

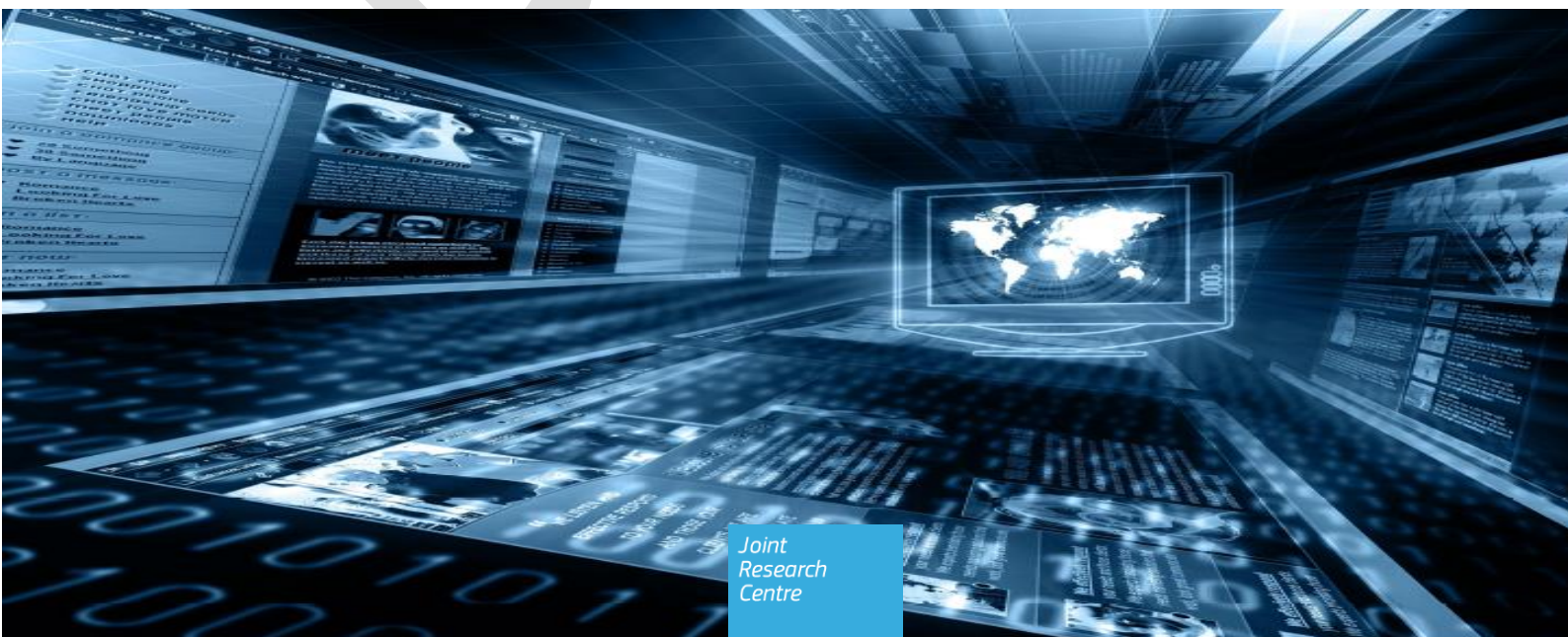
JRC SCIENCE FOR POLICY REPORT

# Revision finalisation of European Ecolabel Criteria for Televisions

*Final Technical Report: Criteria  
proposal for revision of ecological  
criteria*

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January 2020



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EUR xxxxx xx

PDF ISBN xxx-xx-xx-xxxxx-x ISSN xxxx-xxxx doi:xx.xxxxx/xxxxxx

Seville: European Union, 2019

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# 1 INTRODUCTION

In 2009, EU Ecolabel criteria were developed for televisions.<sup>1</sup> A review study was undertaken in 2013 with a view to updating the 2009 criteria.<sup>2</sup> The 2013 review study on the EU Ecolabel criteria for televisions was carried out by the Joint Research Centre Directorate B – Growth and Innovation (Institute for Prospective Technological Studies (JRC-IPTS) in 2013) with technical support from the Öko-Institut e.V. (OEKO). The work was developed for the European Commission's Directorate-General for the Environment.

The revision of the EU Ecolabel criteria for televisions was delayed so as to ensure alignment with EU Ecodesign<sup>3</sup> and EU Energy Labelling<sup>4</sup> Regulations that were being revised in parallel to the EU Ecolabel.

The revisions of the EU Ecodesign<sup>5</sup> and EU Energy Labelling<sup>6</sup> Regulations for televisions were recently finalised.

In 2013 and 2014, several versions of the technical report including draft criteria proposals were published. All relevant reports can be consulted on the product website<sup>2</sup>. The main purpose of the different versions of the technical report was to provide a summary of the technical background and rationale for each criterion proposal at different stages of the revision process.

Furthermore, during the course of the revision process, two general questionnaires on the scope and improvement potential as well as queries specific to certain criteria were sent out to selected stakeholders. The target groups were industry, Member States, NGOs and research institutions.

The first (T.R1.0) and second draft (T.R2.0) versions of the technical report were the basis for the first and second Ad-Hoc Working Group (AHWG) meetings which took place in October 2013 and May 2014 respectively. A third version of the report and criteria (T.R3.0) was produced after the AHWG2 and was open for stakeholders' consultation during November 2014.

A revised updated version (TR4.0 - TECHNICAL REPORT UPDATE (for last open consultation)) was produced in June 2019 in the light of new Ecodesign and Energy Labelling regulations. It provided an update of the criteria development process based on further research on updated legislation, environmental schemes currently in place, updated market figures and relevant technical data. Stakeholders' input received in November 2014 has been taken into consideration. Bilateral communication with stakeholders was maintained during the update process and reflected where relevant.

This **final version** of the report is a revision of TR4.0 based on the comments received in the last consultation (June -July 2019). It consists of the following:

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<sup>1</sup> 2009/300/EC: Commission Decision of 12 March 2009 establishing the revised ecological criteria for the award of the Community Eco-label to televisions (notified under document number C(2009) 1830) (Text with EEA relevance), available from - <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009D0300>

<sup>2</sup> JRC, EU Ecolabel and Green Public Procurement criteria revision for televisions, available from - <http://susproc.jrc.ec.europa.eu/televisions/stakeholders.html>

<sup>3</sup> COMMISSION REGULATION (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions

<sup>4</sup> COMMISSION DELEGATED REGULATION (EU) No 1062/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of televisions

<sup>5</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2019.315.01.0241.01.ENG&toc=OJ:L:2019:315:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.315.01.0241.01.ENG&toc=OJ:L:2019:315:TOC)

<sup>6</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2019.315.01.0001.01.ENG&toc=OJ:L:2019:315:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.315.01.0001.01.ENG&toc=OJ:L:2019:315:TOC)

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- **Introduction:** this section describes the goal and content of the document, the sources of information and the upcoming steps in the project. This section aims to link the information and deliverables already published and the new draft criteria. Among the different sources of information listed and summarised in this section, special attention should be paid to the key environmental aspects of this product group and the criteria proposed. A subsection highlighting the synergies of the revised criteria with the new Ecodesign and Energy Labelling Regulations is included.
  - **Assessment and verification:** this section includes information on the type of documentation required to show compliance with the criteria that shall be provided by applicants and recognised by competent bodies. In addition, the legal prerequisites that applicants shall guarantee are also mentioned in this section.
  - **Criteria proposal:** this section presents the last and most updated EU Ecolabel criteria proposals for the product group 'Televisions'. The proposal is written in a blue box and subsequently a brief rationale is given. **Changes in the criteria text compared to the version published in June 2019 (TR4.0) are marked in blue.** The rationale is based on the most relevant aspects determined over the course of the project. Existing criteria in force are also included in order to allow comparison.
  - **Table of comments:** this section consists of all the stakeholder comments and feedback from the latest open consultation in June- July 2019 presented in an anonymous way. The section is completed by the assessment of the stakeholders' feedback, further research on the points highlighted by the participants and how they triggered the changes to the criteria leading to the current criteria proposal.

Comments were classified under three categories:

- a) *Accepted:* the comment is fully integrated in the new criterion wording.
- b) *Partially accepted:* this category includes those comments that either raise a good idea which is then integrated in the new criterion wording or suggest some modifications of the criterion wording; even if they are not completely reproduced in the wording, they are partially introduced.
- c) *Rejected:* the comment is not taken on board in the proposal. This can be due to different reasons such as lack of standards to perform the measurement, creation of market restrictions if the idea is integrated, etc.

## 1.1 Methodology and sources of information

The current EU Ecolabel definition of 'Television' was assessed against a number of sources to determine its suitability. This included an analysis of alternative Ecolabels, existing statistical and technical categories and relevant legislation and standards in order to propose on that basis the scope and definition of the product for the revised criteria.

With regard to the market analysis, the study was mainly based on an analysis of European statistical data and available literature with a focus on televisions / electronic displays.

The main requirement of the EU Ecolabel is that criteria should be based on scientific evidence and should focus on the most significant environmental impacts during the whole

life cycle of products. According to the European Commission Communication 'Building the Single Market for Green Products' (COM(2013)196), in general, better information on the environmental performance of products should be facilitated. This should be done by gradually incorporating the Product Environmental Footprint (PEF) methodology as appropriate *inter alia* in EU Ecolabel policies. This also includes the use of the International Reference Life Cycle Data System (ILCD) Handbook, which provides technical guidance for detailed LCA studies and the technical basis to derive product category-specific criteria. In the current revision process of Ecolabel criteria for televisions, these methods have been taken into account within the Technical Analysis.

Finally, the revision of the EU Ecolabel criteria largely considers the specific information provided by the stakeholders during the two AHWG meetings as well as during bilateral meetings. The information related to the revision of the EU Ecolabel criteria is summarised in the series of technical reports while the information described above is mainly included in the preliminary research (see detailed information on the revision web page<sup>2</sup>).

## 1.2 Summary of preliminary report and link to the EU Ecolabel criteria

The preliminary report forms the initial stage of the revision of the criteria for the product group 'televisions'. This includes the update and revision of the scope and definitions of the current criteria, an analysis of the televisions market and the implications for the EU Ecolabel, and a review of the scientific evidence to identify the main environmental impacts of these appliances. The sections below provide a summary of the findings from the preliminary research.

### 1.2.1 Product group name, scope and definitions

Existing product group name
Televisions
Revised product group name:
Electronic displays

Existing scope and definition
The product group 'televisions' shall comprise: 'Mains powered electronic equipment, the primary purpose and function of which is to receive, decode and display TV transmission signals.'
Revised scope and definition:
<p><b>Scope:</b></p> <p>Electronic displays including televisions, monitors and digital signage displays.</p> <p><b>Definitions:</b></p> <p><b>'Electronic display'</b> means a display screen and associated electronics that, as its primary function, displays visual information from wired or wireless sources.</p> <p><b>'Television'</b> means an electronic display designed primarily for the display and reception of</p>



audiovisual signals and which consists of an electronic display and one or more tuners/receivers.

**'Tuner/Receiver'** means an electronic circuit that detects television broadcast signal, such as terrestrial digital or satellite, but not internet unicast, and facilitates the selection of a TV channel from a group of network channels.

**'Monitor' or 'computer monitor'** means an electronic display intended for one person for close viewing such as in a desk-based environment.

**'Digital signage display'** means an electronic display that is designed primarily to be viewed by multiple people in non-desktop based environments. Its specifications shall include all of the following features:

- (a) unique identifier to enable addressing a specific display screen;
- (b) a function disabling unauthorised access to the display settings and displayed image;
- (c) network connection (encompassing a hard-wired or wireless interface) for controlling, monitoring or receiving the information to display from remote unicast or multicast but not broadcast sources;
- (d) designed to be installed hanging, mounted or fixed to a physical structure for viewing by multiple people;
- (e) does not integrate a tuner to display broadcast signals.

### **Rationale of proposed name, scope and proposed definitions**

As highlighted in the preliminary research and the previous versions of this technical report, technological progress and convergence of different products increasingly blurred the line between television monitors and other display products. There are technical similarities among the different displays and a functionality overlap, with for example the classic television no longer the only way of watching video content<sup>7</sup> and, because of the enhanced resolution levels now available, televisions sometimes being used as monitors for game consoles. Thus, it is becoming more and more difficult to distinguish between the two product categories. During the revision of the Ecodesign and Energy Labelling for televisions<sup>8</sup>, the scope was modified from solely 'televisions' to 'electronic displays', including television sets, television monitors, and external computer displays. Considering the general desire for harmonised approaches and coherent product policy, at an initial stage of this EU Ecolabel revision process, it was proposed that external computer displays be moved from the revised scope of the EU Ecolabel for computers<sup>9</sup> to a revised scope of EU Ecolabel criteria for televisions, combining them under a new title 'Electronic Displays', subsuming TV sets, TV monitors, dual-function TV monitors and external computer displays.

Initially, the product scope was basically aligned to the proposals provided in the 'Discussion paper on the review of the Ecodesign and Energy Labelling Regulations for televisions and on the draft Regulation on electronic displays, including computer monitors' of August 2012.

Those products excluded from the scope of the Ecodesign and Energy Labelling Regulations for electronic displays of 2012 were also excluded from the scope of the draft EU Ecolabel

<sup>7</sup> Laptops, tablets or even smartphones can be used to watch video content, although the displays integrated in these products would be better tackled within the review of the Regulation on computers.

<sup>8</sup>[https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/energy-efficient-products/televisions\\_en](https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/energy-efficient-products/televisions_en)

<sup>9</sup> Commission Decision 2011/337/EU of 6 June 2011 on establishing the ecological criteria or the award of the EU Ecolabel for notebook computers (OJ L 148, 7.6.2011, p. 5).

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criteria for electronic displays as this would have otherwise required separate calculation, measurement and verification procedures.

While included in the scope of the aforementioned Ecodesign and Energy Labelling drafts for electronic displays (2012), digital photo frames and signage products were proposed to be excluded from the EU Ecolabel for electronic displays. For more details, see the Task 1 report ('Scope and Definitions') and different versions of this technical report (TR1.0 and TR2.0).

Discussions at the second AHWG meeting and written stakeholder feedback revealed that there was support for aligning the definitions of televisions and computer monitor to draft the Ecodesign proposal. Considering the general support, no relevant changes were included in TR3.0. Consequently, as the EU Ecodesign and EU Energy Labelling Regulations were being revised in parallel to the EU Ecolabel, the revision process was delayed to enable alignment.

The recently finalised measures (EU Ecodesign<sup>5</sup> and EU Energy Labelling<sup>6</sup>) apply to electronic displays irrespective of the display technology. The scope covers the three main display product categories (televisions, monitors and signage displays). All displays integrated into other products, such as computers, refrigerators, vending machines, etc. are outside the scope of both the Ecodesign and Labelling Regulations, as are displays in means of transport and medical displays. The electronic displays which have been excluded from all requirements in the EU Ecodesign and Energy Labelling Regulations are either specialist displays (e.g. medical and security displays) or displays for which the underlying requirements would not be suitable (e.g. small displays, projectors, medical displays, status displays, certain types of digital signage displays). The revised EU Ecodesign and Energy Labelling Regulations requirements may not be suitable for the excluded displays because they are either too stringent or because they are inappropriate to describe efficiency for the display technology.

In light of the revised EU Ecodesign and EU Energy Labelling Regulations, it is suggested that this technical report update (TR4.0) be as harmonised as possible with these policy tools to ensure coherence and to allow the use of the same measurements and data. It is proposed to align the scope and definitions **to the revised Energy Labelling scope (televisions, monitors and signage displays)**. However, at this stage, there is not a clear picture of the potential compliance of signage displays with the proposed EU Ecolabel criteria, as this type of displays has been proposed to be included at a late stage of the process. **Therefore, the inclusion of signage displays is therefore subject to feedback to be obtained in the final consultation.** In addition, the relevant definitions of products in the EU Ecolabel revised scope have been included as defined in the revised EU Ecodesign and Energy Labelling Regulations.

### 1.2.2 Summary of key market aspects

The original Task 2 report (see product website<sup>2</sup> for further details) provided some insights into market and production structures. The following points summarise the key aspects of the market analysis, taking into consideration market figures updated since the publication of Task 2 in 2013.



- According to official European statistics<sup>10</sup> provided by Eurostat concerning production and trade data, the overall demand for televisions has decreased from 2012 and is not expected to increase rapidly in the future. As suggested originally in Task 2, much of this reduced demand is likely due to external factors, such as slowing economic growth, high unemployment rates, the completion of the analogue switch-off process in many western European markets, and saturation of flat panel televisions.
- LCD (liquid crystal display) remains the dominant flat panel display technology but OLED (organic light-emitting diode) displays are beginning to gain a higher market share.
- Virtually all LCDs utilise LED backlighting technology rather than the older CCFL (cold cathode fluorescent lamp) backlights.
- The OLED penetration of the display market is estimated to be about 1.0% in 2017. Competition from QLED (quantum dot light-emitting diode) LCD displays has likely impacted sales of OLED displays.
- The average screen sizes of displays have increased over the past years. Data for the UK shows that almost two thirds of homes have televisions of 40 inches or larger and almost 20% have televisions of 50 inches or more.<sup>11</sup>
- Features like smart interactive TV, HDR (High Dynamic Range) and UHD (Ultra High Definition), as well as price decreases, will encourage end users to choose larger display sizes.
- Smart TVs are now present in about 50% households in some EU Member State but lower penetration rates are seen in other Member States. Ultra-high-definition (4K) televisions account for around 50% of all European TV sales.<sup>12</sup>
- As of 2018, 8K UHD displays with resolutions of 7 680 x 4 320 pixels (i.e. 33.2 million pixels) are beginning to enter the market. Global sales of 8K televisions are expected to reach around 11 million per annum by 2023.<sup>13</sup> Shipments of UHD computer monitors have also increased in recent years, especially in the gaming monitor sector.<sup>14</sup> As of December 2018, 8.3% of computer monitors registered with the US ENERGY STAR scheme were UHD.
- The numbers of electronic displays registered with the main environmental initiatives are varied:
  - ENERGY STAR<sup>15</sup>: 709 consumer televisions, 220 commercial televisions, 1 058 computer monitors, 283 signage displays.
  - Blue Angel (DE-UZ 145)<sup>16</sup> on television sets - No licences.
  - EU Ecolabel<sup>16</sup>: 9 licences for televisions.
  - EPEAT<sup>17</sup>: 124 televisions and 1 049 computer monitors.
  - Nordic Ecolabelling<sup>18</sup>: 85 hospitality televisions and 3 consumer televisions.
  - TCO: 3 060 displays (no further detail) and no televisions.

<sup>10</sup> <http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes>

<sup>11</sup> <https://www.statista.com/statistics/438130/tv-sets-usage-in-homes-by-screen-size-in-the-uk/>

<sup>12</sup> <https://www.digitaltveurope.com/2018/04/09/ihs-half-of-tv-sets-shipped-in-western-europe-now-4k/>

<sup>13</sup> <https://www.statista.com/statistics/950951/worldwide-unit-sales-ultra-hdtv-8k/>

<sup>14</sup> <https://press.trendforce.com/press/20181205-3187.html>

<sup>15</sup> [www.energystar.gov/specifications](http://www.energystar.gov/specifications)

<sup>16</sup> <http://ec.europa.eu/ecat/category/en/18/televisions>

<sup>17</sup> <https://epeat.sourcemap.com/>

<sup>18</sup> [www.svanen.se/en/Buy-Svanenmarkt/Ecolabelled-products/?categoryID=159&p=4](http://www.svanen.se/en/Buy-Svanenmarkt/Ecolabelled-products/?categoryID=159&p=4)

- Front runners in terms of Ecolabelling are LG Electronics, Philips, Samsung, Sharp, Sony and Toshiba, and in terms of EU Energy Labelling Loewe, Panasonic, Philips, Samsung, Sharp,, and Sony.
- According to IHSMarkit<sup>19</sup>, a television replacement cycle is between 7 and 10 years. Other sources suggest that a LCD television replacement cycle is around 6 years.<sup>20</sup> Identifying the typical replacement cycle for displays is problematic as few data sources exist. A LCA conducted by the US EPA on computer monitors in 2001 estimated lifespans to be around 6.5 years, but those figures were for CRT monitors.<sup>21</sup> Other studies suggest that LCD monitor replacement cycles are around 8 years.<sup>20</sup> Given the wide range of computer monitor user types, from commercial users to domestic users, it is likely that lifespans will vary widely depending on the individual user type and current drivers for replacement.
- Market research organisations suggest that there are a number of drivers for consumers to replace televisions including a move from FHD (Full HD) to UHD, 4K to 8K, smaller to larger televisions, and high-end LCD to high-end OLED.<sup>19</sup> Research has suggested that consumers are willing to pay around EUR 50 more, on average, for an additional label class, and 50% more for an A-grade TV set compared to a G-grade one on the EU Energy Label 'A-G' scale.<sup>22</sup>
- Across European countries, the average TV viewing time varies significantly, e.g. from 2.3 hours per day in Sweden to 4.1 hours per day in Italy. In general, average TV viewing times have decreased since 2010 as users switch to viewing media on other electronic displays<sup>23</sup>.

### **1.2.3 Key environmental aspects and relation with the criteria proposal**

Based on the LCA review presented in the Task 3 report<sup>2</sup>, 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 televisions, specific environmental 'hot spots' identified are the assembly process of the LCD module, the amount of chrome steel used in the housing and the printed circuit boards used.

One of the reasons is that critical raw materials are concentrated in these components, the extraction and processing of which are associated with major material requirements, appropriation of land and consumption of energy, and which cause severe environmental impacts: silver, gold and palladium in the motherboard and other printed circuit boards, or indium and gallium in the display and background illumination.

The direct influence of EU Ecolabel criteria on the production of single components, especially if provided by external suppliers, of televisions or computer displays is relatively limited. However, by improving design (e.g. design for dismantling and recycling) or indirectly by

<sup>19</sup> <https://ihsmarkit.com/research-analysis/various-factors-will-influence-tv-panel-pricing-for-the-years-first-half.html>

<sup>20</sup> Kalmykova et al., 2015, Waste Management 46 (2015) 511–522, "Out with the old, out with the new – The effect of transitions in TVs and monitors technology on consumption and WEEE generation in Sweden 1996–2014".

<sup>21</sup> [https://www.epa.gov/sites/production/files/2014-01/documents/computer\\_display\\_lca.pdf](https://www.epa.gov/sites/production/files/2014-01/documents/computer_display_lca.pdf)

<sup>22</sup> [https://ec.europa.eu/info/sites/info/files/impact\\_of\\_energy\\_labels\\_on\\_consumer\\_behaviour\\_en.pdf](https://ec.europa.eu/info/sites/info/files/impact_of_energy_labels_on_consumer_behaviour_en.pdf)

<sup>23</sup> <https://www.statista.com/topics/3871/tv-set-market-in-europe/>

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extending the lifetime or by reusing parts, the impacts of the manufacturing phase can be reduced as secondary resources from recycling or an extended lifetime can avoid primary production. Thus, the allocation of benefits from reuse and recycling is an area specifically highlighted in Task 4 (improvement potential) and the criteria development.

Since the publication of the original Task 3 report in 2013 few LCAs have been published on televisions or other electronic displays. One LCA published on computer monitors in 2015<sup>24</sup> included similar findings to those of the previously reviewed LCAs. The study found that the use phase of CRT and CFL backlit LCD monitors was the most important impact category, followed by the production phase. The LCA on LED backlit monitors found that improvements in energy efficiency have caused most burdens to shift to the production phase. In exploring the findings, the authors claim that the Printed Wiring Board (PWB) on all types of monitors had the largest share of overall impacts. They also claimed that the manufacturing phase (including pre-manufacturing) was the cause of most ecotoxicity impacts. In summarising, the authors suggest that extending the useful life of LED backlit LCD monitors should be a priority to reduce impacts.

Improvements in the energy efficiency of televisions, through the introduction of technologies such as LED backlights, will also have shifted more burdens to the production impacts.

The following table shows the link between the identified hotspots and the revised EU Ecolabel criteria proposal. The table only provides an indicative reference to the proposal. The details of the proposed criteria and further technical details are addressed in the next section.

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<sup>24</sup> Bhakar et al., 2015, Procedia CIRP, Volume 29, 2015, Pages 432-437, Procedia CIRP, "Life Cycle Assessment of CRT, LCD and LED Monitors", available from - <https://www.sciencedirect.com/science/article/pii/S2212827115000414>

**Table 1. Link between the hotspots identified and the revised EU Ecolabel criteria**

Section	Proposed criteria	Environmental hotspot
<b>1 Energy consumption</b>	Criterion 1.1 – Energy savings	Energy consumption and resulting greenhouse gas emissions from production and use. Proposed criteria address energy efficiency at use phase.
	Criterion 1.2 – Power management	
<b>2 Hazardous substances</b>	Criterion 2.1 - Excluded or limited substances	Air, soil and water pollution, bioaccumulation and effects on aquatic organisms due to raw material extraction and processing, and hazardous substances used in products. The proposed criteria reflect products with a restricted amount of hazardous constituents and with a reduced potential for hazardous emissions upon disposal.
	Criterion 2.2 – Activities to reduce supply chain fluorinated GHG emissions	Fluorinated greenhouse gases (F-GHGs) are among the most potent and persistent GHGs contributing to global climate change. These gases are relevant in the manufacture of semiconductors, light-emitting diodes, and liquid crystal display (LCD) flat panel displays, <i>inter alia</i> for televisions, computer monitors or tablet PCs. Over the last decade, major flat panel suppliers as well as the semiconductor industry have taken voluntary steps to reduce their F-GHG emissions.  However, the goals and results are published at sectoral not at manufacturer or product level so it is not possible to propose, for example, a certain limit value as a criterion for the EU Ecolabel.  The proposed criteria consist of a general requirement focused on the target of setting limits in the future.
<b>3 Lifetime extension</b>	Criterion 3.– Reparability and commercial guarantee	Use of finite resources and critical raw materials in production. The proposed criterion addresses design for durability and reparability and product life extension upon the end of its life.
<b>4 End-of-life management</b>	Criterion 4.1 – Material selection and information to improve recyclability	Generation of potentially hazardous waste electronic equipment upon its final disposal. The proposed criteria address material selection and design at production to ensure easy dismantling and compatibility with recycling in order to improve resource efficiency and to maximise the recovery of resources at the end of life.
	Criterion 4.2 – Design for dismantling and recycling	
<b>5 Corporate production / supply chain management</b>	Criterion 5.1 – Labour conditions during manufacture	Many product groups, also concerning computer products, are associated with both environmental and social impacts in their life cycle. Within this context, it is also suggested that the EU Ecolabel should gradually introduce social requirements into its criteria documents.
	Criterion 5.2 – Sourcing of 'conflict-free' minerals	
<b>6 Information</b>	Criterion 6.1 – User instructions	Information provides consumers with options to use the product considering the environmental benefits associated with the different modes of the product. In addition, EU Ecolabel information encourages the purchase of the product.
	Criterion 6.2 – Information appearing on the EU Ecolabel	

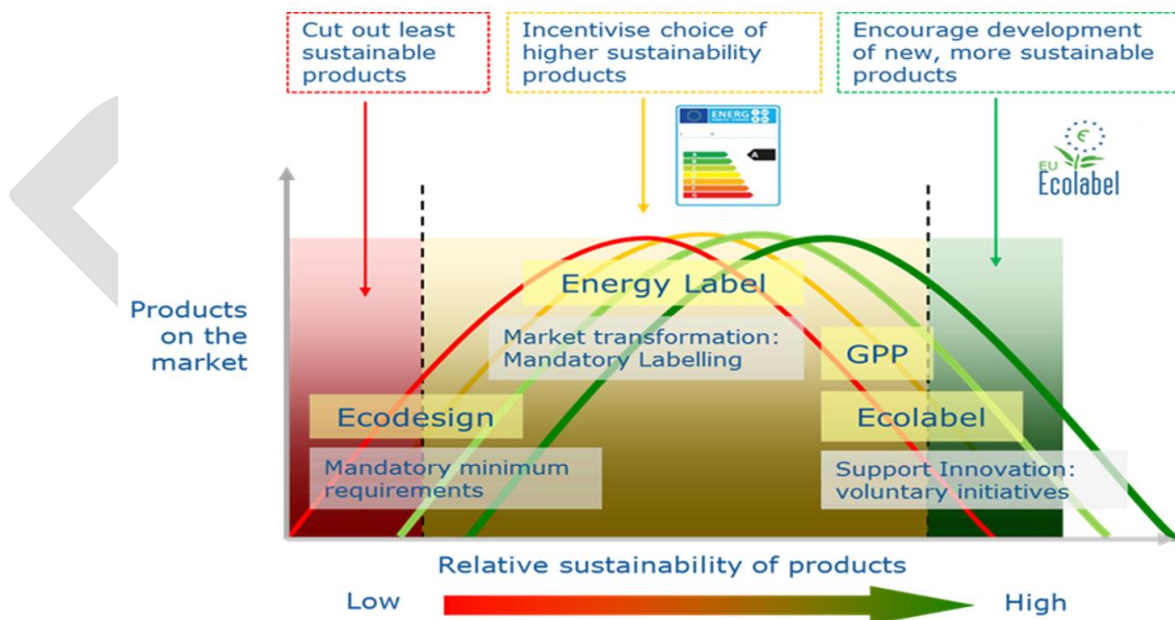
### 1.3 EU Ecolabel within the new EU policy context for electronic displays: synergies of revised criteria with new Ecodesign and Energy Labelling Regulations

The Ecodesign Framework Directive<sup>25</sup> provides a framework that manufacturers of energy-related products are required to use to improve the environmental performance of their products. The framework sets out minimum energy efficiency requirements and other environmental criteria such as water consumption, emission levels or minimum durability of certain components that manufacturers have to fulfil before they can place their products on the market. The aim of the Ecodesign Framework is to cut out the least sustainable products. The new Ecodesign measure<sup>5</sup> for electronic displays has broadened the scope and includes material efficiency and information availability requirements in addition to the energy efficiency requirements.

The Energy Labelling Framework Regulation<sup>26</sup> enables end users to identify the better-performing energy-related products, via an A-G/green-to-red scale (under the old Energy Labelling Framework Directive 2010/30/EU, energy labels were allowed to include A+ to A+++ classes). The new Energy Labelling measure<sup>6</sup> sets the energy efficiency classes for electronic displays to incentivise the consumer's choice of more energy-efficient products.

In this context, the EU Ecolabelling Regulation<sup>29</sup> complements both Ecodesign and Energy Labelling. It is a voluntary scheme that awards products with the best environmental performance throughout their life cycle. EU Ecolabel criteria set higher requirements than those included in Ecodesign (which represent the minimum for market access) and at least as far as the EU GPP (Green Public Procurement) which is aimed at public authorities seeking to procure environmentally friendly goods and services (Communication COM(2008) 400 'Public Procurement for a better Environment').

The legislative framework builds upon the combined effect of the aforementioned pieces of legislation. See the image below for a visualisation of this effect.



<sup>25</sup>Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products. OJ L OJ L 285, 31.10.2009, p. 10.

<sup>26</sup> Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU. OJ L 198, 28.7.2017, p. 1 (Energy Labelling Framework Regulation).

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The updated EU Ecolabel criteria for electronic displays are aligned to the updated scope of products under the revised new Ecodesign and Energy Labelling Regulations (televisions, computer monitors and signage displays). In addition, the EU Ecolabel includes stricter energy efficiency requirements and addresses a number of other environmental issues, for instance hazardous substances in line with the EU Ecolabel Regulation or resource efficiency requirements in line with the Circular Economy Strategy<sup>27</sup>. In addition, the EU Ecolabel Regulation allows the inclusion of social requirements, where relevant. The revision of the EU Ecolabel also includes social aspects in line with other recently voted products.

Furthermore, the requirements included in the EU GPP for computer and monitors<sup>28</sup> which covers computer displays reflected the EU Ecolabel criteria (as drafted in 2014) as far as possible in the criteria aiming to promote the use of EU Ecolabel monitors via green procurement and facilitate the verification process of EU GPP criteria.

A synergic approach has been followed in the revision of the EU Ecolabel; harmonisation with the other EU tools has been sought during the whole revision process. The requirements included in the new Ecodesign and Energy Labelling have been used as a baseline to build stricter requirements for the EU Ecolabel. The following table illustrates the coverage of each policy tool in terms of sustainability aspects and reflects the synergies created among the different tools. In this context, the harmonisation will ensure the development of new, more sustainable electronic displays.

