



Development of European Ecolabel and Green Public Procurement Criteria for Imaging Equipment

BACKGROUND REPORT
INCLUDING DRAFT CRITERIA PROPOSAL
Working Document

for

2nd AHWG MEETING FOR THE
REVISION OF GPP CRITERIA
FOR IMAGING EQUIPMENT

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Development of European Ecolabel and Green Public Procurement Criteria for Imaging Equipment

Background report including draft criteria proposal

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Abbreviations

AHWG	– ad-hoc Working Group
BAT	– Best Available Techniques
BFR	– Brominated Flame Retardant
BREF	– Reference Document on Best Available Techniques
CEN TC	– European Committee for Standardization Technical Committee
CO ₂	– Carbon dioxide
EPA	– United States Environmental Protection Agency
EU	– European Union
GPP	– Green Public Procurement
ISO	– International Standardisation Organisation
MS	– Member State
UBA	– German Federal Environment Agency
dB	– deciBell
DIDP	– di-isodecyl phthalate
DINP	– di-isononyl phthalate
DNOP	– di-n-octyl phthalate
DS	– Dye Sublimation (
DT	– Direct Thermal
ECMA	–European Computer Manufacturers Association
EP	–Electrophotography
IJ	–Ink Jet
ipm	–images per minute
IT	–Information technology
LCA	–Life cycle assessment
MFDs	–multifunctional devices

MFPs	–multifunction products
Sbw	– monochrome printing/copying speed
SI	–Solid Ink
TT	–Thermal Transfer
PJ	–Peta Joule
EEE	–Electric and electronic equipment
TVOC	–Total volatile organic compounds
ISO	–International standardisation organisation
R	–risk phrase
H	–Hazard statement
TBBPA	–Tetrabromobisphenol-A
BBP	–Butyl pththalate
SCCP	–short chain chlorinated paraffins
DIBP	–Diisobutyl phthalate
PBBs	– polybrominated biphenyls
PBDEs	–polybrominated diphenyl ethers–
SDS	–Safety Data Sheets
CMR	–carcinogenic, mutagenic or toxic for reproduction
REACH	–Registration, Evaluation, Authorisation and Restriction of Chemicals
PCs	–Personal computers

1 INTRODUCTION

Green Public Procurement (GPP), defined in the Commission Communication “Public procurement for a better environment”¹ as “a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured.” This is a voluntary instrument, which public authorities can use to provide industry with incentives for developing and marketing more environmentally sound products².

Green Public Procurement (GPP) is a voluntary instrument and for each product/service group two sets of criteria are presented:

- The core criteria are those suitable for use by any contracting authority across the Member States and address the key environmental impacts. They are designed to be used with minimum additional verification effort or cost increases.
- The comprehensive criteria are for those who wish to purchase the best products available on the market. These may require additional verification effort or a slight increase in cost compared to other products with the same functionality.

The process of establishing the criteria proceeds at the European level following consultation with experts and all interested parties.

Based on the technical analysis the key environmental impacts from imaging equipment are strongly associated with the consumption of paper. Further, significant environmental impacts are associated with: a) energy consumption in the use phase, b) use of hazardous constituents and material selection in the product design, c) resource efficient product design including design for recycling and design for cartridges. Other impacts are related to the indoor air quality and to the disturbance due to acoustic noise.

¹ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Public procurement for a better environment, COM (2008) 400, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0400:FIN:EN:PDF>

² GPP website http://ec.europa.eu/environment/gpp/what_en.htm

Key Environmental Areas in imaging equipment life cycle and Key Environmental Impacts	GPP Approach
<p>Key environmental areas</p> <ul style="list-style-type: none"> • Paper consumption (relevant for impacts to all environmental categories) • Energy consumption in the use phase of imaging equipment (relevant for impacts to all environmental categories) • Use of hazardous substances and their environmental consequences (relevant for impacts to human toxicity, ecotoxicity, eutrophication,) • Indoor air emissions and acoustic noise (relevant for impacts to human health) <p>Key environmental impacts:</p> <ul style="list-style-type: none"> • The following key environmental impact categories along the product life cycle are covered: global warming, acidification, ecotoxicity, human toxicity, eutrophication, resource depletion, energy consumption. 	<ul style="list-style-type: none"> • Purchase products with efficient paper management • Purchase energy efficient models • Purchase products with a limited amount of hazardous constituents • Purchase products which are resource efficient, generate little waste and facilitate reuse and recycling • Purchase products with low indoor emissions and acoustic noise

The order of impacts does not necessarily reflect their importance.

The criteria aim, in particular, at promoting products that have a reduced environmental impact along their life cycle (i.e. global warming, acidification, ecotoxicity, human toxicity, eutrophication, resource depletion, energy consumption), whose performance is resource efficient and energy efficient, and which contain a limited amount of hazardous substances. Award criteria furthermore cover also products with low noise levels and that contribute to lower indoor air emissions. Their selection is based on IPTS preliminary work conducted in the project "Development of EU Ecolabel criteria and Revision of GPP criteria for imaging

equipment"³, stakeholders' feedback to the IPTS first working document for criteria development⁴ and input received at the 1st AHWG Meeting in Seville, as well as written comments received afterwards.

2 PRODUCT DEFINITION AND SCOPE

The definition and scope of the product group of imaging equipment has been addressed in the respective background document of IPTS "Product definition and scope" report. This issue was the subject of discussion and agreement in the 1st Ad-hoc Working Group (AHWG) meeting.

The product group of imaging equipment is defined by adopting the definition used in the Energy Star label, which matches the one used in the current EU Green Public Procurement criteria as well as the respective one used in the frame of the Ecodesign Directive (EU Ecodesign Preparatory Study for imaging equipment and respective Industry Voluntary agreement). This definition is also used worldwide by numerous Ecolabel schemes. The definition as proposed by IPTS was agreed in the 1st AHWG. This definition is also proposed for use in the under development EU Ecolabel criteria for imaging equipment.

With regard to the scope of the study in general, imaging equipment involves the products marketed as office printers, copiers, multifunctional devices (MFDs), scanners, digital duplicators and fax and mailing machines. From this wider scope based on the outcomes of the market analysis (Technical background Report⁵), the current market situation, technological trends and the discussion among stakeholders in the 1st AHWG, it was agreed to address in the scope of the Ecolabel criteria the products which are: commonly used in the office (household and professional devices), have high market volumes and without

³ For details please see the project's website: <http://susproc.jrc.ec.europa.eu/ecotapware/>.

⁴ 1st technical background report available at the project's website: <http://susproc.jrc.ec.europa.eu/ecotapware/stakeholders.html>.

⁵ "Technical Background Report- Development of EU Ecolabel and GPP Criteria for Imaging Equipment", Institute for Prospective Technological Studies/ Joint Research Centre, March 2011

significant negative market or trends. The products which fulfil these requirements and were agreed on for the scope of the Ecolabel criteria are: printers, copiers and MFDs.

An important point in determining further the product scope is to set the limit between a) the office imaging equipment devices which are used typically in work or private environments and b) the imaging equipment devices which are designed to address special commercial or professional needs. In the latter category the devices are very large in volume and their market sales are considered lower than in case of a). Based on manufacturers' input this delimitation was made using technical specifications i.e. maximum speed (ipm). A delimitation of the scope based on the marking technology used was not considered relevant.

