



ICT TASK force study

Draft Policy Recommendations

Stakeholders Meeting – 15th of November 2022

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Study Objectives

- Determine the best policy approach for improving their energy efficiency and wider circular economy aspects.
- Provide policy recommendations on the inclusion of Ecodesign criteria and beyond (i.e. systems) based on material and energy efficiency improvement potential, and considering user behaviour.

Study Tasks

Task 2 - Definition and categorisation of different sectors/products under 'ICT products'
Task 3 - Potential for Energy Savings

Presented on 23 Nov 2021

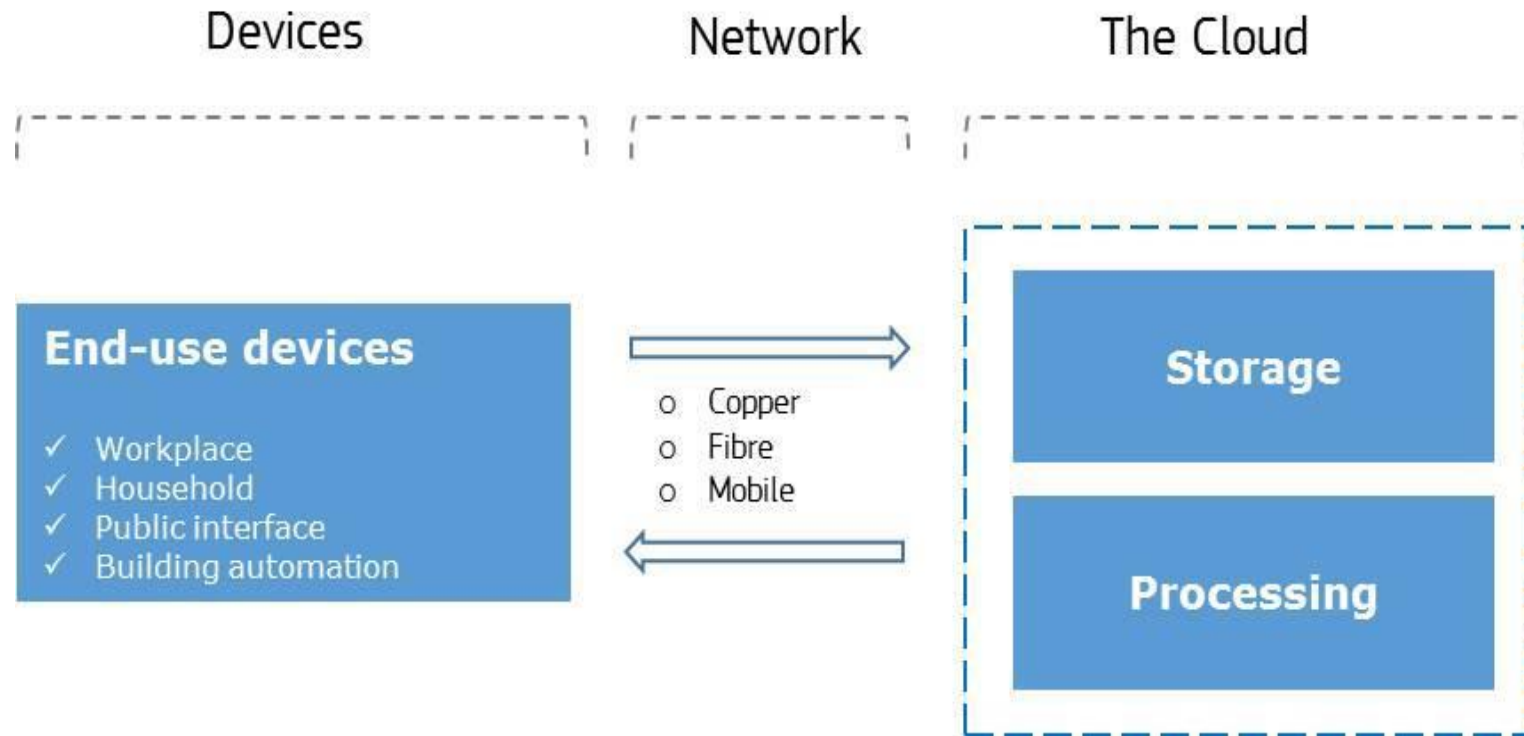
Task 4 - Material Efficiency: Collection of data
Task 5 - Analysis of potential for material efficiency
Task 6 - Analysis of trade-offs and synergies
Task 7 - Analysis of user behaviour implications

Presented on 15 Sept 2022

Task 8 - Grouping of products
Task 9 - Analysis of Life cycle costing implications
Task 10 - Compilation of possible policy instruments
Task 11 - Suitability for different policy instruments
Task 12 - Final Policy Recommendations

