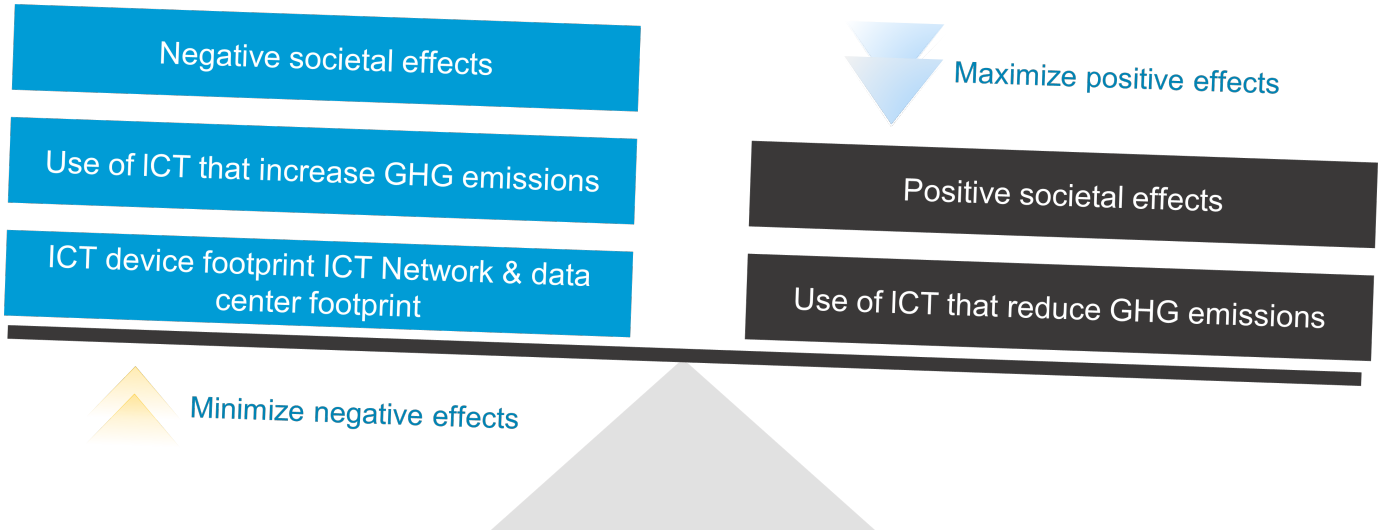
# Sustainable Digital Transformation

How ITU is supporting a sustainable digital transition

Reyna Ubeda

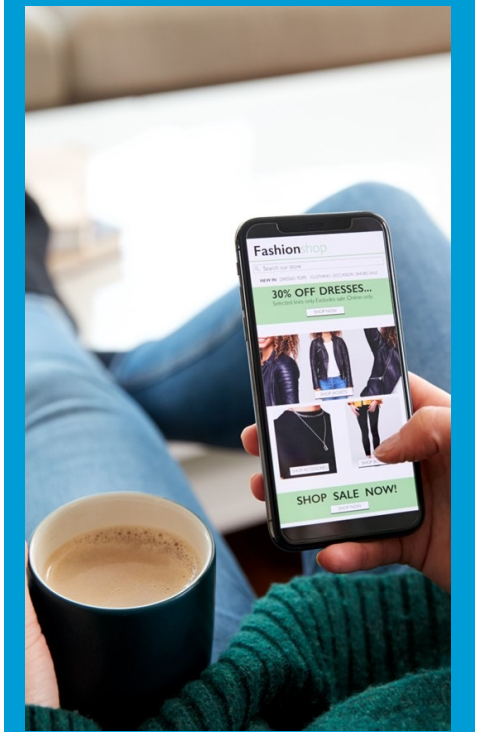
May 2025

# Digital technologies can be both a solution and a challenge



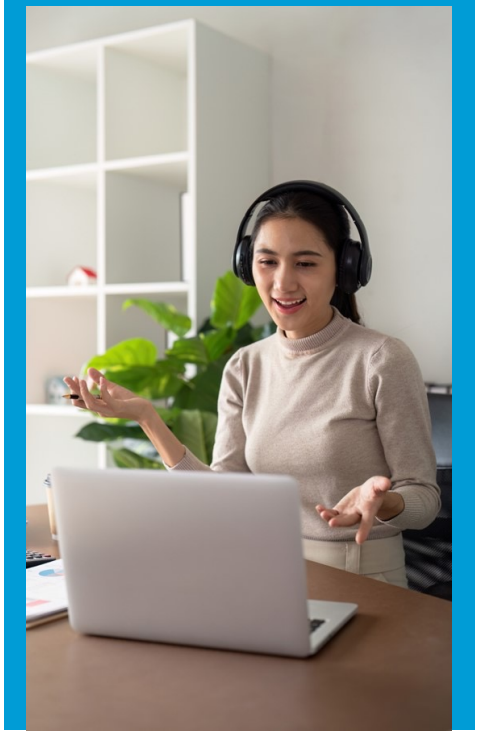

# Digital technologies are a part of our everyday life

## Online Shopping

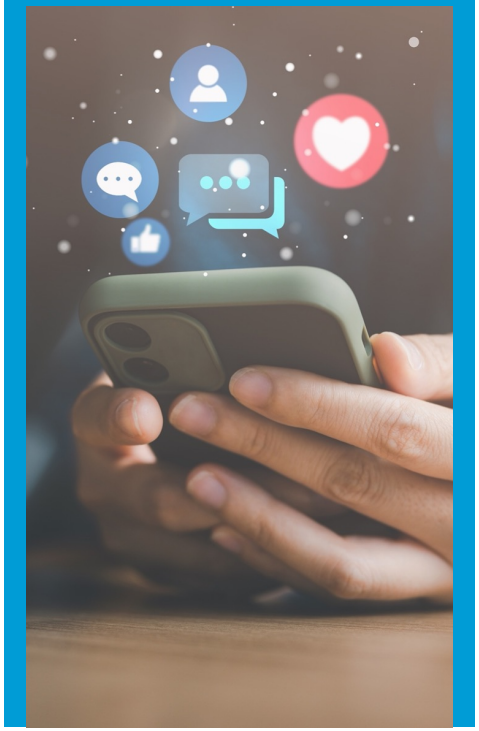



## Online Banking


## Remote Work



## Social Media



# Double tapping has a hefty carbon footprint

TikTok has the largest carbon footprint of all social media platforms, followed by Reddit, Pinterest, Instagram, and Snapchat