The definition of the imaging equipment devices and the scope of the GPP criteria is as follows:

The product group "Imaging equipment" shall comprise products which are used in the office (private or professional) and their function is:

- i) to produce a printed image (paper document or photo) through a marking process either from a digital image (provided by a network/card interface) or from a hardcopy through a scanning/copying process or/and
- ii) to produce a digital image from a hard copy through a scanning/copying process.

The proposed GPP criteria apply to purchase as well as leasing of products which are marketed as printers, copiers and multifunctional devices (MFD).

Other types of imaging equipment devices i.e. fax machines, digital duplicators, mailing machines and scanners are excluded from the scope.

The following marking technologies can be used: Electrophotography (EP), Ink Jet (IJ), Solid Ink (SI), Direct Thermal (DT), Dye Sublimation (DS), Impact, High Performance IJ, Stencil and Thermal Transfer (TT).

The following large products which are not typically used in household and office equipment with the following technical specifications are also excluded from the scope of this decision:

- standard BW format products with maximum speed over 66 A4 images per minute;
- standard colour format products with maximum speed over 51 A4 images per minute;

(speed to be rounded to the nearest integer in the same way as prescribed in the ENERGY STAR agreement).

A "*printer*" is a commercially available imaging product that serves as a hard copy output device, and is capable of receiving information from single-user or networked computers, or other input devices (e.g., digital cameras). The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as printers, including printers that can be upgraded into MFDs in the field.

A "*copier*" is a commercially available imaging product whose sole function is the production of hard copy duplicates from graphic hard copy originals. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as copiers or upgradeable digital copiers.

A "*multifunction device (MFD)*" is a commercially available imaging product which is a physically integrated device or a combination of functionally integrated components that performs two or more of the core functions of copying, printing, scanning, or faxing. The copy functionality as addressed in this definition is considered to be distinct from single sheet convenience copying offered by fax machines. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as MFDs or multifunction products (MFPs).

3 GREEN PUBLIC PROCUREMENT CRITERIA

The following criteria are proposed for the Green Public Procurement for purchase and leasing of imaging equipment. The criteria are classified in core, comprehensive and award. The criteria address several key environmental areas (i.e. Energy efficiency, Resource efficiency) as well as relevant aspects i.e. paper management, energy efficiency, environmental information etc.

An overview of all the proposed criteria follows:

Criterion	Criterion type			Key area and aspect addressed
	Core	Comprehensive	Award	
Double side printing	X	X		Paper management
Multiple page printing and/or copying in one paper sheet	X	X		Paper management
Energy efficiency	X	X		Energy efficiency
User instructions for green performance management	X	X		Environmental Information/Awareness
Resource efficiency: Minimum recycled and reused content		X		Resource efficiency
Resource efficiency for cartridges: Design for reuse of toner and/or ink cartridges		X		Resource efficiency – Inks and toners
Availability of high volume ink cartridges		x		Resource efficiency – inks and toners
Acoustic noise		X		Working environment -

				quality
Design for disassembly - recycling and end of life management			X	Facilitate recycling – sound end of life management
Printouts produced after cancelation			X	Paper management
Substances in plastic parts hazardous to health			X	Health risks
Indoor air emissions			X	Indoor air quality
Mercury in fluorescent lamps			X	Reduction of hazardous substances

The above list covers criteria from the current GPP criteria and other criteria which are based on the EU Ecolabel criteria proposal for imaging equipment as well as on EU and GPP criteria from Member states schemes.

3.1 Double side printing

3.1.1 Formulation as core criterion

Double side printing

Imaging equipment devices with a maximum operating speed for monochrome printing/copying of 30 ipm (images per minute) or more for A4 size paper shall be equipped with an automatic double-side print/copy unit (a duplex-unit).

The duplex printing and/or copying function shall be set as default in the original software provided by the manufacturer.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.1.2 Formulation as comprehensive criterion

Double side printing

Imaging equipment devices with a maximum operating speed for monochrome printing/copying of 25 ipm (images per minute) or more for A4 size paper shall be equipped with an automatic double-side print/copy unit (a duplex-unit).

The duplex printing and/or copying function shall be set as default in the original software provided by the manufacturer.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.1.3 Rationale of Double side printing criterion

A requirement on double side printing was already in the current GPP criteria. The proposed formulation is based on the proposal of EU Ecolabel criteria for imaging equipment.

Such a requirement is also found in all Ecolabel schemes investigated, including the MS Ecolabels. Requirements on duplex printing are also included in the Energy Star label. The duplex printing function is considered to be very effective for the reduction of paper consumption, especially when it is set as a default mode.

For the EU Ecolabel criteria which targets to the best 10-20 % environmental performing products a threshold of 25 ipm is proposed. Stakeholders suggest this threshold to be suitable for EU Ecolabel. In the core GPP criteria formulation the threshold of 30 ipm is suggested. Devices of speed 30 ipm or more are considered imaging equipment of medium-high performance. In these devices a double side printing function is more common. Further the higher the printing speed the more important becomes the double side printing function as a higher number of printouts are produced along the product lifetime hence higher environmental savings potential exists.

3.1.4 Importance of paper management criteria

The most significant aspect affecting the overall life cycle environmental performance of the product group of imaging equipment is the consumption of paper.

The environmental assessment, conducted in the framework of the study, shows (as explained in detail in the 1st Working Document⁶) that paper consumption, followed by energy consumption in the use phase, has the most dominant role in the life cycle of imaging equipment influencing the overall environmental product performance. The high importance of paper consumption is related to the large energy demand in the paper production phase.

Indicatively, in a base-case assessment for monochrome MFD-copier used in a working environment, as analysed in the Preparatory Study for LOT 4⁷, the consumption of paper was assumed to be 87 880 pages for each of the six years of the product's lifetime. The total energy consumption of the stock of copiers, printers and MFDs, as modelled in this study, shows that for the reference year 2005 the consumption of paper was responsible for 80 % (or 586 PJ) of the total EU energy consumption related to the life cycle of imaging equipment. This very high contribution of the paper use to the overall energy consumption affects notably

⁶ Jiannis Kougoulis, Oliver Wolf "Working Document Input to 1st AHWG on 21st March 2011", Institute for Prospective Technological Studies/ Joint Research Centre, March 2011

⁷ DG TREN Preparatory Studies for Eco-Design Requirements of EuPs. LOT 4. 'Imaging Equipment'. Final Report. http://www.ecoimaging.org/doc/Lot4_T1_Final_Report_2007-11-12.pdf

all the other environmental impact categories, as significant environmental impacts are related to energy production. This indicates the strong need for efficient use of paper for a reduction in its total consumption.

3.2 Multiple page printing and/or copying in one paper sheet

3.2.1 Formulation as core and comprehensive criterion

Multiple page printing and/or copying in one paper sheet

Imaging equipment devices shall offer as a standard feature the capability to print and/or copy several pages of a document on one sheet of paper when the product is managed by original software provided by the manufacturer (printer driver).

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.2.2 Rationale and importance of multiple page printing and/or copying in one paper sheet criterion

This criterion is proposed to ensure that the user has the possibility to print more than one digital page on the same side of one paper sheet. This function is user friendly and is considered to reduce unnecessary paper consumption. It is recommended for public authorities to recommend employees using this function as it has environmental and economical benefits.

A requirement on multiple page printing and/or copying in one paper sheet is included in the "industry voluntary agreement for lot 4 Imaging Equipment" with regard to the EU Ecodesign Directive 2005/32/EC for energy using products. The same requirement was proposed and found consensus in the 2nd AHWG for EU Ecolabel criteria for imaging equipment.

