



JRC SCIENCE FOR POLICY REPORT

Revision of the EU Green Public Procurement (GPP) Criteria for Imaging Equipment

TECHNICAL REPORT
Draft criteria

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Table of Contents

1	INTRODUCTION.....	6
1.1	THE CRITERIA REVISION PROCESS AND EVIDENCE BASE	7
1.2	STRUCTURE OF THIS TECHNICAL REPORT	8
1.3	PRODUCT GROUP SCOPE AND DEFINITIONS.....	9
1.3.1	Revised proposal for scope and definitions for imaging equipment product group	9
1.4	PUBLIC PROCUREMENT ROUTES	13
1.5	MARKET VOLUMES	16
1.5.1	Imaging equipment products	16
1.5.2	Imaging equipment consumables	18
1.5.3	Printing services	18
1.6	THE LIFE CYCLE COSTS OF IMAGING EQUIPMENT	19
1.7	THE KEY ENVIRONMENTAL IMPACTS AND IMPROVEMENT POTENTIALS ACCORDING TO TECHNICAL ANALYSIS	22
1.7.1	Imaging equipment products	22
1.7.2	Imaging equipment consumables	22
1.7.3	Imaging equipment services	23
1.7.4	Identified improvement options	23
2	DRAFT CRITERIA AREAS AND PROPOSALS.....	25
2.1	CRITERIA STRUCTURE.....	25
2.2	CRITERIA AREA 1 – IMAGING EQUIPMENT	28
2.2.1	Preliminary assessment of existing fleet and procurement needs	28
2.2.2	Energy efficiency	29
2.2.3	Duplex imaging capability	33
2.2.4	N-up printing	35
2.2.5	Capability to use recycled paper	37
2.2.6	Capability to use remanufactured cartridges	39
2.2.7	Reduced number of materials	42
2.2.8	Postconsumer recycled plastic	44
2.2.9	Reparability and recyclability	48
2.2.10	Substance emissions	57
2.2.11	Noise Emissions	60
2.2.12	Hazardous substances requirements	63
2.2.13	Firmware Update Control.....	69
2.2.14	Warranty and service agreements.....	70
2.2.15	Take-back system.....	73
2.2.16	Supply of paper and imaging equipment consumables	75
2.3	CRITERIA AREA 2 – IMAGING EQUIPMENT CONSUMABLES	77
2.3.1	Cartridges/containers page yield	77
2.3.2	Consumable material efficiency.....	80
2.3.3	Consumable hazardous substances content	86
2.3.4	Reusability and manufacturability.....	90
2.3.5	Consumable quality.....	94
2.3.6	Consumables Take-back system	98
2.4	CRITERIA AREA 3 – PRINTING SERVICES.....	103
2.4.1	Commitment to reuse and repair imaging equipment products.....	103

2.4.2	Supply of imaging equipment.....	104
2.4.3	Supply of paper and imaging equipment consumables.....	105
2.4.4	Provision of consumable use information.....	106
2.4.5	Provision of environmental information during service contract	107
2.5	HORIZONTAL CRITERIA.....	109
2.5.1	Tenderer Environmental Management activities	109
2.5.2	Guaranteed provision of consumables and spare parts during contract	110
2.5.3	User instructions for green performance management	111

DRAFT

List of Tables

Table 1.:	EU public institution supply, service and work contracts covering CPV 30232100 in 2016 by public institution type	14
Table 2.:	EU public institution supply, service and work contracts covering CPV 30232100 in 2016 by procurement procedure	15
Table 3.:	Data sources for sales of products in scope	16
Table 4.:	Estimated non-domestic B2B market share (as percentage of annual sales)	17
Table 5.:	Estimated non-domestic B2B market annual sales (in million units)	17
Table 6.:	Printers and MFDs categories based on size (defined by printing speed).....	19
Table 7.:	Identified improvement options based on environmental analysis	24
Table 8.:	Environmental Initiative Inclusion of Duplex Imaging Criteria	34
Table 9.:	ENERGY STAR v2.0 Duplex Imaging Requirements	34
Table 10.:	N-Up Printing criteria in other initiatives	36
Table 11.:	Related criteria in other initiatives.....	38
Table 12.:	Reduced numbers of materials criteria in other initiatives.....	43
Table 13.:	Postconsumer recycled plastic criterion in other initiatives.....	46
Table 14.:	Compliance Rates to EPEAT Postconsumer Recycled Plastic Criteria	47
Table 15.:	Spare parts criterion in other initiatives	51
Table 16.:	Blue Angel RAL 205-1701 v1.0 requirements on design for disassembly.....	53
Table 17.:	Blue Angel RAL 205-1701 v1.0 requirements on material selection for recyclability.....	55
Table 18.:	EPEAT Hazardous material content criteria.....	65
Table 19.:	Blue Angel hazardous material content criteria.....	67
Table 20.:	Product lifetime criterion in other initiatives	72
Table 21.:	Imaging Equipment Warranty Periods.....	73
Table 22.:	EU Voluntary Agreement Consumable Yield Criterion	78
Table 23.:	Nordic Swan version 6.3 consumable efficiency requirements	81
Table 24.:	Blue Angel exclusion of intentionally added substances in colourants	88
Table 25.:	Additional Blue Angel exclusion of intentionally added substances in colourants	88
Table 26.:	Consumable reuse ability criterion in other initiatives	92
Table 27.:	Consumable quality criterion in other initiatives.....	95
Table 28.:	Consumable Take Back criterion in other initiatives.....	99

List of Figures

Figure 1.:	Total Life Cycle Costs for different printouts per month	20
Figure 2.:	Total Life Cycle Costs for product lifetime assuming 2500 printouts/month.....	20
Figure 3.:	Total Life Cycle Costs for product lifetime assuming 8000 printouts/month.....	21
Figure 4.:	Total Life Cycle Costs for product lifetime assuming 25000 printouts/month.....	21
Figure 5.:	Comparison of energy use between standard sized mono laser printers in the ENERGY STAR database during 2014 and 2018	31
Figure 6.:	Comparison of energy use between standard sized mono laser MFDs in the ENERGY STAR database during 2014 and 2018	31
Figure 7.:	Material efficiency of Mono Toner Cartridges and Containers with associated Drum Units	82
Figure 8.:	Material efficiency of Colour Toner Cartridges and Containers with associated Drum Units	83
Figure 9.:	Material efficiency of Colour Ink Cartridges and Containers (all)	83
Figure 10.:	Material efficiency of Black Ink Cartridges and Containers (below 10,000 page yield).....	84
Figure 11.:	Material efficiency of Colour Ink Cartridges and Containers (below 10,000 page yield)...	84

1 INTRODUCTION

This document is intended to provide the background information for the revision of the Green Public Procurement (GPP) criteria for Imaging Equipment¹. The study has been carried out by the Joint Research Centre's Directorate B (JRC Dir. B – Growth and Innovation) with technical support from a consulting consortium. The work is being developed for the European Commission's Directorate General for the Environment.

EU GPP criteria aim at facilitating public authorities the purchase of products, services and works with reduced environmental impacts. The use of the criteria is voluntary. The criteria are formulated in such a way that they can be, if deemed appropriate by the individual authority, integrated into its tender documents.

There are four main types of GPP Criteria:

1. **Selection criteria (SC)** assess the suitability of an economic operator to carry out a contract and may relate to:
 - (a) suitability to pursue the professional activity;
 - (b) economic and financial standing;
 - (c) technical and professional ability.
2. **Technical specifications (TS)**, the required characteristics of a product or a service including requirements relevant to the product at any stage of the life cycle of the supply or service and conformity assessment procedures;
3. **Award criteria (AC)**, qualitative criteria with a weighted scoring which are chosen to determine the most economically advantageous tender. The criteria are linked to the subject-matter of the public contract in question and may comprise, for instance:
 - environmental performance characteristics, including technical merit, functional and other innovative characteristics;
 - organisation, qualification and experience of staff assigned to performing the contract, where the quality of the staff assigned can have a significant impact on the level of performance of the contract; or
 - after-sales service and technical assistance, delivery conditions such as delivery date, delivery process and delivery period or period of completion.

Award criteria must be considered to be linked to the subject-matter of the public contract where they relate to the works, supplies or services to be provided under that contract in any respect and at any stage of their life cycle, including factors involved in:

- (a) the specific process of production, provision or trading of those works, supplies or services; or
- (b) a specific process for another stage of their life cycle,

even where such factors do not form part of their material substance.

4. **Contract performance clauses (CPC)**, special conditions laid down that relate to the performance of a contract and how it must be carried out and monitored, provided that they are linked to the subject-matter of the contract.

For each set of criteria there is a choice between two ambition levels:

- **Core criteria** are designed to allow for easy application of GPP, focussing on the key area(s) of environmental performance of a product and aimed at keeping administrative costs for companies to a minimum.
- **Comprehensive criteria** take into account more aspects or higher levels of environmental performance, for use by authorities that want to go further in supporting environmental and innovation goals.

¹ <http://ec.europa.eu/environment/gpp/pdf/criteria/imaging/EN.pdf>

1.1 The criteria revision process and evidence base

The main purpose of this technical report is to evaluate the current criteria and discuss if they are still relevant or should be revised, restructured or removed. It also identifies, based on the background technical analysis presented in the preliminary report², new criteria areas for consideration in order to better address key environmental impacts of the product group.

This document is complemented and supported by the abovementioned preliminary report addressing:

- Review of existing scope and product categorisation based on recent legislation, standards and voluntary agreements (Task 1)
- Review of technical state of play, procurement practices, market analysis and life cycle costs (Task 2),
- Review of key environmental aspects including identified life cycle hotspots, of Best Available Technologies (BAT) on the market and identification of improvement options to reduce life cycle environmental impacts (Task 3),

The conclusions of each of the tasks are presented in detail in the preliminary report². In this introductory chapter, extraction of the main aspects and conclusions from these tasks are presented.

An initial survey was sent out to a wide range of stakeholders at the beginning of the revision process concerning scope, definitions and the currently valid criteria. The target groups were government, industry, NGOs, academy and public procurers. The input provided has been incorporated in the preliminary report, and together with the proposed criteria presented in this technical report, will form the basis for continuing a future consultation with the stakeholders. After the consultation process is finalised, this report will be revised and a final set of criteria will be established.

This draft report will be the basis for the first Ad-Hoc Working Group (AHWG) meeting, which will take place in October 2018.

² Available at: <http://susproc.jrc.ec.europa.eu/imaging-equipment/stakeholders.html>

1.2 Structure of this technical report

Based on the findings from the preliminary report, this report is divided into following sections:

- The definition of the proposed scope
- The estimated market volumes in the EU for the proposed scope
- The identified procurement scenarios that occur when public organisations purchase imaging equipment in scope
- The key life cycle costs associated with environmental performance of imaging equipment
- The key environmental impacts of imaging equipment, and the potential improvement areas which led to the focus areas and draft proposed criteria
- The draft proposed criteria divided by focus areas

The focus is given to the areas where the procurers can apply the criteria and engage the tenderers to reduce their life cycle environmental impacts, concentrating in particular on those presenting most of the improvement opportunities and which can be verified by the procurers.

For each focus area, one or more criteria are proposed, supported by a background for the proposed criteria and its assessment and verification. The rationale covers to certain extent following aspects:

- Existing criteria and/or metrics
- Life cycle environmental hotspots and potential improvements
- Life cycle costs implications and trade-offs with potential environmental improvements
- Market implications and functionality
- Applicability to public procurement

1.3 Product group scope and definitions

For the assessment of existing scope and definitions analysis of the product categorisation in statistical sources and well as in relevant legislation and standards was performed. In addition, a detailed study of the scope, product categorisations and definitions used in various environmental initiatives like the Energy Star, EU Voluntary Agreement, the EPEAT scheme and national labels, i.e. Blue Angel, Nordic Swan and Korea Ecolabel, was made.

Main background information which aids the revision of the current scope and definitions of the EU GPP for imaging equipment product group is presented in the previously-mentioned preliminary report². In this section main findings which support the revised proposal are briefly explained along with the stakeholders' feedback.

This feedback has been gathered through a preliminary online survey and regarded mainly the practicability of the current product group definition and scope. Out of the 16 responses provided, half of the stakeholders consider that the scope of GPP should be changed, 4 of them think it should remain as it is and 4 have no opinion.

The most important findings are summarised below:

- Most stakeholders think the cartridges and consumables should be included within the scope of this product group, whilst others were of the opposite opinion (one thinks they should have their separate GPP criteria).
- Most respondents indicated that the speed restriction is unnecessary and a couple ask for alignment with other available environmental schemes.
- Several stakeholders consider that products designed for A2 media and larger as well as products marketed as plotters should be included.

Concerning the inclusion of cartridges and consumables, the stakeholders are mainly supporting their inclusion as these products are responsible for a large part of the product's environmental impacts and therefore giving to clients the opportunity to choose more environmentally friendly consumables should be supported.

1.3.1 Revised proposal for scope and definitions for imaging equipment product group

The current EU GPP criteria focus on imaging equipment products. However, as the products become more efficient, the importance of consumables is more evident (responsible for 20-30% contribution to Global Warming Potential and Primary Energy Demand in the LCA studies reviewed³). Furthermore, other widely used environmental schemes such as the Blue Angel, EPEAT and the Nordic Swan already consider consumables in their criteria concurring on their importance which is also pointed out by the stakeholders answering the survey.

It is therefore proposed to extend the scope of the EU GPP criteria to include consumables and harmonise with the above-mentioned schemes.

In addition, it is proposed to extend the scope to include also printing services, as the analysis of public tenders shown in the preliminary report suggests that a trend to increase the use of printing service agreements where the price is linked to the quantity of printed pages is expected. These can include a leasing agreement for printing and scanning or selling the products including a service agreement covering maintenance and even optimised document output through a managed printing service (MPS). It is expected that these services develop further into established services offered to non-domestic users, and this needs to be taken into account in the revision of the current EU GPP criteria.

³ For more details see section 1.6.

1.3.1.1 Imaging equipment products

For the purpose of the revised EU GPP criteria, the definition of imaging equipment products is proposed to remain the same as in the existing criteria.

The proposed product scope and definitions for imaging equipment products are shown below. The scope for imaging equipment products remains the same as for the existing in force. The only differences are the product classification and product definitions. In the existing EU GPP ‘Large format printing equipment’ defined as: large products which are not typically used in offices if they meet one of the following technical specifications:

- standard black and white format products with maximum speed over 66 A4 images per minute;
- standard colour format products with maximum speed over 51 A4 images per minute
- products designed for A2 media and larger; or
- products marketed as plotters..

are excluded from the scope.

In the proposed revised scope these products are covered by the definition of ‘Printer’, in order to simplify the product categorisation and reflecting that in ENERGY STAR v2.0.

In addition, scanners are proposed to be in the scope for harmonizing with other important voluntary schemes (ENERGY STAR and Nordic Swan) and due to their market significance, which is at the same level as that of copiers.

Imaging Equipment scope	
Products that are marketed for office or domestic use, or both, and whose function is one or both of the following:	
a) to produce a printed image in the form of 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;	
b) to produce a digital image from a hard copy through a scanning/copying process.	
Excluded from the scope are:	
a) Digital Duplicators,	
b) Mailing machines.	

Imaging equipment	Definition
Printer	A product whose primary function is to generate paper output from electronic input. A printer is capable of receiving information from single-user or networked computers, or other input devices (e.g., digital cameras). This definition is intended to cover products that are marketed as printers, and printers that can be field-upgraded to meet the definition of an MFD.
Copier	A product whose sole function is to produce paper duplicates from paper originals. This definition is intended to cover products that are marketed as copiers, and upgradeable digital copiers (UDCs).
Multifunctional device (MFD)	A product that performs two or more of the core functions of a Printer, Scanner, Copier, or Fax Machine. An MFD may have a physically integrated form factor, or it may consist of a combination of functionally integrated components. MFD copy functionality is considered to be distinct from single-sheet convenience copying functionality sometimes offered by fax machines. This definition includes products marketed as MFDs, and “multi-function products” (MFPs).
Scanner	A product whose primary function is to convert paper originals into electronic images that can be stored, edited, converted, or transmitted, primarily in a personal computing environment. This definition is intended to cover products that are marketed as scanners.

1.3.1.2 Imaging equipment consumable

The scope and definitions for consumables have been developed based on the analysis of the definitions found in other schemes like the EPEAT, Blue Angel, Nordic Ecolabelling, Eco Mark and the Korea eco-label (see preliminary report, chapter 2.3). The following scope and definitions are proposed for discussion in the coming AHWG meeting:

Imaging Equipment consumables scope
<p>A replaceable product that is essential to the functioning of the imaging equipment product. It can be replaced or replenished by either the end user or service provider during the normal usage and life span of the imaging equipment product.</p> <p>Imaging equipment consumables covered under the scope of this EU GPP include:</p> <ul style="list-style-type: none"> a) Containers, b) Cartridges, c) Drum units, d) Fusers units, e) Transfer kits.

The proposed definitions are given below:

Imaging equipment consumable	Definition
Container	An end-user replaceable product that holds toner or ink and that fits onto or into or is emptied into an imaging equipment product. Containers do not contain integrated components or moving parts integral to the imaging product's function.
Cartridge (Ink/toner)	An end-user replaceable product, which fits into or onto an imaging equipment product, with printing-related functionality that includes integrated components or moving parts integral to the imaging equipment's function beyond holding the ink or toner material.
Drum units	An end-user replaceable product, which fits into an imaging equipment product and which includes a photosensitive drum.
Fusers units	An end-user replaceable product, which fits into an imaging equipment product and which consists of a pair of heated rollers that fuse toner onto output media.
Transfer unit	An end-user replaceable product, which fits into an imaging equipment product, and which supports the transfer of toner onto output media ahead of a fusing process.

1.3.1.3 Printing services

The proposed scope and definitions for printing services is based on industry practices. Many schemes and business models exist for the provision of these services, so the proposed classification and definitions are somewhat generic in order to cover all these possibilities.

The proposed relevant definitions of printing services are shown below.

Print services	
Service agreements where the price is linked to the quantity of printed pages. These agreements can include the supply of IE products and /or consumables, maintenance, end of life activities and optimisation of organisation's document output.	
Other relevant definitions related to printing services	
Managed Print Services (MSP)	<p>The Managed Print Services Association (MPSA)⁴ defines MPS as "<i>the active management and optimization of document output devices and related business processes</i>".</p> <p>MPS covers the following service areas:</p> <ul style="list-style-type: none">• <i>Assessment</i>: which involves a review of existing print environment of an organization and aims to provide recommendations for better device management,• <i>Optimization</i>: which entails consolidating and rationalizing devices and business processes to develop a comprehensive MPS strategy,• <i>Management</i>: which covers systematic reviews, monitoring of service level agreement (SLA) and remote management. It aims to improve ongoing process and workflows.

Questions to stakeholders
<p>Do you agree with the proposed scope? Are there more elements, which should be included in the scope?</p> <p>Do you agree with the definitions proposed for consumables and/or printing services?</p> <p>Any further clarifications or direct proposals how to improve the scope and definition section are welcome.</p>

⁴ For more information see the website of the organisation: <http://yourmpsa.org/>

1.4 Public procurement routes

Directive 2014/24/EU⁵ defines three kinds of contracts:

1) ‘**public supply contracts**’ means public contracts having as their object the purchase, lease, rental or hire-purchase, with or without an option to buy, of products. A public supply contract may include, as an incidental matter, siting and installation operations;

2) ‘**public service contracts**’ means public contracts having as their object the provision of services other than those referred to in point on ‘**public supply contracts**’;

"3) ‘**public works contracts**’ means public contracts having as their object one of the following:

(a) the execution, or both the design and execution, of works related to one of the activities within the meaning of Annex II;

(b) the execution, or both the design and execution, of a work;

(c) the realisation, by whatever means, of a work corresponding to the requirements specified by the contracting authority exercising a decisive influence on the type or design of the work;

In addition, contracts can also be classified according to its duration and form:

- one-off (e.g. buy one printer; provide a service to clean the windows for a specific date)
- long-term (e.g. supply of a certain number of cartridges every month for one year; offices cleaning service provision every day for one year)
- call-downs from framework contracts that specify the conditions of sale of something during a given time duration but not the amount (e.g. supply as many printers as requested by fix price and specific conditions during one year).

The large variance in imaging equipment products, consumables and services in the scope of this revision project means that procurement practices will also vary significantly.

Lack of data causes that it is not possible to indicate exact purchasing patterns used by businesses. Many large businesses, including large public organisations, may purchase imaging equipment products or printing services directly from imaging equipment manufacturers. There are also many imaging equipment resellers who are also focussed on the larger business market. However, government purchasing patterns can be identified due to the requirement for public disclosure of information. The European Commission Tenders Electronic Daily (TED) website includes records of how government bodies throughout the EU purchase imaging equipment⁶. TED is the supplement to the Official Journal of the EU where all public procurement contracts over set financial thresholds for central government authorities and sub-central contracting authorities are mandatorily published. The thresholds differ according to the type of contracts but it should at least be of value above 135 000 EUR. It is important to note that government purchasing of imaging equipment under the set thresholds may not be recorded in the TED database as there is no requirement to publish the contract through TED. This means that contracts from smaller government bodies are more likely to be missed from this analysis.

Questioning the TED database shows that in 2016 public institutions in the EU published 384 contract award notices for **supply contracts**, **service contracts** and exceptional cases of **work contracts** which included products meeting the CPV code 30232100 (Printers and plotters)⁷ (see Table 1).

⁵ Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC.

⁶ <http://ted.europa.eu/TED/misc/aboutTed.do>

⁷ According to the Common Procurement Vocabulary (CPV). SIMAP (système d'information pour les marchés publics), Codes and nomenclatures – CPV, available from <https://simap.ted.europa.eu/cpv>

About 85% of the procurement contracts in the EU are supply contracts, indicating that most of the public institutions that procured imaging equipment in 2016 over a 135 000 EUR threshold purchased products. This highlights the importance of maintaining EU GPP criteria for imaging equipment products. Although it is predicted that more public institutions will purchase services in the future, this is in fact not yet known with accuracy and criteria for products are therefore needed.

Table 1 also shows that a significantly larger amount of these contracts are procured by diverse government depending organisations with specific purposes (i.e. bodies governed by public law), regional and local authorities and ministries and other national/federal authorities which are not agencies. These public institutions contract imaging equipment products in their large majority.

Table 1.: EU public institution supply, service and work contracts covering CPV 30232100 in 2016 by public institution type

Type	Supply contracts	Service contracts	Work contracts	Total by procurement procedure
Ministry or any other national or federal authority	79	9		88
National or federal Agency/ Office	7	2		9
Regional or local authority	92	19	2	113
Regional or local Agency/ Office	3	1		4
Utilities	16	5		21
Body governed by public law	129	20		149
Total by type of contract	326	56	2	384

Table 2 shows that most procurement contracts in the EU happened as open procedure⁸ in 2016. This keeps a more fair competition and may reflect the wide availability of imaging equipment products, consumables and services providers in the EU.

⁸ In an open procedure any business may submit a tender. The minimum time limit for submission of tenders is 35 days from the publication date of the contract notice. If a prior information notice was published, this time limit can be reduced to 15 days.

Table 2.: EU public institution supply, service and work contracts covering CPV 30232100 in 2016 by procurement procedure

Type	Supply contracts	Service contracts	Work contracts	Total by procurement procedure
Contract award without prior publication	2			2
Competitive dialogue	1	1		2
Competitive procedure with negotiation		3		3
Negotiated procedure without a call for competition	3	5		8
Open procedure	303	45	2	350
Restricted procedure	3			3
Negotiated procedure	14	2		16
Total by type of contract	326	56	2	384

Many purchasing decisions concerning imaging equipment are made at departmental or individual, rather than at the organisational level. This can result in a surplus of imaging equipment products, especially lower specification desktop based devices (e.g. small inkjet printers, scanners and/or multifunctional devices), which also leaves larger centralised imaging equipment underutilised. This situation can result in increased costs for procuring authorities due to the need for increased support and inefficient use of resources. A lack of visibility and understanding over the Total Cost of Ownership (TCO) of printing drove the imaging equipment market to recognise the need for better management of imaging equipment and to provide imaging equipment management services.

1.5 Market volumes

1.5.1 Imaging equipment products

This section provides an overview of the market volumes and future trends for imaging equipment products covered under the scope of the revised GPP criteria. More details on the background analysis can be found in the preliminary report². Because of the lack of procurement-specific data, the volumes and future trends are established based on assumptions made on the share of products sold for B2B purposes.

The annual sales for all imaging equipment products (i.e. B2B and B2C) have been estimated based on several data sources (see Table 3).

Table 3.: Data sources for sales of products in scope

Product type	Product sub-type	Data source
Printers	Inkjet printers	(2017) Interim Report Q3-Q4 2015: Survey of the Market Penetration of energy Efficient Office Equipment under the EU ENERGY STAR Programme ⁹ Imaging equipment Impact Assessment and (2011) ¹⁰
	Laser printers	
Multifunctional devices (MFDs)	Inkjet MFDs	
	Laser MFDs	
Copiers		Imaging equipment Impact Assessment and (2011) ¹⁰ Development of European Ecolabel and Green Public Procurement Criteria for Imaging Equipment: Economic and Market Analysis ¹¹
Scanners		Online research ^{12,13,14}

In order to establish the market volumes of imaging equipment products that are and will be relevant to the GPP criteria, the share of annual sales for the non-domestic market was estimated. Sales of imaging equipment products in the UK show increased B2B share for printers, MFDs, scanners and copiers (data not publicly available). Assuming a similar trend in the rest of the EU, it is expected that there will be an overall increase in the proportion of sales to non-domestic users, as domestic consumer needs for imaging equipment reduces. Printing devices, apart from MFD laser, are estimated to have an increase in non-domestic sales. Shares of copiers and scanners B2B market share are expected to remain stable due to the ongoing and future need of this equipment to digitalize older documents. Furthermore, in many public institutions the need to document in hard copy is still common practice.

⁹ ENER/C3/2014-561 Support for Energy Star Impact Assessment and Market Penetration Survey. Interim Report 3: Q3-Q4 2015: Survey of the Market Penetration of Energy Efficient Office Equipment under the EU ENERGY STAR Programme (not publicly available).

¹⁰ COMMISSION STAFF WORKING DOCUMENT. Impact Assessment - Accompanying the document REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the voluntary ecodesign scheme for imaging equipment. 2013.

¹¹ Development of European Ecolabel and Green Public Procurement Criteria for Imaging Equipment. JRC IPTS Draft Preliminary Study. Draft Task 2. Economic and Market Analysis. February 2011.

¹² http://www.dekko.or.jp/tbf/seika/pdf/29-11_Presentation.pdf

¹³ <https://www.rtmworld.com/2d/news/idc-finds-western-european-document-scanner-market-grew-in-2q2013/>

¹⁴ <http://www.businesswire.com/news/home/20161014005477/en/Global-Document-Scanner-Market---Analysis-Technologies>

The EU GPP background report of previous revision (2014)¹⁵ gave the ratio of images produced at work and at home as approximately 20 to 3. This ratio is used as the basis for estimating the non-domestic (i.e. B2B) and domestic (i.e. B2C) market shares for scanners and copiers. The market shares of printers and MFDs are based on the partial sales data from one Member State combined with the total EU-28 market size, and refined based on expert assumptions projected up to 2030¹⁶. The established share of imaging equipment products sold to the non-domestic market is shown in Table 4.

Table 4.: Estimated non-domestic B2B market share (as percentage of annual sales)

Product type	Product sub-type	2000	2005	2010	2015	2020	2025	2030
Printers	Inkjet	38%	38%	38%	38%	42%	46%	50%
	Laser	85%	85%	85%	86%	87%	87%	88%
Multi-functional devices (MFDs)	Inkjet	54%	54%	54%	53%	57%	61%	65%
	Laser	96%	96%	96%	98%	98%	98%	98%
Copiers		97%	93%	90%	87%	87%	87%	87%
Scanners		97%	93%	90%	87%	87%	87%	87%

Based on these shares, the estimated annual sales for the non-domestic market, both historical and forecasted, are shown in Table 5.

Table 5.: Estimated non-domestic B2B market annual sales (in million units)

Product type	Product sub-type	2000	2005	2010	2015	2020	2025	2030
Printers	Inkjet	3.82	4.66	3.65	0.36	0.36	0.35	0.35
	Laser	3.41	3.77	3.94	3.28	2.30	1.62	1.13
Multi-functional devices (MFDs)	Inkjet	4.46	5.44	6.70	7.89	10.64	13.37	16.36
	Laser	1.01	2.01	3.02	4.09	5.21	6.65	8.49
Copiers		1.54	1.37	1.01	1.19	1.28	1.37	1.43
Scanners		0.04	0.12	0.21	0.40	0.77	1.47	1.47
TOTAL		14.3	17.4	18.5	17.2	20.6	24.8	29.2

The data show that in the future printers will be relatively insignificant compared to multifunctional devices (MFDs, both inkjet and laser). Annual sales data on inkjet printers shows a sharp decrease. According to the data sources, the annual sales were still very high back in 2010. In 2015 these had been significantly reduced due to the rapid shift from inkjet printers to inkjet MFDs. Although copiers and scanners B2B market share will remain stable, total annual sales will still increase due to the digitalisation of documents and documentation in hard copy. But all in all the MFDs will be dominant in the non-domestic market. Overall, it is expected that the non-domestic market for imaging equipment products will continue to grow.

¹⁵ Green Public Procurement for Imaging Equipment Technical Background Report, 2014

¹⁶ Sales data were used to establish a market division between B2C and B2B. It was assumed the B2B will grow considerably for inkjet MFDs since the laser MFD market is already saturated.

1.5.2 Imaging equipment consumables

Data on sales of consumables at EU level is not publicly available and making assumptions on their volumes would provide very uncertain numbers.

1.5.3 Printing services

Publicly available data on the amount of printing services used in public procurement is also not known. However, the analysis of public tenders done in the preliminary report suggests that most public contracts are for purchasing products and not for leasing and services. The overview of the procurement practices performed in the preliminary report, shows that mostly supply contracts (i.e. supply of imaging equipment products) are awarded by public authorities at EU level over a threshold of 135 000 EUR. This, however, does not tell whether the absolute number of imaging equipment products is higher for supply rather than service (i.e. printing services) contracts.

On the other hand, a trend is expected for an increased use of purchase service agreements where the price is linked to the quantity of printed pages.. It is expected that these services develop further into established services offered to non-domestic users.

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1.6 The life cycle costs of imaging equipment

The Life Cycle Costs (LCC) of imaging equipment products in the scope have been established in order to get an overview of the most important costs to consumers, which in this case are the public procurers. The LCCs are also used as the starting point to identify whether certain criteria would incur on significant costs to the procurers.

LCCs account for the products' total cost of ownership. The life cycle stages considered relevant during the development of the current GPP criteria for imaging equipment products are found applicable for the revision of the criteria. These are:

- Purchase cost
- Running costs for operation (i.e. costs for electricity, paper, and toner/ink cartridges)
- Running costs for repair and maintenance
- End of life costs

Installation costs are considered negligible.

