



Committed to connecting the world

4IR Technologies and Applications for Climate-resilient Smart Cities

**International Conference on Innovation, Technology Transfer and
Cooperation for Addressing Climate Change**

06 December 2022

ITU Regional Office for Asia and the Pacific

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ITU is the United Nations **specialized agency for information and communication technologies (ICTs)**



Our sectors

*Each sector has a **separate mandate**, but all work towards **connecting the world***

ITU Radiocommunication

Coordinating radio-frequency spectrum and assigning orbital slots for satellites

ITU Standardization

Establishing international standards

ITU Development

Bridging the digital divide



History of ITU

ITU receives Emmy Award for new audio broadcast standard

Recommendation ITU-R BS.1770 standardizes loudness metering on TV



ITU received the prestigious **Emmy Award** from the US National Academy of Television Arts & Sciences at the 2012 Consumer Electronics Show on 12 January 2012 in Las Vegas for the "Standardization of Loudness Metering for Use in Broadcast Audio".

The National Academy of Television Arts & Sciences is dedicated to the advancement of television broadcasting and the promotion of creative leadership for artistic, educational and technical achievements within the television industry.



In brief
ITU receives Emmy Award for new audio broadcast standard



Franziska Rätz, Director of the ITU Radio Communication Bureau and Christoph Dosch of ITU and Chairman of ITU-R Study Group 6 receiving the Emmy Award

ITU receives Emmy Award for new audio broadcast standard

Christoph Dosch, Chairman, ITU-R Study Group 6 (broadcasting service)

Emmy Award for ITU, ISO and IEC

Hollywood recognizes work on crucial video standard

The United States Academy of Television Arts and Sciences has awarded the prestigious "Primetime Emmy Engineering Award" to ITU, to the International Organization for Standardization (ISO), and to the International Electrotechnical Commission (IEC), for work in extending an advanced video coding standard so that it can deliver high-definition images. In use throughout the industry, that standard is Recommendation ITU-T H.264. (It is also known as ISO/IEC 14496 Part 10 and as MPEG-4 AVC.)

The three organizations received recognition for their Joint Video Team's (JVT) landmark achievement in helping to extend the reach of high-definition video to many devices, from mobile phones to high-definition television (HDTV). The JVT was formed in 2001 by the video experts group in Study Group 16 of ITU's Telecommunication Standardization Sector (ITU-T), together with the ISO/IEC Moving Picture Experts Group (MPEG).

The Engineering Emmy Awards are presented "for developments in engineering that are either so extensive an improvement on existing methods, or so innovative in nature, that they materially affect the transmission, recording or reception of television."

H.264 is a highly efficient video compression method that succeeded to deliver high-quality video. Seven sets of capabilities, created for use in specific applications, in delivering bandwidth saving, transcoding and network — has



The Engineering Emmy Awards are presented "for developments in engineering that are either so extensive an improvement on existing methods, or so innovative in nature, that they materially affect the transmission, recording or reception of television." This Award was presented at a ceremony on 23 August 2008 in Hollywood, Los Angeles, United States.

How JPEG, released in 1992, gained Emmy fame in 2019

News · 6 May 2020



ITU received the prestigious Emmy Award from the US National Academy of Television Arts & Sciences of 5 Emmy awards on 1982/1983, 2008, 2012, 2017, and 2019

Our offices

Globally:

Addis Ababa

Bangkok

Brasilia

Bridgetown

Cairo

Dakar

Geneva (HQ)

Harare

Jakarta

Moscow

New York

Santiago

Tegucigalpa

Yaoundé

On the Asia and the Pacific continent:

Bangkok(Asia and the Pacific regional office)

Jakarta (Area office)

New Delhi (Area office)



ITU Regional Initiatives 2023-2025

Asia and the Pacific

ASP1

Addressing special needs of least developed countries, small island developing states, including Pacific island countries, and landlocked developing countries

