



J R C T E C H N I C A L R E P O R T S

# Development of European Ecolabel and Green Public Procurement Criteria for Personal & Notebook Computers

TECHNICAL REPORT, TASK 5  
**Criteria Proposals**  
(Draft) Working Document

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## 1. INTRODUCTION

This document is intended to provide the background information for the revision of the Ecolabel criteria for Personal and Notebook Computers and the development of Green Public Procurement (GPP) criteria for this product group. The study has been carried out by the Joint Research Centre's Institute for Prospective Technological Studies (JRC-IPTS) with technical support from the Öko-Institut. The work is being developed for the European Commission's Directorate General for the Environment. The main purpose of this document is to evaluate the current criteria and discuss if the criteria are still relevant or should be revised, restructured or removed. This document is complemented and supported by the preliminary report, which consists of a series of task reports addressing:

- the scope and legislative analysis (Task 1 report),
- market analysis (Task 2 report),
- technical analysis (Task 3 report)
- the improvement potential (Task 4 report)

Furthermore, during the course of the revision process two questionnaires were sent out to selected stakeholders. The target groups were industry, Member States, NGOs and research institutions. The specific information, views and suggestions arising from questions about the scope, improvement potential and criteria revision were reflected mainly in the Task 1 and Task 4 reports and taken into consideration as far as possible in the proposals for the criteria revision.

For each criterion a box indicating any major changes proposed and a direct comparison of the current and proposed criteria is provided. After each box a discussion of the rationale for the proposed change (or not) to the criterion is made. Proposals for new criteria have also been made together with the rationale behind each proposal.

The intention is that this technical report will be updated during the criteria development process based on new information, stakeholder inputs or input from the Ad-Hoc Working Group (AHWG) meetings.

The final technical report will bring together the scientific arguments for the proposed new criteria document before being voted upon by the EU Ecolabelling Board.

*The current scope of the EU Ecolabel criteria document for Desktop and Notebook Computers*

Currently, two separate sets of Ecolabel criteria exist for personal computers (Commission Decision 2011/337/EU) and notebook computers (Commission Decision 2011/330/EU). They consist of fifteen and fourteen criteria for personal and notebook computers respectively which are listed in Table 1.

**Table 1: Current Ecolabel criteria for Personal and Notebook Computers according to Commission Decisions 2011/337/EU and 2011/330/EU**

<b>Current EU ecolabel criteria for “Personal Computers”</b>	<b>Current EU ecolabel criteria for “Notebook Computers”</b>
Criterion 1 – Energy savings	Criterion 1 – Energy savings
Criterion 2 – Power management	Criterion 2 – Power management
Criterion 3 – Internal power supplies	---
Criterion 4 – Mercury in fluorescent lamps	Criterion 3 – Mercury in fluorescent lamps
Criterion 5 – Hazardous substances and mixtures	Criterion 4 – Hazardous substances and mixtures
Criterion 6 – Substances listed in accordance with Article 59(1) of Regulation (EC) No 1907/2006	Criterion 5 – Substances listed in accordance with Article 59(1) of Regulation (EC) No 1907/2006
Criterion 7 – Plastic parts	Criterion 6 – Plastic parts
Criterion 8 – Noise	Criterion 7 – Noise
Criterion 9 – Recycled content	Criterion 8 – Recycled content
Criterion 10 – User instructions	Criterion 9 – User instructions
Criterion 11 – User reparability	Criterion 10 – User reparability
Criterion 12 – Design for disassembly	Criterion 11 – Design for disassembly
Criterion 13 – Lifetime extension	Criterion 12 – Lifetime extension
Criterion 14 – Packaging	Criterion 13 – Packaging
Criterion 15 – Information appearing on the Ecolabel	Criterion 14 – Information appearing on the Ecolabel

The revised Ecolabel criteria document is proposed as covering both product groups; thus common criteria proposals for both personal computers and notebook computers have been developed, with differentiation made between technical product characteristics where necessary.

Furthermore, within the parallel revision processes for EU Ecolabel criteria for televisions and computers it has been discussed<sup>1</sup> to remove the product subcategory “computer display” from the current scope of the Ecolabel criteria for personal computers and move it to a revised scope of Ecolabel criteria for “Electronic Displays”, subsuming television sets, television monitors and external computer displays.

Thus, the following sections highlight the revised criteria proposals but exclude specific requirements for computer displays, which are be considered and presented within the Technical Report and Criteria Proposals for Televisions.

#### *The key environmental impacts associated with the product group*

Based on the LCA review presented in the Task 3 report the overall findings indicate that the production phase and the use phase are associated with the most significant environmental impacts during the life cycle of computer products.

Within the manufacturing phase of desktop PCs, specific environmental ‘hot spot’ components identified as being of significance are the motherboard and other Printed Wiring Boards of the desktop unit, the screen (LCD panel), as well as the power supply, CD ROM and the hard disk drive (HDD).

Within the manufacturing phase of notebooks, the production processes of the motherboard and the display have the most significant environmental impact, followed by battery production. One of the reasons is that critical raw materials are concentrated in these components, whose extraction and processing is associated with major material requirements, the transformation of land and the consumption of energy, and cause severe environmental impacts:

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<sup>1</sup> As stated in the previous technical report Task 1 of the revision process for the development of EU Ecolabel criteria for televisions, there is a functionality overlap between computer displays and television sets placed on the EU market. Computer displays are being used to watch content normally only viewed on televisions and television sets are increasingly enabled for web browsing. Thus, it is becoming more and more difficult to distinguish between the two product categories. In the current review process of the EU Ecodesign and Energy Labelling Regulations for televisions, the discussion paper proposed to change the scope from solely “televisions” to “electronic displays”, including television sets, television monitors, and external computer displays.

specifically silver, gold and palladium in the motherboard and other Printed Circuit Boards; indium and gallium in the display and background illumination, and cobalt in batteries.

The potential for the direct influence of ecolabel criteria on the production of single computer components is considered to be limited. However, by improving design (e.g. design for durability and disassembly) or indirectly by extending the lifetime or by reusing parts, the impacts of the manufacturing phase can be reduced as secondary resources from recycling or extended product lifetime avoid primary production stages. Thus, the allocation of benefits from re-use and recycling is an area specifically highlighted in Task 4 (improvement potential) and in the criteria proposals.

A number of issues are currently not addressed by the EU Ecolabel criteria although evidence exists for the potential environmental and / or social impacts (e.g. fluorinated greenhouse gases, conflict-metals). Proposals to include them in the revised criteria are provided in this technical report.

#### *The proposed framework for the revision*

The following table provides a proposal for a new schematic to cluster and allocate the existing as well as possible new criteria to certain thematic fields which reflect the identified hotspots for computers:

**Table 2: New proposed criteria cluster and allocation of sub-criteria for the revision of the Ecolabel criteria for personal and notebook computers**

<b>New proposed criteria cluster</b>	<b>Proposed allocation of sub-criteria</b>
<b>1 Energy consumption</b>	Criterion 1.1 – Energy savings
	Criterion 1.2 – Power management
	Criterion 1.3 – Internal power supplies
<b>2 Environmentally hazardous substances</b>	Will be presented in a separate document
<b>3 Life time extension</b>	Criterion 3.1 – Capability enhancement / upgradeability
	Criterion 3.2 – Lifetime of batteries
	Criterion 3.3 – HDD reliability
	Criterion 3.4 – Repairability
	Criterion 3.5 – Data deletion enabling second-hand usage
<b>4 End-of-life management: Design and material selection</b>	Criterion 4.1 – Material selection and material information
	Criterion 4.2 – Design for disassembly and recycling
	Criterion 4.3 – Packaging
<b>5 Corporate production / supply chain management</b>	Criterion 5.1 – Labour conditions during manufacture
	Criterion 5.2 – Emission of fluorinated GHG during LCD production
	Criterion 5.3 – Use of “conflict-free minerals” during production
<b>6 Further criteria</b>	Criterion 6.1 – Noise
	Criterion 6.2 – Ergonomics
<b>7 Information</b>	Criterion 7.1 – User instructions
	Criterion 7.2 – Information appearing on the Ecolabel

The following sections and criteria proposals follow the revised schema and criteria clusters in Table 2. Note: The final numeration of the single criteria could change in the course of discussions with stakeholders and the final decisions on the criteria.

## 2. PRODUCT GROUP DEFINITION

<b>Present scope, Decisions 2011/337 and 2011/330</b>
<p>The product group 'personal computers' shall comprise: desktop computers, integrated desktop computers, thin clients, displays and keyboards (as a stand-alone item) as defined in Article 2. Notebook computers, small-scale servers, workstations, gaming consoles and digital picture frames shall not be considered personal computers for the purpose of this Decision.</p>
<p>1. The product group 'notebook computers' shall comprise devices which have the following characteristics:</p> <p>(a) They perform logical operations and process data and are 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;</p> <p>(b) They utilise an integrated computer display and are capable of operation off an integrated battery or other portable power source. If a notebook computer is delivered with an external power supply this power supply is considered part of the notebook computer.</p> <p>2. For the purpose of this Decision, tablet personal computers, which may use touch-sensitive screens along with or instead of other input devices shall be considered notebook computers.</p> <p>3. Digital picture frames shall not be considered notebook computers for the purpose of this Decision.</p>

<b>Proposed scope</b>
<p>The product group 'computers' shall comprise: desktop computers, integrated desktop computers, notebook computers and tablet computers, thin clients, workstations, and small-scale servers. Gaming consoles and digital picture frames shall not be considered computers for the purpose of this Decision.</p>

### Major proposed changes

- The so far separate EU ecolabel criteria documents for personal computers and notebook computers to be subsumed under one criteria document.
- External computer displays are proposed to be excluded from the revised scope of the EU ecolabel for computers and moved within the revised scope of the Ecolabel criteria for "Electronic Displays", subsuming television sets, television monitors and external computer displays.
- Keyboards (as stand-alone item) are proposed to be excluded from the scope due to their minor relevance in comparison to the other product sub-categories.
- Workstations and small-scale servers are proposed to be included in the revised scope.

