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Information Requirements to Enable the Repair or Upgrade of Products: EU Policy Tools and Other Voluntary Labels for Computers

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Abstract: Extending the lifetime of products can mitigate, from a life cycle perspective, their environmental and social impacts. One of the options to extend their lifetime is repairing and/or upgrading the product, when possible. A key measure in support of this objective is the availability of relevant information to users and professionals to enable repair/upgrade of products.
Requirements on the provision of repair information have been introduced by different policy tools and labels for a variety of products and services on the market. In the case of computers, minimum requirements have to be fulfilled to enter in the EU market according to the Commission Regulation (EU) No 617/2013, while more ambitious requirements are associated to voluntary tools such as the EU Ecolabel and the EU Green Public Procurement (GPP) for Computers, as well as to other labels such as Blue Angel (the German Ecolabel), TCO Certified and EPEAT. Provision of repair information is also included in the Scoring System on Reparability developed by the Joint Research Centre.
The aim of this work is to review these initiatives to present a classification and comparison of existing information requirements for computers in terms of: i) repair aspects covered, ii) availability of the information to various target groups, and iii) communication vehicles. The analysis focuses on sub-categories of computers that are relevant in terms of market share such as laptops, desktop computers, all-in-one computers and tablets.
The results of the analysis can offer a useful basis for the improvement and harmonization of information requirements on computers, potentially facilitating their implementation by manufacturers and allowing more sustainable purchase decisions of consumers and public administrations.

Introduction

Significant contributions to the environmental impacts along the life cycle of computers are related to the manufacturing of the device itself and sub-assemblies such as motherboards, hard drives, batteries and display units (EC 2016a). The supply chain of computers and other ICT products can be also associated with conflict and human rights impacts (Köhler et al. 2013). Facilitating repair, reuse and upgrade of computers can contribute to extend their lifetime and reduce the impacts associated to resource extraction, production and end of life (Cordella et al. 2019a).
EU consumers currently lack information on reparability (Cerulli-Harms et al. 2018). Providing more information to consumers at the point of the sale about the durability and reparability of products can be an effective measure to shift demand towards products with better environmental credentials and make repair easier (Cerulli-Harms et al. 2018). At EU level, policy measures supporting repair of products could also provide turnover gains and create jobs in the repair sector, which is largely composed of SMEs and social enterprises located in the EU (Deloitte 2016).
Product policy tools such as the Ecodesign Directive (EC 2009), the EU Ecolabel (EC 2010) and the EU Green Public Procurement (GPP) (EC 2008b) can include requirements on reparability and supply of information.
It should be noted that, at the moment of preparing this work, the current Ecodesign regulation for computers (EC 2013) and GPP criteria for computers (EC 2016a) are under revision, with the possibility to introduce new requirements for the provision of repair information.
Moreover, new tools to inform about the ability to repair and upgrade products are under policy

discussion, such as a scoring system to rate the ability to repair and upgrade products. In that context, product-specific criteria have been defined for laptops (Cordella et al. 2019b).
Voluntary Type I ecolabels (ISO 2018) such as TCO Certified (TCO Certified 2018a, b, c, d), EU Ecolabel (EC 2016b) and Blue Angel (Blue Angel 2017), as well as rating system such as EPEAT (IEEE 2018), also include requirements on the provision of repair information. These labels can be also used in support of the formulation and verification of GPP criteria to include in public tenders or to implement sustainable procurement strategies in organizations.
This work provides a classification and analysis of repair/upgrade information requirements set for computers in EU relevant policy initiatives and voluntary programmes. These are finally compared to crosscheck the coherence and level of harmonization between different approaches with the final aim to promote their implementation by manufacturers and allow consumers and public administrations to make better purchase decisions.

Scope and methodology

The scope of this analysis has been restricted to repair/upgrade operations, defined according to Cordella et al. (2019a) as:
• Repair: the process of returning a faulty product, or a part of a product, to a condition where it can fulfil its intended use;
• Upgrade: the process of enhancing the functionality, performance, capacity or aesthetics of a products or a part of a product.
In terms of technologies, this study covers the following sub-categories of computers (EC 2013):
• Notebooks: a computer designed specifically for portability and to be operated for extended periods of time either with or without a direct connection to an AC power source;
• Desktop computers: a computer where the main unit is intended to be located in a permanent location and is not designed for portability and which is designed for use with an external display and external peripherals such as a keyboard and mouse;
• Integrated desktop computers: a computer in which the computer and the display function as a single unit, which receives its AC power through a single cable;
• Tablets: a product which is a type of notebook computer that includes both an attached touch-sensitive display and an attached physical keyboard.
Information requirements are analysed for the following EU product policy tools: Ecodesign (EC 2013), EU GPP (EC 2016a), EU Ecolabel (EC 2016b). Requirements from other international voluntary labels are also analysed. Among the labels, only those recently developed or updated (i.e. after 2016) have been taken into consideration. These are: TCO Certified, Blue Angel and EPEAT. The scoring system developed by JRC (Cordella et al. 2019b), also referred to as Repair Scoring System, has been moreover considered. More details of the analysed initiatives and related background information are listed in Table 1.