ASP2

Harnessing information and communication technologies to support the digital economy and inclusive digital societies

ASP3

Fostering development of infrastructure to enhance digital connectivity and connecting the unconnected

ASP4

Enabling policy and regulatory environments to accelerate digital transformation

ASP5

Contributing to a secure and resilient ICT environment

Learn more at
www.itu.int/AsiaPacific



ITU Regional Initiatives
for Asia and the Pacific



Our thematic priorities

10

-  Networks & digital infrastructure
-  Cybersecurity
-  Emergency telecommunications
-  Digital policy & regulation
-  Digital innovation ecosystems
-  Capacity development
-  Statistics
-  Digital services & applications
-  Digital inclusion
-  Environment

ENVIRONMENT THEMATIC PRIORITY

ITU's Membership has mandated ITU to work in the area of ICTs, environment, climate change and circular economy. Its highest policy making body, the Plenipotentiary Conference, has established a number of indicators and targets related specifically to e-waste, climate change and green digital transformation, which guides the work of ITU:

30% increase the global e-waste recycling rate by 2023

By 2023 raise the percentage of countries with an e-waste legislation to **50%**

In addition, ITU is tracking the contribution of telecommunications/ICT to global greenhouse gas emissions.

CREATING A CIRCULAR ECONOMY FOR ELECTRONICS AND GREENING DIGITAL TRANSFORMATION



E-waste Data

1. Global and Regional E-waste Monitors
2. Training to countries on an internationally adopted e-waste statistics methodology
3. E-waste household and business surveys
4. Monitoring ITU e-waste targets



E-waste Policy

1. Technical assistance to countries to establish environmentally sound national e-waste management regulation
2. Establishing e-waste management systems backed by legally transparent digitally supported and financed EPR systems
3. E-waste awareness raising campaigns



Greening Digital Transformation

1. Monitoring industry emissions, energy use and climate commitments from tech companies
2. Supporting countries to monitor and track ICT sector GHG emissions and energy
3. Supporting countries in developing green ICT strategies and policies.

Developing tools, research, e-learning and communications to support training and knowledge production.



Global Material Crisis



Mining the bonepile of precious rubbish

By Chris Edwards
Published Monday, June 13, 2022

If you want gold, look in a pile of discarded PCBs. If only it were easier to extract the value.



Harvard
Business
Review

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Operations And Supply Chain Management

The Semiconductor Crisis Should Change Your Long-Term Supply Chain Strategy

by Christian Schuh, Wolfgang Schnellbacher, Alenka Triplat, and Daniel Weise

Chip shortage: The lack of "chips to make chips" is exacerbating the shortage by another 2 years



Chip shortage: The lack of "chips to make chips" is exacerbating the shortage by another 2 years.

BUSINESS

Why raw materials could impact speed of energy transition

Public debates about the EU's dependence on oil and gas imports are mounting. But Europe might soon find itself in an even weaker position in a field crucial for energy transition: critical raw materials.

Statement | 14 September 2022 | Brussels

Critical Raw Materials Act: securing the new gas & oil at the heart of our economy | Blog of Commissioner Thierry Breton

Monitoring Global E-waste

- Help countries to improve the quality, collection and interpretation of e-waste data using an **internationally adopted methodology**.
- Serve as a basis for e-waste indicators, contributing to the SDGs and the ITU e-waste targets.
- Evaluate developments over time, set and access targets, identify best practices for policy.
- Two approaches of e-waste data collection: i) EEE put on the market and measure e-waste generated; and ii) household and business surveys.