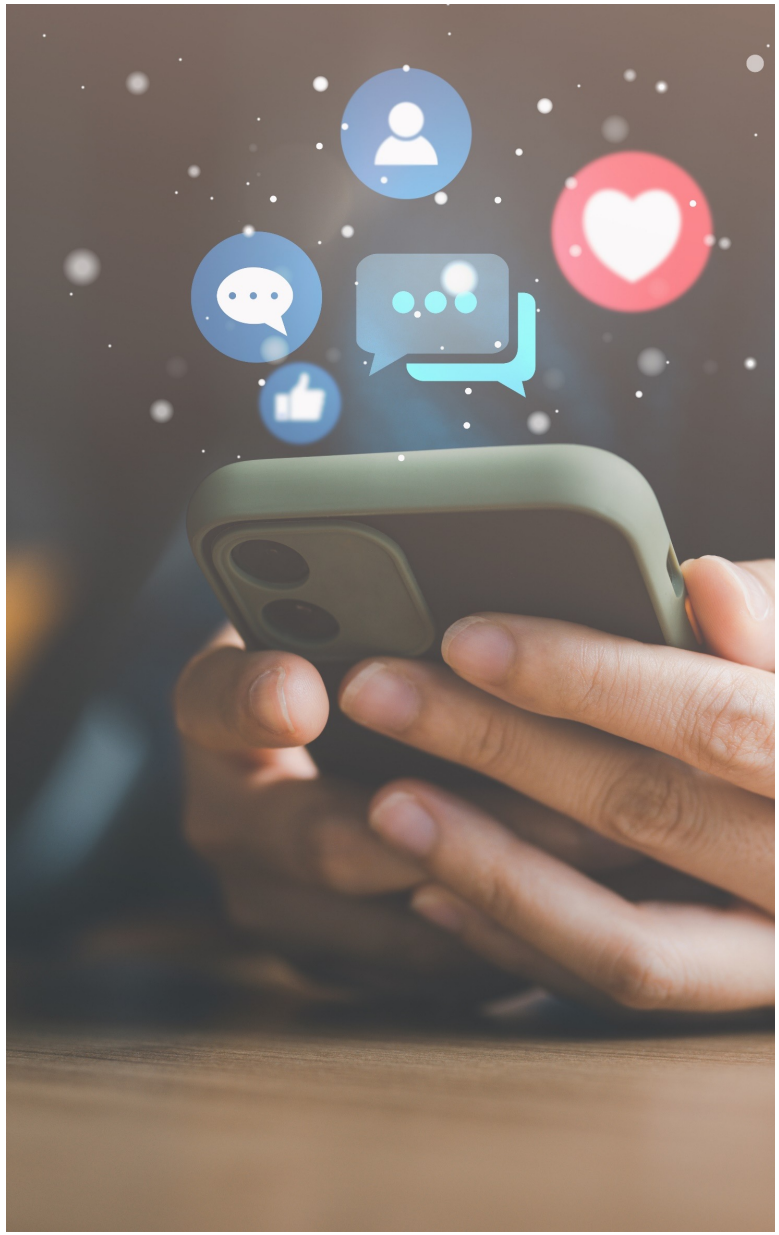
If you were to scroll for just one hour per day over the course of a year,

**57,597g$CO_2$Eq per year**

**Carbon Footprint**

**Equivalent Of**

**Driving 143 miles (230km) in a car**



# However, 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.

# How can international standards help drive sustainable digital transformation?

International standards represent the amalgamation of knowledge contributed by experts from around the world!


**For cities and governments**

- Reduce carbon emissions
- Achieve a sustainable digital Transformation
- Improve uptake of green energy
- Achieve targets set in the Paris Agreement and SDGs

**For ICT Sector**

- Technical guidance to implement green energy solutions
- Provide measurement tools to evaluate progress
- Bring low-cost connectivity to rural areas
- Reach net-zero

# Standards: The Backbone of Sustainable ICT

**Standards enable the ICT sector to take concrete actions to reduce emissions and energy consumption, assisting other sectors in doing the same.**

**Requirements**
Clear guidelines for sustainable ICT practices.

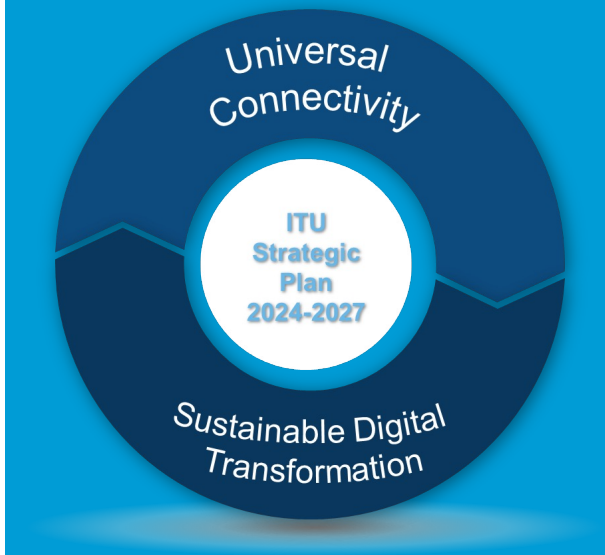
**Frameworks**
Approaches to implement sustainability.

**Metrics and KPIs**
Tools to measure and track progress.

**Assessment**
Methodologies to evaluate environmental impact.

# How ITU is supporting sustainable digital transformation

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




**194** Member States

**+1000** companies, universities, research institutes and international organisations

# Setting the standard for sustainable digital transformation, globally

**ITU-T Standardization Sector**

Sets international standards for sustainable digital transformation.

## ITU-T Study Group 5

Environment, EMF, climate action and circular economy

- Electromagnetic compatibility, 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 standards that drive sustainable ICTs

**Circular Design Criteria**
Recommendation ITU-T L.1023

**Assessing ICTs GHG Emissions**
Recommendation ITU-T L.1410

**Assessing Energy Efficiency of Networks**
Recommendation ITU-T L.1331

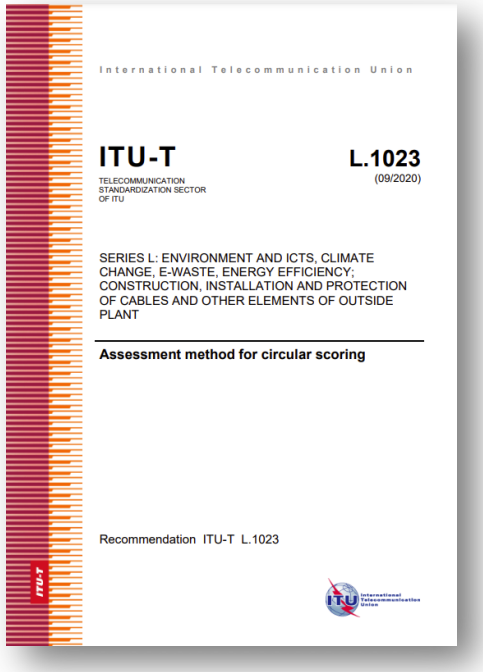
**Assessing GHG Emissions of Networks**
Recommendation ITU-T L.1333