Today's subject

The approach of the study



The main characteristic that ICT product groups share is that they (increasingly) allow communication between devices

Grouping of products

Product Groups		Sub Categories...
Data Centre Devices		Servers, Storage Devices, ...
Telecommunication Network Devices		Broadband communication equipment...
Consumer ICT devices (Consumer Electronics)	Electronic displays	TVs, Monitors...
	Audio/video devices	Video-projectors, cameras ...
	Audio Equipment	Loud-speakers, smart-speakers
	Personal ICT Equipment	Computers, smartphones, game consoles...
	Accessories and peripherals	Chargers, external drives ...
	Wearable ICT Devices	Smartwatches, Earbuds ...
	Imaging Equipment	Printers, MFDs,
	Home / Office Network Equipment	Routers, gateways, ...
Other ICT Devices	ICT in public space	Public WLAN, ATMs,
	Industrial Sensors	Industrial monitoring & management
	Building Automation & Control	Building monitoring & management

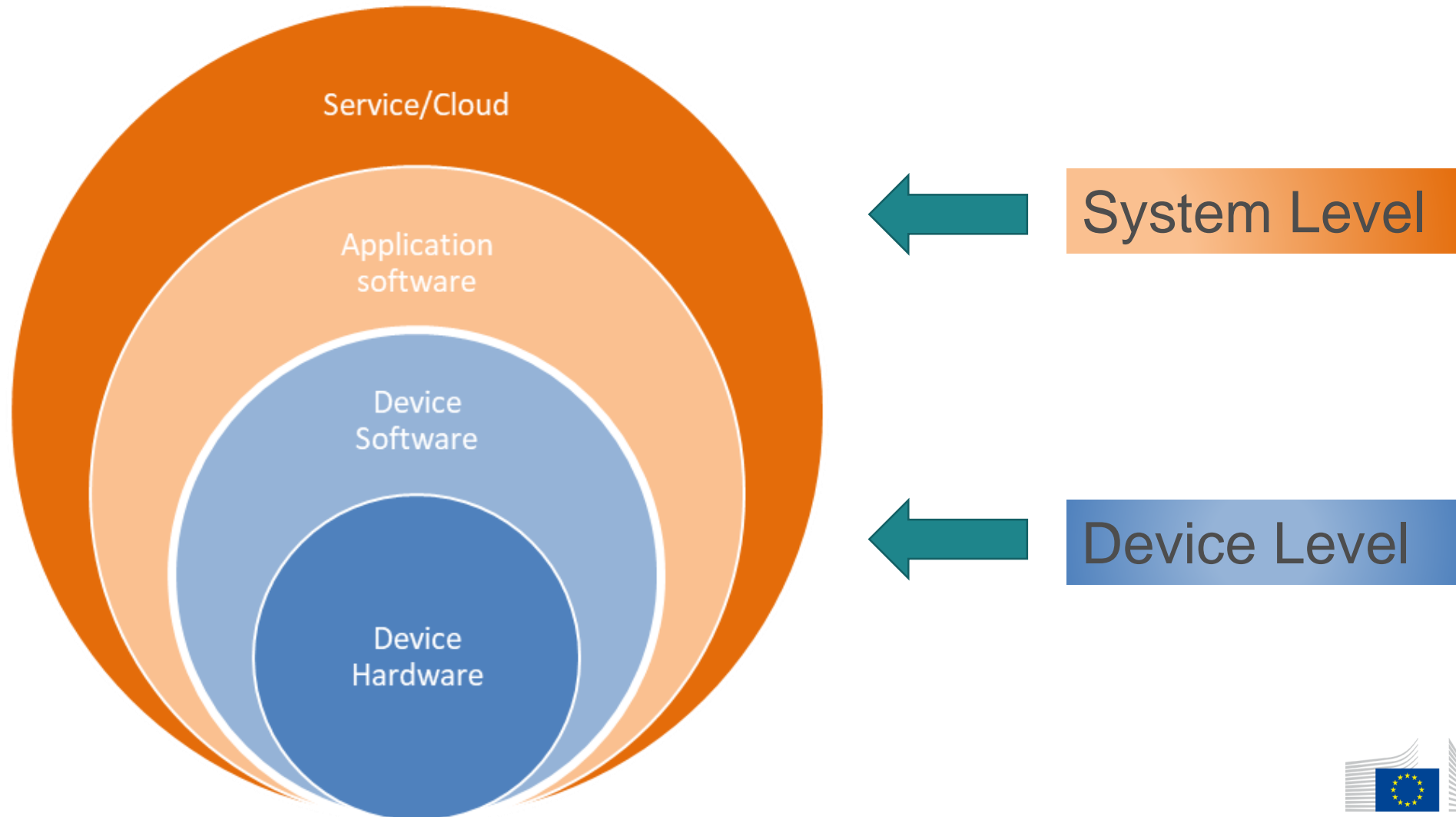
Mapping of the existing product policies