Such a printing function is considered to be very effective for the reduction of paper consumption as the user has the opportunity to control and reduce the paper consumed based on his needs. The overall importance of a sound paper management is presented in section 3.1.4.

3.3 Energy efficiency

3.3.1 Formulation as core and comprehensive criterion

All products shall meet the requirements of the latest ENERGY STAR specifications for imaging equipment available at: www.eu-energystar.org

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements and products holding the Energy Star v.2.0 label (or if applicable a more recent one) will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.3.2 Rationale of energy efficiency criterion

A requirement on energy efficiency was already in the current GPP criteria. The proposed formulation is based on the previous GPP criteria for imaging equipment.

With regard to energy efficiency, as discussed in the 1st AHWG meeting, a new version the Energy Star v2.0 for imaging equipment is under development. Energy Star is considered the most successful energy label with a high number of applications and it is also the EU Energy label for the product group of imaging equipment. Revision of the Energy Star label is planned to take place every 2 years due to its vast developments in the IT and EEE sector. Therefore as also discussed in the AHWG for EU Ecolabel criteria it is important to refer to the latest Energy Star version.

3.3.3 Importance of energy efficiency

After paper consumption, the next most important aspect regarding the life cycle environmental performance of imaging equipment is energy consumption in the use phase. This outcome is confirmed from several LCA studies, as presented in the Working document for the 1st AHWG. It is estimated that energy consumption in the use phase can account for approximately 2/3 of the total energy consumption of imaging equipment during product lifetime (energy consumption related to paper use is not considered). Thus, a better environmental performance can be achieved by energy efficient products. The consumption of less energy is also beneficial with respect to other investigated environmental aspects due to the lower pollutant emissions in the energy production phase.

The electricity consumption in the use phase is an aspect which is dependent on the product design (different from the previous case, i.e. paper consumption, which is strongly user dependent) and together with the energy label criteria is also a key aspect for the EU Ecolabel criteria. Energy efficiency is also one of the main environmental goals set by the manufacturers. The development of the electronic sector is vast and the trend of producing more energy efficient products is very high.

3.4 User instructions for green performance management

3.4.1 Formulation as core and comprehensive criterion

User instructions for green performance management

Environmental performance guide for the particular imaging equipment device (covering paper management functions, energy efficiency functions, waste management of the product and of consumables ink and/or toner cartridges) in written form as a separate part of the user manual and in digital form accessible via the manufacturers website shall be provided.

Additionally, interactive training instructions regarding the paper management functions, energy efficiency functions, waste management of the product and of consumables ink and/or toner cartridges for the particular imaging equipment device shall be provided via a software or be available via a website.

Verification

A copy of the instruction manual shall be supplied to the authority. This manual shall be available for access on the manufacturer's website. A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.4.2 Rationale and Importance of user instructions for green performance management

Criteria related to information for the user are very important as they raise the user awareness on environmental issues which are especially relevant to the particular product group and support environment-friendly behaviour. It happens very often that the product has functions which could reduce significantly the overall environmental impacts of the device during its use life time; the user however is not always aware of the green management of the device and therefore may not apply them. The current formulation proposal is based on similar Ecolabel criteria.

3.5 Resource efficiency: Minimum recycled and reused content

3.5.1 Formulation as comprehensive criterion

The external plastic casing parts shall have in total a post-consumer recycled and reused content of not less than 10 % by mass.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.5.2 Rationale and importance of Minimum recycled and reused content criterion

A requirement on minimum recycled and reused content was proposed in the EU Ecolabel criteria for imaging equipment. The majority of the stakeholders agreed with this proposal and as resource efficiency is an important environmental area it is also proposed here in the comprehensive part of the GPP criteria.

The aim of this criterion area is to facilitate reuse⁸ and recycling⁹ of materials (thus reducing in this way the amount of new resources (raw materials) which have to be used if the end-of-life materials are not recovered) and to avoid design options which hamper the recovery.

⁸ Reuse is defined here as: the use of part of the product for its original intended purpose, with or without prior repair or refurbishment

⁹ Recycling is defined here as: Processing parts of the products for retrieval of usable components or for recovery of material, including the processing of plastic materials for re-processing it in plastics manufacturing and the processing of metals for recovery of precious metals, or for resale as commodity scrap metal.

In many product groups Ecolabels criteria which set requirements related to a mandatory use of recycled material are found (i.e. Nordic Swan, Blue Angel, EU Ecolabel, Epeat etc.). In the manufacturer's sustainability reports the importance of resource efficiency is addressed and reuse and/or recycling activities are reported¹⁰.

However, it shall be kept in mind that environmental impacts are also associated with recycling processes. The environmental break even point (which is defined as the recycling rate point of the material in which the environmental impacts of it are equal with the environmental impacts of a virgin material) varies among different materials and generalization on this is not always straightforward. However, a positive balance is expected for low and very low recycling rates (under 30 %).

It is suggested to set a minimum requirement on the total reused and recycled content. This is considered to give an incentive to manufacturers to explore and integrate in their future developments better performance solutions regarding both aspects – the reuse and recycling. The requirement refers to plastic parts because these parts have currently a very low recycling and reuse rate. Contrary to plastic the recycling rates in general for metals is significant.

3.6 Resource efficiency : Design for reuse of toner and/or ink cartridges

3.6.1 Formulation as comprehensive criterion

The products must accept reused (remanufactured) toner and/or ink cartridges.

¹⁰ See also "Working Document Input to 1st AHWG on 21st March 2011", Institute for Prospective Technological Studies/ Joint Research Centre, March 2011

Any cartridge provided or recommended for use in the product shall be designed for reuse with no technical barriers via chips, compatibility of cartridge and printer software which hamper reusing the cartridge.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.6.2 Rationale and Importance of Design for reuse of toner and/or ink cartridges criterion

This criterion addresses the area of reuse of cartridges. Reuse of cartridges is resource efficient but can be also associated with economical benefits as the price of reused items is generally lower than of the new ones. This can be of special importance as in the analysis of cost consideration for this product group the life cycle costs for the procurers are strongly influenced by the cost of inks/toners and paper (see also respective section in the background report).

The aim of this criterion is to facilitate reuse and recycling of materials (thus reducing in this way the amount of new resources which have to be used if the end-of-life materials are not recovered) and to give the incentive to manufacturers to design their products in this way.

The importance of reuse and recycling of cartridges was presented and discussed in both AHWG meetings for Ecolabel, and criteria regarding this area are also found in Blue Angel and Nordic Swan. Reuse and material recycling strategies on ink and toner cartridges contribute to resource conservation and to waste reduction.

The reference point for this criterion is the respective requirement set in the EU Ecolabel criteria proposal. A more simplified and easier to comprehend proposal of this criterion is given for GPP criteria, which is also based on the feedback received along the criteria development process.