**TRANSITION TO NET ZERO**

Sets the trajectories of GHG emissions for the global ICT sector and sub-sector
Recommendation ITU-T L.1470 and ITU-T L.1471

# Driving the circular economy through standards

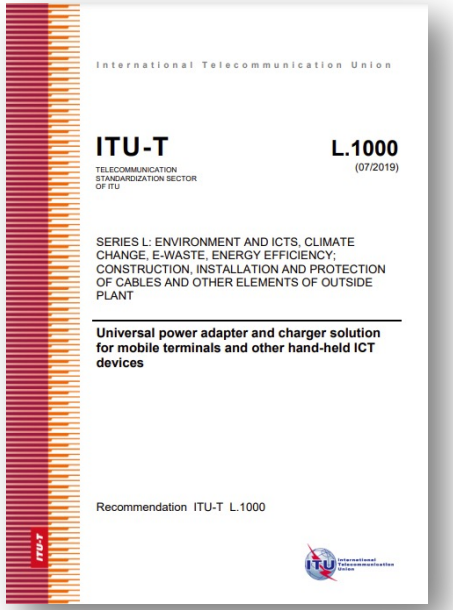
**To achieve a sustainable future, transitioning to a circular economy is crucial.**

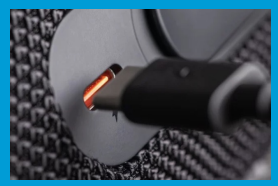



**Recommendation ITU-T L.1023:** Measures the circularity of products, guiding design towards sustainability.

# Tackling the E-Waste Challenge

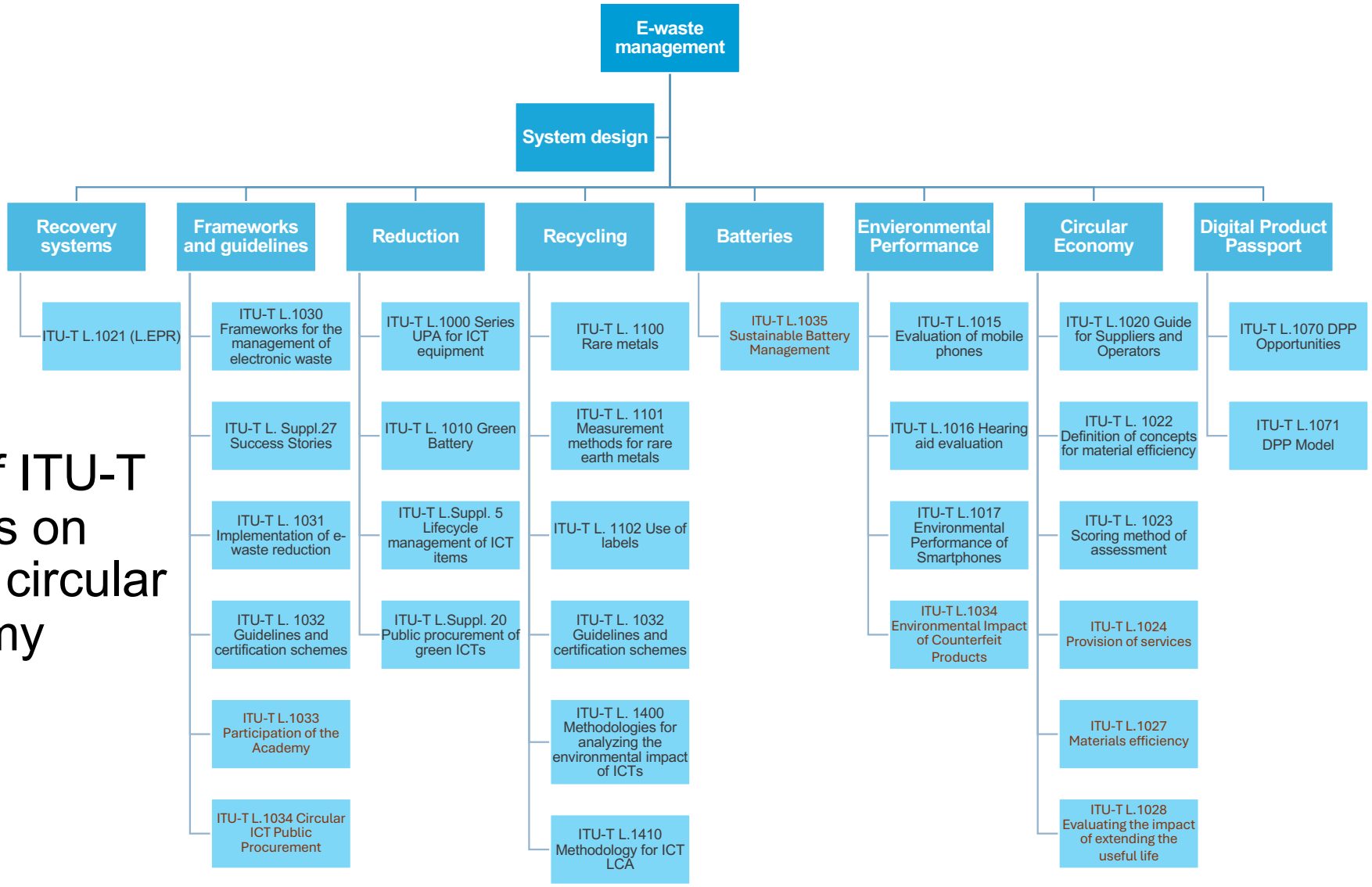
**Reducing production and disposal of new chargers is estimated to reduce the amount of electronic waste by 980 tonnes yearly**



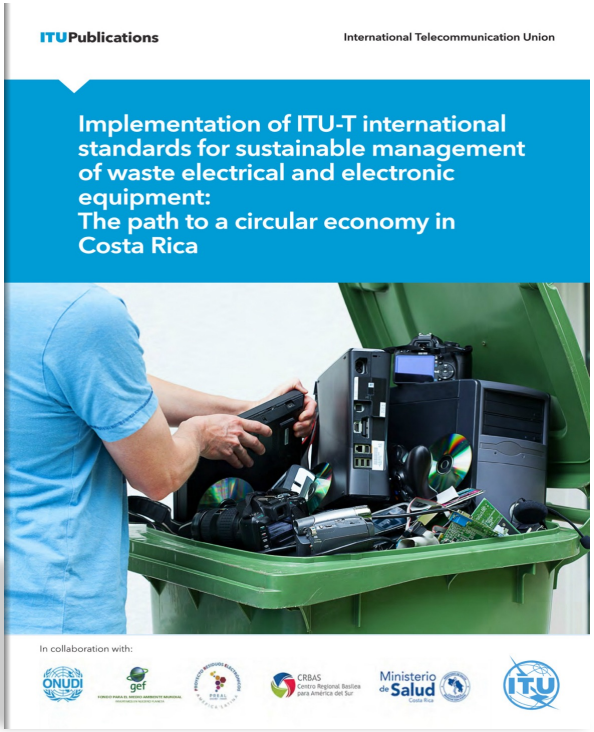
**Recommendation ITU-T L.1000:**
Provides requirements for universal chargers. Reducing the amount produced and recycled by widening their application to more devices and increasing their lifetime.