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<sup>27</sup> [http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm)

<sup>28</sup> [http://ec.europa.eu/environment/gpp/pdf/EU\\_GPP\\_criteria\\_for\\_computers\\_and\\_monitors.pdf](http://ec.europa.eu/environment/gpp/pdf/EU_GPP_criteria_for_computers_and_monitors.pdf)



**Table 2. Summary of requirements on displays from different EU policies.**

Section	Energy Labelling	Ecodesign	EU Ecolabel
<p><b>1 Energy consumption</b></p>	<ul style="list-style-type: none"> <li>- Energy efficiency classes (A to G) based on Energy Efficiency Index (EEI) values.</li> <li>- Allowances reducing the value of <math>P_{measured}</math> for the purposes of calculating the EEI.</li> </ul>	<ul style="list-style-type: none"> <li>- EEI maximum limits that shall not be exceeded by displays.</li> <li>- Allowances reducing the value of <math>P_{measured}</math> for the purposes of calculating the EEI.</li> <li>- Off mode, standby and networked standby mode requirements.</li> <li>- Automatic power down.</li> </ul>	<p><b>Criterion 1.1 – Energy savings</b></p> <p>Strict Energy Efficiency classes. Only best displays in the market; ~10% would comply with thresholds.</p> <p style="padding-left: 40px;">Until 31 December of 2022:</p> <ul style="list-style-type: none"> <li>i. Energy efficiency class E (F for UHD resolutions and above, and for HDR) for televisions</li> <li>ii. Energy efficiency class D (F for UHD resolutions and above, and for HDR) for monitors</li> <li>iii. Energy efficiency class F for digital signage displays</li> </ul> <p><u>G class has been discarded.</u></p> <p><b>Dynamic approach.</b> <u>After 2 years:</u></p> <p>A stricter energy class is now requested after January 2023. However considering that D class for monitors is already very ambitious; this class has been kept in the proposal after 1 of January of 2023 while for the rest of displays a superior class has been proposed.</p> <p style="padding-left: 40px;">From 1 of January of 2023:</p> <ul style="list-style-type: none"> <li>i. Energy efficiency class D (E for UHD resolutions and above, and for HDR) for televisions and monitors.</li> <li>ii. Energy efficiency class E for digital signage displays</li> </ul> <p>The <b>maximum on mode power demand</b> in normal configuration shall be <math>\leq 64</math> W (125W for digital signage displays, for UHD resolutions and above, and for HDR).</p> <p><b>Criterion 1.2 – Power management</b></p> <ul style="list-style-type: none"> <li>- Main allowances of ED/EL have been set as mandatory for the EU Ecolabel.</li> <li>- Requirement on quick start functionality aligned to Blue Angel.</li> </ul>

			- Off mode, standby and networked standby mode requirements are not included as going beyond the ED would only bring small savings.
<b>2 Hazardous substances</b>		<p><b>Cadmium logo</b> - information of its presence or non-presence.</p> <p><b>Halogenated flame retardants</b> - The use of halogenated flame retardants is not allowed in the enclosure and stand of electronic displays.</p>	<p><b>Criterion 2.1 - Excluded or limited substances</b></p> <p><b>Prescriptive requirement on restriction of:</b></p> <p><b>Sub-criterion 2(a): SVHCs</b> Non-presence at or above 0.1% in the article and agreed subassemblies.</p> <p><b>Sub-criterion 2(b): Restrictions on the presence of specific hazardous substances</b> Mercury and cadmium restricted among other specific substances (biocides, PAGs or arsenic compounds)</p> <p><b>Sub-criterion 2(c): Hazard-based restrictions</b> EU Ecolabel hazards restricted with special attention to flame retardants and plasticisers.</p>
			<p><b>Criterion 2.2 – Activities to reduce supply chain fluorinated GHG emissions</b></p> <p>The applicant shall gather information from their LCD display suppliers by which they shall demonstrate their activities to reduce GHG emissions from the production process and the performance of abatement systems they have installed. Proposal in line with EPEAT and Nordic Swan.</p>
<b>3 Lifetime extension</b>		<p><b>Repair and reuse</b></p> <p><b>- Availability of spare parts:</b></p> <ul style="list-style-type: none"> <li>-7 years availability to professional repairers for Internal power supply; connectors to connect external equipment; capacitors; batteries; accumulators; DVD blue ray module</li> <li>-7 years availability to end users only external power supply and remote control</li> <li>-These parts can be replaced with the use of commonly available tools</li> </ul> <p>-Manufacturers shall ensure access to <b>information</b> for repairers. Main aspects to be included in the information:</p> <ul style="list-style-type: none"> <li>- the unequivocal appliance identification;</li> <li>- a disassembly map or exploded view;</li> <li>- list of necessary repair and test equipment;</li> <li>- component and diagnosis information (such as minimum and maximum theoretical values for</li> </ul>	<p><b>Criterion 3.– Reparability and commercial guarantee</b></p> <p><b>-Design for repair:</b></p> <ul style="list-style-type: none"> <li>- A number of spare parts (screen assembly and LCD backlight,; stands; power and control circuit boards) which are not covered by Ecodesign, shall be accessible and exchangeable by the use of commercially available tools.</li> <li>- Adhesives shall not be used to fix the back cover of the electronic display.</li> <li>- Casing parts are free of electronic assemblies.</li> <li>- Screw connections for fastening casing parts, chassis and electric/electronic assemblies can be tightened with no more than three tools.</li> </ul> <p><b>-Repair manual:</b> The applicant shall provide clear disassembly and repair instructions (e.g. hard or soft copy, video) and make them publicly available, to enable a non-destructive disassembly of products for the purpose of replacing key components or parts for upgrades or repairs.</p> <p><b>-Repair service / information.</b></p> <p><b>-Availability of spare parts</b> 7 years for a number of spare parts (not covered by Ecodesign).</p> <p><b>-Commercial guarantee</b> provision (3 years at no extra cost).</p>

		<p>measurements);</p> <ul style="list-style-type: none"> <li>- wiring and connection diagrams;</li> <li>-diagnostic fault and error codes (including manufacturer-specific codes, where applicable); and</li> <li>-data records of reported failure incidents stored on the electronic display (where applicable).</li> </ul> <p><b>- shall ensure the delivery of the spare parts for electronic displays within 15 working days after having received the order;</b></p>	
<p><b>4 End-of-life management</b></p>		<p><b>Marking of plastic components</b></p> <ul style="list-style-type: none"> <li>- <b>Marking</b> of plastic components heavier than <b>50 g</b>.</li> </ul>	<p><b>Criterion 4.1 – Material selection and information to improve recyclability</b></p> <ul style="list-style-type: none"> <li>- <b>Marking</b> of plastic components heavier than <b>25 g</b>.</li> <li>- <b>Recyclability</b> (EPEAT alignment): <ul style="list-style-type: none"> <li>Use of single polymer or recyclable polymer blend.</li> <li>No use of paint and coatings.</li> <li>Plastic enclosures shall not contain moulded-in or glue-on metal.</li> <li>Casings, enclosures and bezels with flame retardants shall be recyclable.</li> </ul> </li> <li>- <b>Recycled content:</b> 10% post-consumer recycled plastic.</li> </ul>
		<p><b>Design for dismantling, recycling and recovery</b></p> <p>Manufacturers shall ensure that joining, fastening or sealing techniques do not prevent the safe and readily achievable removal of the components indicated in WEEE or in Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators, when present.</p> <p>This <b>dismantling information</b> shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.</p>	<p><b>Criterion 4.2 – Design for dismantling and recycling</b></p> <p>Efficient dismantling is considered to be an important proxy for cost-effective dismantling/recycling and should be an important factor in product design.</p> <ul style="list-style-type: none"> <li>- <b>Manual dismantling shall be carried out by one person</b> of target parts (relevant in terms of CRM presence): <ul style="list-style-type: none"> <li>Printed Wiring Boards &gt;10 cm<sup>2</sup>.</li> <li>Thin Film Transistor (TFT) unit &gt;100 cm<sup>2</sup> and film conductors.</li> <li>Polymethyl Methacrylate (PMMA) board light guide).</li> </ul> </li> <li>+ an additional component among: LED backlight units, speaker unit magnets (for display sizes greater than or equal to 25 inches) and HDD drive (if applicable in the case of smart devices).</li> <li>- The <b>time for dismantling</b> the displays for recycling shall be at most 10 minutes for products weighing less than 18kg; and at most 10 minutes plus 1 minute per each additional 2 kg of total product weight. In line with EPEAT.</li> <li>- A test report detailing the <b>dismantling sequence</b>, including a detailed</li> </ul>

			description of the specific steps, tools and procedures for the components listed in (a) and the optional components selected from (b) as a minimum shall be provided for the criteria verification.
<b>5 Corporate production / supply chain management</b>			<p><b>Criterion 5.1 – Labour conditions during manufacture</b></p> <p>The proposal to address labour conditions during manufacturing reflects the significance of social issues in the computer/display manufacturing supply chain. This is evidenced by the investment made by industry to address working conditions through an industry Code of Conduct. In this respect, high-level reference is made in both the Act and the Annex criteria to a number of reference documents, namely:</p> <ul style="list-style-type: none"> <li>- the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy;</li> <li>- the UN Global Compact (Pillar 2);</li> <li>- the UN Guiding Principles on Business and Human Rights; and</li> <li>- the OECD Guidelines for Multi-National Enterprises.</li> </ul>
			<p><b>Criterion 5.2 – Sourcing of ‘conflict-free’ minerals</b></p> <p>The proposed criterion takes a proactive approach to the sourcing of tin, tantalum, tungsten and their ores and gold from conflict-affected and high-risk areas. This reflects the approach already taken by leading manufacturers, which rather than boycotting such areas seeks to support an improvement in working conditions.</p>
<b>6 Information</b>	<b>Product information sheet:</b>	<ul style="list-style-type: none"> <li>- Technical information</li> <li>- Energy consumption and different modes</li> <li>- Availability of spare parts/software updates</li> </ul>	<p><b>Criterion 6.1 – User instructions</b></p> <p>- Information provides consumers with options to use the product considering the environmental benefits associated with the different modes of the product.</p>
			<p><b>Criterion 6.2 – Information appearing on the EU Ecolabel</b></p> <p>- EU Ecolabel information encourages the purchase of the product. The optional label with text box shall contain three out of the following texts:</p> <ul style="list-style-type: none"> <li>(a) High energy efficiency.</li> <li>(b) Restriction of hazardous chemicals.</li> <li>(c) Designed to be easy to repair and recycle.</li> <li>(d) Contains xy% post-consumer recycled plastic (only when greater than 25% as a percentage of the total plastic).</li> </ul>

## 1.4 Proposed framework for the revision of the EU Ecolabel criteria and main changes

Currently, EU Ecolabel criteria exist for televisions (Commission Decision 2009/300/EC) while external computer displays was part of the criteria set for personal computers (Commission Decision 2011/337/EU) already expired in august 2017.

**Table 3: Existing EU Ecolabel criteria for external computer displays and televisions according to Commission Decisions 2011/337/EU and 2009/300/EC**

EU Ecolabel criteria for external computer displays (expired in August 2018)	Existing EU Ecolabel criteria for televisions
Criterion 1 – Energy savings (specific for displays)	Criterion 1 – Energy savings
Criterion 2 – Power management	---
<del>Criterion 3 – Internal power supplies</del>	---
Criterion 4 – Mercury in fluorescent lamps	Criterion 2 – Mercury content of fluorescent lamps
Criterion 5 – Hazardous substances and mixtures	Criterion 5 – Heavy metals and flame retardants
Criterion 6 – Substances listed in accordance with Art. 59(1) of Regulation (EC) No 1907/2006	---
Criterion 7 – Plastic parts	---
<del>Criterion 8 – Noise</del>	---
Criterion 9 – Recycled content	---
Criterion 10 – User instructions	Criterion 6 – User instructions
Criterion 11 – User reparability	---
Criterion 12 – Design for disassembly	Criterion 4 – Design for disassembly
<del>Criterion 13 – Lifetime extension</del>	Criterion 3 – Lifetime extension
Criterion 14 – Packaging	---
Criterion 15 – Information appearing on the Ecolabel	Criterion 7 – Information appearing on the Ecolabel
NB: Crossed out lines: EU Ecolabel criteria for personal computers, explicitly not applied to external computer displays.	

During this revision, it was proposed to cover both product groups; thus common criteria for both televisions and external computer displays have been developed, differentiating between technical product characteristics where necessary.

The following table provides a proposal for a new system to cluster and allocate the old criteria as well as new criteria to certain thematic fields following the identified hotspots for televisions and external computer displays.

**Table 4: New proposed criteria cluster and allocation of sub-criteria for the revision of the Ecolabel criteria for televisions and displays**

<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
<b>2 Hazardous substances</b>	Criterion 2.1 – Excluded or limited substances
	Criterion 2.2 – Activities to reduce supply chain fluorinated GHG emissions
<b>3 Lifetime extension</b>	Criterion 3 – Reparability and commercial guarantee
<b>4 End-of-life management</b>	Criterion 4.1 – Material selection and information to improve recyclability
	Criterion 4.2 – Design for dismantling and recycling
<b>5 Corporate production / supply chain management</b>	Criterion 5.1 – Labour conditions during manufacture
	Criterion 5.2 – Sourcing of 'conflict-free' minerals
<b>6 Information</b>	Criterion 7.1 – User instructions
	Criterion 7.2 – Information appearing on the EU Ecolabel



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## 2 ASSESSMENT AND VERIFICATION

### Existing assessment and verification

The specific assessment and verification requirements are indicated within each criterion.

Where possible, testing should be performed by appropriately accredited laboratories or laboratories that meet the requirements expressed in standard EN ISO 17025 and are competent to perform the relevant tests.

Where appropriate, competent bodies may require supporting documentation and may carry out independent verifications.

The competent bodies are recommended to take into account the implementation of recognised environmental management schemes, such as EMAS or ISO 14001, when assessing applications and monitoring compliance with the criteria (note: it is not required to implement such management schemes).

### Revised assessment and verification

The specific assessment and verification requirements are indicated within each criterion.

Where the applicant is required to provide declarations, documentation, analyses, test reports, or other evidence to show compliance with the criteria, these may originate from the applicant and/or his/her supplier(s) and/or their supplier(s), and/or third party certification and testing bodies, as appropriate.

Competent bodies shall preferentially recognise attestations which are issued by bodies accredited in accordance with the relevant harmonised standard for testing and calibration laboratories and verifications by bodies that are accredited in accordance with the relevant harmonised standard for bodies certifying products, processes and services. Accreditation shall be carried out in accordance with Regulation (EC) No 65/2008 of the European Parliament and of the Council (\*).

Where appropriate, test methods other than those indicated for each criterion may be used if these are described in the user manual of the Ecolabel criteria application and the competent body assessing the application accepts their equivalence.

Where appropriate, competent bodies may require supporting documentation and may carry out independent verifications or site visits.

Changes in suppliers and production sites pertaining to products to which the Ecolabel has been granted shall be notified to Competent Bodies, together with supporting information to enable verification of continued compliance with the criteria.

\* Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93 (OJ L 218, 13.8.2008, p. 30).

### **Rationale and summary of the changes during the revision process:**

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The assessment and verification text refers to the different types of evidence that are considered relevant as proof of compliance for each criterion. No major changes were introduced during the revision process.

At this stage, several amendments have been included in order to harmonise it, as far as appropriate, with the text included in the most recently adopted EU Ecolabel criteria.

The EU Ecolabel Regulation (EC) No 66/2010<sup>29</sup> indicates that competent bodies shall preferentially recognise verifications performed by bodies which are accredited under EN 45011. However, this standard has now been phased out and has been substituted by ISO/IEC 17065:2012: Conformity assessment - Requirements for bodies certifying products, processes and services. For this reason, certification bodies are no longer accredited in accordance with these requirements. A new statement has been included in the text making reference to Regulation (EC) 765/2008 of the European Parliament and of the Council.

In addition, a specific text on notification of changes in suppliers and production sites pertaining to products to which the Ecolabel has been granted has been introduced in line with the text agreed in the final text for EU Ecolabel criteria for personal, notebook and tablet computers<sup>30</sup>.

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<sup>29</sup> [Regulation \(EC\) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel](#). OJ L 27, 30.1.2010, p. 1.

<sup>30</sup> [COMMISSION DECISION \(EU\) 2016/1371 of 10 August 2016 establishing the ecological criteria for the award of the EU Ecolabel for personal, notebook and tablet computers](#)

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### 3 CRITERIA PROPOSAL

The first (T.R1.0) and second draft (T.R2.0) versions of the technical report were the basis for the first and second Ad-Hoc Working Group (AHWG) meetings which took place in October 2013 and May 2014 respectively. A third version of the report and criteria (T.R3.0) was produced after the AHWG2 and was open for stakeholders' consultation during November 2014. This revised version, (T.R4.0- TECHNICAL REPORT UPDATE (for last open consultation)), provides an update of the criteria development process based on further research on updated legislation, environmental schemes currently in place, updated market figures and relevant technical data. Stakeholders' input received in November 2014 has been taken into consideration. Bilateral communication with stakeholders has been maintained during the update process and reflected where relevant.

This section shows the latest proposal for the criteria wording with text that has been added since TR3.0 shown in blue. The new criteria are included in the boxes, followed by a brief rationale which summarises findings and input received over the course of the project and that underpin the criteria. Further information can be found in the previously published preliminary reports and technical reports (TR1.0, TR 2.0 and TR3.0). In addition, Section 5 gathers all comments received in the latest final round of consultation in November 2014 and the JRC responses.

## 3.1 Criterion 1 – Energy consumption

### 3.1.1 Criterion 1.1 - Energy savings

#### Decisions 2009/300 and 2011/337

##### Energy savings for televisions

(a) *Passive Standby*

- (i) The passive standby consumption of the television shall be  $\leq 0.30$  W except where the condition in part ii is fulfilled.
- (ii) For televisions with an easily visible hard off-switch, such that when the switch is operated to the off position, the television's energy consumption is  $< 0.01$  W, the passive standby consumption of the television shall be  $\leq 0.50$  W.

(b) *Maximum energy consumption:* TVs shall have energy consumption in on-mode of  $\leq 200$  W.

(c) *Energy Efficiency*

Until 31 December 2010, televisions placed on the market bearing the Ecolabel shall have an on-mode power consumption equal to or lower than  $0,64 \cdot (20 \text{ W} + A \cdot 4,3224 \text{ W/dm}^2)$ .

From 1 January 2011, until 31 December 2012 televisions placed on the market bearing the Ecolabel shall have an on mode power consumption equal to or lower than  $0,51 \cdot (20 \text{ W} + A \cdot 4.3224 \text{ W/dm}^2)$ .

From 1 January 2013, televisions placed on the market bearing the Ecolabel shall have an on-mode power consumption equal to or lower than  $0,41 \cdot (20 \text{ W} + A \cdot 4,3224 \text{ W/dm}^2)$ .

Where A is the visible screen area <sup>(1)</sup> expressed in dm<sup>2</sup>.

Assessment and verification: (points a) to c): The television shall be tested for its on-mode power consumption in its condition as delivered to the customer, according to the revised IEC62087 standard, using the dynamic broadcast video signal (Methods of Measurement for the Power Consumption of Audio, Video and Related Equipment). If the television has a forced menu upon initial start-up, the default shall be the setting which is recommended by the manufacturer for normal home use. A test report shall be provided by the applicant to the awarding competent body demonstrating that the television meets the requirements set out in points a) to c).

For meeting the conditions of a) ii), the applicant shall declare that their television complies with the requirement and provide photographic evidence regarding the hard off-switch.

For meeting the conditions of c), the applicant shall demonstrate that any of their Ecolabelled televisions when first placed on the market after the dates shown in the criterion will meet the appropriate energy efficiency criterion. If this cannot be demonstrated the competent body will only issue the Ecolabel licence for the period for which compliance can be demonstrated.

<sup>(1)</sup> *Screen Area:* This is the area of the screen in dm<sup>2</sup>. It is equal to [screen size × screen size × 0,480] for a standard screen (4:3 aspect ratio) and [screen size × screen size × 0,427] for a wide screen (16:9 aspect ratio).

#### -----Amendment January 2018-----

In the Annex to Decision 2009/300/EC, criterion 1 (Energy savings) is amended as follows:

- (1) in point b) (Maximum energy consumption), ' $\leq 200$  W' is replaced by ' $\leq 100$  W';
- (2) all four paragraphs in point c) (Energy Efficiency) are replaced by the following:

'Televisions shall meet the specifications of the Energy Efficiency Index set out in Annex I to Commission Delegated Regulation (EU) No 1062/2010 (\*) for the energy efficiency class specified as follows or, alternatively, for a more efficient energy efficiency class:

- i. energy efficiency class A for appliances with a visible screen diagonal  $\leq 90$  cm (or 35,4 inches);
- ii. energy efficiency class A+ (A for UHD) for appliances with a visible screen diagonal  $> 90$  cm (or 35,4 inches) and  $< 120$  cm (or 47,2 inches);
- iii. Energy efficiency class A++ (A+ for UHD) for appliances with a visible screen diagonal  $\geq 120$  cm (or 47,2 inches).

In this point, 'UHD' means Ultra High Definition, which is standardised (\*\*) with two resolutions of  $3840 \times 2160$  (UHD-4K) pixels or  $7680 \times 4320$  (UHD-8K) pixels.

(\*) Commission Delegated Regulation (EU) No 1062/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of televisions (OJ L 314, 30.11.2010, p. 64).

(\*\*) International Telecommunications Union Recommendation (ITU-R) BT.2020.;

(3) in the section headed 'Assessment and verification (points ) to c)': (a) the first paragraph is replaced by the following: 'The applicant shall submit a test report for the television model(s) covering the test carried out according to EN 50564 standards for meeting the conditions set out in point a) and the tests carried out using the measurement procedures and methods referred to in paragraphs 1 and 2 of Annex VII to Delegated Regulation (EU) No 1062/2010 for meeting the conditions set out in points b) and c). In addition, the energy efficiency class and the visible screen diagonal shall be indicated in the report.'; (b) the third paragraph is deleted.

#### **Energy savings for computer displays**

- (i) 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%;
- (ii) Computer display sleep mode power must not exceed 1 W;
- (iii) Computer displays shall have an energy consumption in on-mode of  $\leq 100$  W measured when set to maximum brightness;
- (iv) Computer monitor off mode power shall not exceed 0.5 W.

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

#### **Updated proposal for criterion 1.1: Energy savings**

- (i) Electronic displays shall meet the specifications of the Energy Efficiency Index set out in Annex II to Commission Delegated Regulation (EU) [2019/2013](#) [supplementing Regulation 2017/1369/EU of the European Parliament and of the Council with regard to energy labelling of electronic displays] [for the energy efficiency class specified as follows or, alternatively for a more energy efficient energy efficiency class.](#)

##### [Until 31 December of 2022:](#)

- i. Energy efficiency class E (F for UHD [resolutions and above](#)) for televisions
- ii. Energy efficiency class D (F for UHD [resolutions and above](#)) for monitors
- iii. Energy efficiency class F for digital signage displays

##### [From 1 of January of 2023:](#)

- i. [Energy efficiency class D \(E for UHD resolutions and above\) for televisions and monitors.](#)
- ii. [Energy efficiency class E for digital signage displays](#)

- (ii) The maximum on mode power demand in normal configuration shall be  $\leq 64$  W (125W for digital signage displays, for UHD resolutions and above).

**Assessment and verification:** For requirement (i), the applicant shall submit a test report for the electronic display carried out according to the measurement methods indicated in Annex IV to Commission Delegated Regulation (EU) 2019/2013 [supplementing Regulation 2017/1369/EU of the European Parliament and of the Council with regard to energy labelling of electronic displays]. For requirement (ii), the applicant shall submit a test report for the electronic display carried out according to the measurement methods and conditions indicated under points 1 and 2 of Annex III to Commission Regulation (EU) 2019/2021 laying down eco-design requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council.

Note: For displays presenting the HDR feature, measurement of the on mode power consumption to meet requirements (i) and (ii) shall be done in the normal configuration, in standard dynamic range (SDR).

Notes to be placed in ANNEX:

“Ultra-high Definition (UHD) Display” means an electronic display able to receive a UHD signal as defined in International Telecommunications Union Recommendation (ITU-R) BT.2020, and to display it on the screen at resolution  $3\ 840 \times 2\ 160$  (UHD-4K), or  $7\ 680 \times 4\ 320$  (UHD-8K).

‘High Dynamic Range (HDR)’ means a method to increase the contrast ratio of the image of an electronic display by using metadata generated during the creation of the video material and that the display management circuitry interprets to produce a contrast ratio and colour rendering perceived by the human eye as more realistic than that achieved by non HDR-compatible displays

‘Normal configuration’ means a display screen setting which is recommended to the end user by the manufacturer from the initial set-up menu or the factory setting that the electronic display has for the intended product use. It must deliver the optimal quality for the end user in a typical domestic or office environment. The normal configuration is the condition in which the declared values for off, standby, networked standby and on mode are measured.

### **Rationale and summary of the changes during the revision process**

Although the initial proposal for revision was based on the Ecodesign formulas (TR1.0), at a later stage of the revision process it was suggested to align the energy criteria to the energy efficiency classes of the Energy Labelling Regulation which was under revision. Draft formulas used in the ‘Discussion paper on the review of the Ecodesign and Energy Labelling Regulations for televisions and on the draft Regulation on electronic displays, including computer monitors’ presented and discussed at the Consultation Forum meeting on 8 October 2012 were used as a basis for the proposal.

Distribution of energy classes revealed a higher efficiency for computer monitors. Thus different requirements were established for different display types in the proposal made in TR3.0. Different stringency requirements for small and larger televisions, reflecting the distribution of classes and representing the best products on the market, were proposed. In TR3.0, it was suggested to



reintroduce the initially proposed power cap for televisions considering that the draft Energy Labelling classes were still based on a linear regression line (in the draft Energy Labelling Regulation the EEI formula and Labelling classification scale allowed large televisions to achieve a good Energy Efficiency class despite consuming more energy than smaller televisions).

In August 2017, the new Energy Labelling Framework Regulation (EU) 2017/1369 of the European Parliament and of the Council entered into force, repealing Directive 2010/30/EU<sup>31</sup>. Under the repealed Directive, energy labels were allowed to include A+ to A+++ classes to address the overpopulation of the top 'A' class. Over time, due to technological development, the A+ to A+++ classes also became overpopulated, which significantly reduced the effectiveness of the labels. To resolve this, the new Framework Regulation requires a rescaling of existing energy labels, back to the original A to G scale.

The 'Discussion paper on the review of the Ecodesign and Energy Labelling Regulations for televisions and on the draft Regulation on electronic displays, including computer monitors' presented and discussed at the Consultation Forum meeting on 8 October 2012 identified regulatory gaps and market failures preventing full achievement of the identified energy savings potential. For the finalisation of the Energy Labelling Regulation revision, the information collection was extended and data analysis repeated, highlighting the appropriateness of corrective actions. In total, a database of over 3 000 models of electronic displays placed on the EU market was analysed between 2012 and the end of 2017.<sup>6</sup>

The revised energy efficiency classes are as shown below.

Energy efficiency class	New EEI <sup>6</sup>
A	$EEI < 0.30$
B	$0.30 \leq EEI < 0.40$
C	$0.40 \leq EEI < 0.50$
D	$0.50 \leq EEI < 0.60$
E	$0.60 \leq EEI < 0.75$
F	$0.75 \leq EEI < 0.90$
G	$0.90 \leq EEI$

The following figure illustrates a comparison between existing and revised energy classes. However, this comparison can only be approximated, as the formula to set the limits is different (i.e. a linear bar in the previous Regulation, a curve in the new proposal).

<sup>31</sup>Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products. (OJ L 153, 18.6.2010, p. 1).

## Proposed Energy Label A-G

& existing A+/A++/A+++ reference for 100 dm<sup>2</sup> display

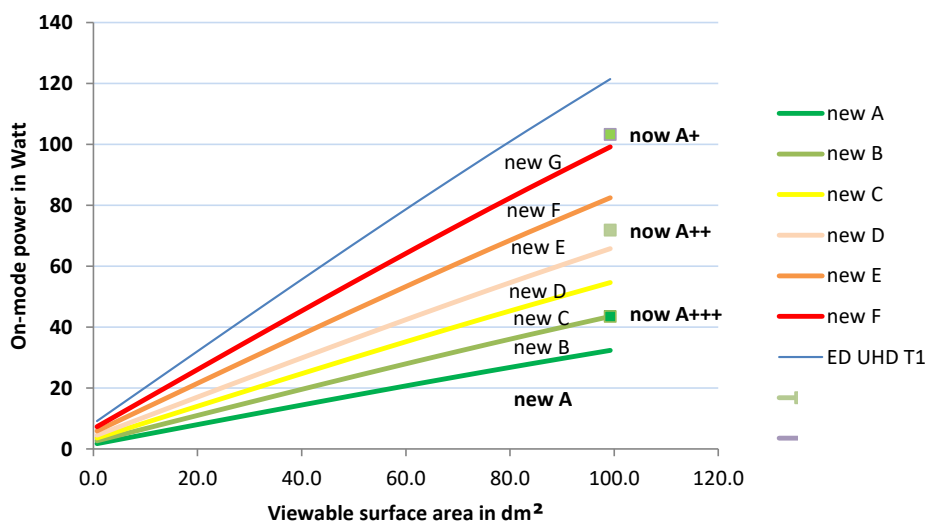


Figure 1: Approximate comparison between old and new energy labelling classes<sup>6</sup>

Figure 2 provides a visual distribution of the electronic displays, which are part of the 2014-2017 dataset used for the revision of the Energy Labelling Regulation (assuming that the same displays will be on the market when rescaling the televisions). All displays above the red curve would be eliminated by the minimum Ecodesign requirements. However, it is extremely unlikely that models on the market in 2014 will still be available on the market in 2021<sup>6</sup>.

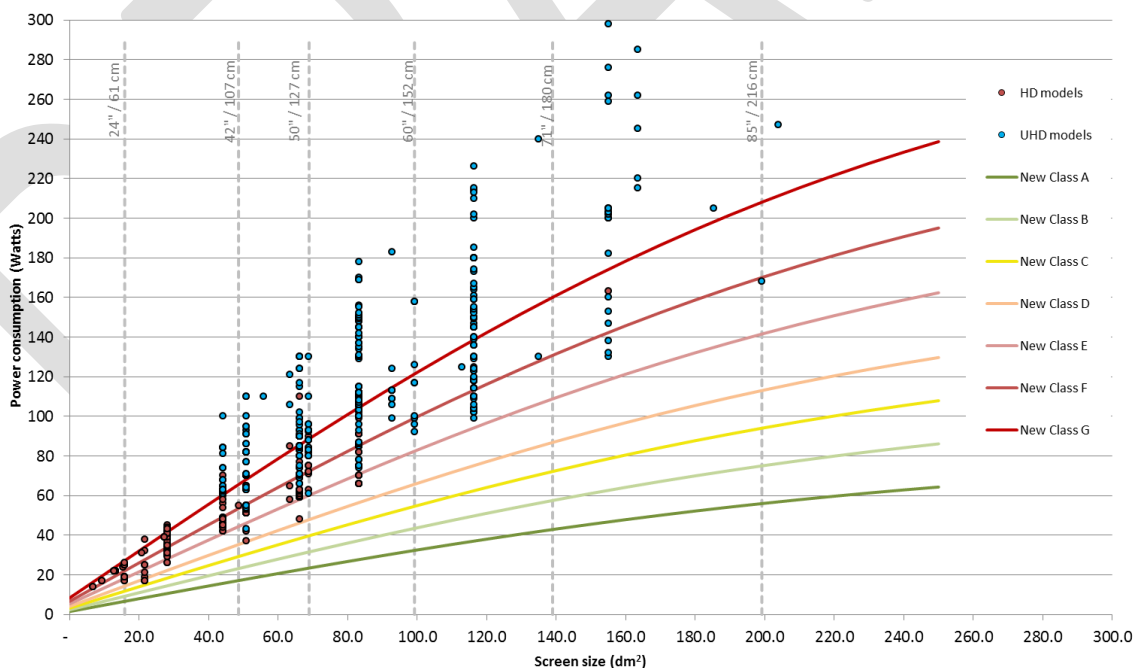
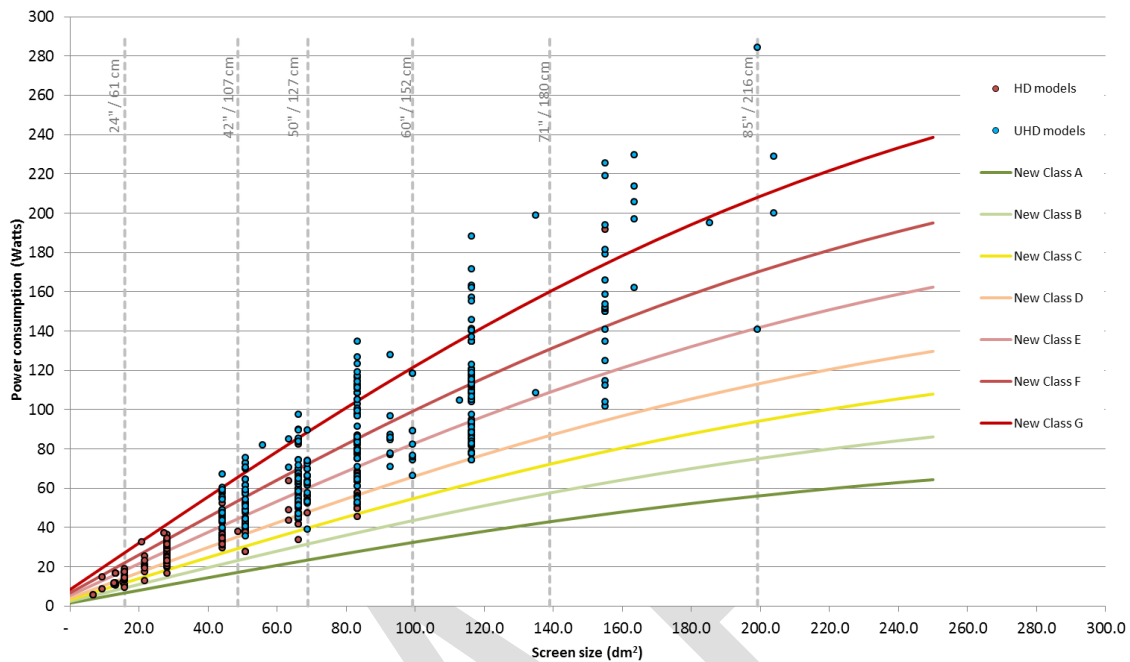


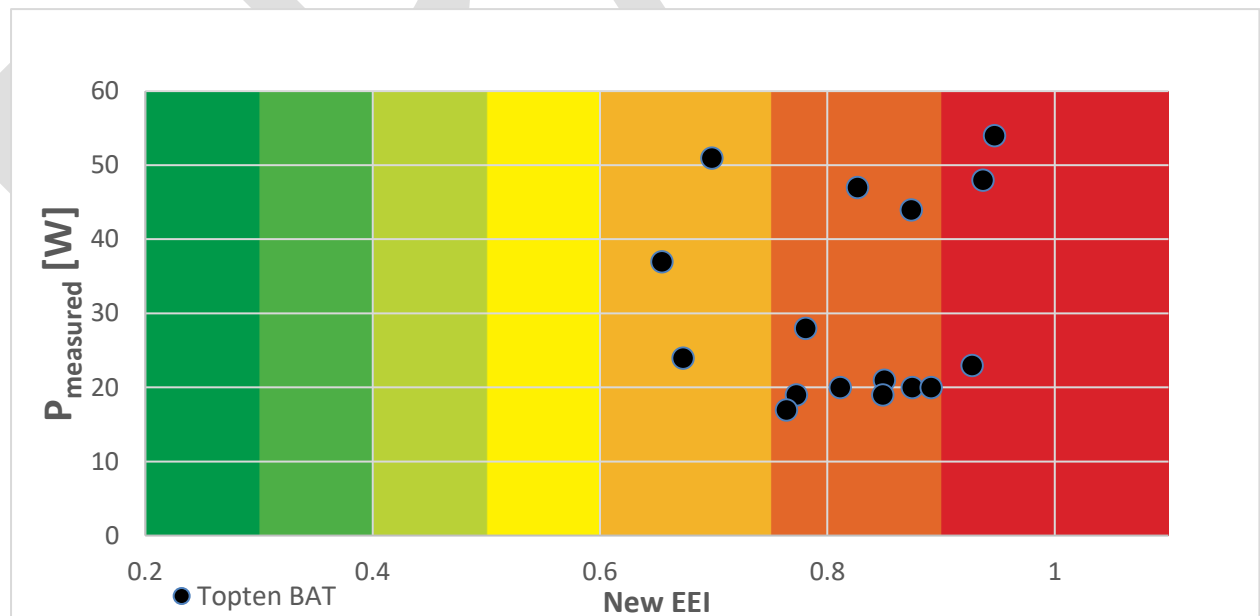
Figure 2: Distribution of displays from the 2018 dataset 'unadjusted' to the new labelling classes<sup>6</sup>

Figure 3 includes an adjustment of the energy efficiency to the same dataset on the basis of average improvements observed when comparing the datasets over the years (from 2012 to 2017).

