

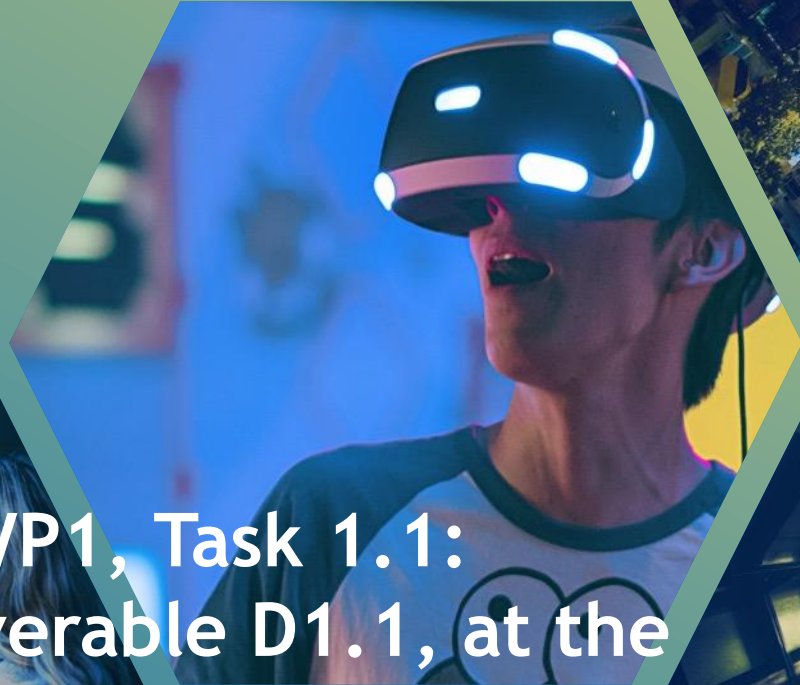


HEXA-X-II

Overview of Existing Standardization Work on ICTs & Sustainability

A sharing session from Hexa-X-II, WP1, Task 1.1: Environmental Sustainability, Deliverable D1.1, at the IETF 118, IAB E-Impact Program Meeting, Prague, 07/11/23

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Environmental Sustainability Standardization - ITU



Monitoring, mitigation, and adaptation to climate change

- Regarding monitoring, the ITU-R's Study Group 7 works on developing science services and systems for remote sensing and space application, with the intention of providing detailed climate data. This enables enhanced monitoring and prediction of climate trends.
- Concerning adaptation, the ITU's approach entails using technology to adapt people's lives to current and expected climate change (ITU-D SG 2, Question 6/2) and developing standards for sustainable and resilient digital technologies while facing climate change (ITU-T SG 5, Q 12/5).
- Regarding mitigation, the ITU-T's Study Group 5 examines and standardizes approaches for evaluating and reducing greenhouse gas emissions of communication and digital technologies as well as their impact in other sectors together with activities on circular economy. ITU-T standards of particular interest are:
 - L.1410: Assessment of environmental impacts of ICT goods, networks, and services
 - L.1480: Assessment of the GHG emissions impacts of ICT when applied in other sectors
 - L.1450: Assessment of the ICT sector footprint
 - L.1470: The decarbonization trajectory of the ICT sector
 - L.1471: Net Zero guidance for the ICT sector
 - More recently, ITU-T SG5 has started to develop guidelines for biodiversity.

Environmental Sustainability Standardization - ETSI



Environmental Engineering committee (TC EE)

Standards for reducing the eco-environmental impact of ICT equipment are developed by TC EE. This involves the following activities:

- Conducting Life Cycle Assessments (LCAs) of ICT goods, networks, and services (with ITU-T SG5).
- Devising approaches for evaluating the energy efficiency of wireless access networks and equipment, core networks, and wireline access equipment, as well as developing efficiency metrics/KPI definitions for equipment and network.
- Establishing network standby modes for household and office equipment.
- Creating a Circular economy standard for ICT solutions.
- Developing power feeding solutions based on high voltages to reduce distribution losses on the distribution and novel storage solutions.

In addition to this, TC EE is accountable for defining the environmental and infrastructural aspects of telecommunication equipment and its surroundings, including equipment installed in subscriber premises. TC EE is collaborating with ITU-T SG5 to develop technically aligned standards on energy efficiency, power feeding solutions, circular economy, network efficiency KPIs, and eco-design requirements for ICT.

Environmental Sustainability Standardization - 3GPP



3rd Generation Partnership Project (3GPP)

The 3rd Generation Partnership Project (3GPP)'s primary focus is developing standards and improving mobile communication technologies. 3GPP efforts on sustainability and energy efficiency are carried out by various groups within the organization. Some of the most notable efforts are:

- The Technical Specification Group Service and System Aspects (TSG SA) Working Group 5 (SA5) group, in Release 17, enhanced its work pursuing energy efficiency and energy saving of mobile networks, by extending its scope from radio access network (RAN) only to the whole 5G system and defined energy efficiency (EE) key performance indicators (KPIs) for the 5G core network and network slices.
- The TSG Radio Access Network (RAN) groups, in ongoing Release 18, have performed a study on network energy consumption model, to identify and study network energy savings techniques and reduce energy consumption in mobile networks.
- The TSG SA Working Group 1 (SA1), in emerging Release 19, aims to introduce energy efficiency as a service. The objectives of this work include 1) defining and supporting energy efficiency criteria as part of communication service to user and as part of application services; 2) supporting information exposure on systematic energy consumption or level of energy efficiency to vertical customers, and 3) performing a gap analysis between the identified potential requirements and existing 5G system requirements or functionalities.
- A new SA1 study is investigating technology options that will allow the introduction of IoT devices with the capability to harvest energy (from, e.g., radio waves, heat, motion, etc.) and perform communications without the need of a battery source or with just some limited energy storage capability using a capacitor. This so called Ambient IoT technology is targeted to deliver energy consumption orders of magnitude lower than the existing 3GPP low-power-wide-area (LPWA) technologies at the device side, addressing, among others, the serious environmental issues arising from the potential upcoming deployment of billions of IoT devices.