Printers and MFDs come in different sizes with very different purchase and operating costs in the market. Three sizes based on printing speed were observed during the data collection, which can be seen in Table 6. Furthermore, prices and costs also vary widely depending on whether the printing is colour or monochrome. Therefore, costs data is split throughout this chapter not only on size but on type of printing.

Scanners don't show these differences, and they are therefore grouped in one product category without further categorization.

All aspects of the LCC analysis except electricity consumption were established based on data collected from online retail prices, including costs of consumables, purchasing costs, and maintenance.

Table 6.: Printers and MFDs categories based on size (defined by printing speed)

Size	Printing speed (Pages per minute – ppm)
Small	1-20
Medium	21-40
Large	>40

The total Life Cycle Costs are shown in Fig1 which consider all the information, assumptions and data presented in the Preliminary Report (see task 2, chapter 10). The error bars primarily originate from the large variation in the costs of paper.

Generally, the paper is the dominant cost for medium/large laser MFDs and printers, while for small laser MFDs and printers the toner is also. These total LCCs represent a wide variation of pages printed per lifetime based on the calculated average prints per month presented in section 10.2.2.1 of the Preliminary Report (i.e. 2500, 8000, and 25000 for small, medium and large products). This has a direct influence on the calculated total LCCs, as large products show higher paper costs.

Figure 1 can hence be used to estimate the total LCC for the products lifetime, but not used comparatively between devices if a set number of printed pages per month is assumed.

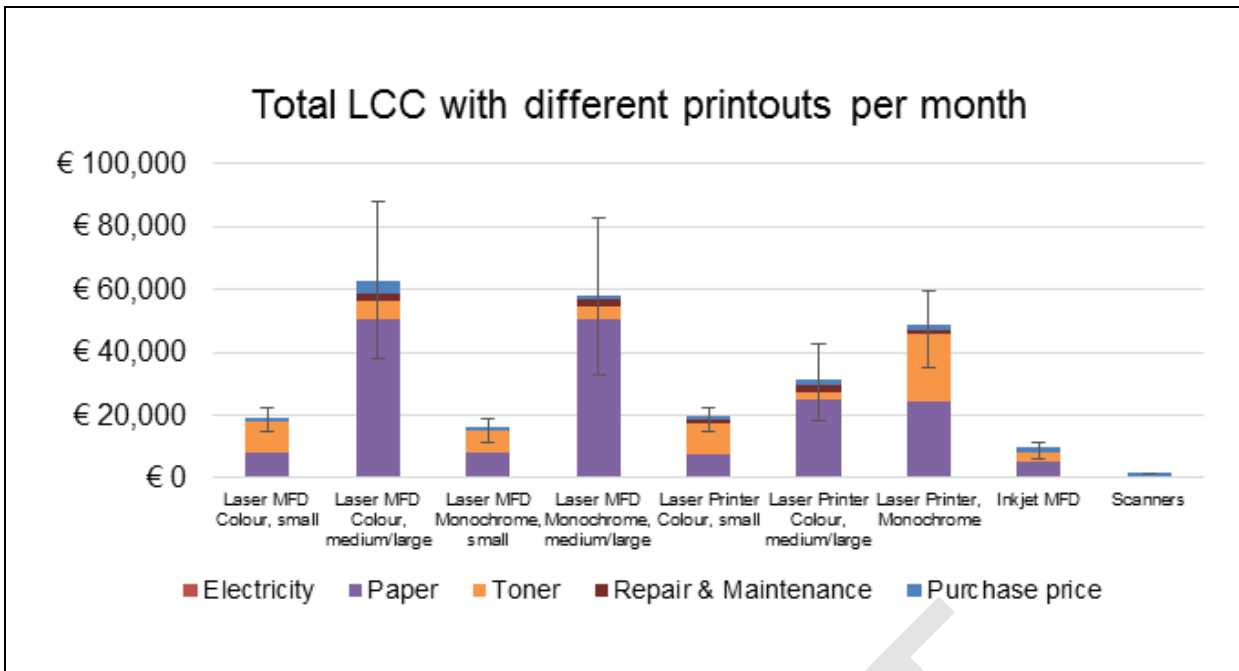


Figure 1.: Total Life Cycle Costs for different printouts per month

Figure 2, Figure 3 and Figure 4 assume a fixed number of pages printed each month, and compare the total LCC of the different devices for their whole lifetime. This can hence be used to compare total LCC when buying new devices, if the required number of pages printed each month is known. Note that the Inkjet MFD devices have a lower number of total pages printed, due to its lifetime being smaller than the Laser printers.

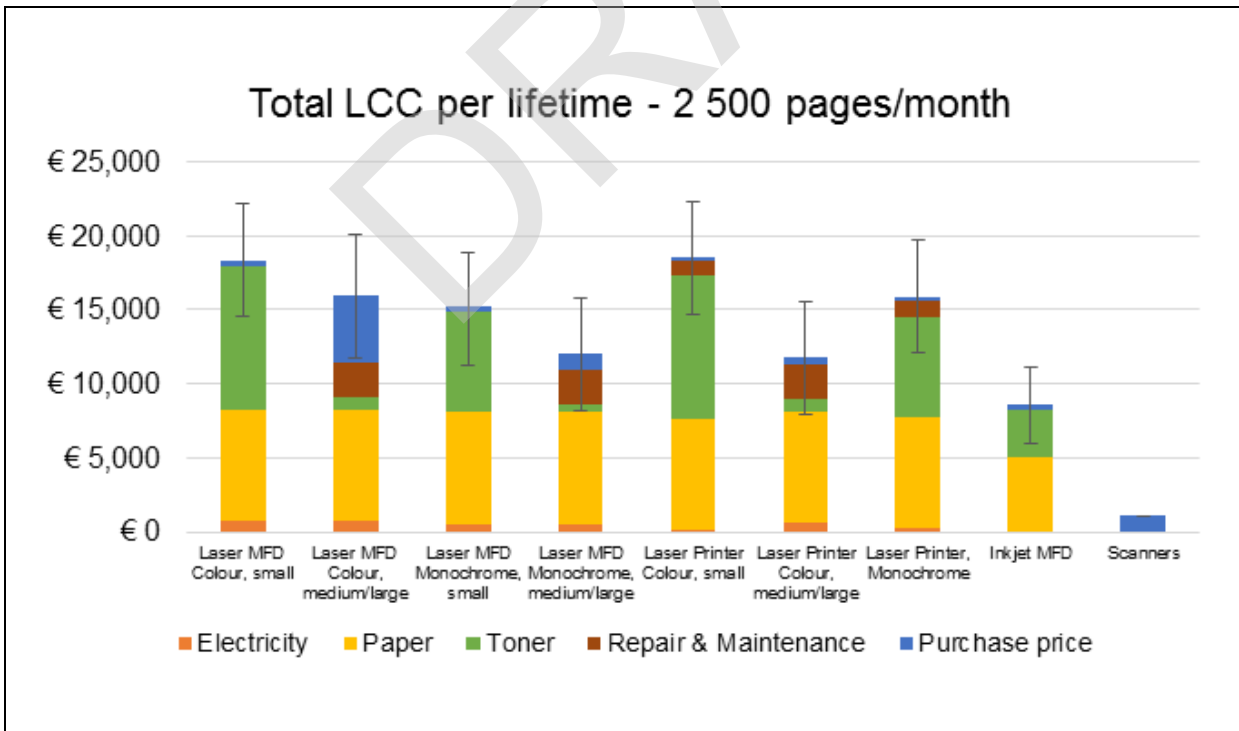


Figure 2.: Total Life Cycle Costs for product lifetime assuming 2500 printouts/month

The figures show that if the printing requirements of an office are at or close to 2500 pages per month, the type of MFD and printer chosen is not as important for the total LCC as it is for

more printouts. When below 2500 pages, the smaller printers tend to be cheaper, as the dominant factor becomes the purchasing price, instead of consumables. Moreover, in these smaller printout ranges, other costs such as purchase price and repair/maintenance costs become important.

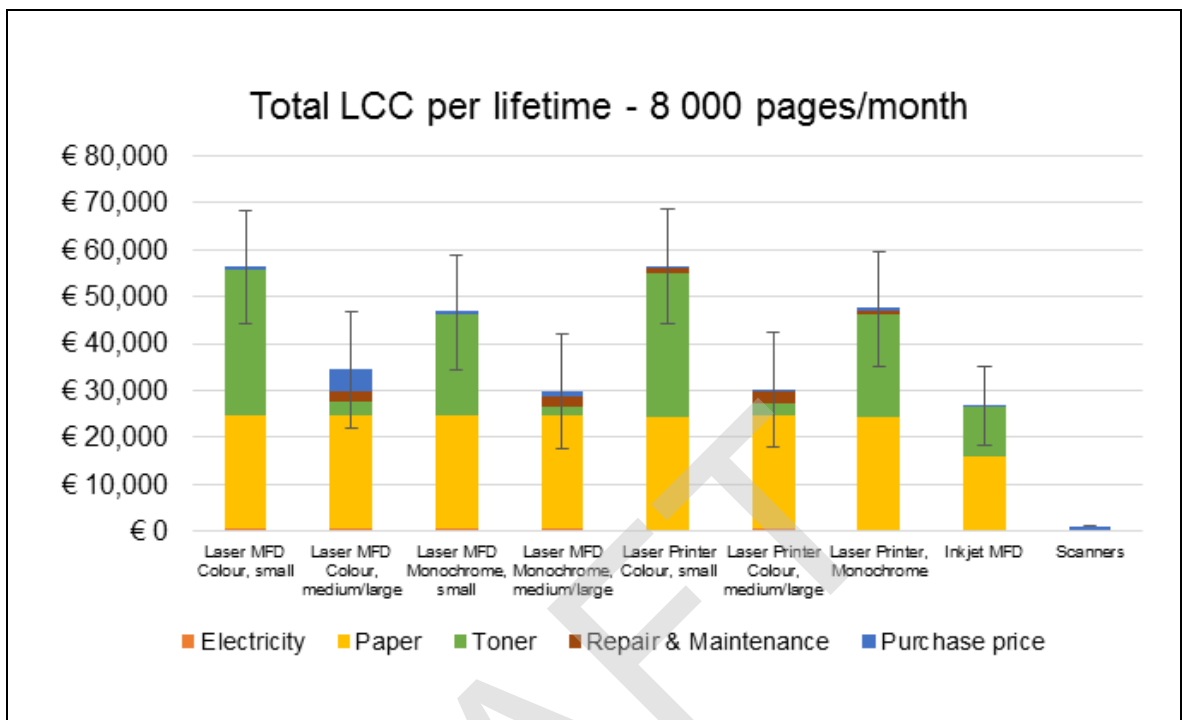


Figure 3.: Total Life Cycle Costs for product lifetime assuming 8000 printouts/month

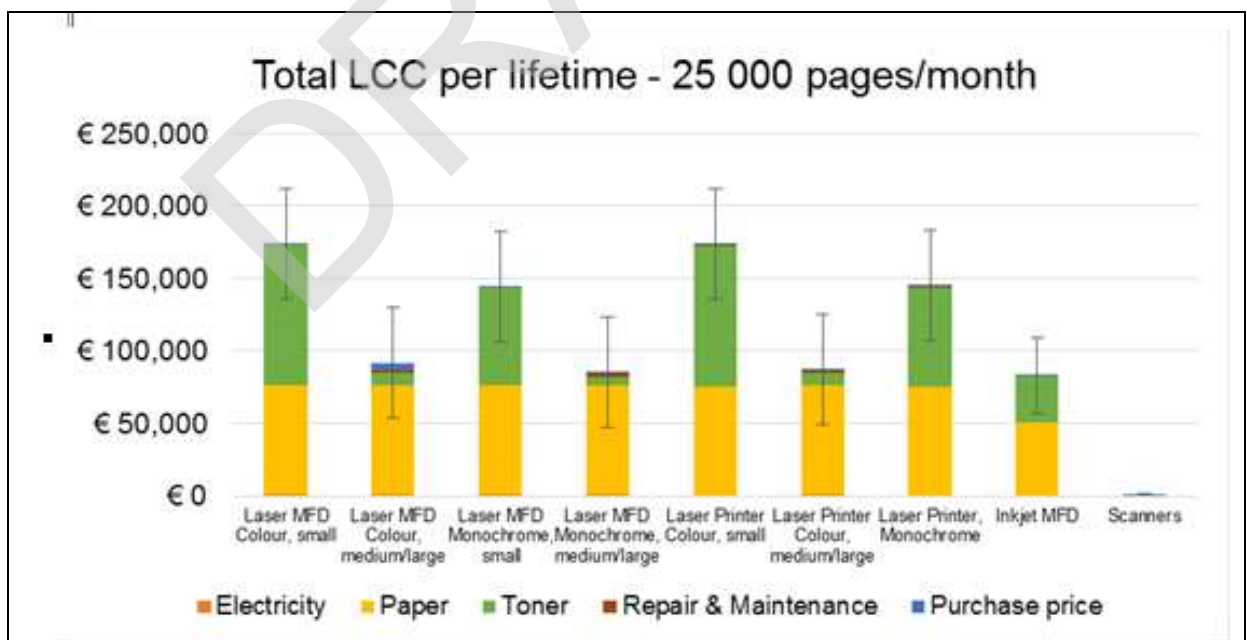


Figure 4.: Total Life Cycle Costs for product lifetime assuming 25000 printouts/month

When above 2500 pages, large devices tend to be dominantly cheaper. This is solely because of the differentiation between costs of toner/ink cartridges for small and for large devices.

1.7 The key environmental impacts and improvement potentials according to technical analysis

Review of key environmental aspects including identified life cycle hotspots, of Best Available Technologies (BAT) on the market and identification of improvement options to reduce life cycle environmental impacts. The conclusions are presented in detail in the preliminary report².

1.7.1 Imaging equipment products

The review of LCA studies has identified the following hotspots for imaging equipment products:

- Use of electricity for printers and MFDs, particularly for those with less efficient printing technologies.
- Use of electricity for scanners, which can be reduced if consumer utilises low power modes for longer periods.
- Use of consumables, particularly paper and cartridges (for printers and MFDs).
- Manufacturing of printers, MFDs and scanners, particularly for the more efficient printing technologies (i.e. laser technologies).

Key Performance Indicators (KPIs) used by other environmental schemes and initiatives are:

- Energy use
- Availability of low power modes and power management functions
- Use of cartridges
- Manufacturing impacts
- Recyclability
- Recycled content
- Product weight
- Product lifetime extension
- Content of hazardous substances

Furthermore, the BAT review indicates that the best products on the market concerning energy and material efficiency aspects are:

- Energy efficient both for active state and low power modes
- Designed for recycling
- Accepting of remanufactured cartridges
- Limiting the content of hazardous substances

1.7.2 Imaging equipment consumables

The review of LCA studies has identified the following hotspots for imaging equipment consumables:

- Manufacturing of cartridges, in particular of the housing and print head, which can be greatly reduced if cartridges can be refilled; the more refills the less contribution from manufacturing.
- The amount of paper the cartridge uses to deliver the printouts at the desired quality; the higher the quality the more the reductions of environmental impacts by using less paper.
- The consumer transport for refilled cartridges; the more refills the higher the contribution of transport for the total environmental impacts. However, this is subject to great variability depending on the allocated fuel used per trip per refilling.

KPIs used by other environmental schemes and initiatives are:

- Paper use
- Manufacturing impacts
- Possibility to refill cartridges
- Indoor emissions
- Furthermore, the BAT review indicates that the products on the market incentivizing the reduction of energy and materials for their consumables are: Promoting more common cartridges designs which promote the use of remanufactured cartridges
- Accepting refilled cartridges
- Reducing use of paper
- Limiting the indoor emissions from the use phase
- Limiting the content of hazardous substances

1.7.3 Imaging equipment services

At organization level, contracting of leasing agreements may promote use of products with higher durability, extend the real usage time and reduce the amount of waste by encouraging take-back systems and managed printing services. This is due to the fact that the imaging equipment fleet may be better managed when outsourced, in particular in large public institutions where time used on tracking product utilization and maintenance by internal staff may be more limited.

Take-back systems reduce the amount of waste and promote reuse and recycling of imaging equipment products and of cartridges. Managed printing services can encourage the use of remanufactured cartridges by encouraging manufacturers to offer brand agnostic services, can reduce the amount of paper used by optimizing document output, can integrate other office service areas to optimize the use of energy and can improve employers education in terms of the products and consumables environmental impacts.

1.7.4 Identified improvement options

Considering information collected for imaging equipment, related services and its consumables identified improvement options (not placed in the order of importance) are shown in Table 7.

Table 7.: Identified improvement options based on environmental analysis

Imaging category	equipment	Improvement options
Imaging products	equipment	<ol style="list-style-type: none"> 1. Limiting the use of energy, both in active state and in low power modes 2. Promote the use of recycled materials in imaging equipment products 3. Promote modular designs which facilitate repair and recycling 4. Restrict the indoor use emissions, in particular of hazardous substances such as VOCs 5. Accepting of remanufactured cartridges 6. Limiting the content of hazardous substances 7. Measuring and reporting the impacts of manufacturing of imaging equipment products 8. Limiting the use of paper and promote the use of recycled paper and printing features in the printer such as automatic duplexing, N-up printing, certified use of recycled and low weighted paper, pull printing, and printing awareness tools 9. Encouraging the use of refilled cartridges, and of remanufactured cartridges rather than limiting to the use of OEM cartridges 10. Promoting more common cartridges designs which promote the use of remanufactured cartridges 11. Accepting refilled cartridges 12. Promote reusability and recyclability trough take back system 13. Provision of information for green performance
Imaging consumables	equipment	<ol style="list-style-type: none"> 1. Promote efficient consumables (materials and printing efficiency) 2. Limiting the indoor emissions from the use phase 3. Limiting the content of hazardous substances 4. Promote reusability and recyclability trough take back system 5. Provision of information for green performance
Imaging services	equipment	<ol style="list-style-type: none"> 1. Promote imaging equipment fleet optimization. 2. Promoting resource efficiency 3. Provision of information for green performance

2 DRAFT CRITERIA AREAS AND PROPOSALS

2.1 Criteria structure

This is a first proposal of the revised EU GPP criteria. The revised criteria proposal has been divided into three main sections, depending on the subject matter and one additional horizontal section which applies to the three criteria areas. Two level of ambitions are proposed for the majority of criteria leading to a high number of requirements. Considering that this is an initial proposal, in order to reduce complexity at core level some requirements of relative lower importance are subject to discussion and potential removal during the revision.

CRITERIA AREA 1 – IMAGING EQUIPMENT

SUBJECT MATTER: PURCHASE, LEASING OF IE PRODUCTS

- CPC1 Preliminary assessment of existing fleet and procurement needs

1. Requirements on the product

- Energy efficiency
 - TS1 Imaging equipment minimum energy efficiency
 - AC1 Improvement in the imaging equipment energy efficiency beyond ENERGY STAR
- TS2 Duplex imaging capability
- TS3 N-up printing
- TS4 Capability to use recycled paper
- TS5 Capability to use remanufactured cartridges
- TS6 Reduced number of materials
- Postconsumer recycled plastic
 - TS7 Information on postconsumer recycled plastic used
 - AC2 Postconsumer recycled plastic minimum content
- Reparability and recyclability
 - TS8 (a) Spare parts availability
 - TS8 (b) Design for disassembly and repair
 - TS8 (c) Design for recycling
 - AC3 Cost competitiveness of spare parts
- TS9 Substance emissions
- TS10 Noise emissions
- Hazardous substances requirements
 - SC1 Restricted substance control
 - TS11 Substances of Very High Concern
 - TS12 Hazardous substances content
- TS13 Firmware update control
- 2. After-supply requirements**
- Warranty and services agreements
 - TS14 Warranty and services agreements
 - AC4(a) Longer warranties and services agreements
 - AC4(b) Longest warranties and services agreements
- Take-back system

AC5 Imaging equipment take-back system implementation
CPC2 Reporting on reuse/recycle activities of imaging equipment

- Supply of paper and imaging equipment consumables
 - TS15 (a) Supply of copy and graphic paper meeting the EU GPP criteria
 - TS15 (b) Supply of cartridges meeting the EU GPP criteria
 - AC6 Supply of reused/remanufactured ink and/or toner cartridges
 - CPC3 Reporting on supplied consumables

Criteria area 2 – Imaging Equipment consumables

Subject matter: purchase of product consumables

1. Requirements on the consumable

- Consumable page yield
 - TS16 Cartridges/containers page yield declaration
 - AC7 Extended page yield
 - Consumable material efficiency
 - TS17 Consumables resource efficiency
 - AC8 Electrophotographic consumables resource efficiency
 - AC9 Reduced number of materials of consumables
 - TS18 Consumable hazardous substances
 - Reusability and remanufacturability
 - TS19 Design for reusing/remanufacturing
 - AC10 Advanced design for reusing/remanufacturing
 - AC11 Facilitating reusability/remanufacturability
 - TS20 Consumable Quality
- #### **2. After-supply requirements**
- TS21 Consumable take-back system implementation
 - CPC4 Reporting on reuse/recycle activities of consumables

Criteria area 3 – Printing services

SUBJECT MATTER: PURCHASE OF OUTPUT - NUMBER OF PRINTOUTS

1. Requirements on the service

- Commitment to reuse and repair of imaging equipment
 - TS22(a) Commitment to reuse of imaging equipment
 - TS22(b) Commitment to repair of imaging equipment
- TS23 Supply of imaging equipment
- Supply of paper and imaging equipment consumables
 - TS24(a) Supply of paper meeting the EU GPP criteria
 - TS24(b) Supply of cartridges meeting the EU GPP criteria
 - AC12 Supply of reused/remanufactured ink and/or toner cartridges
 - CPC5 Reporting on supplied consumables
- CPC6 Provision of consumable use information
- CPC7 Provision of environmental information during service contract

Horizontal Criteria (applicable to all criteria areas)

- SC2 Tender environmental management activities
- Guaranteed provision of consumables and spare parts during contract
 - TS25(a) Guaranteed provision of consumables during contract
 - TS25(b) Guaranteed provision of spare parts during contract
- TS26 User instructions for green performance management

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2.2 Criteria area 1 – Imaging equipment

Criteria under this section can be used when purchasing and/or leasing imaging equipment products that are within scope of the EU GPP but could also be used for provision of these products under a printing service contract (See section **Supply of imaging equipment** under printing service criteria section).

2.2.1 Preliminary assessment of existing fleet and procurement needs

Existing EU GPP criteria in force does not include a criterion regarding assessment of existing fleet and procurement needs for imaging equipment.

For the first revision of this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
CONTRACT PERFORMANCE CLAUSE	
CPC1 Preliminary assessment of existing fleet and procurement needs	
<p><i>(This contract should be considered as a standalone preliminary procedure, conducted by a different provider than the potential provider for procurement of imaging equipment. This preliminary assessment should apply only when the procuring authority identifies the need to optimise the use of existing fleet prior to procurement of new imaging equipment and when the procurer decides not to use in-house staff to carry out this assessment.)</i></p> <p>The service provider must conduct evaluation of any current fleet of imaging equipment that the procuring authority has on their site(s) and provide to the procuring authority the results of that evaluation. The evaluation must identify the following:</p> <ul style="list-style-type: none"> • Number of imaging equipment models on each site • Name, model number and type of each imaging equipment model • Approximate age of each imaging equipment model <p>Based on the main print needs communicated by the procurer and the above evaluation results, the service provider must classify each imaging equipment model into distinct categories which identify their future status. Example categories include:</p> <ul style="list-style-type: none"> ○ Retain: Product to be kept for continued use on procuring authority's estate ○ Return: Product to be returned to incumbent or past supplier ○ Reuse: Product to be sold for reuse outside of procuring authority's estate ○ Recycle: Product to be sent for end-of-life processing <p>Based on above elements service provider must produce a short report advising the procurer on the number and characteristics of the additional new products to be procured.</p>	

2.2.1.1 Background for the proposed criteria

The ability to better manage imaging equipment within a public body could encourage significant reductions in environmental impacts across many environmental hotspots. For example, a full assessment of an imaging equipment fleet could result in identification of areas where fewer products could be used.

There are no known criteria in any major environmental initiatives which cover assessments of products already included in an imaging equipment fleet. No standard metrics are required to assess compliance with this criterion. However, it is suggested that assessments of current fleets of imaging equipment would help procuring authorities to better manage imaging resources on their sites and if they plan to purchase additional equipment.

It is suggested that the assessment is conducted by a different provider to the one wh will supply new equipment. It is recognised that procuring authorities would need to work with potential suppliers to identify how products would be classified (i.e. into the Retain, Return, Reuse or Recycle categories).

2.2.2 Energy efficiency

Existing EU GPP criteria in force include an energy criterion consisting of requirements that products meet the Energy Star v.2.0 specification for imaging equipment.
For the first revision of this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS1 Imaging equipment minimum energy efficiency Imaging equipment must meet all the energy efficiency and power management requirements laid down in the most recently published ENERGY STAR specification. The ENERGY STAR version implemented at the time of publication is 2.0 and updates can be followed at the following link: https://www.energystar.gov/products/office_equipment/imaging_equipment</p> <p>Verification: <i>The tenderer must provide test reports carried out according to the test methods laid down in the latest version of the ENERGY STAR. These must be provided upon award of the contract or prior to that upon request.</i> <i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply..</i></p>	
AWARD CRITERIA	
<p>AC1 Improvement in the imaging equipment energy efficiency beyond ENERGY STAR Points will be awarded if the product is more energy efficient than the TEC_MAX value for imaging equipment covered under the ENERGY STAR TEC approach. Points must be calculated in comparison with the maximum typical electricity consumption (TEC_MAX) allowed under the most recently implemented ENERGY STAR (see Criterion TS1). A maximum of x points [to be specified] may be awarded. Points must be awarded in proportion to the improvement in energy efficiency in comparison to the TEC_MAX value:</p> <ul style="list-style-type: none"> <input type="checkbox"/> over 80% lower: x points <input type="checkbox"/> 60-79% lower: 0.8x points <input type="checkbox"/> 40-59% lower: 0.6x points <input type="checkbox"/> 20-39% lower: 0.4x points <input type="checkbox"/> 10-19% lower: 0.2x points <p>Alternatively, instead of using the TEC_MAX value a Life Cycle Costing calculation could be requested, whereby the offered improvement potential would lead to a relative decrease in the overall running costs of a product compared to a less energy efficient model.</p> <p>Verification: <i>The tenderer must provide test reports carried out according to the test methods laid down in the latest implemented version of ENERGY STAR. The tenderer must detail the measured TEC value and the ENERGY STAR TEC_MAX value for each applicable product and a calculation of the improvement in energy efficiency. These must be provided upon award of the contract or prior to that upon request.</i></p>	

2.2.2.1 Background for the proposed criteria

Energy consumption during the use phase for all imaging equipment products in scope is still one of the three major hotspots, as recognized during the development of the current criteria. This does not only apply to active state consumption but also consumption at other low power modes. In the case of scanners, consumption in low power modes is the main hotspot. Concerning printers and MFDs, studies assessing differences between different technologies showed that energy consumption during use is more critical for solid ink devices than for laser devices increasing about 20-30% of the environmental impacts from the use phase. Therefore, it is important to retain energy efficiency as part of the criteria.

Energy efficiency is being a widely known indicator on the market which is easy to verify. Annex III of Directive 2012/27/EU¹⁷ on energy efficiency, requires also that imaging equipment purchased by central government must meet the energy efficiency requirements within the latest implemented EU version of ENERGY STAR, insofar as that is consistent with cost-effectiveness, economic feasibility, wider sustainability, technical suitability, as well as sufficient competition. This obligation applies to contracts for the purchase of products above certain values as laid down in Article 7 of Directive 2004/18/EC¹⁸.

Besides the ENERGY STAR, Blue Angel is among the voluntary schemes most widely known in public procurement in the EU, with over 1,400 models of imaging equipment across 17 manufacturers registered with the scheme¹⁹. Both criteria offer similar energy efficiency requirements, having energy use and power management as their main focus areas. The criteria for ENERGY STAR can be found [here](#).²⁰ The criteria for the Blue Angel can be downloaded [here](#).

Due to their wide use and knowing they are already applied in public procurement, it is recommended to establish as Technical Specification (core and comprehensive the same) in the revised EU GPP criteria a dynamic link to the energy efficiency and power management requirements of these voluntary schemes, which can be tied to the most recent updates. By making the criteria linked to the latest version of ENERGY STAR, it would be assured that the energy consumption levels are kept updated in relation to technological development and securing the potential energy savings according to this development.

Including a dynamic link to ENERGY STAR is important as the percentage of products on the market complying with ENERGY STAR specifications can reach high levels over time. For example, the US EPA estimates that 100% of the MFD's and printers on the US market met the ENERGY STAR v2.0 specification by mid-2016²¹. The percentage of products on the market meeting ENERGY STAR specifications increases due to improvements in energy efficiency. Figure 5 and Figure 6 illustrate the improvement in energy efficiency of standard sized laser printers and laser MFDs found in the EU ENERGY STAR database during January 2014 and April 2018. The graphs show that products registered with the EU ENERGY STAR initiative in 2014 used considerably more energy than similar products registered in 2018.