Product Group	Existing and planned EU Initiatives			
	Ecodesign Directive	Energy Labelling	EU Ecolabel	EU GPP
Home / Office Network Equip. and Stand-by*	X			
External power supplies*	X			
Servers and Storage Devices*	X			X
Electronic displays*	X	X	X	X
Computers*	X			X
VG consoles	VA			
Complex set boxes	VA discontinued			
Imaging Equipment	Under development			X
Smartphone-Tablets	Under development			X

VA = Voluntary Agreement

* = Review ongoing or planned within this working plan

Policy Recommendations



Device Level – Energy Efficiency

#1 Extending the implementation of energy efficiency requirements

→ *Public ICT and Home network equipment*

#2 Introduction of energy efficiency requirements based on “active mode” performance

- *Computers: Test Suite by CLASP/GTD under development*
- *Game consoles:*
 - *Establish minimum energy requirements based on a combination of modes*
 - *Set specific requirements for a representative active mode*

Extending the implementation of energy efficiency requirements

ICT Electricity consumption EU27

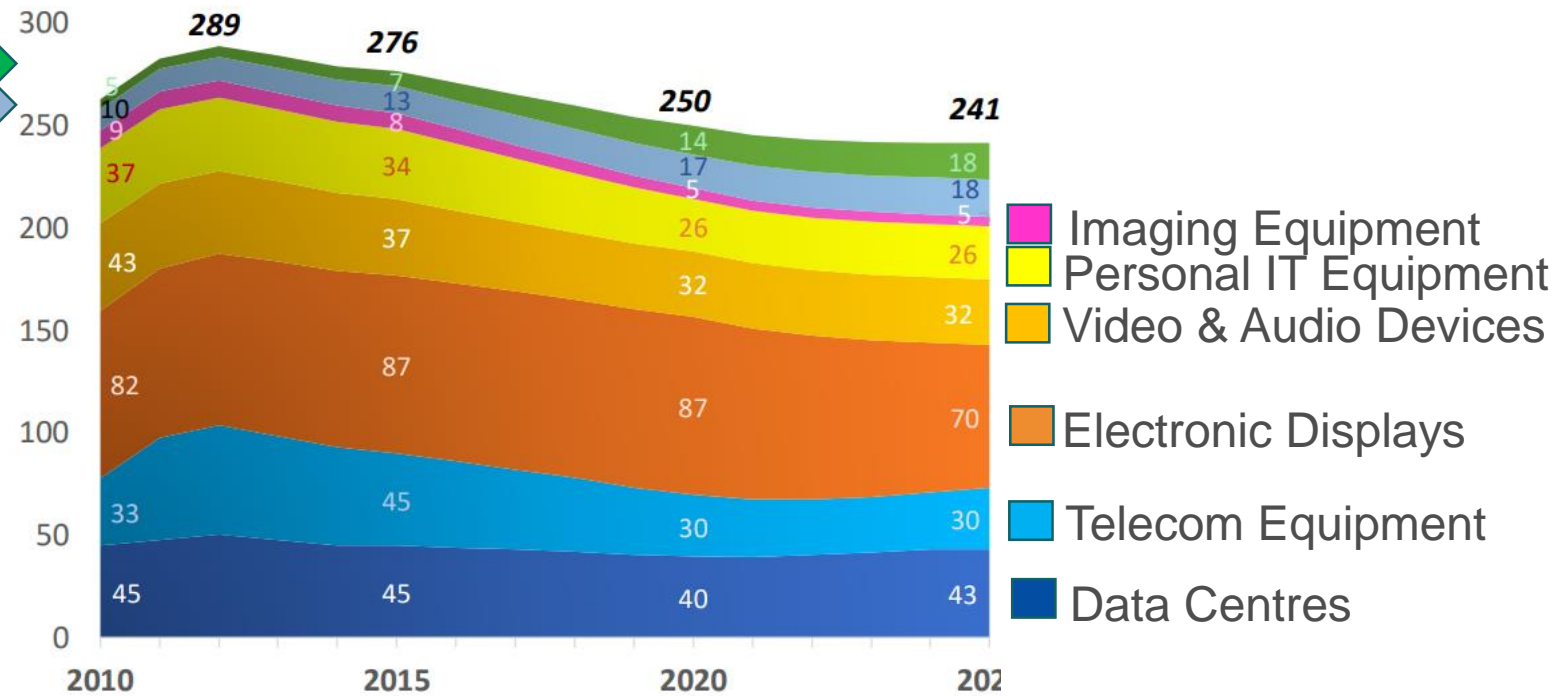
years 2010-2025, in TWh/yr

TWh/yr

Public ICT
Home / Office Network



Growing Trend
By 2025 more than
10% of the energy
consumption of the
ICT sector



Device Level – Energy Efficiency

#2 Introduction of energy efficiency requirements based on “active mode” performance

