centres

ITU-T L.1304 “Procurement Criteria for Sustainable Data Centres”

ITU-T L.1305 “Data centre infrastructure management system based on big data and artificial intelligence technology”

Study Group 5 Key Topics

Towards a Sustainable Digital Transformation (1)

Recommendations Under Study

L.MM&BP

Measurement methodology and Best Practices for decarbonization of Base Station sites; Data Centre and Telecommunication Room; Industrial Park in support of Net Zero

Sustainable buildings

ITU-T L.1370 “Sustainable and intelligent building services”
ITU-T L.1371 “A methodology for assessing and scoring the sustainability performance of office buildings”

Digital product passport

ITU-T L.1070 “Global digital sustainable product passport opportunities to achieve a circular economy”
ITU-T L.1071 “A model for digital product passport information on sustainability and circularity”

Sustainable management of E-waste and Supply Chain

ITU-T L.1015 “Criteria for evaluation of the environmental impact of mobile phones”
ITU-T L.1035 “Sustainable Management of Batteries”
ITU-T L.1060 “General principles for the green supply chain management of information and communication technology manufacturing industry”

Assessment and Climate Actions towards Net Zero

ITU-T L.1450 “Methodologies for the assessment of the environmental impact of the ICT sector”
ITU-T L.1470 “GHG trajectories for the ICT sector compatible with the UNFCCC Paris Agreement”
ITU-T L.1480 “Enabling the Net Zero transition: Assessing how the use of ICT solutions impacts GHG emissions of other sectors”

Circular Economy

ITU-T L.1022 “Circular Economy: Definitions and concepts for material efficiency for Information and Communication Technology”
ITU-T L.1023 “Assessment method for circular scoring”

Circular and sustainable cities and communities

ITU-T L.Suppl. 46 “Definitions and Recent Trends in Circular Cities”

Study Group 5 Key Topics

Towards a Sustainable Digital Transformation (2)

Recommendations Under Study

L.Biodiversity_footprint

Methodology for the assessment of the footprint of an ICT organization on biodiversity

L.SRDT_adaptation

Sustainable and Resilient Digital Technologies for Adaptation to Climate Change

L.VirtualMeetings

Methodology for estimating GHG emissions in the frame of virtual meetings and events

L.CFSP

Guidelines for the assessment of the carbon footprint of Software products

ITU-T Study Group 5

ITU-T Standards driving sustainable development of AI

Circular Design Criteria

Recommendation
ITU-T L.1023
ITU-T L.1070
.....

Environmental efficiency of product and DC for AI

Recommendation
ITU-T L.1300
ITU-T L.1302
.....

Sustainable power supply to AI

Recommendation
ITU-T L.1200 series
ITU-T L.1221
....

Assessing GHG Emissions from AI

Recommendation
ITU-T L.1410
ITU-T L.1420
.....

TRANSITION TO NET ZERO

Ongoing work (examples)

01 ITU-T L. EE_serv
ITU-T L.MM_ Computing power
ITU-T L.S_AI

02 ITU-T L.IEDL
ITU-T L.DLEE
ITU-T L.Energy_sav_Cloud & Edge

03 ITU-T L.PS_HPC
ITU-T L.FR-ESC
ITU-T L.ITLB

04 ITU-T L.ClimAI
ITU-T L.EnvImpServers
ITU-T L.PCF_Server

Artificial Intelligence and the environment

International standards are guiding the ICT industry to address the environmental sustainability of AI

