

TC EE's approach to sustainability

Presented by:

Beniamino Gorini (Nokia); TC-EE chairman

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Agenda



- Sustainability in ETSI TC EE (Environmental Engineering)
- Sustainability of ICT products/services/networks
- Eco-design activities
- Environmental standards vs Sustainability

Sustainability in ETSI - TC EE (Environmental Engineering)



Environmental classes and tests for storage, transportation and operation

Acoustic noise limit for ICT equipment

TC-Environmental Engineering (EE) responsibility

> "Define the environmental and infrastructural aspects for all telecommunication equipment and its environment, including equipment installed in subscriber premises."

Equipment practice and thermal management for installation of telecommunication equipment

Power supply interface requirements for the operation of ICT equipment (including energy storage)

Grounding and bonding aspects

Control and monitoring of different parts of ICT installations

Energy efficiency measurement methods

Life Cycle Assessment process

Circular Economy aspects (eco-design and Digital Product Passport)

ETSI - TC EE (Environmental Engineering)

♥ Fields of activities:

- *Environmental Conditions (WG-EE1)*
 - Including environmental parameters/tests,

 - thermal management
- - Including power supply interface requirements,
- Mechanical Structure and Physical design of equipment and structures
 - ✓ Including equipment practices (racks & sub-racks characteristics)
- Environmental matters associated with Mobile ICT devices (WG M-ICT)



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W Environmental affairs (WG-EEPS)

- ✓ Analysis of European environmental legislation on ecological aspects for ICT equipment
- Liaisons with CEN/CENELEC and European Commission on development of eco-environmental related product deliverables for telecommunication infrastructure and equipment.
- *V* Environmental impact assessment, including Life cycle assessment
- ♥ Circular Economy matters
- *Renewable energy sources*

Environmental matters associated with Mobile ICT devices (WG M-ICT)

- *V* Development of eco-environmental related product deliverables specific to the Mobile ICT device.
- Analysis of relevant European environmental legislation, in terms of ecological aspects, and assessing their impact on Mobile ICT devices

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- Inside ETSI: TC-ATTM (eco-environmental and reverse powering), TC-CYBER (OS/SW aspects linked to eco-design)
- ✓ CEN/CENELEC (e.g. JTC10 on material efficiency, Green Data Center coordination group, TC215)
- ITU-T SG5 on Climate Change (<u>link</u> to the list of technically aligned deliverables between TC-EE/ITU-T SG5)
- European Commission (including JRC for CoC of energy efficiency of Broadband Equipment and Data Centers)



Sustainability of ICT products/services/networks



What is required to support the sustainable ICT products/services/networks?



- Methodologies to determine the environmental impact assessment (e.g. GHG, resource consumption etc)
- Methods to determine the power consumption of ICTs to be used as input data for the environmental impact assessment
- Methodologies to monitor and manage the energy efficiency
- *Guidelines for the realization of "green" installations*
- **Key Performance Indicators for products/installations**

Methods for assessing the environmental impact of ICT products/networks/services

- ES 203 199 "Life Cycle Assessment of ICT equipment, ICT network and service: General definition and common requirement"
 - ✓ Purpose of this ES is to harmonize the LCA of ICT:
 - ✓ It includes specific requirements for LCA of ICTs in respect to:
 - ✓ ISO 14040 Life cycle assessment, Principles and framework
 - ✓ ISO 14044 Life cycle assessment, Requirements and guidelines
 - International Reference Life Cycle Data System (ILCD) Handbook General guide for Life Cycle Assessment



ETSI ES 203 199 V1.3.1 (2015-02)



Environmental Engineering (EE); Methodology for environmental Life Cycle Assessment (LCA) of Information and Communication Technology (ICT) goods, networks and services



Life Cycle stages overview



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Energy Efficiency of ICT equipment/network



- Wireline Broadband Access equipment: EN 303 215
- Wireless Broadband Access equipment: ES 202 706-1 for "Static method" and TS 102 706-1 for "Dynamic method"
- ✓ Customer Premises equipment: EN 301 575
- *♥ Core Network equipment: ES 201 554*
- Switching and Router equipment: ES 203 136
- ✓ Server equipment: EN 303 470
- Mobile networks: ES 203 228



- Storage equipment: in preparation (EN 303 804)
- Network Function Virtualisation (NFV): EN 303 471 and ES 203 539



Energy efficiency monitoring



- Series of standards published by ETSI TC-EE on "Infrastructure equipment control and monitoring system interface" (ES 202 336-x series of 12 parts to cover all systems in the ICT network)
- Control processes defined in these publications aims to reduce the energy consumption by optimizing settings of utilities in the TLC infrastructure (e.g. cooling systems, power systems etc.)