¹⁷ Directive 012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

¹⁸ Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts

¹⁹ Blue Angel, Energy saving and Low-Pollutant Printers, Copiers and Multifunction Devices, available from <https://www.blauer-engel.de/en/products/office/drucker-kopierer-und-multifunktionsgeraete-2012>

²⁰ www.energystar.gov/sites/default/files/FINAL_Version_2.0_Imaging_Equipment_Program_Requirements_%28Rev_Oct-2014%29.pdf

²¹ US EPA, Annual Shipment Data, ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2016 Summary, available from https://www.energystar.gov/ia/partners/downloads/unit_shipment_data/2016_USD_Summary_Report.pdf?bb80-83d4

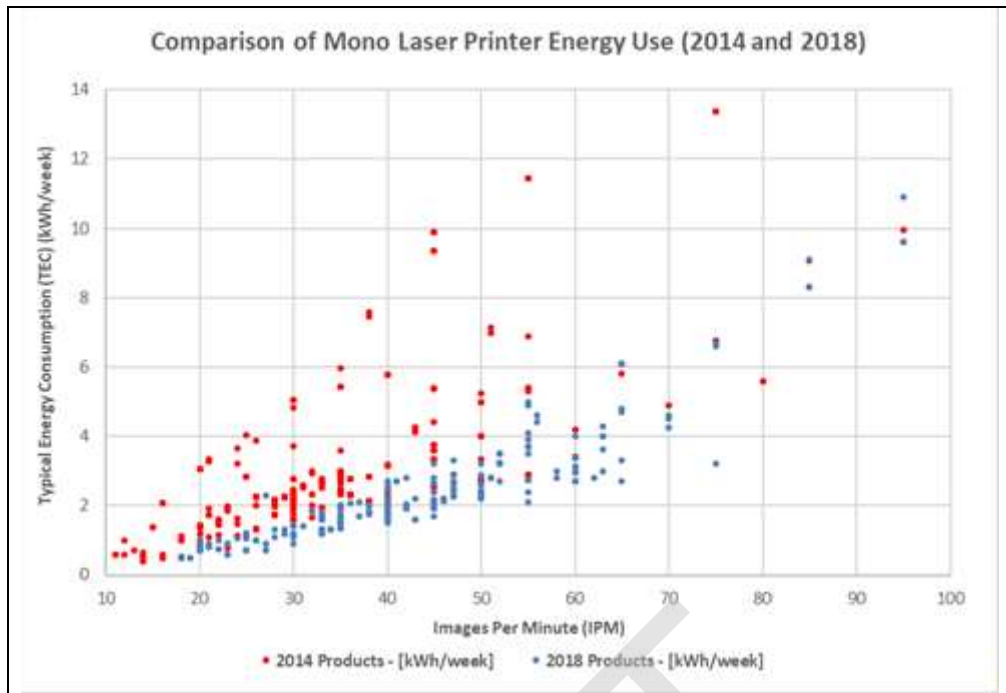


Figure 5.: Comparison of energy use between standard sized mono laser printers in the ENERGY STAR database during 2014 and 2018

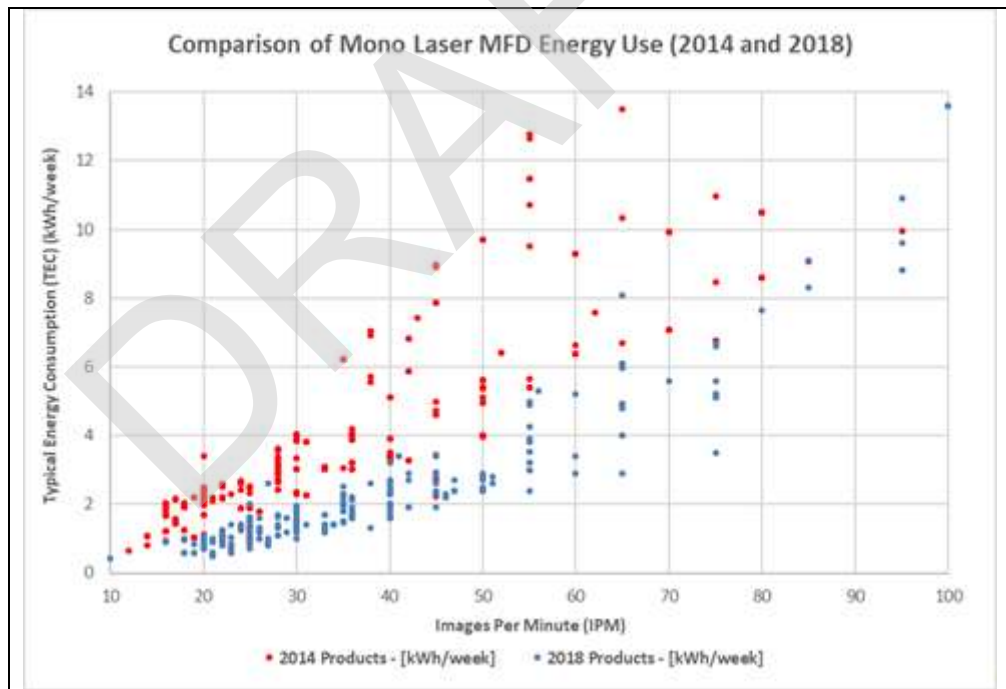


Figure 6.: Comparison of energy use between standard sized mono laser MFDs in the ENERGY STAR database during 2014 and 2018

The current EU GPP criteria on imaging equipment includes requirements based on the ENERGY STAR v2.0 specification and is therefore outdated. Energy Star is currently under revision and it is expected that the new version will be available before the end of the GPP revision process. At the time ENERGY STAR specifications are developed they are designed to be met by only the top 25% most efficient products on the market.

In addition it is proposed to establish an award criterion in order to promote purchase of products which go beyond the Energy Star, as required in Technical Specification. Points would be calculated in comparison with the maximum typical energy consumption allowed under the

criterion TS1. As an alternative to awarding points for greater energy efficiency, procurers could opt for an LCC approach whereby more than just the purchase price is included in the costs when assessing the tenders. The rules for the use of LCC are set out in article 68 of Directive 2014/24/EU²² on public procurement. Procurers have to indicate the data to be provided by the tenderers and the method which the contracting authority will use to determine the life-cycle costs on the basis of this data. It is necessary that the monetary value of the cost elements can be determined and verified.

With regards to the life cycle costs of the proposed criterion it is understood that given the large-scale uptake of ENERGY STAR there are unlikely to be any significant costs for either manufacturers or procuring authorities.

Procuring authorities are likely to save some costs through running more efficient imaging equipment. The running costs differences between products that meet ENERGY STAR requirements and those that do not are likely to be smaller than in the past. Reduced savings are expected as most imaging equipment models on the market already exhibit a good degree of energy efficiency (as witnessed by the high market coverage against the ENERGY STAR v2.0 specification).

2.2.2.2 Background for the proposed verification

The current ENERGY STAR specification for imaging equipment (v2.0) was implemented in the US and EU during 2014. Analysis conducted by the US EPA during 2016 suggests that 100% of imaging equipment on the US market in 2016 was compliant with the ENERGY STAR v2.0 specifications.²³ The US EPA is currently in the process of developing the ENERGY STAR v3.0 specification for imaging equipment with completion, and implementation, expected sometime in 2018.²⁴ When new ENERGY STAR specifications are developed they reflect the performance of the top 25% most efficient products in the ENERGY STAR dataset (i.e. the database of products that is used to inform the ENERGY STAR specification development process). The delay (N.B. varies between 3 months and 18 months) between development of new ENERGY STAR specifications and their implementation provides manufacturers with the opportunity to ensure that new products will meet the new ENERGY STAR specifications. Manufacturers are often quick to ensure new products meet ENERGY STAR specifications as compliance to ENERGY STAR specifications are mandatory requirements in US and was supported in the EU central government public procurement contracts in the past.^{25,26} The EU ENERGY STAR program followed an Agreement between the EU and the Government of the US to coordinate energy labelling of office equipment. It was managed by the European Commission and the Environmental Protection Agency (EPA). The EU-US agreement expired on 20 February 2018. Still, Energy Star is widely used by manufacturers. This widespread uptake ensures that there are sufficient products that meet new ENERGY STAR specifications available on the market.

Verifying whether products meet the energy efficiency and power management requirements of ENERGY STAR or Blue Angel is unlikely to cause complications due to extensive use of the ENERGY STAR test procedure by imaging equipment manufacturers. The test procedure used behind the ENERGY STAR specification is used within the latest Blue Angel specification as well as referred to in the Ecma-370 declaration²⁷.

²² Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC

²³ US EPA, 2017, ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2016 Summary, available from https://www.energystar.gov/ia/partners/downloads/unit_shipment_data/2016_USD_Summary_Report.pdf?3f38-d364

²⁴ US EPA, 2017, *Imaging Equipment Specification Version 3.0*, available from https://www.energystar.gov/products/spec/imaging_equipment_specification_version_3_0_pd

²⁵ US EPA, 2017, *What Energy Efficient Products Are Federal Agencies Required to Purchase?*, available from https://www.energystar.gov/index.cfm?c=fed_agencies.fed_ag_efficient

²⁶ European Commission, *EU ENERGY STAR: For public procurers*, available from <https://www.eu-energystar.org/publicprocurement.htm>

²⁷ For details on ECMA-370 declaration see: <https://www.ecma-international.org/publications/standards/Ecma-370.htm>.

2.2.3 Duplex imaging capability

For the first revision of this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS2 Duplex imaging capability Imaging equipment meets the automatic duplexing requirements laid down in the most recently implemented ENERGY STAR specification. Note: Applicable to imaging equipment covered by duplex imaging requirements in Energy Star. Verification: <i>The tenderer must provide documentation proving that the requirement is met. Equipment registered in the ENERGY STAR database or holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i> <i>A statement from the manufacturer demonstrating that these requirements have been met is also accepted.</i></p>	<p>TS2 Duplex imaging capability Imaging equipment that utilises thermal marking technologies must provide automatic duplexing functionality and it must be set as default in the original software provided by the manufacturer. Verification: <i>The tenderer must provide documentation proving that the requirement is met. Equipment registered in the ENERGY STAR database or holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i> <i>A statement from the manufacturer demonstrating that these requirements have been met is also accepted.</i></p>

2.2.3.1 Background for the proposed criteria

Use of paper is the most important hotspot throughout the life cycle of printers and MFDs. It has been since the development of the existing criteria, even after later developments with paper savings functionalities. Furthermore, this continues to be a hotspot considering printing on hard copy is not done up to the extent it was done 8-10 years ago when the background studies for the development of the existing criteria were done (see Preliminary Report, chapter 12).

The availability of duplex printing as an automatic function and as default setting in the software provided by the manufacturer has an impact on the user concerning use of paper as it directs them to use less. In reality this criterion would continue to secure the potential environmental savings already estimated for existing criteria and the evidence indicates this is still an important criterion which should not be removed.

Duplex functionality set as default is already part of the current EU GPP criteria. Duplex imaging capability is required though only for imaging equipment with monochrome printing/copying speeds which exceeded 25 images per minute (A4 size paper).

Majority of known environmental initiatives include requirements on duplex printing, as shown in Table 8.

Table 8.: Environmental Initiative Inclusion of Duplex Imaging Criteria

Environmental Impact Areas				Initiative				
Impact Area	Sub-Impact Area	ENERGY STAR v2.0	EU GPP Criteria	Ecodesign VA	Blue Angel	Nordic Swan	EPEAT/IEEE 1680.1	Korea Ecolabel
Paper Use	Automatic duplex	Yes	Yes	Yes	Yes	Yes	Yes	Yes

It is proposed that the revised **core criterion** should reflect the duplex requirements found in ENERGY STAR.

The ENERGY STAR specification states that imaging speed must be the highest speed as claimed by the manufacturer, expressed in images per minute (ipm) and rounded to the nearest integer, as follows:

- 1) In general, for Standard-size products, a single A4 or 8.5” × 11” sheet printed/copied/scanned on one side in one minute is equal to 1 (ipm).
 - a) When operating in duplex mode a single A4 or 8.5” × 11” sheet printed/copied/scanned on both sides in one minute is equal to 2 (ipm).
- 2) For all products, the product speed must be based on:
 - a) The highest manufacturer-claimed monochrome print speed, unless the product cannot print, in which case,
 - b) The highest manufacturer-claimed monochrome copy speed, unless the product cannot print or copy, in which case,
 - c) The manufacturer-claimed scan speed.
 - d) When a manufacturer intends to qualify a product in a certain market by making use of test results that qualified the product in another market using other sizes of paper (e.g., A4 versus 8.5” × 11”), and if its maximum claimed speeds differ when producing images on different sizes of paper, the highest speed must be used.

The requirements in the ENERGY STAR can be seen in Table 9.

Table 9.: ENERGY STAR v2.0 Duplex Imaging Requirements

Product Type:	Monochrome Product Speed (s) as Calculated in the Test Method (ipm)	Automatic Duplexing Requirement	Automatic Duplexing Optional Requirements
Colour TEC Copiers, MFDs, and Printers	$s \leq 19$	None	Additional software-supported option for duplex printing and copying.
	$19 < s < 35$	Integral to the base product or optional accessory	Duplex printing must be set as default
	$s \geq 35$	Integral to the base product	
Monochrome TEC Copiers, MFDs, and Printers	$s \leq 24$	None	
	$24 < s < 37$	Integral to the base product or optional accessory	
	$s \geq 37$	Integral to the base product	

The Blue Angel requirement matches that in ENERGY STAR but also includes requirements on duplex imaging needed to be set as a default option.

The proposal for the revised core criterion is slightly more stringent than the existing EU GPP criterion for some products but more lenient for others. That is, the current EU GPP criterion requires that all products with an imaging speed of at least 25 ipm must have automatic duplexing functionality. The revised proposed criterion requires that products with imaging speeds between 19 and 24 must offer automatic duplexing as an optional accessory. The core criterion does not impose extra burden to manufacturers and would continue securing the environmental and costs savings already identified for the existing criteria.

The proposal for **comprehensive criterion** includes a more ambitious requirement that all imaging equipment which uses thermal marking technologies needs to provide automatic duplexing functionality.

Market availability of compliant products is high given the large number of products registered with the ENERGY STAR. Market availability of products which are compliant with the **comprehensive** criterion is also high given that it is similar as in the Blue Angel and there is a high number of products registered under this scheme. In addition, the Voluntary Agreement (VA)²⁸ on imaging equipment includes similar requirements on duplex imaging.

With regards, life cycle costs implications addition of a duplexing unit will result in some extra product costs. These costs are likely to be offset by a reduction in paper usage, especially where installed in a high use imaging equipment model. The requirement for software supported duplex imaging is unlikely to add significant cost to either manufacturers or purchasing authorities.

The presence of duplex printing functionality in products will not result in any significant trade-offs with other impact areas. There is some potential for duplex printing to increase electricity consumption in products due to a more complicated paper path. Any extra electricity usage will be offset by the embodied energy savings resulting from reduced paper use.

2.2.3.2 Background for the proposed verification

Verification of whether a product supports duplexing functionality, and whether this functionality is set to default, can be achieved through reviewing suitable product technical documentation. Manufacturers include these declarations as part of their engagement with initiatives such as ENERGY STAR and via declarations such as the Ecma-370.

Questions to stakeholders
Do you agree with the proposal of the core and comprehensive criterion?

2.2.4 N-up printing

For the first revision of this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS3 N-up printing Imaging equipment must offer as a standard feature the capability to print 2 or more pages of a document on one sheet of paper when the product is managed by original software provided by the manufacturer (printer driver).</p> <p>Verification: <i>The tenderer must provide documentation stating that the requirement is met. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.</i></p>	

²⁸ See more details on Voluntary Agreement in: <http://www.eurovaprint.eu/pages/voluntary-agreement/>

2.2.4.1 Background for the proposed criteria

N-up printing (i.e. the ability to print multiple pages on a single sheet of paper) is already part of the existing EU GPP as criterion titled ‘Multiple images on single sheet of paper’ that requires all imaging equipment to offer capability to print and/or copy 2 or more pages of a document on one sheet of paper as a standard feature and thereby reducing the paper usage.

This criterion is related to the use of paper, which is the most important hotspot in the life cycle of printers. The availability of N-up printing as a standard feature can save considerable amounts of paper, although its use is generally reserved for draft copies of files or notes due to the reduction in size of each page on the sheet of paper and it does not have the same impact as the availability of duplex printing.

It is assumed that only a share of printouts would be for draft files or notes such as power point presentations, maps or internal notes, which would vary between one third and half of the printouts as a general assumption. Therefore, this criterion would continue to secure the potential environmental savings already estimated for existing criteria and it should not be removed.

Apart from the EU GPP criteria, this criterion is also found in the existing Voluntary Agreement of Imaging Equipment²⁹ and in the Blue Angel. The VA of imaging equipment includes a requirement that all products placed on the market after the 1st January 2012 should offer N-up functionality. This functionality is a widely applied metric in the EU not imposing extra burdens to the manufacturers. The respective requirements included in the EU Voluntary Agreement and in Blue Angel can be seen in Table 10 below.

Table 10.: N-Up Printing criteria in other initiatives

Environmental initiative	Criterion Text
EU Voluntary Agreement	<p><i>5.1 Availability of N-up printing</i> <i>All product models first placed on the EU market after 1 January 2012 must offer as a standard feature the capability to print several pages of a document on one sheet of paper, when the product is managed by original software provided by the manufacturer (printer driver). A model is considered Part II qualified when it meets all the requirements as detailed in section 5.</i></p>
Blue Angel	<p><i>1.4.3 Availability of N-up printing</i> <i>Devices must offer as a standard feature the capability to print several pages of a document on one sheet of paper. The required information on the availability of N-up printing and software settings must be contained in the information and data sheet.</i></p>

N-Up printing is a software-based application and so is supported in many common formats such as PDF.³⁰

Even though it is understood that majority of products is already compliant, it is considered reasonable to keep this criterion just as a safety net, due to the fact that if a product does not have this functionality typically it cannot be retrofitted. It requires an update of the printer software to include this feature. An alternative option is to install an add-on 3rd party software, however, this option may add complexity for the users.

²⁹ Industry voluntary agreement to improve the environmental performance of imaging equipment placed on European market, VA v.5.2, April 2015, <https://ec.europa.eu/energy/sites/ener/files/documents/VA%20Imaging%20Self-Regulatory%20Initiative-V-4-0.pdf>

Given the wide scale use of N-Up printing it was not necessary to derive a separate more ambitious comprehensive criterion. No changes are suggested to be introduced in the criterion text and its verification.

Questions to stakeholders

Are there any other paper management practices relevant, like printing on demand or print cancellation, which you consider important to be included in the revised criteria proposal?

2.2.5 Capability to use recycled paper

Existing criteria in force do not directly cover the capability to use recycled paper within imaging equipment.

For the coming AHWG meeting the following criterion is proposed for discussion:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
TS4 Capability to use recycled paper	
Imaging equipment must be capable of processing recycled paper that meets the quality requirements of EN 12281 ³¹ .	
Verification:	
<i>The tenderer must provide a declaration confirming or documentation proving that recycled paper meeting the requirements in EN 12281 can be used in the product. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.</i>	

2.2.5.1 Background for the proposed criteria

Recycled paper can have substantially lower environmental impacts than virgin paper^{32,33}, so the confirmed ability of the equipment to use recycled paper can bring significant reduction of impacts (e.g. at least 75% reductions of Global Warming Potential according to data sources) per ton of paper. Assuming recycled paper is used when printing internal notes or draft copies and that these represent about one third to a half of the printouts.

The availability of using recycled paper in imaging equipment products is found already in many devices on the market. Recycled paper, providing that it meets certain quality standards (e.g. in EN 12281), can deliver quality printouts which can be used, at least, for draft copies of files or notes which would reduce the use of paper. Capability to use recycled paper is a requirement already found in the Blue Angel, the EU Voluntary Agreement and EPEAT (See Table 11)

³¹ EN 12281:Printing and business paper for dry toner imaging processes

³² <https://www.nap.edu/read/5734/chapter/9#61>

³³ <http://www.planetexperts.com/recycled-beats-virgin-paper-environmental-impact-new-study-shows/>

Table 11.: Related criteria in other initiatives

Environmental initiative	Criterion Text
Voluntary agreement	<p>6.4 Information on Paper recyclability For new product models first placed on the EU market after 1 April 2015 Signatories must make available and provide to users information regarding recycled paper via website or other means. Example statements are listed below:</p> <ul style="list-style-type: none"> • Recycled paper promotes the circular economy with more recycling saving more natural resources. • The use of waste paper to produce recycled paper significantly reduces the amount of energy and water consumed compared to virgin fiber paper. In addition, the forest resources are conserved - an important contribution to biodiversity! Existing environmental savings can be enhanced in a simple and efficient manner. • Modern recycled paper meets the highest quality requirements for different printing processes - appropriate standards guarantee this. The imaging equipment supplied by the VA signatories is suitable for using with recycled paper meeting the EN 12281:2002 standard. • Regarding archiving - recycled paper meets all requirements for long-term storage. • The use of recycled paper is a visible and credible sign of ecological, resource efficient behavior.
Blue Angel	<p>3.1.4.1 Usability of recycled paper The devices must be capable of using recycled paper made of 100% post-consumer recycled paper that meets the requirements of EN 12281. The distributor is free to recommend certain types of recycled paper. The information and data sheet must include the following note: “This equipment is suitable for using recycled paper“. A reference to EN 12281 can be included.</p>
EPEAT	<p>4.9.1.1 Required—Allow use of general office paper with renewable content, recycled content, and that is chlorine free Product criterion: The product allows the use of general office paper with renewable content, and paper with pre/postconsumer recycled content, and paper that is chlorine free. Documentation that the product allows the use of these types of paper is readily available or has been provided to the purchaser. For example, documentation types may include the following:</p> <ol style="list-style-type: none"> a) An owner’s manual, set-up instructions, label or other information provided with the product, or b) Warranty and/or service contract provided with the product, or c) Information on the manufacturer’s Website, such as included in product specification or as a policy statement, etc. <p>The manufacturer may require that paper must meet standard paper quality requirements such as EN12281:2002.</p>

There are unlikely to be any life cycle costs implications because of products needing to accept good quality recycled paper. There may be some costs involved for manufacturers needing to test products to ensure that recycled paper can be used without impacting performance
 With the aim of harmonization across different environmental schemes, it is recommended to add a new technical specification to the existing EU GPP criteria to secure more environmental savings. No differentiation between core and comprehensive criteria are suggested.

2.2.5.2 Background for the proposed verification

The VA on imaging equipment and the Blue Angel specification include specific requirements that recycled paper meeting the EN 12281 standard can be used in products. Given the extensive coverage of the VA across imaging equipment on the EU market, no issues with market availability are foreseen.

Verification against this criterion can take the form of a manufacturer's declaration or technical dossier from the manufacturer proving that that recycled paper conforming to the EN 12281 standard can be used in their product.

2.2.6 Capability to use remanufactured cartridges

Existing EU GPP criteria in force includes a requirement regarding the capability to use remanufactured cartridges in imaging equipment. For the coming AHWG meeting discussions on this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
TS5 Capability to use remanufactured cartridges	
The products must accept remanufactured toner and/or ink cartridges. Devices and practices that would prevent use of remanufactured cartridge should not be present or applied.	
Verification:	
<i>The tenderer must provide a declaration confirming or documentation proving that remanufactured cartridges can be used in the product. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.</i>	

2.2.6.1 Background for the proposed criteria

This criterion addresses the area linked to use of remanufactured cartridges. Reuse of cartridges is resource efficient but can be also associated with economic benefits as the price of reused items is generally lower than the price of 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.

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

The reference point for this criterion is the existing requirement set in the EU GPP criteria for Imaging Equipment³⁴. Main outcomes of the consultation with manufacturers and ink or toners remanufacturers (questionnaire feedback) in the previous revision indicated that

- 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;

³⁴ Green Public Procurement for Imaging Equipment - Technical Background Report, JRC Scientific and Policy Reports, 2014, available online at: <http://ftp.jrc.es/EURdoc/JRC88789.pdf>, accessed August 2018.

- 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 2-3 times, and printing quality remains sufficiently good 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 cycles;
 - Some parts break down easier and 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.

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.

Technical analysis from the previous revision has been updated in the preliminary report and concluded that use of remanufactured cartridges should be promoted. Still it is important to mention that there are studies which provide evidence around the environmental benefits of using OEM vs remanufactured cartridges. The answer to which is the most environmentally preferable option is dependent on a set of variables such as:

- Final disposal route and end-of-life practices for cartridges/containers and their associated materials
- Reliability rates of the virgin and remanufactured cartridges
- The number of times a single cartridge/container can be remanufactured
- The number of cartridge/container parts that need to be changed during remanufacture
- The quality of cartridges and related printouts
- Other remanufacturing process impacts

What is clear from the studies is that cartridge/container remanufacturing can, under certain circumstances, result in lower overall environmental impacts.^{35,36,37}

³⁵ Four Elements Consulting, 2011, *Life Cycle Environmental Impact Study HP LaserJet Toner Cartridges vs. Remanufactured Cartridges in North America SUMMARY REPORT*, available from <http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/LJ-LCA-NA.pdf>

³⁶ First Environment, 2004, *LaserJet Cartridge Environmental Comparison: A Life Cycle Study of the HP 96A Print Cartridge vs. its Remanufactured Counterpart in North America*, available from <http://www.etira.org/images/content/HPFirstEnvironmentreport%20Sept%202004.pdf>

³⁷ Berglind et al, 2002, *Life Cycle Assessment of Toner Cartridge HP C4127X Environmental impact from a toner cartridge according to different recycling alternatives*, available from <http://www.etira.org/wp-content/uploads/2013/07/LCA-Kalmar-Univ.pdf>

A Commission funded project into the consumable market has estimated that increasing consumable remanufacturing rates to 75% (from a current estimate of 25%) would result in an annual CO₂ impact reduction of around 4 kt per year.³⁸

There are a significant number of market implications surrounding the remanufacturing of consumables. The previously-mentioned study investigated in detail the consumable reuse/remanufacturing market in Europe. Original Equipment Manufacturer (OEM) suppliers dominate the consumables market with an estimated 18% of inkjet and 25% of laser consumables being collected for remanufacturing. Most remanufacturing organisations are EU based SME's which typically sell remanufactured consumables for significantly less than the originals.

Against this background, existing requirement is proposed to be kept. Freedom given to the designer on how to achieve this goal is considered of importance as no eco-innovation shall be hampered.

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³⁸ *European Commission, 2017, Study on the implementation of product design requirements set out in Article 4 of the WEEE Directive The case of re-usability of printer cartridges. Final report*

2.2.6.2 Background for the proposed verification

Verification against this criterion can take the form of a manufacturer's declaration or technical dossier from the manufacturer proving that that remanufactured cartridges can be used in their product.

2.2.7 Reduced number of materials

Existing EU GPP criteria in force do not address the number of materials used in imaging equipment. For the coming AHWG meeting discussions on this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
-	<p>TS6 Reduced number of materials</p> <p>Imaging equipment must be designed to reduce the number of materials through the following features:</p> <ul style="list-style-type: none"> - parts with a mass greater than 100 grams consist of one single polymer or a polymer blend. <p>all plastic casing parts only consist of up to four separable polymers or polymer blends.</p> <p>Verification: <i>The tenderer must provide a product schematic illustrating the applicable plastic parts and the type of polymer used.</i> <i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>

2.2.7.1 Background for the proposed criteria

Plastic parts constitute an important share of the volume and weight of imaging equipment products. Increasing the share of these parts sent for recycling would bring environmental benefits, especially for devices with large plastic parts. When more polymer blends are used, it becomes more difficult to recycle them as the melting and granulation processes cannot deliver the purity that the pellet needs so it can be reused again for injection moulding and other types of plastic processing. Generally, as more 'pure' the plastics are, the easier is to recycle them (e.g. HDPE, PET, PC), excluding those with flame retardants and other chemicals such as galvanizers which also hinder the recycling process³⁹. However, it is important to notice that the embodied environmental impacts of plastics are generally much lower (except for some high-end plastics) than those of metals, in particular aluminium, steel and copper. Though, the levels of recovery and recyclability of the latter are already very high.

Requirements which focus on reducing the number of materials in products could, potentially, result in earlier product failures. This situation could arise where less durable materials are not used for key components in order that the total material count is minimised. The use of corresponding warranty requirements within tenders would likely minimise any potential negative impacts.

Existing EU GPP criteria in force do not address the number of materials used in imaging equipment. However requirements on reduced number of materials are found in Blue Angel,

³⁹ http://plasticsrecycling.org/images/pdf/design-guide/Full_APR_Design_Guide.pdf

EPEAT, the EU Voluntary Agreement, Nordic Swan and the Korean Ecolabel. The Blue Angel eco-label promotes products with limited number of materials used for plastic components for similar function. The EPEAT initiative includes a requirement on the use of single recyclable plastic type per plastic parts heavier than 100 g. The EuroVAPrint Voluntary Agreement on imaging equipment includes criteria limiting the polymers used in plastic casing parts with a mass greater than 100 grams. There are two additional criteria within the same section of the VA. The first deals with the reuse of recovered plastics in the production of new products. This criterion was not adopted due to difficulties in verifying whether plastics have indeed been reused in alternative products. The second one deals with reduction in coatings that impact recyclability. This requirement is dealt with in criterion 1.6 - Design for disassembly/recyclability. Detailed formulation of the requirements can be found in the following table:

Table 12.: Reduced numbers of materials criteria in other initiatives

Environmental initiative	Criterion Text
Blue Angel	<p>3.1.1.2 Requirements concerning a material selection for recyclability Is the variety of materials used for plastic components of similar function limited to one material? Applies to: Casing parts, chassis Mechanical parts ($\geq 25g$) The smaller the variety of materials, the more efficient the separation and recycling processes are. This requirement does not apply to parts that are demonstrably reused according to para. 3.1.1.4.</p>
EPEAT	<p>4.3.2.1 Required—Use of single recyclable plastic type per plastic part Each plastic part >100 g must consist of only one recyclable plastic type. Printed circuit boards, labels, cables, connectors, electronic components, optical components, ESD components, EMI components, and hoses/tubes for transporting fluid within the unit are excluded from this requirement.</p>
EU Voluntary Agreement	<p>5.3 Polymer composition For all new TEC product models first placed on the EU market after 1 January 2015: In order to limit the variety of materials used, plastic casing parts with a mass greater than 100 grams have to consist of one single polymer or a polymer blend. All plastic casing parts may only consist of up to four separable polymers or polymer blends. Large-sized casing parts must be designed in a way that the contained plastics can be used for the production of high-quality durable products by applying available recycling techniques. The use of coatings for special parts is to be reduced to a minimum, unless it can be demonstrated that it does not alter recyclability. Galvanic coatings on plastic parts are not permissible.</p>

Against this background, it is proposed to include a new technical specification in the revised EU GPP based on the VA requirements. Only comprehensive criterion is proposed for discussion. Due to the very high percentage of imaging equipment models which are compliant with VA on imaging equipment (the majority of all imaging equipment sold in the EU is compliant with the VA requirements⁵³), no negative or positive life cycle cost implications are expected.

2.2.7.2 Background for the proposed verification

As mentioned above, the proposed criterion links closely the VA requirement. Signatories to the VA account for 96% of all imaging equipment sold in the European Union, and over 90% of signatories' products are compliant with the VA requirements. As such, no market availability issues are expected as a result of using the proposed "reduced number of materials" criterion in public procurement contracts.

Verification against this criterion can take the form of a product schematic showing that products are compliant. Compliance with an environmental initiative which also covers the same reduced number of materials requirements.

Questions to stakeholders

Are you aware of any examples of best practices regarding reduction of number of materials used to support design for recyclability, which could help shaping proposal for comprehensive criterion?

2.2.8 Postconsumer recycled plastic

Existing EU GPP criteria in force do not include requirements on postconsumer recycled plastic content. For the coming AHWG meeting discussions on this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
	<p>TS7 Information on postconsumer recycled plastic used</p> <p>The percentage of postconsumer recycled plastic content, calculated as a percentage of total plastic (by weight) must be declared. The percentages must be provided in increments of $x \leq 5\%$, $5\% \leq x < 10\%$, $10\% \leq x < 15\%$, $x \geq 15\%$</p> <p>Verification: <i>The tenderer must provide documentation, which specifies the percentage of postconsumer plastic used within the imaging equipment model(s). Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same product design features or other alternative means of proof detailing postconsumer recycled plastic content</i></p> <p><i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>
AWARD CRITERIA	
	<p>AC2 Postconsumer recycled plastic minimum content</p> <p>Points will be awarded according to the content of postconsumer recycled plastic as a percentage of total plastic (by weight). A maximum of x points [to be specified] may be awarded. Points must be awarded in proportion to the postconsumer recycled</p>

	<p>plastic content:</p> <ul style="list-style-type: none"> <input type="checkbox"/> $\geq 25\%$: x points <input type="checkbox"/> <25 and $\geq 20\%$: 0.8x points <input type="checkbox"/> <20 and $\geq 15\%$: 0.6x points <input type="checkbox"/> <15 and $\geq 10\%$: 0.4x points <input type="checkbox"/> $<10\%$: 0.2x points <p>Verification: <i>The tenderer must provide documentation, which specifies the percentage of postconsumer plastic used within the imaging equipment model(s). Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same product design features or other alternative means of proof detailing postconsumer recycled plastic content. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>
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2.2.8.1 Background for the proposed criteria

Manufacturing is the fourth most important environmental hotspot in the life cycle of imaging equipment products. For more energy efficient product where the energy consumption is no longer the most important hotspot, manufacturing has become even more important. This trend will continue in the future, as more devices become more efficient.