For more details cf. Task 1 report ("Scope and Definitions").

### 3. CURRENT CRITERIA AND PROPOSED CHANGES

#### 3.1 Cluster 1 – Energy Consumption

##### 3.1.1 Criterion 1.1 – Energy savings

Present criteria, Decisions 2011/337 and 2011/330
<p>(a) <i>Energy savings for desktop computers, integrated desktop computers and thin clients</i></p> <p>The energy efficiency performance of desktop and integrated desktop computers shall exceed the appropriate category energy efficiency requirements set out in the Agreement as amended by Energy Star v5.0 by at least the following:</p> <ul style="list-style-type: none"> <li>- category A: 40 %,</li> <li>- category B: 25 %,</li> <li>- category C: 25 %,</li> <li>- category D: 30 %.</li> </ul> <p>The energy efficiency performance of thin clients shall meet at least the energy efficiency requirements for thin clients set out by Energy Star v5.0.</p> <p>Capability adjustments allowed under the Agreement as amended by Energy Star v5.0 may be applied at the same level, except in the case of discrete graphics processing units (GPUs) where no additional allowance shall be given.</p> <p>(b) <i>Energy savings for computer displays</i></p> <p>The computer display's energy efficiency performance in active mode shall exceed the energy efficiency requirements set out in Energy Star v5.0 by at least 30%; computer display sleep mode power must not exceed 1 W; computer displays shall have an energy consumption in on-mode of ≤ 100 W measured when set to maximum brightness; computer monitor off mode power shall not exceed 0.5 W.</p> <p><u>Assessment and verification:</u> The applicant shall declare compliance of the product with these requirements to the competent body.</p>
<p><i>Energy savings for notebook computers</i></p> <p>The energy efficiency performance of notebook computers shall exceed the appropriate category energy efficiency requirements set out in the Agreement as amended by Energy Star v5.0 by at least: category A: 25%; category B: 25%; category C: 15%.</p> <p>Capability adjustments allowed under the Agreement as amended by Energy Star v5.0 may be applied at the same level, except in the case of discrete graphics processing units (GPUs) where no additional allowance shall be given.</p> <p><u>Assessment and verification:</u> The applicant shall declare compliance of the product with these requirements to the competent body.</p>

Proposed revised criteria
<p>The energy-efficiency performance of computers shall meet the appropriate energy-efficiency requirements set out in the Agreement as amended by Energy Star v6.0.</p> <p>Tablet computers shall be exempted from energy savings requirements.</p> <p><u>Assessment and verification:</u> The applicant shall declare compliance of the product with these requirements to the competent body.</p>

### Major proposed changes

- The criteria for energy savings are proposed to be aligned to the forthcoming new Energy Star program requirements for computers, version 6.0 which shall be effective from 28 April 2014.
- The differences with Energy Star (exclusion of additional allowances for discrete graphics processing units (GPUs)) have been removed.
- As tablet PCs (slate computers) are not covered by Energy Star v6.0 and as this product sub-group does not consume much electricity (estimated at around 4 kWh/year) it is proposed to exempt tablet PCs from the requirements on energy savings.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.1.1 “energy efficiency”.

#### **Consultation questions**

- Should the criterion on energy savings include a dynamic approach in order to better react to market developments with regard to energy efficiency gains?
  1. Variant: “The energy-efficiency performance of computers shall meet the appropriate energy-efficiency requirements set out in the Agreement as amended by the most recently published Energy Star standard for computers on the date of application.”
  2. Variant: No later than 2 years after the criteria for EU Ecolabel for Computers have entered into force, the Commission shall evaluate the market penetration of Computers meeting the criterion on “energy efficiency requirement of Energy Star V6.0” and, if justified, present to the EUEB and Regulatory Committee an amendment of this criterion.
  3. Variant: “The energy-efficiency performance of computers shall meet and exceed the appropriate energy-efficiency requirements set out in the Agreement as amended by Energy Star v6.0 as follows:
    1. One year from the date of adoption of the Decision: 5-10% (tbd)
    2. Two years from the date of adoption of the Decision: 10-20% (tbd)”

### 3.1.2 Criterion 1.2 – Power management

#### **Present criteria, Decisions 2011/337 and 2011/330**

The computer shall comply with the following power management requirements <sup>(1)</sup>:

(a) Power management requirements

Personal computers shall be shipped with the power management system enabled at the time of delivery to the customers. Power management settings shall be:

- (i) 10 minutes to screen off (display sleep);
- (ii) 30 minutes to computer sleep (system level S3, suspended to RAM) <sup>(2)</sup>.

(b) Network requirements for power management

- (i) Personal computers with Ethernet capability shall have the ability to enable and disable

**Present criteria,  
Decisions 2011/337 and 2011/330**

wake on LAN (WOL) for sleep mode.

(c) Network requirements for power management (applies to personal computers shipped through enterprise channels only)

(i) Personal computers with Ethernet capability must meet one of the following requirements<sup>(3)</sup>:

- be shipped with WOL enabled from the sleep mode when operating on AC power, or
- provide control to enable WOL that is sufficiently accessible from both the client operating system user interface and over the network if computer is shipped to enterprise without WOL enabled.

(ii) Personal computers with Ethernet capability shall be capable of both remote (via network) and scheduled wake events from sleep mode (e.g. real time clock). Manufacturers shall ensure, where the manufacturer has control (i.e. configured through hardware settings rather than software settings), that these settings can be managed centrally, as the client wishes, with tools provided by the manufacturer.

Assessment and verification: The applicant shall provide the competent body with a declaration to certify that the computer has been shipped in the power management settings stated above or better.

<sup>(1)</sup> As defined in Energy Star v5.0 except for display sleep requirement.

<sup>(2)</sup> Not applicable to Thin Clients.

<sup>(3)</sup> Thin clients — only applies if software updates from the centrally managed network are conducted while the unit is in sleep or off mode. Thin clients whose standard framework for upgrading client software does not require off-hours scheduling are exempt from the requirement.

Notebook computers shall comply with power management requirements<sup>(1)</sup> as follows:

(a) Power management requirements

Notebook computers shall be shipped with the power management system enabled at the time of delivery to the customers. Power management settings shall be:

- (i) 10 minutes to screen off (display sleep);
- (ii) 30 minutes to computer sleep (system level S3, suspended to RAM).

(b) Network requirements for power management

(i) Notebook computers with Ethernet capability shall have the ability to enable and disable Wake on LAN (WOL) for sleep mode.

(c) Network requirements for power management (applies to notebook computers shipped through enterprise channels only)

(i) Notebook computers with Ethernet capability shall meet one of the following requirements:

- be shipped with Wake On LAN enabled from the sleep mode when operating on AC power, or
- provide control to enable WOL that is sufficiently-accessible from both the client operating system user interface and over the network if notebook computer is shipped to enterprise without WOL enabled.

(ii) Notebook computers with Ethernet capability shall be capable of both remote (via network) and scheduled wake events from Sleep mode (e.g. Real Time Clock). Manufacturers shall ensure, where the manufacturer has control (i.e. configured through hardware settings rather than software settings), that these settings can be managed centrally, as the client wishes, with tools provided by the manufacturer.

Assessment and verification: the applicant shall provide the competent body with a declaration to certify that the computer has been shipped in the power management settings stated above or better.

<sup>(1)</sup> As defined in Energy Star v5.0 except for display sleep requirement.

#### Proposed revised criteria

Computers shall comply with power management requirements as defined in Energy Star v6.0 except for display sleep requirement.

Display sleep: Power management settings for display sleep shall be 10 minutes to screen off.

Tablet computers shall be exempted from power management requirements.

*Assessment and verification:* the applicant shall provide the competent body with a declaration to certify that the computer has been shipped in the power management settings stated above or better.

#### Major proposed changes

- The criteria for power management are proposed to be aligned to the forthcoming new Energy Star program requirements for computers, version 6.0 which shall be effective from 28 April 2014.
- As tablet PCs (slate computers) are not covered by Energy Star v6.0 and as this product sub-group does not consume much electricity (estimated at around 4 kWh/year) it is proposed to exempt tablet PCs from the requirements on power management.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.1.2 “power management”.

#### Consultation questions

- Should the current, stricter power management settings for display sleep (after 10 minutes instead of 15 minutes as required by Energy Star) be kept in the revised criteria?
- Are there any additional software solutions that can be pre-installed/promoted that provide more advanced guidance on power management for users, particularly for notebook users?

### 3.1.3 Criterion 1.3 – Internal power supplies

#### Present criteria, Decisions 2011/337 and 2011/330

Internal power supplies shall meet at least the energy efficiency requirements for internal power supplies set out by Energy Star v5.0.

*Assessment and verification:* The applicant shall declare the compliance of the product with these requirements to the competent body.

#### Proposed revised criteria

Internal power supplies of desktop PCs, integrated desktop PCs, desktop-thin clients, workstations and small-scale server shall meet at least the energy efficiency requirements of

- (a) 88% efficiency at 50% of rated output power;
- (b) 85% efficiency at 20% and 100% of rated output power;
- (c) Power factor = 0.9 at 100% of rated output power.

Internal power supplies with a maximum rated output power of less than 75W are exempted from the power factor requirement.

*Assessment and verification:* The applicant shall declare the compliance of the product with these requirements to the competent body. Additionally, a test protocol on the basis of the document “Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies, Revision 6.5” shall be provided to the competent body.