The main outcomes of the consultation with manufacturers and ink or toners remanufacturers (questionnaire feedback), which allow a better insight in the importance of this criterion, are given below:

- with regard to cartridge waste volumes and reuse rates of cartridges, stakeholders suggest that:
 - 300-500 million ink cartridges and 10-20 million toner cartridges are annually sold in the EU-27;
 - an estimated 20 % (at least) of these cartridges are reused.
 - A few OEM producers are involved in remanufacturing activities whereas many are involved in recycling activities;
 - It is estimated that in total volume per year the 40 -70 % of the cartridges end up in landfills and/or incinerators.
- with regard to the cartridge reuse circles stakeholders suggest that:
 - It is estimated that ink and toner cartridges can be reused at least once but on average two-three times, and printing quality remains sufficient at this level of reuse;
 - Toner cartridges can be remanufactured more easily than ink cartridges and there are examples of even up to 25 reuse circles;
 - Some parts have to be changed in the remanufacturing process;
 - The number of reuse circles depends on the model and the condition of the collection of the cartridge.
- with regard to parameters affecting the cartridge reuse cycles stakeholders suggest that:
 - This is a very complex area and there are several parameters affecting the reuse of the cartridge which vary based on the type and model of the cartridge. In cases of remanufacturing of OEM cartridges via cartridge return programs there are obviously no problems. However, for cartridge

remanufacturing by third parties the identified technical parameters (which can limit/influence this process) are as follows:

- presence of clever/killer/smart chips;
- design features that hamper remanufacturing i.e. welding, glue, blind screws or conjoined parts to fit cartridge-parts together;
- weaker print heads;
- legal barriers because of patents.

In conclusion, the potential for achieving environmental savings and resource conservation via reusing cartridges is high as the majority of them are disposed after the first use. Reuse has either better or equal environmental benefits as recycling, thus it shall be prioritised as an option. This is in line with the waste management hierarchy and with priorities set in the MS Ecolabel criteria for imaging equipment and for remanufactured cartridges.

The cartridge reuse circles depend on the type, model and the collection system, however, based on the stakeholders, a cartridge can be reused at least one time but the average is three times with a high improvement potential as there are examples of cartridges which were reused up to 25 times.

Hence, in the current criterion it is proposed to design the cartridges for reuse. Freedom given to the designer on how to achieve this goal is considered of importance as no eco-innovation shall be hampered.

3.7 Resource efficiency: Availability of high volume ink cartridges

3.7.1 Formulation as comprehensive criterion

Monochrome high volume inkjet cartridges with a performance of minimum 1500 page yield shall be available for imaging equipment (applying inkjet technology) of printing speed of 30 images-per-minute or more.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier or a declaration from the manufacturer demonstrating that these requirements have been met is also accepted.

3.7.2 Rationale and Importance of availability of high volume ink cartridges criterion

This criterion is proposed as it is considered to improve resource efficiency and has also positive economical effects for public authorities. The use of high volume ink cartridges is resource efficient as it contributes to a lower overall waste volume along the product lifecycle. Moreover, the cost per page for high volume ink cartridges is in general lower compared with the cost of the standards ones.

The proposed thresholds are based on the following:

Devices performing with 30 ipm speed or more are typically imaging devices of medium or high performance. These devices are procured when a higher number of printouts are to be produced. In this case the risk of the ink drying due to infrequent operation is low – hence the use of high volume cartridges is recommended.

Further, the threshold minimum of 1500 page yield is proposed as typically in high volume cartridges a 2000 page yield is feasible, compared to the typically 1000 page yield for the average (standard) volume cartridges. The criterion is proposed for monochrome printing as the number of monochrome printouts is much higher than of colour. This criterion gains more importance as there is there an increase in the inkjet products sold for medium or high performance applications – an area in which typically EP (laser) imaging equipment devices are used.

3.8 Acoustic noise

3.8.1 Formulation as comprehensive criterion

Acoustic noise

For devices with a printing function the 'Declared A-weighted Sound Level' (L_{WAd}) according to the methods specified in ISO 7779 3rd edition (2010) shall not exceed the limits set by the following formula:

$$L_{WAd,lim,bw} = 37 + 20 \cdot \log(S_{bw} + 8) \text{ dB}$$

Where S_{bw} = images per minute for monochrome images

$L_{WAd,lim,bw}$ = A-weighted sound power level limit for monochrome printouts given in dB

and

$$L_{WAd,lim,co} = 38 + 20 \cdot \log(S_{co} + 8) \text{ dB}$$

Where S_{co} = images per minute for colour images

$L_{WAd,lim,co}$ = A-weighted sound power level limit for colour printouts given in dB

The devices shall additionally not exceed 75 (dB) L_{WAd} except for devices with a printing speed over 71 ipm.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.8.2 Rationale and Importance of acoustic noise criterion

A requirement on acoustic noise was already included in the current GPP criteria. The proposed formulation is based on the new developments as presented in the proposal of EU Ecolabel criteria for imaging equipment. And it is considered important to ensure coherence between the two product policy tools. The current proposal incorporates the recent developments on modelling the noise emissions of imaging equipment based on investigation of data for the best performing products.

This criterion is proposed as it contributes to a better working environment. Noise emissions have a negative influence in the performance of employees, e.g. as they often contribute to lower concentration.

3.9 Design for disassembly and recycling

3.9.1 Formulation as award criterion

Design for disassembly and recycling

- A. The external plastic casings, the cables, and the recommended for use by the manufacturer (OEM) cartridges of weight 25gr or more of the imaging equipment offered does not contain brominated aromatic substances used as flame retardants nor PVC.
- B. The imaging device offered is easy to dismantle by professionally trained personnel using the tools usually available to them, for the purpose of repairs and replacements of worn-out parts, upgrading older or obsolete parts, and separating parts and materials, ultimately for recycling or reuse.

Verification

Regarding point A. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. A declaration from the manufacturer that the

requirements have been met is also accepted. The applicant shall declare the substances used as flame retardants.

Regarding point B. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that the requirements have been met is also accepted. This technical dossier from the manufacturer shall contain either a completed "checklist for recyclable design" indicating that all the requirements have been met (s .Annex 1) or a technical report showing the dismantling of the imaging equipment with an exploded diagram of the imaging equipment labelling the main components as well as identifying any hazardous substances in these components. This diagram shall be in written and audiovisual format which shall be available in the manufacturer website. Information regarding hazardous substances shall be provided to the authority in the form of a list of materials identifying material type, quantity used and position on the imaging equipment.

3.9.1 Rationale of criterion for disassembly and recycling

A requirement on design for disassembly was included in the current GPP criteria. Disassembly is associated with resource efficiency via recycling and secondary material recovery. Therefore it is considered important to include in this criterion also requirements which facilitate recycling. Further, concerns related to important environmental impacts (i.e. due to dioxin formation) which can occur in the end-of-life management phase related to the use of specific substances were also taken into account in order to focus on measurements which capture and avoid significant impacts in this life cycle phase.

The proposed formulation regarding disassembly of the equipment (part B) is based on similar formulations used in GPP and Ecolabel criteria i.e. EU Ecolabel proposal for imaging equipment, GPP criteria proposal for computers, EU Ecolabel for computers.

Currently it is estimated that only 8 wt% of WEEE polymers is recycled including the non flame retarded polymers in the EU – a threshold considered very low. Identifying and separating the external casings and cables from other plastic parts, as proposed, would be supportive in this respect.