One of the sources of impacts is the materials used in imaging equipment products. Because of the complexity of designs, in particular of MFDs and in some printers, the number, type and quantity of materials contained in imaging equipment products vary considerably due to the broad scope of this product group. However, most material volume consists of common plastics (e.g. PS (HI-PS), ABS, PC) and metals (steel, copper, aluminium). In spite of their high embodied impact, steel and aluminium are nowadays highly recyclable^{40,41} but plastics are not. Therefore, it is considered important to address this source of impacts by proposing a criterion to incentivize the use of recycled plastics.

The use of post-consumer recycled plastic in products can result in trade-offs with hazardous material content. This trade-off can occur where manufacturers face difficulties sourcing post-consumer plastics which do not meet hazardous material content requirements. The likelihood of this trade-off occurring reduces as the restrictions on hazardous material content increase in ambition and lifetime.

The declaration of recycled plastics content in imaging equipment products is a criterion/requirement found in Blue Angel, EPEAT, the EU Voluntary Agreement and the Nordic Swan. Due to the great market penetration of Blue Angel and EPEAT in public procurement, this metric is considered widely applied and possible to add to the existing EU GPP criteria. The relevant criteria from EPEAT and Blue Angel are listed in the tables below.

⁴⁰ http://www.world-aluminium.org/media/filer_public/2013/01/15/fl0000181.pdf

⁴¹ <http://www.eurofer.org/Sustainable%20Steel/Steel%20Recycling.fhtml>

Table 13.: Postconsumer recycled plastic criterion in other initiatives

Environmental initiative	Criterion Text
Voluntary agreement	<p>5.5 Recycled plastic content For all new product models first placed on the EU market after 1 January 2015 signatories must make information available to customers on the minimum percentage of postconsumer recycled plastic content*, calculated as a percentage of total plastic (by weight) in each product. * In increments of 0-5%, 5-10%, 10-15%, etc. The following may be excluded from the calculation of the percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and biobased plastic material. Products that do not contain plastics can declare “Not applicable” for this criterion.</p>
Blue Angel	<p>3.1.1.2 Requirements concerning a material selection for recyclability (10) Is the share of post-consumer recycled plastics stated in the information and data sheet, calculated as percentage of total plastic (by weight) and indicated in intervals of 0-1%, 1-5%, 5-10%, 10-15%, 15-20%, and so on (in 5% intervals)? Explanation: The following parts may be excluded from the calculation of the recycle share: printed circuit boards, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and biobased plastic material.</p>
EPEAT	<p>4.2.1.1 Required—Declaration of postconsumer recycled plastic content Product criterion: Manufacturer declares minimum percentage of postconsumer recycled plastic content, calculated as a percentage of total plastic (by weight) in each product. The following may be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and bio based plastic material.</p>

The percentage of post-consumer recycled plastic in products is declared under all above-mentioned initiatives. Whilst EPEAT requires that exact percentages of post-consumer recycled plastic are provided, the BLUE Angel initiative requires that declarations are provided in incremental values.

The results of questioning the EPEAT database around these criteria can be seen in Table 14.

Table 14.: Compliance Rates to EPEAT Postconsumer Recycled Plastic Criteria

EPEAT Criterion	Products Compliant (No.)	Products Compliant (%)	Max Value	Min Value
4.2.1.1 - Declaration of postconsumer recycled plastic content	1832	100.0%	N/A	N/A
4.2.1.1 - Declaration of postconsumer recycled plastic content (%)	1832	100.0%	53.6%	0.0%
4.2.1.2 - Minimum content of postconsumer recycled plastic *	1798	98.1%	N/A	N/A
4.2.1.3 - Minimum 5% to 10% content of postconsumer recycled plastic	220	12.0%	N/A	N/A
4.2.1.4 - Minimum 25% content of postconsumer recycled plastic	26	1.4%	N/A	N/A
* Any product containing plastic parts whose combined weight exceeds 100 g must contain at least 5g of postconsumer recycled plastic.				

The results from the EPEAT database show that 98.1% of products registered with EPEAT contain at least 5% postconsumer plastic in parts over 100 g. Fewer products meet the EPEAT criterion 4.2.1.3 criterion which requires that products containing less than 5kg of plastic contain, on average, a minimum of 10% postconsumer recycled plastic and products with more than 5 kg of plastic must contain a minimum of 5% postconsumer recycled plastic. The EPEAT results also show that manufacturers are readily communicating information about the postconsumer recycled content in imaging equipment.

Whilst it is clear that manufacturers are able to source some postconsumer recycled plastic for use in imaging equipment it is unclear if this results in additional costs. However, given that 98.1% of imaging equipment models registered with the EPEAT scheme contain at least some postconsumer recycled plastic it is assumed that any increases in costs are not significant.

The VA on imaging equipment includes a criterion requiring manufacturers to report on the amount of postconsumer recycled plastic in new products. The inclusion of this requirement in the VA suggests that communication of postconsumer recycled plastic information in imaging equipment is commonplace within the EU market.

Against this background it is proposed to include a new comprehensive criterion aligned to Blue Angel in the revised EU GPP criterion. This is due to evidence, from an assessment of the EPEAT database⁴², suggesting that less than 20% of products on the market contain more than 5% postconsumer recycled plastic.

2.2.8.2 Background for the proposed verification

Verification against this criterion can take the form of a manufacturer declaration which specifies the percentage of postconsumer plastic used within the imaging equipment model(s). Blue Angel and EPEAT awards can be used to assist with verification.

⁴² EPEAT, Product Search, available from <https://ww2.epeat.net/publicsearch.aspx?stdid=0&epeatcountryid=0>

Questions to stakeholders

Could you provide input how to verify compliance with this criterion in most credible and still workable way?
 Are you aware of any examples of best practices regarding use of recycled plastics, which could be shared with the project team?

2.2.9 Reparability and recyclability

For the coming AHWG meeting discussions on this criteria area the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS8 (a) Spare parts availability Spare parts listed below must be available for the imaging equipment for the minimum time periods after the end of product manufacturing: For Electrophotography, Solid Ink and High-Performance Inkjet models - 5 years For Inkjet models - 3 years <u>Spare parts:</u></p> <ul style="list-style-type: none"> • Storage devices • Scanning units • Print heads (where not considered a consumable) • Laser unit (where not considered a consumable) • Fuser units (where not considered a consumable) • Drum units (where not considered a consumable) • Transfer belts/kits (where not considered a consumable) • Maintenance kits (where not considered a consumable) • Paper feed components • Density sensors • Power and control circuit boards • Cartridge/container attachment components • External power supplies • Hinges <p>Verification: <i>The tenderer must provide documentation, which clarifies that spare parts will be available for the durations listed in the</i></p>	<p>TS8 (a) Spare parts availability Spare parts listed below must be available for the imaging equipment for the minimum time periods after the end of product manufacturing: For Electrophotography, Solid Ink and High-Performance Inkjet models - 5 years For Inkjet models – 5 years <u>Spare parts:</u></p> <ul style="list-style-type: none"> • Storage devices • Scanning units • Print heads (where not considered a consumable) • Laser unit (where not considered a consumable) • Fuser units (where not considered a consumable) • Drum units (where not considered a consumable) • Transfer belts/kits (where not considered a consumable) • Maintenance kits (where not considered a consumable) • Paper feed components • Density sensors • Power and control circuit boards • Cartridge/container attachment components • External power supplies • Hinges <p>Verification: <i>The tenderer must provide documentation, which clarifies that spare parts will be available for the durations listed in the</i></p>

<i>criteria. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i>	<i>criteria. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i>
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TS8 (b) Design for disassembly and repair

- Materials and components requiring special handling as defined under ANNEX VII of DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE) must be easy to find and remove using universally available tools (e.g. openly available screw heads, pliers or tweezers)
- Plastic parts >100 g must be manually separable, where necessary allowing the use of universally available tools (e.g. openly available screw heads, pliers or tweezers), into recyclable plastic streams
- Products must utilize commonly used fasteners for joining components, subassemblies, chassis and enclosures.
- All listed spare parts in TS7 (a), if applicable, must be accessible and replaceable through the use of universally available tools (e.g. openly available screw head fittings, pliers or tweezers).
- Product must be accompanied by a repair manual with good quality information to support repair operations.

Verification:

The tenderer must provide a manual, which must include an exploded diagram of the product illustrating the parts that can be accessed and replaced, the tools required and how the repair process should be conducted. It must also be confirmed which parts are covered by service agreements under the warranty.

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

TS8 (c) Design for recycling

Imaging equipment must be designed to facilitate recycling through the following design features:

- Plastic components weighing more than 25 g must be provided with a permanent marking of the material in accordance with ISO 11469 or equivalent standard
- The presence of paints and coatings must not significantly impact upon the resilience of plastic recycle produced from these components upon recycling and when tested according to ISO 180⁴³ or equivalent.
- Galvanic coatings on plastic parts are not used

Verification:

The tenderer must provide documentation, which proves that each of the design for disassembly requirements have been met. This must include:

- *Identification of the plastic parts by their weight, their polymer composition, and their ISO 11469 markings. The dimension and position of the marking must be visually illustrated.*
- *Valid mechanical/physical test reports carried out according to ISO 180 or equivalent. Third party test reports obtained from plastics recyclers, resin manufacturers or independent pilot tests must be accepted.*
- *Manufacturer declaration or applicable test report proving that galvanic coating have not been used on plastic parts*

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

⁴³ 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.

Core criteria	Comprehensive criteria
AWARD CRITERIA	
<p>AC3 Cost competitiveness of spare parts</p> <p>The tenderer must provide a price list for, as a minimum, the following component parts: [the parts list to be provided here, with the TS7(a) list to be provided as a minimum] (Additional component parts, if considered important to the price comparison, should be added to the list provided).</p> <p>For the component parts listed above indicative labour costs for replacements carried out by the tenderer's authorised service providers must be provided.</p> <p>The tenderer should also identify the length of time for which given cost data is valid.</p> <p>Points must be awarded according to the most cost-competitive offers.</p> <p>Verification:</p> <p><i>The tenderer must provide a price list for original or compatible spare parts and indicative labour costs for their replacement, as well as indications about how long prices will remain valid.</i></p>	

2.2.9.1 Background for the proposed criteria

Spare parts mean components/parts that have the potential to fail during the normal useful life of the product. In addition, design to access to spare parts influences indirectly product durability as it incentivizes the repair rather than disposal. Short product lifetime does not seem to be recurrent in office imaging equipment product nowadays, where modular designs are available for many of the larger MFDs making repair more accessible. This is not the case for smaller devices, which are still in use by many small offices with small groups of staff.

In addition, design targeted at easy disassembly/dismantling is one of the crucial legislative features^{44,45} for enhancing recycling of products at their end of life. However, materials must also be easily identified so that they can be sorted more easily according to the type to be recovered. If imaging equipment products are sorted out properly, more of their parts containing highly valued materials can be recovered and sent for recycling. This also avoids the mixing with other products and materials which hinders recycling.

Therefore spare parts availability, design for easy access (spare parts accessibility in the product) and design to facilitate recycling are critical aspects for maintaining the product lifetime and ensure recycling of products at their end of life.

Spare parts availability:

Even though the manufacturing of spare parts implies also environmental burdens from the use of new resources and manufacturing and transport processes, their provision will avoid a premature disposal of the products which will imply a whole new purchase, creating a much larger environmental impact. Generally, the provision of spare parts contributes to reducing the impacts from manufacturing of new products, which is one of the hotspots of imaging equipment products.

The availability of spare parts as a requirement/criterion is found in Blue Angel, EPEAT, the EU Voluntary Agreement and Nordic Swan. The main criteria used to inform the development of the EU GPP criterion can be seen in the tables below.

⁴⁴ <http://www.europarl.europa.eu/legislative-train/theme-new-boost-for-jobs-growth-and-investment/file-ecodesign-for-circular-economy>

⁴⁵ http://ec.europa.eu/environment/circular-economy/implementation_report.pdf

Table 15.: Spare parts criterion in other initiatives

Environmental initiative	Criterion Text
Blue Angel	<p>3.1.5.3 Repair options</p> <p>The distributor commits to ensure that the spare parts and exchange parts needed for repair of the devices and the according infrastructure are available for at least 5 years after ceasing production and that the user is informed about this availability of spare parts. Other parts the life span of which usually exceeds the typical life span of the product do not have to be held available as spare parts.</p> <p>The distributor commits to provide easily accessible repair options for the device to the users. Such repair options may consist in a delivery to the service centre of the manufacturer by means of licensed dealers or logistical solutions (package services) offered to the customer, or that dealers and repair centres independent from the manufacturer have access to spare parts and repair information.</p> <p>Spare parts are components or assemblies that can potentially fail within the service life of the products. This includes e.g. hinges of casing parts, paper trays etc. as well as cable connections and electronic components which might be damaged by overheating.</p>
EPEAT	<p>4.4.3.1 Required—Spare parts</p> <p>Manufacturer must declare if spare parts are available, and if available, the length of time that spare parts are available after the end of production. The following information must be provided to purchasers:</p> <p>a) If spare parts are available, and if available the length of time that they are planned to be available after the end of production.</p> <p>b) If spare parts are available, how to obtain spare parts (or, at the manufacturer’s option, compatible spare parts from a different supplier).</p> <p>Spare parts: A component of a product that is kept in reserve for possible use to replace a similar or identical component in the product.</p>
EU Voluntary Agreement	<p>6.2 Availability of spare parts</p> <p>For new product models first placed on the EU market after 1 January 2015, Signatories must make available spare parts for the minimum time periods after the end of product manufacturing:</p> <ul style="list-style-type: none"> • For Electrophotography, Solid Ink and High Performance Inkjet models - 5 years • For Inkjet models - 3 years <p>Making spare parts available must only involve offering spare parts for sale through their usual spare part distribution channels and must not require Signatories to trade directly with Customers or users.</p> <p>In this section, “spare parts” means those parts which it is reasonably anticipated by the manufacturer of a model as being likely to fail during the typical use of the product. In contrast, those parts whose life cycle usually exceeds the usual life of the product do not have to be made available as spare parts.</p>

EPEAT requires that manufacturers declare the length of time that spare parts are available after the end of production. While the Blue Angel initiative includes a requirement that spare parts should be available for at least 5 years after the end of production. EPEAT defines spare parts as parts that typically have the potential to fail during the normal use of the product. Blue Angel also defines spare parts components or assemblies that can potentially fail within the service life

of the products but also provides a small list of examples including hinges of casing parts, paper trays, cable connections and electronic components which might be damaged by over-heating. Spare parts availability for a period of two years is covered by the EU legal warranty mentioned in the previous criterion. However, a 2-year period is still much shorter than the products lifetime of 6 years for laser printers and MFDs and 4 years for inkjet printers and MFDs and scanners. Therefore, this criterion is proposed to be extended to assure provision of spare parts for a longer share of the time the product is providing a service. The criterion is considered to be widely applied, and due to its importance, it is recommended to add it to the existing EU GPP criteria.

Spare parts availability is a common requirement in many of the established environmental initiatives dealing with imaging equipment and thus spare parts are likely to be widely available for these product types. Despite the large compliance rates, stocking of spare parts does result in additional costs for manufacturers, especially in terms of storage. However, given the fact that the spare parts are already widely available it is not expected that the proposed EU GPP criteria would cause any additional life cycle cost implications.

The current EU GPP criteria include a requirement that spare parts are available for all imaging equipment for a period of 5 years. Given the relatively short average lifespan of inkjet products the 5-year period was deemed a little too restrictive for a core criterion. The comprehensive criterion maintains the 5-year spare parts availability period for all types of imaging equipment in scope of the EU GPP specification. A number of components that are deemed as applicable spare parts has been listed to add clarity. Applicable spare parts were defined as parts which were deemed to be at risk of failure during normal operation of imaging equipment over the expected lifetime. In addition, an award criterion has been added to reward the supplier(s) which offer the most cost-competitive spare parts service.

Design for disassembly and repair:

Access to spare parts is important as some of those tend to fail and need replacement to prevent disposal of the device because of failure. Spare parts that are important to replace are storage devices and storage units which cause product fail if not repaired.

The inclusion of design features to facilitate reparability could potentially have some impact on the durability of products. That is, if parts are easily replaced there may be less incentive on the manufacturers to ensure that parts are durable. The extent of this potential impact would be curtailed through longer warranty periods which place the financial burden for reparability on the manufacturer not the user. In addition, design targeted at easy disassembly/dismantling is crucial for enhancing recycling of products at their end of life. By making the access of these parts available by using universally available tools, materials can be better recovered. Since the housing of imaging equipment products is typically made of plastics, it is important they are easily removed to recover important parts. Marking of plastic parts is also important to enhance the recycling of plastics so plastics are not mixed before treatment. Finally, availability of high quality repair manual is crucial for the support of successful repair operation.

Blue Angel, EPEAT, the EU Voluntary Agreement, Nordic Swan and the Korean Ecolabel include criteria on design for disassembly. However, only Blue Angel and EPEAT include extensive requirements in this area.

The Blue Angel specification includes a broad range of requirements in sections “3.1.1.1 Design for disassembly requirements” and “3.1.1.2 Requirements concerning material selection for recyclability”.

Table 16.: Blue Angel RAL 205-1701 v1.0 requirements on design for disassembly⁴⁶

No.	Requirement	Applies to Assembly	Must/Should Requirement
1	Are assemblies made of mutually incompatible materials separable or connected by separation aids?	Casing parts, chassis, electric/electronic assemblies, modules for colourants	Must
2	Are electric/electronic assemblies easy to find and to remove?	Entire unit, including lamps	Must
3	Are detachable connections easy to find?	Casing parts, chassis, modules for colourants	Should
4	Can disassembly be done exclusively with general-purpose tools?	Casing, chassis, electric/electronic assemblies	Must
5	Have the points of application and the work space required for disassembly tools been considered?	Casing parts, chassis, electric/electronic assemblies	Must
6	Are all connecting elements that have to be dismantled for recycling axially accessible?	Casing parts, chassis, electric/electronic assemblies	Should
7	Can screw connections for fastening assemblies be tightened with no more than three tools?	Casing parts, chassis, electric/electronic assemblies	Must
8	Are detachable connections of plastic components at least half click/snap-on connections?	Casing parts	Should
9	Can the disassembly be performed by one person?	Entire unit	Must
10	Can the supporting surface be maintained during the entire disassembly process?	Unit to be handled	Should
11	Are casing parts free of electronic assemblies?	Casing parts	Must
12	Has the manufacturer carried out a trial disassembly (e.g. in accordance with no.1-11) and recorded it with focus on weak spots?	Entire unit	Must

Most of the Blue Angel criteria in this area are marked as “must” criteria meaning that products have to comply with in order to be awarded the Blue Angel label

⁴⁶ Criteria can be downloaded at: <https://www.blauer-engel.de/en/products/electric-devices/drucker-und-multifunktionsgeraete>

Against this background it is proposed to add a new technical specification on design for disassembly focused on accessibility and easy separation of spare parts/components in order to facilitate reparability and recyclability at the end of life. The criterion has been inspired by the EU GPP for computers and Blue Angel/EPEAT criteria. However, some of the Blue Angel “must” criteria are not used in the proposed EU GPP criterion in order to allow the use of other initiatives such as EPEAT during verification. That is, EPEAT does not contain all of the same requirements as Blue Angel and usage of all Blue Angel criteria would result in that initiative being the sole source of verification data.

Given that large numbers of products in the marketplace include design features which facilitate disassembly it is estimated that there would not be any additional costs associated with meeting the design for reparability criteria. That is, manufacturers have already taken steps to include reparability features into products and therefore already absorbed the costs for these changes to the product design. It is not expected that the design features would continue to add extra costs to the product as they only dictate fastening types. As such, the EU GPP criteria will have little, if any, impact on product price in respect of reparability design features.

Design for recycling:

Materials must also be easily identified so that they can be sorted more easily according to the type to be recovered. If imaging equipment products are sorted out properly, more of their parts containing highly valued materials can be recovered and sent for recycling. This also avoids the mixing with other products and materials which hinders recycling.

The Blue Angel eco-label also includes restrictions on the use of coating which are incompatible with recycling in addition to a ban on the use of galvanic coatings (requirement 3 in Table 17). Compliance with the Blue Angel specification would result in the proposed GPP criterion being met.

EPEAT also includes a broad range of criteria in this area under the section “4.3 Design for end of life”⁴⁷. EPEAT also includes restrictions on coatings that negatively impact recyclability of materials.

⁴⁷ <https://www.epeat.net/resources/criteria-2/#tabs-1=imagingequipment>

Table 17.: Blue Angel RAL 205-1701 v1.0 requirements on material selection for recyclability

No.	Requirement	Applies to Assembly	Must/Should Requirement
1	Is the variety of materials used for plastic components of similar function limited to one material?	Casing parts, chassis Mechanical parts (≥ 25g)	Must
2	Are components that are made of the same plastic dyed uniformly or compatibly?	Casing parts, modules for colourants	Should
3	Has the coating of plastic components been limited to a minimum? Have no galvanic coatings been used?	Casing parts, modules for colourants	Must
4	Are recyclable materials and material composites used?	Casing parts, chassis, modules for colourants	Must
5	Is the partial use of post-consumer recycled plastics permitted?	Casing parts, chassis, modules for colourants	Must
6	Does the share of post-consumer recycled plastics amount to at least 5% of the complete plastic material?	Casing parts, casings of modules for colourants	Should
7	Are assemblies and materials easy to dismantle according to Appendix 4 of the Electrical and Electronic Equipment Act (ElektroG)?	Entire unit	Must
8	Have materials been selected in accordance with no.1-5 and has this been documented in writing?	Casing parts, chassis, modules for colourants	Must
9	Are plastic parts >25 g with a flat surface of at least 200 mm ² marked in accordance with EN/ISO 11469 considering ISO 1043?	Entire unit (exempted are plastic parts contained in reused complex assemblies)	Must
10	Is the share of post-consumer recycled plastics stated in the information and data sheet, calculated as percentage of total plastic (by weight) and indicated in intervals of 0-1%, 1-5%, 5-10%, 10-15%, 15-20%, and so on (in 5% intervals)?	All assemblies	Must

It is suggested to include a new technical specification in the revised GPP. These requirements were used as the main point of reference to develop the proposed GPP criteria. They have been reformulated from questions to requirements, selecting only the most relevant requirements which are common across Blue Angel and EPEAT. Common criteria were chosen to ensure that the EU GPP criteria could be more readily verified.

Due to high market penetration of these schemes in procurement, it is assumed this criterion will not create extra burdens on the market and would create harmonization amongst EU GPP and the rest of the schemes. It is therefore proposed to add a criterion on design for disassembly to the revised EU GPP. This criterion will provide a valuable addition for increasing the recycling of imaging equipment products. A separate comprehensive criterion is not proposed at this stage for this impact area due to uncertainties over market penetration levels against more ambitious requirements, could however be developed after the 1st Ad-hoc Working Group meeting.

Large numbers of products in the marketplace include design features which facilitate disassembly. As these design features are already required under a wide range of environmental initiatives, manufacturers have already invested in changing their product designs. New products would need to include similar design features, but these would still need to be made to satisfy the requirements within a range of environmental initiatives. Some additional financial costs may be incurred through ensuring that products are compliant with the requirements. As such, it is not expected that additional costs will be placed on either manufacturers or purchasers as a result of including this criterion within the GPP specification.

2.2.9.2 Background for the proposed verification

For criterion 7 (a) suppliers can prove compliance against this criterion through documentation which details spare part availability, and any associated conditions, for each model of imaging equipment included in a proposal. For the award criterion the manufacturer must provide a price list and indicative costs for labour replacement.

Verification against this criterion 7(b) and 7(c) can be conducted through the provision of documentation showing that products are compliant with an environmental initiative which covers the same design for disassembly/recycling attributes. Manufacturers could also provide other third-party evidence showing that they meet the applicable requirements and applicable standards such as ISO 11469⁴⁸. In addition, manufacturers can provide other appropriate means of proof such as a technical dossier or product schematic where no access to certificates or test reports is possible. Any such alternative means of verification must prove that the products meet the criterion.

Given the large number of imaging equipment models that are registered with Blue Angel and EPEAT there are no market availability issues foreseen as a result of including design for disassembly criteria within the EU GPP specification.

Questions to stakeholders

Do you agree with the proposed list of spare parts and the length of period for which they should be made available?

Are you aware of any examples of best practices regarding design for disassembly in relation to access to spare parts, which could help shaping proposal for comprehensive criterion?

Are you aware of any examples of best practices regarding design for recyclability, which could be shared with the project team?

⁴⁸ ISO 11469 Plastics – Generic identification and marking of plastics products

2.2.10 Substance emissions

The existing EU GPP specification does not include any requirements on substance emissions from imaging equipment.

For the coming AHWG meeting discussions on this criterion the following is proposed:

First criteria proposal			
Core criteria		Comprehensive criteria	
TECHNICAL SPECIFICATIONS			
<p>TS9 Substance emissions Imaging equipment must meet the following substance emission rate requirements when measured according to the test procedure detailed in the Blue Angel specification RAL-UZ 205 (Edition January 2017 (Printers and Multifunction Devices)) or an equivalent test procedure:</p>		<p>TS9 Substance emissions Imaging equipment must meet the following substance emission rate requirements when measured according to the test procedure detailed in the Blue Angel specification RAL-UZ 205 (Edition January 2017 (Printers and Multifunction Devices)) or an equivalent test procedure:</p>	
<p>Permissible Test Values for Emission Rates as determined according to Appendix S-M for Electrophotographic Devices</p>		<p>Permissible Test Values for Emission Rates as determined according to Appendix S-M for Electrophotographic Devices</p>	
(All Values in mg/h, Except for Particle Emissions)		Monochrome Printing	Colour Printing
Pre-operating Phase	TVOC*	1 (Desktop Devices)	1 (Desktop Devices)
		2 (Floor-mounted Devices, Device Volume > 250 l)	2 (Floor-mounted Devices, Device Volume > 250 l)
Print Phase	TVOC*	10.0	18.0
	Benzene	< 0.05	< 0.05
	Styrene	1.0	1.8
	Ozone	1.5	3.0
	Dust	4.0	4.0
<p>Verification: <i>The tenderer must provide test results indicating emission rates during print phase for each of the named substances along with the details concerning the test procedure used to measure the emission rates.</i> <i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>		<p>Permissible Test Values for Emission Rates as determined according to Appendix S-M for Inkjet Devices</p>	
(All Values in mg/h)		Monochrome Printing	Colour Printing
Pre-operating Phase	TVOC*	1 (Desktop Devices)	1 (Desktop Devices)
		2 (Floor-mounted Devices, Device Volume > 250 l)	2 (Floor-mounted Devices, Device Volume > 250 l)
Pre-operating Phase	TVOC*	10.0	18.0
	Benzene	< 0.05	< 0.05
	Styrene	1.0	1.8
	Unidentified Single Substances	0.9	0.9
	VOC	0.9	0.9
	Ozone	1.5	3.0
	Dust	4.0	4.0
Print Phase (= Pre-operating + Print Phase)	PER10 PW [Particles/10 min]	3.5 * 1011	3.5 * 1011

			Volume >250 l)
Print Phase (= Pre-operating + Print Phase)	TVOC*	10	18
	Benzene	< 0.05	< 0.05
	Styrene	1	1.8
	Unidentified Single Substances VOC	0.9	0.9
<p>* The list of volatile organic compounds which must be considered when measuring emissions from imaging equipment with printing function must be determined as listed in the Blue Angel specification RAL-UZ 205 (edition January 2017) - (Appendix S-M - para. 4.5 VOCs).</p> <p>Verification: <i>The tenderer must provide test results indicating emission rates during print phase for each of the named substances along with the details concerning the test procedure used to measure the emission rates.</i> <i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply</i></p>			

2.2.10.1 Background for the proposed criteria

VOC, dust and other emissions from imaging equipment are hazardous to humans when emitted indoors over certain thresholds.

Some older studies in the early 2000^{49,50,51} reported levels of VOCs indicating laser printers had higher emission levels than inkjet printers, specially operating units rather than idle units. Overall for all imaging equipment products, the emission rates from photocopiers were much higher than for printers and multi-functional devices. But one of the studies refers to other studies and their high variability, ranging over three orders of magnitude for some chemicals, e.g., toluene and styrene. Despite this, there are some consistencies between the studies that show that chamber concentrations of styrene, xylenes and ozone are increased in printing process of the laser printer, and pentanol is detected from the ink-jet printer. The emission rates of laser printers were the highest and found to be about 6 times that of ink-jet printers.

Chemical emissions, both as reporting and limits requirements are found in Blue Angel, EPEAT, Nordic Swan and the Korean Ecolabel. Blue Angel eco-labelled printers, copiers and MFDs all make particularly low contributions to indoor air pollution at the workplace or in private households. For better indoor quality, strict requirements on air emissions are set for low content of harmful substances. In addition, strict requirements are made for fine and ultrafine particle release during laser printer operation. Currently, 1092 products are registered as complying with Blue Angel (RAL-UZ 205).

A standard already exists for measuring and reporting five chemical substances as emissions from the use of imaging equipment products, namely:

⁴⁹ Destailats, Hugo, Randy L Maddalena, Brett C Singer, Alfred T Hodgson, and Thomas E Mckone. 2008. "Indoor Pollutants Emitted by Office Equipment: A Review of Reported Data and Information Needs." Atmospheric Environment 42: 1371–88. doi:10.1016/j.atmosenv.2007.10.080.

⁵⁰ Naoki Kagia, Shuji Fujiib, Youhei Horibab, Norikazu Namikic, Yoshio Ohtanic, Hitoshi Emic, Hajime Tamurad, and Yong Shik Kime. 2007. "Indoor Air Quality for Chemical and Ultrafine Particle Contaminants from Printers." Building and Environment 42: 1949/1954.

⁵¹ S.C. Lee, Sanches Lam *, Ho Kin Fai. 2001. "Characterization of VOCs, Ozone, and PM10 Emissions from Office Equipment in an Environmental Chamber." Department of Civil and Structural Engineering 36: 837/842.

- Dust (particulate matter) (electrophotographic imaging equipment only),
- Styrene,
- Benzene,
- TVOC,
- Ozone (electrophotographic imaging equipment only).

Moreover, the Blue Angel specification includes a test procedure. Nevertheless, measuring these emissions is not a common practice. Although more than one thousand products are registered in Blue Angel, complying with certain limits may be a costly exercise for manufacturers. Reporting may also imply extra costs, however this may be already a common practice by manufacturers, but only covering OEM products (i.e. not non-OEM cartridges set-up in imaging equipment printers and MFDs).