Lifecycle of Artificial Intelligence

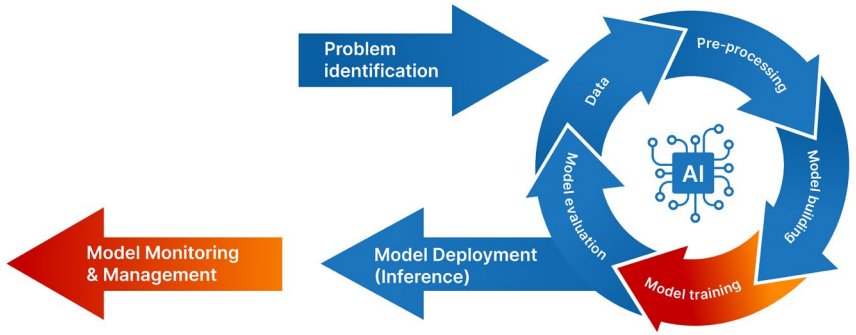
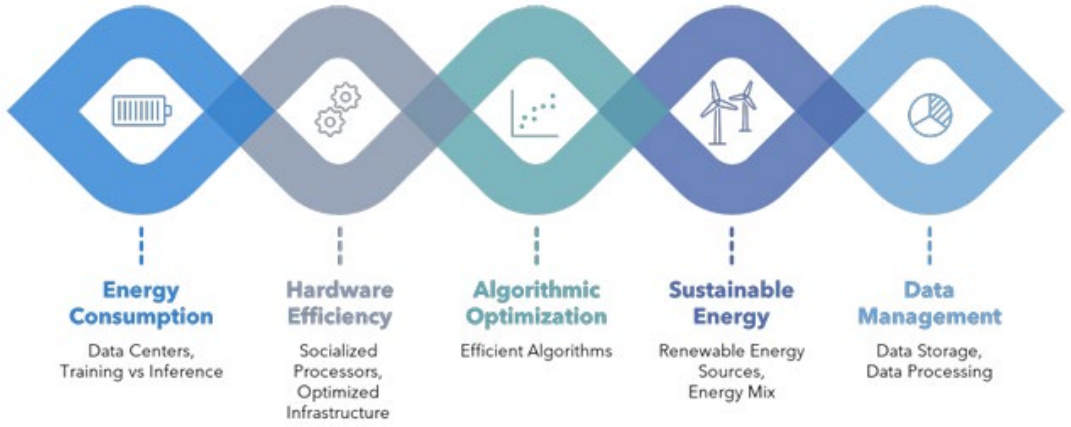
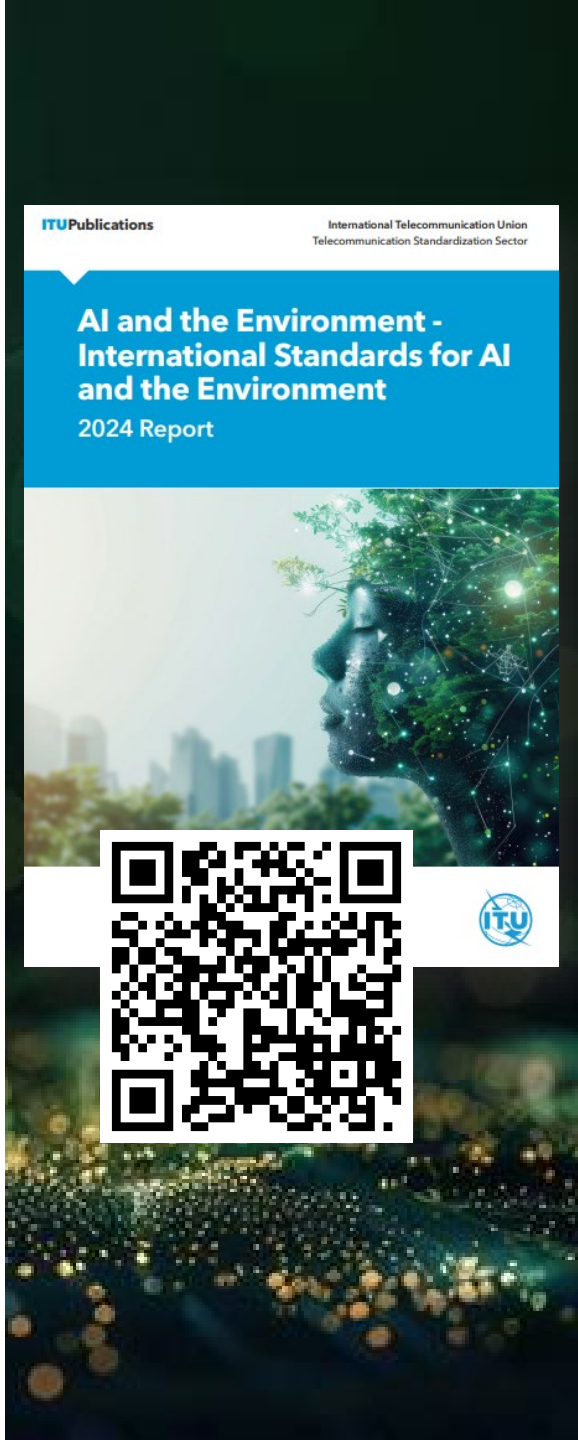