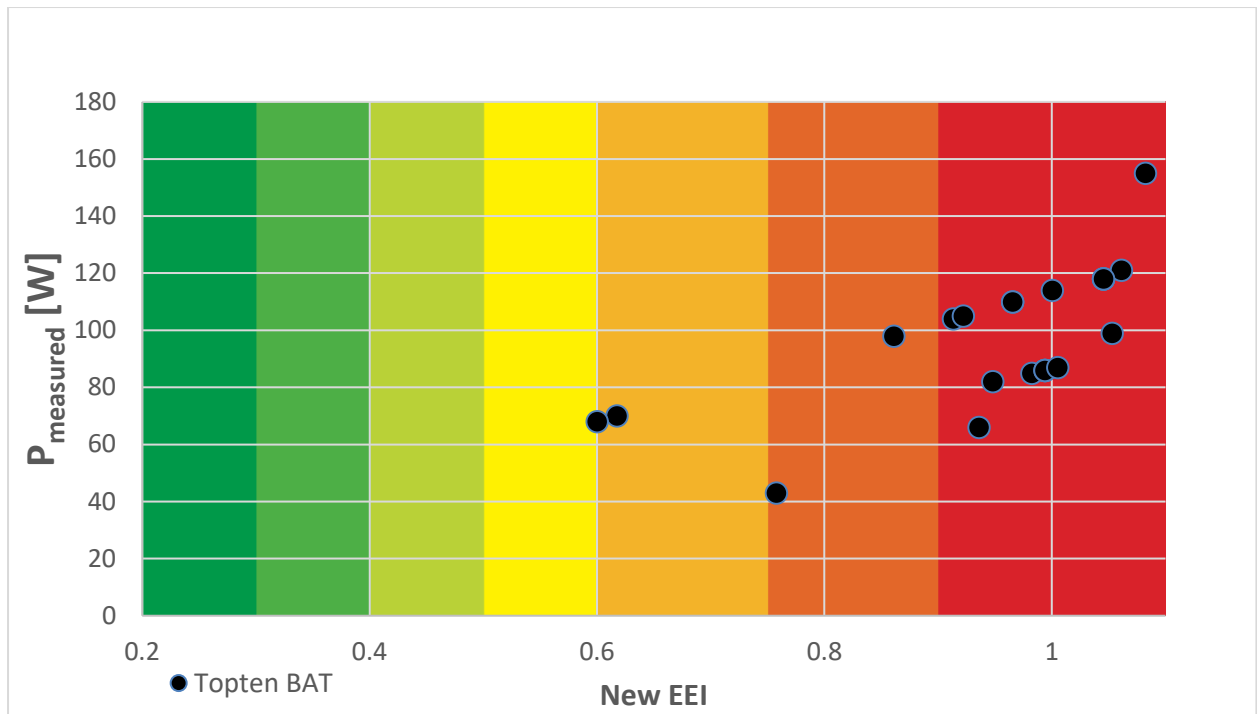


**Figure 3: Distribution of displays from the 2018 dataset with projection of expected improvements at entry into force of the rescaled labels<sup>6</sup>**

The following graph represents very recent data of best available televisions identified by Topten ([www.topten.eu](http://www.topten.eu)) according to the NEW label classes (May 2019).



**Figure 4 Distribution of full HD televisions, May 2019 (source: Topten.eu)**



**Figure 5 Distribution of UHD televisions, May 2019 (source: Topten.eu)**

Most of the models of best available televisions selected by Topten fall under F (orange) and G (red) (especially for UHD). Higher flexibility should therefore be given to UHD.

With regards to a power cap for televisions, Topten sets the following thresholds:

- TV models with HD resolution or lower: Maximum power in on mode, for all screen sizes: 64 W. (This corresponds to the maximum power of a 100cm A-class TV).
- TV models with 4K or UHD resolution: Maximum power in on mode, for all screen sizes: 85 W.

With regards to the sleep mode and off mode power (included in TR3.0 for monitors (aligned to Energy Star)) and networked standby (in TR3.0 for televisions) power requirements, the following values are included in the new Ecodesign (entering into force in March 2021).

**Table 5. Ecodesign requirement for off mode, standby mode and networked standby mode<sup>5</sup>**

	Off mode	Standby mode	Networked standby mode
Maximum limits	0.30	0.50	2.00
Allowances for additional functions when present and enabled			
Status display	0.0	0.20	0.20
Deactivation using room presence detection	0.0	0.50	0.50

Touch functionality	0.0	1	1
HiNA function	0.0	0.0	4.00
<i>Total maximum power demand with all additional functions when present and enabled</i>	<i>0.30</i>	<i>2.20</i>	<i>7.70</i>

Stakeholder feedback as well as own market research at Topten showed that the power demand of energy-efficient computer or television displays in sleep mode or standby mode varies between 0.1 W and 0.5 W; therefore, reducing the limit value could be possible in general.

Table 6 provides an indication of the overall relevance of setting stricter requirements for power demand in standby mode.

**Table 6: Estimation of annual power consumption in standby mode per electronic display**

<b>Power demand in standby mode [W]</b>	<b>Annual power consumption in standby mode [kWh/year] (PCs: approx. 3 hours per day)</b>	<b>Annual power consumption in standby mode [kWh/year] (TVs: approx. 20 hours per day)</b>
<b>0.1 W</b>	0.11	0.73
<b>0.3 W</b>	0.33	2.19
<b>0.5 W</b>	0.55	3.65
<b>1.0 W</b>	3.37	7.30

Assuming that computer displays are in standby mode on average 3 hours per day and televisions 20 hours per day, the overall annual power consumption would be in a range between 0.1 kWh and 7.3 kWh per year. Further reducing the EU Ecolabel requirements from 0.5 W to 0.3 W, for example, would result in total energy savings of around 0.2 kWh to 1.5 kWh per year and device, which seems to be negligible.

Against this background, in the TR4.0 (June 2018), new energy-efficient classes have been proposed based on existing data. The EU Ecolabel normally targets the top 10-20% of the market. Distribution of energy classes revealed higher efficiency for computer monitors. Considering the dataset (2014-2017) used in the revision of the Energy Labelling Regulation, the proposed classes in TR4.0 would have the following estimated pass rates:

- Televisions (672 models) - 15 % would be compliant with E class (10 % for UHD with F class).
- Monitors (159 models) - 17% would be compliant with D class (there are not enough available UHD model data to show a representative pass rate).

Higher flexibility is given to UHD and signage displays. F class was proposed for these displays. This is especially important for signage displays, for which there is a lack of data. It is considered that G class is not appropriate to be included in the EU Ecolabel.

With regards to the power cap, the cap discussed during the revision (64 W) has been kept. However, for UHD and above definitions, 100 W was proposed, which is the value introduced in 2017 for the amendment. In 2017, licence-holders were consulted in order to evaluate the impact of the amendment on the existing licences. Considering the information received for 140 models, it is concluded that 68% of the models would be compliant with 100 W. In addition, current data

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from the Energy Star database for signage displays reflect that 142 models out of 283 comply with 100 W power cap.

With regards to the sleep mode and off mode (included in TR3.0 for monitors (aligned to Energy Star)) and networked standby (in TR3.0 for televisions) power requirements, these are definitively not included as the upcoming Ecodesign covers both (TVs and monitors).

The impact of further requirements on energy use in off mode, standby mode and networked standby, compared to the new Ecodesign requirements, is expected to be negligible. Therefore, no such requirements are included.

### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. As a response to comments received the following amendments have been introduced in the final proposal:

- As a result of several comments received, a dynamic approach has been included. In March 2023 the energy efficiency classes within the eco-design directive will be tightened. In line with this, a tier has been included in EU Ecolabel. A stricter energy class is now requested after January 2023. However considering that D class for monitors is already very ambitious; this class has been kept in the proposal after 1 of January of 2023 while for the rest of displays a superior class has been proposed.
  - Several stakeholders requested to increase the power cap related to UHD and higher definitions in order to allow TVs above 55 inches to apply. As a result, the power cap has been relaxed to 125w. Updated data provided by a CB showed that at least 6 out of 47 big TVs above 70 inches are able to reach this value.
  - Reference to HDR (High Dynamic Range) has been included in order to allow developing technologies to apply. HDR is a feature in displays that may, or may not be activated, depending on the content that is being played by the user. If the content is normal SDR (Standard Dynamic Range) content then the HDR function is not activated and the displays functions normally, as reflected by the normal energy class of the product. However, if the content that is being played is HDR content, the display will use increased processing power and it will also boost its brightness and contrast, which will result in higher power consumption. Because the broadcast of HDR content is currently still very uncommon, and availability is limited to a few movies and series available on streaming platforms HDR feature has not been regulated by Ecodesign. However, for the purpose of consumer information, HDR is covered by the energy label, in addition to the normal SDR energy class of the display also the HDR energy class of the display. Therefore all the displays with HDR function will have 2 energy classes. By considering the HDR energy class for the EU Ecolabel criteria will potentially lead to a situation where no display on the EU market is able to qualify for the EU Ecolabel even when they have normal SDR energy class of F, E or D simply because they have HDR functionality, and their HDR energy class is G. Therefore it is proposed that for all displays (even those presenting HDR functionality) the energy class shall be measured in SDR mode.
  - .
  - Minor wording amendment has been introduced in the definition of UHD as a result of industry expert input.
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### 3.1.2 Criterion 1.2 - Power management

#### Decision 2011/337

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

*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.

#### Updated proposal for criterion 1.2: - Power management

**(a) Manual Brightness Control:** The electronic display shall allow the user to manually adjust the backlight intensity.

**(b) Automatic Brightness Control (ABC):**

- i. ABC is enabled in the normal configuration of the electronic display and persists in any other standard dynamic range configuration available to the end user;
- ii. if applicable, the value of on mode power measured with ABC disabled shall be equal to or greater than the on mode power measured with ABC enabled in an ambient light condition of 100 lux measured at the ABC sensor;
- iii. with ABC enabled, the measured value of the on mode power must decrease by 20% or more when the ambient light condition, measured at the ABC sensor, is reduced from 100 lux to 12 lux;
- iv. the ABC control of the display screen luminance meets all of the following characteristics when the ambient light condition measured at the ABC sensor changes:
  - the measured screen luminance at 60 lux is between 65% and 95% of the screen luminance measured at 100 lux;
  - the measured screen luminance at 35 lux is between 50% and 80% of the screen luminance measured at 100 lux;
  - the measured screen luminance at 12 lux is between 35% and 70% of the screen luminance measured at 100 lux.

**(c) Quick start functionality:** After enabling the quick start functionality (if the appliance supports the feature), the appliance shall automatically switch back to standby or off mode as a default setting 2 hours after the last user activity at the latest.

*Assessment and verification:* The applicant shall provide a declaration to certify that the appliance has been shipped with the power management settings stated above.

For requirement b) the applicant shall submit a test report for the electronic display showing that the conditions described are met. The relevant measurements shall be carried out according to Annex III to Commission Regulation (EU) 2019/2021 laying down eco-design requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council.

For requirement c) the applicant shall submit the relevant pages of the product documentation.

Notes to be placed in ANNEX:

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'Automatic Brightness Control' ('ABC') means the automatic mechanism that, when enabled, controls the brightness of an electronic display as a function of the ambient light level illuminating the front of the display.

'Luminance' means the photometric measure of the luminous intensity per unit area of light travelling in a given direction, expressed in units of candelas per square metre (cd/m<sup>2</sup>). The term brightness is often used to subjectively qualify the luminance of a display.

'Fast start' or 'quick start' means an enhanced reactivation function capable of completing the transition into 'on mode' in a shorter time than that of the normal reactivation function.

'default' referring to a specific setting, means the value of a specific feature as set at the factory and available when the customer uses the product for the first time and after performing a 'reset to factory settings' action, if allowed by the product.

### **Rationale and summary of the changes during the revision process**

Initially, it was proposed to include power management requirements in the revised EU Ecolabel criteria for electronic displays in line with Blue Angel RAL-UZ 145 for Television Sets from July 2012<sup>32</sup>. For more details, see Task 4 report 'Improvement Potential', Section 4.2.1.2 'power management'.<sup>2</sup>

ABC (Automatic Brightness Control) is an energy-saving feature that uses a built-in light sensor to detect ambient light levels in the room and adjusts screen brightness for viewer comfort. Reduced light levels mean reduced screen brightness and, consequently, energy savings.

An article on ambient light levels during television viewing<sup>33</sup> analysed the ambient light levels during television viewing in 60 homes over 7 days. The study revealed that the vast majority of viewing (79.5%) occurred at illuminance levels below 50 lux, while very little viewing (3.6%) occurred at illuminance levels greater than 300 lux. The authors of the study referenced the Energy Star Program Requirements for Televisions Version 5<sup>34</sup> test procedures for ABC-enabled televisions, which requires power measurements at 0 lux and 300 lux. They concluded that 0 lux illuminance is unnecessary and that other illuminance levels (10 lux, 50 lux and 100 lux) should be considered for power measurements, to better reflect actual illuminance levels during television viewing in residential applications. The Energy Star v.6.0<sup>35</sup> for Televisions requires power measurements to be taken at three different luminance levels: 10 lux, 50 lux and 100 lux.

A study of televisions on the market in 2014 showed that many televisions failed to take advantage of an opportunity to save power at low room light conditions of between 10 lux and 100 lux.<sup>36</sup>

In order to estimate potential energy savings by using ABC, the Energy Star database was consulted in 2014. Of 1 697 television units certified as Energy Star models, 556 were ABC-enabled. A total of 150 Energy Star models presented a maximum on mode power demand of 64 W and enabled ABC. The results showed an average 25% lower consumption at 50 lux compared to the measured power at 300 lux. (See Figure 6.)

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<sup>32</sup> <https://produktinfo.blauer-engel.de/uploads/criteriafile/en/DE-UZ%20145-201207-en%20Criteria.pdf>

<sup>33</sup> Invited Paper: Ambient Light Levels During Television Viewing. Kyle Sills, Konstantinos Papamichael, Keith Graeber, My Ton and Chris Wold (2014 Society for Information Display, SID Symposium Digest of Technical Papers, San Diego, CA, June 1–6, 2014, Volume 45, Issue 1, pages 599–602, June 2014).

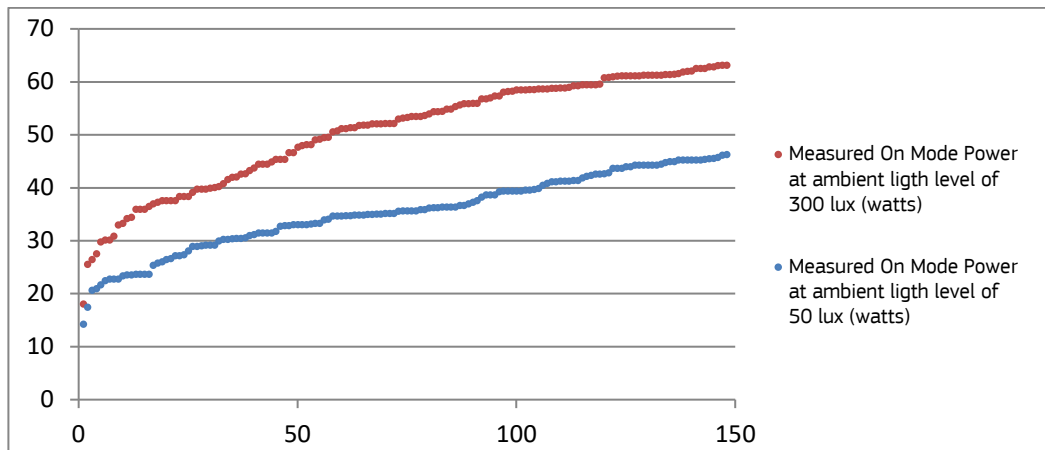
<sup>34</sup> [https://www.energystar.gov/index.cfm?c=archives.tv\\_v5\\_3](https://www.energystar.gov/index.cfm?c=archives.tv_v5_3)

<sup>35</sup> [https://www.energystar.gov/products/spec/television\\_specification\\_version\\_6\\_0\\_pd](https://www.energystar.gov/products/spec/television_specification_version_6_0_pd)

<sup>36</sup> Technical Article How to comply with the Energy Star 6.0 standard for LED TVs: a demonstration of reduced power consumption with improved picture quality. Markus Luidolt and David Gamperl.

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**Figure 6: Measured on mode power at ambient light at 300 lux and 50 lux for Energy Star television models below 64 W maximum power demand (power cap proposed in EU Ecolabel)**

With regards to the quick start functionality, a report created by Defra’s Market Transformation Programme in 2011 on televisions<sup>37</sup> revealed that in November 2010 this functionality was only present in the high-end models of three manufacturers. High-end products could be estimated to represent around 10% of the total market. However, this feature was expected to become much more prevalent in televisions with a diagonal screen size greater than 32 inches in future. The report showed that additional power consumption requirements (above the 1 W regulatory level) may be around 11 W to 12 W, but could be as high as 30 W to 38 W for high-specification products.

Representative data were not available on the proportion of televisions that currently feature such a function and their power demand to establish a threshold. However the Japanese Eco Mark criteria for Televisions Version 1.0<sup>38</sup> require that appliances with this function be set to the factory default as OFF. Furthermore, Blue Angel RAL-UZ 145 for Television Sets from July 2012<sup>32</sup> also included requirements on quick start (or fast start).

With this in mind, in TR3.0, the following changes were proposed:

- Advanced Brightness Control is a feature which, if calibrated correctly to reflect the real-life lighting conditions that users may experience, has been estimated to have the potential to save 20-30% of display energy use. ABC requirements were aligned to Energy Star v.6.0<sup>35</sup> for Televisions.
- A new requirement to disable the 'quick start' functionality by default for televisions offering such a function and to clearly state its major power demand were introduced aligned with the Japanese Eco Mark criteria for Televisions Version 1.0 and the Blue Angel RAL-UZ 145 for Television Sets.

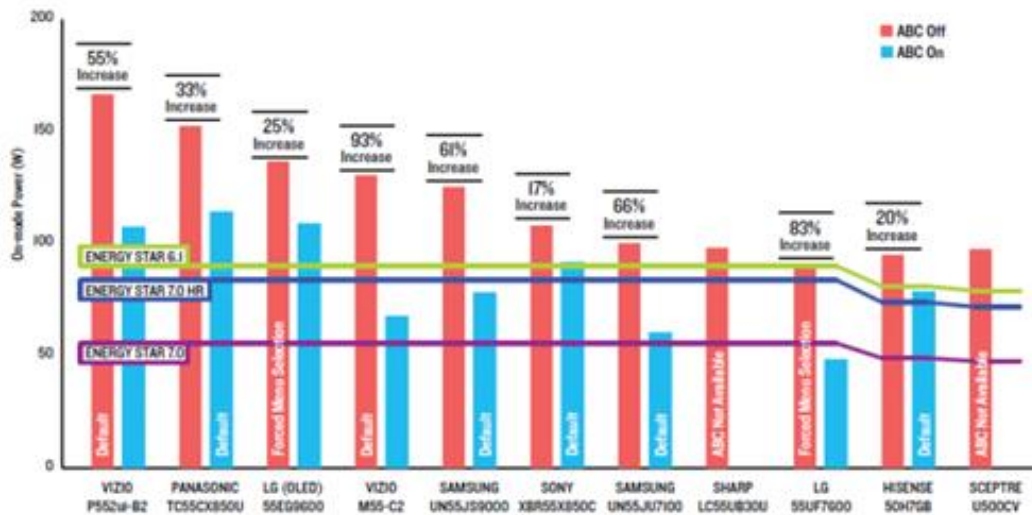
<sup>37</sup> BNCE TV07: Power Impacts of “Quick Start” Standby Functionality in Televisions.

<sup>38</sup> Eco Mark Product Category No. 152 “TelevisionVersion 1.0” Certification Criteria. (See at: <http://www.ecomark.jp/english/pdf/152eC1.pdf>)

- The criterion was focused on televisions considering that power management requirements for computer monitors were covered by Energy Star for displays originally included in energy-saving criteria.

The Impact Assessment<sup>39</sup> accompanying the new Energy Labelling and Ecodesign Regulations provides the following figures supporting the potential for energy savings related to ABC:

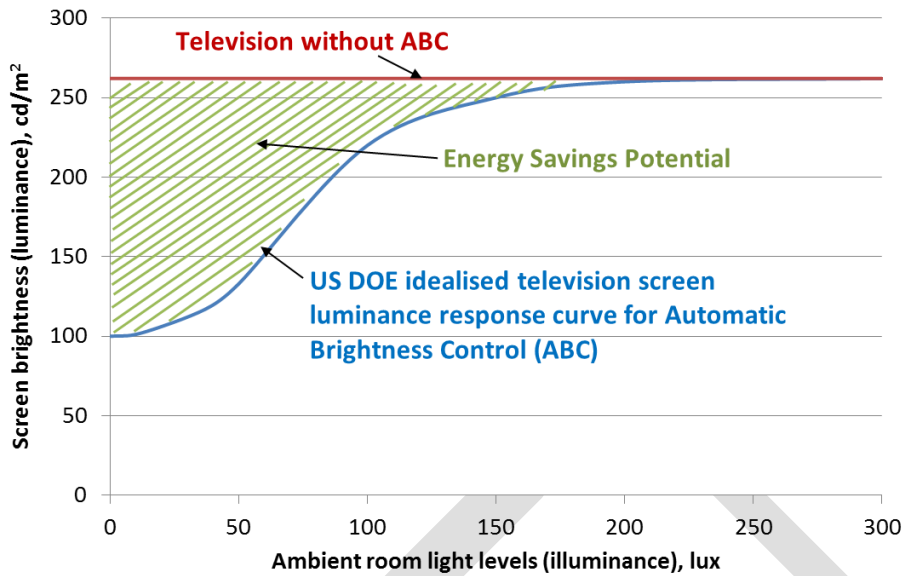
The following chart provides an overview of the likely influence on energy use of activation of ABC control in some televisions found on the US market.



**Comparison of 4K on-mode power use with ABC ON and OFF (Source: NRDC, <https://www.nrdc.org/sites/default/files/uhd-tv-energy-use-report.pdf>)**

The following figure illustrates how a logarithmic response curve can find the ideal relationship between illuminance and luminance for the human eye.

<sup>39</sup> Forthcoming.



**US DOE study (2012) looking at the room illuminance levels and screen luminance**

NB: Found a logarithmic response curve of human eye – doubling of brightness perceived the same - 10 : 20  
 :: 100 : 200 (lux)

ABC implementation in displays, however, can differ greatly from the idealistic curve. An appropriate testing method is consequently deemed necessary.

Against this background, the revised Ecodesign and Energy Labelling Regulations includes allowances and adjustments for the purpose of the EEI calculation (15% reduction in  $P_{measured}$  in Ecodesign and 10% reduction in  $P_{measured}$  in Energy Labelling) if all the following requirements are met:

<p><b>Ecodesign and Energy Labelling (allowances)</b></p>	<p><i>ABC is enabled in the normal configuration of the electronic display and persists in any other standard dynamic range configuration available to the end user;</i></p> <p><i>the value of <math>P_{measured}</math>, in the normal configuration, is measured, with ABC disabled or if ABC cannot be disabled, in an ambient light condition of 100 lux measured at the ABC sensor;</i></p> <p><i>if applicable, the value of <math>P_{measured}</math> with ABC disabled shall be equal to or greater than the on mode power measured with ABC enabled in an ambient light condition of 100 lux measured at the ABC sensor;</i></p> <p><i>with ABC enabled, the measured value of the on mode power must decrease by 20% or more when the ambient light condition, measured at the ABC sensor, is reduced from 100 lux to 12 lux;</i></p> <p><i>the ABC control of the display screen luminance meets all of the following characteristics when the ambient light condition measured at the ABC sensor changes:</i></p> <ul style="list-style-type: none"> <li>- <i>the measured screen luminance at 60 lux is between 65% and 95% of the screen luminance measured at 100 lux;</i></li> <li>- <i>the measured screen luminance at 35 lux is between 50% and 80% of the screen luminance measured at 100 lux;</i></li> <li>- <i>the measured screen luminance at 12 lux is between 35% and 70%</i></li> </ul>
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	of the screen luminance measured at 100 lux.
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In addition, the new Ecodesign indicates:

<b>Ecodesign</b>	<p><b>Forced menu and set up menus</b></p> <p><i>Electronic displays may be placed on the market with a forced menu on initial activation proposing alternative settings. Where a forced menu is provided, the normal configuration shall be set as default choice, otherwise the normal configuration shall be the out-of-the-box setting.</i></p> <p><i>If the user selects a configuration other than the normal configuration and this configuration results in a higher power demand than the normal configuration, a warning message about the likely increase in energy use shall appear and confirmation of the action shall be explicitly requested.</i></p> <p><i>If the user selects a setting other than those that are part of the normal configuration and this setting results in a higher energy consumption than the normal configuration, a warning message about the likely increase in energy consumption shall appear and confirmation of the action explicitly requested.</i></p> <p><i>A change by the user in a single parameter in any setting shall not trigger any change in any other energy-relevant parameter, unless unavoidable. In such a case a warning message shall appear about the change of other parameters and the confirmation of the change shall be explicitly requested.</i></p> <p><b>Peak white luminance ratio</b></p> <p><i>In the normal configuration, the peak white luminance of the electronic display in a 100 lux ambient light viewing environment shall not be less than 220 cd/m<sup>2</sup> or, if the electronic display is primarily intended for close viewing by a single user, not less than 150 cd/m<sup>2</sup>.</i></p> <p><i>If the electronic display's peak white luminance in the normal configuration is set to lower values, it shall not be less than 65 % of the peak white luminance of the display, in a 100 lux ambient light viewing environment in the brightest on mode configuration.</i></p>
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The finally voted EU Ecolabel criteria for personal, notebook and tablet computers<sup>30</sup> included criteria requiring that Automatic Brightness Control is installed.

In this context, considering the potential energy savings, for the updated proposal (TR4.0) it was suggested to keep the criterion on ABC. However, changes in the proposal are made in line with the revised Ecodesign and Energy Labelling Regulations. It is proposed that the conditions that permit the manufacturers to get reductions on the P<sub>measured</sub> for the EEI calculation in the new Energy Labelling and Ecodesign are made mandatory for the EU Ecolabel. Most of these conditions are considered relevant to be included as mandatory for the EU Ecolabel.

The requirements on Manual Brightness Control and 'quick start' remain with no major changes. In line with revised regulations, it is suggested that the criterion applies to all electronic displays within the scope (televisions, monitors and electronic signage displays). The previous proposal only applied to televisions as power management was covered in the Energy Star for monitors (initially computer monitors were requested to comply with Energy Star).

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### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. As a response to comments received the following minor amendments have been introduced in the final proposal:

- Under fast start functionality section, provisions overlapping with Ecodesign (under “forced menu and set up menus” section) have been removed.
- The requirement of quick start feature has been strengthened decreasing from 4 to 2 hours the time the appliance shall automatically switch back to standby or off mode after the last user activity.

## 3.2 Criterion 2 – Hazardous substances

### 3.2.1 Criterion 2.1 - Excluded or limited substances

#### 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.

**Updated proposal for criterion 2.1: Excluded or limited substances**

The presence in the product, or defined sub-assemblies and component parts, of substances that are identified according to Article 59 (1) of Regulation (EC) No 1907/2006<sup>40</sup> (the 'REACH Regulation') or substances and mixtures that meet the criteria for classification according to Regulation (EC) No 1272/2008<sup>41</sup> (the 'CLP Regulation') for the hazards listed in Table 1 shall be restricted in accordance with sub-criterion 2(a), (b) and (c). For the purpose of this criterion, Candidate List Substances of Very High Concern (SVHCs) and CLP hazard classifications are grouped in Table 1 according to their hazardous properties.

**Table 1. Grouping of Candidate List SVHCs and CLP hazards**

**Group 1 hazards**

**Hazards that identify a substance or mixture as being within Group 1:**

- Substances that appear on the Candidate List for Substances of Very High Concern (SVHCs)
- Carcinogenic, Mutagenic and/or Toxic for Reproduction (CMR) Category 1A or 1B CMR: H340, H350, H350i, H360, H360F, H360D, H360FD, H360Fd, H360Df

**Group 2 hazards**

**Hazards that identify a substance or mixture as being within Group 2:**

- Category 2 CMR: H341, H351, H361f, H361d, H361fd, H362
- Category 1 aquatic toxicity: H400, H410
- Category 1 and 2 acute toxicity: H300, H310, H330
- Category 1 aspiration toxicity: H304
- Category 1 Specific Target Organ Toxicity (STOT): H370, H372

**Group 3 hazards**

**Hazards that identify a substance or mixture as being within Group 3:**

- Category 2, 3 and 4 aquatic toxicity: H411, H412, H413
- Category 3 acute toxicity: H301, H311, H331, EUH070
- Category 2 STOT: H371, H373

**2(a) Restriction of Substances of Very High Concern (SVHCs)**

Substances that have been identified according to the procedure described in Article 59 (1) of the 'REACH Regulation' and are included in the Candidate List of SVHCs shall not be intentionally added to or formed in the product at concentrations of greater than 0.10% (weight by weight). The same restriction shall apply to the sub-assemblies forming part of the product that are listed in Table 2.

<sup>40</sup> Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ L 396, 30.12.2006, p.1).

<sup>41</sup> Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (OJ L 353, 31.12.2008, p. 1).

No derogation from this requirement shall be given to Candidate List SVHCs present in the product or in its sub-assemblies at concentrations greater than 0.10 % (weight by weight).

**Table 2. Sub-assemblies and component parts to which Criterion 2(a) shall apply**

<b>Printed Circuit Boards</b> (Printed Wiring Boards, populated motherboards, power boards (power supply units) and module boards )>10 cm <sup>2</sup>
<b>Electrical wiring/cables</b> (aggregated)
<b>External cables</b> (Power cable (AC and DC power cords), (modem cable and LAN cable if applicable), HDMI cable and RCA cable)
<b>External housing</b> (Back cover, front cover (bezel decoration) and stands)
<b>External housing of remote control</b>
LED backlights (LED arrays)

In communicating this requirement to suppliers of the listed sub-assemblies/component parts, applicants may pre-screen the REACH Candidate List using the IEC 62474 declarable substance list<sup>42</sup>. The screening shall be based on identification of the potential for presence of substances in the product.

**Assessment and verification:** The applicant shall compile declarations of the non-presence of SVHCs at or above the specified concentration limit for the product and the sub-assemblies identified in Table 2. Declarations shall be with reference to the latest version of the Candidate List published by ECHA<sup>43</sup> [at the moment of application](#). Where declarations are made based on a pre-screening of the Candidate List using IEC 62474, the screened list given to sub-assembly suppliers shall also be provided by the applicant. The version of the IEC 62474 declarable substance list used shall reflect the latest version of the Candidate List.

The declarations can also be provided directly to competent bodies by any supplier in the applicant's supply chain.

## 2(b) Restrictions on the presence of specific hazardous substances

The hazardous substances specified in Table 3 shall not be intentionally added to or formed in the specified sub-assemblies and component parts at or above the stipulated concentration limits.

**Table 3. Substance restrictions that shall apply to sub-assemblies and component parts**

<b>Substance group</b>	<b>Scope of restriction</b> (substances and sub-assemblies/component parts)	<b>Concentration limits (where applicable)</b>

<sup>42</sup> International Electrotechnical Commission (IEC), *IEC 62474: Material declaration for products of and for the electrotechnical industry*, <http://std.iec.ch/iec62474>

<sup>43</sup> ECHA, *Candidate List of substances of very high concern for Authorisation*, <http://www.echa.europa.eu/candidate-list-table>



i) Metal solder and contacts	Exemption 8b in accordance with Directive 2011/65/EU relating to the use of <i>cadmium in electrical contacts</i> shall not be permitted.	0.01% w/w <i>Test method:</i> IEC 62321-5
ii) Polymer stabilisers, colourants and contaminants	<p>The following organotin stabiliser compounds classified with Group 1 and 2 hazards shall not be present in <i>external cables</i>:</p> <ul style="list-style-type: none"> <li>Dibutyltin oxide</li> <li>Dibutyltin diacetate</li> <li>Dibutyltin dilaurate</li> <li>Dibutyltin maleate</li> <li>Diocetyl tin oxide</li> <li>Diocetyl tin dilaurate</li> </ul>	n/a
	<p><i>External housing of the display</i> shall not contain the following colourants:</p> <p>Azo dyes that may cleave to the carcinogenic aryl amines listed in Appendix 8 of the REACH Regulation, and/or</p> <p>Colourant compounds included in the IEC 62474 declarable substances list.</p>	n/a

	<p>Polycyclic Aromatic Hydrocarbons (PAHs) classified with Group 1 and 2 hazards shall not be present at concentrations greater than or equal to individual and sum total concentration limits in any external plastic or man-made rubber surfaces of:</p> <p><i>External cables</i>  <i>External housing of the remote control</i>  <i>Rubber parts of the remote control</i></p> <p>The presence and concentration of the following PAHs shall be verified:</p> <p><i>PAHs restricted by the REACH Regulation:</i>  Benzo[a]pyrene  Benzo[e]pyrene  Benzo[a]anthracene  Chrysen  Benzo[b]fluoranthene  Benzo[j]fluoranthene  Benzo[k]fluoranthene  Dibenzo[a,h]anthracene</p> <p><i>Additional PAHs subject to restriction:</i>  Acenaphthene  Acenaphthylene  Anthracene  Benzo[ghi]perylene  Fluoranthene  Fluorene  Indeno[1,2,3-cd]pyrene  Naphthalene  Phenanthrene  Pyrene</p>	<p>The individual concentration limits for PAHs restricted under REACH shall be 1 mg/kg</p> <p>The sum total concentration limit for the 18 listed PAHs shall not be greater than 10 mg/kg</p> <p><i>Test method: AfPS GS 2014:01 PAK.</i></p>
iii) Biocidal products	<p>Biocidal products intended to provide an anti-bacterial function shall not be incorporated into <i>External housing and rubber parts of the remote control.</i></p>	n/a
iv) Mercury in backlights	<p>Exemption 3 in accordance with Directive 2011/65/EU relating to the use of mercury in <i>cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL)</i> shall not be permitted.</p>	n/a
v) Glass fining	<p>Arsenic and its compounds shall not be used in the manufacturing of LCD display unit glass and</p>	0.0050% w/w

agents	screen cover glass.	
vi) Chlorine-based plastics	Plastic parts >25g must not contain chlorinated polymers. Note: For this specific sub-requirement, plastic cable housing is not considered as a "plastic part".	n/a

**Assessment and verification:** The applicant shall provide declarations of compliance and test reports according to the requirements in Table 3. Test reports, where required, shall be valid at the time of application for the relevant production model and all associated suppliers. Where sub-assemblies or component parts with the same technical specifications originate from a number of different suppliers, tests where applicable shall be carried out on parts from each supplier. The declarations/test reports can also be provided directly to competent bodies by any supplier in the applicant's supply chain.