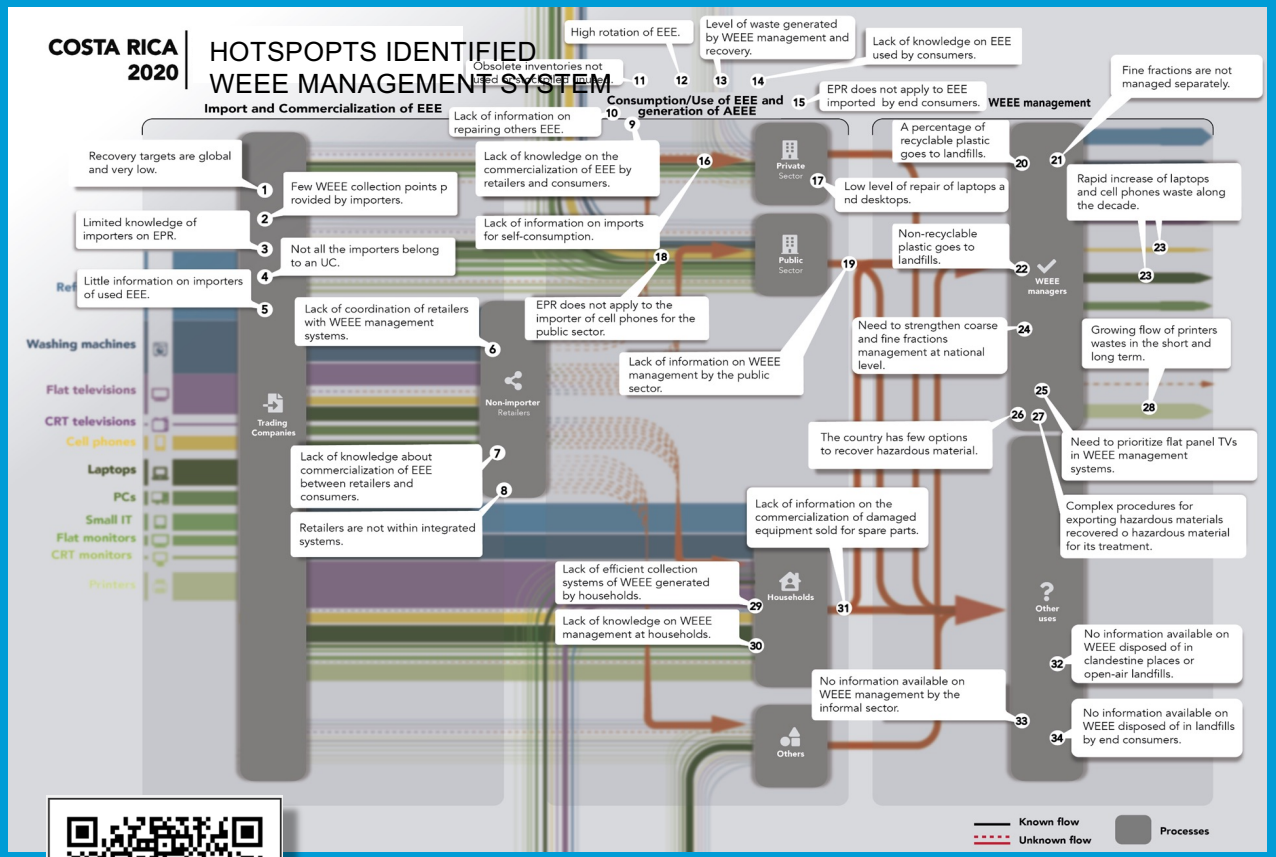
# Overview of ITU-T standards on e-waste and circular economy



International Standards for Climate Action

# Supporting Countries to Make Better Decision Making About Waste



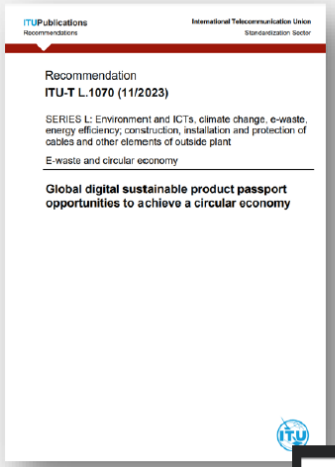
# Digital Product Information Systems

- *ITU definition*

*Digital Product Passports: Structured collection of product-specific data conveyed through a unique identifier.*

## Digital Product Passport Opportunities
**ITU-T L.1070**

Provides an overview of global and common opportunities to represent sustainability, mainly environmental-related, details about digital technology products


ITUPublications
Recommendations

International Telecommunication Union
Standardization Sector

Recommendation
**ITU-T L.1070 (11/2023)**

SERIES L: Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant

E-waste and circular economy

**Global digital sustainable product passport opportunities to achieve a circular economy**

## Digital Product Passport Information on sustainability and circularity
**ITU-T L.1071**

Provides a structured collection of information items organised to represent circularity and environmental sustainability information in accordance with relevant standards of ICT products for various actors during the product lifespan up to final recycling.

# Benefits of these digital product information systems

**Reliable digital information related to environmental sustainability**

- Characteristics and data sheets
- Manuals
- Guides

**Circulation to contribute to the extended use**

- Maintenance
- Repair
- Reuse
- Recycle

**Responsible and verifiable recycling and management**

# Beneficiary users

- Facilitates the activities of product operators:
  - Manufacturers
  - Buyers
  - Owners
  - Repairers
  - Remanufacturers
  - Recyclers
  - National authorities
  - Auditors
- It could empower consumers with relevant information.
- It may have different content depending on the role and accreditation of the operator.

