



Ecodesign Standards for Software: Why Not Take a Horizontal Approach?

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ECOS

Environmental Coalition on Standards

is an international NGO with a network of members and experts advocating for environmentally friendly technical standards, policies, and laws.





What is a software?

- 'Software' as opposed to 'hardware', (the physical parts of an electronic product).
 Though also to be addressed as a tangible product.
- Software consists of instructions, programs, and data that drive computers and execute tasks.
- It comes in two main types: System software (e.g., operating systems, firmware, device drivers) and Application software (e.g., word processors, spreadsheets, Enterprise Resource Planning).





Why ecodesign for software?

- Software has a strong impact on the hardware, influencing everything from the design, functionality and lifespan of the devices.
- A critical role in energy management and security.
- Software updates can extend the functionality and lifespan of hardware; though often it is the opposite happening.





Summary

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 - 1. Durability
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 - Software issues related to repairability
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 - Software issues related to reusability
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- II. Software practices impacting energy efficiency
 - Software issues related to energy efficiency
 - Software legislation related to energy efficiency
- III. Recommendations for more sustainable software





Software issues related to durability:

- Software updates:
 - Security and corrective updates are too heavy and bundled with non-essential 'comfort' or 'functionality' updates
 - If already overloaded, security and corrective updates are impossible
 - The product might slow down to a point where the user considers replacement
- Impossible software update:
 - OS and application updates are not compatible anymore with hardware, leading to early obsolescence
- End of Support:
 - \circ The end of support of hardware-related software, can lead to early obsolescence. Especially when functionalities are removed.
- Limited interoperability can lead to premature obsolescence (e.g. for smart functionalities)
- Battery software can improve battery longevity



Software legislation related to durability:

Legislative text	Provisions
Smartphones/tablets ED regulation	 Operating systems updates available for 5 years at no cost The updates should not decrease the performance of the product Battery software allowing stopping charging at 80% or stopping charging when battery is full
Smartphones/tablets EL regulation	 The 'Software Updates (duration)' (SSU) score shall be calculated at product level as follows: 7 years = 5 pt 6 years = 3 pt 5 years = 1 pt
Cyber Resilience Act	Products with digital elements must benefit from security updates for minimum 5 years, unless for products that last for a shorter period of time



Software standards related to durability:

Legislative text	Provisions
ETSI ES 204 079 - Method for environmental performance scoring of smartphones	 Period of availability of OS support (Provision of security updates, corrective updates or functionality updates to OS, at no cost from the date of end of placement on the market: 7 years = 5 pt 6 years = 3 pt 5 years = 1 pt
EPEAT Label (draft)	 To integrate minimum firmware or OS availability according to the category of products Battery software that enables users to limit the maximum battery state of charge to ≤ 80%.



Software issue related to repairability:

- Part-pairing:
 - Manufacturers lock out new spare parts with software.
 - Discourage, or even prevent, certain parts from being swapped, including with third-party spare parts, second-hand (cannibalised) spare parts or even manufacturer-original replacements





Software legislation related to repairability:

Legislative text	Provisions
New battery regulation	Software shall not be used to impede the replacement of a portable battery or LMT battery, or of their key components, with another compatible battery or key components.
Right to repair directive	Manufacturers shall not use hardware or software techniques that impede the repair of goods covered by ecodesign provisions on repair, unless justified by legitimate and objective factors including the protection of intellectual property rights under Union and national legal acts.
Smartphones/tablets ED regulation	Provide non-discriminatory access for professional repairers and end-users (for parts they can access) to any software tools, firmware or similar auxiliary means needed to ensure the full functionality of replaced spare parts and of the device in which such spare parts are installed



Software standards related to repairability:

Legislative text	Provisions
EPEAT Label (draft)	Limits part pairing in a rather similar way to the smartphones and tablets regulation, but applies also to computers.



Software issue related to reusability :

Data deletion function:

- Lack of data deletion function means no way to reuse a product
- Lack of trust from users in collection systems
- If too complex, raises refurbishment/reuse costs
- Password reset function:
- If lacking, no reuse possible





Software legislation related to reusability:

Legislative and standardisation	Provisions
New battery regulation	Software reset function mandatory for batteries
Servers and data storage products ED regulation	 Secure data deletion shall be made available for the deletion of data contained in all data storage devices of the product (ETSI/EN 303 800-2 - Secure data deletion) The latest firmware is available two years after being placed on the market and for a minimum period of eight years after the last product of a certain product model is placed on the market, free of charge or at a fair, transparent, and non-discriminatory cost (ETSI/EN 303 800-3 - firmware updates)
Smartphones/tablets ED regulation	 Mandatory software function, that resets the device to its factory settings and erases securely by default the encryption key and generates a new one Access to software and firmware reset functions for professional repairer

A 2012 ECJ Ruling allowed the resale of Used Software licenses. This can prevent installing newer versions or forced transfer to cloud-based usage.



Software standards related to reusability:

Legislative and standardisation	Provisions
EN 45554:2020 - repair, reuse and upgrade	 Scoring approach for: Data management (transfer and deletion) Password and factory reset for reuse
EPEAT Label (draft)	Different levels of access to data sanitization for consumers and institutional purchasers.



II. Software practices impacting energy efficiency

Software issues related to energy efficiency:

- Coding:
 - The way software is coded brings about different levels of energy efficiency UBA compared, among others, two text processing programmes: One consumed four times more than the other.
- Software updates:
 - Potentially increasing energy consumption of hardware through more demanding programmes (leading consequentially to less endurant batteries)
- Settings and information:
 - Software can be an ally to nudge consumers towards more energy-efficient behaviour. Ex: Info on battery damage caused by fast charging, adaptative luminance, battery-saving mode, etc.





II. Software practices impacting energy efficiency

Software legislation related to energy efficiency:

Legislative and standardisation	Provisions
(Upcoming) Computer ED regulation	• The GTD methodology, developed to measure the active mode energy efficiency of computers, will determine which computers (including their integrated Oss) are the most energy efficient.
Smartphones/tablets ED regulation	 End-users should be informed and given the opportunity to refuse functionality updates that impact the performance of their smartphones/tablets



III. Recommendations for more sustainable software

A regulation or a standard on the sustainability of software should be developed to integrate:

- A prevention of part serialisation practices that hinder third-party repairs
- In-built data deletion and password reset function
- Provision of corrective and security updates for longer periods
- Unbundling necessary updates from dispensable ones
- Ability to switch from one software to another (particularly operating systems)
- Energy and resource efficiency information functions







THANK YOU

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Relevant links

- <u>https://www.techtarget.com/searchapparchitecture/definition/software</u>
- <u>https://www.britannica.com/technology/software</u>
- <u>https://www.geeksforgeeks.org/software-and-its-types/</u>
- https://hbr.org/2020/09/how-green-is-your-software
- <u>https://www.umweltbundesamt.de/en/press/pressinformation/environmental-impact-of-software-is-now-measurable</u>
- <u>https://inria.hal.science/hal-04082263/document</u>
- <u>https://www.infoq.com/news/2022/03/environmental-impact-software/</u>
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