Remote monitoring and setting reduce CO2 emissions (less on-site interventions)

Energy efficiency management



- ✓ ES 203 237 on "Green Abstraction Layer" (GAL)
- S 203 682 on "Green Abstraction Layer (GAL); Enhanced Interface for power management in Network Function Virtualisation (NFV) environments
- *The GAL is an architectural interface/middleware that:*
 - *gives access to the green networking capabilities of specific devices*
 - adapts energy consumption to take into account load variations
 - offers a framework for information exchange between power-managed data-plane entities and control processes.
 - enables energy management protocols
- *♥ GAL functionalities:*
 - *discovery to retrieve information about available energy configurations and network device*
 - provisioning to set the energy configuration for a network device
 - monitoring of the physical devices and relevant parameters

GUIDELINES FOR IMPROVEMENT OF ENERGY EFFICIENCY AND ALTERNATIVE ENERGY SOURCES



Methods to increase the energy efficiency of telecommunication equipment and infrastructure equipment (power station, air cooling, control of equipment, etc.)

- *Overview of the alternative energy sources and guidelines for its use (for powering and cooling)*
- ✓ Disposal of waste materials
- ✓ LCA analysis related to alternative energy solutions (e.g. batteries)
- - Improved efficiency with less conversion stages
 - Reduction of CO2 emissions using renewable energy options

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GUIDELINES FOR IMPROVEMENT OF ENERGY EFFICIENCY AND ALTERNATIVE ENERGY SOURCES

- - Batteries (part 2)
 - Supercapacitor (part 3)
- Section Sec
 - It considers power feeding solutions for 5G, converged wireless and wireline access equipment and network
 - It takes into consideration their enhanced requirements on service availability and reliability and the environmental impact of the proposed solutions.

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Eco-design activities





Eco-design standards vs Regulations



- ✓ Material efficiency (Mandate M/543)
 - Work is done in CEN/CENELEC JTC10 for the CEN/CENELEC deliverables
 - *ETSI TC-EE for the ETSI WIs on ICT Network equipment*
 - ETSI TR 103 476 V.1.1.2 Circular Economy (CE) in Information and Communication Technology (ICT); Definition of approaches, concepts and metrics
 - ✓ ETSI EN 303 808 "Specific metrics, methods and parameters for assessment of material and resource efficiency aspects of ICT network infrastructure goods in the context of circular economy"
- Server and Storage equipment (Mandate M/573; EU Regulation 2019/424)
 - V DEN/EE-EEPS44 (EN 303 804) on new EN on "Energy efficiency metrics and measurement methods for storage equipment"
 - Ø DEN/EE-EEPS47-2 (EN 303 800-2) on "secure data deletion functionality"
 - ♥ DEN/EE-EEPS47-3 (EN 303 800-3) on "availability of firmware and of security updates to firmware"
 - ✓ DEN/EE-EEPS47-5 (EN 303 800-5) on "disassembly and disassembly instruction"
 - REN/EE-EEPS42 on revision of EN 303 470 "Energy Efficiency measurement methodology and metrics for servers"

Circular economy



- - It defines the general framework of a "product information sheet" or a "digital product passport" including the requirements to include information relevant to sustainability, environmental and health related, of ICT/digital devices in a common digital format.
- VES/EE-EEPS64 "Information model for digital product information on sustainability and circularity"
 - ✓ This complements the DTS/EE-EEPS55 (TS 103 881) work item
 - - Ithe information model for the description of details about ICT products, with a focus on the environment: circularity, environmental sustainability, and human health.
 - ✓ the information items, to be represented in digital format, about ICT product information, either as individual products or grouped by model, batch



Environmental standards vs Sustainability



How environmental parameters are linked to sustainability?



- *V* Environmental standards define

 - test methods for the compliance to the environmental class to which a product is intended to be deployed/used
- What is the relation of these standards with sustainability?
 - ✓ one aspect is the link to circularity aspect for product durability
 - another aspect is the adaptation to climate changes (variations of climatic conditions will bring to the re-consideration of environmental parameters)

How environmental standards are defined





How environmental parameters are linked to sustainability?



- > EN 300 019-1 parts (environmental classes):
 - Part 0: Introduction
 - > part 1: storage
 - > part 2: transportation
 - part 3: Stationary use at weatherprotected locations
 - part 4: Stationary use at nonweatherprotected locations
 - > part 5: Ground vehicle installations
 - > part 6: Ship environment
 - > part 7: Portable and non-stationary
 - part 8: Stationary use at underground locations

- > EN 300 019-2 parts (environmental test requirements):
 - Part 0: Introduction
 - part 1: storage
 - > part 2: transportation
 - > part 3: Stationary use at weatherprotected locations
 - > part 4: Stationary use at non-weatherprotected locations
 - > part 5: Ground vehicle installations
 - > part 6: Ship environment
 - part 7: Portable and non-stationary
 - > Part 8: Stationary use at underground locations





Thank you for your attention





Any questions?

Contact me:

Beniamino.gorini@nokia.com