New Work Item

L.DPP4C - Consumer-oriented environmental information and reversed value chain information about ICT goods on digital product passports

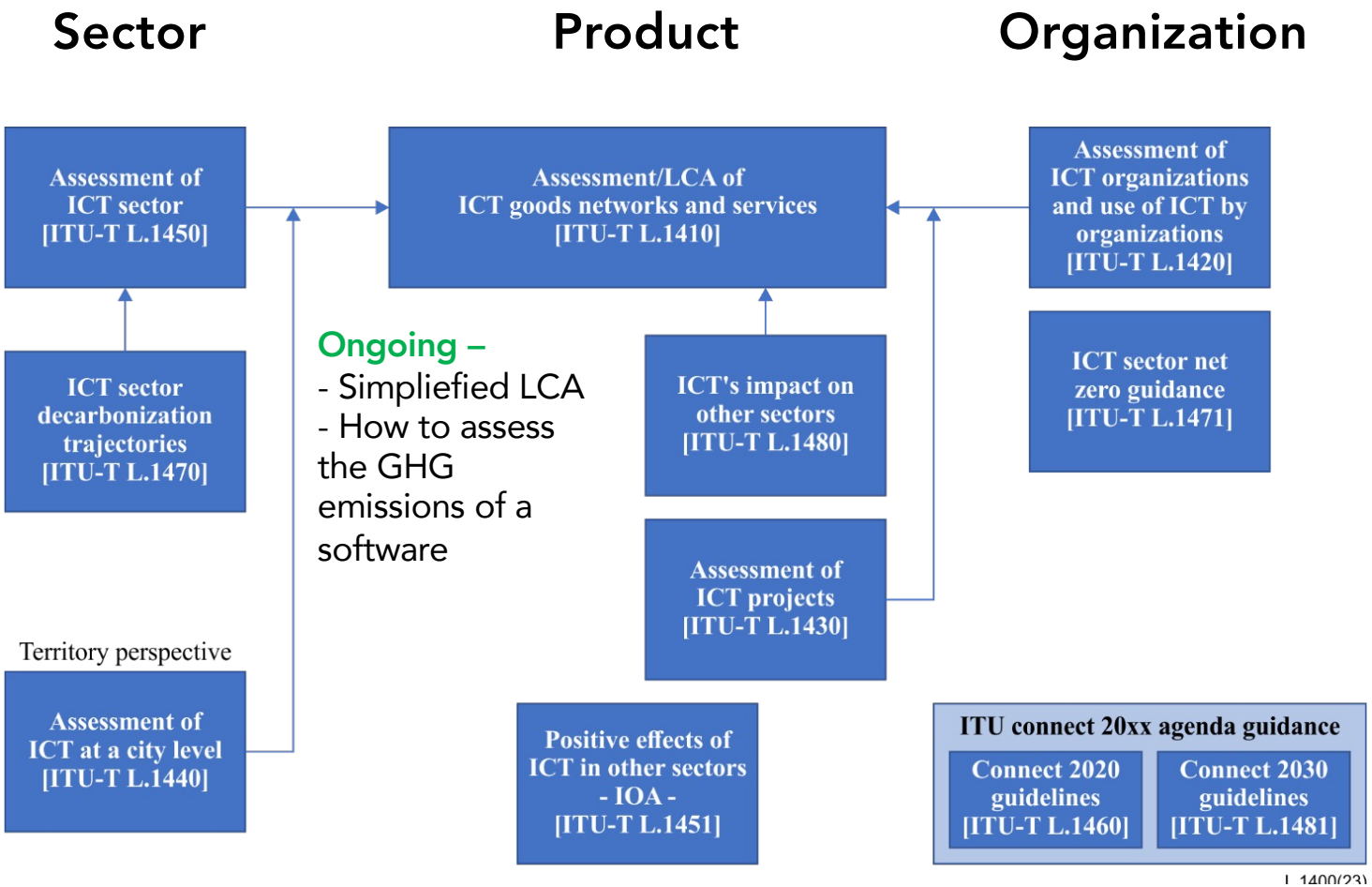
- Will analyse the use of DDP to provide information to customers and how this information needs to be conveyed to consumers.
- Will define which product information is useful to be included in DPP with particular attention to the reverse value chains and how to present it.

ITU

UN environment programme

tsbsg5@itu.int

# Enabling the Net Zero Transition




**Ongoing –**
GHF emissions database worldwide and national level

**Ongoing –**
- Simpliefied LCA
- How to assess the GHG emissions of a software

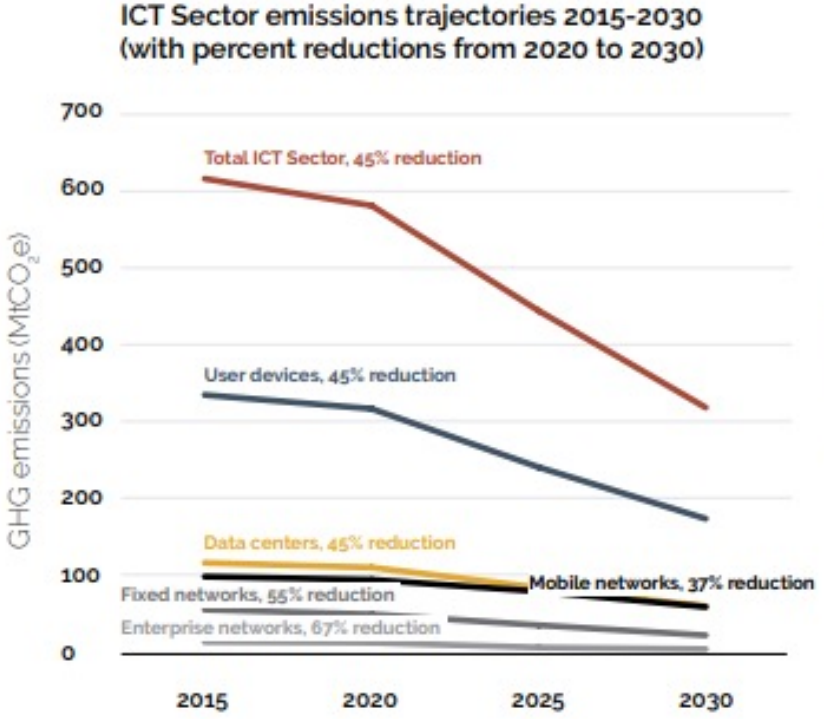
**New** Guidance on Scope 3 for telecom operators (L.Suppl.57)