The EPEAT levels are slightly less stringent than those found in the latest version of Blue Angel, whereas the Nordic Ecolabelling criteria (Version 6.5) refers to the Blue Angel specification RAL UZ 205-1701 v1.0 for compliance. The same applies to the Korean Ecolabel, except that the emission requirements for VOCs are also applicable to standby mode.

It is proposed to include in the revised GPP a technical specification aligned to Blue Angel specification RAL-UZ 205-1701 v1.0 (Edition January 2017). Blue Angel requirements are the most comprehensive and are used also in other schemes. The specific requirements for Electrographic and Inkjet devices are shown as part of the proposed GPP requirements. For core criterion it is asked to measure TVOC in Pre-operating Phase and the following emissions in the Print Phase

- TVOC,
- Benzene,
- Styrene,
- Ozone,
- Dust

for electrographic products. Requirements for inkjet based imaging equipment are not included in the core criterion due to the relatively low number of inkjet products certified to the Blue Angel label.

In addition, in the comprehensive criteria for electrographic equipment maximum allowed value for particles PER10 PW is established and for inkjet devices TVOC emission in Pre-operating Phase are limited and in the Print Phase:

- TVOC,
- Benzene,
- Styrene,
- Unidentified Single Substances VOC.

The large number of products compliant to the Blue Angel specifications suggests that neither manufacturers nor procuring authorities would see additional costs associated with these criteria.

2.2.10.2 Background for the proposed verification

Several of the major environmental initiatives address substance emissions from imaging equipment. The most widely used initiative that addresses the requirements in the core criterion is the Ecma 370 declaration. Ecma 370 declarations are widely used by the imaging equipment manufacturers in the EU as a means of providing information about the environmental performances of their products. As mentioned above, the Blue Angel eco-label also addresses substance emissions and has 1473 products registered against the RAL-UZ-171 specification and 127 products registered against the RAL-UZ-205 specification. Products meeting the RAL-UZ-171 specification would be able to comply with both the core and comprehensive criteria. As such, no market availability issues are foreseen.

Manufacturers will be able to verify compliance to the criteria through submission of documentation showing that products have been tested to the appropriate test procedures, or equivalent, and meet the substance emission requirements. Products holding ISO type I schemes certification which addresses the relevant requirement would be deemed to comply.

Questions to stakeholders
<p>Are these criteria applicable for public procurement in the EU? Do you think it is cost-effective and easily verifiable?</p>

2.2.11 Noise Emissions

The existing EU GPP specification does not include any requirements on noise emissions from imaging equipment. For the coming AHWG meeting discussions on this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS10 Noise emissions The declared A-weighted sound power level L_{WAd} must not exceed the following test values $L_{WAd,lim,mo}$ or $L_{WAd,lim,co}$ in the respective print mode: The maximum value ($L_{WAd,lim,mo}$) for monochrome printing is to be determined based on operating speed (S_{mo}) must be calculated using the following formula: $L_{WAd,lim,mo} = (59 + 0.35 * S_{mo})$ dB The maximum value ($L_{WAd,lim,co}$) for colour printing on parallel systems based on operating (S_{co}) must be calculated using the following formula: $L_{WAd,lim,co} = (61 + 0.30 * S_{co})$ dB This declared A-weighted sound power level L_{WAd} must be determined using ECMA-109(ISO 9296), and specified in decibels (dB) with one decimal place.</p> <p>Verification: <i>The tenderer must provide documentation, such as a test report, which identifies noise emission rates during print phase when measured according to requirements in ECMA-109 (ISO 9296).The documentation should also identify if the A-weighted sound-power level in the criterion has been met. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>	<p>TS10 Noise emissions The A-weighted sound power level L_{WA} must be determined according to ISO 7779. Devices capable of colour printing must be tested in both monochrome mode ($L_{WA,M}$) and colour mode ($L_{WA,F}$). <ul style="list-style-type: none"> • Noise measurements must be conducted without optional peripheral devices. • A4 size paper of grammage 60 g/m² to 80 g/m² must be used for test operations. • The 4-page Adobe Reader file from the Office Test Suite according to B.1 of ISO/IEC 24734 must serve as test pattern. • Only one-sided printing must be measured. • The noise measurement must only be conducted during repetitive printing operation cycles. The measurement time interval must include at least three complete outputs of the 4-page test pattern (12 pages). The interval must begin after the printing preparation. <p>At least three devices of one model have to be tested. The declared A-weighted sound power level L_{WAd} must be determined following the procedures of ISO 9296:1988. It must be declared in decibels (dB) with one decimal place. If the noise emission measurement can be performed with one device only the following formula may be used as a substitute to determine the declared A-weighted sound power level L_{WAd}. $L_{WAd} = L_{WA1} + 3,0$ dB (L_{WA1} = A-weighted sound power level of a</p> </p>

	<p>single device, in dB with one decimal place) The declared A-weighted sound power level(s) of (both) monochrome mode $L_{WAd,mo}$ (and full colour mode $L_{WA,co}$, if applicable) must not exceed the limit. The limit $L_{WA,lim}$ must be determined depending on the page throughput of (both) mono-chrome mode sM and colour mode sF, if applicable, given to one decimal place and according to the following formula:</p> $L_{WA,lim} = 47 + 15 * \lg (S_{M/F} + 10) \text{ dB}$ <p>The values of the declared A-weighted sound power level L_{WAd} in dB with one decimal place and page throughput $S_{M/F}$ in ipm must be indicated in the information and data sheet under “environment and health-related statements“. For devices capable of colour printing the declared A-weighted sound power levels $L_{WAd,M}$ and $L_{WAd,F}$ and corresponding page throughput SM and SF, both of monochrome mode and col-our mode, must be indicated.</p> <p>Verification: <i>The tenderer must provide documentation, such as a test report, which identifies noise emission rates during print phase when measured according to requirements in ECMA-109 (ISO 9296). The testing laboratory must be accredited according to both ISO/IEC 17025 and ISO 7779 for acoustical noise measurements or equivalent. The documentation should also identify if the A-weighted sound-power level in the criterion has been met.</i> <i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>
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2.2.11.1 Background for the proposed criteria

Noise pollution is not an environmental impact and it is thus not reflected in Life Cycle Assessments of imaging equipment products. Noise pollution has an impact to end-user, in particular when confined to a closed area such as public offices.

Nevertheless, it is considered relevant for this product group as larger products such as MFDs may create irritating noise to end-users while in operation. Some of the short and long term effects⁵² that can be avoided are:

- It creates annoyance to the receptors due to sound level fluctuations.
- Physiological features like breathing amplitude, blood pressure, heart-beat rate, pulse rate, blood cholesterol are affected.
- Noise has negative impacts on cognitive performance. For attention and memory, a 5 dB(A) reduction in average noise level results in approximately a 2-3 % improvement in performance.

⁵² Green Public Procurement for Imaging Equipment. Technical Background report. 2014.

- It causes pain, ringing in the ears, feeling of tiredness, thereby effecting the functioning of human system.

It affects sleepiness by inducing people to become restless and lose concentration during their activities.

Some voluntary agreements, such as the ECMA-370, still support measurement of this parameter. Nordic Ecolabel⁵³ and Blue Angel⁵⁴ require certified products to comply with certain limit values.

In order to keep protecting end-users from noise pollution, it is proposed to include criteria on noise emissions as part of the updated GPP criteria. The core criterion only requires that noise emission rates meet the older Blue Angel (RAL-UZ-171⁵⁴) limits. Given the large number of products that were registered to the older Blue Angel specification (1,473), it is expected that this requirement will be not too difficult to be met for most products. The comprehensive criterion is aligned with the new version of Blue Angel RAL-UZ-205 specification⁵⁵, which places restrictions on the noise emission levels of imaging equipment in line with those included under the Blue Angel eco-label.

1092 products are currently awarded with the RAL-UZ-205 Blue Angel label in 2018.

The large number of products compliant to the Blue Angel specifications suggests that neither manufacturers nor procuring authorities are expected to face significant additional costs associated with these criteria.

2.2.11.2 Background for the proposed verification

Manufacturers will be able to verify compliance with the criteria through submission of documentation showing that products have been tested to the appropriate test procedures, or equivalent, and meet the allowed noise emission levels. This documentation could take the form of a manufacturer declaration or proven compliance to the *ECMA-109*⁵⁶ (*ISO 9296*⁵⁷) specification.

Questions to stakeholders

Do you think that the difference of ambition level between core and comprehensive is appropriate?

⁵³ <http://www.svanen.se/en/Criteria/Nordic-Ecolabel-criteria/Criteria/?productGroupID=9>

⁵⁴ RAL-UZ 171 Available at: <https://www.ecomark.jp/pdf/171-1207-e.pdf>

⁵⁵ https://produktinfo.blauer-engel.de/uploads/raluz_uz/DE-UZ-205-201701-en-Office%20Equipment%20with%20Printing%20Function-2018-04-03.zip

⁵⁶ Standard ECMA-109 Declared Noise Emission Values of Information Technology and Telecommunications Equipment

⁵⁷ ISO 9296:2017 Acoustics - Declared noise emission values of information technology and telecommunications equipment

2.2.12 Hazardous substances requirements

The existing EU GPP specification does not include any requirements on hazardous material content.

For the coming AHWG meeting discussions on this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
SELECTION CRITERIA	
	<p>SC1 Restricted Substance Controls</p> <p>The tenderer must demonstrate implementation of a framework for the operation of Restricted Substance Controls (RSCs) along the supply chain for the products to be supplied. Product evaluations according to the RSCs should, as a minimum, cover the following areas:</p> <ul style="list-style-type: none"> - Product planning/design; - Supplier conformity; - Analytical testing. <p>The RSCs must apply, as a minimum, to REACH Candidate List substances and RoHS restricted substances. The IEC 62474 material declaration database* must be used as the basis for identifying tracking and declaring specific information about the composition of the products to be supplied. The RSCs must be used to ensure that the tenderer is aware of the presence or non-presence of substances that are listed in the IEC 62474 database.</p> <p>Supplier declarations of conformity with the RCSs must be collected and maintained up-to-date for relevant materials, parts and sub-assemblies of the products to be supplied. These may be supported, where appropriate, by supplier audits and analytical testing. The RSCs procedures must ensure that product and supplier compliance is re-evaluated when:</p> <ul style="list-style-type: none"> - restricted substance requirements change; - supplied materials, parts and sub-assemblies change; - manufacturing and assembly operations change. <p>Implementation of the RCSs must be with reference to the guidance in IEC 62476 or equivalent and the IEC 62474 material declaration database</p> <p>*<i>International Electrotechnical Commission (IEC), IEC 62474: Material declaration for products of and for the electrotechnical industry, http://std.iec.ch/iec62474</i></p> <p>Verification:</p> <p><i>The tenderer must provide documentation, which describes the system, its procedures and proof of its implementation.</i></p> <p><i>Equipment holding a relevant Type I Eco-</i></p>

	<i>label fulfilling the specified requirements will be deemed to comply.</i>
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS11 Substances of Very High Concern The presence of any REACH Candidate List substances at a concentration of greater than 0.1% (by weight) in the whole product and in each of the following sub-assemblies is not allowed:</p> <ul style="list-style-type: none"> – Circuit boards, – Display unit (including backlighting), – Scanning units (including backlighting), – Casings and bezels, – External control panel, – External AC and DC power cords (including adapters and power packs). <p>Verification: <i>The tenderer must provide a declaration of compliance with the criterion. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>	
	<p>TS12 Hazardous substances content Imaging equipment must meet all hazardous material requirements laid out in the latest published Blue Angel specification for imaging equipment. The Blue Angel version implemented at the time of publication is RAL-UZ 205 (Edition January 2017)</p> <p>Verification: <i>The tenderer must provide documentation, which proves that the requirement has been met. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>

2.2.12.1 Background for the proposed criteria

Most electronics products, including imaging equipment, contain at least some hazardous ingredients. Of particular concern are for instance heavy metals (e.g. mercury, cadmium, lead) and flame retardants in plastics. A number of other substances found on the Candidate List of Substances of Very High Concern (SVHC) and REACH Annex XIV (List of Substances Subject to Authorization) are also likely to be present in some imaging equipment products.

Hazardous material content data for imaging equipment is addressed in a number of environmental initiatives including:

- Blue Angel
- Nordic Swan
- ECMA 370
- EPEAT

The most important criteria from other initiatives used to inform the EU GPP criteria can be seen in the tables below.

Table 18.: EPEAT Hazardous material content criteria

Criterion Number and Title	Criterion Text
4.1.3.1 Required— Reporting on amount of mercury content in light sources	<p>Manufacturer must report the number of mercury containing light sources in the product and the mercury content per light source. Data may be reported in accordance with the ranges of the following list:</p> <ul style="list-style-type: none"> – 0 mg (less than lower limit of detection) – > 0 mg to ≤ 5 mg – > 5 mg to ≤ 10 mg – > 10 mg to ≤ 50 mg – > 50 mg to ≤ 100 mg – > 100 mg to ≤ 1 g – Greater than 1 g <p>For products that do not contain light sources, the manufacturer may declare “Not applicable” on the MSE Registry.</p>
4.1.3.2 Optional— Use of non-mercury containing light sources	<p>No intentionally added mercury in light sources. Light source employs a technology that is documented not to require the presence of mercury.</p>
4.1.4.1 Optional— Reduction of substances on the EU REACH Candidate List of SVHCs	<p>A product must not contain substances included in the Candidate List of Substances of Very High Concern (SVHC) and REACH Annex XIV (List of Substances Subject to Authorization) above the 0.1% weight by weight threshold as described by the current European Chemicals Agency “Guidance on Articles” document or the REACH regulation. The manufacturer must demonstrate absence (less than 0.1% weight by weight in the product) of substances on the Candidate List of SVHC that have a Date of Inclusion on the candidate list of one year or more prior to the date the product in question is first registered. External attachments and associated accessories that ship with the product being registered must also not contain SVHCs above 0.1% weight by weight of the individual attachment or accessory.</p>
4.1.6.1 Required— Reducing BFR/CFR/PVC content of external plastic casings	<p>External plastic casings greater than 25 g must contain no more than 0.1% weight (1000 ppm) bromine and 0.1% weight (1000 ppm) chlorine attributable to brominated flame retardants (BFRs), chlorinated flame retardants (CFRs), and polyvinyl chloride (PVC) with the following exceptions:</p> <ul style="list-style-type: none"> – Parts containing 25% or more postconsumer recycled content are permitted up to 0.3% weight (3000 ppm) bromine and 0.3% weight (3000 ppm) chlorine. – Uses of brominated or chlorinated substances that are not classified as BFRs, CFRs, or PVC are allowed, but their use must be documented if the bromine or chlorine content exceeds the applicable threshold. – External plastic casings for external power supplies.
4.1.6.2 Optional— Eliminating or reducing BFR/CFR content of printed circuit board laminates	<p>All printed circuit board laminates included in the product excluding components soldered or affixed to the printed circuit board laminates must contain no more than 0.1% weight (1000 ppm) bromine and 0.1% weight (1000 ppm) chlorine attributable to BFRs and CFRs, with the following exception:</p> <ul style="list-style-type: none"> – Uses of brominated or chlorinated substances that are not classified as BFRs or CFRs are allowed, but their use must be documented if the bromine or chlorine content exceeds the applicable threshold.

<p>4.1.6.3 Optional— Eliminating or reducing BFR/CFR/PVC content of product</p>	<p>All plastic materials within the product must contain no more than 0.1% weight (1000 ppm) bromine and 0.1% weight (1000 ppm) chlorine attributable to BFRs, CFRs, and PVC with the following exceptions:</p> <ul style="list-style-type: none"> – Parts containing 25% or more postconsumer recycled content are permitted up to 0.3% weight (3000 ppm) bromine and 0.3% weight (3000 ppm) chlorine. – Uses of brominated or chlorinated substances that are not classified as BFRs, CFRs, or PVC are allowed but their use must be documented if the bromine or chlorine content exceeds the applicable threshold.
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Table 19.: Blue Angel hazardous material content criteria

Criterion Number and Title	Criterion Text															
<p>3.2.1 Hazardous substances in casings and casing parts</p>	<p>Halogenated polymers and halogenated organic compounds for their use as flame retardants are not permitted. Exempted from this requirement are:</p> <ul style="list-style-type: none"> • Fluorinated organic additives (as, for example, anti-dripping agents) used to improve the physical properties of plastics, provided that they do not exceed 0.5% w/w. • Fluorinated polymers as, for example, PTFE. • Plastic parts with a mass equal to or less than 25 grams. However, these must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins. (This exemption does not apply to control panel keys.) • Special plastic parts located close to heating and fuser elements. These parts must, however, not contain PBBs, PBDEs or chlorinated paraffins. • Large-sized plastic parts which are reused as can be proven and which are marked according to 3.1.1.2, Table 2, no. 9. They must not, however, contain PBBs, PBDEs or chlorinated paraffins. <p>Flame retardants used in plastic parts with a mass greater than 25 grams are to be confidentially reported to the RAL and identified by their CAS number. In addition, no substances are to be intentionally added as constituents to the plastics which meet at least one of the conditions set out in Table 5: Table 5: Conditions for the exclusion of substances from materials in casings and casing parts</p> <table border="1" data-bbox="619 1323 1426 1697"> <thead> <tr> <th>Hazard class</th> <th>Hazard category</th> <th>CLP-regulation (EC) No. 1272/2008</th> </tr> </thead> <tbody> <tr> <td>Carcinogenicity</td> <td>Carc. 1A, 1B</td> <td>H350 May cause cancer</td> </tr> <tr> <td>Carcinogenicity</td> <td>Carc. 1A, 1B</td> <td>H350i May cause cancer if inhaled</td> </tr> <tr> <td>Germ cell mutagenicity</td> <td>Muta. 1A, 1B</td> <td>H340 May cause genetic damage</td> </tr> <tr> <td>Reproductive toxicity</td> <td>Repr. 1A, 1B</td> <td>H360 May damage fertility or the unborn child</td> </tr> </tbody> </table> <p>Substances of the so-called candidate list according to REACH Article 59. The version of the candidate list at the point of application applies. The requirements also apply to recycled material.</p>	Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008	Carcinogenicity	Carc. 1A, 1B	H350 May cause cancer	Carcinogenicity	Carc. 1A, 1B	H350i May cause cancer if inhaled	Germ cell mutagenicity	Muta. 1A, 1B	H340 May cause genetic damage	Reproductive toxicity	Repr. 1A, 1B	H360 May damage fertility or the unborn child
Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008														
Carcinogenicity	Carc. 1A, 1B	H350 May cause cancer														
Carcinogenicity	Carc. 1A, 1B	H350i May cause cancer if inhaled														
Germ cell mutagenicity	Muta. 1A, 1B	H340 May cause genetic damage														
Reproductive toxicity	Repr. 1A, 1B	H360 May damage fertility or the unborn child														
<p>3.2.2 Hazardous Substances in Printed Circuit Boards</p>	<p>The support material of printed circuit boards must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins.</p>															

EPEAT contains a criterion which requires that products contain less than 0.1% by weight of substances on the REACH Candidate List. As of May 2017, 49% of the 1832 imaging equipment models registered with EPEAT were shown to meet this requirement. The EPEAT scheme also includes a criterion on the identification of intentionally added chemicals residing in products. Under the EPEAT criterion manufacturers must declare if they have identified the presence, within their products, of the Joint Industry Guide 101 (JIG-101)⁵⁸ or IEC 62474⁵⁹ declarable substance lists in concentrations above the thresholds noted in the latest published revisions of those initiatives. It should be noted that the IEC 62474 list has formally replaced the JIG-101. The Blue Angel RAL-UZ-205 specification also includes criteria which address substances on the REACH candidate list but also includes additional hazardous substances limitations. Substances restricted within the Blue Angel label include:

- Halogenated polymers and halogenated organic compounds for their use as flame retardants are not permitted (exemptions apply).
- Substances of the so-called candidate list according to REACH Article 59. The version of the candidate list at the point of application applies.
- support material of printed circuit boards must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins

Given the potential inclusion of hazardous substances in imaging equipment, and the fact that the issue is covered by other environmental initiatives, it is proposed to include in the revised GPP a hazardous substances content technical specification criteria to limit possible impacts from their release, particularly at the products' end-of-life

The current EU GPP criteria on computers and monitors includes a selection criterion which requires that suppliers have implemented a framework for the operation of Restricted Substance Controls (RSCs) along their supply chains. It is proposed that the revised EU GPP specification of Imaging Equipment also includes this as a selection criterion for comprehensive level at this first proposal. Knowledge on how extended is the use of Restricted Substance Controls (RSCs) for IE industry is needed in order to have a proposal at core level. Imaging equipment manufacturers are increasingly aware that they need to understand and control hazardous material content of products. This is witnessed by the registration of large numbers of products within schemes that include restrictions on hazardous material content. Manufacturers would need to develop a supply chain management system to effectively control hazardous material content of products. As such, it is assumed that most manufacturers that claim restrictions of hazardous materials in their products would be able to meet the proposed selection criterion.

The first technical specification (core and comprehensive) addresses substances of very high concern. The second technical specification (only comprehensive) reflects the more ambitious requirements laid out in the Blue Angel eco-label.

There are unlikely to be any additional costs associated with compliance to the core criterion. Some additional costs may be associated with use of the comprehensive criterion given the potential lower number of complaint products on the market. Any additional costs associated with use of the comprehensive criterion will likely reduce over time as manufacturers ensure that their products are compliant with the new Blue Angel specification. It is assumed that most manufacturers will already have implemented a framework for the operation of Restricted Substance Controls (RSCs) along their supply chains and so no added costs are assumed as a result of the selection criterion.

2.2.12.2 Background for the proposed verification

Manufacturers will be able to verify compliance to the criteria through submission of documentation showing that products have been tested to the appropriate test procedures, or equivalent, and meet the hazardous material content requirements (where relevant). This

⁵⁸ http://www.ipc.org/4.0_Knowledge/4.1_Standards/Free/JIG-101-Ed-4.0.pdf

⁵⁹ IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry

documentation could take the form of a manufacturer declaration or proven compliance to the Blue Angel RAL-UZ-205 specification.

As of March 2018, 38% of the products registered in the EPEAT imaging equipment database met the EPEAT criterion on identification of hazardous substances within the IEC 62474 declarable substance list.

As previously noted, 1092 imaging equipment models are already registered against the Blue Angel RAL-UZ-205 specification in 2018.

Questions to stakeholders
Are stakeholders aware of any challenges relating to compliance with the selection and technical specification criteria, core or comprehensive level?

2.2.13 Firmware Update Control

The existing GPP specification on imaging equipment does not tackle control of firmware updates. For the coming AHWG meeting discussions on this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
	<p>TS13 Firmware Update Control</p> <p>The imaging equipment includes functionality allowing any automatic firmware updates to be rolled back to previously installed firmware, where such an update impacts the usability of remanufactured consumables. This functionality may be provided through a network connected computer or within the Imaging Equipment itself. Instructions detailing how automatic firmware updates can be rolled back must be provided in the technical documentation.</p> <p>Verification: <i>The tenderer must provide documentation, which identifies that the requirement has been met. Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information.</i></p>

2.2.13.1 Background for the proposed criteria

The possibility to control firmware would give the end-users control over any updates that interfered with the operation of their imaging equipment. This is an important consideration given that some manufacturer firmware updates sent to imaging equipment in use have resulted in the ability to no longer use remanufactured consumables.⁶⁰ Therefore it is suggested to include a criterion on firmware control to ensure that public authorities can maintain the option to use remanufactured consumables. The criterion is listed as comprehensive due to uncertainties surrounding market availability of this option. None of the main schemes used as background for the GPP criteria includes this kind of criterion.

⁶⁰ Bit-tech, 2017, *HP re-releases third-party ink cartridge lock-out firmware*, available from <https://www.bit-tech.net/news/tech/peripherals/hp-re-releases-third-party-ink-cartridge-lock-out-firmware/1/>

Any additional costs from facilitating user control of software updates would likely be minimal for manufacturers and have no negative costs implication for procuring authorities. Procuring authorities could see savings because of continued available use of remanufactured cartridges. It is currently unclear how many imaging equipment manufacturers support the rolling back of firmware updates. At least one imaging equipment manufacturer has provided users with the ability to disable software updates that have limited the ability to use remanufactured cartridges.⁶¹ Given that one manufacturer has afforded users the ability to remove software it suggests that other manufacturers could provide the same service.

2.2.13.2 Background for the proposed verification

Tenderers will be able to provide documentation which identifies that the users are afforded the ability to roll back firmware updates.

2.2.14 Warranty and service agreements

The existing EU GPP criteria include a product longevity and warranty criterion. This requests repair and replacement warranty for a period of five years including availability of spare parts. For the first revision of this criterion the following is proposed:

First criteria proposal	
Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS14 Warranty and service agreements The tenderer must provide a minimum two-year warranty, effective from delivery of the product. This warranty must cover repair or replacement and include a service agreement with options for pick-up and return or on-site repairs. The warranty must guarantee that the products are in conformity with the contract specifications at no additional cost.</p> <p>Verification: <i>A copy of the warranty and service agreement must be provided by the tenderer. They must provide a declaration that they cover the conformity of the goods with the contract specifications.</i></p>	<p>TS14 Warranty and service agreements The tenderer must provide a minimum three-year warranty, free of additional costs, effective from delivery of the product. This warranty must cover repair or replacement and include a service agreement with options for pick-up and return or on-site repairs. The warranty must guarantee that the products are in conformity with the contract specifications at no additional cost. The warranty must not be invalidated as a result of non-OEM cartridges or containers being used in imaging equipment unless it is proven that any malfunction was directly caused by the use of a non-OEM cartridge or container.</p> <p>Verification: <i>A copy of the warranty and service agreement must be provided by the tenderer. They must provide a declaration that they cover the conformity of the goods with the contract specifications.</i></p>
AWARD CRITERIA	
Core criteria	Comprehensive criteria
<p>Option 1 AC4(a) Longer warranties and services agreements Additional points must be awarded to each additional year of warranty and service agreement offered that is more than the minimum technical specification. A maximum of x points [to be</p>	

⁶¹ HP, 2017, *HP Inkjet Printers - Dynamic Security Feature Affecting Cartridges Using Non-HP Security Chip*, available from <https://support.hp.com/us-en/product/hp-officejet-pro-8610-e-all-in-one-printer-series/5367603/model/5367606/document/c05308850/>

specified] may be awarded. Points must be awarded separately for the warranty and then service agreement periods. Where warranty and service agreement period differ across product types then an average value across all applicable products must be used.

+4 years or more: x points

+3 years: 0.75x points

+2 years: 0.5x points

+1 year: 0.25x points

Verification:

A copy of the warranty and service agreement must be provided by the tenderer. They must provide a declaration that they cover the conformity of the goods with the contract specifications.

Option 2

AC4(b) Longest warranty and service agreement

Additional points must be awarded to the tenderer that provides the longest warranty and service agreement amongst all organisations that submitted a response to tender. The length of the warranty and service agreement should be an average value across all products to be supplied. A maximum of x points [to be specified] may be awarded to the tenderer that offers the longest warranty and service agreement.

Verification:

A copy of the warranty and service agreement must be provided by the tenderer. They must provide a declaration that they cover the conformity of the goods with the contract specifications.

2.2.14.1 Background for the proposed criteria

Repair and maintenance are key aspects for assuring a product's longevity according to its predicted lifetime. If the product lifetime is reduced by means of fail, more environmental impacts will arise from manufacturing new products as a cause of replacement.

Warranty coverage needs to be in place for accessing free repair and maintenance of imaging equipment products (as in other product groups). However, the existing legal warranty scheme in the EU requires products to be covered for a period of 2 years⁶² including repair for consumer products.

According to the authors knowledge, there is no EU wide legislation which requires a minimum guarantee period for non-consumer products. Some Member States have specific legislation covering commercial warranties.⁶³

Still, even in consumer products warranties, some particular aspects such as the use of non-OEM cartridges may prevent being able to benefit from the warranty terms, and it is thus important to ensure that the 2-years legal period includes using such cartridges. This will also incentivize the use of refilled and remanufactured cartridges, which according to evidence in the Preliminary Report reduces the environmental impacts significantly as being one of the life cycle hotspots of imaging equipment products.

Placing requirements on product warranties is unlikely to result in any negative trade-offs with other impact areas. Conversely, the existence of warranties on products may encourage manufacturers to improve durability to reduce costs associated with product returns.

Blue Angel, EPEAT and Nordic Swan include a criterion addressing early lifetime and warranties. The most important of these, from the perspective of informing the development of the EU GPP criteria can be found in the tables below.

⁶² https://europa.eu/youreurope/citizens/consumers/shopping/guarantees-returns/index_en.htm

⁶³ For instance the United Kingdom "The Sale of Goods Act"

Table 20.: Product lifetime criterion in other initiatives

environmental initiative	Criterion Text
EPEAT	4.4.1.1 Required—Early failure process Manufacturer must make available to the customer procedures as to how the manufacturer or its designee must troubleshoot, repair, or replace a product that fails prior to 3 years after date of sale for institutional products and 1 year after date of sale for consumer products. These procedures must be easily accessible to customers on the manufacturer’s website or in the documentation that accompanies the product at the point of sale.
Blue Angel	3.1.5.1 Information regarding supposed service life The distributor informs in the information and data sheet about the typical service life span or use intensity (e.g. in printed pages), which the device is designed for in its default configuration assuming typical user behaviour. The manufacturer must define the assumed typical use conditions in the information and data sheet.

EPEAT includes a requirement which states that manufacturers should provide information to customers regarding procedures for troubleshooting, repair, or replacement of product that fails prior to 3 years after date of sale for institutional products and 1 year after date of sale for consumer products. Blue Angel states that manufacturers must provide information about the typical service life span or use intensity (e.g. in printed pages), which the device is designed for in its default configuration assuming typical user behaviour. As such neither of the major initiatives require a defined warranty period but availability of a warranty or service contract would meet the EPEAT requirement.

Considering the importance of warranty coverage for the provision of repair services, this criterion is quite important. Although it may be problematic to require a certain warranty period, especially for smaller devices. For office use, though, there are some standard practices in terms of service provision and warranty, but these may be limited to certain types and/or sizes or to specific services. Against this background it is proposed to keep the existing criterion with following modifications. The core criterion reduces the warranty period to two years to reflect current market practices. A new comprehensive criterion extends the required warranty period to three years and ensures that warranties cannot be automatically invalidated through usage of remanufactured consumables. In addition, award criterion is proposed which rewards suppliers with longer standard warranty period.

Only one of the imaging equipment manufacturers (Kyocera) provides a two-year warranty as standard (i.e. no fees involved), with most of the remaining manufacturers offering extended warranties (i.e. additional purchase required) meeting the two-year requirement. The need to purchase an extended warranty will increase upfront purchase costs for public bodies but the extended coverage could save costs in the long term due to product failures being covered.

2.2.14.2 Background for the proposed verification

Suppliers can prove compliance against this criterion through documentation which details the warranty period, and any associated conditions, for each model of imaging equipment included in a proposal.