### 2(c) Restrictions based on CLP hazard classifications

Flame retardants and plasticisers that meet the criteria for classification with the CLP hazards in Table 2 shall not be intentionally added to or formed in the sub-assemblies and component parts in Table 4 at or above a concentration limit of 0.10% (weight by weight).

**Table 4. Sub-assemblies and component parts to which Criterion 2(c) shall apply**

<i>Parts containing flame retardants</i>	
-	Printed Circuit Boards
-	External cables
-	External housing of the display
<i>Parts containing plasticisers</i>	
-	External cables
-	Internal electrical wiring
-	External housing of the display

### Derogations for the use of hazardous flame retardants and plasticisers

The use of flame retardants and plasticisers meeting the criteria for classification with CLP hazards listed in Table 1 are derogated from the requirements of criterion 2(c) provided that they meet the conditions specified in Table 5.

**Table 5. Derogation conditions that shall apply to the use of flame retardants and plasticisers**

<b>Substances and mixtures</b>	<b>Sub-assembly or component part</b>	<b>Scope of derogation</b>
Flame retardants	i) Printed Circuit Boards	Flame retardants classified with a Group 3 hazard and TBBPA (classified with Group 2) are derogated for use.
	ii) External cables	Flame retardant and its synergist classified with

		Group 3 hazard and <a href="#">Antimony trioxide -Sb<sub>2</sub>O<sub>3</sub>- (classified with Group 2)</a> are derogated for use.
	iii) External housing of the display	Flame retardants and their synergists classified with Group 2 and 3 hazards are derogated for use.
Plasticisers	i) External cables, internal electrical wiring and external housing of the display	Plasticisers classified with Group 3 hazards are derogated for use.

**Assessment and verification:** The applicant shall provide a declaration of compliance with criterion 2(c). The declaration shall be supported by the list of flame retardants, plasticisers and metal additives and coatings used in the sub-assemblies and component parts listed in Table 4 together with SDS supporting their hazard classification or non-classification.

For the derogated substances and mixtures listed in Tables 5, the applicant shall provide proof that all the derogation conditions are met. Where test reports are required, they shall be valid at the time of application for a production model.

The declarations/test reports can also be provided directly to competent bodies by any supplier in the applicant's supply chain.

### **Rationale and summary of the changes during the revision process**

The Task 3 LCA review identified that, with regard to freshwater aquatic ecotoxicity, marine aquatic ecotoxicity and terrestrial ecotoxicity, the manufacturing phase is more significant than the use phase. The impacts are mainly associated with environmental pollution related to the extraction of raw materials and to the processing of sub-assemblies such as motherboards.

The impact categories listed above are also significant for the more energy-intensive products in their use phase, such as desktops, being associated with electricity generation. Emissions during the end-of-life phase can also be significant if displays are disposed of improperly – for example, by burning cables and printed wiring boards to recover metals.

In general, LCA studies are not able to identify and characterise the hazard inventory of substances that may be present in a final product sold to a consumer. A specific background report was prepared to scope and identify hazards that may be present (Hazardous substances paper)<sup>44</sup>.

Following extensive discussions with stakeholders, a new approach was applied to the computers and televisions product groups. The methodology was based on the findings of the EU Ecolabel's Horizontal Task Force on Chemicals paper)<sup>45</sup>.

- An initial screening of the bill of components/materials (see Section 2.4 of the Hazardous Substances paper) was carried out, followed by an initial identification of substance groups by their function.

<sup>44</sup> [http://susproc.jrc.ec.europa.eu/televisions/docs/Task\\_Special\\_Hazardous\\_Substances\\_docx.pdf](http://susproc.jrc.ec.europa.eu/televisions/docs/Task_Special_Hazardous_Substances_docx.pdf)

<sup>45</sup> JRC-IPTS, *Findings of the EU Ecolabel Chemicals Horizontal Task Force – Proposed approach to hazardous substance criteria development*, 24<sup>th</sup> February 2014.

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- Case studies and OEM (Original Equipment Manufacturers) restricted substance listings were collated that enabled the state-of-the-art in hazard substitution to be identified.
  - Additional input was requested from stakeholders in order to identify substitutions that have been made and also, if required, to identify derogations that may be required.
  - A subgroup (SG) consisting of a representative cross-section of stakeholders was formed in order to obtain further information, discuss technical issues in detail and to develop a workable criterion proposal.

In order to screen and evaluate the existing evidence, two matrices were set up:

1. *Candidate List and RoHS screening matrix*: The IEC 62474 Declarable substance list for electrotechnical products<sup>46</sup> was used as the starting point for identifying substances from the most current ECHA Candidate List that may be relevant to computers and displays. The IEC list is frequently updated by a dedicated team and is therefore understood to be accurate as well as assisting in screening the list.
2. *Hazardous substance screening matrix*<sup>47</sup>: The evidence gathered during the revision was structured, firstly, according to substance groups, which can generally be seen to be related to functions associated with components of the product, and, secondly, according to the components/subcomponents where hazardous substances are/may be found.

The analysis carried out using the matrix was used to derive the following outputs which form the basis for the scope and ambition level of the criteria proposal:

- Hazard benchmarks: Substances that were currently used or were used until recently in mainstream products.
- Proposed substitution benchmarks: Substitutes for hazardous substances currently used in mainstream products that have been implemented, or are proposed for implementation, by leading manufacturers.
- Proposed restrictions: Substance or substance group restrictions that have been identified from OEM restriction lists or from risk assessment exercises by the European Commission, Member State or Intergovernmental bodies.

As a result, criteria with following elements were proposed:

- **Substances of Very High Concern**

In discussions within the SG, there was a general agreement on setting a threshold of 0.10% for the non-presence of Candidate List substances. This is the threshold for notification under the REACH Regulation and, moreover, manufacturers and their suppliers are familiar with having to provide declarations at or above this threshold. Manufacturers' experience was also that there are very limited substances on the Candidate List that may be present above 0.1% at the article level (usually only plasticisers).

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<sup>46</sup> International Electrotechnical Commission, *IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry*, <http://std.iec.ch/iec62474>

<sup>47</sup> [http://susproc.jrc.ec.europa.eu/televisions/docs/140429%20EU%20Ecolabel%20Electronic%20Displays\\_Hazardous%20substance%20matrix\\_AHWG2%20revision-v2.pdf](http://susproc.jrc.ec.europa.eu/televisions/docs/140429%20EU%20Ecolabel%20Electronic%20Displays_Hazardous%20substance%20matrix_AHWG2%20revision-v2.pdf)

A more significant issue raised by manufacturers was whether the threshold should be applied at 'complex article' (the whole product), sub-assembly, component or material level. This would be stricter than current practice because many products are imported as a finished article. Some manufacturers do not assemble their final products, having decided to outsource their design and assembly.

However, it was agreed to introduce further selectivity in the criterion because *some manufacturers request declarations of compliance at what is termed 'sub-assembly' level.*

In order to arrive at a sub-assembly (components) list, stakeholders were consulted during the revision. A definition of the main subassemblies that might typically be verified was created with the feedback received. A manufacturer from the SG stated that for the level described in table below they might be able to comply with the non-presence of Candidate List substances above 0.10%.

**Table 7: Proposed definition of sub-assembly and main components**

<b>Original proposed list of components</b>	<b>Agreed with SG</b>	<b>Definitions</b>
Printed Circuit Boards >10 cm <sup>2</sup>	Printed Circuit Boards >10 cm <sup>2</sup>	Populated motherboard, power board (power supply unit), module board and other PCBs assembly above 10 cm <sup>2</sup> .
Electrical solder and metal contacts	----	Not easy to define and localise. Proposed to be removed. Solders form part of cables/wiring or PCBs (will be addressed at these components).
Electrical and data connections (internal and external)	Electrical wiring/cables (aggregated)	All these parts are very light in separate form. It could be proposed to address them in aggregated form.
	----	Data connectors: Tuner, HDMI, USB and data storage device (HDD, SSD) if present. (Normally embedded in PCBs.)
External cables	External cables	Power cable or cord, (modem cable and LAN cable if applicable), HDMI cable, RCA cable.
External housing and enclosure materials	External housing	Back cover, front cover (bezel decoration) and stands.
External casing and surfaces of remote control	External housing of remote control	Housing of remote control.
Display screen glass	-----	The screen glass is normally integrated in the LCD panel. Proposed to be removed as a separate component.
Liquid crystal display unit	Liquid crystal display panel	Crystal black panel (cell).
Screen LED backlights	LED backlights	LED arrays.

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It was also noted in SG discussions that not all Candidate List substances are for electronics. The IEC 62474 substance declaration list<sup>48</sup> is used as a tool to pre-screen the Candidate List for relevance. This list includes notes on what functions substances serve and in which products and/or components they may be present. This is then provided to suppliers who must then provide declarations down to a concentration limit of 0.1%. In general, it was felt by SG members to be relevant and reasonable to carry out such a pre-screening.

- **Restriction of specific hazardous substances**

In April 2014, an initial criteria proposal was put forward based on the restriction lists of leading manufacturers. These lists are used to communicate to suppliers substances that shall not be present in their products. The different types of restrictions broadly fell into the following categories:

- plastic additives that impart a function that may be physical/mechanical, safety- or design-related e.g. *colourants, stabilisers*;
- restriction of *RoHS exceptions that may sunset*, e.g. lead solder in servers, cadmium in metal switches and relays;
- biocides use for consumer hygiene purposes, e.g. *biocide added to keyboard plastic*;
- contaminants and process residues in plastic and glass, e.g. *Polyaromatic Hydrocarbons in plastic and man-made rubber, arsenic in screen glass*.

Based on further analysis and stakeholder feedback, the criterion was streamlined and the following restrictions removed that were deemed unnecessary:

- phthalates that are already restricted under 2(a) because they are SVHCs;
- cadmium and lead that are already subject to legal requirements under RoHS;
- PFOA residue in PTFE non-dripping agents which may be present at less than 0.1% in plastic sub-assemblies;
- controls on cleaning and degreasing agents such as benzene as there is no evidence that they carry over to the final product at concentrations >0.1%.

Where possible, test methods for assessment and verification were cross-checked based on methods used by manufacturers and/or which are linked to RoHS.

- **Restriction of CLP hazards**

The initial background research highlighted that a complete picture of hazards that may be present in a display product is not available. Moreover, whilst the CAS numbers of colourants that may be used in different types of plastic can be identified from the catalogues of, for example, Clariant<sup>49</sup>

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<sup>48</sup> International Electrotechnical Commission (IEC), IEC 62474: *Material declaration for products of and for the electrotechnical industry*, <http://std.iec.ch/iec62474>

<sup>49</sup> Clariant (2007) *The coloration of plastics and rubber*, Pigments & Additives Division.

and BASF<sup>50</sup>, an overview of the hazard profile of additives such as colourants and their comparative improvement potential is not currently available. Suppliers are also often given flexibility as to how they meet certain specifications, e.g. plastic colour.

It was agreed early on in the AHWG and SG to focus attention on the hazard profile and **substitution of flame retardants and plasticisers**. Flame retardants and plasticisers have been the main focus for planned substitutions of hazardous substances by leading manufacturers. These substance groups are also notable for being the first examples of substitutions by computer and display manufacturers where hazard classifications have formed the basis for decision making. This process has been supported by research programmes of the US EPA and assessments using tools such as Green Screen. In TR3.0, indicative results based on a bill of materials of a LCD monitor demonstrated that a large proportion of each product is addressed, in some cases by several elements of the criterion proposal.

Having identified the main substitute flame retardants and plasticisers used by leading manufacturers, their hazard classifications were used to develop derogations reflecting the specific range of substances used in different computer components. Decisions on derogations submitted by stakeholders are summarised in TR3.0.

Member States and manufacturers requested a summary of the flame retardants and plasticisers that indicatively would meet the derogation conditions in proposed criterion. These are summarised in following tables.

**Table 8: Flame retardants deemed to meet the derogation conditions**

Flame retardant	CAS No	Hazard group
<i>Derogated for use in Printed Circuit Boards and external cables</i>		
TBBPA (only in Printed Circuit Boards)	79-94-7	Group 2: H400, H410
Dihydrooxaphosphaphenanthrene (DOPO) CAS No	35948-25-5	Group 3: H411, H412
Fyrol PMP (Aryl Alkylphosphinate)	63747-58-0	Group 3: H413
Magnesium hydroxide (MDH) <i>with zinc synergist</i>	1309-42-8	Group 3: H413
Ammonium polyphosphate	68333-79-9	Group 3: H413
Aluminium hydroxide (ATH) <i>with zinc synergist</i>	21645-51-2	Group 3: H413
Bisphenol A bis (Diphenyl phosphate)	5945-33-5	Not classified
<i>Derogated for use in plastic external housing of the display</i>		
Triphenyl phosphate	115-86-6	Group 2: H400, H411
Resorcinol bis (Diphenyl phosphate)	125997-21-9	Group 2: B, H400, H410
Phosphoric acid, mixed esters with [1,1"-bisphenol-4,4"-diol] and phenol	1003300-73-9	Group 2: H351, H400, H410

<sup>50</sup> BASF, *Housing applications*, Accessed 2014, [http://www.plasticadditives.basf.com/ev/internet/plastic-additives/en\\_GB/content/plastic-additives/Industries/Electrical\\_Electronics/electrical\\_electronics\\_applications](http://www.plasticadditives.basf.com/ev/internet/plastic-additives/en_GB/content/plastic-additives/Industries/Electrical_Electronics/electrical_electronics_applications)



Polyphosphonate	68664-06-2	Group 2: H351, H410
Ethane bis (pentabromophenyl) (EBP)	84852-53-9	Group 2: H351
Antimony trioxide synergist (with EBP)	1309-64-4	Group 2: H351
Poly[phosphonate-co-carbonate]	77226-90-5	Group 3: H413
Bisphenol A bis (Diphenyl phosphate)	5945-33-5	Not classified

**Table 9 Plasticisers deemed to meet the derogation conditions**

Plasticiser	CAS No	Hazard group
<i>Derogated for use in external cables, internal electrical wiring and external housing of the display</i>		
Triocetyl trimetallate (TOM/TOTM)	3319-31-1	Not classified
Dioctyl terephthalate (DOTP)	6422-86-2	Not classified
Hexamoll DINCH	166412-78-8	Not classified
DIDP	68515-49-1	Not classified
DINP	28553-12-0	Not classified.

A number of stakeholders highlighted the need to address the improper disposal of computers/displays in the end-of-life phase. Concerns relating to the end-of-life phase of electrical products have driven action by computer manufacturers to phase out those materials and flame retardants for which evidence exists of the potential for toxic emissions<sup>51</sup>. In light of this, the proposal included in TR3.0 reflects several derogations in the event that low emissions were demonstrated. However, these conditions introduced a high degree of complexity to the criterion.

The revised Ecodesign (2019) regulation includes requirements related to the end-of-life treatment of the displays such as the marking of plastics, in particular if containing flame retardants, and the possible presence of mercury and cadmium (more details in Criterion 4 – End-of-life management).

Nordic Swan for televisions and projectors (Version 5.5 (20 June 2013 - 30 June 2020)<sup>52</sup>) with 88 certified products contains the following criteria with regards to hazardous substances.

<b>Flame retardants in plastic and rubber parts</b>	<ol style="list-style-type: none"> <li><i>The flame retardants Hexabromocyclododekan (HBCDD), tris(2-chloroethyl)phosphate (TCEP) and high chlorinated short chain and high chlorinated medium chain chloro paraffins must not be added.</i></li> <li><i>The flame retardant Tetrabromobisphenol-A (TBBP-A) must not be added.</i></li> <li><i>Other organic halogenated flame retardants and other flame retardants assigned one or more of the following risk phrases, or combinations, must not be added: H350 (may cause cancer), H350i (may cause cancer by inhalation), H340 (may cause</i></li> </ol>
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<sup>51</sup> Chem Sec, *Leading Electronics companies and Environmental organisations urge EU to restrict more hazardous substances in electronic products in 2015 to avoid more global dioxin formation*, 19th May 2010, [http://www.chemsec.org/images/stories/publications/ChemSec\\_publications/RoHS\\_restrictions\\_Company\\_\\_NGO\\_alliance.pdf](http://www.chemsec.org/images/stories/publications/ChemSec_publications/RoHS_restrictions_Company__NGO_alliance.pdf)

<sup>52</sup> [file:///C:/Users/vidacan/Downloads/071e\\_5\\_5\\_CD\\_071\\_TV\\_och\\_projektorer\\_5\\_Engelska.pdf](file:///C:/Users/vidacan/Downloads/071e_5_5_CD_071_TV_och_projektorer_5_Engelska.pdf)

	<p>heritable genetic damage), H360F (may damage fertility), H360D (may cause harm to the unborn child), H360Fd (may damage fertility, suspected of damaging the unborn child), H360Df (may cause harm to the unborn child, suspected of damaging fertility)</p> <p>Exceptions from 2) are made for printed circuit board.</p> <p>Exceptions from 3) are made for flame retardants:</p> <ul style="list-style-type: none"> <li>-In cases where there is demand for safety reason with reference to low voltage Directive 73/23/EG or standard EN 60335-1.</li> <li>-Printed circuit board, PCB.</li> <li>-Plastic and rubber parts that weight less than 25 gram and are parts of electric components.</li> </ul> <p>Exceptions are not made for flame retardants in 1) or that are regulated according to the RoHS Directive (2011/65/ EG).</p> <p>Assessment: The manufacturer of the TV or projector must provide a list of plastics and rubber used in plastic parts in the product signed by filling out Appendix 2 – Plastics and rubber in TV and Projector, Manufacturer’s Declaration. The plastic and rubber manufacturer must provide a list with flame retardants used in plastic parts, by filling out Appendix 3 – Flame retardants in plastics and rubber, Plastic and rubber manufacturer’s declaration. The manufacturer of flame retardants, used in plastic and rubber parts, must certify that the requirements are fulfilled by filling out Appendix 4 – Flame retardant manufacturer’s declaration and submit an MSDS for each flame retardant. Confidential information can be sent directly to the Nordic Ecolabel.</p>
<p><b>Chlorine-based plastics</b></p>	<p>Plastic parts &gt;25g must not contain chlorinated polymers.</p> <p>Assessment: Declaration from the manufacturer of TV/projector, showing that the requirement is fulfilled.</p>
<p><b>Phthalates in the external power cable</b></p>	<p>The external power cable delivered with the product must not contain the following substances: Diethylhexyl phthalate (DEHP), Dibutyl phthalate (DBP/DnBP), Benzyl butyl phthalate (BBP), Dicyclohexyl phthalate (DCHP), Diisobutyl phthalate (DIBP), Diisononyl phthalate (DINP), Diisodecyl phthalate (DIDP), Di-n-octylphthalate (DNOP), Dihexyl phthalate (DHP), Diethyl phthalate (DEP), Diisoheptyl phthalate (DIHP), Bis(2-methoxyethyl) phthalate, Diisopentyl phthalate, N-pentyl-isopentyl phthalate</p> <p>Ingoing substances are defined as all substances in the product – including additives, but not residuals from production. Residuals are defined as residuals, pollutants and contaminants derived from the production, which are present in the final product in amounts less than 1 000 ppm (0.1% by weight, 1 000 mg/kg), but not substances added to the raw materials or product intentionally and with a purpose – regardless of amount. Known substances realised from the raw materials are also regarded as ingoing substances. Declaration is made by the chemical supplier based to the best of his/her knowledge at the given time, also based on information from raw material manufacturers, recipe and available knowledge on the chemical product with reservations for new advances and new knowledge. Should such new knowledge arise, the undersigned is obliged to submit an updated declaration to Nordic Ecolabelling.</p> <p>Assessment: Declaration from the cable manufacturer, Appendix 6, can be used.</p>
<p><b>Mercury content in background light in LCD displays and projector lamp</b></p>	<p>The background light in the TV-screen must not have any mercury (Hg) content. The lamp for projectors cannot contain mercury (Hg).</p> <p>A declaration from the manufacturer of the TV/projector showing that the requirement is fulfilled. The manufacturer of the TV/projector shall also describe the technique used.</p>

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Several discussions around Tetrabrombisphenol-A (TBBPA) were carried out during the revision. Manufacturers stated that TBBPA is being replaced with halogen-free FRs. However, due to cost and reliability issues, they claimed that TBBPA is still needed for bare PWB board in specific TV parts. Reliability issues include:

- 1) hardness: halogen-free PWB is harder than PWB using halogens; this means that it is easily broken;
- 2) smell test: quality assessment smell test for PWB assembly fails when using halogen-free PCB board.

The hazardous criterion included in the latest EU Ecolabel criteria for personal, notebook and tablet computers<sup>30</sup> seemed to be very complex and stakeholders claim that, as a result, no licences were registered for this product group in 2019 and this one of the reasons the criteria set has been discontinued. In this context, for the updated criterion included in TR4.0, it was proposed to maintain the proposal on hazardous substances but to simplify it where possible in order to make it workable and to not impact considerably on existing licences for televisions. The general wording of this requirement and in particular the assessment and verification sections were modified to seek better alignment with recently voted product groups.

#### Sub-criterion 2(a): SVHCs

- Manufacturers obtain declarations for the presence/non-presence of Candidate List substances to meet the legal obligation for notification at concentrations >0.1% under the REACH system. This is generally obtained for the whole imported article as most electronic displays are assembled outside the EU. However, some manufacturers additionally seek notifications for sub-assemblies and components.
- It is therefore proposed that in sub-criterion 2(a) SVHC declarations are required for the product as a whole and a defined set of 'sub-assemblies'. The additional declaration for sub-assemblies would introduce an additional level of strictness, differentiating those manufacturers who require more information from their suppliers.
- It is additionally proposed in sub-criterion 2(a) that, reflecting current practices, the process of screening the Candidate List for relevant substances is made easier for applicants by allowing use of the IEC 62474 declarable substance list.
- Minor changes have been introduced in the wording in line with recently voted product groups.

#### Sub-criterion 2(b): Restrictions on the presence of specific hazardous substances

- The industry is more accustomed to communicating requirements for the non-presence of specific substances to suppliers than hazard restrictions. A sample of manufacturers' substance restriction lists were therefore analysed and a list compiled for the EU Ecolabel criterion, with a focus on restrictions that restrict Group 1 and 2 hazards.
- For each restriction, specific substances have been identified, together with their hazard classification and a specification for how they shall be restricted. Combinations of laboratory tests and declarations are requested for verification. Reflecting current best practice, testing is proposed as being required for each supplier of identical components or sub-assemblies.

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- Minor changes have been introduced in the wording in line with recently voted product groups.

#### Sub-criterion 2(c): Hazard-based restrictions

- Leading manufacturers have started to identify, screen and request the substitution of hazardous flame retardants and plasticisers based on their hazard classifications. This is not yet the case for other types of hazardous substances that may be present in a display product. It was agreed early on in the AHWG and SG to focus attention on the hazard profile and substitution of flame retardants and plasticisers.
- Hazards have been restricted for flame retardants and plasticisers in a way that reflects substitutions of hazardous substances made by leading manufacturers. Safer substances have been identified and their hazard profile determined. (See Table 8 and Table 9.)
- Derogations discussed during the revision are kept with changes in order to simplify and make it workable. For instance, references to emission tests have been deleted due to the high complexity of the requirement and restrictions on metallic parts have been deleted due to the low relevance in the product. As reflected in the table above, Nordic Swan includes an exception for TBBPA use in PCBs. In line with this requirement, it is suggested that TBBPA is derogated exclusively for use in PCBs.

#### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. As a response to comments received the following amendments have been introduced in the final proposal:

- Under SVHC section, the specific component *LCD panel film* has been removed as UV328 and Boric acid are used for polarizer in LCD panel film.
  - Seeking for harmonisation with other schemes (Nordic Swan and TCO) and as requested by several stakeholders, chlorine-based plastics (plastic parts >25g must not contain chlorinated polymers) has been restricted.
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### 3.2.2 Criterion 2.2 – Activities to reduce supply chain fluorinated greenhouse gas (GHG) emissions

Decisions 2011/337 and 2011/330
No requirements
Updated proposal for criterion 2.2 – Activities to reduce supply chain fluorinated greenhouse gas (GHG) emissions
<p>The applicant shall gather the following information from their LCD display suppliers by which they shall demonstrate their activities to reduce GHG emissions from the production process, including the performance of abatement systems they have installed:</p> <ul style="list-style-type: none"><li>(a) Specification of which of the F-GHGs are used and which are being reduced.</li><li>(b) Estimated annual F-GHG emissions intensity (in kg CO<sub>2eq</sub> per m<sup>2</sup> of flat panel displays (array glass) produced) across manufacturing sites for the most recent year.</li><li>(c) Indication of the destruction or removal efficiencies (DREs) of installed abatement systems for each of the F-GHGs used.</li></ul> <p><b>Assessment and verification:</b> <i>The applicant shall provide the supporting documentation containing the information above from their display suppliers to the competent body. The documentation can also be provided directly to competent bodies by any supplier in the applicant's supply chain.</i></p>

#### **Rationale and summary of the changes during the revision process**

Fluorinated greenhouse gases (GHG) are among the most potent and persistent GHGs contributing to global climate change; they are relevant in the manufacture of semiconductors, light-emitting diodes and LCD flat panel displays. It was difficult to set product-related criteria (difficulties to compare panel suppliers' F-GHG emissions due to a lack of consistency in estimating emissions, estimating emissions reductions, and monitoring the efficacy of installed abatement systems). Therefore, initially, within the EU Ecolabel revision, a process-oriented approach was proposed, based on the revision proposal of Nordic Ecolabelling criteria for television displays. For more details, see the Task 4 report 'Improvement Potential', Section 4.2.5.2.2 'Minimising the use of F-gases in the production'.

Generally, LCD panel manufacturers have used the following F-gases:

- NF<sub>3</sub>, being used in chamber cleaning of the deposition process;
- SF<sub>6</sub>, being used in LCD surface treatment of the dry etching process;
- CF<sub>4</sub> and c-C<sub>4</sub>F<sub>8</sub>, being used for OLED panel manufacturing.

A consideration could be changing SF<sub>6</sub> to NF<sub>3</sub>, since the latter has a lower GWP (GWP - SF<sub>6</sub>: 23,900, NF<sub>3</sub>: 17,200).

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In theory, there is the possibility that F<sub>2</sub> and COF<sub>2</sub> may replace NF<sub>3</sub>, but in practice these two gases have scarcely been used. The reasons are that F<sub>2</sub> lacks stability and COF<sub>2</sub> has a lack of usage and manufacturing records. For these reasons, it is inevitable that F-gases have to be used in LCD manufacturing processes.

The efforts below are known to improve the emissions from flat panel display manufacturing:

- Participation in WLICC (World LCD Industry Cooperation Committee) with Korean, Japanese, Chinese and Taiwanese LCD manufacturing companies making several efforts to reduce F-gas emission voluntarily. WLICC was organised in July 2001 for a new industrial mechanism aimed at contributing to the promotion of global LCD industry cooperation to work on environmental issues. WLICC has made efforts to reduce PFC emission through a fair and equitable burden among members, and active information exchanges, adopting effective approaches toward implementation of global warming countermeasures.
- Being designated as one of the companies that are managed and controlled by the Korean GHG gas Regulation, i.e. having plans for prolonged investment in treatment facilities to reduce F-gas emission.

One of the stakeholders considered this new criteria proposal to be interesting and important but asked to verify the feasibility in order to avoid no one being able to apply for the EU Ecolabel due to too stringent or too ambitious criteria.

One of the manufacturers argued that they cannot interfere with suppliers' manufacturing processes that do not have direct impacts on the parts they supply to manufacturers. The criterion, if maintained, was requested to be a general information requirement rather than a prescriptive requirement. In addition, a confidentiality issue relating to actual F-gas abatement programmes implemented by display manufacturers was mentioned, so NDA may be required in submitting relevant information to the competent body.

It is difficult to compare panel suppliers' F-GHG emissions due to a lack of consistency in estimating emissions, estimating emissions reductions, and monitoring the efficacy of installed abatement systems. Also, stakeholder feedback did not provide enough information to establish a prescriptive criterion on abating fluorinated GHG emissions during LCD production.

US EPA (2013)<sup>53</sup> has developed sets of questions that are intended to be a starting point to help panel purchasers and retailers to understand how their suppliers are reducing their F-GHG emissions and identify opportunities for discussions to target and implement further mitigation efforts.

The second criterion proposal (see TR2.0) was based on these questions. Based on the discussions at the second AHWG meeting, the criterion was redrafted.

- It was clarified that the applicant shall gather the GHG emissions information from suppliers and provide it to competent bodies.
- The information to be collected was reduced, showing a few bullet points with a focus on gathering information to set the basis for the future setting of limits (e.g. amount and type of GHGs used per display/abated amount ratio).

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<sup>53</sup> [http://www.epa.gov/climateleadership/documents/questions\\_for\\_suppliers.pdf](http://www.epa.gov/climateleadership/documents/questions_for_suppliers.pdf)

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IEEE Std. 1680.3™ -2012 includes the following optional requirement.

<p><b>4.1.8.1 Optional— Reduce fluorinated gas emissions resulting from flat panel display manufacturing</b></p>	<p><i>Product criterion: The manufacturer shall declare that the supplier of flat panel displays used in products declared to conform to this criterion has installed, operated, and maintained control technology designed specifically to recover or destroy fluorinated greenhouse gases (F-GHGs) used in the production of flat panel displays. The intent of this criterion is to enable recovery, destruction, or removal of at least 90% of the F-GHGs used across all flat panel display manufacturing facilities. This declaration shall be supported with a letter provided by the flat panel display supplier. F-GHGs include CF4, C2F6, C3F8, C-C4F8, C4F8O, CHF3, NF3, and SF6.</i></p> <p><i>The letter shall assure the following:</i></p> <ul style="list-style-type: none"> <li><i>–That the supplier has installed control technology covering at least 90% of the equipment used in each and every type of operation that uses F-GHGs in the production of flat panel displays. This includes equipment used in all manufacturing and ancillary operations related to flat panel displays, such as dry etching and chamber cleaning.</i></li> <li><i>–That the supplier installs, operates, and maintains the control technology in accordance with the control technology supplier’s specifications.</i></li> </ul> <p><i>Manufacturers shall declare “Not applicable” for this criterion on the MSE Registry for products that do not contain flat panel displays manufactured with F-GHGs.</i></p>
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Nordic Swan for televisions and projectors (Version 5.5 (20 June 2013 - 30 June 2020)<sup>54</sup>) with 88 certified products contains the following criteria with regards to greenhouse gases.

<p><b>Declaration of nitrogen trifluoride (NF<sub>3</sub>) and sulphur hexafluoride (SF<sub>6</sub>) emission during LCD production</b></p>	<p><i>The LCD panel must be produced in such a way that the greenhouse gases NF3 and SF6, if part of the production process, are abated by a system that is an integrated part of the production process. It is the responsibility of the manufacturing company to ensure that the abatement system is installed, operated and maintained in accordance with the manufacturers (of the abatement system) specifications. The manufacturer of the LCD shall declare the amount of NF3 and SF6 purchased in relation to amount of LCD (m2) produced over one year.</i></p> <p><i>Assessment: Description of the abatement system for NF3 and SF6 gases used in the production of the LCD modules that are used in the TV. Declaration from the manufacturer(s) of the LCD, declared by production site. The manufacturer of the TFT-cell shall declare the amount of NF3 and SF6 purchased in relation to amount of TFT-cell (m2) produced over one year. Confidential information can be sent directly to the Nordic Ecolabel.</i></p>
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For the updated proposal in TR4.0, minor wording changes have been introduced in this criterion in order to make it clearer and to allow suppliers to provide the relevant information directly to competent bodies, due to the confidentiality issues raised during the revision and in line with the Nordic Swan text.

### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. No changes have been introduced under this criterion after the occultation.

<sup>54</sup> [file:///C:/Users/vidacan/Downloads/071e\\_5\\_5\\_CD\\_071\\_TV\\_och\\_projektorer\\_5\\_Engelska.pdf](file:///C:/Users/vidacan/Downloads/071e_5_5_CD_071_TV_och_projektorer_5_Engelska.pdf)

### 3.3 Criterion 3 – Reparability and commercial guarantee

The research results of Task 3 and Task 4 revealed that close attention should be paid to the extension of the lifetime of televisions and external computer displays to reduce the overall environmental impacts caused by ever shorter lifecycles and continual manufacturing of new products which increases the environmental and social burdens of primary extraction and to reduce the impacts caused by the manufacturing processes.

In the current criteria documents, requirements affecting the lifetime of televisions and external computer displays are subsumed under different criteria titles (televisions: 'lifetime extension'; external computer displays: 'user reparability').

To illustrate the importance of lifetime extension for televisions and external computer displays, for the revision it was proposed to cluster the associated criteria, and complement them with some new proposals.