# Exploring standards, reporting and internal monitoring

## Setting 1.5°C Trajectories for the ICT sector


GeSI ENABLING DIGITAL SUSTAINABILITY  GSMA  SCIENCE BASED TARGETS DRIVING AMBITIOUS CORPORATE CLIMATE ACTION  IEA  ITU

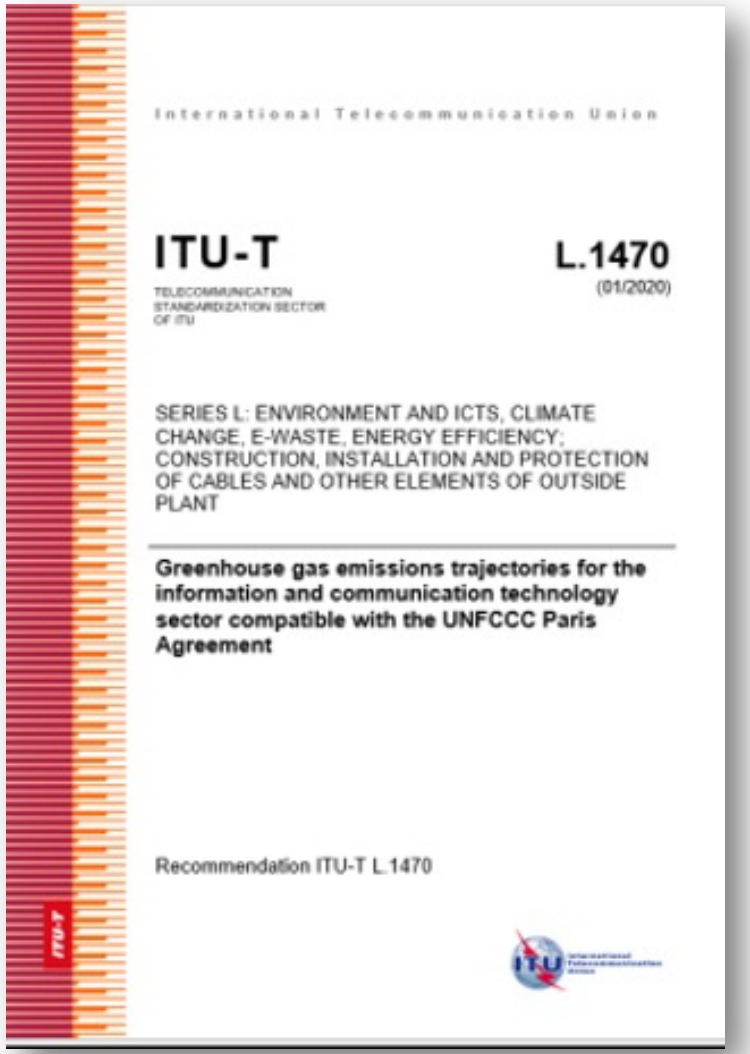
Figure 1: Summary of ICT sector and sub-sector trajectories including embodied emissions and operation



# Exploring standards, reporting and internal monitoring

## Several steps to decarbonize ICT activities:

- Assess baseline
- Set medium term and long-term targets
- Elaborate a transition plan (which includes reduction and adaptation plan)
- Implement it / adjust it



# Assessing and Reporting on Scope 3 Emissions

Scope 3 emissions cover a wide range of economic activities that are divided into 15 Categories.

| Upstream activities | Downstream activities |
|---|---|
| Category 1: Purchased goods and services | Category 9: Downstream transportation and distribution |
| Category 2: Capital goods | Category 10: Processing of sold products |
| Category 3: Fuel- and energy-related emissions[92] | Category 11: Use of sold products |
| Category 4: Upstream transportation and distribution | Category 12: End-of-life treatment of sold products |
| Category 5: Waste generated in operations | Category 13: Downstream leased assets |
| Category 6: Business travel | Category 14: Franchises |
| Category 7: Employee commuting | Category 15: Investments |
| Category 8: Upstream leased assets | |

## New Standard – Under approval

Draft Recommendation ITU-T L.1472 - Requirements for the creation of an ITU database on energy consumption and GHG emissions of the ICT sector

**First step: priority data collection**

**Table A.1:** Data categories, sources and applicability, basic approach, priority data collection

| | | Who | | | | | Type of data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Data type** | **Purpose** | **Telecom operator** | **Data center operators** | **Network goods provider** | **End-user goods provider** | **Other ICT actors** | **Worldwide organization footprint** | **National emissions from the organization when available** | **Database based on CDP reporting or sector member data collection** | **Preferred Primary data source** |
| **Electricity and renewable energy (GWh)** | | | | | | | | | | |
| Total energy consumption, of which: | Basic data | X | X | X | X | X | X | X | X | Public company data* |
| Total electricity consumption, of which: | Basic data | X | X | X | X | X | X | X | X | Public company data* |
| Renewable electricity consumption, of which: | Basic data | X | X | X | X | X | X | X | X | Public company data* |
| Own renewable electricity generated consumption | Basic data | X | X | X | X | X | X | X | X | Public company data* |
| Electricity with Guarantees of origin | Basic data | X | X | X | X | X | X | X | X | Public company data* |
| Purchase contracts (PPA) | Basic data | X | X | X | X | X | X | X | X | Public company data* |

Call to Action: Help us to pilot this standard and understand which data your country and organization can collect

# AI’s impact on the environment

SUCCESS · CLIMATE CHANGE

AI doesn’t just require tons of electric power. It also guzzles enormous sums of water.

BY JANE THIER
September 23, 2024 at 2:44 PM EDT

CLIMATE

**AI already uses as much energy as a small country. It’s only the beginning.**

The energy needed to support data storage is expected to double by 2026. You can do something to stop it.

by **Brian Calvert**
Mar 28, 2024, 8:00 AM EDT

MIT Technology Review

SIGN IN SUBSCRIBE

CLIMATE CHANGE AND ENERGY

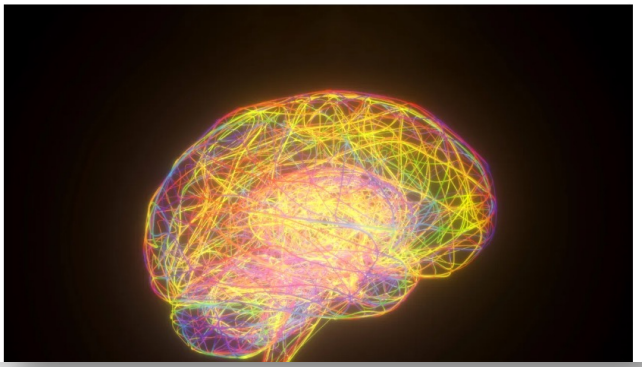
**AI is an energy hog. This is what it means for climate change.**

How worried should we be about AI’s effects on the grid?

By Casey Crownhart
May 23, 2024

**AI’s Energy Demands Are Out of Control. Welcome to the Internet’s Hyper-Consumption Era**

Generative artificial intelligence tools, now part of the everyday user experience online, are causing stress on local power grids and mass water evaporation.