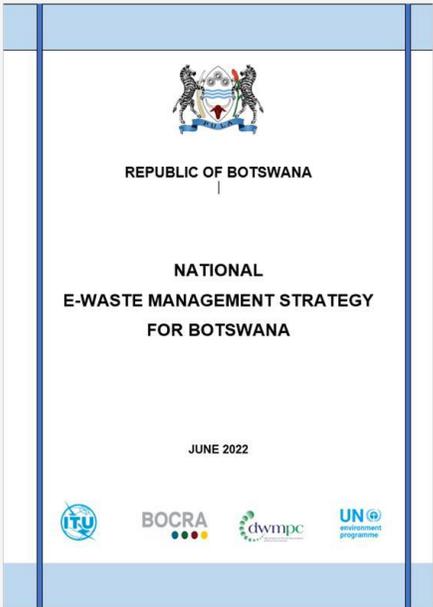


THE
GLOBAL
E-WASTE
STATISTICS
PARTNERSHIP



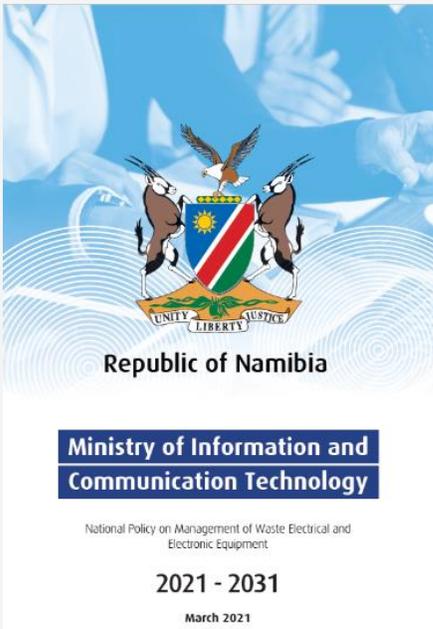
'The Global E-waste Monitor 2020'





Developing E-waste Regulation

- Increase the global take-up of environmentally sound national e-waste management regulation. **Now initiating projects in Asia and the Pacific.**
- E-waste management systems backed by a legally transparent, digitally supported and appropriately financed extended producer responsibility system.



Consulta Pública

EXTENSION DE PLAZO

El Ministerio de Medio Ambiente y Recursos Naturales, en virtud de la Ley sobre los Derechos de las Personas en sus Relaciones con la Administración y de Procedimiento Administrativo, No. 107-13, CONVOCA al público en general a participar en el proceso de CONSULTA PÚBLICA del siguiente proyecto:

1. Reglamento para la Gestión Integral de Residuos de Aparatos Eléctricos y Electrónicos (RAEE).

Pueden enviar sus observaciones y sugerencias utilizando el Formulario de Observaciones de Consulta Pública ([Descargar AQUÍ](#)) y remitirlas al correo institucional Regulaciones.Ambientales@ambiente.gov.do o depositarlas en físico en la sede del Ministerio con atención a la Dirección de Regulaciones Ambientales hasta el día primero (1) de julio de 2022, conforme las disposiciones que regulan la materia.

Public consultation of the e-waste regulation in Dominican Republic



Signing of an MoU between INDOTEL and MARENA on e-waste in Dominican Republic



#GreenRwanda | #RecycleRevolution



Greening Digital Transformation



Monitoring emissions, energy use and climate commitments of 150 leading tech companies via an **annual industry assessment report**.



Supporting **countries to monitor and track their ICT sector greenhouse gas emissions and energy use** by developing a methodology and database.



Supporting countries in **developing green ICT strategies and policies**, including through the provision of tools, resources and training.



Examples of best practice





KEY ROLE

Crucial role in **defining operation and interoperability of technologies** that underpin global communications network

200 - 300 new global standards approved every year, with over **4,000** in use today

Standards enable global communications by ensuring ICT networks and devices **speak the same language globally.**



MAJOR ACHIEVEMENTS

PKI

Public-key infrastructure, central to e-commerce

G.fast

New broadband standard designed to deliver access speeds of up to 1Gbit/s over existing telephone wires



H.264

The **Emmy award** winning **video codec** and its successor, H.265



WORLD TELECOMMUNICATION STANDARDIZATION ASSEMBLY (WTSA)

Sets the overall direction and structure for ITU-T, every 4 years

Draws up ITU-T **Action Plan**

Establishes ITU-T Study Groups and approves top **priorities, questions** and **work programme**

ITU-T Study Group 5: Environment, climate change and circular economy (1)

How ITU supports Environment, EMF and Circular Economy

International Telecommunication Union – the UN specialized agency for ICTs

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

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



Study Group 5 Key Topics

EMC, lightning protection, EMF

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”

Resistibility



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

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.