### Major proposed changes

- The criteria for internal power supplies are proposed to exceed those of the currently developed Energy Star program requirements for computers, version 6.0 which shall be effective from 28 April 2014. These correspond mostly to the so called 80plus-label, class bronze. For the revision, it is proposed to align the minimum requirements for internal power supplies to those of the 80plus-label, class silver, or possibly gold, as research suggests that there are a range of certified power supplies available in the market.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.1.3 “power supplies”.

## **3.2 Cluster 2 – Hazardous substances**

The research results from the background paper on hazardous substances in computers, displays and televisions has highlighted the need for an interpretation of Articles 6(6) and 6(7) of the Ecolabel Regulation (EC) 66/2010 that is workable for such complex products. These two Articles place restrictions on the presence of hazardous substances in ecolabelled products, using REACH and CLP as their main reference points.

The requirements of the Ecolabel Regulation have up until now been interpreted by a standard legal text addressing ‘hazardous substances and mixtures’ which has, since 2010, been added as a criteria for each product group. This can be seen in Criteria 5 of Decision 2011/337/EU for personal computers and Criteria 4 of Decision 2011/330/EU for portable computers (see below). This requirement has not yet been integrated into the television criteria.

### Defining computers as complex articles

A computer or television comprises a number of different articles, or components. For example, a desktop computer would include a monitor, keyboard, hard drive, DVD reader/writer and power cable. In accordance with the Ecolabel Regulation it could therefore be considered to be a 'complex article' (i.e. an article composed of many individual articles). A definition is suggested as being:

*'An object composed of an assembly of different articles which during production is given a special shape, design, structure and component configuration which determine its function to a greater degree than does its chemical composition or its constituent articles'*

The Ecolabel Regulation also refers to homogenous parts of a complex article which could be interpreted to homogenous plastic and metals components. Whilst no specific definition can be found in REACH or CLP, the RoHS Directive 2011/65/EU defines a homogenous material as:

*'one material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes'*

Components or homogenous parts of a complex article may also be treated with or incorporate chemical mixtures or additives that impart specific functions to the sub-component or the product. For example:

- circuit boards and plastic housings may be required to have flame retardant properties;
- Plastic housings may contain colorants such as pigments;
- Power cables may contain plasticizers such as phthalates;
- Solder may contain metals such as antimony and beryllium;
- Lithium ion batteries contain hazardous electrolyte but are fundamental in achieving long notebook and tablet battery lives.

This distinguishment between articles, complex articles and chemical mixtures is important because it will influence how hazards within a computer product are assessed and verified.

*Proposed approach to hazard screening and criteria development for computers*

Subject to discussion with stakeholders it is proposed to apply a new approach to the computer product group. This would follow an adapted version of the proposed approach developed by JRC-IPTS for the EU Ecolabel's Horizontal Task Force on Chemicals.

An initial screening has been carried out of the bill of components/materials (see section 2.4 of the Hazardous Substances paper) followed by an initial identification of substance groups by their function (see also section 2.5). This reflects the broad approach outlined in the box below.

Case studies and restricted substance listings have been collated that will then enable the state-of-the-art in hazard substitution to be defined for these substance groups.

Additional input will also be required from stakeholders in order to identify substitutions that have been made and also, if required, to identify derogations that may also be required if substitutions are not currently possible for technical reasons.

According to the Ecolabel Regulation derogations are only to be granted

*"in the event that it is not technically feasible to substitute them as such, or via the use of alternative materials or designs, or in the case of products which have a significantly higher overall environment performance compared with other goods of the same category,"*

*And furthermore, additional rules apply to Substances of Very High Concern:*

*"No derogation shall be given concerning substances that meet the criteria of Article 57 of Regulation (EC) No 1907/2006 and that are identified according to the procedure described in Article 59(1) of that Regulation, present in mixtures, in an article or in any homogeneous part of a complex article in concentrations higher than 0,1 % (weight by weight)."*

*Substitution proposal and derogation request forms will be circulated to stakeholders following the first Ad-Hoc Working Group meeting on the 10<sup>th</sup> October 2013.*

**Proposed approach to the hazard screening of complex articles**

- Identification of the main homogenous materials within the bill of materials i.e. metals, alloys, polymers, glass, ceramics;
- Alloys and polymers to which no potentially hazardous additives, coatings or treatments have been applied are proposed for exemption, with reference to Article 23 of Regulation (EC) No 1272/2008 and Annex I point 1.3.4;
- Identification of functional additives, coatings and treatments that are related to components of the complex article. These should then be screened for hazards and/or risk of potential release;
- Separate screening of hazards associated with the chemistry of batteries;
- The identification of relevant Candidate List and Article 57 substances by reference to industry declaration lists, European Commission initiatives (e.g. Endocrine disruptors) and Member State intentions;
- Check that the alloys and/or polymers to which hazardous additives or treatments have been applied would pass design for recycling/dismantling requirements (see the Cluster 4 criteria proposals).

*Screening and identifying substances and hazards*

As a starting point for an investigation on the functional level the table below presents a preliminary overview of computer substance groups by function, and gives example substances for each of them. *Feedback is required from stakeholders in order to complete their identification and where in the product they may arise.*

<b>Substance groups</b>	<b>Where in product?</b> <i>To be completed by means of stakeholder input</i>	<b>Substances (examples)</b>
Flame retardants	e.g. PWB, plastic casing, housing, connectors	<ul style="list-style-type: none"> <li>• TBBP-A</li> <li>• Hexabromocyclododekan (HBCDD),</li> <li>• tris(2-chloroethyl)phosphate (TCEP)</li> <li>• Short and medium chain chlorinated paraffins (SCCP and MCCP)</li> </ul>
Colorants / dye / pigments	e.g. Plastic casing	<ul style="list-style-type: none"> <li>• Antimony and its compounds;</li> <li>• Lead/lead compounds</li> <li>• Azo dyes</li> <li>• Lead chromate molybdate sulfate red (C.I. Pigment Red 104)</li> <li>• Lead sulfochromate yellow (C.I. Pigment Yellow 34)</li> </ul>
Solder		<ul style="list-style-type: none"> <li>• Antimony or bismuth and its compounds</li> <li>• Cadmium/cadmium compounds</li> </ul>
Catalysts : a) flame retardant catalyst		a) <ul style="list-style-type: none"> <li>• Antimony or beryllium and its compounds</li> </ul>

Substance groups	Where in product? <i>To be completed by means of stakeholder input</i>	Substances (examples)
b) curing catalyst for silicone resin and urethane resin		b) <ul style="list-style-type: none"> <li>• Dibutyltin (DBT)</li> <li>• Dioctyltin (DOT)</li> </ul>
Plasticizer		<ul style="list-style-type: none"> <li>• Phthalates (including DEHP, BBP, DINP, DIDP, DNOP, DHNUP, DIHP)</li> <li>• Short Chain Chlorinated Paraffins (SCCPs)</li> </ul>
Additives (e.g. in metal, glass and plastics)		<ul style="list-style-type: none"> <li>• Phthalates (plasticizers in plastics)</li> <li>• Arsenic compounds (in glass)</li> </ul>
Adhesives		<ul style="list-style-type: none"> <li>• Phthalates</li> </ul>
Anti-corrosion surface treatments		<ul style="list-style-type: none"> <li>• Cadmium/cadmium compounds</li> </ul>
Lubricants / Surfactant		<ul style="list-style-type: none"> <li>• Phthalates</li> <li>• Nonylphenol</li> <li>• Nonylphenoethoxylates</li> </ul>
Anti-microbial agents/coatings		<ul style="list-style-type: none"> <li>• Selenium and its compounds,</li> <li>• Triclosan</li> <li>• Organotins Tributyl tin oxide (TBTO) Dibutyltin dichloride (DBTC) Dibutyltin (DBT) Dioctyltin (DOT)</li> </ul>
Ceramics		<ul style="list-style-type: none"> <li>• Beryllium oxide (BeO)</li> </ul>
Electrolytes (in batteries)		<ul style="list-style-type: none"> <li>• Bis(2-methoxyethyl) ether</li> </ul>
Stabilizer		<ul style="list-style-type: none"> <li>• Cadmium/cadmium compounds</li> <li>• Lead/lead compounds</li> <li>• Dibutyltin (DBT) for PVC</li> <li>• Dioctyltin (DOT) for PVC</li> </ul>
Surface finish/treatment: Ink, paint, plating <sup>2</sup> ; anti-corrosion layer		<ul style="list-style-type: none"> <li>• Cadmium/cadmium compounds</li> </ul>
Fluorescence		<ul style="list-style-type: none"> <li>• Cadmium/cadmium compounds</li> </ul>

Relevant substance restrictions arising from this exercise would then be entered into a restricted substance list. This list would be specified to reflect the state-of-the-art within industry and ecolabel substance restrictions. It is likely that in the process the

<sup>2</sup> Surface covering in which a metal is deposited on a conductive surface

list would remove a range of hazards from the computer product, including Article 57 and 59 (Candidate List) SVHC's.

The list could be structured with reference to electronics industry declaration protocols such as the Joint Industry Guide (JIG) and IEC 62474. For example, the JIG establishes three criteria that determine whether substances shall be declared:

- **Criteria 1 – R (Regulated)**  
Substances that are subject to enacted legislation that (a) prohibits their use; or (b) restricts their use; or (c) requires reporting or results in other regulatory effects (e.g. RoHS).
- **Criteria 2 – A (For Assessment Only)**  
Substances that are likely to be subject to enacted legislation (e.g. Authorisation under REACH of SVHC's) but where the substance specific effective dates of the regulatory requirements are uncertain.
- **Criteria 3 – I (For Information Only)**  
Substances that are not regulated but where there is a recognised market requirement for reporting their content in computer products (e.g. to be in compliance with ecolabel criteria).