Recyclability of the imaging devices is increased when the plastic parts of the product do not contain brominated flame retardants (BFR). A number of reasons substantiating this follow¹¹:

1. The WEEE Directive requires the separation of plastics containing brominated flame retardants (BFR) prior to recycling, energy recovery or disposal. The reduced use or avoidance of use from BFR would make easier the recycling of plastics parts.
2. Whilst there are several WEEE recycling plants in Europe using 'state-of-the-art' technologies for the separation of plastics, there are still only a handful of facilities for comprehensive treatment integrating plastic separation and recycling, and only a very few plants separate BFR-containing plastic¹².
3. Recycled plastic contaminated by BFR cannot/should not be used in several applications. For sensitive non-BFR applications made of recycled polymers (e.g. toys, kitchen articles, food packaging, refrigerator interiors, etc.) brominated flame retardants or other chemicals (heavy metals, softeners) should not be present in these materials.
4. Further, energy recovery in halogen sensitive facilities is possible only for plastic parts without BFR and organochlorine (halogen free/low materials).
5. All BFRs investigated have certain toxic properties. These are evident even when there is a low mass of BFR found in the recyclate. Their unnecessary incorporation into recycling streams is, in practical terms, the use of dilution to treat hazardous wastes contrary to accepted good practice in waste management. However, the health risks can differ based on the application of the product. Undertaken risk assessments are in general valid when referring to the original design¹³. The presence of BFR contaminated recycled material decreases its quality and subsequently price.

¹¹ UNEP, "Guidelines on Best Available Techniques and Best Environmental Practice for the Recycling and Disposal of Articles containing Polybrominated Diphenyl Ethers (PBDEs) under the Stockholm Convention on Persistent Organic Pollutants" Version 1, 9. December 2011 (in print)

¹² UNEP (2010) Technical review of the implications of recycling commercial penta and octabromodiphenyl ethers. Stockholm Convention document for 6th POP Reviewing Committee meeting (UNEP/POPS/POPRC.6/INF/6) Geneva 11-15. October 2010.

¹³ The risk scenarios in the risk assessments cover typically the original design usage. If the BFR is subsequently used for another product then the risk assessment and exposure pathways can be very different from the original use. This has been shown recently with assessments by Chen et al. of the risks associated with recycled polymers containing BFRs being used for the production of children's toys which are vulnerable to exposure routes, such as mouthing, which were not anticipated in the original use (Chen et al. 2009b, Chen et al. 2010a). Chen demonstrated that such uses of contaminated recycled polymers carry unacceptable risks and uncertainties for human health

Apart from hampering the recyclability of imaging equipment the use of brominated flame retardants is also associated with many environmental concerns and health risks regarding their end-of-life management.

- Recycling: Plastic containing brominated substances has a negative influence on the recycling of imaging equipment as presented previously.
- Incineration: A large proportion of brominated flame retarded materials are combusted. Depending on the quality of combustion, high levels of brominated dioxins and furans can be formed and released as a result of the dioxin precursor properties of aromatic brominated flame retardants. In particular, open burning of e-waste is estimated to globally generate PBDD/PBDFs and PXDD/PXDFs on a scale of tons and for many geographical areas can be considered as common practice. The toxicity and environmental concerns related to dioxins and furans are high. Brominated flame retardants in plastics can be destroyed with high efficiency only if the plastics are treated in incinerators constructed and operating according to best available technology (BAT) and best environmental practices (BEP). However, in this case costs per ton of incinerated material are considered high (in the order of \$100/t).
- Land filling: Additionally, a large portion of Brominated FR-treated products end up in landfills and there is growing evidence and concern that brominated flame retardants including POPs/PBDEs are leaching from landfills and contaminating the environment in industrial countries as well as in developing/transition countries. Only in engineered landfills with bottom liners leachates that escape to the environment can be collected and treated to reduce the flow of contaminants to ground and surface water for some time but such treatments are expensive and not state-of-the art. Because of their persistence, POPs/PBDEs will remain in landfills for many decades – and probably centuries and are expected to be eventually released to the environment as the landfill engineering systems (including basal and capping liners, gas and leachate collection systems) will inevitably degrade and lose their ability to contain the contaminants. Therefore, land filling does not appear to be a sustainable solution for long-term containment of brominated FR-treated materials
- High volume of electronic waste is treated outside the EU: A very high number of imaging equipment, like also other electronic products, is not treated within the EU but is exported as second hand products for reuse to third countries. Treatment

following the provisions of WEEE Directive is estimated to have much higher costs than the conventional treatments in most developing/transition countries. These countries have a limited capacity to properly treat these high waste streams containing brominated additives.

The majority of the brominated flame retardants used is brominated aromatic flame substances. These brominated aromatic flame retardants, due to their potential to form dioxins, raise very high environmental concerns (s. also technical analysis in Background Report). As in the current proposal it is considered important to focus on the most relevant additives, hence, the brominated aromatic flame retardants are addressed.

The praxis showed that these substances can be avoided -Ecolabelled products. This can prevent all these above mentioned problems.

Further, the presence of PVC has also a negative impact in the recyclability of imaging equipment. In addition, there are also many environmental concerns associated with the end-of-life management of PVC:

- Recyclability of product and presence of PVC

PVC has a negative influence on the recycling of other plastics such as the recycling of mixed plastic waste (i.e. from imaging equipment). As stated in the Green Paper for PVC, the processing temperature is limited to the range of PVC processing, which is a relatively low range compared to other plastics.

- End-of-life phase of PVC

- The PVC recycling quota is very low. Based on the prediction of vinyl2010¹⁴ the recycling quota of PVC would be only 4% of the total PVC waste amount for 2010. This recycled amount would be only 50 % of the baseline scenario estimated from the Commission in the “Green Paper – Environmental Issues of PVC”. Even for this small

¹⁴ Vinyl 2010 is the voluntary programme on Sustainable Development by the PVC industry. Vinyl 2010 represents the whole PVC industry chain. Its four founding members are: ECVM (the European Council of Vinyl Manufacturers), representing the 13 European PVC resin producing companies which account for almost 100% of the current total EU-27 PVC resin production, ESPA (the European Stabilisers Producers Association), representing 11 companies which produce more than 98% of the stabilisers sold in Europe, ECPI (the European Council for Plasticisers and Intermediates), representing the seven major European plasticiser and intermediate

recycling quota, governmental support in collection (which is the most expensive part of recycling) is a precondition.

- PVC (together with other chlorine containing polymers) has crucial negative impact on the incineration and thermal recovery of polymer waste in cement kilns. The presence of PVCs in mixed plastic waste fractions restrict the use of PVC containing waste as fuel in cement plants which normally accept polymer waste up to a chlorine content of 0.5%.

- PVC has a negative impact in incineration plants which operate under BAT conditions, due to the high costs of the treatment of flue gas cleaning residues which are produced in increased volumes when PVC is present. Flue gas cleaning residues are classified as hazardous waste and their treatment is associated with high costs which are directly linked to the operational costs of the incinerator. As highlighted in the EC Green Paper for PVC, a preventive measure aimed at reducing the quantity of residues generated at source is more preferable than the treatments of them afterwards.

- PVC-containing waste is associated with the formation of dioxins and furans in thermal processes with insufficient combustion conditions i.e. incinerators operating on non-BAT conditions, uncontrolled burning, accidental fires etc.

- Deposition in landfills is the most common waste management route for PVC. Degradation of plasticisers used in PVC occurs in landfills, resulting to emissions both to leachates and to air. Environmental impacts are related to the release of these substances. Emissions from PVC can last longer than the guarantee of the technical barrier used in landfills.