Figure 3: Key Factors of the environmental efficiency of AI systems





Call to action: Support the current ongoing work

L.FCC
Energy consumption management and optimization platform Framework for cloud computing

●○○

L.MM_Computing_power/ETSI DES/EE-EEPS75
Standardization of computing power efficiency measurement methods for computing center and Guidelines on improving the computing energy-efficiency of data centre

○●○

L.MM&BP_DC
Measurement methodology and Best Practices for decarbonization of Data Center and Telecommunication Room in support of Net Zero

○○●

ITU-T L.impact_simplified
Simplified assessments of the GHG emissions impact of the use of ICT solutions

●○

L.CFSP
Guidelines for the assessment of the carbon footprint of Software products

○●

L.ClimAI:

Guidelines for Assessing the Impact of Artificial Intelligence on Environment

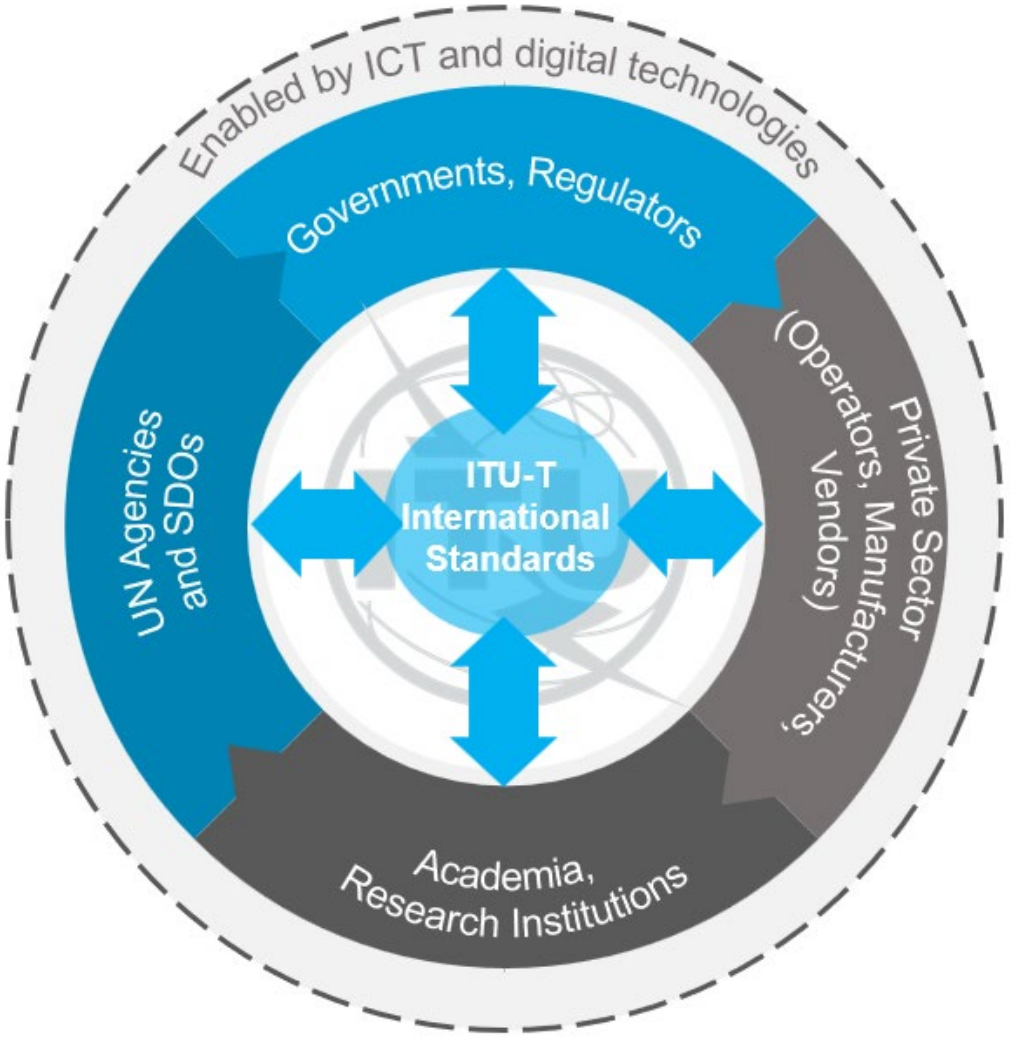
L.S_AI:

Recommendation for the design of environmentally Sustainable AI-based and XR-based Systems

L.DLEE:
Deep Learning Computation Energy Efficiency Evaluation Framework and Metrics

Bringing countries and industries together to help industry and governments.
A mutually beneficial partnership.

Strengthening Collaboration and Implementation of Standards



Collaboration Across UN Agencies

World Health Organization
UNFCCC
UNECE
UNIDO
UN environment programme
BASEL CONVENTION
One planet connect with care
unitar

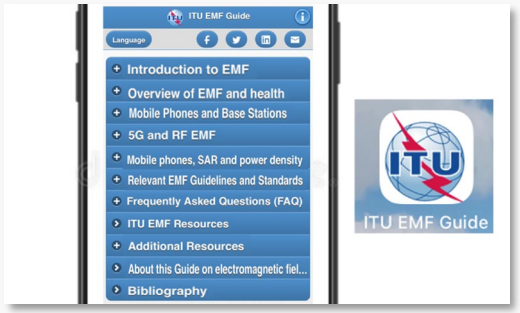
Collaboration with other SDOs

ETSI
ISO
IEC

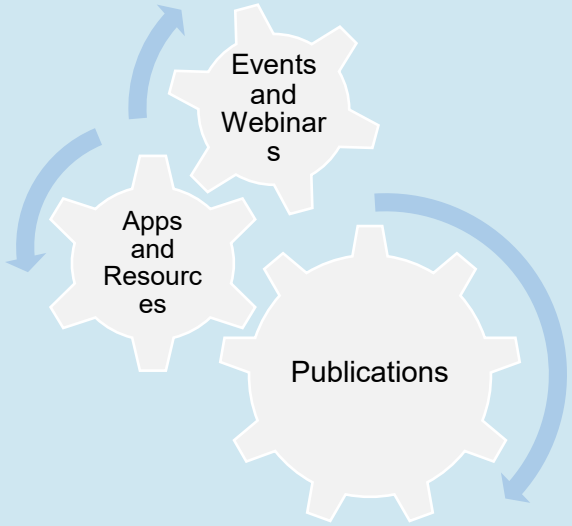
Collaboration with other Organizations

step solving the e-waste problem
circular electronics partnership
GSMA
GeSI ENABLING DIGITAL SUSTAINABILITY
CODES COALITION FOR DIGITAL ENVIRONMENTAL SUSTAINABILITY

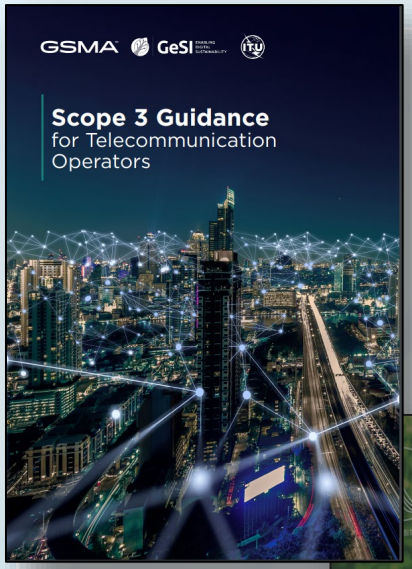
Raising Awareness Towards Sustainable Digital Transformation