21 SEP 2024 | STORY | ENVIRONMENT UNDER REVIEW

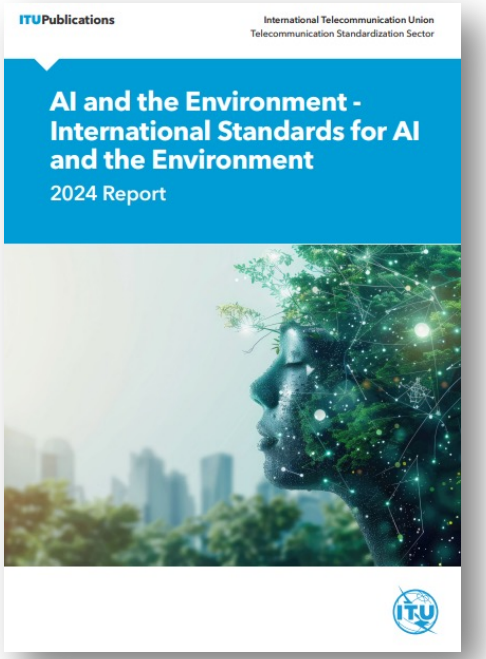
**AI has an environmental problem. Here’s what the world can do about that.**

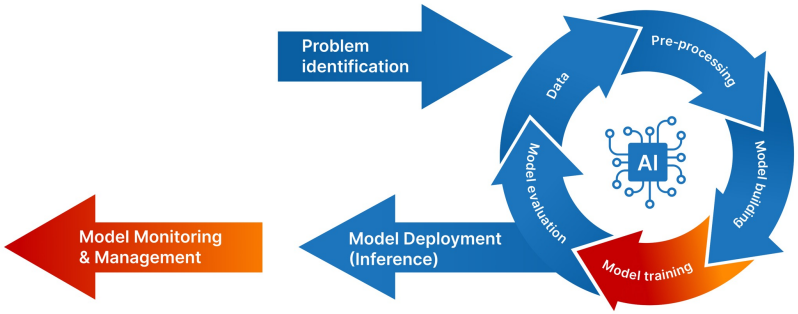
*SciencePhoto Library via AFP*

Sustainable Digital Transformation

# AI and the Environment

**This report addresses the intersection of AI and environmental sustainability, emphasizing the importance of international standards in guiding the ICT industry.**




*Lifecycle of Artificial Intelligence*

# Call to action: Support the current ongoing work

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

●○○

**L.TR_TA_GC**
Testing and Assessment method of Green Computing Power

○●○

**L.Env_DC**
Guidelines on Multi-Dimensional Environmental Metrics and Management for Data Centres

○○●

**L.IEDL**
Energy saving strategy for deep learning computing

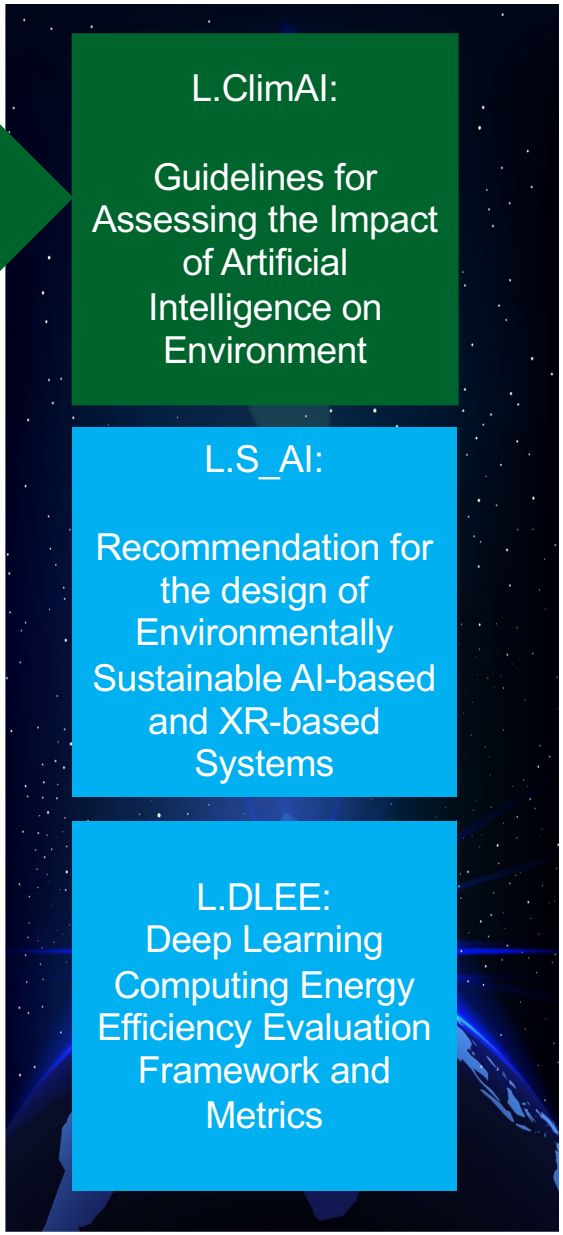
●○○

**L.MM_Computing_power**
Computing power efficiency matrix and measurement methodology

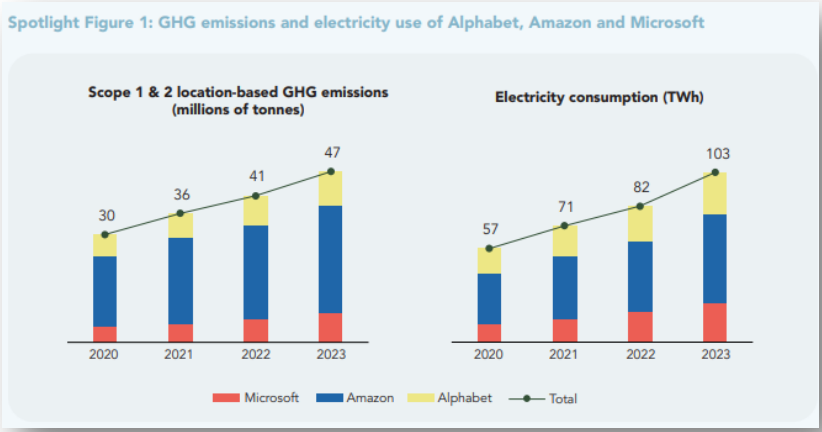
○●○

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

○○●



# Impact of AI on GHG emissions and energy consumption

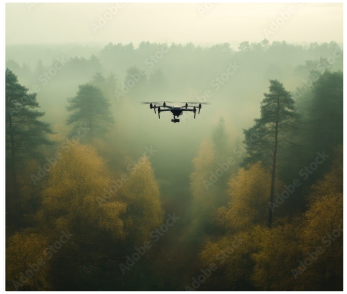

# The benefits of virtual meetings

**The transitioning from in-person to virtual conferencing can substantially reduce the carbon footprint by 94% and energy use by 90%.**

Source: Nature (2021)


# How ICTs can benefit biodiversity

## Data Collection & Monitoring



**Drones & satellite imagery** can provide real-time data on habitat conditions, deforestation rates, and biodiversity hotspots.