Substances used within computers would then need to be screened for the hazards listed in the table below. The preferred approach would be to screen at substance group level which, as illustrated by screening exercises in the background paper comparing flame retardants, allows for the comparison of substitutes. Given the complexity of the products existing studies will be used as far as possible.

<b>Acute toxicity</b>	
<b>Category 1 and 2</b>	<b>Category 3</b>
H300 Fatal if swallowed (R28)	H301 Toxic if swallowed (R25)
H310 Fatal in contact with skin (R27)	H311 Toxic in contact with skin (R24)
H330 Fatal if inhaled (R23/26)	H331 Toxic if inhaled (R23)
H304 May be fatal if swallowed and enters airways (R65)	EUH070 Toxic by eye contact (R39/41)
<b>Specific target organ toxicity</b>	
<b>Category 1</b>	<b>Category 2</b>
H370 Causes damage to organs (R39/23, R39/24, R39/25, R39/26, R39/27, R39/28)	H371 May cause damage to organs (R68/20, R68/21, R68/22)
H372 Causes damage to organs (R48/25,	H373 May cause damage to organs (R48/20,

R48/24, R48/23)	R48/21, R48/22)
<b>Respiratory and skin sensitisation</b>	
<b>Category 1a</b>	<b>Category 1b</b>
H317: May cause allergic skin reaction (R43)	H317: May cause allergic skin reaction (R43)
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled (R42)	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled (R42)
<b>Carcinogenic, mutagenic or toxic for reproduction</b>	
<b>Category 1a and 1b</b>	<b>Category 2</b>
H340 May cause genetic defects (R46)	H341 Suspected of causing genetic defects (R68)
H350 May cause cancer (R45)	H351 Suspected of causing cancer (R49)
H350i May cause cancer by inhalation (R49)	
H360F May damage fertility (R60)	H361f Suspected of damaging fertility (R62)
H360D May damage the unborn child (R61)	H361d Suspected of damaging the unborn child (R63)
H360FD May damage fertility. May damage the unborn child (R60, R60/61)	H361fd Suspected of damaging fertility. Suspected of damaging the unborn child (R62/63)
H360Fd May damage fertility. Suspected of damaging the unborn child (R60/63)	H362 May cause harm to breast fed children (R64)
H360Df May damage the unborn child. Suspected of damaging fertility (R61/62)	
<b>Hazardous to the aquatic environment</b>	
<b>Category 1 and 2</b>	<b>Category 3 and 4</b>
H400 Very toxic to aquatic life (R50)	H412 Harmful to aquatic life with long-lasting effects (R52/53)
H410 Very toxic to aquatic life with long-lasting effects (R50/53)	H413 May cause long-lasting effects to aquatic life (R53)
H411 Toxic to aquatic life with long-lasting effects (R51/53)	
<b>Hazardous to the ozone layer</b>	
EUH059 Hazardous to the ozone layer (R59)	

### Assessment and verification

Assessment and verification procedures would then need to be specified. It is proposed that these should reflect the supply chain management practices of front runner manufacturers and selected ecolabels with experience in this area (see 3.3.3). Initial findings from industry and ecolabel case studies suggest that this could include declarations for specific sub-components obtained from tier 1 suppliers and random analytical testing for specific substances or chemistries.

**Present criteria,  
Decisions 2011/337 and 2011/330**

**“Hazardous substances and mixtures”**

In accordance with Article 6(6) of Regulation (EC) No 66/2010 the product or any part of it shall not contain substances referred to in Article 57 of Regulation (EC) No 1907/2006 nor substances or mixtures meeting the criteria for classification in the following hazard classes or categories in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council.

List of hazard statements and risk phrases: *see equivalent listing above*

The use of substances or mixtures which change their properties upon processing (e.g. become no longer bioavailable, undergo chemical modification) so that the identified hazard no longer applies is exempted from the above requirement.

Concentration limits for substances or mixtures meeting the criteria for classification in the hazard classes or categories listed in the table above, and for substances meeting the criteria of Article 57(a), (b) or (c) of Regulation (EC) No 1907/2006, shall not exceed the generic or specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008. Where specific concentration limits are determined, they should prevail over the generic ones.

Concentration limits for substances meeting criteria of Article 57(d), (e) or (f) of Regulation (EC) No 1907/2006 shall not exceed 0,1 % weight by weight.

The following substances/uses of substances are specifically derogated from this requirement:

Homogenous parts with weight below 10 g: Nickel in stainless steel

Assessment and verification: for each part above 10 g the applicant shall provide a declaration of compliance with this criterion, together with related documentation, such as declarations of compliance signed by the suppliers of substances and copies of relevant Safety Data Sheets in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures.

Concentration limits shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006 for substances and mixtures.

**“Substances listed in accordance with Article 59(1) of Regulation (EC) No 1907/2006”**

No derogation from the exclusion in Article 6(6) may be given concerning substances identified as substances of very high concern and included in the list foreseen in Article 59 of Regulation (EC) No 1907/2006, present in mixtures, in an article or in any homogenous part of a complex article in concentrations higher than 0,1 %. Specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008 shall apply in case it is lower than 0,1 %.

Assessment and verification: the list of substances identified as substances of very high concern and included in the candidate list in accordance with Article 59 of Regulation (EC) No 1907/2006 can be found here:

[http://echa.europa.eu/chem\\_data/authorisation\\_process/candidate\\_list\\_table\\_en.asp](http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp)

Reference to the list shall be made on the date of application.

The applicant shall provide a declaration of compliance with this criterion, together with related documentation, such as declarations of compliance signed by the suppliers of substances and copies of relevant Safety Data Sheets in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures. Concentration limits shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006 for substances and mixtures.

### Proposed structure for the revised criteria

#### “Substitution of hazardous substances and mixtures in computers”

The following structure is proposed for the criteria, which will also need to include the standard hazard listing and a legal reference to the requirements in the Ecolabel Regulation 66/2010:

- (a) Restricted substances in computers: A list would be compiled based on best practice by manufacturers and, as far as possible,
  - Article 57 substances that have already been/are in the process of being substituted by leading manufacturers.
  - The listing would be appended as an appendix of the Ecolabel Decision. The listing would include the Article 6(6)/6(7) requirement to exclude Candidate List SVHC's and Article 57 substances.
- (b) Derogation framework: If the need for derogations is identified then these will, as far as possible, be structured according to the function of the substance and/or the relationship of the substance to a specific sub-component within a computer.
  - Derogations will only be permitted for specific hazards if, after a screening of substance group substitutions, they are required.
  - The hazards derogated would be defined by the hazard profile and market status of substitution options.
  - Derogation conditions would be set that would be related to the point in the life cycle of the product where the hazard is most relevant.
- (c) Assessment and verification: This would be specified for the restricted substance listing and for the derogation framework (if required).
  - It is to be discussed if a restriction list could be verified by random analytical testing and if so the frequency of this testing.
  - It is to be discussed the level at which verification of the classification/non-classification of substance groups within products could be workable. One possibility is for declarations to be obtained from tier 1 component suppliers.

### Consultation questions

- Could the overall approach, combining a substance list and a substance group approach to hazard screening and substitution/derogation, be workable for this product group?
- Are there other screening studies and/or examples of (implemented) substitution projects that we have not covered in the background report?
- What can be learnt from the experience of applicants/competent bodies for other ecolabels which have similar criteria? e.g. EPEAT, TCO
- Based on the experience of industry and existing ecolabels could the approach to assessment and verification be workable? Are there other examples of how this can work in a way that provides a high level of assurance?

**3.3 Cluster 3 – Lifetime extension**

The research results of Task 3 and Task 4 revealed that attention should be paid to the extension of the lifetime of computers in order to reduce the overall environmental impacts caused by ever shorter lifecycles, primary extraction and manufacturing processes.

In the current criteria documents, requirements that influence the lifetime of computers are spread across different discontinuous criteria. To illustrate the importance of lifetime extension for computers, for the revision it is proposed to cluster the associated criteria, complementing them by some new proposals.

**3.3.1 Criterion 3.1 – Capability enhancement / upgradeability**

<p><b>Present criteria, Decisions 2011/337 and 2011/330</b></p>
<p><b>“Lifetime extension”:</b>            Personal computers shall have facilities that enable the following:                (i) Exchangeable and upgradeable memory and graphic cards;                (ii) Expansion capability: presence of at least four USB interfaces            Notebook computers shall have facilities that enable the following:                (i) Exchangeable and upgradeable memory                (ii) Expansion capability: presence of at least three USB interfaces as well as a connection for an external monitor.            The computer shall also be designed so that major components (including memory drives, CPUs and cards) can be exchanged and/or upgraded easily by the end-user. For example using snap, slide in/slide out or cartridge-style housing for components.  <u>Assessment and verification:</u> The applicant shall declare the product’s compliance with these requirements to the competent body.</p>

<p><b>Proposed revised criteria</b></p>
<p><b>Capability enhancement / upgradeability</b>            Computers shall have the following facilities to enable easy exchange to upgrade major components without the use of special tools by the end-user:                (i) Desktop PCs:                    • Presence of at least 4 USB interfaces.                    • Installation and/or exchange of memory (for thin clients only applicable if equipped with a processor), storage capacity (not applicable to thin clients) and optical drives (not applicable to thin clients).                (ii) Notebook PCs:                    • Presence of at least 3 USB interfaces as well as a connection for an external monitor                    • The memory shall be exchangeable or upgradeable.                    • Presence of a modular bay for an extra battery.                (iii) Tablet PCs:</p>

#### Proposed revised criteria

- Presence of at least 1 USB interface.
- Support for external monitor, keyboard and mouse.
- The memory shall be exchangeable or upgradeable.

*Assessment and verification:* The applicant shall declare the compliance of the product with these requirements to the competent body.