Most of the large imaging equipment manufacturers operating in the EU market provide warranties on their products. The extent of these warranties can vary in terms of both scope and duration. Below table illustrates the standard and enhanced warranty periods as advertised by the largest imaging equipment manufacturers on the EU market.

Table 21.: Imaging Equipment Warranty Periods

Imaging Equipment Manufacturer	Standard Warranty Duration (years)	Enhanced Warranty Duration (max) (years)
Brother	1	3
Canon	unclear	1
EPSON	1	3
HP	unclear	3
Konica Minolta	1	5
KYOCERA	2	5
Lexmark	1	5
OKI	1	3
RICOH	1	Unclear
SHARP	unclear	Unclear
TOSHIBA	unclear	Unclear
Xerox	1	Lifetime of product (where consumables purchased from Xerox)

Questions to stakeholders

Are you aware of best practices in the field of warranties offered in public procurement? What is the typical length and which services are covered?

2.2.15 Take-back system

The existing GPP specification on imaging equipment does not place requirements on service providers to guarantee the provision of a take back system for used imaging equipment. For the coming AHWG meeting, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
AWARD CRITERIA	
	<p>AC5 Imaging equipment take-back system implementation</p> <p>Points must be awarded to a tenderer who offers a free take back system for used imaging equipment with the aim to channel such equipment for reuse of the equipment or its parts, or for material recycling with preference given to reuse. The supplier may fulfil these obligations themselves or via a suitable third-party organisation.</p> <p>Verification: <i>The tenderer must provide documentation, which states that a free take back system will be provided. Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same requirement or other alternative means of proof that provide the necessary information.</i></p>
CONTRACT PERFORMANCE CLAUSES	
Core criteria	Comprehensive criteria
	<p>CPC2 Reporting on reuse/recycle activities of imaging equipment</p> <p>The contractor must provide records regarding the free take back system for used imaging equipment aimed to channel such equipment for reuse of the equipment or its parts, or for material recycling with preference given to reuse.</p> <p>In particular the recording must detail:</p> <ul style="list-style-type: none"> - number of equipment taken back for free from the awarding authority, - number of equipment/parts, as appropriate, channelled for reuse, - number of equipment/parts, as appropriate, channelled for material recycling,

2.2.15.1 Background for the proposed criteria

As electronic products, imaging equipment falls within the scope of the Waste Electrical and Electronic Equipment (WEEE) 2012/19/EU Directive.⁶⁴ The WEEE-Directive regulates the separate collection, treatment and recycling of end-of-life electrical and electronic equipment, which includes imaging equipment within category 3 "IT and telecommunications equipment". The WEEE Directive sets collection, recycling and recovery targets for all types of electrical goods, which EU member states are obligated to achieve. The WEEE Directive currently (as of August 2015) requires that for WEEE imaging equipment 80% is recovered and 70% is prepared for re-use and recycling. The targets are set to change in August 2018 with 80% of WEEE imaging equipment needing to be recycled.

⁶⁴ European Commission, Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), available from <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0019>

The provision of a take-back scheme could contribute to improvement of environmental impacts associated with manufacture of new equipment due to better channeling of used products for reuse of parts or entire equipment after repair or refurbishment, if necessary, or for remanufacturing.

As this is not certain that such take back practices are well developed in the procurement, for the first proposal it is suggested to set this criterion as a comprehensive award one in order to promote such practices but not to be too demanding. During the meeting best practices on imaging equipment end of life will be discussed and may help further shaping of this criterion.

2.2.15.2 Background for the proposed verification

As a proof of verification the tenderer should provide documentation which confirms that such a free take back system will be provided by the tenderer or a third party sub-contracted by them. Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same requirement or other alternative means of proof that provide the necessary information.

Questions to stakeholders

Are you aware of such take back systems being currently used in public or private procurement?

2.2.16 Supply of paper and imaging equipment consumables

The goal of these criteria is to promote the use of environmental preferable paper and imaging equipment consumables, when those are supplied together with imaging equipment.

For the coming AHWG, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATION	
<p><i>(when copy and graphic paper supply is included in the imaging equipment supply contract)</i></p> <p>TS15 (a) Supply of copy and graphic paper meeting the EU GPP criteria</p> <p>Copy and graphic paper offered by the tenderer in the frame provision of imaging equipment must comply with Core Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper⁶⁵.</p> <p>Verification:</p> <p><i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>	<p><i>(when copy and graphic paper supply is included in the imaging equipment supply contract)</i></p> <p>TS15 (a) Supply of copy and graphic paper meeting the EU GPP criteria</p> <p>Copy and graphic paper offered by the tenderer in the frame provision of imaging equipment must comply with Comprehensive Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper⁶⁵.</p> <p>Verification:</p> <p><i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above</i></p>

⁶⁵ Available at: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

<p><i>(when cartridges supply is included in the imaging equipment supply contract)</i></p> <p>TS15 (b) Supply of cartridges meeting the EU GPP criteria</p> <p>Cartridges offered by the tenderer in the frame of provision of imaging equipment must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification:</p> <p><i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>	<p><i>(when cartridges supply is included in the imaging equipment supply contract)</i></p> <p>TS15 (b) Supply of cartridges meeting the EU GPP criteria</p> <p>Cartridges offered by the tenderer in the frame of provision of imaging equipment must comply with Comprehensive Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification:</p> <p><i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>
<p>AWARD CRITERIA</p>	
<p>Core criteria</p>	<p>Comprehensive criteria</p>
<p><i>(when cartridges supply is included in the imaging equipment supply contract)</i></p> <p>AC6 Supply of reused/remanufactured cartridges</p> <p>Points must be awarded for the commitment to provide the highest percentage (share) of reused/remanufactured cartridges must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification:</p> <p><i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>	<p><i>(when cartridges supply is included in the imaging equipment supply contract)</i></p> <p>AC6 Provision of reused/remanufactured cartridges</p> <p>Points must be awarded for the commitment to provide the highest percentage of reused/remanufactured cartridges must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification:</p> <p><i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>
<p>CONTRACT PERFORMANCE CLAUSES</p>	
<p>Core criteria</p>	<p>Comprehensive criteria</p>
<p><i>(when cartridges or copy and graphic paper supply is included in the imaging equipment supply contract)</i></p> <p>CPC3 Reporting on supplied consumables</p> <p>The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for:</p> <ul style="list-style-type: none"> - copy and graphic paper meeting the EU GPP criteria (TS14 (a)), - cartridges meeting the EU GPP criteria (TS14 (b)), - reused/remanufactured cartridges (AC5). 	<p><i>(when cartridges or copy and graphic paper supply is included in the imaging equipment supply contract)</i></p> <p>CPC3 Reporting on supplied consumables</p> <p>The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for:</p> <ul style="list-style-type: none"> - copy and graphic paper meeting the EU GPP criteria (TS14 (a)), - cartridges meeting the EU GPP criteria (TS14(b)), - reused/remanufactured cartridges (AC5).

2.3 Criteria area 2 – Imaging Equipment consumables

Criteria under this section can be used when purchasing imaging equipment consumables (see scope in chapter 1.3.1.2).

2.3.1 Cartridges/containers page yield

For the coming AHWG meeting the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS16 Cartridges/containers page yield declaration</p> <p>The expected page yield must be declared for all cartridges/containers that will be supplied for use in the relevant imaging equipment.</p> <p>Verification:</p> <p><i>The tenderer must provide documentation, which identifies page yields and associated test procedures used to derive the values. Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information.</i></p> <p><i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>	
AWARD CRITERIA	
<p><i>[For procurers with high need of printouts]</i></p> <p>AC7 Extended page yield</p> <p>Additional points must be awarded for tenderers that provide cartridges/containers with higher page yields than other tenderers' consumables for the same model of imaging equipment. The page yield of each cartridge/container should be compared to the minimum page yield for an equivalent cartridge/container offered by an alternative prospective supplier. A maximum of x points [to be specified] may be awarded to each cartridge/container for each model of imaging equipment and calculated as:</p> $\text{Award Points (x)} = \sum \left(\left(\frac{\text{Yield}_{EXT} - \text{Yield}_{MIN}}{\text{Yield}_{MIN}} \right) \times \left(\frac{x_{Max}}{n_{CAPACITY}} \right) \right)$ <p>Where:</p> <p>Yield_{EXT} = maximum available page yield Yield_{MIN} = minimum available page yield x_{Max} = maximum available award points n_{CAPACITY} = number of cartridges/containers designed to be installed in an individual model of imaging equipment to provide full functionality</p> <p>Verification:</p> <p><i>The tenderer must provide documentation, which identifies all page yields, associated test procedures used to derive the values and the maximum number of cartridge/containers that may be installed in each model of imaging equipment. Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information.</i></p>	

2.3.1.1 Background for the proposed criteria

Impacts related to the use of cartridges are among them imaging equipment three life cycle environmental hotspots identified in the preliminary analysis⁶⁶. Depending on the printing

⁶⁶ For more details see Preliminary report at the project website: <http://susproc.jrc.ec.europa.eu/imaging-equipment/>.

technology, the relative contribution of life cycle environmental impacts from the use of cartridges becomes the second most important after the use of paper. When paper use is excluded from the system boundaries, the embodied impacts from the cartridges (i.e. from manufacturing) can become at least as important as the energy consumption during use, in terms of Global Warming Potential, Primary Energy Demand, Ozone Depletion, Acidification Potential, Eutrophication Potential, Resource Depletion Potential, amongst others.

By requiring tenderers to report page yield, it is expected that a level playing field is created, which can incentivise longer yields maintaining same printing quality (including refilled and remanufactured cartridges). The latter is of special importance, as the evidence shows printing quality is very important for use of paper (see Preliminary Report, chapter 12). By doing this, impacts from new cartridge manufacturing will be avoided.

Page yield information is important for procuring authorities as it can help identify costs per printed page. Cartridges/containers with higher page yields tend to have lower costs per printed page. As such, providing procurers with indications of how many pages may be printed with each cartridge/container will assist in printed page cost calculations.

Reporting measured cartridge yield is only found in the EU Voluntary Agreement (see Table 22).

Table 22.: EU Voluntary Agreement Consumable Yield Criterion

Criterion and Title	Number	Criterion Text
6.6.2		Signatories must make information on inkjet and toner cartridge yield available to Customers based on the measurement standards specified, for example, in ISO/IEC 24711:2006 (for ink), ISO/IEC 19752:2004 (for monochrome toner), ISO/IEC 19798:2006 (for colour toner), and through other company methods.

In spite of being an important parameter affecting the life cycle environmental impacts of imaging equipment products as identified in the Preliminary Report, task 3 (chapters 12, 13 and 14), this is not a common metric to report for compliance with environmental schemes. However, this is a common metric to benchmark cartridges and due to its influence on their overall environmental impacts (i.e. the lower yield, the more cartridges to buy), this issue is considered important. However, it is essential that the test methods applied to measure the yield are declared and that evidence is provided on how the yield was derived. Measurement standards already exist^{67,68}, which can be used as reference. Against this background it is proposed to introduce the same core and comprehensive technical specification requiring provision of cartridge yield data. This information will allow procuring authorities to make enhanced decisions about the choice of consumables based on page yield data. An additional award criterion is included which identifies how procuring authorities can utilize the differences in page yields amongst suppliers' consumables in order to procure more materially efficient products.

The EU Voluntary Agreement on imaging equipment includes information reporting requirements on cartridge/container yield.^{69,70} Most large OEMs therefore already communicate page yield data for their cartridges and containers and so an EU GPP criterion on this issue will not add any extra costs to these large OEMs. Smaller cartridge/container remanufacturers may

⁶⁷ ISO/IEC 24711:2007 Method for the determination of ink cartridge yield for colour inkjet printers and multi-function devices that contain printer components, available at: <https://www.iso.org/standard/50016.html>

⁶⁸ ISO/IEC 19798:2007 Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components; available at: <https://www.iso.org/standard/50015.html>

⁶⁹ EUROVAPRINT, Members, available at <http://www.eurovaprint.eu/pages/members/>

⁷⁰ Page 14, Industry Voluntary Agreement to improve the environmental performance of imaging equipment placed on the European market, VA v.5.2 April 2015, available from http://www.eurovaprint.eu/fileadmin/eurovaprint_files/pdfs/VA_version_5.2_April.pdf

encounter some additional costs as a result of the proposed EU GPP criterion on cartridge/container page yield. The expected impact of these costs is likely to be small. ETIRA members⁷¹ test their cartridges using either the ISO or DIN standards.⁷²

2.3.1.2 Background for the proposed verification

The “page yield” of a cartridge, container or other imaging equipment consumable identifies the number of printed pages that are likely to be produced before a consumable reaches its end of life. The verification of the proposed page yield criterion is relatively straightforward given the existence of the ISO and DIN standards. It is normally measured according to:

- ISO/IEC 24711:2006 - Method for the determination of ink cartridge yield for colour inkjet printers and multi-function devices that contain printer components
- ISO/IEC 19752:2017 - Information technology -- Office equipment -- Method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multi-function devices that contain printer components
- ISO/IEC 19798:2017 - Information technology -- Office equipment -- Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components

The ISO standards provide a common printed output so that comparisons of page yields across different cartridges and containers can be made. The ISO series of standards identify page yields under specific test conditions and actual page yields witnessed by users may differ. The difference between measured page yields, according to one of the ISO standards, and actual page yield differ depending on a variety of factors including:

- Page coverage – the percentage of paper that is covered by ink or toner
- Colour use – greater use of one colour over another can result in decreased yields
- Cartridge failure – the premature end of life of a cartridge/container
- Humidity – the humidity of the air in the immediate vicinity of the imaging equipment
- Print frequency – infrequent use of ink cartridges often results in the use of some ink to keep print nozzles clear

The following list of DIN series of standards which cover remanufactured cartridges/containers also cover page yields, reflecting the requirements in the ISO series of standards:

- DIN 33870-1 - Office machines - Requirements and tests for the preparation of refilled toner modules for electrophotographical printers, copiers and facsimile machines - Part 1: Monochrome⁷³
- DIN 33870-2 - Office machines - Requirements and tests for the preparation of refilled toner modules for electrophotographical printer, copiers and facsimile machines- Part 2: 4-Colour-printers⁷⁴
- DIN 33871-1 - Information technology - Office machines, inkjet print heads and inkjet tanks for inkjet printers - Part 1: Preparation of refilled inkjet print heads and inkjet tanks for inkjet printers⁷⁵
- DIN 33871-2 - Information technology - Office machines, inkjet print heads and inkjet tanks for inkjet printers - Part 2: Requirements on compatible ink cartridges (4-colour system) and their characteristic features⁷⁶

Suppliers offering alternative means of verification would need to demonstrate how the alternative method produced comparable results to the more established page yield test standards.

⁷¹ ETIRA – the European Toner and Inkjet Remanufacturers Association, <http://www.etira.org/>

⁷² <http://www.etira.org/cartridge-remanufacturing/quality-first/>

⁷³ <https://www.din.de/en/getting-involved/standards-committees/nia/standards/wdc-beuth:din21:181049829>

⁷⁴ <https://www.din.de/en/getting-involved/standards-committees/nia/standards/wdc-beuth:din21:193881977>

⁷⁵ <https://www.din.de/en/getting-involved/standards-committees/nia/standards/wdc-beuth:din21:193881343>

⁷⁶ <https://www.din.de/en/getting-involved/standards-committees/navp/wdc-beuth:din21:113904190>

2.3.2 Consumable material efficiency

For the coming AHWG meeting the following new criteria are proposed for discussion:

Core criteria	Comprehensive criteria						
TECHNICAL SPECIFICATIONS							
	<p>TS17 Consumable resource efficiency</p> <p>The consumable mass resource efficiency using the formula (1) below must not exceed the result indicated in table below: Imaging Equipment consumable resource efficiency</p> <table border="1"> <thead> <tr> <th>Consumable Type</th> <th>Minimum Images per Gram(g) of Consumable Material</th> </tr> </thead> <tbody> <tr> <td>Toner Cartridge or Container & Drum</td> <td>$(2 \times [10 \times \tanh(0,1+0,0003 \times (C_{\text{Mass}}-10))]-0.5)+1)$</td> </tr> <tr> <td>Ink Cartridge or Container</td> <td>$(2 \times [15 \times \tanh(0,2+0,0004 \times (C_{\text{Mass}}-8))-1]+2)$</td> </tr> </tbody> </table> <p>A calculation of page yield mass efficiency, i.e. minimum page yield per gram of the total consumable material supplied (any cartridge or container plus drum units, as appropriate, used in imaging equipment product) must be provided. The page yield mass efficiency must be calculated as follows:</p> $\text{Page Yield Mass Efficiency} = \frac{\text{Page Yield}}{C_{\text{Mass}}} \quad (1)$ <p>Where:</p> <ul style="list-style-type: none"> • Page yield is the measured number of images that may be produced by the consumable • Cartridge or Container/Drum mass (C_{Mass}) is calculated as the mass (g) of each cartridge or container plus drum unit, as measured in their to be installed condition (i.e. full of ink or toner and any additional components not present whilst installed in the imaging equipment removed). <p>Verification: <i>The tenderer must provide result of Page Yield Mass Efficiency calculation together with documentation, which identifies all page yields, associated test procedures used to derive the values, and the mass of all cartridges, containers and drum units designed for use in each imaging equipment model. Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information.</i></p>	Consumable Type	Minimum Images per Gram(g) of Consumable Material	Toner Cartridge or Container & Drum	$(2 \times [10 \times \tanh(0,1+0,0003 \times (C_{\text{Mass}}-10))]-0.5)+1)$	Ink Cartridge or Container	$(2 \times [15 \times \tanh(0,2+0,0004 \times (C_{\text{Mass}}-8))-1]+2)$
Consumable Type	Minimum Images per Gram(g) of Consumable Material						
Toner Cartridge or Container & Drum	$(2 \times [10 \times \tanh(0,1+0,0003 \times (C_{\text{Mass}}-10))]-0.5)+1)$						
Ink Cartridge or Container	$(2 \times [15 \times \tanh(0,2+0,0004 \times (C_{\text{Mass}}-8))-1]+2)$						
AWARD CRITERIA							
	<p>AC8 Electrophotographic consumables resource efficiency</p> <p>Points must be awarded for electrophotographic consumables (cartridges, containers and drum units) that minimise material use per yielded page. A maximum of x points [to be specified] may be awarded to the tenderer which offers the highest overall consumable resource efficiency value across all electrophotographic consumables for each model of imaging equipment. The resource efficiency should be calculated in accordance with the equation given in TS16. When different consumables are purchased, the value should be an average value across all products to be supplied.</p> <p>Verification: <i>The tenderer must provide result of Page Yield Mass Efficiency calculation together with documentation, which identifies the following for all cartridges/container and any separate drum units used in relevant electrophotographic imaging equipment:</i></p> <ul style="list-style-type: none"> • Page yields 						

- *Mass of full cartridges/containers*
 - *Mass of separate drum units*
- Documentation may consist of a manufacturer declaration or other alternative means of proof that provide the necessary information.*

	<p>AC9 Reduced number of materials of consumables</p> <p>Points must be awarded for cartridges/containers and drum units that include reduced numbers of material types. A maximum of x points [to be specified] may be awarded to the tenderer which offers consumables that are constructed with the lowest number of material types compared to all other tenderers. The number of material types should be an average value across all products to be supplied.</p> <p>Verification:</p> <p><i>The tenderer must provide documentation, which identifies the number and type of materials used in each consumable. Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information.</i></p>
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2.3.2.1 Background for the proposed criteria

Consumable resource efficiency

The amount of material used in consumables results in lifecycle impacts from extraction to disposal. The extent of these lifecycle impacts will depend on the exact material composition of the consumable (i.e. what materials are included) and the total volume of materials used. There is significant variation in the amount of material used within consumables that provide the same or similar functionality. Plastics account for most of the materials used in most consumables and so any reduction in weight will reduce the amount of plastics used.

The Nordic Swan Version 6.3 includes a requirement that consumables (including packaging) must meet defined material efficiency requirements. The requirements can be seen in Table 23.

Table 23.: Nordic Swan version 6.3 consumable efficiency requirements ⁷⁷

Images Per Minute (IPM)	Monochrome application (Kg/1000 pages according to ISO/IEC 19752)	Colour application (Kg/1000 pages according to ISO/IEC19798)
IPM > 19	≤ 0,65	≤ 2
IPM ≤ 19	≤ 1	≤ 3

There are no known criteria within any other established environmental schemes which address consumable material efficiencies.

Due to a lack of data, it was not possible to assess the level of ambition associated with the Nordic Swan criterion. As such, further investigations were made as part of this EU GPP project

⁷⁷ Nordic Ecolabelling of Imaging equipment Version 6.3 □ 20 June 2013 – 31 December 2019

into consumable material efficiency based on a dataset with 571 products resulting in the criteria formulas proposed.

Whilst many manufacturers publish the packaged weight of cartridges/containers there is little data available for cartridges/containers as separate products. Manufacturers could collate cartridge/container weight data from either production or end of life processes. As such, market availability of cartridge/container weight data could become readily available if disclosure was promoted via the EU GPP criteria.

To facilitate the development of a consumable material efficiency criterion, consumable weight data was secured from an EU based remanufacturer.⁷⁸ Yield data was compared to full weight data (i.e. full levels of ink or toner) for each consumable in the dataset. To aid the analysis the consumables were grouped into five main types:

- Toner container
- Toner drum units
- Toner cartridges
- Ink containers
- Ink cartridges

Each of the five main types of consumables were further subdivided into mono/black and colour. Two formulae were developed which ensured that approximately half of the consumables (of each type) met the efficiency requirements. The figures below show the results of the analysis as well as the proposed criterion limit line. Consumables above the red line would be compliant with the criterion limit, with those below the line not meeting the requirement.

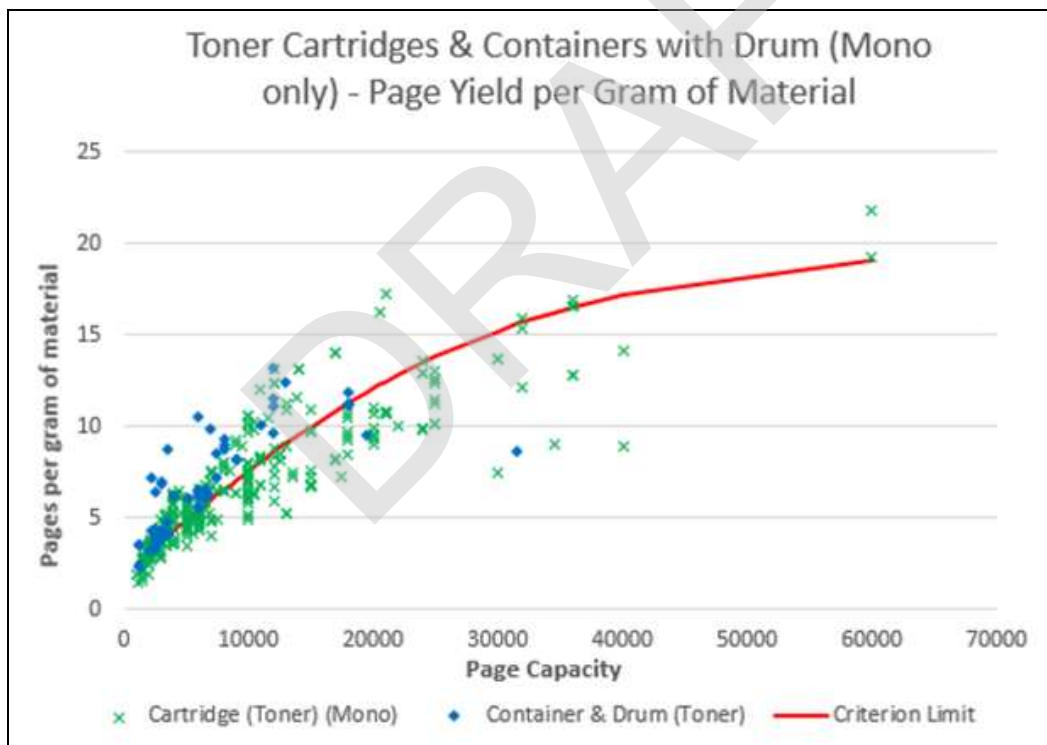


Figure 7.: Material efficiency of Mono Toner Cartridges and Containers with associated Drum Units

⁷⁸ Embatex Iberia S.L, personal communications.

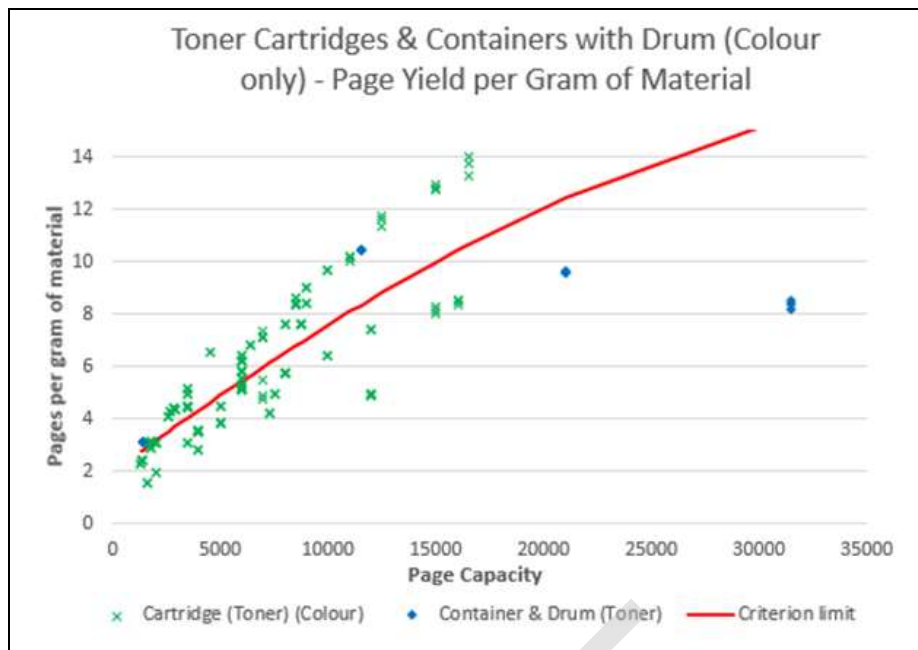


Figure 8.: Material efficiency of Colour Toner Cartridges and Containers with associated Drum Units

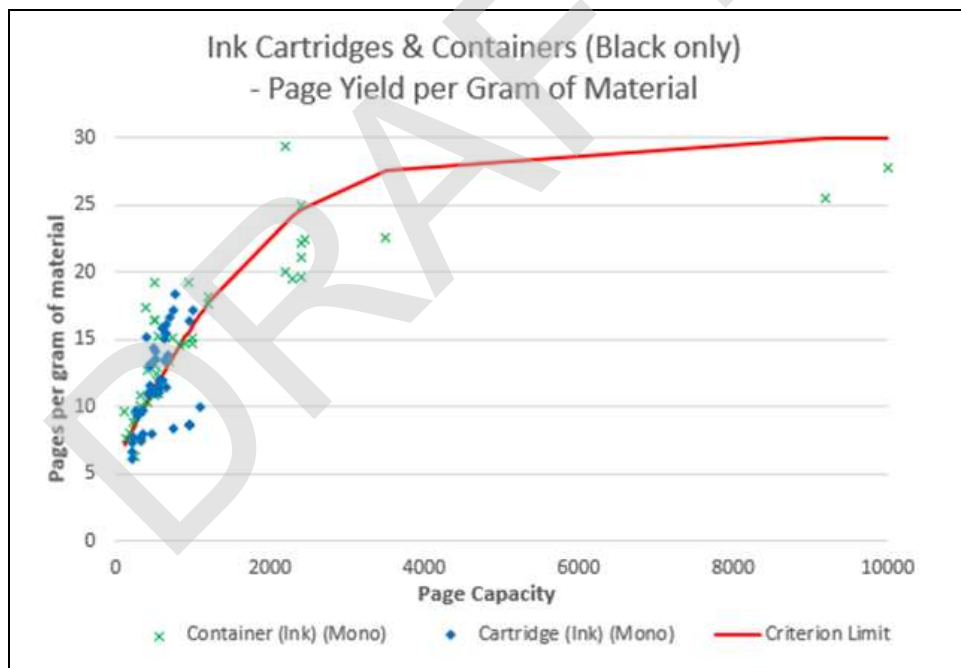


Figure 9.: Material efficiency of Colour Ink Cartridges and Containers (all)

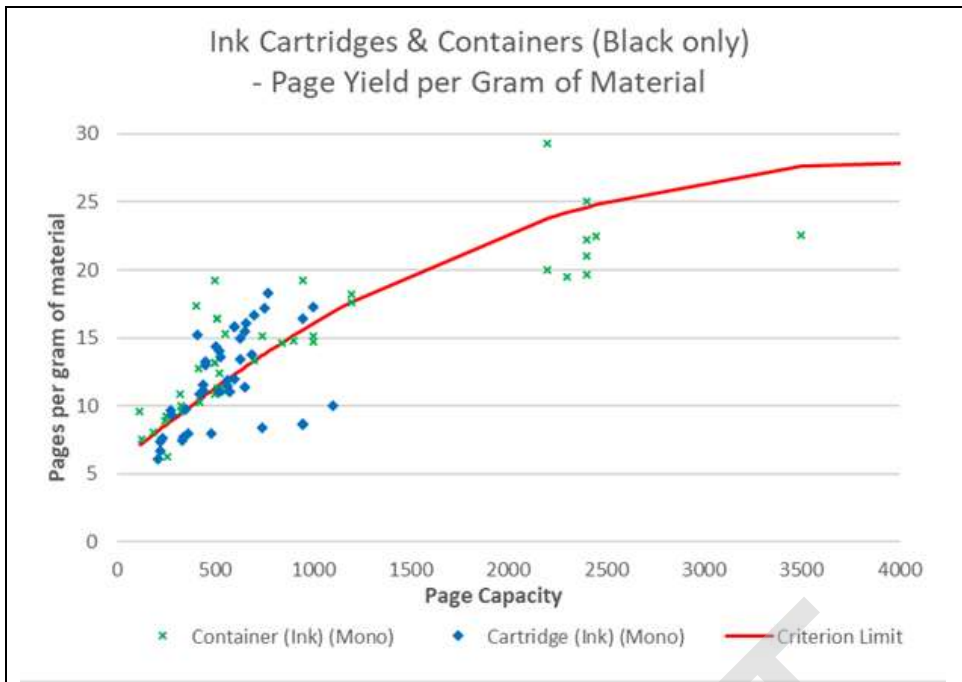


Figure 10.: Material efficiency of Black Ink Cartridges and Containers (below 10,000 page yield)

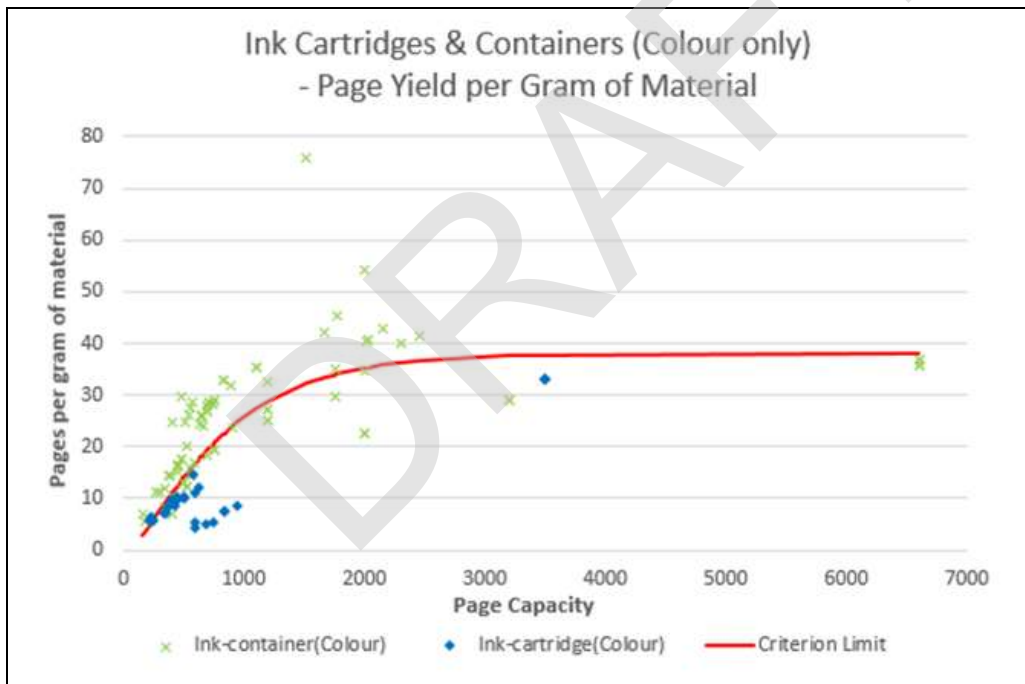


Figure 11.: Material efficiency of Colour Ink Cartridges and Containers (below 10,000 page yield)

Given the ability to measure both consumable mass and yield it is therefore possible to propose a consumable material efficiency criterion. Only a comprehensive criterion and award criterion is included for this issue, reflecting some of the complexities that procurers may face when using this innovative approach to consumable efficiency. Approximately 50% of the toner cartridges and containers in the dataset (571 products) met the proposed comprehensive criterion efficiency requirements. Analysis of the inkjet consumables revealed that 54% of the mono and 71% of the colour consumables in the dataset (194 products in total) met the proposed comprehensive criterion efficiency requirements. The consumables in the dataset were assumed to be representative of products on the market. As such, it is assumed that about the 50% of consumables on the market would be compliant with proposed comprehensive criterion.