With the current proposal in the larger amount of the plastic waste volume produced along the life cycle of imaging equipment (includes the waste volume of cartridges used) the problems related to the end-of-life treatment of PVC will be avoided. Stakeholders provided feedback that the availability of high voltage cables in which PVC is not available is limited. Therefore, an exemption in the proposed criterion for the use of PVC in high voltage cables could be considered. Stakeholders are requested to submit their feedback.

producers, EuPC (the European Plastics Converters) represents close to 50,000 companies in Europe, producing over 45 million tonnes of plastic products of various types every year.

3.9.1 Importance of criterion for disassembly and recycling

In Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) in Annex II it is required that "*plastics containing brominated flame retardants*" are removed from any separately collected WEEE and are disposed of or recovered in compliance with Article 4 of Council Directive 75/442/EEC on Waste. In the Article 4 of Directive 75/442/EEC (Council Directive on waste) it is stated that Member States shall take the necessary measures to ensure that waste is recovered or disposed of without endangering human health and without using processes or methods which could harm the environment.

Currently it is estimated that only 8 wt% of WEEE polymers is recycled including the non flame retarded polymers in the EU – a threshold considered very low. Moreover, for the separation of plastics, in EU are still only a handful of facilities for comprehensive treatment integrating plastic separation and recycling, and only a very few plants separate BFR-containing plastic¹⁵.

The removal obligation for brominated flame retardants given in WEEE is expected to reduce the amount of plastics available for recycling and hinder the meeting of recycling targets in plastic dominated WEEE categories as reported in the 2008 review report on WEEE Directive for DG ENV conducted by United Nations University¹⁶. In the same report it is also stated that "although very little information on WEEE treatment capacity in the EU27 Member States is available it can be calculated that on average a recovery of 10 % of total equipment weight could be achieved through the recovery of plastic polymers. As the average plastic content in electronic waste is about 20 %, the fulfilment of the recovery targets may involve recovering half the plastic present in WEEE and recycling 25 %. However the current

¹⁵ UNEP (2010) Technical review of the implications of recycling commercial penta and octabromodiphenyl ethers. Stockholm Convention document for 6th POP Reviewing Committee meeting (UNEP/POPS/POPRC.6/INF/6) Geneva 11-15. October 2010.

¹⁶ Huisman, Jaco, Delgado Clara, Magalini Federico, Kuehr Ruediger, Maurer, Claudia Artim, Eniko Szlezak, Josef Ogilvie, Poll Jim, Steve Abs, final Report for DG ENV, 2008 Review of Directive 2002/96 on Waste Electrical and Electronic Equipment (WEEE), United Nations University, 2008

recovery of polymers from electronic waste is limited and the actual recycling figures are some distance from these objectives."

Most WEEE recycling companies dismantle and sort equipment into various streams and then pass the plastic rich fraction to other specialised operators. Some aim for the recovery of residual metals in these polymer-rich fractions, others recycle parts of the plastic fraction, a third group recovers energy and a proportion of WEEE plastics are sold as mixed plastic for export - mainly to China³⁷. Only about 8 % of plastic from WEEE is recycled^{17,39}.

There are many reasons for the limited recycling of WEEE plastic:

The four main reasons for the limited number of approaches for recycling plastics from WEEE are included below¹¹:

- a) Industry using secondary plastic materials has tight specifications in relation to polymer quality, both chemically (RoHS compliance) and with respect to material properties. This is also used as an argument to depress the prices of recyclate thus increasing the economic challenges.
- b) WEEE plastics contain at least 15 different plastic types (Dimitrakakis et al. 2009, UNEP 2011). The efficient sorting of this mixture presents difficult technical challenges and a degree of cross-contamination is inevitable in practice. According to Dimitrakakis¹⁸ three polymers (ABS, PS, PP) account for between 70 % and 85 % of total while other studies estimate that this fraction is a bit lower at 50-70 %.
- c) WEEE plastics contain RoHS regulated/listed BFRs (PentaBDE, OctaBDE, DecaBDE; but normally no PBB which is also listed) reducing the applicability range (lower number of products in which they can be used) as well the value of the recyclates.
- d) Production of larger volumes with identical properties and performance, as required by many major manufacturers, requires consistent quality and composition of inputs.

¹⁷ UNEP (2011). Guidance on the Best Available Techniques (BAT) and Best Environmental Practice (BEP) for recycling and waste disposal of articles containing POP-PBDEs. Draft 10/2011.

¹⁸ Dimitrakakis E., Janz A., Bilitewski B. Gidaracos E. (2009) Small WEEE: Determining recyclables and hazardous substances in plastics. *Journal of Hazardous Materials* 161(2-3): 913-919

3.10 Printouts produced after cancelation

3.10.1 Formulation as award criterion

Points can be awarded to imaging equipment devices based on their performance regarding the maximum number of pages which are printed after the user has cancelled the printing process for monochrome one side printing. The measurement shall be conducted using the measurement procedure described in Annex 2. The following formula shall be used:

$$a = b (1-0.05x)$$

Where:

a = points awarded using this criterion t for the offered imaging device

b = maximum points that can be awarded from this criterion

x = number of maximum printouts produced after cancelling printing

if x is over 20 pages no points can be awarded

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier or a declaration from the manufacturer demonstrating that these requirements have been met is also accepted.

3.10.1 Rationale and importance of printouts produced after cancelation criterion

In the use phase of imaging equipment the number of printouts could be reduced if the imaging equipment is designed in such a way that no or a very limited number of printouts would be produced after the user decides to cancel the printing process. Avoiding these unnecessary printouts result to direct environmental and economical savings. As mentioned in section 3.1.4 based on all the available LCA studies by far the most significant aspect

affecting the overall life cycle environmental performance of the product group of imaging equipment is the consumption of paper.

The proposed criterion on printouts cancellation could save costs as well environmental impacts independently from the savings that could result via the use of the other options related to efficient paper management i.e. double side printing or multiple page printing in one paper sheet etc. These savings are mainly due to the reduced paper consumption, but also the lower electricity and ink/toner consumption has a positive effect. The capacity of imaging equipment to react quickly and to produce after cancellation by the user only a very limited (if any) amount of (wasted) printouts is a user friendly feature which is related eventually to the product design. It is important hence to give the incentive to manufacturers and improve the performance of their products in this respect.

With regard the specific formulation of the proposed award criterion on printouts cancellation the following was considered:

- The vast amount of printouts is produced for monochrome printing. Only the performance on monochrome printing is tested.
- Imaging equipment printing after cancelling the process by the user more than 20 pages of after cancellation is considered a very poor performance hence no award points shall be given
- Each printout page produced after cancellation reduces 5% the overall points awarded via this criterion.
- The measurement method applied in the proposal of EU Ecolabel shall be used

The proposed formula is:

$$a = b (1-0.05x)$$

Where:

a = points awarded using this criterion for the offered imaging device

b = maximum points that can be awarded for this criterion

x = number of maximum printouts produced after cancelling printing

if x is 20 pages or more no points can be awarded

It is recommended that the procurers purchase devices which have a minimised generation of printouts after cancelation. The printing speed may influence the number of printouts. However, as the procurement is dependent on specific needs (i.e. number of users, type of equipment and average number of printouts per day) the offered and compared equipment is expected to lie in a certain range of printing performance – hence the comparison is valid.

An advantage of this criterion for GPP is that it is simple and has a direct environmental and cost benefit for the procurer.