Thank you!



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Hexa-X-II, WP1, Task 1.1 on Environmental Sustainability,
Deliverable 1.1: Environmental, social, and economic drivers and goals for 6G,
https://hexa-x-ii.eu/wp-content/uploads/2023/07/Hexa-X-II_D1.1_final-website.pdf



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Backup Slides



International Telecommunication Union (ITU)

As the UN agency responsible for ICTs, the International Telecommunication Union (ITU) dedicates substantial work for the development of sustainable technologies, for all its radio communication (ITU-R), standardization (ITU-T), and development (ITU-D) branches. Besides ITU-R and ITU-D actions, ITU-T has a dedicated area of action for Environment, climate change and circular economy, focused on defining and recommending sustainable ICTs: Study Group 5 (SG5).

Activities proposed by the ITU to achieve sustainable ICTs

- Promote digital technologies to monitor, mitigate, and adapt to climate change.
- Reduce e-waste to protect environment and human health.
- Improve energy efficiency based on digital solutions to reduce carbon emissions.
- Set the example by greening the ITU itself.

Environmental Sustainability Standardization - ITU (ctd.)



E-waste reduction

- The ITU has a broad portfolio of activities intended to tackle and reduce the negative effects of e-waste, also known as Waste Electrical and Electronic Equipment (WEEE). This includes the definition of dedicated WEEE policies at the ITU Regional Offices for UN members to raise the global WEEE recycling rate to 30%, among other objectives. Besides, the ITU-T's Study Group 5 (SG5) also works on providing international standards and guidelines to encourage a global circular economy.

Energy Efficiency

- The ITU aims at playing a leading role in improving energy efficiency of ICTs through SG 5 activities. In addition, there is a dedicated ITU-T Focus Group called "Environmental Efficiency for Artificial Intelligence and other Emerging Technologies" (FG-AI4EE), on evaluating the influence of emerging technologies such as AI, augmented/virtual reality, industry 5.0, nanotechnology, etc.

Greening ITU

- To encourage the adoption of their proposed standards and guidelines, the ITU is committed to operate with sustainable technology itself. This includes efforts such as digitizing paper processes, virtualizing ICT servers, promoting virtual meetings, etc.



European Telecommunications Standards Institute (ETSI)

The European Telecommunications Standards Institute (ETSI) is a recognized European Standardization Organization (ESO) that creates fundamental standards for ICT, to power digital society, dealing with telecommunications, broadcasting and other electronic communications networks and services. ETSI supports EU strategic objectives, regulatory requirements, and policies. It strives for a sustainable future and promotes the EU Industrial Strategy objectives of becoming more green, digital, and resilient. There are different technical committees which are addressing topics of sustainability.

ETSI Technical Committees on Sustainability

- Environmental Engineering committee (TC EE),
- Access, Terminals, Transmission and Multiplexing committee (TC ATTM),
- Industry Specification Group (ISG) on Operational energy Efficiency for Users (OEU).



Environmental Sustainability Standardization - ETSI (ctd.)

Access, Terminals, Transmission and Multiplexing committee (TC ATTM)

TC ATTM concentrates on fulfilling the eco-friendliness requirements of operational networks and sites, as well as broadband transmission. Its tasks include:

- Developing global KPIs to enable ICT users to monitor their eco-efficiency and energy management,
- Defining networks that connect digital multi-services in cities, producing KPIs to oversee the sustainability of broadband solutions,
- Upgrading standards for transmission equipment to aid the European Commission's Eco-design of Energy Related Products Directive
- Supporting the effective management of ICT waste during maintenance and end-of-life stages.

Industry Specification Group (ISG) on Operational Energy Efficiency for Users (OEU)

ISG OEU is dedicated to minimizing the power consumption and greenhouse gas emissions of infrastructure, utilities, equipment, and software within ICT sites and networks. Its tasks comprise:

- Measuring the energy consumption of IT servers, storage units, broadband fixed access, and mobile access, with the objective of developing global KPIs.
- Managing the end-of-life of ICT equipment.
- Defining global KPI modelling for green smart cities.

Environmental Sustainability & Industry Associations



Global System for Mobile Communications Association (GSMA)

- The GSMA Sustainability Assessment Framework is intended to examine sustainability efforts across the mobile industry in a comparable and leading-edge way. The framework has the goal of helping to better understand the landscape of operator efforts in social and environmental sustainability.
- GSMA is working jointly with ITU and Global Enabling Sustainability Initiative (GESI) to provide guidance on reporting scope 3 (value chain) emissions of operators.

Next Generation Mobile Networks Alliance (NGMN)

- A series of whitepapers on “Green Future Networks”- KPIs and target values for green network assessment.
- Key considerations for 6G include enabling a seamless and affordable experience, focusing on sustainability and energy efficiency, taking a holistic approach to development, and considering user terminal and service design to optimize resource usage and reduce waste.

Next G Alliance (NGA) – Green G Working Group

- Promoting environmental sustainability in the development of future wireless technology and creation of a sustainable 6G ecosystem, enabling other industries to reduce GHG emissions, limit land and water use, and move towards a circular economy.
- Two whitepapers: “Green G: The Path Toward Sustainable 6G” and “6G Sustainability KPI Assessment: Introduction and Gap Analysis” .