Decisions 2009/300 and 2011/337
Televisions: "Lifetime extension" The manufacturer shall offer a commercial guarantee to ensure that the television will function for at least two years. This guarantee shall be valid from the date of delivery to the customer. The availability of compatible electronic replacement parts shall be guaranteed for seven years from the time that production ceases. Assessment and verification: The applicant shall declare the compliance of the product with these requirements.
External Computer Displays No explicit criterion on lifetime extension
Televisions No explicit criterion on user reparability
External Computer Displays: "User reparability": 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 computer monitor. 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.
Updated proposal for criterion 3: - Reparability and commercial guarantee
(a) Design for repair: (i) The following spare parts of electronic displays shall be accessible and exchangeable by the use of commercially available tools (i.e. all tools except proprietary tools, e.g. screwdriver, spatula, pliers, or tweezers): <ul style="list-style-type: none"><li>-screen assembly and LCD backlight,</li><li>-stands, and</li><li>-power and control circuit boards.</li></ul> (ii) Adhesives <a href="#">which need to be removed with heat or chemicals</a> shall not be used to fix the



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back cover of the electronic display.

(iii) Casing parts are free of electronic assemblies [which cannot be removed with use of commercially available tools](#).

- (b) Repair manual: The applicant shall provide clear disassembly and repair instructions (e.g. hard or soft copy, video) and make them publicly available ([at no additional cost](#)), to enable a non-destructive disassembly of products for the purpose of replacing key components or parts for upgrades or repairs.
- (c) 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 electronic display, including contact details as appropriate [and the recommended manufacturer price of spare parts](#). During the guarantee period referred to in (e) this may be limited to the applicant's Authorized Service Providers.
- (d) Availability of spare parts: The applicant shall ensure that original or backwardly compatible spare parts (those mentioned in (i) [and those included under section 5 of Commission Regulation \(EU\) 2019/2021 laying down eco-design requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council](#), as a minimum) are publicly available for at least 8 years following the end of the model production.
- (e) Commercial guarantee: without prejudice to the legal obligations of the seller under national law on legal and commercial guarantees, the applicant shall provide at no additional cost a minimum of a 3 year commercial guarantee during which time they shall ensure the goods are in conformity with the contract of sale. This guarantee shall include a service agreement with pick-up and return [for cases where repair is not done on-site](#).

**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) *An exploded diagram showing how casing parts, chassis and electric/electronic assemblies are assembled in the product.*
- (b) *A copy of the commercial guarantee.*
- (c) *A copy of the repair manual.*
- (d) *A copy of the user instructions.*

**Note:**

Proprietary tools are tools that are not available for purchase by the general public or for which any applicable patents are not available to license under fair, reasonable, and non-discriminatory terms. Spare parts are all components or assemblies that can potentially fail and/or that are expected to need replacement within the service life of the product. Other parts which have a lifetime usually exceeding the typical life span of the product are not spare parts.

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### **Rationale and summary of the changes during the revision process**

To avoid an earlier replacement of the whole television or external computer display in the case of defective single components, the reparability of products is a major factor facilitating a lifetime extension.

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A case study by WRAP (2011)<sup>55</sup> of three LCD television models to illustrate and encourage the durability and repair summarises the following most common faults that cause failure and shorten the product's lifetime:

- screen faults – due to damage, sometimes caused by impact;
- power circuit board faults;
- main circuit board faults – including hardware and microchip software;
- damage to connections – often between circuit boards; and
- damage to television stands.

Assemblies such as the screen that are fragile and critical to use are particularly susceptible to damage. Damage occurs through strains on connectors and PCBs (printed circuit boards) that are subject to flexing, causing strain on soldered joints. Electronic components and solder can also become damaged by variations in temperature and humidity, for example, which exacerbate poorly soldered joints and corrupt chips.

The following aspects have been addressed during the revision of this criterion:

- **Design for repair:** the criterion aims to ensure that the consumer is able to easily repair an EU Ecolabel computer product. A list of key components with significant potential for failure and a reference to universal tools have been included. The importance of reparability criteria was remarked on by a consumer organisation stakeholder.
- **Repair manual:** provision of clear instructions in the form of a repair manual to enable replacement of the key components.
- **Repair service/information:** provision of information to let the user know where to go to obtain professional repairs and servicing of the device.
- **Availability of spare parts:** availability of spare parts for a certain period of time after ceasing production. From the industry side, manufacturers claimed that 7 and 5 years seem too high to be realistic values and they remarked that producers say that consumers tend not to repair televisions and monitors since it is not convenient for them.
- **Extended commercial guarantee:** the relevance of an extended guarantee was questioned during the revision. On one hand, some stakeholders mentioned that the main failures on displays normally lead to TV replacement while, on the other hand, others expressed the opinion that an extended legal guarantee contributes to the quality and durability of the product. Finally, a requirement was included on an extended guarantee (aligned to the computer product group). The Consumer Sales Directive (1999/44/EC) regulates aspects of the sale of consumer goods and associated legal guarantees. According to Directive 1999/44/EC, the term guarantee shall mean any undertaking by a seller or producer to the consumer, given without extra charge, to reimburse the price paid or to replace, repair or handle consumer goods in any way if they do not meet the specifications set out in the guarantee statement or in the relevant advertising. In addition, Directive 2011/83/EU on consumer rights defines the concept of 'commercial guarantee' (also known as 'warranty'), which can be offered by sellers or

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<sup>55</sup> Cf. <http://www.wrap.org.uk/sites/files/wrap/TV%20case%20study%20AG.pdf>

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producers in addition to the legal guarantee obligation. This can either be included in the price of the product or at an extra cost.

- **Upgradability:** during the revision, the example of Samsung's upgrade kit (Evolution Kit) for their high-end Smart TVs was provided. The consumer can fit it into a slot at the rear of the TV to upgrade the main processor, RAM, graphics processor and perhaps other components. A new style remote control is also provided. TVs with this upgradeability can be updated to the current model functionality. However, apart from the general possibility to upgrade TVs, there is no further information provided on the level of interest there has been in this kit or the level of Samsung's commitment to the future development of this product. A criterion on upgradeability for the product group televisions/displays was not proposed during the revision.

The Joint Research Centre Directorate B's Circular Economy & Industrial Leadership unit has compiled multi-level approaches for assessing the reparability and upgradability of products. In April 2019, a draft report was published describing the application of such approaches to televisions<sup>56</sup>.

The study identifies the following priority parts of relevance for the repair/upgrade of a television and their correspondent priority weight (1 to 3) taking into consideration the likelihood of failure and the functional relevance:

- Main board (3)
- T-con board (3)
- Sound board (3)
- Power board (3)
- Inverter board (sometimes combined with power board) (3)
- Internal/external power supply (2)
- Transistor column (3)
- Speakers (3)
- LVDS cable (3)
- Lamps (3)
- TV stand (2)
- Remote control (2)
- Connectors for external equipment (2)
- Capacitors, batteries and accumulators (3)
- DVD/Blue ray module (when applicable) (1)
- HD/SSD (when applicable) (1)

However, according to the input of stakeholders involved in the development of the study, among the typical repair operations, the most expensive part to replace in a TV is the screen (LCD module). The most common and cheaper repair operations are instead related to the remote control and power supplies (capacitors). Repair of the main board, power board or sound board

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<sup>56</sup> <http://susproc.jrc.ec.europa.eu/E4C/documents.html>

can be found in a middle position. Repair of speakers can be expected to be relatively cheaper when the problem is not related to the board. Faults in the main board or the display module can be fixed by either replacing or repairing these parts.

In addition, the study identifies the following technical barriers to repair:

- Difficulties in the identification of parts. In some cases it can be hard to identify parts, for instance when marking has become illegible due to overheating. In such cases, the availability of diagrams and lists of parts is important to facilitate their identification. However, this information is not always available to independent repairers.
- Use of adhesives. Some manufacturers use adhesives to fix the back cover of TVs which makes disassembly difficult with common tools.
- Use of specific tools. The use of specific tools for the disassembly of TVs should be avoided, or at least limited.
- Difficulties in the identification of the problem.
- Spare parts. Some parts of the circuit boards are difficult to find on the public market as spare parts.
- Lack of standardisation of LCD screens.

The revised Ecodesign measure<sup>5</sup> includes the following relevant requirements.

Repairability requirements under the Section D. material efficiency requirements:	
<i>From 1 March 2021, electronic displays shall meet the requirements indicated below.</i>	
<b>5. Design for repair and reuse</b>	<p>(a) <i>Availability of spare parts:</i></p> <p>(1) <i>manufacturers, importers or authorised representatives of electronic displays shall make available to professional repairers at least the following spare parts: internal power supply, connectors to connect external equipment (cable, antenna, USB, DVD and Blue-Ray), capacitors, batteries and accumulators, DVD/Blue-Ray module if applicable and HD/SSD module if applicable for a minimum period of seven years after placing the last unit of the model on the market;</i></p> <p>(2) <i>manufacturers, importers or authorised representatives of electronic displays shall make available to professional repairers and end-users at least the following spare parts: external power supply and remote control for a minimum period of seven years after placing the last unit of the model on the market;</i></p> <p>(3) <i>manufacturers shall ensure that these spare parts can be replaced with the use of commonly available tools and without permanent damage to the appliance;</i></p> <p>(4) <i>the list of spare parts concerned by point 1 and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, at the latest two years after the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts; and</i></p> <p>(5) <i>the list of spare parts concerned by point 2 and the procedure for ordering them and the repair instructions shall be publicly available on the manufacturer's, the importer's or authorised representative's free access website, at the moment of the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts.</i></p>

	<p>(b) <i>Access to repair and maintenance information</i></p> <p><i>After a period of two years after the placing on the market of the first unit of a model or of an equivalent model, and until the end of the period mentioned under (a), the manufacturer, importer or authorised representative shall provide access to the appliance repair and maintenance information to professional repairers in the following conditions:</i></p> <p>(1) <i>the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, manufacturers, importers or authorised representative may require the professional repairer to demonstrate that:</i></p> <p>(i) <i>the professional repairer has the technical competence to repair electronic displays and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;</i></p> <p>(ii) <i>the professional repairer is covered by insurance covering liabilities resulting from its activity, regardless of whether this is required by the Member State;</i></p> <p>(2) <i>the manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request by the professional repairer;</i></p> <p>(3) <i>manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates. A fee is reasonable if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;</i></p> <p><i>Once registered, a professional repairer shall have access, within one working day after requesting it, to the requested repair and maintenance information. The available repair and maintenance information shall include:</i></p> <ul style="list-style-type: none"> <li><i>– the unequivocal appliance identification;</i></li> <li><i>– a disassembly map or exploded view;</i></li> <li><i>– list of necessary repair and test equipment;</i></li> <li><i>– component and diagnosis information (such as minimum and maximum theoretical values for measurements);</i></li> <li><i>– wiring and connection diagrams;</i></li> <li><i>– diagnostic fault and error codes (including manufacturer-specific codes, where applicable); and</i></li> <li><i>– data records of reported failure incidents stored on the electronic display (where applicable).</i></li> </ul> <p>(c) <i>Maximum delivery time of spare parts</i></p> <p>(1) <i>during the period mentioned under point 5(a)(1) and point 5(a)(2), the manufacturer, importer or authorised representatives shall ensure the delivery of the spare parts for electronic displays within 15 working days after having received the order;</i></p>
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	(2) <i>in the case of spare parts available only to professional repairers, this availability may be limited to professional repairers registered in accordance with point (b).</i>
<b>Repairability related requirements under the Section E. INFORMATION AVAILABILITY REQUIREMENTS</b>	
<i>From 1 March 2021, the information set out below shall be available when placing on the market the first unit of a model or of an equivalent model. The same information can be provided for any equivalent model or model of the same family, if applicable.</i>	
<i>The information shall be provided free of charge to third parties dealing with professional repair and reuse of electronic displays (including third party maintenance actors, brokers and spare parts providers).</i>	
<b>1 Availability of software and firmware updates</b>	<p><i>(a) The latest available version of the firmware shall be made available for a minimum period of eight years after the placing on the market of the last unit of a certain product model, free of charge or at a fair, transparent and non-discriminatory cost. The latest available security update to the firmware shall be made available until at least eight years after the placing on the market of the last product of a certain product model, free of charge.</i></p> <p><i>(b) Information on the minimum guaranteed availability of software and firmware updates, availability of spare parts and product support has to be indicated in the Product Information Sheet as from Annex V of Regulation (EU) (Energy Labelling Regulation).</i></p>

With regards to other Ecolabelling schemes, the majority of them request the availability of spare parts for a certain period of time after ceasing production.

The EU GPP requirements for Imaging Equipment (still draft) also include relevant requirements to facilitate repair.

**TS8 (b) Design for disassembly and repair**

Imaging equipment shall be designed to facilitate disassembly and repair. The following requirements shall be met:

- Casing parts, chassis, electric/electronic assemblies and cartridges/containers are separable or connected by separation aids<sup>[1]</sup>
- Electric/electronic assemblies and components such as batteries and condensers which have a risk of containing constituents bearing hazardous substances, as well as fluorescent lamps containing mercury are easy to find and to remove
- Disassembly of casing, chassis and electric/electronic assemblies can be undertaken with commercially available tools (i.e. all tools except of proprietary tools<sup>[2]</sup>)
- Screw connections for fastening casing parts, chassis and electric/electronic assemblies can be tightened with no more than three tools
- Disassembly of the entire unit can be performed by a single person (i.e. not more than one snap-on connection have to be loosened at the same time).
- Casing parts are free of electronic assemblies
- Manufacturer has carried out a trial disassembly, with reference to the above design features, and recorded it with focus on weak spots



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- Repair manual with enough information to support repair operations (e.g. illustrating the parts that can be accessed and replaced, the tools required and how the repair process should be conducted, etc.) must be available to the procuring authority and to repairers.

**Verification:**

*The tenderer must provide a declaration of compliance with above requirements together with the repair manual (physical document or a link where the document is available).*

*Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*

Note [1]: The term “separation aids” refers to predetermined breaking points, for example.

Note [2]: Proprietary tools are tools that are not available for purchase by the general public or for which any applicable patents are not available to license under fair, reasonable, and non-discriminatory terms.

In this context, for the updated proposal in TR4.0, it was suggested to keep the latest proposed criterion in TR3.0 with the following changes:

- Minor changes have been introduced in the wording in order to simplify/clarify.
- Notes have been introduced on ‘spare parts’ and ‘proprietary tools’ aiming to a better explains the criterion. Number of years have been harmonised for all type of displays.
- Additional requirements on easy disassembly of casing parts, chassis and electric/electronic assemblies have been included based on the technical barriers for repair identified by the JRC and the requirements included in the EU GPP for Imaging Equipment. The assessment and verification wording has been amended accordingly.
- Reference to national law included in the commercial guarantee as the NGO stakeholder suggested in the table of comments (Section 5). The additional guarantee provided by the applicant under the Ecolabel could in some elements overlap with the legal guarantee affecting the seller; it should be clearly stated that the consumer’s legal rights established in the national laws are not affected by the additional guarantee.

The revised EU Ecodesign Regulation sets the focus on provision of information and spare parts for repairers. However the proposed EU Ecolabel goes beyond setting additional requirements on the design of the display in order to be easily repaired and on the availability of relevant spare parts that are not covered by Ecodesign, in addition to the availability of information and offer of commercial guarantees at no additional cost. Furthermore, the proposed requirements are in line with requirements included in the EU GPP for computers and monitors on ‘design for reparability’ and ‘continued availability of spare parts’, therefore monitors bearing the EU Ecolabel could be used as a means of proof for these EU GPP requirements.

### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. As a response to comments received the following amendments have been introduced in the final proposal:

- As requested by several stakeholders, the availability of spare part has been slightly extended from 7 to 8 years. It has been explicitly mention that spare parts included in Ecodesing are also covered.
- It has been mentioned that repair manual shall be available at no additional cost.
- Wording amendments have been introduced as requested by stakeholders.

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- Provision of information of manufacturer recommended price of spare parts have been included in line with JRC reparability study on TVs recommendations has been included.
  - The requirement inspired on the draft EU GPP for IE on restricting the number of tools to disassembly casing parts have been removed as in the absence of solid references and evidence.

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### 3.4 Criterion 4 – End-of-life management

The research results of Task 3 and Task 4 also revealed that close attention should be paid to the end-of-life (EoL) management of televisions and external computer monitors to reduce the overall environmental impacts as secondary resources from recycling can substitute primary production.

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

The different sub-requirements under the existing criteria ‘recycled content’ and ‘design for disassembly’ were rearranged and renamed as criteria ‘material selection and material information to improve recyclability’ and ‘design for recycling’.

#### Decision 2011/337

##### “Recycled content”:

The external plastic case of the monitor 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.

#### Existing criteria, Decisions 2009/300 and 2011/337

##### “Design for disassembly”:

The manufacturer shall demonstrate that the [television/monitor] can be easily dismantled by professionally trained personnel/recyclers 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 [television/computer monitor] shall allow for its disassembly, e.g. screws, snap-fixes, especially for parts containing hazardous substances;
- (b) [Only computer criteria:] 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) [Only computer criteria:] 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 [television / computer monitor] 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 [television/computer monitor]. It shall include an exploded diagram of the [television/computer monitor] 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 to improve recyclability

#### Updated proposal for criterion 4.1 Material selection and information to improve recyclability

(a) Recyclability of plastics:

- (i) Parts with a weight greater than 25 grams shall consist of a single polymer or a polymer blend or alloy that are recyclable;
- (ii) The presence of paints and coatings shall not significantly impact upon the resilience of plastic recycle produced from these components upon recycling and when tested according to ISO 180\* or equivalent;
- (iii) Plastic enclosures shall not contain moulded-in or glue-on metal unless the metal inserts can be removed with commercially available tools.
- (iv) Casings, enclosures and bezels incorporating flame retardants shall be recyclable.

(b) Information to facilitate recycling:

b.1. Plastic parts with a mass greater than 25 grams shall be marked in accordance with ISO 11469 and ISO 1043, Sections 1 and 4. For plastic parts > 100 grams, the markings should be large enough and located in a visible position in order to be easily identified.

Exemptions are made in the following cases:

- (i) Where the marking would impact on performance or functionality of the plastic part including optical plastics;
- (ii) Where parts cannot be marked because there is not enough available appropriate surface area for the marking to be of a legible size to be identified by a recycling operator;
- (iii) Where marking is technically not possible due to the moulding method; or
- (iv) Where the addition or location of marking causes unacceptable defect rates under quality inspection, leading to unnecessary wastage of materials

b.2. applicant shall make available to professional operators of the waste sector, in a website and free of charge, information relevant for dismantling and recovery. This should include at least: (a) a diagram of the product showing the location of the plastic components containing flame retardants; (b) the location of components containing the toxic or ecotoxic substances.

- (c) Recycled content: The product shall contain on average a minimum 10% post-consumer recycled plastic, measured as a percentage of total plastic (by weight) in the product excluding Printed Wiring Boards. Where the recycled content is greater than 25% a declaration may be made in the text box accompanying the Ecolabel (see Criterion 6(b)). Products with a metal casing are exempt from this sub-criterion.

Note:

\* For the purposes of this criterion a significant impact is defined as a >25% reduction in the notched izod impact of a recycled resin as measured using ISO 180.

**Assessment and verification:**

The applicant shall provide an exploded diagram of the electronic display in written or audio-visual format. This shall identify the plastic parts greater than 25 grams by their weight, their polymer composition, and their ISO 11469 and 1043 markings. The dimensions and positions of the marking shall be illustrated and,

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where exemptions apply, technical justifications provided. Applicant shall provide the information relevant for dismantling and recovery available for professional operators and the website where is located.

The applicant shall verify recyclability by providing evidence that the plastics either individually or combined do not impact the technical properties of the resulting recycled plastics in such a way that they cannot be used again in electronic products. This could include:

- A declaration from an experienced plastics recycler or permitted treatment operation in accordance with Article 23 of Directive 2008/98/EC ('the Waste Framework Directive');
- Test results from an independent laboratory or an experienced plastics recycler;
- Peer and industry reviewed technical literature applicable to Europe.

The applicant shall provide third party verification and traceability for post-consumer recycled content. Certificate of recyclers pursuant to the EuCertPlast certification scheme or equivalent could be used to support verification.

### **Rationale and summary of the changes during the revision process**

Consideration of the environmental effects from the (pre-)production stage and possible barriers for high-level recycling is crucial for any requirements for material selection, in line with the aim of the roadmap for a resource-efficient Europe. Meaningful criteria are needed to address these issues.

The criteria discussed during the revision covered the following main aspects:

#### **Recyclability of plastics:**

The study 'Disassembly analysis of slates: Design for repair and recycling evaluation' by Fraunhofer IZM (2013)<sup>57</sup> indicates on the basis of an interview with a recycler that plastics are separated into white (including light grey) plastics, which are of significantly higher recycling value, and black plastics. Metal foils attached to plastic parts reduce the value of the plastics fraction, and might be given to an additional shredding process for separation. Coating and plastic parts attached to bulk plastic parts reduce the value of the plastic fractions PC/ABS, white mixed plastics and black mixed plastics from the perspective of the dismantler. This means that mono-material plastic housing parts without coatings, inserted metal windings, and metal shields attached are better to recycle than composite materials.

Initially, the requirement on a variety of plastics was proposed to limit the use of a maximum of four types of plastics used in plastic parts with a mass greater than 25 grams in the overall product. With regards to coatings, it was proposed to limit the use of coatings and/or metal inlays.

With regards to the use of flame retardants, EN 60065/A11 requires that TV sets comply with the external ignition (candle flame) requirements by passing the necessary tests as per TS 62441. According to TS 62441, the candle flame accessible area of television housing is considered to comply if it meets any of the requirements below:

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<sup>57</sup> Cf. [http://www.izm.fraunhofer.de/content/dam/izm/de/documents/News-Events/News/2013/urn\\_nbn\\_de\\_0011-n\\_255111-18-1.pdf](http://www.izm.fraunhofer.de/content/dam/izm/de/documents/News-Events/News/2013/urn_nbn_de_0011-n_255111-18-1.pdf)

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- a) The total mass of the combustible materials located at the outer surface does not exceed 300 g.
  - b) The combustible material used in candle flame accessible areas is made of V-1 class material.
  - c) The combustible materials used in candle flame accessible areas do not exhibit flaming for more than 3 minutes.

This means that, for televisions' plastic housings, compliance is generally achieved by using flame retardants (FRs). Research by Peeters et al.<sup>58</sup> has highlighted the importance of considering the flame retardants incorporated into plastic components, particularly casings and enclosures, as these are added to the polymer to provide fire protection.

The JRC-IES developed a report on material efficiency for product policy support focused on computers and television product groups<sup>59</sup>. With regard to recyclability of plastic parts, they mentioned that the scientific literature largely discussed the relevance of considering the recyclability of plastic parts in WEEE. They highlighted Peeters et al. (2014)<sup>58</sup> where the authors discussed the compatibility for the recycling of different mixtures of plastics in televisions (including flame retardants and different enclosures). According to the authors, plastic fractions with high purity are needed to obtain high-quality recyclates, so efforts to improve identification and separation such as labelling will improve recycling rates.

The report remarked that compatibility for recycling should also be extended to other materials assembled/attached to plastic parts. The use of materials with distinct physical properties could facilitate their separation. For example, replacing stainless steel inserts in aluminium components with aluminium inserts or with steel inserts (separable by high-efficiency magnetic separators) could improve their recyclability.

The ENFIRO project highlighted the importance of retaining the functional value of FRs by increasing recycling. A further issue highlighted by the US EPA's study of flame retardants in Printed Circuit Boards<sup>60</sup> relates to aluminium oxide arising from aluminium FR additives. Their high loading in PCB materials together with their insolubility in furnace slag means that if they arose in larger quantities in waste PCBs smelters would need to use more energy. The potential for this trade-off to occur was confirmed from discussions with an FR specialist involved with the ENFIRO project.

The successful US ecolabel EPEAT (IEEE 1680.1 standard for the environmental assessment of computer products<sup>61</sup>) includes:

- *a requirement relating to the avoidance of paints or coatings that are incompatible with recycling;*
- *an optional criterion that plastic enclosures shall not contain moulded-in or glue-on metal unless the metal inserts can be easily removed;*

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<sup>58</sup> Peeters.J.R, Vanegas.P, Tange.L, Van Houwelingen.J and J.R.Duflou, *Closed loop recycling of plastics containing Flame Retardants*, Journal of Resources, Conservation and Recycling, 84 (2014) p-35-43.

<sup>59</sup>[http://publications.jrc.ec.europa.eu/repository/bitstream/JRC100785/lb-na-27793-en-n%20\(final\).pdf](http://publications.jrc.ec.europa.eu/repository/bitstream/JRC100785/lb-na-27793-en-n%20(final).pdf)

<sup>60</sup> Chem Sec, *Leading Electronics companies and Environmental organisations urge EU to restrict more hazardous substances in electronic products in 2015 to avoid more global dioxin formation*, 19th May 2010, [http://www.chemsec.org/images/stories/publications/ChemSec\\_publications/RoHS\\_restrictions\\_Company\\_\\_NGO\\_alliance.pdf](http://www.chemsec.org/images/stories/publications/ChemSec_publications/RoHS_restrictions_Company__NGO_alliance.pdf)

<sup>61</sup> IEEE Computer Society, *Standard for Environmental Assessment of personal computer products*, IEEE Std 1680.1-2009, 5<sup>th</sup> March 2010.

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- *only one plastic material shall be used in each plastic enclosure part greater than 100 g.*

*'Paints and coatings on plastic parts are proven to be compatible with recycling processes if they do not significantly impact the physical/mechanical properties of the recycled resin. Significant impact is defined as >25g reduction in notched Izod impact at room temperature as measured using ASTM D256-05.'*

Alternatively, the term 'recyclable' is also used in relation to materials and components and is defined as:

*'Materials or components that can be removed or recovered from the whole product or package and put back into productive use as a material, not including energy recovery, using standard technologies, or as otherwise demonstrated.'*

With this in mind, it was proposed to reflect the EPEAT criterion that addresses the compatibility for recycling of plastics with coatings/paints and the ease of removal of moulded-in or glued-on metal inserts.

The recyclability of casings, enclosures and bezels that incorporate flame retardants was suggested to be verified and, furthermore, the use of aluminium-based FRs with a high loading in PCB base materials was proposed not to be permitted because more energy is required to smelt them in the end-of-life phase.

In order to address concerns relating to the definitions of 'compatibility with recycling' or 'recyclable', greater flexibility was proposed in the assessment and verification, again reflecting EPEAT, with three different options based on (i) declarations from recyclers, (ii) test results and/or (iii) technical literature relevant to the EU market.

#### Material information to facilitate recycling:

Although some stakeholders claimed during the revision that plastic marking has little influence on recycling practices, other stakeholders reported that recyclers do use this information for their sorting activities.

In 2013, EFRA finalised a pilot project<sup>62</sup> on the recycling of plastics containing flame retardants from LCD televisions. Some of the main reasons for the low plastics recycling rate in Europe identified were the lack of information on the polymer type, the FR applied and the huge variety of different plastic types used, among others.

As marking is widely established in practice, it was suggested to include a requirement on marking. Exemptions were included for cases where technical limitations result in marking not being feasible. A technical justification shall be provided where an exemption applies. In addition, it is proposed that the CAS number of any flame retardant incorporated in the plastic is marked according to the suggested notation.

Reference to following standards was included:

- ISO 11469 Plastics -- Generic identification and marking of plastics products;

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<sup>62</sup> EFRA 2013. Recycling of Plastics from LCD Television Sets. Pilot project on mechanical plastics recycling from post-consumer flat panel display-LCDs.

- ISO 1043-1 Plastics -- Symbols and abbreviated terms -- Part 1: Basic polymers and their special characteristics;
- ISO 1043-4 Plastics -- Symbols and abbreviated terms -- Part 4: Flame retardants.

Recycled content:

The suggested requirement applies to all plastic parts and structural elements > 25 grams. A threshold of 10% was included because there are still practical problems, even for front-runner manufacturers, in consistently meeting a higher requirement. Instead it was proposed, following the example of cotton content claims in the textile product group, where a higher content can be demonstrated, that there is an option to display this in Box 2 next to the EU Ecolabel. This would provide a benefit to manufacturers wishing to work towards a high recycled content, without placing an overall burden which could reduce the selectivity of the EU Ecolabel.

Concerns were raised at the first AHWG about the verification of recycled content. An example of a traceability system was provided by the Belgian competent body. The QA-CER system is a third-party-verified quality management system developed by a Belgian certification body and the Flemish Plastics Centre<sup>63</sup>. The system is based on ISO 9001, as well as the EN standards EN 15347 relating to the characterisation of waste polymers<sup>64</sup> and EN 15343 relating to the traceability of waste polymers<sup>65</sup>. EN 15343 is of particular interest as an underlying reference for QA-CER as it described a system for tracing polymer waste flows recognising that a system for analytical testing to verify recycled content does not exist.

It was proposed that third party verification is required for recycled polymer content.

Products with metal casings are excluded from the recycled content requirement because the quantity of plastic remaining would be too low for the sub-criterion to be practical.

The revised Ecodesign<sup>5</sup> (2019) includes the following relevant requirements.

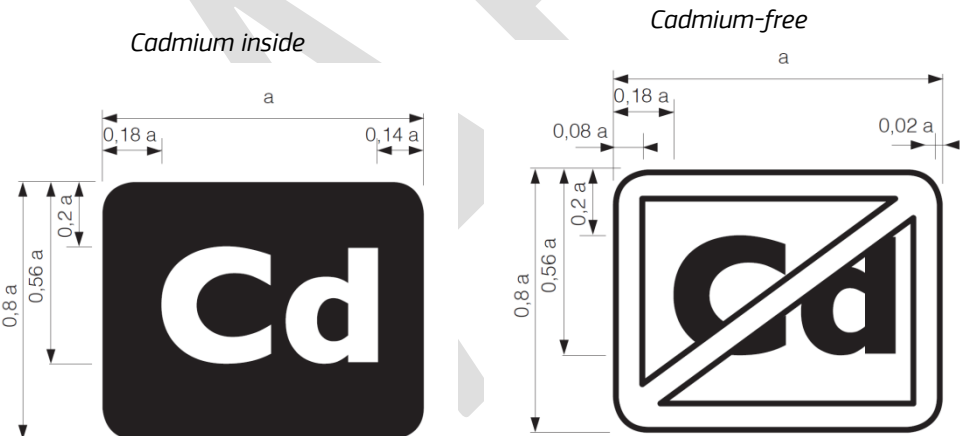
Requirements on material selection/information under the Section D. Material Efficiency Requirements:	
<i>From 1 March 2021, electronic displays shall meet the requirements indicated below.</i>	
<b>2 Marking of plastic components</b>	<p><i>Plastic components heavier than 50 g:</i></p> <p>1. <i>Shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks "&gt;" and "&lt;" as specified in available standards. The marking shall be legible.</i></p> <p><i>Plastic components are exempt from marking requirements in the following circumstances:</i></p> <p>i. <i>the marking is not possible because of the shape or size;</i></p> <p>ii. <i>the marking would impact on the performance or functionality of the plastic component;</i></p> <p>iii. <i>marking is technically not possible because of the moulding method.</i></p> <p><i>For the following plastic components no marking is required:</i></p>

<sup>63</sup> QA-CER, QA-CER certification of the quality management system for recycling and production companies, Version 1, January 2013.

<sup>64</sup> CEN, Recycled plastics – characterisation of plastics wastes, EN 15347, December 2007.

<sup>65</sup> CEN, Plastics recycling traceability and assessment of conformity and recycled content, EN 15343, December 2007.



	<ul style="list-style-type: none"> <li>i. packaging, tape, labels and stretch wraps;</li> <li>ii. wiring, cables and connectors, rubber parts and where not enough appropriate surface area is available for the marking to be of a legible size;</li> <li>iii. PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;</li> <li>iv. transparent parts where the marking would obstruct the function of the part in question.</li> </ul> <p>2. Components containing flame retardants shall additionally be marked with the abbreviated term of the polymer followed by hyphen, then the symbol "FR" followed by the code number of the flame retardant in parentheses. The marking on the enclosure and stand components shall be clearly visible and readable.</p>
<p><b>3 Cadmium logo</b></p>	<p>Electronic displays with a screen panel in which concentration values of Cadmium (Cd) by weight in homogeneous materials exceed 0.01 % as defined in Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment with a be labelled with the "Cadmium inside" logo. The logo shall be clearly visible without the removal of a cover, durable, legible and indelible. The logo shall be in the form of the following graphic:</p> <div style="text-align: center;">  <p style="text-align: center;"> <i>Cadmium inside</i>                      <i>Cadmium-free</i> </p> </div> <p>The dimension of "a" shall be greater than 9 mm and the typeface to be used is 'Gill Sans'. The "Cadmium inside" logo shall be firmly attached also internally on the display panel in a position clearly visible by workers once the external back cover bearing the external logo is removed.</p> <p>A "Cadmium free" logo shall be used if concentration values of Cadmium (Cd) by weight in any homogeneous material part of the display do not exceed 0,01 % as defined in Directive 2011/65/EU.</p>
<p><b>4 Halogenated flame retardants</b></p>	<p>The use of halogenated flame retardants is not allowed in the enclosure and stand of electronic displays.</p>

Nordic Swan<sup>18</sup> includes the following requirements.

<b>Dismantling</b>	<p><i>The manufacturer shall demonstrate that the product can be easily dismantled by professionally trained recyclers, using the tools usually available to them, for the purpose of:</i></p> <ul style="list-style-type: none"><li><i>• undertaking of repairs and replacements of worn-out parts</i></li><li><i>• upgrading older or obsolete parts</i></li><li><i>• separating parts and materials, ultimately for re-cycling</i></li></ul> <p><i>To facilitate the dismantling:</i></p> <ul style="list-style-type: none"><li><i>• Fixtures within the products shall allow for this disassembly, e.g. screws, snap-fixes, especially of parts containing hazardous substances.</i></li><li><i>• Plastic parts shall be of one polymer or be of compatible polymers for re-cycling and have the relevant ISO11469 marking if &gt;25g in mass. Exception is made for extruded plastic materials and for light emitters in flat screens.</i></li><li><i>• Metal inlays that cannot be separated shall not be used.</i></li><li><i>• Data on the nature and amount of hazardous substances in the television will be gathered in accordance with the directive of classification, packaging and labelling of dangerous substances (67/548/EEC) and directive 2006/121/EEC about changes in directive 67/548/EC.</i></li></ul> <p><i>Assessment: An exploded diagram of the product labelling the main components as well as identifying any hazardous substances in components. This can be in written or audiovisual format. Information regarding hazardous substances shall be provided in the form of a bill of materials identifying material type, quantity used and location, by filling out Appendix 5.</i></p>
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On 28 February 2018, producers of electrical and electronic equipment (EEE) launched a platform named “Information for Recyclers- I4R”<sup>66</sup> to allow producers to provide information about preparation for re-use and treatment in respect of each type of new EEE placed for the first time on the Union market within one year after the equipment is placed on the market. In line with the requirements of Directive 2012/19/EU (Article 15(1)), this information shall identify, as far as it is needed by centres which prepare for re-use and treatment and recycling facilities, in order to comply with the provisions of this Directive, the different EEE components and materials, as well as the location of dangerous substances and mixtures in EEE

Against this background, for the updated proposal in TR4.0, it was proposed to retain the criterion with minor modifications.