Type	Policy/initiative	Rev.	Application
EU policy tools	Eco-design (EC, 2013)	2013	Mandatory application at EU level
	EU GPP (EC 2016a)	2016	Voluntary inclusion of criteria in public tenders.
	EU Ecolabel (EC 2016b)	2016	Voluntary type I ecolabel
Labels	TCO (TCO 2018 a,b,c,d)	2018	Voluntary type I label ecolabel (mainly oriented to sustainable procurement in organizations)
	Blue Angel (Blue Angel 2017)	2017	Voluntary type I ecolabel
	EPEAT (IEEE 2018)	2019	Environmental rating system and label (mainly oriented to sustainable procurement in organizations)
Others	Repair Scoring System (Cordella et al 2019b)	2019	Under discussion. Product specific methodology developed for laptops.

Table 1. Details of the Initiatives analysed and their applicability.

The presence of key words as "repair", "information", "instructions", "access", has been crosschecked in the corresponding reference documents in order to identify requirements specifically requesting provision of information / instructions to facilitate the repair process. The level of market uptake has been also verified through the consultation of the product registries and considered in the discussion of the results. The repair information has been grouped based on topics covered. Associated target groups (e.g. professional repairers, users) and vehicle of communication / media required (e.g. free access website, user manual, other product documents, .external packaging) have been identified.

EU product policies on computers

The Ecodesign Regulation (EC 2013) mainly focuses on energy efficiency aspects; however this regulation already requires manufacturers to inform about the skills needed to replace batteries in notebooks. The Commission is exploring the possibility of including additional requirements such as disassembly instructions to be shared with professional repairers (Viegand Maagøe and VITO 2018). Similar requirements about the availability of repair information have been implemented in recent Ecodesign implementing measures for ICT products like servers (EC 2019a) and displays servers (EC, 2019b).

Current GPP criteria (EC 2016a) focus on the provision of disassembly and repair instructions during the service contract, as well as the information on the availability of spare parts; additionally, information on spare parts cost can be requested as awarding criteria. However, it has to be remarked that the provision of repair and spare parts information to the public administrations can be useful during the contract performance only when the public authority is actually responsible for the repair/upgrade of the equipment. It is moreover difficult to evaluate the level of implementation of GPP criteria since public authorities are free to select and adapt the criteria to integrate in their tender process.

The EU Ecolabel for computers (EC 2016b) introduces criteria on the availability of repair information such as the availability of a repair manual including clear disassembly and repair instructions and the provision of information on repair service. Nevertheless, there are no models registered under the European Ecolabel and the criteria expired in August 2019.

Voluntary labels on computers

Despite all the analysed labels have been available on the market at least in the past three years, only TCO and EPEAT have been able to reach a good level of market uptake in Europe (Table 2). Currently there are no computers registered neither under the EU Ecolabel nor under the Blue Angel.

Type of computer	Number of certified models			
	EPEAT	TCO v.8	Blue Angel	EU Ecolabel
Notebooks	135	48	0	0
Desktop Computers	90	21	0	0
Integrated Desktop Computers	42	23	0	0
Tablets	5	1	0	0

Table 2. Computer models certified in the EU under different voluntary labels (June 2019).

Identified information criteria

Based on the analysis of existing criteria, the following types of information on repair have been compiled (Table 3):

- Information on the availability of professional repair services;
- Instructions on how to identify failures;
- Instructions on data erasure;
- Information on replaceable components and skills needed;
- Information on the availability of spare parts;
- Disassembly instructions (for battery and/or other key components);
- Self-repair implication on computers warranty.

The implementation of such information differs from initiative to initiative as described in the sections below.

Availability of professional repair services

Information on the availability of professional repair services is required by EPEAT, EU Ecolabel, Repair Scoring system. This information should let the user know where to find professional services for the repair and upgrade of the computer.

Instructions on how to identify failures

It can include troubleshooting instructions, software diagnostic tools (e.g. battery health tools), troubleshooting videos or other troubleshooting guidance. The provision of instructions to identify failures is optional under EPEAT while this prescription is considered as a pass/fail criterion in the application of the Repair Scoring System to laptops.

Type of information	**ECD**	**GPP**	**EL**	**TCO**	**BA**	**EPEAT**	**RSS**
Availability of professional repair services			X			X	X
How to identify failures						X	X
Instructions on data erasure				X		X	X
Replaceable components and skills needed	X					X	X
Information on the availability of spare parts		X			X	X	X
Disassembly instructions		X	X	X	X	X	X
Self-repair implication on computers warranty		X					X

Note:
- ECD = Ecodesign
- GPP = EU Green Public Procurement
- EL = EU Ecolabel
- TCO = TCO Certified
- BA = Blue Angel
- EPEAT = EPEAT
- RSS = Repair Scoring System

Table 3. Information requirements included in different initiatives for computers.