- Ecodesign requirements based on combinations of “active modes” have been developed for servers
- The Commission is currently working at a methodology approach for measuring energy efficiency of computers based on “active modes”
- *Game consoles:*
 - *Establish minimum energy requirements based on a combination of modes*
 - *Set specific requirements for a representative active mode*

Device Level – Energy Efficiency

#2 Introduction of energy efficiency requirements based on “active mode” performance

console mode	h/d	UHD gaming capable		HD+UHD media capable		HD (onTV)	
		PS4 Pro W	Xbox One X W	PS4 slim W	Xbox One S W	Switch W	
Active gaming	1.67	135,93	148,69	73,14	66,59	1	11,42
Streaming & Media	0.98	78,58	51,61	47,18	35,3	0,56	8,1
Navigation and other	0.47	63,74	49,32	44,07	28,3	0,28	5,02
Standby	5.12	1,77	0,29	1,88	0,34	0	0
Low Power download	0.15	52,69	40,76	41,55	16,91	0	0
Rest mode	15.21	0,95	13,48	1	1,1	0,71	0,28
Off	0.4	0,25	0,29	0,24	0,33	0,45	0,35
wght. average power Pavg in W		15.2	22,3	9,2	11,3		1,0

Higher Power Requirements

- Less relevant in terms of time

Source: CSES, Ökopol, TU Wien, Review Study of the Ecodesign Voluntary Agreement for the Product Group “Videogames Consoles”, study for the European Commission, 2019

Active Modes: Higher power requirements

Other Modes: Lower power requirements, but still relevant in terms of h/d

Device Level – Material Efficiency

#3: Material efficiency of consumer electronics

Aspect	Provisions
Hardware durability and reliability	Resistance to stresses/ageing mechanisms (e.g. drop/shock/ scratch resistance, ingress protection from water/dust) Battery endurance in cycles, battery protection software, intelligent charging, information on battery state of health Minimum / Expected lifetime Durability/reliability score
Software related durability	Minimum requirements for availability of software functionality / security updates Availability and durability of cloud based services associated to the product. Decoupling of the electronic device from cloud services
Reparability, Upgradability and Reusability	Introduction of a Reparability Scoring Index / Label Availability of repair/upgrade/maintenance info to independent operators/end-users Spare part availability and delivery time Disassembly generally or related to Disassembly Depth, Tools, Fasteners, Working Environment and Skill Level Use of coding standards for identification of components and materials Use of standard components Reusability/Upgradability specific provisions
Ability to be refurbished and remanufactured	Ability to be identified of products/parts Wear and damage resistance during the remanufacturing process steps
Recyclability	Ability to easily separate the product into different materials (e.g. metals, plastic) Choice of materials and restrictions on substances (e.g. choice and combination of polymers, additives) Condition for the access to product data relevant for the recycling, Recyclability information (incl. scores) to consumers / recyclability claims

Other Device Level Recommendations

#4 Minimum Guarantee for B2B ICT sales

Sales of goods Directive (EU) 2019/771 and supply of digital content and digital services (EU) 2019/770: seller / trader liability limited to B2C context

#5 Quality labelling / certification for refurbishing and second-hand markets

→ *Quality label for refurbished products*

→ *Quality Code of Conduct or Certification for ICT refurbishers and second-hand marketplaces*