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”

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 the wireless radiocommunication devices operating close to the human body

Study Group 5 Key Topics

Towards a Sustainable Digital Transformation (1)

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

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”

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”

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

Recommendations Under Study

L.BBU

Requirements and use cases of liquid cooling solutions and high energy efficiency solutions for 5G BBU in C-RAN mode

L.ENV-KPI-5G-ARCH

Environmental KPIs/metrics for 5G architectures

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

Study Group 5 Key Topics

Towards a Sustainable Digital Transformation (2)

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”

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”

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”

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 and sustainable cities and communities



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

Recommendations Under Study

L.Mat_frame
Assessment of material efficiency of ICT network goods (circular economy) (5 parts)

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

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

ITU-T SG5RG-AP - Management Team

SG5RG-AP Chairman: **Shuguang Qi (CAICT)**

SG5RG-AP Vice-chairmen:

Byung Chan Kim (ETRI)

Kazuhiro Takaya (NTT)

Last Meeting:



19-20 October 2021



Virtual via [MyMeetings](#)

ITU-T Study Group 20 “Internet of things (IoT) and smart cities and communities (SC&C)”



ITU:
International Telecommunication Union –
the UN specialized agency for ICTs



U4SSC:
United for Smart Sustainable Cities initiative

Focus Group on "Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture" (FG-AI4A)

Joint IEC-ISO-ITU Smart Cities Task Force

JCA-IoT and SC&C:
Joint Coordination Activity on IoT and Smart Cities and Communities

Correspondence Group on Artificial intelligence of Things (CG-AIoT)