3.11 Substances in plastic parts hazardous to health

3.11.1 Formulation as award criterion

Plastic parts heavier than 25g do not contain substances or preparations (including additives used as flame retardants) that are assigned any of the following risk phrases as defined in Council Directive No. 1272/2008:

- R45 (may cause cancer).
- R46 (may cause heritable genetic damage).
- R60 (may impair fertility).
- R61 (may cause harm to the unborn child).

Verification

Products holding a relevant Type 1 ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof will also be accepted.

3.11.2 Rationale of Sub stances in plastic parts haz arduous to health criterion

A requirement on substances which are hazardous and entail health risks (and are contained in plastic parts of imaging equipment) was already included in the current GPP criteria. The proposed formulation is based on the current GPP criteria for imaging equipment and is similar to other GPP criteria for IT products (i.e. computers). The criterion proposal for GPP has lower administrative effort than the current stricter EU Ecolabel proposal and applies to the plastic parts of imaging equipment.

Requirements regarding the use of hazardous substances are found in the Ecolabel criteria of different schemes (EU Ecolabel proposal, MS Ecolabels, third country Ecolabelling schemes). The importance of a criterion in this area is high in the EU Ecolabel due to the provisions of Article 6(6) of the EU Ecolabel Regulation 66/2010.

Within EU Ecolabel the criterion area regarding hazardous substances and mixtures is considered a horizontal issue, which is applicable for numerous product groups. The list of H- and R-phrases used in the EU Ecolabel criterion is more extensive and is the outcome of the investigation carried out by DG ENV and DG ENTR in which the described text of the Ecolabel Regulation is expressed in technical terms and parameters.

3.12 Indoor emissions

3.12.1 Formulation as award criterion

In the use phase the product does not emit the below listed pollutants in amounts higher than the maximum emission rates given below:

Substance	Emission rate Print phase (mg/h)		Emission rate Ready phase (mg/h).	
	Colour Printing Total in ready + print phase	Monochrome printing Total in ready + print phase	Desktop products	Floor-mounted equipment (Volume >250 litres)
TVOC	18	10	1	2
Benzene	<0.05	<0.05		
Styrene	1.8	1.0		
Non identifiable VOC	1.8	1.0		
Ozone*	3.0	1.5		
Dust*	4.0	4.0		

*applies only for Electrophotography (laser) printing technology

All the above emission rates must be measured in accordance with the requirements described in ECMA-328 5th edition (based on Annex C9. Model for RAL-UZ 122 Option) or Blue Angel: RAL-UZ 122 Version June 2006.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier from the manufacturer demonstrating that these requirements have been met is also accepted.

3.12.2 Rationale and importance of indoor emissions criterion

A requirement on indoor emissions can be found in the EU Ecolabel and in the Blue Angel and the Nordic Swan labels. The proposed formulation is based on the proposal of the EU Ecolabel criteria for imaging and is similar to the one used in Blue Angel. This criterion was discussed with stakeholders and consensus was found for the EU Ecolabel.

Ecolabel criteria on indoor air emissions are present in the schemes for many years and the practice showed that it contributes to a better indoor air quality. In this respect it was considered also relevant to be proposed as an award criterion for GPP.

3.13 Mercury in fluorescent lamps

3.13.1 Formulation as award criterion

Offered imaging equipment devices in which mercury or its compounds is not intentionally be added to the backlights displays used.

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier or a declaration from the manufacturer demonstrating that these requirements have been met is also accepted.

3.13.1 Rationale and importance of mercury in fluorescent lamps criterion

A restriction of the use of mercury in backlight displays used in imaging equipment is found in the EU Ecolabel as well in other labelling schemes. Further a similar requirement is proposed in the GPP criteria for IT products (computers, notebooks, etc). As this requirement finds a general consensus among stakeholders (as discussed in the 2nd AHWG-EU Ecolabel) it is also proposed as an award criterion in GPP.

3.13.1 Importance of mercury in fluorescent lamps criterion

Mercury and its compounds are highly toxic to humans, ecosystems and wildlife, including risk of serious, chronic, irreversible adverse neurotoxic and neurodevelopmental effects. Public awareness about the health and environmental concerns related to mercury has increased in recent years. Actions towards a reduction of the use of mercury in products have been undertaken for many years, most recently with the current pending proposal of ECHA regarding Mercury in measuring devices¹⁹. The release of mercury from imaging equipment is thought to take place mainly during the post-consumption phase. Mercury is mainly contained in scanning unit lamps and the LCD control panel backlights.

Fluorescent lights are classified as hazardous under the European Hazardous Waste Directive because of their mercury content. Annex II of the WEEE Directive requires that the mercury has to be removed from these lights. In the study for DG ENTR regarding the RoHS and WEEE Directives²⁰ it is reported that, although the amount of mercury in copiers and printers had been significantly reduced, there could be still be up to 84 g per copier (up to 0.1%). This criterion proposal is set in the context of a widely recognized need to further reduce mercury emissions at an EU level and apply the strategy to avoid pollution at source.

Today, LED lamps are becoming more common in these appliances (e.g. scanners and photocopiers) and replace mercury-containing fluorescent lamps. LEDs often provide additional benefits, such as longer lifetimes and energy efficiency. Additionally, according to stakeholders, the environmental benefits of using LEDs outweigh their impacts which are related to resource depletion potentials (i.e. use of gallium, energy intensive manufacturing process).

3.14 Energy efficiency in Networked standby mode

¹⁹ European Environmental chemical Agency, Restrictions under considerations: http://echa.europa.eu/reach/restriction/restrictions_under_consideration_en.asp

²⁰ Sarah Bogaert, Mike Van Acoleyen, Inge Van Tomme, Lieven De Smet, Dave Fleet, Rocio Salad, Final report: Study on RoHS and WEEE Directives N° 30-CE-0095296/00-09 project for European Commission DG Enterprise and industry, March 2008 http://www.rsjtechnical.com/images/Documents/RoHSreview_simplification_Mar08.pdf

3.14.1 Formulation as award criterion

Imaging equipment device which fulfils the following requirement:

"the power consumption of the networked product with low network availability in the modes with networked standby which the product is switched into by the power management function does not exceed 2,00 W"

Verification

Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.

A technical dossier or a declaration from the manufacturer demonstrating that these requirements have been met is also accepted.

3.14.2 Rationale and importance of energy efficiency in networked standby mode criterion

After paper consumption, the next most important aspect regarding the life cycle environmental performance of imaging equipment is energy consumption in the use phase. This outcome is confirmed from several LCA studies, as presented in the in the project Background Report (s. section 3.1.4). Energy efficiency of the procured or leased imaging equipment is an important issue from both environmental and economical point of view.

With the current proposal the core and comprehensive GPP criteria requirements are the requirements set in the EU Energy label – Energy Star. Additional considerations regarding an award criterion for GPP in the area of energy efficiency could be based on the performance of the product in its networked standby mode.

Currently, following the investigations carried out in Lot 26 on "Networked Standby Losses"²¹ for the Energy related products Directive 2009/125/EC, implementing measures are planned. These implementing measures will be mandatory for all the products within the scope of Lot 26 (including imaging equipment) marketed at the EU -27.

In July 2011 the Commission proposed for consultation implementing measures for Lot 26 in which requirements regarding the power consumption limits are set. This proposal sets targets which will become mandatory for all the products in two fiscal years, first in 2014 and later – in 2016. As GPP shall address better environmentally performing products it is currently proposed as an award criterion to give additional points for devices which achieve the target benchmarks of the second phase (based on the current proposal the ones of 2016). It is important at this point to highlight that the proposal for implementing measures is not finalised yet.