#### Major proposed changes

- The components required to be upgradeable shall be defined more clearly to take into account major technical developments (to-date, certain components are not separately exchangeable any more).
- New: Inclusion of specific requirements for tablet computers.
- New: Notebooks shall provide a modular bay for an extra battery as this provides potential advantages in terms of lifetime extension and material efficiency (additional battery capacity, availability of battery spare parts, modular bay also usable for other applications, e.g. optical drives).

For more details cf. Task 4 report “Improvement Potential”, section 4.2.3.1 “expansion capability” and section 4.2.3.2 “upgradeability”.

#### Consultation questions

- Expansion capability: Are there any other technical solutions (USB host, hub, thunderbolt etc.) instead of a certain number of standard USB interfaces fulfilling the same requirement and therefore justifying a different formulation of the criterion?
- Is there any possibility for upgrading graphic cards, CPUs or other significant components? Are there differences between Desktop and Notebook PCs?

#### 3.3.2 Criterion 3.2 – Lifetime of batteries

For notebook computers and tablet computers, the lifetime of the rechargeable batteries is a crucial and limiting factor to the overall lifetime of the whole product. Thus, the following new criteria are proposed for inclusion in the revised criteria documents for computers (user instructions on factors influencing the lifetime of batteries; application of a test method to ensure a minimum battery capacity for ecolabelled computer products).

For more details cf. Task 4 report “Improvement Potential”, section 4.2.3.4 “Life-time of individual components”.

## Proposed new criteria

### Lifetime of batteries

Notebook computers and tablet computers shall have the following facilities to enable lifetime extension of rechargeable batteries:

- (i) Information should be included in the user instructions and the manufacturer's website to let the user know the factors influencing the lifetime of batteries as well as instructions for the user facilitating its prolongation.

**Assessment and verification:** The applicant shall declare the compliance of the product with these requirements and shall provide a copy of the instruction manual to the competent body. These user instructions should then be preloaded onto the notebook or tablet computer for the user to read and available for access on the manufacturer's website.

## Consultation questions

### A test method to ensure a minimum battery capacity

In Germany, as part of revising the Blue Angel ecolabel criteria for mobile phones, the following test procedure has been applied in order to derive minimum requirements regarding the lifetime of rechargeable lithium batteries:

Four different batteries per size and type shall be tested. All four tested batteries shall meet the requirements of the following test method.

#### Test Method:

C is the rated capacity given on the battery in ampere hours (Ah) as maximum capacity. The test starts (quasi the 'zeroth' cycle) with a discharge at 0.2 C until the cut-off voltage is reached (according to IEC/EN 61960: specified voltage under load where the discharge of one cell or battery is completed). The subsequent repeated charge and discharge shall be done in accordance with the specifications listed in the following tables. Different requirements are set for different applications.

#### Test Specifications for Rechargeable Lithium Batteries:

Cycle No.	Charge	Rest period after charge	Discharge	Rest period after discharge
1-399	Manufacturer specification	30 minutes	1.0 C to cut-off voltage	30 minutes
400	Manufacturer specification	1 hour	0.2 C to cut-off voltage	

The minimum discharge time for cycle 400 shall be 3.5 hours and the capacity delivered during cycle 400 shall be equal to 70 % of the rated capacity.

#### Applied Test Specification for Rechargeable Lithium Batteries in Blue Angel ecolabel requirements for Mobile Phones:

Cycle No.	Charge	Rest period after charge	Discharge	Rest period after discharge
1-149	Manufacturer specification	30 minutes	1.0 C to cut-off voltage	30 minutes
150	Manufacturer specification	1 hour	0.2 C to cut-off voltage	

The minimum discharge time for cycle 150 shall be 3.5 hours and the capacity delivered during cycle 150 shall be equal to 90 % of the rated capacity.

**Consultation question:** Discussion if one of the above introduced test specifications for rechargeable Lithium Batteries can also be required by the EU Ecolabel for notebook PCs and tablet PCs.

### 3.3.3 Criterion 3.3 – HDD reliability

Hard disk drives (HDD) are one of the computer components where according to WRAP (2011)<sup>3</sup> the most common faults are reported by several studies and product surveys. It is also understood that there can be significant variations in the reliability of HDD products. Several HDD products reviewed, as well as examples of OEM procurement procedures for HDD, specify the reliability of HDD using metrics such as ‘Mean Time Between Failures’ and ‘Operating Shock’.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.3.4 “Life-time of individual components”.

#### Consultation questions

- Besides criteria regarding easy access for repairability (see next section) it should be discussed the feasibility of an Ecolabel criterion requiring a standardised test method being applied comparably indicating the reliability of HDD, for example using the indicators “Mean time between failures (MTBF)”, “Annualised Failure Rate (AFR)” or others relating to simulated environmental stresses such as ‘operating shock’.

### 3.3.4 Criterion 3.4 – Repairability

To avoid an early replacement of the whole computer in the case of defective single components, the repairability of products is a major factor that can facilitate a lifetime extension. Thus it is proposed to place a focus on the revision of this criterion.

#### Present criteria, Decisions 2011/337 and 2011/330

##### “User repairability”:

The applicant shall provide clear instructions to the end-user in the form of a manual (in hard or soft copy) to enable basic repairs to be undertaken. The applicant shall also ensure that spare parts are available for at least five years from the end of production of the personal computer and/or computer monitor / notebook computer.

Assessment and verification: The applicant shall declare the product’s compliance with these requirements to the competent body together with a copy of the repair manual.

#### Proposed revised criteria

##### Repairability:

For the purpose of undertaking repairs and replacements of worn out parts, or to upgrade older parts and components, the following criteria shall be fulfilled:

<sup>3</sup> See <http://www.wrap.org.uk/sites/files/wrap/Laptop%20case%20study%20AG.pdf>

- (a) Design for repair: All major repairable/replaceable components of computers, if applicable, such as hard drive, CD/DVD and Blue-ray drive, printed circuit board, memory, screen assembly, LCD backlight, keyboard, mouse pad, rechargeable battery, cooling fan, catches and hinges shall be easily accessible and exchangeable by the use of universal tools (i.e. widely used commercially available tools).  
*As a minimum the following should be used: simple access panels provided for key components and screw numbers minimised (e.g. by lugs and slots). Screw heads standardised with no more than three head sizes. Removable electrical connectors (e.g. clip or screw) should be used rather than soldered or crimped joints where access is required. The following should not be used: self-tapping screws, irreversible snap-fits or adhesives where access is required. Tamper-proofing (such as plastic covers or labels) should only be used to ensure authorised repair under warranty and should not inhibit other repairs outside of the warranty period.*
- (b) Repair manual: The applicant shall provide clear instructions in form of a repair manual (in hard or soft copy) to enable replacing of these key components.
- (c) Availability of spare parts: The applicant shall ensure that spare parts, including rechargeable batteries (if applicable), are available for at least five years following the end of the computer model production.
- (d) Reasonable repair costs: The applicant shall ensure that the cost of individual spare parts is less than 20% (LCD assembly: less than 60%) of the cost of a new machine.
- (e) Repair Service / Information: Information should be included in the user instructions or the manufacturer's website to let the user know where to go to obtain professional repairs and servicing of the computer, including contact details as appropriate.

Assessment and verification: The applicant shall declare the compliance of the product with these requirements to the competent body. Additionally, the applicant shall provide

- A copy of the repair manual
- A copy of the user instructions
- A list with prices of available spare parts.

### Major proposed changes

- The link to the end-user has been removed; today's products become increasingly complex and often the right to claim under guarantee becomes invalid when repairs are executed by persons who are not authorised.
- Design for repair: Detailed requirements for major components that shall be easily exchangeable have been included. The focus is instead on those components that appear to have a high failure rate. The term "easily accessible and exchangeable" has been illustrated with clear examples.
- A new criterion on reasonable repair costs has been proposed in order to avoid costs of single spare parts being more expensive than the purchase of a whole new computer product.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.3.3 “Repairability / Warranty / Service”.

#### Consultation questions

- In general: does a commercial guarantee in case of products’ defects facilitate the repair, i.e. lifetime prolongation, or are the defect devices simply being exchanged for new products?
- Should an additional commercial guarantee by the brand owner be required (e.g. TCO: 1 year, EPEAT: 3 years)?

#### 3.3.5 Criterion 3.5 – Data deletion

Second hand usage can prolong the overall usage and lifetime of computers.

However, a barrier to IT devices being given for second hand usage could be the end-users’ concern on possible misuse of private data still stored in the devices.

Thus, a new criterion on data deletion is proposed.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.3.5 “Second hand usage / secure data wiping”.

#### Proposed new criteria

##### Data deletion:

- To allow a second use of the computer, the device shall be designed so as to allow the user to completely and safely delete all personal data by himself without the help of fee-required software or special tools. This can be achieved by either physically removing the data storage (e.g. memory card, Hard Disk Drive) or with the help of software provided by the manufacturer or a third party free of charge. When using software, the deletion process shall at least include an overwriting of all the data stored with a random pattern. Software solutions from the manufacturer or a third party must be available free of charge for at least five years following the end of the computer model production.
- The applicant shall provide clear instructions to the end-user in form of a manual (in hard or soft copy) to enable personal data deletion.

*Assessment and verification:* The applicant shall declare compliance of the product with these requirements and additionally provide a copy of the user instructions to the competent body.

### 3.4 Cluster 4 – End-of-life management: Design and material selection

Similar to the cluster lifetime extension, the research results of Task 3 and Task 4 also revealed that high attention should be paid to the end-of-life (EoL) management of computers to reduce the overall environmental impacts since secondary resources from recycling can substitute primary production.