The proposal included during the revision on prohibition of aluminium-based FRs with a high loading in PCB base materials because they require more energy to smelt in the end-of-life phase has been removed. This sub-requirement adds complexity to the criteria set; stakeholders mentioned that such a requirement seems to block the substitution of halogen-free FRs and the evidence behind the proposal was not considered solid enough. In addition, this requirement is not reflected in other available schemes for displays.

Material information to facilitate recycling (marking) is kept as it is considered to be more stringent than the revised Ecodesign which applies to parts above 50 g while the EU Ecolabel proposal applies to parts above 25 g.

<sup>66</sup> <https://i4r-platform.eu/about/>



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### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. As a response to comments received the following amendments have been introduced in the final proposal:

- Certificate of recyclers pursuant to the EuCertPlast certification scheme or equivalent could be used to support verification.
- As suggested by a stakeholder, it has been included an additional requirement on availability of information relevant for dismantling and recovery.
- It has been further precise the requirement with regards the use of paints and coatings in line with the EU GPP for computers and monitors.

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

#### Updated proposal for criterion 4.2. - Design for dismantling and recycling

- (a) For the following target parts, as relevant to the product, a manual dismantling shall be carried out by one person (i.e. not more than one snap-on connection has to be loosened at the same time) using widely used commercially available tools (i.e. pliers, screw-drivers, cutters and hammers as defined by ISO 5742, ISO 1174, ISO 15601):
- (i) Printed Wiring Boards >10 cm<sup>2</sup>
  - (ii) Thin Film Transistor (TFT) unit >100 cm<sup>2</sup> and film conductors
  - (iii) Polymethyl Methacrylate (PMMA) board light guide
- (b) At least *one* of the following optional components shall also be possible to manually disassemble using common commercially available tools:
- (i) LED backlight units
  - (ii) Speaker unit magnets (for display sizes greater than or equal to 25 inches)
  - (iii) HDD drive (if applicable in the case of smart devices)

#### **Assessment and verification:**

*The applicant shall provide:*

*A test report detailing the dismantling sequence, including a detailed description of the specific steps\*, tools and procedures, for the components listed in (a) and the optional components selected from (b) as a minimum.*

#### **Note:**

\* Dismantling step: An operation that finishes with the removal of a part or with a change of tool.

### **Rationale and summary of the changes during the revision process**

As laid out in the Task 4 report, manual dismantling is an important means of improving material recovery of precious and critical metals and thus reducing the overall impacts of televisions and external computer displays. This can be facilitated by appropriate design. Nevertheless, the existing requirements are not very specific regarding the dismantling process and key components being affected.

#### Identifying critical raw materials from an EU perspective

Under the EU Raw Materials Initiative, a working group has identified and listed the critical raw materials from a geopolitical and economic point of view<sup>67</sup>. The list is based on a time horizon of 10 years, so geological scarcity was not a central consideration; the increasing demand for

<sup>67</sup> European Commission, *Critical raw materials for the EU*, Report of the Ad Hoc Working Group on defining critical raw materials, DG Enterprise and Industry, 30<sup>th</sup> July 2010.

products containing CRMs was cited instead as an important factor. Recyclability and the potential for substitution were also factors considered in the creation of the initial list.

**Table 10: Initial list of critical raw materials at EU level**

Antimony	Indium
Beryllium	Magnesium
Cobalt	Niobium
Fluorspar	PGMs (Platinum Group Metals) <sup>a</sup>
Gallium	Rare earths <sup>b</sup>
Germanium	Tantalum
Graphite	Tungsten

Notes:

- a) *Platinum, palladium, iridium, rhodium, ruthenium and osmium.*
- b) *Yttrium, scandium, and the 'lanthanides' - lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium.*

Lithium and chromium were at the time of the initiative on the borderline of being identified as CRMs. It is understood that in the meantime their economic importance and supply risk may have shifted, bringing them within the definition of 'critical'.

Of direct relevance to the development of this EU Ecolabel criterion is the recommendation made within the 2010 report that policy actions are undertaken to 'make recycling of raw materials-containing products more efficient' including 'mobilising end of life products with critical raw materials for proper collection'. A specific recommendation is also made that:

*'...overall material efficiency of critical raw materials should be achieved by...minimising raw material losses into residues from where they cannot be economically-recovered.'*

A number of bills of materials (BOMs) for electronic display products were identified and presented in the background report on Hazardous Substances published in September 2013<sup>68</sup>. Aside from metal and plastic associated with enclosures and the chassis, these did not identify CRM occurrence within product subcomponents. Literature was therefore reviewed in order to identify a bill of materials for CRMs. Indicative BOMs have been identified for a LED LCD PC monitor and a LED LCD TV based on analysis by Öko-Institut<sup>69</sup>. It can be seen from the BOM that CRMs are concentrated in a small number of main components, primarily the PCB and contacts and LED backlights.

**Table 11: Indicative occurrence of high-value metals and CRMs in electronic displays**

Metal	Content per LCD (LED backlit) [mg]	LCA hotspot		Occurrence in the product
		LCA	EU CRM	

<sup>68</sup> [http://susproc.jrc.ec.europa.eu/televisions/docs/Task\\_Special\\_Hazardous\\_Substances\\_docx.pdf](http://susproc.jrc.ec.europa.eu/televisions/docs/Task_Special_Hazardous_Substances_docx.pdf)

<sup>69</sup> Öko-Institut, Recycling critical raw materials from waste electronic equipment, Commissioned by the North Rhine-Westphalia State Agency for Nature, Environment and Consumer Protection, 24th February 2012

	TV	Monitor			
Silver	580	520			PCB and contacts (100%)
Indium	260	82		☒	Internal coating on display (100%)
Gold	140	200			PCB and contacts (100%)
Yttrium	4.8	3.20		☒	Background illumination (100%)
Palladium	44	40	☒	☒	PCB and contacts (100%)
Europium	0.09	0.06		☒	Background illumination (100%)
Cerium	0.30	0.2		☒	Background illumination (100%)
Gallium	4.90	3.30		☒	Background illumination (100%)
Gadolinium	2.30	1.50		☒	Background illumination (100%)

An industry survey conducted by WRAP suggested that, to a great extent, removal by manual treatment of circuit boards (88-94%), plastics incorporating brominated flame retardants (82%) and LCD displays (88%) already takes place, although it is not clear to what extent this can be taken to be representative of the picture across the EU.

**Printed Circuit Boards (PCBs)** - The main economic aim of recovering PCBs is to recover the copper, gold, silver and palladium. Currently, CRMs are primarily recovered from circuit boards at large metal refining facilities designed to handle complex streams of metal-containing wastes<sup>70</sup>. They can then be refined from copper alloys.

**LCD/LED display units** - Displays are usually recycled thermally in waste incineration plants or in the Waelz kiln process for steel mill dust. The organic components (liquid crystals, polarisation filters, resins) are generally shredded and may then be incinerated, and the glass along with the oxidised metals remains bound in an inert slag. The indium contained in the displays is generally lost through dissipation<sup>71</sup>.

Several pilot and laboratory technologies have been already developed for indium<sup>72</sup> and rare earths<sup>73</sup> recovery. However, there are currently no large-scale recycling facilities for the separation and refining of indium from the display units and the rare earths from the background illumination. The very low indium content and lack of another significant metal to recover in each LCD unit makes the economics of recovery very challenging. However, with indium supplies being dependent on lead or tin extraction, there is the potential for exposure of the electronics sector to price volatility.

In view of the need to protect future supplies of indium, Germany is understood to be considering storage of dismantled display units for recycling at a later date. It has been postulated that some form of chemical leaching process might in the future be more promising than a smelting process. The rare earth elements contained in the luminescent materials are currently not recycled. Up until now the luminescent materials and rare earth elements contained in display units, e.g. yttrium,

<sup>70</sup> Van Kamp.M and A, Vasseur, *Raw materials sustainability: Collaborating towards a better world*, Presentation to the Future Circular Materials Expo, Sweden, 2013

<sup>71</sup> See Öko-Institut (2012).

<sup>72</sup> Kye-Sung Park, Wakao Sato, Guido Grause, Tomohito Kameda, Toshiaki Yoshioka. *Recovery of indium from In<sub>2</sub>O<sub>3</sub> and liquid crystal display powder via a chloride volatilization process using polyvinyl chloride*. Thermochemica Acta 2009.

<sup>73</sup> See HydroWEEE projects.

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europium, terbium, were sent to landfill following shredding. However, several mobile pilot plants are being developed to recover metals like copper, manganese, zinc, yttrium and indium from WEEE by hydrometallurgical processes.

**LED backlights** - The CRMs and rare earth metals used in the manufacture of LED backlight units are related to doping and luminescence. They can include indium, gallium, cerium, europium, yttrium and gadolinium. The weight per substance typically amounts to only  $\mu\text{g}$ 's per LED. There is no current reliable information on the potential to recycle LED chips.

**PMMA display light guide** -The plastic light guides within a LCD display constitute a large proportion of the plastic used in a TFT display. In particular, the PMMA light guide has been identified as a subcomponent that is readily identified and which is readily recyclable according to IEC 62635. The JRC-IES identified that, without prior manual separation, the PMMA light guide would be dispersed among other shredded fractions. This would cause the contamination and consequent downcycling of the recyclates. On the other hand, PMMA sorted from other fractions before shredding can be recycled for the production of new boards with the same quality.

During 2013, the JRC-IES carried out an analysis of electronic displays to provide scientific support to help assess the benefits of the extraction of key components from electronic displays, and to assess their benefits and environmental impacts. Further analysis was carried out including a literature review of related studies, a campaign of measurement of the time for the dismantling of electronic displays carried out in an Italian electronic equipment waste recycling plant and identification and assessment of suitable thresholds for the time taken to extract key components. The analysis identified several possible thresholds for the total time taken to extract key components, differentiated according to the sizes of the devices. The analysis focused on two types of key components in displays: Printed Circuit Boards (PCBs) and Thin Film Transistor (TFT) units. The extraction of the PCB and TFT units has some common steps. Therefore, the setting of a single time threshold for the extraction of both of these components was considered to introduce less uncertainty. Moreover, a requirement on the combined extraction of PCB and TFT panels would lead to greater flexibility as regards the design of products that are compliant within the expected thresholds.

Electronic displays can use cold cathode fluorescent lamps (CCFL) or, in newer models, light-emitting diodes (LED) as backlighting systems. The JRC-IES highlights that both types of backlight units can be configured as backlit or side-lit units in the screens<sup>74</sup>. Even though they vary significantly in their design<sup>75</sup>, LEDs are often mounted on rails and strings, similarly to CCFL, thus their extraction is analogous to that of CCFL tubes. Therefore, both types of backlight units have a similar dismantling sequence and analogous times for extraction.

Against this background, during the revision three main requirements were proposed (see TR3.0 for further details):

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<sup>74</sup> European Commission, Joint Research Centre – Institute for Environment and Sustainability. Analysis of dismantlability draft 2014.

<sup>75</sup> Veit H., Juchneski N. C. F., Scherer J. and I. H. Grochau (2013). "Disassembly and characterization of liquid crystal screens." *Waste Management & Research* 31(6): 549-558.

1) Manual dismantling with commercially available tools of most relevant components in terms of LCA hotspots, CRM/REE occurrence and market potential identified:

- Printed Wiring Boards >10 cm<sup>2</sup>;
- Thin Film Transistor (TFT) unit >100 cm<sup>2</sup> and film conductors;
- Polymethyl methacrylate (PMMA) board light guide.

2) Time threshold for dismantling based on the JRC IES studies and data (targeting the 30% compliance).

3) Manual dismantling with commercially available tools of *one* additional component among ((i) LED backlight units, (ii) speaker unit magnets (for display sizes greater than or equal to 25 inches) or (iii) HDD drive (if applicable in the case of smart devices)), which have been identified as more challenging to extract.

During the different consultation rounds, several stakeholders expressed concern with regards to time thresholds. They saw the proposal as very ambitious; they claimed there is a lack of standardised testing and measurement procedures and disagreed with third party verification.

The revised Ecodesign<sup>5</sup> (2019) includes the following relevant requirements.

Requirements related to dismantling/recycling under the Section D. Material Efficiency Requirements:	
<i>From 1 March 2021, electronic displays shall meet the requirements indicated below.</i>	
<b>1. Design for dismantling, recycling and recovery</b>	<p><i>Manufacturers, importers or their authorised representatives shall ensure that joining, fastening or sealing techniques do not prevent the removal, using commonly available tools, of the components indicated in point 1 of Annex VII of Directive 2012/19/EU on WEEE or in Article 11 of Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators, when present.</i></p> <p><i>Manufacturers, importers or their authorised representatives shall, without prejudice to point 1 Article 15 of Directive 2012/19/EU, make available the dismantling information needed to access, any of the products components referred to in point 1 of Annex VII of Directive 2012/19/EU on a free-access website.</i></p> <p><i>This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.</i></p> <p><i>The end of life information shall be available until at least 15 years after the placing on the market of the last unit of a product model.</i></p>

The only environmental scheme including a requirement on time for dismantling is EPEAT (IEEE for televisions):

IEEE Std. 1680.3™ -2012	<p><i>The time for dismantling the television for recycling shall be “at most 10 minutes for products weighting less than 50 pounds (18.7 kg); and at most 10 min plus 1 min per each additional 5 pounds (1.87 kg) of total product weight, for products weighting 50 pounds or more:</i></p> <p><i>1) Enclosures and sub-enclosures containing materials with special handling needs shall be removable with tools commonly available to recyclers.</i></p> <p><i>2) Materials that require special handling shall be easy to find and remove.</i></p>
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For the updated proposal in TR4.0, the criterion was proposed to be maintained. Changes have been introduced with regards to 'time for dismantling'. Considering the feedback from stakeholders during the revision, it is suggested that the revised version aligns with IEE. This approach is considered workable as it is already in place and is more flexible than the previous proposal. In addition, this will serve as a basis to gather relevant data for stringent and more component-specific time thresholds in future revisions.

### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. As a response to comments received the following amendments have been introduced in the final proposal:

- In line with the results published in the Joint Research Centre Directorate B's Circular Economy & Industrial Leadership draft report assessing the reparability and upgradability for televisions<sup>56</sup> and as requested by several stakeholders, the time for dismantling has been finally removed. The report concludes that "disassembly time" is not appropriate parameter, since a relevant differentiation among TV models does not seem possible with this parameter. The definition of reference values for a representative sample of products would require a significant amount of resources, for a parameter that is covered indirectly by other parameters.

## 3.5 Criterion 5 – Corporate responsibility

Within the hotspot analysis for televisions and external computer displays, some additional issues concerning environmental as well as social impacts were identified. Within this context it has been discussed whether the revision of the EU Ecolabel for electronic displays should also introduce new requirements on corporate responsibility, meaning that they cannot be implemented and verified at product level but need to be implemented instead at production level, possibly already during production stages not carried out by the applicant him/herself.

### 3.5.1 Criterion 5.1 – Labour conditions during manufacture

Decisions 2011/337 and 2011/330
No requirements
Updated proposal for criterion 5.1 – Labour conditions during manufacture
<p>Having regard to the International Labour Organisation's (ILO) Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, the UN Global Compact (Pillar 2), the UN Guiding Principles on Business and Human Rights and the OECD Guidelines for Multi-National Enterprises, the applicant shall obtain third party verification supported by site audits that the applicable principles included in the ILO fundamental conventions and the supplementary provisions below <a href="#">identified</a> have been respected at the final assembly plant(s) for the product.</p> <p>Fundamental conventions of the ILO:</p> <ul style="list-style-type: none"><li>a) <b>Child Labour:</b><ul style="list-style-type: none"><li>i. Minimum Age Convention, <a href="#">1973</a> (No 138)</li><li>ii. Worst Forms of Child Labour Convention, <a href="#">1999</a> (No 182)</li></ul></li><li>b) <b>Forced and Compulsory Labour:</b><ul style="list-style-type: none"><li>i. Forced Labour Convention, <a href="#">1930</a> (No 29) and 2014 Protocol to the Forced Labour Convention</li><li>ii. Abolition of Forced Labour Convention, <a href="#">1957</a> (No 105)</li></ul></li><li>c) <b>Freedom of Association and Right to Collective Bargaining:</b><ul style="list-style-type: none"><li>i. Freedom of Association and Protection of the Right to Organise Convention, <a href="#">1948</a> (No 87)</li><li>ii. Right to Organise and Collective Bargaining Convention, <a href="#">1949</a> (No 98)</li></ul></li><li>d) <b>Discrimination:</b><ul style="list-style-type: none"><li>i. Equal Remuneration Convention, <a href="#">1951</a> (No 100)</li><li>ii. Discrimination (Employment and Occupation) Convention (No 111)</li></ul></li></ul> <p>Supplementary provisions:</p> <ul style="list-style-type: none"><li>a) <b>Working Hours:</b><ul style="list-style-type: none"><li>i. ILO Hours of Work (Industry) Convention, <a href="#">1919</a> (No 1)</li></ul></li><li>b) <b>Remuneration:</b><ul style="list-style-type: none"><li>i. ILO Minimum Wage Fixing Convention, <a href="#">1970</a> (No 131)</li><li>ii. Living wage: The applicant shall ensure that wages paid for a normal work week shall always meet at least legal or industry minimum standards and shall be sufficient to</li></ul></li></ul>



meet the basic needs of personnel and to provide some discretionary income. Implementation should be audited with reference to SA8000<sup>76</sup> guidance on “Remuneration”.

c) **Health & Safety:**

- i. ILO Safety in the use of chemicals at work Convention, 1981 (No.170)
- ii. ILO Occupational Safety and Health Convention, 1990 (No.155)

In locations where the right to freedom of association and collective bargaining are restricted under law, the company **will not restrict workers from developing alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment, and shall recognise legitimate employee associations with whom it can enter into dialogue about workplace issues.**

The audit process shall include consultation with external stakeholders in local areas around sites, including trade unions, community organisations, NGOs and labour experts. **During the validity period of the EU Ecolabel, the applicant shall publish aggregated results and key findings from the audits, together with correction action plan detailed remedial process to address specific problems if identified in the audit, online in order to provide evidence of their performance to interested consumers.**

***Assessment and verification:*** *the applicant show compliance with these requirements by providing copies of the most recent version of their code of conduct which must be consistent with the provisions specified above and supporting audit reports for each final product assembly plant for the model(s) to be ecolabelled, together with a web link to where online publication of the results and findings can be found.*

*Third party site audits shall be carried out by auditors qualified to assess the compliance of the industry manufacturing sites with social standards or codes of conduct or, in countries where ILO Labour Inspection Convention, 1947 (No 81) has been ratified and ILO supervision indicates that the national labour inspection system is effective and the scope of the inspection system covers the areas listed above<sup>77</sup>, by labour inspector(s) appointed by a public authority.*

*Valid certifications from third party schemes or inspection processes that, together or in part, audit compliance with the applicable principles of the listed fundamental ILO Conventions and the supplementary provisions on working hours, remuneration and health & safety, shall be accepted. These certifications shall be not more than 12 months old.*

### **Rationale and summary of the changes during the revision process**

There are no social requirements under the existing criteria in force. However, the EU Ecolabel Regulation allows the inclusion of social requirements, where relevant. In TR1.0, stakeholders were asked about the possibility of including labour condition requirements based on ILO core conventions. There was a certain level of agreement on the inclusion of social criteria based on the fundamental principles of ILO conventions but a general concern with regards to the criterion formulation and its verification was expressed. The initial proposal was further defined in TR2.0 and TR3.0.

The following information summarises the main discussions and rationale behind the final proposal for the latest **EU Ecolabel criteria for the personal, notebook and tablet computers:**

<sup>76</sup> Social Accountability International, *Social Accountability 8000 International Standard*, <http://www.sa-intl.org>

<sup>77</sup> See ILO NORMLEX (<http://www.ilo.org/dyn/normlex/en>) and supporting guidance in the User Manual.

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### Addressing key social hot spots and providing the right level of assurance

According to expert judgement, a basic linkage to the underlying principles of the eight fundamental ILO labour conventions and (often weaker) national labour laws would not be sufficient enough to address the social hotspots specific to computer and display manufacturing processes. Thus, as minimum criteria, the underlying principles of the eight ILO fundamental conventions should be supplemented by provisions in the underlying principles of further ILO conventions addressing working hours, remuneration and health and safety.

Reference to the underlying principles is important to emphasise in the criterion text, because ILO conventions are intended to be ratified at national level, whereas for social auditing they are used as a reference at factory or company level.

In terms of remuneration, ILO's Minimum Wage Fixing Convention 131 (1970) specifies in Article 3 (a) and (b) that the following two elements are taken into consideration in determining the minimum wage:

- the needs of workers and their families taking into account the general level of wages in the country, the cost of living, social security benefits, and the relative living standards of other social groups;
- economic factors, including the requirements of economic development, levels of productivity, and the desirability of attaining and maintaining a high level of employment.

According to SA8000<sup>78</sup>, in most countries these two considerations are at odds and may not be weighted equally in the determination of the minimum wage. These wages also frequently do not reflect inflation and other factors that affect actual standards of living.

Lack of enforcement of even these minimal rates of pay is common, forcing workers to work excessive overtime just to earn the legal minimum wage. For this reason, the proposed EU Ecolabel criteria include an additional requirement on the 'living wage' being sufficient to meet the basic needs of personnel and to provide some discretionary income. For a definition of 'living wages', interpretations, implementation, auditing and evidence of compliance, reference is made to the SA8000 Consolidated Guidance on Remuneration<sup>79</sup>.

### Defining the scope of the criteria proposal

The social requirements are proposed only to address first-tier suppliers (final product assembly). This is due to the fact that first-tier suppliers (contract manufacturers) increasingly act vertically within the supply chain from purchase to final assembly. Moreover, social aspects regarding hotspots of raw materials extraction will be addressed more specifically by criterion 'Use of conflict-free minerals'.

For most manufacturers, the final assembly of their ICT products takes place at a limited number of contract manufacturers. Providing a list of first-tier suppliers summing up to at least 90% of procurement expenditure for final assembly (see for example Apple's information on suppliers<sup>80</sup>) would help the competent bodies to cross-check with the availability of independent audit reports as also being required for verification. Online publication of audit reports would improve the overall transparency of the ICT supply chain.

### Addressing perceived weaknesses with the industry Code of Conduct

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<sup>78</sup> Source: [http://www.sa-intl.org/data/n\\_0001/resources/live/SA8000Remuneration.pdf](http://www.sa-intl.org/data/n_0001/resources/live/SA8000Remuneration.pdf)

<sup>79</sup> See [http://www.sa-intl.org/data/n\\_0001/resources/live/SA8000Remuneration.pdf](http://www.sa-intl.org/data/n_0001/resources/live/SA8000Remuneration.pdf)

<sup>80</sup> Cf. <http://www.apple.com/supplier-responsibility/our-suppliers/> and [http://images.apple.com/supplier-responsibility/pdf/Apple\\_Supplier\\_List\\_2014.pdf](http://images.apple.com/supplier-responsibility/pdf/Apple_Supplier_List_2014.pdf)

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Feedback from industry stakeholders requested alignment with the Electronic Industry Citizenship Coalition's (EICC) Code of Conduct. Although the EICC CoC provides a positive framework for action on social issues by manufacturers, it raises a number of concerns:

- The labour standards are not based on the fundamental ILO labour conventions but rather on the national laws which might be weaker in some countries.
- The Freedom of Association and Right to Collective Bargaining requirements fall behind the Core ILO and SA8000 standards.
- Moreover, the CoC only implies regional minimum wages and not wages sufficient to meet basic needs ('living wages').
- Rights relating to employment security are not addressed.
- Monitoring is mainly based on self-evaluation and, in the monitoring process, no independent trade unions or labour rights organisations are included. Controls of the self-evaluation of suppliers only take place on a random basis. Although the EICC has a 'Validated Audit Process' (VAP), it is not a requirement.

Whilst it is not proposed to explicitly refer to labour conditions in the assessment and verification text, as all qualified social auditors should be encouraged in order to support implementation of the Ecolabel, the intention is to recognise third party auditing by accredited SAAS (SA8000) and EICC VAP auditors. This is considered to provide greater scope for applicants who are members of the EICC to comply with the criterion, albeit with stricter additional requirements relating to the audit process, ILO coverage and minimum/living wages.

Although the SA8000 audit process focuses in a similar way to the EICC VAP audit process on interviews with the employer and workforce, it also identifies consultation with external stakeholders as being important. The SA8000 audit guidance describes how stakeholders shall be involved prior to the audit process<sup>81</sup>:

*'The interested stakeholders to be consulted include: workers, trade unions, research institutions, NGOs, community organisations, and labor experts. The groups being consulted may be asked if any facility in the area has particular problems and/or for comments on a list of facilities including the audited facility, but auditors should not identify the applicant facility prior to certification.'*

This wider engagement is intended to assist auditors to 'build up a picture of working conditions at the enterprises in advance of the verification process'. The guidance specifically refers to the convening of meetings of local groups.

#### *Cross-checking the provisions and safeguards against 'scandals'*

Early in the revision process a case cited of a social criterion 'scandal' involved Samsung, who in May 2013 were awarded TCO certification for a Galaxy S4 smartphone model<sup>82</sup>. The scandal appears from NGO announcements to have related to the handling of chemicals (occupational health and safety) and workers' rights (Freedom of Association).

A cross-check of the provisions within the criterion proposal was made with the aim of ensuring that the issues raised in the cited Samsung case are addressed. The industry EICC code of conduct, TCO and SA8000 were also checked. This exercise highlighted that health and safety issues were not directly

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<sup>81</sup> Social Accountability International (2004) *Guidance document for Social Accountability 8000*.

<sup>82</sup> Uncited press release, *Global health and justice groups demand that TCO withdraw its sustainability certification award for Samsung's S4 smartphone*.

<http://www.amrc.org.hk/system/files/Global%20health%20and%20justice%20groups%20demand%20that%20TCO%20withdraw%20Samsu ng%20certification.pdf>

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addressed within the criterion proposal, with chemical handling having been identified as a specific issue in the case of Samsung.

ILO Conventions 'Occupational Safety and Health' (No 155) and 'Safety in the use of chemicals at work' (No 170) were identified as being relevant for the purposes of auditing. Convention No 155 has already been adopted for the EU Ecolabel for Textiles. Convention No 170 specifically addresses chemical handling and risk assessment in the workplace. Both provisions are specifically referenced in the consolidated guidance for the SA8000 standard<sup>83</sup>.

#### How to address countries where collective bargaining is illegal

A cross-check of the TCO criterion also highlighted a point raised in early discussions relating to countries where the right to freedom of association and collective bargaining via unions is restricted or banned, such as in China. The TCO social audit requirement 'Mandate A.7.1' states that *'in situations where the right to freedom of association and collective bargaining are restricted under law, workers shall be permitted to freely elect their own representatives.'* The alternative text proposed originates from UN guidance on implementation of the Global Compact<sup>84</sup>, which states that *'the company shall recognise legitimate employee associations with whom it can enter into dialogue about workplace issues'*.

The proposal to address labour conditions during manufacturing reflects the significance of social issues in the computer/display manufacturing supply chain. This is evidenced by the investment made by industry to address working conditions through an industry Code of Conduct. In this respect, high-level reference is made in both the Act and the Annex criteria to a number of reference documents, namely:

- the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy;
- the UN Global Compact (Pillar 2);
- the UN Guiding Principles on Business and Human Rights; and
- the OECD Guidelines for Multinational Enterprises.

The proposal seeks to provide a minimum acceptable level of assurance based on third party auditing of final assembly sites. Auditing would be carried out against the underlying principles of ILO fundamental conventions, which are commonly used as a reference for social auditing. Specific additional ILO conventions and points for verification relating to working hours, remuneration and health and safety have been added, reflecting 'hotspot' social issues for computer manufacturing. A clause has also been included recognising that in some countries, such as China, some flexibility is required because of laws restricting unions.

The form of verification addresses two key identified weaknesses of the industry Code of Conduct. Firstly, third party auditing is a requirement so as to ensure impartiality. Secondly, the stakeholders involved in the audit process have been expanded beyond the workforce so as to better detect possible breaches of the requirements, reflecting best practice from SA8000.

The use of auditors qualified to assess compliance of the electronics supply chain is promoted, with the intention to recognise accreditations such as those provided by SAAS (the accreditation body for SA8000) and the EICC. It is considered important to support the industry's EICC initiative within the frame of the criterion proposal.

The updated revised proposal included in TR4.0 was fully aligned to the finally voted EU Ecolabel criteria for the personal, notebook and tablet computers product group.

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<sup>83</sup> Social Accountability International, *Social Accountability 8000 International Standard*, <http://www.sa-intl.org>

<sup>84</sup> Castan Centre for Human Rights Law and the International Business Leaders Forum (2008) *Human rights translated: A business reference guide*, Office of the United Nations High Commissioner for Human Rights.

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## Latest consultation and rationale of final proposal

All received comments and responses with regard to TR4.0 are gathered at the section 5.

During the EUEB in June 2019 several stakeholders mentioned to use TCO as a reference. TCO generation 8 for displays includes the following mandate:

<b>TCO 2.1 Supply chain responsibility</b>	<p><b>Background</b></p> <p>Supply chains of IT products are complex and spread all over the world. The most basic aspect of socially responsible manufacturing in the supply chains is to define the responsibility. After this is done, the level of conformity and the implementation in the supply chains need to be defined. Finally, to get required results, verification is crucial. Without verification there are no considerable results. The contribution of TCO Certified is to:</p> <ul style="list-style-type: none"><li>• Place the responsibility on the brand owners' which are on the top of the value chains.</li><li>• Define a minimum level of conformity to the code of conducts of the brand owners.</li><li>• Provide a control system to ensure that the brand owners take responsibility and work in a structured way in accordance with their code of conducts.</li><li>• Create an incentive for brand owners to work proactively.</li></ul> <p><b>Definitions</b></p> <p>Brand owner: The company or organization owning or controlling the brand name. Final assembly factory: The whole factory where final assembly of the certified product is taking place. Corrective action plan (CAP): A list of actions and an associated timetable detailing the remedial process to address a specific problem.</p> <p><b>Mandate</b></p> <p>By signing this mandate, the brand owner agrees to the (1.) Commitment and agrees to conduct the (2.) Structured work. Additionally TCO Development requires that the brand owner shows (3.) Proof of the commitment and the structured work by allowing random inspections, by sharing audit reports and CAPs and by providing other documented proof described below.</p> <p><u>1. Commitment</u></p> <p>The brand owner must have a code of conduct for the manufacture of certified products, that is considered consistent with the following:</p> <ul style="list-style-type: none"><li>-ILO's eight core conventions: 29, 87*, 98*, 100, 105, 111, 138 and 182.</li><li>-UN Convention on the Rights of the Child, Article 32.</li><li>-All applicable local and national health and safety and labor laws effective in the country of manufacture and a 60 hour working week including overtime*.</li></ul> <p>*See clarifications 2.1.2</p> <p><u>2. Structured work</u></p> <ul style="list-style-type: none"><li>• The brand owner must report the final assembly factories for each certified product model in TCO Certified Portal in the application for a new certificate.</li><li>• For all factories listed in TCO Certified Portal that the brand owner is using, the brand owner must supervise the implementation of the code of conduct.</li><li>• In the final assembly factories and in the rest of the supply chain, the brand owner must ensure that CAPs are developed and fulfilled within reasonable time for all non-conformities against their code of conduct that the brand owner is made aware of.</li></ul> <p><u>3. Proof</u></p> <ol style="list-style-type: none"><li>1. TCO Development may conduct / commission random factory inspections (spot checks) at any final assembly factory manufacturing certified products for the brand owner and may require full audit reports during the certification period in order to assess social commitment and advancement.</li><li>2. TCO Development may also require seeing audit reports and CAPs from factories further down the supply chain to ensure that corrective actions have been successfully implemented.</li><li>3. TCO Development additionally requires the documentation below to be verified by an independent verifier approved by TCO Development: Submit the following to an approved verifier: Once a year: The most recent version of the brand owner's code of conduct, which must be considered consistent with the TCO Certified mandate. Information on the routines of how management and workers have been informed about the brand owner's code of</li></ol>
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conduct.

A completed and signed brand owner form covering one or all products (chapter 11.1).

For each application:

Name and address of all final assembly factories manufacturing the certified product. If any factory is used that is not on the TCO Certified accepted factory list then the factory identification template must be submitted for this factory.

For each final assembly factory of the certified product The most recent independent audit and a CAP for each non-conformity. The audit interval is determined by the risk category of the factory. The risk category is determined by the verifier according to the mandate.

Submit the following, together with the application to TCO Development:

A copy of a verification report from a verifier approved by TCO Development.

A copy of the code of conduct in English must be uploaded to TCO Certified Portal.

All final assembly factories manufacturing the certified product must be reported in TCO Certified Portal.

An independent audit and a CAP for each non-conformity must be reported in TCO Certified Portal at an interval determined by the risk category of the factory for all final assembly factories manufacturing the certified product.

### **2.1.2 Clarification**

#### **General Clarifications**

The mandate is a social performance mandate and criteria are based on the eight ILO (International Labour Organization) core conventions and local legislation. The mandate requires that the brand owner is in conformity with the minimum standards for code of conduct, inspection and corrective action engagement, regarding the situation at their own and/or their supplier factories manufacturing certified products.

\* *Collective bargaining and freedom of association:* All workers must have the right to form, join and organize trade unions of their choice and to have them bargain collectively on their behalf with employers. In situations where this is restricted under law, employers must allow workers to freely and democratically elect their own representative(s) for the purpose of defending the rights and interests of workers.

\* *Local labor law clarifications:* The limit and enforcement of local law regarding working hours differs tremendously across the world. To harmonize with other initiatives and to find a reasonable level for the industry, the criteria in TCO Certified sets a maximum 60 hour working week, including overtime, as a global requirement regardless of the local law.