Due to the relatively small material savings available from purchasing the most efficient inkjet consumables, the scope for the award criterion is limited to toner consumables.

The costs involved in manufacturers collecting cartridge/container weight data from either production or end-of-life operations is likely to be minimal.

Procuring authorities are unlikely to see significant costs implications from the provision of cartridge/container weight data. Some benefit could be achieved through a reduction in costs associated with disposal of waste materials. These waste disposal savings would be achieved where procuring authorities favour lower weight consumables and where they are responsible for the financial costs of consumable disposal.

Reduced number of materials

The overall lifecycle hotspots resulting from consumable composition are highly dependent on the type and quantity of materials used as well as their final end-of-life processing. Potential improvements in environmental impacts can be brought about by improving the level of information concerning consumable material composition. Better information would allow more informed decisions about choice of consumable.

The detailed composition of consumables is not covered in any other major environmental initiative. No metrics are required to support a declaration on material composition above 1g as no testing would be required. An award criterion has been included to reward consumables that include reduced numbers of material types. Reducing the number of material types within consumables is likely to result in higher recoverable material content during end of life processing.

The material content of cartridges and containers is not widely communicated in the marketplace. Some manufacturers do choose to communicate cartridge/container material content data, especially where designs are shown to minimise material content. For example, Kyocera provides information about their Ecosys consumables showing that they are manufactured using just five components consisting of two material types.⁷⁹

As with cartridge weight data, manufacturers have access to this information through either production or end-of-life processes.

There are unlikely to be significant costs associated with collating material content of consumables since the information is likely already held by manufacturers.

2.3.2.2 Background for the proposed verification

Consumable resource efficiency

Measuring the weight of a cartridge/container at empty could be easily verified using a standard set of scales. Page yield can be measured using a range of methodologies including the following:

- DIN Technical Report No. 155:2007-09⁸⁰
- ISO/IEC 19752:2004 for monochrome cartridges⁸¹
- ISO/IEC 19798:2007 for colour cartridges⁸²
- DIN 33870-1 for monochrome cartridges
- DIN 33870-2 for colour cartridges

Reduced number of materials

There are no standards which dictate how cartridge/container material content should be declared. Manufacturer self-declared cartridge/container material content could be verified through the physical inspection of the consumables. Procuring authorities may need to identify either internal or external technical expertise to assist in any such evaluations.

⁷⁹ Kyocera, Ecosys Technology, available from https://www.kyoceradocumentsolutions.eu/index/about/environment/green_technology/ecosys_technology.html

⁸⁰ DIN Technical Report 155:2007-09 Information technology -- Office machines: Requirements for remanufactured print engines with toner -- Monochrome/colour

⁸¹ ISO/IEC 19752:2004 Information technology -- Method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multi-function devices that contain printer components

⁸² ISO/IEC 19798:2007 Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components

Questions to stakeholders

Are you aware of similar initiative and best practices which could aid further development of this requirement?

2.3.3 Consumable hazardous substances content

For the coming AHWG meeting the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria																																				
TECHNICAL SPECIFICATIONS																																					
	<p>TS18 Consumable hazardous substances content Colourants used in consumable products must not contain any intentionally added substances that meet the classifications in the table below.</p> <table border="1"> <thead> <tr> <th>Hazard class</th> <th>Hazard category</th> <th>CLP-regulation (EC) No. 1272/2008</th> </tr> </thead> <tbody> <tr> <td>Carcinogenicity</td> <td>Carc. 1A, 1B</td> <td>H350 May cause cancer</td> </tr> <tr> <td>Carcinogenicity</td> <td>Carc. 1A, 1B</td> <td>H350i May cause cancer if inhaled</td> </tr> <tr> <td>Carcinogenicity</td> <td>Carc. 2</td> <td>H351 Suspected of causing cancer</td> </tr> <tr> <td>Germ cell mutagenicity</td> <td>Muta. 1A, 1B</td> <td>H340 May cause genetic damage</td> </tr> <tr> <td>Germ cell mutagenicity</td> <td>Muta. 2</td> <td>H341 Suspected of causing genetic defects</td> </tr> <tr> <td>Reproductive toxicity</td> <td>Repr. 1A, 1B</td> <td>H360 May damage fertility or the unborn child</td> </tr> <tr> <td>Reproductive toxicity</td> <td>Repr. 2</td> <td>H361 Suspected of damaging fertility or the unborn child</td> </tr> <tr> <td>Specific target organ toxicity (Single exposure)</td> <td>STOT SE 1</td> <td>H370 Causes damage to organs</td> </tr> <tr> <td>Specific target organ toxicity (Single exposure)</td> <td>STOT SE 2</td> <td>H371 May cause damage to organs</td> </tr> <tr> <td>Specific target organ toxicity (Repeated exposure)</td> <td>STOT RE 1</td> <td>H372 Causes damage to organs through prolonged or repeated exposure</td> </tr> <tr> <td>Specific target organ toxicity (Repeated exposure)</td> <td>STOT RE 2</td> <td>H373 May cause damage to organs through prolonged or repeated exposure</td> </tr> </tbody> </table> <p>Consumables must also meet the following hazardous</p>	Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008	Carcinogenicity	Carc. 1A, 1B	H350 May cause cancer	Carcinogenicity	Carc. 1A, 1B	H350i May cause cancer if inhaled	Carcinogenicity	Carc. 2	H351 Suspected of causing cancer	Germ cell mutagenicity	Muta. 1A, 1B	H340 May cause genetic damage	Germ cell mutagenicity	Muta. 2	H341 Suspected of causing genetic defects	Reproductive toxicity	Repr. 1A, 1B	H360 May damage fertility or the unborn child	Reproductive toxicity	Repr. 2	H361 Suspected of damaging fertility or the unborn child	Specific target organ toxicity (Single exposure)	STOT SE 1	H370 Causes damage to organs	Specific target organ toxicity (Single exposure)	STOT SE 2	H371 May cause damage to organs	Specific target organ toxicity (Repeated exposure)	STOT RE 1	H372 Causes damage to organs through prolonged or repeated exposure	Specific target organ toxicity (Repeated exposure)	STOT RE 2	H373 May cause damage to organs through prolonged or repeated exposure
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Core criteria	Comprehensive criteria
	<p>material requirements:</p> <ul style="list-style-type: none"> • Not contain any additional REACH Candidate List substances at a concentration of greater than 0.1% (by weight) • Toners and inks must not contain any intentionally added mercury, cadmium, lead, nickel or chromium-VI-compounds. High molecular weight complex nickel compounds used as colourants are exempted. • Toner and inks must not contain azo dyes (dyes or pigments) that can release carcinogenic aromatic amines listed in Regulation (EC) 1907/2006 (REACH Regulation), Annex XVII, Appendix 8. • No biocides must be added to toners or inks unless an active substance dossier as defined under the Biocidal Product Regulation (BPR, Regulation (EU) 528/2012) for preservatives for products during storage (product type 6) has been submitted. Substances must not be used where they have been rejected from inclusion in the list of approved substances for product type 6. • Photoconductor drums must not contain intentionally added selenium, lead, mercury or cadmium (or any of their compounds). <p>Verification: <i>The tenderer must provide documentation, which proves that the requirement has been met. Documentation should clearly prove that each aspect of the criterion has been met. Proof of compliance may consist of test reports from third parties or manufacturer own tests illustrating the lack of any of the excluded substances listed in the criterion.</i> <i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>

2.3.3.1 Background for the proposed criteria

Hazardous substances present in cartridges are usually not assessed in Life Cycle Assessments. Still during operation of the imaging equipment products hazardous substances can be emitted, in the form of dust, volatile organic chemicals (VOCs), ozone, benzene, particulate matter and semi-volatile organic compounds (SVOCs).

Information about the hazardous material content of cartridges/containers is available in several widely used sources of information and environmental initiatives including:

- Material Safety Data Sheets
- Blue Angel
- Ecma 370

The level of detail provided about hazardous material content of consumables varies across the main initiatives. The material safety data sheets and the Ecma 370 provide the least amount of information about consumable hazardous material content. The Ecma-370 declaration includes criteria relating to:

- cadmium content of photo conductors and inks/toners
- labelling of consumables and provision of Safety Data Sheet (SDS) where consumables are classified as hazardous or where they contain a substance(s) for which there are Community workplace exposure limits

The Nordic Swan and the Blue Angel initiatives require significantly more information about hazardous material content. The Blue Angel RAL-UZ 205 specification includes a broad range of substance restrictions including those listed in Table 24 and

Table 25.

Table 24.: Blue Angel exclusion of intentionally added substances in colourants

Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008
Carcinogenicity	Carc. 1A, 1B	H350 May cause cancer
Carcinogenicity	Carc. 1A, 1B	H350i May cause cancer if inhaled
Carcinogenicity	Carc. 2	H351 Suspected of causing cancer
Germ cell mutagenicity	Muta. 1A, 1B	H340 May cause genetic damage
Germ cell mutagenicity	Muta. 2	H341 Suspected of causing genetic defects
Reproductive toxicity	Repr. 1A, 1B	H360 May damage fertility or the unborn child
Reproductive toxicity	Repr. 2	H361 Suspected of damaging fertility or the unborn child

Substances of the so-called candidate list according to REACH Article 59. The version of the candidate list at the point of application applies.

Table 25.: Additional Blue Angel exclusion of intentionally added substances in colourants

Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008
Specific target organ toxicity Single exposure	STOT SE 1	H370 Causes damage to organs
Specific target organ toxicity Single exposure	STOT SE 2	H371 May cause damage to organs
Specific target organ toxicity Repeated exposure	STOT RE 1	H372 Causes damage to organs through prolonged or repeated exposure
Specific target organ toxicity Repeated exposure	STOT RE 2	H373 May cause damage to organs through prolonged or repeated exposure

In addition, the Blue Angel RAL-UZ 205 specification requires that no substances which contain mercury, cadmium, lead, nickel or chromium-VI-compounds are to be added to toners and inks. An exemption is included for high molecular weight complex nickel compounds used as colourants. There is also an exemption for production-related heavy metal (e.g. cobalt and nickel oxides and organotin compounds) contamination. Further restrictions are included for azo dyes (dyes or pigments) in toners and inks that can release carcinogenic aromatic amines as listed in Regulation (EC) 1907/2006 (REACH Regulation), Annex XVII, Appendix 8. Biocides which are not covered by an active substance dossier for preservatives for products during storage (product type 6) according to the Biocidal Product Regulation (BPR, Regulation (EU) 528/2012) are also not permitted under the Blue Angel rules. Furthermore, the Blue Angel RAL-UZ 205 specification also prohibits the inclusion of selenium, lead, mercury or cadmium (or any of their compounds) in photoconductor drums.

It is proposed to include a comprehensive technical specification on hazardous material content in consumables in the revised EU GPP based on the Blue Angel criteria. No core level for this technical specification has been suggested to reflect the fact that addressing the issue of consumable hazardous material content is ambitious.

There are likely to be some costs to manufacturers associated with identifying the hazardous material content of their consumables. Many of these costs can already be assigned to legal

requirements for the more basic hazardous material identifications. Some of the additional costs for more in-depth hazardous material content analysis has already been assigned to compliance with the Blue Angel and Nordic Swan eco-label criteria.

Disposal costs for hazardous material content can be higher than for non-hazardous material content. Costs for procuring authorities could therefore be reduced where they can avoid purchasing consumables that become classified as hazardous at their end-of-life.

2.3.3.2 Background for the proposed verification

Manufacturers will be able to verify compliance to the criteria through submission of documentation showing that relevant consumables have been tested to the appropriate test procedures, or equivalent, and meet the hazardous material content requirements (where relevant). This documentation could take the form of a manufacturer technical dossier or proven compliance to the Blue Angel RAL-UZ-205 specification.

At the time of writing, there were 1092 imaging equipment models registered with the latest version of the Blue Angel eco-label (RAL-UZ 205) and even higher numbers of models registered with the Nordic Swan eco-label.

Questions to stakeholders
<p>Do you agree with the proposed elements of the comprehensive criterion?</p> <p>Could you indicate other best practices regarding chemicals management, which could aid improving the proposal?</p> <p>Are there any special frontrunners initiatives, which could be supported through an award criterion?</p>

2.3.4 Reusability and manufacturability

The existing GPP specification on imaging equipment includes a requirement on consumable design for reuse. The current criterion states that devices and practices that would prevent reuse of toner and/or ink cartridge (i.e. anti-reutilisation devices/ practices) should not be present or applied in the imaging equipment.

In the revision it is proposed to have this special criteria set for consumables, therefore the focus of this criterion is on the design of cartridges and containers. The following is proposed:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
<p>TS19 Design for reusing/remanufacturing</p> <p>Cartridges or containers must not be purposefully designed to limit the ability to reuse/remanufacture. Examples of features which are deemed to limit the ability to remanufacture include, but are not limited to:</p> <ul style="list-style-type: none"> • Cartridges or containers are not covered by patents or licence agreements which include statements that seek to limit remanufacturing. <p>Verification: <i>The tenderer must provide documentation, which explicitly states that cartridges or containers are not purposefully designed to limit the ability to reuse/remanufacture.</i> <i>Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</i></p>	
AWARD CRITERIA	
	<p>AC10 Advanced design for reusing/remanufacturing</p> <p>A maximum of x points [to be specified] may be awarded to the tenderer which meets the following advanced consumable design criteria and end of life consideration practices:</p> <ul style="list-style-type: none"> • Design of any consumable product facilitates its reuse/remanufacture through technical features which encourage remanufacturing and unrestricted remanufacturing practices. <p>The technical features may include the following among others:</p> <ul style="list-style-type: none"> • Lack of a chip in the consumable which controls imaging functionality • Any installed chip includes functionality allowing a full reset to be initiated via either the imaging equipment controls or a network connected computer without the need for additional products • Consumable can be easily manually dismantled, where necessary with the use of universally available tools (e.g. openly available screw heads, pliers or tweezers), in order to replace worn parts and be refilled with toner material or ink. <p>Verification: <i>The tenderer must provide an annotated product schematic detailing which design features have been included to facilitate remanufacturing.</i></p>
AWARD CRITERIA	

Core criteria	Comprehensive criteria
	<p>AC11 Facilitating reuseability/remanufacturability</p> <p>A maximum of x points [to be specified] should be given where tenderers facilitate the reuse of consumables through the following actions:</p> <ul style="list-style-type: none"> • The ability for non-OEM organisations to purchase the rights, from an OEM, at a reasonable cost, to reprogramme a consumable chip in order that full imaging equipment functionality is supported • From the time a consumable is first placed on the EU market, replacement chips, which support full imaging equipment functionality, are available on the open market • Avoids placing any restrictions on the necessary remanufacturing steps needed to remanufacture any consumable <p>Verification: <i>The tenderer must provide a declaration that each of the requirements in the criterion have been met.</i></p>

2.3.4.1 Background for the proposed criteria

Relevant rationale regarding the use of remanufactured cartridges can be consulted additionally in chapter 2.2.6

In relation to the design aspects of the cartridges there are several different challenges limiting the ability to remanufacture imaging equipment consumables. These can be broken down into technical and non-technical barriers. The technical barriers include design features such as welded materials to limit separation and the inclusion on non-reprogrammable chips which facilitate communications between the consumable and the imaging equipment. Non-technical barriers include legal restrictions on remanufacturing such as patented remanufacturing processes and patents placed on parts needed to facilitate use after remanufacturing. Additional barriers stem from either real or perceived quality issues with remanufactured consumables and the lack of supporting criteria in public procurement contracts.

Including a criterion which limits negative influences on the ability to reuse/remanufacture consumables could result in more EU based remanufacturing.

Design for reuse is a criterion used in Blue Angel, EPEAT, the EU Voluntary Agreement, Nordic Swan and the Korean Ecolabel. In spite it is applied widely by environmental initiatives, the use of refilled and remanufactured cartridges is assumed not to constitute a significant part of the market. It has been estimated that, in the EU, remanufactured consumables account for 17% to 21% of the toner consumable market and 15% of the inkjet consumable market.⁸³

The most widely used criteria which address remanufacturing limits in consumables can be found in the EU Voluntary Agreement, EPEAT and Blue Angel. These criteria are shown in the tables below.

⁸³ *European Toner and Inkjet Remanufacturers Association, Key facts about the cartridge remanufacturing market, available from <https://www.etira.org/cartridge-remanufacturing/key-facts/>*

Table 26.: Consumable reuse ability criterion in other initiatives

Environmental initiative	Criterion Text
EU Voluntary Agreement	5.4.1 Any cartridge produced by or recommended by the OEM for use in the product must not be designed to prevent its reuse and recycling. The requirements of paragraph 5.4 must not be interpreted in such a way that would prevent or limit innovation, development or improvements in design or functionality of the products, cartridges, etc.
EPEAT	4.9.4.1 Required—Documentation that the cartridge or container is not designed to prevent its reuse and recycling Manufacturer must provide documentation that is readily available and provided to the purchaser stating that any cartridge or container produced by or recommended by the manufacturer for use in the product is not designed to prevent its reuse and recycling. Examples of documentation that will satisfy the requirements of this criterion and should be readily available and provided to the purchaser include, but are not limited to, an owner’s manual; set-up instructions; or information on the manufacturer’s Website, whereby a purchaser received a URL or hard/electronic copy of a product specification or a policy statement that is available on the manufacturer’s Website.
Blue Angel	3.1.1.3 Reusability of components and assemblies (5)Can modules for colourants be refurbished? Reuse must not be precluded by constructive measures

At least two major EU based environmental initiatives, Blue Angel and Nordic Swan, have also developed remanufactured cartridge/container specifications.^{84,85} Both specifications include criteria which seek to reduce the potential negative environmental impacts associated with remanufactured cartridges/containers. The requirements focus on hazardous material content, emissions and the actual remanufacturing process as opposed to including detailed requirements concerning cartridge design to prevent reuse. The Blue Angel RAL-171 and RAL-205 specifications (i.e. those that focus on the imaging equipment and not the specific remanufactured consumables specification) do include some detailed cartridge requirements. The specifications concentrate on encouraging cartridge design which facilitates recycling rather than reuse. However, the Blue Angel RAL-205 specification does state that consumables can be remanufactured and that reuse must not be precluded by constructive measures. No further details about what is meant by “constructive measures” is included in the Blue Angel specification. The EPEAT and EU Voluntary Agreement criteria also do not adequately identify what features of consumables could be deemed to inhibit remanufacturing.

The proposed EU GPP core criterion recognises the need to identify specific consumable design features which limit potential remanufacturing. The two main features which appear to most limit remanufacturing are non-reprogrammable chips and patents or licence agreements which cover remanufacturing processes. Developing a criterion that limited the use of non-reprogrammable chips would significantly impact product availability. Including a core criterion that limits the use of patents or licence agreements which constrain remanufacturing is ambitious but achievable.

⁸⁴ Blue Angel, Remanufactured Toner Modules (DE-UZ 177), available from <https://www.blauer-engel.de/en/products/paper-printing/tonermodule/aufbereitete-tonermodule>

⁸⁵ Nordic Swan, 2012, *Nordic Ecolabelling of Remanufactured OEM Toner Cartridges: Version 5.3- 15 June 2012 – 31 December 2019*, available from <http://www.nordic-ecolabel.org/product-groups/group/?productGroupCode=008>

The award criterion (AC7) seeks to provide additional rewards for manufacturers that employ enhanced design for reuse/remanufacture features in their consumables. The award criterion (AC8) is designed to reward manufacturers that actively facilitate the remanufacturing of consumables.

The purchasing of remanufactured cartridges/containers can result in significant costs savings for procuring authorities. As an example, the French Ministry of Education saw cost reductions of 30 % over two and half years as a result of purchasing remanufactured cartridges.⁸⁶ The costs savings from purchasing remanufactured cartridges can be significantly reduced, or eliminated, where the quality of remanufactured cartridges is poor. The use of poor quality remanufactured cartridges/containers can lead to increased costs associated with paper use, engineer visits and additional cartridges/containers. Requiring that remanufactured cartridges/containers meet established quality standards can help to reduce these potential impacts.

2.3.4.2 Background for the proposed verification

Verification of the core criterion could be problematic as many technical features which are included in cartridges, and to a lesser extent containers, may inadvertently limit remanufacturing but may also be required for function of the consumable. For example, many cartridges contain chips which communicate with the imaging equipment that they are installed within via direct contact or radio frequency. Cartridge chips tend to provide the following functions:

- Stores cartridge specific information including
- Model
- Page Yield
- Region
- Provides a means of authentication between the imaging equipment and cartridge
- Stores data on toner use as determined by the imaging equipment

Whilst these functions are important to assist the imaging equipment monitor toner or ink levels they also result in the need for chips to be either replaced or reprogrammed at cartridge end-of-life. The need for reprogramming or replacement occurs because the data written to the chip, by the imaging equipment, is permanent. As such, when the imaging equipment determines that the cartridge is empty this information is permanently written to the chip. Some chips are capable of being reprogrammed but most are not, therefore necessitating their replacement. If replacement chips are not available in the market place, then the ability to remanufacture is limited.

In the current core criterion proposal it is required from the tenderer to provide documentation, which explicitly states that cartridges or containers are not purposefully designed to limit the ability to remanufacture. In addition, in order to demonstrate compliance with the award criteria annotated product schematic detailing which design features have been included to facilitate remanufacturing, must be provided as well as a declaration stating that all the specific requirements have been met.

Questions to stakeholders

Are you aware of best practices in the area of reuse/remanufacture which should be promoted through GPP award criteria?

⁸⁶ UNEP, 2012, *The Impacts of Sustainable Public Procurement: Eight Illustrative Case Studies*, available from <http://www.unep.fr/scp/procurement/docsres/projectinfo/studyonimpactsofspp.pdf>

2.3.5 Consumable quality

For the coming AHWG meeting the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
TS20 Consumable Quality	
Any cartridges or containers described as remanufactured products must meet all requirements behind at least one widely recognised remanufactured cartridge/container quality standard.	
Verification:	
<i>The tenderer must provide documentation, which proves that cartridges or containers meet requirements of at least one recognised quality standard. Documentation may consist of a manufacturer declaration, a quality standard certificate of compliance, proof of compliance to an appropriate environmental scheme which includes the same reporting requirements or other alternative means of proof that provide the necessary information.</i>	

2.3.5.1 Background for the proposed criteria

Poor quality consumables can result in excessive waste generation as users dispose of them before their end of life. As such, the life-cycle hotspots of poor quality consumables are the same as those found for all consumables but magnified due to their shorter lifespan. Improving the quality of consumables therefore results in life cycle impacts that are shared over a greater period of time.

The quality of consumables is an important issue which is addressed in a number of different environmental initiatives like the Nordic Ecolabel⁸⁷ and Blue Angel⁸⁸. The relevant Nordic Swan and Blue Angel criteria are shown in the tables below.

⁸⁷ Available at: <http://www.nordic-ecolabel.org/product-groups/group/?productGroupCode=008>

⁸⁸ Available at: <https://www.blauer-engel.de/en/products/office/toner-modules/toner-modules>

Table 27.: Consumable quality criterion in other initiatives

Environmental initiative	Criterion Text
Nordic Swan	<p>R13 Production quality The annual average level of complaints relating to Nordic Swan Ecolabelled products must not exceed 1%. Only complaints relating to Nordic Ecolabelling criteria must be included in this calculation. The level of complaints must be calculated monthly for each type of Nordic Swan Ecolabelled toner cartridge. These complaint figures must be used actively to assure and raise the quality. If the level of complaints exceeds 1% for a month, a report must be submitted detailing the reasons and remedial actions. If the level of complaints exceeds 2%, contact Nordic Ecolabelling. Specification of complaints must include types of product-related complaint, how claims are dealt with, the follow-up of production and contact with Nordic Ecolabelling.</p> <p>R15 Print quality All toner cartridges must be tested to and comply with one of the following standards/test methods:</p> <ul style="list-style-type: none"> • DIN Technical Report No. 155:2007-09 • ASTM F:2036 for monochrome printouts • DIN 33870-1 for monochrome printouts • DIN 33870-2 for colour printouts <p>For applications and the extension of a licence, each Nordic Swan Ecolabelled toner cartridge type must be tested. During the licence period, print quality must be tested annually for 50% of the Nordic Swan Ecolabelled toner cartridge types. If the toner powder and/or the drum are changed during the licence period, the relevant cartridge type must be tested. Independent auditors (from a third-party company such as TÜV, STMC, Dekra, Intertek etc) must confirm that testing has been carried out in line with the requirement. The third-party company must confirm in writing that the auditor is familiar with the applied test method for print quality for remanufactured OEM toner cartridges, and provide a CV to support the expertise of the auditor in assessing how the applicant is applying the test methods used. Alternatively, the applicant may be certified under the STMC certification system. In both cases, documentation must show that the applicant has a valid declaration or STMC certificate. Specify the test standard and describe the test process in production.</p>
Blue Angel	<p>3.1.2 Remanufacturing The toner modules must be remanufactured in accordance with remanufacturing instructions detailing the remanufacturing process. The functionality of the toner modules must be ensured by tests and documented in accordance with DIN 33870-1 or DIN 33870-2. Remanufacturing must include and document the following process steps:</p> <ul style="list-style-type: none"> • Incoming goods inspection and marking of quality-relevant components, such as purchased parts and raw materials. • Inspection of empty and used toner modules. The applicant must ensure the use of empty modules which had been marketed by original equipment manufacturers (OEM) or remanufactured in accordance with DIN 33870-1 and -2.

	<p>Remanufacturing may include the following process steps:</p> <ul style="list-style-type: none"> • Disassembly of the toner module to the extent required for compliance with quality requirements; • Cleaning of the components intended for reuse; • Filling of the toner containers with the specified amount and type of toner as shown in the parts list; • Assembly of the specified components according to the parts list; • Testing of the functionality of each toner module on a printer; • Optical test of the finished toner module; • Marking of the toner modules with a serial or lot number to ensure the traceability of the remanufacturing process. <p>The remanufactured toner modules must contain a minimum of 75% (weight per-cent) recycled material, not counting the amount of toner filled in. Excluded are parts with a direct impact on the print quality (e.g. photoconductor drum).</p>
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The Nordic Swan states that the annual average level of complaints relating to Nordic Swan Ecolabelled production must not exceed 1%. In relation to consumables, the Nordic Swan states that the level of complaints must be calculated monthly for each type of Nordic Swan Ecolabelled toner cartridge and associated production line. Furthermore, the label requires that if the level of complaints exceeds 1% for a month, a report must be submitted detailing the reasons and remedial actions. The report needs to include the types of product-related complaints, how claims are dealt with, the follow-up of production and contact with Nordic Ecolabelling.

Blue Angel requires that the functionality of the toner modules must be ensured by tests and documented in accordance with DIN 33870-1 or DIN 33870-2.

Some metrics exist to support measurements on consumable quality. The following DIN standards refer to remanufactured cartridges:

- DIN 33870-1 Office machines - Requirements and tests for the preparation of refilled toner modules for electrophotographical printers, copiers and facsimile machines - Part 1: Monochrome
- DIN 33870-2 Office machines - Requirements and tests for the refilled toner modules for electrophotographic printers, copiers and facsimile machines - Part 2: 4 colour printers
- DIN 33871-1 Office machines, inkjet print heads and inkjet tanks for inkjet printers - Part 1: Preparation of refilled inkjet print heads and inkjet tanks for inkjet printer
- DIN 33871-2 Office machines, inkjet print heads and inkjet tanks for inkjet printers - Part 2: Requirements on compatible ink cartridges (4-colour system) and their characteristic features

They address the performance to ensure consistent print quality and the good functioning. They specify the properties and functions after remanufacturing as well as the tests to be carried out to prove consistent printing quality and malfunction-free operation across the entire period of use of the toner cartridges, inkjet print heads and ink tanks.

There are also an ISO/IEC standard that address image quality outputs from printers and copiers:

- ISO/IEC 24700:2005 Quality and performance of office equipment that contains reused components
- ISO/IEC 24790:2017 Information technology -- Office equipment -- Measurement of image quality attributes for hardcopy output -- Monochrome text and graphic images

ISO/IEC 24700:2004 specifies product characteristics for use in an original equipment manufacturer's or authorized third party's declaration of conformity to demonstrate that a marketed product that contains reused components performs equivalent to new, meeting

equivalent to new component specifications and performance criteria, and continues to meet all the safety and environmental criteria required by responsibly built products. It is relevant to marketed products whose manufacturing and recovery processes result in the reuse of components.⁸⁹

ISO/IEC 24790:2017 specifies device-independent image quality attributes, measurement methods and analytical procedures to describe the quality of output images from hardcopy devices. The standard is relevant for applicable to human-readable monochrome documents produced from printers and copiers.⁹⁰ It is unclear how often this standard is used to support quality attributes from office based imaging equipment.