In the current criteria documents, requirements affecting the EoL-management of computers are spread across different discontinuous criteria. To illustrate the importance of EoL for computers, for the revision it is proposed to cluster and rearrange the associated criteria, complementing them with some new proposals.

#### Present criteria, Decisions 2011/337 and 2011/330

##### “Recycled content”:

The external plastic case of the system unit, monitor and keyboard shall have a post-consumer recycled content of not less than 10% by mass.

*Assessment and verification:* The applicant shall provide the competent body with a declaration stating the percentage post-consumer recycled content.

#### Present criteria, Decisions 2011/337 and 2011/330

##### “Design for disassembly”:

The manufacturer shall demonstrate that the personal computer/monitor can be easily dismantled by professionally trained personnel using the tools usually available to them, for the purpose of undertaking repairs and replacements of worn out parts, upgrading older or obsolete parts, and separating parts and materials, ultimately for recycling or reuse. To facilitate dismantling:

- (a) Fixtures within the personal computer shall allow for its disassembly, e.g. screws, snap-fixes, especially for parts containing hazardous substances;
- (b) Circuit boards, and/or other precious metal-containing components, shall be easily removable using manual separation methods both from the product as a whole and from specific components (such as drives) that contain such boards to enhance recovery of high value material;
- (c) All plastic materials in covers/housing shall have no surface coatings incompatible with recycling or reuse;
- (d) Plastic parts shall be of one polymer or be of compatible polymers for recycling and have the relevant ISO 11469 marking if greater than 25 g in mass;
- (e) Metal inlays that cannot be separated shall not be used;
- (f) Data on the nature and amount of hazardous substances in the personal computer shall be gathered in accordance with Council Directive 2006/121/EC and the Globally Harmonised System of Classification and Labelling of Chemicals (GHS).

*Assessment and verification:* A test report shall be submitted with the application detailing the dismantling of the personal computer. It shall include an exploded diagram of the personal computer labelling the main components as well as identifying any hazardous substances in components. It can be in written or audio-visual format. Information regarding hazardous substances shall be provided to the competent body in the form of a list of materials identifying material type, quantity used and location.

### 3.4.1 Criterion 4.1 – Material selection and information

#### Proposed revised criteria

##### **“Material selection and information”**

- (a) Variety of plastics: Plastic parts with a mass greater than 25 grams shall consist of a single polymer or a polymer blend compatible with recycling. A maximum of 4 types of plastic may be used for these parts. Plastic cases may consist of two separable polymers or polymer blends at the most.
- (b) Surface coating / metal inlays:
- (i) Personal computers: All plastic materials used for covers/housing shall have no surface coatings / metal inlays incompatible with recycling or reuse;
  - (ii) Notebook computers: It shall be allowed to apply a metal coating to plastic case parts if such a coating is technically required. However, no electroplating shall be allowed.
- (c) Content of recyclates: The external plastic case of the system unit, monitor and keyboard shall have a content of post-consumer recyclates material of not less than 10% by mass.
- (d) Material information facilitating recycling:
- (i) Plastic parts with a mass greater than 25 grams shall be marked in accordance with ISO 11469 and ISO 1043, sections 1-4. For plastic parts > 200 grams, the marking should be large enough and located in a visible position in order to be easily identified by workers of specialised recycling firms.
  - (ii) Data on the nature and amount of hazardous substances in the computer shall be gathered and provided in accordance with Council Directive 2006/121/EC and the Globally Harmonised System of Classification and Labelling of Chemicals (GHS).

##### Assessment and verification:

The applicant shall declare compliance of the product with these requirements to the competent body.

The applicant shall provide the competent body with an exploded diagram of the computer in written or audio-visual format, labelling the main components, especially plastic parts greater than 25 grams in mass, as well as identifying any hazardous substances in components.

The information shall include documentation to prove the conformity to the above mentioned ISO standards and additional specifications of the marking (dimension and position).

Information regarding hazardous substances shall be provided to the competent body in the form of a list of materials identifying material type, quantity used and location.

The applicant shall provide the competent body with a declaration stating the percentage post-consumer recycled content. In case of surface coating / metal inlays, the applicant shall provide the competent body with a declaration proving the technical demand.

##### Major proposed changes

- The different sub-requirements under the current criteria ‘recycled content’ and ‘design for disassembly’ have been rearranged and renamed ‘material selection and information’ and ‘design for recycling’.
- The criterion ‘variety of plastics’ has been detailed, taking the current Blue Angel criteria for Personal Computers and Notebook Computers as basis.

- The criterion 'surface coating' has been specified for notebook computers with a derogation, where legal requirements technically necessitate surface coating in relation to electromagnetic compatibility (EMC).
- The criterion 'Material information facilitating recycling' specifies marking requirements.
- The assessment and verification requirements have been specified according to the new criteria structure.

For more details cf. Task 4 report "Improvement Potential", section 4.2.4.2 "End-of-life management of computer products".

### 3.4.2 Criterion 4.2 – Design for disassembly and recycling

As laid out in the Task 4 report, manual dismantling is an important means to improve material recovery of, in particular, precious and critical metals, thus reducing the overall impacts of computer products. This can be facilitated by appropriate design.

Nevertheless, the current requirements are not very specific regarding the dismantling process and the key components affected. Here, proposals developed by JRC-IES in support of implementation of the Ecodesign Directive (Ardente & Mathieux 2012) and approaches taken by other ecolabels (in particular Blue Angel RAL-UZ 78a) are more specific. Thus, it is suggested to introduce more specific requirements for the most relevant components of computers in terms of material recovery of precious and critical metals, which are

- Printed circuit boards > 100 cm<sup>2</sup>
- Displays > 100 cm<sup>2</sup>
- Rechargeable batteries.

This selection is based on the WEEE-Directive, which requires recyclers to separate these components during end-of-life management <sup>4</sup>.

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<sup>4</sup> Although the WEEE-Directive also requires separate treatment of other components (e.g. external electrical cables, plastic containing brominated flame retardants, mercury containing backlights), these fractions are of less relevance for the European Ecolabel as some constituents are excluded from

Additional components identified as hot spots by the LCA analysis could also be added to the criteria. The following revised formulation is proposed:

#### Proposed revised criteria

##### **“Design for disassembly and recycling”**

For recycling purposes computers shall be designed so that

- (a) They shall facilitate easy (manual) disassembly in order to separate rechargeable batteries (if applicable), display units >100 cm<sup>2</sup> (if applicable) and printed circuit boards >100 cm<sup>2</sup>.
- (b) An efficient (manual) disassembly of display units >100 cm<sup>2</sup> (if applicable), rechargeable batteries (if applicable) and printed circuit boards >100 cm<sup>2</sup> by a specialised firm can be carried out using widely used commercially available tools (i.e. pliers, screw-drivers, cutters).
- (c) One person alone shall be able to disassemble display units >100 cm<sup>2</sup> (if applicable), rechargeable batteries (if applicable) and printed circuit boards >100 cm<sup>2</sup>.
- (d) Electrical modules shall be easily removed from the case.

##### Assessment and verification:

The applicant shall declare compliance with the requirements to the competent body.

The applicant shall provide a ‘test disassembly report’ to the competent body including disassembly procedures and tools needed for the disassembly supported by either:

- (i) Test results verifying the time (in seconds) required for the different steps to disassemble the components during the testing. The timing shall be verified by a third party, which can include specialised recycling firms or testing bodies.
- (ii) Verification by a specialised recycling firm that the requirements of the criteria can be fulfilled. Firms shall be a permitted treatment operation in accordance with Article 23 of Directive 2008/98/EC.

The report may be submitted either in writing or by photo, drawing or in video format.

#### Major proposed changes

- The criterion ‘design for disassembly’ has been renamed ‘design for disassembly and recycling’; the focus of this criterion is now clearly set on recycling by removing the introduction “...for the purpose of undertaking repairs and replacements of worn out parts, upgrading older or obsolete parts...”. Typically dismantling for repair or upgrade purposes is carried out significantly different from dismantling for recycling: While the first one requires caution to avoid any damage, the latter can widely accept damage to parts as it solely aims at recycling. Thus, the structure of the requirements should clearly distinguish between both purposes. For this reason, requirements for the access and exchange of components for repair and/or upgrade are specified under ‘repairability’ (cf. section 3.3.3)

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labelled products (e.g. plastic containing brominated flame retardants, mercury containing backlights) or do not represent any challenge in dismantling processes (e.g. external electric cables).

- Some of the sub-requirements under the current criterion ‘design for recycling’ have been moved to the new proposed criterion ‘material selection and information’.
- The components being relevant in terms of LCA hot spots and material recovery of precious and critical metals have been specified.
- The disassembly process has been specified (specialised firm, one person alone, use of universal tools).
- For the assessment and verification, the provision of a ‘test disassembly report’ has been proposed with two options for third party verification.

Ideally, as proposed by JRC-IES (Ardente & Mathieux 2012) for televisions and LCD displays <sup>5</sup>, the above listed requirement would also incorporate a threshold for the disassembly time in seconds for the different specified parts and components.

However, according to Ardente & Mathieux (2012), the testing and verification of such a dismantling-time benchmark would require a detailed standardised test and measurement procedure as the manual dismantling time depends on various factors:

- Minimum working experience of disassembler or operators (e.g. number of years working in the sector);
- Pre-conditions for the measurement (e.g. knowledge of the product’s structure and location of the part to be disassembled, including access to relevant information from manufacturers as videos and exploded diagrams of the product);
- The sequence of the steps in the disassembly;
- Tools or machine / equipment to be used for the disassembly (e.g. common tools and machines in use in recycling plants for dismantling);
- Typology and precision of instruments used for measurement of the time;
- Uncertainty of the measurement and tolerance of the results.