Example: refurbished self declarations

RefurbMe	BackMarket	Gazelle
<p>Excellent (Grade A)</p> <p>Devices are like new.</p>	<p>Excellent</p> <p><u>Appearance:</u> Like new. The body may have very light micro-scratches, invisible at a distance of 8 inches (a bit longer than a standard-sized pencil) or more. For items with screens, the screen will have no scratches.</p> <p><u>Technical Condition:</u> Excellent. Durability scores are high, and chances of encountering technical issues are very low.</p>	<p>Excellent</p> <p>The screen and body of these devices are in excellent condition.</p>
<p>Good (Grade B)</p> <p>Devices are in working condition but have light cosmetic issues.</p>	<p>Good</p> <p><u>Appearance:</u> Light signs of wear. The body may have light micro-scratches, invisible at a distance of 20 inches (about an arm's length) or more. For items with screens, the screen will have no scratches.</p> <p><u>Technical Condition:</u> Very Good. Durability scores are above average, and chances of encountering technical issues are low.</p>	<p>Good</p> <p>Very good condition, although with light aesthetic blemishes. The functionality is the same.</p>
<p>Fair (Grade C)</p> <p>Devices have light but visible scratches on the body.</p>	<p>Fair</p> <p><u>Appearance:</u> Signs of wear. The body may have a few visible scratches and dents that don't affect performance. For devices with screens, they may have light scratches that are slightly visible when the device is on.</p> <p><u>Technical Condition:</u> Good. Durability scores are average and still correspond with the quality levels required by our quality charter.</p>	<p>Fair</p> <p>A good condition with visible wear and tear.</p>

Other Device Level Recommendations

#6 Take Back and Preparation for Reuse

- *More targeted collection for valuable ICT devices to ensure significantly higher reuse rates than current collection system for WEEE.*
- *Enhanced communication through establishment of on-line platforms at public and/or private level matching the availability of devices and the demand from refurbishers.*

#7 Sustainable Sourcing

- *Mandatory sustainability requirements including supply chain due diligence for at least conflict materials present in ICT devices: i.e. the 3TG tin, tungsten, tantalum, and gold (e.g. similarly to proposed Battery Regulation)*

Q&A session and coffee break

System Level Recommendations

#8 Video streaming default settings

→ *Requirement to use minimum resolution as default: can be addressed at device level within the ecodesign framework, or at platform/application level via another regulatory instrument.*


#9 Consumer info on environmental impact of settings and data usage

→ *Complementary to the previous recommendation: consumers should be informed about potential change in energy use when settings are changed.*

#10 Energy Efficiency / Carbon Footprint Label of Telecom Network Services

→ *Color scale (e.g. similar to the well-known EU energy label) for power consumption of the service per subscriber, or energy intensity, or carbon footprint of data transmission*

Example: energy efficiency label for access network

Energy efficiency colour scale	E.g. Power consumption of the service per subscriber	E.g. Energy intensity of data transmission	E.g. Carbon footprint of data transmission
	< 1 Watt	< 1 Wh/GByte	< 1 g CO ₂ -eq/GByte
	< 2 Watt	< 2 Wh/GByte	< 2 g CO ₂ -eq/GByte
	< 4 Watt	< 4 Wh/GByte	< 4 g CO ₂ -eq/GByte
	< 8 Watt	< 8 Wh/GByte	< 8 g CO ₂ -eq/GByte
	< 16 Watt	< 16 Wh/GByte	< 16 g CO ₂ -eq/GByte
	< 32 Watt	< 32 Wh/GByte	< 32 g CO ₂ -eq/GByte
	≥ 32Watt	≥ 32 Wh/GByte	≥ 32 g CO ₂ -eq/GByte

System Level Recommendations

#11 Application software efficiency

→ *Potentially applicable to several categories of application software, e.g. word processing software, media players, gaming. It could include minimum and information requirements and cover different aspects (efficiency, hardware needs, support...)*