It is proposed to include a criterion (the same core and comprehensive) to request that remanufactured consumables meet the requirements behind at least one quality standard. By allowing compliance to any recognized standard there is greater scope for suppliers to prove compliance. This would provide procuring authorities with further confidence that any remanufactured consumables purchased would not cause excessive costs through early failures. The use of quality standards amongst consumable remanufacturing organisations appears well established.

The costs associated with complying the DIN quality standards (DIN 33870 and DIN 33871) can be high but are often market access requirements due to customer concerns over cartridge/container quality. It costs approximately €3000 to test a cartridge against one of the DIN standards. As market access requirements the costs associated with compliance to these standards would unlikely to be increased by a EU GPP criterion. The costs involved in achieving ISO 9001 compliance vary significantly depending on various factors such as the size of the operation, starting level of quality within organisation and the number of processes to be covered.⁹¹

Procuring authorities could save a significant amount of costs by procuring higher quality cartridges. Cartridge failures can result in extra costs through issues such as increased paper use, engineer visits, extra replacement cartridges.

Ensuring that remanufactured cartridges/containers comply with high quality standards provide assurance that early failure rates will be reduced and print quality will meet customer requirements.

Quality information about cartridge/container available on the EU market is widely available. Large OEMs tend to rely on the fact that cartridges/containers are produced in facilities that meet ISO 9001 quality standards.^{92,93, 94} OEMs are also driven to ensure quality of consumables to assist in the sale of their imaging equipment hardware over the hardware from other manufacturers. The ISO 9001 quality management system can be used by any organization to demonstrate its ability to consistently provide a product that meets customer and applicable regulatory requirements.⁹⁵ Whilst the ISO 9001 standard does not apply to a finished product, it focuses on processes to help organisations achieve consistent results and to continually improve those processes.

ISO/IEC 29142 series was set to cover print quality performance standards.

Remanufacturers of cartridges/containers tend to rely on stated compliance to the DIN standards to verify quality levels have been met.

The Nordic Swan specification for remanufactured OEM Toner Cartridges includes a requirement that reference to the above DIN 33870 standards. There are 9221 remanufactured toner cartridges registered against this Nordic Swan specification in Sweden alone.⁹⁶

⁸⁹ ISO/IEC 24700:2005 Quality and performance of office equipment that contains reused component, available from <https://www.iso.org/standard/34909.html>

⁹⁰ ISO/IEC 24790:2017 Information technology -- Office equipment -- Measurement of image quality attributes for hardcopy output -- Monochrome text and graphic images, available from <https://www.iso.org/standard/69796.html?browse=tc>

⁹² Xerox, 2017, *Xerox-approved Quality and Reliability*, available from <https://www.xerox.com/printer-supplies/compatible-cartridges/toner-quality/enus.html>

⁹³ Canon, *ISO 9001 Quality Management System*, available from https://www.canon-europe.com/images/ISO9001_Nagahama_Canon_Inc_20140501_tcm13-28261.pdf

⁹⁴ Lexmark, 2010, *Genuine Lexmark Supplies, Service and Parts*, available from <http://media.lexmark.com/www/mdbnk/md/LXPRINT-2011060915341025.PDF>

⁹⁵

⁹⁶ <http://www.svanen.se/en/Find-products/Product-search/?categoryID=53>

Questions to stakeholders

Do you agree with the proposal of the criterion to be applicable for remanufactured cartridges only or do you consider that also OEM/new cartridges should be tested for quality?
 If a requirement for OEM, what would be the suitable verification procedure?

2.3.6 Consumables Take-back system

The existing GPP specification on imaging equipment does not place requirements on service providers to guarantee the provision of a take back system for consumables. For the coming AHWG meeting, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATION	
<p>TS21 Consumables Take-back A free take back system is provided for any cartridge or containers. The tenderer must provide containers to Contracting Authorities which are suitable for the accumulation of used cartridges and containers. The supplier may fulfil these obligations themselves or via a suitable third-party organisation.</p> <p>Verification: <i>The tenderer must provide documentation, which states that a free take back system will be provided for cartridges and containers. Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same requirement or other alternative means of proof that provide the necessary information.</i></p>	<p>TS21 Consumables Take-back A free take back system is provided for any consumable used in the imaging equipment. The tenderer must provide containers to Contracting Authorities which are suitable for the accumulation of used consumables and redundant parts including but not limited to: spent toner bottles, cartridges, waste toner, developer liquids/powder, replaceable units such as a fuser or developer, broken parts and packaging. The supplier may fulfil these obligations themselves or via a suitable third-party organisation.</p> <p>Verification: <i>The tenderer must provide documentation, which states that a free take back system will be provided for all consumables (excluding paper). Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same requirement or other alternative means of proof that provide the necessary information.</i></p>
	<p>CPC4 Reporting on reuse/recycle activities of consumables The contractor must provide records regarding the free take back system for used consumables aimed to channel such equipment for reuse of the equipment or its parts, or for material recycling with preference given to reuse.</p> <p>In particular the recording must detail:</p> <ul style="list-style-type: none"> - number of consumables taken back for free from the awarding authority, - number and type of parts, as appropriate, channelled for reuse, - number and type of parts, as appropriate, channelled for material recycling.

2.3.6.1 Background for the proposed criteria

The direct lifecycle environmental hotspots associated with consumable take back will largely be limited to transportation. Additional associated impacts stem from the consumable end-of-life processing. Improvement potential in consumable take-back would be limited to optimization of the collection process. The provision of a take-back scheme could contribute to improvement of environmental impacts associated with consumables manufacture due to better channeling of used consumables for remanufacturing and lower need to produce completely new products.

Most OEMs provide a take-back system for end-of-life consumables. The scope of the available take back programmes can vary in terms of geographical and product coverage.

Majority of larger remanufacturers also offer take back programmes either directly or via agreements with other organisations.

In addition, given that end-of-life cartridges/containers often have residual value, due to their potential remanufacturability and subsequent resale; other organisations operating in the marketplace also offer cartridge/container take back systems.

It has been estimated that 370 million inkjet cartridges are placed on the European market each year with a total value of around €9.4 billion.⁹⁷ The 370 million units comprise of 13% reused cartridges, 2% from non-OEM ‘clones and 85% OEM sources.⁵⁴ It has been further estimated that a total of 65 million inkjet cartridges are collected at end-of-life with 75% of these being remanufactured.⁵⁴

The European toner cartridge market is estimated to be worth €10.2 billion annually, comprising of 135 million cartridges.⁵⁴ Approximately 20% of these cartridges are remanufactured, 4% non-OEM clones and 76% OEM. It is estimated that around 20% of toner cartridges are collected at end-of-life with 82% of these being remanufactured.⁵⁴

The Blue Angel RAL-205, EPEAT and EU Voluntary Agreement all include requirements on consumable take back. The relevant criteria can be seen in the tables below.

Table 28.: Consumable Take Back criterion in other initiatives

Environmental initiatives	Criterion Text
Blue Angel	<p>3.1.2 Take-back of modules and containers for colourants</p> <p>The distributor commits to take back modules and containers for colourants which he supplied or recommended for use in the product documents in order to preferably channel such modules and containers to reuse or material recycling.</p> <p>This also applies to excess toner reservoirs. A third party (dealers or service agencies or companies engaged in the module reuse/recycling business) may be commissioned to perform this task. The formers are to be provided with instructions for proper handling of excess toners. Non-recyclable product parts must be properly disposed of.</p> <p>Modules and containers are to be taken back free of charge by the return facility named by the distributor to which products can be returned personally or by shipment (return facilities abroad are only permissible if the products can be sent there free of charge). The product documents and the information and data sheet must include detailed information on the return options.</p>
EPEAT	<p>4.9.3.1 Required—Provision of take-back and end-of-life management for cartridges and containers</p> <p>Manufacturer provides a take-back service for toner and ink cartridges and containers for end-of-life management for at least registered and</p>

⁹⁷ European Commission, 2017, Study on the implementation of product design requirements set out in Article 4 of the WEEE Directive The case of re-usability of printer cartridges. Final report

formerly registered products. In the case of containers, the manufacturer can advocate local recycling of toner and ink containers but offers take-back for such items if a local recycling option is not identified by the end user.

Landfill disposal and incineration are not used as part of the manufacturer take-back program for registered and formerly registered products. Waste-to-energy conversion may be used as an acceptable, but not preferable, disposition process when necessary for some materials. Secondary or residual materials resulting from waste-to-energy processes are exempt from this requirement.

Additionally, on an annual basis, manufacturer must provide on its Website the end-of-life management methods for all cartridges and containers that are collected through its take-back program. Manufacturers must report the following:

a) Total tonnage of cartridges and containers collected annually (in metric tons)

b) Total tonnage of materials sent to each of the following end-of-life management methods as a proportion of total collected weight of cartridges and containers

– Reuse of components

– Materials recycling

– Waste-to-energy

– Material in storage, pending processing

– Incineration (incineration cannot be used for registered or formerly registered products)

– Landfill (landfill cannot be used for registered or formerly registered products)

Manufacturers must declare the Website location of the preceding required information. Reporting must be done at the global level and/or at the region or country level and must be for all cartridges and containers collected through its take-back program for that geographic region.

The take-back requirement is applicable only in those regions or countries for which the manufacturer has products declared on the MSE Registry. Cartridges or containers not manufactured under the registered trademark of the manufacturer provider of the imaging equipment are exempt from this requirement.

Manufacturers that do not have any products on the Registry that use toner cartridges or containers can declare “Not applicable” for this criterion on the Registry.

4.9.3.2 Optional—Manufacturer recycles or reuses toner material collected through its cartridge and container take-back program Annual Corporate Declaration Criterion: In accordance with the priorities of the waste hierarchy, manufacturer ensures that toner material collected through its cartridge and container take-back program for at least registered and formerly registered products is reused or recycled and that none is disposed of through a landfill or incineration option. Disposal through waste to energy of up to 25% of the total weight of toner material collected through this program is allowed. More than 25% may be sent to waste to energy where applicable local, national, or regional regulations dictate that toner material, regardless of composition, must be sent to waste to energy. The manufacturer must provide on its Website information confirming conformance with this requirement.

The requirement is applicable only in those regions or countries for which the manufacturer has products declared on the MSE Registry. Cartridges or containers not manufactured under the registered

	<p>trademark of the manufacturer provider of the imaging equipment are exempt from this requirement.</p>
	<p>4.9.3.3 Optional—Manufacturer recycles or reuses plastics collected through its cartridge and container take-back program Annual Corporate Declaration Criterion: In accordance with the priorities of the waste hierarchy, manufacturer ensures that plastic collected through its cartridge and container take-back program for at least registered and formerly registered products is reused or recycled and that none is disposed of through a landfill or incineration option. Disposal through waste to energy of up to 25% of the total weight of plastic collected through this program is allowed. More than 25% may be sent to waste to energy where applicable local, national, or regional regulations dictate that plastic, regardless of composition, must be sent to waste to energy. The manufacturer must provide on its Website information confirming conformance with this requirement.</p> <p>The requirement is applicable only in those regions or countries for which the manufacturer has products declared on the MSE Registry. Cartridges or containers not manufactured under the registered trademark of the manufacturer provider of the imaging equipment are exempt from this requirement.</p>
EU Voluntary Agreement	<p>6.3 Cartridge disposal and treatment For new product models first placed on the EU market after 1 January 2012, Signatories must provide end-users with information on suitable end-of-life management options for used cartridges. This information may be communicated via a company website.</p>

The Blue Angel specification states that distributors must provide a free take back system (either themselves or via a third party) for consumables supplied for, or recommended for, use in the imaging equipment. The EPEAT specification states that manufacturers (or dedicated third parties) must provide a take-back service for toner and ink cartridges and containers for all EPEAT registered imaging equipment (past and present). EPEAT also requires that landfill disposal and incineration are not used as part of the manufacturer take-back program. The Voluntary Agreement states that manufacturers must provide information on potential end of life options for consumables but does not require that a take back system is provided.

The Blue Angel requirement was deemed most suitable for use in EU GPP as it dictated the provision of a free take back system. The EPEAT requirement that landfill and incineration are not used in any consumable take back system was deemed potentially too ambitious for the EU market due to potential use of incineration in some EU consumable take back systems.

No measurement metrics are needed to enforce compliance with this criterion. A proposed EU GPP selection criterion on consumable take back would ensure that used consumables can be collected effectively at their end of life.

OEMs tend to operate free take back systems, for a variety of business reasons, especially for larger users of cartridges and containers. Procuring authorities are unlikely to encounter any costs associated with end-of-life cartridges and containers. Procuring authorities may encounter additional costs associated with the disposal of other consumable items, such as fuser kits, transfer kits etc., that are not covered under some OEM take back systems.

2.3.6.2 Background for the proposed verification

The existence of a take back system can largely be verified via a manufacturer, or other organisation, declaration. Continual verification may be required where additional information about take-back activities is required.

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2.4 Criteria area 3 – Printing services

The scope of the revised EU GPP is proposed to be extended to criteria which can be used in the procurement of printing services. Service agreements where the price is linked to the quantity of printed pages. These agreements can include the supply of IE products and /or consumables, maintenance, end of life activities and optimisation of organisation’s document output.

2.4.1 Commitment to reuse and repair imaging equipment products

For the coming AHWG meeting the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
CONTRACT PERFORMANCE CLAUSE	
TS22(a) Commitment to reuse of imaging equipment	
Tenderers agree that fully functional imaging equipment owned by the purchasing authority and present at the procurer's premises must be retained for continued use rather than be replaced with new products. This requirement does apply if fewer overall imaging equipment models should be installed. Verification: <i>Tenderer must provide a declaration of compliance with this requirement.</i>	
TS22(b) Commitment to repair of imaging equipment	
Suppliers agree that imaging equipment that ceases to function during the contract will be brought back into full service using spare parts. This requirement does not extend to: <ul style="list-style-type: none"> • Imaging equipment that is no longer able to provide the necessary levels of functionality stipulated by the procuring authority, • Imaging equipment that cannot be feasible brought back into full service through the substitution of non-functioning spare parts either due to lack of available spare parts or due to excessive costs, • Situation where the procuring authority wishes to reduce the total number of imaging equipment models in service. Verification: <i>Tenderer must provide a declaration of compliance with this requirement.</i>	

2.4.1.1 Background for the proposed criteria

The reuse of imaging equipment results in most the lifecycle hotspots being shared over a greater period of time, thereby reducing impacts per unit of service. Energy use may become a larger factor where inefficient imaging equipment is used for longer periods of time. This issue will become less important as the efficiency gap between old and new products reduces over time (i.e. as efficiency improvements reduce over time).

There are no detailed criteria in major environmental initiatives which encourage purchasing or retention of used equipment. Some public bodies have begun to include these stipulations in contracts.⁹⁸ It is proposed that the EU GPP specification includes a criterion which commits new suppliers to retain fully functional imaging equipment already on the procuring authority's estate rather than install new products. The criterion also requires that suppliers utilise the available spare parts for imaging equipment and repair products where feasible. This requirement therefore serves to extend the lifetime of existing equipment on government estates and reduce the number of new products needed to provide government services.

Imaging equipment service providers may face additional costs, and a fall in revenue, from reusing existing imaging equipment within a customer premises. However, financial impacts associated with the reuse of existing equipment are highly variable depending on different service operator practices and their own cost models.

⁹⁸ Crown Commercial Service, 2016, “Multifunctional Devices, Managed Print and Content Services and Records and Information Management”, available from <https://ccs-agreements.cabinetoffice.gov.uk/contracts/rm3781>

Encouraging the reuse of existing imaging equipment may provide financial savings for procuring authorities as has been achieved with reuse of computers⁹⁹ but this will depend on which costs are assigned to them in a managed print service. For example, if procuring authorities only pay per printed page, with no costs associated for the installation of imaging equipment on their sites, then financial savings may be minimal for the procuring authority. Alternatively, procuring authorities which pay for each imaging equipment model installed on site are more likely to achieve financial savings by encouraging the reuse of equipment. There is an increasing awareness in the imaging equipment service provider industry that the complete replacement of existing imaging equipment within an organisation is not always necessary at the start of a new contract. Instead, some service providers integrate existing imaging equipment in customers' premises into their new service provision. That is, imaging equipment that is already in use within customer's premises may be reused where the products are still fully operational.

2.4.1.2 Background for the proposed verification

A supplier declaration that they will commit to reuse or repair of equipment is likely to be sufficient for verification purposes but continued evaluation of the supplier during the course of the contract will also be necessary.

2.4.2 Supply of imaging equipment

The goal of these criteria is to promote the use of environmental preferable equipment, when those are supplied within a printing service.

For the coming AHWG, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATION	TECHNICAL SPECIFICATION
<p><i>(when supply of imaging equipment is included in the printing service contract)</i></p> <p>TS23 Supply of imaging equipment meeting the EU GPP criteria</p> <p>Imaging equipment offered by the tenderer in the frame of provision of printing services must comply with Core Technical Specifications included in the EU GPP Criteria Area 1 Imaging equipment.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>	<p><i>(when supply of imaging equipment is included in the printing service contract)</i></p> <p>TS23 Supply of imaging equipment meeting the EU GPP criteria</p> <p>Imaging equipment offered by the tenderer in the frame of provision of printing services must comply with Comprehensive Technical Specifications included in the EU GPP Criteria Area 1 Imaging equipment.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>

⁹⁹ http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue57_Case_Study115_Durham.pdf

2.4.3 Supply of paper and imaging equipment consumables

The goal of these criteria is to promote the use of environmental preferable paper and imaging equipment consumables, when those are supplied within a printing service. For the coming AHWG, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATION	
<p><i>(when copy and graphic paper supply is included in the printing service)</i></p> <p>TS24(a) Supply of copy and graphic paper meeting the EU GPP criteria</p> <p>Copy and graphic paper offered by the tenderer in the frame provision of the printing service must comply with Core Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper¹⁰⁰.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>	<p><i>(when copy and graphic paper supply is included in the printing service)</i></p> <p>TS24(a) Supply of copy and graphic paper meeting the EU GPP criteria</p> <p>Copy and graphic paper offered by the tenderer in the frame provision of the printing service must comply with Comprehensive Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper⁶⁵.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above</i></p>
<p><i>(when cartridges supply is included in the printing service)</i></p> <p>TS24(b) Supply of cartridges meeting the EU GPP criteria</p> <p>Cartridges offered by the tenderer in the frame of provision of the printing service must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above</i></p>	<p><i>(when cartridges supply is included in the printing service)</i></p> <p>TS24(b) Supply of cartridges meeting the EU GPP criteria</p> <p>Cartridges offered by the tenderer in the frame of provision of the printing service must comply with Comprehensive Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above</i></p>
AWARD CRITERIA	
Core criteria	Comprehensive criteria
<p><i>(when cartridges supply is included in the printing service)</i></p> <p>AC12 Supply of reused/remanufactured cartridges</p> <p>Points must be awarded for the commitment to provide the highest percentage (share) of reused/remanufactured cartridges must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>	<p><i>(when cartridges supply is included in the printing service)</i></p> <p>AC12 Provision of reused/remanufactured cartridges</p> <p>Points must be awarded for the commitment to provide the highest percentage of reused/remanufactured cartridges must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables.</p> <p>Verification: <i>The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.</i></p>
CONTRACT PERFORMANCE CLAUSES	
Core criteria	Comprehensive criteria

¹⁰⁰ Available at: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

Core criteria	Comprehensive criteria
<p><i>(when cartridges or copy and graphic paper supply is included in the printing service)</i></p> <p>CPC5 Reporting on supplied consumables</p> <p>The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for:</p> <ul style="list-style-type: none"> - copy and graphic paper meeting the EU GPP criteria (TS14 (a)), - cartridges meeting the EU GPP criteria (TS14 (b)), - reused/remanufactured cartridges (AC5). 	<p><i>(when cartridges or copy and graphic paper supply is included in the printing service)</i></p> <p>CPC5 Reporting on supplied consumables</p> <p>The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for:</p> <ul style="list-style-type: none"> - copy and graphic paper meeting the EU GPP criteria (TS14 (a)), - cartridges meeting the EU GPP criteria (TS14(b)), - reused/remanufactured cartridges (AC5).

2.4.3.1 Background for the proposed criteria and verification

See explanation in chapter 2.2.16

2.4.4 Provision of consumable use information

For the first proposal, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATION	
<p>CPC6 Provision of consumable use information</p> <p>The printing service provision must include dissemination of detailed consumable usage statistics to the procuring authority, on a regular basis, or when requested to do so by the procuring authority, during the life of the contract. Consumable usage information must include, as appropriate, among the below listed:</p> <ul style="list-style-type: none"> • Paper usage per each imaging equipment model within the fleet to include: <ul style="list-style-type: none"> – Number of sheets/rolls of paper, including size (i.e. A4, A3, etc.), – Identification of paper type (i.e. recycled, virgin, grammage, etc.) • Number of cartridges or containers used within each imaging equipment model within the fleet, • Yield per cartridge/container/drum unit per imaging equipment model in fleet, • Amount of other consumables used within each imaging equipment model within the fleet. <p>Verification:</p> <p><i>The tenderer must provide documentation which contains the listed information.</i></p>	

2.4.4.1 Background for the proposed criteria

There are no direct life cycle environmental hotspots associated with the provision of consumable use information. The information itself may help to reduce the environmental impacts of imaging equipment consumables through improved management practices.

Some public bodies require that the use of consumables within their organizations is monitored by suppliers.¹⁰¹ No measurement metrics are needed to report on this criterion given that values are absolute figures. The inclusion of the requirement on the provision of consumable use information will assist procuring authorities to better manage environmental impacts. For example, procuring authorities would be provided sufficient information to be able to identify

¹⁰¹ European Commission, 2015, GPP in Practice Issue 54, Resource efficient print and copy management solutions Consip (Italy), available from http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue54_Case_Study110_italy_print_management.pdf

where high levels of impacts were occurring on their estates. There are no detailed criteria in major environmental initiatives covering this area for printing services.

The provision of consumable use information is unlikely to place additional costs on imaging equipment service providers as much of the required data is already collected.

The ability to understand consumable usage patterns over an estate provides significant costs savings opportunities for procuring authorities.

Imaging equipment service providers often provide detailed consumable usage information to customers as it is frequently needed for billing purposes.

2.4.5 Provision of environmental information during service contract

For the first proposal, the following criteria are proposed:

Core criteria	Comprehensive criteria
CONTRACT PERFORMANCE CLAUSE	
	<p>CPC7 Provision of environmental information during service contract</p> <p>The service provision must include, on request by the contracting authority, supply of the following information during the life of the contract:</p> <p>Details concerning the management of the imaging equipment and associated components at end of life. This must include:</p> <ul style="list-style-type: none"> • Initial destination of products at end of life • Confirmation that the end of life service providers are certified on an ongoing basis to a recycling standard by independent certification bodies • Number of products sent for: <ul style="list-style-type: none"> • Reuse • Remanufacture then reuse • Recycling • Other end of life options <p>Verification:</p> <p><i>The tenderer must provide documentation, which confirms that the required environmental information will be supplied, on request by the contracting authority, throughout the duration of the contract.</i></p>

2.4.5.1 Background for the proposed criteria

The provision of environmental information about impacts associated with a contract can help procuring authorities mitigate these impacts. For example, procuring authorities may seek to set targets for reduction of impacts from certain activities (e.g. energy use) but need to first identify current state of play (i.e. set a benchmark). Without understanding the current situation it is difficult for public bodies to develop savings targets.

Some public bodies require that suppliers monitor and report on environmental impacts throughout the duration of an imaging equipment service provision. Suppliers would need to identify their own metrics for measuring and reporting the required information. It is proposed that a new EU GPP contract performance clause on the provision of environmental information during imaging equipment service contracts is developed. This criterion will help procuring authorities to better manage the environmental impacts from their imaging equipment services.

There are no detailed criteria in major environmental initiatives covering this area for printing services.

The collection and distribution of the environmental information listed in the proposed criterion is unlikely to result in any significant costs to a service provider.

Procuring authorities could see savings as a result of using the information to reduce electricity running costs and costs associated with waste management.

It is unclear how many imaging equipment service providers operating within the EU market currently provide detailed environmental information during the provision of their services.

Provision of information, such as energy use and product end of life statistics, during a service contract can help procuring authorities to better manage the environmental impacts of imaging equipment used on their sites.

2.4.5.2 Possibilities for verification

A supplier declaration that they will provide the required environmental information during the life of the service contract is likely to be sufficient for verification purposes. Continual assessment of the service provider against this criterion would be required within the contract performance clauses.

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2.5 Horizontal Criteria

Criteria under this section can be used to all criteria areas (supply/lease of imaging equipment products, supply of consumables and procurement of printing services).

2.5.1 Tenderer Environmental Management activities

For the coming AHWG meeting, the following selection criterion is proposed for discussion:

Core criteria	Comprehensive criteria
SELECTION CRITERIA	
SC2 Tenderer environmental management activities	
The tenderer must prove its commitment to reduce the environmental impact associated to their activities.	
Verification:	
<i>The tenderer must provide the document/reports of the following operational procedures which constitute the basis of an Environmental Management System:</i>	
<ul style="list-style-type: none">• <i>identification of the most relevant environmental aspects relevant to their activities;</i>• <i>a precise action programme establishing targets on environmental performance regarding the identified environmental aspects</i>• <i>an internal evaluation process allowing verifying at least yearly organisation performances with regard to the targets defined in the action program and setting correction actions if needed.</i>	
<i>Tenderer registered under EMAS or certified according to ISO 14001 must be deemed to comply. In this case, ISO 14001 certificate or EMAS registration must be provided as a means of proof.</i>	

2.5.1.1 Background for the proposed criteria

Ensuring that tenderers effectively identify, measure, evaluate and then reduce impacts stemming from their activities help to reduce overall environmental impacts associated with imaging equipment

There are no known environmental initiatives for imaging equipment which cover such environmental management activities. However, requirements regarding tenderers' abilities to manage their environmental impacts exist in other EU GPP criteria¹⁰² and it is proposed to include a new selection criterion in this revised proposal criteria for imaging equipment.

This proposal aims to ensure that the tenderers commit to reduce the environmental impacts associated to their activities. Having an environmental management system (EMS) implemented is one of systematic ways to help organisations in minimizing the environmental impacts associated with their activities.

The proposed selection criterion is horizontal and can be used in all procurement routes covered by this GPP (supply/lease of imaging equipment products, supply of consumables and procurement of printing services).

¹⁰² For instance in the currently revised criteria for Transport (for more information about them see the project's website: <http://susproc.jrc.ec.europa.eu/Transport/documents.html>) and the currently under revision EU GPP criteria for Food and catering services (for more information see http://susproc.jrc.ec.europa.eu/Food_Catering/stakeholders.html).

2.5.1.2 Background for the proposed verification

The costs borne by organizations in attempting to reduce the environmental impacts of their activities will be highly variable. Much will depend on the extent and degree to which they attempt to reduce their environmental impacts.

Although EMS is a very useful tool to develop systematic improvement processes, the EMAS/ISO certification might be particularly difficult to be achieved by SMEs which may lead to their exclusion from the tender process. It is therefore proposed that verification is based on plan-do-check-act (PDCA) principles, which constitute the basis of the management systems:

- Plan- identification of the most relevant environmental aspects relevant to their activities and setting a precise action plan
- Do - Implementation of the action plan
- Check- evaluation of the performance with regard to the targets
- Act- setting correction actions

Questions to stakeholders

Is this requirement relevant for all types of tenderers (suppliers, manufacturers, service providers)?

2.5.2 Guaranteed provision of consumables and spare parts during contract

For the coming AHWG meeting, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATION	
<i>(applicable for tenders where procurement of consumables is included)</i>	
TS25(a) Guaranteed provision of consumables during contract	
The tendered must ensure the provision of consumables for any imaging equipment that is retained for use for the duration of the contract.	
Verification:	
<i>The tenderer must provide a declaration of compliance with this criterion.</i>	
<i>(applicable for tenders where procurement of repair service is included)</i>	
TS25(b) Guaranteed provision of spare parts during contract	
The service must include the provision of spare parts for any existing installed imaging equipment that is retained for use for the duration of the contract.	
Verification:	
<i>The tenderer must provide documentation, which confirms that spare parts for any existing installed imaging equipment that is retained for use will be provided for the duration of the contract.</i>	

2.5.2.1 Background for the proposed criteria

The guaranteed provision of consumables and spare parts for existing equipment in stock for the duration of a contract is not addressed in the major environmental initiatives. However, the ability to secure them for the life of a contract would facilitate continued use of existing imaging equipment, resulting in lower environmental impacts

Other initiatives such as Blue Angel and EPEAT include requirements that manufacturers must provide spare parts these requirements do not cover service providers.

Guaranteeing the provision of consumables and spare parts for reused imaging equipment during the life of a contract may result in some additional costs for service providers, while

procuring authorities are likely to see savings from the ability to continue to use existing imaging equipment through the life of a contract. The extent of any savings will be dependent on the structure of the imaging equipment service provision though.

It is proposed that new EU GPP requirements guaranteeing the availability of consumables and spare parts (see section 0) for older equipment would help to extend the life of products and reduce overall impacts from an imaging equipment fleet.

2.5.2.2 Background for the proposed verification

A supplier declaration that they will guarantee the provision of consumables during a contract will be required for verification purposes.

Questions to stakeholders

It is unclear how at present any service providers guarantee the provision of consumables and spare parts for imaging equipment present at procurers' premises. This will be discussed further in the AHWG meeting.

2.5.3 User instructions for green performance management

For the coming AHWG meeting, the following criteria are proposed for discussion:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATION	
<p>TS26 User instructions for green performance management</p> <p>A guide must be provided with instructions on how to maximise the environmental performance of the particular imaging equipment and the use of related consumables in written form as a specific part of the user manual and/or in digital form accessible via the manufacturers website. It should include at least the following elements: paper management functions, energy efficiency functions, more efficient use and better end-of-life management for consumables.</p> <p>Verification: Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Other appropriate means of proof will also be accepted, such as written evidence from the manufacturer that the above clause will be met.</p>	

2.5.3.1 Background for the proposed criteria

Criteria related to information for the user are very important as they raise the user environmental awareness and subsequent behaviour. It happens very often that the product has functions which could reduce significantly the overall environmental impacts of the device during its use; the user however is not always aware of the "green" features of the device and therefore may not apply them. The existing GPP criteria in force requires that a guide must be provided with instructions on how to maximise the environmental performance of the particular imaging equipment (covering paper management functions, energy efficiency functions and of any consumables such as ink and/or toner cartridges). It can be provided in written form as a specific part of the user manual and/or in digital form accessible via the manufacturer's website. It is suggested for this revision to keep current formulation and extend the criteria to cover also consumables.

2.5.3.2 Background for the proposed verification

Existing verification text is proposed to be kept. User instructions for green performance management requirements the certification of being Type I product could be used as a mean of proof. Other means of proof should also be accepted.

Questions to stakeholders

Do you consider that a face-to-face training for green use of imaging equipment could be proposed as a requirement?

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