This discussion point was addressed also in the 2nd AHWG meeting for the EU Ecolabel criteria in which a similar requirement may be proposed.

An alternative option for an award GPP criterion in the area of energy efficiency could follow the approach made in the EU Ecolabel criteria for personal computers²². High energy efficient imaging equipment devices could gain awarded points based on their better percentage performance from the minimum requirement prescribed in Energy Star specifications.

²¹ http://ec.europa.eu/energy/efficiency/ecodesign/eco_design_en.htm and <http://www.ecostandby.org/>

²² Criterion 1 in: Official Journal of the European Union COMMISSION DECISION of 9 June 2011 on establishing the ecological criteria for the award of the EU Ecolabel for personal computers

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:151:0005:0014:EN:PDF>

4 ANNEXES

DRAFT

4.1 Checklist for recyclable design

A: Structure and Connection Technology

	Components made of materials incompatible with each other are connected separably or via separation aids	Case parts, chassis, electric modules, toner modules	M	<input type="checkbox"/>
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Important connections are those between case and chassis as well as those between chassis and electric modules. Their separability is a prerequisite for separate use/recycling of modules and materials as well as for a quick and save separation of pollutant-containing components. Adhesive labels (e.g. company logos and labels) are concerned as well.

The term "separation aids" stands, for example, for predetermined breaking points.

	Electric modules are easily traceable and removable	Entire unit, including lamps	M	<input type="checkbox"/>
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Minimum recycling strategy means: removal of the pollutant freight.

Electric modules and components according to Annex III, ElektroG (Electrical and Electronic Equipment Act), as, for example, batteries and condensers involving the risk of pollutant-containing ingredients as well as mercury-containing fluorescent lamps must be easily traceable and separable.



	Disassembly can be done with universal tools exclusively	Case, chassis, electric modules	M	<input type="checkbox"/>
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"The term „universal tool“ stands for general commercial tools.

	Necessary points of application and working space for disassembly tools have been taken into consideration	Case parts, chassis, electric modules	M	<input type="checkbox"/>
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A point of application is the point from where the impact is transferred from tool to connecting element. Sufficient working space is needed for the execution of the tool's separating movement.

This requirement particularly refers to snap connections which, unlike during assembly, often require tools to be disconnected.

	Screwed connections between modules can be separated with no more than three tools	Case parts, chassis, electric modules	M	<input type="checkbox"/>
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Standardized and uniform connection elements facilitate disassembly. The less tools must be changed the easier is assembly and disassembly.

A tool is characterized by the type of drive (e.g. cross recession) and the drive size (spanner size).

	Disassembly can be done by a single person	Entire unit	M	<input type="checkbox"/>
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An optional number of snap connections of the same joining direction may be assembled at a time but not always be disassembled if the re-entrant angle is $\geq 90^\circ$. This requirement shall be considered not fulfilled if more than two connections must be separated at a time.

	Case parts are free from electronic modules	Case parts	M	<input type="checkbox"/>
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With regard to a clean and quick pollutant removal and separation of the electronic parts all electric modules must be connected to the chassis. The case may not contain any electronic modules. Here, a control element attached to the case and case parts which simultaneously perform the functions of the chassis are not considered as case parts.

	The manufacturer did a trial disassembly (e.g. according to A.1 - A.11) and prepared a test report focussing on the weak-points	Entire unit	M	<input type="checkbox"/>
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B: Selection and Marking of Materials

	The variety of materials forming plastic components performing comparable functions are limited to one material	Case parts, chassis mechanical parts ($\geq 25g$)	M	<input type="checkbox"/>
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The smaller the number of materials the more efficient are separation and recycling processes. This requirement shall not apply to parts that have been reused as can be proved.

	The coating of plastic components has been limited to the minimum necessary	Case parts, toner and ink modules	M	<input type="checkbox"/>
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Large-area layers of lacquer, vapour depositions and printings on plastic components require additional removal processes if recycling by the material is to be done thereafter. Reasons shall be given if metallic coatings are used. Laser-produced labelings shall not be considered as printings. This requirement shall not apply to parts case that have been reused, as can be proved.

	The materials and material compounds used can be recycled by the material	Case parts, chassis, toner modules	M	<input type="checkbox"/>
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This means that recycle materials identical to the original material (original recycling) can be obtained.

	The proportional use of recycle material is permitted	Case parts, chassis, toner and ink modules	M	<input type="checkbox"/>
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A real "cycle" does not exist before the manufacturer actually uses recycle goods or promises to do so along with the product specification.

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	Components and materials under Annex III to ElektroG (Electrical and Electronic Equipment Act) can be easily exchanged	Entire unit	M	<input type="checkbox"/>
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	Material selection according to B.1-B.5 has been done and recorded in writing	Case parts, chassis, toner modules	M	<input type="checkbox"/>
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	Plastic parts > 25 g according to EN/ISO 11469: considering ISO 1043 are marked	Entire unit	M	<input type="checkbox"/>
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Plastics marking enables all recycling companies to do a type-specific sorting and separation of plastics

C: Longevity

	At least 50% of the components of the device, except for standard parts, are identical in design to those in other devices of the same manufacturer and the same performance category and generation	Entire unit	M	<input type="checkbox"/>
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	The use of reprocessed modules or components is possible and permissible	Entire unit	M	<input type="checkbox"/>
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The manufacturer shall be prepared to use modules and components as spare parts or ETN-parts in the product, provided that they have been reprocessed under his guidance - (ETN- equivalent to new)



	Toner or ink modules can be reprocessed	Toner and ink modules, except for containers	M	<input type="checkbox"/>
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Reuse should not be prevented by constructive measures

All Requirements have been met and answered „Yes“?			M	<input type="checkbox"/>
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Place:
Date:

Applicant:
(Signature of authorized representative and company stamp)

4.2 Reporting of printouts produced after cancelation-measurement method

The applicant shall report the number of paper sheets which are printed or copied after the user has cancelled the printing or copying process separately for one-side printing and for double-side printing based on the measurement method described below.

Measurement method for the assessment of the reporting of number of printouts produced after cancelation

The following measurement method is proposed:

The devices shall be tested in the following modes while operating in high performance (speed and print quality):

One side monochrome printing

Double side monochrome printing

One side colour printing

Double side colour printing

In all cases A-4 size paper having a weight per unit area of 70 to 80 g/m² shall be used for the printouts. The double side printing test is only applicable only for devices equipped with automated duplex unit.

The same monochrome and colour sample will be used as the test sample as was used in the measurement of indoor emissions in Blue Angel Ecolabel criteria RAL-UZ122:2006-04 (also available via <http://www.ps.bam.de/RALUZ122E/>) originating from JBMS-74-1.

The printing process shall start and shall be interrupted (cancelled) when the forth printout leaves the internal printing part and is in on the respective casing part available and ready for the user to take. The cancelation can be made either using the software cancelling option or if available via a button directly on the hardware.

The number of paper sheets printed after the printing cancelation shall be reported.

The final reported value shall be the average of three tests.

The following table shall be completed:

Table 1 Form for reporting the number of printouts produced after cancelation

Tested operation	Speed in ipm	Number of printouts printed after cancelation
One side monochrome printing		
Double side monochrome printing		
One side colour printing		
Double side colour printing		

In case of copiers the same test measurement procedure shall be used.