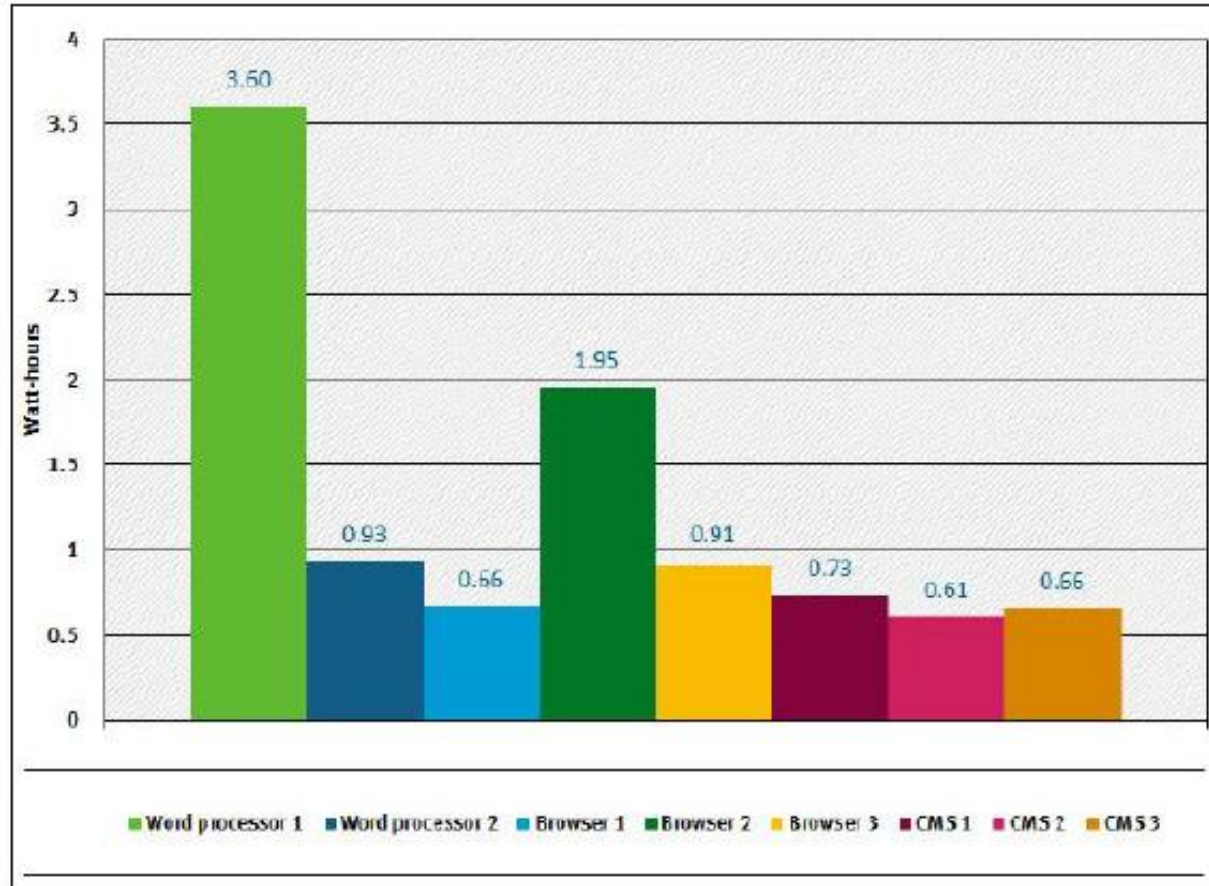
#12 Mandatory Green Public Procurement

→ *EU GPP Criteria already available for several ICT product categories (displays, computers, servers, smartphone, tablets, printers). Mandatory implementation of core criteria could save energy and resources associated to ICT hardware and services*

#13 Financial instruments

→ *Data traffic is associated to use of resources (energy and materials). Data tariffs can incentivise users to use resources efficiently*

Software induced energy consumption



Comparison of energy consumption of the local device (SUT(Client)) during the execution of the standard usage scenario
Source: Gröger et al. (2018)

Device Level Prioritisation

	Durability and reliability				Software related durability			Reparability, upgradability and reusability							Remanufacture and refurbishing		Recyclability				
	Minimum lifetime Resistance to stresses/ageing	Battery endurance (cycles)	Minimum / Expected Lifetime	Durability/Reliability score	Availability of software updates	Availability and durability of cloud based services	Decoupling of device from cloud services	Reparability Scoring Index / Label	Availability of repair/upgrade info	Spare parts availability and delivery time	Disassembly / Depth, Tools, Fasteners, Working Env, Skill Level	Use of component and material coding standards	Use of standard components	Reusability/Upgradability specific provisions	Ability to identify parts	Wear/ damage resistance during remanufacturing	Ability to easily separate product into different materials	Choice of materials and substances restrictions	Access to product data relevant to recycling	Recyclability info	Recyclability Score
Electronic displays*	++	N/A	++	++	+++	+	+	+++	+++	+++	+++	+++	+++	+++	+++	+++	++	++	++	++	++
Audio/video devices	++	++	++	++	+	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	++	++	++	++	++
Audio Equip	+++	+++	+++	+++	+	+++	+++	+	+	+	++	+	++	++	+	+	++	++	++	++	++
Personal ICT	+++	+++	++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	++	++	++	++	++
Accessories	+++	+++	+++	+++	+	+	+	+	+	+	+	++	+++	+	+	++	++	++	++	++	+
Wearables	+++	+++	+++	+++	+++	+++	+++	++	++	++	+	++	+	+	+	++	++	++	++	++	+
Imaging Equip	++	N/A	++	++	++	++	++	++	++	++	+++	+++	+	+++	+++	++	++	++	++	++	+
Home/Office Ntwrk Equip	++	N/A	++	++	+	+	+	+	+	+	+	+	+++	+++	+++	++	++	++	++	++	+