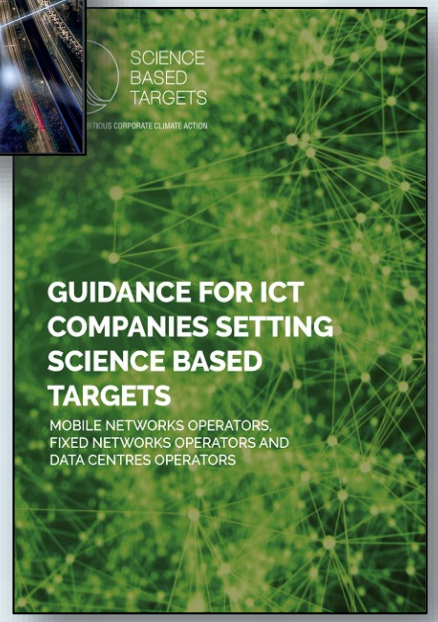


Study Group 5 Resources



Publications and reports on Environment, Climate Change and Circular Economy





First ever digitalization day

This year, for the first time in COP history, the Presidency recognized the importance of digitalization in the climate talks and announced the Digitalization Day.

Green Digital Action Declaration

The roundtable concluded with the adoption of the first **Declaration**, which aims to accelerate climate-positive digitalization and emission reductions in the Information and Communication Technology sector and enhance accessibility of green digital technologies.

Green Digital Action

Green Digital Action aims to **enhance collaboration, fast-track industry-wide commitments** to addressing climate challenges, and put **digital solutions** at the forefront of **climate action**.

ICT Sector GHG emissions:

Commitment 1:
Companies commit to:

- Setting (or already have set) 1.5 degree aligned science-based targets;
- Create and publish transition plans

Commitment 2:
Contribute to an ICT sector database creation on products and services.

- Invitation to join existing standardization efforts in **ITU-T SG5.**

Commitment 3:
Companies commit to:

- Report data on all GHG emission scopes and categories yearly, publicly and submit results to a public ITU database.

Green Digital Action aims to **enhance collaboration, fast-track industry-wide commitments** to addressing climate challenges, and put **digital solutions** at the forefront of **climate action**.

Green Standards – Call to action:

From Commitment to action: Implementing Standards for a sustainable future. The Green Standards pillar established a refined framework for categorizing and advancing green standards adoption.

Statement by the World Standards Cooperation

As the world's leading developers of international standards, **we pledge to uphold the principles that allow sustainability to be built into their development by design**, and to delivering the standards that make both business and environmental sense.

Green Digital Action @COP29

Acting on the environmental efficiency of AI

AI for Climate Action Innovation Factory

Winners:

Machine Learning competition on **Smart Energy Supply Scheduling for Green Telecom**

Innovation Factory on **How to tackle digitalization waste for energy efficiency**

GDA Pillar on Green Computing

Call to action:

We aim to develop guiding principles, practices and re-usable patterns for the governance, building, training, running and consumption of AI.

Through highlighting the gaps today, we can ensure we continue to build a sustainable tomorrow.

ITU-T SG5: as follow up of WTSA-24, our most important Topics in 2025-2028

ITU-T SG5's work does not stop here

- **Climate Action & Energy Efficiency including AI**
- **Biodiversity & Environmental Resilience**
- **E-Waste & Circular Economy**
- **Safety & Reliability**

Message from the Chair of ITU-T SG5

“

I’m proud of our role in setting the standards that guide environmental and climate action in the ICT sector. With climate change affecting us all, the relevance of our work has never been more critical.

The ICT sector must be part of the solution, and SG5 is leading the charge in driving sustainable digital transformation. Through our collaborative efforts, we’re ensuring that technology becomes a powerful tool in the fight against climate change.

- Dominique Würges, SG5 Chair

”

Thank you!

Email

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Website

SG5 - Environment, EMF, climate action & circular economy