The criteria in TCO Certified sets a global limit for weekly working hours that includes overtime based on ILO convention 1 (56 hours per working week including overtime) and an additional 4 hours per working week is given to harmonize with SAI and RBA. Therefore, working weeks including overtime are not to exceed a total of 60 hours. A working week is considered 1 day of every 6 consecutive work days.

To monitor continued conformity during an agreed period of time, when considered necessary the factory will be required to submit working week data to TCO Development using the working week template. The template to be used will be shared with the brand owner or factory owner by TCO Development.

#### **The verification process**

Proof documentation must be submitted to an independent verifier approved by TCO Development. It is the verifier's responsibility to request any additional documents necessary for the review. The verifier will evaluate the information received from the brand owner according to the following principles.

##### **1. The code of conduct**

The brand owner must have their code of conduct reviewed annually by an approved verifier. If the code of conduct has not changed since the previous annual review then the brand owner does not have to submit it again. In this instance, the senior management representative for supply chain responsibility must report this to an approved verifier.

The code of conduct must be considered consistent with:

ILO's eight core conventions: 29, 87\*, 98\*, 100, 105, 111, 138 and 182.

UN Convention on the Rights of the Child, article 32.

All applicable local and national health and safety and labor laws effective in the country of manufacture and a 60 hour working week including overtime\*.

\* See local labor law clarifications 2.1.2.

The contents of the code of conduct must have been adopted by the board and addressed by management.

The code of conduct must relate to the manufacturing of the specific product being certified.

##### **2. Proof of the supply chain being informed of the code of conduct.**

The brand owner must annually submit for review by an approved verifier a description of how management and workers at all their final assembly factories of certified products are informed about the code of conduct. Proof of training classes or other means of worker training and how the factory measures the effectiveness of the worker training must be submitted for review. If there are no changes to the communication routine since the previous annual review, then the brand owner does not have to submit it again. In this instance the senior management representative must report this to an approved verifier.

Examples may be that the brand owner:

-has translated the code of conduct into local languages. This shows that the company  
 -has made efforts to inform management and employees about the code's content in their own language.  
 -has conducted training on the code for employees and / or management at production facilities.  
 -has made suppliers complete a questionnaire (self-assessment) on their understanding of, and conformity with, the code of conduct.

3. Signed brand owner form  
 The brand owner signs that the mandate is fulfilled for one or all products to be certified.

4. Identification of final assembly factories  
 For each certified product, all final assembly factories the brand owner is using to manufacture the certified product must be identified. The approved verifier will ensure that all these factories are listed on the TCO Certified accepted factory list.  
 For new factories that are not already on the TCO Certified accepted factory list the factory must be added. This is done by submitting the factory identification template with the factory's name, full address and audit information to an approved verifier.  
 Each time a factory is removed, added or updated in any way, the brand owner must ensure that this information is updated in the TCO Certified accepted factory list by contacting an approved verifier.

5. Independent social audit reports to TCO Development  
 The brand owner must ensure that TCO Certified Portal is continuously updated with the most recent independent initial audit report and CAPs for any non-conformities from all the final assembly factories manufacturing the certified product.  
 Brand owners or applicants / manufacturers must submit audit reports and CAPs to an approved verifier for upload to TCO Certified Portal. Consistency of these reports are ensured through annual spot-checks by TCO Development.  
 The audit interval is determined by the risk category of the factory.

1. Independent audits must be conducted by organizations accredited to ISO 17021 and carried out by SA8000, RBA or BSCI certified lead auditors. An independent party is considered to be a person or body that is recognized as being independent of the parties involved, regarding the issue in question.

2. Types of accepted audits are:

a. SA8000,  
 b. RBA VAP,  
 c. RBA Non-VAP: full audit with same auditor qualification, audit and report quality as a RBA VAP audit, or  
 d. BSCI: full audit with at least 'C' grade and completed CAP.  
 e. Other audits with evidence that could prove 'equal quality to other approved audits' must include auditor qualification, audit process (e.g. triangulation of non-conformities), audit report and CAP. This option will need to be verified by an approved verifier and accepted by TCO Development before it is used.

All received comments and responses with regard to TR4.0 are gathered at the section 5. As a response to comments received the following amendments have been introduced in the final proposal:

- Wording amendments have been introduced to reflect the latest changes included in the final version text version for computers product group as voted. It has been specified that in countries where ILO Labour Inspection Convention, 1947 (No 81) is ratified and ILO supervision indicates that the national labour inspection system is effective, labour inspector(s) appointed by a public authority are accepted to carry out the audit process.
- Additional wording amendments have been included to further harmonise with TCO generation 8 for displays. References to applicant code of conduct and to the availability of correction action plan have been included in line with TCO.
- As suggested by a stakeholder, the language concerning where freedom of association and collected bargaining are restricted has been clarified.

### 3.5.2 Criterion 5.2 – Use of ‘conflict-free minerals’ during production

Decisions 2011/337 and 2011/330
No requirements
Updated proposal for criterion 5.2 – Sourcing of ‘conflict-free’ minerals
The applicant shall support the responsible sourcing of tin, tantalum, tungsten and their ores and gold from conflict-affected and high-risk areas by: <ul style="list-style-type: none"><li>(i) conducting due diligence in line with the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas; and</li><li>(ii) promoting responsible mineral production and trade <b>within conflict-affected and high-risk areas</b> for the identified minerals used in components of the product in accordance with OECD.</li></ul> <p><b>Assessment and verification:</b> <i>The applicant shall declare the compliance with these requirements together with the following supporting information:</i></p> <ul style="list-style-type: none"><li>• <i>A report describing their due diligence activities along the supply chain for the four minerals identified. Supporting documents such as certifications of conformity issued by the European Union's scheme shall also be accepted.</i></li><li>• <i>Identification of component(s) which contain the identified minerals, and their supplier(s), as well as the supply chain system or project used for responsible sourcing.</i></li></ul>

#### **Rationale and summary of the changes during the revision process**

Displays contain a wide range of scarce resources which are largely mined in the Democratic Republic of the 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 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.

Responsible sourcing projects can be specified geographically by defining activities carried out within or on the fringes of the resource-conflict hotspot (the eastern parts of the Democratic Republic of the Congo) and by their compliance with the *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas*, which was specifically tailored to the responsible sourcing of tin, tantalum, tungsten and gold.

The activity in this area was stimulated by the US Dodd-Frank Act which requires disclosure of the source of metals. Example projects on the ground include those working to establish traceability systems at a general level, such as the Public-Private Alliance for a responsible minerals trade and Solutions for Hope, the Responsible Mineral Initiative<sup>85</sup> and those focused on specific minerals, such as the Conflict-free tin initiative, the Tin Source Initiative and the Tantalum Initiative. Front-runner companies are amongst the active members of these projects.

#### **Towards an integrated EU approach**

At the AHWG2, DG Trade outlined work by the Commission to address the conflict-free sourcing of materials for end-products containing tin, tantalum, tungsten and gold. The proposed approach is outlined in Joint Communication JOIN(2014)8<sup>86</sup> which includes proposals for public procurement guidance.

<sup>85</sup> <http://www.responsiblemineralsinitiative.org/>

<sup>86</sup> Joint Communication to the European Parliament and the Council on *Responsible sourcing of minerals originating in conflict-affected and high-risk areas: Towards an integrated EU approach*, JOIN(2014)8



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Although the Communication highlights the significance of the OECD's Due Diligence guidance as a framework for action it cites fragmented compliance efforts, including a wide range of public and private initiatives, as well as the limited incentives to act, as barriers to further progress. Moreover, membership of existing projects supposes a substantial investment of time and resources which may be a barrier to smaller manufacturers.

A draft Regulation is proposed which would introduce a requirement for due diligence along the supply chain for EU importers, reflecting the approach promoted by the OECD. It describes a responsible importer due diligence self-certification requirement linked to the establishment of a list of responsible smelters and refiners. However, implementation will take some time so any Ecolabel criteria must therefore be pragmatic in the form of assessment and verification.

The Commission also proposed to broaden the geographical scope of conflict areas adopted under the Dodd-Frank Act to any '*areas in a state of armed conflict, fragile post-conflict as well as areas witnessing weak or non-existing governance and security, such as failed states, and widespread and systematic violations of international law, including human rights abuses.*'

The proposed criterion takes a proactive approach to the sourcing of tin, tantalum, tungsten and their ores and gold from conflict-affected and high-risk areas. This reflects the approach already taken by leading manufacturers, which rather than boycotting such areas seeks to support an improvement in working conditions.

The requirements and verification have been aligned with the OECD's guidance on due diligence, with anticipation of the EU's certification scheme for conflict-free smelters which will introduce a third party verified supply chain conformity scheme. They also require applicants to demonstrate how they promote the sourcing of conflict-free minerals by providing verification of action for at least one mineral related to at least one component. This is deliberately flexible as it does not require applicants to join traceability projects. They can verify compliance at either:

- final product level, as members of traceability projects;
- by contracting final assemblers that are members of traceability projects; or
- by specifying sub-assemblies or components manufacture by suppliers who are members of traceability projects.

In this way, supply chain activity in conflict-affected and high-risk areas will be supported, helping the development of traceability to improvement initiatives on the ground and demand for conflict-free minerals.

For the preparation of the updated proposal included in TR4.0, additional evidence of manufacturers/suppliers that are part of conflict-free sourcing initiatives was gathered:

- LG Electronics<sup>87</sup> is a member of the Responsible Minerals Initiative (RMI). The RMI provides its members with the most up-to-date information on conflict-free smelters and refiners, and tools for conducting due diligence. The RMI also operates the Responsible Minerals Assurance Process (RMAP), a programme that uses third party independent auditors to verify that participating smelters and refiners have adequate policies and due diligence processes in place to trace the origins of the minerals that they process and assess whether they were obtained from conflict-free sources.

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<sup>87</sup> <https://www.lg.com/global/sustainability/business-partner/conflict-minerals>

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- Samsung Electronics<sup>88</sup> has banned the use of conflict minerals that are mined unethically in conflict areas in 10 African countries, including the Democratic Republic of the Congo. To establish a conflict-free system, it has implemented a process of due diligence for conflict minerals in line with the 'OECD Due Diligence Guidance'. Additionally, it encourages suppliers to partner with smelters certified by the RMAP (Responsible Minerals Assurance Process), and require uncertified smelters in its supply chain to become certified by the RMAP.

NVIDIA<sup>89</sup> is committed to operating in a socially responsible manner and to implementing due diligence practices designed to determine whether minerals from the Democratic Republic of the Congo (DRC) and adjoining countries, including gold, tantalum, tungsten and tin (3TG), used in its products are 'conflict-free'. NVIDIA's due diligence process aligns with the Organisation for Economic Co-operation and Development (OECD) framework. NVIDIA established an internal management system, centered around a conflict minerals team with representatives from operations, legal, sales and marketing, and requested all 3TG suppliers to complete the Conflict Minerals Reporting Template (CMRT). To improve the collection, validation and analysis of its conflict minerals programme, it leverages a third party supplier management solution. It is an active member of the Conflict-Free Sourcing Initiative (CFSI) and the Public Private Alliance (PPA) for Responsible Minerals Trade to support initiatives targeted at improving the traceability of conflict minerals in the DRC.

Against this backdrop, it was considered that the proposed criterion during the revision was achievable. In TR4.0, changes were introduced in this criterion in order to fully align it to the finally voted EU Ecolabel criteria for the personal, notebook and tablet computers product group; in particular, the assessment and verification section were further clarified.

#### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. No changes have been introduced under this criterion after the consultation.

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<sup>88</sup> <https://www.samsung.com/levant/aboutsamsung/sustainability/supply-chain/>

<sup>89</sup> <https://www.nvidia.com/object/conflict-minerals-program.html>

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## 3.6 Criterion 6 – Information criteria

### 3.6.1 Criterion 6.1 – User instructions

#### Decisions 2009/300 and 2011/337

##### Televisions:

The television 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 will include in particular:

- (a) The television's power consumption in the various modes: on, off, passive standby, including information on energy savings possible in different modes.
- (b) The television's average annual energy consumption expressed in kWh, calculated on the basis of the on-mode power consumption, operating 4 hours a day and 365 days a year.
- (c) Information that energy efficiency cuts energy consumption and thus saves money by reducing electricity bills.
- (d) The following indications on how to reduce power consumption when the television is not being watched:
  - turning the television off at its mains supply, or un-plugging it, will cut energy use to zero for all televisions, and is recommended when the television is not being used for a long time, e.g. when on holiday,
  - using the hard off-switch will reduce energy use to near zero (where one is fitted),
  - putting the television into standby mode, will reduce energy consumption, but will still draw some power,
  - reducing the brightness of the screen will reduce energy use.
- (e) The position of the hard off-switch (where one is fitted).
- (f) Repair information regarding who is qualified to repair televisions, including contact details as appropriate.
- (g) End-of-life instructions for the proper disposal of televisions 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 (1).
- (h) Information that the product has been awarded the flower (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>

*Assessment and verification:* The applicant shall declare compliance of the product with these requirements and shall provide a copy of the instruction manual to the competent body assessing the application.

##### External computer displays:

The computer display 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 computer display reduces energy consumption to zero;
- (c) The following indications on how to reduce power consumption when the computer display is not being used:
  - (i) Putting the computer display 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) 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 computer display, including contact details as appropriate;

- (e) End-of-life instructions for the proper disposal of computer displays 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.

#### Updated proposal for criterion 6.1 – User instructions

The electronic display 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, as a minimum, the following information (when applicable):

- (a) Energy consumption: Energy Efficiency Class according to Energy Labelling of electronic displays(\*). The maximum power demand in each operating mode. In addition, instructions shall be provided on how to use the device's energy saving mode and Information that energy efficiency cuts energy consumption and thus saves money by reducing electricity bills.
- (b) The following indications on how to reduce power consumption:
  - (i) Turning the product off at its mains supply, un-plugging it, or using the hard off-switch (where one is fitted) will cut energy use to (near) zero;
  - (ii) Putting the product into standby mode will reduce energy consumption, but will still draw some power;
  - (iii) Note that screen savers (computer monitors) can stop displays from powering down into a lower power mode when not in use. Ensuring that screen savers are not activated on displays can therefore reduce energy use;
  - (iv) Note that a Quick Start Function might cause increased power consumption;
  - (v) Note that integrated functions, such as a receiver for digital signals (e.g. DVB-T) or hard disk recorders may help reducing power consumption if, as a result, an external device becomes redundant.
- (c) Network connectivity: Information on how to deactivate networking functions
- (d) The position of the hard off-switch.
- (e) Information that extension of the product's lifetime reduces the overall environmental impacts.
- (f) The following indications on how to prolong the lifetime of the product:
  - (i) Clear disassembly and repair to enable a non-destructive disassembly of products for the purpose of replacing key components or parts for repairs.
  - (ii) Information to let the user know where to go to obtain professional repairs and servicing of the product, including contact details as appropriate.
- (g) End-of-life instructions for the proper disposal of the product 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.
- (h) 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>
- (i) Any print-versions of instruction/repair manual(s) should contain recycled content and should not contain chlorine bleached paper. To save resources, online versions should be preferred.

*Assessment and verification:* The applicants shall declare the compliance of the product with these requirements to the competent body and shall provide a link to the online-version or a copy of the user instructions / repair manual to the Competent Body.

\*Commission Delegated Regulation (EU) 2019/2013 of 11 March 2019 supplementing Regulation 2017/1369/EU

#### **Rationale and summary of the changes during the revision process**

Initially, both existing consumer information for televisions and external computer displays were integrated into one criterion. In addition, information on newer functions and modes (manual/automatic brightness control, quick start mode, active standby for networked products) was included.

During the revision:

- the product group was changed to ‘electronic display’;
- a requirement on network connectivity was added;
- the provision of a list of available spare parts with current prices was deleted as this was not seen as practicable by stakeholders;
- a sub-criterion on repair manuals was specified regarding print versions with additional advice to prefer online versions of to save resources;
- the assessment/verification was amended by the provision of a copy and/or link to the user instructions.

In the updated proposal included in TR4.0, minor wording changes were introduced in this criterion in order to make it clearer and to fully align it to the finally voted EU Ecolabel criteria for the personal, notebook and tablet computers product group. The information requirements on energy consumption were adapted to align it with the new Energy Labelling Regulation.

### Latest consultation and rationale of final proposal

All received comments and responses with regard to TR4.0 are gathered at the section 5. No changes have been introduced under this criterion after the consultation.

## 3.6.2 Criterion 6.2 – Information appearing on the Ecolabel

### Decisions 2009/300 and 2011/337

Televisions:

Box 2 of the Ecolabel shall include the following text:

- ‘- High energy efficiency,
- Reduced CO<sub>2</sub> emissions,
- Designed to facilitate repair and 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 appears on the packaging and/or product and/or accompanying documentation to the awarding competent body.

External computer displays:

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.

### Updated proposal for criterion 6.2 – Information appearing on the Ecolabel

The optional label with text box shall contain three of the following texts:

- (a) High energy efficiency
- (b) Restriction of hazardous [substances](#)
- (c) Designed to be easy to repair and recycle
- (d) Contains xy% post-consumer recycled plastic (only when greater than 25% as a percentage of the total plastic)

The guidelines for the use of the optional label with text box can be found in the 'Guidelines for use of the Ecolabel logo' on the website:

[http://ec.europa.eu/environment/ecolabel/documents/logo\\_guidelines.pdf](http://ec.europa.eu/environment/ecolabel/documents/logo_guidelines.pdf)

**Assessment and verification:** *The applicant shall provide a sample of the product label or an artwork of the packaging where the EU Ecolabel is placed, together with a declaration of compliance with this criterion.*

### **Rationale and summary of the changes during the revision process**

Initially, changes were made to existing criteria in force:

- To have an explicit focus on extended lifetime (formerly repair and upgrading).
- For televisions: addition of mercury-free backlights.

During the revision, the major proposed changes were:

- The 'mercury-free' claim has been deleted and a more general claim in accordance with criteria on hazardous substances has been introduced.
- Inclusion of criteria addressing plastic recycled content claims. Following the example of cotton content claims in the textile product group, where a higher content can be demonstrated there is an option to display this in Box 2 next to the Ecolabel. This would provide a benefit to manufacturers wishing to work towards a high recycled content, without placing an overall burden which could reduce the selectivity of the Ecolabel.

In the updated proposal included in TR4.0, minor changes were introduced in this criterion in line with the final criteria for the EU Ecolabel for the personal, notebook and tablet computers product group.

### **Latest consultation and rationale of final proposal**

All received comments and responses with regard to TR4.0 are gathered at the section 5. No changes have been introduced under this criterion after the consultation.

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## 4 IMPACT OF CHANGES TO CRITERIA

This section consists of a summary of the main general changes proposed for the revised criteria and potential implications for current licence-holders and possible applicants. In relation to the scope, it is suggested to align it with the revised Ecodesign and Energy Labelling Regulations and broaden the range of products covered. It is proposed to move from solely televisions to electronic displays, which include televisions, computer monitors and signage displays.

In relation to the criteria, there is a general increase in the level of ambition proposed, based mainly on the available technical evidence and information from other labelling schemes. Relating to the energy criteria, more efficient energy classes have been defined. With regards the power cap, stricter values has been proposed (decreased to 64W) except for a UHD and signage displays where the existing value has been relaxed 125w in order to allow more screens above 55 inches to apply. Power management requirements have been extended compared to existing criteria in force.

Regarding the criteria dealing with hazardous substances, the requirements have been modified taking into consideration changes in legislation and new evidence. In addition, following the example of other labelling schemes, a new requirement on activities to reduce supply chain fluorinated greenhouse gas (GHG) emissions has been included.

With regard to criteria on reparability, the requirements have been widened. The existing requirements in force set the focus on the guarantee and availability of spare parts and the reference to easy disassembly is considered imprecise. The revised text includes additional requirements on the provision of information. With regards to the sub-requirement on design for reparability, this has been further defined.

End-of-life management has been revised and extended. In addition to the marking of parts, the target parts have been further defined and the dismantling time has been included in line with EPEAT. In addition, manufacturers wishing to work towards a high recycled content are allowed to claim this (if above 25%) in the label.

Finally, the EU Ecolabel Regulation allows the inclusion of social requirements, where relevant. The revised criteria of the EU Ecolabel also includes new criteria on labour conditions and on conflict-free mineral sourcing.

In conclusion, the revised criteria set a higher ambition level, reflecting front runners' performance, and allow a broader spectrum of displays to be awarded the EU Ecolabel as a result of the changes in the scope.

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## 5 TABLE OF COMMENTS: Stakeholder written comments on TR4.0

Criteria/subject	Comments received in final consultation	JRC response
<b>General Comments</b>	<ul style="list-style-type: none"> <li>- We support the alignment of the criteria with the Energy labelling and Eco-design directives regarding energy consumption, reparability and end-of-life management.</li> <li>- We agree on the scope of products included in the referential.</li> <li>- We are aware of the low success of this product group (currently 1 licence holder in Europe), the criteria should therefore be achievable for the manufacturers.</li> <li>- We support the simplification of the substances criterion and the alignment with recently voted referentials.</li> </ul>	<b>Comment accepted</b>
	<p>The validity period (Article 4, p. 4) should be based on the increasing demand of the eco-design-directive. The validity period could be too long and then, the EU Ecolabel too unambitious in the last year.</p>	Comment acknowledged
	<p>Do you have any ideas regarding “High dynamic range (HDR)”? Do you have any plans to consider these device types?</p>	Indications on the verification for displays including HDR functionality have been included in order to allow developing technologies to apply.
	<p>As a general comment, we wish to emphasise that, given the existing low uptake track record of EU Ecolabels for IT equipment, and in order to have an Ecolabel that is able to compete with more established eco labels, it is necessary to increase interest of the sector in obtaining this certification. We believe this can only be achieved by setting realistic targets.</p>	<b>Comment accepted</b>
<b>Scope</b>	<p>We recommend including signage displays in the scope. Despite limited data on criteria compliance, the EU Ecolabel can have an added value as a benchmark on resource efficiency for this type of displays.</p>	<b>Comment accepted</b>
	<p>Having a different threshold for displays with “UHD resolutions and above, and for HDR” is the appropriate approach, as displays can have HDR capabilities without having resolutions as high as UHD. However, there can be confusion when the criteria is applied, because it is not clear whether the class threshold for displays with HDR capability applies only to SDR modes or to the HDR mode too. We assume, considering that HDR mode energy efficiency is not regulated by ecodesign (i.e. it is only subject to declaration requirements), that the Ecolabel will not include a threshold for HDR mode, but this needs to be clarified. We suggest adding a sentence explaining that the energy class of the display shall be determined by testing the product in the normal configuration using an SDR test clip.</p>	
	<p>We support to include digital signage displays into these awarding criteria</p>	

	<p>Why (in Article 1, p. 3) are “external computer displays” not included? At page 1, paragraph 2 is written “The new title “Electronic Displays” subsumes televisions, external computer displays and signage displays.”</p>	<p><b>Comment accepted</b> Monitors are included. Mistake in Article 1 has been corrected.</p>
<p><b>1.1: Energy savings</b> <b>(i) Energy efficiency performance</b></p>	<p><i>The EU Ecolabel should stay at the top of the energy efficiency classes placed on the market. In light of fast-moving market, a dynamic approach would be desirable to allow adaptation of the energy efficiency class required by the EU Ecolabel during the validity period of the criteria set (i.e. revise it as a given percentage of televisions (i.e. 20-30%) comply with the top energy class). In the past (until an amendment was introduced in 2018), class B Televisions could be ecolabelled because the criteria were static and did not encompass energy efficiency innovation.</i></p> <p><i>We favour the formulation of a dynamic approach from the entry into force of the revised criteria. As there are often delays in revision processes, a short validity time might not be a good solution.</i></p> <p><i>The current proposal for energy efficiency performance is too lenient. Class F will be the mandatory level in 2023. As shown in the report, most of the models fall under class F and G (especially for UHD). We should increase at least one class or even two.</i></p> <p><i>The criterion should specify that performances in normal/UHD are not affected by software updates. Software updates should not lead to an increase in energy consumption. According to ICRT tests, differences in energy use between similar TV models tested with different software versions are mostly not present or marginal.</i></p> <p><i>Please consider that in March 2023 the energy efficiency classes within the eco-design directive will be tightened. The result will be that the EU Ecolabel is only a half energy efficiency class (in average) higher than the eco-design-directive. From our perspective this ambition level is too low. Therefore, we suggest a stepwise approach (in line with the eco-design-directive) or a shorter (&lt;4 years) validity period of the criteria.</i></p> <p><i>We received feedback from the French consumer association Stop to planned obsolescence (Halte à l'obsolescence programmée): they mentioned that TV and computers screens are mainly UHD screens and represent now most of the screens sold on the market. It is therefore necessary to scale the criterion for UHD to ensure the criteria remain stringent in the future. The JRC needs to ensure that the defined thresholds apply to UHD screens and are still relevant for the coming years.</i></p> <p><i>We propose changing the method to express the requirement for energy efficiency in on-mode. In the criteria document (annex) this is expressed as (example for television):</i></p> <p style="text-align: center;"><i>Energy efficiency class <math>\geq E</math></i></p> <p><i>But what is greater than or equal to when talking about letters. We suggest that the energy efficiency instead is expressed by the EEI.</i></p> <p><i>The proposed ecolabel criteria for energy efficiency will for some displays (depending on the size and</i></p>	<p><b>Comment partially accepted</b> As a result of several comments received, a dynamic approach has been included. In March 2023 the energy efficiency classes within the eco-design directive will be tightened. In line with this, a tier has been included in EU Ecolabel. A stricter energy class is now requested after January 2023. However considering that D class for monitors is already very ambitious; this class has been kept in the proposal after 1 of January of 2023 while for the rest of displays a superior class has been proposed.</p> <p><b>Comment partially accepted</b> There was a general agreement since early phase of the process to align to Energy Labelling classes. More familiarity with classes than with EEI. No relevant changes are to be included at this stage of the process. Dynamic proposal has been establish having the data provided into consideration.</p>

resolution) be similar or close to the ecodesign requirement applicable already from 1 March 2023. See table below.

To ensure that the ecolabel criteria are ambitious at their entry into force, and that they do not after few years correspond to the ecodesign requirements, we suggest that the ecolabel criterion regarding energy efficiency should be tightened with an energy class. Alternatively, the ecolabel criteria must be tightened as of 1 March 2023. See comment on revision below.

Please note that the same formula is not used to calculate the EEI in the new energy labelling and ecodesign regulations. The energy labelling formula is less ambitious for the small screens, but more ambitious for the big ones. Therefore, the EEI values cannot be directly compared.

*Revision of energy efficiency criterion*  
The Commission shall review the new ecodesign and energy labelling regulations and present the results of the review and revised draft regulations (if appropriate) to the Consultation Forum no later than three years after the entry into force of the new regulations (probably mid 22).

We propose that a revision of the ecolabel criteria is carried out in parallel with the revision of the ecodesign and energy labelling regulations and that new ecolabel criteria is established based on the new data set and knowledge.

Product	Ecolabel Criteria (from 1.03.21)	Expressed by EEI	Ecodesign requirement tier 1 (from 1.03.21)	Ecodesign requirement tier 2 (from 1.03.23)	DK propos Ecolabel Criteria
television	≥ E ≥ F	EEI < 0,75 EEI < 0,90	EEI ≤ 0,9* EEI ≤ 1,1**	EEI ≤ 0,75* EEI ≤ 0,90** EEI ≤ 0,90***	EEI < 0,60 EEI < 0,75
monitor	≥ D ≥ F	EEI < 0,60 EEI < 0,90	EEI ≤ 0,9* EEI ≤ 1,1**	EEI ≤ 0,75* EEI ≤ 0,90** EEI ≤ 0,90***	EEI < 0,50 EEI < 0,75
image display	≥ F	EEI < 0,90	n.a.	n.a.	EEI < 0,75

\* For displays with resolution up to 2 138 400 pixels (HD)

\*\*For displays with resolution above 2 138 400 pixels (HD) and up to 8 294 400 pixels (UHD-4k)

\*\*\*For displays with resolution above 8 294 400 pixels (UHD-4k) and for MicroLED displays

The \* and \*\* are not explained. Please include the explanations.

**Comment accepted**  
Definitions placed in the legal text.

	<p><i>Different wording is used in the annex: “electronic display models” or “display models”. Please use “electronic displays” as it is used in the eco-design directive.</i></p>	<p><b>Comment accepted</b></p>
	<p><i>appreciates the extension of the scope to computer monitors and signage displays, however, the energy criteria for computer monitors (class ≥ D) is too strict, and only a very small percentage of monitors are expected to be able to meet this criteria. <b>We recommend to lower the threshold to class E.</b></i></p>	<p><b>Comment partially accepted</b></p>
	<p><i>We remain very concerned that the D class threshold for monitors is too strict, and will prevent these products to be certified with Ecolabel. We therefore suggest that a similar approach to TVs is implemented for monitors too, specifically a Tier 1 at the level of E class, followed by an application of D class threshold at Tier 2. Such a tiered approach would give industry the necessary time to improve efficiencies of monitors in order to qualify for the Ecolabel.</i></p>	<p>Data showed that a 17% of 160 HD monitors would comply with D. However considering that D class for monitors is already very ambitious; this class has been kept in the proposal after 1 of January of 2023 while for the rest of displays a superior class has been proposed.</p>
	<p><i>The energy requirement for computer monitors (class ≥ D) is too strict, and as a result a large share of monitors will be excluded from the Ecolabel due to the advanced functionalities they have, even though these are not necessarily inefficient monitors. This would really limit the portfolio of products that could be certified to the Ecolabel in the EU market. A more appropriate threshold for this criterion is class E. It should also be taken into account that for monitors meeting the definition of “professional displays” in the upcoming Lot 5 ecodesign regulation, even class E will represent an excessively strict requirement, therefore it is recommended to find a different approach for such products.</i></p>	
	<p><i>The methodology of using an “adjustment” for the 2018 dataset in order to justify the requirements is flawed, as energy improvements are not linear and instead occur in steps attributable to particular innovations that cannot be foreseen in advance. Please see the graph below as well as the justification provided by DigitalEurope in a position paper dated 25 October 2018 (attached for reference), where the issue of the “adjustment” based on an average annual energy efficiency improvement rate is addressed in detail. We recommend deleting Figure 3 as well as the references to the use of an “adjustment”, to avoid any future challenges related to methodology.</i></p>	<p><b>Comment rejected</b></p> <p>References from the Ecodesign and Energy Labelling background documents have been used in this report.</p>

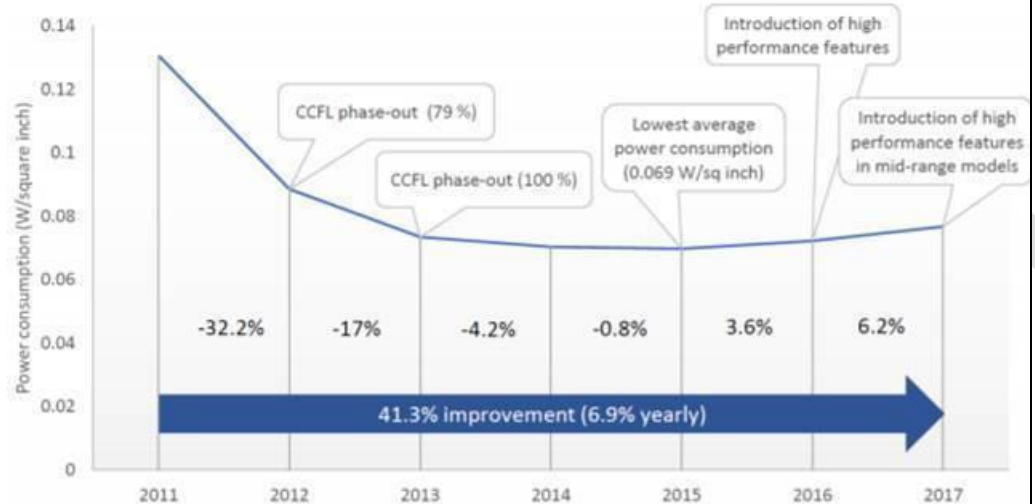


Figure 1: Evolution of TV power consumption, 2011 - 2017

**1.1: Energy savings (ii) maximum on mode power demand**

*For UHD 100W has been proposed. According to the report 68% of 140 models assessed comply this threshold. This raises the question whether the limit of 100W could not be made stricter.*

*We regret that provisions for a visible and accessible on/off switch have been discarded. It should be introduced as it can help users save energy when they are not using the device.*

**Comment rejected**

The models assessed were not average models but models of excellence wearing an Ecolabel. Only 68% of these excellence models complied with 100W. It is considered that 100W quite restrictive. Actually it has been relaxed to allow a small portion of screens bigger than 55/60 inches to qualify.

The inclusion of a requirement on a visible and accessible on/off switch was discarded in an initial phase of the revision based on:

The mechanical stability of modern, light, flat panel designs could be compromised by the inclusion of a mechanically operated mains switch.