Durability / reliability of consumers electronics

	Durability and reliability			
	Minimum lifetime Resistance to stresses/ageing	Battery endurance (cycles)	Minimum / Expected Lifetime	Durability/Reliability score
Electronic displays*	++	N/A	++	++
Audio/video devices	++	++	++	++
Audio Equip	+++	+++	+++	+++
Personal ICT	+++	+++	++	+++
Accessories	+++	+++	+++	+++
Wearables	+++	+++	+++	+++
Imaging Equip	++	N/A	++	++
Home/Office Ntwrk Equip	++	N/A	++	++

Hardware durability and reliability is relevant aspects for:

- ICT devices (e.g. smartphones and tablets) that are more exposed to use and/or environmental stresses, battery aging, accidents.
- less complex product groups as audio equipment, wearable devices, accessories and peripherals (e.g. a charging cable)

Software related durability of consumer electronics

	Software related durability		
	Availability of software updates	Availability and durability of cloud based services	Decoupling of device from cloud services
Electronic displays*	+++	+	+
Audio/video devices	+	+++	+++
Audio Equip	+	+++	+++
Personal ICT	+++	+++	+++
Accessories	+	+	+
Wearables	+++	+++	+++
Imaging Equip	++	++	++
Home/Office Ntwrk Equip	+	+	+

Software related durability measures are high relevant for :

- ICT devices whose correct functioning and security level are high dependent from the update level of the firmware and operation system (e.g. personal ICT devices, electronic displays)
- for devices whose main functionalities are linked to cloud based applications, as it could be the case for personal ICT devices, security cameras, loudspeakers, smartwatches...

Reparability, upgradability and reusability

Reparability, upgradability and reusability								
	Reparability Scoring Index / Label	Availability of repair/upgrade info	Spare parts availability and delivery time	Level	Disassembly / Depth, Tools, Fasteners, Working Env, Skill	Use of component and material coding standards	Use of standard components	Reusability/Upgradability specific provisions
Electronic displays*	+++	+++	+++	+++	+++	+++	+++	+++
Audio/video devices	+++	+++	+++	+++	+++	+++	+++	+++
Audio Equip	+	+	+	++	+	++	++	++
Personal ICT	+++	+++	+++	+++	+++	+++	+++	+++
Accessories	+	+	+	+	+	++	+++	+++
Wearables	++	++		++	+	++	+	+
Imaging Equip	++	++	++	++	+++	+++	+	+
Home/Office Ntwrk Equip	+	+	+	++	+	+	+++	+++

Reparability strategies tends to be more effective for devices with a longer expected lifetime and higher purchase price

Reusability/Upgradability (by modular design) relevant also for EPS and network equipment

Remanufacturing and refurbishing

	Remanufacture and refurbishing	
	Ability to identify parts	Wear/ damage resistance during remanufacturing
Electronic displays*	+++	+++
Audio/video devices	+++	+++
Audio Equip	+	+
Personal ICT	+++	+++
Accessories	+	+
Wearables	+	+
Imaging Equip	+++	+++
Home/Office Ntwrk Equip	+++	+++

Similarly to repair, measures aiming to facilitate remanufacturing and refurbishment are more relevant for devices with a longer expected lifetime and higher purchase price. Moreover, a special considerations is need for printer cartridges for their nature of consumables and the importance of reducing the electric and electronic waste production associated to their use.

Recyclability

	Recyclability				
	Ability to easily separate product into different materials	Choice of materials and substances restrictions	Access to product data relevant to recycling	Recyclability info	Recyclability Score
Electronic displays*	++	++	++	++	++
Audio/video devices	++	++	++	++	++
Audio Equip	++	++	++	++	++
Personal ICT	++	++	++	++	++
Accessories	++	++	++	++	+
Wearables	++	++	++	++	+
Imaging Equip	++	++	++	++	+
Home/Office Ntwrk Equip	++	++	++	++	+

Recyclability measures are considered more product group neutral, due to the similarities of ICT product groups in terms of material composition.