ITU-T Study Group 20:
ITU Study Group on IoT and Smart Cities and Communities

Lead Study Group 20 Roles



Internet of Things and its Applications



Smart Cities and Communities and related digital services

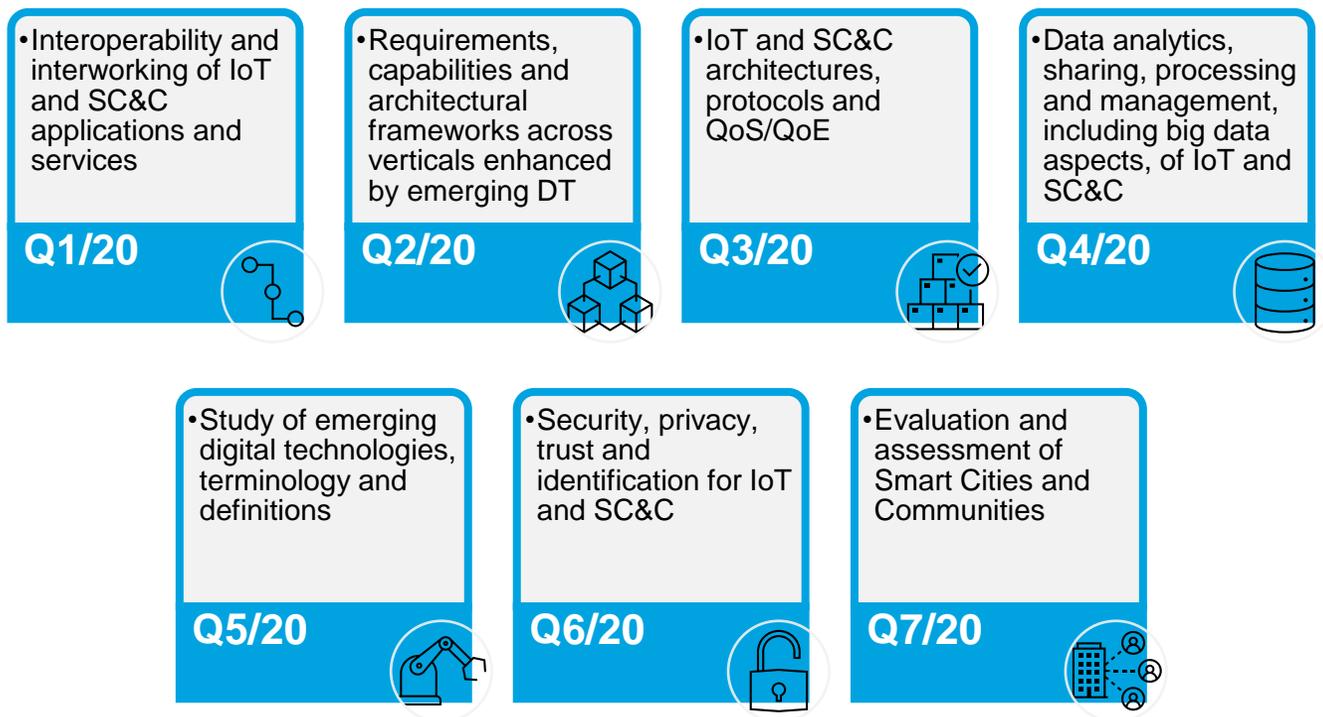


IoT Identification



Digital health related to IoT and SSC

SG20 - Study Group Structure (Study Period 2022-2024)



ITU-T SG20 - Regional Groups

- **SG20RG-LATAM** ITU-T SG20 Regional Group for the Latin American Region
- **SG20RG-AFR** ITU-T SG20 Regional Group for the Africa Region
- **SG20RG-ARB** ITU-T SG20 Regional Group for the Arab Region
- **SG20RG-EECAT** ITU-T SG20 Regional Group for Eastern Europe, Central Asia and Transcaucasia

Key Topics & ITU-T Recommendations



Requirements and use cases

Recommendation ITU-T Y.4208: "IoT requirements for support of edge computing"

Recommendation ITU-T Y.4211: "Accessibility requirements for smart public transportation services"

Recommendation ITU-T Y.4214: "Requirements of IoT-based civil engineering infrastructure health monitoring system"



Infrastructure and architecture

Recommendation ITU-T Y.4470: "Reference architecture of artificial intelligence service exposure for smart sustainable cities"

Recommendation ITU-T Y.4480: "Low power protocol for wide area wireless networks"

Recommendation ITU-T Y.4500.1: "oneM2M-Functional Architecture" (Y.4500 series)



Interoperability

Recommendation ITU-T Y.4200: "Requirements for interoperability of smart city platforms"

Recommendation ITU-T Y.4201: "High-level requirements and reference framework of smart city platform"

Recommendation ITU-T Y.4805: "Identifier service requirements for the interoperability of smart city applications"



Data management and Processing

Recommendation ITU-T Y.4461: "Framework of open data in smart cities"

Recommendation ITU-T Y.4464: "Framework of blockchain of things as decentralized service platform"

Recommendation ITU-T Y.4472: "Open data application programming interface (APIs) for IoT data in smart cities and communities"



Evaluation and Assessment

Recommendation ITU-T Y.4903: "Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals"

Recommendation ITU-T Y.4904: "Smart sustainable cities maturity model"

Recommendation ITU-T Y.4906: "Assessment framework for digital transformation of sectors in smart cities"



Identification and security

Recommendation ITU-T Y.4807: "Agility by design for ICT Systems security used in the Internet of Things"

Recommendation ITU-T Y.4808: "Digital entity architecture framework to combat counterfeiting in IoT"