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<sup>5</sup> Ardente, F.; Mathieux, F.: Integration of resource efficiency and waste management criteria in European product policies – Second phase. Report no 2, Application of the project’s method to three product groups. Joint Research Centre – Institute for Environment and Sustainability, Ispra, 2012

As such a test and measurement procedure is not currently available, and pending further guidance in support of the Ecodesign process, the above listed criteria would either have to be specified in the User Manual for the product group or other means for verification would need to be specified. An alternative proposal for verification by registered specialised firms is therefore proposed.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.4.2 “End-of-life management of computer products”.

#### Consultation questions

- Have similar testing procedures based on timed dismantling or verification by dismantlers been developed in other countries or regions?
- Could the alternative proposal for verification by specialised dismantlers be workable and if so, would any supporting requirements or procedures need to be introduced into the criteria or the User Manual?
- Are there other examples of verification procedures for this type of criteria that may be relevant?

### 3.4.3 Criterion 4.3 – Packaging

#### Present criteria, Decisions 2011/337 and 2011/330

Where cardboard boxes are used, they shall be made of at least 80 % recycled material.

Where plastic bags are used for the final packaging, they shall be made of, at least, 75 % recycled material or they shall be biodegradable or compostable, in agreement with the definitions provided by the EN 13432 or equivalent.

*Assessment and verification:* a sample of the product packaging shall be provided on application, together with a corresponding declaration of compliance with this criterion. Only primary packaging, as defined in European Parliament and Council Directive 94/62/EC, is subject to the criterion.

#### Consultation questions

- The technical analysis and literature review of LCA studies (see Task 3) clearly shows that the packaging of computers and displays is of negligible relevance with regard to environmental impacts. Against this background it shall be discussed if this criterion should be retained?

### 3.5 Cluster 5 – Corporate production / supply chain management

Within the hotspot analysis for computer products, some additional issues concerning environmental as well as social impacts were identified. Within this context it shall be discussed if the revision of the EU ecolabel for computers shall also introduce new requirements on corporate responsibility, meaning that they cannot be implemented and verified at product level but would need to be implemented at production level, possibly during production stages not carried out by the applicant themselves.

#### 3.5.1 Criterion 5.1 – Labour conditions during manufacturing

##### Proposed options for a new criterion

###### Option (a): No social criteria at all

###### Option (b): Labour conditions during manufacturing

The applicant shall have a code of conduct or a comparable policy that requires adherence to the core labour standards of the International Labour Organisation (ILO Core Labour Standards). This code of conduct and/or policy shall also address the assembly-stage of the production even in cases the assembly is not carried out by the applicant. The applicant shall ensure that the code of conduct is communicated to all suppliers / subcontractors (up to the level of product assembly) together with a requirement that these shall also comply with a code of conduct that follows the ILO Core Labour Standards.

*Assessment and verification:* The applicant shall declare compliance with these requirements (for example implementation of OECD Guidelines for Multi-National Enterprises “Recommendations on human rights and on employment and industrial relations” or of the United Nations Global Compact: “Principles on Human rights and Labour”) and shall provide a copy of the code of conduct and a description of the implementation process at tier 1 suppliers/sub-contractor level (up until assembly).

###### Option (c): Labour conditions during manufacturing

Fundamental principles and rights with respect to universal human rights, as specified in the applicable core labour standards of the International Labour Organisation (ILO Core Labour Standards) shall be complied with during manufacturing (assembly) of the European eco-labelled products.

*Assessment and verification:*

Option (1): The applicant shall declare the compliance with these requirements to the competent body.

Option (2): The applicant shall declare the compliance with these requirements to the competent body and provide evidence by third-party verified certification of tier 1 production sites (up until assembly), e.g. by SA8000 or other standards that contain the ILO Core Labour Standards. This shall include site visits by auditors for all tier 1 production sites in the supply chain (up until assembly) for the licensed products. Site visits shall take place upon application and subsequently during the license period if new production sites are introduced.

Note: Requirements regarding the social labour conditions during manufacturing are difficult to integrate in ecolabel criteria, especially in terms of assessment and verification.

Recent examples show that the reputation of the overall Ecolabel might be at risk if breaches of social labour conditions of ecolabelled products become known.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.5.1 “General CSR criteria: Challenges for the implementation by ecolabels”.

#### Consultation questions

- Should a criterion addressing labour conditions be included?
- Which further social aspects might be required beyond the ILO Core Labour Standards (e.g. wages, working time, occupational health & safety)?
- Are there specific hot spots in the supply chain that might provide for a more focused criterion? (see also proposed criteria 5.3)
- Which verification mechanisms shall apply in order to best ensure compliance with the required criteria?

### 3.5.2 Criterion 5.2 – Emission of fluorinated GHG during LCD production

#### Proposed new criterion

##### Fluorinated GHG emission during LCD production

Computers with integrated LCD panel must be produced in a way that the fluorinated greenhouse gases  $\text{NF}_3$  and  $\text{SF}_6$ , if part of the production process, are abated by a system that is an integrated part of the production process.

*Assessment and verification:* The applicant shall declare the compliance with these requirements and shall additionally provide a description of the implementation process at suppliers/sub-contractors (i.e. LCD panel makers) to the competent body.

Fluorinated greenhouse gases (GHG) are among the most potent and persistent GHG contributing to global climate change; they are relevant in the manufacture of semiconductors, light emitting diodes and LCD flat panel displays. As it is currently difficult to set product-related criteria addressing these emissions (difficulties in comparing panel suppliers' F-GHG emissions due to a lack of consistency in estimating emissions, estimating emissions reductions, and in monitoring the efficacy of installed abatement systems), within the EU ecolabel revision a process oriented approach is therefore proposed, based on a proposal in the current revision of the Nordic Ecolabelling criteria for television displays.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.5.2.2 “Minimizing the use of F-gases in the production”.

### 3.5.3 Criterion 5.3 – Use of ‘conflict-free minerals’ during production

#### Proposed new criterion

##### **‘Conflict-free minerals’ in electronics**

The applicant shall support the responsible sourcing of “conflict-free minerals” from the African Great Lakes Region for use in their computer products.

*Assessment and verification:* The applicant shall declare the compliance with these requirements and shall provide additionally a description of the way he engages in responsible sourcing projects in the African Great Lakes Region (e.g. membership in a voluntary industry initiative, e.g. the Public Private Alliance, the Conflict-Free Tin Initiative or the Solutions for Hope Project) to the competent body.

Computer products contain a wide range of scarce resources which are largely mined in the Democratic Republic of Congo, a conflict region, and according to sources under dangerous conditions, without sufficient maintenance of health and safety standards and in some cases by children. However, instead of a criterion to exclude of the use of conflict minerals, bearing in mind the potential impact of a de facto embargo of minerals from a whole region that is economically and socially dependent on the mining industry, for the EU ecolabel revision a process oriented approach has been proposed to stimulate sustainable sourcing.

For more details cf. Task 4 report “Improvement Potential”, section 4.2.5.2.1 “Minimising the risk of using ‘conflict metals’ in electronics”.

## 3.6 Further criteria

### 3.6.1 Criterion 6.1 – Noise

#### Present criteria, Decisions 2011/337 and 2011/330

The ‘Declared A weighted Sound Power Level’ (re 1 pW) of the personal computer, in accordance with paragraph 3.2.5 of ISO 9296, shall not exceed

- (1) 40 dB (A) in the idle operating mode,
- (2) 45 dB (A) when accessing a hard disk drive.

The ‘Declared A weighted Sound Power Level’ (re 1 pW) of the notebook computer system unit, in accordance with paragraph 3.2.5 of ISO 9296, shall not exceed

- (1) 32 dB (A) in the idle operating mode,
- (2) 36 dB (A) when accessing a hard disk drive.

*Assessment and verification:* the applicant shall provide the competent body with a report, certifying that the levels of noise emissions have been measured in accordance with ISO 7779 and declared in accordance with ISO 9296. The report shall state the measured levels of noise emissions in both idle operating mode and when accessing a disk drive, which shall be declared in accordance with paragraph 3.2.5 of ISO 9296.

The following table provides an overview how different ecolabel criteria implement noise requirements.

**Table 3: Existing noise requirements in ecolabel criteria**

	EU Ecolabel	Blue Angel	Nordic Swan	TCO	EPEAT
<b>Desktop PCs</b>	<ul style="list-style-type: none"> <li>Idle operating mode: 40 dB (A)</li> <li>HDD enabled: 45 dB (A)</li> </ul>	<ul style="list-style-type: none"> <li>Idle operating mode: 38 dB (A)</li> <li>HDD enabled: 42 dB (A)</li> <li>Optical drive enabled: 50 dB (A)</li> </ul>	<ul style="list-style-type: none"> <li>Idle mode: 38 dB (A)</li> <li>Operating: 42 dB (A)</li> </ul>	<ul style="list-style-type: none"> <li>Idle mode: 39 dB (A)</li> <li>Operating mode: 44 dB (A)</li> </ul> <p>Valid for desktop PCs with integrated moving parts, such as motor driven HDD, fans etc. <i>If the product does not emit prominent discrete tones a higher declared A-weighted sound power level is accepted but shall not exceed</i></p> <ul style="list-style-type: none"> <li>Idle mode: 42 dB (A)</li> <li>Operating mode: 47 dB (A)</li> </ul>	No noise criteria at all
<b>Notebook PCs including Tablet PCs</b>	<ul style="list-style-type: none"> <li>Idle operating mode: 32 dB (A)</li> <li>Hard-disk drive enabled: 36 dB (A)</li> </ul>	<ul style="list-style-type: none"> <li>Idle operating mode: 35 dB (A)</li> <li>Hard-disk drive enabled: 40 dB (A)</li> <li>Optical drive enabled: 48 dB (A)</li> <li>Netbooks: The sound power levels of the netbook shall be reported for statistical purposes in accordance with ISO 7779.</li> </ul>	<ul style="list-style-type: none"> <li>Idle mode: 35 dB (A)</li> <li>Operating: 40 dB (A)</li> </ul> <p><i>Valid for Notebook PCs + Thin clients</i></p>	<ul style="list-style-type: none"> <li>Idle mode: 35 dB (A)</li> <li>Operating mode: 39 dB (A)</li> </ul> <p><i>Valid for notebook PCs with integrated moving parts, such as motor driven HDD, fans etc. If the product does not emit prominent discrete tones a higher declared A-weighted sound power level is accepted but shall not exceed</i></p> <ul style="list-style-type: none"> <li>Idle mode: 38 dB (A)</li> <li>Operating mode: 42 dB (A)</li> </ul>	No noise criteria at all