TV sets must be designed in such a way that equipment shall not tip over when used (e.g. when operating such a



		<p>switch).</p> <p>Further, the CENELEC TC206 TV harmonised standard working group have produced a “White Paper” for the Commission, meeting the latter’s requirement for a definition of “an easily Visible” TV off -switch. In the white paper, they qualify the practicality of such a switch in the context of current “thin” displays and show that the potential energy saving of such a switch is minimal. This is due to the remarkable downturn in the standby power requirement of the majority of TVs sold in Europe (The white paper shows that Off-switch energy saving, is very small compared with total on-mode energy even if the switch was used on 100% of the installed TVs in Europe. The energy saving is shown to be smaller than the measurement error of the on-mode power testing standard, used for the TV Regulation conformance declaration).</p>
	<p><i>Besides, the 100 MW maximal on mode energy demand threshold seems to be achievable for 55 inches TV screens (and below sizes) but not for the next screen size reference of 65 inches, whose energy demand is higher. With the current criterion proposal, these bigger screens could not be awarded the EU Ecolabel and are excluded from the scope. We should wonder if the referential should exclude the larger screens or propose thresholds linked to screen size.</i></p>	<p><b>Comment partially accepted</b></p> <p>Data provided by a CB showed that a small portion of big TVs could achieve 100W. A compromise value of 125W has been therefore proposed. At least 6 out of 47 big TVs above 70- inches are able to reach this value.</p>
	<p><i>As indicated during the 2017 revision of the TV ecolabel energy criteria, the maximum energy consumption of 100W will disproportionately impact televisions that integrate new technologies such as UHD and High Dynamic Range (HDR). These technologies significantly improve picture quality by increasing resolution and offering expanded contrasts and more realistic, natural colors. Consumers are highly interested in televisions implementing these new technologies even though they will, inevitably, come with an increase in power consumption of the television. By implementing a tight maximum energy consumption of 100W, these high performance televisions will not be able to be certified with Ecolabel, which will have a negative effect on the recognition of these state-of-the-art technologies. <b>Industry suggests changing the maximum energy consumption limit for UHD resolutions to 160W.</b></i></p>	
<p><b>1.2 – Power management</b></p>	<p><i>Requirements on automatic brightness control and quick start- We support the inclusion of mandatory conditions for the manufacturers to get reductions on the Pmeasured for the EEI calculation of the new Energy labelling and Ecodesign.</i></p>	<p><b>Comment accepted</b></p>



	<p><i>Automatic Brightness Control ABC</i>  <i>We do not understand this criterion. Is the criterion that:</i></p> <ul style="list-style-type: none"> <li>• <i>electronic displays must have ABC; or</i></li> <li>• <i>ABC should be enabled in the normal configuration in case the display provides ABC; or</i></li> <li>• <i>ABC should meet the ecodesign requirement to qualify for a 10 % reduction of the power consumption in on-mode<sup>90</sup>.</i></li> </ul> <p><i>We propose to clarify what is meant by this criterion.</i></p>	<p>Allowance conditions for the manufacturers to get reductions on the <math>P_{\text{measured}}</math> for the EEI calculation of the new Energy labelling and Ecodesign have been set as mandatory to get the EU Ecolabel.</p>
	<p><i>Automatic Brightness Control implementation should only be required for products used in settings with significant illumination variance. In the case of office monitors, the illumination conditions don't vary significantly. Therefore this criteria should only apply for TVs and Signage Monitors for outdoor use.</i></p>	<p><b>Comment rejected</b>  Allowance conditions for the manufacturers to get reductions on the <math>P_{\text{measured}}</math> for the EEI calculation of the new Energy labelling and Ecodesign have been set as mandatory to get the EU Ecolabel. These conditions apply to all type pf displays.</p>
	<p><i>Quick start functionality - After enabling the quick start function, the appliance shall automatically switch back to standby or off mode 4 hours after the last user activity.</i></p> <p><i>We recommend requiring 2 hours instead of 4 hours.</i></p>	<p><b>Comment accepted</b></p>
	<p><i>We suggest to strengthen the amount of the hours from 4 hours to 2 hours.</i>  <i>"After enabling the quick Start feature, the appliance shall automatically switch back to standby or off mode as a default setting <b>2 hours</b> after the last user activity."</i></p>	
	<p><u><i>Quick start functionality</i></u>  <i>Criterion (i) is not relevant because automatic switch to off mode and/or standby mode and/or another mode which does not exceed the applicable power demand requirements for standby mode must be set as default according to annex II, C, 2 of the new ecodesign regulation for electronic displays. This means that it will not be allowed to place on the market displays with functions such as quick start enabled.</i></p> <p><i>In addition, requirements very similar to criterion (iii) and (iv) are included in new the ecodesign regulation annex II B, 2 (See the requirements in the figure below).</i></p>	<p><b>Comment accepted</b>  Provisions overlapping with Ecodesign have been removed.</p>

<sup>90</sup> The text is to a large extent copied from the ecodesign regulation Annex II, B, 1, which includes the requirements the ABC should meet in order to qualify for the 10 % power reduction in on-mode

	<p><b>2. Forced menu and set up menus</b></p> <p>Electronic displays may be placed on the market with a forced menu on initial a proposing alternative settings. Where a forced menu is provided, the normal configuration be set as default choice, otherwise the normal configuration shall be the out-of-the-box</p> <p>If the user selects a configuration other than the normal configuration and this configuration results in a higher power demand than the normal configuration, a warning message and a likely increase in energy use shall appear and confirmation of the action shall be explicitly requested.</p> <p>If the user selects a setting other than those that are part of the normal configuration, a setting results in a higher energy consumption than the normal configuration, a message about the likely increase in energy consumption shall appear and confirmation of the action explicitly requested.</p> <p>A change by the user in a single parameter in any setting shall not trigger any change in other energy-relevant parameters, unless unavoidable. In such a case a warning message shall appear about the change of other parameters and the confirmation of the change shall be explicitly requested.</p>	
<p><b>2.1. Excluded or limited substances</b></p>	<p><i>Flame retardants and chlorinated plastics- While we welcome the effect of the benchmarking proposed on the choice of flame retardants and plasticizers, we regret that an exclusion of halogenated flame retardants and PVC in plastic parts is not considered in the proposed criteria.</i></p> <p><i>The Ecodesign Directive limits the presence of halogenated flame retardants in the disclosure and stands of electronic displays as they represent a major issue in the recycling of plastics.</i></p> <p><i>The TCO label restrict halogenated substances (flame retardants or plasticizers) in plastic parts weighing more than 25 grams (with some derogated components). The Nordic Swan Ecolabel restrict the use of halogenated flame retardants (with some derogated components) and chlorinated polymers in parts above 25 grams.</i></p> <p><i>The EU Ecolabel should not be less strict than the TCO and the Ecolabel Nordic Swan in the substitution of flame retardants and chlorinated plastics. Considering the new measure introduced by the Ecodesign Directive, the EU Ecolabel should further exclude halogenated flame retardants in all plastic parts (allowing derogations as required by other labels). PVC raises similar problems regarding hazardous substances. For a label of environmental excellence it is justified to exclude this polymer (as done already by the EU Ecolabel for footwear and furniture).</i></p>	<p><b>Comment partially accepted</b></p> <p>EU ecolabel restrictions on FR and plasticisers are in line with Nordics swan; however the restrictions of substances are based on CLP hazard classifications. No specific mention to halogenated FRs is made.</p> <p>Flame retardants and plasticisers that meet the criteria for classification with the CLP hazards in Table 2 shall not be intentionally added to or formed in the sub-assemblies specified in the criteria at or above a concentration limit of 0.10% (weight by weight).</p> <p>With regards chlorinated polymers, seeking for further harmonisation, a requirement in line with other labels, has been included.</p>

	<p>UV328 is used for polarizer in LCD panel film. Boric acid is also used in optical polarizing glass for the LCD panel. LG Electronics is disclosing this information in the website: <a href="https://www.lg.com/global/sustainability/environment/management-of-hazardous-substances">https://www.lg.com/global/sustainability/environment/management-of-hazardous-substances</a>.</p> <p><b><u>The LCD panel should be exempted from this requirement, as long as the applicant publicly discloses the SVHC substances used in this component.</u></b></p> <p>Furthermore, we advise caution when including requirements related to SVHCs. As you know, the list of SVHCs is being expanded 2 times per year. Manufacturers don't know in advance which new substances will be published, and as a result products already certified with Ecolabel may become non-compliant because of additional substances being subsequently added to the list.</p>	<p><b>Comment partially accepted</b></p> <p>LCD panels have been removed from the list. The wording has been modified to specify that the latest version of SVHC available at the time of application should be used.</p> <p>Declarations shall be with reference to the latest version of the Candidate List published by ECHA<sup>91</sup> at the moment of application.</p>
	<p>The restriction on SVHCs is defined on product level and its subassemblies. This is not in line with how REACH is handled in the electronics industry. Since several years (in line with the EU court justice ruling ), the presence of SVHCs is declared on the article level (~homogeneous level). It seems evident that requirements are set on the article level and not on arbitrary subassemblies because this implies extra administration and calculations for manufacturers.</p> <p>The restriction of not allowing any SVHC &gt;0.1% is very strict, no to say unrealistic. Lead (Pb) is an SVHC and is present in the majority of components &gt;0.1% w/w on the article level. Besides Lead, also boric acid and UV-238 are often present in LCD panels. For some panels, the suppliers informed us that currently no technical alternatives are available. We would suggest to require clear SVHC communication from manufactures e.g. By providing FMD's (full material declarations).</p>	<p><b>Comment rejected</b></p> <p>The additional declaration for sub-assemblies would introduce an additional level of strictness, differentiating those manufacturers who require more information from their suppliers. The list of components was agreed with industry stakeholders during the revision process.</p>
	<p>External cables may contain Sb<sub>2</sub>O<sub>3</sub>(H351) for synergist. This is Group 2 hazard. However, the text only contains a derogation for Group 3 hazards.</p> <p><b><u>It is therefore necessary to add a derogation for Group 2 hazards for external cables as well as internal electrical wiring.</u></b></p>	<p><b>Partially accepted</b></p> <p>A derogation for the mentioned synergist has been included.</p>
	<p>Plasticizers deemed to meet the derogations conditions - Diisononyl phthalate (DINP) and Diisodecyl phthalate (DIDP) are allowed, as they meet the derogation conditions. However, they are restricted by the Nordic Swan Ecolabel. We strongly recommend aligning the EU Ecolabel with the Nordic Swan.</p>	<p><b>Comment rejected</b></p> <p>Plasticisers are restricted according to the Hazard profile. DINP and DIDP are "Not classified".</p>
	<p>Criterion 2.1 has become very complex by trying to restrict a lot of substances for different components/ sub-assemblies. Checking this criterion is a huge task for manufacturers.</p>	<p><b>Comment rejected</b></p> <p>A subgroup consisting of a representative cross-section of stakeholders was formed during the revision in order to</p>

<sup>91</sup> ECHA, Candidate List of substances of very high concern for Authorisation, <http://www.echa.europa.eu/candidate-list-table>

	<p>Furthermore, details on flame retardants and plasticizers are very difficult to obtain from plastic part suppliers. They often see this information as trade secret. We agree that flame retardants and plasticizers should be restricted, but the way criterion 2.1 2(c) is set up now is too complex. As alternative, there could be a list of restricted substances in a certain concentration. Then plastic suppliers can declare that none of the substances is present without providing their trade secret.</p>	<p>obtain further information, discuss technical issues in detail and to develop a workable criterion proposal.</p>
<p><b>2.2. Activities to reduce supply chain fluorinated greenhouse gas (GHG) emissions</b></p>	<p>This criterion (design for repair) aims to facilitate that consumers can easily repair their product. This might be the case for TV's and computer monitors. For professional displays like signage displays or outdoor applications different requirements should be set. Their the end user is not a consumer but professional user; repair is always performed by authorized service partners as these products are more complex and require dedicated calibration equipment.</p> <p>For this reason, signage displays are typically bought with a maintenance/service contract.</p> <p>To provide the screen assembly and LCD backlight as a spare part for 7 years (original or backwardly compatible) is unrealistic. LCD panels are typically end of life in 1 year – max 2 years (due to technical, operational and technology reasons). Keeping these parts this long on stock also represents non negligible footprint and manufactures to perform last time buys.</p> <p>It makes more sense to put more focus on durability. For signage displays this could be done easy: does the producer offer extend warranty of 7 years. This forces manufacturers to invest in long lasting panels.</p> <p>Please align with the draft ECO design directive for electronic displays.</p>	<p><b>Comment accepted</b></p>
	<p>GHG emissions are dependent on the investments of the LCD supplier. TV manufacturers cannot control their panel supplier in a manner that could force them to conduct investments in this area.</p> <p><b><u>We request deleting criterion 2.2, as it is simply beyond the control of the applicant.</u></b></p>	<p><b>Comment rejected</b></p> <p>EPEAT and NS include requirements on this.</p>
<p><b>3. Reparability and commercial guarantee</b></p>	<p>We welcome measures improving the reparability of electronic displays beyond mandatory requirements defined by Ecodesign. The following recommendations for improvement of the criterion/technical report can increase further the added value of the EU Ecolabel:</p> <ul style="list-style-type: none"> <li>- Limit the price of spare parts/repair costs. For instance, the French display label on reparability under development: "price of most expensive part is less than 30% of catalogue price".</li> <li>- Integrate a reference for a list of commercially available tools as specified on ongoing standards for repair (TC10).</li> </ul>	<p><b>Comment partially accepted</b></p> <p>The section 1.3 contains a revised comparison between the different UE tools on displays.</p> <p>The criterion has been amended to in order to increase the ambition level and to harmonise with ecodesign.</p> <p>Price restriction of spare parts is not seen appropriate.</p>

	<ul style="list-style-type: none"> <li>- Provide a comparison table between Ecodesign and Ecolabel so that it can be seen which additional parts are covered by the EU Ecolabel.</li> <li>- Availability of spare parts: the EU Ecolabel can require more than 7 years for the parts demanded by Ecodesign. The EU Ecolabel can be more ambitious as regards the delivery time of spare parts (e.g. within 5 days vs 15 working days required under Ecodesign).</li> <li>- Reparability information should be made available to independent repairers.</li> </ul>	<p>Price can vary significantly over products, parts, regions and time<sup>92</sup>. Nevertheless, information about price of spare parts could still allow the monitoring and comparison between different products Therefore it has been included that recommended price of spare parts is provided.</p>
	<p>Today, most of the TV screens and especially the “smart” ones include in fact a screen and computer. The computer software should be regularly updated to correct bugs, address security alerts and improve the performance of the equipment. In addition to the availability of spare parts, we think the operating system and drivers should be available on the manufacturer’s website for as long as the spare part are available and that this should be included in the criterion.</p> <ul style="list-style-type: none"> <li>- The TR n°4 mentions that “the provision of a list of available spare parts with current prices was deleted as this was not seen as practicable by stakeholders”. We ask for more details regarding the removal of this sub-criterion as we considered that limiting the price of spare part price was a good reparability indicator, ensuring that the price of spare parts would not be too high which would prevent the effective reparation of devices.</li> <li>- We propose to extend to <b>8 or 10 years</b> the requirement on spare part availability after the end of the model production instead of 7 years. This would be aligned with the European Ecodesign Directive for washing machines and dishwashers that require spare part availability for 10 years after the end of model production.</li> <li>- We finally acknowledge that most of the requirements are aligned with the French roadmap on circular economy published in 2018. The French Ministry for the Ecological and Solidary Transition is currently developing a reparability index for electric, electronic devices, we think this kind of requirement should be included in the next EU Ecolabel criteria revision (to be indicated in the Commission statements) or at least the work of the JRC in progress.</li> </ul>	
	<p>We suggest to adapt the list of available tools to the list of the eco-design-directive. Thus. Both list would be comparable and the EU Ecolabel would not be less ambitious as the eco-design-directive.</p>	<p><b>Comment accepted</b></p>
	<p>To have a clear added-value (compared to the eco-design directive) it would be good to include a reparability score.</p>	<p><b>Comment rejected</b> Not yet available. The development of a scoring system on the reparability of products, in the context of the contribution of the ecodesign and energy labelling</p>

<sup>92</sup> [http://publications.jrc.ec.europa.eu/repository/bitstream/JRC114337/jrc114337\\_report\\_repair\\_scoring\\_system\\_final\\_report\\_v3.2\\_pubsy\\_clean.pdf](http://publications.jrc.ec.europa.eu/repository/bitstream/JRC114337/jrc114337_report_repair_scoring_system_final_report_v3.2_pubsy_clean.pdf)



		framework to the objectives of the Circular Economy is still ongoing.
	<i>The eco-design directive has a higher ambition level regarding the repair manual.</i>	<b>Comment rejected</b> While Ecodesing requires repair instructions to be available for registered repairers, the EU Ecolabel request to be publicly available in order to reach consumers that will be able to choose repairers independently.
	<i>We suggest to address the costs for spare parts, i.e. it should be included that the costs for spare parts do not hinder repair.</i>	<b>Comment rejected</b> No price requirement is included under the well established labels. No price requirement is suggested to be included at this stage as it is considered a relevant change and no further consultation to industry is expected. It is suggested to consider this for future revision once the French label is finalised.
	<i>Assessment and verification. To have a higher ambition level 2 tightenings of rules.</i> 1. <i>Inclusion of "a free and available copy of the repair manual at the webpage"</i> 2. <i>Inclusion of "a free and public copy of the repair manual"</i>	<b>Comment partially accepted</b> Repair manual shall be publicly available "at no additional cost".
	<i>OLED technology is using adhesive tape to fix the back cover. <b><u>This does not impact the disassembly of the product with commonly available tools, or the reparability of the product, therefore it should not be restricted.</u></b></i>	<b>Comment accepted</b> Requirement modified accordingly
	<i>Use of Adhesives- Ecolabels should refrain from restricting technologies and instead focus on the goal of this requirement (enable disassembly of the display panel). Therefore, the use of adhesives should not be restricted, as long as removability with commonly available tools is guaranteed.</i>	
	<i>Casing parts may sometimes contain small circuit parts, such as the power control key or Wi-Fi module. <b><u>This does not impact the disassembly of the product with commonly available tools, or the reparability of the product, therefore it should not be restricted.</u></b></i>	<b>Comment accepted</b> Requirement modified accordingly
	<i>Casing parts free of electronic assemblies- This criterion is not clear enough and should be clarified to ensure it is not misunderstood. PCBs may be affixed to casing parts via screws (power button, control buttons, etc.). This practice does not hamper reparability and should be allowed. Recommend to reword to "Should be able to separate all electronic assemblies from the enclosure with commonly available tools."</i>	
	<i>Providing repair manuals to the end user is not recommended because of safety and liability issues. <b><u>Only trained professionals should attempt to repair such products, therefore the</u></b></i>	<b>Comment rejected:</b> Public availability of repair instructions will allow end user

	<p><b><i>provision of repair manuals should be limited to independent repairers.</i></b> Because this requirement is already covered by ecodesign, it should be deleted from the Ecolabel criteria.</p>	to independently choose the repairer.
	<p><i>Spare parts- The LCD backlight requires special tools and knowledge to replace without inducing damage to the product. Furthermore, LCD module disassembly should be only attempted in special environments, as the presence of dust can negatively impact the quality of repair. Therefore the criteria should be defined at LCD module/screen assembly level instead.</i></p>	<p><b>Comment rejected</b> No change is suggested to be included in the list that has been agreed during the revision process with all type of stakeholders.</p>
	<p><i>Screw connections for fastening casing parts, chassis and electric/electronic assemblies can be tightened with no more than three tools. - Number of 3 tools seems arbitrary. There might be good technical reasons to use different kinds of tools for fastening certain components. For ease of manufacturing reasons, manufacturers anyway try to use as few different tools as possible. As long as these tools are commercially available there should be no requirement to limit the number of tools.</i></p>	<p><b>Comment accepted</b> Requirement has been deleted in the absence of references and evidence.</p>
	<p><i>Delete the requirement on a 3 year guarantee, including a service agreement with pick-up and return.</i></p> <ul style="list-style-type: none"> <li>• <i>The Ecolabel is an Environmental Label and not a Service Label</i></li> <li>• <i>In some cases pick-up and return is irrelevant, as repair is done on-site</i></li> <li>• <i>This criteria would lead to an unequal situation within Europe, as the legal warranty/ period shifting the burden of proof from producer to consumer varies on national level.</i></li> </ul>	<p><b>Comment partially accepted</b> Repair services are relevant for an environmental label. Criterion is suggested to be kept. The wording has been modified to reflect that pickup/return is offered for cases where repair in not done on-site.</p>
	<p><i>We proposed to include some additional criteria to prevent premature obsolescence of displays (most relevant for televisions).</i></p> <p><u><i>Possibility for firmware updates</i></u> <i>Recently the improvement of the image quality of displays has developed quickly lead by the change in broadcasting signal, higher resolution, bigger screens and newly added functions like HDR. However, this high speed in development also influences when the consumers consider their television as obsolete. To prevent premature obsolescence of displays, it is suggested to set an ecolabel criterion regarding firmware and security updates. It could for instance be required that it is possible to update the operating system for at least three years (or more). Most television manufacturers update their operations system to a new version each year, but only few manufacturers offer these updates for televisions from previous years.</i></p> <p><i>Also, it is already well-known that the successor to HEVC decoding (HEVC, H.265 -&gt; FVC, H.266) is expected by 2021. In order to prevent equipment from becoming obsolete when this change occurs, it should be considered to introduce a criterion concerning possibilities for hardware upgrades.</i></p>	<p><b>Comment rejected</b> New Ecodesign already cover this aspect under the following requirement.</p> <p><i>“(a) The latest available version of the firmware shall be made available for a minimum period of eight years after the placing on the market of the last unit of a certain product model, free of charge or at a fair, transparent and non-discriminatory cost. The latest available security update to the firmware shall be made available until at least eight years after the placing on the market of the last product of a certain product model, free of charge.”</i></p>



<p><b>4.1. Material selection and information (End-of-life management)</b></p>	<p><i>We welcome the introduction of this requirement. However, we think that further measures can facilitate the recycling of plastics:</i></p> <ul style="list-style-type: none"> <li>- <i>Reintroduce a limitation on the number of polymers and the use of coatings/metal inlays. Limit as well the number of colours. As described in the report, mono-material plastic housing parts without coatings, inserted metal windings, and metal shields attached are better to recycle than composite materials.</i></li> <li>- <i>Require that the model is placed on the market with a standardised external power supply (= 'universal charger').</i></li> <li>- <i>Make more demanding the definition of "recyclable": readily recycling without pre-treatment or depollution into a commercially available recycling process.</i></li> <li>- <i>The 10% threshold for recycled content does not seem very ambitious as it applies to the total plastic used and not for each plastic.</i></li> </ul> <p><i>Require information requirements on the bill of materials (as done by the Nordic Swan) and the location of critical raw materials.</i></p>	<p><b>Comment rejected</b></p> <p>Criterion is considered ambitious. Considering the decreasing success of this label it is suggested to not increase the level of complexity of this requirement at this stage. Additional measures with this regards are suggested to be discussed in future revisions.</p>
	<p><i><u>(a) Recyclability of plastics:</u></i>  <i>Recyclability of plastic is of great importance to the overall environmental performance of products. All efforts to improve the recyclability of plastic are welcomed and should be supported. However, the definition of recyclability and the procedure for assessment and verification can lead to some ambiguity.</i></p> <p><i>The definition of recyclability is:</i>  <i>'Recyclability' means an ability of a product to be recycled at its end-of-life, based on actual practices.</i></p> <p><i>The assessment and verification procedure for criterion 4.1 are described as follows:</i></p> <p><i>"The applicant shall verify recyclability by providing evidence that the plastics either individually or combined do not impact the technical properties of the resulting recycled plastics in such a way that they cannot be used again in electronic products. This could include:</i></p> <ul style="list-style-type: none"> <li>• <i>A declaration from an experienced plastics recycler or permitted treatment operation in</i></li> <li>• <i>accordance with Article 23 of Directive 2008/98/EC ('the Waste Framework Directive');</i></li> <li>• <i>Test results from an independent laboratory or an experienced plastics recycler;</i></li> <li>• <i>Peer and industry reviewed technical literature applicable to Europe.</i></li> </ul> <p><i>The applicant shall provide third party verification and traceability for post-consumer recycled content.</i></p> <p><i>The challenge is that no quality requirements for plastic are set and with no consideration of the actual recycling processes. Various types of plastic can be recycled in high quality if they are</i></p>	<p><b>Comment partially accepted</b></p> <p>To introduce requirement on type of plastics/additives that could be used to ensure recyclability seems to be a good idea, however such change in the requirement cannot be introduced at this late stage of the process. It is suggested to study this possibility in future revisions. The assessment and verification has been amended in order to ensure recyclability of materials used.</p>

	<p>recycled in a “clean fraction”. In general, plastic recyclers are challenged by a mix of different materials which may affect the quality and properties of the plastic. With the right boundary conditions, it will probably be easy to fulfil and comply with the criterion for recyclability, however the output could be plastic fractions of low quality. Instead of the current criterion, it should be considered to introduce requirements on the types of plastic (and additives) used in displays. This would ensure that a limited number of plastic types are used, and that they all are compatible regarding recycling.</p>	
	<p>It is unclear which types of painting or coatings shall be considered recyclable. It is possible to check recyclability using Izode test – <b><u>would Izode tests be accepted?</u></b></p>	<p><b>Comments accepted</b> The criterion has been further precise in line with EU GPP for computer and monitors.</p>
	<p>Why do you not consider certificates, for example EU Cert Plast, to verify the criteria? We suggest to accept trustworthy and ambitious labels.</p>	<p><b>Comment accepted</b></p>
	<p>A mandatory criteria of minimum recycled plastic content can be quite challenging given the trend towards bigger size displays and the consequent increase of plastic weight. There are a series of aspects that should be thoroughly considered before the inclusion of minimum post-consumer plastic content criteria, specifically the quality limitations in terms of mechanical and visual properties, the decline in product durability associated with recycled content, and most importantly the risk of hazardous substances being introduced in the plastic streams and negatively impacting health, safety and the environment. There is also the risk of non-compliance with the ecodesign ban on use of halogenated flame retardants in displays if the recycled plastic used contains such substances. Furthermore, there is limited supply of such materials because of restrictions in plastic waste shipment, especially in the context of the amendment of the Basel Convention and the pressure to classify plastic waste with more than the LPC thresholds for POPs as hazardous waste, and we can expect this to result in further increases of shipping costs for recyclers and of the cost of uptake of recycled content for manufacturers.</p> <p><b><u>An alternative that could incentivize the use of recycled plastics would be an information requirement on the postconsumer recycled plastic used in the product, in the form of a range.</u></b> Such approach has been already proposed for the Green Public Procurement for imaging equipment, and is generally seen as more manageable. The downside remains the lack of objective verifiability of the use of recycled plastic materials in the product, as it is currently impossible to differentiate them from virgin plastics.</p>	<p><b>Comment rejected</b> The 10% value was discussed and agreed during the revision process. Several stakeholders requested higher values however a low value of 10% was kept in order to reflect industry difficulties. No change in this criterion is suggested with regards to this comment.</p>

	<p>We support most of the non-energy requirements included in the final draft and appreciate that many of our comments are taken on board. However, we would like to point out that the 10% recycled plastic content criteria still remaining in the final draft will block the uptake of the EU Ecolabel for display products despite all the other positive changes. Finding trustworthy suppliers able to guarantee the necessary volumes and quality of post-consumer plastic for display products has been extremely difficult, so setting the 10% threshold for the recycled plastic content will discourage, rather than encourage the effort for manufacturers to continue their research efforts in this field and introduce the recycled plastic content where possible. Thus, we remain of the opinion that the requirement should be deleted and instead replaced with the requirement to disclose information on the percentage of the recycled plastic content used in the products.</p> <p>The term 'Recyclable' or 'Compatible with recycling' should be defined. Although this is extremely difficult, it is necessary to judge this criterion objectively. An alternative is to copy the requirement of EPEAT on recyclability.</p> <p>Note: we confirm that 10% post-consumer recycled plastic is a hard target to achieve; often due to safety regulations (fire enclosure) and the lack of affordable reliable supply chain.</p>	
<p><b>4.2. Design for dismantling and recycling</b></p>	<p>While we strongly support this requirement, we consider that it could be further improved by:</p> <ul style="list-style-type: none"> <li>- Make available to professional operators of the waste sector, in a website and free of charge, information relevant for dismantling and recovery. This should include at least: (a) a diagram of the product showing the location of the plastic components containing flame retardants; (b) the location of components containing the toxic or ecotoxic substances.</li> </ul> <p>NOTE: this requirement was dropped in the final text voted under Ecodesign (please amend text in page 77 of the background report).</p> <ul style="list-style-type: none"> <li>- Consider manual disassembly of all optional requirements parts and not only one (proposed criterion 4.2.b).</li> </ul>	<p><b>Comment partially accepted</b> Information relevant for dismantling and recovery request has been included in criterion 4.1.</p>
	<p>Dismantling time should not be one of the scoring criteria as it is highly subjective and cannot be properly evaluated in the absence of a harmonized standard. For TVs, a previous study conducted by the JRC (Methods for the Assessment of the Reparability and Upgradability of Energy-related Products: Application to TVs, Sanfelix et al, 2019), showed that in case of disassembly for the purpose of repair, <b><u>the variation of disassembly times is not significant enough to be used as a differentiating criterion, therefore we strongly believe that it should not be used for the Ecolabel either.</u></b></p> <p>Dismantling time is highly subjective and cannot be properly evaluated in the absence of a harmonized standard. For TVs, a previous study conducted by the JRC (Methods for the Assessment of the Reparability and Upgradability of Energy-related Products: Application to TVs, Sanfelix et al, 2019), showed that in case of disassembly for the purpose of repair, the variation of disassembly times is not significant enough to be used as a differentiating criterion. In light of this evidence, this criterion should not be considered for the Ecolabel certification.</p>	<p><b>Comment accepted</b> Requirement removed.</p>

<b>5.1. Labour conditions during manufacturing</b>	<i>The proposed requirements should be compared to TCO to ensure that it has at least the same level of ambition.</i>	<b>Comment accepted</b>
	<i>The ILO conventions are demanding and stringent standards, and compliance is difficult to evaluate because many cases must be considered. While these standards are a common and strong references, there is currently no existing audit program that would ensure to exhaustively assess the compliance of an entity to ILO Conventions. The risk is that audit work programs differ between countries, auditors and audited sites and that the EU Ecolabel is not awarded homogeneously. Therefore, the JRC needs to propose references for the assessment and verification and define the applicable standards in terms of social and human rights audits, such as SMETA audits (whose guidelines are available online <a href="https://www.sedexglobal.com/smeta-audit/smeta-documents/">https://www.sedexglobal.com/smeta-audit/smeta-documents/</a>). SMETA audits are commonly used by companies to assess their supplier's social practices. We suggest to the JRC to consider SMETA requirements to develop a specific audit approach for the Electronic Displays referential, or to request that the audits performed follow the SMETA methodology. Other initiatives such as Electronic Watch guidelines (<a href="http://electronicswatch.org/en/what-we-do_2548040">http://electronicswatch.org/en/what-we-do_2548040</a>) could also be investigated.</i>	<b>Comment partially accepted</b> Certifications from third party schemes that audit compliance with the applicable principles of the listed fundamental ILO Conventions and the supplementary provisions on working hours, remuneration and health & safety are proposed to be accepted. No specific certification schemes have been included in the text. The text is flexible to allow the use of different schemes. It is suggested that specific information to the different available certification schemes compliant with the provisions requested is included in the User Manual.
	<i>Why do you not consider certificates, for example FWF to verify the criteria? We suggest to accept trustworthy and ambitious labels.</i>	
	<ul style="list-style-type: none"> <li>• <i>The references to the core Conventions and the new addition of the Forced Labour Protocol are welcome</i></li> <li>• <i>Paragraph 1 refers to the final assembly plant contrary to the last paragraph - A&amp;V- that refers to the industry supply chain. It is important to clarify that respect to rights and working conditions should be applied across the whole supply chain and to make clear what precisely is the responsibility down the supply chain.</i></li> <li>• <i>Points F) and G): It may be helpful for greater clarity on expectations to include relevant Recommendations for the supplementary provisions. In this respect, one may wish to refer to Minimum Wage Fixing Recommendation No. 135, the Chemicals Recommendation 177 and the OSH Protocol to Convention 155. It may also be considered relevant to refer to the Occupational Health Services Convention 161 aimed at regular review of the workplace risks and relevant adaptations. A reference to the 2001 ILO OSH management system would be beneficial.</i></li> <li>• <i>Point F): we would like to clarify that in relation to wages, the ILO Convention refers to Minimum Wage and not to a living wage. In addition to the Minimum Wage Fixing Convention and Minimum Wage Fixing Convention Recommendation, some relevant language may be found in the June 2019 Centenary Declaration for the Future of Work, where reference is made to 'an adequate minimum wage, statutory or negotiated'.</i></li> </ul>	<b>Comment partially accepted</b> The social requirements are proposed only to address first-tier suppliers (final product assembly). This is due to the fact that first-tier suppliers (contract manufacturers) increasingly act vertically within the supply chain from purchase to final assembly. Moreover, social aspects regarding hotspots of raw materials extraction will be addressed more specifically by criterion 5. 2 'Use of conflict-free minerals'.  In order to not add complexity to the legal text it is suggested that relevant recommendations are included in the User Manual.  The definition of living wage is aligned to SA8000. No changes are suggested to be included at this stage of the process with this regards.

	<ul style="list-style-type: none"> <li><i>The language concerning where freedom of association and collected bargaining are restricted could be clearer. Inspiration may be taken from the International Finance Corporation Performance Standard which is also used by a number of other development banks: “Where national law substantially restricts workers’ organizations, the client will not restrict workers from developing alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment”.</i></li> <li><i>In relation to A&amp;, including certification of compliance and auditors, we would like to propose an exchange with the EU ecolabel team and relevant colleagues to discuss this and the wider use and application of the labour criteria.</i></li> </ul>	The language concerning where freedom of association and collected bargaining has been clarified as suggested.
<b>5.2. Use of conflict minerals during production</b>	<p><i>This requirement can clearly differentiate the EU Ecolabel from Ecodesign and rewards frontrunner companies which already comply with such measure.</i></p> <p><i>We furthermore recommend a considering a requirement that will demand sustainable certification for the sourcing of bio-based plastics.</i></p>	<b>Comment rejected</b> No relevant changes are suggested to be introduced at this stage of the process.
	<p><i>Regulations on the responsibility of companies towards their suppliers and supply chain are reinforcing (see the Duty of care in France) and echo the growing demands of civil society. The approach proposed by the JRC is flexible but not very constraining (compared to a request for traceability of the materials used in the products for example). With regards to the low success of this referential (only 1 holder at the European level), we believe that the requirement of means proposed is sufficient, requirements of results (traceability) will have to be studied in the Commission statements.</i></p>	<b>Comment accepted</b>
<b>6.1 Information on the Label</b>	<p><i>To complement the criterion, we think the label should also include a warning on the potential harmful effects of screens for children of less than 3 years old (relating to a French law proposal led by the Committee on Culture, Education and Communication). This follows pediatric, psychiatric, professional alerts about the consequences of children exposure to these screens.</i></p> <ul style="list-style-type: none"> <li><i>- Besides, controversies on the health impacts of screens (blue light, quality of sleep, macular degeneration, etc.) are not currently addressed in the referential.</i></li> <li><i>- Finally, as GHG emissions are mainly occurring during the product manufacturing, it could be interesting to have the GHG balance of the product on the label (ISO 14044/40 and environmental labelling standards (PEP EcoPassport) are now quite mature). This complement the energy consumption criterion</i></li> </ul>	<b>Comment rejected</b> The sentences reflect the criteria covered and since no relevant changes have been introduced in the criteria set at this stage, no changes are suggested in the sentences included in the label.

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