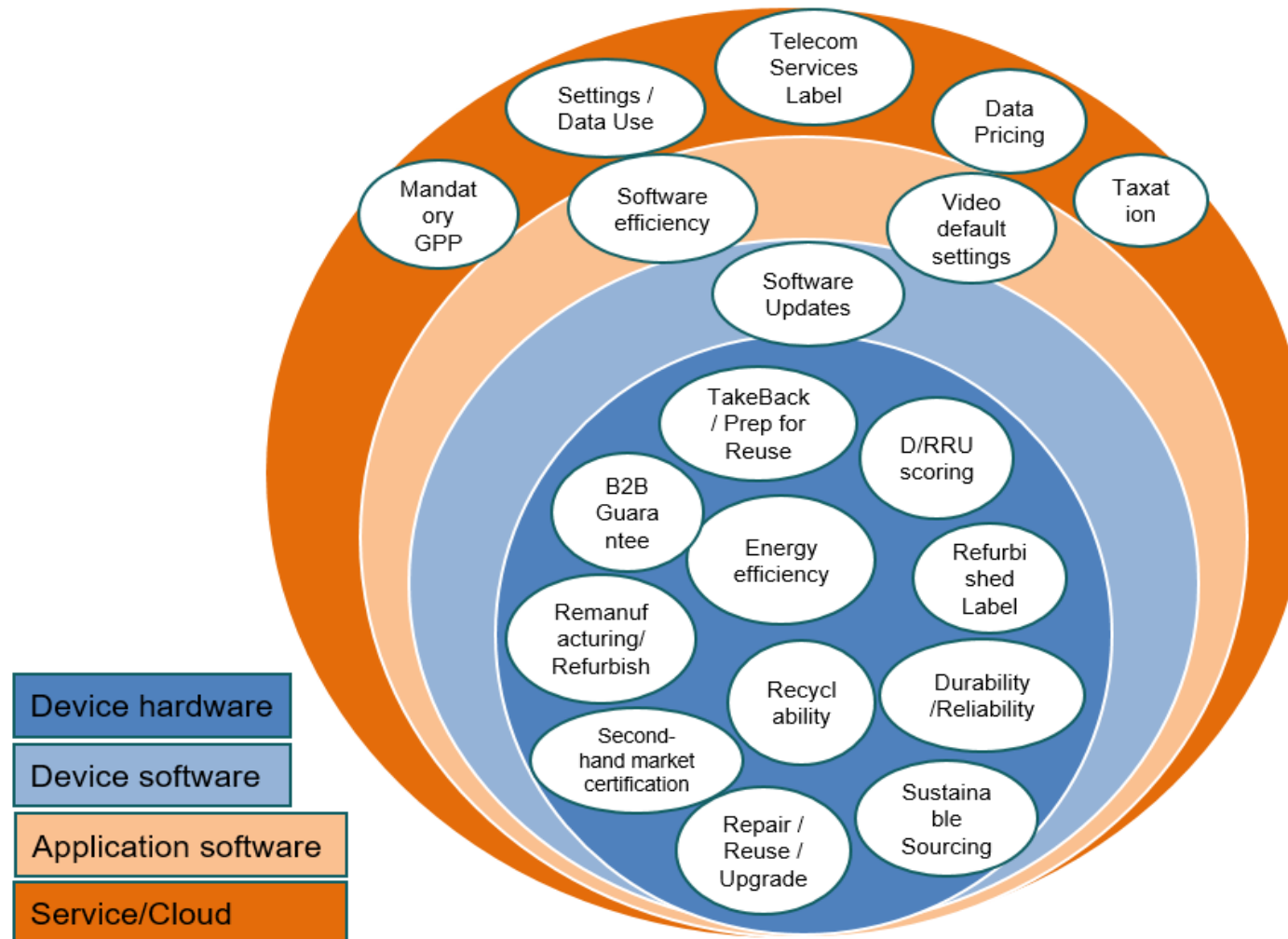
Device Level Prioritisation

	Other Device level Policy Recommendations			
	B2B Guarantees	Refurbish Quality Label	Take Back & prep Reuse	Sustainable Sourcing
Electronic displays	+++	+++	+++	++
Audio Video devices	+++	+	++	++
Audio Equipment	+++	+	++	++
Personal ICT Equip.	+++	+++	+++	++
Accessories	++	+	+	++
Wearable Devices	+++	+	+	++
Imaging Equipment	+++	+++	+++	++
Home / Office Network Equipment	++	++	++	++
DC devices	++	+++	+++	++
Telecom / network	N/A	++	++	++

System Level Prioritisation

	System level Policy Recommendations				
	Video default settings	Telecom service Label	Applications efficiency	Mandatory GPP	Financial
Electronic displays	+++	N/A	++	+++	N/A
Audio Video devices	N/A	N/A	+	+	N/A
Audio Equipment	N/A	N/A	+	+	N/A
Personal ICT Equip.	+++	N/A	+++	+++	N/A
Accessories	N/A	N/A	N/A	++	N/A
Wearable Devices	++	N/A	+++	+	N/A
Imaging Equipment	N/A	N/A	N/A	+++	N/A
Home / Office Network Equipment	N/A	N/A	N/A	+++	N/A
DC devices	N/A	N/A	N/A	+++	N/A
Telecom / network	N/A	+++	N/A	+++	+++
UPS	N/A	N/A	N/A	++	N/A

Policy recommendations by ICT system level



Thank you

Project Website:

<https://susproc.jrc.ec.europa.eu/product-bureau//product-groups/522/documents>

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