**Proposed revised criteria**

The 'Declared A weighted Sound Power Level' (re l pW) of the computer, in accordance with paragraph 3.2.5 of ISO 9296, shall not exceed

- (1) in the idle operating mode (the measurement can be dropped if no fans are installed, e.g. CPU fans, power supply fans, computer system fans):
  - a. 38 dB (A) for desktop computers,
  - b. 32 dB (A) for notebook computers;
- (2) when accessing a hard disk drive (the measurement can be dropped if no mechanical hard disk drive is installed):

- a. 42 dB (A) for desktop computers,
  - b. 36 dB (A) for notebook computers;
- (3) when optical drive enabled (the measurement can be dropped if no optical drive is installed):
- a. 50 dB (A) for desktop computers,
  - b. 48 dB (A) for notebook computers.

*Assessment and verification:* the applicant shall provide the competent body with a report, certifying that the levels of noise emissions have been measured in accordance with ISO 7779 and declared in accordance with ISO 9296. The report shall state the measured levels of noise emissions in idle operating mode, when accessing a disk drive and when optical drive enabled (if applicable), which shall be declared in accordance with paragraph 3.2.5 of ISO 9296. In case of different configurations of identically constructed units the measurements have to be performed on the loudest individual components.

### Major proposed changes

- Based on the most current Blue Angel ecolabel criteria for personal computers and notebook computers,
  - For personal computers the slightly stricter limit values have been taken;
  - For personal and notebook computers limit values for when an optical drive is enabled have been included.
- Exemptions have been included for the measurements in cases where fans, mechanical hard disk drives or optical drives are not installed.
- Regarding assessment and verification, in case of different configurations of identically constructed units the measurements shall be allowed to be performed on the loudest individual components to avoid measurements for each individual configuration.

### 3.6.2 Criterion 6.2 – Ergonomics

TCO Certified 2012 for Desktops, Notebooks, All-in-One PCs and Tablet PCs as well as TCO Certified Displays contain criteria regarding visual ergonomics (image detail, luminance, luminance contrast, reflection and screen colour) and work load ergonomics (inter alia vertical tilt and vertical height for AiO-PCs); the Nordic Swan ecolabel aligns to TCO Displays and Notebooks criteria with regard to ergonomics and includes some own requirements for tablet PCs.

### Consultation questions

- Should the EU ecolabel for computers include criteria for (visuable and/or workload) ergonomics, e.g. aligning them to the TCO criteria?

## 3.7 Cluster 7 – Information

### 3.7.1 Criterion 7.1 – User instructions

#### Present criteria, Decisions 2011/337 and 2011/330

The [personal computer and computer display] / [notebook computer] shall be sold with relevant user information that provides advice on its proper environmental use. The information shall be located in a single, easy-to-find place in the user instructions as well as on the manufacturer's website. The information shall include in particular:

- (a) Energy consumption: TEC value in accordance with Energy Star v5.0, as well as the maximum power demand in each operating mode. In addition, instructions must be provided on how to use the devices energy-saving mode;
- (b) Information that energy efficiency cuts energy consumption and thus saves money by reducing electricity bills and that unplugging your [personal computer or computer display] / [notebook computer] reduces energy consumption to zero;
- (c) The following indications on how to reduce power consumption when the [personal computer and/or computer display] / [notebook computer] are not being used:
  - (i) Putting the [personal computer and computer display] / [notebook computer] into off mode will reduce energy consumption but will still draw some power;
  - (ii) Reducing the brightness of the screen will reduce energy use;
  - (iii) Running the disk fragmentation on the [computer] / [notebook computer] will reduce energy use and increase the life of your [personal computer] / [notebook computer] (this is not applicable to solid state device machines);
  - (iv) Screen savers can stop [personal computer monitors] / [notebook displays] from powering down into a lower power mode when not in use. Ensuring that screen savers are not activated on [computer monitors] / [notebook computers] can therefore reduce energy use;
- (d) Information should be included in the user instructions or the manufacturer's website to let the user know where to go to obtain professional repairs and servicing of the [personal computer and/or computer display] / [notebook computer], including contact details as appropriate;
- (e) End-of-life instructions for the proper disposal of [personal computers and/or computer displays] / [notebook computers] at civic amenity sites or through retailer take-back schemes as applicable, which shall comply with Directive 2002/96/EC of the European Parliament and of the Council.
- (f) Information that the product has been awarded the EU Ecolabel with a brief explanation as to what this means together with an indication that more information on the Ecolabel can be found at the website address <http://www.ecolabel.eu>
- (g) Any instruction/repair manual(s) should contain recycled content and should not contain chlorine bleached paper.

**Assessment and verification:** the applicants shall declare the compliance of the product with these requirements to the competent body.

### Proposed revised criteria

The computer shall be sold with relevant user information that provides advice on its proper environmental use. The information shall be located in a single, easy-to-find place in the user instructions as well as on the manufacturer's website. The information shall include in particular:

- (a) Energy consumption: TEC value in accordance with Energy Star v6.0<sup>6</sup>, as well as the maximum power demand in each operating mode. In addition, instructions must be provided on how to use the device's energy-saving mode;
- (b) Information that energy efficiency cuts energy consumption and thus saves money by reducing electricity bills and that unplugging your computer reduces energy consumption to zero;
- (c) The following indications on how to reduce power consumption when the computer is not being used:
  - (i) Putting the computer into off mode will reduce energy consumption but will still draw some power;
  - (ii) Reducing the brightness of the screen will reduce energy use;
  - (iii) Periodically applying the computer's disk defragmentation function will reduce energy use and increase the lifetime of the computer (this is not applicable to solid state device machines);
  - (iv) Screen savers can stop computer displays from powering down into a lower power mode when not in use. Ensuring that screen savers are not activated on computer displays can therefore reduce energy use;
  - (v) Charging tablet computers via USB-interface by another desktop or notebook computer might increase the energy consumption in case of leaving the desktop or notebook computer in an energy-consuming idle-mode for the sole reason of charging the tablet computer.
- (d) Information that extension of the computer's lifetime reduces the overall environmental impacts.
- (e) The following indications on how to prolong the lifetime of the computer<sup>7</sup>:
  - (i) Information to let the user know the factors influencing the lifetime of batteries as well as instructions for the user facilitating its prolongation (only applicable to mobile computers powered with rechargeable batteries).
  - (ii) Clear instructions in form of a repair manual to enable replacing of key components for upgrades or repair.
  - (iii) A list of available spare parts with current prices.
  - (iv) Information to let the user know where to go to obtain professional repairs and servicing of the computer, including contact details as appropriate;
  - (v) Clear instructions to enable a permanent deletion of personal data from the computer to facilitate a possible second hand usage.
- (f) End-of-life instructions for the proper disposal of computers, including separate instructions for the proper disposal of rechargeable batteries, at civic amenity sites or through retailer take-back schemes as applicable, which shall comply with Directive 2012/19/EU of the European Parliament and of the Council.
- (g) Information that the product has been awarded the EU Ecolabel with a brief explanation as to what this means together with an indication that more information on the Ecolabel can be found at the website address <http://www.ecolabel.eu>
- (h) Any instruction/repair manual(s) should contain recycled content and should not contain chlorine bleached paper.

***Assessment and verification:*** the applicants shall declare the compliance of the product with these requirements to the competent body.

<sup>6</sup> Depending on the final criteria formulation in section 3.1.1

<sup>7</sup> Depending on the final decision on sub-criteria in section 3.3

Major proposed changes:

- Aligning the information on energy consumption with the most current Energy Star version taken as basis for the energy criteria.
- Information that charging tablet computers via the USB-interface of another desktop or notebook computer can increase the energy consumption in case of leaving the desktop or notebook computer in idle-mode for the sole reason of charging the tablet computer.
- Inclusion of information requirements including detailed instructions for the extension of the computer's lifetime.
- Inclusion of information requirements regarding the proper disposal of rechargeable batteries

3.7.2 Criterion 7.2 – Information appearing on the Ecolabel

**Present criteria,  
Decisions 2011/337 and 2011/330**

Optional label with text box shall contain the following text:

- ‘ - high energy efficiency
- designed to facilitate recycling, repair and upgrading
- mercury-free backlights (if computer displays)’.

Assessment and verification: the applicant shall declare the compliance of the product with this requirement, and shall provide a copy of the Ecolabel as it will appear on the packaging and/or product and/or accompanying documentation to the competent body.

**Proposed revised criterion**

Optional label with text box shall contain the following text:

- ‘ - high energy efficiency
- mercury-free backlights (if the product contains an LED display)
- designed to be more durable and upgradeable
- designed to facilitate recycling.’

Assessment and verification: the applicant shall declare the compliance of the product with this requirement, and shall provide a copy of the Ecolabel as it will appear on the packaging and/or product and/or accompanying documentation to the competent body.

Major proposed changes:

- Explicit focus on extended lifetime (formerly repair and upgrading) with distinguishment between the aspects of lifetime and recycling.