Recommendation ITU-T Y.4809: "Unified IoT Identifiers for intelligent transport systems"

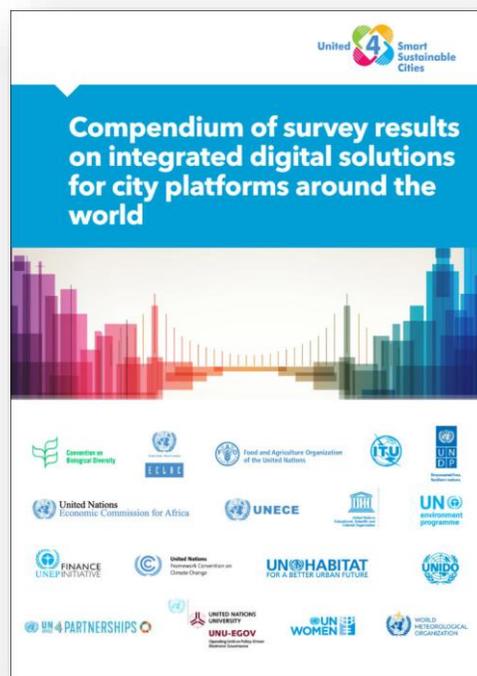
UNITED FOR SMART SUSTAINABLE CITIES (U4SSC)



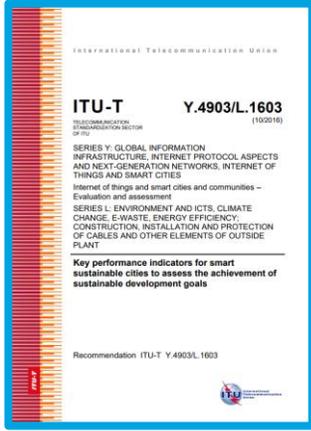
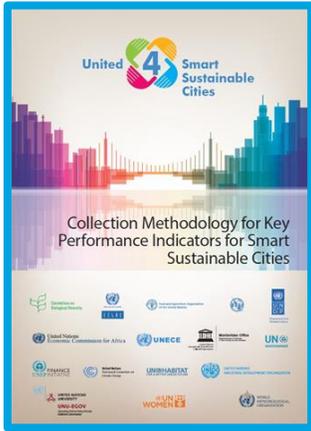
U4SSC Thematic Groups



RECENT U4SSC PUBLICATIONS



U4SSC Methodology is an ITU standard



Category	KPI	Result	Performance to Benchmark	SDG
	Fixed Broadband Subscriptions	75.62 %		 17 PARTNERSHIPS FOR THE GOALS
	Wireless Broadband Subscriptions (per 100 000 inhabitants)	116 000.00		
	Household Internet Access	79.60 %		 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
	Wireless Broadband Coverage – 3G and 4G	100.00 %		
	Availability of WiFi in Public Areas	250.00 Spots	No Benchmark Available	