Instruction on data erasure

By providing software that wipes the storage of the device, the computers owners can more safely send out products for repair (TCO 2018a, b, c, d). TCO requires that manufacturers, in case data erasure software is not preinstalled on the product, provide the link to download the software on their webpage. EPEAT includes this requirement as optional. According to the Repair Scoring System, the data erasure software has to be provided (either pre-installed or as web-link), and complemented by information for installation.

Information on replaceable components and skills needed

According to the current Ecodesign Regulation for computers, manufacturers have to disclose whether the battery (notebook) cannot be easily replaced by users themselves. This information has to be made available on a free-access website and on the external packaging of the notebook computer. EPEAT explicitly requires a statement from manufacturers about the possibility to replace batteries; the other ecolabels require other components to be replaceable as well (see Table 3). Despite the initiatives analysed require a design of replaceable components (see Table 3) there is no obligation to disclose this information, except from battery for EPEAT. A repair scoring system label could address this aspect.

Information on available spare parts

Transparent information and procedures on how to obtain spare parts are required by Blue Angel, EPEAT and Repair Scoring System. EU GPP criteria include the declaration of the spare parts that will be made available to the contracting authorities. More comprehensive information on their availability period, price, functional specifications and compatibility is awarded through the Repair Scoring System.

Disassembly instructions

EU GPP, Ecolabel and TCO require that the disassembly information for the key components should be made publicly available. EPEAT includes the availability of this information as an optional criterion, while the Repair Scoring System requires disassembly information available to professional repairers as entry level. The list of replaceable components varies depending on the initiative considered. Instructions on how to replace the battery must be publicly available according to TCO, EU Ecolabel and Blue Angel, while EPEAT require, as an alternative, providing information on how to obtain and replace the battery. The Repair Scoring System requires, in addition, that functional specifications and compatibility with other products of parts (such as batteries and external power supplies) is made available.

Information on self-repair implication on computers warranty

Some warranty clauses can affect the actual possibility of repairing the product. EU GPP criteria require confirming which parts are covered by service agreements under the warranty. A product is considered to score points under the Repair Scoring System only if

the warranty is ensured for the entire product. The Repair Scoring System also requires to inform consumers about any implications of self-repair or non-professional repair for the safety of the end-user and for the legal guarantee (and when applicable also to the commercial guarantee).

Availability of information to different target groups and communication vehicles

Depending on its level of sensitiveness, the information reported above can be accessible to different target groups. The voluntary labels analysed require, whenever an information requirement is included, to have information accessible to the generic public (i.e. all possible users). A graded approach is presented in the Repair Scoring System, where information to carry out a repair has to be made available to professionals (either authorised repair centres or qualified independent repairers) in order to enter the assessment framework (corresponding to a minimum requirement under Ecodesign); higher scores are then assigned in case relevant information is made publicly available.
Different communication vehicles can be used including external packaging, publicly accessible websites and manuals (e.g. service / repair or user manuals). This wide range of information sources and vehicles could make difficult the comparison of products, especially at the decision stage (e.g. the point of sale).

Conclusions

This research shows a spectrum of repair information and instructions required by different policy tools and voluntary labels for computers.
As "entry level" in the EU market, the Ecodesign regulation obliges manufacturers to inform consumers about the skills needed to replace a notebook battery. However, the ongoing revision of the EU regulation 617/2013 could introduce a more ambitious set of mandatory information supporting the repair of computers, as already done for related product groups (e.g. servers, displays).
Among the voluntary labels analysed it is evident that only those more oriented to business to business procurement have been able to reach a good level of market penetrations.
Type I Ecolabels (such as TCO, the Blue Angel and the EU Ecolabel) aim to award the best environmental performing products on the market that are, together with other characteristics, repairable. These ecolabels aim to ensure the reparability of key components and require providing comprehensive information available to the end-users (e.g. contacts of professional repairers, disassembly instructions, information on the availability of spare parts).
EPEAT, although characterized by a less ambitious entry level, can stimulate the market by qualifying the products according to the different level of ambitions reached (bronze/silver/gold). The best performing products meet optional criteria such as the provision of detailed disassembly instructions, diagrams and the availability of troubleshooting instructions in a publicly accessible website.
A similar approach is proposed in the Repair Scoring System, where an entry level is associated to the availability of repair information limited to professional independent repairers. A potential label based on the Repair Scoring System would have the advantages of addressing specifically reparability issues and being more complete and granular in terms of requirements. However, how to best communicate this information with consumers is still under discussion.
In this context, and in absence of further initiatives, consumers could still have some difficulties in the access to reparability information, especially in the purchase decision stage.
This work, showing examples and results achieved by voluntary labels and initiatives established in the EU market, can serve decision makers as guidance for a broader and harmonized diffusion of repair information. This could support the formulation of relevant policies and strategies allowing more sustainable purchase decisions of consumers and public administrations.

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