**Big data & AI** can identify biodiversity trends and potential threats through data patterns.

## Habitat Conservation

**IoT sensors** can track environmental changes

**Remote monitoring** can protect endangered areas by monitoring human activity and natural events.

## Sustainable Resource Management

**Smart agriculture** uses ICT to minimize the environmental footprint of farming, preserving natural habitats.

**Water management technologies** can improve water use efficiency to reduce stress on ecosystems.

ITU-T Study Group 5

# Developing standards that support biodiversity


**L.Bio-Adapt**
Biodiversity Adaptation to Climate Change

**Biodiversity Adaptation**

**L.SMART**
Impact assessment framework for evaluating how ICT-based subsea infrastructure could support climate, environmental and biodiversity monitoring in the oceans

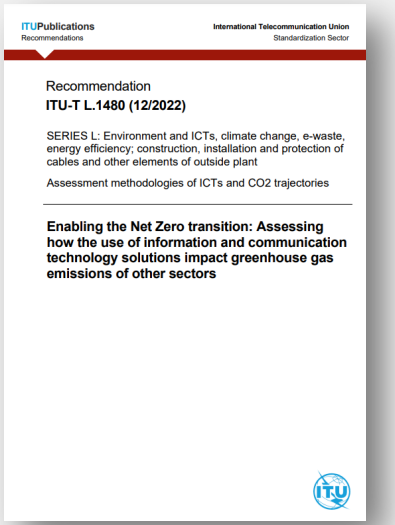
**Biodiversity Solutions**

**L.Biodiversity_footprint**
Methodology for the assessment of the footprint of an ICT organization on biodiversity

**L.Biodiversity_opportunities**
Development of guidance on how to assess the second order effects of ICT solutions on biodiversity, including positive effects

# Measuring the impact of ICT and digital technologies solutions

**Enabling a Net Zero Transition**
**ITU-T L.1480**


ITUPublications
Recommendations

International Telecommunication Union
Standardization Sector

Recommendation
**ITU-T L.1480 (12/2022)**

SERIES L: Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant

Assessment methodologies of ICTs and CO2 trajectories

**Enabling the Net Zero transition: Assessing how the use of information and communication technology solutions impact greenhouse gas emissions of other sectors**

Provides a structured methodological approach, that aims to improve consistency, transparency and comprehensiveness of assessments of how the use of ICT solutions impact GHG emissions over time.

The evolution:

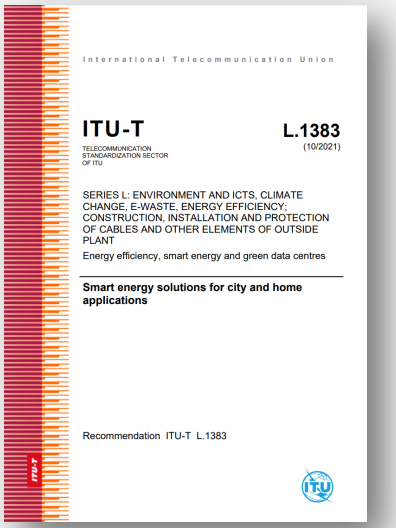
Ongoing collaboration with other organizations such as ETSI and AIOTI to improve the standard introducing more examples.

ETSI World Class Standards

Alliance for IoT and Edge Computing Innovation

# Smart energy solutions

**Smart energy solutions**
**ITU-T L.1383**


International Telecommunication Union

ITU-T L.1383
(10/2021)

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

SERIES L: ENVIRONMENT AND ICTS, CLIMATE CHANGE, E-WASTE, ENERGY EFFICIENCY; CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

Energy efficiency, smart energy and green data centres

**Smart energy solutions for city and home applications**

Recommendation ITU-T L.1383

***Smart energy applications in industrial parks***


# First ever digitalization day

**Last 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.

# Thematic Pillars

Reduce ICT sector **GHG emissions**

Drive the adoption of international **green standards**

Foster a **circular ICT industry**

Advance **green computing**

Leverage **emergency telecommunication systems** to ensure life-saving disaster alerts

Advance **climate solutions** through **open environmental data and technology**

Facilitate a **green transition across all industries** through digital technology and skills development

# Approach

Green Digital Action

**Working groups**
Shape collaborative action and drive progress through partner-led approach

**Webinars & workshops**
Enable knowledge exchange and peer-to-peer capacity building

**Communication**
Raise awareness and mobilize others through impact stories, joint messaging and branding to amplify shared goals

**Action coalitions**
Support joint implementation and progress on intended actions

**Accountability**
Track progress and establish accountability mechanisms

**Events**
Bring together GDA community, announce progress and mobilize additional commitments

# COP30

Building on the COP28 and COP29 momentum, COP30 offers a unique opportunity to make decisive steps in the Green Digital Action agenda by moving from political commitments to implementation and scaling-up of solutions.

## Preliminary Agenda

| | | | |
|---|---|---|---|
| **High-level GDA opening** | Net zero digital tech industry | Green tech standards | Green Digital Infrastructure Investments |
| Harnessing Digital Infrastructure for Green Energy Advancements | Deforestation and Digital Solutions | Circular digital industry and critical raw materials | Green computing AI and data centers |
| AI Innovation Factory | Empowering the Future | Partner sessions | **High-level roundtable** |


Green
Digital
Action
Summit
23 May 2025
Berlin
In partnership with:
Green Digital Action
GITEX EUROPE Berlin
Umwelt Bundesamt

# Green Digital Action Summit at GITEX Europe, Berlin 2025
# 23 May 2025; 10.30AM – 4 PM

**Purpose:**

- Reflect on progress made since COP29 Green Digital Action Declaration
- Look ahead to COP30 in Brazil, exploring digital innovation for climate action

**Focus Areas:**

- AI & Big Data for sustainability
- Green digital infrastructure investments
- Net-zero targets & transparent reporting
- Policy/regulatory frameworks supporting climate-positive digital transformation

**Participation & Format:**

- High-level speakers: Government ministers, tech-industry leaders, civil society, and UN organizations
- Short interactive sessions (panels & fireside chats)

Green Digital Action

GITEX EUROPE Berlin

Umwelt Bundesamt

# Upcoming events


- **Green Digital Action Summit**

  23 May 2025, Berlin, Germany
- **ITU-T Study Group 5 meeting**

  3-12 June 2025, Geneva, Switzerland
- **Navigating the Intersect of AI, Environment and Energy for a Sustainable Future**

  10 July 2025, Geneva, Switzerland

# Thank you!

**Email**

tsbsg5@itu.int

**Website**

SG5: Environment, climate change and circular economy

# White Paper on
# Lithium batteries for Telecom Sites


- The Global battery industry has experienced rapid growth
- The global demand for lithium batteries alone is expected to surpass 6 TWh by 2030
- Prices of lithium batteries are becoming more affordable, driving the global telecom lithium battery market
- Need of specific standards providing requirements for the use of lithium batteries in telecom sites