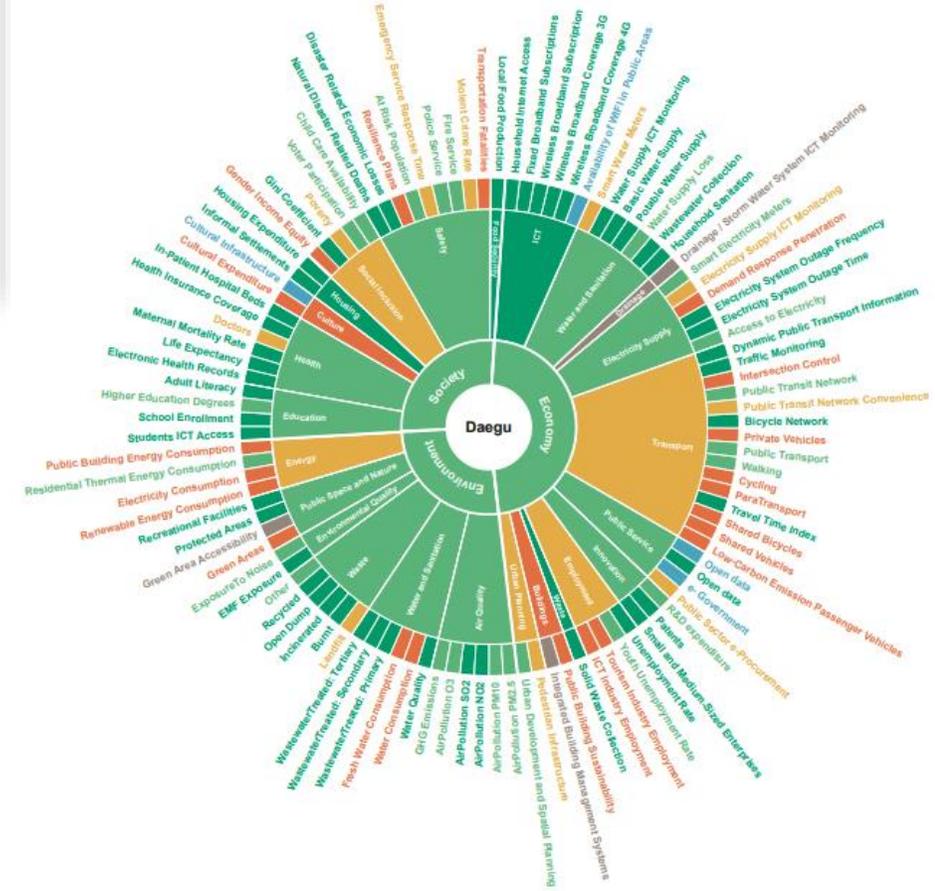
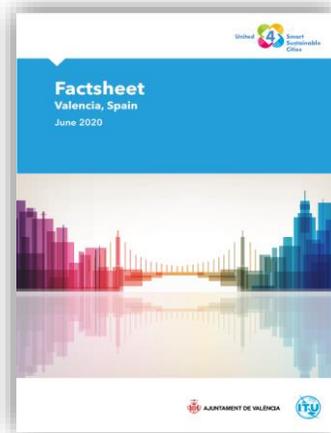
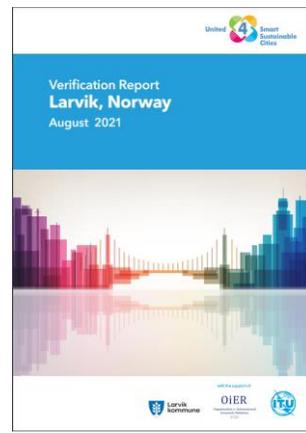
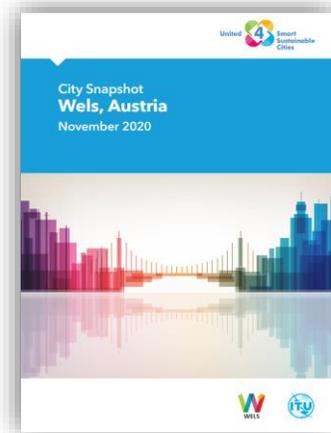
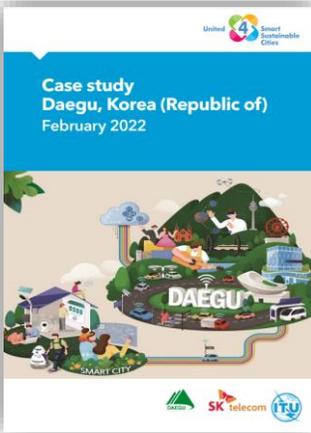
ITU's implementation of the U4SSC KPIs (over 150 cities worldwide)

Case Studies

City Snapshots

Verification Report

Factsheets



For more information on U4SSC KPIs, please see: <https://u4ssc.itu.int/u4ssc-kpi/>



Thank You



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